Mead
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Northern Colorado
Regional Airport

NOCO

MASTER PLAN STUDY

November 2020

FINAL REPORT

Mead & Hunt

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Northern Colorado Regional Airport

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EXECUTIVE SUMMARY

The Cities of Fort Collins and Loveland are located along the Front Range of the Rocky Mountains, east of Rocky Mountain National Park and the Arapaho & Roosevelt National Forests, approximately 50 miles north of Denver along Interstate 25. Jointly owned and operated by the Cities of Fort Collins and Loveland, Northern Colorado Regional Airport (FNL or Airport) is a vital asset to a major commercial center in the Fort Collins/Loveland area and a key component of the region's growing high-tech, innovation-focused economy.

The Northern Colorado Regional Airport Master Plan was prepared to guide the physical development of Airport property to accommodate existing and anticipated aviation activity. In addition, other factors relating to the Airport and its environs were evaluated, such as surrounding land use, environmental impacts, and financial planning.

As a general aviation and commercial service airport, FNL is a major economic catalyst in the northern Colorado region. In addition to the many aviation-related assets, the Airport also provides benefits to local businesses and industries, promotes tourism, and supports business development and expansion throughout northern Colorado. The 2020 Colorado Aviation Economic Impact Study by the Colorado Department of Transportation (CDOT) estimated the total impact in 2018 of Northern Colorado Regional Airport at 1,072 jobs with a total payroll of $52 Million and a total annual economic output of $161 Million.

The Airport's current Master Plan was completed in 2007. Since that time, there have been numerous changes in aviation at the local, regional, and national levels. For instance, Allegiant discontinued its commercial service at FNL in 2012. In 2017, FNL was selected as the test site for the Colorado Remote Tower Project. The COVID-19 pandemic, which began in 2020, caused a great amount of disruption and uncertainty throughout the aviation industry. The pandemic prompted the passage of the Coronavirus Aid, Relief, and Economic Security (CARES) Act, which included $10 billion of economic relief for U.S. airports, including FNL, for the prevention of, preparation for, and response to the pandemic. This Master Plan serves as a reevaluation of the existing and projected aviation needs at FNL and provides the framework for the physical development at the Airport over the next 20 years. Most importantly, it identifies and reserves space for the continued improvement needs of the Airport in a manner that is financially feasible and appropriate in consideration of its surroundings. This is not a decision document, but rather a planning tool that indicates how the Airport's land might best be used to meet anticipated future demand and needs.

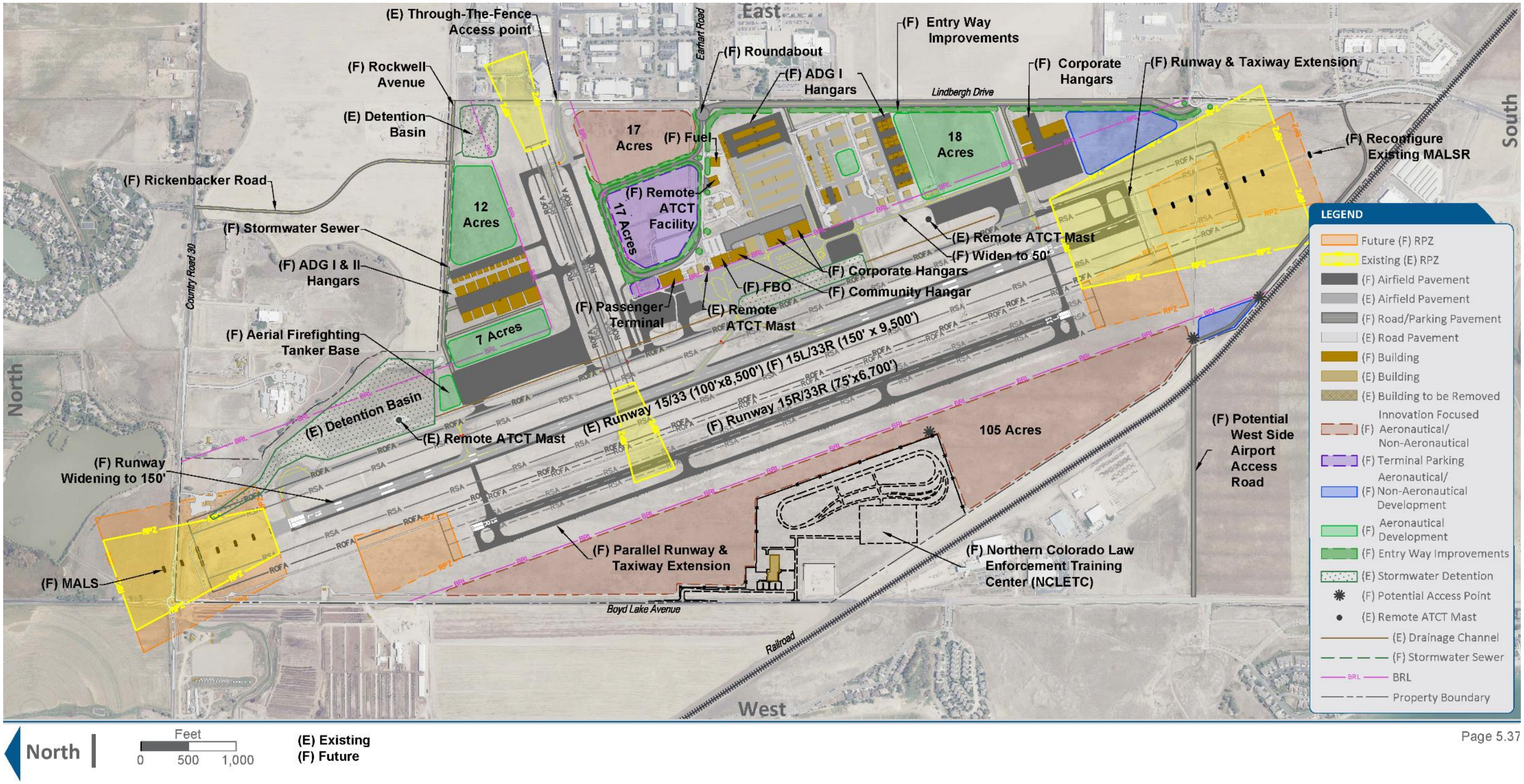
The long-term development plan for the Airport is described in the following sections and is graphically depicted in the Conceptual Development Plan (CDP) shown in **Figure E-1**.

Key Components of the Master Plan Study

Key issues and considerations addressed in this Master Plan include:

- The incorporation of the strategic plan goals, objectives and initiatives outlined in the Airport's 2018 Strategic Plan.
- The anticipated return of commercial service in relation to aviation forecasts and future facility needs, including widening and extending Runway 15/33, a new commercial passenger terminal building, and improved vehicle access and parking.
- The selection of FNL as the test facility for the Colorado Remote Tower Project.
- The integration of compatible land use planning and the development of an Airport Influence Area Plan.
- The preservation of space to accommodate a future parallel runway as well as additional aviation and non-aviation related facilities to support the strategic objectives of the Airport.
- The flexibility to adapt to evolving conditions and needs.

Figure E-1: Conceptual Development Plan



Study Findings

Airport Influence Area Study Summary

Gruen Gruen + Associates (GG+A), a real estate firm specializing in market analysis, compiled an economic evaluation of the FNL Airport Influence Area (AIA). This study effort was conducted to comprehensively analyze the existing economic and development conditions within the AIA and to provide a framework to be used by the Cities of Loveland and Fort Collins, and Larimer County in their future land use decision making processes. The recommendations of this study are intended to be used to develop a framework for future compatible land use and infrastructure planning on and around the Airport.

Since much of this effort was not eligible for federal grant funding under the FAA Airport Improvement Program (AIP), it was completed separately from the other chapters in this Master Plan Update. Key recommendations of the AIA Study include:

- Develop implementation plan to lay the groundwork for a successful research and technology park or innovation district within the AIA.
- Encourage a long-term competitive functioning land market in the AIA.
- Proactively plan for a thriving mixed-use environment compatible with Airport operations.
- Maintain vigilance in protecting Airport from encroachment/ incompatible land uses.
- Encourage Larimer County and City of Fort Collins to establish requirements within the AIA that are similar to City of Loveland's overlay zoning ordinance (via zoning or similar measure).
- Adopt additional land use compatibility measures to avoid problems with commercial air service development in the future (Aviation Activity Notices, requirements for new/amended plats).
- Establish uniform procedures (across jurisdictions) for Airport Director/Commissioners to provide review of all development proposals, land use applications, and proposed zoning changes in the AIA.

Aviation Activity Forecasts Summary

In order to provide a defined rationale for necessary improvements needed at FNL as demand increases, aviation activity forecasts were developed using approaches outlined in FAA Advisory Circular (AC) 150/5070-6B - Airport Master Plans. The aviation activity forecasts, which are detailed in **Chapter 3**, were developed for the 20-year planning period (2018-2038) and based on historic activity, industry trends, local socioeconomic data, and considered the changes that have occurred at FNL since the completion of previous planning studies. Four passenger enplanement forecast scenarios were developed and evaluated. Because of the remote tower Project at FNL, three of the scenarios assumed that commercial service would resume at FNL (presumably sometime in 2020 following the introduction of air traffic control as part of the remote tower project). The Medium grown scenario, which is based on a 3.25% Annual Compound Growth Rate (ACGR) and the return of commercial service to two destinations (Las Vegas and Phoenix-Mesa), was selected as the preferred forecast for several reasons. Given Allegiant's successful history in providing commercial service routes to Las Vegas and Phoenix-Mesa have been successful, and it is reasonable to believe they could be successful again once their requirement for air traffic control at the Airport has been met.

Over the next 20 years, the types of aircraft projected to operate at FNL are the same as those that presently operate at the Airport, including small single engine prop-aircraft, larger business jet aircraft, and narrow body commercial passenger service aircraft, such A320. Overall, total aircraft operations, passenger enplanements, and based aircraft at FNL are anticipated to increase over the course of the 20-year planning period, as shown in **Table E-1**. The number of annual aircraft operations (landings and takeoffs) at the Airport is forecast to increase from just approximately 94,900 in 2018 to just over 142,000 by the end of the 20-year planning period. As shown below, it's anticipated that passenger enplanements will grow significantly during the planning period. The number of based aircraft at the Airport is expected to increase from 256 in 2018 to 325 in 20 years.

Table E-1: Aviation Activity Forecasts Summary, 2018-2038

Aviation Activity	2018	2023	2028	2033	2038
OPERATIONS					
Commercial Service	50	590	692	812	954
General Aviation	94,650	108,504	118,452	129,313	141,170
Military	200	200	200	200	200
TOTAL OPERATIONS	**94,900**	**109,294**	**119,344**	**130,325**	**142,324**
PASSENGER ENPLANEMENTS	**3,388**	**48,431**	**56,829**	**66,684**	**78,248**
BASED AIRCRAFT	**256**	**275**	**291**	**308**	**325**

SOURCE: Mead & Hunt, 2018.

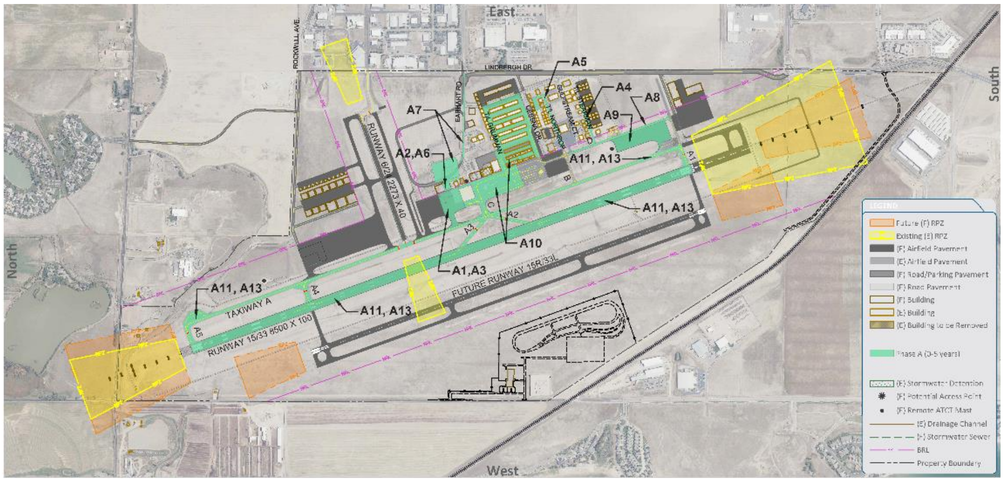
Development Program Summary

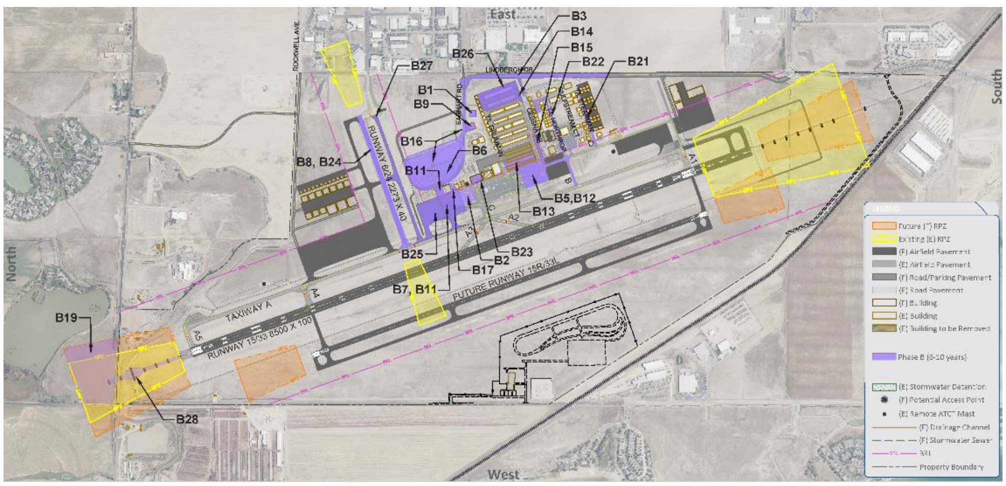
The Capital Improvement Program (CIP) presented in **Chapter 8** outlines the long-term development program for FNL and includes planning level cost estimates for each project. These airport improvement projects are addressed in three phases to best incorporate funding mechanisms over time:

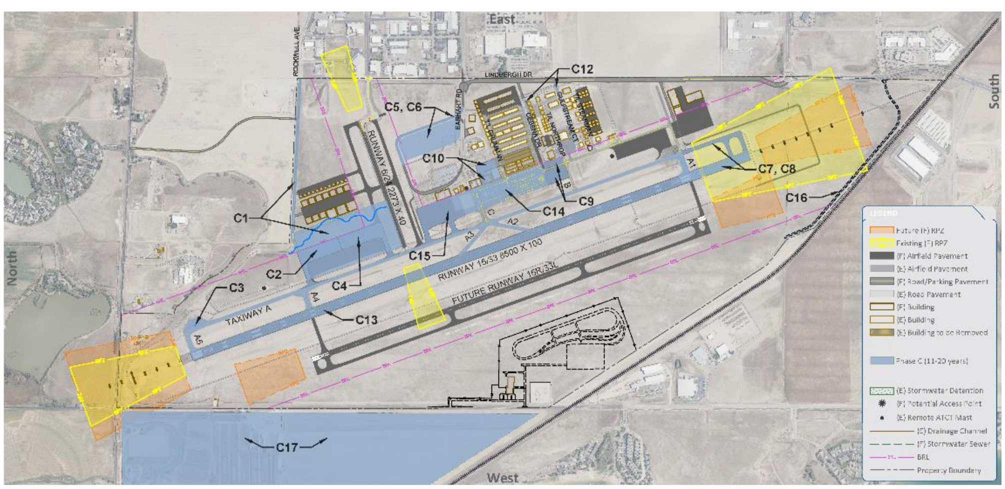
- Phase A – Short-Term (0-5 years)
- Phase B – Mid-Term (6-10 years)
- Phase C – Long-Term (11-20 years)

The CIP is a critical planning tool for the Federal Aviation Administration (FAA), the Colorado Department of Transportation (CDOT) Division of Aeronautics, and the local sponsors (the Cities of Fort Collins and Loveland). From the FAA's perspective (keeping in mind that the FAA funded roughly 90% of the cost to prepare the Master Plan), the CIP is used by the agency when establishing priorities and budgeting expenditures at this Airport when compared with the needs of other airports. From the local sponsor's perspective, the CIP identifies improvement needs and allows budgeting/financial decisions to be made with a comprehensive understanding of financial implications. The project included in Phases A, B and C are illustrated on the following three figures entitled Phasing Plans (see larger scale versions in **Chapter 8 - Development Program and Needs Assessment**).

Figures E-3, E-4 and E-5: Phasing Plans A, B, and C







Financial Implementation Analysis

The primary objective of the Financial Implementation Analysis, which is presented in **Chapter 9** of the Master Plan, is to evaluate the Airport's capability to fund the Development Program and to finance airport operations. The analysis includes development of a detailed Financial Implementation Plan that presents the results of the implementation evaluation and provides practical guidelines for matching an appropriate amount and timing of financial sources with the planned use of funds.

The details of the Development Program (including a capital improvement project list, escalated project cost estimates, phasing recommendations, and a financial feasibility analysis) have been formulated into the Financial Implementation Analysis in consideration of comments received from Airport management, the Airport Commission, and the PDSC. The Financial Implementation Analysis assumes resumption of commercial passenger service at FNL and the achievement of the aviation operations and passenger enplanement forecasts. However, the achievement of any financial projection is dependent on future events, the occurrence of which is currently unknown.

Based on the assumptions underlying the Financial Implementation Analysis summarized in the Capital Cash Flow section of **Schedule 9-6**, implementation of projects in the Master Plan CIP that are scheduled during the Short-Term planning period are projected to be financially reasonable. Traditional airport capital funding sources are anticipated to be insufficient to finance a number of projects in the Mid-Term and Long-Term planning periods - such projects represent funding shortfalls for the capital program. However, a number of factors are unknown and may change by the time demand dictates the need to plan for and construct many of those projects. Furthermore, if funding cannot be identified for the indicated projects in the time frames needed, these projects will also need to be modified, delayed or cancelled until such time as a funding source is secured.

CHAPTER 1.

INTRODUCTION

Northern Colorado Regional Airport (FNL or Airport), jointly owned and operated by the Cities of Fort Collins and Loveland, is a vital asset to a major commercial center in the Fort Collins/Loveland area and a key component of the region's growing high-tech/innovation-focused economy. As both a commercial service and general aviation (GA) airport, it serves an important, niche role as a key component in the transportation infrastructure of the two cities and the surrounding region. A key consideration of this Master Plan is the compatibility with the surrounding environs and land uses, which will be a primary component in developing the Airport Influence Area (AIA) Plan that is included in **Appendix B**. Additionally, this Master Plan incorporates the goals and initiatives from the Airport's 2018 Strategic Plan Update, identifies space for potentially needed facilities, and includes the development of an on-airport land use plan. This Master Plan will serve as the 20-year roadmap to guide development at the Airport to meet current service levels while accommodating future demand.

Local, regional, and national aviation issues have evolved since the Airport's last Master Plan was completed in 2007. For most of its history, FNL has served the dual role of accommodating both GA and commercial service, but in 2012 Allegiant Air discontinued its commercial service at FNL; resulting in a significant decrease in enplanements, consequently reducing the annual entitlement funding the Airport receives under the Airport Improvement Program (AIP). However, in 2017, the Colorado Division of Aeronautics (Division) and the Federal Aviation Administration (FAA) NextGen Office selected FNL as the nation's first remote air traffic control technology test facility, which may present opportunities for the reinstatement of commercial service at the Airport.

The requirement of future facilities is evaluated not only from an aviation standpoint, but also regarding the relationship of Airport facilities to surrounding land uses and the community at large. The focus will be on the total aviation facility and its environs, with the overall planning goal being the development of an aviation facility that can accommodate future demand, is not significantly constrained by its environs, and does not adversely impact its surroundings.

1.1 Master Plan Study Goals

While the Airport Master Plan Update will consider a variety of issues with the formulation of a long-range development plan for the Airport, the primary goal is continued Airport improvement in a manner that is compatible with its surroundings and recognizes community goals.

To accomplish this goal, the Airport coordinated with stakeholders to develop the following Master Plan objectives:

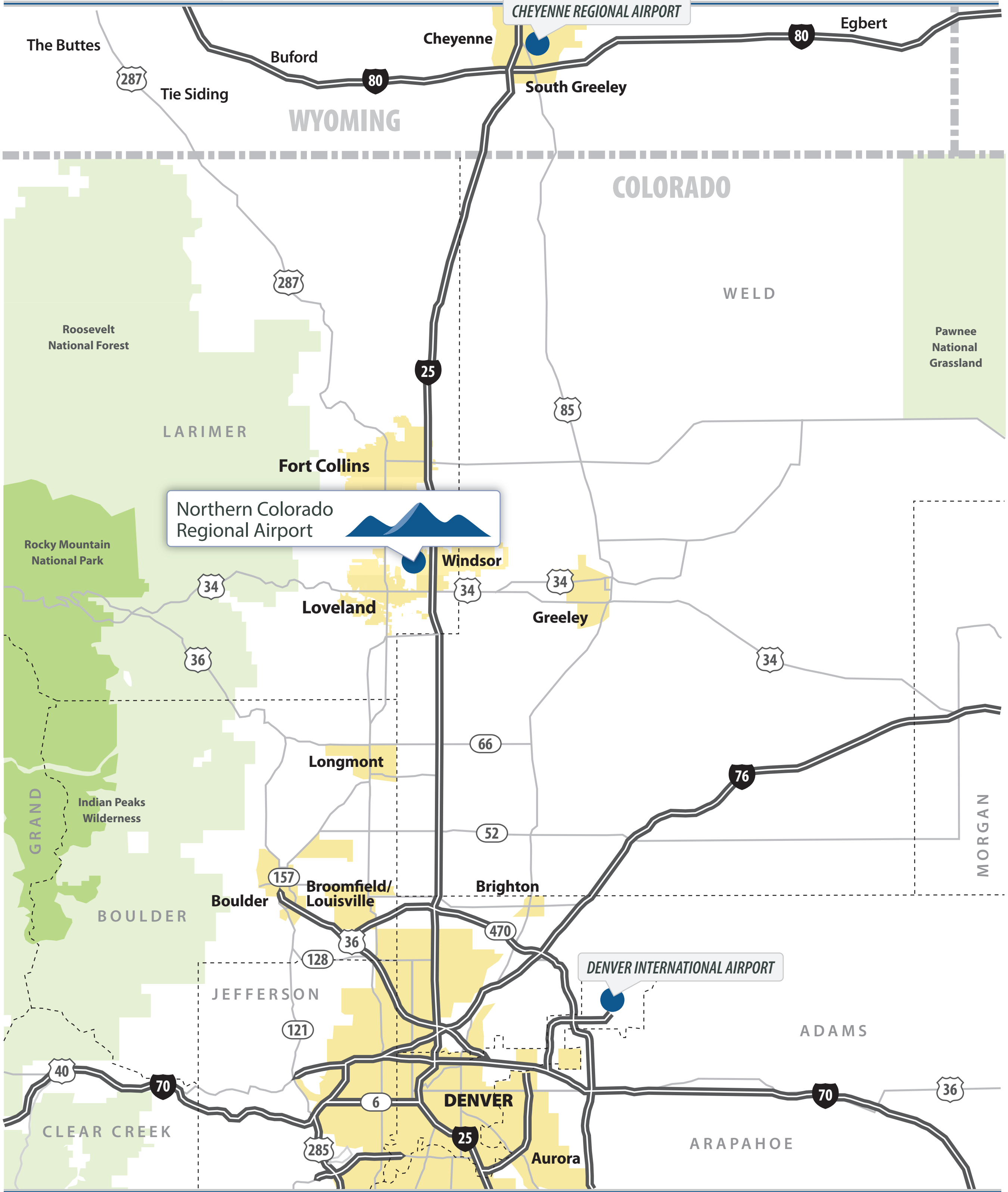
- Prepare a Master Plan that is *Resilient, Flexible,* and *Adaptable*.
- Integrate compatible land use planning and the development of an Airport Influence Area Plan.
- Provide a planning document for the next 20 years that is technically accurate, realistically executable, and financially feasible and sustainable.
- Determine the current condition and efficiency of existing facilities.
- Prepare updated low scenario (without commercial service) and high scenario (with commercial service) forecasts of aviation activity.
- Develop a financial plan that considers the operating budget, revenue, expenses, and potential FAA grant funding.
- Integrate public involvement throughout the process to ensure that future development plans align with the values and vision of the community.
- Incorporate the strategic plan goals, objectives and initiatives outlined in the Airport's 2018 Strategic Plan Update.

1.2 Airport Location and Vicinity

Northern Colorado Regional Airport is located in Larimer County, Colorado, the sixth most populous county in the state. Larimer County extends to the Continental Divide, which includes several mountain communities and Rocky Mountain National Park. More than 50 percent of Larimer County is publicly owned, with most public land being located within Roosevelt National Forest and Rocky Mountain National Park. In addition to these federal lands, Colorado State Parks and Recreation, and Larimer County Parks and Open Spaces, the County has some of the finest irrigated farmland in the state. There are also vast stretches of scenic ranch lands, forests, and high mountain peaks. FNL is one of 14 Colorado airports that are certified to provide commercial air service, and it serves as a northern regional gateway for commerce, tourism, and emergency access. The relative location of FNL within the state is illustrated in **Figure 1-1**.

FNL is situated on 1,050 acres along Interstate 25 (I-25), on the eastern perimeter of the City of Loveland and approximately ten (10) miles south of downtown Fort Collins. The Cities of Fort Collins and Loveland are located on the high plains in north-central Colorado, east of Rocky Mountain National Park. FNL is minutes away from downtown Loveland, Fort Collins, Greeley, Windsor, and Estes Park; and 50 miles north of downtown Denver. The Airport is located on the western side of I-25 and north of US Highway 34, east of Boyd Lake. FNL's location relative to the Cities of Loveland and Fort Collins is illustrated in **Figure 1-2**.

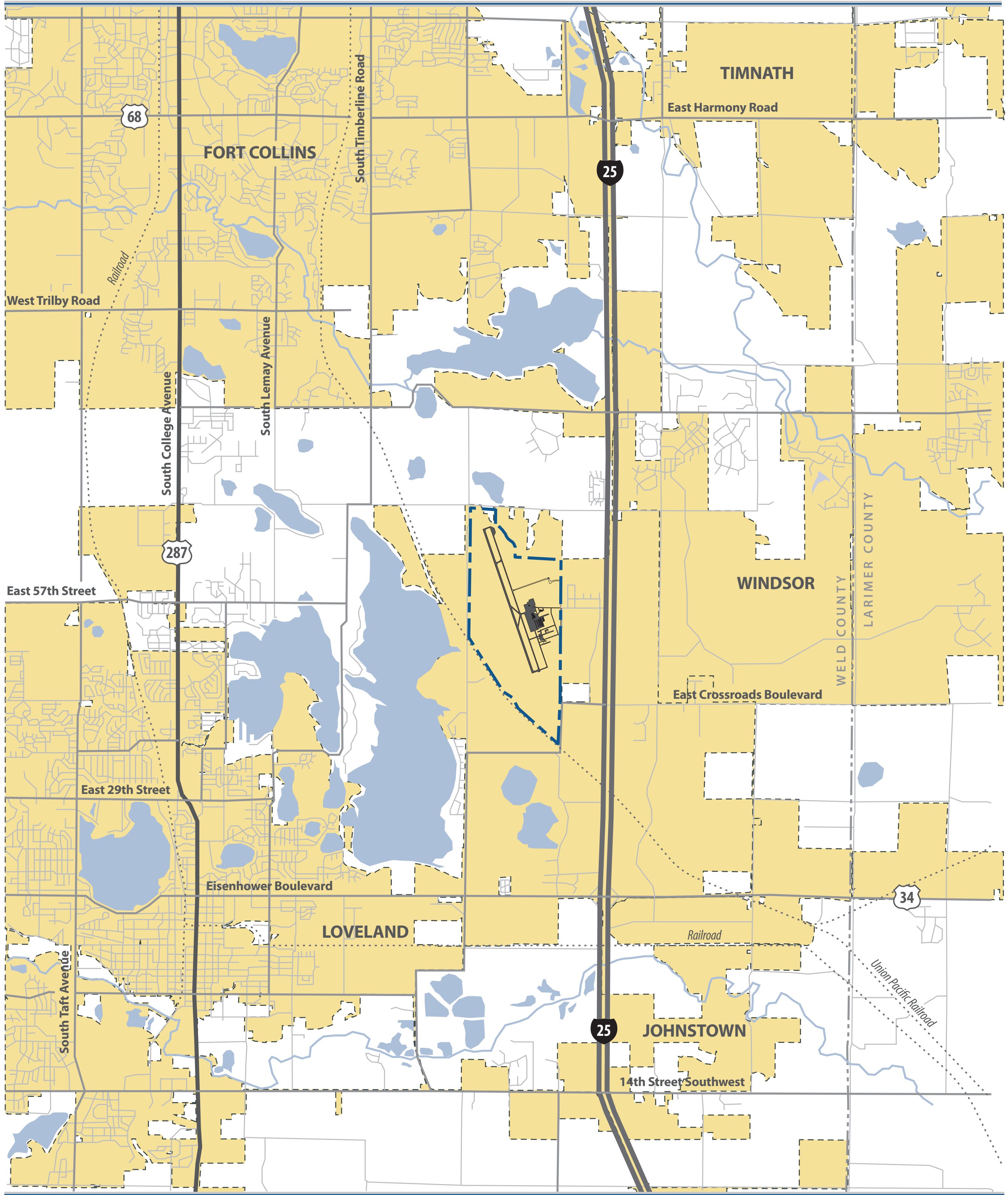
SOURCE | Google Maps, 2018



North | Approximate Scale: 1″ = 15 Miles

FIGURE 1-1 **Airport Location Map**

SOURCE | SOURCE: Google Maps, 2018



North | Approximate Scale: 1" = 1.5 Miles

FIGURE 1-2 **Airport Vicinity Map**

1.3 Airport Role

The current FAA National Plan of Integrated Airport Systems (NPIAS) report (2019-2023), classifies Northern Colorado Regional Airport as a *non-primary commercial service, regional airport*. Airports included in the NPIAS are eligible to receive federal grants for airport planning and various capital improvements to keep the airports current with design standards and to meet system capacity needs. The non-primary commercial service classification is for airports used mainly by general aviation aircraft that have facilities capable of accommodating commercial service.

Airports are defined within the NPIAS by their service level, which reflects the type of service the airport provides to the surrounding community. The regional subclassification is assigned to airports that are in metropolitan areas and serve relatively large populations. These airports support regional economies with interstate and some long-distance flying, and have high levels of activity, including some jets and multiengine propeller aircraft.

FNL is also included in the Colorado State Aviation System and it was classified within the state system as a *major commercial service airport* in the last update to the Colorado State Aviation System Plan (CASP), which was completed in 2011.1 The Colorado Airport System includes a total of 74 public-use airports; 14 of which 14 are categorized as commercial service airports and 60 categorized as non-commercial service general aviation airports. that represented an essential element of the State transportation system and provided critical support to the State economy.

1.4 Airport Development History

The Cities of Fort Collins and Loveland agreed to jointly build and operate a regional airport in November 1963. Formerly known as the Fort Collins-Loveland Municipal Airport, the Airport opened in 1964 under joint agreement and ownership by the Cities of Loveland and Fort Collins. The construction of the Airport followed a significant rise in Colorado State University (CSU) enrollment due to the civil rights movement.

The name was officially changed to Northern Colorado Regional Airport in 2016 to better reflect the area served by the Airport. When the Airport was originally constructed, the population of Larimer County was about 65,000; now, the population is over 300,000.

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[1] All airports in the Colorado airport system are assigned to one of three roles: Major, Intermediate, or Minor.

Significant development projects and milestones at FNL include:

- Mid to late 1960s – Runway 6/24 was constructed
- 1977: Aircraft parking apron rehab
- 1980s: Runway 6/24 length reduced (for safety concerns associated with intersecting runways)
- 1982: GA area development (roads, utilities, and taxiways)
- 1989: Runway 15/33 rehab
- 1993: Airport Master Plan
- 2007: Airport Master Plan; Runway 6/24 rehab
- 2011: Runway 15/33 reconstruction
- 2013: Aircraft parking apron rehab
- 2017: Selected as the test facility for one of the first in the nation remote airport traffic control towers

1.5 Airport Management, Ownership Structure, and Airport Commission

The operation and maintenance of the Airport is a joint venture between the City of Fort Collins and the City of Loveland, with full management and policy-making authority vested equally in both Cities. The City of Loveland and the City of Fort Collins established the Northern Colorado Regional Airport Commission (the Airport Commission) through an intergovernmental agreement (IGA) to serve as the governing body for the Airport. The seven-member Airport Commission is comprised of two members from the City of Loveland Council and staff, two members from the City of Fort Collins Council and staff, and three citizens.

The Cities of Loveland and Fort Collins are responsible for all Airport policy considerations, as well as compliance with all federal, state, and local regulations.

1.6 FNL Planning and Development Subcommittee (PDSC)

In January 2018, the Airport Commission, which includes elected members from both the City of Fort Collins and the City of Loveland, formed the Planning and Development Subcommittee (PDSC) to support the development of the 2018 updates to the Strategic Plan and the Airport Master Plan. The PDSC will serve in an advisory role to oversee the Master Plan process and provide recommendations to the Airport Commission. The PDSC will help to guide development of the plan and is comprised of an Airport Commission member, Airport tenants, stakeholders, and representatives from the Cities of Fort Collins and Loveland.

1.7 Economic Impact

GA and commercial service airports are a major catalyst to economic development in Colorado's communities. The Colorado Department of Transportation (CDOT) Division of Aeronautics (the Division) completed the last Economic Impact Study in 2020 to identify how commercial and GA airports support the State and local economies.

The economic contributions of FNL stem from on-airport activities and off-airport spending by visitors who arrive in Colorado via the Airport. The economic contributions of these activities are measured through jobs, associated payroll, and economic output. These initial economic impacts enter the economy and re-circulate, which generates successive rounds of spending, employment, payroll, and output in other economy sectors. In the Economic Impact Study, the impacts generated through recirculation are classified as “multiplier” effects.

As illustrated in **Figure 1-3**, the total economic contribution of FNL in 2018 was estimated to be almost $161 million in output and 1,072 jobs, with an annual payroll of nearly $52 million. These figures far exceed the direct economic impact of FNL as identified in the last study, which was prepared in 2013. At that time, FNL’s total economic contribution was estimated to be $129.4 million in output and 826 jobs, with an annual payroll of $24.8 million.

Figure 1-3: Economic Impacts of FNL

Northern Colorado Regional (FNL)

CEIS

Individual Airport Impacts

Northern Colorado Regional is one of 14 commercial service airports contributing to the state’s aviation economic impacts. The components that comprise the total economic impacts for FNL are summarized below.

Visitors travel to Colorado on commercial flights and general aviation (GA) aircraft to do business and visit our state. Visitor Spending measures the sum of commercial passenger and GA visitor impacts.

Annual On-Airport Economic Impacts for FNL

	Direct	Supplier Sales	Income Re-Spending
Jobs	257	122	191
Payroll	$18,411,000	$8,155,000	$9,170,000
Value Added	$26,529,000	$11,867,000	$16,698,000
Business Revenues	$63,226,000	$20,167,000	$28,328,000

Annual Off-Airport Visitor Spending Economic Impacts for FNL

	Direct	Supplier Sales	Income Re-Spending
Jobs	354	66	82
Payroll	$8,375,000	$3,815,000	$3,988,000
Value Added	$14,594,000	$6,235,000	$7,265,000
Business Revenues	$26,049,000	$10,765,000	$12,339,000

Northern Colorado Regional’s Total Impacts

	Jobs	Payroll	Value Added	Business Revenues
On-Airport Activity	570	$35,736,000	$55,094,000	$111,721,000
Visitor Spending	502	$16,178,000	$28,094,000	$49,153,000
Total	1,072	$51.91 Million	$83.19 Million	$160.87 Million

Columns may not add due to rounding.

Source: 2020 Colorado Airport Economic Impact Report, Colorado Aviation Economic Impact Study (CEIS) - Colorado Division of Aeronautics.

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CHAPTER 2.

INVENTORY OF EXISTING CONDITIONS

Introduction

This chapter provides a summary of the types of existing facilities at FNL and the general condition of these facilities. This inventory compiles information for all facilities at the Airport, including the airside, landside, passenger terminal area, navigational aids, ground access, parking, pavement conditions, among others. Existing conditions of key airside and landside facilities at FNL are detailed in the chapter and summarized in **Table 2-1, Table 2-2, and Table 2-3**.

Table 2-1: Airport Pavement Inventory Summary

Item	Description
Runway 15/33	▪ 8,500 feet x 100 feet ▪ Asphalt ▪ Published Strength: 50,000 pounds Single Wheel (SW) and 65,000 pounds Dual Wheel Gear (DW)
Runway 6/24	▪ 2,273 feet x 40 feet ▪ Asphalt
Taxiways	▪ Parallel Taxiway A ▪ Connector Taxiways A1 through A5 ▪ Asphalt
Apron	▪ Passenger Terminal Aircraft Parking Apron: 11,500 square yards ▪ GA Aircraft Parking Apron: 45,000 square yards ▪ Asphalt and Concrete

SOURCE: Mead & Hunt.

Table 2-2: Airport Facilities Inventory Summary

Item	Description
Airport Facilities	▪ Commercial Passenger Terminal – 4,900 square feet ▪ Commercial Passenger Modular Building – 2,600 square feet ▪ Remote Tower Facility – 2,500 square feet ▪ Apron – 56,500 square yards (terminal and GA) ▪ Hangars – 210 units (41 Airport owned) ▪ Administration/ARFF building – 7,500 square feet ▪ SRE building – 6,400 square feet ▪ Fuel storage facilities - One 10,000-gallon above ground 10LL Avgas storage tank; two 10,000-gallon above ground Jet A storage tanks; two Thompson filters; one Permanent Jet A dispenser[1]
Parking	▪ Employee, Visitor (Terminal Parking Lot) – approximately 336 marked spaces ▪ jetCenter (FBO Parking Lot) – approximately 69 marked spaces

SOURCE: Mead & Hunt.
NOTES: 1. Off-airport fuel storage includes three (3) private 10,000-gallon tanks and one (1) one private 50,000-gallon tank.

Table 2-3: FNL Taxiway System

Taxiway	Description	TDG	Width (feet)
A	Full length parallel taxiway east of Runway 15/33 (400 feet Runway centerline to Taxiway centerline)	3	50
A1	Taxiway connector from parallel Taxiway A to the threshold of Runway 33	5/2	75/35
A2	Taxiway connector from parallel Taxiway A to Runway 15/33	3	50
A3	Taxiway connector from parallel Taxiway A to Runway 15/33	3	50
A4	Taxiway connector from parallel Taxiway A to Runway 15/33	5	75
A5	connector from parallel Taxiway A to the threshold of Runway 15	5	75
B	Taxiway connector from GA apron to parallel Taxiway A	2	40
C	Taxiway connector from commercial apron to parallel Taxiway A	5	90
D	Taxiway connector from commercial apron to GA apron	2	35
F	Access taxiway connector from Off-Airport parcel to Runway 6/24	2	40

DATA SOURCE: FAA Advisory Circular 150/5300-13A-Change 1, Airport Design; and existing conditions at FNL.

2.1 Previous Planning Studies

Previously completed planning studies and FAA records, which are current and applicable to the objectives and overall intent of this Master Plan, were reviewed to avoid redundant and unnecessary inventory data collection and include:

- 2007 FNL Airport Master Plan and Airport Layout Plan (ALP)
- 2018 FNL Strategic Plan Update
- FAA Data/Records/Terminal Area Forecasts (TAF)
- FNL Airport Master Records (5010)
- Colorado Division of Aeronautics 2020 Colorado Aviation Economic Impact Study
- 2015 Residential Encroachment White Paper
- 2015 Utility Master Plan
- 2015 Loveland Comprehensive Plan
- 2011 Fort Collins City Plan
- FAA environmental records.

The Northern Colorado Regional Airport 2018 Strategic Plan Update provides a basis for the future vision at FNL and is a key driver of this Master Plan. The Vision statement from the Strategic Plan reads as follows:

The Northern Colorado Regional Airport: Unmatched for its service and innovation. The premier destination for aviation centered business, research, development, education and training.

Furthermore, the mission of the Northern Colorado Regional Airport is:

To provide a fiscally sustainable airport to the region with facilities that meet the highest FAA standards for safety and efficiency while ensuring the long-term ability of the Airport to serve Northern Colorado as a transportation hub and a global gateway for commerce.

The Strategic Plan includes five strategic initiatives. Each initiative includes a strategic statement, desired outcomes, and tasks necessary to reach the desired outcomes. The five FNL strategic initiative areas are:

- **Innovation** – Serving as a catalyst and center for innovation focused on aviation, FNL strives to continually explore and support new technologies. Some outcomes of this initiative include being a recognized aviation innovation center, collaborative and engaged partnerships with stakeholders, supportive R&D programs, and facilities and to provide a reputable aeronautical and technology-based education research, and training programs.
- **Organization Excellence** – Providing a responsive, forward-thinking, and optimal governance structure with high performing staff is key to FNL's success. Some outcomes of this initiative include high caliber, well-trained employees, established and effective governance model, responsible, ethical, and accountable leadership, and having a supported and funded Strategic Plan.
- **Fiscal Sustainability** – FNL is committed to achieving and maintaining a self-sustaining budget to operate a safe and efficient airport, manage assets, and support industry and economic development. Some outcomes of this initiative include having a self-sustaining budget with diversified revenue streams, fiscally sound financial practices, and responsibly maintained assets.
- **Economic Development** – FNL actively encourages private and public investments to ensure a strong economic platform for both on-Airport development and compatible uses within the Airport Influence Area. Some outcomes of this initiative include a completed Master Plan and Airport Influence Area Plan, a successful Commercial Air Service Marketing Plan, and incentivized development strategies for targeted industries.
- **Regional Collaboration** – Recognized as an active regional partner, FNL supports a collaborative approach to transportation, tourism, training, and marketing with its surrounding partners and communities. Some outcomes of this initiative include being recognized as a regional transportation hub, having a successful marketing plan that maximizes regional partnerships, effective public awareness of this Airport with partners, elected officials, and communities, and having an effective working relationship with elective officials to share vision and achieve outcomes.

2.2 Airside

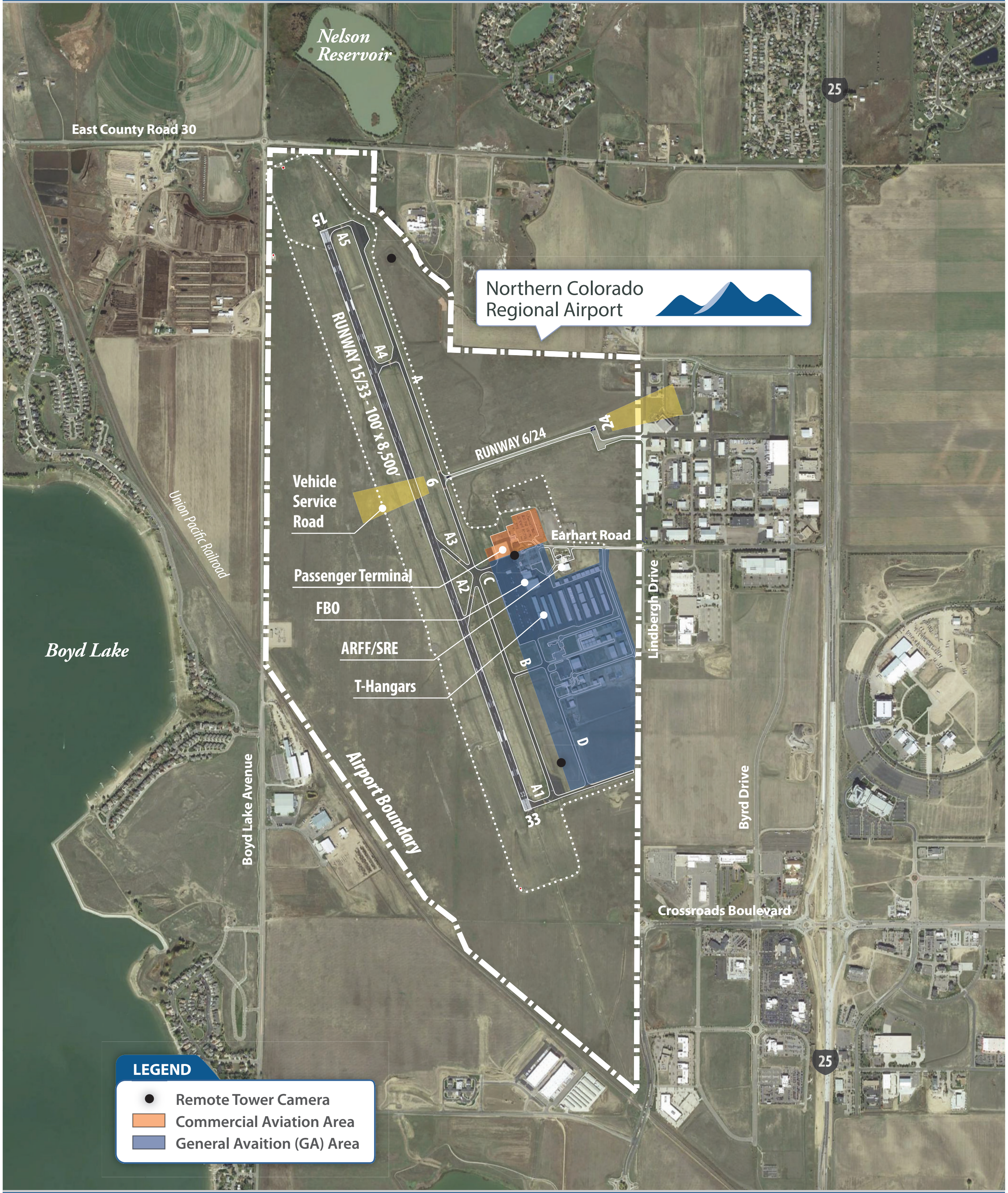
This section summarizes the existing airside facilities at FNL. The existing airfield layout at FNL is illustrated in **Figure 2-1**.

2.2.1 Pavement Condition and Strength

As part of the CDOT Division of Aeronautics Pavement Management Program (PMP), a visual rating system known as the Pavement Condition Index (PCI) is used to evaluate for pavement distress and deterioration. The PCI scale values range from zero (pavement in a failed condition) to 100 (pavement in excellent condition). The CDOT Division of Aeronautics last conducted a major PCI inspection at FNL in 2016. The PCI values from this inspection range from 42 to 100. Runway 15/33 has a PCI of 93 (excellent condition) and is constructed to support a gross weight bearing capacity of 50,000 pounds single wheel, 65,000 pound dual wheel, and 130,000 pounds double tandem wheel main landing gear configuration. The runway also has a Pavement Condition Number (PCN) of 49 /F/C/W/T.

Runway 6/24, the crosswind runway, is used for small aircraft with maximum certificated takeoff weight of 12,500 pounds or less during crosswind conditions, which occur less than 5% of the time. This Runway does not have a published PCI rating because the primary runway, Runway 15/33, meets the 95% wind coverage benchmark, so while Runway 6/24 is important to the operation of the Airport, FNL is not required to have a crosswind runway to provide adequate wind coverage; therefore, Runway 6/24 is recognized as an additional runway by FAA and it is not eligible for funding from FAA or CDOT. This is also why the taxiways associated Runway 6/24 (Taxiway B and Taxiway D) do not have PCI ratings. The Airport independently monitors the condition of these pavements; maintenance and capital improvement projects for the pavements without PCI ratings are funded with Airport revenues.

SOURCE | **AERIAL:** Google Maps, 2018. **AIRFIELD LAYOUT:** Mead & Hunt, 2018.



North | Approximate Scale: 1" = 2,000'

FIGURE 2-1 **Existing Airfield Layout**

2.2.2 Navigational Aids, Visual Aids, and Signage

The Airport's lighting, visual aids, and signage are summarized in **Table 2-4**. Runway 6/24 has only edge reflector lights.

Table 2-4: Airport Facilities Inventory Summary

Item		Description
Navigational Aids		▪ Area Navigation (RNAV/Global Positioning System (GPS) ▪ VHF Omnidirectional Range/Tactical Air Navigation (VORTAC): Gill VORTAC (114.2 GLL) - 21 NM west; Mile High VORTAC (114.7 DVV) - 33 NM southwest; and Jeffco VOR/DME (115.4 BJC) - 38 NM south ▪ Instrument Landing System (ILS) ▪ Non-Directional radio Beacons (NDB): Greeley NDB (348 GZW) - 11 NM
Visual Aids	Lighting	▪ High Intensity Runway Lighting system (HIRL) - Runway 15/33 ▪ Runway End Identifier Lights (REIL) - Runways 15 ▪ Medium Intensity Runway Lights with Runway Alignment Indicator Lights (MALSR) - Runway 33 ▪ 4-Light Precision Approach Path Indicators (PAPIs), three-degree glide path - Runways 15 and 33 ▪ Medium intensity taxiway lighting (MITL) system - Taxiway A
	Markings and signage	▪ Precision runway markings - Runway 15/33 ▪ Basic runway markings - Runway 6/24 ▪ Standard taxiway markings - Taxiway A system ▪ Runway & taxiway guidance signs -instruction, location, direction, destination, and information
	Misc. Aids	▪ Airport Rotating Beacon (green and white) ▪ Segmented Circle / Wind Cone (lighted)

SOURCES: Mead & Hunt (2018) and Airport Master Record 5010-1 (2018).
NOTES:
NDBs: General purpose low- or medium-frequency radio beacons that an aircraft equipped with a loop antenna can home in on or determine its bearing relative to the sending facility.
VORTAC: Very High Frequency Omnidirectional Range Station with Distance Measuring Equipment transmitting very high frequency signals, 360 degrees in azimuth oriented from magnetic north

2.2.3 Airfield Communications Facilities and Equipment

Pilots at FNL can contact the Denver Flight Service Station (FSS) through the Northern Colorado Remote Communications Outlet (RCO). RCO's are remote aviation band radio transceivers, established to extend the communication capabilities of FSS. The RCO facility is located 10.5 miles to the northeast of FNL and serves as the nearest remote communications facility to the FSS.

Pilots at FNL can also use the co-located RCO site at the Gill VOR, located northeast of the Greeley-Weld Airport.[1]

2.2.4 Weather Monitoring Equipment

The Airport has an Automated Weather Observing System III Precipitation/Thunderstorm (AWOS III P/T) that measures wind speed, wind gusts, wind direction, wind variable direction, temperature, dew point, altimeter setting, density altitude, visibility, sky condition, and cloud height and type. The system is also capable of tracking precipitation and thunderstorm activity within 30 miles of the Airport. The AWOS III provides minute-by-minute updates to airborne pilots on VHF radio frequency 135.075 MHz and by phone.

2.2.5 Airfield Vehicle Access Routes

FNL airfield access routes include a service and perimeter roadway network comprised of paved and unpaved surfaces. The main vehicle service road loops around Runway 15/33, as previously illustrated in **Figure 2-1**.

2.3 Airspace System

The control and use of navigable airspace can help determine the capacity and operational utility of an airport. This section describes the three main surface components of FNL's airspace system (*en route*, *transitional*, and *terminal*) and the remote tower system.

2.3.1 Airspace Surfaces

En route airspace is for aircraft traveling between airports. These aircraft generally follow FAA-defined low altitude "Victor" routes (below 18,000 feet Mean Sea Level or MSL) and high altitude "jet" routes (above 18,000 feet MSL) that navigate between ground-based Very High Frequency (VHF) Omni-Directional Radio Ranges (VOR) and positional fixes. V-81 low altitude route passes over FNL from north to south. Larger commercial and corporate jet aircraft on approach to Denver from the northwest are routed over FNL at altitudes between 12,000 feet and 19,000 feet. **Figure 2-2** depicts airspace in Airport vicinity.

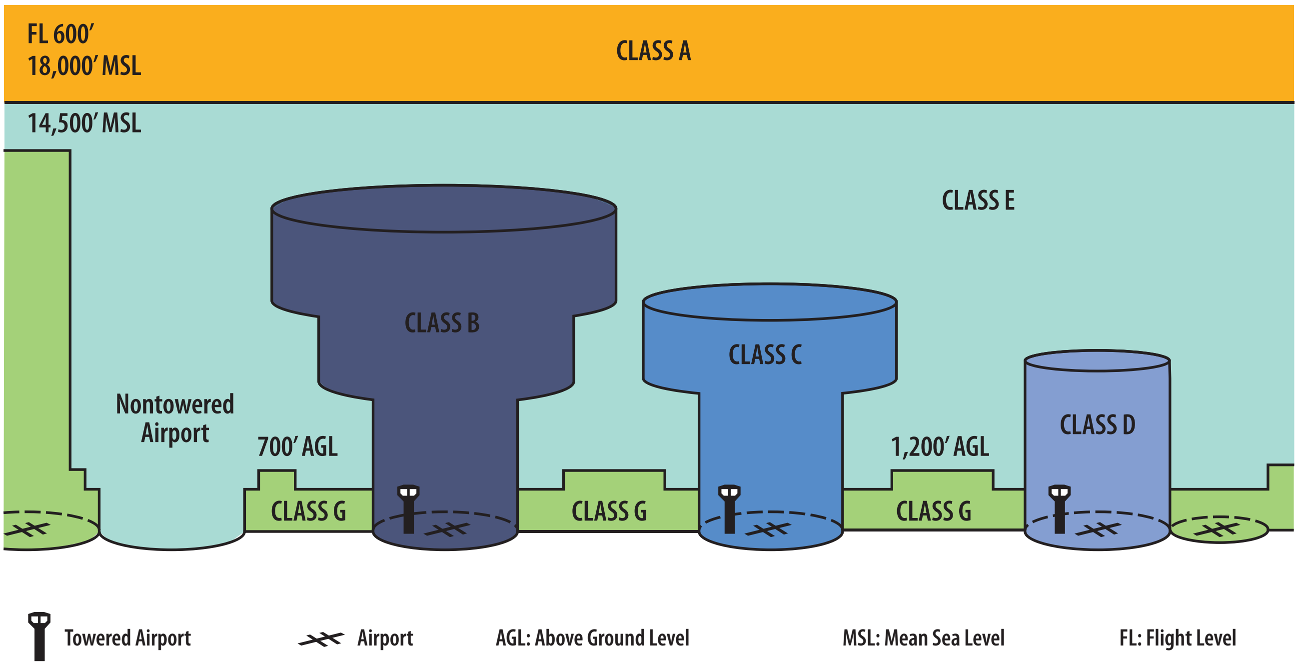
[1] Pilots can find RCO frequencies on charts or publications for the Airport to make a radio call to the outlet as if the pilot were making the call directly to the FSS. The outlet will relay the call and the briefer's response automatically.

The FAA identifies **transitional** airspace as Class E airspace. **Figure 2-3** illustrates and describes possible airspace class categories. At FNL, the Class E airspace begins at the surface and extends to 18,000 feet above MSL.

Terminal airspace is the local airspace around an airport. With the addition of the mobile tower and eventually the remote tower, the Airport is now within controlled Class D airspace. The Class D airspace around FNL does not have any extensions to accommodate instrument flight procedures. Air traffic control services within the Class D airspace around FNL are currently provided by the mobile tower during the testing phase for the remote tower for IFR and VFR traffic. The surrounding airspace does not contain designated restricted or special-use airspace, other than traffic patterns reserved for nearby public and private airports. The Airport is now in towered airspace and pilots must contact the tower before takeoff and landing at FNL. During the hours tower is not in operation, pilots are expected to announce their positions and intentions to other aircraft on the radio frequency known as the Common Traffic Advisory Frequency (CTAF).

SOURCE | **SECTIONAL CHARTS:** Cheyenne Sectional 98th Edition, JULY 2018/Denver Sectional 99th Edition, JULY 2018.

FIGURE 2-2 **Airspace/ NAVAIDS Summary**



Airspace Class	Communication with Air Traffic Control (ATC)	Entry Requirements	Seperation Services	Special VFR in Service Area
A	Required for All Operations	ATC Clearance	All	N/A (No Surface Area)
B	Required for All Operations	ATC Clearance	All	Yes
C	Required for All Operations	Two-way Communications Required Prior to Entry	VFR/IFR	Yes
D	Required for All Operations	Two-way Communications Required Prior to Entry	Runway Operations	Yes
E	Required for All Operations	Required for IFR Operations	Required for IFR Opeartions Only	Yes
G	Not Required	None	None	N/A (No Surface Area)

FIGURE 2-3 **Airspace Classifications**

2.3.2 Remote Tower

The Airport is currently undergoing installation and testing of a first of its kind remote tower system. The remote tower system uses leading-edge technology to combine camera/visual data and aircraft tracking data. The tower system consists of one centrally located 360-degree view tower and two shorter towers located near runway end 15 and 33 respectively.

The central tower uses 14 stationary cameras and three pant/tilt/zoom cameras, while the shorter towers employ seven stationary cameras on top and two mobile cameras just below the stationary cameras. The towers transmit communication to an onsite facility adjacent to terminal building. Tower locations are previously depicted in **Figure 2-1**. The central and tallest tower is depicted in **Figure 2-4**.

Figure 2-4: Central Remote Tower Camera

IMAGE SOURCE: CDOT Division of Aeronautics, 2018.

2.4 Landside Facilities

Landside facilities at FNL include the aircraft parking aprons, GA facilities, and the commercial passenger terminal, which are described below.

2.4.1 Aprons

The main aircraft parking apron is east side of the parallel taxiway and consists of approximately 56,700 square yards of aircraft parking and movement space. Approximately 10,300 square yards are associated with the passenger terminal building, with the remainder being utilized for GA.

The apron has three designated areas for the terminal, Fixed Base Operator (FBO), and transient aircraft tie-downs, located in the GA area previously illustrated in **Figure 2-1**. The terminal apron is used for charter operations; the FBO apron is operated by the Fort Collins-Loveland jetCenter and used for jet and large aircraft parking; and the transient and tie-down apron is used for smaller GA aircraft.

2.4.2 General Aviation Facilities

General Aviation (GA) facilities include Fixed Base Operators (FBOs), aircraft hangars, and apron aircraft parking/tie-down spaces, and are described below.

Fixed Base Operator

An FBO is an aviation related business that provides services for non-air carrier pilots, aircraft, and passengers. However, some FBOs fuel air carrier aircraft, as well as provide deicing and light maintenance. FBO services range from GA aircraft fueling, ground servicing, aircraft maintenance and repair, in-flight catering, flight training, and aircraft rental.

FBOs often serve as a terminal for GA passengers and include a lobby, restrooms, vending, and rental car services. Pilot lounges, flight planning rooms, weather computers, and pilot shops are also typical in FBOs. Currently, FNL has one full-service FBO: The Fort Collins-Loveland jetCenter. The FBO is operated year-round, 24 hours a day. The FBO operates two community hangars and 48 tie-downs.

Commercial Aviation Businesses

FNL thrives with a variety of business located on-airport and off-airport in the business park. Some of the services include aircraft flight training, aircraft repair and maintenance, avionics, robotics, manufacturing, fashion, consulting, and biotech.

Airport Hangars

Hangars at FNL are primarily located in the area south and east of the FBO. There are also through-the-fence (TTF) aircraft storage units off-airport property on the east end of Runway 24. There is a total of 210 hangars at FNL, 60 of which are T-hangars that are owned and leased by the Airport. T-hangars generally hold one aircraft, while box hangars can hold multiple aircraft. Cooperate hangars are typically accommodating larger aircraft and have more amenities such as office space and restrooms.

All Airport owned hangars have asphalt floors and electricity. The remaining hangars are a combination of privately-owned and managed T-hangars, box, and cooperate hangars. Amenities of the privately-owned hangars are unknown; however, FNL maintains a Master Hangar Database to catalog basic information on age, general condition, and square footage of all hangars on the Airport,

2.4.3 Passenger Terminal Building

Passenger terminal building's location is depicted in **Figure 2-1**. The building is a general-purpose facility used for charter operations by casino charters and local sport teams. The main structure is approximately 4,900 square feet with an additional 2,500 square feet of hold room space in the modular building immediately south of the terminal; 2,500 square feet of the modular building has been repurposed as the temporary remote tower facility.

2.5 Airport Support Facilities and Equipment

The Airport owns and operates several pieces of large equipment to perform maintenance, snow removal, and Aircraft Rescue and Fire Fighting (ARFF).

2.5.1 Aircraft Rescue and Fire Fighting Station/Administration Building

Aircraft Rescue and Fire Fighting (ARFF) is a special category of firefighting on airports for response, evacuation, and possible rescue of passengers and crew in an aircraft. Since FNL is a Federal Aviation Regulations (FAR) Part 139 airport, it is required to provide ARFF services. The Airport administration building, which is located east of the FBO on Earhart Dr., includes Airport staff offices and the FNL's Index B ARFF facility. The Loveland Fire Rescue Authority (LFRA), through the City of Loveland, provides the Airport with fire protection.

ARFF facility location is identified in **Figure 2-1**. The facility was built in 1993 and is approximately 7,500 square feet. The list of equipment is listed in **Table 2-4.**

Table 2-5: ARFF Response Vehicles

Year	Model	Water (gal)	Dry Chem (lbs)	AFFF[1] (lbs)	Condition
2015	Titan	1,585	500	205	Excellent
1993	Titan	1,500	500	200	Fair
1996	Spartan	500	500	70	Fair

DATA SOURCES: FAA Certification and Compliance Management System (2018).
NOTES: [1] AFFF (Aqueous Film Forming Foam)

2.5.2 Snow Removal Equipment Storage Building and Maintenance Building

FNL uses snow removal equipment (SRE) to clear the runway, taxiways, and aprons. The equipment is stored in a 6,400 square foot building, whose location is depicted in **Figure 2-1**. SRE equipment includes the following:

- 2013 Western Star
- 1993 Oshkosh Snow Blower
- 1985 International Paystar 5000 Dump/Plow
- 2008 Volvo Multiuse Vehicle
- 2006 Sweepster
- 1997 International Tandem Dump
- Other Miscellaneous Vehicles and Attachments.

2.5.3 Aircraft Fuel Storage and Use

On-airport fuel storage and equipment includes:

- One (1) 10,000-gallon above ground 10LL Avgas storage tank
- Two (2) 10,000-gallon above ground Jet A storage tanks

Off-airport fuel storage includes two (2) private 10,000-gallon tanks and one (1) private 50,000-gallon tank.

2.6 Airport Access and Circulation Network

The main access road to the Airport is Earhart Rd., which connects to I-25 via Byrd Dr. and Crossroads Blvd. Earhart Rd is a two-lane road that terminates at the Airport and FBO auto parking lots. Business park circulation roads feed into Earhart Rd. from North and South.

2.7 Automobile Parking Lots and Transportation

There is one public parking lot at FNL, which is located at the end of Earhart Rd., on the east side of the passenger terminal. This parking lot has approximately 336 marked spaces of which approximately 168 are leased to Groome Transportation and the rest are used for charter flights. Overnight parking is currently $7 per space. The parking lot for the Fort Collins-Loveland jetCenter is located south of the passenger terminal parking lot and has 125 spaces. According to Airport staff, parking facilities at jetCenter adequately accommodate existing demand.

Groome Transportation provides charter ride services to the Airport and can accommodate pickups anywhere from one person to a large group of a few hundred people or more. The Loveland jetCenter provides crew cars as one of their amenities.

2.8 Emergency Response

Northern Colorado Regional Airport is an FAA Part 139 commercially certificated airport and is required to have an Airport Emergency Plan (AEP) that outlines response expectations to incident and accidents that may occur on the Airport. The Airport is responsible for implementation of the emergency plan and coordination with all responding agencies. Initial response to an aircraft incident on the Airport will come from the on-site Loveland Fire station #4 that houses the Airport Rescue Firefighting (ARFF) equipment and personnel.

The Loveland Fire Rescue Authority (LFRA has full authority over any accidents or incidents that occur at the Airport. The LFRA is responsible for incident command, incident stabilization, rescue, fire suppression and the Mass Casualty Incident (MCI) program. In addition to ARFF response, the LFRA is also responsible for primary response involving Hazardous Materials (HAZMAT). Mutual aid for fire suppression, ARFF and HAZMAT are provided to the Airport by the Poudre Fire Authority (PFA) and the Windsor Severance Fire Rescue (WSFR). The Northern Colorado Bomb Squad is also housed in the Airport Fire Station.

Depending upon the needs of the incident command for response there is a list of organizations and agencies in the Airport Emergency Plan that are relied upon to provide emergency services support. Organizations identified in the emergency plan include City, County, State and Federal agencies.

2.9 Utilities

FNL utilities include: a potable/fire water system, sanitary sewer, power, natural gas, communications, and drainage. Brief descriptions for each utility are provided below. The *2015 Utility Master Plan*[2], which summarizes the existing infrastructure at FNL and includes proposed utility upgrades that correspond with the phased development recommended in the **2007 Master Plan**.

Potable/Fire Water System

Fort Collins – Loveland Water District (FCLWD) owns utilities within airport property. FNL water system consists of 12- and 8-inch lines. Abandoned waterline exist under Taxiway A1.

Sanitary Sewer

The (SFCSD) owns utilities within Airport property. Sanitary Sewer utilities consist of 10- and 8-inch lines.

Power/Natural Gas/Communications

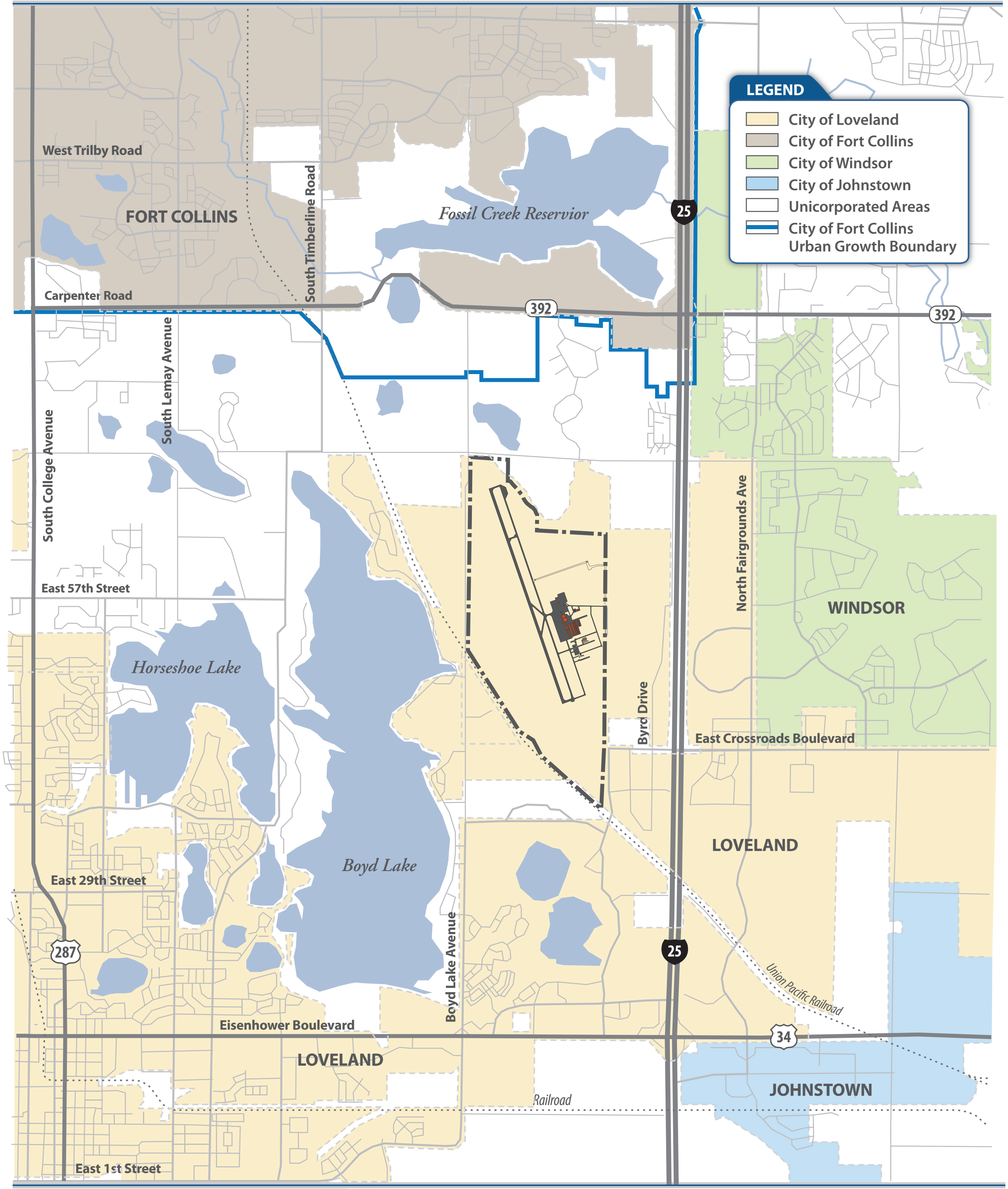
All power on the Airport is owned by City of Loveland, except for any power feeds connecting FAA-owned navigational aid (NAVAIDS) equipment shelters to navigational antennas. The City of Loveland owns the overhead power and underground utilities. Xcel Energy owns the natural gas utilities. Century link owns the telecommunication and fiber optic utilities. Generally, dry utilities run along on-airport roads at FNL. The City of Loveland plans to implement broadband services to the airport and the rest of the city in the future.

[2] One of the primary purposes of the *2015 Utility Master Plan* was to outline the primary potable water distribution and sanitary sewer collection mains associated with the future FNL planned hangar developments. As a secondary exercise, dry utilities communications, gas, electric, access control) were also laid out to show interaction between the various utilities.

2.10 Airport Environs

While the FNL property is entirely contained within the jurisdictional boundary of the City of Loveland, some of the land near the Airport is in the City of Fort Collins and some is in unincorporated Larimer County. Relatively small parcels are within the City of Windsor (East) and the City of Johnstown (Southeast). The Airport property boundary and surrounding incorporated areas are illustrated in **Figure 2-5**.

SOURCE | **BASE MAP:** Google Maps, 2018



North | Approximate Scale: 1" = 1 Mile

FIGURE 2-5 **Airport Environs**

2.10.1 Existing Zoning

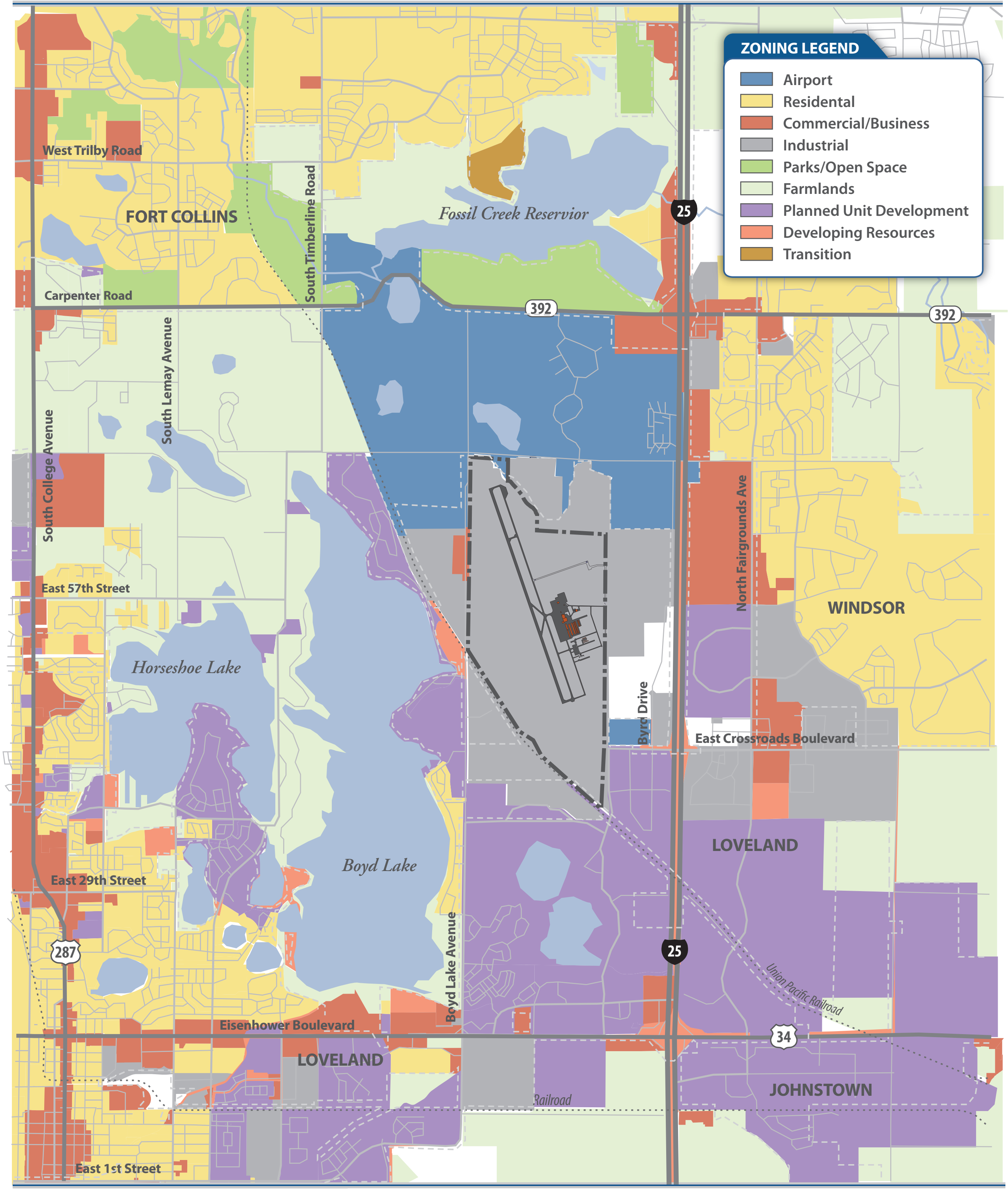
The existing generalized zoning surrounding the Airport is illustrated in **Figure 2-6**.

The Airport is zoned Developing Industrial, which is intended to provide space for employment opportunities in sectors such as warehousing and distribution, commercial, industrial, and manufacturing. Developing Industrial zone is also meant for complementary uses such as day care centers, convenience shopping centers. Good access to major arterial roads is required.

The Airport is surrounded by Developing Resource, Developing Business, Residential, and Planned Unit Development Zones. Developing Resources zones are areas being annexed and that may not have a specific plan or are intended for open space. Developing Business zones are meant for goods and service provides intended to be accessed by vehicle. Some Low- and High-Density Residential areas exist near Airport. Planned Unit Development Zones are unique to specific areas and accommodate needs of city, developers, property owners, and residents.

Compatible land use protects the health, safety, and welfare of those living and working near FNL, while protecting airspace for safe and efficient aircraft operations. Airports that receive federal funds must prevent the development of incompatible uses on land and ensure that proposed airport actions, including the adoption of zoning laws, have or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. Compatible land use is addressed in detail in **Appendix B - Airport Influence Area Plan**.

SOURCE | **BASE MAP:** Google Maps, 2018. **ZONING DATA:** Cities of Fort Collins, Loveland, Windsor & Johnstown.



North | Approximate Scale: 1" = 1 Mile

FIGURE 2-6 **Generalized Existing Zoning**

2.10.2 Future Land Use

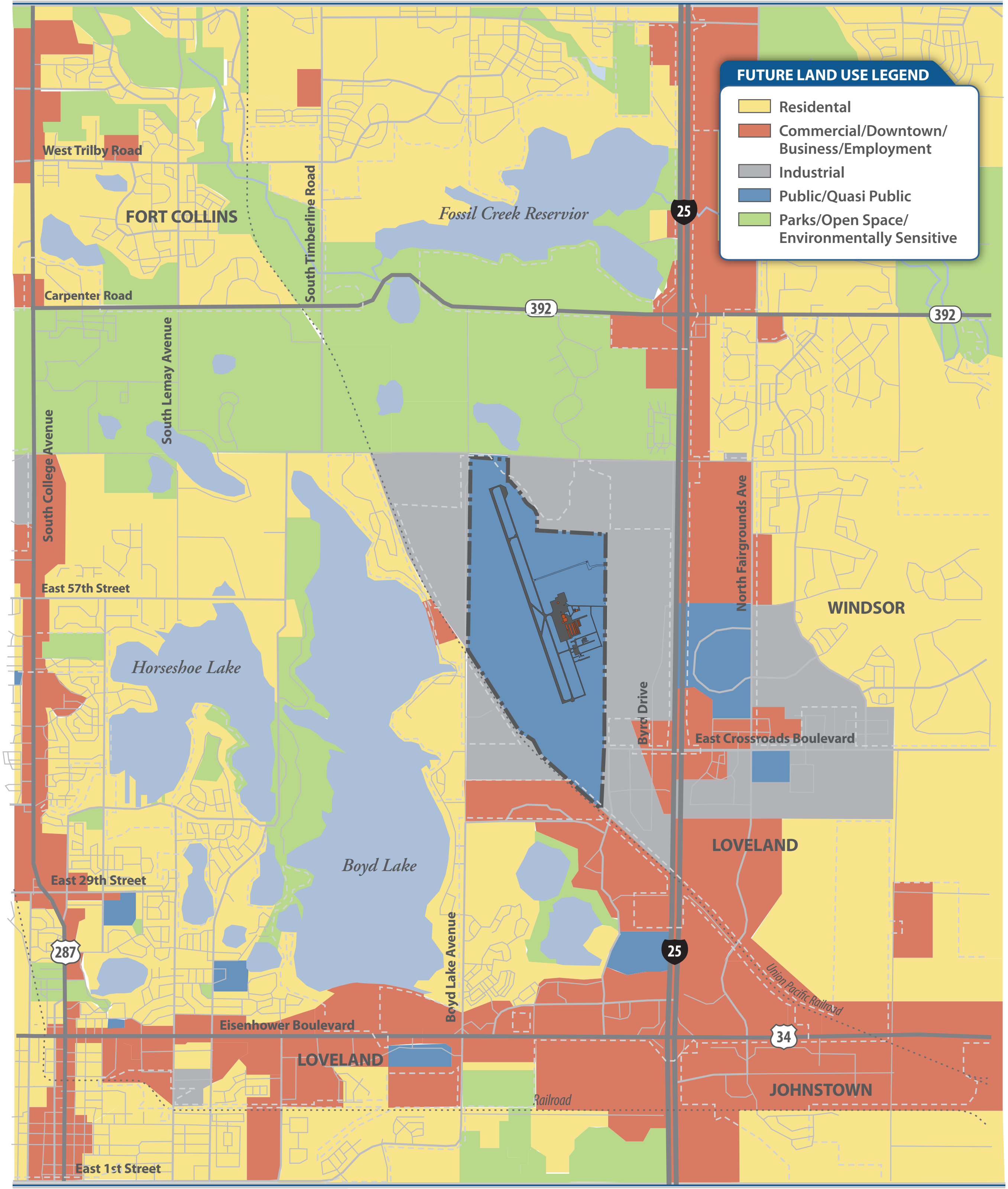
It is important that future land use planning efforts consider the compatibility of off-airport development to avoid creating obstacles to the safe and efficient use of the airspace surrounding an airport. Non-compatible future land uses planned for the area surrounding an airport can negatively impact current and future airport operations.

Future land uses of the areas immediately surrounding the Airport are primarily identified in the City of Loveland's Comprehensive Plan, *Plan Loveland* (2016), and include Industrial, Employment, and Corridor Commercial (Activity Center Mixed Use). Future land uses farther to the west, along the eastern edge of Boyd Lake, are primarily residential. Within the incorporated area Fort Collins, north of County Road 30 at the north end of the Airport, future land uses are identified in *City Plan Fort Collins* (2011) and include Community Separator Edge and Open Lands Corridor areas.

Larimer County is currently updating its Comprehensive Plan and is re-evaluating the future land uses proposed in the current *Larimer County Master Plan* (1997). Future land uses for the unincorporated areas of Larimer County in the Airport vicinity are currently designated as Cities and Towns. As a quickly growing area within the State, it is important that the AIA framework being developed as part of this Master Plan is used to help inform the County's long-range plans for land uses in unincorporated areas in the Airport vicinity. Land uses of the unincorporated areas of Larimer County north of County Road 30 are also guided by another document, *Plan for the Region between Fort Collins and Loveland* (1995), which indicates that these areas north of the Airport, particularly those areas influenced by aircraft operational activity, should remain agricultural or open land use, with some low density residential in the future.

Future generalized land use surrounding the Airport is illustrated in **Figure 2-7**. The future zoning in the Airport vicinity is intended protect and preserve compatible land uses in the area. Future land use goals include fostering quality investments, attracting diverse but compatible Airport uses, supporting commercial service, investing in and enhancing safety, and offering incentives that will spur economic development in the area. The City of Loveland aims to work with City of Fort Collins and Larimer County to develop an agreement to help guide the future of Airport area. Land use designations have been adopted in the Unified Development Code (UDC) for Loveland.

SOURCE | **BASE MAP:** Google Maps, 2018. **FUTURE LAND USE:** Cities of Fort Collins, Loveland, Windsor & Johnstown.



North | Approximate Scale: 1" = 1 Mile

FIGURE 2-7 **Generalized Future Land Use**

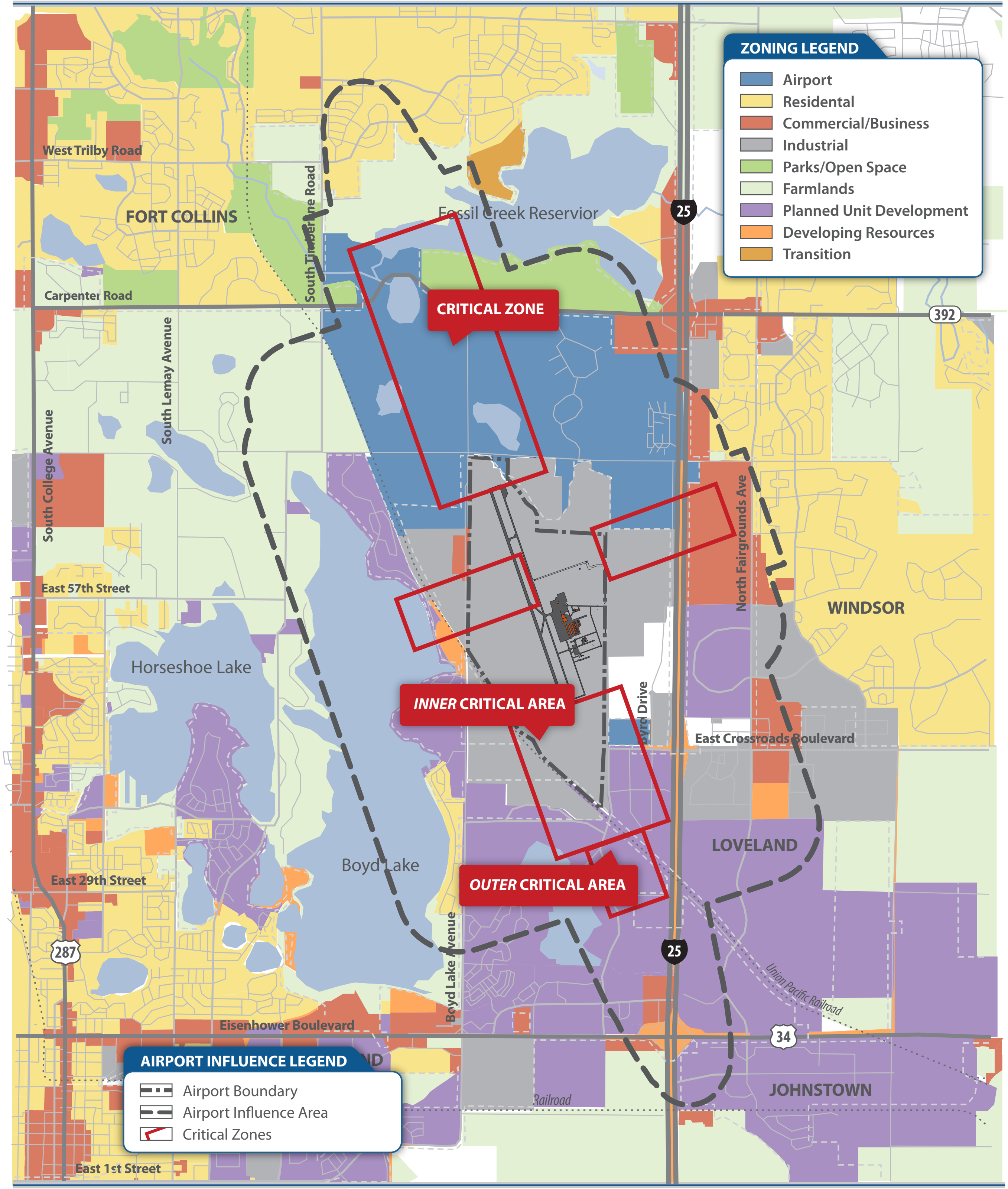
2.10.3 Airport Influence Area

Off-Airport land use planning and protecting the Airport from future encroachment by incompatible land use is of utmost importance. To protect surrounding land uses, FNL developed an Airport Influence Area (AIA) Plan, which was established as part of the City of Loveland's 1994 Master Plan and has since been carried forward in City and Airport planning documents. As defined in the 2015 Loveland Comprehensive Plan, the AIA is "an area that recognizes the benefits and potentially adverse impacts that occur within certain distances from public aviation facilities and that provides a policy framework to minimize these impacts as well as protect the safety and efficiency of aircraft operations." The existing AIA is illustrated in **Figure 2-8**.

The existing AIA Plan is being reviewed as part of this Master Plan to evaluate consistency with local and county land use plans, policies, and regulations; and identify opportunities to encourage compatible off-airport land use development. The purpose of this review is to reevaluate the existing guiding principles and criteria for compatible land use near the Airport and propose a strategic direction for future development in the AIA that maximizes potential for compliance with grant assurances and FAA guidance while best aligning community land use, infrastructure, and economic development goals.

The findings and recommendations for potential changes to the existing AIA are included as part of **Appendix B – Airport Influence Area**. This AIA Plan review will be used to inform the Cities of Loveland and Fort Collins in future zoning and planning efforts by providing guidance relating to compatible development on and around the Airport.

SOURCE | **AIRPORT INFLUENCE AREA DATA:** 2007 Master Plan Update. **BASE MAP:** Google Maps, 2018. **ZONING DATA:** Cities of Fort Collins, Loveland, Windsor & Johnstown.



North | Approximate Scale: 1" = 1 Mile

FIGURE 2-8 **Airport Influence Area**

2.11 Environmental Baseline Conditions

The purpose of this section is to document existing baseline environmental conditions at the Airport. This allows for the consideration of potential environmental impacts thorough the planning process including during the development of alternatives and recommendations.

FAA Orders 1050.1E, *Environmental Impacts: Policies and Procedures*, and 5050.4B, *National Environmental Policy Act: Implementation Instruction for Airport Actions,* address specific environmental categories to be evaluated in environmental documents in accordance with the National Environmental Policy Act (NEPA). This section summarizes the applicable environmental categories and their existence at FNL. The following environmental categories are not discussed as they are not relevant to FNL and/or they relate to impacts from a specific project.

- Coastal Resources
- Climate
- Construction Impacts
- Secondary Impacts
- Socioeconomic Impacts
- Environmental Justice, Children's Health and Safety Risks

2.11.1 Air quality

Air quality analysis for federally funded projects must be prepared in accordance with applicable air quality statutes and regulations, including the Clean Air Act of 1970[3], the 1977 Clean Air Act Amendments[4], the 1990 Clean Air Act Amendments[5], and the National Ambient Air Quality Standards (NAAQS)[6]. The air pollutants of concern in the assessment of impacts from airport related sources include six "criteria pollutants"; carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO2), ozone (O3), particulate matter (PM-10 and PM-2.5), and sulfur dioxide (SO2). Regions are designated as "attainment," "nonattainment," and "maintenance" by the EPA based on the status relative to the NAAQS. Attainment refers to geographic areas that meet the NAAQS, while nonattainment refers to areas that do not meet the NAAQS. Maintenance areas refer to geographic areas that were once nonattainment but have recently achieved compliance with NAAQS.

The Airport is located within Larimer County, parts of which are designated by the U.S. Environmental Protection Agency (EPA) as CO Maintenance Areas, including Loveland (where the Airport is located). The Airport is within the Denver-Boulder-Greeley-Ft. Collins-Loveland Ozone Non-Attainment Area. The area is designated

[3] U.S. Code. The Clean Air Act of 1970. U.S. Congress, Public Law 91-604, 42 U.S.C. §7401
[4] U.S. Code. The 1977 Clean Air Act Amendments, U.S. Congress, Public Law 95-95, 42 U.S.C. §7401
[5] U.S. Code. The 1990 Clean Air Act Amendments, U.S. Congress, Public Law 101-549, 42 U.S.C. §7401
[6] 40 CFR Part 50, Section 121, National Ambient Air Quality Standard

by the U.S. EPA as being in attainment status for all parts of the County in all other criteria.[7]

2.11.2 Biological Resources

Biological resources include fish, wildlife, plants, and their respective habitats. Requirements have been set forth by The Endangered Species Act (ESA)[8], The Sikes Act[9], The Fish and Wildlife Coordination Act[10], The Fish and Wildlife Conservation Act[11], The Migratory Bird Treaty Act[12], Executive Order 13751 (Invasive Species)[13], and various state and local regulations for the protection of fish, wildlife, and plants of local and national significance.

The US Fish and Wildlife Service (USFWS) is the federal agency responsible for the Endangered Species Act (ESA), the Fish and Wildlife Coordination Act and the Migratory Bird Treaty Act (MBTA). Colorado Parks and Wildlife (CPW) is the state agency responsible for conservation, outdoor recreation, and wildlife management within the State of Colorado. The ESA requires Federal agencies to ensure that actions authorized, funded, or carried out by the agency would not jeopardize the continued existence of endangered or threatened species, nor result in the destruction or adverse modification of a species' habitat. Agencies overseeing Federally funded projects are required to obtain information from and coordinate with the USFWS concerning any species listed or proposed to be listed that may be present in a proposed project study area.

The U.S. Fish and Wildlife Service's (USFWS) Information, Planning, and Conservation (IPaC) System was used to identify species of concern. Species listed as threatened or endangered, or candidates that may be found within the Airport vicinity are depicted in **Table 2-6**. The Airport property has been disturbed by past construction and is characterized by non-native patches of grasses and weeds and does not contain sensitive flora or suitable habitat for wildlife. There does not appear to be suitable habitat for any of these species within the Airport property limits. A survey would need to be completed prior to any proposed development to determine if any listed threatened or endangered species are present on Airport property.

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[7] U.S. Environmental Protection Agency, Green Book – Colorado Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants, https://www3.epa.gov/airquality/greenbook/anayo_co.html. Accessed October 11, 2018.

[8] Endangered Species Act of 1973, U.S. Congress, Public Law 93-205, 16 U.S.C §1531-1544

[9] Sikes Act, Amendments of 1974, U.S. Congress, Public Law 93-452

[10] Fish and Wildlife Coordination Act of 1958, U.S. Congress, Public Law 85-624, 16 U.S.C §661-666c

[11] Fish and Wildlife Conservation Act of 1980, U.S. Congress, Public Law 96-366, 16 U.S.C §2901-2912

[12] Migratory Bird Treaty Act of 1981, 16 U.S.C §703-712

[13] E.O. 13751 of Dec 5, 2016, Safeguarding the Nation from the Impacts of Invasive Species, 81 FR 88609

There is limited suitable nesting habitat for migratory birds on Airport property. A field investigation would need to be performed prior to proposed development to determine whether there are birds protected by the MBTA present on Airport property. **Table 2-6** lists the threatened or endangered species currently listed in Larimer County.

Table 2-6: Threatened or Endangered Species in Larimer County

Group	Species	Scientific Name	Status
Birds	Least Tern	*Sterna antillarum*	Endangered
	Mexican Spotted Owl	*Strix occidentalis lucida*	Threatened
	Piping Plover	*Charadrius melodus*	Threatened
	Whooping Crane	*Grus americana*	Endangered
Insects	Arapahoe Snowfly	*Arsapnia arapahoe*	Candidate
Fish	Greenback Cutthroat Trout	*Oncorhynchus clarkii stomias*	Threatened
	Pallid Sturgeon	*Scaphirhynchus albus*	Endangered
Mammals	Canada Lynx	*Lynx canadensis*	Threatened
	North American Wolverine	*Gulo gulo luscus*	Proposed Threatened
	Preble's Meadow Jumping Mouse	*Zapus hudsonius preblei*	Threatened
Flowering Plants	Colorado Butterfly Plant	*Gaura neomexicana var. coloradensis*	Threatened
	North Park Phacelia	*Phacelia formosula*	Endangered
	Ute Ladies'-tresses	*Spiranthes diluvialis*	Threatened
	Western Prairie Fringed Orchid	*Platanthera praeclara*	Threatened

DATA SOURCE: U.S. Fish and Wildlife Service, Information for Planning and Consultation (IPaC) Species Report, https://ecos.fws.gov/ipac/. Accessed October 10, 2018.

2.11.3 Section 4(f)

According to Section 4(f) of the Department of Transportation Act (recodified as 49 USC, Subtitle I, Section 303), no publicly owned park, recreation area, wildlife or waterfowl refuge, or land of historic site that is of national, state or local significance shall be used, acquired, or affected by programs or projects requiring federal assistance for implementation unless there is no feasible or prudent alternative.

The closest Section 4(f) properties to the Airport are Boyd Lake (0.5 miles west), the Highland Meadows Golf Course (1.5 miles east) and Frank Farm Park (2 miles south); however, none are located within the Airport property boundary.[14]

2.11.4 Farmlands

The Farmland Protection Policy Act (FPPA) regulates federal actions that may impact or convert farmland to a non-agricultural use. FPPA defines farmland as "prime or unique land as determined by the participating state or unit of local government and considered to be of statewide or local importance".

While the Natural Resources Conservation Service (NRCS) Web Soil Survey was used to evaluate soils in the Airport vicinity. , the Airport is located within the incorporated city limits of Loveland; therefore, it is exempt from FPPA.[15] North of Runway 15, there are areas that are classified as farmland of statewide or local importance within the property boundary and also areas with these classifications north of the property boundary. FPPA would apply to these areas that are north of County Road 30 because they are located outside of the city limits.

[14] City of Loveland Parks & Recreation Facilities Map, http://www.cityofloveland.org/departments/parks-recreation/parks-facilities/parks-recreation-facilities-map. Accessed October 10, 2018.

[15] USDA Natural Resources Conservation Service. Farmland Protection Policy Act (2017). Available at: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/fppa/?cid=nrcs143_008275. Accessed September 21, 2017.

2.11.5 Hazardous Materials, Pollution Prevention and Solid Waste

Hazardous materials are defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) 42 United States Code (USC) 6901-6992. Hazardous materials include substances that, due to their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or welfare or the environment.

The two statutes of concern to the FAA are the RCRA, as amended by the Federal Facilities Compliance Act, and the CERCLA, as amended by the Superfund Amendments Reauthorization Act (SARA) and by the Community Environmental Response Facilitation Act. RCRA governs the generation, treatment, storage, and disposal of hazardous wastes. CERCLA provides for consultation with natural resources trustees and cleanup of release of a hazardous substance, excluding petroleum, into the environment.

Sites of interest are defined as state cleanup sites, federal superfund cleanup sites, hazardous waste generators, solid waste facilities, underground storage tanks, dairies, and enforcement actions. The U.S. EPA lists nine (9) sites of interest at FNL. These are listed below in **Table 2-7**.

Table 2-7: Sites Reporting Generation of Hazardous Waste to EPA

Site Name	Site Address (Loveland, CO 80538)
Loveland Aero[1]	5280 Northrop Street
Continental Express[1]	4826 Earhart Road
Eagle Air Jet Services[1]	5235 Gulfstream Court
Fire Wall Forward	5212 Cessna Drive
Fort Collins-Loveland jetCenter	4824 Earhart Road
FNL	4900 Earhart Road
Hach Company[2]	5600 Lindbergh Drive
FNL TSA	4900 Earhart Road
Virga Corp Airport Hangars[1]	Lear Drive and Gulfstream Court

SOURCE: United States Environmental Protection Agency Envirofacts (2018).
NOTES:
1. Note that Loveland Aero, Continental Express, Eagle Air Jet Services and Virga Corp no longer operate at FNL.
2. The Hatch Company site is in the Airport Business Park and it is not within the Airport property boundary.

2.11.6 Historical, Architectural, and Cultural Resources

Historical, architectural, archaeological, and cultural resources encompass a range of sites, properties, and physical resources associated with human activities, society, and cultural institutions. Federal law requires project sponsors who require federal funds or approvals to consider how their proposed projects would affect historic properties. In accordance with NEPA and Section 106 of the National Historic Preservation Act (NHPA), the FAA is the lead agency for identifying the potential impacts of a proposed project on these resources and consulting with the federally recognized tribes, the State Historic Preservation Office (SHPO), and other agencies as necessary. The FAA must also comply with the Archaeological and Historic Preservation Act, which states:

> *[The Act] provides the survey, recovery, and preservation of significant scientific, prehistorical, historical, archeological, or paleontological data when such data may be destroyed or irreparably lost due to a federal, federally licensed, or federally funded project.*

In the context of this Master Plan, historic, archaeological, and cultural resources are districts, sites, buildings, structures, objects, landscapes, and Native American Traditional Cultural Properties (TCPs) that are on or eligible for listing on the NRHP. The Airport does not have historic buildings or structures. The closest historic resource listed on the NRHP is Preston Farm, located over four miles north of Airport.

Previous cultural resource surveys have not identified any cultural resources. Historic use of the Airport area was related to agriculture. Most Airport land has been previously disturbed because of previous agricultural actives and Airport construction projects.

A cultural resource survey may be required prior to any major development to determine if any historic, archaeological, and cultural resources occur on Airport property.

2.11.7 Natural Resources and Energy Supply

Energy or natural resources impacts result from implementation of projects that have a measurable effect or result in significant changes in the use or demand placed on local supplies. Energy requirements associated with an airport usually fall into two categories: demands for stationary facilities and demands for the movement of air and ground vehicles.

FAA does not have an established significance threshold for Natural Resources and Energy Supply[16]. Certain Airport improvement projects may potentially cause a deficit in natural resources and energy supply.

2.11.8 Noise and Noise-Compatible Land Use

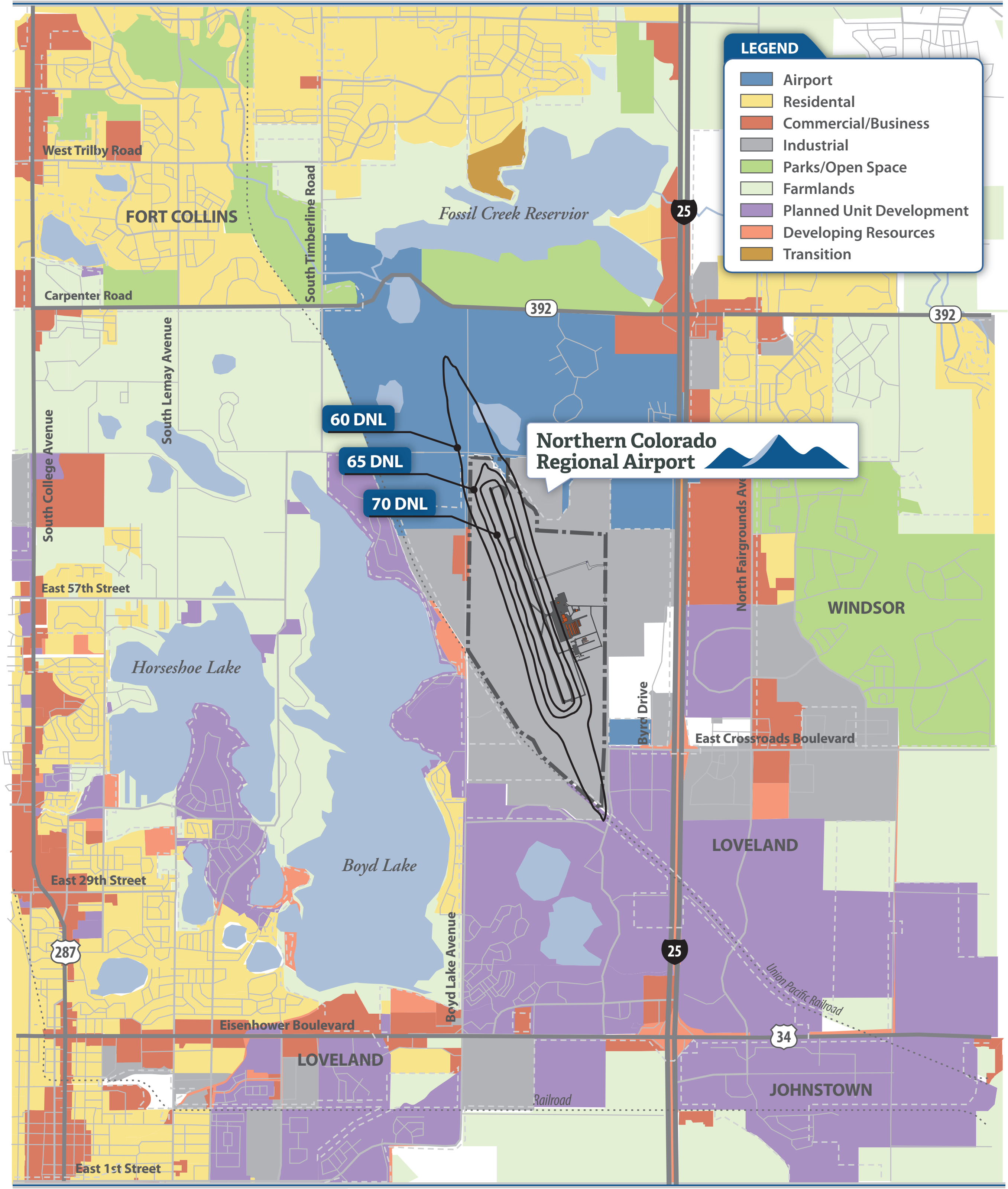
According to the FAA Order 1050.1F, Desk Reference, Chapter 11, Noise and Noise-Compatible Land Use, "noise" is defined as unwanted sound that may interrupt activities such as sleep, conversation, or student learning. Aviation noise typically comes from the operation of aircraft during departures, arrivals, overflights, taxiing, and engine run-ups. The Control and Abatement of Aircraft Noise and Sonic Boom Act of 1986 authorizes the FAA to prescribe standards for the measurement of aircraft noise and establish regulations to abate noise. The Noise Control Act of 1972, which amends the Control and Abatement of Aircraft Noise and Sonic Boom Act of 1986, adds consideration of the protection of public health and welfare and adds the EPA to the rulemaking process for aircraft noise and sonic boom standards.

Per FAA Order 1050.1F, projects at airports that experience 90,000 annual piston-powered aircraft operations, 700 annual jet-powered aircraft operations, such as siting a new airport, runway relocation, runway strengthening, or a major runway expansion require a noise analysis including noise contour maps. FNL meets these operational criteria and has established noise contours as documented in the 2007 Airport Master Plan. **Figure 2-9** illustrates the 65 Day-Night Average Sound Level (DNL). As shown, the 65 DNL noise contour remains well within FNL's boundary.

[16] FAA Order 1050.1F

Mead &Hunt

SOURCE | Google Maps, 2018. Zoning Data: Cities of Fort Collins, Loveland, Windsor & Johnstown.



North | Approximate Scale: 1" = 1 Mile

FIGURE 2-9 **2007 DNL Noise Contours with Generalized Existing Zoning**

2.11.9 Light Emissions and Visual Impacts

FAA Order 1050.1F defines light emissions as light that emanates from a light source into the surrounding environment (i.e. airfield and apron flood lighting, NAVAIDs, terminal lighting, parking lighting, roadway lighting, safety lighting). Visual resources may include structures or objects that obscure or block other landscape features (i.e. buildings, sites, traditional cultural properties, or other manmade landscape features).

The primary sources of light emissions at FNL are the runway lights, rotating beacon, PAPIs, and apron and parking lights, which aid in providing a safe environment for aircraft operations and produce an insignificant amount of light on the surrounding area. New or relocated lighting is analyzed for potential effects on residential or other light sensitive land uses. Light emissions and visual impacts should be considered prior to any future development projects.

2.11.10 Water Resources

Water resources are surface waters and ground water that are vital to society because they provide drinking water as well as support recreation, transportation and commerce, industry, agriculture, and aquatic ecosystems. Surface water, ground water, floodplains, and wetlands do not function as separate and isolated components of the watershed, but rather as a single, integrated natural system. Disruption of any one part of this system can result in consequences to the functioning of the entire system, which must be considered along with potential impacts to the quality of water resources throughout this Master Plan.

Surface and Ground Water:

Surface water is water that occurs above ground such as a wetland, river, stream, or lake. There are no major surface water resources within the Airport property boundary. There are several small drainage swales on Airport property. The main hydrological features in the vicinity of the Airport are the Nelson Reservoir, located approximately ¼-mile north of the Airport, and Boyd Lake, which is located approximately ¾-mile west of the Airport.

Groundwater is a subsurface water that occupies the space between sand, clay, and rock formations. Aquifers are the geologic layers that store or transmit groundwater to wells, springs, and other water sources. The Safe Drinking Water Act and its implementing regulations (40 CFR Parts 141-149) prohibit federal agencies from funding actions that would contaminate an EPA-designated sole source aquifer or its recharge area. State and local agencies may also promulgate regulations to protect sole source aquifers and their recharge areas. The northern half of the FNL property boundary lies within the Cache La Poudre watershed while the southern half of the property is within the Big Thompson watershed.

Wetlands and Non-Wetland Water Features:

The Clean Water Act (CWA) defines wetlands as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." Federal regulations require that proposed actions avoid, to the greatest extent possible, long-term and short-term impacts to wetlands, including the destruction and altering of the functions and values of wetlands.

The USFWS National Wetlands Inventory (NWI) online mapping system was reviewed to identify delineated wetlands near FNL. According to the NWI, the only delineated wetland on Airport property is an 8.99-acre Freshwater Emergent Wetland located northwest of the Runway 33 glideslope tower.

Floodplains:

A floodplain is generally a flat, low-lying area adjacent to a stream or river that is subject to inundation during high flows. The relative elevation of a floodplain determines its frequency of flooding.

Executive Order 11988 requires federal agencies "to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification floodplains and to avoid direct or indirect support of floodplain development whenever there is a practical alternative."

According to the Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL) Viewer, the Airport is entirely located within an area of minimal flood hazard (Zone X). Areas within Zone X are areas are outside the 500-year flood plain.

Wild and Scenic Rivers:

Wild rivers are free of obstructions such as canals and dams, and normally so remote as to only be accessible by trail. Scenic rivers are free of obstructions and have undeveloped shorelines but may have road access. Wild and scenic rivers are protected by the 1986 Wild and Scenic Rivers Act. Wild and scenic rivers are managed by the Bureau of Land Management (BLM), the National Park Service (NPS), the USFWS, and the U.S. Forest Service (USFS).

According to the NPS map of the National Wild and Scenic Rivers System, there are no wild and scenic rivers within or around FNL. The nearest wild and scenic river is the Cache la Poudre Wild and Scenic River, which is approximately 22 miles away.

Water Quality:

The Clean Water Act[17] provides the federal government the "authority to establish water quality standards, control discharges, develop waste treatment management plans and practices, prevent or minimize the loss of wetlands, location with regard to an aquifer or sensitive ecological area such as a wetland area, and regulate other issues concerning water quality."

The Airport is within the Cache La Poudre and Big Thompson watersheds. No surface water resources exist on Airport property. Boyd Lake is approximately ¼ Mile from west of the Airport boundary and is used for recreation and drinking water storage to balance demand during the summer. Houts Reservoir and Equalizer Lake are located to the south. Mud Lake, Nelson Reservoir, Duck Lake, Swede Lake, and Fossil Creek Reservoir are located the north of the Airport. Water resources and water quality will be considered during throughout the master planning process.

[17] U.S. Code, 1977 The Clean Water Act, 33 U.S.C. §1251-1387

CHAPTER 3.

AVIATION ACTIVITY FORECASTS

Introduction

Developing aviation activity forecasts is an essential step in analyzing existing airport facilities and identifying future needs and requirements of the facilities. While forecasting, by nature, is not exact, it does establish general estimates for future aviation activity levels and provides a defined rationale for necessary changes at the Airport as demands increase.

Airport activity forecasts are largely influenced by local airport factors, aviation industry trends, and overarching regional socioeconomic market conditions, as described in the previous sections. Overall, aviation activity forecasts are developed to meet five main objectives:

1. Provide a realistic and sustainable estimate
2. Be based on the latest available data
3. Reflect current conditions at the Airport
4. Be supported by information in the Master Plan
5. Provide adequate justification for future airport development.

The aviation activity forecasts presented in this chapter were developed for the 20-year planning period (2018-2038) and are based on historic activity, industry trends, local socioeconomic data, and consider the changes that have occurred at FNL since the completion of previous planning studies. The forecasts utilize fiscal year (FY) 2018 (October 1, 2017 through September 31, 2018) as the base year and project future activity through 2038, identified in 5-year increments.

This chapter is organized to first describe current and historic activity levels. Prior to forecasting future activity levels for FNL, previous planning efforts and forecasts were reviewed and summarized, along with an industry and regional socioeconomic overview.

3.1 Current Statistics and Aviation Environment

Before examining current and future activity levels at the Airport, historical and projected socioeconomic conditions were evaluated to develop a series of assumptions that served as a foundation for developing the forecasts described in this chapter. These variables represent a variety of physical, operational, and socioeconomic considerations, which in varying degrees relate to or affect aviation activity at FNL. Generally, the socioeconomic conditions of a region correlate with aviation activity within that region. Population, employment, and income are indicators that typically influence aviation activity. Population figures indicate the general number of persons served by the airport, and therefore the potential customer base, while employment and income indicate the degree to which the population served by the airport has enough disposable income to put toward the purchasing of airfares.

The level and types of aviation activity occurring at an airport are dependent upon many factors, but generally reflective of the services available to aircraft operators, the meteorological conditions under which the Airport operates (daily and seasonally), the businesses located on the Airport or within the community the Airport serves, and the general economic conditions prevalent within the surrounding area.

These variables represent the basis for developing a set of assumptions pertaining to variety of physical, operational, socioeconomic considerations, and to varying degrees, relate to and affect aviation activity at FNL.

3.1.1 Weather Conditions

Current FNL weather data that was collected and analyzed shows, the Airport is not adversely affected by poor weather conditions, except for a few days a year. Visual Flight Rules (VFR) meteorological conditions occur, on average, approximately 98.91% of the time annually. In addition, the Airport has a complement of electronic landing guidance systems to assist aircraft operations during periods when weather conditions minimize a pilot’s visual capacity. Therefore, aircraft can operate at FNL on a regular basis throughout the year, with limited interruption due to weather.

3.1.2 Socioeconomic Conditions

Population. The northern Colorado region has seen significant population growth since in recent years. According the Colorado State Demographer's Office, the population of Fort Collins-Loveland area and the Fort Collins Metropolitan Statistical Area (MSA), which is recognized as Larimer County by the US Office of Management and Budget (OMB), increased 14.59% and 14.76%, respectively, between 2010 and 2017. The cities of Fort Collins and Loveland, as well as the Fort Collins MSA, increased more than the state population during this period, which was 11.07%. When evaluated together, the population of Weld and Larimer Counties, which are home to the three largest cities in northern Colorado, increased 16.86% during this period.

Population growth in the northern Colorado area is expected to continue and the major cities in the region (Fort Collins, Loveland, and Greely) are projected to be among the top five fastest growing cities in Colorado. As illustrated in **Table 3-1**, the projected average annual growth rate (AAGR) for the Fort Collins MSA and Weld and Larimer Counties between 2018 and 2038 is 1.29% and 1.77%, respectively.

Employment. The Colorado Department of Labor and Employment reports that there were 205,656 people in the Fort Collins MSA labor force in Q2 of 2018, with an unemployment rate of 2.7%, which is also the unemployment rate in the state of Colorado for the same period. The unemployment rate in the Fort Collins MSA is lower than the that of the US for the same period – 4.0%.

For a decade after the Great Recession, the Fort Collins MSA experienced low unemployment rates and a steady increase in household incomes, increasing purchasing power and stimulating the local economy.

In 2020, the COVID-19 pandemic led to the largest increase in unemployment in modern U.S. history. At the end of Q2 2020, the unemployment rate for the Fort Collins MSA was 9.2%, which represented the lowest unemployment rate of the seven Colorado MSAs and was below the state unemployment rate of 10.7% and the national rate of 11.2%.

Income.[1] The 2016 per capita income for the Fort Collins-Loveland MSA and the state of Colorado was $32,433 and $33,230. This compares to the 2016 US per capita income of $33,205. The 2016 median household income for the Fort Collins-Loveland MSA, the state of Colorado, and the US was $61,942, $62,520, and $55,322, respectively.

Table 3-1: Historical Population Data and Population Projections

Year	Weld and Larimer Counties	Larimer County (MSA)[3]	Fort Collins/ Loveland	State of Colorado
HISTORIC				
1990[1]	319,027	186,136	125,110	3,304,042
2000[1]	436,164	251,494	169,260	4,338,801
2010[1]	554,762	299,630	210,845	5,050,332
2018[2]	663,439	349,079	246,730	5,689,227
PROJECTED				
2023[2]	745,478	378,657	267,636	5,838,181
2028[2]	840,208	411,630	290,941	5,765,527
2033[2]	933,289	442,186	312,539	5,689,227
2038[2]	1,025,940	471,028	332,925	5,838,181
Projected AAGR 2018-2038	**1.77%**	**1.29%**	**1.29%**	**0.13%**

SOURCE: Mead & Hunt, 2018.
NOTES:

1. U.S. Census & Demographic Services Center, Colorado Department of Local Affairs, State Demography Office. Available at: https://demography.dola.colorado.gov/population/data/historical_census/. Accessed November 12, 2018.
2. U.S. Census & Demographic Services Center, Colorado Department of Local Affairs, State Demography Office. Available at: https://demography.dola.colorado.gov/population/population-totals-colorado-substate/#population-totals-for-colorado-and-sub-state-regions. Accessed November 12, 2018.
3. The US Office of Management and Budget (OMB) defines metropolitan statistical areas (MSAs) according to published standards that are applied to Census Bureau data. The OMB recognizes the Fort Collins MSA as Larimer County.

[1] Unless otherwise noted, the data source for income data is the U.S. Census Bureau, 2012-2016 American Community Survey 5-year estimates.

3.1.3 Community Support

FNL benefits from the support of both the cities of Loveland and Fort Collins, as well as Larimer County. FNL also benefits from the healthy local industry, and the support of the citizens of Fort Collins, Loveland, and the surrounding communities. Increased interest in development at or near the Airport is associated with economic growth, regional demand, land values, and streamlining of Airport development processes. The Airport is recognized as a vital asset contributing to the economic stability of the city, region, and state.

3.1.4 Aviation Industry[2]

The Airport is located within a thriving region for aviation. FNL is part of the nine-county Metro Denver and Northern Colorado region's airport system, which serves as significant economic engine, with a regional impact of nearly $28 billion that supports over 195,750 jobs in all industries.

In 2017, Aviation was the nine-county region's fastest growing cluster, with 5.7% employment growth between 2016 and 2017, compared with a nationwide increase of 0.1%. Employment in the region's aviation cluster grew for the sixth-consecutive year in 2017. Between 2012 and 2017, aviation employment increased by 23.1%, compared with 4.1% nationally. The strong growth of the Aviation industry in the nine-county region is attributed to the location, low overall costs of doing aviation-related business, and access to aviation-related training programs.

3.1.5 Emerging Technology

As a vital asset to a major commercial center in the Fort Collins/Loveland area and a key component of the region's growing high-tech/innovation-focused economy, the Airport is well positioned to support advancing aviation technology sectors, including hybrid and electric propulsion for civil and commercial aircraft as well as electric vertical takeoff and landing (eVTOL) aircraft for urban mobility. There are currently nearly 100 electrically propelled aircraft being developed around the world; more than half were unveiled within just the last 18 months.[3]

[2] Unless otherwise noted, Aviation Industry information was sourced from the Metro Denver Economic Development Corporation, AVIATION: Metro Denver and Northern Colorado Industry Cluster Profile, 2018.

[3] Roland Berger Strategy Consultants. *Electric flight just over the horizon*. Available at: https://www.rolandberger.com/en/Insights/Global-Topics/Electric-Propulsion/. Accessed December 18, 2018.

In an effort to achieve large reductions in aviation carbon emissions, both start-up companies and large aerospace companies are developing battery technology for all-electric power generation primarily intended for general aviation aircraft and urban air mobility vehicles. While the introduction of electric and hybrid-electric aircraft will be a phased process, it's likely to start with general aviation, including short-range urban air taxis, followed by regional aircraft, and eventually long-range commercial aircraft.[4]

As emerging technologies, the regulatory framework; certification and licensing requirements; and maintenance, infrastructure, and operational needs are still being developed and there is not yet enough information available to develop forecasts for these types of aviation activity. However, recent market studies commissioned by NASA, as well as those published by financial investment and analysis companies, such as Morgan Stanley, estimate that as many as 100,000 eVTOL aircraft could be flying commercially in the coming decades as part of an emerging $500 billion to $2 trillion market.[5]

3.1.6 Remote Tower Project

In 2017, the Colorado Department of Transportation (CDOT) Aeronautics Division and the FAA contracted with Searidge Technologies to build a remote air-traffic control tower at FNL, which will utilize cameras and radar to monitor and control FNL traffic. This project is being completed to improve safety and help attract commercial airlines to FNL. In addition to revolutionizing future airport and aircraft operations, the remote tower project demonstrates FNL's leadership in incorporating new technology as an avenue to improve the National Airspace System (NAS).

Based on the current project schedule, testing for the remote tower will begin in 2020. When Allegiant Air ceased service at FNL in 2012, they cited the lack of a tower and safety concerns as contributing factors and have indicated to the Airport that should the remote tower project prove successful, they would be interested in reinitiating service.

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[4] Velocci, Tony (for Dassault Systèmes North America). *Electric Propulsion Will be Propelling Aviation Into its Next Golden Age* (2018). Available at: https://blogs.3ds.com/northamerica/electric-propulsion-will-be-propelling-aviation-into-its-next-golden-age/?linkId=61035033. Accessed December 18, 2018.

[5] Wolfe, Frank (2019, January 15). *"Promise of eVTOL "Coming to Be Realized," GAMA Says*. Retrieved from https://www.rotorandwing.com/2019/01/15/promise-evtol-coming-realized-gama-says/.

3.1.7 Community/Airport Location Potential

In addition to the Fort Collins-Loveland area, many of the surrounding communities of the northern Front Range region of Colorado benefit from the proximity of a high-quality aviation facility and, in turn, provide an economic base that serves as a market for commercial passenger service and can attract additional based aircraft and industrial/business development. This impact was documented in the latest Colorado Department of Transportation (CDOT) Division of Aeronautics (the Division) Economic Impact Study, completed in 2020. According to the Study, the total annual economic contribution of FNL is estimated to be almost $161 million in output and 1,072 jobs, with an annual payroll of nearly $52 million.

Economic activity was defined as the "economic contribution" of the Airport to the region and state economy in terms of total jobs, wages, and economic activity (business receipts).

In addition to the larger regional economic impact generated by the Airport, some local businesses rely heavily on the Airport to maintain a healthy, synergistic, environment. According to the Study, those businesses that are dependent or rely upon the Airport produced nearly $161 million in economic activity, almost $52 million in wages, and 1,072 jobs according to 2018 data, which demonstrates the value that the Airport provides to the local community.

In **Appendix D - General Aviation Industry Analysis**, Aviation Management Consulting Group (AMCG) notes that FNL's role as a regional airport when compared with competing and comparable airports remains viable because of factors such as local community business and industry, traditional economic analysis, airport infrastructure, licensed pilots, registered aircraft, and overall demographics.

3.1.8 Potential Challenges

Generally, there are very few negative factors that have potential to significantly impact future aviation activity at FNL. However, as part of the planning process it is important to consider broad factors that could have a negative or neutralizing impact on the Airport, and the aviation industry. From an on-airport facilities standpoint, runway length and width, and lack of appropriate passenger terminal facilities could potentially be considered negative factors.

Other potential challenges could include the relatively slow growth in general aviation activity nationally for the past 20 years. New general aviation aircraft deliveries and active general aviation aircraft have both declined during the past

20 years and are anticipated to grow relatively slowly at 2.6% and 0.1%, respectively (AMCG, 2018).

The current state of the airline industry also presents some potential challenges for FNL as described in **Appendix C - Passenger Demand Analysis.** Potential challenges associated with reinstating commercial service could include:

- **Industry trends:** Airline frequency and capacity changes; airline profitability; airline consolidation; bankruptcies, mergers and acquisitions; fleet changes; the fluctuating price of fuel; the pilot shortage; and low-cost carrier competition.
- **Major network airlines:** With Denver International Airport (DEN) located approximately one-hour from FNL, traditional major network airlines such as American, Delta, United or Southwest, are unlikely to serve the market in the near term. Looking longer term, American may be a possibility.
- **Ultra-low-cost carriers:** A number of low-cost carriers have a presence at DEN. It is unknown if any of these carriers would be willing to operate from both markets.

3.2 Historical Airport Activity

The aviation activity profile provides a baseline for the forecasts by identifying trends in activity at FNL and providing context for any changes in aviation activity that have occurred. Sources of information include the FAA, Airport management, and Airport tenants. This section summarizes historical operations and based aircraft information. Prior to 2020, FNL was a non-towered airport so IFR records and the FAA TAF are the primary resources for historical aviation activity at the Airport. Historical operations and based aircraft data are summarized in **Table 3-2**. Because FNL was a non-towered airport, operations were been primarily tracked through instrument flight rules (IFR) filings and historical TAF data.

Table 3-2: Historical Aviation Activity

Northern Colorado Regional Airport (FNL) Aircraft Operations							
Year	Passenger Enplanements	Operations					Total Based Aircraft
		Air Carrier	Air Taxi & Commuter	GA	Military	Total	
2003	4,901	348	0	101,735	200	102,283	208
2004	30,333	736	0	105,804	200	106,740	215
2005	32,394	876	0	110,035	200	111,111	222*
2006	33,262	1,014	0	114,436	200	115,650	230
2007	29,069	1,154	0	119,015	200	120,369	230
2008	30,800	1,167	0	120,775	200	122,142	230
2009	31,809	1,209	0	122,452	200	123,861	220
2010	31,297	526	3,500	106,500	200	107,226	219
2011	44,662	624	3,500	106,500	200	107,324	215
2012	43,798	660	3,500	106,500	200	107,360	237
2013	4,872	600	3,500	106,500	200	107,300	247
2014	1,733	150	3,500	94,650	200	95,000	248
2015	2,978	110	3,500	94,650	200	94,960	263
2016	3,720	46	3,500	94,650	200	94,896	263
2017	3,288	48	3,500	95,776	200	96,024	266

SOURCES: FAA TAF (FNL 1998-2017) and 2007 FNL Airport Master Plan.
NOTE: * 2007 Master Plan notes that a based aircraft count was conducted Spring 2005 by Airport Personnel and that there were 204 based aircraft in 2005.

3.2.1 Summary of Historical Enplanements and Operations

Passenger Enplanements. The fluctuations in passenger enplanements since 2003 are primarily related to whether an airline was providing commercial service at FNL in a particular year, as illustrated in **Table 3-2**. Enplanements grew significantly in 2003-2004 when Allegiant added commercial service. Enplanements peaked in 2011 at 44,662 when Allegiant was providing service to both Phoenix-Mesa and Las Vegas. Enplanements increased by more than 10,000 between 2010 and 2011 when Allegiant added Phoenix-Mesa as a second destination. When Allegiant discontinued its FNL service in the fall of 2012, passenger enplanements decreased significantly.

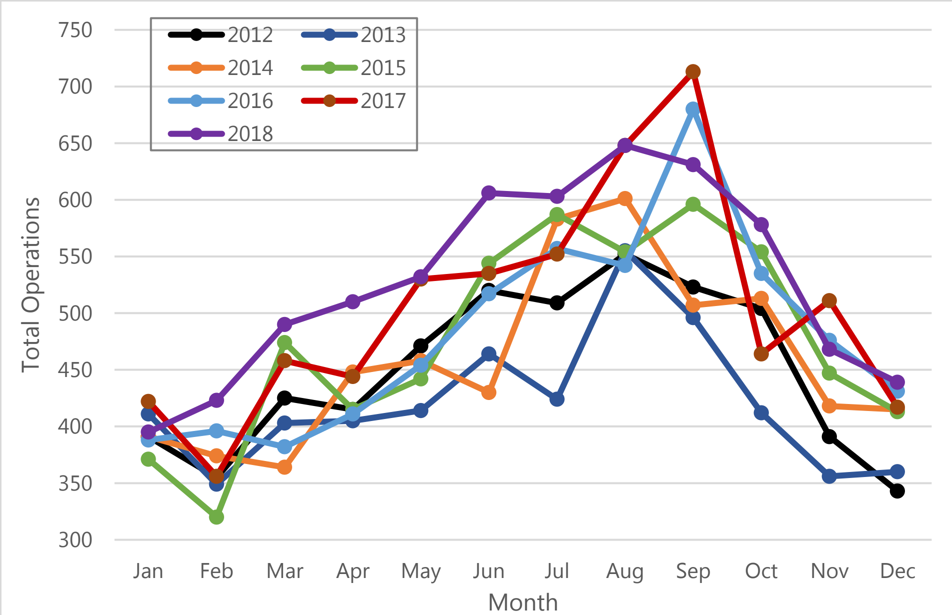
The load factor on Allegiant's service to Las Vegas improved over time, exceeding 90% on an annual basis for the first time in 2008. Loads continued to be strong through 2012. The Phoenix-Mesa service had strong load factor performance, averaging 92-93%. With the introduction of air traffic control in 2020 and return of a commercial service airline, FNL could minimize the need of individuals to commute to alternate departing airports (i.e., Denver International Airport), ultimately increasing the number of enplanements to 2004-2012 levels.

Total Operations. While it is important to identify historical and current trends as part of the forecasting process, historical activity levels at non-towered airports like FNL represent estimates, rather than actual counts, and different data sources generally provide conflicting information. For instance, the current aviation activity levels at FNL recorded in the FAA Terminal Area Forecast (TAF) and the Airport Master Record Form 5010 (effective September 13, 2018) show different operations counts.

As illustrated in **Table 3-2**, historical TAF data shows that total aircraft operations (either a takeoff or a landing) increased steadily between 2003-2009, before beginning to decline until 2016, and increasing slighting in 2017. Estimated annual counts have ranged from a low of 94,896 operations in 2016 to a high of approximately 123,861 operations in 2009.

Additional operational data was collected from the FAA Traffic Flow Management System Counts (TFMSC) for FNL between 2012 and 2018 and illustrated in **Table 3-2**. TFMSC data only reflects operations on an Instrument Flight Rules (IFR) flight plan, which has been approximately 4-6% of the total annual operations at FNL since 2010. While filed IFR flight plans represent only a small percentage of all operations at FNL when compared to historical TAF operations, this data does illustrate an increasing trend in IFR operations at FNL with a seasonal peaking of IFR operations in late summer (August and September) each year.

Figure 3-1: Historical TFMSC Operations



SOURCE: FAA Traffic Flow Management System Counts (TFMSC), Aviation System Performance Metrics (ASPM), IFR operations 2012-2018.

Air Carrier Operations. Air carrier operations are defined as commercially operated aircraft capable of accommodating more than 60 passenger seats. In 2003, Allegiant Air began serving FNL and ceased operations in 2012. After two years of no scheduled service, Elite Airways entered the market with service to Chicago Rockford International Airport. Elite provided service from 2015 to 2016.

From 2003-2012, Allegiant provided air service on a less-than-daily basis to Las Vegas. Allegiant also provided service to Phoenix-Mesa from 2010 to 2012. As illustrated in **Table 3-2**, the years with higher annual air carrier aircraft operations coincide with the years Allegiant provided commercial service at FNL from 2003-2012. Scheduled available seats peaked for the year ended March 31, 2012, with 46,350 annual seats and 309 annual flights. The lowest service level occurred from the first quarter of 2013 through the second quarter of 2015 when the Airport had no scheduled commercial airline service. Elite's service provided far fewer seats and flights than the previous service provided by Allegiant. Since 2016, when Elite stopped providing service, there has been no scheduled commercial air service at FNL.

FNL does not currently have scheduled air carrier activity. Commercial service aircraft operations at FNL are currently represented by a combination of regional jet and narrow-body jet aircraft that are operated by Elite Airways (CRJ 100/200 and Embraer 135/145) and Sun Country Airlines (Boeing 737s) and other charter aircraft operators associated with Colorado State University and Northern

Colorado University sports teams charter operations. FNL also has some charter flight diversions from Denver International Airport during inclement weather.

Air Taxi/Commuter Operations. Air Taxi operations are defined as those aircraft capable of seating less than 60 passengers, which are being utilized for commercial passenger or air freight service and which use a three-letter company designator or the "Tango" designation. For purposes of this study, Air Taxi aircraft utilized for scheduled passenger service are included in the air carrier operations category, and those utilized for freight or other purposes are included in the general aviation operations category. As illustrated in **Table 3-2,** there are no recorded air taxi operations from 2003-2009. Since 2010 annual Air Taxi operations have remained at 3,500. Air Taxi operations at FNL are primarily from charter aircraft operations and fractional ownership turboprops or small jets.

General Aviation (GA) Operations. Most operations at FNL fall under the general aviation category. GA includes a wide range of operations, including flight training, air ambulance, wildland firefighting, pipeline survey, and corporate aviation. Based on historical TAF estimates, GA traffic contributed between 98 and 99 percent of all operations at FNL between 1998 and 2017.

Military Operations. Since 2003, there have been an estimated 200 military operations at FNL annually. Historically, military aircraft have infrequently operated at FNL. Military operations have generally been related to training and/or operational purposes. FAA Traffic Flow Management System Counts (TFMSC) data indicates that helicopters, particularly the Sikorsky SH-60 Seahawk and UH 60-Blackhawk, have accounted for the majority of military operations since 2007.

3.2.2 Historical Based Aircraft Mix

The number of aircraft that can be expected to base at any airport is dependent upon many factors, such as aircraft maintenance facilities, airport communication practices, services provided at the Airport, airport proximity and access, and similar factors. According to Airport Management there are currently 256 based aircraft at FNL, which are summarized in **Table 3-3**.

Table 3-3: 2018 Based Aircraft by Type

2018 Airport Reported Based Aircraft								
	Single Engine	Multi Engine	Jet	Helicopters	Gliders	Military	Ultra-Light	Total
Based Aircraft	216	16	9	13	1	0	1	256

SOURCE: FAA National Based Aircraft Inventory

3.2.3 Fleet Mix/Aircraft Type Operations

FAA Aircraft Classification.

Table 3-4 identifies a fleet mix breakdown of FY 2018 FNL aircraft operations by FAA category per the TFMSC database. While TFMSC data only reflects operations on an Instrument Flight Rules (IFR) flight plan, which are primarily high-performance aircraft, and such operations account for approximately 4-6% of the total operations when compared to historical TAF operations, the TFMSC data provides a breakdown of the types of aircraft that make up the total IFR operations at FNL. From this TFMSC information, it's possible to estimate the percentage of total operations by each aircraft type.

The FAA Airport Reference Code (ARC) is a classification by aircraft category determined by the Aircraft Approach Category (defined by the aircraft approach speed and expressed by letter A through D) and the Airplane Design Group (defined by the wingspan and tail height and expressed by Roman numeral I through III). The information summarized in this table represents the best estimate at determining the breakdown of FY 2018 airport operations in ARC categories.

Table 3-4: FY 2018 TFMSC Operations Estimate by ARC

FAA ARC Category (Aircraft Type)	Operations	Percentage
General Aviation/Air Carrier/Air Taxi	5,286	94.43%
A-I (single engine piston)	*1,056*	*18.86%*
A-II (single and multi-engine piston)	*243*	*4.34%*
B-I (multi-engine piston, singe engine turboprop and small jet)	*989*	*17.67%*
B-II (multi-engine turboprop and small jet)	*1,666*	*29.76%*
B-III (multi-engine turboprop)	*14*	*0.25%*
C-I (small business jet)	*422*	*7.54%*
C-II (medium business jet)	*633*	*11.31%*
C-III (large business jet)	*27*	*0.48%*
D-I (medium business jet)	*35*	*0.63%*
D-II (large business jet)	*102*	*1.82%*
D-III (large business jet)	*99*	*1.77%*
Helicopter	116	2.07%
Military	91	1.63%
No Data	105	1.88%
Total	**5,598**	**100%**

SOURCE: FAA Traffic Flow Management System Counts (TFMSC), Aviation System Performance Metrics (ASPM), IFR operations FY 2018.

3.3 Forecast Documentation Review and Data Sources

To provide context for the development of future activity levels, it's important to not only to consider historical aviation activity data, but also existing projections for both the region and the Airport made by other independent organizations. In addition to that collecting and analyzing historical aviation activity data, a documentation review was also conducted to ascertain and assess available forecast-related data pertinent to the FNL forecasts, including FAA guidance documents, published industry analysis and statistical studies, and other approved state, local, and Airport studies.

The following reports, studies, publications, and associated projections were referenced to provide support and guidance in the development of the aviation activity forecasts presented in this chapter.

The COVID-19 pandemic greatly disrupted the aviation industry in 2020. The decline in commercial air travel was especially severe and recovery to pre-pandemic levels will likely take several years. The following forecasts were made prior to the pandemic, therefore do not consider its impacts.

3.3.1 Historical Forecasting Documents

2007 Fort Collins-Loveland Municipal Airport Master Plan (Chapter B – Forecasts of Aviation Activity). The last Master Plan, completed in 2007, used 2003 as the base year and forecasted aviation activity through the year 2023. Overall, the 2007 Plan forecasted aviation activity to increase over the course of the 20-year planning period. Based on a combination of commercial service and general aviation forecasting methods. The 2007 Plan forecasted total operations to increase from 102,283 in 2003 to 151,776 by 2023.

2013 State Aviation System Plan. FNL airport activity projections published in the Colorado Department of Transportation (CDOT) Division of Aeronautics *Colorado Aviation System Plan* (CASP), which was last completed in 2011, were also referenced. From 2010 through 2030, CDOT estimated that total operations at FNL would increase by about 1.3% annually, which is slightly less than the 1.5% average annual growth rate of other commercial service airports in the state.

3.3.2 Federal Aviation Administration Published Data and Guidance

Federal Aviation Administration Terminal Area Forecast (TAF) 2008-2038. The TAF is FAA developed forecasting tool that is updated annually and used by the FAA to determine budget and staffing needs. Due to limited staff resources, the FAA cannot forecast in as great of detail at smaller regional airports as they can at large airports. However, the TAF provides a guideline for developing forecasts, and is utilized by FAA to compare scenario-driven forecasts (like those presented in this chapter) with the forecasts developed by the FAA. The TAF for FNL does not consider important localized aviation environment factors (such as the remote tower project at FNL and high potential for reinstitution of commercial service). Aviation activity forecasts are one of the two master plan components that require FAA approval. It is important to note that if a preferred forecast varies more than 10% from the TAF in the first five years or 15% within the first 10 years, it must be supported by an acceptable forecast methodology and analysis.

Federal Aviation Administration Aerospace Forecasts Fiscal Years 2018-2038. FAA prepares annual updates of this document, which examines the current economic and aviation outlook, as well as macro level forecasts of aviation activity and the aircraft fleet in the U.S. The 2018 FAA forecast calls for U.S. carrier passenger growth over the next 20 years to average 1.9% annually. Overall, the

2018-2038 FAA Aerospace Forecast projects active general aviation pilots to decrease about 22,600 (down 0.4% annually) over the next 20 years. In the long term, it's predicted that the aviation industry will be competitive and profitable, characterized by increasing demand for air travel and airfares growing more slowly than inflation, reflecting over the long term a growing U.S. and global economy.

The long-term outlook for general aviation is stable to optimistic, as growth at the high-end offsets continuing retirements at the traditional low end of the segment.

The active general aviation fleet is forecast to remain relatively stable between 2018 and 2038. Both private and commercial pilot certificates are projected to decrease at an average annual rate of 0.8 and 0.5 percent, respectively until 2038. The Student pilot forecast is currently suspended because of the April 2016 rule change that the new student pilot certificates do not expire. This change generates a cumulative increase in the certificate numbers and breaks the link between student pilot and advanced certificate levels of private pilot or higher. Currently, there is insufficient data to formulate a reliable forecast for the student pilots.

Federal Aviation Administration Advisory Circular 150/5070-6B (Change 2), Airport Master Plans. This AC describes the methodology for preparing airport master plans, including the development of FAA compliant forecasts. For the forecasting component of master planning, it provides key guidance on preparing aviation activity forecasts and it identifies what elements should be forecasted.

Federal Aviation Administration Form 5010-1, Airport Master Record: An Airport Master Record, commonly referred to as the 5010, summarizes aeronautical data and physical and operational characteristics of active airports included in the National Airspace System (NAS). Airport data are compiled from both physical inspections of the airport, and the National Airspace System Resources (NASR) database. FNL's last FAA inspection was on May 15, 2019.

Forecasting Aviation Activity by Airport (Prepared for FAA by GRA, Inc.). GRA, Inc. developed this document for FAA in 2001, which provides guidance for those preparing and reviewing airport activity forecasts. The FAA follows this guidance when developing the TAF.

3.3.3 Industry Reports

Aircraft Manufacturer Marketing Outlooks. Demand for aviation services is generally driven by changes in economic activity. The aviation industry declined with the economy during the 2008 recession and has been slowly recovering ever since. Aircraft manufacturers have increased production to supply commercial airline fleet renewal programs, and general aviation operators have sought more fuel efficient and technologically capable aircraft. The FAA Aerospace Forecast expects U.S. scheduled domestic airline passengers to increase by an average of 1.9% through 2038.

Based on figures released by the General Aviation Manufactures Association (GAMA), U.S. manufacturers of general aviation aircraft delivered 2,324 aircraft in 2017, 2.4% more than 2016. Overall piston deliveries increased by 6.5%, with single-engine deliveries up 5.2%, and the much smaller multi-engine category up 15.5%. In the turbine categories, turbojet deliveries were up 1.3%. Turboprop deliveries were down 3.3% in 2017.

Overall, forecasts from the FAA, GAMA, and the commercial airline manufacturers show the long-term outlook for the aviation industry is one of growth.

3.4 Forecast Approach and Methodology

Now that existing and historical socioeconomic data and Airport activity and trends have been collected, analyzed, and presented, and industry trends and their relevance to FNL have been identified, this information will be used to inform and develop realistic forecasts of future demand (both aircraft operations and based aircraft) at FNL for the 20-year planning period (2018-2038).

Various forecast statistical methods (trend, market share, and regression) were considered and assessed for applicability in developing a range of reasonable forecast scenarios.

While the forecast method(s) provide a means for developing quantifiable aviation demand, the confidence and correlations for each forecast method is susceptible to some level of uncertainty. Therefore, the forecast scenarios are documented and substantiated by historic FNL activity trends, FAA statistical industry-related projections, and other applicable national, local, and industry-related data sources. Although activity levels during individual years might be above or below the forecast projections, the Airport's future developments should conform to the tracking of actual activity. For this reason, the forecasts do not necessarily coincide to a specific year, and are considered 'unconstrained', which assumes facilities and services are, or will be, sufficiently available to accommodate user demands when the demand arises.

From this, a single preferred forecast is selected based on qualified research and professional industry knowledge, as found acceptable upon Airport Management and the Planning and Development Subcommittee (PDSC) review.

The preferred forecast is then compared with the FAA TAF for consistency and submitted to the FAA for review and formal written approval. FAA forecast approval guidance indicates that:

> *For all classes of airports, forecasts for total enplanements, based aircraft, and total operations are considered consistent with the TAF if the forecasts differ by less than 10% in the 5-year forecast period, and 15% in the 10-year forecast period.*[6]

Given the anticipated start of testing of the remote tower in 2020 at FNL, and the high potential for reintroducing commercial air service, a low forecast scenario (representing no commercial service for the duration of the planning period) and a range of scenarios that consider future commercial service are tested to support fiscally judicious financial recommendations. A high forecast scenario is also used to test the adequacy of programmed facility improvements to accommodate demand that is beyond the recommended forecast.

3.5 Aviation Activity Forecasts

Aviation activity forecasts for airports are often established using several sets of assumptions to generate a range of possible forecast scenarios. Several forecast scenarios are used in this Master Plan Update, the primary purpose of which is to provide a long-term facilities development plan for the Airport that safely and efficiently accommodates anticipated demand. The forecasts presented in this section will be used to inform the future Airport and AIA land use compatibility program.

Forecasting any type of future activity is as much an art as a science, particularly in the current climate of airline deregulation and changing operating methodologies (legacy airline hub and spoke systems vs. low cost carrier's point-to-point systems). Any forecast represents a "best guess" or "deducted guess" at a particular point in time. It must, therefore, be revised and updated periodically to reflect new conditions and developments.

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[6] FAA Airports, *Memo: Review and Approval of Aviation Forecasts* (2008). Available at: https://www.faa.gov/airports/planning_capacity/media/approval_local_forecasts_2008.pdf. Accessed November 14, 2018.

The projections of aviation demand at FNL the next 20-year planning period are based on the information presented above and summarized in the following sections, along with a description of the various forecast methodologies considered.

3.5.1 Passenger Enplanements Forecast

Passenger enplanement forecasts are an important element of the forecasting effort as they form the cornerstone of formulating air carrier and commuter operations projections. Commercial passenger service was reintroduced at FNL by Allegiant in 2003, after several years of no scheduled passenger service. Allegiant discontinued its commercial service at FNL again in 2012.

Four enplanement scenarios, ranging from low to high growth, are presented in this section and subsequently compared with the TAF.

3.5.1.1 Enplanement Scenarios

The four passenger enplanement scenarios are presented in this section for consideration. They are based on a variety of assumptions that consider a range of potential scenarios related to the return of commercial service following the establishment of air traffic control as part of the remote tower project in 2020. Each scenario assumes 3,388 enplanements in 2018 as the base year, which represents estimates provided by Airport management and information provided in the TAF. The scenarios described below are compared against each other and to the TAF in **Table 3-5**.

- **Scenario One – Low Growth/No Commercial Service (1.29%):** This scenario projects enplanements to increase at a CAGR of 1.29%, which is equal to the projected population average annual growth rate (AAGR) for the Fort Collins MSA between 2018 and 2038, as reported by the State of Colorado Demographer's Office projections. This scenario is the most conservative scenario assumes that no air carriers will provide commercial service at FNL within the 20-year planning period.

- **Scenario Two – Medium Growth/Low-Cost Carrier Service to One Destination (3.25%):** This scenario represents a somewhat conservative approach to the potential for Allegiant's return to FNL as the scenario anticipates that the only commercial service destination is Las Vegas. Given Allegiant's successful history in providing commercial service to Las Vegas, it is reasonable to believe they will provide this service again after air traffic control is in place and the remote tower begins testing. It assumes that Allegiant provides service on a less than daily basis to Las Vegas, generally with four weekly roundtrips.

Allegiant's tendency to provide less than daily service was historically driven by aircraft type as they used MD-80's, which were expensive to operate. Following the transition to Airbus A-320 aircraft, Allegiant has provided more daily service from regional airports like FNL, as their ability to park aircraft on historically slower days such as Tuesday, Wednesday, or Saturday, has been limited.

As illustrated in **Table 3-5**, this scenario has flat growth for the first two years of the planning period (2018 and 2019). In 2020, Allegiant returns with commercial service to Las Vegas with 30,000 enplanements, which is approximately the number of enplanements Allegiant had in its first year of providing FNL commercial service to Las Vegas in 2008. From 2020 through the end of the planning period, this scenario reflects a 3.25% CAGR, the same growth rate as projected by the TAF for the planning period.

Scenario Three – Medium Growth/Low-Cost Carrier Service to Two Destinations (3.25%): This scenario considers the return of Allegiant Air return to FNL with service two both Las Vegas and Phoenix. This scenario utilizes a 3.25% CAGR for FNL enplanements, which is equivalent to the TAF for the planning period (2018-2038). This scenario represents a more optimistic approach with Allegiant's return to FNL and initial service to both Las Vegas and Phoenix-Mesa. Like Scenario 2, the scenario shows flat growth for the first two years of the planning period (2018 and 2019). In 2020, Allegiant returns with service to Las Vegas and Phoenix-Mesa with 44,000 enplanements.

- **Scenario 4 – High Growth/Low-Cost Carrier Commercial Service to Two Destinations and A Regional Carrier to One Destination (4.7%):** This is the most optimistic scenario for future commercial service at FNL. Scenario Four assumes that Allegiant returns with daily service two destinations and second carrier provides service to one destination. Regional airline service would mostly likely be to a major hub like DFW or PHX. Additional low-cost service may be provided to a number of potential destinations from FNL as described on pages 36 and 37 of **Appendix C**. Scenario 4 reflects a 4.70% CAGR, which correlates to the historical TAF air carrier enplanement counts from 2008-2012, when Allegiant was providing commercial service at FNL.

The forecast scenarios described above are also illustrated in **Figure 3-2**, along with the historical TAF reported passenger enplanements from 2008-2017.

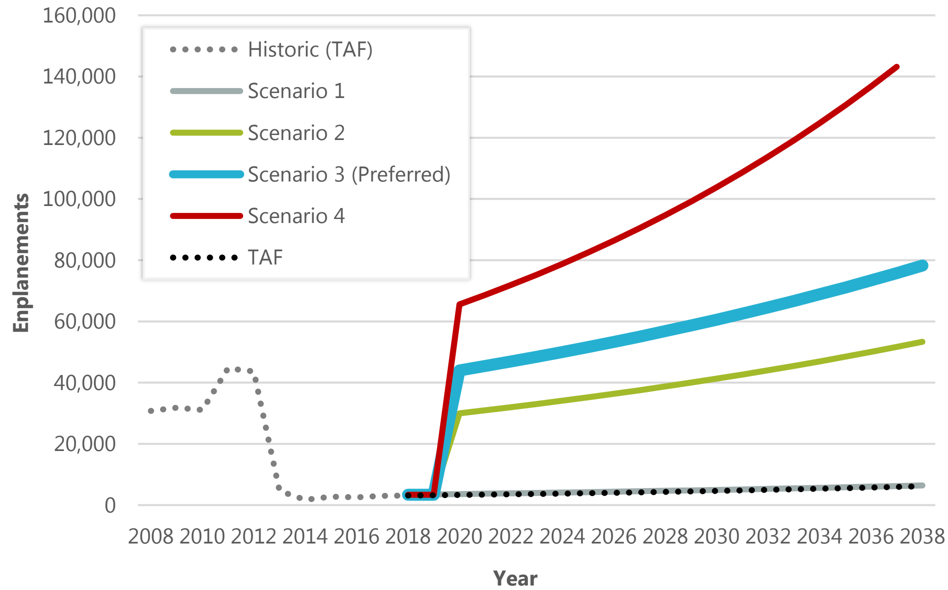
Table 3-5: Forecasted Enplanements Scenario Comparison

Year	TAF	Scenario One[1]	Scenario Two[1]	Scenario Three[1]	Scenario Four[2]
2018	**3,388**	**3,388**	**3,388**	**3,388**	**3,388**
2019	3,488	3,498	3,388	3,388	3,388
2020	3,588	3,612	30,000	44,000	65,580
2021	3,688	3,729	30,975	45,430	68,662
2022	3,788	3,850	31,982	46,906	71,889
2023	**3,888**	**3,976**	**33,021**	**48,431**	**75,268**
2024	4,019	4,105	34,094	50,005	78,806
2025	4,154	4,238	35,202	51,630	82,510
2026	4,294	4,376	36,346	53,308	86,388
2027	4,438	4,518	37,528	55,041	90,448
2028	**4,590**	**4,665**	**38,747**	**56,829**	**94,699**
2029	4,746	4,817	40,007	58,676	99,150
2030	4,908	4,973	41,307	60,583	103,810
2031	5,076	5,135	42,649	62,552	108,689
2032	5,247	5,302	44,035	64,585	113,797
2033	**5,425**	**5,474**	**45,467**	**66,684**	**119,146**
2034	5,611	5,652	46,944	68,852	124,746
2035	5,803	5,835	48,470	71,089	130,609
2036	6,002	6,025	50,045	73,400	136,747
2037	6,208	6,221	51,672	75,785	143,174
2038	**6,423**	**6,423**	**53,351**	**78,248**	**149,903**
CAGR (2018-2038)	**3.25%**	**3.25%**	**14.78%**	**17.00%**	**20.86%**
CAGR (2020-2038)	**3.29%**	**3.25%**	**3.25%**	**3.25%**	**4.70%**

SOURCES: Mead & Hunt, 2018.
U.S. Census & Demographic Services Center, Colorado Department of Local Affairs, State Demography Office. Available at: https://demography.dola.colorado.gov/population/population-totals-colorado-substate/#population-totals-for-colorado-and-sub-state-regions. Accessed October 1, 2018.
FAA 2018 APO Terminal Area Forecast Detail Report for FNL.

NOTES: Low- and medium growth forecasts are based on TAF projected enplanements 3.25% CAGR 2020-2038.
High growth forecast is based on TAF historical air carrier enplanements 4.70% CAGR 2004-2012.

Figure 3-2: Historical Passenger Enplanements and Forecast Enplanement Scenarios



SOURCE: Mead & Hunt, 2018.
NOTE: Data source is FAA 2018 APO Terminal Area Forecast Detail Report for FNL.

Preferred Passenger Enplanements Forecast Scenario. Based on Allegiant's historical success at FNL with service to two destinations, Scenario 3 is the preferred passenger enplanement forecast because it is reasonable to assume that Allegiant will initiate service following the introduction of air traffic control as part of the remote tower project. Also, historical enplanements and operations show that Allegiant's service at FNL was successful operating at around a 93% load factor between 2010 and 2012, when Allegiant provided service to both Las Vegas and Phoenix-Mesa.

Additional justification for this preferred passenger enplanements forecast relative to Allegiant Air is included on pages 34 and 35 of **Appendix C**. Allegiant Travel (parent company of Allegiant) has demonstrated consistent growth since the early 2000s. In October 2018, Allegiant posted its 63rd consecutive profitable quarter and noted that since 2016, the company has grown 20% in capacity (available seats per mile) carrying 13.6 million passengers during the previous twelve months, an increase of 1.64 million passengers over 2016.[7]

[7] (Allegiant Travel Company Investor Relations, 2018). Available at: http://ir.allegiantair.com/news-releases/news-release-details/allegiant-travel-company-third-quarter-2018-financial-results.

3.5.2 Commercial Operations Forecast

The establishment of projected passenger enplanements is required to properly project commercial service operations and there is usually a direct relationship between passenger enplanements and commercial service operations. If enplanements increase, operations will generally increase to accommodate the demand. However, the relationship can vary significantly, in that enplanements can increase without increasing operations, or even increase following a decrease in operations. Often, this is a result of airlines using larger aircraft with greater seating capacity, or more efficient scheduling with increased passenger load factors. The Boarding Load Factor (BLF) of the A320 was used to determine the forecast of commercial service operations. The BLF is the ratio of seats available for passenger boarding on an aircraft compared to the number of passengers actually boarding (for example, if an aircraft has fifty seats available and twenty-five passengers board, the BLF is 50%).

According to the 2018 FAA baseline estimates in the FAA Aerospace Forecasts Fiscal Years 2018-2038, average load factors of approximately 84.7% increasing to 86.6% are anticipated to be achieved by the air carrier industry through 2038. Historically, low-cost air service at FNL operated near a 93% BLF during the period when service was offered to two destinations; therefore, this was used as the BLF in the air carrier operations forecast presented in **Table 3-6**, which shows that with continued additions of the A320 aircraft, the average seats per departure (177 seats) and the projected BLF (approximately 93%) are anticipated to remain consistent throughout the planning period. As shown in **Table 3-6**, the projected numbers of total commercial operations in 2038 is 4,454.

Table 3-6: Commercial Service Forecast

Year	Air Carrier Enplanements	Average # of Seats/ Departure	BLF	Departures	Air Carrier Operations[2]	Commuter/ Air Taxi Operations[3]	Total Commercial Operations[4]
2018	3,388	177	76.6%	25	50	3,500	3,550
2023	48,431	177	92.8%	295	590	3,500	4,090
2028	56,829	177	92.8%	346	692	3,500	4,192
2033	66,684	177	92.8%	406	812	3,500	4,312
2038	78,248	177	92.7%	477	954	3,500	4,454

SOURCE: Mead & Hunt, 2018.
NOTES:
1. 2018 enplanements and operational data sourced from the 2018 FAA TAF.
2. Operations = Departures x 2.
3. Private charters at FNL are considered air taxi operations (and accounted for in the general aviation forecast). Public Charters are considered non-scheduled commercial service aircraft operations.
4. 2018 commercial operations data sourced from the 2018 FAA TAF.

3.5.3 Air Cargo Activity Forecast

Historically, air cargo activity has been closely associated with the Gross Domestic Product (GDP). National factors and trends that potentially stimulate demand for air cargo include increased market opportunities through open skies agreements, decreased costs from global airline alliances, and increased business volumes attributable to e-commerce. Factors and trends that could potentially limit growth of air cargo include increased use of e-mail, decreased costs of sending documents via facsimile, and the increased costs to airlines in meeting environmental and security restrictions.

Perhaps the most influential component currently affecting the air cargo industry is the security directives emanating from the 9/11 terrorist attacks in 2001. Directives since that time have strengthened security standards for transporting cargo on passenger flights (i.e., no USPS package weighing more than 13 ounces can be shipped on a passenger aircraft) and have required air cargo carriers to conduct random inspections of cargo. These restrictions are anticipated to remain in place for the foreseeable future and, in fact, may become more stringent.

Air Cargo activity at the Airport is generally counted in the general aviation air taxi category. It is anticipated that there is a low potential for increased cargo activity at FNL given the proximity to Denver International Airport (DEN).

3.5.4 Military Operations Forecast

As a percentage of total annual aircraft operations, the number of military operations at the Airport has historically been low (approximately 200 operations per year). There have been no indicators that suggest a significant increase the number of military operations in the future at FNL and the Department of Defense (DoD) does not typically publicize plans for future military use of publicly owned airports; therefore, the number of military aircraft operations is projected to remain at historic levels throughout the planning period, with 200 annual operations.

3.5.5 General Aviation Aircraft (GA) Operations Forecast

Many different factors impact the number of GA operations at an airport including, but not limited to:

- Total based aircraft
- Area demographics
- Activity and policies of neighboring airports
- National trends

In developing the GA activity forecasts, national trends were considered along with airport-specific data and trends identified within the northeast region of Colorado to appropriately reflect current GA operation activity and provide realistic projections for the 20-year planning period as shown in **Table 3-7.** Note that these forecasts serve only as estimates and the reasoning, assumptions, and trends that the numbers represent are the most important element of this forecasting element.

The four GA forecast scenarios anticipate GA traffic will increase in 2019 with the planned relocation of Aims Community College (ACC) flight training operations program to FNL. Based on information provided to Airport Management by ACC, there would be an additional 25 to 30 program related flights a day at the Airport beginning in 2019. Outside of this immediate increase projected in 2019, the forecast scenarios generated for this assume, for the most part, straight-line growth. While it is recognized that straight-line (consistent) growth never occurs year after year for many years, average annual growth methodologies are appropriate for intermediate and long-range planning purposes.

General Aviation (GA) Operations Forecasts

Four total forecasting scenarios were considered based upon national, regional, and local trends.

- **Scenario One – Flat Growth/(0%):** This scenario shows an immediate increase of 6,500 GA operations in 2019 associated with the ACC flight operations program and no growth through the remainder of the planning period. While this scenario does not project a decline in GA operations, it represents the most conservative projection based on the general flat growth or a slight decline over the 20-year planning period.

- **Scenario Two – Low Growth/(1.2%):** This scenario also shows an immediate increase of 6,500 operations in 2019 associated with the ACC flight operations program and forecasts GA operations to increase 1.21% annually, which is equal to the TAF projected growth rate for FNL GA/Air Taxi during planning period (2018-2038).

- **Scenario Three – Medium Growth/(1.8%):** This scenario also shows an immediate increase of 6,500 operations in 2019 associated with the ACC flight operations program and forecasts GA operations to increase 1.77% annually, which is equal to the combined average annual growth rate (AAGR) for Weld and Larimer Counties projected through planning period (2018-2038).

- **Scenario Four – High Growth/(4.2%):** This scenario also shows an immediate increase of 6,500 operations in 2019 associated with the ACC flight operations program and forecasts GA operations to increase at 4.2% annually, which is equal to the 2017 growth rate for general aviation deliveries as reported by the FAA Aerospace Forecast (Fiscal Year 2018-38).

Preferred General Aviation (GA) Operations Forecast Scenario. Scenario Three is the preferred forecast scenario for GA operations because it mirrors the anticipated growth in northern Colorado, and it positions FNL to be at 65% capacity within 15 years (2033) and 70% capacity by the end of the planning period (2038).[8]

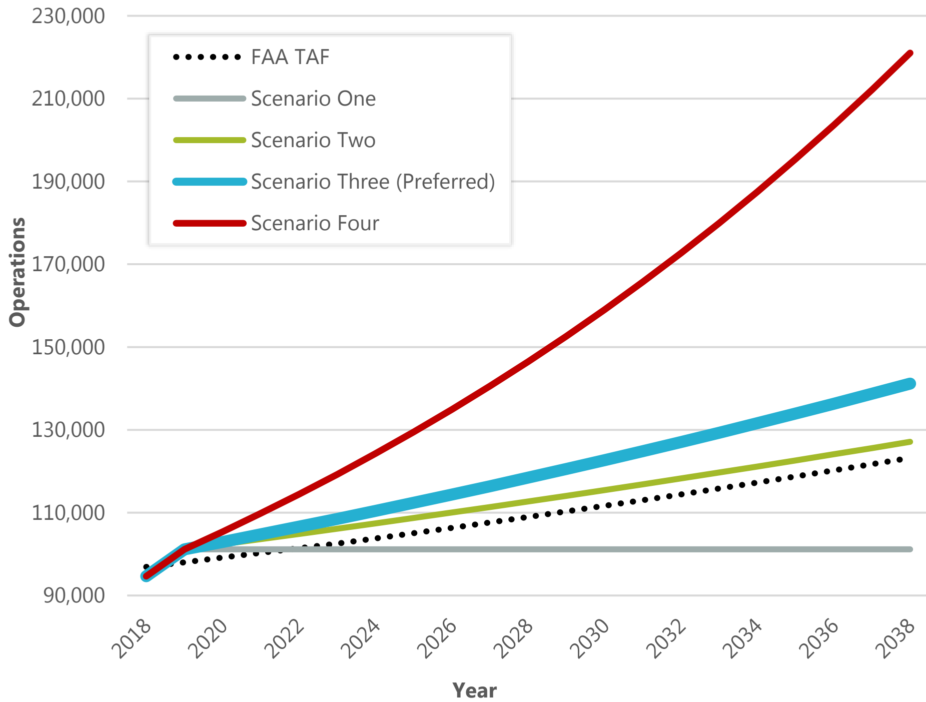
Table 3-7: General Aviation (GA) Operations Forecast Scenarios, 2013-2038

Year	TAF (1.21%)[1]	2007 Master Plan (4.0% then 1.27)[2]	Scenario One (0.00%)	Scenario Two (1.21%)	Scenario Three (1.77%) *Preferred*	Scenario Four (4.20%)
2018[3]	96,901	140,425	94,650	94,650	94,650	94,650
2023	102,530	149,572	101,150	106,135	108,504	119,244
2028	108,952	--	101,150	112,714	118,452	146,479
2033	115,836	--	101,150	119,700	129,313	179,934
2038	123,217	--	101,150	127,119	141,170	221,031

SOURCE: Mead & Hunt, 2018.
NOTES: -- Data not available.
1. FAA Terminal Area Forecast, Fiscal Years 20018-2038, issued January 2017. Includes air taxi operations.
2. Preferred forecast obtained from the 2007 Fort Collins-Loveland Municipal Airport Master Plan Update, which assumed that FNL would attract based aircraft following the closure of the Downtown Fort Collins Airport and operations would grow at 4% annually from 2008-2013 and at 1.27% after that, which translated to the average annual population growth rate for Larimer County 2003-2008.
3. 2018 base year scenario data sourced from FNL Airport Master Record 5010.

[8] Capacity estimates are based on 200,000 operations per year for a single runway airport.

Figure 3-3: General Aviation (GA)/Air Taxi Operations Forecasts, 2018-2038



SOURCE: Mead & Hunt, 2018.

Forecasted operations are also categorized as local or itinerant operations. The Air Traffic Control Handbook defines a local operation as any operation performed by an aircraft operating in the local traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the Airport.

Local operations currently account for 37.1% of all Airport operations and are expected to increase to 47.1% by the end of the planning period as a result of approximately 6,500 additional operations annually associated with the ACC flight school. Based on this consideration, local and itinerant operations forecasts are summarized in **Table 3-8**.

Table 3-8: Local and Itinerant Operations Forecast

Year	Local	Itinerant	Total
2018	35,208	59,692	94,900
2023	43,280	66,013	109,294
2028	50,244	69,100	119,344
2033	58,125	72,200	130,325
2038	67,034	75,289	142,324

SOURCE: Mead & Hunt, 2018.
NOTES: 2018 base year data sourced from the FNL Airport Master Record 5010.

3.5.6 General Aviation (GA) Based Aircraft Forecast

The number of general aviation aircraft that can be expected to base at an airport depends on several factors including, airport radio communications, available facilities, airport operator services, airport proximity and access, aircraft basing capacity available at adjacent airports, and similar considerations. GA operators are particularly sensitive to both the quality and location of their basing facilities, with proximity of home and work often being identified as the primary consideration in the selection of an aircraft basing location.

The based aircraft forecasts for the 20-year planning period are based on the preferred GA operations forecast and five growth scenarios illustrated in **Figure 3-4** and described below. Each of the five forecast scenarios assume that ACC will base seven aircraft at FNL beginning in the fall of 2019.

General Aviation (GA) Based Aircraft Forecasts

In a similar fashion to GA-related operations, forecast scenarios were examined relating to the number of total based aircraft at FNL.

- **Scenario One – Low Growth/(0.77%):** This scenario illustrates a 0.77% average annual growth rate, equivalent to the compound annual growth rate of the total national based aircraft according to the FAA Aerospace Forecast (2018-2038).
- **Scenario Two – Medium-Low Growth/(0.82%):** This scenario illustrates a 0.82% average annual growth rate, equivalent to the average annual growth rate of based aircraft in Colorado according to the TAF (2018-2038).
- **Scenario Three – Medium-High Growth/(0.89%):** This scenario illustrates a 0.89% average annual growth rate, equivalent to the

average annual growth rate of based aircraft in the Northwest Mountain Region according to the TAF (2018-2038).

- **Scenario Four – High Growth/(2.03%):** This scenario illustrates a 2.03% average annual growth rate, equivalent to the historic average annual growth rate of the population in Fort Collins and Loveland (1990-2010).
- **Average Growth/(1.13%):** This scenario represents the average growth rate of scenarios one through four.

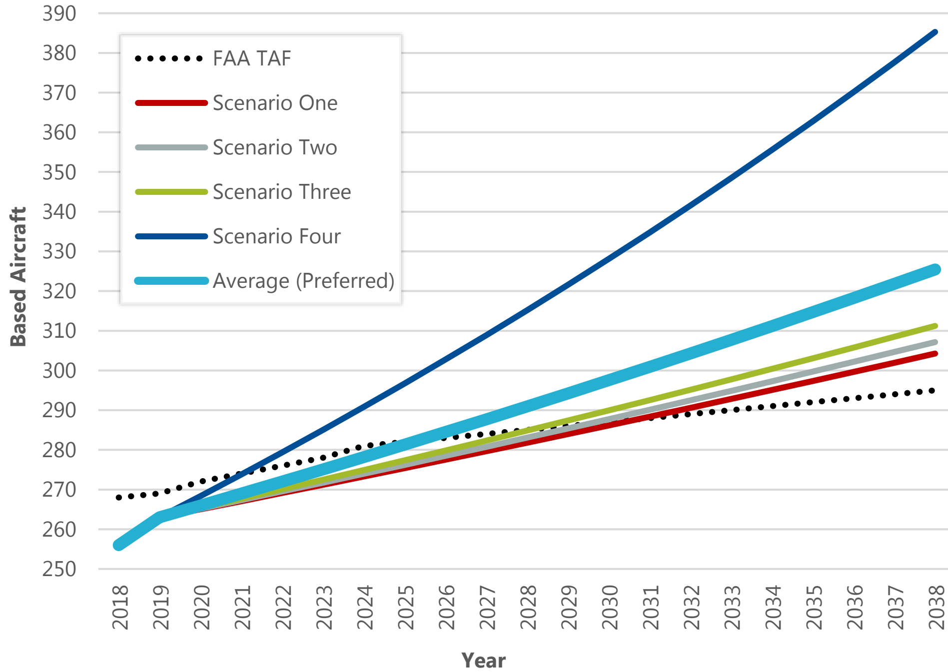
Preferred Based Aircraft Forecast Scenario. The average growth scenario is the preferred forecast scenario for based aircraft and summarized in **Table 3-9**. Following the addition of approximately seven based aircraft associated with ACC in 2019, based aircraft are projected to grow at 1.13% through the end of the planning period.

Table 3-9: General Aviation (GA) Based Aircraft Forecast, 2018-2038

Year	Preferred GA Operations Forecast	Scenario One	Scenario Two	Scenario Three	Scenario Four	Average Scenario (Preferred)
2018	94,650	256	256	256	256	**256**
2023	108,504	271	272	272	285	**275**
2028	118,452	282	283	285	315	**291**
2033	129,313	293	295	298	348	**308**
2038	141,170	304	307	311	385	**325**

SOURCE: Mead & Hunt, 2018.

Figure 3-4: Based Aircraft Forecast Scenarios, 2018-2038



SOURCE: Mead & Hunt, 2018.

3.5.7 Based Aircraft by Type

The mix of based aircraft anticipated at FNL throughout the planning period is illustrated in **Table 3-10**. Single-engine aircraft currently represent a high percentage of based aircraft at the Airport and this is expected to remain the same throughout the planning period. The number of multi-engine piston aircraft based at FNL is expected to remain constant throughout the planning period and based aircraft in the glider/ultra-light category are expected to grow only slightly. The percentage of business jet aircraft is expected to increase as a part of the total based aircraft population. This is in line, first, with overall trends in general aviation, but even more importantly, parallels the economic development and growth expectations and projections characteristic of the region. Based helicopters are anticipated to grow only slightly.

Table 3-10: General Aviation (GA) Based Aircraft Fleet Mix, 2018-2038

Aircraft Type	2018[1]	2023	2028	2033	2038
Single-engine Piston	216	230	241	253	265
Multi-engine Piston	16	16	16	16	16
Glider/Ultra-Light	2	3	4	5	6
Business Jet	9	11	13	15	17
Helicopter	13	15	17	19	21
Total Based Aircraft	**256**	**275**	**291**	**308**	**325**

SOURCE: Mead & Hunt, 2018.
NOTES: 1. 2018 based aircraft fleet mix breakdown provided by FNL Airport Management.

3.5.8 Critical (Design) Aircraft Analysis and Forecasts of Operations by Runway Design Code (RDC)

The types of aircraft presently utilizing FNL and those projected to utilize the Airport in the future have a significant impact on the planning and design of airport facilities. Airport design standards are based on the "critical aircraft," often referred to as the design aircraft that currently utilize the Airport on a regular basis (regular use).

In June of 2017, FAA published AC 150/5000-17, *Critical Aircraft and Regular Use Determination*, which defines "critical aircraft" as the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport. Regular use is 500 or more annual operations, including itinerant and local, excluding touch-and-go operations. An operation is defined as either a takeoff or landing.

The design aircraft can be either one specific aircraft or a composite of more than one aircraft representing the highest Aircraft Approach Category (AAC) and Airplane Design Group (ADG). The selected AAC and ADG are combined to form the Runway Design Code (RDC) of a runway. The RDC determines the dimensional criteria standards that apply to that runway. The first component, depicted by a letter (A-E), is the AAC and relates to the aircraft approach speed. The second component, depicted by a roman numeral (I-V), is the ADG and relates to the aircraft wingspan, and tail height. In general, aircraft approach speed applies to the design standards for runways and runway-related facilities, while aircraft wingspan is primarily related to separation criteria associated with taxiways and taxilanes.

Runway 15/33. Runway 15/33 accommodates most of the small aircraft (aircraft weighing less than 12,500 pounds) and all of the large aircraft (aircraft weighing more than 12,500 pounds). The 2007 Master Plan determined that the "Design Aircraft" for Runway 15/33 was the Allegiant operated MD-83 (narrow body commercial passenger jet aircraft with a passenger seating capacity of 162).

In 2011, the last full calendar year Allegiant provided commercial service, there were 537 MD-83 operations. However, Allegiant has since retired its MD-83 fleet and has transitioned to an all Airbus fleet of A319 aircraft (narrow body commercial passenger jet aircraft with a passenger seating capacity of 156) and A320 aircraft (narrow body commercial passenger jet aircraft with a passenger seating capacity of 177). Like the MD-83, both the A319 and the A320 have a C-III ARC. Even though there is no commercial service at FNL currently, it is anticipated that once their need for air traffic control is met, Allegiant will resume providing commercial service with the A320 aircraft.

Many of the sports charters currently operating at FNL include 737s, which have an ARC of C/DIII. The Airport is also utilized by the business jet fleet, many of which have C- or D- approach speeds and the new, larger business jets (i.e., the Gulfstream V, Canadair Global Express, and the Boeing Business Jet) that have ADG III wingspans.

While the total number of annual C/D aircraft operations is currently less than the 500 operations threshold, the Airport is already designed to accommodate C/D-III aircraft. It is anticipated that commercial service will resume and the A319/A320 will be the design aircraft and consequently, it is recommended that ARC C/D-III criteria continue to be maintained so as not to prohibit commercial service aircraft from operating at FNL in the future.

Runway 6/24. Runway 6/24 is primarily used as an emergency runway and it can only accommodate smaller general aviation aircraft (under 12,500 pounds). The design aircraft fleet for this runway is made up of the single engine piston-driven general aviation aircraft (e.g., the Beech Bonanza, Cessna 172, etc.). The approach speeds for these aircraft are less than 121 knots and wingspans are less than 49 feet. This indicates that this runway should be designed using ARC B-I (small aircraft only) dimensional criteria.

3.6 Aviation Forecasts Summary

Overall, total aircraft operations, passenger enplanements, and based aircraft at FNL are anticipated to increase over the course of the 20-year planning period. **Table 3-11** summarizes the preferred aviation activity forecasts presented in this chapter. This forecast information will be used in the following chapter to document and analyze both airside and landside facility requirements. Therefore, these forecasts of aviation activity represent the basis for planning and implementation decisions related to future airport development that can accommodate the forecasted aviation activity growth at FNL.

After identifying the preferred aviation operations and based aircraft forecasts, an assessment of the current and future critical aircraft was conducted. The critical aircraft determination is a very important outcome of this chapter because it is a key consideration in the development of the remaining sections of this Plan. The critical aircraft is used to analyze facility requirements, aid in the development of alternatives, and guide the design and programming of future airport facilities. In other words, the aviation activity forecasts (and critical aircraft determination) serve as the foundation from which future development needs are determined and implementation decisions will be made.

Table 3-11: Summary of Aviation Activity Forecasts, 2018-2038

Aviation Activity	2018	2023	2028	2033	2038
OPERATIONS					
Commercial Service	50[1]	590	692	812	954
General Aviation	94,650[2]	108,504	118,452	129,313	141,170
Single Engine Piston	*63,298*[3]	*72,372*	*79,008*	*86,252*	*94,160*
Multi-Engine Piston	*28,470*[3]	*32,009*	*34,351*	*36,854*	*39,528*
Turboprop	*285*[3]	*597*	*948*	*1,358*	*1,835*
Business Jet	*2,847*[3]	*3,526*	*4,146*	*4,849*	*5,647*
Military	200[2]	200	200	200	200
TOTAL OPERATIONS	**94,900**[2]	**109,294**	**119,344**	**130,325**	**142,324**
Local Operations	35,208[2]	43,280	50,244	58,125	67,034
Itinerant Operations	59,692[2]	66,013	69,100	72,200	75,289
PASSENGER ENPLANEMENTS					
Enplanements	**3,388**[2]	**48,431**	**56,829**	**66,684**	**78,248**
BASED AIRCRAFT BY TYPE					
Single Engine Piston	216[1]	230	241	253	265
Multi-Engine Piston	16[1]	16	16	16	16
Glider/Ultra-Light	2[1]	3	4	5	6
Business Jet	9[1]	11	13	15	17
Helicopter	13[1]	15	17	19	21
Total Based Aircraft	**256**[4]	**275**	**291**	**308**	**325**

SOURCE: Mead & Hunt, 2018.
NOTES:
1.FAA 2018 APO Terminal Area Forecast Detail Report for FNL.
2. Base year data source: FAA Form 5010.
3. Percentages of GA operations by aircraft by type were extrapolated using the percentages identified in the 2007 Fort Collins-Loveland Airport Master Plan.
4. National Based Aircraft Inventory

Table 3-12 provides a comparison of the preferred aviation activity forecasts and the FAA TAF aviation activity forecasts. As previously noted, forecasts for total enplanements, based aircraft, and total operations are considered consistent with the TAF if the forecasts differ by less than 10% in the 5-year forecast period (2023), and 15% in the 10-year forecast period (2028).

While the preferred forecasts for total operations and based aircraft are consistent with the FAA TAF, the preferred enplanements and commercial operations forecasts are not consistent with TAF forecasts, as the TAF does not account for the anticipated return of commercial service. This information is presented below in **Table 3-12**.

Table 3-12: Master Plan Forecasts/TAF Forecast Comparison, 2018-2038

Aviation Activity	Master Plan Forecast (Preferred)	January 2018 TAF	AF/TAF % Difference
ENPLANEMENTS			
Base Year (2018)	3,388	3,388	0.0%
2023	48,431	3,888	1,145.7%
2028	56,829	4,590	1,138.1%
2033	78,248	5,425	1,342.4%
COMMERCIAL OPERATIONS			
Base Year (2018)	50	50	0.0%
2023	590	60	883.3%
2028	692	70	888.6%
2033	812	80	915.0%
TOTAL OPERATIONS			
Base Year (2018)	94,900	97,151	-2.3%
2023	109,294	102,790	6.3%
2028	119,344	109,222	9.3%
2033	130,325	116,116	12.2%
BASED AIRCRAFT			
Base Year (2018)	256	268	-4.5%
2023	275	278	-1.1%
2028	291	285	2.1%
2033	308	290	6.2%

SOURCE: Mead & Hunt, 2018.

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CHAPTER 4.

CAPACITY ANALYSIS AND FACILITY REQUIREMENTS

Introduction

A key step in the master planning process is determining the requirements of airport facilities that are needed to accommodate airside and landside needs throughout the planning period. By comparing the existing conditions at Northern Colorado Regional Airport (FNL or the Airport), which were presented in **Chapter 2 – Inventory** in conjunction with the predicted growth patterns developed in **Chapter 3 – Aviation Activity Forecasts**, this chapter defines the future requirements for airside, landside, and terminal facilities to accommodate FNL's forecasted aviation demand related to the existing and forecasted fleet through 2038.

Determining FNL's current capacity and ability to accommodate future airport capacity is an essential step in estimating future airport needs. The capacity of an airfield is primarily a function of the major aircraft operating surfaces that compose the facility and the configuration of those surfaces (runways and taxiways). Airfield capacity is also affected by wind coverage, airfield layout, and aircraft mix. A capacity analysis is used to identify deficiencies, surpluses, and opportunities for future development, and ultimately inform the design of the Airport Layout Plan (ALP) and future facility development.

This chapter describes the capacity analysis methodology and findings; airside and landside facility requirements; passenger terminal requirements; and remote tower operational considerations. The findings of this Airfield Capacity & Facility Requirements chapter will be used to inform the following chapter, which presents and evaluates a range of development alternatives to meet the current and projected aviation activity at the Airport.

The capacity analysis and facility requirements review presented in this chapter resulted in the recommendations summarized in **Table 4-1**, which are necessary to meet FAA design standards and accommodate forecasted aviation activity.

The analysis in this chapter was done for the critical (design) aircraft identified in **Chapter 3 – Aviation Activity Forecasts**. Airbus A319/A320 is the critical (design) aircraft for Runway 15/33. The B-I-Small criteria was used for Runway 6/24. Refer to **Figure 4-1** for a representation of critical (design) aircraft and aircraft from other Runway Design Codes (RDC).

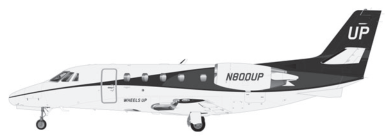
Table 4-1: Capacity Analysis and Facility Requirements Recommendations Summary

Item	Recommendation
Airfield Capacity	It is recommended that the Airport continue planning for a parallel runway and initiate design/construction of parallel runway when annual operations reach 164,000.
Runway Length	It is recommended that the Airport continue to plan for a 1,000-feet runway extension to better accommodate the current business jet fleet as well as Allegiant's A319 and A320, and other narrow body aircraft anticipated to operate at FNL. It is recommended that Runway 6/24 remain at current length.
Runway Width	It is recommended that the Airport consider widening of both runways in accordance with FAA standards to safely accommodate future commercial service aircraft.
Runway Shoulder	The Airport should consider runway shoulder improvements in accordance with FAA standards.
Holding Position Markings	It is recommended that the Airport adjust holding position markings on Taxiway A at Runway End 6.
Taxiway Shoulder	The Airport should consider taxiway shoulder improvements per FAA standards. The quantity of exit taxiways at FNL is adequate for existing and future operations; no action is recommended.
Runway Object Free Area (ROFA)	The Airport meets ROFA criteria for Runway 15/33 and 6/24. No action is recommended.
Runway Protection Zone (RPZ)	The Airport does not have complete ownership of RPZs for Runways 15, 33, and 24. It is recommended that the Airport attain sufficient interest in Runway Protection Zones.
Runway Safety Area (RSA)	The Airport meets RSA criteria for Runway 15/33 and 6/24. No action is recommended.
Airport Access and Circulation	It is recommended that current airport access be maintained in the existing location for the future use. Widening of Earhart road from Lindbergh Drive to the terminal parking lot should be considered as well as expansion as a terminal loop road. The Airport should investigate the need for a dedicated access road to GA facilities.

SOURCE: Mead & Hunt, 2018.

RDC A-I
Single-Engine Aircraft - 2 to 6 Seats
Cessna-172
Beech Bonanza
Cirrus SR22

RDC B-I
Twin-Piston Aircraft - 4 to 10 Seats
Piper 31-310 Navajo
Beech Baron 58
Cessna 414



RDC B-II
Twin-Turboprop/Business Jet/Small Cabin Aircraft
6 to 12 Seats - *Includes most commercial turboprop aircraft.*
Citation Excel/XLS
Beach King Air 200
Pilatus PC-12

RDC C/D-I
Business Jets - 6 to 12 Seats
Lear 45
1124 Westwind
Hawker 400

RDC C/D-II
Commercial/Business Jet - 6 to 70 Seats
Bombardier CRJ-200
Bombardier CL-600 Challenger
Embraer ERJ-145

RDC C/D-III
Large Commercial/Business Jet - 14 to 177 Seats
Airbus A320
Bombardier BD-700 Global Express
CRJ-900

Representative Aircraft not to scale.

4.1 Airfield Capacity Methodology

As FAA capacity methodology has not changed since the completion of the 2007 Master Plan, the following sections summarize analysis completed as part of 2007 Master Plan. Many characteristics identified in the previous Master Plan still apply. Where applicable, updated data such as wind data, was used in the demand-capacity analysis presented in this chapter. The individual factors that influence airfield capacity are described below.

4.1.1 Airfield Layout

The arrangement and interaction of airfield components (runways, taxiways, and ramp entrances) refers to the layout or "design" of an airfield. FNL's airfield system consists of primary Runway 15/33 and Runway 6/24. Runway 15/33 is supported by full parallel Taxiway A. Runway 6/24 serves as a taxiway for though the fence (TTF) tenants located east of airport property. Taxiway C, B, and D provide access between Taxiway A and terminal/hangar area. Airport hangars, aprons, Fixed Based Operator (FBO), and other facilities are located east of Runway 15/33. The existing landside facilities at FNL have adequate access to the airfield with the current airfield layout. Future development that may be required to accommodate forecasted demand may require additional taxiways or other airfield components.

4.1.2 Climatological Conditions

The climatological conditions specific to the location of an airport influence both the layout or design of the airfield, and the use of the runway system. Variations in the weather, resulting in limited cloud ceilings and reduced visibility, typically lower airfield capacity, while changes in wind direction and velocity dictate runway usage and affect runway capacity.

Ceiling and Visibility. FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, describes three categories of ceiling and visibility minimums for use in both capacity and delay calculations. Conditions needed to meet cloud ceiling and/or visibility criteria under the three approach visibility conditions are summarized in **Table 4-2**.

Table 4-2: Visibility and Ceiling Criteria

Visibility Category	Cloud Ceiling	Visibility
Visual Flight Rules (VFR)	At least 1,000’ above ground level	At least 3 statute miles
Instrument Flight Rules (IFR)	At least 500’, but less than 1,000’	At least 1, but less than 3 statute miles
Poor Visibility and Ceiling (PCV)	Less than 500’	Less than 1 statute mile

SOURCE: FAA Advisory Circular 150/5060-5, Airport Capacity and Delay.

Current National Climatic Data Center data was collected to analyze approach visibility minimums at FNL and summarized in **Table 4-3**.

Table 4-3: National Climatic Data Center Approach Visibility Minimums

Visibility Category	Cloud Ceiling	Visibility	Annual occurrence at FNL
VFR Conditions (all runways)	At least 1,000’ above ground level	At least 3 statute miles	95.2%
VFR minimums to existing Runway 33 approach minimums (Category I ILS)	At least 200’, but less than 1,000’	At least 1/2, but less than 3 statute miles	3.7%
Below Category I ILS minimums	Less than 200’	Less than 1/2 statute mile	1.1%

SOURCE: National Climatic Data Center.

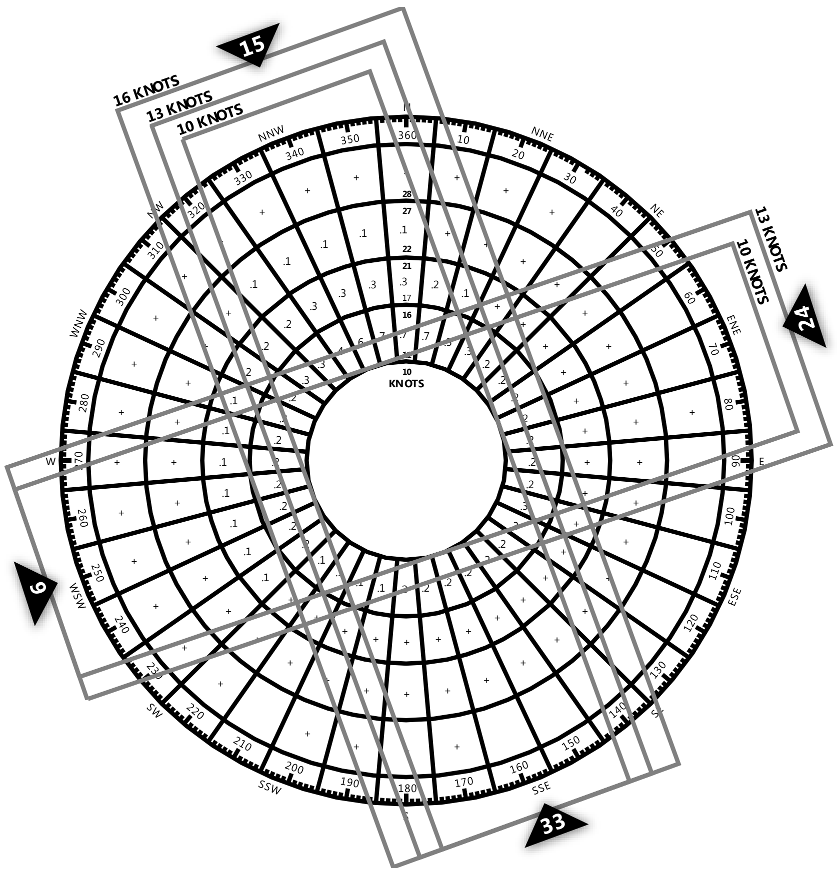
Wind Coverage. Surface wind conditions (direction and speed) generally dictate optimal runway alignment and configuration. Ideally aircraft will land and take off into the wind to take advantage of wind resistance. Runways, which are not oriented to take advantage of prevailing winds, will restrict the capacity of the Airport. Wind conditions affect all airplanes to varying degrees; however, the ability to land and takeoff in crosswind conditions varies according to pilot proficiency and aircraft type. Generally, the smaller the aircraft, the more it is affected by crosswind velocity.

Wind data was collected through FAA’s portal for FNL’s AWOS station Direction and velocity data were collected from year 2008 to 2017.

Based on the all-weather wind analysis for FNL, illustrated in **Figure 4-2** and summarized in **Table 4-4**, the existing runway configuration of the primary runway (Runway 15/33) provides more than 95 percent wind coverage under the allowable crosswind components for aircraft up to C/D-III (16 knots), which are expected to continue to operate at FNL throughout the planning period, under all meteorological conditions.[1] In addition, since it is known that the Airport will continue to also serve small single and twin-engine aircraft for which the allowable crosswind component is 10.5 knots, this crosswind component was also analyzed. For comparison purposes, the 13-knot crosswind component has been included as well.

[1] The allowable crosswind component is dependent upon the Airport Reference Code (ARC) for the type of aircraft that utilize the Airport on a regular basis. The current Airport Reference Code (ARC) for Runway 15/33 is ARC C/D-III.

Figure 4-2: All Weather Windrose



SOURCE: FAA Airport Design Tools, 2008 to 2017.

Table 4-4: All Weather Wind Coverage Summary

Runway	10.5 knots	13 knots	16 knots
All Weather			
Runway 15/33	95.24%	97.26%	98.93%
Runway 6/24	91.57%	94.51%	N/A
Runway 15/33 & 6/24 Combined	98.95%	99.68%	99.93%

SOURCE: Wind analysis tabulation provided by Mead & Hunt utilizing the FAA Airport Design Tools, Wind Analysis. Wind data obtained from AWOS Station 724769, Fort Collins Loveland. Period of Record: 2008-2017.

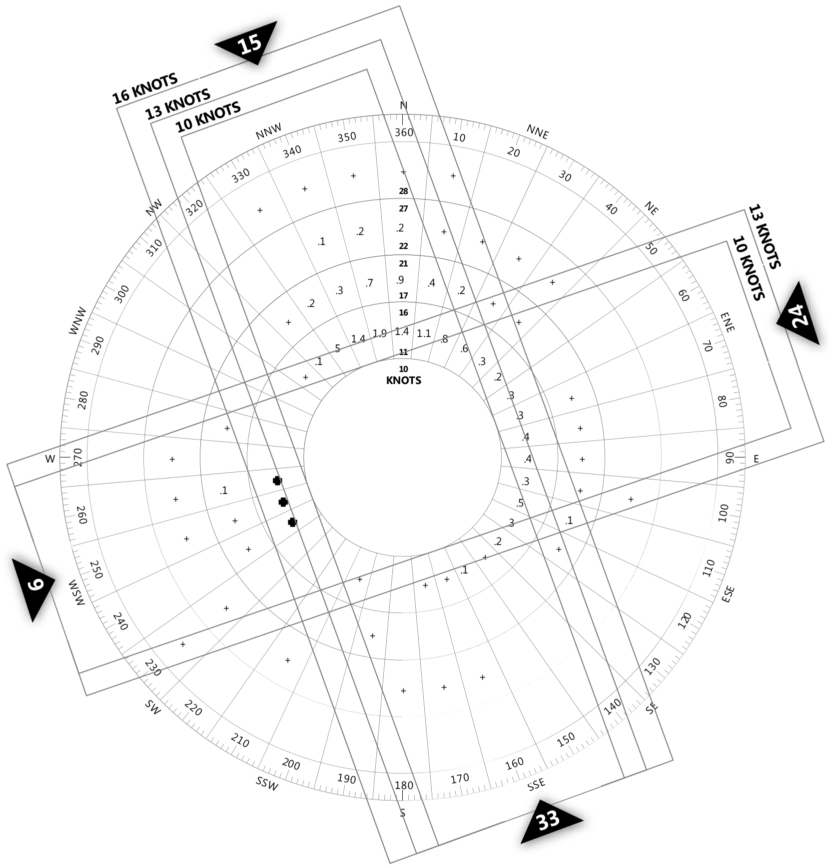
NOTES: Runway 15/33 true bearing is 160 degrees. Runway 6/24 true bearing is 71 degrees. Wind data period of record is 2008 to 2017. All Weather observations – 233,128. A 60-knot tailwind component was used for bidirectional runway wind analysis.

The desired wind coverage for an airport's runway is 95 percent, meaning that the runway orientation and configuration should be developed so that the maximum crosswind component is not exceeded more than 5 percent of the time annually. The FAA may recommend a crosswind if runway if wind coverage for the primary runway is below 95 percent.

As summarized in **Table 4-4**, Runway 15/33 provides more than 95 percent wind coverage with 16-knot, 13-knot, and 10.5-knot crosswind components under all-weather conditions. The combined wind coverage of Runway 15/33 and Runway 6/24 under each crosswind component exceeds 98 percent. This analysis indicates that the existing runway configuration provides adequate wind coverage for the 16-knot, 13-knot, and 10.5-knot crosswind components. Since Runway 15/33 meets the desirable wind coverage criteria (95 percent) without consideration of the crosswind runway, and the type of aircraft operating at the airport is not expected to change, a crosswind runway is not required at FNL to minimize adverse wind conditions.

Figure 4-3 and **Table 4-5** illustrate that runway 15/33 provides over 95 percent coverage for all presented crosswind categories, and thus can accommodate FNL operations independently. Runway 6/24 is not designed for instrument approach procedures.

Figure 4-3: IFR Windrose



SOURCE: FAA Airport Design Tools, 2008-2017.

Table 4-5: IFR Wind Coverage Summary

Runway	10.5 knots	13 knots	16 knots
Instrumental Flight Rules (IFR)			
Runway 15/33	96.29%	98.22%	99.52%
Runway 6/24	89.41%	92.84%	N/A
Runway 15/33 & 6/24 Combined	99.21%	99.82%	99.97%

SOURCE: Wind analysis tabulation provided by Mead & Hunt utilizing the FAA Airport Design Tools, Wind Analysis. Wind data obtained from AWOS Station 724769, Fort Collins Loveland. Period of Record: 2008-2017.

NOTES: Runway 15/33 true bearing is 160 degrees. Runway 6/24 true bearing is 71 degrees. Wind data period of record is 2008 to 2017. IFR observations – 12,541. A 60-knot tailwind component was used for bidirectional runway wind analysis.

Table 4-6 shows that Runway 15/33 is adequate for VFR conditions during all presented crosswind conditions and that Runway 6/24 does not provide sufficient coverage for its users as it provides less than 95 percent coverage.

Table 4-6: VFR Wind Coverage Summary

Runway	10.5 knots	13 knots	16 knots
Visual Flight Rules (VFR)			
Runway 15/33	95.22%	97.23%	98.91%
Runway 6/24	91.77%	94.65%	N/A
Runway 15/33 & 6/24 Combined	98.95%	99.68%	99.93%

1. **SOURCE:** Wind analysis tabulation provided by Mead & Hunt utilizing the FAA Airport Design Tools, Wind Analysis. Wind data obtained from AWOS Station 724769, Fort Collins Loveland. Period of Record: 2008-2017.
2. **NOTES:** Runway 15/33 true bearing is 160 degrees. Runway 6/24 true bearing is 71 degrees. Wind data period of record is 2008 to 2017. VFR observations – 222,857. A 60-knot tailwind component was used for bidirectional runway wind analysis.

No additional runways are necessary for the purpose of providing additional wind coverage throughout the planning period.

4.1.3 Characteristics of Demand

Certain site-specific characteristics related to aviation use and aircraft fleet makeup impact the capacity of the airfield. These characteristics include aircraft mix, runway use, percent arrivals, touch-and-go operations, exit taxiways, and air traffic control rules. Since these characteristics have not changed significantly since the last Master Plan was completed in 2007, this section summarizes the characteristics of demand identified in that study.

Since Runway 6/24 is used less frequently than Runway 15/33, it is not included in the following analysis.

Aircraft Mix. Aircraft mix refers to the variety of aircraft operating at an airport according to maximum take-off weight categories, as described in FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*. Aircraft mix is defined as the relative percentage of operations conducted by each of the four classes of aircraft summarized in **Table 4-7**. There have not been any significant changes in the aircraft mix at FNL since the 2007 Master Plan, which identified an approximate split of 60 percent class A & B aircraft and 40 percent class C aircraft. Currently, there are no class D operations at FNL with no class D operations forecasted throughout the planning period.

Table 4-7: Aircraft Weight Classifications

Aircraft Class	Max Certified Take-off Weight (pounds)	Number of Engines	Wake Turbulence Classification
A	12,500 or less	Single	Small
B	12,500 or less	Multi	Small
C	12,500 to 300,000	Multi	Large
D	Over 300,000	Multi	Heavy

SOURCE: FAA Advisory Circular 150/5060-5, Airport Capacity and Delay.

Runway Use. The use configuration of a runway system is defined by the number, location, and orientation of the active runway(s) and relates to the distribution and frequency of aircraft operations at those facilities. The prevailing winds in the region and the existing runway facilities at FNL dictate the utilization of the existing runway system. Runway 33, the calm-wind runway, remains the most utilized runway, although wind data indicates that prevailing winds only favor it slightly. It is still estimated that approximately 60 percent of the Airport's operations utilize Runway 33, and Runway 15 is used for the remaining 40 percent.

Percent Arrivals. Runway capacity is also significantly influenced by the percentage of all operations that are arrivals. Higher percentages of arrivals during peak periods reduce the Annual Service Volume (ASV) since aircraft on final approach are typically given absolute priority over departing aircraft. The assumption that arrivals equal departures during the peak period at FNL remains valid.

Touch and Go Operations. Touch-and-go operations refer to aircraft maneuvers in which aircraft perform a normal landing touchdown followed by an immediate takeoff without stopping or taxiing clear of the runway. These operations are normally associated with training and are included in local operations figures. Local operations often include touch-and-go operations, which are conducted almost exclusively on Runway 15/33 and comprise approximately 37 percent of all operations at the Airport (according to the FAA's Form 5010, Airport Master Record). By the end of the 20-year planning period, local operations are expected to increase to approximately 47 percent of the total aircraft operations at the Airport. This increase is associated with the Aims Community College (ACC) flight operations program relocating to FNL in 2019.

Exit Taxiways. The quantity and design of the exit taxiways directly influences aircraft runway occupancy time and capacity based on the ability of an aircraft to exit the runway as quickly and safely as possible.

Air Traffic Control (ATC) Rules. The FAA specifies separation criteria and operational procedures for aircraft in the vicinity of an airport contingent upon aircraft size, availability of radar, and sequencing of operations, both advisory and/or regulatory, which may be in effect at the Airport. The impact of ATC on runway capacity is most influenced by aircraft separation requirements dictated by the mix of aircraft utilizing the Airport. Presently, there are no special ATC rules in effect at FNL that significantly impact operational capacity.

4.2 Airfield Capacity Analysis

The airfield capacity analysis performed in the 2007 Master Plan used the following assumptions: arrivals equal departures, the percent of touch-and-go operations is between 0 percent and 50 percent of total operations, there is a full-length parallel taxiway with ample exits and no taxiway crossing issues, there are no airspace limitations, the Airport has at least one (1) runway equipped with an ILS, IFR weather conditions occur roughly 5 percent of the time, and approximately 95 percent of the time the Airport is operated with the runway use configuration that produces the greatest hourly capacity. The optimized capacity for Runway 15/33 is formulated in terms of:

- **Hourly Capacity of Runways (VFR and IFR):** The maximum number of aircraft that can be accommodated under conditions of continuous demand during a one-hour period; and
- **Annual Service Volume (ASV):** A reasonable estimate of an airport's annual capacity.

A single runway airport, with a fleet mix like that at FNL, can have an ASV as high as 205,000 operations, with a VFR capacity of roughly 63 operations per hour, and an IFR capacity of approximately 56 operations per hour. FAA's Airport Improvement Program Handbook recommends planning for additional runway when 60 percent of ASV is reached and constructing additional runways when 80 percent of ASV is reached. The optimized ASV of 205,000 is greater than the number of annual operations (142,324) forecast through the 20-year planning period.

However, from a long-term planning perspective, the forecasted operations are nearly 70 percent of the ASV capacity are close enough that the planning of a significant capacity enhancement (i.e., a new parallel runway) should still be considered in the formulation of the ultimate development plan for the Airport. Adding a parallel runway could potentially increase the Airport's ASV as high as 260,000 operations.

It is recommended that the Airport continue planning for a parallel runway and initiate construction of parallel runway when annual operations reach 164,000.

4.3 Facility Requirements

This section provides an analysis of airside and landside facility requirements necessary to meet forecasted aviation demand at FNL over the 20-year planning period. Airside facilities include the runways, taxiways, runway protection zones, thresholds, and navigational aids. Landside facilities include hangars, aircraft apron areas, and airport support facilities. When existing facilities do not meet the current or future demand, the type and size of facilities required to meet future demand are identified.

This analysis is based on the preferred growth scenario identified in **Chapter 3 - Aviation Activity Forecasts**. This is not intended to dismiss the possibility that, due to the unique circumstances in the region, either accelerated growth or consistently higher or lower levels of activity may occur. Aviation activity levels should be monitored for consistency with the forecasts. In the event of changes, the schedule of development should be adjusted to correspond to the demand for facilities rather than be set to predetermined dates of development. By doing this, over-building or under-building can be avoided.

4.3.1 Airside Facilities

Dimensional Criteria. Runway and taxiway design standards established by FAA AC 150/5300-13A – Change 1 and are based upon the critical aircraft. See **Figure 4-1** for representation of critical (design) aircraft and aircraft from other RDC. See **Table 4-4** for representation of airfield design surfaces.

Runway dimensional design standards define the widths and clearances required to optimize safe operations in the landing and takeoff area. These dimensional standards vary depending upon the RDC for the runway and the type of approach that is provided. C/D-III aircraft still represent the most demanding, or critical aircraft, operating at FNL.

In accordance with previous FAA airport design standards, Runway 15/33 is designated with a RDC of C/D-III; however, it does not currently meet all C/D-III design standards. Runway 15/33 does not meet runway width standard of 150 feet and runway shoulder recommendation of 25 feet wide. Existing Runway 15/33 dimensions and current C/D-III design standards are summarized in **Table 4-8**.

Table 4-8: RDC C/D-III Runway Design Standards – Runway 15/33

Item	Existing Runway Dimension (feet)	C/D-III Design Standard (feet)	Standard Met
Runway 15/33			
Runway Width	*100*	*150*	*No*
Runway Shoulder Width	*N/A*	*25 (recommended)*	*No (25 feet recommended)*
Runway Safety Area (RSA) Width	*500*	*500*	*Yes*
RSA Beyond Runway End	*1,000*	*1,000*	*Yes*
Runway Object Free Area (ROFA) Width	*800*	*800*	*Yes*
ROFA Beyond Runway End	*1,000*	*1,000*	*Yes*
Obstacle Free Zone Width	*400*	*400*	*Yes*
Runway Centerline to:			
Parallel Taxiway Centerline	*400*	*400*	*Yes*
Aircraft Parking	*658*	*500*	*Yes*
Runway Holding Position Markings	*250*	*250*	*Yes*

SOURCE: FAA Advisory Circular 150/5300-13A-Change 1, Airport Design; and existing conditions at FNL.
NOTES: **Runway Safety Area (RSA):** An area adjacent to the runway that is cleared and graded and that has no potentially hazardous ruts, humps, depressions, or other surface variations. Under dry conditions, the safety area shall be capable of supporting aircraft rescue equipment, snow removal equipment, and the occasional passage of aircraft without causing structural damage.
Runway Object Free Area (OFA): A two-dimensional ground area surrounding a runway that is clear of objects protruding above the safety area edge elevation. Objects are acceptable within the OFA if the location is required for the purpose of air navigation or aircraft ground maneuvering purposes.
Bold/Italic Numbers: Indicate existing non-standard condition.
N/A: Not applicable.
--- Data not available.

Associated with Runway 15/33, Taxiway A has a TDG 3 designation. As illustrated in **Table 4-9,** the existing dimensions meet the current TDG 3 standards, which are necessary to accommodate aircraft such as the A320.

Table 4-9: Taxiway Design Group (TDG) 3 Standards

Item	Existing Runway Dimension (feet)	TDG 3 Standards	Standard Met
Taxiway Width	50	50	Yes
Taxiway Safety Area Width	118	118	Yes
Taxiway Object Free Area (TOFA) Width	186	186	Yes

SOURCE: FAA Advisory Circular 150/5300-13A-Change 1, Airport Design

Runway 6/24 is designated with a RDC of B-I Small Aircraft. As summarized in **Table 4-10**, it also does not meet some of the current RDC B-I Small Aircraft design standards outlined in FAA AC 150/5300-13A – Change 1. Runway 6/24 does not meet the runway width standard, shoulder recommendation, and holding position marking standard.

Table 4-10: RDC B-I Small Aircraft Runway Design Standards – Runway 6/24

Item	Existing Runway Dimension (feet)	B-I Small Aircraft Design Standard (feet)	Standard Met
Runway 6/24			
Runway Width	*40*	*60*	*No*
Runway Shoulder Width	*N/A*	*10 (recommended)*	*No (10 ft recommended)*
Runway Safety Area (RSA) Width	*120*	*120*	*Yes*
RSA Beyond Runway End	*240*	*240*	*Yes*
Runway Object Free Area (ROFA) Width	*250*	*250*	*Yes*
ROFA Beyond Runway End	*240*	*240*	*Yes*
Obstacle Free Zone Width	*250*	*250*	*Yes*
Runway Centerline to:			
Parallel Taxiway Centerline	*N/A*	*150*	*N/A*
Aircraft Parking	*1,045*	*125*	*Yes*
Runway Holding Position Markings	*150 & 120*	*150*	*No (Runway 6: -30 ft)*

SOURCE: FAA Advisory Circular 150/5300-13A-Change 1, Airport Design; and existing conditions at FNL.

NOTES: **Runway Safety Area (RSA):** An area adjacent to the runway that is cleared and graded and that has no potentially hazardous ruts, humps, depressions, or other surface variations. Under dry conditions, the safety area shall be capable of supporting aircraft rescue equipment, snow removal equipment, and the occasional passage of aircraft without causing structural damage.

Runway Object Free Area (ROFA): A two-dimensional ground area surrounding a runway that is clear of objects protruding above the safety area edge elevation. Objects are acceptable within the ROFA if the location is required for the purpose of air navigation or aircraft ground maneuvering purposes.

Bold/Italic Numbers: Indicate existing non-standard condition.

N/A: Not applicable.

--- Data not available.

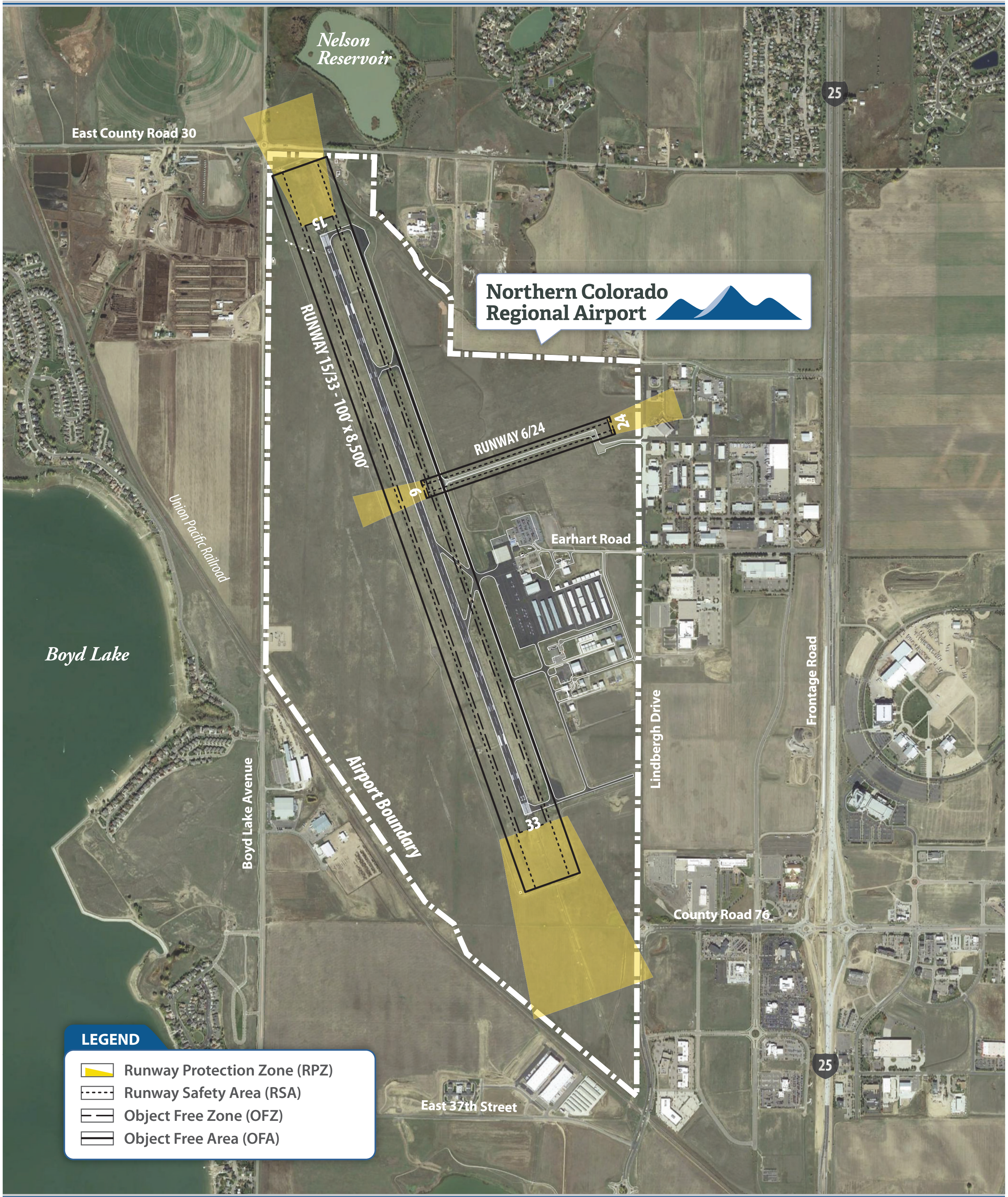
It is recommended that the Airport consider runway width improvements for Runway 15/33 and 6/24, along with correcting holding position markings for Runway 6. The Airport may consider runway shoulder improvements to meet the FAA recommended shoulder width criteria.

Runway Pavement Strength. According to a 2014 report by CH2M HILL, the primary runway at FNL, Runway 15/33, has a Pavement Classification Number of 49 meaning it can support operations by narrow-body aircraft like the Boeing 737 series and the Airbus A319 and A320 family of aircraft. The published pavement strength in the FAA 5010 should be updated to reflect this analysis and these numbers should also be reflected on the ALP that results from this Master Plan Study.

As previously described in **Chapter 3**, while Runway 6/24 is important to the operation of the Airport, it is classified as a secondary runway because wind coverage conditions at FNL do not necessitate a crosswind runway. Runway 6/24 was designed with a pavement strength to serve primarily smaller aircraft weighting up to 12,500 pounds. The 2016 CDOT inspection of Runway 6/24 indicates that this runway has a PCI of 44, which is considered fair condition on the PCI rating scale. The Airport also independently monitors the condition of Runway 6/24; maintenance and capital improvement projects are funded by owners of properties within the adjacent Centrepoint Business Park.

Both runways have adequate pavement strength to accommodate existing and project future aircraft operations.

SOURCE | **AERIAL:** Google Maps, 2018. **SAFETY AREAS DATE:** Mead & Hunt, 2018.



North | Approximate Scale: 1" = 2,000'

Runway Length. FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design,* identifies a step-by-step process for determining recommended runway length. The first step is to determine a critical aircraft for runway length. As determined in the previous chapter, FNL is already designed to accommodate C/D-III aircraft. While there are less than 500 operations of this family grouping of aircraft, it was recommended that RDC C/D-III criteria continue to be maintained so as not to prohibit commercial service aircraft from operating on a regular basis at FNL in the future. The AC notes that if the critical aircraft has a Maximum Take-Off Weight (MTOW) of over 60,000 pounds, the process is to follow the instructions in Chapter 4 of the AC and utilize the Airport Planning Manuals (APMs) published by the aircraft manufacturers.

The 2007 Master Plan recommended that a 1,000-foot extension would provide significant benefit in consideration of Allegiant's Las Vegas service provided at that time and the anticipated Phoenix-Mesa route. The 2007 Master Plan also determined that the business jet fleet, which is similar to the business jet fleet operating at FNL today, would benefit from a 1,000-foot extension, and that a 1,500-foot extension would be optimal (accommodating 100 percent of the fleet at 60 percent useful load).

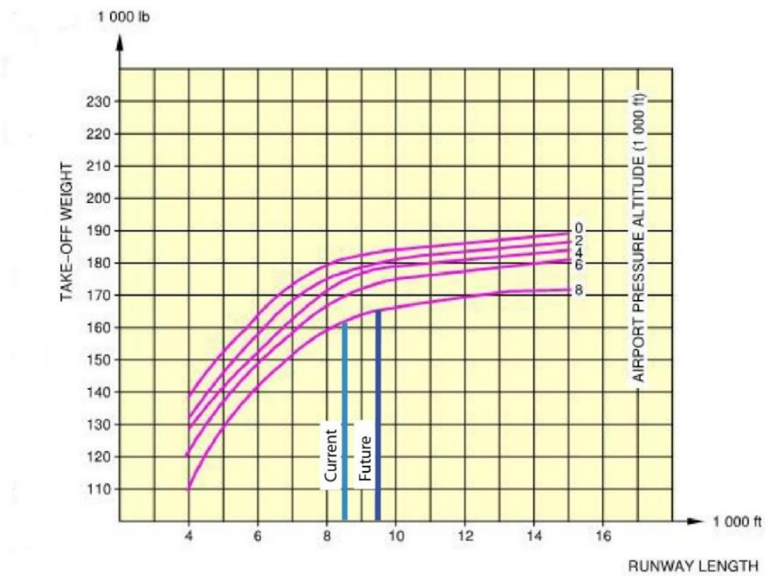
The 1,000-foot extension for Runway 15/33 was based on the design criteria for Allegiant's MD-80 Aircraft. While Allegiant no longer operates the MD-80, the new Allegiant fleet consists of the A319 and A320, which would also significantly benefit from extending the runway based on the runway length analysis presented in this section.

Figure 4-5 displays take-off weight limitations for the A320 aircraft. The Y-axis represents the aircraft's MTOW and the X-axis represents runway length, while the curves inside the graph represent a constant density altitude, which is based on airport's elevation and climate characteristics. The A320's MTOW is 171,961 pounds, and FNL's density altitude is 8,000. Density altitude comes from adjusting the airfield elevation (5,016 feet) to non-standard temperature that occurs during summertime. Air density decreases as temperature and altitude increase. Essentially, aircraft don't perform as well at higher density altitude since there is less air available and require more runway length for takeoffs and landings.

Figure 4-5 also shows that at the current length of 8,500 feet, Runway 15/33 does not provide adequate runway length to accommodate the A320 aircraft at its MTOW. At the current length of Runway 15/33, the A320 could only depart at approximately 163,000 pounds, taking roughly a five percent reduction from the MTOW. Weight reductions are typically accomplished by reducing fuel amounts or reduction in passengers.

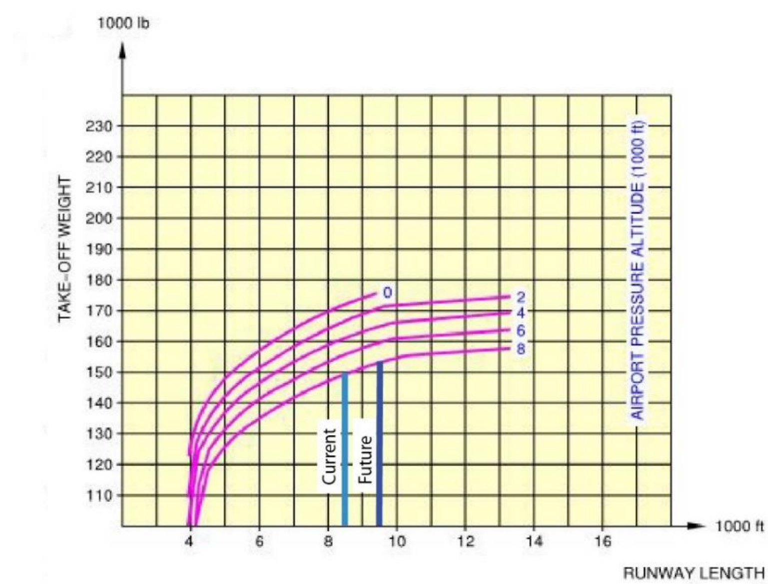
Figure 4-6 represents take-off weight limitations for the Airbus A319, which has a MTOW of 166,000 pounds. To operate at FNL, the A319 would need to reduce its weight to approximately 150,000 pounds, a 10 percent weight reduction.

Figure 4-5: Airbus A320 Take-Off Weight Limitations



SOURCE: Airbus A320 Aircraft Characteristics Airport and Maintenance Planning AC.

Figure 4-6: Airbus A319 Take-Off Weight Limitations



SOURCE: Airbus A319 Aircraft Characteristics Airport and Maintenance Planning AC.

The 2007 Master Plan also cited payload restriction challenges experienced by Allegiant between April 1 and October 31 (a seven-month period), with loads on the 162-seat MD-83 restricted to a maximum of 148 passengers due to takeoff runway length-imposed weight restrictions.[2] Allegiant personnel had also indicated that a 1,000-foot extension (providing a runway length of 9,500 feet), would likely eliminate the weight restrictions on the Las Vegas route, except for very hot days, adding that limitations on other potential routes (i.e., Los Angeles, San Francisco, and Seattle) would be significantly reduced.

Based on the information provided above and the anticipated return of commercial service, a 1,000-foot runway extension would still benefit the existing business jet fleet utilizing the Airport as well as the low-cost air carrier fleet expected to operate at FNL. **Table 4-11** provides a comparison of the runway length requirements for the 2007 Master Plan aircraft fleet and the current fleet using the Airport (or anticipated to use the Airport).

From a long-term planning perspective, the information provided above was substantial enough to provide the impetus to investigate a detailed alternative analysis related to how a runway extension of between 1,000 feet and 1,500 feet might be implemented in the 2007 Master Plan. An extension of 1,000 feet to the south was the preferred alternative and shown on the current ALP.

Based on the existing and anticipated fleet of aircraft that serve FNL, the existing Runway 15/33 length (8,500 feet) could be extended by 1,000 feet to allow some operators to depart FNL at higher takeoff weights, particularly during the summer months. This would increase Allegiant's ability to carry even more useful load, which would further increase FNL's attractiveness as an origin and destination (O&D) passenger market, which may present an opportunity to serve new, longer haul routes to FNL's top 10 markets (identified in **Appendix C – Passenger Demand Analysis)**, such as Los Angeles, San Francisco, and Seattle.

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[2] This information was supported by a letter from Allegiant Air provided in the 2007 Master Plan Appendix. Under the 2007 operating practices, the payload restriction represented 4,247 departing seats that could not be sold (14 seats on 10 flights per week for the seven-month period).

Table 4-11: 2007/2018 Aircraft Fleet Runway Length Requirements Comparison

2007 Master Plan Aircraft	Runway Length Requirement (feet) at MTOW	2018 Master Plan Aircraft	Runway Length Requirement (feet) at MTOW
Business Jet Fleet			
Challenger 600	10,659′	Challenger 350	8,240′
G-IV	10,500′	G-450	10,800′
Cessna Citation 650	8,731′	Cessna Citation Sovereign	6,258′
Commercial Fleet			
MD-80	Greater than 13,000′ or limited to 130,000 lbs (10,000 lbs off MTOW) at current length of 8,500′	A319	Greater than 14,000′ or limited to 155,000 lbs (13,653 lbs off MTOW) at current length of 8,500′
MD-83	Greater than 13,000′ or limited to 144,000 lbs (8,000 lbs off MTOW) at current length of 8,500′	A320	11,500′ or limited to 167,000 lbs (4,900 lbs off MTOW) at current length of 8,500′

SOURCE: FAA Advisory Circular 150/5325-4B, and Individual Aircraft Airport Planning Manuals.

Analysis for Runway 6/24 revealed that to capture 100 percent of the B-I-Small fleet, the runway needs to be 6,300 feet long and 6,200 feet to capture 95 percent of the fleet. Runway 6/24's current length of 2,273 feet greatly restricts the type of aircraft that may operate on the runway; however, the B-I-Small aircraft that require a longer runway currently operate on 15/33.

It is recommended that the Airport continue to plan for a 1,000-feet runway extension to better accommodate the current business jet fleet as well as Allegiant's A319 and A320 aircraft and other narrow body aircraft anticipated to operate at FNL.

It is recommended that Runway 6/24 remain at current length.

Taxiways. Taxiways are constructed primarily to enable the movement of aircraft between the various functional areas on the Airport and the runway system. Some taxiways are necessary simply to provide access between aircraft parking aprons and runways; whereas, other taxiways become necessary to provide more efficient and safer use of the airfield. The Taxiway A system, which serves aircraft on Runway 15/33, is 50 feet wide and designed to meet TDG 3 aircraft. Taxiway A meets the current design criteria for TDG 3 aircraft, which includes the A320.

Taxiway A does not have shoulders. Current FAA design standards recommends that taxiways accommodating ADG-III aircraft have 25-foot paved shoulders.

When serving as a taxiway, Runway 6/24 meets TDG 2 width and Taxiway Edge Safety Margin (TESM) design standards and may accommodate aircraft with main gear width of up to 20 feet and cockpit to main gear distance of up to 65 feet, which characterizes the aircraft currently using Runway 6/24 as taxiway. Runway 6/24 does not have shoulders. Current FAA design standards recommend that TDG 2 taxiways have 15-foot shoulders, which could be constructed of turf, aggregate-turf, soil cement, lime, or bituminous stabilized soil.

In addition, the need for additional exit taxiways will be studied as part of the alternatives analysis in the following chapter to determine if improvements might be implemented to reduce runway occupancy times for arriving aircraft.

It is recommended that the Airport consider taxiway shoulder improvements per FAA standards. The quantity of exit taxiways at FNL is adequate for existing and future operations, no action is recommended.

Runway Protection Zones. The function of the RPZ is to enhance the protection of people and property on the ground beyond the runway ends. This is achieved through airport control of the RPZ areas. The RPZ is trapezoidal in shape and centered about the extended runway centerline. It begins 200 feet beyond the end of the area usable for takeoff or landing. The RPZ dimensions are functions of the type of aircraft operating at the Airport and the approach visibility minimums associated with each runway end. FNL RPZ dimensions are listed in **Table 4-12**. Per FAA guidance the Airport is recommended to purchase RPZ areas in fee simple, if ownership is not attainable, airports may acquire an easement or rely on appropriate zoning.

It is recommended that FNL attain sufficient interest in Runway Protection Zones.

Table 4-12: Runway Protection Zones

Runway End	Width at Runway End	Length	Width at Outer End	Airport Controls Entire RPZ	Percent Owned	Existing Easement
Runway 15	500′	1,700′	1,010′	No	55	No
Runway 33	1,000′	2,500′	1,750′	No	99	No
Runway 6	250′	1,000′	450′	Yes	100	N/A
Runway 24	250′	1,000′	450′	No	46	Yes

SOURCE: FAA AC 150/5300-13A – Change 1.

Electronic Landing Aids. Electronic landing aids, including instrument approach capabilities and associated equipment, airport lighting, and weather/airspace services, which were detailed in **Chapter 2 – Inventory of Existing Conditions**. The Airport is currently equipped with an ILS instrument approach to Runway 33 and RNAV(GPS) instrument approaches serving Runway 15 and Runway 33. The Airport also has a VOR instrument approach procedure.

No new instrument approaches are expected to be developed during the planning period.

Visual Landing Aids (Lights). Presently, the primary runway, Runway 15/33, has a high intensity runway lighting system (HIRL) and the taxiway system is equipped with a medium intensity edge lighting system (MITL). Runway 33 has a medium intensity approach lighting system with runway alignment indicator lights (MALSR), as well as Precision Approach Path Indicator (PAPI) lights west of the runway. Runway 15 has PAPI lights east of the runway and runway end identifier lights (REIL). Runway 6/24 has full-length runway edge reflector lights.

No new visual landing aids are considered necessary during the planning period.

Holding Position Markings. At airports without operating airport traffic control towers (ATCT), runway holdlines identify the location where a pilot should ensure there is adequate separation from other aircraft before proceeding onto the runway. Runway 15/33 meets holding position marking standards with holding positions 250 feet from runway centerline. Runway 6/24 does not meet the 150-foot holding position marking standard at Runway End 6. Holding position markings at Runway End 6 are 120 feet away from runway centerline.

It is recommended that holding position markings at Runway End 6 be relocated to 150 feet away from runway centerline.

Runway Object Free Area (ROFA)

"To the extent practicable, objects in the ROFA should meet the same frangibility requirements as the RSA. Objects non-essential for air navigation or aircraft ground maneuvering purposes must not be placed in the ROFA." *(FAA Advisory Circular 150/5300-13A-Change 1, Airport Design)*

The Airport meets ROFA criteria for Runway 15/33 and 6/24. No action is recommended.

Runway Obstacle Free Zone (ROFZ)

The (ROFZ) is a three-dimensional airspace centered above the runway, above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline, and extended runway centerline that is required to be clear of obstacles for protection to aircraft landing or taking off from the runway and for missed approaches.

The Airport meets ROFZ criteria for Runway 15/33 and 6/24. No action is recommended.

Runway Safety Area (RSA)

Centered on the runway, this area must be cleared and graded to have no potentially hazardous ruts, humps, depressions, or other surface variations; drained by grading or storm sewers to prevent water accumulation; capable, under dry conditions, of supporting snow removal equipment, Aircraft Rescue and Fire Fighting (ARFF) equipment, and the occasional passage of aircraft without causing damage to the aircraft; and be free of objects, except those functionally required to be in the RSA. Objects higher than 3 inches above grade must be constructed, to the extent practical, on frangible mounted structures.

The Airport meets RSA criteria for Runway 15/33 and 6/24. No action is recommended.

4.3.2 Landside Facilities

Landside facilities are those facilities that are supported by the airside facilities but are not actually part of the aircraft operating surfaces. These consist of such facilities as passenger terminal facilities, aprons, access roads, hangars, and support facilities. Following an analysis of these existing facilities, current deficiencies can be noted in terms of accommodating both existing and future needs. Passenger terminal facilities will be discussed in the **Passenger Terminal Facility Requirements** section.

Commercial Aeronautical Development. There are a number of commercial enterprises currently located at the Airport that can be classified as aeronautical development given the operators use of and access to the airfield. These operators include the FBO at the Airport as well as aircraft maintenance operators, helicopter operators, avionics specialists and flight schools.

It is recommended that the Airport continue to reserve space for both expansion of commercial aeronautical development as well as new commercial aeronautical development. Additional detail is provided in the Operator Facility Needs Assessment included in Appendix E.

Non-Aeronautical Development. Generating increased revenue from land assets to help fund airport operations and future improvements continues to be a strategic goal of the Airport. This Master Plan Study and associated ALP will help further establish the conditions and criteria needed to obtain FAA approvals to release portions of the property for non-aeronautical uses. The Airport is ideally situated at the "crossroads" of Northern Colorado with good accessibility to Interstate 25, the primary transportation link within the region.

Strong population and job growth throughout Northern Colorado continue to result from a desirable quality of life, well-educated labor base, high-quality public institutions, a strengthening network of positive social and financial capital, and a strong entrepreneurial spirit. These competitive strengths and assets provide the opportunity to accommodate a variety of non-aeronautical land use needs on portions of the property, to the benefit of both the Airport and communities and region of Northern Colorado.

Non-aeronautical land uses that represent leading opportunities to expand and diversify Airport revenue sources include Light Industrial/Flex uses and Public/Institutional uses:

- **Light Industrial/Flex Uses** - The industrial real estate market continues to be extremely tight with favorable demand-supply fundamentals. The market area has a limited inventory of available, modern industrial building space to accommodate future growth. Developable land sites for traditional Light Industrial/Flex uses within Loveland and Fort Collins are also increasingly scarce.

  The Airport property is situated in the preferred industrial submarket of the region and both near- and long-term opportunities for non-aeronautical industrial use are likely to arise. Prevailing market rents for existing Light Industrial/Flex buildings are typically high enough (and continually increasing) to encourage and reward the speculative development of new industrial building space, provided land with appropriate entitlements/zoning and reasonable pricing is available. Some of the Airport property could be released for non-aeronautical use to provide these industrial land opportunities.

- **Public/Institutional Uses** – Given the FNL's centrality within the region, its property represents an ideal location to serve municipal/public functions, especially multi-jurisdictional land or facility requirements that can be co-located or combined into one location to reduce costs and improve efficiencies. The approximately 43-acre Northern Colorado Law Enforcement Training Center on the west side of the Airport is an example of this opportunity.

  Similar opportunities to generate non-aeronautical land lease revenues while accommodating public land and facility needs may arise over time. A consolidated base for regional emergency and disaster/fire response operations, for example, would derive advantages from an Airport location (given access to airside infrastructure to serve aircraft used in such operations) but may require some non-aeronautical land.

The near-term market is currently stronger for Light Industrial/Flex use than it is for Office uses. Office market conditions are not currently as robust, and the existing inventory has more capacity to accommodate future growth.

East Loveland is not generally a "preferred" location for office space users in the Northern Colorado region, and land supply competition is also much deeper for Office uses. The viability of Airport property as an Office use location can be expected to improve over time as contemporary office parks in Fort Collins, Loveland, and Johnstown build-out and the region continues to grow.

As commercial passenger services at FNL are cultivated over time, this could also stimulate some non-aeronautical land use needs related to ancillary travel services (e.g., hotel, rental cars, and food service). The foreseeable scale of such demands outside of the terminal area, however, would likely be very small (less than five acres). The surrounding environs already contain a relatively complete array of hospitality and travel-related services and amenities.

Non-aeronautical development could be accommodated in a variety of locations on Airport property. However, the two opportunities to create large, contiguous sites for non-aeronautical use are likely to be on the south and west sides of the property. If both areas north and south of the 6/24 runway are not required for future General Aviation facilities, the currently unutilized land south of the runway (east of the Terminal Area) would be desirable to non-aeronautical industrial users. It adjoins existing off-airport Light Industrial uses, provides existing roadway access via Earhart Road, and could effectively develop as a combination of aeronautical and non-aeronautical uses similar to the business park/airpark adjoining the Airport property to the east.

It is recommended that a minimum of 100 acres of the Airport property be identified and planned for future non-aeronautical land uses.

General Aviation Aircraft Storage. General aviation aircraft that are based at FNL are stored on the east side of the Airport, in the area south of the crosswind runway. Over the course of the 20-year planning period, the number of based aircraft at the Airport is forecast to increase from 2018 count of 256 aircraft to 325 aircraft by 2038. In addition, there is a known existing demand for additional indoor aircraft storage facilities. All Airport-owned hangars (963 square feet to 1,000 square feet T-Hangars) are presently occupied. there is a total of 65 slots on the paid waiting lists (by hangar type), which require a $25 deposit. The trend of increasing general aviation aircraft size also plays a role in defining future development needs.

Perhaps the most important influence contributing to the need for a comprehensive analysis of the future development needs for general aviation is the configuration of the existing facilities in consideration of space currently available for development, the goals identified in the Airport's Strategic Plan, and identifying highest and best use in available development areas.

Considerations in the future development plan for the configuration of future general aviation facilities at FNL include:

- The existing general aviation area can accommodate additional development with expansion to the east and to the south; however, a lease agreement was recently executed for a proposed development south of the existing general aviation area, which may include construction of corporate aircraft hangars and associated office space, a second FBO, a restaurant, and an aerial cable transportation system to transport passengers across I-25 to the Brands, which is proposed as a live, work, play development.
- The area north of the existing GA development area will be reserved for expanded passenger terminal facilities.
- General aviation demand during the next 20 years will likely be larger than can be accommodated in the currently developed GA area.
- The areas on either side of the Runway 6/24 can accommodate general aviation facilities development.
- Additional general aviation facility development areas could be captured with land acquisition on the east side of the existing development area (across Lindbergh Drive). Programming the integration of the available development parcels into the long-term development plan is a key component of the overall future development recommendation of this Airport Master Plan Update.

Tie-down Storage Requirements/Based Aircraft. Aircraft tie-downs are provided for those aircraft that do not require, or do not desire to pay the cost for hangar storage. Because of the great value of even small, unsophisticated general aviation aircraft, most aircraft owners prefer some type of indoor storage. There will continue to be some demand for based aircraft tie-down areas; however, it is anticipated that the Airport has enough area on existing aprons to accommodate future demand.

Tie-Down Storage Requirements/Itinerant Aircraft. In addition to the needs of the based aircraft tie-down areas addressed in the preceding section, transient aircraft also require apron parking areas at the Airport. This storage is provided in the form of transient aircraft tie-down space. In calculating the area requirements for these tie-downs, an area of 400 square yards per aircraft is used. As the plan for future general aviation development is formulated, adequate space will be provided for transient aircraft parking areas, especially in those areas that cater to transient aircraft needs (i.e., FBO services).

Hangars. The development plan for future general aviation hangars on the east side of the Airport will focus on identifying potential parcels, in consideration of the ability to provide roadway and taxiway access in a manner that is efficient and secure. The number of based aircraft at the Airport is forecast to increase by almost 70 during the next 20 years; therefore, the proposed plan will accommodate indoor storage space for a minimum of 70 additional aircraft. The breakdown of these aircraft per the previous chapter includes approximately 50 future single engine aircraft, eight jets, eight helicopters and 4 glider/ultralight type aircraft.

It is recommended that the Airport continue to plan for additional tie-down storage for itinerant aircraft and additional hangar storage for future based aircraft.

Air Cargo. Currently, air cargo is not a significant component of the activity at FNL. Air cargo activity which does occur is not scheduled and is provided by contract carriers, operating general aviation aircraft that utilize the general aviation ramp area. Given the local area's proximity to DIA and the fact that the area is considered primarily a consumer importer area, significant increases in cargo activity are not anticipated. Furthermore, without one of the "big three" air cargo operators (FedEx, UPS, or DHL), the cargo activity that takes place at FNL will likely remain general aviation related with smaller cargo aircraft offloading to trucks on the ramp.

New air cargo specific facilities are not recommended.

Support Facilities. In addition to the facilities described above, there are several airport support facilities that have requirements and that are vital to the efficient and safe operation of the Airport.

Aircraft Rescue and Fire Fighting (ARFF) Facility. The ARFF facility serving the Airport is located east of the FBO/Terminal complex, on the south side of Earhart Road. According to Code of Federal Regulations (CFR) Part 139.317, ARFF equipment and staff requirements are based upon the length of the largest air carrier aircraft that serves the Airport with an average of five (5) or more daily departures. **Table 4-13** presents the ARFF Index, length criteria, and representative air carrier aircraft.

Table 4-13: ARFF Support Requirements

ARFF Index	Aircraft Length	Representative Aircraft
A	Less than 90'	RJ-85
B	Between 90' and 126'	Bombardier Q400; Airbus A319/A320
C	Between 126' and 159'	MD-80; 737-800
D	Between 159' and 200'	B757; B767; Airbus A330
E	Greater than 200'	B747-400; B777

Source: FAA Part 139.315 ARFF Index Determination.

The Airport does not have current scheduled air carrier service, but still maintains an ARFF Index B classification, which would adequately serve Airbus A320, the forecasted critical aircraft.

It is recommended that the Airport maintain their ARFF Index B classification and ARFF facilities.

Fuel Storage Facility. The Airport's fuel storage facility is located adjacent to the main remote air traffic control camera tower, north of the FBO facility and south of passenger terminal. The site provides adequate access for delivery trucks from Earhart Road, and for aircraft fueling trucks to the airfield via a gated entrance leading to the aircraft parking apron. The size of the existing site provides the capacity to accommodate expansion needs that can reasonably be anticipated during the next 20 years; however, development considerations related to the passenger terminal and general aviation facilities, along with landside access and parking could potentially require the relocation of the fuel storage tanks.

It is recommended that the Airport monitor fuel demand and make appropriate accommodations if supplies become insufficient. If necessary, relocate fuel to an alternate location.

Service Roads. Airport's service roads are provided on airport and essentially follow the perimeter fence line. These roads give operations staff and emergency vehicles access to the entire Airport. The current service roads are in good condition and adequate for current and forecasted activity. The roads provide appropriate width and access for vehicle serving the Airport.

It is recommended that the Airport maintain current service roads and construct additional roads if demand arises.

Utilities.

The Airport has an existing Utility Master Plan that was completed in 2015. The information in the plan is still relevant and should be referenced for future planning considerations. Additional fiber optic cable has since been added for the remote tower facility, which should be incorporated into future updates of the Utility Master Plan.

It is recommended that the 2015 Utility Master Plan continue to be updated and incorporated into future airport planning decisions.

Airport Access and Circulation.

The existing Airport access roads provide easy landside access to the existing passenger terminal building; however, passenger terminal alternatives will be evaluated in the following chapter. With construction of new commercial terminal and vehicle parking facilities, additional access roads may be required. Wayfinding from Interstate 25 is clear and simple, and it is recommended that future terminal facilities be constructed in place of or adjacent to existing terminal facilities. The Airport Commission selected a future site for the Passenger Terminal which will be incorporated into the alternatives analysis in the following chapter. With expansion of GA facilities there may be a need for an additional access point to GA area.

It is recommended that current airport access be maintained in the existing location for the future use. Widening of Earhart road from Lindbergh Drive to the commercial terminal parking lot should be considered.

Remote ATCT Facilities

The remote tower control facility is located inside of a mobile structure located adjacent to the passenger terminal holding room. It is likely that the control facility could either be located off site in the future, onsite in a standalone facility, or onsite within the new terminal building. However, in the short term the Airport should continue to plan for this facility on airport property.

According to the Colorado Remote Tower Project website, the remote tower project includes leading-edge technology that will be the first of its kind to mesh both ground-based visual/camera data with aircraft radar/track-based data. This high-tech array will provide an enhanced level of efficiency and safety, while dramatically reducing the costs associated with the construction and staffing of a traditional air traffic control tower. There are three tower masts located along the runway. The center tower mast has a 360-degree view plane while the two masts near the end of Runway 15/33 have 180-degree view planes. Consideration of these view planes and line-of-sight for the cameras is an important consideration in future airfield and landside planning.

4.3.3 Passenger Terminal Facility Requirements

Based on the forecasts included in the previous chapter, it is recommended that the Airport plan for a future replacement terminal building. The existing terminal and modular building, at a total of 7,500 square feet, are not adequate for the anticipated number of annual enplanements. The layout of the two buildings is also not considered conducive for expansion. In accordance with the FAA approved forecasts, a future replacement airport terminal building has been programmed as a two-gate, two-airline facility capable of accommodating the A320 as the design aircraft.

This section contains information relevant to the terminal building space program. The facility program was developed using the FAA Advisory Circular 150/5360-13A, *Airport Terminal Planning,* and the *IATA Airport Development Reference Manual, 10th Edition*. The first document contains references to other publications used in the development of this program. For planning purposes, the program design aircraft holds 177 passenger seats. This has been factored by an 85% design load factor, an industry standard, to yield 150 peak hour originating or terminating passengers. This number is factored further according to the activity being measured. The formulas are derived from and compared to the references noted above and are a compilation of different methodologies. The space generated from this process is then modified as appropriate, in this case, a single aircraft/airline operation served as the driver of space for both arrivals and departures operations and a dual operation was considered in increasing sizes of certain components over others.

Further, facilities that would be expensive to expand were given additional consideration to determine what would be needed for an initial building development phase. Finally, component areas, such as corresponding ticket hall concourse, were programmed by calculating the size of the area. Circulation was included mainly for back of house space. The terminal passenger and aircraft profiles and program summary are shown in **Table 4-14**.

Airline Ticket Counter. Airline ticket counter check-in distributions were created to determine a model for the percentage and number of passengers who will check in with bags, and passengers who will use kiosks to obtain boarding passes only. These figures along with the design population noted above, are applied to the worksheets found in Airport Cooperative Research Program (ACRP) Report 25, v. 2, *Airport Passenger Terminal Planning and Design*, and other sources to determine both number of positions and area required for the ticket hall.

Space for ticketing operations has been built upon industry standard ticket counter arrangements. The number of positions required serve two airlines, providing space to each to operate separately. This serves to cover different operating scenarios, including off-schedule operations.

Airline Offices. Airline ticket offices are smaller at destination airports, providing space for the station manager and agents. Break rooms are typically shared space with ramp agents, many of whom often serve dual functions. This is the case with this program component at FNL. There is also a potential for this function to have moved on to an alternative that is more self-directed, requiring less space and personnel in the future. This may include self-service baggage check in use in larger airports or options for remote baggage check-in.

Baggage Claim Area. The baggage claim area has been programmed for one flight using approximately 78 percent of passengers claiming bags and 80 percent of these passengers claiming bags within twenty minutes of a flight's arrival. These figures have been derived based on planning experience at other airports to provide a baggage claim device that will provide approximately 115-feet of claim device frontage. The baggage claim device recommended is a flat-plate device, with the off-load belt located on the secure side of the terminal.

There remains a possibility that these devices will be modified such that bags delivered to the non-secure, public area of the claim hall will not be allowed to return into the off-load space. The public space for this function includes the claim device, queuing and waiting areas, and airline baggage service offices as well as the adjacent concourse.

Baggage Claim Off-Load. The inbound baggage claim off-load device is recommended to be housed within and enclosed structure as part of the terminal building. It provides the baggage claim drop belt with tug and cart maneuvering and equipment storage space for overnight and weather events. An odd/oversized baggage drop-off area is also recommended in this space. This can be a sloped tray or a run-out baggage belt into the claim hall.

Baggage Make-up. The airline outbound baggage make-up area includes the baggage run-out belt(s) from TSA's checked baggage inspection room. A small baggage make-up device is recommended in this program to assist with sorting of baggage into carts. The make-up area includes circulation are for tug and cart maneuvering and staging. It is programmed as a shared airline space but with separate operations areas for the outbound operation, small equipment, and storage. This can also be configured to enclose airline operations to house aircraft ground service equipment.

Baggage Service Office. An airline baggage service office that is sized to accommodate two airlines is recommended in the claim hall program. However, the airlines serving FNL may prefer to maintain this operation at their ticket offices to better utilize staff and keep the bags secure.

Checked Baggage Screening. Checked baggage security screening has been programmed for one mini-inline system with Computer Tomography X-ray (CTX) and two Explosive Trace Detection (ETD) machines. TSA personnel will manage this operation within space behind or to one side of the ticket counters.

Concessions. Concessions for a two-gate operation are anticipated to be mainly food and beverage with a small retail and personal items. It's assumed that much of the food will be pre-packaged, possibly from a local vendor. The space will likely contain a small kiosk, similar to a coffee stand that has a refrigerated case for beverages and supplemented with vending machines.

Gate Departure Lounge. The gate departure lounge area for a two-gate operation has been programmed so that passengers from two flights could share a lounge area. Instead of building out to a demand for two departures equal to two full flights, the departure lounge will provide a larger area that will support two overlapping but separated operations where one flight may be boarding passengers as others are in the middle of arriving at the terminal. This will allow airlines more schedule flexibility over the long term. This figure was determined to be 150 percent of the total area required for one flight. It acknowledges the lower probability of two closely spaced departures yet recognizes the need for room to accommodate growth.

Rental Car Counters. Car rental companies will operate at this terminal on a limited basis just before and after a flight. Their counter and office space are programmed to their industry standard for three vendors.

Ticket Hall. The ticket hall ticket area has been programmed for two airlines, each having two four-position counters each, and five kiosks apportioned between the two airlines. Supporting queues, concourse, and waiting areas are included in this space.

Public Seating. Public seating is included in the ticket and baggage claim halls as well as outside the terminal. Seating in the departures lounge was apportioned at a higher area per passenger to allow for non-standard seating options, such as tables that can be used as work surfaces and softer furnishings for group gatherings.

Restrooms. Restrooms are limited to one fixture per gender per 25 passengers based on the design aircraft for both secure and non-secure areas of the terminal. Family restrooms, one at both the secure and non-secure areas, are also included.

Security Screening Check Point. In the recommended Security Screening Check Point (SSCP), there is more than enough capacity to process one flight during the period prior to a departure. Allowance for an additional future checkpoint lane may be appropriate if the main checkpoint is located with an area that isn't easily expanded. TSA office and breakroom/training room are located within this area as well.

General Public Circulation. A main hall area has been included in the program to provide a central entrance, gathering, and waiting area as well as focal point for wayfinding in the non-secure area of the terminal. This space includes other general public circulation, such as buffer space between functional components.

Airport Administration. Airport administration includes airport offices, break areas, small public conference space, and police office. Back of house space includes facilities services equipment and supply storeroom and office/break room. It is also recognized that the repurposing of the existing terminal for airport administration space is a possibly.

Transportation Security Administration. TSA offices will be housed adjacent to and with direct access to the checked baggage security screening room and the public.

Mechanical/Electrical/Utility. Program area for building systems has been developed to allow for a combination of mechanical, electrical, water and emergency generator.

Structure/Non-Net Areas. A percentage of the programmed space for building structure, walls, cavities and building systems has been included in the terminal building program.

Automobile Parking. The number of auto parking spaces required for this terminal considers both the future airline use as well as continued sports and casino charter use of the parking area. While the existing parking area with 336 spaces is adequate to accommodate current use of charter flights and employees, it is recommended that FNL consider reservation space to essentially double the size of the existing vehicle parking to accommodate the return of commercial service.

The recommended number of spaces dedicated to commercial service is approximately 50 short-term spaces and 350 long-term spaces based on the anticipated design aircraft.

Conclusion - Passenger Terminal Facility Planning. The planning and programming for this passenger terminal for FNL requires allowing for some uncertainty in where the industry will be when the terminal is designed and built. This includes how baggage will be managed from the ticket counter to the aircraft and if there will be a traditional ticket hall with agents at counters or if agents will be in a space to guide passengers who require assistance.

This passenger engagement will take many forms until it becomes mostly virtual and highly mobile. This may have a great impact on terminal space, even at a smaller commercial service airport. In preparing for the future, it will likely to require areas for passengers to work and relax in a larger secure area that provides services to meet passenger needs and can be obtained within the secure environment, no matter how many people are awaiting their flight.

This recommended terminal facility program provides an outline for the future, with options for accommodating expansion within the programmed space. The program also allows for the Master Plan Study to plan for an appropriate reservation of space for such facilities. The airport layout plan (ALP) and financial implementation components of this master plan will consider the general phasing for construction and general budgeting purposes.

Table 4-14: Future Terminal Program

Terminal Demand Profiles and Program Summary	Future Terminal
Departure & Arrivals Demand Profiles	
Design Aircraft	A320
Design Aircraft Seats	177
Peak Hour Design Load Factor	85%
Peak Hour Originating Passengers (PHOP)	150
Peak Ten-Minute Percent of Originating Passengers	20%
Peak Ten-Minute Originating Passengers	30
Peak Hour Terminating Passengers (PHTP)	150
Peak Hour Terminating Passengers w/Bags Percent	78%
Peak Hour Terminating Passengers w/Bags	117
Peak Twenty Minute Terminating Passengers w/Bags	117
Peak Twenty Minute Terminating Passengers w/Bags %	100%
Terminal Component Program Summary	
Main Hall Circulation	1,640 sf
Airport Administration	1,163 sf
Ticketing Positions (Kiosks and Counters)	*13*
Ticketing Check-In / Baggage Check-In Area	3,140 sf
Outbound Checked Baggage Screening	
Total Positions (one Inline EDS and two ETD)	*3*
Total Inline Checked Baggage Screening Area Rqd	928 sf
Airline Operations Outbound Baggage Make-Up Device	2,303 sf
Departing Passenger Security Screening & TSA Offices	
Total SSCP Lanes Required	*1*
Total SSCP Area Required	2,535 sf
Total Recommended Aircraft Gates	*2*
Total Passenger Departure Lounge Area Required	4,753 sf
Baggage Claim Hall	
Recommended Number of Baggage Claim Devices	*1*
Total Baggage Claim Area Recommended	3,547 sf
Car Rental Counters & Offices	450 sf
Inbound Baggage Claim Drop-Off	2,304 sf
Concessions Retail	744 sf
Restrooms	2,400 sf
Total Functional Component Area Requirements	**25,907 sf**
Building Administration & Support Space	1.250 sf
Building Structure, Walls, Cavities, & Building Systems	3,345 sf
Total Building	**30,502 sf**

SOURCE: Mead & Hunt, 2018.

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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.

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.

- Plan and develop the Airport to be environmentally compatible with the community, while minimizing environmental impacts both on-airport and off-airport.
- 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.

Table 5-1: Airfield Recommendations Summary

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*

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 (¾-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.

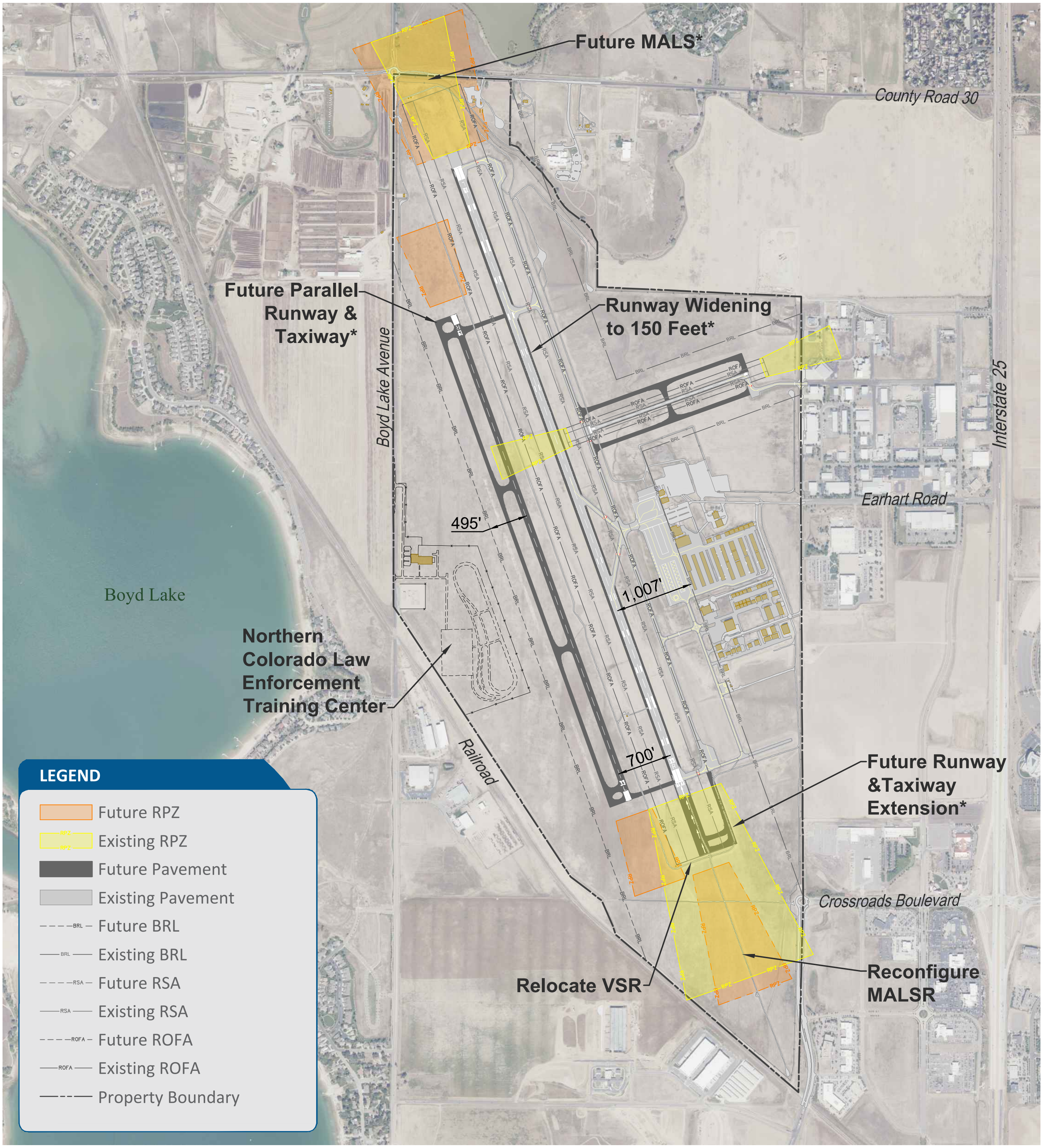
Runway 6/24. Airport users have indicated that a crosswind runway is a desired component of the Airport's airside facilities. In consideration of input received and in recognition of the fact that federal matching funds for the extension, reconstruction, or improvement of the crosswind runway are not 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).



*Future facility recommendation is carried over from previous Airport Master Plan and illustrated on the current Airport Layout Plan (ALP).

Figure 5-1 **Airfield 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.

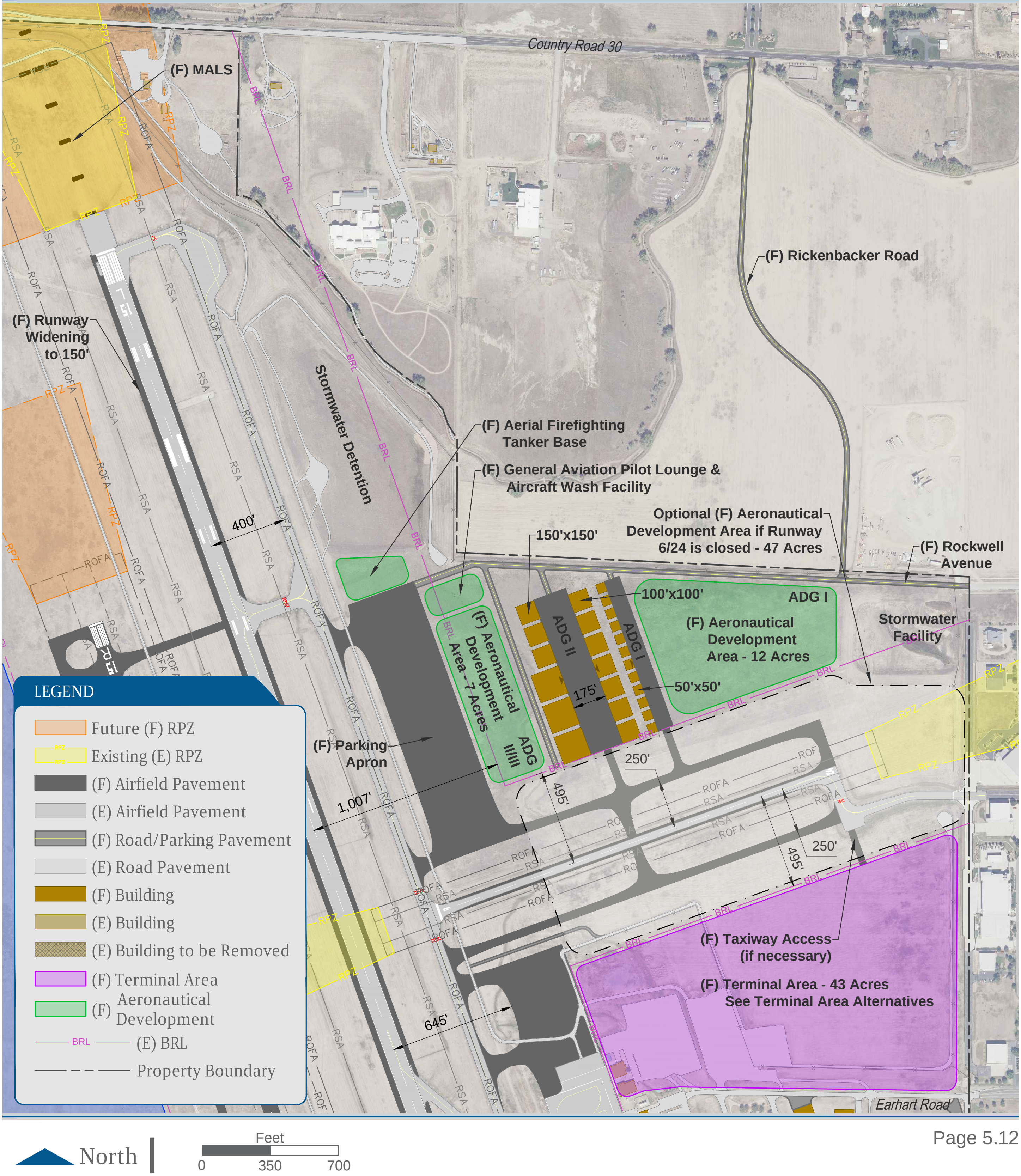


Figure 5-2 Northeast Alternative 1

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.

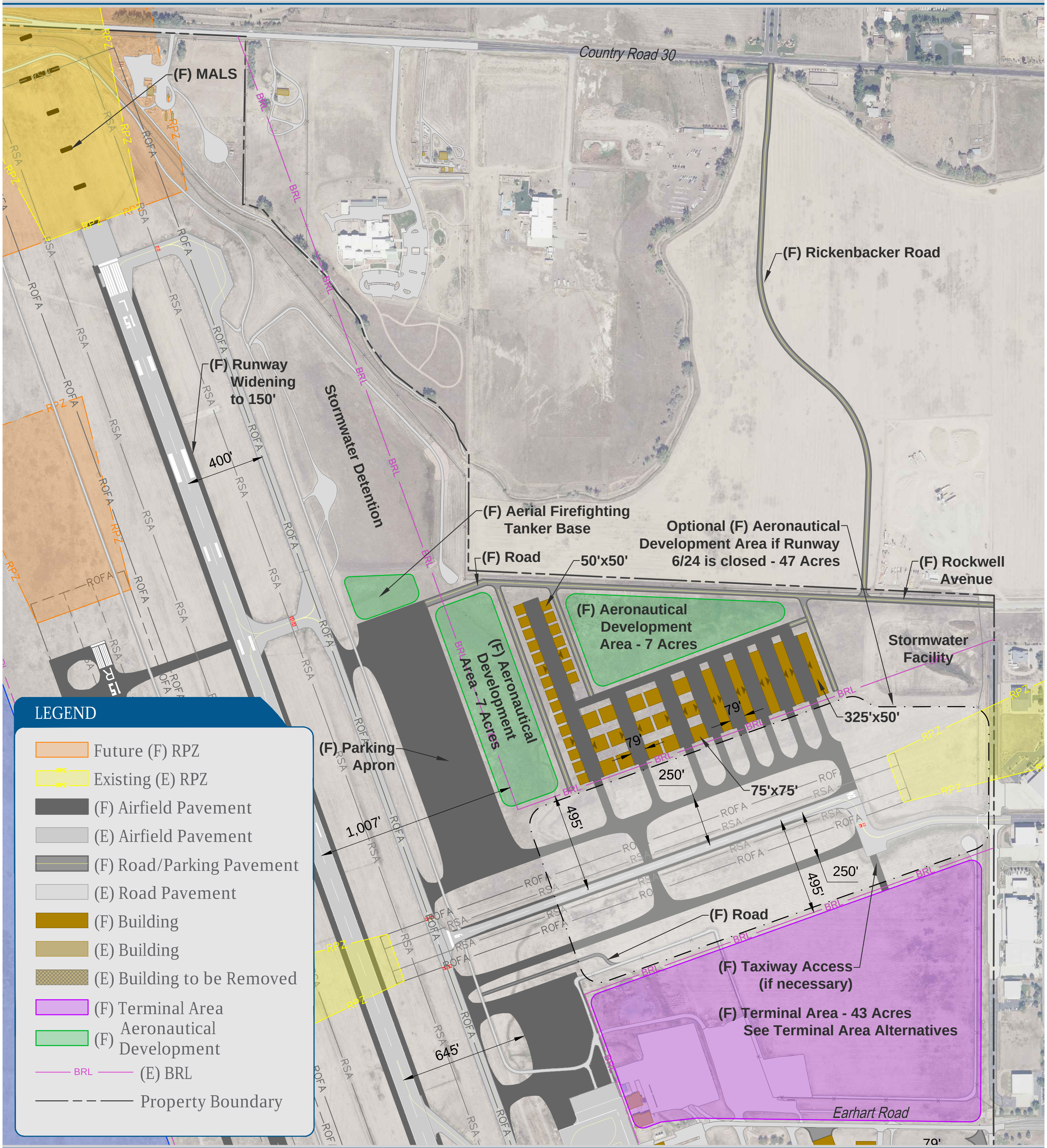
Similar to Northeast Landside Alternative 1, vehicle access to this area does not currently exist but can be achieved either by an extension of Rockwell Avenue and/or through the planned Rickenbacker Road extending south from County Road 30.

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.



North

Feet
0 350 700

Figure 5-3 Northeast Alternative 2

Master Plan
Northern Colorado Regional Airport

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 two-lane 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.

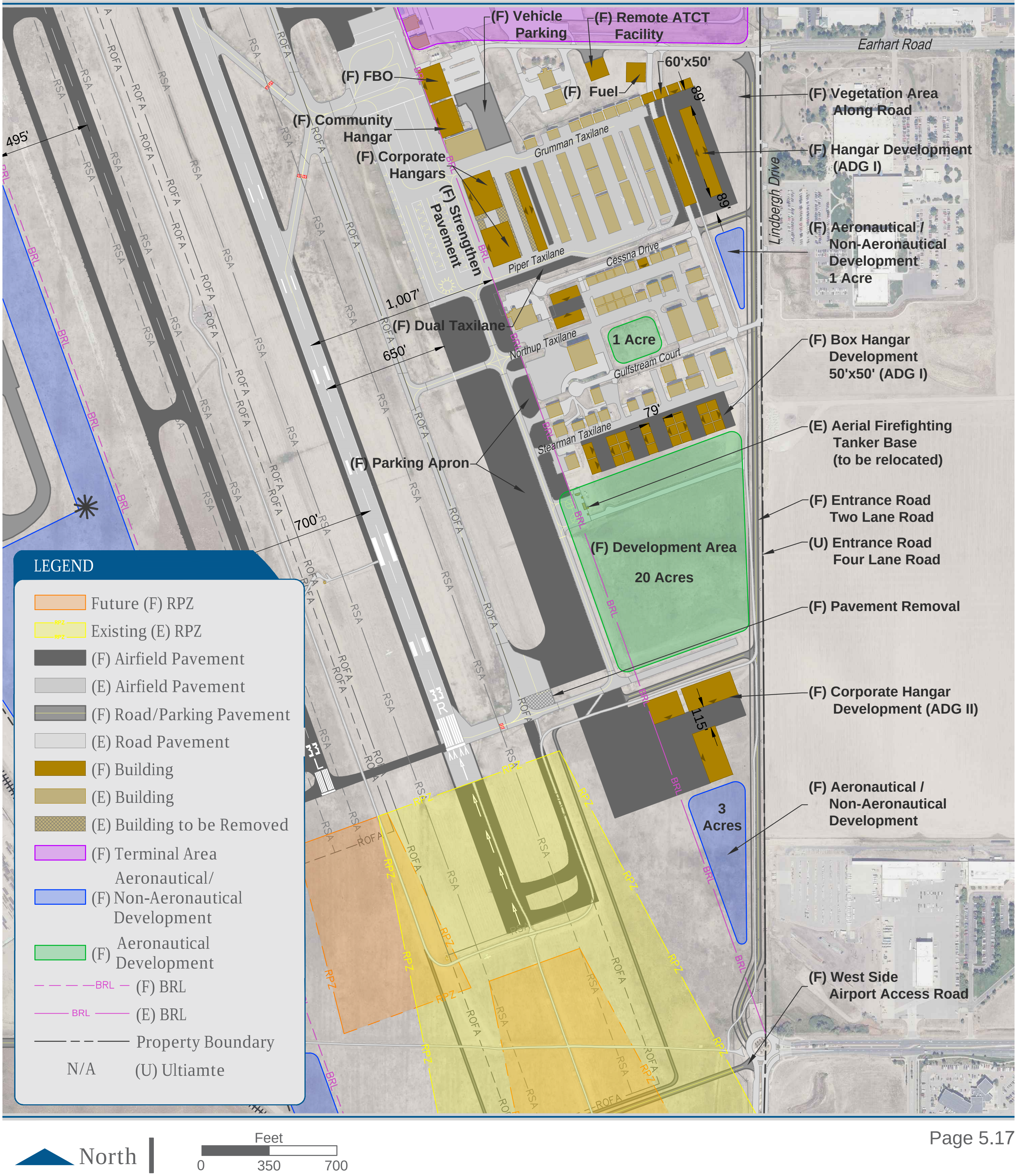


Figure 5-4 Southeast Alternative 1

Southeast Landside Alternative 2

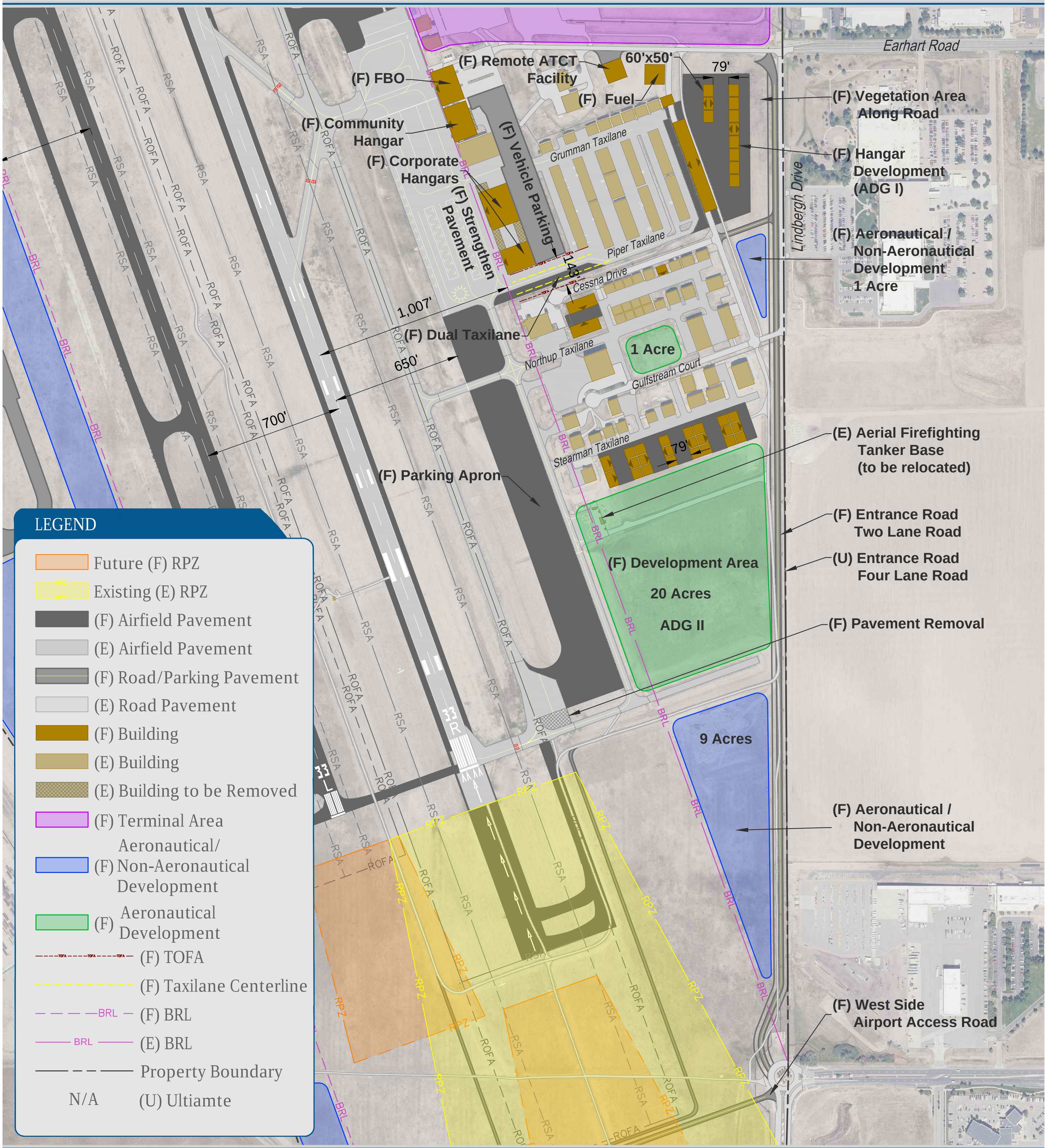
Southeast Landside Alternative 2 shows a reconfigured layout for the two corporate hangars that replace older T-hangars with the goal of avoiding north facing hangars. The hangar development that extends from Grumman Taxilane takes advantage of all available space. Aeronautical/non-aeronautical development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



North

Feet
0 350 700

Figure 5-5 Southeast Alternative 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/non-aeronautical 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.

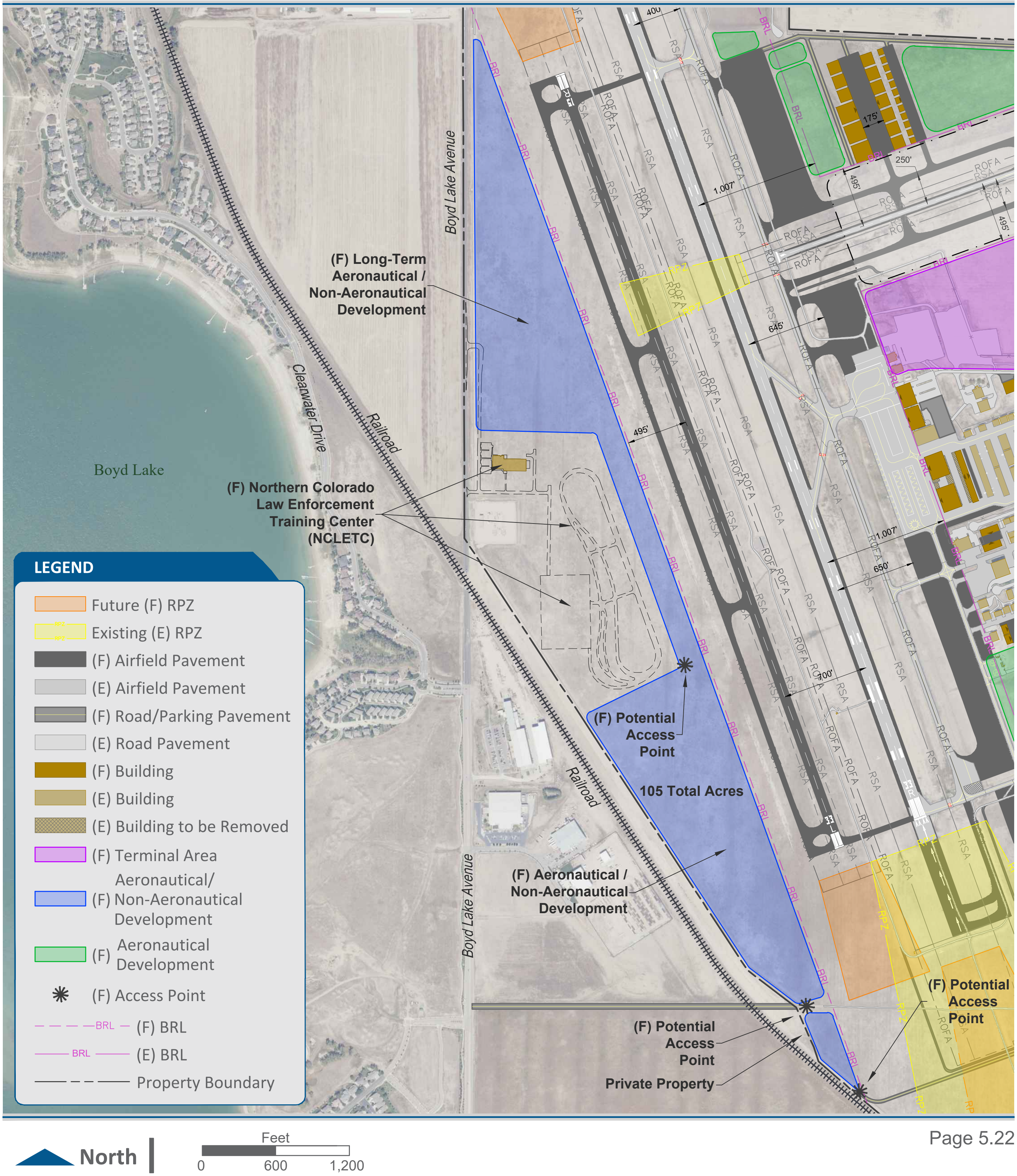


Figure 5-6 **West Alternative 1**

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.

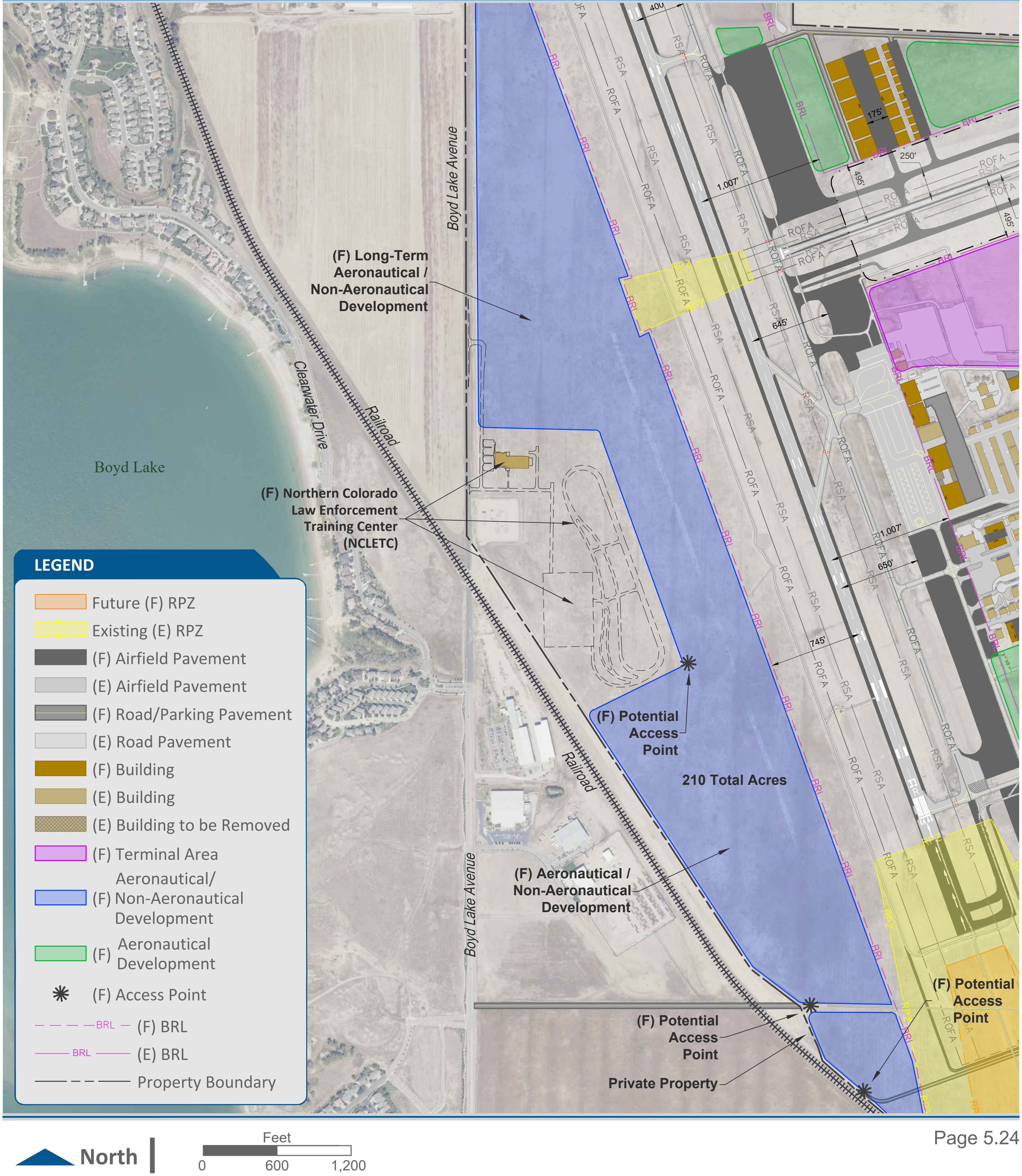


Figure 5-7 **West Alternative 2**

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 re-initiation 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.

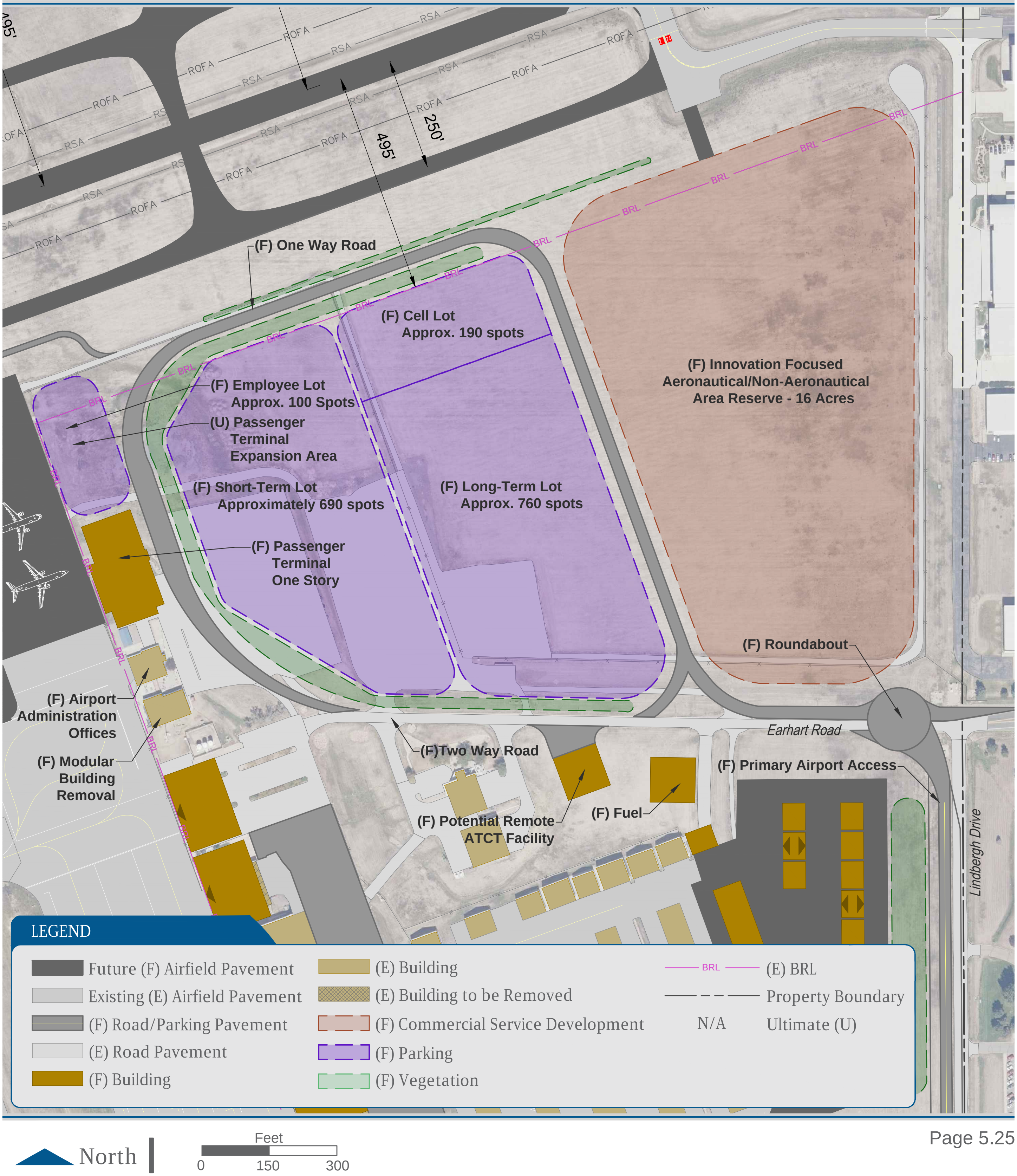


Figure 5-8 Terminal Area Alternative 1

Master Plan Northern Colorado Regional Airport

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.

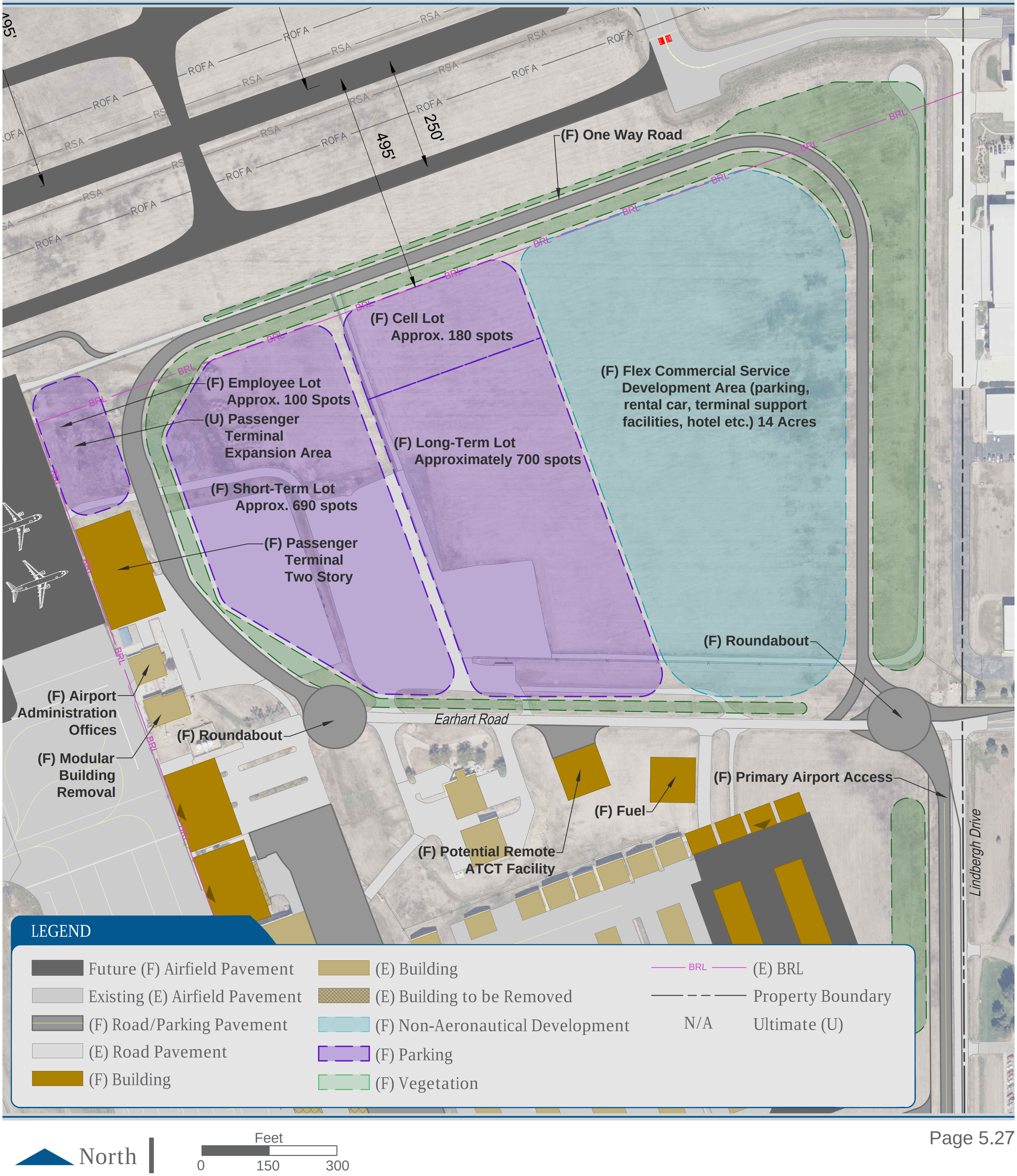


Figure 5-9 Terminal Area Alternative 2

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.

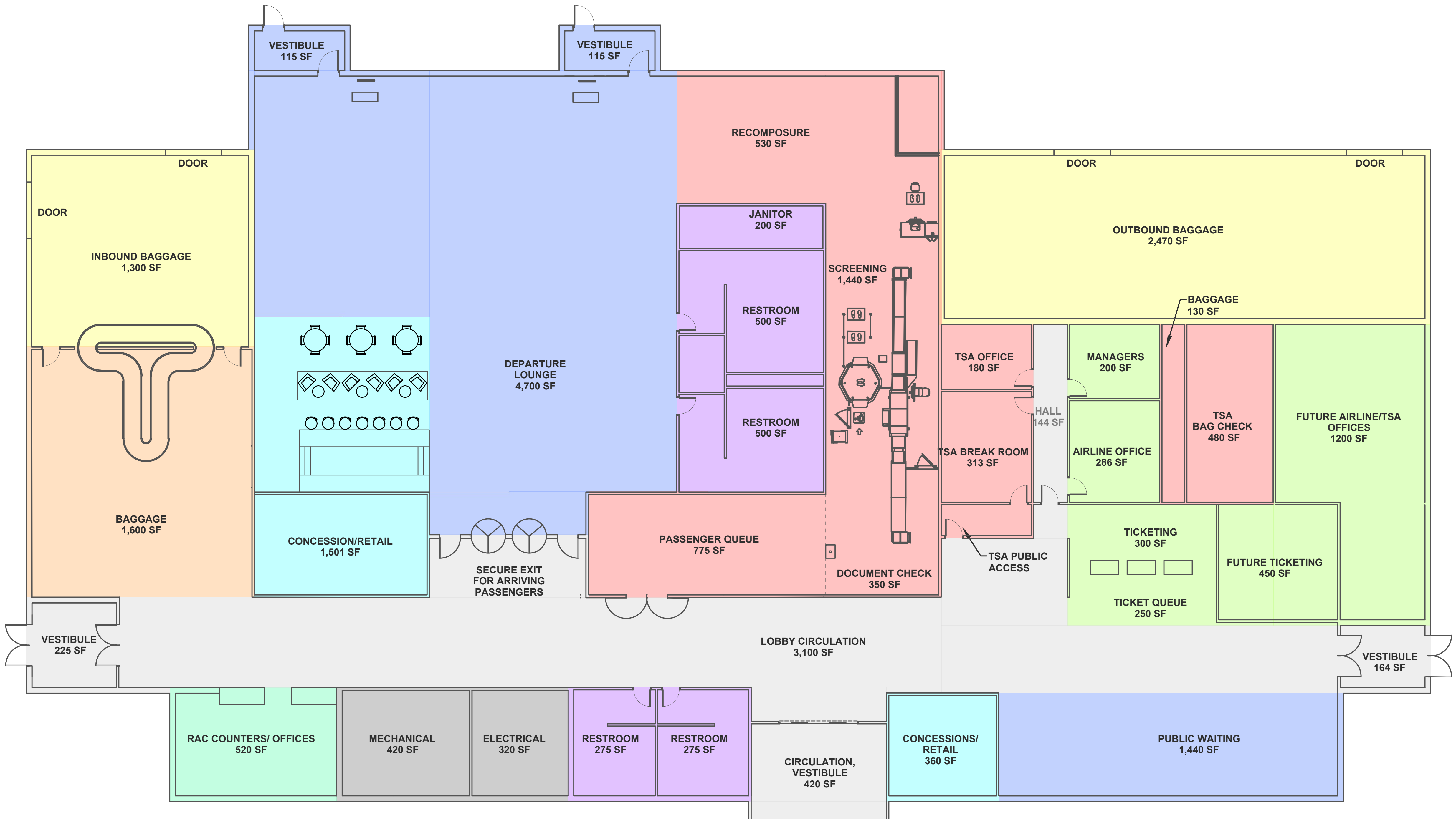
Passengers' progression through the terminal follows a known path, from security screening to the departures lounge and aircraft. Given the length of the security checkpoint, it is placed perpendicular to the main hall orientation. A perpendicular placement results in the passenger departures lounge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

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.



TOTAL AREA: 30,000 SF

LEGEND

TSA Screening/Queuing	Retail/Concessions
Baggage Claim	Passenger Lounge
Inbound/Outbound Baggage	Restroom/Janitor
Admin/Ticketing	Circulation
Car Rental	Mechanical

Figure 5-10 **Terminal Layout One 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.

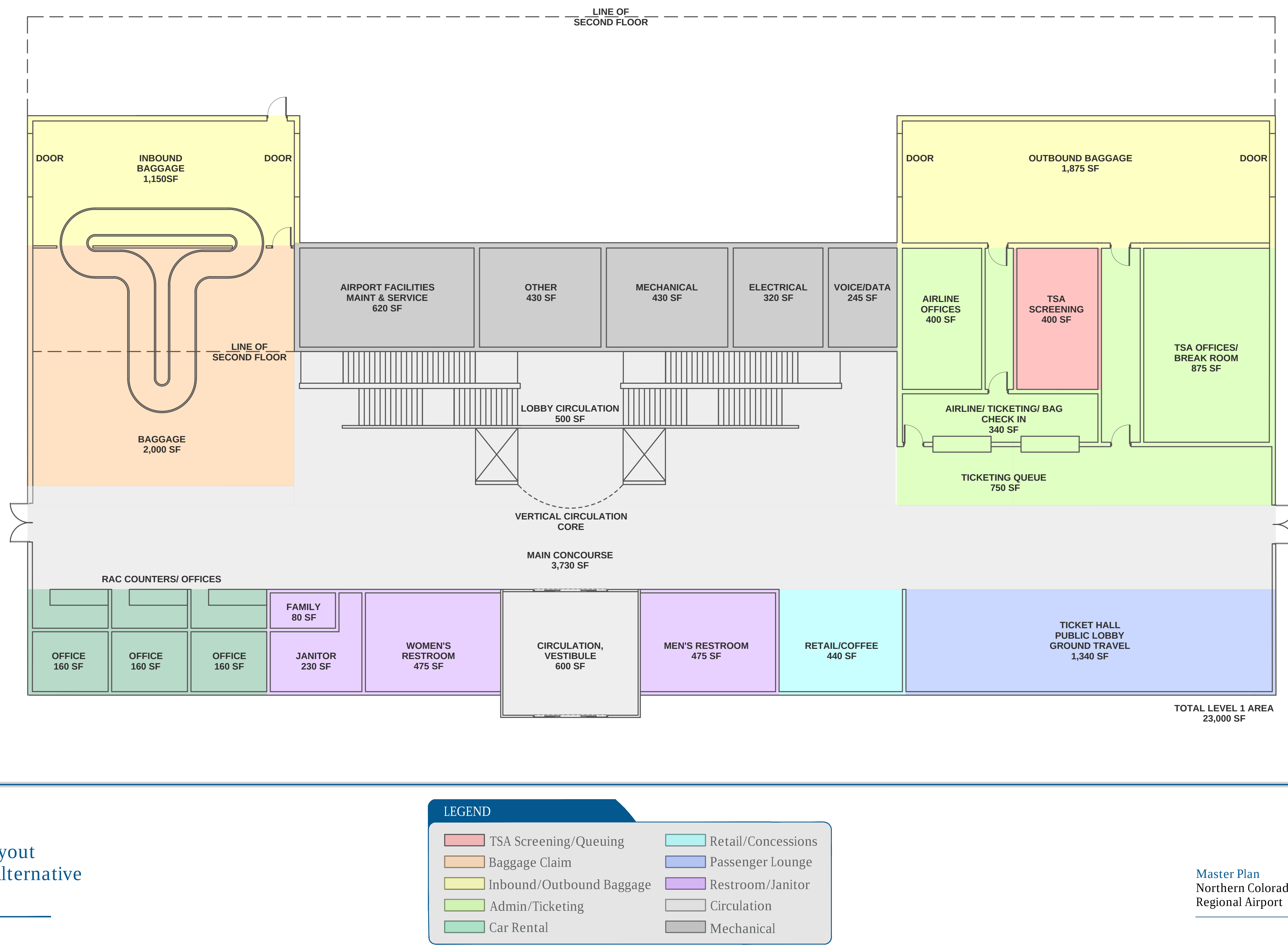
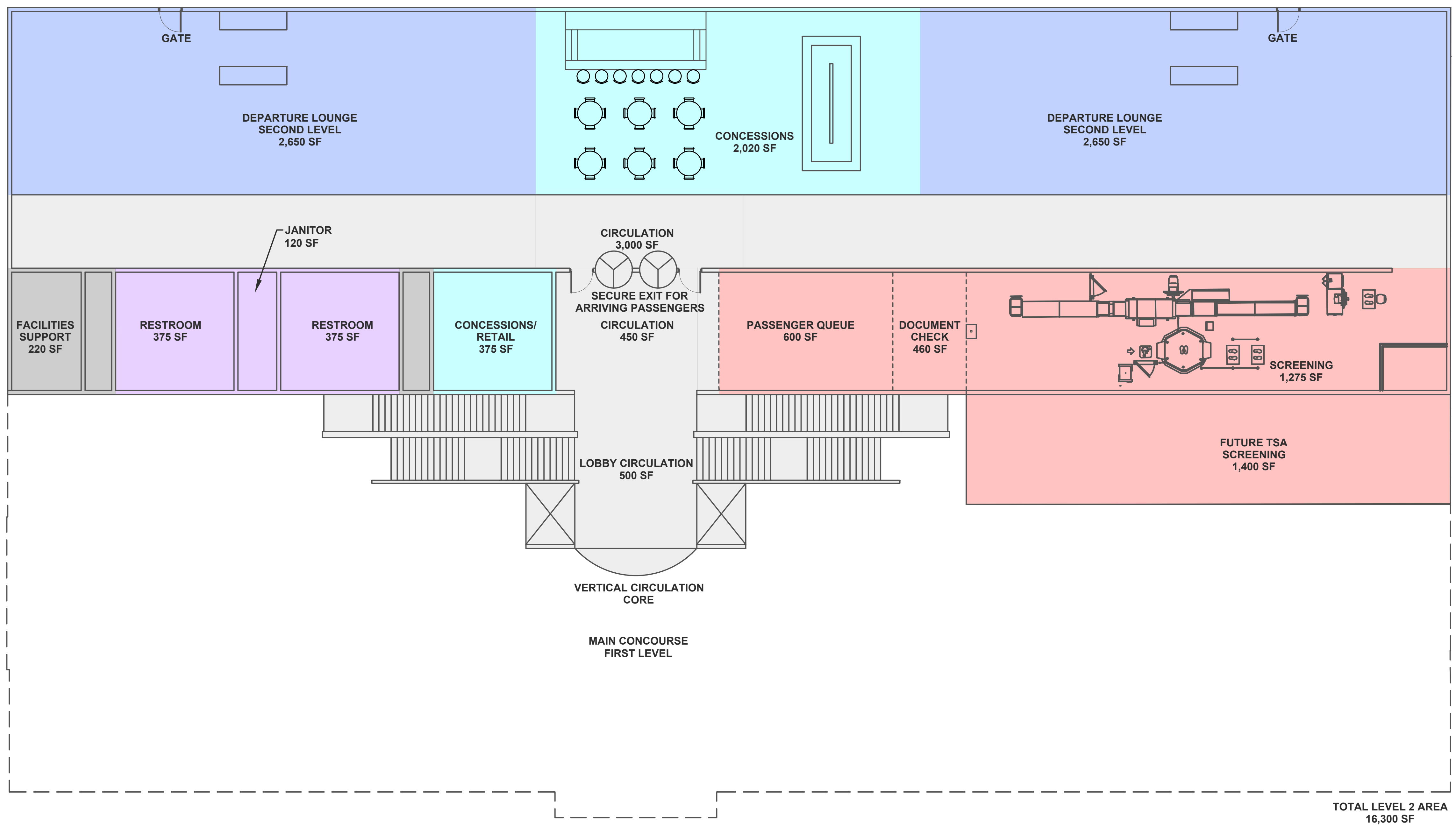


Figure 5-11 Terminal Layout
Two Story Alternative
Level 1



LEGEND

- TSA Screening/Queuing
- Baggage Claim
- Inbound/Outbound Baggage
- Admin/Ticketing
- Car Rental
- Retail/Concessions
- Passenger Lounge
- Restroom/Janitor
- Circulation
- Mechanical

Figure 5-12 **Terminal Layout Two Story Alternative Level 2**

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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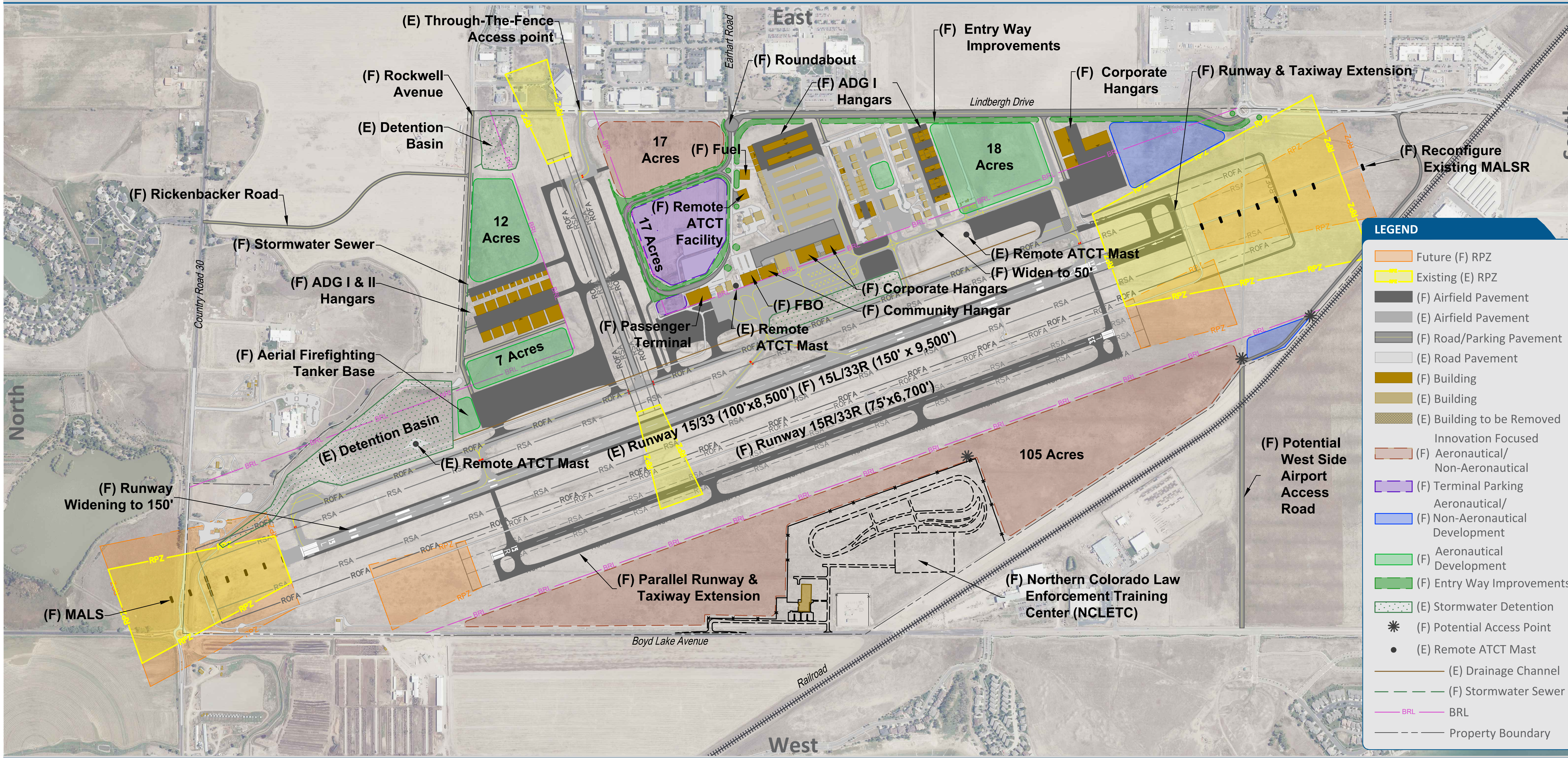

North

Feet
0 500 1,000

(E) Existing
(F) Future

Figure 5-13 **Conceptual Development Plan (CDP)**

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CHAPTER 6.

AIRPORT INFLUENCE AREA MARKET ANALYSIS AND RECOMMENDATIONS STUDY SUMMARY

Introduction

As a component of this Master Plan, land use planning adjacent to the Airport was analyzed as part of the Airport Influence Area (AIA) Market Analysis and Recommendations Study (see full report in **Appendix B**) in order to protect the Northern Colorado Regional Airport (FNL or Airport) from future encroachment by non-compatible land uses. The purpose of the AIA Study is to establish guiding principles and criteria for compatible land use near the Airport and propose a strategic direction for future development in the AIA that maximizes potential for compliance with grant assurances and Federal Aviation Administration (FAA) guidance while best aligning community land use, infrastructure, and economic development goals. The AIA Framework is intended to provide guidance to the Cities of Loveland and Fort Collins and Larimer County in future zoning and planning decision making efforts and ensure compatible development on and around the Airport.

The FNL AIA consists of the land containing and immediately surrounding FNL where airport-related activities could result in adverse impacts to non-compatible land uses within area. The AIA boundary is determined by the existing and future extents of the existing and future flight tracks, Airport Critical Zones associated with Federal Aviation Regulation (FAR) Part 77 surfaces, and 65 Day-Night average Level (DNL) noise contour.

This AIA Framework will be used to inform the Cities of Loveland and Fort Collins when conducting future zoning and planning efforts by providing guidance relating to compatible development on and around FNL. The AIA Market Analysis Recommendations Study was completed before the COVID-19 pandemic of 2020.

6.1 Study Background

GG+A previously completed a target market analysis for the Airport in September 2017 to assess aviation and non-aviation market opportunities. The focus of the study was to examine steps the Airport could take to make more productive use of its land assets while also protecting for land use compatibility within the AIA. The AIA component prepared in association with this Master Plan was focused on further market analysis and the development of recommendations for the AIA framework.

GG+A completed interviews with more than 20 public and private stakeholders in the Fort-Collins-Loveland area to gather baseline data. Their research also involved:

- Review of area land use and economic studies.
- Creation of a land use inventory thanks to parcel information provided by the Larimer County Assessor.
- Identification of best practices of developing research, technology, and innovation districts and how their success relates to AIA proximity.
- Analysis of current demographic, labor force, employment, and other economic statistics.
- Evaluation of past and current real estate performance trends.
- Review of residential characteristics and the possibility for growth.
- Examination of the existing hotel inventory, trends.
- Development of a series of long-term (20 year) projections to quantify viable strategies for all land uses within the AIA.

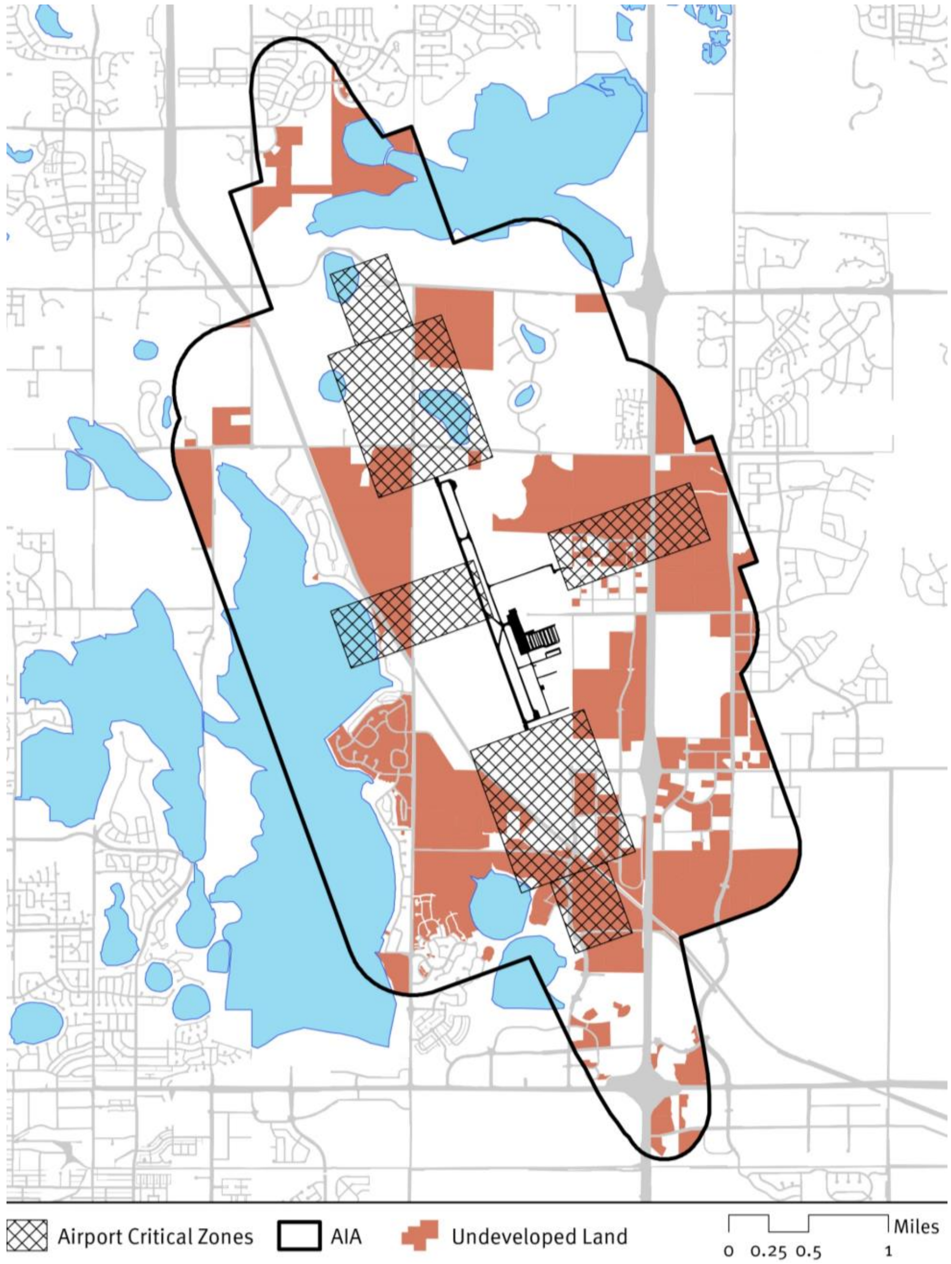
6.2 Existing Land Use and Development

FNL's AIA covers an area of roughly 10,000 acres. With the Airport's footprint of only 1,060 acres, the Airport itself only makes up 11% of the total area in the AIA. The remaining 89% of the AIA consists of a mixture of land uses, including residential, industrial, commercial, public functions, natural areas, and agricultural.

Of the land contained in the AIA that lies beyond FNL's control through land ownership or easements, about 2,500 acres, or 27% of the AIA, is occupied by already developed land uses. Private properties in the AIA have seen a massive increase in the amount of total useable building space over the past few decades. Over 10,000,000 square feet, or roughly 230 acres, of new physical building space has been built since 1990, with much of the development occurring within the past 20 years. Specifically, there has been a dramatic rise in residential development with close to 2,100 new housing units, most of which are single-family dwellings.

Undeveloped land in the AIA, illustrated in **Figure 6-1**, remains as an abundant source of future economic viability. Approximately 2,900 acres of undeveloped land may be found outside of the Airport property in the AIA, and 2,300 of those acres are outside of Airport Critical Zones. In total 80% of the AIA's undeveloped land is located within the City of Loveland's Growth Management Area, thereby making this land extremely valuable for future development.

Figure 6-1: Off-Airport Undeveloped Land in the AIA



SOURCE: Gruen + Gruen Associates, 2019.

Evaluating existing and planned residential development within the AIA is a crucial aspect of maintaining compatible land uses and protecting the airport from encroachment. GG+A's Key observations relative to the existing and active residential development within the AIA are summarized below:

- Proximity to the Airport is currently viewed as a 'neutral' factor for residential development within the AIA.
- Sales and leasing representatives of residential properties near the Airport stated that complaints concerning airport noise or nuisances from homeowners and tenants is "virtually non-existent," while other land uses within the AIA, such as the UCHealth helipad, are perceived to be more of a nuisance.
- There are no avigation easements, waivers, or noise-mitigation construction measures for the active single-family residential developments on the north side of Fossil Creek Reservoir; and buyers are generally unaware that these properties are located within the AIA.
- The Federally recognized threshold for significant aircraft noise exposure (the 65 DNL) is entirely within the Airport's property boundary and the existing residential development in the AIA is compatible with the current level of flight activity.

6.3 Real Estate Market Conditions

In addition to the existing types of developed land uses within the AIA, GG+A provided a comprehensive breakdown of development patterns and specific market findings related to office, industrial/flex, hotel, retail, and residential land uses to analyze existing and forecasted market needs.

Their findings indicated that near-term market demand for industrial and flex uses is much stronger than that of traditional private office uses within the AIA. The main determinant in this demand allocation is that areas north of the AIA are currently recognized as being more desirable locations for office space. GG+A found that typically the prevailing asking rents of existing industrial spaces within the Fort Collins-Loveland area are high enough to encourage new industrial development, and that the prevailing asking rents for existing space is an important distinction between office and industrial or flex uses in the market area.

Other types of real estate were also noted to be thriving. The study indicated that current market trends in the AIA for all types of housing, from single-family homes to multi-family developments, is and will continue to be strong for the foreseeable future. While there is currently less demand for commercial office space when compared to industrial and flex uses, it will remain a key component of land use within the AIA into the future. It is likely because of several desirability factors of the area, such as a centralized location in the region and immediate accessibility to I-25, that allows all types of uses to remain competitive in the AIA.

Hotel development in the AIA was observed to be quite strong. As much of the activity related to hotel activities is based upon travel, it remains unsurprising that the primary generators of the hotel demand in the AIA are related to business or interstate travel. Travelers of either category infiltrate the area almost entirely through FNL or I-25. The hospitality market is likely to grow in the coming years, and some developers are beginning construction on hotels ahead of the market.

It is anticipated that the total land requirement for future office, industrial/flex, hotel, and residential uses within the AIA is approximately 630 to 860 acres, representing approximately 22 to 30 percent of the inventory off-Airport undeveloped land located within the AIA.

6.4 AIA Future Land Use Demand and Planning Considerations

Following the field research, interviews, and analysis conducted by GG+A, projected types and mix of future land use demand within the AIA were identified and are summarized below in **Table 6-1**.

Table 6-1: AIA Projected Land Use 20-Year Demand

Land Use	20-Year Demand	Estimated Land Requirement
Single-Family Residential	2,000-2,800 units	331-464 acres
Industrial/Flex	2,254,000-3,006,000 (sq. ft.)	172-230 acres
Multi-Family Residential	1,400-1,800 units	58-73 acres
Office	869,000-1,216,000 (sq. ft.)	57-80 acres
Hotel	457 hotel rooms	9-11 acres

SOURCE: GG+A, *Airport Influence Area Market Analysis and Recommendations* (2019), p. 11.

As illustrated in **Table 6-1**, it is expected that the highest demand will be for single-family residential and industrial/flex uses within the AIA in the next 20 years. Given the importance of protecting the Airport from encroachment of incompatible land uses, such as residential and the Airport's strategic objective to encourage private and public investment in compatible land use development within the AIA and incentivize development strategies for targeted industries, it will be important to coordinate with the cities, the county, and the local communities to ensure that future development within the AIA remains compatible. Considerations relative to these land uses within the AIA are summarized in the following sections.

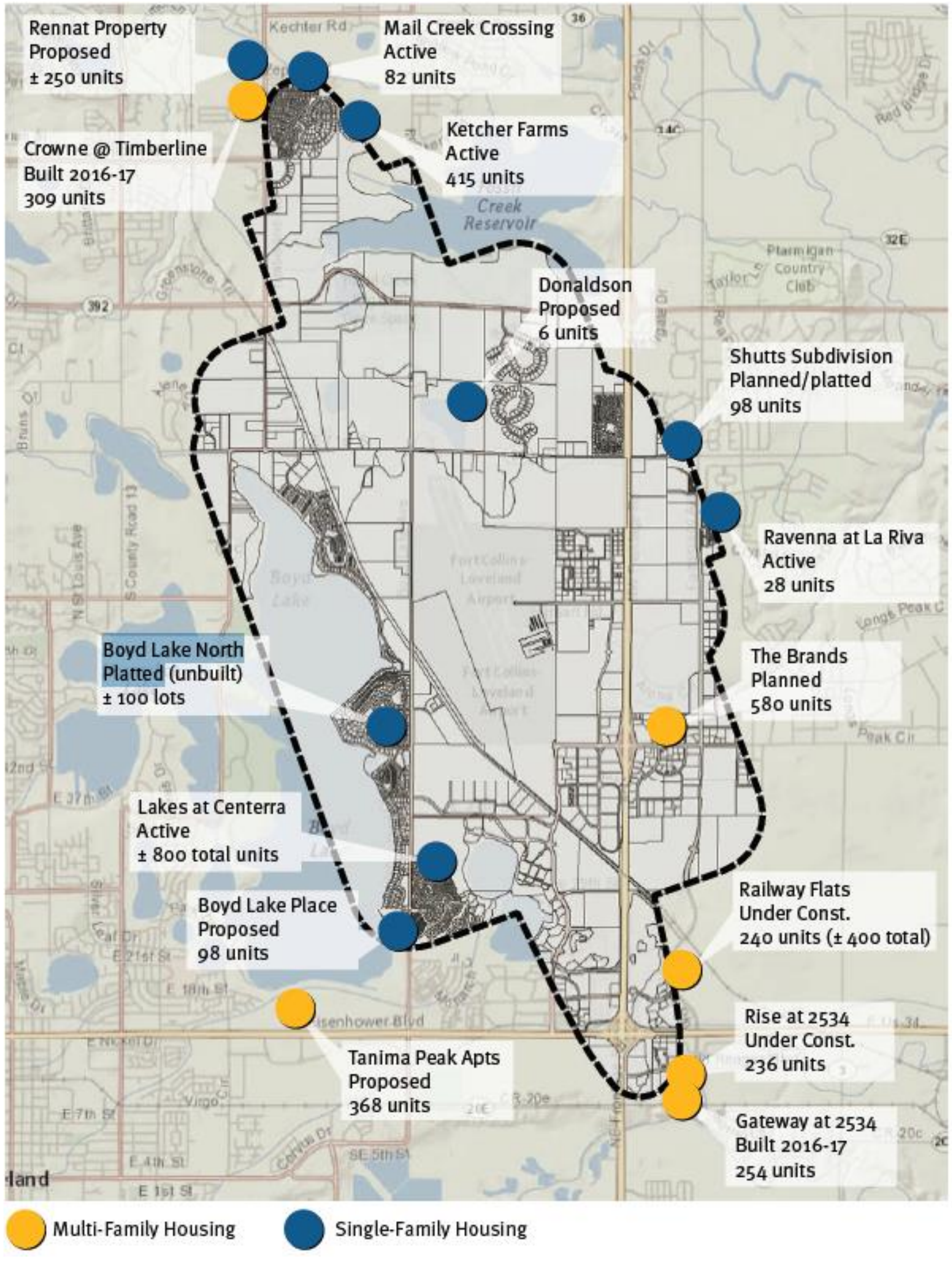
6.4.1 Residential Compatibility and Land Use

The current volume and type of aviation activity at FNL has not deterred residential development in any significant way in the AIA. Current residential trends inside the AIA report extremely high occupancy rates of 96-97% with no signs of stagnation or decline. Indeed, the current shortage of housing is likely to continue into the near future, thereby indicating a strong need for expansion of residential development.

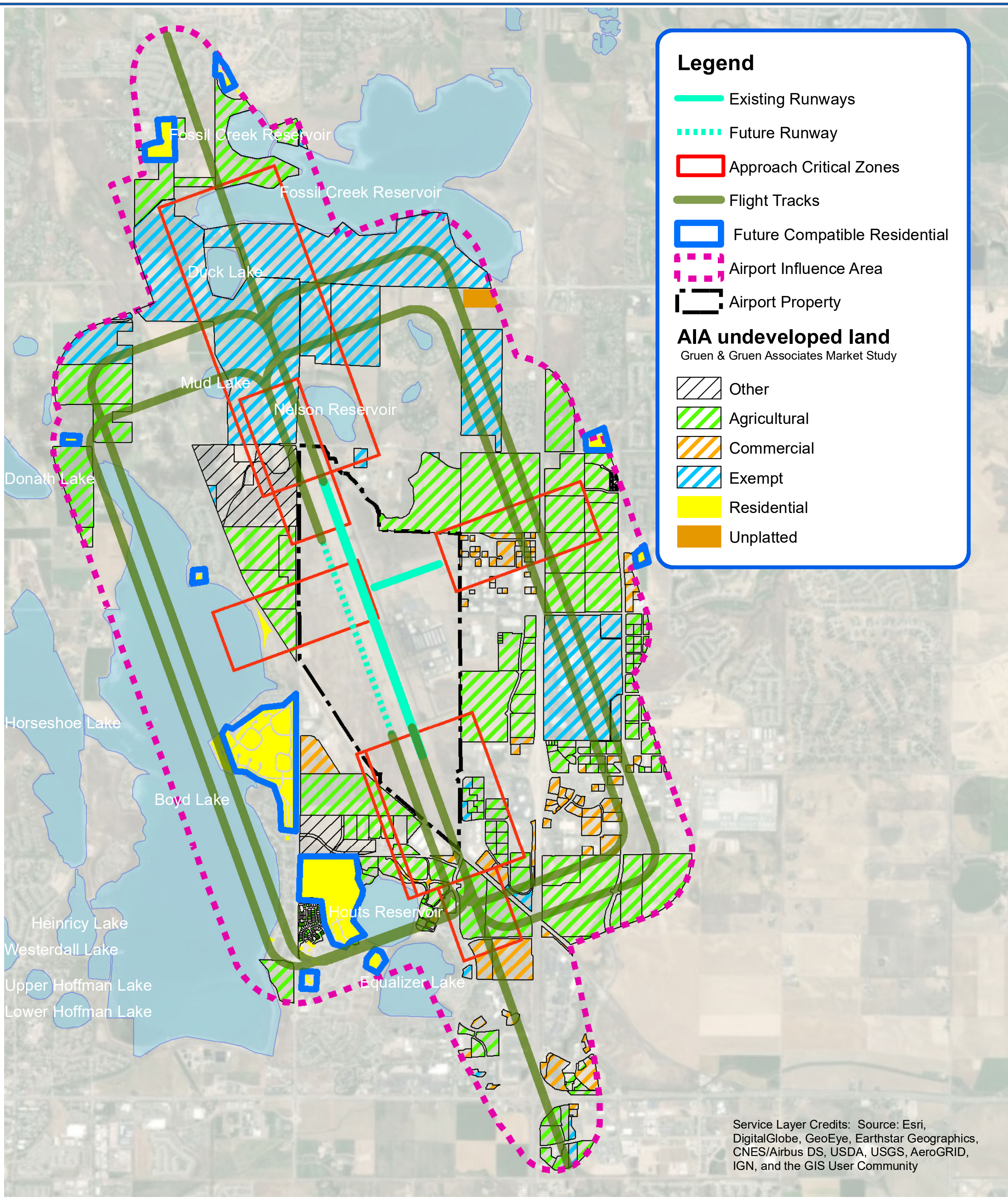
Opposition to long-term commercial air service could arise if residential uses of any significant scale are developed closer to Airport Critical Zones and the 65 DNL. A degree of caution is therefore encouraged to better adapt to the changing conditions at the Airport and in the AIA. In **Figure 6-2**, GG+A identifies planned residential development in and near the AIA, while **Figure 6-3** illustrates the existing and planned Airport Critical Zones and flight tracks along with existing undeveloped land uses to show where future residential land uses within the AIA may be most compatible.

As shown in **Figure 6-3**, there are several small areas of undeveloped lots slated for future residential development that could conflict with Airport activity if developed. The Boyd Lake North Platted residential development has one lot located within the Runway 24 Critical Zone and several lots located under the existing Runway 15/33 flight tracks. Several residential lots associated with the proposed Boyd Lake Place development are directly under the existing Runway 15/33 flight tracks as well as the future parallel runway flight tracks.

Figure 6-2: Residential Development Activity in AIA Vicinity



SOURCE: Gruen + Gruen Associates, 2019.



North

Figure 6-3 **Future AIA Residential Compatibility**

6.4.2 Research and Technology

Given the highly successful nature of industry and flex-use space thus far in the AIA and the anticipated demand for this type of land use in the future, there is high potential for industrial growth through research and technology. The Airport Planning and Development Subcommittee (PDSC) has also identified Technology and Innovation as an important development focus area within the AIA. Excellent transportation links and technology infrastructure are entirely necessary for the success of research and technology parks.

The location of FNL provides a considerable opportunity for such development; however, an upgrade of broadband infrastructure may be required to support such development. With some improvements the excellent accessibility to transportation links, including the Airport itself and I-25, will help to attract this type of development. Another asset that would support this type of development is the higher than average labor pool percentage of skilled labor in hi-technology within Larimer County.

Successful research and technology parks, or "Innovation Districts", typically have an anchor tenant, such as an academic institution, that can add value by the provision of that university or institution's assets and resources. This anchor tenant ultimately helps to attract additional users. With the existing academic institutions in the area, as well as more that are anticipated to come, there may be an opportunity to develop commitments from such institutions. Once an anchor tenant can illustrate its success, other educational, government, institutional, and industrial anchor occupants will generally begin to follow.

6.5 AIA Recommendations

There were many conclusions based upon the findings of the market, economic, and land use conditions that will shape future development pressures and opportunities within the AIA. GG+A utilized these findings to develop a series of pointed recommendations related to off-Airport land use and economic development, as well as opportunities to help guide the decision-making processes of the cities of Fort Collins and Loveland or the other surrounding jurisdictions.

These recommendations are summarized as the following numbers one through 11 and are intended to provide direction on how undeveloped land may be best used within the AIA to meet future needs while remaining compatible with airport activity at FNL.

1. ***Develop an implementation plan and conduct further research, analysis, and outreach needed to lay the groundwork for a successful research and technology park or innovation district within the AIA.*** This recommendation focuses on developing a framework and securing participation from anchor tenants and/or academic institutions. Effective communication between participants and stakeholders would remain a top priority, as would participation amongst each institution with clearly defined roles for all members involved. Such a plan would be developed cooperatively between FNL, the Cities of Fort Collins and Loveland, and Larimer County.

2. ***Encourage a long-term competitive functioning land market in the AIA by allocating more land for office and industrial/flex uses than the 230 to 310 acres of demand forecast over the next 20 years.*** It will be important to support a long-term competitive functioning land market in the AIA. This is in an effort to avoid land cost increases and insufficient development of building space that can sometimes result when there is a limited number of property owners controlling large portions of undeveloped land.

3. ***Identify potential sites on which to encourage additional long term industrial/flex development that is (a) compatible with adjacent uses and (b) provides the most efficient access to public infrastructure.*** Two large entitled Planned Unit Developments (PUDs) are recommended within the AIA and could include portions of Airport property appropriate for non-aeronautical development. The successful build-out of such PUDs will require coordination between the Airport, surrounding communities, and private property owners to identify these areas and provide a wide variety of industrial/flex space development opportunities.

4. ***Engage the Fort Collins-Loveland Water District and Loveland Water and Power Department in assessing infrastructure needs and developing joint strategies to provide adequate public utility infrastructure for undeveloped portions of the AIA. Future transportation infrastructure and roadway capacities should also be evaluated to ensure positive development outcomes in the AIA.*** Successful development within the AIA will require the presence and/or future build-out of utilities and transportation infrastructure to accommodate future development. Early planning and coordination with the surrounding public utility providers will be needed to support infrastructure build-out.

5. ***Encourage a thriving mixed-use environment compatible with Airport operations and dual accessibility to aviation services and Interstate 25.*** Providing diverse uses and economic activities within the AIA that are compatible with Airport operations will be a key factor in the success of development within the AIA. Findings suggest that there is enough land within the AIA to support diverse land uses and economic activities over the next 20 years, but that the Airport and aviation activities are unlikely to be a primary catalyst for development within the AIA.

6. ***Encourage additional residential development within the AIA at locations that will not conflict with Airport operations and commercial air service development (i.e., locations are sufficiently buffered from flight paths, the 55-60 DNL, and Airport Critical Zones).*** With the projected growth of the region, residential land uses are expected to be in high demand within the AIA. Rather than restricting residential land use within the AIA, it will be important to identify areas where future residential land uses will be most compatible with Airport operations to help to support a mixed-use environment.

7. ***Position the AIA as a master planned, user-friendly environment with appropriate design and use standards.*** The user-friendly environment of the Airport should continue to be upheld through the use of appropriate design and use standards to promote the long-term success and economic development within the AIA.

8. ***Be proactive in planning for long term expansion of the existing medical activity center focused around the UCHealth Medical Center of the Rockies.*** The anticipated growth of the healthcare sector in the region and the land capacity to accommodate related development within the AIA are two potentially conflicting uses. To preserve this balance, effective communication with stakeholders will be important in ensuring that the development of future healthcare facilities does not conflict with the ability of the Airport to accommodate the forecasted growth of aviation activity. This is particularly important relative to the existing and future boundaries of the Airport Critical Zones to ensure land use compatibility and avoid impacts to noise sensitive uses within those boundaries.

9. ***Maintain all existing land use compatibility requirements (primarily in the City of Loveland's overlay zoning ordinance) and encourage Larimer County and the City of Fort Collins to establish the same requirements via overlay zoning or similar measure.*** The area north of the Airport is largely undeveloped and expected to remain undeveloped because it is protected by a variety of land controls including public infrastructure requirements, natural areas and conservation easements, and the City of Loveland Airport Overlay zoning ordinance. It will be important to maintain vigilance in the protection of the Airport from encroachment by incompatible land uses. In accordance with the specific protection of Airport land, the governing bodies of Larimer County and City of Fort Collins should be encouraged to establish land use compatibility controls similar to those of the City of Loveland's Airport Overlay zoning to preserve compatible land use within this area.

10. ***Adopt additional land use compatibility measures to avoid precluding commercial air service development in the future.*** The governing bodies of Loveland, Fort Collins, and Larimer County should adopt further land use compatibility measures to avoid encroachment of non-compatible land uses that could restrict future commercial air service development. It is recommended that new or amended plats for properties wholly or partially within the AIA, should require the recordation of the AIA boundary, Airport Critical Zones, and existing noise contours. Similarly, for any major alterations to existing buildings, new developments, or changes in land use, it is recommended that an Aviation Activity Notice be publicly recorded to identify the location of a property within the AIA and the potential for operational activity related impacts.

11. ***All jurisdictions possessing land use review and approval authority in the AIA should establish a uniform procedure for Airport staff and/or representatives to provide written review.*** Uniform procedures across all local jurisdictions should be established to provide opportunities for the Airport Director or Commissioners to review development proposals, land use applications, and proposed zoning changes within the AIA.

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CHAPTER 7.

AIRPORT PLANS

Introduction

The plan for future development at Northern Colorado Regional Airport (FNL or Airport) incorporates a variety of considerations, including the following:

- Aviation demand forecasts
- Facility requirements
- Aircraft operational characteristics
- Environmental considerations
- Assumptions and goals formulated in the initial stages of the planning process
- Development alternatives analysis.

While the components listed above are analyzed in previous chapters of the Master Plan to establish and quantify the future development needed to accommodate the anticipated demand at FNL, this chapter provides a narrative summary to accompany the full Airport Layout Plan (ALP) drawing set provided in **Appendix G – Airport Layout Plan**, which serves as the blueprint for airport development. The ALP depicts the existing facilities and proposed facilities that are needed to accommodate anticipated demand throughout the planning period and relationships of those facilities in the context of the airport setting and adjacent land uses.

The ALP, a planning guidance tool created by the Federal Aviation Administration (FAA), establishes a checklist of required documents which depict the existing and future facilities needed to accommodate anticipated demand at an airport. These documents are to be depicted in the form of illustrations outlining both existing and proposed airside and landside facilities at an airport.

Airports are required to maintain an up-to-date ALP as part of federal grant assurances. Upon conditional approval of the ALP by the FAA, the FAA can subsequently fund development that is eligible for FAA participation, pending the necessary environmental processing through the National Environmental Policy Act (NEPA) prior to development of the proposed projects.

7.1 Cover

The **Cover Sheet (sheet 1 of 18)**, provides required airport location information, an index of drawings included in the ALP drawing set Prior to FAA conditional approval and signature of an ALP, the drawing set is circulated throughout various lines of FAA business for review and comment.

7.2 Airport Data

The **Airport Data Sheet (sheet 2 of 18)** provides detailed airport and runway design criteria information as well as wind data. Data on this sheet informs the size, type, dimensions, and design criteria relative to existing facilities FNL maintains as well as future facilities the Airport intends to construct to accommodate anticipated demand.

7.3 Existing and Future Airport Layout Plans

Existing Airport Layout (sheet 3 of 18) and **Future Airport Layout Plan (sheet 4 of 18)** depict the existing and future runway and taxiway systems and landside development, as well as proposed property acquisitions.

Runway System

The airport layout currently consists of two runways: Runway 15/33 and Runway 6/24. A third runway, Runway 15R/33L, is a proposed future runway that would relieve GA traffic from both 15/33 and 6/24.

Dimensions. Runway 15/33 serves the Airport as the primary runway and is 8,500 feet long by 100 feet wide; it is programmed to be extended by 1,000 feet to the south and widened to 150 feet.

Runway 6/24, the Airport's smaller secondary runway, is 2,189 feet in length and 40 feet in width; it is programmed to be widened to 60 feet while maintaining its current length.

Future Runway 15R/33L is planned for construction west of Runway 15/33 with a length of 6,700 feet and width of 75 feet.

Instrument Approaches. The existing Area Navigation/Global Positioning System (RNAV/GPS) and Very High Frequency Omnidirectional Range (VOR) non-precision approach capabilities for Runway 15; and Instrument Landing System (ILS), Non-Directional Beacon (NDB), GPS, and VOR precision approach to Runway 33 will be maintained. Visibility minimums for Runway 33 will be maintained at ½-mile and the ability to implement precision instrument approach capabilities (not lower than ¾-mile visibility minimum) will be protected for Runway 15.

Runway Lighting. Existing visual aids are planned to be maintained on the existing runways. It is recommended that a Medium Intensity Approach Lighting System (MALS) be installed at Runway 15 to support improved instrument approach capabilities (¾-mile visibility minimum). This improvement will require a larger RPZ (1,000 x 1,700 x 1,510 feet).

Taxiway System

The existing taxiway system will be maintained, and fillets will be constructed to meet the updated design criteria outlined in FAA Advisory Circular (AC) 150/5300-13A, *Airport Design*. It is recommended that Taxiway "A" serving Runway 15/33 be extended 1,000 feet south from its present Runway 33 end to provide a full-length parallel taxiway and align with the 1,000 feet Runway 15/33 extension to the south. Also, 400 feet of separation will between maintained between the runway and taxiway centerlines. Additionally, it is recommended that a full-length parallel taxiway system serve the west side of future Runway 15R/33L.

In addition, to facilitate aviation development on the east side of the Airport, north of Earhart Road, future parallel taxiways are recommended on both sides of Runway 6/24. The Medium Intensity Taxiway Lighting System (MITL) serving Taxiway "A" will be replaced with a High Intensity Lighting System (HITL).

Property Acquisition

Several parcels of land are recommended for acquisition. These include approximately:

- 15 acres of land for the Runway Protection Zone associated with Runway 15 via aviation easement.
- Seven (7) acres of land northeast of the approach end of Runway 15. This land is recommended for acquisition for aviation use and land use compatibility.
- 310 acres west of Runway 15 and Future Runway 15R approach thresholds. This land is recommended for acquisition for approach protection, for future aviation development, and for land use compatibility.

Landside Development

Landside development is also shown on the existing and future ALP sheets. These facilities are demand-driven and will only be developed when sufficient demand exists; therefore, the layout of hangars and other landside facilities on the ALP are considered conceptual layouts. Landside facilities include terminal services, aircraft parking aprons, hangars, automobile access and parking, aircraft maintenance areas, and airport support facilities.

7.4 Airspace Plan

The Airspace Plan for the Airport is based upon Federal Aviation Regulation (FAR) Part 77: *Safe, Efficient Use, and Preservation of the Navigable Airspace*. In order to protect the airport's airspace and approaches from hazards that could affect the safe and efficient operation of aircraft, federal criteria contained in the FAR Part 77 document have been established to provide guidance in controlling the height of objects in the vicinity of the Airport. FAR Part 77 criteria specify a set of imaginary surfaces which, when penetrated, designate an object as being an obstruction.

The Airspace Plan provides plan and profile views that depict these criteria as they specifically relate to FNL. The plan is based on the ultimate planned runway lengths, along with the ultimate planned approaches to each runway end. Therefore, it is based on larger-than-utility airport criteria with precision instrument approaches to Runway 33 and Runway 15 and visual approaches to Runways 6/24 and 15R/33L.

The **Airport Airspace Drawings (sheets 5 to 8 of 18)** illustrate the plan and profile views of the imaginary surfaces and penetrations to those surfaces at FNL.

7.5 Inner Approach Surfaces

The primary component of the inner portions of a runway's approach are the Part 77 imaginary approach surfaces and the Runway Protection Zone (RPZ). An RPZ is trapezoidal in shape, centered about the extended runway centerline, and typically begins 200 feet beyond each runway end. The RPZs are safety areas within which it is desirable to clear all objects (although some uses are normally acceptable). The size of the RPZ is driven by the approach category of the design aircraft and the visibility minimums associated with the type of approach (visual and not lower than one mile, not lower than ¾- mile, and lower than ¾- mile).

The **Inner Approach Drawings (sheet 9 to 14 of 18)** provide large-scale drawings with both plan and profile delineations. They are intended to facilitate identification of the roadways, utility lines, railroads, structures, and other possible obstructions that lie within the confines of the inner approach surface area associated with each runway end. The figures also depict the approach clearance requirements specified by threshold siting criteria. As with the airspace plans detailed in **Section 7.4**, the Inner Portion of the Approach Surface Drawings are based on the ultimate planned runway length and instrument approach capabilities associated with each runway.

A future access road extends across the RPZ at the southern end of Runway 15/33 that would provide an access point to the to the innovation focused aeronautical/non-aeronautical development area on the west side of the Airport and would be constructed only if such a demand exists. This road reflects a conceptual layout. Prior to construction, a full range of alternatives will need to be evaluated, and coordination with FAA and local road jurisdictions would need to occur.

7.6 Departure Surface Drawing

The **Departure Surface Drawing (sheet 15 of 18)** presents a detailed view of departure ends of Runway 15/33. Departure surfaces begin at the point identified as the end of the takeoff distance available and extend along the extended runway centerline at a slope of 40 to 1. When clear, departure surfaces allow pilots to follow standard departure procedures. Obstacle penetrations of the departure surfaces may require non-standard climb rates, higher departure minimums or possibly a reduction in the takeoff distance available. The applicability of the departure surface is dependent on the designation of primary runway(s) for instrument departures. Runway 6/24 is not equipped for instrument departures; therefore, there are no departure surfaces for Runway 6/24.

7.7 Terminal Area Plan

The **Terminal Area Plan (sheet 16 of 18)** provides a detailed drawing of the more intensely developed portions of the Airport.

Passenger Terminal Facilities

Land reserved in the vicinity of the terminal complex will accommodate a replacement passenger terminal facility and the long-term expansion of the facility, automobile parking facilities, and other passenger terminal support facilities. Forecasted airport activity over the planning period indicates that the reservation of space shown on the Terminal Area Plan will adequately accommodate future demand.

General Aviation (GA) Facilities

Programmed improvements for general aviation facilities are also critical components of the master planning effort. As such, general aviation facilities require significant improvement to accommodate both existing and forecasted activity.

A significantly greater amount of space has been reserved at the Airport than has been forecasted over the planning period. Hangar facilities will only be constructed as demand requires. As dictated by demand, these new facilities may include a variety of hangar types ranging in style from small executive or T-hangars to larger corporate hangars.

Aviation Support Facilities

Aircraft Rescue and Firefighting Facility (ARFF). ARFF Index B facilities and equipment are currently provided at the Airport. It is anticipated that the existing ARFF Index B facilities and equipment will adequately accommodate forecasted aircraft operations at FNL.

Fuel Storage Facility. The Airport's fuel storage facility is located adjacent to the main remote air traffic control camera tower, north of the FBO parking lot and south of passenger terminal. While the site provides adequate access for fuel delivery trucks and aircraft fueling trucks, its current location represents an opportunity for a higher and better use related to proposed landside access and general aviation development. It is recommended that the fuel storage facility be relocated farther east on the south side of Earhart Road.

Remote Tower. A temporary Remote Tower control center along with three camera masts and associated utilities have been installed at FNL. The Remote Tower, which is currently pending FAA certification, will eventually control air traffic will enhance safety and better manage aircraft operations at the Airport. The temporary Remote Tower Control Facility is located in a modular building. Space for a permanent building location has been reserved east of the temporary building, off Earhart Road.

7.8 Land Use Plan

The **Airport Land Use Plan (sheet 17 of 18)** depicts existing and recommended future land use within the ultimate airport property boundary, along with land use planning considerations for areas in the vicinity of the Airport. It incorporates land use information from Larimer County, the City of Fort Collins, and the City of Loveland and serves as a key planning document that is used to identify existing and long-term land use compatibility in the Airport vicinity. The Land Use Plan also provides Airport Management with a plan for the use of lease revenue-producing areas on the Airport, in consideration of FAA specified safety setbacks and object clearing standards.

7.9 Airport Property Map

The **Airport Property Map (sheet 18 of 18)** depicts the legal control exercised by the Cities of Loveland and Fort Collins, the acquisition history of tracts within the airport boundary, and the ownership status of any land recommended for acquisition in the Master Plan. The purpose of the Property Map is to confirm that existing and future airport development is and will be constructed on land that is owned and/or controlled by the Airport Sponsor (the cities of Fort Collins and Loveland). Several parcels are recommended for future acquisition during the planning period; however, such acquisition will be dependent on the availability of federal funding. The Property Map also indicates whether land is retained for aeronautical uses or if land has been released from aeronautical uses, such as the area on the west side of the Airport that encompasses the Northern Colorado Law Enforcement Training Center.

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CHAPTER 8.

DEVELOPMENT PROGRAM AND NEEDS ASSESSMENT

Introduction

The Capital Improvement Program (CIP) presents the long-term development program for Northern Colorado Regional Airport (FNL or Airport) and establishes a strategy to fund airport improvements by maximizing the potential to receive federal and state matching funds and establishing a financially prudent plan for improvement funding at the local level. The CIP provides a list of the projects identified in the Master Plan and the associated cost estimates. This information serves as a critical planning tool for the Federal Aviation Administration (FAA) in establishing priorities and budgeting expenditures at FNL when compared with the needs of other airports. From the local sponsor's perspective, the CIP identifies improvement needs and allows budgeting/financial decisions to be made with a comprehensive understanding of financial implications.

The overall concept is to maximize opportunities for receiving federal and state matching funds, within the context of and in recognition of the amount of local funds available to support capital needs. While the CIP is utilized by the FAA for programming projects, neither the federal government nor the sponsor are financially obligated to provide funding for the CIP. Should federal matching funds be unavailable for a project during its specified time frame, it is unlikely that local funding will cover its cost and the project will be put on hold until funding becomes available. This chapter introduces the overall structure of the Development Program/CIP and project cost estimates in 2019 dollars, while the next chapter (**Chapter 9 – Financial Implementation Analysis**) provides a more detailed financial analysis and accounts for escalation. The potential improvements necessary to accommodate the future needs at FNL have been placed into three (3) phases according to priority:

- Phase A – Short-Term (1-5 years, 2020-2024)
- Phase B – Mid-Term (6-10 years, 2025-2029)
- Phase C – Long-Term (11-20 years, 2030-2040)

The suggested program for the phasing of these projects is provided in **Table 8-1** through **8-3**. Some projects in the Mid- and Long-Term phases may not be needed unless forecast projections of enplanements and operations are exceeded. However, the projects are still listed as potential future needs should demand be realized. The first three phases of these proposed improvements are illustrated in **Figures 8-1** through **8-3**.

8.1 Implementation Schedule and Project List

Using the information from previous chapters, including **Chapter 4 – Facility Requirements** and **Chapter 7 – Airport Layout Plan**, a list of capital improvement projects was developed. The proposed projects and phasing of projects are presented in **Table 8-1, Table 8-2,** and **Table 8-3**. The Phase A Short-Term project list includes the year each project is programmed for implementation. The phasing and prioritization of Phase B Mid-Term and Phase C Long-Term projects is likely to change as local and federal priorities evolve over time; therefore, the year of implementation is not specified Phase B and C projects.

The details of the Development Program (including a capital improvement project list, project cost estimates, a finalized phasing list, and a financial feasibility analysis) were formulated with consideration of comments and input received from City staff, the FAA, the Colorado Division of Aeronautics, and the Planning & Development Subcommittee (PDSC).

8.2 Cost Estimates

Planning level cost estimates were prepared for projects identified during each phase of the 20-year planning period. The CIP cost estimates presented in this chapter are based on 2019 dollars and do not account for inflation. Inflation of these cost estimates is addressed in the following chapter, **Chapter 9 – Financial Implementation Analysis**. These estimates are intended for planning purposes only; they are not construction cost estimates, which can only be compiled following the preparation of detailed engineering design documents.

Table 8-1: Phase A (0-5 years) Development Plan Project Costs

Year	Project No.	Project	Estimated Total Cost
2020	A1	Design and Environmental for De-ice Pad and Tanks, Commercial Apron Expansion & TW E - A320 Design Aircraft	$ 339,207
	A2	Design New Terminal, Supporting Infrastructure, & CATEX (Phase I)	$ 1,200,000
		2020 Annual Subtotal	**$ 1,539,207**
2021	A3	Construct Commercial Apron Expansion & TW E - A320 Design Aircraft (Phase I)	$ 2,700,000
	A4	Rehabilitate Stearman Taxilane (Design and Construct)	$ 278,000
		2021 Annual Subtotal	**$ 2,978,000**
2022	A5	Rehabilitate Northrop Taxilane (Design and Construct)	$ 450,000
	A6	Construct New Terminal (Phase I)	$ 12,000,000
	A7	Construct Landside and Roadway Improvements	$ 2,000,000
	A8	Taxiway D Reconstruct and Strengthen All of Taxiway to 30K lbs	$ 1,111,111
	A9	Construct New South GA Ramp	$ 5,700,000
		2022 Annual Subtotal	**$ 21,261,111**
2023	A10	Design and Construct Seal Coat and Crack Repair for All Existing GA Ramp Areas (Phase I)	$ 500,000
	A11	Design RW 15/33 Widening to 150 feet & Rehab and Lighting & Signage for A-320 Design Aircraft, Taxiway A Pavement Rehab	$ 1,112,000
	A12	Broom Truck SRE Replacement	$ 700,000
		2023 Annual Subtotal	**$ 2,312,000**
2024	A13	Construct RW 15/33 widening to 150 feet & Rehab and Lighting & Signage for A-320 Design Aircraft, Taxiway A Pavement Rehab	$ 13,000,000
		2024 Annual Subtotal	**$ 13,000,000**
		Phase A (2020-2024) Total	**$ 41,090,318**

8-2: Phase B (6-10 years) Development Plan Project Costs

Years	Project No.	Project	Estimated Total Cost
2025-2029	B1	Fuel Farm Relocation (Design, Environmental, and Construct)	$ 440,000
	B2	Commercial Apron Maintenance	$ 520,000
	B3	Extend Portions of Lindbergh Rd. for Connection to Hangar Development and Extend Cessna St. to Lindbergh Dr.	$ 4,240,000
	B4	Rehab Existing ARFF Truck	$ 140,000
	B5	Reconstruct Taxiway B and Ramp Rehabilitation/Reconstruction, Including Drainage Improvements	$ 1,877,800
	B6	Terminal Parking Reconstruction and Expansion (Phase II)	$ 3,600,000
	B7	Construct De-ice Pad and Tanks, Commercial Apron Expansion & TW E - A320 Design Aircraft (Phase II)	$ 1,361,059
	B8	Runway 6/24 Seal Coating & Pavement Maintenance	$ 400,000
	B9	Remote Tower Permanent Facility 50 feet x 50 feet Building Plus Vehicle Parking	$ 990,000
	B10	High Speed Runway Broom Replacement	$ 750,000
	B11	Terminal Expansion Design and Supporting Infrastructure (Phase II)	$ 1,000,000
	B12	Six E-Charging Stations for Aircraft	$ 952,200
	B13	Demo Two Rows of T-Hangars and Construct 2 Large Corporate Hangars	$ 4,480,000
	B14	Construct Phase I ADG I T-Hangars with Restroom and Apron	$ 4,340,000
	B15	Reconstruct and Widen Piper Taxilane (Dual Parallel Taxilane to GA Hangars SE) Including Drainage and Utility Modification/Relocation, and Close Grumman Taxilane	$ 2,060,000
	B16	Terminal Access Loop Road and Terminal Parking Expansion (Phase II)	$ 6,030,000
	B17	Terminal Expansion (Phase II)	$ 8,000,000
	B18	SRE Equipment Replacement	$ 560,000
	B19	Easement Acquisition for RW 15 RPZ	$ 290,000
	B20	SRE Equipment Replacement	$ 400,000
	B21	Reconstruct West Half of Stearman Taxilane (Design and Construct)	$ 400,000
	B22	Reconstruct Northrop Taxilane (Design and Construct)	$ 1,325,000
	B23	New FBO Building & Hangar (Private)	$ 4,360,000
	B24	Reconstruct Runway 6/24, 40 feet by 2,273 feet	$ 1,920,000
	B25	Expand Commercial Apron to the North with New Connector, Concrete (Phase II)	$ 2,940,000
	B26	Phase II ADG I T-Hangars (SE) with Apron - One Row of T's and Associated Taxilanes	$ 3,140,000
	B27	Taxiway F (parallel to 6/24) (Design and Construct)	$ 2,800,000
	B28	RW 15 MALS Approach Lighting & Procedure Improvements	$ 4,800,000
		Phase B (2025-2029) Total	**$ 64,116,059**

Table 8-3: Phase C (11-20 years) Development Plan Project Costs

Years	Project No.	Project	Estimated Total Cost
2030-2040	C1	Relocate Northside Drainage and Northside Apron Earthwork, and Construct Rockwell Ave Extension to Northside GA Apron Area	$ 2,460,000
	C2	Taxiway A 4 Extension and Phase I GA Northside Ramp Expansion	$ 3,340,000
	C3	Reconstruct Taxiway A, A320 Design Aircraft	$ 16,050,000
	C4	Phase II North GA Apron Expansion and Connector Taxiway	$ 2,950,000
	C5	Terminal Access Loop Road, Reconstruction and Expansion (Phase III)	$ 730,000
	C6	Terminal Parking, Reconstruction and Expansion (Phase III)	$ 6,020,000
	C7	Environmental Assessment for Runway 15/33 Extension	$ 450,000
	C8	Runway 15/33 Extension and Taxiway A Extension - 1,000 feet to the South	$ 6,260,000
	C9	Expand GA Apron to the South	$ 2,510,000
	C10	Reconstruct FBO Facilities	$ 3,330,000
	C11	Acquire SRE Replacements	$ 2,150,000
	C12	Rehabilitate Cessna Dr. and Gulfstream Ct.	$ 1,710,000
	C13	Runway 15/33 Rehab	$ 8,750,000
	C14	GA Apron Rehab	$ 3,000,000
	C15	Commercial Apron Rehab	$ 1,830,000
	C16	West Side Access Road	$ 2,110,000
	C17	Land Acquisition, Parcels 8 and 9	$ 3,220,000
	C18	Master Plan Update	$ 750,000
	C19	Acquire New ARFF Truck	$ 680,000
		Phase C (2030-2040) Total	**$ 68,300,000**

		Phase A, B, and C Total	**$ 173,506,377**

8.3 Capital Improvement Program

To assist the FAA's effort to provide grant funding to the most needed projects, FNL maintains an up to date Airport Capital Improvements Program (ACIP) and provides this to the FAA annually. This document is similar in format to **Table 8-1** through **8-3**. The proposed project list, phasing, and cost estimates in the AICP serves to provide a progressive projection of capital needs, which can then be utilized in local and federal financial programming. The project list and priorities inevitably change from year to year, so it is important to recognize that the project lists presented in this Master Plan will soon become outdated. As a result, these project lists will differ from the Airport's current five-year ACIP on file with the FAA.

8.4 Phasing Plan

Figure 8-1 through **8-3** illustrate the suggested phasing for the proposed improvement projects throughout the 20-year planning period. These phasing plans represent a suggested project timeline, but it may be necessary to stray from this schedule especially during the latter phases of the planning period. Phase I projects are primarily critical improvements projects needed at the Airport for the reintroduction of commercial air carrier service. The primary factors influencing the timing of project implementation, especially in Phases B and C, include the demand for certain facilities and projects and the economic feasibility. It is important to provide adequate lead-time for detailed planning and construction of these Mid- and Long-Term projects in order to accommodate and keep up with aviation demand. Some considerations in developing the project phasing plan include minimizing disruptive scheduling to avoid making a portion of the facility inoperative due to construction, and preventing extra costs resulting from improper project scheduling.

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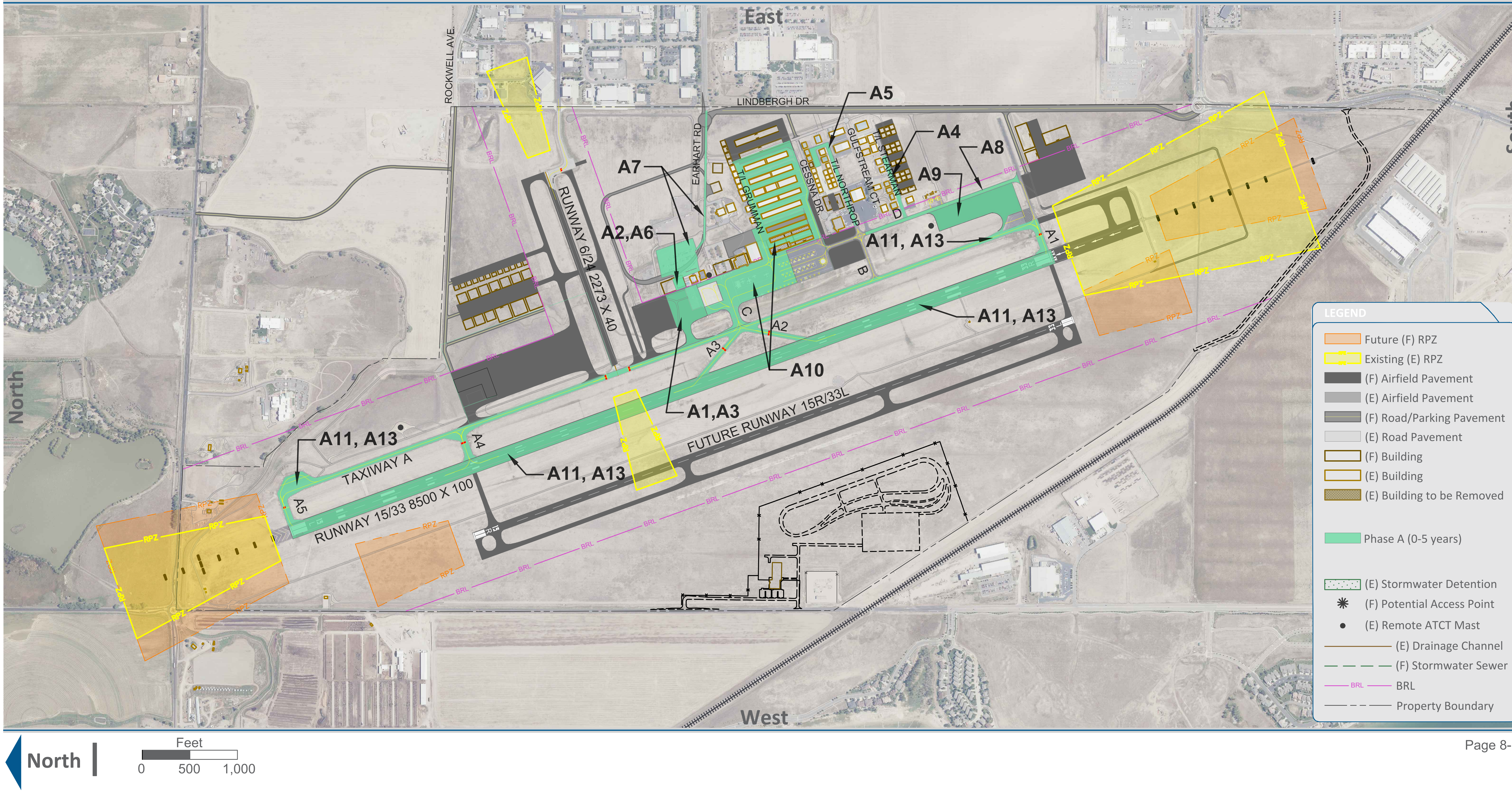

Figure 8-1 **Project Phasing Plan - Phase A**

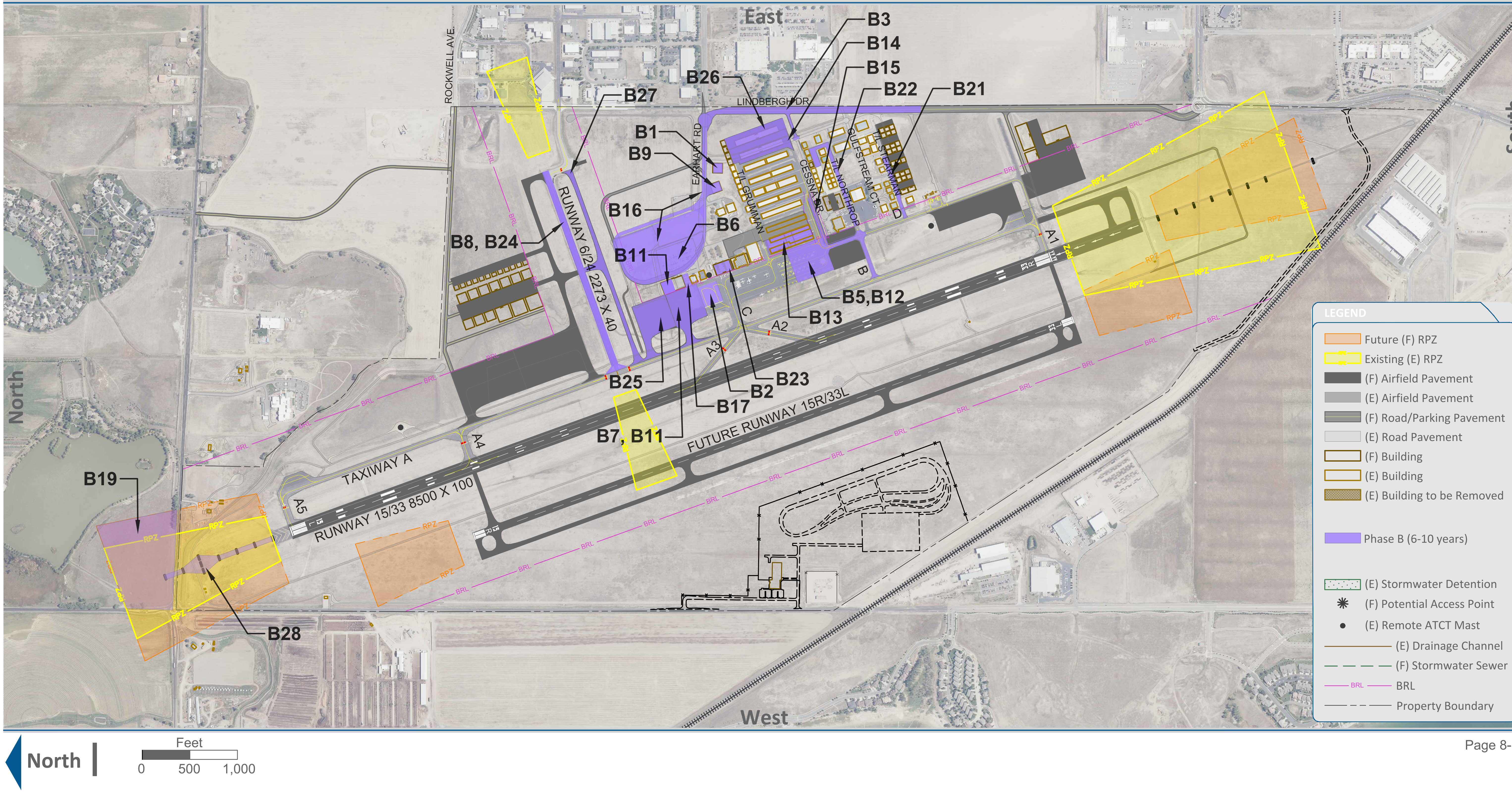

Figure 8-2 **Project Phasing Plan - Phase B**

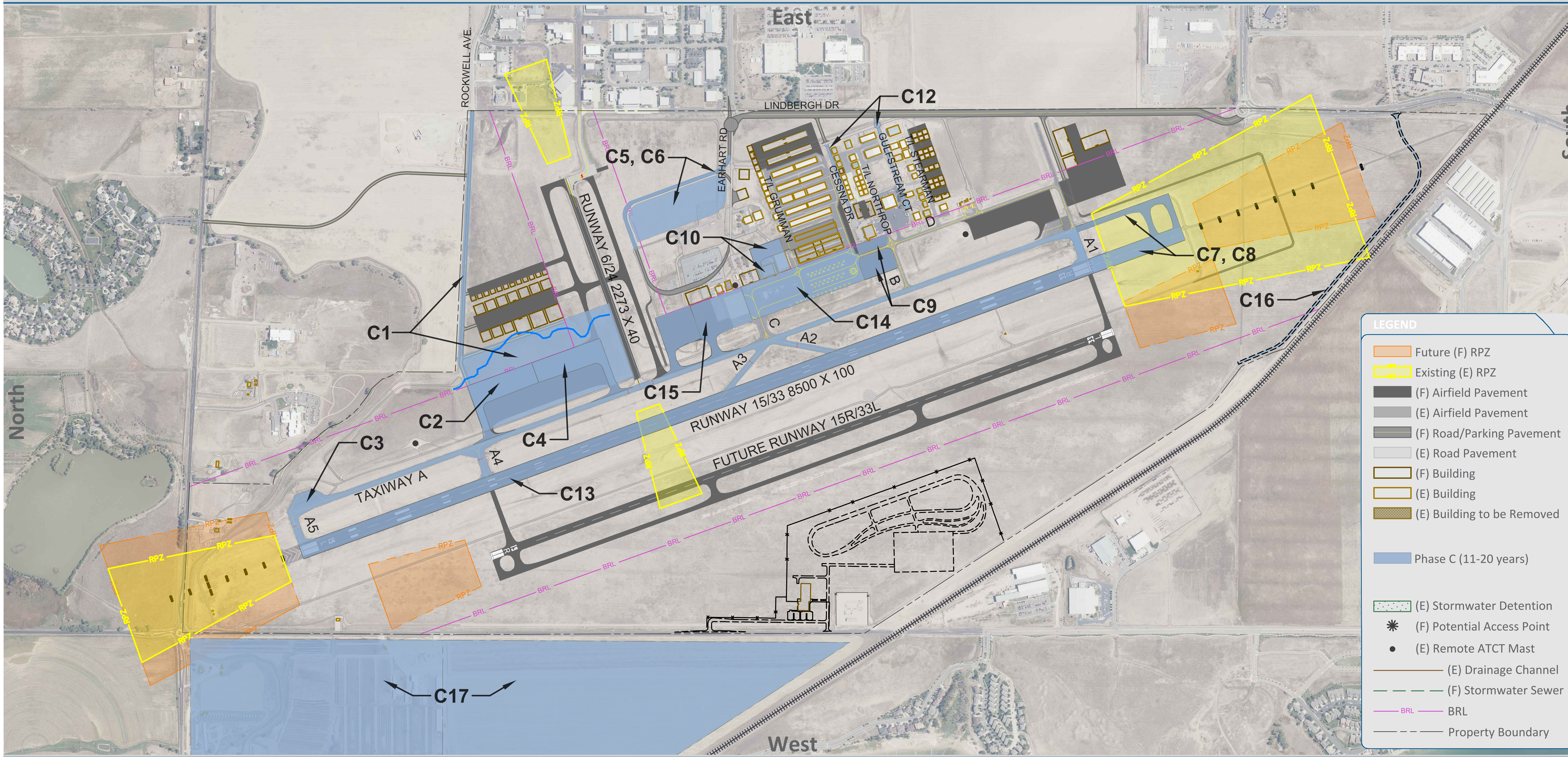

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Figure 8-3 **Project Phasing Plan - Phase C**

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8.5 Financial Plan and Implementation Strategy

Funding sources for the Capital Improvement Program depend on many factors, including Airport Improvement Program (AIP) project eligibility and availability of AIP funds, the ultimate type and use of facilities to be developed, debt capacity of the Airport, the availability of other financing sources, and the priorities for scheduling project completion. The cost estimates presented in this chapter serve as the basis for the detailed financial analysis in **Chapter 9 – Financial Implementation Analysis**, which outlines the potential CIP project financing options. In Chapter 9, the cost estimates will include an escalation factor.

8.6 Summary

In the case that aviation demand continues to indicate improvements are needed, and if the proposed improvements prove to be environmentally acceptable, the capital improvement financial implications discussed in this chapter are likely to be acceptable for the FAA and the Cities of Fort Collins and Loveland. It must be recognized; however, that this is only a programming analysis and not a commitment on the part of the Sponsor or the FAA. If the cost of an improvement project is not financially feasible, it will not be implemented.

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CHAPTER 9.

FINANCIAL IMPLEMENTATION ANALYSIS

9.1 Financial Analysis Objectives

The primary objective of the Financial Implementation Analysis for the Northern Colorado Regional Airport (FNL or AIrport) Master Plan is to evaluate the Airport's capability to fund the Capital Improvement Program (CIP) and to finance Airport operations. The implementation of the program consists of three planning periods: Short-Term (2020-2024), Mid-Term (2025-2029), and Long-Term (2030-2039). The analysis includes development of a detailed Financial Implementation Plan. Objectives for developing the Financial Implementation Plan include presenting the results of the implementation evaluation and providing practical guidelines for matching appropriate funding amounts and aligning timing of funding from various sources with the planned use of funds.

9.2 Overall Approach

The overall approach for conducting the Financial Implementation Analysis included the following steps:

- Gathering and reviewing key Airport documents related to historical financial results, capital improvement plans, operating budgets, regulatory requirements, City and Commission policies, airline agreements and other operating agreements with Airport users.
- Interviewing key Airport officials to gain an understanding of the existing operating and financial environment, relationships with the airlines, and overall management philosophy.
- Reviewing the Aviation Activity Forecast previously developed in the Master Plan.
- Reviewing the Capital Improvement Program project cost estimates and development schedules anticipated for each planning period and projecting the overall financial requirements for the program.
- Determining and analyzing the sources and timing of capital funds available to meet the financial requirements for operating the Airport and financing the Capital Improvement Program.
- Analyzing historical operations and maintenance expenses, developing operations and maintenance expense growth assumptions, reviewing assumptions with Airport management, and projecting future operations and maintenance expenses for each planning period.

- Analyzing historical revenue sources, developing revenue growth assumptions, reviewing assumptions with Airport management and projecting future airline and non-airline revenues for each planning period.
- Completing results of the review in a Financial Analysis Summary that evaluates the financial reasonableness of the Capital Improvement Program.

9.3 Organization, Accounting and Budgeting

9.3.1 Governmental Organization and Administration

Northern Colorado Regional Airport is jointly owned and operated by the Cities of Fort Collins and Loveland (the "Cities"). The operation and maintenance of the Airport is a joint venture between the Cities, with full management and policy-making authority vested equally in both Cities. Management authority over Airport operation and activities located on the Airport is vested with the Northern Colorado Regional Airport Commission (the "Commission"). The Commission is comprised of seven members with appointments and terms provided for in the Intergovernmental Agreement (IGA) as amended. The day-to-day affairs of the Airport are managed by a professional staff of key administrators whose responsibilities include policy implementation, capital planning, financial planning and control, operations and maintenance, and personnel supervision.

9.3.2 Accounting and Budgeting Practices

Accounting records for the Airport are maintained by the City of Loveland as provided for in the IGA. The financial records for the Airport are maintained in a separate accounting fund, and the services provided by the City include monthly reports, accounts payable, payroll processing, processing and payment of purchase orders, and preparation of work papers for the annual audit. The financial statements are reported using the economic resources measurement focus and the accrual basis of accounting. The accrual basis of accounting is used in which revenues are recognized when earned and expenses are recognized when the liability is incurred.

The annual budget serves as the foundation for the Airport's financial planning and control. The budget is developed by the City of Loveland's staff and the Airport Director on a non- Generally Accepted Accounting Principles (GAAP) budgetary basis, which includes budgeting for capital outlay and excludes depreciation. The budget is then submitted to the Commission. Upon approval, the City Councils of Fort Collins and Loveland consider and legally adopt the budget. Revisions that alter total expenditures of the fund must be approved by the City Councils.

9.4 Aviation Forecasts

In Chapter 3 of the Master Plan, aviation activity forecasts are developed to determine if existing Airport facilities have the capacity to meet future demand or if facility modifications are needed. These forecasts, which include passenger enplanements, total aircraft operations and commercial aircraft operations aid in the development and prioritization of the projects included in the CIP. AIP entitlement funds, Passenger Facility Charges (PFCs), and operating revenues described in **Section 9.6.4** below are projected based on these forecasts.

As previously described in the Master Plan, for most of its history, FNL has served the dual role of accommodating both general aviation and commercial service. In 2012, Allegiant Air discontinued its commercial service at FNL, resulting in a significant decrease in enplanements and impacting the funding the Airport received under the Airport Improvement Program. However, in 2017, the Colorado Department of Transportation (CDOT) Division of Aeronautics and the FAA's NextGen Office selected FNL as Colorado's first remote air traffic control technology test facility, which may present opportunities for the resumption of scheduled passenger commercial service at the Airport. The forecasts described above and used in the projection of future operating revenues and capital funding sources assume the resumption of passenger service in 2021.

9.5 Capital Funding Sources

In the past, the Airport has used a combination of FAA AIP entitlement and discretionary grants, Passenger Facility Charges, Colorado Department of Transportation grants, and cash reserves/net operating revenues to fund capital improvements. These funding sources, as well as additional sources of capital funding, will continue to be important to finance the Airport's Master Plan CIP during the future twenty-year planning period.

9.5.1 Federal Funding

The Airport receives grants from the federal government through the Federal FAA to finance the eligible costs of certain capital improvements. These federal grants are allocated to airports through the AIP. AIP grants include passenger entitlement grants for commercial service airports, which are allocated among airports by a formula that is based on passenger enplanements and discretionary grants which are awarded based on project prioritization in accordance with FAA guidelines. After several years of continuing budget resolutions and other short-term legislative measures implemented by Congress, the FAA Reauthorization Act of 2018 was enacted on October 5, 2018. The Act authorized funding for the AIP through September 30, 2023.

Commercial service airports with annual passenger enplanements of 10,000 passengers or more are considered "primary" and receive a minimum of $1,000,000 in AIP entitlement funds two years following the calendar year that this threshold is met under the current legislation. Commercial service airports with more than 2,500 but fewer than 10,000 annual passenger enplanements are designated as "non-primary" and are entitled to $150,000 per year. There are special rules for airports which had sufficient enplanements to achieve "primary" designation, but where enplanements fell below the 10,000 requirement due to a temporary but significant interruption in service unrelated to the demand for air transportation at the airport. In such cases, an airport is designated as a "virtual primary" airport and may continue to be entitled to an annual AIP entitlement of $1,000,000 based on the requirements and limitations in the AIP handbook (5800.38D). FNL received designation as a virtual primary airport for federal year 2020 and therefore was allotted $1,000,000 in AIP entitlements. The financial implementation analysis assumes that the Airport will not receive virtual primary designation in 2021, and that the Airport will be allotted $150,000 in non-primary entitlement funds that year. The analysis further assumes that there will be sufficient enplanements in 2020 and going forward for the Airport to achieve non-hub "primary" status for the 2022 federal funding year and will be allotted, at a minimum, entitlements of $1,000,000 per year. Should the Airport not reach the enplanements required to achieve non-hub "primary" status as forecasted, it would only be entitled to the $150,000 per year, and planned projects would need to be adjusted accordingly.

Under current AIP authorization legislation, eligible projects are funded on a 90 percent AIP grant/10 percent local match basis for small and non-hub airports. Non-hub airports (currently those with annual enplanements between 10,000 passengers and approximately 450,000 passengers) can accumulate and carryover up to three years of unspent entitlements plus the current year before the awards are revoked. In 2020, the Airport had $685,000 of unspent entitlements to carryover for use in 2020. The implementation analysis assumes the application of annual AIP passenger entitlement funds will be about $4.8 million during the Short-Term planning period, $5.0 million during the Mid-Term and $11.0 million during the Long-Term.

The approval of AIP discretionary funding is based on a project eligibility ranking method the FAA uses to award grants, at their discretion, based on a project's priority and importance to the national air transportation system. Based on early discussions between the Airport and the FAA, it is reasonable to assume that the Airport will receive discretionary funding during the planning period for higher priority, eligible projects, such as runway projects. The implementation analysis assumes that $13.8 million of AIP discretionary funds will be required during the Short-Term to fund the widening and rehabilitation of Runway 15/33 to support the design aircraft for commercial operations at FNL, as well as to fund Taxiway A rehabilitation, commercial apron expansion, and snow removal equipment. The implementation analysis also assumes that AIP discretionary grants of $5.5 million will be available for Phase II of the Airport terminal expansion and additional commercial aircraft apron expansion during the five-year Mid-Term period. In the Long-Term, $42.5 million in discretionary funds are assumed for the reconstruction and extension of Taxiway A, the rehabilitation and extension of Runway 15/33 as well as some commercial apron rehabilitation and acquisition of a new aircraft rescue and firefighting (ARFF) truck. Since the future availability of AIP discretionary grants is not certain until actual grants are awarded, it should be noted that any CIP projects which have discretionary funds indicated as a funding source in the financial Implementation plan may need to be delayed until such funds actually become available.

The implementation analysis further assumes that the current AIP program will continue to be extended through 2039 and that future program authorizations will provide substantially similar funding levels as it currently does and as it has historically provided since the program was established in 1982.

On March 27, 2020, the Coronavirus Aid, Relief and Economic Security Act (CARES Act) was enacted and included $10 billion in supplemental funding for airports. The funds were allocated to airports based on formulas specified in the Act by Congress and calculated by the FAA. Under the Act, the funds can be used for any lawful purpose on which airport revenues can be used (in accordance with Airport Sponsor Grant Assurances and FAA policies), including capital and operating costs of the airport. FNL was allotted and awarded $16,865,798 in CARES funding. Additionally, the CARES Act separately provided the FAA funding in order for all 2020 AIP grants to be 100 percent federally funded with no local match requirements. As approved by the Airport Commission, the implementation analysis provides that $2 million of the Airport's CARES Act award will be used for operations and maintenance expenses and the remaining $14.9 million will be used to fund capital projects in the Short-Term, specifically the design and construction of a new passenger terminal building and associated entrance road and parking lot improvements.

9.5.2 Colorado Department of Transportation Grants

The CDOT Division of Aeronautics provides discretionary aviation grants for airport projects from a portion of the state sales tax collected on aviation fuel. Grants are approved for projects including those that are AIP eligible, aviation pavement maintenance projects, and various other aviation projects. For AIP eligible projects, state grant awards for up to 50 percent of an airport's local match requirement are allowed. Non-Revenue producing projects that are not AIP eligible (but are still eligible for state funding) may also receive up to 80 percent funding (with a 20 percent local match) for the total cost of approved projects. Currently, an estimated limit of $250,000 per year in state grants is anticipated to be awarded to Colorado airports supported by the Division.

The Master Plan CIP includes several projects during the planning period that are assumed to be partially funded from State Aeronautics Grants - $1.1 million in the Short-Term, $1.7 million in the Mid-Term and $2.5 million in the Long-Term.

9.5.3 Passenger Facility Charges

The Aviation Safety and Capacity Expansion Act of 1990 established the authority for commercial service airports to apply to the FAA for imposing and using a PFC of up to $3.00 per eligible enplaned passenger. With the passage of AIR-21 in June 2000, airports could apply for an increase in the PFC collection amount from $3.00 per eligible enplaned passenger to $4.50. The proceeds from PFCs are eligible to be used for AIP eligible projects and for certain additional projects that preserve or enhance capacity, safety, or security; mitigate the effects of aircraft noise; or enhance airline competition. PFCs may also be used to pay debt service on bonds (including principal, interest and issue costs) and other indebtedness incurred to carry out eligible projects. In addition to funding future planned projects, the legislation permits airports to collect PFCs to reimburse the eligible costs of projects that began on or after November 5, 1990.

FNL has previously used PFC revenues to fund capital projects. However, previously approved collection authority has since expired and the Airport is not currently approved to collect PFCs. Once scheduled commercial passenger service has resumed at FNL, the Airport plans to submit a new application for additional PFC eligible capital projects identified in the Master Plan and to resume PFC collection authority. The analysis assumes PFC collection authority will be in place by 2022 and that collections at the $4.50 level will average approximately $169,000 per year in the Short-Term as commercial service resumes, and are projected to grow to $454,000 per year by the end of the planning period. The implementation analysis assumes that the Airport will submit additional PFC applications and amendments, as required, to ensure that the collection of PFC revenues continues beyond the authorized expiration date through the end of the twenty-year planning period in 2039.

PFCs can be used on a pay-as-you-go basis or can be used to pay debt service on bonds or other indebtedness related to eligible projects. The implementation analysis assumes that PFCs will be used on a pay-as-you-go basis to fund approximately $498,000 in eligible project costs during the Short-Term, $797,000 during the Mid-Term and $2.3 million in the Long-Term. These pay-as-you-go funds will be used to fund the required local match on various AIP grants.

In addition to using PFCs on a pay-as-you-go basis, the implementation analysis assumes that during the Mid-Term, the Airport will issue approximately $1.25 million in debt to provide partial funding for Phase II of the Airport terminal expansion project to be serviced with PFC funds. Additionally, the analysis assumes that PFC funds in the amount of approximately $178,000 will be used to fund the PFC eligible financing and interest cost on this debt.

The analysis assumes the debt will be secured through the Colorado State Infrastructure Bank Program. As the Commission cannot independently secure debt financing, such a loan would need to be secured jointly by both Cities. The anticipated terms of the loan, as reflected in **Schedule 9-3** (provided at the end of Chapter 9) would be 10 years at a 2.5 percent rate of interest and 0.75 percent loan origination fee. Being jointly owned by the Cities, the Airport has additional options in securing debt financing. One such option would be to obtain a loan from another City department which generates net revenues from the services it provides as an enterprise fund of the City. Such departments/enterprise funds may have available cash reserves which are currently invested in a pooled municipal investment account. This option would generally yield lower financing costs for the Airport and often provides the loaning department/enterprise fund with a greater rate of return on their excess cash than traditional municipal investing. Such arrangements which follow federal guidelines comply with FAA regulatory requirements.

9.5.4 Private Third-Party Funding

Certain on-airport development projects may be funded through private third-party sources. This is frequently the case for general aviation hangar development where a third party assumes the capital development costs of a hangar and the Airport receives rent through a ground lease. The implementation analysis assumes private third-party funding in each phase of the planning period. In the Short-Term, approximately $5.8 million in private third-party funding is assumed to fund the construction of a new south general aviation ramp, as well as provide partial funding for general aviation area seal coating and crack repairs. In the Mid-Term and Long-Term, approximately $24.0 million and $6.9 million respectively, are assumed for the development of additional corporate hangars and t-hangar units (and associated demolition costs), a new Fixed Base Operator (FBO) building, improvements related to Runway 6/24 including a seal coating and a parallel Taxiway F, and a west side access road. If private third-party funding does not materialize in the time frame needed, the associated project or projects may have to be modified, delayed or cancelled until such funding is committed.

9.5.5 Cash Reserves/Airport Net Operating Revenue

The Airport’s cash reserves and future net operating revenues can be an important source of funds for the implementation of the projects included in the CIP. Net operating revenues represent the remaining funds available from the generation of operating revenues less payment of operating expenses as well as any debt service requirements of the Airport’s debt obligations not funded through other sources such as PFCs. The projection of Operating Expenses and Operating Revenues is further discussed in Sections 9.6.3 and 9.6.4.

At the beginning of 2020, the Airport had accumulated about $2.5 million in unrestricted cash reserves available for operations and capital project funding. During the Short-Term, an additional $1.5 million in net operating revenues are anticipated to be generated. The Airport benefits from the estimated $2 million of CARES Act funds planned to support operating expenses, as previously discussed, but is also impacted by potential new costs associated with the operations of the remote tower, further discussed in Section 9.6.3. As a result, no additional net operating revenues are anticipated to be generated during the planning period and available for capital development.

The implementation analysis assumes that Airport cash reserves/net operating cash flow will be used during the planning period to fund only $2.2 million in project costs. This will include local grant match requirements, project components ineligible for federal funding, or projects which federal and/or state funding may not be available. The implementation analysis assumes $2.0 million during the Short-Term and $166,000 in the Mid-Term.

9.5.6 Funding Shortfalls

The traditional airport capital funding sources described in the preceding paragraphs are insufficient in amount and timing to finance a number of capital projects planned for implementation during the mid and long-term planning periods. In the Mid-Term, these projects include roadway and parking improvements, electric aircraft charging stations, Taxiway B and general aviation taxilane reconstruction, reconstruction of Runway 6/24, approach lighting improvements, additional commercial apron expansion and a portion of the estimated costs of the construction of the permanent facility for the remote tower as well as ineligible design and construction of the Phase II Airport Terminal Expansion. In the Long-Term, additional roadway and parking improvements, land acquisition, and a number of projects to expand and rehabilitate general aviation aprons and taxiways rely on the availability of currently unidentified funding.

Consequently, other funding sources will be needed to finance the cost of projects totaling about $40.5 million during the Mid-Term planning period, and $42.7 million during the Long-Term planning period. The source of this funding has not yet been determined and represents a shortfall for the capital project implementation plan. This funding shortfall could be provided by sources such as future private third-party funding, federal economic stimulus grants, City and local economic development funding, and other possible sources that are not certain at this time. It is also important to note that many of the Mid-Term and Long-Term projects included in the funding shortfall may only be needed under the high growth scenarios (more than 4 percent compound annual growth) from Chapter 3. Should these high growth scenarios be realized, additional Airport revenue and funding sources may be available that have not been factored into the analysis in this chapter. Examples of such revenue could include airline landing fees or additional terminal rent. Examples of such funding sources could include additional PFCs and CFCs.

If other funding sources cannot be identified and obtained in the time frames needed, the associated projects will have to be modified, delayed or cancelled until such funding can be identified. This source of capital funding has been referenced in the Financial Implementation Analysis as "Funding Shortfall".

9.6 Financial Analysis and Implementation Plan for the Master Plan Capital Improvement Program

This analysis, along with the Schedules presented at the end of Chapter 9, provides the results of evaluating the financial reasonableness of implementing the Master Plan Capital Improvement Program during the planning period from 2020 through 2039.

9.6.1 Estimated Project Costs and Development Schedule

The CIP Estimated Project Costs and Development Schedule is derived from previous results of the Master Plan analysis. The CIP for capital expansion and improvement projects is projected on an annual basis for the Short-Term planning period from 2020 through 2024, in total for the Mid-Term planning period from 2025 through 2029 and in total for the Long-Term planning period from 2030 through 2039. Projects in the Mid-Term and Long-Term are presented in total, not by specific year, to provide flexibility for changes or adjustments to the timing and priority of projects based on the needs of the Airport as it progresses through the planning periods. For each of these planning periods, **Schedule 9-1** (provided at the end of Chapter 9) presents the Capital Improvement Program including estimated costs and anticipated development schedule for the identified projects.

As shown in **Schedule 9-1**, the total estimated cost of projects is $173,506,377 in 2020 dollars. The estimated costs for projects scheduled during the period 2023 through 2039 are adjusted by an assumed 3 percent rate of annual inflation. No inflation is assumed for the projects programmed in 2020 through 2022. The resulting total project costs escalated for inflation are $229,962,735. **Table 9-1** below presents a summary of the **Schedule** and provides a comparison of 2020 base year costs with escalated costs adjusted for inflation for each of the planning periods.

Table 9-1: Summary of 2020 Base Year and Total Escalated Costs for the Master Plan Capital Improvement Program

Planning Periods	2020 Base Year Costs	Total Escalated Costs
Short-Term Projects (2020-2024)	$41,090,318	$42,936,317
Mid-Term Projects (2025-2029)	$64,116,059	$78,914,376
Long-Term Projects (2030-2039)	$68,300,000	$108,112,041
Total Project Cost	$173,506,377	$229,962,735

SOURCE: Leibowitz & Horton; AMC analysis.
NOTES: Addition errors are due to rounding of calculated amounts.

9.6.2 Sources and Uses of Capital Funding

Funding sources for the CIP depend on many factors, including AIP and PFC project eligibility, the ultimate type and use of facilities to be developed, management's current and desired levels of the Airport's airline cost per enplaned passenger, the availability of other financing sources, and the priorities for scheduling project completion. For example, airfield projects such as runways and taxiways are typically eligible for AIP and PFC funding, so such projects are primarily funded by those sources and do not require use of airport-generated funds. However, revenue producing projects such as parking lots or non-aeronautical development projects are not eligible for AIP or PFC funding, so such projects are typically funded with airport operating revenues or third-party funding. For master planning purposes, assumptions were made related to the funding source of each capital improvement.

Schedule 9-2 (provided at the end of Chapter 9) lists each of the CIP projects, their estimated costs (escalated for inflation) and the assumed funding sources and amounts. During the twenty-year planning period, it was assumed that AIP entitlement grants would partially fund the construction, rehabilitation and extension of various runways and taxiways, commercial apron rehabilitation and expansion and deicing pads, terminal construction and expansion, acquisition of snow removal equipment, rehabilitation of ARFF equipment, runway protection zone easements, and a future master plan update. It was assumed that AIP discretionary grants would fund the reconstruction and extension of Taxiway A, the rehabilitation and extension of Runway 15/33, as well as some commercial apron rehabilitation, and acquisition of a new ARFF truck. CARES Act funding is currently programmed to design and construct a new passenger terminal building, associated entrance road, and parking lot improvements in the Short-Term. It was assumed that CDOT aviation grants, in addition to providing 50 percent of the local match requirement on AIP funds, would also support taxilane rehabilitation, the fuel farm relocation, the permanent facility for the remote tower, and general aviation apron rehabilitation. PFC revenues were assumed to fund a portion of the local match of some AIP projects as well as provide funding on the debt service related to the Phase II expansion of the Airport Terminal Building in the Mid-Term. It was assumed that private third party funding will fund apron expansion, certain general aviation pavement rehabilitation, the development of additional corporate hangars and t-hangar units (and associated demolition costs), a new FBO building, and a west side access road. In the Mid-Term and Long-Term planning periods, funding shortfalls exist for roadway and parking improvements, E-charging stations, various general aviation taxiway, taxilane and apron projects, reconstruction of Runway 6/24, approach lighting improvements, additional commercial apron expansion, land acquisition, a portion of the estimated costs of the construction of the permanent facility for the remote tower as well as ineligible design and construction of the phase II Airport terminal expansion. In the Short-Term period, available cash reserves were assumed to fund a number of local grant match requirements, project components ineligible for federal funding, and projects for which federal and/or state funding may not be available.

An overall summary of the sources of capital funding by type and uses of capital funding by planning period for the CIP is presented in **Table 9-2** below. **Table 9-2** summarizes the uses of capital funding into eight categories. The projects included in the CIP have been categorized as described below.

- **Runway/Taxiway Improvements.** This category includes all projects related to the construction, extension, widening, reconstruction, or rehabilitation of any runway, taxiway or taxilane. This includes pavements used by both commercial service aircraft as well as general aviation aircraft.
- **Aircraft Apron Improvements.** This category includes all projects related to the construction, expansion, reconstruction, or rehabilitation of all aircraft parking aprons, including the aprons associated with the new terminal building as well as all existing or planned general aviation aircraft parking aprons.
- **Terminal Building and Expansion.** This includes the construction of the new terminal building as well as planned future expansions of the building.
- **Roadways, Parking and Related Landside Improvements.** This category includes the rehabilitation of existing roadways and parking lots as well as

reconfiguration or expansion of roadways or parking lots. This also includes rehabilitation of vehicular roads within the general aviation area and planned future access roads to new general aviation areas.

- **General Aviation Private Facility Improvements.** This category includes non-pavement related improvements to the general aviation areas, specifically new FBO and hangar construction, which are typically privately funded.
- **SRE Equipment.** This includes the acquisition or rehabilitation of snow removal equipment.
- **ARFF Equipment.** This includes the acquisition or rehabilitation of aircraft rescue and fire-fighting equipment.
- **Other Improvements.** This includes miscellaneous improvements not otherwise accounted for within the preceding categories. At FNL, these include the fuel farm relocation, remote tower permanent facility, E-charging stations, runway protection zone easement, Medium Intensity Approach Lighting System (MALS) Procedure improvements, drainage improvements, land acquisition and a future Master Plan update.

Table 9-2: Summary of Sources and Uses of Capital Funding for the Master Plan Capital Improvement Program

Sources of Capital Funding	Short-Term (2020-2024)	Mid-Term (2025-2029)	Long-Term (2030-2039)	Totals
AIP Entitlement Grants	$4,835,000	$4,944,318	$11,016,660	$20,795,979
AIP Discretionary Grants	$13,757,157	$5,506,538	$42,522,265	$61,785,960
CARES Act Capital Funds	$14,899,719	$0	$0	$14,899,719
CDOT Aviation Grants	$1,084,357	$1,747,270	$2,458,186	$5,289,812
Passenger Facility Charges - PayGo	$0	$1,309,711	$118,524	$1,428,235
Passenger Facility Charges - Debt	$497,802	$797,270	$2,340,753	$3,635,824
Private Third Party Funding	$5,809,273	$24,007,138	$6,933,405	$36,749,816
Cash Reserves/Net Ops Cash Flow	$2,053,010	$166,145	$ 0	$2,219,155
Total Available Sources of Capital Funding	**$42,936,317**	**$38,478,388**	**$65,389,793**	**$146,804,500**
Funding Shortfall	$0	$40,435,988	$42,722,248	$83,158,236
Total Required Sources of Capital Funding	**$42,936,317**	**$78,914,376**	**$108,112,041**	**$229,962,735**
Uses of Capital Funding				
Runway/Taxiway Improvements	$17,685,838	$13,261,484	$55,103,574	$86,050,896
Aircraft Apron Improvements	$9,285,571	$5,929,294	$16,270,180	$31,485,045
Terminal Building and Expansion	$13,200,000	$11,128,575	$118,524	$24,447,099
Roadways, Parking and Related Landside Improvements	$2,000,000	$17,058,351	$16,712,906	$35,771,257
General Aviation Private Facility Improveme	$0	$20,071,541	$5,265,277	$25,336,818
SRE Equipment	$764,909	$2,103,084	$3,399,503	$6,267,496
ARFF Equipment	$0	$172,182	$1,075,192	$1,247,374
Other Improvements	$0	$9,189,864	$10,166,886	$19,356,750
Total Uses of Capital Funding	**$42,936,317**	**$78,914,376**	**$108,112,041**	**$229,962,735**

SOURCE: Leibowitz & Horton AMC analysis.
NOTES: Addition errors are due to rounding of calculated amounts.
Private third party funding could include both individual and organizations that desire to lease land for hangars or on airport businesses.

A summary of the application of the different capital funding sources to specific categories of CIP projects is presented in **Table 9-3**.

Table 9-3: Summary of Application of Funding Sources to Master Plan Capital Project Categories

Summary of Project Types	AIP Entitlements	AIP Discretionary	CARES Capital Funding	CDOT Aviation Grants	Passenger Facility Charges - Debt	Passenger Facility Charges - PayGo	Private Third Party Funding	Funding Shortfall	Cash Reserves/ Net Revenues	Total Funding
Runway/Taxiway Improvements	$7,889,822	$52,118,868	$0	$2,441,592	$0	$2,372,605	$3,935,596	$16,145,696	$1,146,717	$86,050,896
Aircraft Apron Improvements	$5,410,581	$3,011,001	$33,921	$895,350	$0	$260,350	$5,809,273	$15,492,479	$572,091	$31,485,045
Terminal Building and Expansion	$1,000,000	$5,000,000	$13,200,000	$500,000	$1,428,234	$550,000	$0	$2,768,865	$0	$24,447,099
Roadways, Parking and Related Landside Improvements	$0	$0	$1,665,798	$0	$0	$0	$1,668,128	$32,103,128	$334,202	$35,771,257
General Aviation Facility Improvements	$0	$0	$0	$0	$0	$0	$25,336,818	$0	$0	$25,336,818
SRE Equipment	$4,952,329	$688,418	$0	$313,375	$0	$313,375	$0	$0	$0	$6,267,496
ARFF Equipment	$154,964	$967,673	$0	$62,369	$0	$62,369	$0	$0	$0	$1,247,374
Other Improvements	$1,388,283	$0	$0	$1,077,127	$0	$77,127	$0	$16,648,068	$166,145	$19,356,750
Total Uses of Capital Funding by Project Type	$20,795,979	$61,785,960	$14,899,719	$5,289,812	$1,428,234	$3,635,825	$36,749,816	$83,158,236	$2,219,154	$229,962,736

SOURCE: Leibowitz & Horton AMC analysis.
NOTES: Addition errors are due to rounding of calculated amounts.

9.6.3 Projected Operations and Maintenance Expenses

Operations and maintenance expense projections for the Short-Term (2020 to 2024), the Mid-Term (2025 to 2029) and the Long-Term (2030 to 2039) planning periods are based on the Airport's 2020 budget, the anticipated impacts of inflation, aviation traffic increases, facility improvements and the recent experience of other airports with similar levels of aviation activity.

Operations and Maintenance Expense Projection Assumptions. Operations and maintenance expense growth assumptions, as reflected in **Schedule 9-4**, were developed to project the Airport's operating expenses during the planning period. Actual amounts for 2017 through 2019, and budgeted amounts for 2020 provide a comparison with expenses that are projected for the period 2021 through 2039.

- **Operations and Maintenance Expenses.** The types of expenses at FNL while operating primarily as a non-controlled, general aviation airport, include salaries, as well as supplies, repairs and maintenance, utilities, insurance, and professional services. For each of the following expense categories listed below, projections are based on 2020 budgeted amounts with an assumed 3 percent annual rate of inflation beginning in 2021. Even with the anticipated resumption of scheduled commercial passenger services, the Airport believes the incremental costs of any additional requirements can be managed within the current operating budget with inflation, with the exception of air traffic controls services, discussed below.
    - Personal Services - Wages and Salaries
    - Personal Services - Benefits/Allowances
    - Travel & Mileage
    - Insurance
    - Professional Services
    - Repairs & Maintenance
    - Utilities
    - Marketing and Advertising
    - Payments to Outside Agencies
    - Other Purchased Services
    - Office Supplies and Equipment
    - Building and Equipment Supplies
    - Other Supplies.
- **Other Potential Expenses related to the Remote Control Tower Operations.** As previously mentioned, in 2017, the Colorado Division of Aeronautics and the FAA's NextGen Office selected FNL as the nation's first remote air traffic control technology test facility. The Colorado Division of Aeronautics is investing approximately $8.8 million in the construction and commissioning of the remote tower. In March 2020, air traffic control was activated at FNL through a Mobile Air Traffic Control Tower (MATCT). This was the first step of testing required for the new remote tower certification.

Upon successful testing of the remote tower operations, it is hoped that the FNL Tower will be accepted into the Federal Contract Tower (FCT) Program upon the completion a Benefit/Cost Analysis (BCA) resulting in a positive (greater than 1.0) benefit/cost ratio.

In the event that FNL's remote tower is successfully tested, but it is not accepted into the FCT program, FNL would be responsible for the costs of operating the tower including staffing costs. The Airport has estimated those costs to be approximately $650,000 per year beginning in 2023. In order to be conservative, the financial implementation analysis has assumed this "worst case" scenario of the tower not being funded through the FCT program.

Projection of Operations and Maintenance Expenses and Operating Expenses Per Enplaned Passenger. The projection of operations and maintenance expenses is provided in **Schedule 9-4** (provided at the end of Chapter 9). As shown in the Schedule, total expenses are expected to grow from $1,292,890 budgeted in 2020 to $2,355,972 projected in 2024, reflecting an overall growth rate of 16.2 percent per year, and a total of $8,692,036 during the Short-Term planning period. Mid-Term expenses are projected to total $12,894,670 reflecting a 3 percent annual growth rate for the five-year period 2025-2029, and Long-Term expenses are projected to total $32,249,655, reflecting a 3 percent annual growth rate for the ten-year period 2030-2039.

Schedule 9-4 also provides a comparison of FNL's total operating expenses per enplaned passenger versus non-hub airports with similar levels of aviation activity beginning in 2021 when scheduled commercial service is anticipated to resume. FNL's operating expenses per enplaned passenger are projected to decrease from $88.78 for 2021 to an average of $36.82 during the Long-Term planning period. Over the same period of time, the overall non-hub industry average is projected to grow from $44.37 in 2021 to $46.46 during the Long-Term (Source: Non-Hub Airports, FAA Operating and Financial Summary Report #127 and FAA Air Carrier Activity Information System enplanement database). These comparisons show that as passenger enplanements grow, the Airport benefits through economies of scale as expenses increase more slowly than the anticipated increases in passengers. After the predicted initial growth of passenger enplanements begins to level off in 2023, these comparisons show that projected operating expenses at FNL are generally only somewhat higher than other non-hub airports of similar size. This implies that the Airport will be able to achieve overall operating efficiencies in the management of new commercial service operations along with its existing high volume of general aviation activity.

9.6.4 Projected Operating Revenues

Operating revenue projections for the Short-Term (2020 to 2024), the Mid-Term (2025 to 2029) and the Long-Term (2030 to 2039) planning periods are based on the Airport's 2020 budget, current/planned rates and charges methodology, current leasing practices, the anticipated impacts of inflation, aviation traffic increases, facility expansions and the recent experience of other airports with similar levels of aviation activity.

Operating Revenue Projection Assumptions. Operating revenue growth assumptions, as reflected in **Schedule 9-5** (provided at the end of Chapter 9), were developed to project the Airport's operating revenues during the planning period. Actual amounts for 2017 through 2019, and budgeted amounts for 2020 provide a comparison with revenues that are projected for the period 2021 through 2039. This analysis organizes revenues into categories for airline revenues, non-airline revenues and non-operating revenues. Annual revenue growth assumptions for the period 2021 through 2039 are provided in the following sections.

- **Airline Revenues.** Airline Revenues, which include landing fees, ARFF standby fees and terminal rents, have in recent years, accounted for a small percentage of the Airport's annual operating revenue. However, the financial implementation analysis assumes the resumption of scheduled commercial air service at FNL in 2021. It is anticipated that such service will be provided by a low cost carrier which typically operates on a "per turn" basis, meaning that they pay the airport various rents/fees based on their flight frequency.
  - *Landing fees.* The 2020 landing fee rate set by the Airport is $0.90 per 1,000 lbs. of an aircraft's certified maximum gross landed weight (MGLW). Airline landing fee projections beginning in 2021 are based on the forecasted 2021 commercial aircraft operations and the average MGLW of the commercial service aircraft anticipated to be operating at FNL, times the 2020 landing fee rate. Beginning in 2022, landing fee projections are based on the previous year's projection with increases in the forecasted commercial aircraft operations plus a 3 percent annual rate of inflation. This assumes the Airport increases the landing fee rate as the costs of operating the airfield increase over time.
  - *ARFF Standby Fees.* At FNL, commercial passenger operations must have aircraft rescue and firefighting services on standby, the level of which is dependent on the size of aircraft. FNL has established a fee per flight depending on the level of ARFF services required (Index B or Index C). Based on the aircraft size that low cost carriers typically operate, Index B ARFF services would be required and those rates, as established by the Airport for 2020, are $100 per flight. ARFF standby fee projections beginning in 2021 are based on the forecasted 2021 commercial aircraft operations at the 2020 ARFF standby fee rate. Beginning in 2022, ARFF standby fee

projections are based on the previous year's projection with increases in the forecasted commercial aircraft operations plus a 3 percent annual rate of inflation. This assumes the Airport increases the ARFF standby fees as the costs of providing ARFF services increase over time.

- *Terminal Rents*. As previously mentioned, the resumption of scheduled commercial air service at FNL is anticipated to be provided by a low cost carrier, that typically pays an Airport rents/fees based on a "per turn" rate. At FNL, a terminal use rent of $50 per flight was set for 2020. Similar to the ARFF standby fee, the Terminal Rent projections for 2021 are based on the forecasted 2021 commercial aircraft operations at the 2020 Terminal fee rate. Beginning in 2022, Terminal Rent projections are based on the previous year's projection with increases in the forecasted commercial aircraft operations plus a 3% annual rate of inflation. This assumes the Airport increases the Terminal Rent fee over time.

- **Non-Airline Revenues.** Non-Airline Revenues account for the majority of the Airport's annual operating revenue. Given the Airport's historic role of serving primarily general aviation aircraft and operations, the most significant non-airline revenues are generated from land lease rents, hangar rents, fuel flowage fees and aviation fuel rebates. As scheduled commercial service resumes at FNL, revenues generated from passenger activities are anticipated to grow and contribute to the operations of the Airport. These types of revenues include paid public parking as well as concession fee revenues generated from rental car operators, ground transportation service providers, and terminal food & beverage and retail sales.
  Non-Airline revenue projections beginning in 2021 for the following categories are based on the Airport's 2020 budget with growth thereafter at a 3 percent annual rate of inflation plus increases of the forecasted growth in total aircraft operations at the Airport:
  - Fuel Flowage Fees (Gas & Oil Commissions)
  - State Aviation Fuel Tax Rebates
  - County Aviation Fuel Tax Rebates

  Non-Airline revenues attributable to passenger traffic include paid public parking and terminal concessions described above. Projections for parking revenue beginning in 2021 are based on the forecasted passenger enplanements times $4.15 per passenger. This rate is based on the Airport's previous experience from 2009 to 2012 when there was scheduled commercial service at FNL. Beginning in 2022, the projections are based on the 2021 projection increased by the forecasted growth in passenger enplanements. This revenue is not adjusted for inflation as airports generally do not increase parking rates every year and only increase rates as either costs or parking demand dictates. Projections for terminal concessions beginning in 2021 are based on the forecasted passenger enplanements times $1.32 per passenger. This rate is based on other non-hub airport averages and anticipated revenues that may be generated from ground transportation

providers. Beginning in 2022, the projections are based on the 2021 projection increased by the forecasted growth in passenger enplanements. This revenue is also adjusted for a 3 percent rate of inflation.
Non-Airline revenue projections beginning in 2021 for the following categories are based on the Airport's 2020 budget with growth at a 3 percent annual inflation rate thereafter:

- FBO Rent
- Hangar Rent
- Land & Facilities Rent
- Airport Commissions
- Badging Fees

- **Non-Operating Revenues.** Non-Operating revenue projections beginning in 2021 for Investment Income are based on the Airport's 2020 budget and are assumed to remain flat throughout the planning period.
  As previously described, the Airport was allotted funding under the CARES Act. Of its allotment, the Airport set aside $2 million to support operations and maintenance during the four-year period in which the grant award must be used. Therefore, the financial implementation analysis assumes the use of CARES Act revenues during the years 2020 through 2023.

Projection of Operating Revenues, Airline Cost Per Enplaned Passenger and Operating Revenues Per Enplaned Passenger. The projection of operating revenues is provided in **Schedule 9-5** at the end of Chapter 9. As shown in the Schedule, airline revenues are expected to grow from $12,000 budgeted for 2020 to $89,673 projected for 2024 with a total of $265,596 during the five-year Short-Term planning period. During the five-year Mid-Term period, airline revenues are projected to total $541,184 and during the ten-year Long-Term period, revenues are projected to total $1,737,425. The compound annual growth rate for airline revenues is 16.7 percent during the twenty-year planning period. Non-Airline revenues are expected to increase from $1,201,150 budgeted for 2020 to $1,655,096 projected for 2024, with a total of $7,197,397 during the Short-Term period. During the Mid-Term period, non-airline revenues are projected to total $9,222,843 and during the Long-Term period, non-airline revenues are projected to total $25,279,094. The compound annual growth rate for non-airline revenues is 5.0 percent. Total Airport revenues (including non-operating revenues) are expected to increase from $1,638,150 budgeted for 2020 to $1,769,769 projected for 2024, with a total of $9,587,993 during the Short-Term period. This includes the $2 million allotment from the CARES Act reserved for operations and maintenance. During the Mid-Term period, revenues are projected to total $9,889,028 and during the Long-Term period, revenues are projected to total $27,266,519. The compound annual growth rate for total Airport revenues is 3.8 percent.

Schedule 9-5 also provides a comparison of the Airport's airline cost per enplaned passenger (CPEP) versus non-hub airports with similar levels of aviation activity. The airline CPEP (all airline fees and rentals divided by enplaned passengers) is a measure that airlines use to compare their cost of operations among the airports they serve. The Airport's airline CPEP is projected to remain stable at $1.97 in 2021 to an average of $1.98 during the Long-Term planning period. Over the same period, the overall non-hub industry average is estimated to grow from $9.19 in 2021 to $9.62 during the Long-Term (Source: Non-Hub airports, FAA Operating and Financial Summary Report #127 and FAA Air Carrier Activity Information System enplanement database).

FNL's CPEP is reflective of the expectation that the airport's scheduled passenger service will be provided by a low-cost carrier. Low-cost carriers operate leaner and with higher cost sensitivity than traditional legacy air carriers. Low-cost carriers offer generally low fares in exchange for eliminating many traditional passenger services, or providing additional services at a fee to the passenger. Based on their previous experience with a low-cost carrier at FNL and in response to their cost sensitivity, the Airport developed and maintained a rates and charges strategy to keep airline costs low. It is important to note that the existing facilities are reflective of the current rates. As scheduled commercial passenger service starts to grow at FNL, the Airport plans to review its rates and charges strategy and methodology to ensure appropriate revenues are generated from air carriers based on the Airport's investment in the new facilities, the cost to operate the new facilities and the services provided to the carriers.

Schedule 9-5 additionally provides a comparison of FNL's total operating revenue per enplaned passenger versus an average for other non-hub airports. The Airport's total operating revenue per enplaned passenger is projected to decline from $89.64 projected for 2021 to an average of $30.84 during the Long-Term planning period. Over the same period, the overall non-hub industry average is estimated to grow from $46.75 in 2021 to $48.95 during the Long-Term (Source: Non-Hub airports, FAA Operating and Financial Summary Report #127 and FAA Air Carrier Activity Information System enplanement database). This comparison indicates that, after the initial growth of passenger enplanements start to level off in 2023, total Airport revenues will be 26 percent to 43 percent lower than the non-hub industry average throughout the twenty-year planning period. This is reflective of the Airport's low airline revenues and resulting low cost per enplaned passenger. Additionally, given the nature of the passenger service anticipated at FNL, other passenger related revenues such as paid public parking and rental car revenues are anticipated to be lower than the average non-hub airport. Again, as scheduled commercial passenger service starts to grow at FNL, the Airport may identify opportunities to increase non-airline revenues, specifically those related to passenger service.

9.6.5 Financial Plan Summary for the Master Plan Capital Improvement Program

The Financial Plan Summary presented in **Schedule 9-6** at the end of Chapter 9 includes a Capital Cash Flow section that presents a summary of projected capital funding (from **Schedule 9-2**) and scheduled capital expenditures (from **Schedule 9-1**) with the cash flow that results from implementing the Master Plan Capital Improvement Program. **Schedule 9-6** also includes an Operating Cash Flow section that summarizes totals for operating revenues (from **Schedule 9-5**) and operating expenses (from **Schedule 9-4**) with the addition of beginning cash reserve balances to provide the cash flow that results from these activities as well as the addition of a required subsidy to fund the remote tower operations, further described below.

In **Schedule 9-1** of the Financial Implementation Analysis, practical approaches were provided for scheduling capital expenditures to match the availability of capital funding. **Schedule 9-2** provided practical approaches for matching specific capital funding sources with each of the identified projects. As shown in **Schedule 9-6**, positive year end cash reserves are projected throughout the twenty-year planning period 2020 to 2039. Additionally, the projected year-end cash balances are expected to remain at minimum acceptable balances to the Airport as determined necessary to provide the required resources to meet operating cost needs, to allow for unforeseen circumstances, and to provide protection resulting from unexpected fluctuations of revenue sources.

As discussed in **Section 9.6.3.1**, in the worst-case scenario that FNL's remote tower is successfully tested, but it is not accepted into the FCT program, FNL would be responsible for the costs of operating the tower including staffing costs. The Airport has estimated those costs to be approximately $650,000 per year beginning in 2023. Should that be the case, current and projected operating revenues are not sufficient to support those additional costs and a subsidy would be required to fund the tower operating costs, or at a minimum, make up for the annual net operating losses. Net operating losses are projected to begin in 2024 and continue through the remainder of the planning period. The minimum estimated amount of subsidy which would be required to offset these net operating losses is reflected on **Schedule 9-6**. This also means that in the Mid-Term and Long-Term periods, there are no net operating revenues generated to support the capital improvement program.

Based on the assumptions underlying the Financial Implementation Analysis summarized in the Capital Cash Flow section of **Schedule 9-6**, implementation of projects in the Master Plan CIP that are scheduled during the Short-Term planning period are projected to be financially reasonable. Traditional airport capital funding sources are anticipated to be insufficient to finance a number of projects in the Mid-Term and Long-Term planning periods - such projects represent funding shortfalls for the capital program.

The Financial Implementation Analysis relies on the resumption of commercial passenger service at FNL and the achievement of the aviation operations and passenger enplanement forecasts. However, the achievement of any financial projection is dependent on future events, the occurrence of which cannot be assured. Actual aviation traffic may temporarily vary from the projected levels of activity without a significant adverse impact on the capital program. If resumption of commercial passenger service is delayed or decreased traffic levels occur and persist, the differences between the projected and actual results could be material and the implementation of all the proposed projects may not be financially feasible. It should also be noted, however, that if the forecast activity levels are not met, then a number of the planned capital improvements may not be necessary.

Additionally, implementation of capital projects during the 2020-2039 planning period that have AIP discretionary, CDOT grants, or private third party funding indicated as a funding source are subject to the availability of those grants which are provided at the sole discretion of the FAA, CDOT, or third parties. If the identified portion of discretionary funding is not awarded by the respective agency or entity, then these projects may need to be delayed until funding is available or until alternative funding is identified.

Finally, a number of projects planned for implementation in the Mid-Term and Long-Term can be reasonably funded with traditional capital funding sources. However, significant portions of the capital program in those later phases have funding sources which are not currently identified and which represent a funding shortfall. If funding cannot be identified for the indicated projects in the time frames needed, these projects will also need to be modified, delayed or cancelled until such time as a funding source is secured.

9.7 Financial Analysis Schedules

Financial analysis **Schedules 9-1** through **9-6** are presented on the following pages and described below:

- **Schedule 9-1 – Estimated Project Costs and Development:** This schedule presents the CIP including estimated costs and anticipated development schedule for individual projects in the program. The schedule provides practical approaches for matching capital expenditure amounts with capital funding availability in the Short-Term, Mid-Term, and Long-Term planning periods. This schedule also applies inflation adjustments to provide escalated development costs for projects implemented throughout the entire 20-year planning period.

- **Schedule 9-2 – Projected Capital Funding Sources:** This schedule lists each of the CIP projects, their estimated costs (escalated for inflation) and the assumed funding sources and amounts. The schedule applies specific capital funding sources to each individual project in the capital program.
- **Schedule 9-3 – PFC Serviced Debt Issue:** This schedule provides the details of the debt issue which is expected to be required in 2028 to partially fund Phase II of the Airport terminal expansion project. The schedule includes the anticipated terms of the loan and the resulting annual debt service requirements including associated financing and interest costs. Debt service is planned to be funded with PFCs.
- **Schedule 9-4 – Actual, Budgeted and Projected Operations & Maintenance Expenses:** This schedule reflects the past three years of actual operations and maintenance expenses, budgeted 2020 operations and maintenance expenses, and projections of these expenses through the Short-Term, Mid-Term, and Long-Term planning periods. This schedule also provides a comparison of FNL's annual expenses per enplaned passenger with the average of other non-hub airports.
- **Schedule 9-5 – Actual, Budgeted and Projected Operating Revenues:** This schedule reflects the past three years of actual operating revenues, budgeted 2020 operating revenues, and projections of these revenues through the Short-Term, Mid-Term, and Long-Term planning periods. These revenues are organized into categories for airline revenues, non-airline revenues and non-operating revenues, and provides statistical comparisons of FNL's airline cost per enplaned passenger and total revenue per enplaned passenger with other non-hub airport averages.
- **Schedule 9-6 – Budgeted and Projected Net Revenues, Capital Funding and Capital Expenditures:** This Financial Plan Summary includes a Capital Cash Flow section that presents a summary of projected capital funding (from Schedule 9-2) and scheduled capital expenditures (from Schedule 9-1) with the cash flow that results from implementing the Master Plan Capital Improvement Program. It also includes an Operating Cash Flow section that summarizes totals for operating revenues (from Schedule 9-5) and operating expenses (from Schedule 9-4) with the addition of beginning cash reserve balances to provide the cash flow that results from these activities as well as the addition of a required subsidy to fund the remote tower operations.

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NORTHERN COLORADO REGIONAL AIRPORT (FNL)
Cities of Loveland and Fort Collins, Colorado

FNL - MP - V6

Schedule 9-1

Master Plan - Financial Implementation Analysis
Estimated Project Costs and Development Schedule

25-Aug-20

	Funding Schedule								
	Short Term						Mid Term	Long Term	Total
Capital Improvement Program	**2020**	**2021**	**2022**	**2023**	**2024**	**Total**	**2025-2029**	**2030-2039**	**Funding**
Funds Used for Capital Improvement Projects									
AIP Entitlement Grants:	$1,000,000	$150,000	$1,000,000	$1,000,000	$1,000,000	$4,150,000	$5,000,000	$10,960,979	$20,110,979
AIP Entitlements carryover from the prior years	685,000	1,379,714	0	0	0	685,000	0	55,682	685,000
AIP Entitlement unspent current year + carryover	(1,379,714)	0	0	0	0	0	(55,682)	0	0
AIP Discretionary Grants	0	900,286	0	688,418	12,168,453	13,757,157	5,506,538	42,522,265	61,785,960
CARES Capital Funding	1,233,921	0	13,665,798	0	0	14,899,719	0	0	14,899,719
CDOT Aviation Grants	0	385,000	355,556	93,801	250,000	1,084,357	1,747,270	2,458,186	5,289,812
Passenger Facility Charges:	0	0	118,530	191,351	197,569	507,450	1,095,968	3,460,641	5,064,059
PFC beginning year unliquidated balance	0	0	0	118,530	112,079	0	9,648	22,700	0
PFC unspent current year + carryover	0	0	(118,530)	(112,079)	(9,648)	(9,648)	(22,700)	0	0
SIB Debt Proceeds (10 yrs, 2.5%) Thru 2037	0	0	0	0	0	0	1,250,000	0	1,250,000
Less Debt Principal Funded with PFCs	0	0	0	0	0	0	(225,936)	(1,024,064)	(1,250,000)
Private 3rd Party Funding	0	0	5,700,000	109,273	0	5,809,273	24,007,138	6,933,405	36,749,816
Funding Shortfall	0	0	0	0	0	0	40,435,988	42,722,248	83,158,236
Net Operating Cash Flow	345,260	437,945	595,004	103,950	0	1,482,159	0	0	1,482,159
Funds Available Current Year	1,884,467	3,252,945	21,316,357	2,193,244	13,718,453	42,365,467	78,748,231	108,112,041	229,225,740
Beginning Cash Balance/Funds Carried Over from Prior Year	2,523,742	2,869,002	3,143,947	3,199,194	2,866,053	2,523,742	1,952,892	1,786,747	2,523,742
Funds Used Current Year	(1,539,207)	(2,978,000)	(21,261,111)	(2,526,385)	(14,631,615)	(42,936,317)	(78,914,376)	(108,112,041)	(229,962,735)
Funds Carried Over to Next Year	$2,869,002	$3,143,947	$3,199,194	$2,866,053	$1,952,892	$1,952,892	$1,786,747	$1,786,747	$1,786,747
			Average Debt Service Coverage using PFCs only				1.62x	2.26x	

NORTHERN COLORADO REGIONAL AIRPORT (FNL)
Cities of Loveland and Fort Collins, Colorado

Master Plan - Financial Implementation Analysis
Estimated Project Costs and Development Schedule

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			Estimated Project Costs and Development Schedule								
			Short Term								
	Capital Project Description	2020 Base Year Costs	2020	2021	2022	2023	2024	Total	Mid Term 2025-2029	Long Term 2030-2039	Total Escalated Costs
	Short Term Projects (2020-2024)										
	Capital Projects 2020										
A1	Design & Environmental for De-ice Pad and Tanks, Commercial Apron Expansion & TW E - A320 Design Aircraft	$339,207	$339,207					$339,207			$339,207
A2	Design New Terminal, Supporting Infrastructure, & CATEX (Phase I)	1,200,000	1,200,000					1,200,000			1,200,000
	Total Capital Projects 2020	$1,539,207	$1,539,207	$0	$0	$0	$0	$1,539,207	$0	$0	$1,539,207
	Capital Projects 2021										
A3	Construct De-ice Pad and Tanks, Commercial Apron Expansion & TW E - A320 Design Aircraft (Phase I)	$2,700,000		$2,700,000				$2,700,000			$2,700,000
A4	Rehabiliate Stearman Taxilane (Design and Construct)	278,000		278,000				278,000			278,000
	Total Capital Projects 2021	$2,978,000	$0	$2,978,000	$0	$0	$0	$2,978,000	$0	$0	$2,978,000
	Capital Projects 2022										
A5	Rehabiliate Northrop Taxilane (Design and Construct)	$450,000			$450,000			$450,000			$450,000
A6	Construct New Terminal (Phase I)	12,000,000			12,000,000			12,000,000			12,000,000
A7	Construct Landside and Roadway Improvements	2,000,000			2,000,000			2,000,000			2,000,000
A8	Taxiway D Reconstruct and Strengthen All of Taxiway to 30K lbs	1,111,111			1,111,111			1,111,111			1,111,111
A9	Construct New South GA Ramp	5,700,000			5,700,000			5,700,000			5,700,000
	Total Capital Projects 2022	$21,261,111	$0	$0	$21,261,111	$0	$0	$21,261,111	$0	$0	$21,261,111
	Capital Projects 2023										
A10	Design and Construct Seal Coat and Crack Repair for All Existing GA Ramp Areas (Phase I)	$500,000				$546,364		$546,364			$546,364
A11	Design RW 15/33 Widening to 150 feet & Rehab and Lighting & Signage for A320 Design Aircraft, Taxiway A Pavement Rehab	1,112,000				1,215,112		1,215,112			1,215,112
A12	Broom Truck SRE Replacement	700,000				764,909		764,909			764,909
	Total Capital Projects 2023	$2,312,000	$0	$0	$0	$2,526,385	$0	$2,526,385	$0	$0	$2,526,385
	Capital Projects 2024										
A13	Construct RW 15/33 Widening to 150 feet & Rehab and Lighting & Signage for A320 Design Aircraft, Taxiway A Pavement Rehab	$13,000,000					$14,631,615	$14,631,615			$14,631,615
	Total Capital Projects 2024	$13,000,000	$0	$0	$0	$0	$14,631,615	$14,631,615	$0	$0	$14,631,615
	Total Short Term Project Costs Before Financing	$41,090,318	$1,539,207	$2,978,000	$21,261,111	$2,526,385	$14,631,615	$42,936,317	$0	$0	$42,936,317
	Financing Costs for Debt Serviced with PFCs	-	0	0	0	0	0	0	0	0	0
	Total Short Term Project Costs	$41,090,318	$1,539,207	$2,978,000	$21,261,111	$2,526,385	$14,631,615	$42,936,317	$0	$0	$42,936,317

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Estimated Project Costs and Development Schedule

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			Estimated Project Costs and Development Schedule								
		2020 Base Year	Short Term						Mid Term	Long Term	Total Escalated
	Capital Project Description	Costs	2020	2021	2022	2023	2024	Total	2025-2029	2030-2039	Costs
Mid Term Projects (2025-2029)											
B1	Fuel Farm Relocation (Design, Environmental, and Construct)	$440,000						$0	$541,145		$541,145
B2	Commercial Apron Maintenance	520,000						0	639,534		639,534
B3	Extend Portions of Lindbergh Rd. for Connection to Hangar Development and Extend Cessna St. to Lindbergh Dr.	4,240,000						0	5,214,665		5,214,665
B4	Rehab Existing ARFF Truck	140,000						0	172,182		172,182
B5	Reconstruct Taxiway B and Ramp Rehabilitation/Reconstruction, Including Drainage Improvements	1,877,800						0	2,309,457		2,309,457
B6	Terminal Parking, Reconstruction and Expansion (Phase II)	3,600,000						0	4,427,546		4,427,546
B7	Construct De-ice Pad and Tanks, Commercial Apron Expansion & TW E - A320 Design Aircraft (Phase II)	1,361,059						0	1,673,931		1,673,931
B8	Runway 6/24 Seal Coating & Pavement Maintenance	400,000						0	491,950		491,950
B9	Remote Tower Permanent Facility 50 feet x 50 feet Building Plus Vehicle Parking	990,000						0	1,217,575		1,217,575
B10	High Speed Runway Broom Replacement	750,000						0	922,405		922,405
B11	Terminal Expansion Design and Supporting Infrastructure (Phase II)	1,000,000							1,229,874		1,229,874
B12	Six E-Charging Stations for Aircraft	952,200						0	1,171,086		1,171,086
B13	Demo Two Rows of T-Hangars and Construct 2 Large Corporate Hangars	4,480,000						0	5,509,835		5,509,835
B14	Construct Phase I ADG I T-Hangars with Restroom and Apron	4,340,000						0	5,337,653		5,337,653
B15	Reconstruct and Widen Piper Taxilane (Dual Parallel Taxilane to GA Hangars SE) Including Drainage and Utility Modification/Relocation, and Close Grumman Taxilane	2,060,000						0	2,533,540		2,533,540
B16	Terminal Access Loop Road and Terminal Parking Expansion (Phase II)	6,030,000						0	7,416,139		7,416,139
B17	Terminal Expansion (Phase II)	8,000,000						0	9,838,991		9,838,991
B18	SRE Equipment Replacement	560,000						0	688,729		688,729
B19	Easement Acquisition for RW 15 RPZ	290,000						0	356,663		356,663
B20	SRE Equipment Replacement	400,000						0	491,950		491,950
B21	Reconstruct West Half of Stearman Taxilane (Design and Construct)	400,000						0	491,950		491,950
B22	Reconstruct Northrop Taxilane (Design and Construct)	1,325,000							1,629,583		1,629,583
B23	New FBO Building & Hangar (Private)	4,360,000						0	5,362,250		5,362,250
B24	Reconstruct Runway 6/24, 40 feet by 2,273 feet	1,920,000						0	2,361,358		2,361,358
B25	Expand Commercial Apron to the North with New Connector, Concrete (Phase II)	2,940,000						0	3,615,829		3,615,829
B26	Phase II ADG I T-Hangars (SE) with Apron - One Row of T-s and Associated Taxilanes	3,140,000						0	3,861,804		3,861,804
B27	Taxiway F (parallel to 6/24) (Design and Construct)	2,800,000						0	3,443,647		3,443,647
B28	RW 15 MALS Approach Lighting & Procedure Improvements	4,800,000						0	5,903,395		5,903,395
	Total Mid Term Project Costs Before Financing	$64,116,059	$0	$0	$0	$0	$0	$0	$78,854,665	$0	$78,854,665
	Financing Costs for Debt Serviced with PFCs	-	0	0	0	0	0	0	59,711	0	59,711
	Total Mid Term Project Costs	$64,116,059	$0	$0	$0	$0	$0	$0	$78,914,376	$0	$78,914,376

NORTHERN COLORADO REGIONAL AIRPORT (FNL)
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Schedule 9-1

Master Plan - Financial Implementation Analysis
Estimated Project Costs and Development Schedule

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			Estimated Project Costs and Development Schedule								
		2020 Base Year Costs	Short Term						Mid Term	Long Term	Total Escalated Costs
	Capital Project Description		2020	2021	2022	2023	2024	Total	2025-2029	2030-2039	
Long Term Projects (2030-2039)											
C1	Relocate Northside Drainage and Northside Apron Earthwork, and Construct Rockwell Ave Extension to Northside GA Apron Area	$2,460,000						$0		$3,889,664	$3,889,664
C2	Taxiway A 4 Extension and Phase I GA Northside Ramp Expansion	3,340,000						0		5,281,089	5,281,089
C3	Reconstruct Taxiway A, A320 Design Aircraft	16,050,000						0		25,377,686	25,377,686
C4	Phase II North GA Apron Expansion and Connector Taxiway	2,950,000						0		4,664,435	4,664,435
C5	Terminal Access Loop Road, Reconstruction and Expansion (Phase III)	730,000						0		1,154,250	1,154,250
C6	Terminal Parking, Reconstruction and Expansion (Phase III)	6,020,000						0		9,518,609	9,518,609
C7	Environmental Assessment for Runway 15/33 Extension	450,000						0		711,524	711,524
C8	Runway 15/33 Extension and Taxiway A Extension - 1,000 feet to the South	6,260,000						0		9,898,088	9,898,088
C9	Expand GA Apron to the South	2,510,000						0		3,968,722	3,968,722
C10	Reconstruct FBO Facilities	3,330,000						0		5,265,277	5,265,277
C11	Acquire SRE Replacements	2,150,000						0		3,399,503	3,399,503
C12	Rehabilitate Cessna Dr. and Gulfstream Ct.	1,710,000						0		2,703,791	2,703,791
C13	Runway 15/33 Rehab	8,750,000						0		13,835,187	13,835,187
C14	GA Apron Rehab	3,000,000						0		4,743,493	4,743,493
C15	Commercial Apron Rehab	1,830,000						0		2,893,531	2,893,531
C16	West Side Access Road	2,110,000						0		3,336,257	3,336,257
C17	Land Acquisition, Parcels 8 and 9	3,220,000						0		5,091,349	5,091,349
C18	Master Plan Update	750,000						0		1,185,873	1,185,873
C19	Acquire New ARFF Truck	680,000						0		1,075,192	1,075,192
	Total Long Term Project Costs Before Financing	$68,300,000	$0	$0	$0	$0	$0	$0	$0	$107,993,517	$107,993,517
	Financing Costs for Debt Serviced with PFCs	-	0	0	0	0	0	0	0	118,524	118,524
	Total Long Term Project Costs	$68,300,000	$0	$0	$0	$0	$0	$0	$0	$108,112,041	$108,112,041
Total Project Costs		$173,506,377	$1,539,207	$2,978,000	$21,261,111	$2,526,385	$14,631,615	$42,936,317	$78,914,376	$108,112,041	$229,962,735

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Schedule 9-2

Master Plan - Financial Implementation Analysis
Projected Capital Funding Sources

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	Capital Improvement Projects	Total Escalated Costs	AIP Entitlement Funding	AIP Discretionary Funding	CARES Capital Funding	Total AIP/CARES Funding	CDOT Aviation Grants	Passenger Facility Charges (Debt)	Passenger Facility Charges (PAYG)	Private 3rd Party Funding	Funding Shortfall	Cash Reserves/ Net Revs	Total Required Funding
Short Term Projects (2020-2024)													
Capital Projects 2020													
A1	Design & Environmental for De-ice Pad and Tanks, Commercial Apron Expansion & TW E - A320 Design Aircraft	$339,207	$305,286		$33,921	$339,207						$0	$339,207
A2	Design New Terminal, Supporting Infrastructure, & CATEX (Phase I)	1,200,000			1,200,000	1,200,000						0	1,200,000
	Totals for 2020	$1,539,207	$305,286	$0	$1,233,921	$1,539,207	$0	$0	$0	$0	$0	$0	$1,539,207
Capital Projects 2021													
A3	Construct De-ice Pad and Tanks, Commercial Apron Expansion & TW E - A320 Design Aircraft (Phase I)	$2,700,000	$1,529,714	$900,286		$2,430,000	$135,000					$135,000	$2,700,000
A4	Rehabiliate Stearman Taxilane (Design and Construct)	278,000				0	250,000					28,000	278,000
	Totals for 2021	$2,978,000	$1,529,714	$900,286	$0	$2,430,000	$385,000	$0	$0	$0	$0	$163,000	$2,978,000
Capital Projects 2022													
A5	Rehabiliate Northrop Taxilane (Design and Construct)	$450,000				$0	$300,000					$150,000	$450,000
A6	Construct New Terminal (Phase I)	12,000,000			12,000,000	12,000,000						0	12,000,000
A7	Construct Landside and Roadway Improvements	2,000,000			1,665,798	1,665,798						334,202	2,000,000
A8	Taxiway D Reconstruct and Strengthen All of Taxiway to 30K lbs	1,111,111	1,000,000			1,000,000	55,556					55,555	1,111,111
A9	Construct New South GA Ramp	5,700,000				0				5,700,000		0	5,700,000
	Totals for 2022	$21,261,111	$1,000,000	$0	$13,665,798	$14,665,798	$355,556	$0	$0	$5,700,000	$0	$539,757	$21,261,111
Capital Projects 2023													
A10	Design and Construct Seal Coat and Crack Repair for All Existing GA Ramp Areas (Phase I)	$546,364				$0	$0			$109,273		$437,091	$546,364
A11	Design RW 15/33 Widening to 150 feet & Rehab and Lighting & Signage for A320 Design Aircraft, Taxiway A Pavement Rehab	1,215,112	1,000,000			1,000,000	55,556		159,557			0	1,215,112
A12	Broom Truck SRE Replacement	764,909		688,418		688,418	38,245		38,245			0	764,909
	Totals for 2023	$2,526,385	$1,000,000	$688,418	$0	$1,688,418	$93,801	$0	$197,802	$109,273	$0	$437,091	$2,526,385
Capital Projects 2024													
A13	Construct RW 15/33 Widening to 150 feet & Rehab and Lighting & Signage for A320 Design Aircraft, Taxiway A Pavement Rehab	$14,631,615	$1,000,000	$12,168,453		$13,168,453	$250,000		$300,000			$913,161	$14,631,615
	Totals for 2024	$14,631,615	$1,000,000	$12,168,453	$0	$13,168,453	$250,000	$0	$300,000	$0	$0	$913,161	$14,631,615
	Total Short Term Project Funding Before Financing	$42,936,317	$4,835,000	$13,757,157	$14,899,719	$33,491,876	$1,084,357	$0	$497,802	$5,809,273	$0	$2,053,010	$42,936,317
	Financing Costs for Debt Serviced with PFCs							0					0
	Total Short Term Project Funding	$42,936,317	$4,835,000	$13,757,157	$14,899,719	$33,491,876	$1,084,357	$0	$497,802	$5,809,273	$0	$2,053,010	$42,936,317

NORTHERN COLORADO REGIONAL AIRPORT (FNL)
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Master Plan - Financial Implementation Analysis
Projected Capital Funding Sources

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	Capital Improvement Projects	Total Escalated Costs	AIP Entitlement Funding	AIP Discretionary Funding	CARES Capital Funding	Total AIP/CARES Funding	CDOT Aviation Grants	Passenger Facility Charges (Debt)	Passenger Facility Charges (PAYG)	Private 3rd Party Funding	Funding Shortfall	Cash Reserves/ Net Revs	Total Required Funding
Mid Term Projects (2025-2029)													
B1	Fuel Farm Relocation (Design, Environmental, and Construct)	$541,145				$0	500,000					$41,145	$541,145
B2	Commercial Apron Maintenance	639,534	575,581			575,581	31,977		31,977			0	639,534
B3	Extend Portions of Lindbergh Rd. for Connection to Hangar Development and Extend Cessna St. to Lindbergh Dr.	5,214,665				0					5,214,665	0	5,214,665
B4	Rehab Existing ARFF Truck	172,182	154,964			154,964	8,609		8,609			0	172,182
B5	Reconstruct Taxiway B and Ramp Rehabilitation/Reconstruction, Including Drainage Improvements	2,309,457				0					2,309,457	0	2,309,457
B6	Terminal Parking, Reconstruction and Expansion (Phase II)	4,427,546				0					4,427,546	0	4,427,546
B7	Construct De-ice Pad and Tanks, Commercial Apron Expansion & TW E - A320 Design Aircraft (Phase II)	1,673,931	1,000,000	506,538		1,506,538	83,697		83,697			0	1,673,931
B8	Runway 6/24 Seal Coating & Pavement Maintenance	491,950				0				491,950		0	491,950
B9	Remote Tower Permanent Facility 50 feet x 50 feet Building Plus Vehicle Parking	1,217,575				0	500,000				592,575	125,000	1,217,575
B10	High Speed Runway Broom Replacement	922,405	830,165			830,165	46,120		46,120			0	922,405
B11	Terminal Expansion Design and Supporting Infrastructure (Phase II)	1,229,874				0	250,000		550,000		429,874	0	1,229,874
B12	Six E-Charging Stations for Aircraft	1,171,086				0					1,171,086	0	1,171,086
B13	Demo Two Rows of T-Hangars and Construct 2 Large Corporate Hangars	5,509,835				0				5,509,835		0	5,509,835
B14	Construct Phase I ADG I T-Hangars with Restroom and Apron	5,337,653				0				5,337,653		0	5,337,653
B15	Reconstruct and Widen Piper Taxilane (Dual Parallel Taxilane to GA Hangars SE) Including Drainage and Utility Modification/Relocation, and Close Grumman Taxilane	2,533,540				0					2,533,540	0	2,533,540
B16	Terminal Access Loop Road and Terminal Parking Expansion (Phase II)	7,416,139				0					7,416,139	0	7,416,139
B17	Terminal Expansion (Phase II)	9,838,991	1,000,000	5,000,000		6,000,000	250,000	1,250,000			2,338,991	0	9,838,991
B18	SRE Equipment Replacement	688,729	619,856			619,856	34,436		34,436			0	688,729
B19	Easement Acquisition for RW 15 RPZ	356,663	320,997			320,997	17,833		17,833			0	356,663
B20	SRE Equipment Replacement	491,950	442,755			442,755	24,597		24,597			0	491,950
B21	Reconstruct West Half of Stearman Taxilane (Design and Construct)	491,950				0					491,950	0	491,950
B22	Reconstruct Northrop Taxilane (Design and Construct)	1,629,583				0					1,629,583	0	1,629,583
B23	New FBO Building & Hangar (Private)	5,362,250				0				5,362,250		0	5,362,250
B24	Reconstruct Runway 6/24, 40 feet by 2,273 feet	2,361,358				0					2,361,358	0	2,361,358
B25	Expand Commercial Apron to the North with New Connector, Concrete (Phase II)	3,615,829				0					3,615,829	0	3,615,829
B26	Phase II ADG I T-Hangars (SE) with Apron - One Row of T-s and Associated Taxilanes	3,861,804				0				3,861,804		0	3,861,804
B27	Taxiway F (parallel to 6/24) (Design and Construct)	3,443,647				0				3,443,647		0	3,443,647
B28	RW 15 MALS Approach Lighting & Procedure Improvements	5,903,395				0					5,903,395	0	5,903,395
	Total Mid Term Project Funding Before Financing	$78,854,665	$4,944,318	$5,506,538	$0	$10,450,856	$1,747,270	$1,250,000	$797,270	$24,007,138	$40,435,988	$166,145	$78,854,665
	Financing Costs for Debt Serviced with PFCs	59,711						59,711					59,711
	Total Mid Term Project Funding	$78,914,376	$4,944,318	$5,506,538	$0	$10,450,856	$1,747,270	$1,309,711	$797,270	$24,007,138	$40,435,988	$166,145	$78,914,376

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	Capital Improvement Projects	Total Escalated Costs	AIP Entitlement Funding	AIP Discretionary Funding	CARES Capital Funding	Total AIP/CARES Funding	CDOT Aviation Grants	Passenger Facility Charges (Debt)	Passenger Facility Charges (PAYG)	Private 3rd Party Funding	Funding Shortfall	Cash Reserves/ Net Revs	Total Required Funding
Long Term Projects (2030-2039)													
C1	Relocate Northside Drainage and Northside Apron Earthwork, and Construct Rockwell Ave Extension to Northside GA Apron Area	$3,889,664				$0					$3,889,664	$0	$3,889,664
C2	Taxiway A 4 Extension and Phase I GA Northside Ramp Expansion	5,281,089				0					5,281,089	0	5,281,089
C3	Reconstruct Taxiway A, A320 Design Aircraft	25,377,686	2,249,450	20,590,467		22,839,917	500,000		499,049		1,538,720	0	25,377,686
C4	Phase II North GA Apron Expansion and Connector Taxiway	4,664,435				0					4,664,435	0	4,664,435
C5	Terminal Access Loop Road, Reconstruction and Expansion (Phase III)	1,154,250				0					1,154,250	0	1,154,250
C6	Terminal Parking, Reconstruction and Expansion (Phase III)	9,518,609				0					9,518,609	0	9,518,609
C7	Environmental Assessment for Runway 15/33 Extension	711,524	640,372			640,372	35,576		35,576			0	711,524
C8	Runway 15/33 Extension and Taxiway A Extension - 1,000 feet to the South	9,898,088	1,000,000	7,908,279		8,908,279	494,904		494,904			0	9,898,088
C9	Expand GA Apron to the South	3,968,722				0					3,968,722	0	3,968,722
C10	Reconstruct FBO Facilities	5,265,277				0				5,265,277		0	5,265,277
C11	Acquire SRE Replacements	3,399,503	3,059,553			3,059,553	169,975		169,975			0	3,399,503
C12	Rehabilitate Cessna Dr. and Gulfstream Ct.	2,703,791				0					2,703,791	0	2,703,791
C13	Runway 15/33 Rehab	13,835,187	1,000,000	11,451,668		12,451,668	500,000		883,519			0	13,835,187
C14	GA Apron Rehab	4,743,493	1,000,000			1,000,000	500,000				3,243,493	0	4,743,493
C15	Commercial Apron Rehab	2,893,531	1,000,000	1,604,177		2,604,177	144,677		144,677			0	2,893,531
C16	West Side Access Road	3,336,257				0				1,668,128	1,668,128	0	3,336,257
C17	Land Acquisition, Parcels 8 and 9	5,091,349				0					5,091,349	0	5,091,349
C18	Master Plan Update	1,185,873	1,067,286			1,067,286	59,294		59,294			0	1,185,873
C19	Acquire New ARFF Truck	1,075,192		967,673		967,673	53,760		53,760			0	1,075,192
	Total Long Term Project Funding Before Financing	$107,993,517	$11,016,660	$42,522,265	$0	$53,538,925	$2,458,186	$0	$2,340,753	$6,933,405	$42,722,248	$0	$107,993,517
	Financing Costs for Debt Serviced with PFCs	118,524						118,524					118,524
	Total Long Term Project Funding	$108,112,041	$11,016,660	$42,522,265	$0	$53,538,925	$2,458,186	$118,524	$2,340,753	$6,933,405	$42,722,248	$0	$108,112,041
Total Project Funding		$229,962,735	$20,795,979	$61,785,960	$14,899,719	$97,481,657	$5,289,812	$1,428,235	$3,635,825	$36,749,816	$83,158,236	$2,219,154	$229,962,735

Master Plan - Financial Implementation Analysis
PFC Serviced Debt Issue

25-Aug-20

Debt Issue Structure

Issue Date:	01-Jan-28	
Interest:	2.5%	
Term:	10 Years	
Project Funding Requirement:	$1,250,000	
Debt Service Reserve Fund Requirement (MADS):	0	< no assump
Capitalized Interest:	0	< no assump
Capitalized Debt Issue Costs (0.75%):	0	< no assump
Total Debt Requirement:	$1,250,000	

Notes:
(1) Assumes no interest earnings on Construction Fund balance or Debt Service Reserve Fund deposit.
(2) Assumes DSRF funded from the issue amount

Debt Service Schedule

Payment Number	Year	Beginning Principal	Annual Debt Service	Interest Payment	Principal Payment	Ending Principal
1	2028	$1,250,000	$142,823	$31,250	$111,573	$1,138,427
2	2029	1,138,427	142,823	28,461	114,363	1,024,064
3	2030	1,024,064	142,823	25,602	117,222	906,842
4	2031	906,842	142,823	22,671	120,152	786,689
5	2032	786,689	142,823	19,667	123,156	663,533
6	2033	663,533	142,823	16,588	126,235	537,298
7	2034	537,298	142,823	13,432	129,391	407,907
8	2035	407,907	142,823	10,198	132,626	275,281
9	2036	275,281	142,823	6,882	135,941	139,340
10	2037	139,340	142,823	3,483	139,340	0
	Totals		$1,428,235	$178,235	$1,250,000	

NORTHERN COLORADO REGIONAL AIRPORT (FNL)
Cities of Loveland and Fort Collins, Colorado

FNL - MP - V6

Schedule 9-4

Master Plan - Financial Implementation Analysis
Actual, Budgeted and Projected Operations & Maintenance Expenses

25-Aug-20

				Short Term							
	Actual	Actual	Actual	Budget	Projected					Mid Term	Long Term
Operations & Maintenance Expenses	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**Total**	**2025-2029**	**2030-2039**
Personal Services - Wages and Salaries	$415,912	$405,398	$421,942	$486,728	$501,330	$611,370	$629,711	$708,602	$2,937,741	$3,874,927	$9,699,680
Personal Services - Benefits/Allowances	133,944	147,086	174,564	216,702	223,203	271,399	279,541	314,427	1,305,273	1,719,418	4,304,030
Travel & Mileage	16,611	14,163	11,839	25,500	26,265	27,053	27,865	28,700	135,383	156,946	392,866
Insurance	26,342	25,169	30,126	40,765	41,988	43,248	44,545	45,881	216,427	250,898	628,046
Professional Services	112,929	173,624	411,488	150,000	154,500	159,135	163,909	168,826	796,370	923,212	2,310,974
Repairs & Maintenance	55,184	55,029	103,509	99,445	102,428	105,501	108,666	111,926	527,967	612,058	1,532,099
Utilities	89,145	107,828	122,577	122,800	126,484	130,279	134,187	138,212	651,962	755,803	1,891,918
Marketing and Advertising	19,696	2,179	3,338	35,000	36,050	37,132	38,245	39,393	185,820	215,416	539,227
Payments to Outside Agencies	23,450	23,450	23,450	23,450	24,154	24,878	25,624	26,393	124,499	144,329	361,282
Other Purchased Services	24,783	23,431	22,095	18,000	18,540	19,096	19,669	20,259	95,564	110,785	277,317
Office Supplies and Equipment	7,018	5,536	2,974	7,500	7,725	7,957	8,195	8,441	39,819	46,161	115,549
Building and Equipment Supplies	32,501	48,590	66,331	62,500	64,375	66,306	68,295	70,344	331,821	384,671	962,906
Other Supplies	1,611	1,816	3,370	4,500	4,635	4,774	4,917	5,065	23,891	27,696	69,329
Remote Tower Operations (if not funded through federal contract tower program)	0	0	0	0	0	0	650,000	669,500	1,319,500	3,661,100	9,164,432
Non-Operating - SIB Origination Fee	0	0	0	0	0	0	0	0	0	11,250	0
Total Operations & Maintenance Expenses	$959,126	$1,033,299	$1,397,603	$1,292,890	$1,331,677	$1,508,127	$2,203,371	$2,355,972	$8,692,036	$12,894,670	$32,249,655
Annual Growth Rate	-	7.7%	35.3%	-7.5%	3.0%	13.3%	46.1%	6.9%	11.0%	3.0%	3.0%
Operating Expenses Per Enplaned Passenger:											
Northern Colorado Regional Airport	-	-	-	-	$88.78	$50.27	$45.50	$47.11	$57.91	$46.49	$36.82
Non-Hub Industry Average	-	-	-	-	$44.37	$44.52	$44.67	$44.82	$44.60	$45.28	$46.46

NORTHERN COLORADO REGIONAL AIRPORT (FNL)
Cities of Loveland and Fort Collins, Colorado

Master Plan - Financial Implementation Analysis
Actual, Budgeted and Projected Operating Revenues

25-Aug-20

				Short Term							
				Budget	Projected						
Revenues	**Actual 2017**	**Actual 2018**	**Actual 2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**Total**	**Mid Term 2025-2029**	**Long Term 2030-2039**
AIRLINE REVENUES											
Landing Fees	$7,537	$8,331	$8,229	$5,500	$13,118	$22,134	$37,349	$39,716	$117,817	$239,689	$769,500
ARFF Standby Fees	3,046	649	714	3,000	11,000	18,561	31,320	33,305	97,186	200,997	645,283
Terminal Rent	3,550	2,450	2,300	3,500	5,500	9,281	15,660	16,652	50,593	100,499	322,642
Total Airline Revenues	$14,133	$11,430	$11,243	$12,000	$29,618	$49,976	$84,329	$89,673	$265,596	$541,184	$1,737,425
Annual Growth Rate	-	-19.1%	-1.6%	6.7%	146.8%	68.7%	68.7%	6.3%	51.5%	6.3%	6.3%
Airline Cost Per Enplaned Passenger:											
Northern Colorado Regional Airport	-	-	-	-	$1.97	$1.67	$1.74	$1.79	$1.79	$1.95	$1.98
Non-Hub Industry Average	-	-	-	-	$9.19	$9.22	$9.25	$9.28	$9.23	$9.38	$9.62
NON-AIRLINE REVENUES											
Fuel Flowage Fees (Gas & Oil Commissions)	$152,779	$199,017	$190,731	$180,000	$190,711	$202,059	$214,083	$224,419	$1,011,273	$1,295,480	$3,716,099
State Aviation Fuel Tax Rebates	92,088	94,326	137,981	95,000	100,653	106,642	112,988	118,444	533,727	683,726	1,961,275
County Aviation Fuel Tax Rebates	15,093	17,754	18,680	18,000	19,071	20,206	21,408	22,442	101,127	129,548	371,610
FBO Rent (Land)	78,216	98,060	88,336	88,250	90,898	93,624	96,433	99,326	468,531	543,156	1,359,623
Hangar Rent	115,834	117,155	131,782	150,000	154,500	159,135	163,909	168,826	796,370	923,212	2,310,974
Land & Facilities Rent	193,554	232,541	650,497	644,000	663,320	683,220	703,716	724,828	3,419,083	3,963,655	9,921,783
Airport Commissions	3,300	3,300	3,600	2,400	2,472	2,546	2,623	2,701	12,742	14,771	36,976
Terminal Concessions	0	0	0	0	19,800	36,781	68,327	72,664	197,572	441,856	1,769,284
Parking Revenue	13,595	9,940	11,240	10,000	62,250	112,271	202,485	209,065	596,070	1,159,737	3,661,998
Badging Fees	10,423	13,527	11,618	11,000	11,330	11,670	12,020	12,381	58,400	67,702	169,471
Miscellaneous Revenue	14,815	11,260	2,555	2,500	0	0	0	0	2,500	0	0
Total Non-Airline Revenues	$689,697	$796,880	$1,247,020	$1,201,150	$1,315,005	$1,428,155	$1,597,992	$1,655,096	$7,197,397	$9,222,843	$25,279,094
Annual Growth Rate	-	15.5%	56.5%	-3.7%	9.5%	8.6%	11.9%	3.6%	5.8%	3.7%	4.4%
NON-OPERATING REVENUES											
Investment Income	$25,965	$31,930	$118,764	$25,000	$25,000	$25,000	$25,000	$25,000	$125,000	$125,000	$250,000
City Contributions	520,000	485,000	0	0	0	0	0	0	0	0	0
CARES Act Grant - O&M Funding	0	0	0	400,000	400,000	600,000	600,000	0	2,000,000	0	0
Total Non-Operating Revenues	$545,965	$516,930	$118,764	$425,000	$425,000	$625,000	$625,000	$25,000	$2,125,000	$125,000	$250,000
Annual Growth Rate	-	-5.3%	-77.0%	257.9%	0.0%	47.1%	0.0%	-96.0%	-26.8%	0.0%	0.0%
Total Revenues	$1,249,795	$1,325,240	$1,377,027	$1,638,150	$1,769,622	$2,103,131	$2,307,321	$1,769,769	$9,587,993	$9,889,028	$27,266,519
Annual Growth Rate	-	6.0%	3.9%	19.0%	8.0%	18.8%	9.7%	-23.3%	5.1%	3.8%	4.5%
Operating Revenues Per Enplaned Passenger:											
Northern Colorado Regional Airport	-	-	-	-	$89.64	$49.27	$34.74	$34.89	$52.14	$35.20	$30.84
Non-Hub Industry Average	-	-	-	-	$46.75	$46.91	$47.07	$47.23	$46.99	$47.71	$48.95

NORTHERN COLORADO REGIONAL AIRPORT (FNL)
Cities of Loveland and Fort Collins, Colorado

FNL - MP - V6

Schedule 9-6

Master Plan - Financial Implementation Analysis
Financial Plan Summary
Budgeted and Projected Net Revenues, Capital Funding and Capital Expenditures

25-Aug-20

Operating/Capital Cash Flow	Short Term						Mid Term	Long Term
	Budget	Projected						
	2020	2021	2022	2023	2024	Total	2025-2029	2030-2039
Passenger Enplanements	1,000	15,000	30,000	48,431	50,005	144,436	277,390	875,890
Annual Growth Rates	-	1400.00%	100.00%	61.44%	3.25%	165.92%	3.9%	6.6%
Operating Cash Flow								
Revenues:								
Airline Revenues	$12,000	$29,618	$49,976	$84,329	$89,673	$265,596	$541,184	$1,737,425
Non-Airline Revenues	1,201,150	1,315,005	1,428,155	1,597,992	1,655,096	7,197,397	9,222,843	25,279,094
Non-Operating Revenues	425,000	425,000	625,000	625,000	25,000	2,125,000	125,000	250,000
Subsidy Needed to Fund Air Traffic Control Costs	0	0	0	0	586,203	586,203	3,005,642	4,983,135
Total Revenues	$1,638,150	$1,769,622	$2,103,131	$2,307,321	$2,355,972	$10,174,196	$12,894,670	$32,249,655
Operations & Maintenance Expenses	(1,292,890)	(1,331,677)	(1,508,127)	(2,203,371)	(2,355,972)	(8,692,036)	(12,894,670)	(32,249,655)
Total Net Operating Cash Flow Available For Capital Expenditures	$345,260	$437,945	$595,004	$103,950	$0	$1,482,159	$0	$0
Capital Cash Flow								
Beginning Cash Balance	$2,523,742	$2,869,002	$3,143,947	$3,199,194	$2,866,053	$2,523,742	$1,952,892	$1,786,747
Other Capital Funding Sources:								
AIP Entitlement Grants:	$1,000,000	$150,000	$1,000,000	$1,000,000	$1,000,000	$4,150,000	$5,000,000	$10,960,979
AIP Entitlement unspent current year + carryover	(1,379,714)	0	0	0	0	0	(55,682)	(0)
AIP Entitlements carryover from the prior years	685,000	1,379,714	(0)	(0)	(0)	685,000	(0)	55,682
AIP Discretionary Grants	0	900,286	0	688,418	12,168,453	13,757,157	5,506,538	42,522,265
CARES Capital Funding	1,233,921	0	13,665,798	0	0	14,899,719	0	0
CDOT Aviation Grants	0	385,000	355,556	93,801	250,000	1,084,357	1,747,270	2,458,186
Passenger Facility Charges:	0	0	118,530	191,351	197,569	507,450	1,095,968	3,460,641
PFC beginning year unliquidated balance	0	0	0	118,530	112,079	0	9,648	22,700
PFC unspent current year + carryover	0	0	(118,530)	(112,079)	(9,648)	(9,648)	(22,700)	0
SIB Debt Proceeds (10 yrs, 2.5%) Thru 2037	0	0	0	0	0	0	1,250,000	0
Less Debt Principal Funded with PFCs	0	0	0	0	0	0	(225,936)	(1,024,064)
Private 3rd Party Funding	0	0	5,700,000	109,273	0	5,809,273	24,007,138	6,933,405
Other Anticipated Capital Funding Sources	$1,539,207	$2,815,000	$20,721,354	$2,089,294	$13,718,453	$40,883,308	$38,312,244	$65,389,793
Funding Shortfall	0	0	0	0	0	0	40,435,988	42,722,248
Other Required Capital Funding Sources	$1,539,207	$2,815,000	$20,721,354	$2,089,294	$13,718,453	$40,883,308	$78,748,231	$108,112,041
Total Funds Required for Capital Expenditures	$4,408,209	$6,121,947	$24,460,305	$5,392,438	$16,584,506	$44,889,209	$80,701,123	$109,898,788
Capital Improvement Program Expenditures	1,539,207	2,978,000	21,261,111	2,526,385	14,631,615	42,936,317	78,914,376	108,112,041
Ending Cash Balance	$2,869,002	$3,143,947	$3,199,194	$2,866,053	$1,952,892	$1,952,892	$1,786,747	$1,786,747

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APPENDIX A:

ACRONYMS AND GLOSSARY

ACRONYMS

AAC	Aircraft Approach Category
AAGR	Average Annual Growth Rate
AC	Advisory Circular
ACC	Aims Community College
ACIP	Airport Capital Improvement Program
ACGR	Annual Compound Growth Rate
ACRP	Airport Cooperative Research Program
ADG	Airplane Design Group
ADO	Airports District Office
AEP	Airport Emergency Plan
AFFF	Aqueous Film Forming Foam
AGL	Above Ground Level
AIA	Airport Influence Area
AIP	Airport Improvement Program
ALP	Airport Layout Plan
APMs	Airport Planning Manuals
ARC	Airport Reference Code
ARFF	Aircraft Rescue and Firefighting Facility
ASPM	Aviation System Performance Metrics
ASV	Annual Service Volume
ATC	Air Traffic Control
ATCT	Airport Traffic Control Tower
AWOS III P/T	Automated Weather Observing System III Precipitation/Thunderstorm
BLF	Boarding Load Factor
BMP	Best Management Practice
BRL	Building Restriction Line
C&D	Construction and Demolition
CAGR	Compound Annual Growth Rate
CARES Act	Coronavirus Aid, Relief, and Economic Security Act
CASP	Colorado State Aviation System Plan
CDAG	Colorado Discretionary Aviation Grant
CDOT	Colorado Department of Transportation
CDP	Conceptual Development Plan
CEIS	Colorado Aviation Economic Impact Study
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CIP	Capital Improvement Program

CPEP	Cost Per Enplaned Passenger
CPW	Colorado Parks and Wildlife
CRJ	Canadair Regional Jet
CSU	Colorado State University
CTAF	Common Traffic Advisory Frequency
CTX	Computer Tomography X-ray
CWA	Clean Water Act
DEN	Denver International Airport
DNL	Day-Night Noise Level
DoD	Department of Defense
DW	Dual Wheel
EPA	Environmental Protection Agency
ERJ	Embraer Regional Jet
ESA	Endangered Species Act
ETD	Explosive Trace Detection
eVTOL	Electronic Vertical Takeoff and Landing
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FBO	Fixed Base Operator
FCLWD	Fort Collins – Loveland Water District
FCT	FAA Contract Tower
FIS	Federal Inspection Station
FL	Flight Level
FMRA	FAA Modernization and Reform Act
FNL	Northern Colorado Regional Airport
FPPA	Farmland Protection Policy Act
FSS	Flight Service Station
FY	Fiscal Year
GA	General Aviation
GAMA	General Aviation Manufacturers Association
GARA	General Aviation Revitalization Act
GDP	Gross Domestic Product
GPS	Global Positioning System
GSE	Ground Service Equipment
HAZMAT	Hazardous Materials
HIRL	High Intensity Runway Lights
IFR	Instrument Flight Rules
IGA	Intergovernmental Agreement
ILS	Instrument Landing System
IPaC	Information, Planning, and Conservation
LFRA	Loveland Fire Rescue Authority
MALS	Medium Intensity Approach Lighting System

MALSR	Medium Intensity Runway Lights with Runway Alignment Indicator Lights
MATCT	Mobile Air Traffic Control Tower
MBTA	Migratory Bird Treaty Act
MCI	Mass Casualty Incident
MITL	Medium Intensity Taxiway Lights
MSA	Metropolitan Statistical Area
MSL	Mean Sea Level
MSW	Municipal Solid Waste
MTOW	Maximum Takeoff Weight
NAAQS	National Ambient Air Quality Standards
NAS	National Airspace System
NASR	National Aerospace System Resources
NAVAIDS	Navigational Aids
NCLETC	Northern Colorado Law Enforcement Training Center
NDB	Non-Directional Beacon
NEPA	National Environmental Policy Act
NFHL	National Flood Hazard Layer
NHPA	National Historic Preservation Act
NM	Nautical Miles
NPE	Non-Primary Airports Entitlement
NPIAS	National Plan of Integrated Airport Systems
NPS	National Park Service
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O&D	Origin and Destination
OFA	Obstacle Free Area
OFZ	Obstacle Free Zone
OMB	Office of Management and Budget
PAPI	Precision Approach Path Indicator
PCI	Pavement Condition Index
PCN	Pavement Condition Number
PCV	Poor Visibility Ceiling
PDEW	Passengers Daily Each Week
PDSC	Planning and Development Subcommittee
PFA	Poudre Fire Authority
PFCs	Passenger Facility Charges
PHOP	Peak Hour Originating Passengers
PHTP	Peak Hour Terminating Passengers
PUD	Planned Unit Development
RCRA	Resource Conservation and Recovery Act
RCO	Remote Communications Outlet

RDC	Runway Design Code
REIL	Runway End Identifier Lights
RNAV	Area Navigation
ROFA	Runway Object Free Area
ROFZ	Runway Obstacle Free Zone
RPZ	Runway Protection Zone
RSA	Runway Safety Area
SARA	Superfund Amendments Reauthorization Act
SASOs	Specialized Aviation Service Operators
SFCSD	South Fort Collins Sanitation District
SHPO	State Historic Preservation Office
SIB	State Infrastructure Bank
SRE	Snow Removal Equipment
SSCP	Security Screening Check Point
SW	Single Wheel
TAF	Terminal Area Forecasts
TCPs	Traditional Cultural Properties
TDG	Taxiway Design Group
TESM	Taxiway Edge Safety Margin
TFMSC	Traffic Flow Management System Counts
TOFA	Taxiway Object Free Area
TRUE	Total Resource Use and Efficiency
TSA	Transportation Security Administration
TSS	Threshold Siting Surface
TTF	Through-the-fence
USC	United States Code
USFWS	United States Fish and Wildlife Service
VFR	Visual Flight Rules
VHF	Very High Frequency
VOR	Very High Frequency Omnidirectional Range
VORTAC	Very High Frequency Omnidirectional Range/Tactical Air Navigation
WSFR	Windsor Severance Fire Rescue

GLOSSARY OF TERMS

Above Mean Sea Level. The elevation of an object above the average sea level.

Aeronautical Development. On-airport development requiring runway and taxiway access.

Air Carrier. A commercial airline with published schedules operating at least five round trips per week.

Aircraft Apron Improvements. In the context of the Capital Improvement Plan, this category includes all projects related to the construction, reconstruction or rehabilitation of all aircraft parking aprons, including the aprons associated with the new terminal building as well as all existing or planned general aviation aircraft parking aprons.

Aircraft Operation. An aircraft arrival (landing) or an aircraft departure (takeoff) represents one aircraft operation.

Aircraft Rescue and Firefighting Facility. A facility housing specifically trained personnel and equipment in response, firefighting, hazard mitigation, evacuation, and rescue of passengers and crew of an aircraft involved in a ground emergency.

Airport Layout Plan. The official, FAA approved drawing of an airport's existing and proposed facilities.

Airport Reference Code. An FAA design criteria based upon the approach speed (represented by a capital letter) and wingspan (represented by a roman numeral) of an aircraft that produces a minimum annual itinerant operations per year at an airport.

Airport Traffic Control Tower. A central operations tower in the terminal air traffic control system with an associated IFR room if radar equipped, using air to ground communications and/or radar, visual signaling, and other devices to provide the safe and expeditious movement of air traffic.

Air Route Traffic Control Center. A facility providing air traffic control to aircraft on an IFR flight plan within controlled airspace and principally during the enroute phase of flight.

Air Traffic Control. The control of aircraft traffic in the vicinity of airports from control towers, and in the airways between airports from control centers.

Annual Service Volume. A reasonable estimated of an airport's annual capacity (i.e., the level of annual aircraft operations that will result in an average annual aircraft delay of approximately one to four minutes).

Approach Lighting System. Radiating light beams guiding pilots to the extended runway centerline on final approach and landing.

Area Navigation. A method of navigation that permits aircraft operation on any desired course within the coverage of station-referenced navigation signals or within the limits of a self-contained system capability, or a combination of these.

ARFF Equipment. In the context of the Capital Improvement Plan, this includes the acquisition or rehabilitation of aircraft rescue and fire-fighting equipment.

Boarding Load Factor. The ratio of aircraft seats available for passenger boarding compared to the number of passengers actually boarding.

Cell Lot. Vehicle parking lot for meeters and greeters to await a cell phone call from their passengers.

Common Traffic Advisory Frequency. The name given to a VHF radio frequency used at U.S., Canadian, and Australian airports that do not have an active or on-site control tower.

Decibel. A measurement used to quantify sound levels referencing a scale from the threshold of human hearing, 0 dB, upward toward the threshold of pain, about 120-140 dB.

Distance Measuring Equipment. Equipment used to measure, in nautical miles, the distance of an aircraft from the broadcasting facility.

Day-Night Noise Level. The daily average noise metric in which noise occurring between 10:00 p.m. and 7:00 a.m. is penalized by 10 db. DNL is often expressed as annual average noise levels.

Federal Aviation Regulations. The rules and regulations that govern the operation of aircraft, airways, airmen, and airports.

Fixed Based Operator. A facility on an airport providing various services for aircraft such as maintenance, fuel, storage, etc.

Fleet Mix. The mix or differing aircraft types operated at a particular airport or by an airline.

Flight Plan. Specific information related to the intended flight of an aircraft, filed with a Flight Service Station or Air Traffic Control facility.

Funding Shortfall. In the context of the capital implementation of this Master Plan, this term is used to describe funds insufficient in amount and timing to finance a number of capital projects planned for implementation during the mid and long term planning periods.

General Aviation. Civil aviation excluding air carriers, commercial operations, and military aircraft.

General Aviation Private Facility Improvements. In the context of the Capital Improvement Plan, this category includes non-pavement related improvements to the general aviation areas, specifically new FBO and hangar construction, which are typically privately funded.

Glide Slope. An angle of approach to a runway established by means of airborne instruments during instrument approaches, or visual ground aids for the visual portion of an instrument approach and landing.

Global Positioning System. A satellite-based radio positioning, navigation, and time-transfer system.

High Intensity Runway Lights. High intensity light fixtures delineating the limits of a runway served by a precision instrument approach procedure.

Instrument Approach. A series of predetermined maneuvers developed for the orderly transfer of aircraft under instrument flight conditions, from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

Instrument Flight Procedure. Procedures developed by the FAA to guide aircraft to airports including distance, topography, elevation, coordinates, angle of approach, and missed approach procedures.

Instrument Flight Rules. Rules specified by the FAA for the flight under weather conditions in which visual reference cannot be made to the ground and the pilot must rely on instruments to fly and navigate.

Instrument Landing System. A precision instrument approach system that normally consists of a localizer antenna, glide slope antenna, outer marker, middle marker, and ad approach lighting system.

Instrument Meteorological Conditions. Weather conditions that require that pilots rely primarily on instrumentation for navigation under IFR, rather than by visual reference and VFR.

Itinerant Operation. An aircraft landing or takeoff that originates at one airport and terminates at another (place-to-place).

Knots. A measure of speed used in navigation. One knot is equal to one nautical mile per hour (1.15 knots – 1 mile per hour).

Landing Minimums. Prescribed altitudes and visibility distances that the pilot uses to make a decision as to whether or not it is safe to land on a particular runway.

Local Operation. An aircraft landing or takeoff that remains in the local traffic pattern (i.e. training or touch-and-go operation).

Level of Service. A measure that determines the quality of service provided by transportation devices, or transportation infrastructure, and is generally linked to time and speed of the vehicles.

Low Intensity Runway Lights. Low intensity light fixtures delineating the limits of a runway having no instrument approach procedures.

Load Factor. The percentage of seats occupied on an aircraft by passengers.

Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights. A medium intensity approach lighting system providing a visual lighting path for landing pilots, consisting of nine light bars with five steady burning white fixtures, five sequential flashing white fixtures, and a threshold bar of 18 steady burning green fixtures.

Medium Intensity Runway Lights. Medium intensity light fixtures delineating the limits of a runway supplied with a non-precision instrument approach procedure.

Middle Marker. A beacon that defines a point along the glide slope of an Instrument Landing System, normally located at or near the point of decision height.

Missed Approach. An instrument approach not completed by a landing. This may be due to visual contact not established at authorized minimums or instructions from air traffic control, or other reasons.

National Ambient Air Quality Standards. Standards established by the United States Environmental Protection Agency for six outdoor air pollutants considered harmful to the public health and the environment.

National Airspace System. The common network of U.S. airspace, air navigation facilities, equipment and services, airports or landing areas, aeronautical charts, information and services, rules, regulations and procedures, technical information, manpower, and material.

National Plan of Integrated Airport Systems. Established by the Airport and Airway Improvement Act of 1982, it is the identification of national airport system needs including short- and long-term development costs.

Nautical Mile. A measure of distance used in air and sea navigation. One nautical mile is equal to the length of one minute of latitude along the Earth's equator, officially set as 6,076.115 feet.

Navaids. Any facility providing assistance or aid to pilots for navigating through the air.

Noise Contour. The "map" of noise exposure around an airport, computed by the Integrated Noise Model. The FAA defines significant noise exposure as any area within the 65 DNL contour, which is the area within an annual average noise exposure of 65 decibels or higher.

Non-Aeronautical Development. On-airport development NOT requiring runway and taxiway access.

Non-Directional Beacon. A navaid providing signals that can be read by pilots of aircraft equipped with direction finding equipment, used to determine bearing and can "home" in or track to or from the desired point.

Non-Precision Approach. A standard instrument approach procedure in which no vertical guidance is provided.

Omnidirectional Approach Lighting System. An approach lighting system consisting of five sequential flashing omnidirectional lights extended along the runway centerline and two located on either side of the runway threshold.

Other Improvements. In the context of the Capital Improvement Plan, this includes miscellaneous improvements not otherwise accounted for within the preceding categories. At FNL, these include the fuel farm relocation, remote tower permanent facility, E-charging stations, runway protection zone easement, MALS Approach Lighting Procedure improvements, drainage improvements, land acquisition and a future Master Plan update.

Outer Marker. A navigational facility within the terminal area navigational system located four to seven miles from the runway threshold on the extended centerline indicating the beginning of the final approach.

Precision Approach Path Indicator. A visual navigational aid providing guidance information to help pilots acquire and maintain the correct approach (in the vertical plane) to a runway.

Roadways, Parking and Related Landside Improvements. In the context of the Capital Improvement Plan, this category includes the rehabilitation of existing roadways and parking lots as well as reconfiguration or expansion of roadways or parking lots. This also includes rehabilitation of vehicular roads within the general aviation area and planned future access roads to new general aviation areas.

Runway. A strip of pavement, land, or water used by aircraft for takeoff or landing.

Runway Object Free Area. A defined two-dimensional surface centered on a runway providing enhanced safety for aircraft operations by having the area free of objects protruding above the runway safety area edge elevation, except for objects that need to be located within the area for air navigation or aircraft ground maneuvering purposes.

Runway/Taxiway Improvements. In the context of the Capital Improvement Plan, this category includes all projects related to the construction, extension, reconstruction or rehabilitation of any runway, taxiway or taxilane. This includes pavements used by both commercial service aircraft as well as general aviation aircraft.

Runway Safety Area. A defined surface surrounding a runway prepared or suitable for reducing the risk or damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway.

Runway Visual Range. Facilities providing a measurement of horizontal visibility located adjacent to instrument runways.

Single Event. Noise generated by a single aircraft overflight.

SRE Equipment. In the context of the Capital Improvement Plan, this includes the acquisition or rehabilitation of snow removal equipment.

Tactical Air Navigation. An enroute navaid combining azimuth and distance measuring equipment into one unit and operated in the ultra-high frequency band.

Taxiway. A designated area that connects runways with aprons, providing the ability to move aircraft on the ground so they will not interfere with takeoffs or landings.

Terminal Airspace. The airspace controlled by a terminal radar approach control facility.

Terminal Area. A general term used to describe airspace in which approach control service or airport traffic control service is provided.

Terminal Building and Expansion. In the context of the Capital Improvement Plan, this includes the construction of the new terminal building as well as planned future expansions of the building.

Terminal Radar Approach Control. An FAA air traffic control service to aircraft arriving, departing, or transiting airspace controlled the facility.

Transient Aircraft. An aircraft that is not based at the airport in which it is currently located.

Very High Frequency Omnidirectional Range. A ground based electronic navigation aid transmitting navigation signals for 360° oriented from magnetic north.

Very High Frequency Omnidirectional Range/Tactical Air Navigation. A ground based electronic navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment at a single site.

Visual Approach. An aircraft approach conducted under IFR, which authorizes the pilot to proceed visually and clear of clouds to the airport. The pilot must, at all times, have either the airport or the preceding aircraft in sight.

Visual Flight Rules. Rules that govern the procedures for conducting flight under visual meteorological conditions.

Visual Meteorological Conditions. Weather conditions under which pilots have the ability to visually see and avoid stationary objects and other aircraft and fly without the use of instrumentation, under VFR.

APPENDIX B:

AIA MARKET ANALYSIS AND RECOMMENDATIONS

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AIRPORT INFLUENCE AREA MARKET ANALYSIS AND RECOMMENDATIONS

To

MEAD & HUNT

NORTHERN COLORADO REGIONAL AIRPORT

From

GRUEN GRUEN + ASSOCIATES
Urban Economists, Market Strategists & Land Use/Public Policy Analysts

C1525

APPLYING KNOWLEDGE
CREATING RESULTS
ADDING VALUE

April 2019
(Updated July 2019)

Gruen Gruen + Associates

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I. EXECUTIVE SUMMARY

This report summarizes research and analysis completed by Gruen Gruen + Associates ("GG+A") to evaluate market, economic, and land use conditions that will shape future development pressures and opportunities within the Airport Influence Area ("AIA"). A focus of this report is to provide perspective and an information base for off-airport land use and economic development recommendations to be adopted within an AIA component to the Master Plan update for the Northern Colorado Regional Airport (the "Airport"). The AIA contains approximately 2,900 acres of undeveloped land (outside of Airport ownership) and recommendations and actions to make the best use of this land are identified in this first section of the report. The body of the report contains individual sections organized by topic and land use and summarizes the full scope of the research and analysis upon which the key findings and recommendations summarized below are based.

PURPOSE

Off-airport land use planning and policies will continue to have a significant impact on the future success of the Airport. The Airport and AIA are increasingly in the path of residential and nonresidential growth which presents both challenges and opportunities. Ensuring that the Airport remains adequately protected from encroachment by incompatible land uses is of critical importance. A purpose of this analysis is to identify a strategic direction for future land use and economic development in the AIA that can align aviation compatibility requirements with future land use needs and development opportunities, economic development goals and prospects, and established community values and priorities.

Background & Work Completed

GG+A completed a target market analysis for the Northern Colorado Regional Airport in September 2017 that assessed aviation and non-aviation market opportunities to make more productive use of its land assets. GG+A was asked to provide additional analysis and recommendations for an AIA plan as part of the current Airport Master Plan update.

GG+A has completed interviews with more than 20 public and private stakeholders over the past 18 months for these assignments. Interviews with public representatives have included Airport staff, representatives of the City of Loveland and City of Fort Collins economic development and finance departments, Larimer County long-range planning, and representatives of local business/economic development organizations such as the Fort Collins Chamber of Commerce, Loveland Business Partnership, and Loveland Chamber of Commerce. GG+A has also interviewed representatives of many AIA property owners and developers including Burgener Holdings Inc., CBRE, Chrisland Real Estate Companies, Doberstein Lemburg Commercial, Inc., Lake Vista Apartments, Loveland Commercial, McWhinney Enterprises, The Neenan Company, Realtec, Richmond American Homes, Spirit Hospitality, SVN Commercial, Toll Brothers, Water Valley Development Co., William Lyon Homes, and W.W. Reynolds Companies.

GG+A completed the following additional tasks to prepare the AIA analysis and recommendations:

- Reviewed a variety of prior studies and plans including the *Create Loveland* Comprehensive Plan, City of Fort Collins *City Plan* (2019 update), Northern Colorado Regional Airport *2018 Strategic Plan*, City of Fort Collins *Economic Health Strategic Plan*, City of Loveland *Economic Development Strategic Plan*, City of Loveland *Incentive Policy*, Larimer County *Plan for the Region Between Fort Collins & Loveland*, and *Larimer County Fairgrounds and Events Complex (The Ranch) Master Plan*;
- Obtained parcel and improvement records from the Larimer County Assessor to develop an inventory of existing land use and building space within the AIA and to assess historical land use and development patterns;
- Researched the characteristics of successful research and technology parks and innovation districts, office developments, and industrial developments and compared the location of the AIA to the identified characteristics, resulting in identified actions that would be needed to position the AIA for such development;
- Analyzed up-to-date demographic, labor force, employment, and other economic data;
- Evaluated current and past performance of relevant real estate space markets (including office, industrial/flex, hotel, and residential uses) that will bear on land use needs/opportunities in the AIA;
- Reviewed household and housing characteristics of the market area and AIA, including the potential for future population and housing growth;
- Reviewed the existing hotel inventory and analyzed gross lodging room revenue trends to assess the relative strengths and productivity of lodging activities in the AIA and broader market area; and
- Developed long-term (20 year) projections to quantify order-of-magnitude demands for office, industrial/flex, hotel, and residential land uses within the AIA.

FINDINGS & CONCLUSIONS

Existing Land Use and Development Patterns

The AIA covers an approximately 10,000-acre area spanning five local jurisdictions. The 1,060-acre Airport property represents approximately 11 percent of the area within the AIA. Developed land uses within the AIA currently total about 2,500 acres, or 27 percent, of off-airport land area. Residential, public/institutional, and industrial uses are currently the three predominant (largest) developed uses of off-airport land in the AIA. Water bodies comprise a substantial share of the AIA geographic area, estimated to total nearly 1,400 acres or about 16 percent. Protected lands and other open space uses are estimated to comprise an additional 1,300 acres of land. Existing public Right of Ways represent 800 acres. Almost 40 percent of the off-airport area within the AIA is therefore not developable (assuming such uses do not change).

The AIA contains well over 10,000,000 square feet of physical building space. Much of this building space has been built within the past 20 years. Residential and industrial uses comprise about 70 percent of privately owned off-airport building space in the AIA. County Assessor records indicate that approximately 2,100 housing units (including manufactured homes) exist within the AIA. Figure I-1 summarizes off-airport building space in the AIA by year built.

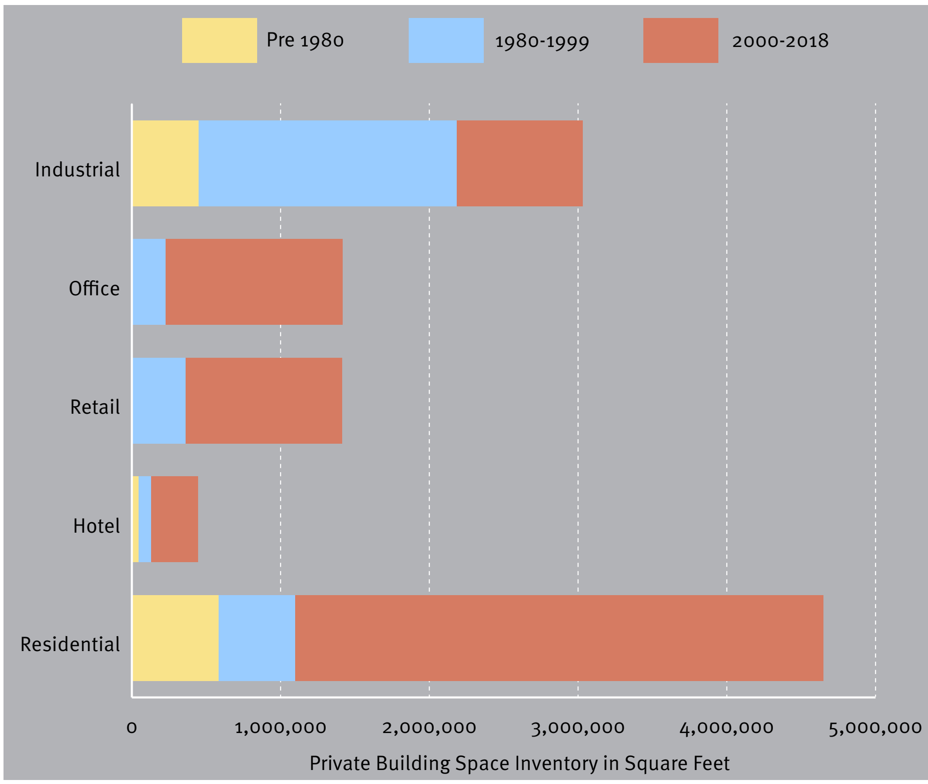
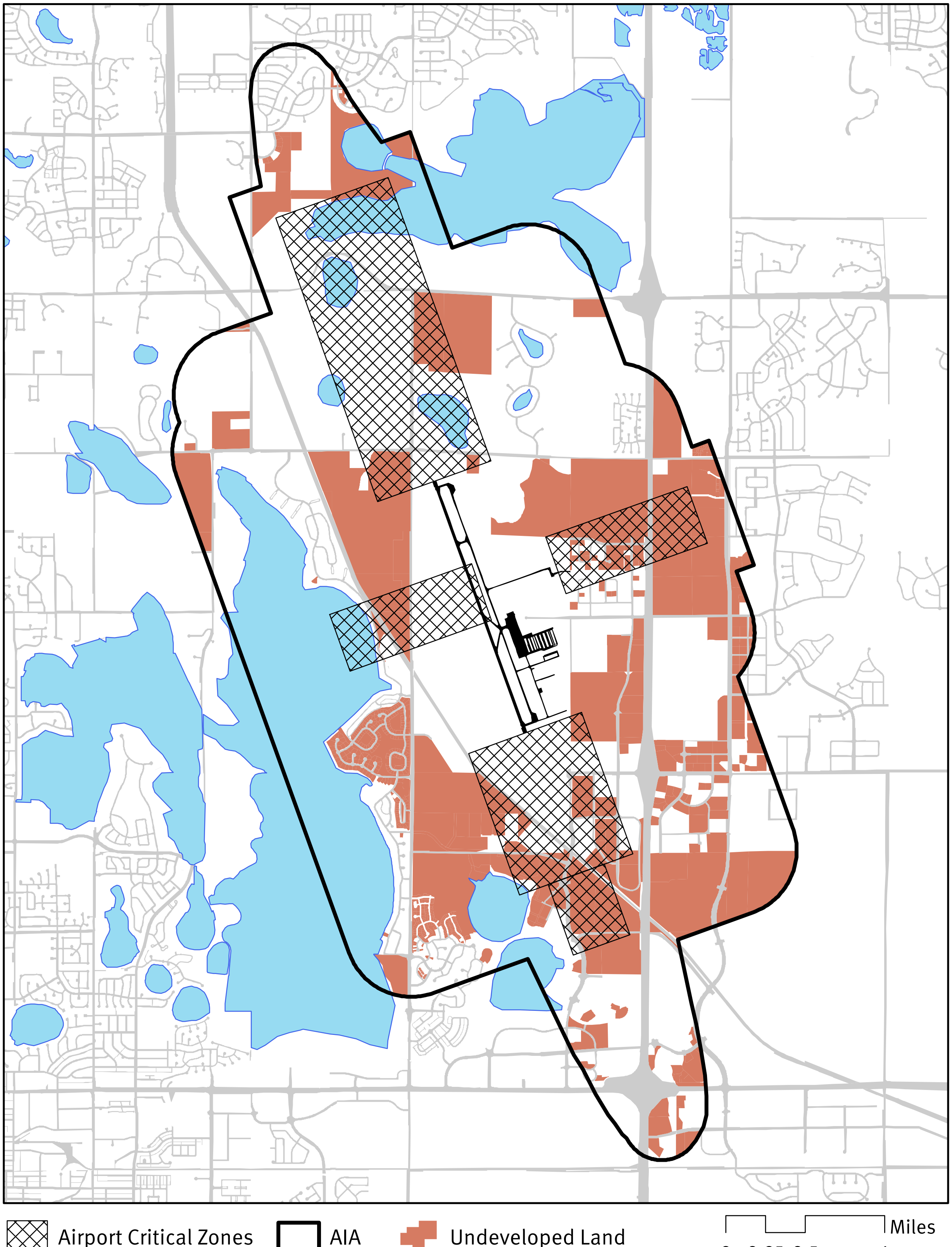


Figure I-1: Off-Airport Building Space (by Year Built) in the AIA

Undeveloped Land Inventory

The AIA is estimated to contain approximately 2,900 acres of undeveloped land located outside of Airport ownership. Some additional development capacity exists on agricultural properties with minimal building/residential improvements as well the Airport property. An estimated 2,275 undeveloped acres are located outside of the Airport Critical Zones. Most of the undeveloped off-airport land in the AIA (about 80%) is located within the City of Loveland's Growth Management Area. Figure I-2 illustrates undeveloped land in the AIA.

Figure I-2: Off-Airport Undeveloped Land* in AIA



*Undeveloped land refers to land on which no building or parking improvements have been constructed.

Employment Trends and the Economic Base

The Larimer County employment base has grown by more than 30,000 wage and salary jobs over the past 10 years. All industry sectors gained jobs over this period, indicating the economic base continues to diversify. The Education and Healthcare sector continues to be a leading source of employment growth (accounting for about one-third of all job growth since 2008).

Industry sectors traditionally associated with industrial land uses, including Manufacturing, Wholesale Trade, Transportation and Warehousing, and Construction expanded by approximately 6,100 jobs between 2008 and 2018. Activities usually associated with private office land uses, including Professional and Business Services, Financial Activities, and Information grew by approximately 3,700 jobs over the period. Employment within the AIA is more concentrated in sectors typically associated with industrial land uses.

Review of private industries with high location quotients in Larimer County indicates that employment in the market area continues to be most concentrated in manufacturing activities (specifically related to beverage, machinery, computer/electronics, and plastics), information technology, and building trades and service sectors (which relate to continued high rates of household and nonresidential growth in Northern Colorado).

A large employment concentration or "cluster" pattern still exists among several technology-related sectors (including computer/electronics manufacturing, data processing, information publishing, etc.). However, some of these local industries exhibit patterns of long-term employment decline.

Labor Force Conditions

The Larimer County population is projected to grow to about 480,000 people by 2040, representing an average annual growth rate of 1.5 percent. This is slightly below historical growth rates since 2000. The labor force is projected to expand more slowly at 1.2 percent annually. The labor force participation rate is projected to decline slightly to about 70 percent and then remain relatively stable over the longer-term.

The labor market continues to be in a full-employment condition. Economic development professionals continue to report that some companies experience challenges finding labor.

The AIA benefits from a wide and diverse labor shed because of its regional centrality and highly accessible environs. Communities represented within the AIA will continue to function as one employment and housing market area to varying degrees - significant flows of labor across municipal borders occur in many directions. Labor shed patterns exemplify how future growth and economic development of the AIA can provide indirect regional benefits: the vast majority of workers employed in the AIA have and will likely continue to reside outside the municipality in which the Airport is located.

Characteristics of Successful Research/Technology Parks or "Innovation Districts"

Airport Commissioners and Planning and Development Subcommittee members have identified Technology and Innovation as an important developmental focus area, preferably integrated with technical education and training activities. A fully-certified remote tower and the attraction of an accredited remote air traffic control program are perceived by the Subcommittee to be first steps on a path towards aviation and high-tech industry cluster development in the AIA.

Other nearby property owners and partners have also previously discussed technology-oriented development concepts, such as those related to time-share 3D printing facilities that could benefit additive manufacturing

Successful Research/Technology Parks

SKYSONG, Scottsdale, Arizona
The 1,200,000-square-foot, mixed-use development located on a 42-acre campus at the site of a former closed mall, involved a variety of commitments and contributions by Arizona State University ("ASU"), ASU Enterprise Partners, and the City of Scottsdale. The ASU Scottsdale Innovation Center occupies 135,566 square feet of space for corporate engagement, entrepreneurship, education, technology, and innovation. It links and leverages technology, research, education and entrepreneurship to create beneficial economic development and economic impacts. These services support entrepreneurial ventures and established businesses through access to the latest technologies, capital networks, and a skilled workforce. 1951 @ Skysong is a co-working and meeting space part of the Innovation Center. The innovation Center also hosts the ASU "Startup School". Initiatives based at ASU SkySong have been responsible for: over 120 companies that have collectively raised over $600 million in venture capital, and generated over 1,100 jobs; the nation's leading summit for education technology, the ASU/GSV Education Innovation Summit; the groundbreaking ASU Online/Starbucks degree program; and support of over 400 community meetings and 5,500 visitors each month.

ISU Research Park, Ames, Iowa
The ISU Research Park in Ames, Iowa sponsored by Iowa State University contains about 800,000 square feet of office and industrial flex/R&D space on 150 acres of land. The project began development in 1987 but only significantly installed infrastructure to serve future development in the past five years. An additional 176 acres of land remain available for development which can support an additional 1.0 million square feet of office/flex/R&D space. ISU Research Park office space and land is reserved for businesses that have linkages to research activities at Iowa State University. ISU Research Park owns and operates 10 of the 12 buildings including technology and wet-dry lab incubators. The Park provides access to specialized facilities, technology, and equipment, faculty and students as well as sources of public and private funding. ISU Startup Factory, the Park's pre-incubator accelerator started about two years ago, has launched more than 45 startups and is responsible for more than 70 jobs and $20 million in external funding. Examples of office space-using businesses in the ISU Research Park include Workiva (formerly WebFilings which creates cloud-based productivity solutions) and NewLink Genetics (developing cancer vaccines). Since the infrastructure installation about five years ago, about 200,000 square feet of building space has built. The building additions include about 50,000 square feet for an animal health research company (Boehringer Ingelheim Vetmedica), about 40,000 square feet of space for an agricultural technology company (Ag Leader Technology) and support uses including a fitness center of about 30,000 square feet, a medical/child-care center of about 30,000 square feet, and 10,000 square feet of restaurant/food service space. According to the Real Estate Development and Operations Manager for the ISU Research Park, the addition of the amenities and services have facilitated attraction of new businesses and helped attract/retain needed labor in a geographic market experiencing unemployment rates below two percent.

UTEP Technology Research and Acceleration Park, El Paso, Texas
An airport related relatively small-scale example of the kind of commitment and partnership arrangements required for research and technology parks or innovation districts to launch include the transformation of an underutilized portion of Fabens Airport into The University of Texas at El Paso ("UTEP") Technology Research and Acceleration Park. In 2016, UTEP and El Paso County entered into a partnership that is part of a new strategic initiative for UTEP's Center for Space Exploration and Technology Research. Through the partnership, the County contributed land under a lease to UTEP and obtained federal and state funds to improve the property with roads and utilities. The University's Center for Space Exploration Technology Research ("cSETR") obtained federal funding and provides student talent to attract industry leaders to the Fabens site as part of its continued commitment to meet the demand for engineers in aerospace and federal labs, particularly in combustion and propulsion. cSETR partners, including NASA, the U.S. Department of Energy, Lockheed Martin, and the Missile Defense Agency are anticipated to participate in projects at the Fabens Airport UTEP Technology Research and Acceleration Park. In 2017, the U.S. Department of Commerce awarded UTEP a $500,000 grant to create and expand cluster-focused proof-of-concept and commercialization programs through the Economic Development Administration's (EDA) Regional Innovation Strategies (RIS) program. The EDA grant money was matched by UTEP for a total investment of $1million and applied toward the development of the Technology Research Innovation Acceleration Park ("tRIAC") in Fabens. Renovation of the existing hangar facility started in April 2017 and since then three test cells have been developed and a wind tunnel facility is under construction. tRIAC is envisioned to include additional facilities such as a data center, a rocket tower, and incubator facilities for small businesses.

See Appendix B for a case study summary of a technology park (the DuPage National Technology Park) that was not successfully implemented.

processes for small or start-up companies (which may not be able to afford the capital investment of 3D printing equipment). Other emerging sectors that could evolve into industry cluster candidates also include research and development activities related to clean energy, drone technology, and agricultural/bioscience technology. Characteristics associated with successful research and technology parks or "innovation districts" frequently include:

1. Excellent accessibility to transportation links;
2. High quality technology infrastructure;
3. Participating academic institutions (with a strong reputation for encouraging technology transfer) and "bell cow"[1] educational, government, other institutional, and industry anchor occupants;
4. On-site amenities such as child care, restaurant, health club, hotel, and business support uses as well as housing uses needed to attract and retain younger talented employees on which innovative organizations depend; and especially important
5. An existing technology labor pool base and technology cluster[2].

The AIA provides excellent accessibility within the Northern Colorado region. The existing broadband communications service/infrastructure is perceived to require upgrading or enhancement. The deficiencies could be remedied through the recently approved municipal-owned broadband utility in Loveland. No formal commitments or partnerships have been established with universities in support of an innovation district or technology park in the AIA or at the Airport. Success frequently depends upon adding value to users through the provision of the anchor university or institution's assets and resources, including access to sophisticated equipment, laboratories, and faculty and students.

The AIA includes an adequate and growing base of desirable amenities and support services, including a variety of shopping, dining, fitness and lodging uses. Establishing these types of amenities "on-site" within a specific innovation district or research and technology park in the immediate vicinity of the Airport property, however, could be problematic. Uses such as housing and child care should not be encouraged to locate on or near the Airport property or Airport Critical Zones.

A base of skilled labor in high-technology occupations does exist in Larimer County, which is estimated to contain about 19,000 workers in computer, engineering, and science-related occupations representing about 10 percent of the overall labor force (roughly twice the national average). Two existing technology-related employment clusters in the county are relatively small, but highly specialized.[3] The presence of existing skilled labor and an established base of some technology-related clusters should help to support innovation initiatives in the AIA.

[1] The "bell cow" is the lead cow of a herd, having a bell attached to a collar around its neck so that the herd can be located easily. The analogy to real estate and economic development just implies a pioneering first-in "leader" tenant who can both brand a project/location and provide benefits to other tenants (thereby increasing the likelihood of attracting other tenants).

[2] Studies have indicated not only the importance of universities as participants in technology clusters but also the importance of research institutes as well as proximate companies in related sectors having access to a deep labor pool consisting of both scientists and other technical experts and managers with relevant industry experience. In successful high technology regions like Silicon Valley, social structures promote innovation because of high inter-firm mobility and firm creation by serial entrepreneurs and job hopping. In addition, proximity to venture capital sources is considered important.

[3] According to the *U.S. Cluster Mapping Project* of the Harvard Business School Institute for Strategy and Competitiveness, two highly specialized technology-related clusters exist in Larimer County: "Information Technology and Analytical Instruments" and "Biopharmaceuticals." As of 2016, approximately 4,200 workers were employed in these technology clusters, or about three percent of the overall workforce. See: https://clustermapping.us/region/county/larimer_county_co/cluster-portfolio#employment

REAL ESTATE/LAND USE MARKET CONDITIONS

Office and Industrial/Flex Uses

Private office space developments in the AIA are estimated to contain about 1.4 million square feet of existing building space. Existing industrial/flex space development in the AIA is approximately twice as large, estimated at approximately 3.0 million square feet of building space. Office and industrial/flex buildings differ in their function and design but share a key similarity: they provide workspace for almost all primary employment (primary jobs) located in a given area. The near-term market in many locations of the AIA is likely to be stronger for industrial/flex uses than for traditional private office uses.

The primary geographic market area within which office and industrial/flex development within the AIA will generally compete is Larimer County and the Interstate 25 Corridor. Some locations outside of Larimer County such as Greeley and Boulder/Denver are "secondary" market areas that may represent potential sources of demand for future office or industrial/flex development in the AIA, but not direct sources of competition. Internal movements, expansions, and consolidations within the primary competitive market area can be expected to account for most future office and industrial/flex space demand in the AIA. The competitive position of the AIA for new office space development will continue to improve over time as land supply in preferred Fort Collins locations declines.

Office Market:

- The Fort Collins/Loveland office market is very well occupied. This reflects consistent job growth over the past several years with limited new office space construction. Office space rents have increased but have not escalated at high rates comparable to other land uses in the market, indicating that landlords have kept rates comparatively "in check" to absorb existing spaces. Prevailing market rents for most office space product remain well below levels required to speculatively build new office space.

- Locations in Fort Collins provide more than 70 percent of all office space inventory in the market and Southeast Fort Collins continues to be a preferred location for private office space users. The Fort Collins/Loveland office space market is estimated to have absorbed approximately 260,000 square feet of space within the past year; all of it within Fort Collins.

- The Airport and most of the AIA are located within the "East Loveland" office space submarket. The office space vacancy rate at year-end 2018 was above average, at approximately 10 percent. The appeal of East Loveland as multi-tenant office space location has improved over time, and vacancy rates have declined, although it is not perceived to be as desirable to office space users as some competing locations to the north.

Industrial/Flex Market:

- The regional industrial/flex space market is similarly well occupied. Warehouse space, which comprises most of the existing inventory, had a total vacancy rate of only 2.5 percent at year-end 2018. The three largest submarkets, including North Fort Collins, South I-25/US 34, and North I-25, all have vacancy rates of 3.0 percent or less. The South I-25/US 34 submarket which encompasses the AIA is the preferred warehouse/distribution submarket within Northern Colorado while North Fort Collins has traditionally been a preferred location for manufacturing space and activity.

- From early 2015 through year-end 2018, the average asking net industrial space rent is estimated to have increased by approximately 33 percent to over $10 per square foot. Prevailing industrial space rents are typically high enough to encourage and reward speculative development.

- The Fort Collins/Loveland industrial market has absorbed approximately 385,000 square feet of space within the past year. Approximately 75 percent of this positive absorption occurred in Loveland. The five-year annual absorption average has been approximately 190,000 square feet of space. Locations within Loveland continue to absorb and deliver a greater amount of industrial space than Fort Collins.

CHARACTERISTICS OF SUCCESSFUL OFFICE DEVELOPMENTS

Successful corporate office developments depend on how well they enable businesses to be more productive and satisfy their customers with innovations that produce better products and services. Office projects must be located and built with or near other activities that will enhance productivity and attract and hold talented labor. They must be located where a culture of innovation exists and can be enhanced by the office space. Therefore, the availability of an affordable and diverse mix of housing and a supply of land zoned for residential uses that serves to maintain a supply of competitively priced high-quality housing units is an inducement to office space-using businesses. It is difficult to be productive or innovative if the talented labor companies need is exhausted by long commutes. In an era of globalization and a shortage of well educated, highly-skilled workers, businesses and office development follow the talented labor. Successful corporate office space developments typically must meet the following criteria:

- A central or highly accessible location to major transportation modes and other activity centers in the region;
- A large commute shed providing access to a significant concentration of a highly-skilled and well-educated workforce;
- Proximity to a diverse set of housing uses. The proximity to a variety of housing product options relates well to the national trend for people to prefer to work close to their residences;
- Proximity to retail, lodging, and other support services and amenities, including eating and drinking establishments and day-care and fitness facilities;
- Market-responsive product types with appropriate technology capabilities; and most important,
- Locations within agglomerations or a “critical mass” activity that helps businesses attract and retain labor and operate cost effectively and productively.

CHARACTERISTICS OF SUCCESSFUL INDUSTRIAL DEVELOPMENTS

Industrial building and grounds are becoming increasingly more park-like and user-friendly. Industrial buildings, which often look less like traditional factories and more like office buildings, are designed for maximum efficiency and productivity with ample loading docks and overhead doors, large truck turnaround areas, and enhanced lighting for round-the-clock operations. An increasing proportion of industrial buildings include higher amounts of office space than historically has been the case because of the need to accommodate increased administrative, data processing, and sales functions.

To succeed, an industrial park typically requires a location including the following attributes:

- Near major airports and convenient to major highways and seaports;
- High identity or visibility to/from and convenient access to major highways;
- Proximity to commercial services and activities;
- Near, but not too close, to housing uses and an appropriately skilled labor base; and
- An image or identity as a well-established place for contemporary industrial businesses.

Hotel Uses

The cities of Loveland and Fort Collins contain a total hotel room inventory of approximately 4,000 rooms (with "limited service" hotels representing most of the inventory). Eleven hotels within the AIA, containing approximately 1,100 rooms, represent approximately one-quarter of the hotel supply. Annual occupancy rates in Loveland for 2017 and 2018 averaged approximately 70 percent, while annual occupancy in Fort Collins has been less robust at approximately 62 percent in 2017 and 58 percent in 2018. Average daily rates over the prior two years have remained relatively stable.

Business travel and general interstate travel on I-25 tend to be the primary generators of local room night demand within the AIA. The presence of the Ranch Events Complex and Budweiser Events Center within the AIA is reported to be a strong, though secondary generator of hotel room night demands. Aviation activities at the Airport also generate some room night demands within the AIA, although general aviation is not reported to be a primary driver of hotel demand.

Expanding business activity and continued population growth throughout Northern Colorado, in combination with a period following the Great Recession in which new hotel development was non-existent, have led to recent high levels of recent hotel development activity. Three recently opened properties in the AIA have alone added approximately 240 rooms to the local hotel supply within the past 18 months.

Total annual gross room revenue in Loveland and Fort Collins is estimated to have increased in real terms from approximately $56 million in 2008 to over $95 million in 2017, representing 40 percent growth over the 10-year period. Average daily revenue per available room ("RevPAR") has grown over time, indicating that the new hotel inventory added over the past 10 years has primarily captured new room night demand (as opposed to merely siphoning demand/sales from the existing hotel supply). New hotels typically require higher rates and/or occupancy than current market averages to be feasibly developed.

Projects in the development or planning stage represent well over 1,000 additional hotel rooms. Interviews suggest that some planned hotel developments have been pushed back as the market still absorbs recently built inventory.

Residential Uses

The local and regional housing markets have experienced rapid change amid recovery from the 2008-2010 Great Recession and the housing market crash and foreclosure crisis that preceded it. New housing production, especially for owner occupied single-family uses over the past five years, has not kept pace with new household formation (demand). Housing vacancy and availability rates have declined and remain extremely low for all types of housing. This has resulted in high cost increases for existing inventory. Average single-family home resale prices in the Fort Collins and Loveland areas increased by approximately 54 percent between 2013 and 2018. Average apartment rents increased by about 30 percent over the same period.

A combination of declining residential land supply in the core/central areas of Fort Collins and Loveland and robust population and job growth have caused residential development patterns to shift toward the periphery of each community. Prior to 2000, the entire AIA contained fewer than 600 housing units or about 0.5 percent of the regional housing stock. The AIA today still represents less than two percent of the county housing stock. Since 2000,however, the AIA has accounted for about four percent of all <u>new</u> residential building space constructed in Larimer County. These patterns can be expected to continue and will probably intensify.

The current market for all types of housing within and near the AIA is reported to be strong. Multi-family apartment properties in the AIA report high occupancy rates of 96 to 97 percent. Representatives of single-family housing developments report that projects have sold quickly, and that the AIA appeals to homebuyers partially for the same reasons that appeal and provide advantages to nonresidential uses (centrality in the region and accessibility to Interstate 25).

Residential land use compatibility observations:

- Proximity to the Airport has generally been a "neutral" factor with respect to the absorption of residential units within or near the AIA.
- The Federal significance threshold for aircraft noise exposure (the 65 DNL) is entirely contained within the bounds of Airport property ownership. The current level of flight activity at the Airport, and the type of aircraft using the Airport, are not necessarily incompatible with existing locations of residential development in the AIA.
- Land use compatibility regulations/policies should be proactive in protecting against future property owner "opposition" to longer term development of commercial air service. This could arise if residential land uses of any significant scale are allowed to develop closer to Airport Critical Zones and the 65 DNL.

Future Land Use Demand and Planning Implications

The following summarizes a projection of the type and mix of future land uses potentially in demand in the AIA.

Land Use	20-Year Demand	Estimated Land Requirement
Single-Family Residential	2,000-2,800 units	331-464 acres
Industrial/Flex	2,254,000-3,006,000 (sq. ft.)	172-230 acres
Multi-Family Residential	1,400-1,800 units	58-73 acres
Office	869,000-1,216,000 (sq. ft.)	57-80 acres
Hotel	457 hotel rooms	9-11 acres

Demand for office space in the AIA over the next 20 years is projected to grow by approximately 870,000 to 1,220,000 square feet of office building space. Demand for industrial/flex space is projected to grow by about 2,250,000 to 3,010,000 square feet of building space over the next 20 years. The projections (which have been developed using published secondary employment forecasts by industry sector) indicate that market support for office and industrial/flex space development in the AIA could almost double the inventory of existing building space within the next 20 years. Based on typical densities at which suburban office space and industrial/flex buildings are currently being developed, we estimate that approximately 230 to 310 acres of land will be required over the next 20 years for these types of "Employment" land uses. More than 500 acres of land is potentially available for development of employment uses in the AIA.

The demand projection for hotels rooms in the AIA over 20 years totals approximately 460 additional rooms. At a density of 40 to 50 rooms per acre, the demand equates to approximately 10 acres of land required for future hotel uses. The projection is based on primary employment growth in the AIA, which is a primary generator of existing room night demand and does not explicitly account for external lodging needs due to increased interstate travel or significant commercial air service at the Airport. However, the projection does provide a useful comparison between likely future demand and supply. As described in Chapter V, three PUD projects within the AIA have already publicized plans or proposals to develop approximately 800 additional hotel rooms. Significant major hotel developments in other areas of the AIA should not be anticipated or planned.

Future hotel developments may depend on increased room night demand from sources unrelated to local business activity (e.g., increased non-local visitation to the Budweiser Events Center or County Fairgrounds).

Future demand for single-family residential uses over the next 20 years is projected to grow by approximately 2,000 to 2,800 additional units (attached and detached). The projection for multi-family residential uses indicates that potential demand within the AIA could total 1,400 to 1,800 units over the next 20 years. For both housing types, the projections equate to more than doubling the existing inventory of housing units within the AIA. The projected housing demand in AIA over the next 20 years would equate to a need for approximately 390 to 540 acres of gross land area allocated to residential uses. Assessor records indicate that about 280 acres of platted and unplatted residential land (currently undeveloped land) already exists within the AIA outside of the Airport Critical Zones, primarily including the next phase of the Lakes at Centerra residential development. This undeveloped land is mostly planned for single-family uses. There are 390 platted but unbuilt single-family lots within the AIA. Additional "agricultural" parcels within the Millenium General Development Plan (GDP), such as Centerra, also provide an additional 200 acres of vacant land that has already been approved through PUD agreement with residential development permitted as-of-right.

Two multi-family developments on the east side of Interstate 25 could also effectively meet most of the projected 20-year demand for multi-family units summarized above in Table VI-4. The Brands at the Ranch has entitlements to build up to 580 multi-family units. The Railway Flats project in Centerra recently broke ground with plans to provide up to 420 units in two phases. These two projects alone have capacity to add 1,000 additional multi-family units in locations that will not interfere or conflict with Airport operations. However, market support in the long-term for additional multi-family uses will likely arise.

The total land requirement estimated for the office, industrial/flex, hotel, and residential uses equates to 630 to 860 acres. This represents about 22 to 30 percent of the estimated off-airport inventory of undeveloped land in the AIA.

AIRPORT INFLUENCE AREA RECOMMENDATIONS

1. **Develop an implementation plan and conduct further research, analysis, and outreach needed to lay the groundwork for a successful research and technology park or innovation district within the Airport Influence Area.** Securing participation from academic institutions and “bell cow” anchor occupants will be essential. In addition, roles and contributions required by participants/stakeholders must clearly be defined. It is not enough to place a university’s name and brand on the park or innovation district. Instead, institutional participants must actively lead the effort to promote the park and support it until the project is substantially developed and occupied by beneficial space users and financially solid. Working capital will be required to pay for the necessary market and feasibility studies, master planning, development agreements, and operating expenses including staffing and marketing costs of the research and technology park or innovation district. Commitments of financial assistance in terms of direct financial support or contributions of in-kind services are essential for the planning, formation, and launch of a park or innovation district. Identify what sources of funding, and from whom, may be available to complete due diligence and pre-development activities well before detailed physical planning, engineering and other design-related steps are taken. The Airport should encourage and be a participant in this effort, but this needs to be a community-led plan with broad cooperation.

2. **Encourage a long-term competitive functioning land market in the AIA by allocating more land for office and industrial/flex uses than the 230 to 310 acres of demand forecast over the next 20 years.** This will help to avoid land cost increases and insufficient development of building space that can sometimes result when a limited number of property owners control a high share of developable land and land use entitlements.

3. **Identify potential sites on which to encourage additional long term industrial/flex development that is (a) compatible with adjacent uses and (b) provides the most efficient access to public infrastructure.** These areas should be identified beyond the two large entitled Planned Unit Developments in the AIA, including portions of the Airport property, and should also emphasize larger contiguous areas of land. Both Centerra and The Brands may not be in the position for a variety of reasons to accommodate the full scope of industrial activities/users that could be attracted to the AIA over time. Future successful build-out in the AIA will partly depend on how well communities in the AIA, the Airport, and private property owners can coordinate with each other to agree upon what uses work best and where, and to ensure that the physical environment is best positioned for a wide variety of industrial/flex space development opportunities. (A scarcity of sites for traditional office space development is less likely to materialize in the AIA over the next 20 years).

4. **Engage the Fort Collins-Loveland Water District and Loveland Water and Power in assessing infrastructure needs and developing joint strategies to provide adequate public utility infrastructure for undeveloped portions of the AIA. Future transportation infrastructure and roadway capacities should also be evaluated to ensure positive development outcomes in the AIA.** More than 70 percent of undeveloped land within the AIA, plus the Airport property, is served by the Fort Collins-Loveland Water District (and synonymous South Fort Collins Sanitation District). Draw on the land use findings and related recommendations in this report as a baseline from which to evaluate future needs (recognizing public infrastructure capacity is unlikely to be needed for the entire ±3,000 acres of undeveloped land in 20 years). The Fort Collins-Loveland Water District reportedly has adequate capacity to accommodate its current users but is already

planning to expand water supply capital infrastructure/delivery systems to accommodate an additional 8,000 acre-feet over the next 10 or so years. Similarly, Loveland Water and Power has issued bonds to develop its municipal broadband network. Make sure roll-out and development efforts appropriately emphasize the economic development opportunities in the AIA. Sufficient fiber and broadband service will be one of many key ingredients to successfully establishing a research/technology park or innovation district in the AIA.

5. **Encourage a thriving mixed-use environment compatible with Airport operations and dual accessibility to aviation services and Interstate 25.** Occupied building spaces and jobs/wages created within the AIA are examples of fundamental metrics of success. The AIA has enough land to accommodate and adapt to a diverse array of land uses and economic activities over the coming decades. The Airport itself and aviation activities are unlikely to be a primary catalyst for development.

6. **Encourage additional residential development within the AIA at locations that will not conflict with Airport operations and commercial air service development (i.e., locations are sufficiently buffered from flight paths, the 55-60 DNL, and Airport Critical Zones).** The biggest source of future land demand in the AIA will continue to be for residential land uses. An attempt to limit all future residential development within the AIA could have unintended or even counter-productive consequences, including a negative impact for long-term economic development. Northern Colorado is already experiencing challenges associated with inadequate housing availability and burdensome price increases that reduce housing affordability (which in turn, limit or constrain the long-term prospects for positive economic growth and development). Land in the AIA will continue to be needed for residential uses to create the "mixed-use" environment that will be sustainable and successful in the future.

7. **Position the AIA as a master planned, user-friendly environment with appropriate design and use standards.** Long term success and economic development of the AIA will require built-in flexibility and land and building opportunities that can meet the needs of a wide variety of economic activities and uses.

8. **Be proactive in planning for long term expansion of the existing medical activity center centered around the UCHealth Medical Center of the Rockies**. The healthcare sector is anticipated to maintain a high rate of growth in Northern Colorado and the AIA includes considerable land capacity to accommodate this growth in a regionally-centric location. Coordinate with property owners and medical users/providers to ensure future facility needs or plans do not create undue conflicts with aviation activity growth. Also consider whether non-medical uses such as workforce housing might be acceptable in the future near the UCHealth campus.

9. **Maintain all existing land use compatibility requirements (primarily in the City of Loveland's overlay zoning ordinance) and encourage Larimer County and the City of Fort Collins to establish the same requirements via overlay zoning or similar measure.** The area north of the Airport between the growth management areas of Loveland and Fort Collins is unlikely to experience much further urban development given the restrictive "mosaic" of density transfer requirements/credits, natural areas and conservation easements, and public infrastructure requirements for this mostly agricultural area. Nor are the policies of either jurisdiction encouraging significant development here; the recently updated Fort Collins *City Plan* envisions the corridor as an open space community buffer. However, as a simple protective measure, amend existing land use and zoning codes to incorporate the same or similar requirements as the Airport Overlay zoning adopted by the City of Loveland.

10. **Adopt additional land use compatibility measures to avoid precluding commercial air service development in the future.** For all properties wholly or partially contained within the AIA, require that the AIA boundary, Airport Critical Zones, and existing noise contours be recorded on all new or amended plats. For any new

development, changes of land use, or substantial alterations to existing buildings within the AIA, require an Aviation Activity Notice be publicly recorded which recognizes the presence of the property within the AIA and the possibility of impacts related to flight activities.

11. **All jurisdictions possessing land use review and approval authority in the AIA should establish a uniform procedure for Airport staff and/or representatives to provide written review.** Refer all future development proposals, land use applications, and proposed zoning changes to the Airport Director and Airport Commission for review.

II: EXISTING LAND USE AND DEVELOPMENT PATTERNS

The AIA covers an approximately 10,000-acre area, portions of which span five local jurisdictions including the cities of Loveland, Fort Collins, Windsor, and Johnstown as well as unincorporated Larimer County. More than 90 percent of the AIA area however is currently located within the City of Loveland and unincorporated Larimer County. The 1,060-acre Airport Property represents approximately 11 percent of the area within the AIA.

EXISTING LAND USE IN THE AIA

Table II-1 below presents a generalized summary of land area outside of Airport ownership. Existing off-airport land use within the AIA is also summarized in Figure II-1.

Table II-1: Generalized Land Use in the AIA

Land Use [1]	Area # Acres	Percent of AIA %
Developed:		
Residential [2]	1,400	15.6
Public/Institutional	379	4.2
Industrial	330	3.7
Commercial	235	2.6
Office	109	1.2
Subtotal	*2,453*	*27.4*
Water Bodies/Lakes	1,385	15.5
Natural Areas/Open Space [3]	1,254	14.0
Right of Way	800	9.0
Agricultural and/or Vacant	3,057	34.2
Total Off-Airport	8,950	100.0

[1] Land use is summarized based on building improvements. "Developed" land area refers to parcels with building space improvements reported by the Larimer County Assessor.
[2] Includes common area lands within residential subdivisions.
[3] Includes Boyd Lake State Park; protected open space associated with the Fossil Creek Reservoir, Fossil Creek Natural Area, Flores del Sol Natural Area, and Soaring Vista Natural Area; agricultural land with conservation easements (north of Airport); properties zoned "Developing Resources" within Loveland; and environmentally sensitive areas identified within the Millenium GDP (Centerra).

Source: GG+A Analysis of Larimer County Assessment Records

Lands with developed building space or parking improvements, referred to as "developed land uses", within the AIA are estimated to currently total about 2,500 acres or 27 percent of off-airport land area. Existing residential uses are the largest category of developed land use, totaling 1,400 acres or approximately 16 percent of land area. (This includes common area lands within residential subdivisions). Institutional/Public land uses are estimated to comprise approximately 380 acres or about four percent of off-airport land area in the AIA. This primarily includes the County Fairgrounds property and Medical Center of the Rockies hospital campus. Developed Industrial land uses are estimated at 330 acres or approximately four percent of total land. Commercial land uses such as shopping centers, retail buildings, and lodging properties are estimated to contain approximately 240 acres of developed land area or approximately three percent of off-airport land area in the AIA. Office land uses are the smallest category of developed land in the AIA, estimated to total approximately 110 acres or about one percent of off-airport land area.

Water bodies (ponds and lakes) comprise a substantial share of the AIA geographic area, estimated to total nearly 1,400 acres or about 16 percent of the area within the AIA. Protected open spaces and natural areas (such as around Fossil Creek Reservoir), land in conservation easements north of the Airport, and environmentally sensitive areas within Centerra represents an additional 1,300 acres of land. Agricultural and/or vacant properties in the AIA are estimated to total approximately 3,100 acres of gross land area. This represents approximately 34 percent of total off-airport area within the AIA.

EXISTING BUILDING SPACE AND HOUSING UNIT INVENTORY

Parcels fully or partially contained within the AIA contain well over 10,000,000 square feet of physical building space. Much of this space has been built within the past 20 years. Table II-2 summarizes the existing building space inventory, by year built, for major use categories of industrial, office, retail, hotel, and residential.

Table II-2: Inventory of Off-Airport Building Space (in Square Feet) within the AIA[1]

	Pre 1980	1980-1989	1990-1999	2000-2009	2010-2018	**Total**
Industrial	449,000	1,389,000	346,000	444,000	403,000	**3,032,000**
Office	0	0	226,000	929,000	260,000	**1,415,000**
Retail[2]	2,000	3,000	356,000	1,024,000	27,000	**1,412,000**
Hotel	46,000	0	81,000	180,000	139,000	**446,000**
Residential	584,000	188,000	324,000	2,366,000	1,189,000	**4,652,000**

[1] Figures are rounded. Estimates do not contain building spaces on public/exempt parcels (such as the Larimer County Fairgrounds property).
[2] Includes restaurants and automotive dealers.

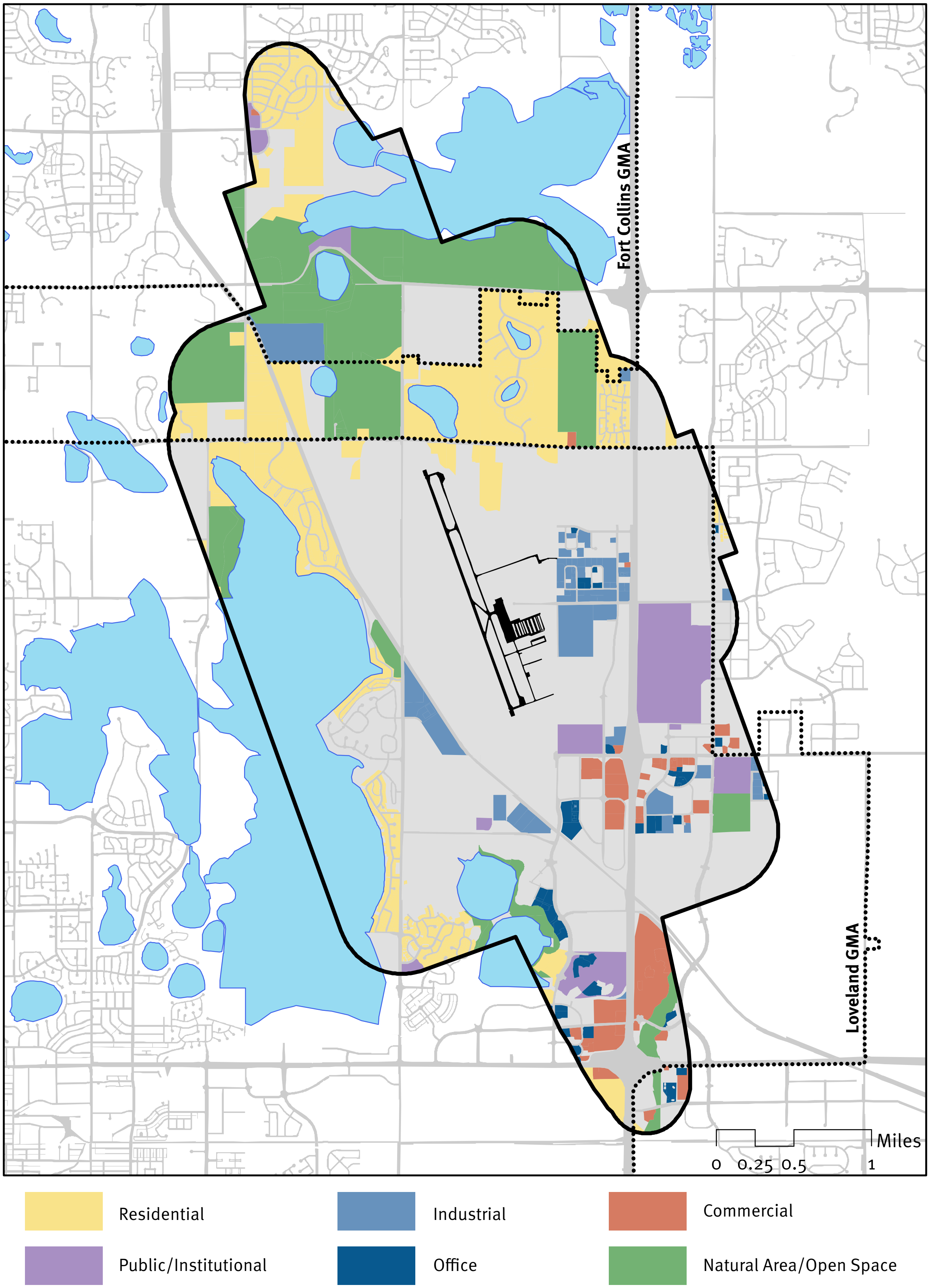
Source: GG+A Analysis of Larimer County Assessment Records

The AIA is estimated to contain approximately 3.0 million square feet of industrial building space and 1.4 million square feet of office building space on privately owned parcels. Approximately 60 percent of existing industrial building space was built prior to 1990. Just over 400,000 square feet of industrial space in the AIA has been completed since 2010 according to County assessment records. The majority or about 66 percent of office space within the AIA was built between 2000 and 2009, a period during which more than 920,000 square feet was completed. Office development activity has slowed since the Great Recession, with approximately 260,000 square feet completed between 2010 and 2018 (including medical space).

Approximately 320,000 square feet of hotel space and 1,050,000 square feet of retail and restaurant space has been built within the AIA since 2000. The AIA collectively contains approximately 1.9 million square feet of lodging and retail space on private property. Including the Embassy Suites on the Larimer County Fairgrounds property, the existing hotel room inventory in the AIA is estimated to total approximately 1,100 rooms.

Residential developments within the AIA are estimated to contain nearly 4,700,000 square feet of building space. More than one-half of all residential development – about 2,370,000 square feet – occurred between 2000 and 2009. Approximately 1.2 million square feet of residential building space is estimated to have been built between 2010 and 2018. As of 2018, residential developments within the AIA contained an estimated

Figure II-1: Existing Off-Airport Land Use in the AIA



2,140 housing units. Detached single-family units are estimated to comprise two-thirds of all existing housing units within the AIA or approximately 1,430 units. Attached single-family units (e.g., townhomes), multi-family units, and manufactured homes are estimated to comprise an additional 715 units or about one-third of the existing housing inventory in the AIA.

UNDEVELOPED LAND INVENTORY

Table II-3 summarizes an estimate of undeveloped land within the AIA, not including undeveloped portions of the Airport property.

Table II-3: Summary of Undeveloped Land in AIA by Type[1]

	Residential # Acres	Commercial # Acres	Other # Acres	Total # Acres
In Airport Critical Zones[2]				
Loveland Growth Management Area	0	70	450	520
Fort Collins Growth Management Area	0	0	75	75
Other [3]	0	0	0	0
Outside Airport Critical Zones				
Loveland Growth Management Area	225	190	1,385	1,800
Fort Collins Growth Management Area	25	0	240	265
Other [3]	10	20	180	210
TOTAL:				
Loveland Growth Management Area	225	260	1,835	2,320
Fort Collins Growth Management Area	25	0	315	340
Other [3]	10	20	180	210
Total	**260**	**280**	**2,330**	**2,870**

[1] Figures are rounded. Land type refers to Larimer County Assessor land abstract codes. Residential and Commercial parcels include platted and unplatted lots. "Other" primarily includes Agricultural and Exempt properties. Protected open space and natural areas, while undeveloped, are not included here.
[2] Airport Philosophy Statements adopted under the *Loveland Comprehensive Plan* suggest that "No residential land uses or other uses that would subject persons to an unreasonable risk or injury should be permitted within the Airport Critical Zone."
[3] Includes portions of Larimer County outside of the growth management areas for Loveland and Fort Collins, as well as small portions of Windsor and Johnstown.

Source: GG+A Analysis of Larimer County Assessment Records

The AIA is estimated to contain approximately 2,900 acres of undeveloped land located outside of Airport ownership. Properties in current agricultural use (according to the assessor) represent more than 70 percent of the undeveloped land. The total inventory of potentially developable land in the AIA is greater if some agricultural properties with minimal residential building improvements and parts of the Airport property are considered. Approximately 600 acres of the undeveloped land inventory are located inside of the Airport Critical Zones. An estimated 2,275 undeveloped acres are located outside of the Airport Critical Zones. Approximately 80 percent of the undeveloped land inventory is located within the City of Loveland Growth Management Area. A comparatively small share of the inventory, about 12 percent, is located within the City of Fort Collins Growth Management Area. The unincorporated corridor (between the two growth management areas of Loveland and Fort Collins) and properties in Windsor and Johnstown are estimated to contain approximately 200 acres or seven percent of undeveloped land area.

III: ECONOMIC BASE AND LABOR FORCE

The purpose of this section is to identify the industry sectors likely to continue to grow or contract within the local and regional economy, and therefore the types of firms and activities that may represent potential business targets for employment land in the AIA.

The structure and composition of the Larimer County employment base is reviewed, including employment by industry sector and location quotients (industry clusters). Long-term labor force growth projections and existing commute (labor shed) patterns, which are likely to bear on future economic development in the AIA, are also described. An employment forecast for Larimer County prepared recently by the Colorado Department of Labor and Employment is also presented. The forecast of employment identifies how the composition of the local economy may continue to change and provides a baseline from which to estimate the amount of potential future building space and land demand within the market area.

EMPLOYMENT BASE CHARACTERISTICS

Table III-1 summarizes historical wage and salary employment and average weekly wages by industry sector for Larimer County from fourth quarter 2008 through fourth quarter 2018 (the most recent quarter for which data is available). The estimates are drawn from the Quarterly Census of Employment and Wages program published by the Colorado Office of Labor Market Information.

Table III-1: Larimer County Employment and Wages by Industry Sector, 2008-2018

Sector	2008		2018		10 Year Change		
	Employment #	Weekly Wage $	Employment #	Weekly Wage $	Employment Change #	Employment AAGR* %	Weekly Wage %
Natural Resources & Mining	1,238	594	1,439	854	201	1.5	43.8
Construction	9,858	781	11,303	1,038	1,445	1.4	32.9
Manufacturing	12,019	1,236	14,324	1,529	2,305	1.8	23.7
Wholesale Trade	3,185	931	4,761	1,492	1,576	4.1	60.3
Retail Trade	17,271	456	19,260	560	1,989	1.1	22.8
Transportation/ Warehousing & Utilities	3,303	847	4,084	1029	781	2.1	21.5
Information	2,803	884	3,294	997	491	1.6	12.8
Financial Activities	5,520	788	6,736	1,166	1,216	2.0	48.0
Professional & Business Services	18,154	967	20,103	1,253	1,949	1.0	29.6
Education and Health Care Services	30,920	679	41,802	878	10,882	3.1	29.3
Leisure and Hospitality	17,215	279	22,869	396	5,654	2.9	41.9
Other Services, Ex. Public Admin	3,551	512	4,724	691	1,173	2.9	35.0
Public Administration	7,402	986	8,215	1,135	813	1.0	15.1
Unclassified	23	1,502	26	1,182	3	1.2	-21.3
TOTAL	132,462		162,940		30,478	2.1	

* Average annual growth rate.

Sources: Colorado Office of Labor Market Information, Quarterly Census of Employment and Wages; Gruen Gruen + Associates.

The countywide employment base has grown by more than 30,000 wage and salary jobs over the past 10 years. All industry sectors gained jobs over this period. The education and health care and leisure and hospitality sectors experienced particularly strong growth. The largest source of absolute job growth has been attributable to the education and health care sector which has added nearly 11,000 jobs since 2008. The education and health care sector accounted for about 36 percent of all jobs added between 2008 and 2018.

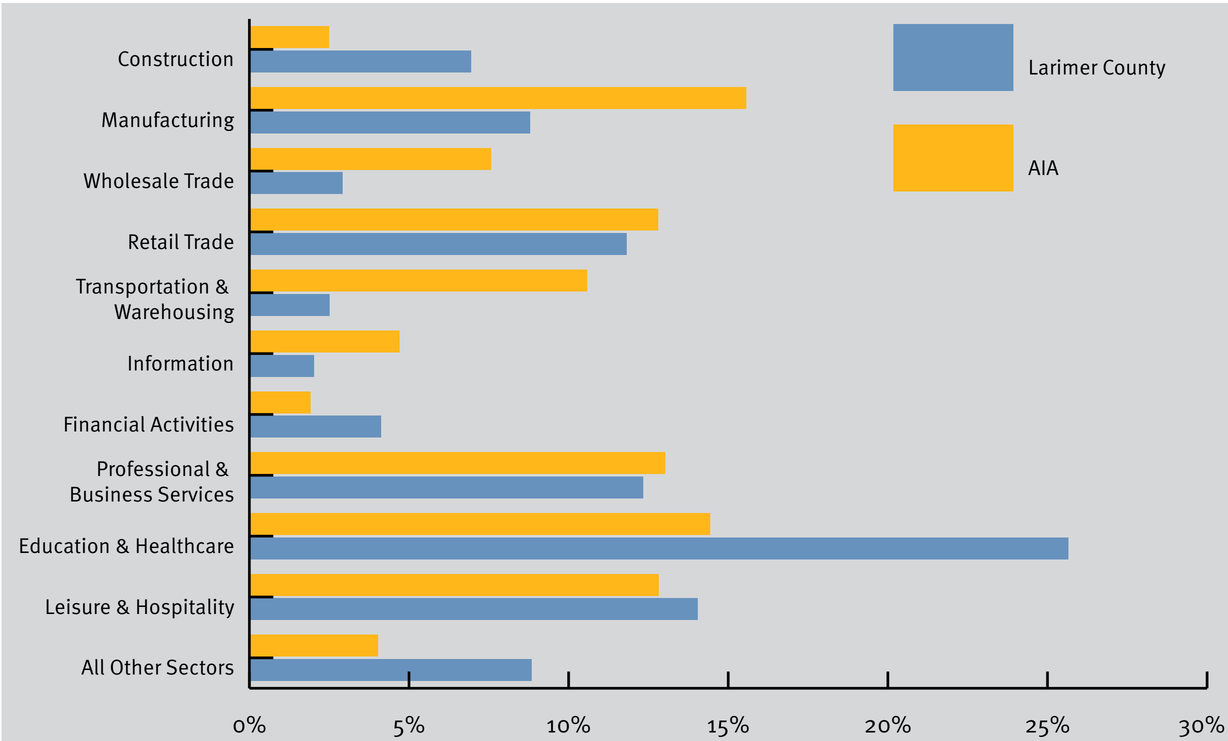
The employment base has grown at an average annual rate of approximately 2.1 percent since 2008, expanding on average by about 3,000 jobs per year. Education and healthcare, leisure and hospitality, other services, and financial activities grew at average annual rates exceeding two percent or more. Employment sectors associated with the consumption of industrial space, manufacturing and wholesale trade have also experienced high rates of growth since 2008 and account for about 22 percent of jobs added between 2008 and 2018. Manufacturing employment grew at an average rate of 1.8 percent to over 14,300 jobs in 2018 compared to about 12,000 jobs in 2008. The wholesale trade sector added approximately 2,000 jobs.

In 2008, manufacturing had the highest average weekly wages of $1,236 followed by public administration, professional and business services, and information. By 2018, manufacturing remained at the top for average weekly wages followed by professional and business services and financial activities, public administration and construction.

EMPLOYMENT COMPOSITION

Figure III-1 describes the employment mix for the AIA in comparison to that of the Larimer County economy.

Figure III-1: Employment Mix Comparison*



*AIA estimate is based on most recently available data from the U.S. Census Bureau LODES program. Larimer County estimates are for 2018.

Existing employment within the AIA is more concentrated in industry sectors that typically use industrial facilities. Manufacturing, wholesale trade, and transportation and warehousing are estimated to comprise about 34 percent of all jobs located in the AIA (as of 2016 estimates). These sectors are estimated to represent a much smaller share, approximately 14 percent, of countywide employment.

AIA employment in sectors traditionally associated with the use of office space (information, financial activities, and professional and business services) comprise 20 percent of total employment, a composition that is similar to the countywide employment base.

LOCATION QUOTIENTS

"Location Quotients" in the jargon of economic base analysis are metrics used to quantify industry sectors or activities that derive specific competitive advantages from a given region or locality and are particularly concentrated in the region or locality. High location quotients are typically considered to signal the presence of industry clusters or agglomerations within basic industries that export most of their goods and services beyond the local market area. Industry sectors with lower location quotient generally signify an activity that is local-serving.

Table III-2 summarizes industry subsectors within Larimer County (at the 3-digit NAICS level) that exhibited location quotients of 1.25 or greater (as of 2018) as well as historical job growth between 2008 and 2018 in these subsectors. In the third quarter of 2018, relative to the United States employment base, for example, the beverage manufacturing subsector had a location quotient of approximately 4.8, indicating the beverage manufacturing sector is nearly five times more concentrated in the region than the national average.

Table III-2: Top Location Quotients in Larimer County[1]

	2018 Location Quotient	2008-2018 Job Growth
NAICS 312 Beverage and tobacco product manufacturing	4.8	52.0%
NAICS 334 Computer and electronic product manufacturing	3.4	-3.6%
NAICS 333 Machinery manufacturing	2.0	8.9%
NAICS 326 Plastics and rubber products manufacturing	1.7	265.3%
NAICS 238 Specialty trade contractors	1.6	17.3%
NAICS 511 Publishing industries (except Internet)	1.6	-22.1%
NAICS 518 Data processing, hosting and related services	1.4	161.5%
NAICS 811 Repair and maintenance	1.4	29.3%
NAICS 531 Real estate	1.3	45.6%
[1] Does not include public sector employment.		
Sources: U.S. Bureau of Labor Statistics; Gruen Gruen + Associates.		

Other subsectors with location quotients of 2.0 or greater (i.e., twice as concentrated as the national economy) include machinery manufacturing and computer and electronics manufacturing. Industry subsectors related to the housing and non-residential growth occurring in Northern Colorado have relatively high location quotients. These sectors include specialty trade contractors, real estate, and repair and maintenance services. These subsectors have been expanding at annual rates above 1.5 percent over the past 10 years. Businesses occupying industrial space in the AIA are frequently related to the building and trades industries. The location quotient analysis indicates that a clustering or agglomeration effect continues to exist within technology-related subsectors, including computer and electronic parts manufacturing, data processing, and information publishing. However, some of these local industries exhibit patterns of long-term employment decline.

According to the *U.S. Cluster Mapping Project*, the Larimer County economy has six "traded" employment clusters with high degrees of specialization. A cluster is a regional concentration of related industries in a

Source: U.S. Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School.

particular location, while "traded" clusters refer to industry concentrations that primarily export their goods or services beyond the local/regional market. The six largest traded clusters in Larimer County are estimated to include Distribution & Ecommerce, Information Technology (IT), Financial Services, Marketing, Biopharma, and Performing Arts. The Distribution & Ecommerce cluster is estimated to employ more people than the next five largest clusters combined. Activities related to Distribution & Ecommerce typically require some type of industrial building space.

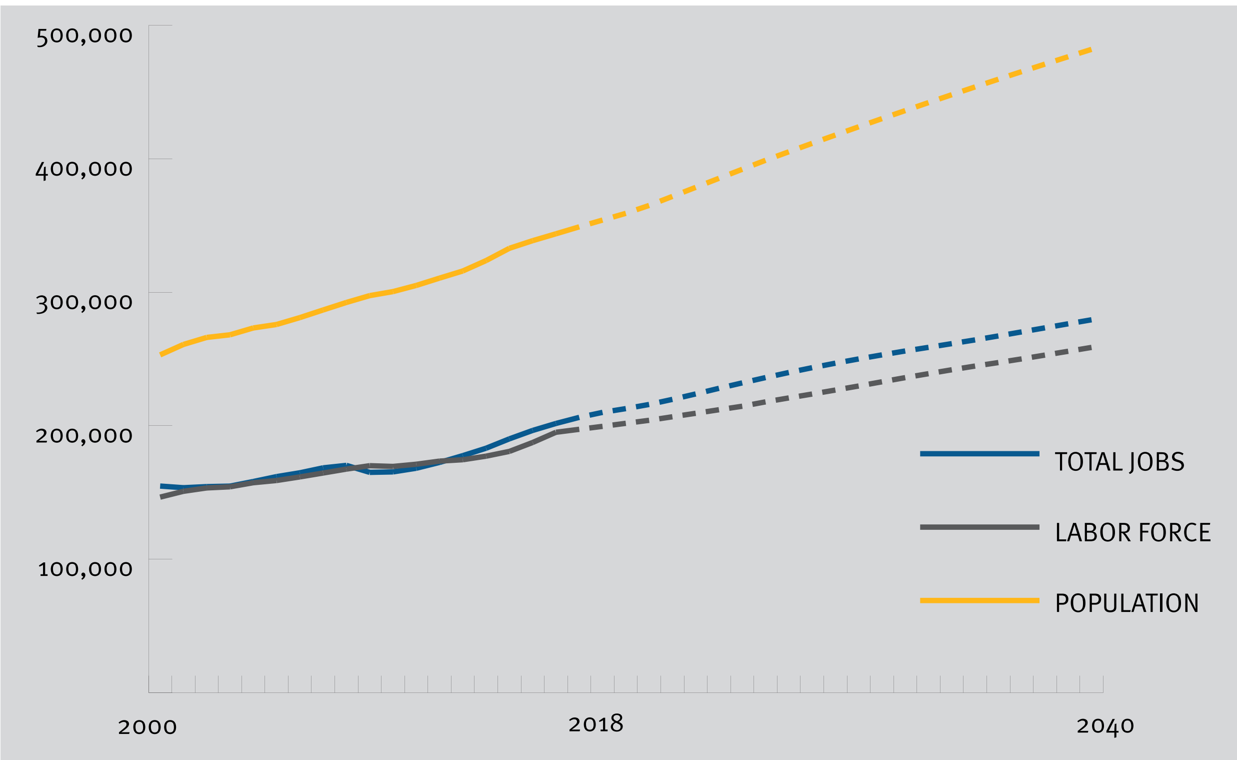
LABOR FORCE GROWTH AND LABOR SHED PATTERNS

Labor Force Growth and Participation

Larimer County continues to steadily grow in population. The County population has increased by about 96,000 people since 2000, representing a long-term annual growth rate of about 1.8 percent. The population is currently estimated to approximate 350,000; up from approximately 253,000 in 2000. The civilian labor force is currently estimated at about 197,000 workers.

Figure III-2 summarizes historical and projected population, labor force, and job growth in Larimer County according to Colorado Department of Local Affairs ("DOLA") estimates and forecasts.

Figure III-2: Population, Labor Force, and Job Growth in Larimer County



Sources: Colorado State Demography Office; Gruen Gruen + Associates.

DOLA projections indicate that the Larimer County population will grow to about 480,000 people by 2040, representing future annual growth rate of 1.5 percent. This is only slightly below historical growth rates since 2000. The labor force is projected to expand more slowly at 1.2 percent annually.

The labor force participation rate is projected to decline slightly to about 70 percent and then remain relatively stable over the longer-term. The peak participation rate was approximately 74 percent in 2005-2006, prior to the housing market crash and Great Recession.

The unemployment rate averaged 2.5 percent in 2018, down from a high of about eight percent in 2010. The labor market continues to be in a full-employment condition, although it has been widely documented and discussed that many of Larimer County's well-educated workers may be "underemployed."[1] Long-term projections suggest that a significant change in the labor market is not anticipated. Unemployment is forecast to remain below 3.5 percent for each of the next 20 years in Larimer County. The total number of jobs is projected to eclipse the total available labor, indicating a greater likelihood that Larimer County will need to import a greater amount of labor over time.

Economic development professionals report that some companies continue to experience challenges finding labor and this may constrain economic growth moving forward, particularly as larger numbers of Baby Boomers begin to leave the workforce in coming years. This indeed suggests future employment growth may lag population and household growth, as predicted by DOLA. These trends will also encourage companies to invest in capital equipment and software to reduce the need for labor.

Labor Shed Patterns

Because of its regional centrality and highly accessible environs, the AIA benefits from a wide and diverse labor shed. The economic base of Northern Colorado is increasingly inter-connected, especially with respect to labor. The communities represented within the AIA will continue to function as one employment and housing market area to varying degrees; significant flows of labor across municipal borders occur in many directions. Figure III-3 illustrates the labor shed served by employers in the AIA (where workers employed in the AIA are estimated to live).

A very small share of the jobs located within the AIA (less than three percent) are estimated to be held by workers who also reside within the AIA. This is not surprising given the relatively limited number of housing units available within the AIA proper.

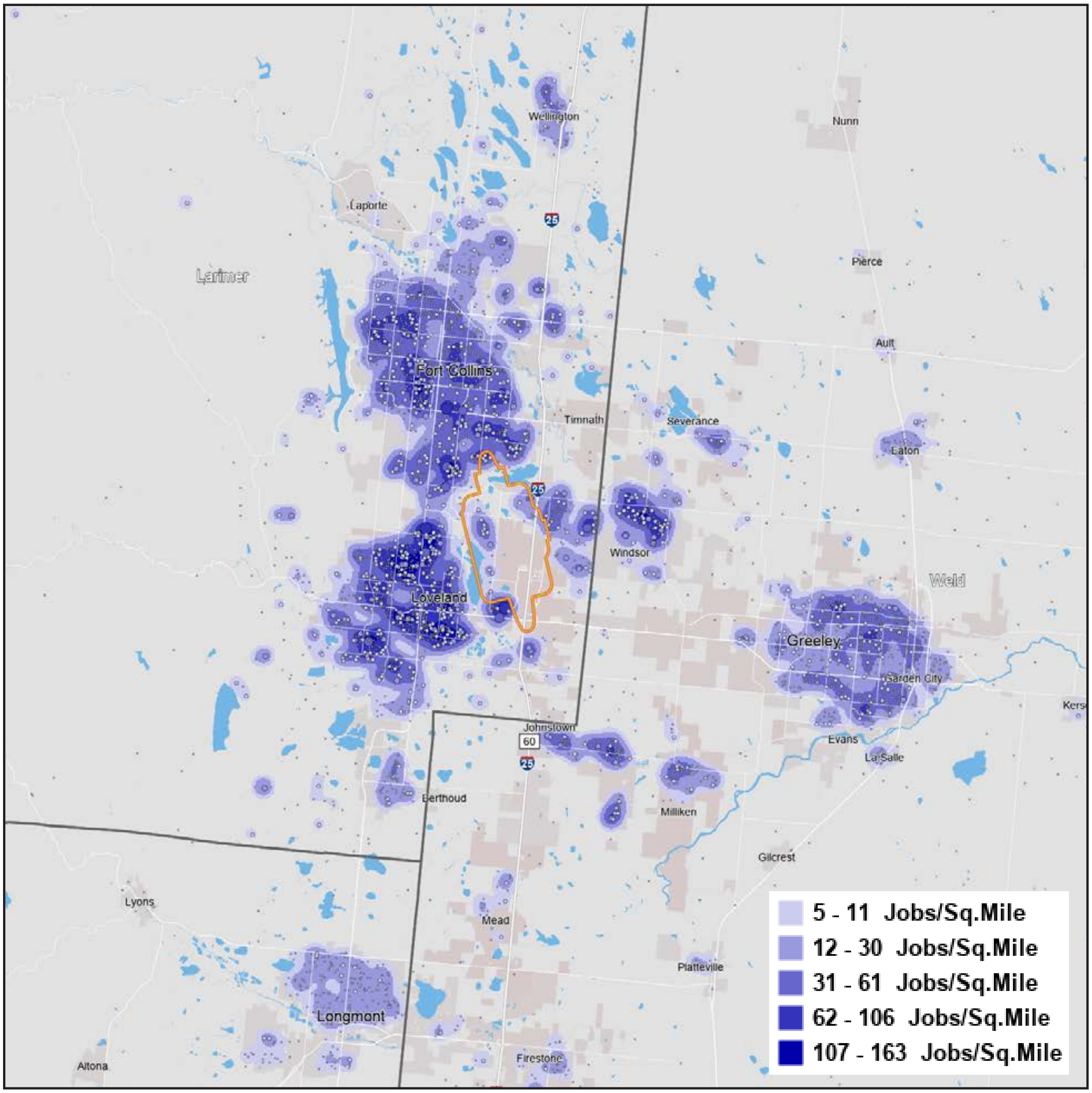
The City of Fort Collins is estimated to account for the largest source of labor employed within the AIA, representing approximately 21 percent of total jobs.[2] Labor originating from within the City of Loveland comprises just under 20 percent of total AIA jobs, while other locations in Larimer County are estimated to provide about 14 percent of labor employed in the AIA. Labor originating from Weld County to the east represents an additional 22 percent of AIA labor.

The prevailing labor shed patterns exemplify how future growth and economic development of the AIA can provide indirect regional benefits simply from the recirculation of wages and salaries paid to workers employed in the AIA, the vast majority of which are likely to reside outside the municipality in which the Airport is located.

[2] See: https://fortcollinschamber.com/wp-content/uploads/2017/02/2017-02-06-Regional-Workforce-Strategy-FINAL.pdf.

[3] U.S. Census Bureau, 2016 LODES estimates.

Figure III-3: Origin of Workers Employed in AIA



COUNTY EMPLOYMENT FORECAST BY INDUSTRY

Table III-3 presents a forecast of employment growth by industry sector for Larimer County.

Table III-3: Larimer County Employment Forecast by Sector[1]

	Forecast Average Annual Growth Rate %	Estimate 2017 #	Forecast 2027 #	Forecast Growth 2017-2027 #
Natural Resources & Mining	1.0	1,341	1,479	138
Utilities	0.1	255	258	3
Construction	2.2	10,699	13,320	2,621
Manufacturing	0.7	13,734	14,748	1,014
Wholesale Trade	2.8	4,654	6,132	1,478
Retail Trade	1.0	19,064	21,128	2,064
Transportation and Warehousing	1.9	1,736	2,096	360
Information	1.2	2,833	3,193	360
Finance, Insurance, and Real Estate	2.0	6,828	8,349	1,521
Professional & Business Services	2.6	20,315	26,183	5,868
Education and Health Care Services	2.6	38,837	50,358	11,521
Leisure and Hospitality	2.7	21,281	27,783	6,502
Other Services, Ex. Public Admin	1.9	6,449	7,795	1,346
Public Administration	1.2	10,973	12,360	1,387
TOTAL	2.1	158,999	195,182	36,183

[1] Wage and salary employment estimate for the fourth quarter of 2017. Does not include unclassified employment or employment not disclosed due to confidentiality.

Sources: Colorado Department of Labor and Employment; Gruen Gruen + Associates.

The Larimer County employment base is projected to increase at an annual rate of 2.1 percent through 2027. This suggests that over the forecast period, employment will grow by over 36,000 jobs. Education and healthcare services are projected to increase by nearly 11,500 jobs to over 50,000 jobs. By 2027, this sector is projected to comprise approximately 26 percent of the employment base. Leisure and hospitality jobs are expected to grow at a slightly higher rate (2.7 percent) and second largest amount (6,502) to nearly 28,000 jobs. The leisure and hospitality sector is projected to comprise the second largest share of jobs at nearly 14 percent of total employment. The professional and business services sector is projected to grow at an average annual rate (2.6 percent) similar to education and healthcare employment and third largest absolute amount of added jobs (5,868 jobs) to comprise 13 percent of total employment. The retail trade sector is projected to increase by 2,000 jobs. The construction sector is projected to add about 2,600 jobs. Nearly 2,500 jobs are projected to be added to the manufacturing and wholesale trade sectors. Employment in manufacturing of approximately 14,700 is projected to comprise over seven percent of total employment in 2027. Wholesale trade employment of 6,100 (at the fastest projected growth rate of 2.8 percent) is projected to comprise three percent of total employment in 2027.

IV: OFFICE AND INDUSTRIAL/FLEX USES

Office and industrial/flex buildings differ in their function and design but share a key similarity: they provide workspace for almost all primary employment (primary jobs) located in a given area.[3] Future land use planning designations referring to "Employment" land are commonly focused on providing adequate development opportunities for primary employers that utilize office and industrial/flex space, or combinations of such facilities in campus-type settings.

This section reviews the existing inventory of office and industrial/flex space within Northern Colorado and the competitive market area, as well as trends related to the past construction, absorption, vacancy, and average rental rates for office and industrial/flex building space. An updated 20-year projection of future office and industrial/flex space demand for the AIA is also presented with an accompanying discussion of factors that may affect the ability to capture office and industrial/flex demands.

COMPETITIVE MARKET AREA AND DEMAND SOURCES

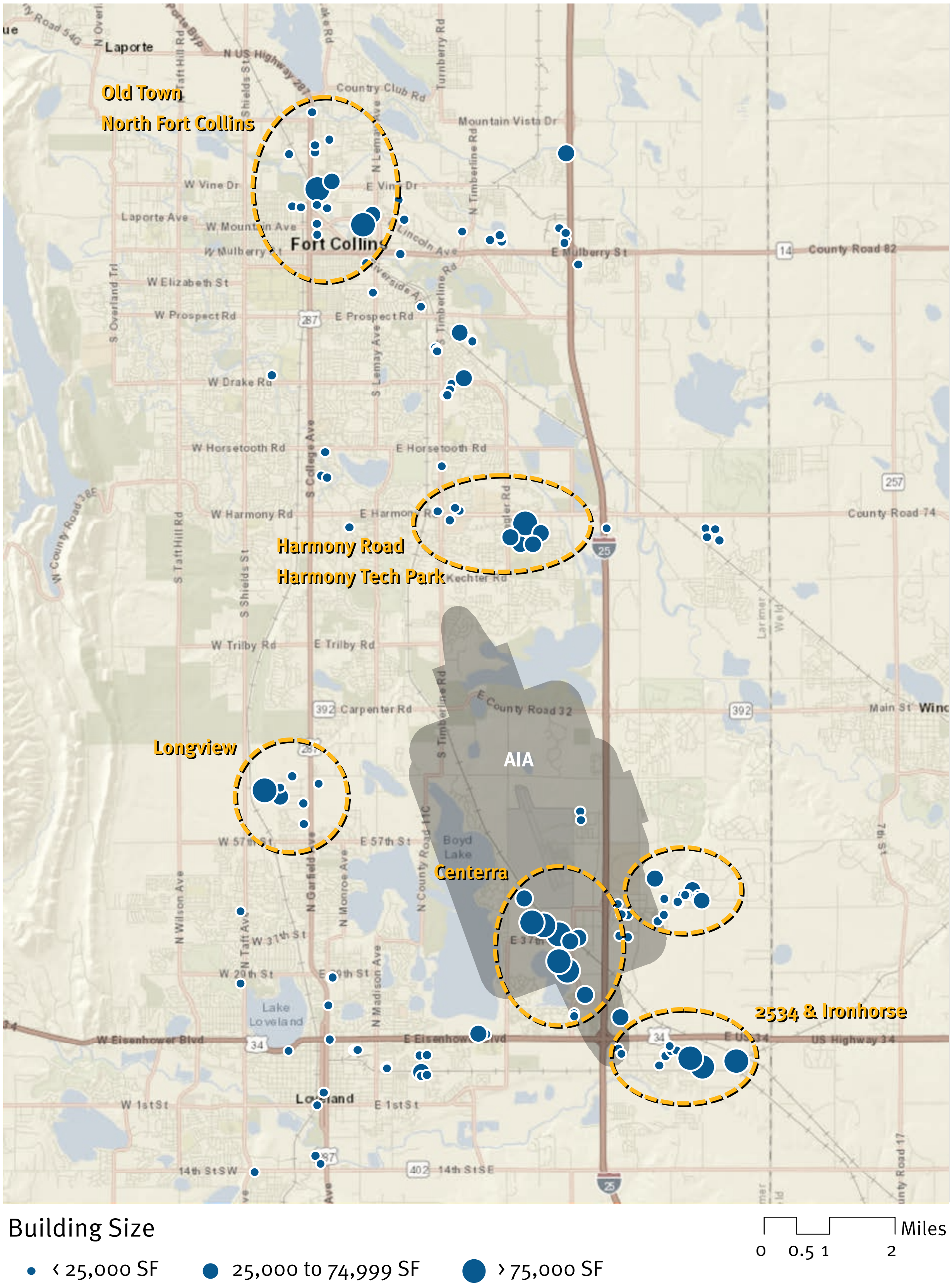
The primary geographic market area within which office industrial/flex development within the AIA will generally compete includes Larimer County and the Interstate 25 Corridor. Some locations outside of Larimer County such as Greeley and Boulder/Denver can be considered "secondary" market areas that may represent potential sources of demand for future office or industrial/flex development in the AIA, but not direct sources of competition. Some commercial brokers and economic development professionals, for example, anticipate that future industrial and office space demand may originate from Boulder and Northwest Denver as those areas continue to be space-constrained and more expensive than Northern Colorado.[4]

Figure IV-1 illustrates the primary competitive market area as well as the locations within the market area that have been experiencing recent office and industrial/flex development activity. Internal movements, expansions, and consolidations within the primary competitive market area can be expected to account for most future office and industrial/flex space demand. Northern Colorado is characterized by many small "homegrown" firms that over time have expanded and consolidated operations into larger single facilities. Non-local firms that have relocated operations to the primary market area have usually originated from out of the state; primarily because owners or key decision makers have been drawn to the high quality of life and relative affordability of Fort Collins and Loveland. Some have also grown into the largest private employers in the market area, including notable examples such as Woodward, Inc., Hach Company, Manes Machine and Engineering, and Advanced Energy, which originally relocated to Fort Collins from Midwestern and Southern California locations.

[4] There is no formal definition of what is a primary employer or primary job, though the widely accepted concept of a primary job is one that produces goods and/or services for export beyond the locality. By exporting goods and services beyond a community's borders, primary jobs are involved in attracting dollars/wealth from outside a local market, a portion of which then gets re-distributed locally through payroll and supplier networks.

[5] Average asking industrial space rents in the Boulder and Longmont markets are still ± 20-30% higher than industrial space rents in the Fort Collins/Loveland market. Class A office space rents in Boulder for example are also about 40% higher than in Fort Collins/Loveland.

Figure IV-1: Competitive Market Area and Office and Industrial Developments (2008-2018)



Recent examples of larger office and industrial space-using firms expanding, consolidating and relocating from within the market area include:

- CPP Wind - relocated its office and testing/R&D operations from Fort Collins to Windsor;
- Toddy Coffee - consolidated manufacturing operations from four locations throughout Fort Collins to Loveland (Centerra) several years ago; recently expanded again into larger industrial footprint near the Airport;
- Value Plastics – relocated/expanded manufacturing operations from Fort Collins to west Loveland;
- Numerica - moved its headquarters from Loveland to Fort Collins (Harmony Technology Park) in 2015; now proposed to expand within HTP;
- Hach Company – one of Loveland's largest private employers has now expanded operations three times at their site adjacent to the Airport;
- Madwire – the digital marketing/software company, which relocated to Fort Collins from Loveland, and recently consolidated into a new second large office space at Timberline and Horsetooth;
- High Country Beverage – which relocated from facilities near the Airport into larger space in Johnstown;
- Custom Blending – food manufacturer which expanded from Fort Collins to Loveland a few years ago;
- Prosci – a business research/training company which relocated from Loveland to Harmony Road in Fort Collins; and
- Canyon Bakehouse –consolidated several locations in Loveland to one larger manufacturing facility in Johnstown.

Sources of demand for industrial/flex building space in the market area continue to include manufacturing and wholesale trade (distribution) activities, including those in the food and beverage, machinery, plastics and medical manufacturing sectors; and firms in the construction and buildings trades industry. Current and historical drivers of office space demand in the market area typically relate to healthcare and wellness, technology sectors (increasingly related to environmental/bioscience activities), agri-business, and government/institutional users.

Demand Sources

"The industries driving current [industrial] market activity include manufacturing, engineering, and construction services...warehouse and distribution centers remain the most demanded product type in Northern Colorado."

"Agriculture, Government, Medical, and Technology sectors are expected to drive office tenant activity in 2019. That said, Northern Colorado's tight labor market is a challenge for firms wanting to grow and expand into new space."

- CBRE, Northern Colorado Market View, H2 2018

OFFICE MARKET CONDITIONS AND TRENDS

Table IV-1 summarizes the Northern Colorado office market inventory as of year-end 2018. The market overall remains very well occupied, reflecting consistent job growth with limited new construction activity. The 16.7 million square feet of office space throughout Northern Colorado is estimated to have a low vacancy rate of 3.5 percent (this includes single-tenant, owner-occupied office as well as medical buildings). Class C office space has the lowest vacancy rates, while Class A space (the highest-quality and most expensive office space) has higher vacancy rates, estimated at approximately eight percent in the Fort Collins/Loveland market. Approximately 70 percent of all existing office space inventory is classified as Class B space.

Table IV-1: Northern Colorado Office Market Inventory (Year-End 2018)

	Fort Collins/ Loveland	Greeley/Weld County	Northern Colorado Total
Class A			
Rentable Inventory	1,074,670	673,748	1,748,418
Vacancy Rate	7.7%	0.0%	4.7%
Class B			
Rentable Inventory	7,670,664	3,524,663	11,195,327
Vacancy Rate	3.7%	4.2%	3.9%
Class C			
Rentable Inventory	2,379,485	1,389,745	3,769,230
Vacancy Rate	2.2%	1.9%	2.1%
Total			
Rentable Inventory	11,124,819	5,588,156	16,712,975
Vacancy Rate	3.7%	3.2%	3.5%
Sources: CoStar Group, Inc.; Gruen Gruen + Associates.			

Approximately 120,000 square feet of Class A and B office space is reportedly under construction in the Fort Collins/Loveland market with 70 percent of the space pre-leased (indicating primarily "build to suit" development).

The Airport and most of the AIA are located within the "East Loveland" office space submarket. Table VI-2 summarizes current direct vacancy rates by submarket and the composition of the overall office space inventory.

Table IV-2: Office Vacancy Rates by Major Submarket (Year-End 2018)

	Percent of Total Office Market Inventory	Direct Vacancy Rate 2018
Southeast Fort Collins	26.6%	4.1%
North/Midtown Fort Collins	34.1%	2.5%
East Loveland	12.3%	9.8%
Downtown Loveland	6.7%	5.5%
North Loveland	6.8%	8.6%
Sources: CBRE Research, H2 2018; Gruen Gruen + Associates.		

Locations in Fort Collins continue to provide more than 70 percent of all office space inventory in the market. Midtown Fort Collins and other northern parts of the community contain more than one-third of all office space in the market. Vacancy is very low, at 2.5 percent. Southeast Fort Collins contains about 27 percent of all office space in the market area according to CBRE estimates. The vacancy rate is currently estimated at about four percent. Southeast Fort Collins and the Harmony Road Corridor continues to be a preferred location for private office space users in the market area.

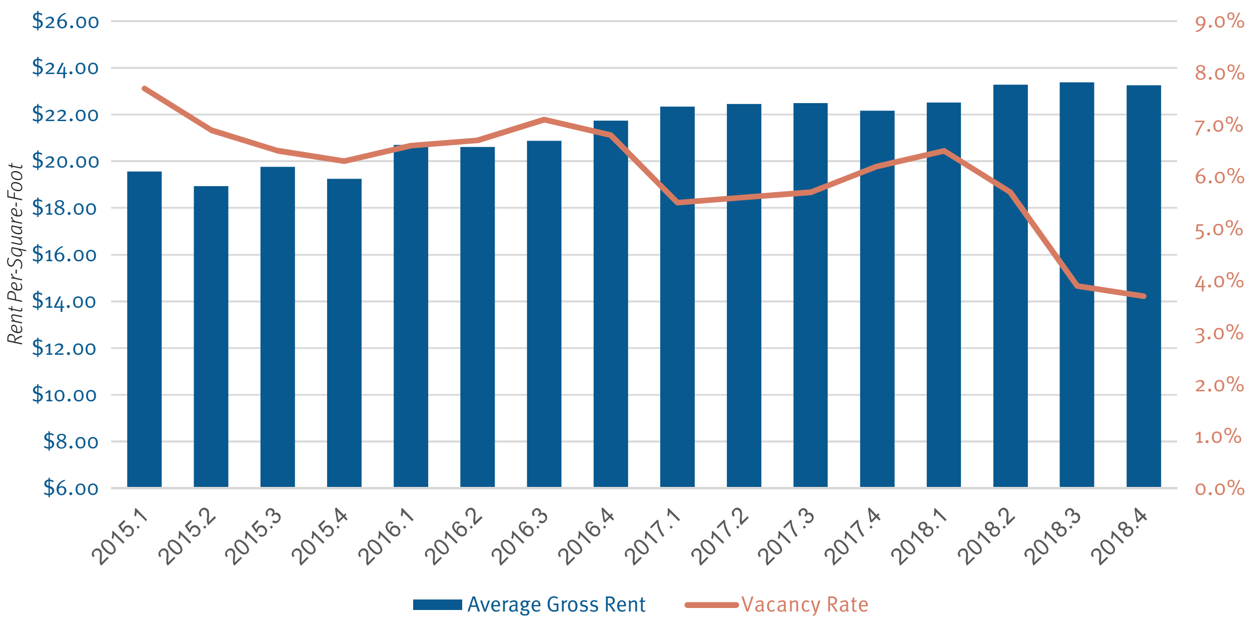
East Loveland contains approximately 12 percent of the total office space inventory and the vacancy rate at year-end 2018 was above average, at approximately 10 percent. The appeal of East Loveland as a multi-tenant office space location has improved over time, and vacancy rates have declined, although the submarket is still not perceived to be as desirable to office space users as competing locations to the north in Fort Collins.

The competitive position of East Loveland (including much of the AIA) for new office space development will likely improve over time when land supply in preferred Fort Collins locations decline. Fort Collins has a higher quality stock of a critical mass of office space in more amenity-and service-laden locations with a higher share of residents skilled in office occupations. Other submarkets in Loveland including the Downtown area include much smaller concentrations of office space, though they remain well-occupied (albeit at low rental rates) with vacancy rates below nine percent.

Historical Office Rental Rates and Vacancy Rates

Figure IV-2 summarizes recent rental rate growth and vacancy rate changes in the Fort Collins/Loveland office market.

Figure IV-2: Rents and Vacancy Rates in Fort Collins/Loveland Office Market



Sources: CoStar Group; Gruen Gruen + Associates.

From early 2015 through year-end 2018, the average asking gross (full-service) office space rent is estimated to have increased by approximately 18 percent; escalating from about $20 per square foot in first quarter 2015 to about $23 per square foot by year-end 2018. The overall office vacancy rate has declined from a about 8.7 percent in early 2015 to 3.7 percent by year-end 2018. The market has shown continued signs of improvement reflecting positive office space absorption with limited new office space construction. Office rents have increased but have not escalated at high rates comparable to other land uses in the market (e.g., industrial/flex, multi-family), indicating that office space landlords have kept rates comparatively "in check" in order to absorb existing spaces. CBRE estimates net office space rents currently average about $15.50 per square foot. Prevailing market rents for most office space product remain well below levels required to speculatively build new office space.

"Base (net) rents have been hovering between $14 and $16 per square foot as far back as Q1 2016, which is less than half of those seen in Denver and averaged across the nation. Office space in Northern Colorado is seeing a drop in vacancy rates mostly due to the fact that rents aren't high enough to justify new construction."
- Brinkman Construction, *2018 Brinkman News*

Table IV-3 summarizes office building absorption and new construction patterns for Loveland and Fort Collins. Annual figures for the past year, as well as the annual five-year average, are presented.

Table IV-3: Office Space Absorption and Construction Trends[1]

	Past Year			5-Year Average (Annual)		
	Loveland	Fort Collins	**Total**	Loveland	Fort Collins	**Total**
Net Space Absorption	0	259,000	**259,000**	55,000	126,000	**181,000**
Total Leasing Activity	165,000	444,000	**609,000**	150,000	356,000	**506,000**
New Building Deliveries	1,000	34,000	**35,000**	58,000	109,000	**167,000**
[1] Figures expressed in square feet of rentable building space.						
Sources: SVN Commercial Denver; Gruen Gruen + Associates.						

The Fort Collins/Loveland office space market is estimated to have absorbed approximately 260,000 square feet of space within the past year; all of it within Fort Collins. This is above the historical five-year average of about 180,000 square feet. A significant share of positive absorption in Fort Collins in the past year has related to the expansion/consolidation of a large office space user already located in the Harmony Road corridor – Madwire, which expanded into 102,000 square feet of a repurposed building.[5] Less than 40,000 square feet of new space was delivered, explaining the continued decline in vacancy rates.

The distribution of total office leasing activity reflects the differences between office space locations in Loveland and Fort Collins. Submarkets in Fort Collins have and continue to represent more than 70 percent of all office market activity.

INDUSTRIAL/FLEX MARKET CONDITIONS AND TRENDS

Table IV-4 summarizes the current industrial/flex market inventory in Northern Colorado. Warehouse space, which comprises the vast majority of the existing inventory, has a total vacancy rate of only 2.5 percent. Flex space which represents about 20 percent of the total industrial space inventory is less well-occupied with an overall regional vacancy rate of about 12 percent. Much of the flex space vacancy, however, reflects the former Agilent/HP campus in Loveland (the Rocky Mountain Center for Innovation and Technology) which is reportedly not competitive for modern contemporary industrial uses. Buildings in the former Agilent/HP campus are obsolete and not well-attuned to modern warehousing requirements with respect to ceiling heights and loading capabilities. This property is also not highly accessible to I-25 as is land in the AIA.

[6] https://crej.com/news/madwire-leases-102000-square-feet-fort-collins/

Table IV-4: Northern Colorado Industrial Market Inventory (Year-End 2018)

	Warehouse		Flex		Total	
	RBA[1] # Square Feet	Vacancy %	RBA # Square Feet	Vacancy %	RBA # Square Feet	Vacancy %
Fort Collins/Loveland	14,167,607	3.6	5,966,976	15.0[1]	20,134,583	7.0
Outlying Larimer County	1,753,897	0.4	114,447	0.0	1,868,344	0.4
Weld County	21,561,910	2.0	2,416,531	5.8	23,978,441	2.4
Northern Colorado Total	37,483,414	2.5	8,497,954	12.2	45,981,368	4.3

[1] Rentable building area.

[2] The former Agilent/HP campus in Loveland (the Rocky Mountain Center for Innovation and Technology) comprises a significant share of the vacant space.

Sources: CoStar Group; Gruen Gruen + Associates.

Approximately 190,000 square feet of industrial building space is currently under construction in Fort Collins/Loveland market. In 2018, about 400,000 square feet of new industrial/flex space was delivered. Major industrial leases in 2018 included 63,000 square feet in Fort Collins for SCA Performance (an OEM light-duty truck manufacturer/wholesaler), 47,000 square feet for Rubadue Wire in Loveland, and 84,000 square feet for Toddy Coffee in Loveland. The latter two users are both located in the AIA and both have manufacturing operations. (Toddy Coffee was already located in a Centerra industrial building adjacent to the Airport and expanded into a larger space).

The AIA is located within the "South I-25/US 34" industrial space submarket. Table IV-5 summarizes current direct vacancy rates by submarket and the composition of the overall industrial space inventory.

Table IV-5: Industrial Vacancy Rates by Submarket (Year-End 2018)

	Percent of Total Industrial Market Inventory	Direct Vacancy Rate 2018
North I-25	16.7%	0.3%
North Fort Collins	22.5%	2.4%
South Fort Collins	4.2%	8.4%
Windsor	14.1%	0.1%
South I-25/US 34	20.3%	3.0%
North Loveland	4.7%	17.0%
South Loveland[1]	13.9%	24.6%

[1] Excluding the former Agilent/HP campus buildings, the vacancy rate is below 5.0 percent. This space is competitively obsolete for many modern warehousing and manufacturing operations.

Sources: CBRE Research, H2 2018; Gruen Gruen + Associates.

North Fort Collins, the South I-25/US 34, and North I-25 industrial submarkets contain about 60 percent of all existing space inventory. All three are very well-occupied with vacancies of 3.0 percent or less. The South I-25/US 34 submarket in Loveland and Johnstown is the preferred warehouse/distribution submarket within Northern Colorado while North Fort Collins has traditionally been a preferred location for manufacturing space and activity.

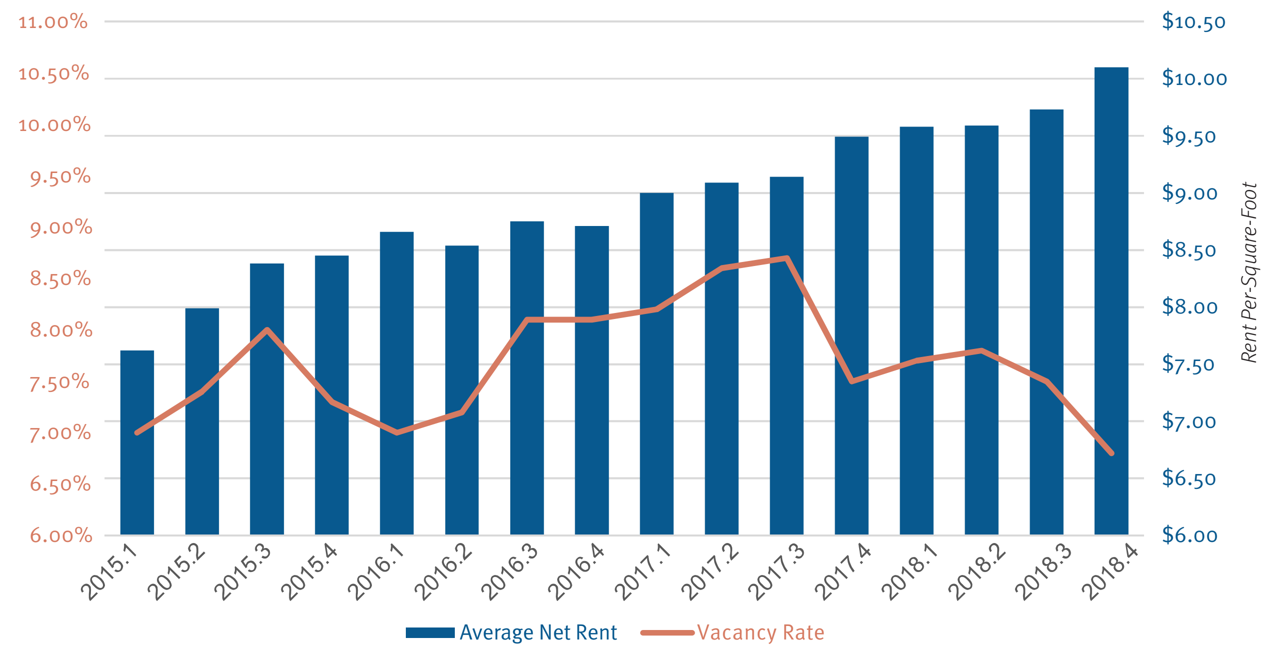
Historical Rental Rates and Vacancy Rates

Figure IV-3 summarizes average rental rate growth and vacancy rate changes in the Fort Collins/Loveland industrial market.

From early 2015 through year-end 2018, the average asking net industrial space rent is estimated to have increased by approximately 33 percent. Average net rents have grown from about $7.50 per square foot in early 2015 to above $10.00 per square foot as of year-end 2018. Industrial rent growth has been strong and consistent. The rental growth indicates that demand continues to exceed new supply. The industrial vacancy rate has declined from a peak of approximately 8.7 percent in third quarter 2017 to a current overall rate of approximately 7.0 percent.

Industrial space rents are high enough to support new industrial space development, while office space rents are too low to support speculative office space development. New industrial buildings have been recently developed in the market area and AIA that have commanded rents comparable to the current market rent average of approximately $10 per square foot. Prevailing industrial space rents are typically high enough to encourage and reward speculative development provided land is available with appropriate entitlements, infrastructure, and reasonable pricing.

Figure IV-3: Rents and Vacancy Rates in Fort Collins/Loveland Industrial Market



Sources: CoStar Group; Gruen Gruen + Associates.

Table IV-6 summarizes industrial building absorption and new construction patterns for Loveland and Fort Collins.

Table IV-6: Industrial Absorption and Construction Patterns[1]

	Past Year			5-Year Average (Annual)		
	Loveland	Fort Collins	Total	Loveland	Fort Collins	Total
Net Space Absorption	289,000	96,000	385,000	119,000	74,000	193,000
Total Leasing Activity	390,000	406,000	796,000	267,000	446,000	713,000
New Building Deliveries	307,000	102,000	409,000	168,000	112,000	280,000

[1] Figures expressed in square feet of rentable building space.

Sources: SVN Commercial Denver; Gruen Gruen + Associates.

SVN Commercial reports that the Loveland and Fort Collins industrial market has absorbed approximately 385,000 square feet of space within the past year. About three-quarters of this positive absorption occurred in Loveland. The five-year annual absorption average has been approximately 190,000 square feet of space. Locations within Loveland continue to absorb and deliver a greater amount of industrial space than Fort Collins.

FORECAST OF OFFICE AND INDUSTRIAL BUILDING SPACE AND LAND REQUIREMENTS IN THE AIA

Table IV-7 summarizes a 20-year projection of future office and industrial/flex building space demand and land requirements for the primary market area (Larimer County) and the AIA. The order-of-magnitude projection is developed from the secondary employment forecast by industry, reviewed previously (see Table III-3), which identifies how the composition of the local economy may continue to change. This provides the framework from which to estimate the amount of potential future office and industrial/flex building space and land demand within the market area. The employment forecast covering a period of 10 years is extrapolated to 20 years (i.e., forecast job growth is doubled).[6] Appendix A to this report provides further explanation of how future employment growth by industry sector is converted to estimates of future office and industrial/flex building space needs.

The future employment projection suggests that approximately 21 percent of future job growth in Larimer County is likely to utilize traditional private office space. Specialized medical support or institutional-type office space (e.g., government or educational users) are not specifically accounted for here. About 16 percent of the projected job growth in Larimer County is likely to utilize industrial and flex space. A total of 27,000 jobs occupying private office and industrial/flex uses could be added within Larimer County over the next 20 years.

Based upon an average employment density assumption for office space of one worker for every 225 square feet of space, the potential demand for office space is estimated to total approximately 3.5 million square feet over the next 20 years. This equates to average annual potential office space demand within Larimer County of 175,000 square feet. To put this into perspective, new office development activity in the primary market area is estimated to have averaged approximately 170,000 square feet per year over the past five years. Demand for industrial/flex space is estimated to total 7.5 million square feet through 2039 assuming 650 per square feet for every worker in industrial/flex space. This equates to average annual potential demand of 375,000 square feet. An average of approximately 300,000 square feet of industrial space is estimated to have been developed per year in Loveland and Fort Collins over the past five years. Strong job growth anticipated to continue in sectors such as Wholesale Trade, Construction trades, and Transportation and Warehousing could generate industrial building space and land needs slightly higher than supported by recent and historical average construction deliveries.

[7] The rate of long-term job growth is likely to slow as the market area grows larger over time so this may somewhat overstate future land needs. However, long range land use planning should always provide for more capacity than is anticipated to be needed – to ensure adequate land opportunities and avoid undue land price escalations resulting from scarcity.

Potential AIA Capture

Demand for and absorption of office and industrial/flex land in the AIA will not be linear. The potential "capture" of long-term market area demand within the AIA will also depend upon how well communities in the AIA, the Airport, and private property owners can coordinate with each other to agree upon what uses work best and where, and to ensure that the physical environment (such as having adequate roadway capacity and sufficient public utility infrastructure) is best positioned for office and industrial/flex space development opportunities. That is indeed one purpose for presenting an office and industrial land demand forecast: to demonstrate the potential scale of need and opportunity.

Table IV-7: Forecast Office and Industrial Building Space and Land Requirements (2019-2039)

	Office[1]	Industrial/Flex	Combined
Potential Countywide Employment Growth (Jobs)	15,444	11,560	27,004
Average Employment Density (Square Feet / Job)	225	650	
Countywide Building Space Demand in Square Feet	3,475,000	7,514,000	10,989,000
AIA Capture Rate	25-35%	30-40%	
AIA Building Space Demand in Square Feet	**869,000-1,216,000**	**2,254,000-3,006,000**	**3,123,000-4,222,000**
Average Floor-Area-Ratio[2]	0.35	0.30	
AIA Land Requirement in Acres	**57-80**	**172-230**	**229-310**

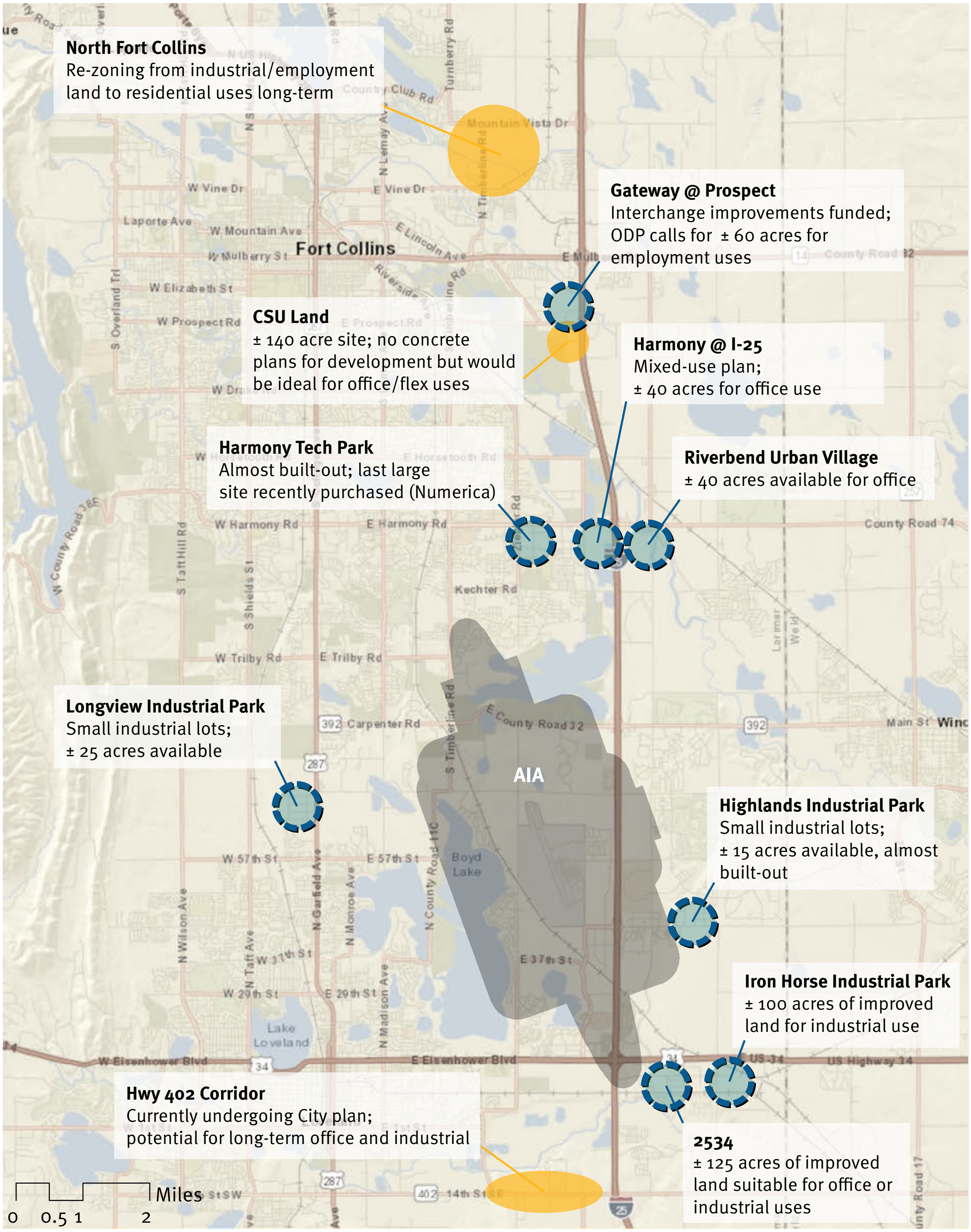
[1] Not including specialized healthcare/medical space or institutional (i.e. public) facilities.
[2] Ratio of gross floor area to gross land area. Assumptions reflect densities at which buildings are currently being developed in the AIA. If economic conditions change over time to encourage higher-density office space development, for example, less land would be required.

Source: Gruen Gruen + Associates

The share of long-term market area demand potentially captured within the AIA will also be a function of the alternative competing supply of land made available for office and industrial uses beyond the AIA. Figure IV-4 reviews existing and planned alternatives in the competitive market area. For purposes of future land use planning in the AIA, we assume that land within the AIA can likely capture 25 to 40 percent of long-term market area office and industrial space development needs. Properties specifically within the AIA boundary currently contain about 20 percent of all industrial building space and approximately nine percent of all office building space in Larimer County. The share of new construction occurring within the AIA over the past 18 years, for both uses, has exceeded 20 percent. These patterns can be expected to amplify in the future given the large undeveloped land inventory in the AIA, its competitive advantages reviewed previously including is ideal position at the "crossroads" of future growth in Northern Colorado, and especially for industrial uses, the increasingly scarce supply of developable industrial sites in highly accessible locations along Interstate 25.

Over 20 years, based on capture rates of 25 to 35 percent for office space and 30 to 40 percent for industrial space, potential building space demand in the AIA totals approximately 3.1 to 4.2 million square feet for office and industrial/flex uses. To convert estimates of building space demand into land requirements, we make assumptions about the floor-area ratios for office and industrial/flex space. Based upon our review of recent examples of development activity, we assume an average floor-area-ratio (ratio of gross floor area to gross land area) of 0.35 for office space, which is generally consistent with two- to -three-story office buildings. We apply an average floor-area-ratio of 0.30 for industrial/flex space. Land required to accommodate future office space demand in the AIA would approximate 60 to 80 acres at these densities, while land required to accommodate future industrial/flex space demand over 10 years would approximate 170 to 230 acres.

Figure IV-4: Land Supply Competition for Employment Uses Outside of AIA



V: HOTEL USES

This section reviews the existing and planned hotel inventory within the AIA and an assessment of the hotel market, including current market conditions and room night demand generators. This review is used to inform a long-term projection of potential hotel demand within the AIA.

EXISTING HOTEL ROOM INVENTORY

The cities of Loveland and Fort Collins are estimated to contain a total hotel room inventory of approximately 4,000 rooms. Limited service hotels (i.e., hotels that do not offer food and beverage service or significant amounts of on-site meeting/conference space) comprise most of the existing room inventory. The 263-room Embassy Suites Loveland Hotel Conference Center & Spa, the 229-room Fort Collins Marriot, and the recently completed 164-room Elizabeth Hotel in Downtown Fort Collins are the three primary full-service hotels.

Eleven hotels within the AIA, containing approximately 1,100 rooms, represent approximately one-quarter of the hotel supply in Loveland, Fort Collins, and Johnstown. Three recently opened properties in the AIA including a Courtyard by Marriot at the Promenade Shops of Centerra, a My Place Hotel east of I-25 along Crossroads Boulevard, and a Wingate by Wyndham in the 2534 development in Johnstown have added approximately 240 rooms to the local hotel supply within the past 18 months.

HOTEL MARKET CONDITIONS AND ROOM NIGHT DEMAND SOURCES

Table V-1 summarizes the two basic indicators of lodging demand (average daily rate and occupancy rate) for the Loveland and Fort Collins hotel market.

Table V-1: Loveland and Fort Collins Hotel Market Performance, 2017-2018

	Average Daily Rate $	Occupancy Rate %
Loveland:		
2017	115	68.0
2018	119	70.1
Fort Collins:		
2017	106	61.5
2018	114	57.5
Sources: BizWest, 2018 Economic Profile & Market Facts; Gruen Gruen + Associates.		

Annual occupancy rates in Loveland for 2017 and 2018 averaged approximately 70 percent, while annual occupancy in Fort Collins has been less robust at approximately 62 percent in 2017 and 58 percent in 2018. Average daily rates over the prior two years have remained relatively stable. As of 2018, the average daily room rate was $114 in Fort Collins and $119 in Loveland.

Interviews with representatives of hotel operators in the AIA suggest that business travel and general interstate travel on I-25 tend to be the primary generators of local room night demand. The leisure/tourism market is strongest in summer months which typically corresponds to higher hotel occupancy rates during peak season generally from May through September. The presence of the Ranch Events Complex and Budweiser Events

Center within the AIA is reported to be a strong, though secondary generator of hotel room night demands. The on-site Embassy Suites hotel accommodates much of the overnight travel needs that “spillover” from the events center and County fairgrounds. Aviation activities at the Northern Colorado Regional Airport do generate some room night demands within the AIA. Several local hotels have arrangements with the FBO to accommodate overnight travel needs of pilots and associated activities. General aviation activity at the Airport itself is not reported to be a major generate of hotel demand in the AIA.

Expanding business activity and continued population growth throughout Northern Colorado, in combination with a period following the Great Recession in which new hotel development was non-existent, have led to recent high levels of recent hotel development activity. Interviews suggest the addition of a significant amount of new limited service hotel development within the AIA and elsewhere in the competitive hotel market area (Fort Collins, Windsor, Loveland, and Johnstown) has generally kept room rates “in check.” According to BizWest’s 2018 Economic Profile & Market Facts publication, for example, “the hospitality industry in Northern Colorado and Boulder isn’t as hot as it once was, according to one of the developers of multiple hotels in the region, but it remains a good value if the opportunity is right.”

OVERALL HOTEL REVENUE PERFORMANCE

Table V-2 summarizes an estimate of annual room revenues in Loveland and Fort Collins in relation to on-the-ground hotel supply. Both communities impose lodging bed taxes; the gross room revenue estimates are derived from Comprehensive Annual Financial Reports available from each city.

Table V-2: Loveland and Fort Collins Hotel Revenue Performance

Year	Gross Room Revenue[1] $	Estimated Hotel Inventory # Rooms	RevPAR[2] $
2008	55,500,000	2,808	54
2012	79,100,000	3,282	66
2017	95,400,000	3,668	71
Change	39,800,000	860	17

[1] Adjusted for inflation to current 2019 dollars.
[2] Daily gross revenue per available room.

Sources: City of Loveland; City of Fort Collins; Larimer County Assessor; Gruen Gruen + Associates.

Total annual gross room revenue in Loveland and Fort Collins is estimated to have increased in real terms from approximately $56 million in 2008 to over $95 million in 2017, representing 40 percent growth over the 10-year period. The inventory of hotel rooms in the two cities is estimated to have grown by nearly 900 rooms over that same period. Average daily revenue per available room (“RevPAR”) grew from approximately $54 in 2008 to $71 by 2017. This is one indication that the new hotel inventory added over the past 10 years has primarily captured new room night demand (as opposed to merely siphoning demand/sales from the existing hotel supply). The overall RevPAR estimate for 2017 of approximately $71 is commensurate with an average daily rate of about $100 at a 70 percent annual occupancy rate. New hotels will typically require higher rates and/or occupancy than this market average to be feasibly developed.

FUTURE HOTEL SUPPLY

The future hotel supply pipeline is likely to satisfy most if not all near-term demand within the competitive market area and AIA. Examples of projects in the development or planning process include:

- TownPlace Suites consisting of 102 rooms under construction in Downtown Loveland in the Foundry mixed-used development;
- Staybridge Suites of 107 rooms under construction on Lincoln Avenue in Fort Collins;
- Homewood Suites and Hilton Garden Inn, consisting of approximately 200 additional rooms, planned for additional development in the Promenade Shops at Centerra;
- A dual-branded Staybridge Suites and Avita hotel, totaling 190 rooms, planned for development in the 2534 business park in Johnstown;
- Woodspring Suites extended stay hotel of 123 rooms planned for I-25 and Mulberry; and
- Brands East and West, with approximately 200 full-service and 200 limited-service hotel rooms planned for east and west of I-25 within the AIA.

Interviews suggest that some of these planned hotel developments have been pushed back as the market still needs to grow to absorb recently built inventory. Additionally, previously proposed projects such as the PeliGrande Resort and Windsor Conference Center (near the AIA) could add additional long-term lodging capacity.

HOTEL DEMAND FORECAST

Hotel demand in the AIA and the competitive market area is primarily driven by business travel and proximity to interstate highway traffic. Historical changes in hotel demand can be partially explained by growth in primary (office and industrial) employment. We use the forecast of office and industrial employment for the AIA to estimate the potential long-term growth in hotel demand. Assuming a relationship equating to about $1,500 in annual room revenue per additional primary job[7], consistent with past trends, we estimate the total potential demand growth. To estimate the total number of potential new hotel rooms supported, we then apply a rule-of-thumb RevPAR benchmark for new hotel development to be feasible. Table V-3 summarizes these calculations and the projection of potential hotel demand.

Table V-3: Long-Term Hotel Demand Projection for AIA

	20-Year Total
Projected Office & Industrial Employment Growth (Jobs) in AIA[1]	10,000
Additional Annual Hotel Room Revenue Per Job	$1,500
Total Additional Room Revenue	$15,000,000
RevPAR Required for Feasible New Hotel Development [2]	$90.00
Additional Hotel Demand (# Rooms)	**457**
[1] See Table IV-7. The office and industrial space demand projection for the AIA (on the high-end) would equate to approximately 10,000 additional jobs over the next 20 years. [2] For limited-service hotel development. A full-service hotel product would require a higher amount of revenue per room to be feasibly developed.	
Source: Gruen Gruen + Associates	

[8] Larimer County contained approximately 50,000 jobs in primary sectors (natural resources, manufacturing, wholesale trade and transportation, information, financial services, and professional and business services) in 2008, and approximately 65,000 jobs as of 2018. Total gross hotel room revenues in Loveland and Fort Collins are estimated to have equated to approximately $1,100 to $1,500 per primary job.

The demand projection over 20 years totals approximately 460 new hotel rooms. This estimate reflects total additional room revenue forecast to be about $15 million, divided by $32,850 of annual revenue per room ($90 RevPAR multiplied by 365 days/year) required to feasibly deliver new limited service hotel product.

The quantitative projection is not a precise tool, but its results lend to a basic comparison between likely future demand and supply. Three projects within the AIA have already publicized plans or proposals to develop approximately 800 additional hotel rooms – within Centerra, 2534, and The Brands.

With respect to planning for future hospitality land uses in the AIA, the primary implication is that already entitled and proposed projects should be more than adequate to meet overnight lodging needs from a wide variety of demand sources for both the foreseeable and long-term future. Significant major hotel developments in other areas of the AIA should not be anticipated or planned for absent the development of specific venues or uses expected to attract significant visitation. The projection indicates that some future hotel developments will likely depend on increased room night demand from business travel sources outside of the AIA and other sources – whether that be commercial airline enplanements or increased non-local visitation to the Budweiser Events Center or County Fairgrounds, and so forth.

VI: RESIDENTIAL LAND USES

This section reviews household trends, housing market conditions, and potential future housing needs to provide perspective about residential development pressures that are likely to continue within the AIA. Analysis presented in this section also provides a long-term market-based estimate of residential land needs that could be captured within the AIA. Observations about residential land use compatibility are also summarized first.

RESIDENTIAL LAND USE COMPATIBILITY OBSERVATIONS

Observations developed based on field research and interviews conducted by GG+A and our review of relevant materials (e.g. existing Airport noise contours and existing overlay zoning policies) include the following:

- Proximity to the Airport has generally been a "neutral" factor with respect to the absorption of residential units within or near the AIA. Sales and leasing representatives at recently built and active residential projects indicate that questions and/or complaints related to the Airport and associated noise or nuisances from homebuyers or renters are virtually non-existent;
- The desirability of locations within the AIA for housing is high, partially for the same reasons that appeal and provide advantages to nonresidential land uses (such as accessibility to Interstate 25 and centrality within the region);
- Active single-family residential developments with available lots on the north side of Fossil Creek Reservoir reportedly have no avigation easements, waivers, or noise-mitigation construction measures. Home buyers are generally unaware that properties are located in an area considered be influenced by the Airport;
- Other non-airport land uses/activities within the AIA have the potential to generate negative impacts to residential uses. A representative of the largest existing multi-family apartment development within the AIA, for example, indicated that the helipad at the UCHealth hospital is perceived to be a more frequent (albeit still minimal) source of complaint and nuisance to tenants; and
- The Federal significance threshold for aircraft noise exposure (the 65 DNL) is entirely contained within the bounds of Airport property ownership. Anecdotal feedback from our field research indicates that the current level of flight activity at the Airport (and the type of aircraft using the Airport) are not necessarily incompatible with existing locations of residential development in the AIA.

Land use compatibility regulations and policies should be proactive in protecting against future conflicts with residential or other noise-sensitive uses. This primarily relates to potential longer-term development of commercial air service at the Airport and public (residential property owner) opposition that could arise if residential land uses of any significant scale develop closer in proximity to Airport Critical Zones and the 65 DNL.

Land use compatibility measures also need to reflect the recognition that restricting or limiting all future residential development within the AIA may have unintended or even counter-productive consequences including a negative impact for long-term economic development. As reviewed previously and further below, Northern Colorado is anticipated to experience continued strong growth and is already experiencing challenges associated with inadequate housing availability and burdensome price increases that reduce housing affordability (which in turn, limit or constrain the long-term prospects for positive economic growth and development).

RESIDENTIAL DEVELOPMENT CONTEXT

Secondary projections from DOLA indicate that Larimer County is anticipated to grow by more than 130,000 people over the next 20 years. Future growth is expected to slow somewhat relative to historical trends, though population is still forecast to expand at a moderate rate of about 1.5 percent annually.

The communities of Loveland and Fort Collins are anticipating similar levels of future population and housing growth. The recently completed Fort Collins Comprehensive Plan ("City Plan") update is based on expectations that the residential population will grow to nearly 240,000 people by 2040, resulting in a need for more than 30,000 new housing units over the period to accommodate that growth. The Community and Strategic Planning division of the City of Loveland expects that its housing stock inventory will need to grow by approximately 12,000 units between 2020 and 2040 to accommodate future population growth.[8]

A combination of declining residential land supply in the core/central areas of Fort Collins and Loveland and robust population and job growth have resulted in residential development shifts toward the periphery of each community. These patterns can be expected to continue and will probably intensify. Prior to 2000, for example, the entire 10,000-acre AIA contained fewer than 600 housing units which represented an infinitesimal fraction (± 0.5%) of the regional housing stock available at the time. The AIA however has accounted for a much higher share - approximately four percent - of all residential building space constructed in Larimer County since 2000.

HOUSING UNIT ABSORPTION AND PERMIT TRENDS

Table VI-1 summarizes how the inventory of occupied housing units is estimated to have changed since 2000. The change in occupied units, by type of unit and location, in Larimer County provides an indication of residential demand and absorption patterns.

Table VI-1: Larimer County Housing Unit Absorption Patterns, 2000-2017

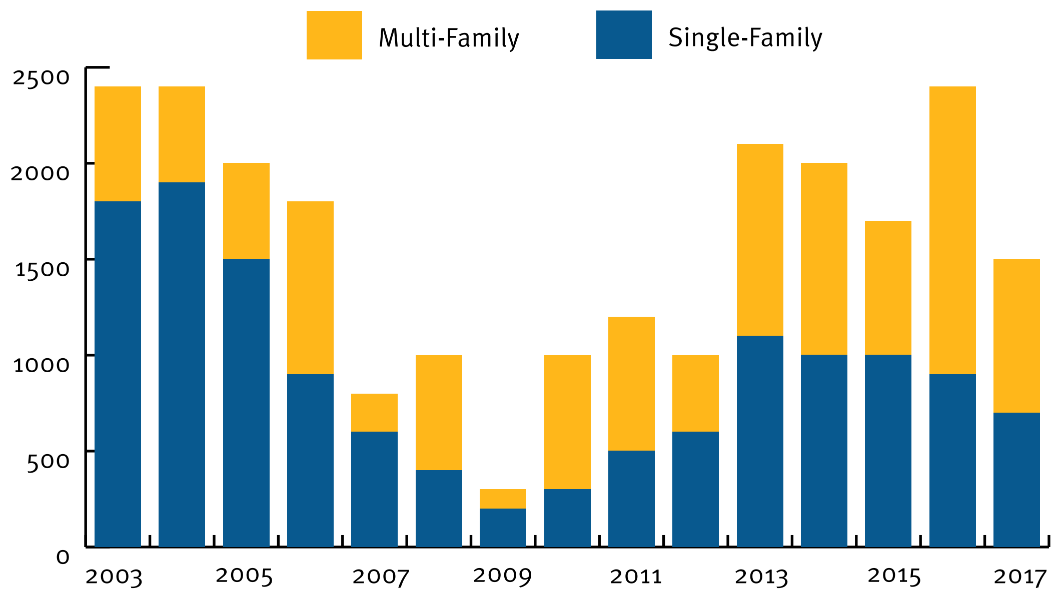
	Change in Occupied Housing Units, 2000-2017			
	Fort Collins #	Loveland #	Other #	County Total #
Owner-Occupied:				
Single-Family Detached	5,615	8,092	10,336	24,043
Single-Family Attached	(201)	670	150	619
Multi-Family	429	(55)	(118)	256
Other[1]	220	(157)	(1,075)	(1,012)
Subtotal	6,063	8,550	9,293	23,906
Renter-Occupied:				
Single-Family Detached	3,530	783	(889)	3,424
Single-Family Attached	904	878	(103)	1,679
Multi-Family	4,083	3,180	1,145	8,408
Other[1]	(32)	265	(105)	128
Subtotal	8,485	5,106	48	13,639
[1] Primarily includes mobile/manufactured homes.				
Sources: U.S. Census Bureau; Gruen Gruen + Associates.				

[9] See: http://www.cityofloveland.org/home/showdocument?id=44674

Detached single-family housing units represent approximately 68 percent of the City of Loveland housing stock and 58 percent of the City of Fort Collins housing stock. The existing housing inventory within the AIA is comprised by a comparable share (roughly 60 percent) of detached single-family units. Historically, between 2000 and 2017, detached single-family units represented about 71 percent of all housing absorbed in Loveland and Fort Collins. Larimer County is estimated to have absorbed approximately 2,200 additional housing units annually between 2000 and 2017, approximately 80 percent of which occurred in Loveland and Fort Collins. Larimer County is estimated to have absorbed nearly 38,000 additional housing units since 2000.

Figure VI-1 summarizes residential permit trends within Fort Collins and Loveland for the 15-year period between 2003 and 2017.

Figure VI-1: Residential Permit Trends in Fort Collins and Loveland



Trends in residential development activity in Loveland and Fort Collins have fluctuated widely over the past 15 years. Nearly 2,300 total residential permits were issued in the two communities in 2003 and 2004 during the peak of the prior housing market boom, while permit levels declined to fewer than 300 collective units in 2009 during the height of the Great Recession. Particularly over the past five years, residential development activity has picked up considerably. Permit levels in the two communities returned to their prior pre-recession peak by 2016. Approximately 5,000 single-family units and 5,000 multi-family units were permitted in the five-year period from 2013 through 2017.

All indications point to similar levels of residential development occurring in the Fort Collins/Loveland market area for the foreseeable near future - meaning, somewhere between 1,500 to 2,500 new housing units per year to simply keep pace with new demand.

RESIDENTIAL MARKET CONDITIONS

Multi-Family Uses

The Fort Collins/Loveland multi-family apartment market is characterized by very low vacancy rates, strong rental rate growth over the past five years, and a significant amount of new development activity. Average monthly rents in the Fort Collins/Loveland apartment market increased by $0.34-per-square-foot or 28 percent over the past five years.

Table VI-2 summarizes current and past apartment market conditions for the Fort Collins/Loveland market area by unit type.

Table VI-2: Fort Collins/Loveland Apartment Market Conditions

	2013 (3rd Quarter)	2018 (3rd Quarter)
Average Monthly Rent (Per Square Foot):		
Efficiency	$1.70	$2.63
1 Bedroom	$1.30	$1.75
2 Bedroom / 1 Bathroom	$1.12	$1.49
2 Bedroom / 2 Bathroom	$1.15	$1.37
Three Bedroom	$1.13	$1.43
All	$1.21	$1.55
Vacancy Rates:		
Efficiency	0.0	0.0
1 Bedroom	2.7	2.9
2 Bedroom / 1 Bathroom	1.8	3.0
2 Bedroom / 2 Bathroom	4.7	3.2
Three Bedroom	3.1	1.9
All	2.8	2.8
Sources: Colorado Department of Local Affairs, Statewide Vacancy and Rent Surveys; Gruen Gruen + Associates.		

As of the third quarter of 2018, the overall physical apartment vacancy rate was 2.8 percent – unchanged from the prior five years. The stable and extremely low vacancy rates indicate that new construction has been absorbed quickly and that multi-family supply additions have captured new (rather than existing) housing demands. Average rental rate growth has been particularly strong over the past three years. Average monthly rents for small units especially have escalated quickly. Rents for studio (efficiency) and one-bedroom apartment units have grown at annual rates of nine and six percent, respectively, over the past five years. The current market for multi-family rental units within and near the AIA is equally strong. Two properties we interviewed (the Lake Vista Apartments in the AIA, and the Gateway at 2534 apartments, bordering the AIA) report high occupancy rates of 96 and 97 percent.

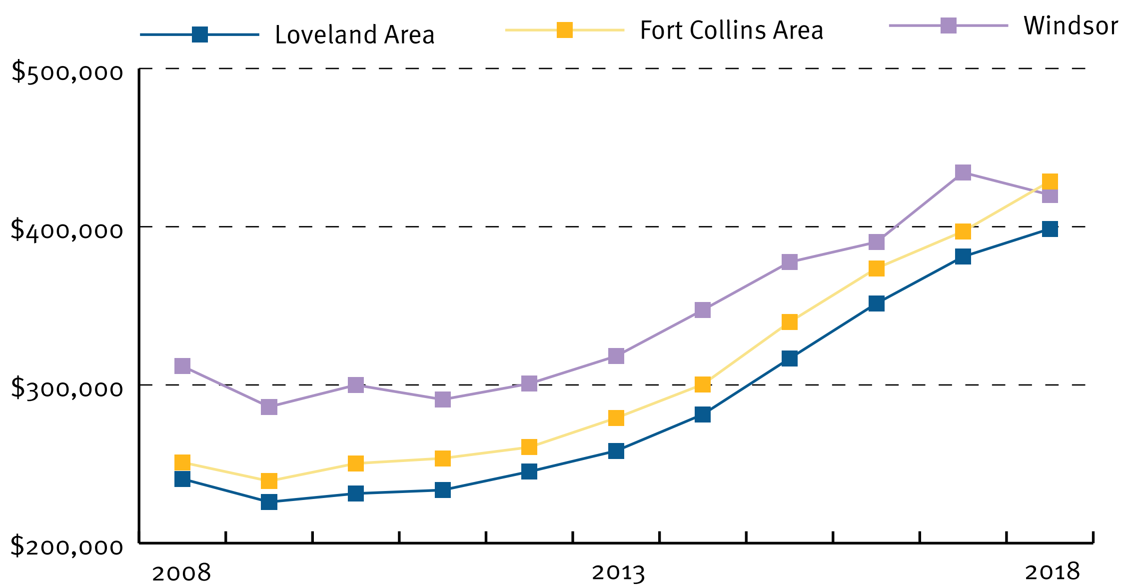
The pipeline of new apartment supply both locally and regionally may put some downward pressure on rent growth and ultimately provide greater choice and flexibility in mobility among renters. McWhinney recently broke ground on a 420-unit apartment development within the AIA, adjacent to the Promenade Shops at

Centerra. Another multi-family project bordering the AIA, Rise at 2534, is under construction with 236 units. Several additional projects are planned or proposed within or near the AIA, including the 368-unit Tanima Peak Apartments currently under review by the City of Loveland. The Brands PUD on the east side of Interstate 25 also includes approvals to develop up to 580 market-rate apartment units.

Single-Family Uses

The local and regional housing markets have experienced rapid change amid recovery from the 2008-2010 Great Recession and the housing market crash and foreclosure crisis that preceded it. New housing production, especially for owner occupied single-family uses over the past five years, has not kept pace with new household formation (demand). Housing vacancy and availability rates have declined, which in turn has resulted in high cost increases for existing inventory. Average single-family home resale prices in the Fort Collins and Loveland areas increased by approximately 54 percent between 2013 and 2018.

Figure VI-2: Single-Family Housing Price Escalation

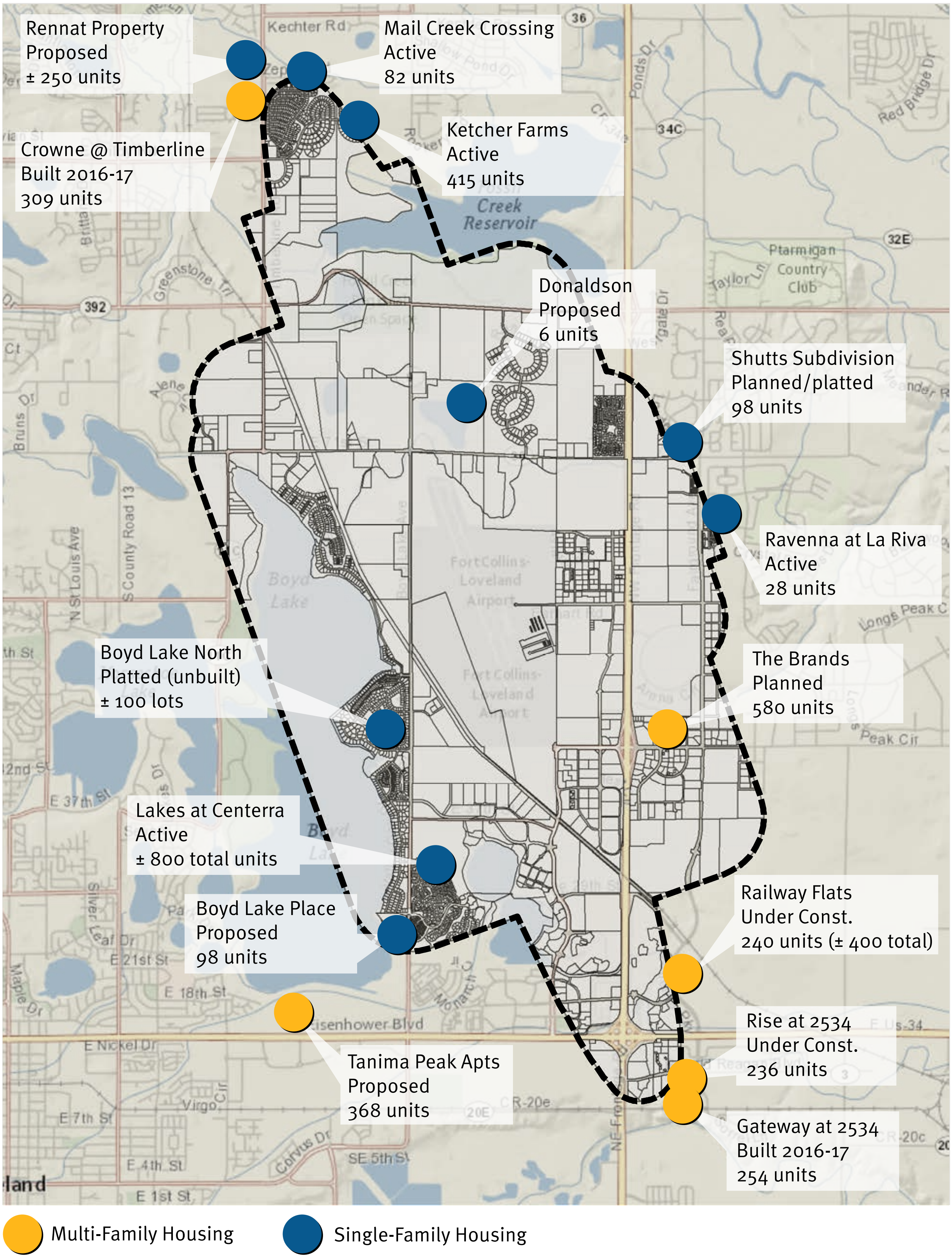


Source: The Group, Inc., Annual Market Reports

For-sale housing affordability has deteriorated rapidly over the past five years. The National Association of Home Builder's Housing Opportunity Index (HOI) for Larimer County declined from 86.1 in the first quarter of 2013 to 42.0 by the fourth quarter of 2018. The index measures the percentage of homes sold that would have been affordable to a family earning the local median income, based on standard mortgage underwriting criteria. As single-family housing affordability becomes more of a constraint, future development activities for this residential product type will largely depend on the price points at which market-responsive units can be produced within the Loveland and Fort Collins market area, including within the AIA.

Active single-family developments on the north end of the AIA around the Fossil Creek Reservoir such as Mail Creek Crossing and Kechter Farms are predominately supplying and selling single-family homes in the $500,000 to $750,000 price range; well above prices for resale inventory. Buyers of estate-type lots in these projects, with homes built to price points up to approximately $1 million, have reportedly not been concerned with proximity to the Airport (open spaces and natural areas around Fossil Creek Reservoir do provide a large

Figure VI-3: Residential Development Activity in and near the AIA



natural amenity that buffers from the Airport environs). New construction homes being developed in the Lakes at Centerra development closer to the Airport are more modestly priced, though many are still in the $400,000 to $600,000 price bracket. Empty-nester households and other older-age buyers "trading down" in home size are reported to be two primary sources of demand for all of these single-family developments. The market area and Northern Colorado more broadly are projected to age rapidly over the next 20 years. These trends are already evidencing themselves in the new single-family housing product being offered. Interestingly, multiple brokers also indicated that an increasing number of households from the Boulder/Denver area have considered or purchased single-family units in these subdivisions in the AIA, and either work remotely or commute a few days each week back to Denver. This points to the still "relative" affordability of new single-family housing product in the Fort Collins/Loveland market.

LONG-TERM HOUSING DEMAND PROJECTION

Secondary household projections available from DOLA for Larimer County are utilized to estimate future housing demands within the region and to quantify the scale of potential residential demands and development pressures that may continue within and near the AIA. The historical share of residential development activity captured within the AIA, from 2000 through 2018, provides a basis to approximate the share of future demand potentially captured (provided that adequate residential land is made available).

Table VI-3 summarizes projected future household growth in Larimer County over a 20-year period from 2019 to 2039.

Table VI-3: Projected Household Growth in Larimer County, 2019-2039

	2019	2029	2039	20-Year Change	
	#	#	#	#	AAGR[1]
Single-Person Households	37,309	46,111	53,280	15,971	1.8%
2+ Person Households, No Children	61,337	74,496	86,002	24,665	1.7%
2+ Person Households, With Children	44,066	50,794	57,818	13,752	1.4%
Total	142,712	171,401	197,100	54,388	1.6%

[1] Average annual growth rate.

Sources: DOLA; Gruen Gruen + Associates.

Single-person households are projected to grow by approximately 16,000 over the next 20 years at an average annual rate of 1.8 percent. Households including two or more persons, but no children, are projected to grow by approximately 25,000 households at an annual rate of 1.7 percent. Growth in family households with children are anticipated to account for a still meaningful, albeit smaller share, of additional households over the next 20 years. Households with two or more persons including children are projected to grow at an annual rate of 1.4 percent and will expand by about 14,000 households by 2039.

Table VI-4 presents a 20-year projection of possible residential land use demand in the AIA. The order-of-magnitude estimates incorporate a five percent frictional vacancy factor (to provide for adequate mobility in the housing market) and further assume that the composition of housing preferred by size/type of household does not deviate considerably from existing patterns.[9]

[9] For example: approximately 55 percent of single-person households in Larimer County are estimated to currently occupy an attached or detached single-family unit. This is not assumed to change in the projection of additional units needed.

Table VI-4: Projection of Potential Residential Land Demand in AIA[1]

	Single-Family[2] #	Multi-Family #	Total #
20-Year Countywide Household Growth	37,700	16,600	54,400
Plus: Frictional Vacancy @ ± 5%	2,000	900	2,900
20-Year Countywide Housing Unit Demand	39,700	17,500	57,300
AIA Capture Rate	5-7%	8-10%	
20-Year AIA Housing Unit Demand	**1,986-2,781**	**1,402-1,753**	**3,388-4,533**
Average Housing Density in Dwelling Units/Acre [3]	6 du/ac	24 du/ac	
Potential AIA Residential Land Demand in Acres	**331-464**	**58-73**	**390-537**

[1] Figures are rounded.
[2] Includes detached and attached units (e.g., townhomes, patio homes).
[3] Average density assumptions are consistent with active and planned residential development in the AIA. The Millenium (Centerra) General Development Plan, for example, restricts "overall" residential density to a maximum of six units per gross acre, while certain sub-areas are permitted for multi-family residential with densities of up to 30 units per acre. Built and proposed apartment developments in or near the AIA have densities generally ranging from 20 to 30 units per acre.

Sources: U.S. Census Bureau; DOLA; Gruen Gruen + Associates.

Existing and historical patterns of residential development activity and consideration of current market conditions suggest it is likely that about five to ten percent of regional housing need will materialize as future demand within the AIA. This would equate to approximately 2,000 to 2,800 additional single-family detached and attached units over the next 20 years. Applying a slightly higher capture rate to multi-family uses indicates that potential demand within the AIA could total 1,400 to 1,800 multi-family units over the next 20 years. The projections equate to more than doubling the existing inventory of housing units within the AIA.

The potential housing demand in the AIA over the next 20 years likely equates to a need for approximately 390 to 540 acres of gross land area allocated to residential uses. Assessor records indicate that about 280 acres of residential land (currently undeveloped land, both platted and unplatted) already exists within the AIA outside of the Airport Critical Zones, primarily including the next phase of the Lakes at Centerra residential development. This undeveloped land is mostly planned for single-family uses. There are 390 platted but unbuilt single-family lots within the AIA.

Two multi-family developments on the east side of Interstate 25 could also effectively meet most of the projected 20-year demand for multi-family units summarized above in Table VI-4. The Brands at the Ranch has entitlements to build up to 580 multi-family units. The Railway Flats project in Centerra recently broke ground with plans to provide up to 420 units in two phases. These two projects alone have capacity to add 1,000 additional multi-family units in locations that will not interfere or conflict with Airport operations. However, market support in the long-term for additional multi-family uses will likely arise.

Additional "agricultural" parcels within the Millenium GDP (i.e., Centerra) also provide an additional 200 acres of vacant land that has already been approved through PUD agreement with residential development permitted as-of-right.

Appendix A: Office and Industrial Forecast Methodology

ESTIMATING FUTURE EMPLOYMENT GROWTH BY TYPE OF SPACE

The need to provide efficient work space generates demand for building space. We use the employment forecast to project space demands by employment using GG+A's Spacewalk™ model. GG+A's Spacewalk™ model converts employment growth by economic sector into an estimate of relevant demand for different kinds of space. Firms within a specific economic sector do not use the same type of space for all their workers. Therefore, the GG+A Spacewalk™ model assigns employment within various economic sectors to occupational categories which correspond to the types of space most likely to be used. For example, while most manufacturing firms primarily demand industrial space, managers of manufacturing companies also use office space where products are typically stored in warehouse/distribution space. The amount of space primarily depends upon the number of added workers and the associated employment densities (number of square feet of space per employee).

A basic input into the model is an estimate of the percentage and amount of space the employees of a specific type of firm utilize. These basic inputs are based on the percentage of the employees that are in various kinds of occupations. That is, it is necessary to estimate the occupational makeup of an industry in order to tie employment to space. We made this estimate from a synthesis of our interviews, prior GG+A research and data drawn from the United States Department of Labor, Bureau of Labor Statistics. We made estimates concerning the type of space used by employees of differing occupational makeups within the economic sectors and employment densities for office, industrial, and warehouse and distribution space. We used GG+A's Spacewalk model to carry out a series of calculations needed to relate employment densities by occupation within economic sectors to employment forecasts to produce estimates of office and industrial building space demand.

EMPLOYMENT DENSITY CHARACTERISTICS

GG+A reviewed a sample of existing office and industrial properties, and their occupants, within the primary market area to develop density-related benchmarks necessary to estimate the effects of employment growth on land and building space requirements. As noted, we have assumed an average office space density of 225 square feet of space per worker and an average industrial/flex space density of 650 square feet per worker. These employment density estimates are subject to some degree of change over time (such as related to automation or improved remote working capabilities for office workers), as well as variations that may relate to specific businesses or buildings. However, they provide the best approximation of current worker-to-space relationships that can be readily quantified. Relevant examples within the market area and AIA are provided below:

	Use	Building Space # Square Feet	Workers #	Density # Square Feet per Worker
Rubadue Wire	Industrial	47,500	75	630
Nordson Medical	Industrial	115,000	120	960
Madwire	Office	102,000	700; 1,200 (planned)	150 (85)
Agrium	Office	120,000	400	300
Woodward	Campus	360,000	1,600	230
Toddy Coffee	Industrial	42,000	45	930
Leed Fabrication	Industrial	22,000	50	440
High Country Beverage	Industrial	130,000	130	1,000

Appendix B: DuPage National Technology Park Example

DuPage National Airport, West Chicago, Illinois

The DuPage Airport Authority ("DAA") owns over 800 acres of non-aviation property south of the Prairie Landing Golf Club and airfield. The property continues to build-out today as the DuPage Business Center ("DBC"). The DBC provides land and facilities for non-aviation industrial businesses. The largest tenants include Continuum, Simpson Strong Tie, DS Containers, Suncast, and Norix.

The DBC land was originally conceived and developed as the *DuPage National Technology Park*. The land (situated between the airport and the Fermi National Accelerator Laboratory) was initially acquired by the DAA to avoid residential land use conflicts with its landing and takeoff routes. Initial development of the *DuPage National Technology Park* was also funded by a $34 million grant from the State of Illinois.

The park was designed with infrastructure to accommodate technology-based companies in an environmentally serene atmosphere. The road system was designed in a manner to accommodate higher level development with robust minimum building design standards and significant amounts of landscaping. In addition, a network of fiber optic cable was installed that provided potential technology-based users with significant band width. An underlying premise of the technology park concept also related to collaboration and technology transfer between Northern Illinois University and nearby federal laboratories including Fermilab in Batavia and Argonne National Laboratory near Lemont. Northern Illinois University had proposed to build a cancer treatment center (built around a proton beam treatment device) that was ultimately never developed at the park.

The DAA entered into an exclusive Development and Lease Agreement with CenterPoint Properties Trust to complete "vertical" development of the technology park. The deal was executed in September 2005 and continued through September 2017. Land leases were the only deal structures permitted, with the lease rate based on appraisals that are mandated by Federal Aviation Administration regulations to achieve fair market value. Two developments occurred under this structure—Pella Windows in 2006, and a data center the following year. Unfortunately, the recession of 2008 caused demand to erode significantly and there was an extended period of time in which no new developments were realized.

Subsequent to the 2008-2010 recession, a number of key steps were taken by the DAA to market the park to a broader spectrum of users and to relax the business terms in ways that promoted the development:

- First, the DAA made the decision that it would permit the fee-simple sale of land and undertook the process of seeking formal approval from the FAA to do so. This approval was received in 2011 and the DAA sold several parcels to CenterPoint;

- Second, it was determined that marketing only to technology-based companies was imposing too narrow of a market on CenterPoint. The types of developments the DAA would consider for the park was broadened to include light manufacturing and distribution. The park signage and branding was also changed from DuPage National Technology Park to DuPage Business Center;

- Third, the minimum design standards were relaxed to reduce the costs of developing in the DBC; and

- Finally, the overall agreement with CenterPoint was restated to include significant concessions by the DAA in order to give CenterPoint more resources to devote to marketing and developing the DBC.

Gruen Gruen + Associates (GG+A) is a firm of economists, sociologists, statisticians and market, financial and fiscal analysts. Developers, public agencies, attorneys and others involved in real estate asset management utilize GG+A research and consulting to make and implement investment, marketing, product, pricing and legal support decisions. The firm's staff has extensive experience and special training in the use of demographic analysis, survey research, econometrics, psychometrics and financial analysis to describe and forecast markets for a wide variety of real estate projects and economic activities.

Since its founding in 1970, GG+A has pioneered the integration of behavioral research and econometric analysis to provide a sound foundation for successful land use policy and economic development actions. GG+A has also pioneered the use of economic, social and fiscal impact analysis. GG+A impact studies accurately and comprehensively portray the effects of public and private real estate developments, land use plans, regulations, annexations and assessments on the affected treasuries, taxpayers, consumers, other residents and property owners.

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APPENDIX C:

PASSENGER DEMAND ANALYSIS

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NORTHERN COLORADO REGIONAL AIRPORT

PASSENGER DEMAND ANALYSIS

YEAR ENDED
MARCH 31, 2018

Mead & Hunt

TABLE OF CONTENTS

SECTION 1. INTRODUCTION

The constantly changing air transportation needs of communities and the dynamics of the airline industry create an on-going challenge for small and mid-sized communities in the United States. Today, communities are faced with intense competition for air service as the industry continues to maintain capacity discipline. Following September 11, 2001, airlines, struggling to remain in business, reduced capacity nationwide and focused on the performance of the high density markets. Small and mid-sized communities experienced dramatic reductions in service; while, at the same time, airlines began phasing lower capacity aircraft out of their fleets. Now, these challenges have been further compounded by industry consolidation and rising fuel prices, making service reinstatement in markets like Fort Collins even more challenging.

This *Passenger Demand Analysis* report is an effort to understand and evaluate Northern Colorado Regional Airport's (FNL) air service market, to facilitate actions for reinstatement of commercial air service. To that end, this report provides objective, comparative data compiled from industry sources on the FNL air service market. It reviews historical performance of FNL's previous commercial air service and provides an estimate of the total market demand today. This outlook is useful in assuring that long lead-time airport infrastructure needs are attuned to air service and market demand needs. Airlines take many factors into consideration when making capacity and route decisions, and it is the intent of this report to provide insight into several of those market considerations. This report reviews scheduled commercial air service potential and does not include information on general aviation activity. Finally, the report provides support for passenger enplanement and peak hour forecasts in the Airport Master Plan.

SECTION 2. EXECUTIVE SUMMARY

SOURCE DATA

Data used in the *Passenger Demand Analysis* is sourced from Diio Mi (origin and destination and schedule data) and Airline Reporting Corporation (ARC) ticketed data for the year-ended March 31, 2018. The true market estimate includes 58,554 ARC tickets from the FNL catchment area.

INDUSTRY TRENDS

Industry trends that have impacted or will impact reinstatement of FNL commercial air service include airline frequency and capacity changes; airline profitability; bankruptcies, mergers and acquisitions; fleet changes; the fluctuating price of fuel; the pilot shortage; and low-cost carrier competition. Trends that are beneficial to FNL's efforts include airline profitability being at an all-time high and low-cost carrier competition. However, trends such as the pilot shortage and the increasing cost of fuel may be a barrier to FNL's air service development efforts.

HISTORICAL SCHEDULED AIR SERVICE

From 2003 to 2012, Allegiant Air provided scheduled commercial air service to FNL. Service was provided on a less-than-daily basis to Las Vegas during that time period. Allegiant also provided service to Phoenix-Mesa from 2010 to 2012. After two years of no scheduled service, Elite Airways entered the market with service to Chicago Rockford International Airport. Elite provided service from 2015 to 2016.

The load factor on Allegiant's service to Las Vegas improved over time, exceeding 90 percent on an annual basis for the first time in 2008. Loads continued to be strong through 2012. The Phoenix-Mesa service had strong load factor performance, averaging 92 to 93 percent. Elite Airways' available data is limited. The load factor data that is available shows low loads for the service in 2016, averaging 57 percent.

On a revenue per available seat mile (RASM) basis, the FNL service performed well for Allegiant for the year ended June 30, 2012, having improved in both markets year-over-year. RASM information is not available for the Elite service.

TRUE MARKET ESTIMATE

The FNL catchment area has an estimated 2018 population of 685,693 in 32 zip codes. The catchment area contains the population of travelers who should use FNL considering the drive time from the catchment area to competing airports.

FNL's true market is estimated at 2,333,783 annual origin and destination passengers. Domestic travelers accounted for 93 percent of the total true market. International travelers made up the remaining 7 percent of passengers. All FNL catchment area travelers used Denver International Airport (DEN).

Fifty-eight percent of travelers, or 1,269,963 passengers, were destined to or from one of the top 25 markets. Phoenix-Sky Harbor was the number one destination. The next largest markets were Los Angeles, Seattle, San Francisco and Las Vegas, with each of the top five markets having more than 100 passengers daily each way (PDEW). Cancun, Mexico, London-Heathrow, UK, and Puerto Vallarta, Mexico, made up the top three international destinations.

Twenty-seven percent of travelers were destined to the West region, followed by the Southeast region with 15 percent. The Great Lakes region, East region and Southwest region had 13, 11 and 11 percent shares, respectively, of the total true market. Of the international travelers, the top three international regions were Mexico and Central America, Europe, and Asia.

The airline share of passengers using DEN was estimated using an approximation of carrier share with ARC data. Carrier shares were: United Airlines 37 percent, Southwest Airlines 24 percent, American Airlines 13 percent, Delta Air Lines 10 percent, Frontier Airlines 8 percent and Alaska Airlines 3 percent. All other carriers combined for the remaining 5 percent of passengers.

OPPORTUNITY ANALYSIS – MAJOR NETWORK AIRLINES

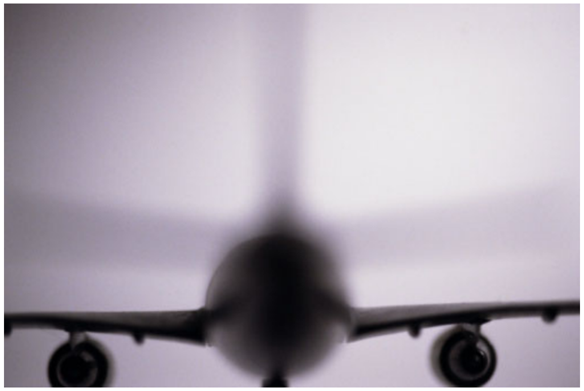
With DEN less than a one-hour drive from FNL, traditional major network airlines such as American, Delta, United or Southwest, are unlikely to serve the market in the near term. Looking longer term, American may be a possibility. American is re-instating service at Cheyenne Regional Airport with a large minimum revenue guarantee. With this type of incentive, the airline is guaranteed it will generate a specified amount of revenue from ticket sales associated with the new service. If the airline does not meet the target revenue, the local entity providing the guarantee makes a cash payment to the airline for the shortfall.

If American is able to overcome the proximity to DEN at Cheyenne, it could open up an opportunity for FNL service in the future. Similar to Cheyenne, airline risk abatement (i.e., minimum revenue guarantee) would likely be needed.

OPPORTUNITY ANALYSIS – ULTRA-LOW-COST AIRLINES

The biggest opportunity for FNL is with the low-cost and ultra-low cost carriers. Allegiant previously served FNL, and by all indicators was successful in the market. With the close proximity to a large potential market, both from the FNL catchment area and the nearby Denver area, it is reasonable that Allegiant could operate service to its traditional destination markets like Las Vegas, Phoenix-Mesa or Orlando-Sanford, and its less traditional large markets like Cincinnati or Austin. Other low-cost-carriers have a presence at DEN. It is unknown if they would be willing to operate from both markets.

SECTION 3.
INDUSTRY TRENDS



This section reviews commercial air service industry trends that have impacted or will impact reinstatement of air service at FNL. For example, recent airline profitability is a strength that could provide opportunities for FNL whereas the pilot shortage is a weakness and may threaten FNL's ability to obtain air service.

The following industry trends are reviewed in this section:

- Frequency and capacity changes
- Airline profitability
- Bankruptcies, mergers and acquisitions
- Fleet changes
- Fluctuating price of fuel
- Pilot shortage
- Low-cost carrier competition

Specific airline-by-airline trends are discussed in Section 6.

Declining Flights at Non-Hub Airports
While flights at medium hub and large hub airports have increased, flights at non-hub and small hub airports decreased, with flights at non-hub airports decreasing 9.2 percent over the past five years.

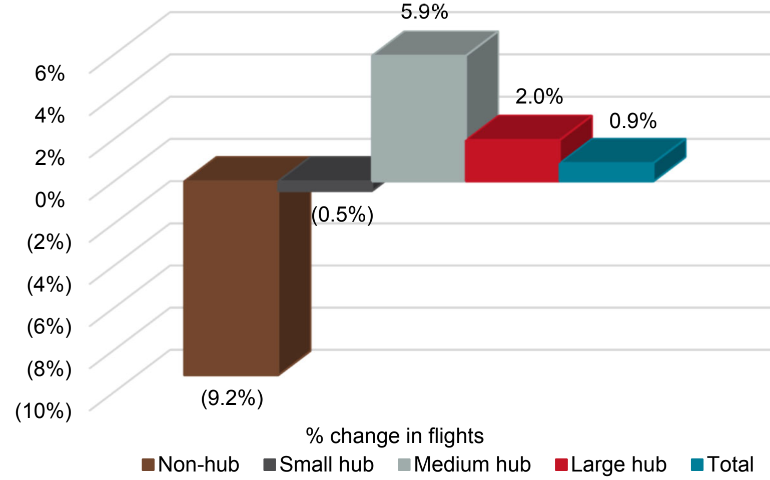
FREQUENCY AND CAPACITY CHANGES

Over the past decade many airports experienced capacity reductions as carriers merged, mainline hubs/fleets were realigned, regional jets replaced mainline flying in the US and carriers shifted resources to international markets. A total of 69 US airports with air service in 2008 do not have scheduled service in 2018 (source: Diio Mi). Much of the negative change in flights in the last five years was experienced by non-hub airports as shown in **Exhibit 3.1**.

Conversely, seats have increased across all airport categories, with non-hub airports increasing 5.6 percent, small hub by 18.0 percent, medium hub by 23.4 percent and large hub by 15.5 percent. While small to large hubs increased by double digits, seats at non-hub airports increased at a much slower pace. Most of this growth resurgence has happened in just the last two years.

Table 3.1 provides an overview by top domestic airlines of total scheduled flights and seats over the past five years. Overall domestic flights have increased 0.8 percent. The top three airlines decreased flights as they shifted to larger aircraft. At the same time, domestic seats increased 16.6 percent. Growth differs greatly from airline to airline with all airlines increasing seats since 2013.

EXHIBIT 3.1 US DOMESTIC FLIGHT CHANGE BY AIRPORT SIZE (CY 2018 VS. CY 2013)



Source: Diio Mi Scheduled Flights by Calendar Year; as of 9/26/18
Note: Non-hub includes primary and non-primary

TABLE 3.1 SCHEDULED FLIGHTS AND SEATS COMPARISON BY AIRLINE

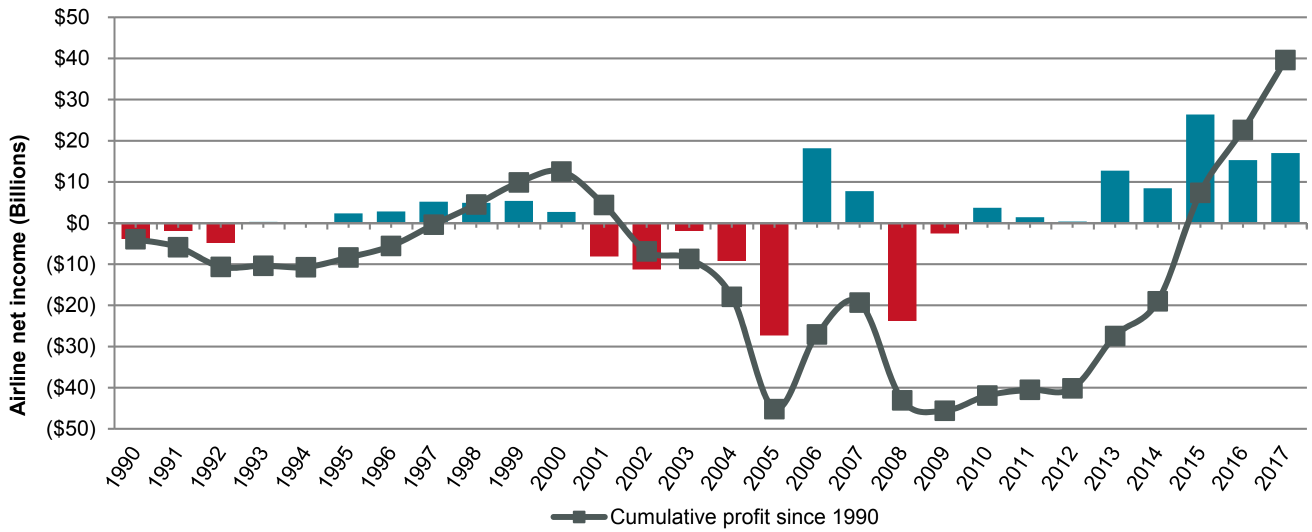
CARRIER	JUL 2018 VS JUL 2013 FLIGHTS	JUL 2018 VS JUL 2013 SEATS
American Airlines	(3.7%)	6.0%
Delta Air Lines	(1.3%)	12.4%
United Airlines	(8.9%)	14.4%
Southwest Airlines	3.0%	10.8%
Alaska Airlines	28.7%	36.3%
JetBlue Airways	20.4%	25.5%
Spirit Airlines	123.4%	153.2%
Frontier Airlines	44.5%	92.2%
Allegiant Air	115.0%	108.6%
Hawaiian Airlines	22.6%	21.0%
Sun Country Airlines	22.9%	39.7%
Total All Domestic	**0.8%**	**16.6%**

Source: Diio Mi Schedule (July 2018 versus July 2013) as of 8/14/18; Ranked by July 2018 flights; Note: Historical data includes merged airlines

AIRLINE PROFITABILITY

For many years traditional network carriers struggled to survive. Since 1990, multiple airlines have entered and exited bankruptcy (discussed in the following subsection). However, in recent years, airlines are thriving as shown in **Exhibit 3.2**, which shows the US airline industry net income from 1990 through 2017.

EXHIBIT 3.2 US AIRLINE INDUSTRY NET INCOME



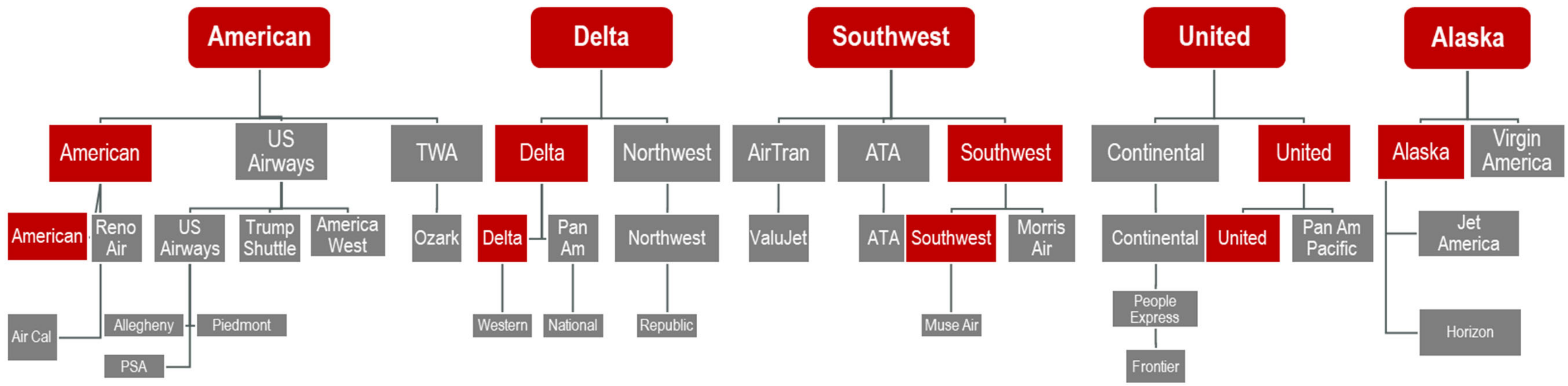
Source: Diio Mi, Form 41 Net Income (All Airlines, Total System)

Until recently, airlines have not sustained strong profitability. From 2001 through 2005, the combination of depressed air travel demand and higher costs produced financial losses which were more severe and sustained over a longer period of time than previous downturns. The industry rebounded in 2006/2007 only to suffer significant losses in 2008/2009 with the increased cost of fuel and the economic recession. Since 2010, the airlines have consistently been profitable, finally overcoming previous losses and achieving a cumulative net profit in 2015 for the first time since 2001. From 2010 to 2017, the airlines had a combined net income of approximately $85 billion. Profit drivers have included consolidation, capacity restraint, increased ancillary revenue (e.g., bag fees) and a reduction in fuel cost.

BANKRUPTCIES, MERGERS AND ACQUISITIONS

Since the airline industry deregulation in 1978, many airlines have come and gone as the industry and economy evolved. The economic woes of the 2000 through 2005 period pushed many airlines to the brink of financial distress. In spite of layoffs, wage and benefits cuts, the pruning of amenities, and emphasis of cost savings through automation, many airlines moved into the protection of bankruptcy reorganization. A number of airlines ceased operations during this time period or merged with other airlines. Examples within the last 10 years of service cessation include Peoples Express in 2015 Colgan Air in 2012, Air Midwest in 2008, Skybus Airlines in 2008 and Big Sky Airlines in 2008. Chapter 11 bankruptcy filings included PenAir (2017), Pinnacle Airlines (2012), American Airlines (2011), Gulfstream International Airlines (2010), and Mesa Airlines (2010) to name a few. More recently, airline consolidation (i.e., mergers) has led to just five major airlines (American Airlines, Delta Air Lines, United Airlines, Southwest Airlines and Alaska Airlines). These five major airlines control approximately 86 percent of domestic capacity. **Exhibit 3.3** provides a depiction of the impact of consolidation.

EXHIBIT 3.3 MERGERS AND ACQUISITIONS

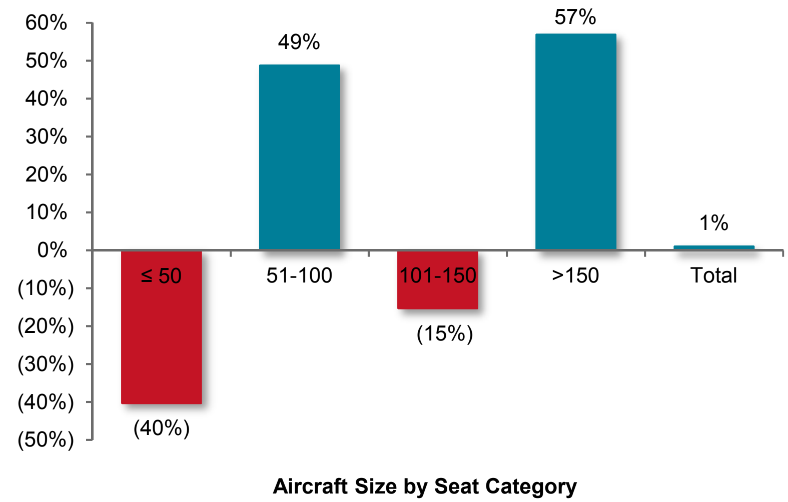


There has been very little in the way of new entrant carriers in the past five years, leaving fewer options for communities negatively impacted by industry changes. The continued consolidation of domestic airlines (such as the recent Alaska Airlines/Virgin America merger) can be a threat to FNL's ability to add air service, but as carriers like Alaska and United compete more aggressively for regional presence, FNL could see some opportunities emerge.

FLEET CHANGES

Fleet changes at the major and regional airlines have impacted airports significantly and will continue to have a major impact in the years ahead as older, smaller aircraft are phased out. The composition of regional airline fleets have changed dramatically since the mid-1990s. There has been a marked decline in regional airline turboprop and smaller regional jet fleets. They have been replaced by larger regional jets and 70-plus seat Bombardier Q400 turboprops. As smaller aircraft have been rapidly retired from airline fleets, there are currently no new replacements being manufactured. As a result, smaller communities with limited passenger demand are running out of traditional air service options.

EXHIBIT 3.4 PERCENTAGE CHANGE IN DEPARTURES BY AIRCRAFT SIZE



Source: Diio Mi US Domestic Schedule Departures and Seats for Calendar Years Shown; As of 8/14/18

The regional jet evolution started initially with 37- to 50-seat jets. They were used to connect smaller markets to more distant hubs, hubs that were not previously accessible with turboprop aircraft. Approximately 1,500 small regional jets were delivered to US carriers, with most deliveries occurring by 2006. There have been no orders for 50-seat regional jets in nearly a decade.

In the early 2000s, the 70-seat regional jet with first class seating was born. These larger regional jets are similar to the larger, mainline aircraft product with further range and better performance. Many of the 50-seat regional jets are being replaced with larger regional jets. This transition to larger aircraft often results in fewer departures to offset the additional seats in the market.

Exhibit 3.4 provides the change in departures by aircraft seat category over the past five years. Aircraft with 50 seats or less have declined the most, with a decrease of 40 percent, followed by aircraft with 101 to 150 seats at a 15 percent decline. The use of 51 to 100 seat aircraft and greater than 150 seats have increased significantly.

Fuel Prices Adverse Effect
The cost of fuel has been the single largest source of the airline industry's inability to sustain ongoing profitable operations.

FLUCTUATING PRICE OF FUEL

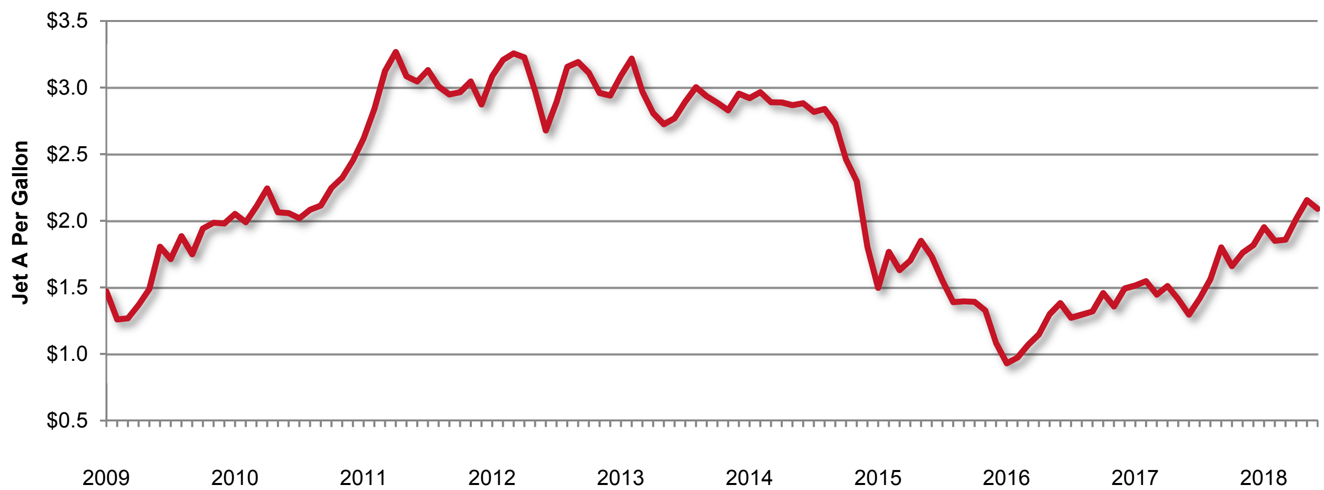
The cost of fuel historically has been the single largest source of the airline industry's inability to sustain ongoing profitable operations. Increases in fuel cost adversely affect airlines in two ways:

- Absolute increases in overall expenses
- Reduced demand as higher gas prices mean less discretionary income for air travel

When fuel prices are high, airlines reduce flying, raise airfares and retire fuel inefficient aircraft. A 25 percent increase represents roughly $6 billion in added operating expenses. The opposite reaction also occurs when fuel prices drop. Declines in fuel cost increase profits and put pressure on the airlines to reduce average fares.

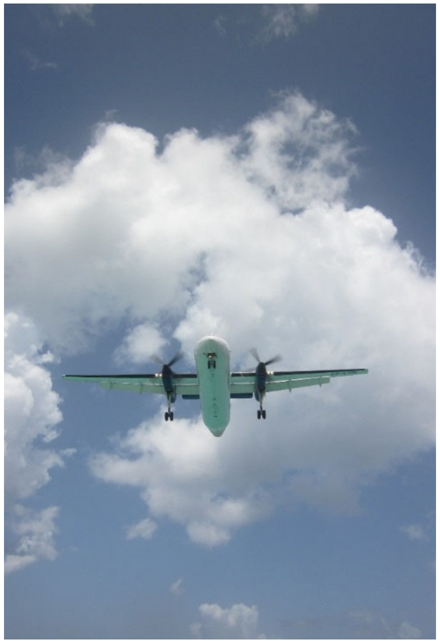
Exhibit 3.5 shows the fluctuating price of fuel since 2009. Fuel prices dropped by 43 percent on average in 2015 over 2014 driving record profitability. Calendar year 2016 prices were down 18 percent over 2015; however, 2017 prices increased 25 percent over 2016 (still down 42 percent over 2014). Recently, fuel prices for the first six months of 2018 were up 37 percent over the first six months of 2017 which could lead airlines to consider pulling back on growth.

EXHIBIT 3.5 FLUCTUATING PRICE OF FUEL



Source: US Energy Administration for Gulf Coast Jet Fuel Spot Price Per Gallon through June 2018

PILOT SHORTAGE



Regulatory requirements have led to pilot shortages that continue to have a very negative impact on small airports across the nation. The regulatory changes were brought about by a Colgan Air accident in February 2009. Public and government outcry over pilot training and crew rest led to changes in the rules that affect pilot availability. The most significant change was the requirement that all pilots for Part 121 carriers be Airline Transport Pilot (ATP) rated, which requires 1,500 hours of flight time. In the past a first officer could have as few as 250 hours with a Commercial Certificate. Limited options exist today for getting from 250 hours to 1,500 hours. There are significantly fewer military pilots entering the workforce as the military is training fewer pilots annually. Civilian (private) flight training is drastically more expensive than pre 9/11, and costs are harder to justify for trainees. It can cost up to $100,000 for training up to Certified Flight Instructor. Many instructors make less than $20,000 per year upon graduation and need to instruct for several years to get to 1,500 hours total.

Other changes included longer minimum crew rest, an increase from eight hours to 10 hours. While the pilot shortage of the mid-2000s was abated due to the mandatory retirement age for pilots increasing from 60 to 65 years old, the benefit of that change ended a few years ago. In fact, pilot retirements will accelerate over the next five years as pilots hired during the 1980s hiring boom start to retire. The result of these changes on regional airlines is significant, and hiring pressure has been reported by the airlines. While mainline airlines continue to recruit from regionals, the regional airlines are having difficulty keeping up with pilot recruitment and retention. They are essentially a pipeline for the mainline airlines. Several regional airlines have shrunk or announced closure due to pilot concerns. In addition, the pilot shortage has sped the retirements of 50-seat regional jets and growth in smaller mainline aircraft. This is a direct threat to regional air service.

LOW-COST CARRIER COMPETITION

Low-cost carriers (LCCs) have been a part of the industry fabric for 40-plus years, most successfully illustrated by Southwest Airlines' growth into what has become the largest domestic airline, both in terms of flights and passengers carried. As part of the natural marketplace, major network carriers like American Airlines, Delta Air Lines and United Airlines have learned to compete successfully with them. The major change in the competitive dynamic in most recent years has been the evolution and growth of the ultra-low-cost carriers (ULCCs) like Spirit Airlines, Frontier Airlines and Allegiant Air who have taken average fares to new lows and have forced the established carriers to rethink the way they compete.

Table 3.2 shows the average domestic fares by airline for the year ended March 31, 2018, broken down by non-ULCCs and ULCCs. While the traditional LCCs like Southwest and JetBlue generate fares that are 20 percent to 35 percent less than the average for network carriers, the ULCCs like Allegiant, Frontier and Spirit averaged fares that are 70 percent to 80 percent lower than the traditional airlines. This is a very different pricing dynamic than the network carriers have traditionally competed against. Even traditional LCCs like Southwest find themselves with pricing competition that has become a major challenge. It is important to note, however, that for the ULCCs, especially Spirit and Allegiant, that a very large percentage of their revenue is generated from ancillary revenues, which are not included in average passenger fares.

TABLE 3.2 AVERAGE DOMESTIC FARE BY AIRLINE

AIRLINE	YE 1Q 2018 ONE-WAY AVERAGE AIRFARE
Non-ULCC Airlines	
United	$214
Delta	$207
American	$205
Alaska	$169
JetBlue	$153
Southwest	$132
Avg Non-ULCC	**$182**
ULCC Airlines	
Allegiant	$68
Frontier	$60
Spirit	$50
Avg ULCC	**$58**
Avg U.S.	**$170**

Source: Diio Mi YE 1Q 2018 US airfares ranked by YE 1Q 2018; Note: Alaska includes Virgin America

In addition to the steep discounted pricing, the traditional carriers are seeing more and more of their networks affected by this new pricing dynamic. Just five years ago, only 15 percent of US domestic passengers had a ULCC option in their market. Today, just five years later, that percentage has more than doubled. Network airlines are having to adapt rapidly to this new intensity of competition. American, Delta and United have come out with a form of basic economy fares to price themselves more competitively in markets where they overlap with these carriers. Many of these programs now have tiered pricing options where consumers can pay the lowest price by giving up amenities that typically accompany normal fares, like seat selection, baggage check, carry-ons, priority boarding, meals, etc. The evolution of price competition is accelerating as the ULCCs grow at a pace much faster than the rest of the industry, and airlines are experimenting and adapting rapidly.

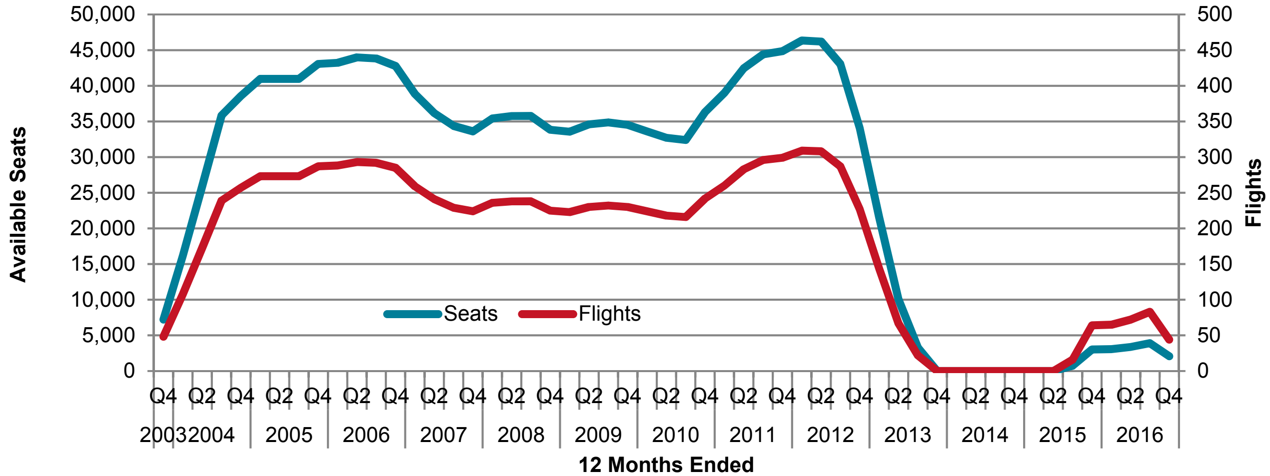
SECTION 4. HISTORICAL AIR SERVICE

This section reviews historical air service at FNL, with a review of scheduled airline service and seasonality. This section also reviews FNL's service performance compared to other markets that the airline served at the time.

HISTORICAL SCHEDULED AIR SERVICE

In 2003, Allegiant Air began serving FNL. Allegiant ceased service in 2012. From 2015 to 2016, Elite Airways provided service. To depict the fluctuation in air service, **Exhibit 4.1** provides the total available seats and flights since 2003 on a year-ended basis. Scheduled available seats peaked for the year ended March, 31, 2012, with 46,350 annual seats and 309 annual flights. The lowest service level occurred from the first quarter of 2013 through the second quarter of 2015 when the airport had no scheduled commercial airline service Elite's service provided far fewer seats and flights than the previous Allegiant service.

EXHIBIT 4.1 HISTORICAL SCHEDULED OUTBOUND AIRLINE SEATS/FLIGHTS



Source: Diio Mi, Scheduled Seats/Flights

Table 4.1 provides historical air service by airline and destination for calendar years 2004 through 2016. From 2003 through 2012, Allegiant provided service to Las Vegas. Allegiant also provided service to Phoenix-Mesa from 2010 to 2012. From 2015 through 2016, Elite Airways provided service to Rockford, IL, located approximately 85 miles from the Chicago Metro area.

TABLE 4.1 FNL HISTORICAL SCHEDULED AIRLINE SERVICE

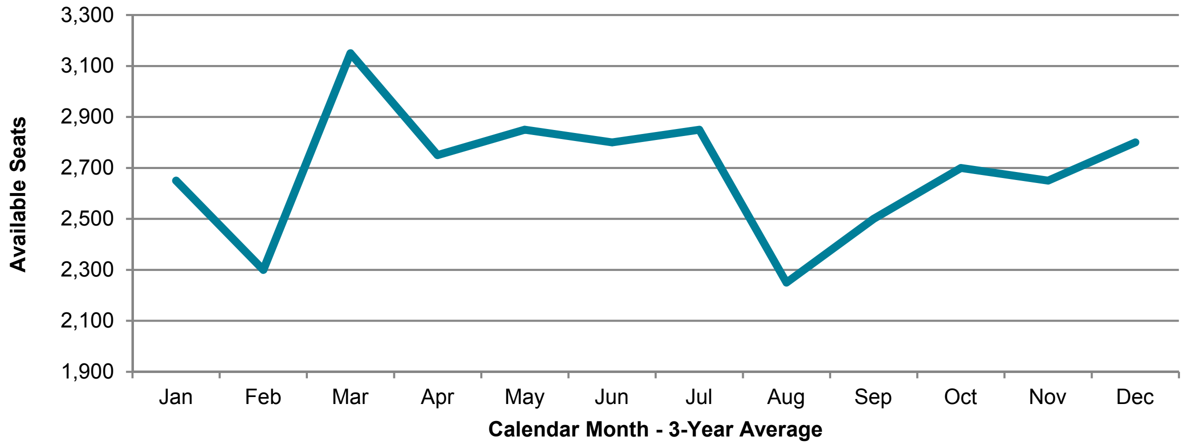
		FLIGHTS BY CALENDAR YEAR												
DESTINATION	AIRLINE	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Las Vegas, NV	Allegiant	257	285	284	223	218	227	217	201	153				
Phoenix, AZ (AZA)	Allegiant							24	98	74				
Rockford, IL	Elite Airways												64	44
Total Flights		**257**	**285**	**284**	**223**	**218**	**227**	**241**	**299**	**227**	**0**	**0**	**64**	**44**
Total Seats		**38,550**	**43,074**	**42,762**	**33,612**	**33,834**	**34,536**	**36,312**	**44,850**	**34,050**	**0**	**0**	**3,008**	**2,068**

Source: Diio Mi scheduled departures/seats

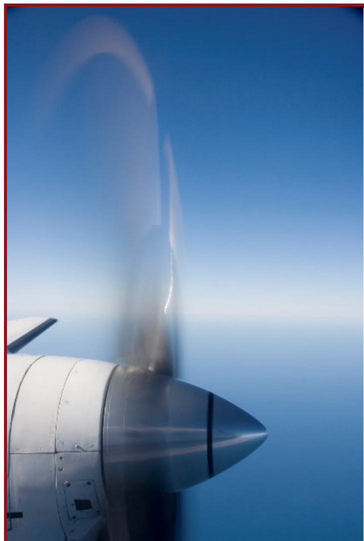
SEASONALITY

Exhibit 4.2 shows the average number of available seats provided by month from 2009 through 2011 for the FNL-Las Vegas service. The number of available seats fluctuated significantly by month, peaking in March and hitting 12-month lows in February and August.

EXHIBIT 4.2 SEASONALITY OF SCHEDULED SEATS



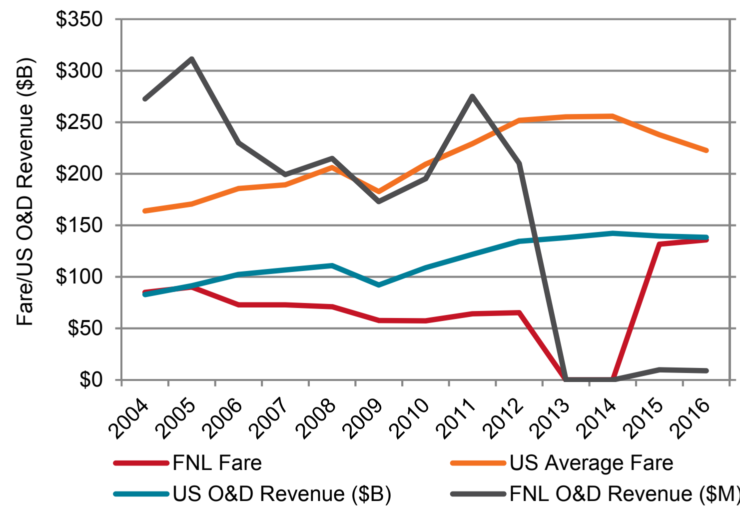
Source: Diio Mi scheduled seats for FNL-Las Vegas service, January 2009 through December 2011



REVENUE AND FARE TRENDS

Exhibit 4.3 shows the FNL revenue and fare trend from calendar year 2004 through 2016 compared to the national average. With Allegiant's low-fare service in the market from 2004 through 2012, FNL's average fare was significantly lower than the US average. While FNL's fare increased with the Elite Airways service, the average remained far below the national average. FNL's origin and destination revenue fluctuated significantly with the changing levels of air service. Comparatively, the US origin and destination revenue continued to increase throughout the 13-year period, with the exception of

EXHIBIT 4.3 REVENUE AND FARE TRENDS



Source: Diio Mi

LOAD FACTOR

Table 4.2 provides FNL's average load factor by market and airline from calendar year 2004 to 2016. For the first several years of service, load factors for Las Vegas averaged less than 80 percent. Loads began to increase in 2007 and exceeded 90 percent for the first time in 2008. Loads continued to be strong until service ended in 2012. At Phoenix-Mesa, load factors exceeded 90 percent on average in all three years of service, indicating strong passenger performance. There is limited data available for the Elite Airways service due to limited reporting requirements; information that is available indicates a low load factor which likely contributed to the cancellation of service.

TABLE 4.2 FNL AVERAGE LOAD FACTOR

		LOAD FACTOR BY CALENDAR YEAR												
DESTINATION	AIRLINE	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Las Vegas, NV	Allegiant	75	79	78	82	91	88	91	93	88				
Phoenix, AZ (AZA)	Allegiant							92	93	93				
Rockford, IL	Elite Airways													57
Average Load Factor		**75**	**79**	**78**	**82**	**91**	**88**	**91**	**93**	**90**	**0**	**0**	**0**	**57**

Source: Diio Mi

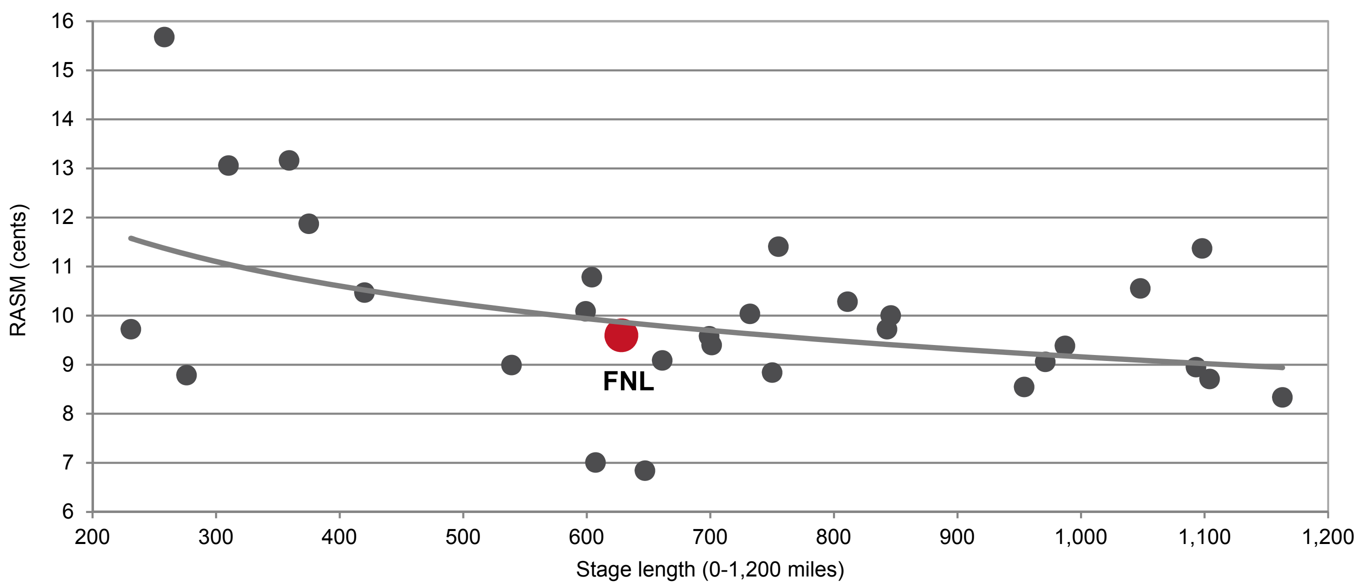
FNL Las Vegas Service Performed Average
FNL's Las Vegas service performed at Allegiant's RASM average and the load factor was slightly above average.

RASM PERFORMANCE

RASM is the unit revenue (i.e. revenue divided by available seat miles) generated and is a key indicator to understanding and comparing performance of multiple stations/markets. RASM comparisons for FNL are provided for the Allegiant service. Data is not available for the Elite Airways service. The charts plot the RASM by market against the stage length of the service. A trend line is provided to show the average RASM for the stage lengths selected. A market above the trend line is considered to be performing above average and a market below the trend line is generally considered to be performing below average.

Allegiant provided service at FNL on a less than daily basis to Las Vegas, generally with four weekly roundtrips. **Exhibit 4.4** shows the RASM for markets served by Allegiant to Las Vegas plotted against the stage length (under 1,200 miles) for the last full year of service, year ended June 30, 2012. FNL's RASM of 9.6 cents at a stage length of 628 miles was at Allegiant's market average. Compared to year ended June 30, 2011, FNL's RASM improved 5 percent. FNL's Las Vegas load factor of 90 percent was slightly above Allegiant's Las Vegas average of 89 percent but declined year-over-year by 3 percentage points. Based on the information available, cancellation of FNL's Las Vegas service was not directly related to performance issues.

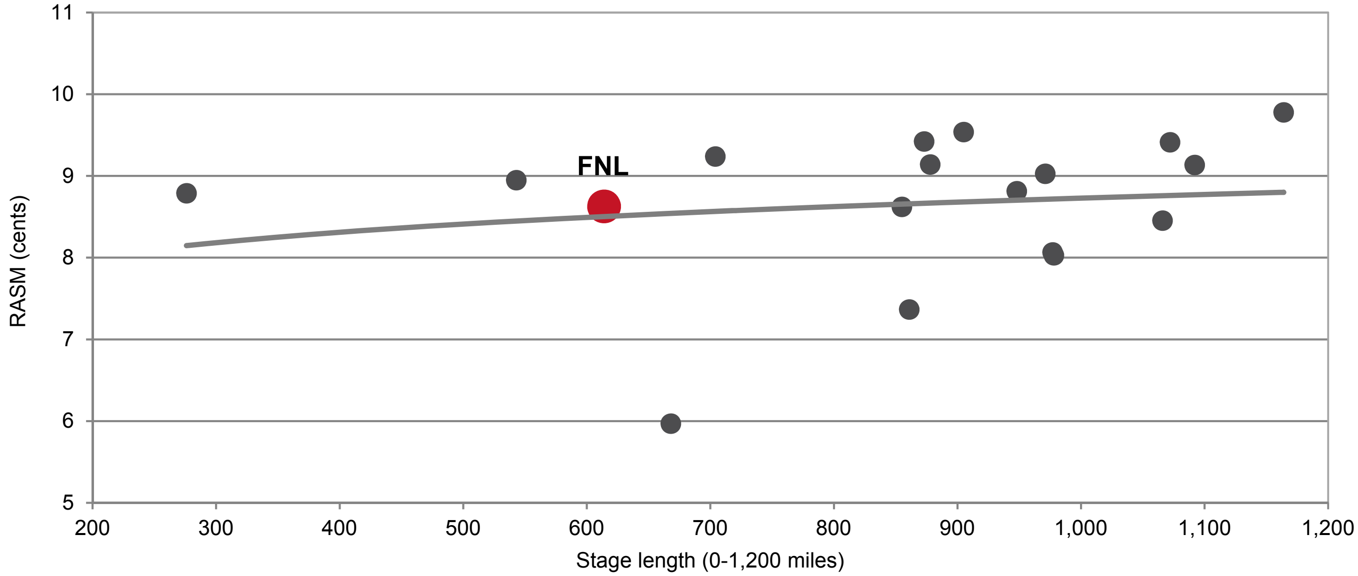
EXHIBIT 4.4 ALLEGIANT AIR LAS VEGAS (LAS) RASM PERFORMANCE – YE JUNE 30, 2012



Source: Diio Mi

Allegiant also provided service at FNL on a less than daily basis to Phoenix-Mesa, generally with two weekly roundtrips. **Exhibit 4.5** shows the RASM for markets served by Allegiant to Phoenix-Mesa plotted against the stage length (under 1,200 miles) for the last full year of service, year ended June 30, 2012. FNL's RASM of 8.6 cents at a stage length of 614 miles was at Allegiant's market average. Compared to year ended June 30, 2011, FNL's RASM improved 5 percent. FNL's Phoenix-Mesa load factor of 93 percent was slightly above Allegiant's Las Vegas average of 92 percent and remained steady year-over-year. Based on the information available, similar to Las Vegas, Allegiant's cancellation of FNL's Phoenix-Mesa service was not directly related to performance issues.

EXHIBIT 4.5 ALLEGIANT AIR PHOENIX-MESA (AZA) RASM PERFORMANCE – YE JUNE 30, 2012



Source: Diio Mi

SECTION 5. TRUE MARKET ESTIMATE

The true market portion of the *Passenger Demand Analysis* provides the total number of passengers in the catchment area. This section investigates destinations associated with travel to and from the catchment area. In addition, destinations are grouped into geographic regions to further understand the regional flows of catchment area air travelers.

METHODOLOGY

The *Passenger Demand Analysis* combines ARC ticketed data and U.S. Department of Transportation (DOT) airline data to provide a comprehensive overview of the air travel market. For the purposes of this study, ARC data includes tickets purchased through travel agencies in the FNL catchment area as well as tickets purchased via online travel agencies by passengers in the FNL catchment area. It does not capture tickets issued directly by airline Web sites (e.g., www.delta.com, www.united.com) or through airline reservation offices. The data used include tickets for the zip codes in the catchment area, NOT all tickets. As a result, ARC data represents a sample to measure the air travel habits of catchment area air travelers.

Data for travel agencies located within the catchment area is reported by the zip code of the travel agency. Online travel agency data (e.g. Expedia, Orbitz and Travelocity) is reported by the customer zip code used to purchase the ticket. Although limitations exist, ARC data accurately portrays the airline ticket purchasing habits of a large cross-section of catchment area travelers, making the data useful to both airports and airlines. A total of 58,554 ARC tickets for the year ended March 31, 2018, were used in this analysis. Adjustments were made to account for Southwest Airlines and Frontier Airlines since they have limited representation in ARC.

With no existing scheduled commercial air service, to estimate the total number of air travelers generated by the FNL catchment area, a population travel factor is used. The travel factor is an estimate of the number of air trips per year per capita. An array of travel factors for cities that are similar to the Fort Collins-Loveland area are included in **Table 5.1**.

TABLE 5.1 TRAVEL FACTOR ESTIMATE

AIRPORT	POPULATION	TRUE MARKET	TRAVEL FACTOR
Billings, MT	898,306	238,939	3.76
Pullman, WA	288,184	77,769	3.71
Flagstaff, AZ	656,534	178,645	3.68
Bismarck, ND	547,976	154,260	3.55
Grand Junction, CO	561,198	220,000	2.55
Total	**2,952,198**	**869,613**	**3.39**

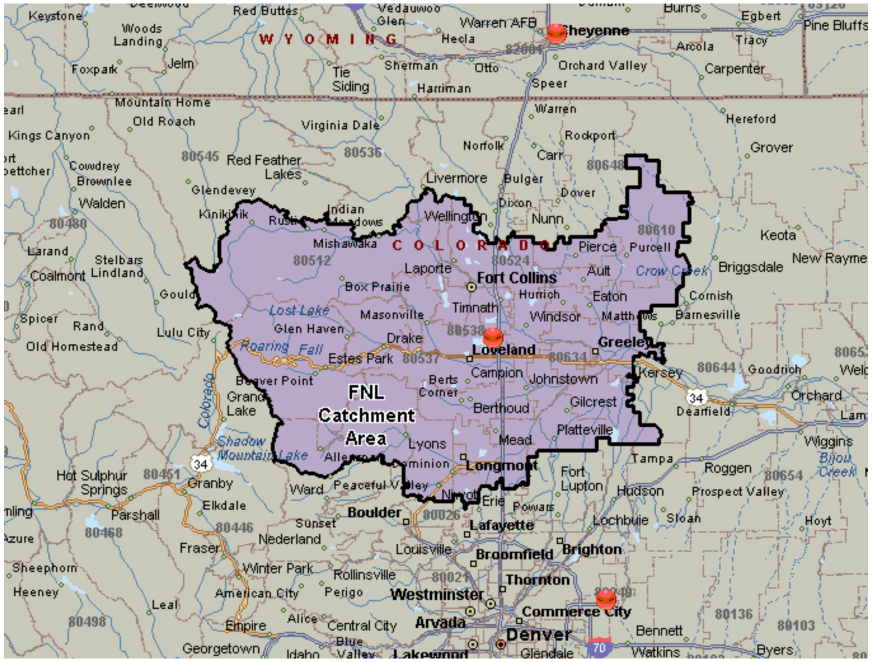
Source: Mead & Hunt Estimates

DEN catchment area origin and destination passengers include large numbers of winter and summer vacationers destined for the Rocky Mountains. FNL origin and destination passengers will include many vacationers due to the proximity of Rocky Mountain National Park, but the airport will not be a gateway to the ski areas due to geographic topography and highway limitations. Use of DEN's travel factor would risk overstating the FNL catchment area's market size. All of the communities in **Table 5.1** have varying degrees of vacation/tourist traffic. For purposes of this analysis, a travel factor of 3.39 is used to estimate passenger traffic in the FNL catchment area.

AIRPORT CATCHMENT AREA

An airport catchment area, or service area, is a geographic area surrounding an airport where it can reasonably expect to draw passenger traffic and is representative of the local market. The catchment area contains the population of travelers who should use FNL considering the drive time from the catchment area to competing airports. This population of travelers is FNL's focus market for air service improvements and represents the majority of travelers using the local airport. **Exhibit 5.1** identifies the FNL catchment area. It is comprised of 32 zip codes within the U.S. with an estimated population of 685,693 (source: U.S. Census Bureau, Woods & Poole Economics, Inc.).

EXHIBIT 5.1 FNL CATCHMENT AREA



DOMESTIC VERSUS INTERNATIONAL

Exhibit 5.2 shows the split between domestic and international itineraries. An estimated 93 percent of passengers fly domestically. The remaining 7 percent of passengers fly to international destinations.

TRUE MARKET PASSENGERS BY COMMUNITY

Table 5.2 shows the breakdown of the total true market passengers by community based on ARC data. ARC includes local travel agency data (reported by travel agency zip code) and online travel agency data (reported by the passenger zip code).

The Fort Collins community had the largest share of passengers at 35 percent followed by Longmont at 22 percent and Loveland at 13 percent. The only other community with a share 10 percent or greater was the Greeley community.

EXHIBIT 5.2 AIRPORT USE

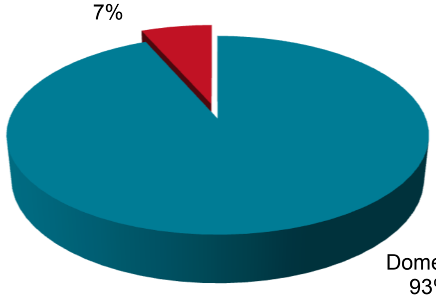


TABLE 5.2 TRUE MARKET PASSENGERS BY COMMUNITY

COMMUNITY	TRUE MARKET	% OF TOTAL
Fort Collins	810,829	35
Longmont	522,799	22
Loveland	293,182	13
Greeley	226,063	10
Windsor	138,483	6
Johnstown	56,307	2
Berthoud	50,407	2
Estes Park	41,125	2
Lyons	27,108	1
Timnath	26,239	1
Eaton	26,239	1
Evans	24,394	1
Mead	21,431	1
Milliken	13,477	1
Other	55,701	2
Total	**2,333,783**	**100**

TOP 25 DOMESTIC DESTINATIONS

Table 5.3 provides the top 25 domestic true markets. All FNL catchment area passengers used DEN. The top 25 destinations for FNL accounted for 58 percent of the travel to/from the FNL catchment area. Phoenix-Sky Harbor was the largest market with 124,461 annual passengers (170.5 PDEW). Los Angeles was the second largest market with 157.8 PDEW, followed by Seattle with 129.2 PDEW. San Francisco was the fourth largest market with 113.8 PDEW, while Las Vegas rounded out the top five markets with 104.0 PDEW. All top five markets had greater than 100 PDEW.

TABLE 5.3 TOP 25 DOMESTIC DESTINATIONS

RANK	DESTINATION	FNL FLOWN PAX	DEN DIVERTED PAX	TRUE MARKET	PDEW
1	Phoenix, AZ (PHX)	0	124,461	124,461	170.5
2	Los Angeles, CA	0	115,178	115,178	157.8
3	Seattle, WA	0	94,302	94,302	129.2
4	San Francisco, CA	0	83,089	83,089	113.8
5	Las Vegas, NV	0	75,922	75,922	104.0
6	Minneapolis, MN	0	60,871	60,871	83.4
7	Chicago, IL (ORD)	0	58,860	58,860	80.6
8	Dallas, TX (DFW)	0	58,031	58,031	79.5
9	Orlando, FL (MCO)	0	51,738	51,738	70.9
10	San Diego, CA	0	46,260	46,260	63.4
11	Atlanta, GA	0	46,079	46,079	63.1
12	New York, NY (LGA)	0	44,564	44,564	61.0
13	Boston, MA	0	44,438	44,438	60.9
14	Philadelphia, PA	0	38,510	38,510	52.8
15	Orange County, CA	0	34,486	34,486	47.2
16	Portland, OR	0	33,114	33,114	45.4
17	Salt Lake City, UT	0	32,763	32,763	44.9
18	Austin, TX	0	30,324	30,324	41.5
19	Kansas City, MO	0	29,237	29,237	40.1
20	Detroit, MI	0	29,204	29,204	40.0
21	Tampa, FL	0	28,548	28,548	39.1
22	New York, NY (JFK)	0	28,127	28,127	38.5
23	Washington, DC (IAD)	0	27,619	27,619	37.8
24	Chicago, IL (MDW)	0	27,166	27,166	37.2
25	St. Louis, MO	0	27,072	27,072	37.1
	Top 25 destinations	**0**	**1,269,963**	**1,269,963**	**1,739.7**
	Total domestic	**0**	**2,181,758**	**2,181,758**	**2,988.7**

TOP 15 INTERNATIONAL DESTINATIONS

Table 5.4 shows the top 15 international destinations. Only the top 15 international destinations are shown due to the smaller market sizes involved with international itineraries and limited available data. The top 15 destinations made up 47 percent of total international passengers.

The top three international markets were Cancun, Mexico; London-Heathrow, UK; and Puerto Vallarta, Mexico. London-Heathrow, UK, and Mexico City, Mexico, San Jose del Cabo, Mexico, and Vancouver, Canada, rounded out the top five destinations. Only the top three markets had more than 10 PDEW.

TABLE 5.4 TOP 15 INTERNATIONAL DESTINATIONS

RANK	DESTINATION	FNL FLOWN PAX	DEN DIVERTED PAX	TRUE MARKET	PDEW
1	Cancun, Mexico	0	16,936	16,936	23.2
2	London, UK (LHR)	0	8,332	8,332	11.4
3	Puerto Vallarta, Mexico	0	7,402	7,402	10.1
4	San Jose del Cabo, Mexico	0	7,027	7,027	9.6
5	Vancouver, Canada	0	5,074	5,074	7.0
6	Paris-De Gaulle, France	0	3,921	3,921	5.4
7	Mexico City, Mexico	0	3,856	3,856	5.3
8	Calgary, Canada	0	2,995	2,995	4.1
9	Dublin, Ireland	0	2,814	2,814	3.9
10	Frankfurt, Germany	0	2,614	2,614	3.6
11	Rome-Da Vinci, Italy	0	2,514	2,514	3.4
12	Toronto, Canada	0	2,478	2,478	3.4
13	Amsterdam, Netherlands	0	2,169	2,169	3.0
14	San Jose, Costa Rica	0	2,004	2,004	2.7
15	Munich, Germany	0	1,979	1,979	2.7
	Top 15 International	**0**	**72,115**	**72,115**	**98.8**
	Total International	**0**	**152,025**	**152,025**	**208.3**

FEDERAL AVIATION ADMINISTRATION (FAA) GEOGRAPHIC REGIONS

It is important to identify and quantify air travel markets, but it is also important to measure air travel by specific geographic regions. Generally, airlines operate route systems that serve geographic areas. Additionally, most airline hubs are directional and flow passenger traffic to and from geographic regions, not just destinations within the region. Therefore, air service analysis exercises consider the regional flow of passenger traffic as well as passenger traffic to a specific city. Accordingly, this section analyzes the regional distribution of air travelers from the airport catchment area. For this exercise, the FAA geographic breakdown of the U.S. is used (**Exhibit 5.3**).

EXHIBIT 5.3 FAA GEOGRAPHIC REGIONS

West Largest Region
The West region had the highest number of air travelers, garnering 27 percent of FNL catchment area travelers.

REGIONAL DISTRIBUTION OF TRAVELERS

Table 5.5 divides catchment area travel into the FAA's nine geographic regions and one catch-all international region. The West region was the largest traveled region for FNL catchment area passengers, with 27 percent of the total catchment area passengers. The Southeast region followed as the second largest region with 15 percent and the Great Lakes region was the third largest region with 13 percent. The International region was the seventh largest traveled region.

TABLE 5.5 REGIONAL DISTRIBUTION OF TRAVEL

AIRPORT		REGION										
		W	SE	GL	E	SW	NW	INTL	C	NE	AK	TOTAL
DEN	Pax	627,189	348,847	301,534	259,720	257,046	207,407	152,025	95,817	67,496	16,703	2,333,783
	%	27	15	13	11	11	9	7	4	3	1	100

DISTRIBUTION OF INTERNATIONAL TRAVEL

Seven percent of catchment area travelers had international itineraries. **Table 5.6** shows international travelers by region. Mexico and Central America was the most frequented international region with 32 percent, or 49,405 of the total 152,025 catchment area international travelers, followed by Europe and Asia with 30 and 12 percent of the total, respectively.

TABLE 5.6 REGIONAL DISTRIBUTION OF INTERNATIONAL PASSENGERS

REGION	TRUE MARKET	% OF COLUMN
Mexico & Central America	49,405	32
Europe	44,940	30
Asia	17,695	12
Canada	16,131	11
Caribbean	9,923	7
Australia & Oceania	4,586	3
South America	3,941	3
Africa	3,878	3
Middle East	1,525	1
Total passengers	**152,025**	**100**

AIRLINES USED AT DEN

Table 5.7 shows the airlines used for the top 25 destinations. The airline market share is based on ARC data and is an estimation of carrier share. United Airlines had the largest share of catchment area passengers carrying an estimated 37 percent of diverting passengers. Southwest Airlines carried the second largest share of diverting passengers with 24 percent, followed by American Airlines with 13 percent, Delta Air Lines with 10 percent, Frontier Airlines with 8 percent and Alaska Airlines with 3 percent. All other airlines carried 5 percent of passengers.

TABLE 5.7 AIRLINES USED AT DEN

RANK	DESTINATION	AIRLINE %							TOTAL DEN PAX
		UA	WN	AA	DL	F9	AS	OTHER	
1	Phoenix, AZ (PHX)	25	29	42	1	3	0	0	124,461
2	Los Angeles, CA	35	21	19	18	4	2	1	115,178
3	Seattle, WA	16	11	1	35	5	32	0	94,302
4	San Francisco, CA	49	15	0	0	6	28	2	83,089
5	Las Vegas, NV	50	34	1	1	13	0	0	75,922
6	Minneapolis, MN	34	19	1	26	9	0	11	60,871
7	Chicago, IL (ORD)	49	0	35	1	14	0	1	58,860
8	Dallas, TX (DFW)	37	0	53	1	9	0	0	58,031
9	Orlando, FL (MCO)	53	23	5	2	17	0	1	51,738
10	San Diego, CA	46	39	3	2	10	0	0	46,260
11	Atlanta, GA	30	26	2	28	11	0	3	46,079
12	New York, NY (LGA)	47	17	3	26	6	0	0	44,564
13	Boston, MA	47	23	3	2	0	0	25	44,438
14	Philadelphia, PA	23	20	43	2	10	0	0	38,510
15	Orange County, CA	49	32	0	2	17	0	0	34,486
16	Portland, OR	49	29	0	5	15	2	0	33,114
17	Salt Lake City, UT	18	27	0	42	13	0	0	32,763
18	Austin, TX	41	50	1	1	8	0	0	30,324
19	Kansas City, MO	42	51	1	1	6	0	0	29,237
20	Detroit, MI	33	18	1	41	7	0	0	29,204
21	Tampa, FL	41	36	7	4	10	0	0	28,548
22	New York, NY (JFK)	0	0	2	47	0	0	51	28,127
23	Washington, DC (IAD)	63	31	1	1	4	0	0	27,619
24	Chicago, IL (MDW)	0	99	0	1	0	0	0	27,166
25	St. Louis, MO	35	54	0	2	8	0	0	27,072
	Total top 25	**36**	**25**	**12**	**11**	**8**	**4**	**3**	**1,269,963**
	Total all markets	**37**	**24**	**13**	**10**	**8**	**3**	**5**	**2,333,783**

SECTION 6. OPPORTUNITY ANALYSIS

This section reviews domestic airlines and their plans for expansion/retraction and individual hub focus. Current fleet mix by hub and fleet plans are discussed by airline. An opportunity assessment by airline for FNL is also included.

MAJOR NETWORK AIRLINES

Each of the major network airlines including American Airlines, Delta Air Lines, Southwest Airlines and United Airlines, are discussed in this section with a review of their existing departures and seats by hub/focus city, equipment type used, and potential opportunities a FNL. Other airlines and their business models are reviewed in subsequent sections.

American Airlines

Post-merger with US Airways, American Airlines is the largest airline in the world with numerous hubs across the US. American has been investing in fortifying their existing hubs, and with a large influx of new aircraft, American is on the path to have the youngest fleet of the legacy airlines.

Table 6.1, next page, compares American's departures and seats in July 2018 with the prior year. Overall, average daily seats and departures increased 1 percent. The most significant hub changes on a percentage basis year-over-year was at Chicago-O'Hare and Philadelphia. Several hubs had decreases in seats and departures including Charlotte, Miami, Phoenix-Sky Harbor and Los Angeles.

Reduction in Smaller Regional Jets and Turboprops
Year-over-year, American's use of 50-seat or smaller regional jets and turboprop aircraft declined.

TABLE 6.1 AMERICAN AIRLINES - DEPARTURES AND SEATS BY HUB

HUB/ FOCUS CITY	JULY 2018			% CHANGE YOY		
	AVG DAILY SEATS	AVG DAILY DEPARTURES	AVG SEATS/ DEPARTURE	AVG DAILY SEATS	AVG DAILY DEPARTURES	AVG SEATS/ DEPARTURE
Dallas, TX (DFW)	99,180	778	128	3	3	(0)
Charlotte-Douglas, NC	70,159	652	108	(2)	(2)	(0)
Chicago, IL (ORD)	50,982	482	106	4	1	2
Miami, FL	47,956	337	142	(3)	(2)	(1)
Philadelphia, PA	41,703	396	105	12	6	6
Phoenix, AZ (PHX)	34,418	262	131	(2)	(1)	(1)
Los Angeles, CA	27,785	199	139	(3)	(4)	1
Washington, DC (DCA)	20,172	233	86	1	2	(1)
Total all markets	**738,951**	**6,587**	**112**	**1**	**1**	**(0)**

Source: Diio Mi; As of 9/27/18

Table 6.2 outlines the aircraft in use in July 2018. Forty-seven percent of departures were provided on Airbus, Boeing or McDonnell Douglas (MD) mainline aircraft. Twenty percent of departures were with 50-seat or smaller regional jet aircraft, up from 19 percent in July 2017. Less than 1 percent of departures were provided with turboprop aircraft. Aircraft with the highest percentage change since July 2017 included a 64 percent increase in Embraer Regional Jet (ERJ) 140/145 aircraft, a 51 percent decrease in Canadair Regional Jet (CRJ) 200 aircraft and a 98 percent decrease in Bombardier Q200/300 aircraft.

TABLE 6.2 AMERICAN AIRLINES - AIRCRAFT IN USE

AIRCRAFT TYPE	SEATING CAPACITY	AVERAGE DAILY DEPARTURES		
		JULY 2018	JULY 2017	% CHANGE
Boeing 737	160	1,159	1,060	9
Embraer ERJ-140/145	44-50	981	599	64
Embraer E-170/175	76	757	723	5
Airbus A321	102-187	754	755	(0)
Canadair CRJ-700	63-70	674	574	4
Canadair CRJ-900	76	659	680	(3)
Airbus A319	128	528	517	2
Canadair CRJ-200	50	310	629	(51)
Airbus A320	150	183	189	(3)
McDonnell Douglas MD80	140	182	226	(20)
Embraer E-190	99	100	92	9
Boeing 777	260-310	99	85	16
Boeing 757	176-188	67	114	(41)
Boeing 787	226-285	48	38	27
Airbus A330	258-291	44	45	(1)
Boeing 767	209	41	55	(25)
Bombardier Q200/300	35-48	3	130	(98)
Total		**6,587**	**6,510**	**1**

Source: Diio Mi; As of 9/28/18

American has embarked on a massive fleet renewal process that will last until the end of the decade, and at the end of 2017, its fleet will was the youngest of any of the major airlines in the US. They are replacing MD80 and Boeing 757 aircraft with Airbus A319 and A321 aircraft, while replacing much of the Boeing 767 and Airbus A330 fleets with new wide-body aircraft such as Boeing 787s. This has created significant flux in the departures and capacities on many routes as they are rightsizing their schedules for each market. These changes are predominately resulting in larger gauge (more seats) than the older aircraft. On the regional side, American Eagle is also going through a massive re-fleeting post-merger. American had the smallest fleet of large regional jets of any of the legacy carriers, limited by very strict scope clauses. Upon entering bankruptcy, American was able to increase the number and size of the large regional jets significantly, allowing for hundreds of 76-seat aircraft. While American had parked all of its 37- and 44-seat aircraft post-merger, they were forced to “un-retire” more than 50 44-seat regional jets to act as a backfill for 50-seat regional jets that are operated by Air Wisconsin, whose contract was up and decided to execute a new contract with United Airlines and not American.

American has invested heavily in facilities at Charlotte and Dallas-Fort Worth and will be opening a significant number of new gates at both hubs in 2019, allowing for growth. American has publicly discussed the desire to grow their Dallas-Fort Worth hub from 800 daily departures to 900 daily departures in 2019. Much of that growth will be on American Eagle.

American has announced it will be returning to Cheyenne Regional Airport in 2019, supported by a very large minimum revenue guarantee funded by state and local governments. While Cheyenne had service before with American that failed and had been suspended, this new service could be a bellwether for FNL. If the Cheyenne service is able to succeed this time, overcoming its proximity to ultra-low fares at DEN, then it could demonstrate that FNL service could also work. However, it is unlikely that American would consider service to FNL without a very large ($1-2 million) minimum revenue guarantee to support the service.

Delta Air Lines

Delta has consistently ranked as one of the top airlines for operational performance and customer service and continues to evolve as an airline focusing on operational and product excellence. They have also been active in route network adjustments, with Memphis no longer being a hub and Cincinnati now considered a focus city like Raleigh-Durham. Across the Delta system, Delta operates an extensive route network with hubs/focus cities at Atlanta, Detroit, Minneapolis, Salt Lake City, New York Kennedy and LaGuardia, Los Angeles and Seattle. **Table 6.3**, next page, provides frequency and capacity changes at Delta’s hubs. All hubs except Minneapolis had an increase in seats compared to July 2017. Atlanta continues to be the largest hub in the world for a single airline, with more than 985 daily departures. The most significant year-over-year growth on a percentage basis was at Seattle, with an 11 percent increase in seats and 6 percent increase in departures.

TABLE 6.3 DELTA AIR LINES - DEPARTURES AND SEATS BY HUB

HUB	JULY 2018			% CHANGE YOY		
	AVG DAILY SEATS	AVG DAILY DEPARTURES	AVG SEATS/ DEPARTURE	AVG DAILY SEATS	AVG DAILY DEPARTURES	AVG SEATS/ DEPARTURE
Atlanta, GA	139,695	985	142	3	1	2
Minneapolis, MN	47,708	407	117	(1)	(1)	(0)
Detroit, MI	44,632	407	110	2	(2)	4
New York, NY (JFK)	31,149	222	141	3	2	1
Salt Lake City, UT	30,304	255	119	6	3	3
Los Angeles, CA	24,607	159	154	6	(2)	8
Seattle, WA	22,393	165	135	11	6	5
New York, NY (LGA)	21,704	233	93	5	3	2
Total all markets	**688,247**	**5,569**	**124**	**3**	**1**	**2**

Source: Diio Mi; As of 9/28/18

Delta's fleet distribution by hub is depicted in **Table 6.4**. Delta has continued to reduce the total number of 50-seat regional jets in its network while adding larger regional jets and mainline flying. Numerous aircraft types experienced year-over-year decreases in utilization, including the CRJ series that was in part replaced with ERJ-170/175 aircraft. On the mainline side, the most notable changes was the significant increase in Airbus A321 and Boeing 737 aircraft and the reduction in the MD-88/90 aircraft.

TABLE 6.4 DELTA AIR LINES - AIRCRAFT IN USE

AIRCRAFT TYPE	SEATING CAPACITY	AVERAGE DAILY DEPARTURES		
		JULY 2018	JULY 2017	% CHANGE
McDonnell Douglas MD-88/90	149-158	794	889	(11)
Canadair CRJ-900	76	726	736	(1)
Canadair CRJ-200	50	718	822	(13)
Boeing 737	124-180	697	607	15
Embraer E-170/175	69-76	525	416	26
Boeing 717	110	467	469	(0)
Boeing 757	168-234	362	352	3
Canadair CRJ-700	69	344	395	(13)
Airbus A320	150-160	240	254	(5)
Airbus A321	192	228	104	120
Airbus A319	132	217	226	(4)
Boeing 767	208-261	143	151	(5)
Airbus A330	234-293	72	74	(3)
Boeing 777	291	22	24	(7)
Airbus A350	306	13	0	100
Boeing 747	376	0	8	(100)
Total		**5,569**	**5,527**	**1**

Source: Diio Mi; As of 9/28/18

Delta continues to evolve its fleet and is receiving the first of 75 of the Airbus A220 series aircraft (formerly the Bombardier C-Series) soon, which will fit in size between the Boeing 717 and 737 aircraft. Delta has stated that the purpose of those aircraft will be to replace more 50-seat regional jets, leaving just a fraction of what Delta operated at one point. Delta is also expanding their fleet with the CRJ-900 and ERJ-175 larger regional jets and will continue to receive new Boeing 737-900ER aircraft through 2018.

Delta is the least likely of the legacy airlines to consider service at FNL. It has added very few markets like FNL in the last decade, and as they continue to shift from 50-seat regional jets to small mainline aircraft like the Airbus A220, Delta will spend the majority of its network planning efforts on retaining current service, and not growth into new markets like FNL.

Southwest Airlines

In October 2014, the Wright Amendment, which restricted operations by Southwest at Dallas-Love field, expired and led to new nonstop service to markets like Los Angeles, San Diego and Phoenix. Southwest continues to grow its capacity each year; however, capacity increases are predominately due to replacing smaller, older Boeing 737-300 aircraft with larger Boeing 737-800 and Max 8 aircraft. Southwest discontinued use of the smaller Boeing 737-300 aircraft in October 2017. New rules for ground handling and scheduling will allow limited seasonal and less-than-daily service in the future.

Table 6.5 compares Southwest's focus city average daily departures and seats in July 2018 with the prior year. All markets except Chicago-Midway and Baltimore, experienced increases in capacity over July 2017. The most significant percentage increase in capacity and departures occurred at St. Louis and San Diego. Overall seats increased 3 percent while departures increased 2 percent year-over-year.

TABLE 6.5 SOUTHWEST AIRLINES - DEPARTURES AND SEATS BY FOCUS CITY

	JULY 2018			% CHANGE YOY		
FOCUS CITY/HUB	AVG DAILY SEATS	AVG DAILY DEPARTURES	AVG SEATS/ DEPARTURE	AVG DAILY SEATS	AVG DAILY DEPARTURES	AVG SEATS/ DEPARTURE
Chicago, IL (MDW)	38,391	252	153	(0)	(1)	1
Baltimore, MD	33,811	221	153	(1)	(2)	1
Las Vegas, NV	31,792	209	152	2	0	2
Denver, CO	31,592	205	154	2	1	1
Dallas, TX (DAL)	26,064	174	150	3	1	2
Phoenix, AZ (PHX)	25,707	170	151	3	2	1
Houston, TX (HOU)	24,749	164	151	5	4	1
Orlando, FL (MCO)	19,477	126	155	2	(1)	3
Los Angeles, CA	18,151	121	149	1	(1)	2

Southwest Unlikely at FNL
With a very large hub in DEN less than an hour away, it is unlikely that Southwest would consider service at FNL, as it would split its operations in what they would consider the same geographic catchment area.

TABLE 6.5 SOUTHWEST AIRLINES - DEPARTURES AND SEATS BY FOCUS CITY

FOCUS CITY/HUB	JULY 2018 AVG DAILY SEATS	JULY 2018 AVG DAILY DEPARTURES	JULY 2018 AVG SEATS/ DEPARTURE	% CHANGE YOY AVG DAILY SEATS	% CHANGE YOY AVG DAILY DEPARTURES	% CHANGE YOY AVG SEATS/ DEPARTURE
Atlanta, GA	17,630	118	149	1	1	(0)
Oakland, CA	17,425	116	150	4	3	1
St. Louis, MO	16,897	113	150	7	7	0
San Diego, CA	16,835	111	151	6	5	1
Nashville, TN	15,204	102	150	5	4	0
Total all markets	**600,694**	**3,993**	**150**	**3**	**2**	**1**

Source: Diio Mi; As of 9/28/18

Table 6.6 outlines Southwest's aircraft fleet in use. Southwest operates a fleet of Boeing 737 aircraft. As noted previously, Southwest discontinued use of Boeing 737-300 aircraft and has been replacing them with a combination of Boeing 737-700, 737-800 and Max 8 aircraft.

TABLE 6.6 SOUTHWEST AIRLINES - AIRCRAFT IN USE

AIRCRAFT TYPE	SEATING CAPACITY	AVERAGE DAILY DEPARTURES JULY 2018	AVERAGE DAILY DEPARTURES JULY 2017	AVERAGE DAILY DEPARTURES % CHANGE
Boeing 737-700	143	3,067	2,823	9
Boeing 737-800	175	853	715	19
Boeing 737-Max 8	175	73	0	100
Boeing 737-300	137-143	0	379	(100)
Total		**3,993**	**3,917**	**2**

Source: Diio Mi; As of 9/28/18

The Boeing 737-800 and Max-8 fleet is significantly larger in term of seats than the other aircraft and is the bulk of the new aircraft deliveries that Southwest has scheduled going forward. This will apply pressure to markets that are potentially on the bubble to support mainline Southwest service, since the Boeing 737-800 aircraft seat 175 instead of 122 or 143 seats of the older aircraft.

With a very large hub in DEN less than an hour away, it is unlikely that Southwest would consider service at FNL, as it would split its operations in what they would consider the same geographic catchment area.

United Airlines

With United's financial performance, on-time performance and other metrics lagging the industry in the mid 2010s, United looked towards changes in management. United has experienced significant upper management turnover. With the change in management, United is looking for growth and has focused on smaller "heartland" markets to increase their presence across the US.

United operates hubs at Houston-Intercontinental, Chicago-O'Hare, Newark, DEN, San Francisco, Washington-Dulles and, to a lesser extent, Los Angeles. **Table 6.7** shows seat and departure growth at each of United's hubs year-over-year. All hubs experienced increases in daily seats while the Houston hub was the only hub to experience a slight decrease in departures. The most significant increases on a percentage basis for seats occurred at the DEN and Los Angeles hubs, with both markets experiencing double digit departure increases. Overall, United's seats and departures increased 5 and 6 percent, respectively, year-over-year.

TABLE 6.7 UNITED AIRLINES - DEPARTURES AND SEATS BY HUB

	JULY 2018			% CHANGE YOY		
HUB/FOCUS MARKET	AVG DAILY SEATS	AVG DAILY DEPARTURES	AVG SEATS/ DEPARTURE	AVG DAILY SEATS	AVG DAILY DEPARTURES	AVG SEATS/ DEPARTURE
Chicago, IL (ORD)	64,489	619	104	2	7	(5)
Houston, TX (IAH)	57,665	504	114	6	(0)	6
Newark, NJ	53,100	429	124	5	4	2
Denver, CO	46,830	445	105	8	12	(3)
San Francisco, CA	45,993	307	150	3	3	0
Washington, DC (IAD)	26,866	242	111	5	8	(3)
Los Angeles, CA	22,892	165	139	13	17	(3)
Total all markets	**571,870**	**5,089**	**112**	**5**	**6**	**(1)**

Table 6.8, next page, provides the average daily departures by aircraft for July 2018. United continues to alter its regional fleet significantly. The Bombardier Q400 turboprop aircraft were completely retired in 2016, eliminating over 100 daily departures at one point in time. Use of the 50-seat regional jet aircraft account for nearly 1,500 daily departures for the United network, or 29 percent of departures. Despite the increase from July 2017 to July 2018, retirements for the 50-seat aircraft are expected to accelerate over the next couple of years, as the contracts with partners such as ExpressJet were adjusted to park the small regional jets in favor of larger regional jets and mainline aircraft, but the timing is now in question.

TABLE 6.8 UNITED AIRLINES - AIRCRAFT IN USE

AIRCRAFT TYPE	SEATING CAPACITY	AVERAGE DAILY DEPARTURES		
		JULY 2018	JULY 2017	% CHANGE
Boeing 737	118-179	1,247	1,189	5
Embraer E-170/175	69-76	919	846	9
Embraer E-145	50	744	841	(12)
Canadair CRJ-200	50	742	412	80
Airbus A320	150	376	370	2
Canadair CRJ-700	70	309	338	(9)
Airbus A319	128	302	268	12
Boeing 757	142-213	193	185	4
Boeing 777	267-366	133	128	4
Boeing 767	183-242	75	82	(9)
Boeing 787	219-252	49	45	10
DeHavilland DHC-8-200/300	37-50	0	71	(100)
Boeing 747	374	0	14	(100)
ATR-42/72	46	0	11	(100)
Total		**5,089**	**4,801**	**6**

Source: Diio Mi; As of 9/28/18

Similar to other legacy carriers, United has placed orders for new mainline aircraft to replace older mainline aircraft as well as some regional jet aircraft. With the change in management, United has adjusted several orders for different aircraft that it today feels would better fit its business model. This includes adjustments to narrow- and wide-body jet aircraft produced by Boeing and Airbus. United over the past few years has dramatically increased its focus on smaller, underserved markets in the Midwest, coined their “Heartland Initiative”. They added numerous new routes to Chicago and DEN and continue to look at adding more of these markets. Their focus on growth has been primarily at their Washington-Dulles, Chicago-O’Hare and DEN hubs.

With their fastest growing hub less than an hour from FNL, it is unlikely that United would be interested in serving FNL due to the risks of diluting their current service at DEN.

ULTRA LOW-COST AIRLINES

This section includes a discussion of carriers considered to be ultra-low-cost airlines, including: Allegiant, Frontier Airlines and Spirit Airlines.

Allegiant Air

Allegiant has been changing their strategy with the majority of its growth since 2014 in larger markets such as Austin, Cincinnati, Cleveland, Indianapolis, Newark, New Orleans and Pittsburgh. Allegiant continues to discuss opportunities to Mexico and the Caribbean.

In general, Allegiant's leisure destination oriented service is focused primarily on service to Orlando-Sanford, Tampa-St. Petersburg, Las Vegas, Punta Gorda and Phoenix-Mesa with limited service in select other markets such as Cincinnati and Fort Lauderdale. Service is typically provided through secondary airports (e.g., Sanford, Mesa) and is generally on a less-than-daily basis (two to three times weekly) from cities having limited access to service at larger airports. **Table 6.9** compares Allegiant's average weekly departures and seats in July 2018. Allegiant's primary growth is in Florida markets. Overall seats and departures increased 15 percent.

TABLE 6.9 ALLEGIANT AIR - DEPARTURES AND SEATS BY FOCUS CITY

	JULY 2018			% CHANGE YOY		
FOCUS CITY	AVG WEEKLY SEATS	AVG WEEKLY DEPARTURES	AVG SEATS/ DEPARTURE	AVG WEEKLY SEATS	AVG WEEKLY DEPARTURES	AVG SEATS/ DEPARTURE
Orlando, FL (SFB)	36,167	217	167	6	7	(1)
St. Petersburg, FL	28,964	171	170	15	17	(2)
Las Vegas, NV	28,215	178	158	(4)	2	(6)
Punta Gorda, FL	18,455	105	176	22	20	1
Phoenix, AZ (AZA)	17,691	104	171	18	8	9
Cincinnati, OH	15,555	88	176	57	43	10
Fort Lauderdale, FL	11,421	65	177	27	25	2
Fort Walton Beach, FL	11,132	63	177	58	55	2
Myrtle Beach, SC	9,954	57	174	23	16	6
Total all markets	**392,710**	**2,330**	**169**	**15**	**15**	**1**

Source: Diio Mi; As of 9/28/18

Table 6.10 provides Allegiant's aircraft in use for July 2018. Allegiant has been aggressively transforming its fleet from a MD-80 operation to an Airbus fleet. The MD80 fleet is down to just 14 percent of daily departures and will continue to shrink as MD80s are replaced by the Airbus A319/320-series. This fleet change has had a profound impact on the schedule model for the airline. The MD80 aircraft were inexpensive aircraft to purchase but expensive to operate due to their relative older age (high fuel and maintenance costs). The transition to a younger Airbus fleet increases the ownership costs, while reducing the relative cost for fuel and maintenance. This change will likely necessitate the airline to operate the aircraft more each week on average, and limit its ability to park the airplanes on historically slower days such as Tuesday, Wednesday or Saturday.

TABLE 6.10 ALLEGIANT AIR - AIRCRAFT IN USE

AIRCRAFT TYPE	SEATING CAPACITY	AVERAGE WEEKLY DEPARTURES JULY 2018	JULY 2017	% CHANGE
Airbus A320	177	1,237	664	86
Airbus A319	156	765	547	40
McDonnell Douglas MD-80	166	328	800	(59)
Boeing 757	223	0	20	(100)
Total		**2,330**	**2,031**	**15**

Source: Diio Mi; As of 9/28/18

Allegiant will fully retire its MD-80 fleet by the end of November 2018, which will have a significant impact on the number of aircraft available to schedule in 2019. With new and used aircraft deliveries expected to catch up with those aircraft retirements by mid-2019, Allegiant has discussed significant growth in the foreseeable future. With plans on adding 10 new aircraft to their fleet every year, there will undoubtedly be new opportunities around the country. Allegiant still plans on adding international service "soon", which could very well occupy much of the growth aircraft for several years once implemented.

FNL had Allegiant service in the past and all indications are that they performed well in the market. With a large immediate catchment area population and the ability to draw from the entire Denver area, it is likely that Allegiant could base multiple aircraft at FNL and serve numerous destinations, not just their traditional leisure markets such as Las Vegas, Phoenix-Mesa or Orlando-Sanford, but also their large markets such as Cincinnati, Pittsburgh or Austin. Low airport costs are critical to "winning the hearts" of Allegiant, but the competition for their aircraft is only increasing as they continue to shift their growth from small markets (such as Grand Island, Nebraska) to medium and large markets like Cincinnati or Austin.

Frontier Airlines

Frontier was purchased by Indigo Partners, which previously owned Spirit Airlines. Indigo has transformed Frontier into an ultra-low-cost carrier, similar to Spirit Airlines. Frontier has become less Denver centric and has been focusing on opportunistic growth in larger markets. Their existing growth has been in very large markets, while canceling service to smaller markets.

Frontier is actively growing their hub/focus cities (**Table 6.11**) focusing on markets with significant local demand. Frontier continued reductions at DEN, reducing capacity and departures by 3 percent, while Philadelphia and Austin grew significantly year-over-year. In total, Frontier's average daily seats increased 14 percent while departures increased 11 percent.

TABLE 6.11 FRONTIER AIRLINES - DEPARTURES AND SEATS BY FOCUS CITY

FOCUS CITY/ HUB	JULY 2018			% CHANGE YOY		
	AVG DAILY SEATS	AVG DAILY DEPARTURES	AVG SEATS/ DEPARTURE	AVG DAILY SEATS	AVG DAILY DEPARTURES	AVG SEATS/ DEPARTURE
Denver, CO	12,503	68	184	(3)	(3)	(0)
Orlando, FL (MCO)	5,092	25	207	2	(5)	8
Las Vegas, NV	3,444	18	194	(4)	(8)	4
Philadelphia, PA	3,411	17	199	34	22	10
Austin, TX	2,487	14	172	137	163	(10)
Cincinnati, OH	2,190	12	189	(12)	(16)	4
Atlanta, GA	1,968	10	188	3	(13)	18
Chicago, IL (ORD)	1,892	10	189	(14)	(9)	(5)
Cleveland, OH	1,784	8	219	(31)	(35)	6
Total all markets	**67,180**	**357**	**188**	**14**	**11**	**3**

Source: Diio Mi; As of 9/28/18

Frontier continues to adjust their Airbus fleet mix (**Table 6.12**). Frontier's smallest aircraft, the Airbus A319 (150 seats), decreased by 41 percent in departures, while the Airbus A320 (180 seats) and A321 (230 seats) had significant growth.

TABLE 6.12 FRONTIER AIRLINES - AIRCRAFT IN USE

AIRCRAFT TYPE	SEATING CAPACITY	AVERAGE DAILY DEPARTURES		
		JULY 2018	JULY 2017	% CHANGE
Airbus A320	180	211	150	40
Airbus A321	230	92	78	18
Airbus A319	150	54	93	(41)
Total		**357**	**321**	**11**

Source: Diio Mi; As of 9/28/18

While Frontier has their primary hub at DEN, they are a very distant third in terms of market share at DEN and will likely struggle to gain market share as United and Southwest continue to grow. This could lead to a situation in which Frontier looks at growth at FNL as a way to grab market share without the direct competition at DEN.

Spirit Airlines

Spirit has been actively growing their presence in point-to-point markets. Spirit plans significant growth, but their current growth has been focused in larger markets that can support daily service using aircraft with high density seating. In general, Spirit service has been less than stable with their fleet being redeployed to markets perceived to offer a greater opportunity.

Spirit primarily serves leisure markets with a focus on Fort Lauderdale, Orlando-International, Las Vegas, Detroit, Chicago-O'Hare, Baltimore, Los Angeles, Dallas-Fort Worth and Atlanta. **Table 6.13** compares average departures and seats in July 2018 with the prior year. Overall Spirit's seats and departures increased 18 and 15 percent, respectively. The most significant percentage increases (greater than 20 percent capacity and departures) occurred in the Las Vegas, Orlando-International, Dallas-Fort Worth and Baltimore markets.

TABLE 6.13 SPIRIT AIRLINES - DEPARTURES AND SEATS BY HUB

HUB/FOCUS CITY	JULY 2018			% CHANGE YOY		
	AVG DAILY SEATS	AVG DAILY DEPARTURES	AVG SEATS/ DEPARTURE	AVG DAILY SEATS	AVG DAILY DEPARTURES	AVG SEATS/ DEPARTURE
Fort Lauderdale, FL	12,350	67	185	13	14	(1)
Las Vegas, NV	7,451	41	182	24	24	(0)
Orlando, FL (MCO)	7,216	39	185	34	30	3
Dallas, TX (DFW)	6,340	35	181	24	25	(1)
Chicago, IL (ORD)	6,150	30	205	9	0	9
Detroit, MI	5,764	31	185	19	16	3
Los Angeles, CA	4,859	26	190	2	(4)	6
Baltimore, MD	4,833	28	174	34	27	6
Houston, TX (IAH)	4,602	22	209	8	(3)	11
Atlanta, GA	4,183	25	170	28	19	7
Myrtle Beach, SC	3,490	20	173	15	19	(3)
Total all markets	**104,319**	**570**	**183**	**18**	**15**	**3**

Source: Diio Mi; As of 9/28/18

Spirit operates the Airbus A319, A320 and A321 aircraft with more than half of departures on the 178- to 182-seat A320 aircraft (**Table 6.14**, next page). Spirit continues to grow its fleet significantly, with a doubling in capacity expected by 2020. This growth is coming predominately in the largest sized aircraft, the Airbus A320 and A321. However, Spirit plans to increase the number of A319 aircraft and begin serving mid-size markets previously not considered a fit with Spirit's business model.

TABLE 6.14 SPIRIT AIRLINES - AIRCRAFT IN USE

AIRCRAFT TYPE	SEATING CAPACITY	AVERAGE DAILY DEPARTURES JULY 2018	JULY 2017	% CHANGE
Airbus A320	178-182	278	253	10
Airbus A319	145	155	152	2
Airbus A321	218-228	137	90	52
Total		**570**	**496**	**15**

Source: Diio Mi; As of 9/28/18

Spirit was the first of the ultra-low-cost carriers in the US and has been growing tremendously for years, predominately in larger markets such as Atlanta, Los Angeles, Chicago and Dallas-Fort Worth. They operate at relatively few secondary airports like FNL and, with their service already at DEN, FNL is not likely an immediate opportunity for them.

OTHER AIRLINES

Other airline opportunities may arise such as pro-rate flying on regional airlines like SkyWest Airlines or scheduled charter service on evolving carriers such as JetSuiteX, Elite Airways or Via Air. SkyWest operates all pro-rate service with the CRJ-200 and, due to profitability impacts of longer haul flights, typically operates pro-rate at stage lengths under 700 miles. There are also many discussions ongoing regarding startup airlines throughout the US; however, due to DEN being one of the highest number of seats per capita, the initial risk of startup service at FNL would likely require significant incentives from the community. Without a Federal Inspection Station (FIS), international service is limited to international airports that offer pre-clearance facilities.

APPENDIX A.
TOP 50 TRUE MARKETS

TABLE A.1 TOP 50 TRUE MARKETS

RANK	DESTINATION	FNL REPORTED PAX	DEN DIVERTING PAX	TRUE MARKET	PDEW
1	Phoenix, AZ (PHX)	0	124,461	124,461	170.5
2	Los Angeles, CA	0	115,178	115,178	157.8
3	Seattle, WA	0	94,302	94,302	129.2
4	San Francisco, CA	0	83,089	83,089	113.8
5	Las Vegas, NV	0	75,922	75,922	104.0
6	Minneapolis, MN	0	60,871	60,871	83.4
7	Chicago, IL (ORD)	0	58,860	58,860	80.6
8	Dallas, TX (DFW)	0	58,031	58,031	79.5
9	Orlando, FL (MCO)	0	51,738	51,738	70.9
10	San Diego, CA	0	46,260	46,260	63.4
11	Atlanta, GA	0	46,079	46,079	63.1
12	New York, NY (LGA)	0	44,564	44,564	61.0
13	Boston, MA	0	44,438	44,438	60.9
14	Philadelphia, PA	0	38,510	38,510	52.8
15	Orange County, CA	0	34,486	34,486	47.2
16	Portland, OR	0	33,114	33,114	45.4
17	Salt Lake City, UT	0	32,763	32,763	44.9
18	Austin, TX	0	30,324	30,324	41.5
19	Kansas City, MO	0	29,237	29,237	40.1
20	Detroit, MI	0	29,204	29,204	40.0
21	Tampa, FL	0	28,548	28,548	39.1
22	New York, NY (JFK)	0	28,127	28,127	38.5
23	Washington, DC (IAD)	0	27,619	27,619	37.8
24	Chicago, IL (MDW)	0	27,166	27,166	37.2
25	St. Louis, MO	0	27,072	27,072	37.1
26	Miami, FL	0	25,739	25,739	35.3
27	Fort Lauderdale, FL	0	24,764	24,764	33.9
28	Houston, TX (IAH)	0	24,141	24,141	33.1
29	Charlotte-Douglas, NC	0	23,836	23,836	32.7
30	Dallas, TX (DAL)	0	22,580	22,580	30.9
31	Nashville, TN	0	22,344	22,344	30.6

TABLE A.1 TOP 50 TRUE MARKETS

RANK	DESTINATION	FNL REPORTED PAX	DEN DIVERTING PAX	TRUE MARKET	PDEW
32	New Orleans, LA	0	21,634	21,634	29.6
33	Newark, NJ	0	21,134	21,134	29.0
34	San Antonio, TX	0	20,965	20,965	28.7
35	Washington, DC (DCA)	0	20,852	20,852	28.6
36	Milwaukee, WI	0	20,349	20,349	27.9
37	Houston, TX (HOU)	0	19,824	19,824	27.2
38	San Jose, CA	0	19,646	19,646	26.9
39	Sacramento, CA	0	19,154	19,154	26.2
40	Indianapolis, IN	0	18,758	18,758	25.7
41	Omaha, NE	0	18,603	18,603	25.5
42	Baltimore, MD	0	18,260	18,260	25.0
43	Cancun, Mexico	0	16,936	16,936	23.2
44	Raleigh/Durham, NC	0	16,218	16,218	22.2
45	Pittsburgh, PA	0	14,259	14,259	19.5
46	Fort Myers, FL	0	14,251	14,251	19.5
47	Cleveland, OH	0	13,814	13,814	18.9
48	Oakland, CA	0	13,484	13,484	18.5
49	Anchorage, AK	0	12,905	12,905	17.7
50	Oklahoma City, OK	0	12,885	12,885	17.7
	Top 50 Destinations	**0**	**1,747,298**	**1,747,298**	**2,393.6**
	Total Domestic	**0**	**2,181,758**	**2,181,758**	**2,988.7**
	Total International	**0**	**152,025**	**152,025**	**208.3**
	Total All Markets	**0**	**2,333,783**	**2,333,783**	**3,197.0**

APPENDIX B. GLOSSARY

Airport catchment area (ACA)
The geographic area surrounding an airport from which that airport can reasonably expect to draw passenger traffic. The airport catchment area is sometimes called the service area.

Airport codes
AZA .... Phoenix-Mesa, AZ
DAL .... Dallas-Love Field, TX
DCA .... Washington-National, DC
DEN .... Denver, CO
DFW .... Dallas-Fort Worth, TX
FNL .... Fort Collins, CO
HOU .... Houston-Hobby, TX
IAD .... Washington-Dulles, DC
IAH .... Houston-Intercontinental, TX
JFK.............................. New York-Kennedy, NY
LGA.......................... New York-LaGuardia, NY
LHR .... London-Heathrow, UK
MCO......................... Orlando-International, FL
MDW .... Chicago-Midway, IL
ORD .... Chicago-O'Hare, IL
PHX............................ Phoenix-Sky Harbor, AZ
SFB .... Orlando-Sanford, FL

ARC
Acronym for Airline Reporting Corporation.

Average airfare
The average of the airfares reported by the airlines to the U.S. DOT. The average airfare does not include taxes or passenger facility charges and represents one-half of a roundtrip ticket.

Destination airport
Any airport where the air traveler spends four hours or more. This is the Federal Aviation Administration definition.

Diversion
Passengers who do not use the local airport for air travel, but instead use a competing airport to originate the air portion of their trip.

Enplanement
A passenger boarding a commercial aircraft.

FAA
Acronym for the Federal Aviation Administration.

Hub
An airport used by an airline as a transfer point to get passengers to their intended destination. It is part of a hub and spoke model, where travelers moving between airports not served by direct flights change planes en route to their destination. Also an airport classification system used by the FAA (e.g., non-hub, small hub, medium hub, and large hub.

Large hub
An airport with one percent or more of total US annual passenger boardings.

Load factor
The percentage of airplane capacity that is used by passengers.

Local market
The number of air travelers who travel between two points via nonstop air service.

Low-cost airline
A category of airlines that has emerged since deregulation which offer low fares, minimal amenities, and serve primarily high volume markets.

Medium hub
A hub with at least 0.25 percent but less than one percent of total US annual passenger boardings.

Network carrier
The category assigned to the large hub and spoke airlines with nationwide route networks.

Non-hub
An airport with more than 10,000 but less than 0.05 percent of the total US annual passenger boardings.

Nonstop flight
Air travel between two points without stopping at an intermediate airport.

Onboard passengers
The number of passengers transported on one flight segment.

Origin and destination (O&D) passengers
Includes all originating and destination passengers. In the context of this report, it describes the passengers arriving and departing an airport.

Originating airport
The airport used by an air traveler for the first enplanement of a commercial air flight.

Passenger Facility Charge
Fee imposed by airports of $1 to $4.50 on enplaning passengers. The fees are used by airports to fund FAA approved airport improvement projects.

Pax
Abbreviation for passengers.

PDEW
Abbreviation for passengers daily each way.

Point-to-point
Nonstop service that does not stop at an airline's hub and whose primary purpose is to carry local traffic rather than connecting traffic.

RASM
Acronym for Revenue per Available Seat Mile, also referred to as unit revenue. Available seat-miles are aircraft miles flown on each flight multiplied by the seat capacity available for sale. Passenger revenue is the number of paying passengers flown multiplied by the fare they paid.

Regional airline
Airlines that specialize in serving smaller markets with smaller aircraft normally in association with a larger airline.

Regional jet
A jet aircraft with a single aisle designed for seating fewer than 100 passengers.

Retained passengers (retention)
Passengers who use the local airport for air travel instead of using a competing airport to originate the air portion of their trip.

Scheduled air service
Flights provided between cities at pre-planned departure and arrival times.

Small hub
An airport with at least 0.05 but less than 0.25 percent of the total US passenger annual boardings.

Stage length
Distance of itinerary nonstop leg.

True market
Total number of air travelers, including those who are using a competing airport, in the geographic area served by BTM. The true market estimate includes the size of the total market and for specific destinations.

Turboprop aircraft
A type of engine that uses a jet engine to turn a propeller. Turboprops are often used on regional and business aircraft because of their relative efficiency at speeds slower than, and altitudes lower than, those of a typical jet.

U.S. DOT
Acronym for U.S. Department of Transportation.

FOR MORE INFORMATION, PLEASE CONTACT

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APPENDIX D:

GA INDUSTRY ANALYSIS

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General Aviation Industry Analysis

Mead & Hunt

Northern Colorado Regional Airport

December 20, 2018

December 20, 2018

Mr. Ryan Hayes, C.M.
Project Manager Aviation Services
Mead & Hunt
1743 Wazee Street, Suite 400
Denver, Colorado 80202

RE: General Aviation Industry Analysis

Dear Mr. Hayes:

Pursuant to our engagement, Aviation Management Consulting Group (AMCG) has completed a General Aviation Industry Analysis. This report conveys key findings, and observations.

The General Aviation Industry Analysis analyzes general conditions, industry trends and demographics in the market. This assessment included analyzing funding mechanisms, general aviation new aircraft deliveries, hours flown, active pilots and fuel consumption, as well as Fixed Base Operators and Specialized Aviation Service Operators.

We are pleased to have been called upon to conduct this assessment. Please contact me if you have any questions about this report. Thank you for the opportunity to be of service.

Sincerely,

Bryan E. Johnson, A.A.E.
Consultant

I. LIMITING CONDITIONS

This report is subject to the following conditions and to other specific and limiting conditions as described by the AMCG team in this report.

1. The data utilized in compiling this report was provided by and/or obtained from sources considered reliable and authentic. Aviation Management Consulting Group (AMCG) has accepted the information provided by and/or obtained from others without audit or cross verification. As such, AMCG assumes no liability for its accuracy or correctness.
2. The estimates, conclusions, and projections contained in this report are included to assist the reader in understanding the uniqueness of the aviation services industry. As assumptions are a necessary component of future projections, the assumptions made in this report are based upon reasonable and prudent estimates. These estimates are, however, subject to unforeseen and unpredictable influences such as, competition, local, regional, national, and global economies, fuel supply volatility, pricing, and discounting, quality of management, supervision, and operating-level employees, and the implementation of effective sales, marketing, and promotional programs. Therefore, actual outcomes may vary from the estimates, projections, and conclusions contained herein.
3. It is intended that this report be considered as a total product, the components of which must not be considered independently.
4. Compensation for preparing this report is not, in any manner, contingent upon the conclusions suggested or drawn herein.
5. This report is made for the client to whom it is addressed and is delivered to the client on the condition that it is to be used by the client only for the purpose stated in the report. No reliance is to be placed on this report for any other purposes.
6. Neither all nor any part of this report (especially any conclusions reached or the identity of the individuals or the firm with which they are connected) shall be disseminated to the public through the advertising media, public relations media, news media, sales media or any other public means of communication without prior written consent and approval of the individuals or the firm.

II. GENERAL AVIATION INDUSTRY TRENDS

A. Airports

Communities across the United States depend on general aviation airports to facilitate air transportation, which both builds and sustains local economies. While general aviation airports support a full range of activities including such important public services as medical transport, law enforcement, fire protection, etc., perhaps the most important role of general aviation airport is to provide business access to the community.

B. Aviation Service Industry

Air transportation services and/or aircraft ground services are provided by Fixed Base Operators (FBOs) and Specialized Aviation Services Operators (SASOs). FBOs are defined as a commercial operator engaged in the sale of products and services and the renting or subleasing of facilities consistent with an airport’s minimum standards for commercial aeronautical activities. A SASO is defined as a commercial operator that provides any one or a combination of the following activities: aircraft maintenance, avionics or instrument maintenance, aircraft rental or flight training, aircraft charter or aircraft management, aircraft sales, and other commercial aeronautical activities consistent with an airport’s minimum standards for commercial aeronautical activities.

At this time, it is estimated that there are approximately 3,500 FBOs and in excess of 20,000 SASOs in operation in the United States at airports having a paved runway of 3,000 feet or more. The 3,000 foot runway length is important as it is normally recognized as the minimum runway length required to accommodate the majority of general aviation aircraft. For higher altitude airports, however, considering the effects of density altitude, longer runways in the 5,000 to 6,000 foot range are typically required to achieve the same safety and performance parameters.

1. Products, Services, and Facilities

The products, services, and facilities that are offered in the general aviation marketplace have been predicated primarily on the demand created by four distinctly separate operating classifications within the marketplace –personal, business, commercial, and government. These segments are defined and briefly examined, as follows:

a. Personal

In many respects, aircraft owners and operators who have committed time and financial resources to this segment of the industry have done so because of a sheer love of aviation. The “romance factor”, which has enthralled both young and old alike, is a very important element in understanding the relationship between people and flying machines.

The aircraft utilized for personal flying are typically based at general aviation airports, both public and private. For the most part, the aircraft used for personal flying are single-engine and light multi-engine piston-powered aircraft, although some larger aircraft, including turbine-powered aircraft, are also used for this purpose.

According to the General Aviation Manufacturer's Association (GAMA),there were 211,000 active aircraft being used in the United States in 2016. This segment of the market is typically price oriented, seeking the best price for the service.

b. Business

The business segment of the market is viewed as integral to the long-term growth and development of the general aviation industry. As of 2016, this segment was comprised of approximately 26,000 active aircraft, including approximately 11,000 turboprop and jet aircraft, in the United States. It is estimated that business flights make up over 17% of the approximately 25 million hours flown by general aviation each year (GAMA 2017).

One of general aviation's most important roles in the economy of the United States is enhancing the profitability and competitive strength of United States companies and industries. Companies that take advantage of general aviation routinely outperform businesses relying solely on the airlines for travel. Studies have shown that, on average, Standard & Poor's 500 firms that use general aviation to transport management teams, employees, business partners, and customers earned approximately 70% more total return to shareholders than those that do not utilize general aviation (NexaAdvisors 2017). This analysis revealed a correlation between firms utilizing general aviation aircraft and return on equity. It did not conclude that the use of general aviation aircraft increased financial performance.

While approximately 3% of general aviation aircraft are registered to Standard & Poor's 500 firms, the majority of business aircraft are operated by smaller companies. In the Business Aviation Factbook (2017), National Business Aviation Association indicates that 59% of companies operating business aircraft employ fewer than 500 employees and 70% have fewer than 1,000 employees. The business segment of the market is typically service oriented, seeking the best service for the price.

c. Commercial

Commercial aviation is a significant economic engine as it represents companies that use general aviation aircraft for commercial purposes including flight instruction, air taxi (non-scheduled, on-demand), medical transportation (air ambulance), sightseeing, aerial observation (e.g., pipeline/power-line patrol/inspection), aerial application (e.g., agriculture, photography, firefighting, etc.), cargo, and much more. This segment is comprised of more than 40,000 active aircraft. It is estimated that general aviation aircraft used for commercial purposes make up about 64% of the 25 million hours flown by general aviation each year (GAMA 2017). The commercial segment of the market is typically value oriented, seeking the best combination of service and price.

III. FUNDING MECHANISMS

A. Introduction

Under Airport Assurance 24, the Federal Aviation Administration (FAA) requires that any federally obligated airport be as financially self-sustaining as possible given the circumstances that exist at the airport. Potential funding sources include the airport revenues, FAA, State of Colorado, airport sponsor loan program, and commercial lending institutions.

B. Airport Revenues

The airport sponsor generates revenues from several sources including rents (e.g., commercial and non-commercial land and improvement leases), fees (e.g., fuel flowage fees, landing fees, etc.) and other miscellaneous fees and charges.

C. Federal Aviation Administration

Four key areas of potential funding sources from the FAA include the following:

1. Airport Improvement Program (AIP)

AIP provides grants to airport sponsors for the planning and development of public-use airports that are included in the National Plan of Integrated Airport Systems (NPIAS). For general aviation airports, the grant covers a range of 90 to 95 percent of eligible costs, based on statutory requirements.

2. AIP Discretionary Funds

Distribution of AIP discretionary funds is based on national airport system priorities and objectives with the highest priority given to projects that enhance safety, capacity, security, and preserving airport infrastructure, meeting FAA standards and environmental concerns. Remaining funds are distributed to a discretionary fund that are distributed according to a prioritization formula.

3. Non-Primary Entitlement Funds for General Aviation Airports

Non-primary entitlement funds are specifically allocated for eligible general aviation airports that show justified airfield development. Eligible airports receive money on an annual basis for approved projects. Airport operational costs such as salaries, mowing equipment, and supplies are not eligible for entitlement funds.

4. AIP Funded Hangar Development Project

The AIP reauthorization “Vision100 – Century of Aviation Reauthorization Act,” included a provision that allows the use of AIP funds for revenue-producing facilities, such as hangars or fuel farms. The Federal share of the cost of allowable revenue-producing facilities can only be funded with non-primary entitlements. Discretionary funds cannot be used for the Federal share of these project costs.

The intent of the statute is to support the construction of “new” facilities which “add additional revenue producing capability” for the facility; however, the FAA will review acquisition of existing facilities on a case-by-case basis. Improvements to existing facilities requires approval from the FAA. Replacement of facilities is only allowed if there is a demonstrated need and the replacement increases capacity.

D. State of Colorado

Two key areas of potential funding sources from the State of Colorado include the following:

1. Aviation Fuel Tax

The Aviation Fuel Tax is the mechanism used to support Colorado public-use airports. Fuel taxes are used to support airport growth and development at the local level through discretionary aviation grants (mostly used to support larger AIP projects) and airport fuel disbursements. The aviation fuel tax disbursement is the portion of the tax that is collected at the Airport. For additional details please visit, https://www.codot.gov/programs/aeronautics/FuelTax. The Colorado Discretionary Aviation Grant (CDAG) program enhances airport development through a competitive process. Most AIP eligible projects are supported through the CDAG.

2. SIB Loan Program

The Colorado Division of Aeronautics in conjunction with the Colorado Department of Transportation administers the State Infrastructure Bank (SIB) Loan Program. Colorado public-use airports are encouraged to develop and support airport projects through the low-interest revolving loan program. SIB loans can be used for multiple capital improvement projects such as equipment acquisition, pavement, etc. SIB information is available at https://www.codot.gov/programs/aeronautics/SIB.

E. Airport Sponsor Loan Program

In the event FAA/state funding is not available, the airport sponsors may, in certain situations, finance development at airports typically related to hangars. Under this situation, the airport sponsor funds the original development and the tenant repays the airport sponsor based on a specific repayment schedule or arrangement.

F. Commercial Lending Institutions

In the event FAA/state funding is not available, airport sponsors and/or interested parties may secure a loan from a commercial lending institution which will charge market-based interest rates which may not be as attractive as those available from public agencies.

IV. GENERAL AVIATION INDUSTRY TRENDS

A. Introduction

For the purposes of this analysis, national general aviation trends, including general aviation new aircraft deliveries, active general aviation aircraft, general aviation hours flown, active pilots, and general aviation fuel consumption were analyzed. General aviation is a term used to describe a diverse range of aviation activities which includes all segments of the aviation industry except commercial air carriers and military. This includes recreational flying in single engine aircraft, up to corporate business jets. The key findings follow.

B. General Aviation New Aircraft Deliveries

General aviation new aircraft deliveries by United States manufacturers reached a high of 17,811 in 1978 and then experienced a significant decline until bottoming out in 1994 at an industry low of 929 units. The significant decline during this period can be attributed to a number of factors including:

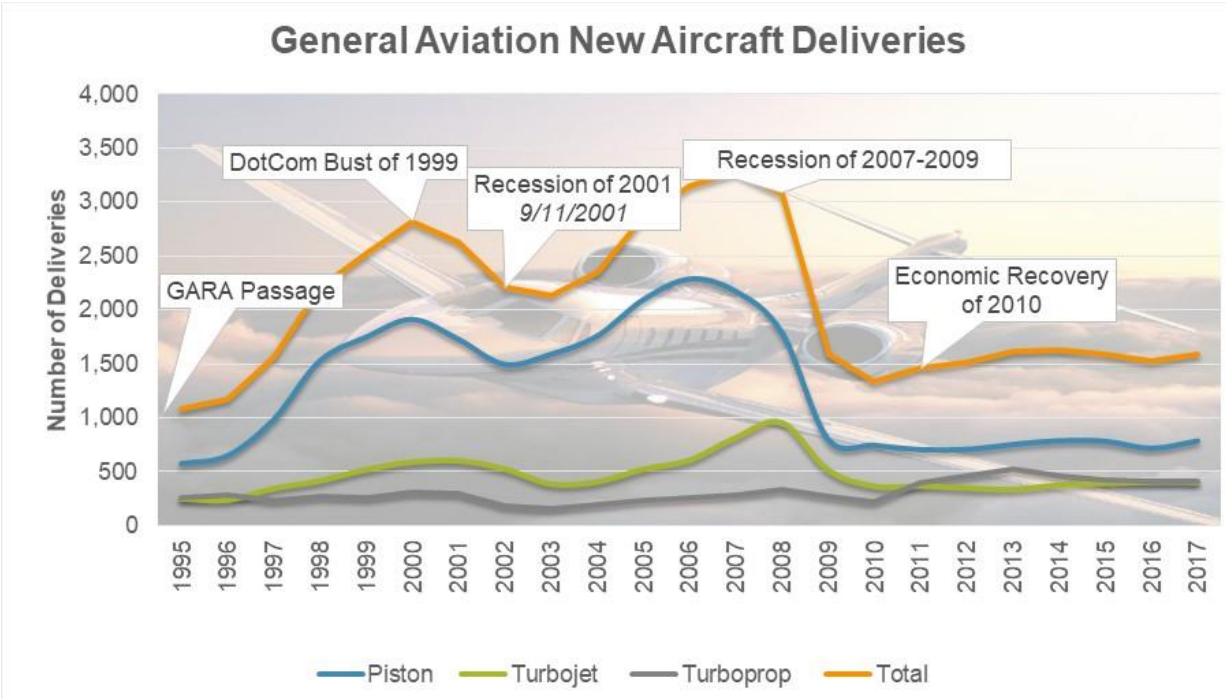
- Increased aircraft acquisition costs (relating primarily to the rising costs associated with product liability insurance)
- Increased operating costs (insurance, maintenance, fuel, etc.)
- Implementation of the “luxury” tax in 1986 and repeal of the Investment Tax Credit
- Increased air carrier service capabilities including regional and commuter carriers

Following this decline, general aviation aircraft deliveries increased from 929 annual shipments in 1994 to 3,279 annual shipments in 2007 which represents an increase of 253% or a compounded annual increase of 10.2% over the period. This significant increase was attributed to several factors, as follows:

- The passage of the General Aviation Revitalization Act (GARA) in 1994 that limited the liability of aircraft and aircraft parts manufacturers to 18 years
- The proliferation of fractional aircraft ownership programs
- A strong economy during the late 1990s to the mid-2000s (including low interest rates)
- Entrance by new aircraft manufacturing companies
- Introduction of new technologies (e.g., composite materials and glass cockpits).

Subsequently, annual general aviation new aircraft deliveries decreased sharply from 3,279 in 2007 to 1,334 in 2010 due to the economic recession. From 2010 to 2017, general aviation aircraft new deliveries increased from 1,334 deliveries to 1,596 deliveries which represents an increase of 19.6% or a compounded annual increase of 2.6%.

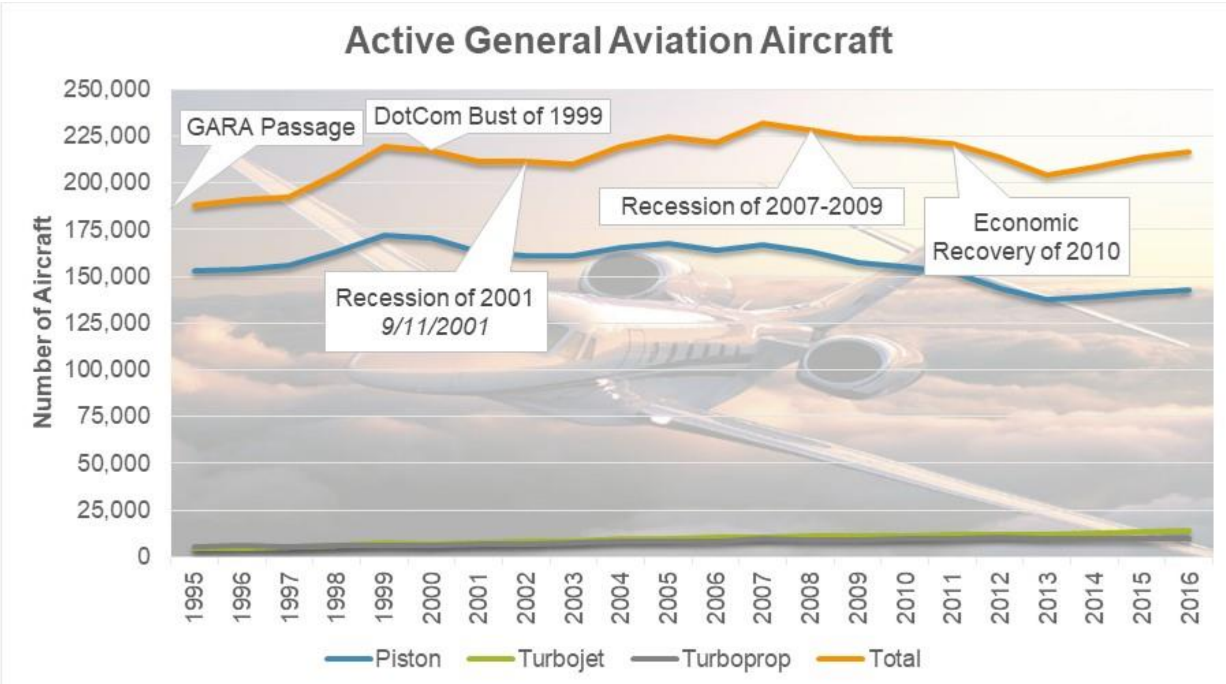
Figure 1 – General Aviation New Aircraft Deliveries



C. Active General Aviation Aircraft

As with new general aviation aircraft deliveries, the number of active general aviation aircraft hit a low in 1994 of 172,936. Since that time, the number of active aircraft increased to a high of 231,607 in 2007. This increase was attributed to the growth of experimental and turbine aircraft, the resurgence of new aircraft manufacturing (i.e., the growth of new aircraft deliveries and the number of companies developing Supplemental Type Certificate programs to modify and keep the aging aircraft fleet active). However, since the peak in 2007, active aircraft has dropped year after year. From 2007 to 2016 active aircraft decreased to 216,257 which represents a decrease of 6.6% or a compounded annual change of -0.8%. Active general aviation aircraft is forecasted by the Federal Aviation Administration (FAA) to decrease 0.1% annually through 2026.

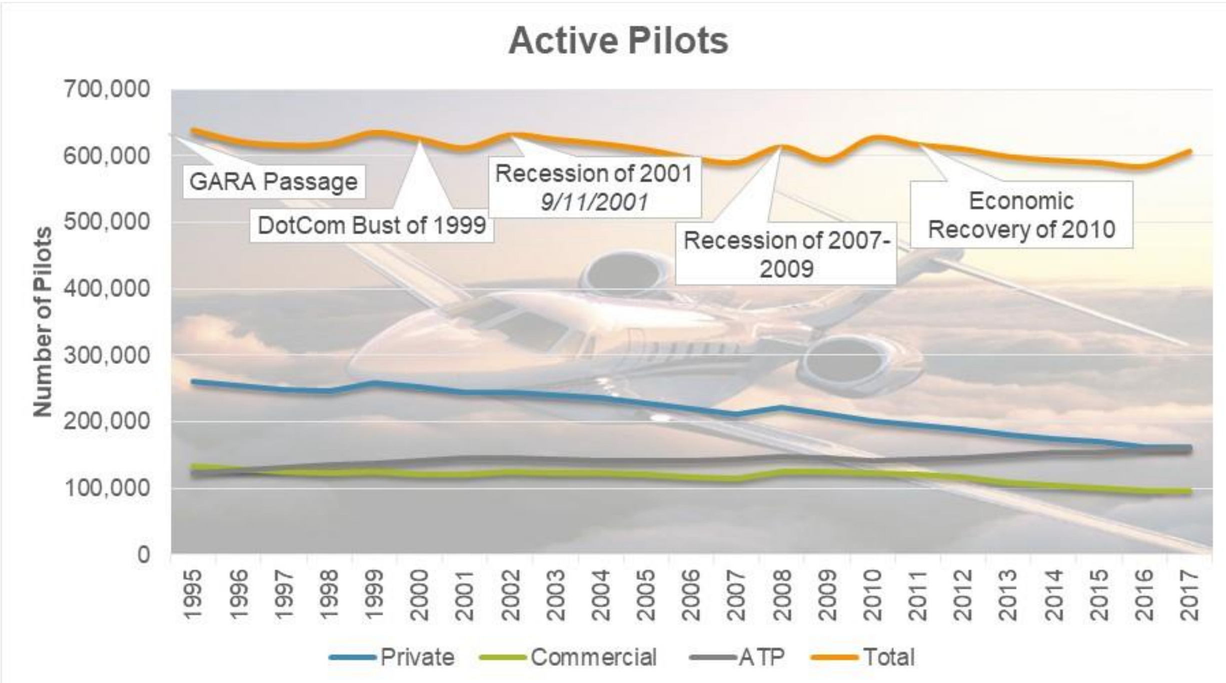
Figure 2 – Active General Aviation Aircraft



D. Active Pilots

The number of active pilots in the United States decreased throughout the 1980s and 1990s. Since peaking at 827,071 in 1980, the number of active pilots has declined 29.3% or a compounded annual decrease of 1.0% to 584,362 active pilots in 2016. During this overall decrease, the number of active pilots increased slightly in the late 1990s and early 2000s which can be attributed to pilot development programs. With minor fluctuations, the number of active pilots has remained relatively consistent since 2006. However, the number of active pilots increased to 607,306 in 2017 which represents an increase of 2.3% or a compounded annual change of 0.8%. Out of the 607,306 active pilots in 2017, 106,692 or approximately 17.6% hold a Certified Flight Instructor certificate and 306,066 or 50.5% hold instrument ratings.

Figure 3 – Active Pilots



E. General Aviation Hours Flown

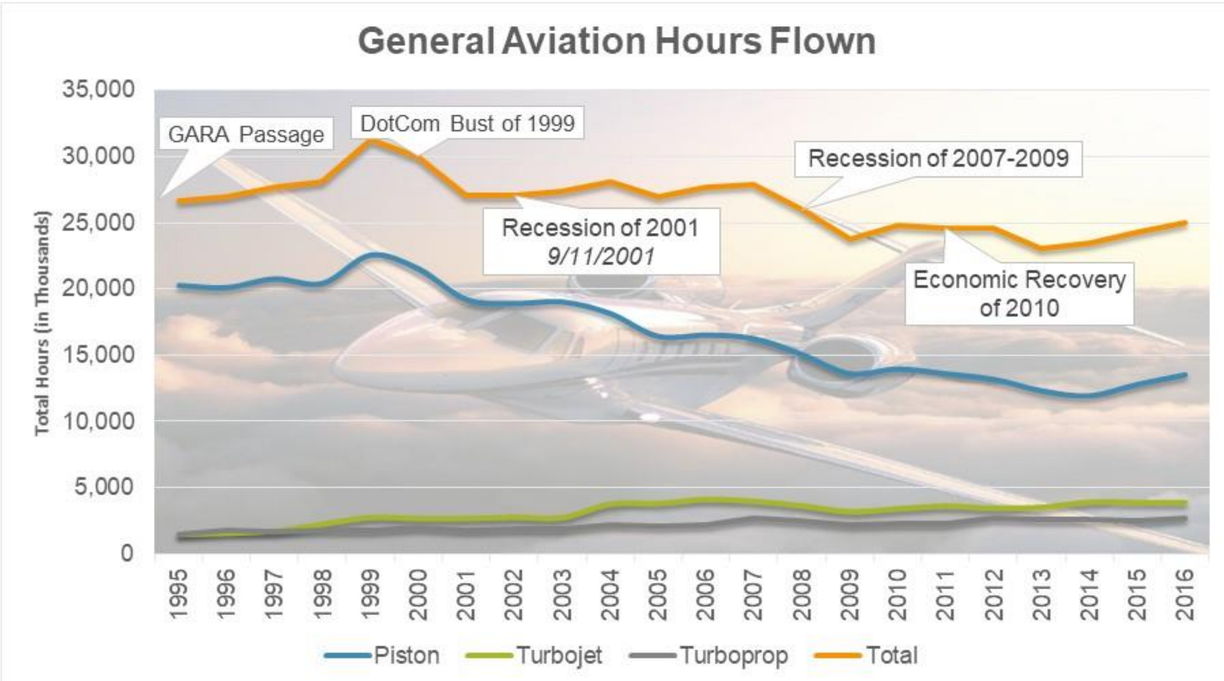
The total number of general aviation hours flown in the United States reached a low in 2013 of 23,009,000 hours, which represents a decrease of 43.9% and a compounded annual decrease of 1.7% over the period from the high of 41,017,000 hours achieved in 1980 (which corresponds with the first-year data was available). Since 2013, the number of general aviation hours flown increased to 24,986,000 in 2016 which represents an increase of 8.6% or a compounded annual change of 2.8%. General aviation hours flown is forecasted to increase 0.6% annually through 2026.

While the number of hours flown by piston-powered aircraft have fluctuated (declining for the most part) since the early 1980s, the number of turboprop and turbojet aircraft hours flown have been cyclical over this same period. However, turbine aircraft hours have increased from 3,572,000 in 1980 to 6,554,000 in 2016 (an increase of 83.5% or a compounded annual increase of 2.4%). These fluctuations can be attributed, in large part, to changes in the economy.

At first glance, the increase in the number of active general aviation aircraft since 1994 and the decline in general aviation hours flown appear to be contradictory. However, these divergent trends are supported by the decline in the average number of hours flown per aircraft which has decreased from a high of 194.4 hours per aircraft in 1980 to a low of 106.1 hours per aircraft in 2009 (which represents a decrease of 45.4% or a compounded annual decrease of 2.1% over the period).

Average number of hours flown by aircraft has increased slightly since 2009 to 115.5 in 2016 which represents an increase of 8.9% or a compounded annual increase of 1.2% over the period.

Figure 4 – General Aviation Hours Flown

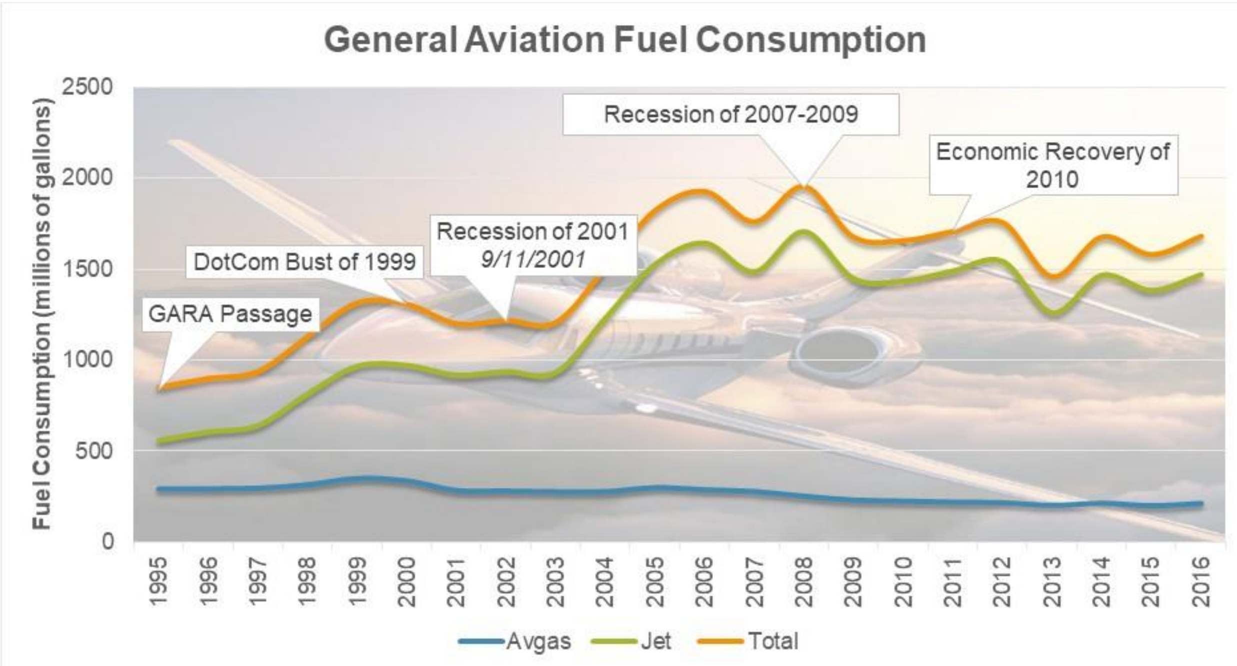


F. General Aviation Fuel Consumption

Total general aviation fuel consumption increased from 702,800,000 gallons in 1993 to 1,926,000,000 gallons in 2016. This represents a total increase of 174.0% or a compounded annual increase of 8.1%. This trend can be attributed to an increase in aircraft manufacturing, expansion of fractional aircraft ownership, and a robust economy (particularly in the late 1990s). Since 2006, general aviation fuel consumption decreased to 1,679,500,000 gallons in 2016 which represents a total decrease of 12.8% or a compounded annual change of -1.0%.

While aviation gasoline volumes declined through 1994 (except for small increases in 1984 and 1990), jet fuel volumes experienced several cycles of growth and decline throughout the same period. The dramatic drop in jet fuel volumes from 1989 to 1993 and the impressive recovery since 1994 are indicative of the resurgence in activity the industry has enjoyed since that time.

Figure 5 – General Aviation Fuel Consumption



V. INDUSTRY AND MARKET FORECASTS

A. Industry Forecasts

The following are based on forecasts developed by the Federal Aviation Administration (FAA) and leading aviation industry product manufacturers (including GAMA and Honeywell Aerospace’s Business Aviation Outlook).

- General aviation aircraft hours flown are forecast to increase at an average annual rate of 0.9% through 2037.
- General aviation aircraft fuel consumed is forecast to increase at an average annual rate of 1.7% through 2037. Jet fuel consumption is forecast to increase at an average of 1.9% during this same period while avgas consumption is forecast to decrease an average of 0.4% annually through 2037.
- Active general aviation aircraft is forecast to increase at an average annual rate of 0.1% through 2037 with the business jet segment of general aviation aircraft forecast to have growth of 2.3% annually over the same time period.
- In 2016, aircraft shipments manufactured worldwide increased to 2,324 aircraft deliveries, while billings increased to $23.9 billion, the second-highest industry billing number ever recorded.

It is anticipated that increased aircraft manufacturing and general aviation hours flown will translate into additional general aviation fuel demand (volumes). It is expected that as the number of active aircraft increase, the demand for FBO products, services, and facilities (i.e., terminal buildings and aircraft parking, tiedown, and hangar space) will increase as well. In addition, as activity levels increase, the general aviation services industry will strengthen.

B. General Aviation Hours Flown

As stated above, the general aviation aircraft hours flown are forecast to increase at an average annual rate of 0.9% through 2037 which is driven by a growing United States and world economies especially in the turbojet, turboprop, and turbine rotorcraft markets.

C. Active General Aviation Aircraft

General Aviation New Aircraft Deliveries (National) is determined to have a positive impact on demand at the Airport. As stated above, active general aviation aircraft are forecast to increase at an average annual rate of 0.1% through 2037 with the business jet segment of general aviation aircraft forecast to have growth of 2.3% annually over the same period.

D. Market Forecasts

1. Fixed Base Operators

The FBO industry has, from its inception, imitated the classic economic model for the lifecycle of a business; concept (1920s to the 1950s), expansion (1950s through the late 1970s), maturity (late 1970s through the early 1980s), and decline (early 1980s through the early 1990s). Today, however, the number of FBOs (supply) is now more in line with the level of demand that exists for FBO products, services, and facilities and is beginning to see a restart of the lifecycle similar to the expansion experienced in the 1950s through the late 1970s. However, the expansion will not be as dramatic and will be controlled by experienced business investors as opposed to just those individuals with a passion for the industry.

At this time, it is estimated that there are approximately 3,500 FBOs and in excess of 20,000 SASOs in operation in the United States at airports having a paved runway of 3,000 feet or more. The 3,000 number is important as it is normally associated to be the minimum runway length to accommodate the majority of general aviation aircraft. For higher altitude airports, however, considering the effects of density altitude, longer runways in the 5,000 - 6,000 foot range are typically required to achieve the same safety and performance parameters.

Since 2003, the number of FBOs in operation in the United States at airports having a paved runway of 3,000 feet or more has increased by approximately 3.3%, or a compounded annual average of 0.2%.

Additionally, the FAA Aerospace Forecasts (FY 2018 – 2038) forecasts total fuel volumes to increase at 1.4% throughout the period which is a major driver for the FBO industry. Out of the approximately 3,500 airports in the United States having a hard surface runway of 3,000 feet or more, approximately 76.3% of airports have one FBO and approximately 15.8% of airports have no FBO at all. Therefore, only approximately 7.9% of airports have more than one FBO. Additionally, based on AMCG's experience, airports with more than one FBO generally have total fuel volumes well in excess of 1,000,000 million gallons.

2. Flight Training

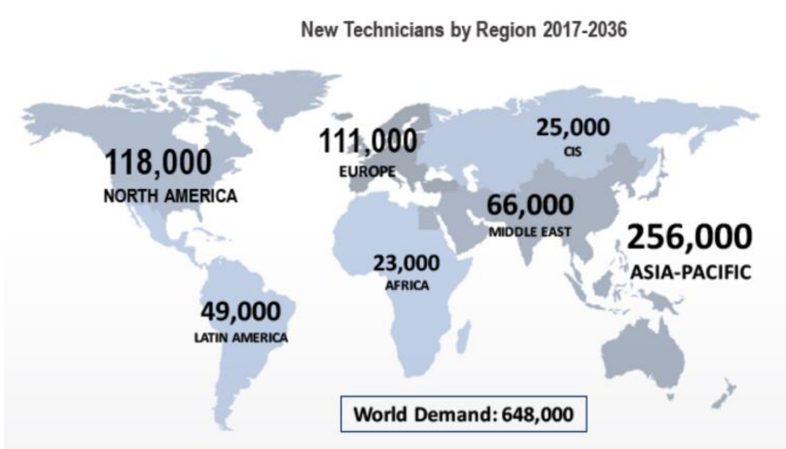
Industry forecasts for flight instruction over the 20-year planning horizon are mixed. Flight instruction activity is highly related to the number of student pilot certificates as this is the first certificate future pilots receive.

Conversely, the forecasts over the same period for the number of private pilots and commercial pilots indicate a slight decline. Over the forecast period, the FAA forecasts an increase of 7,200 total pilots.

From 2017 – 2036, the Boeing Pilot Outlook for pilots indicates that 637,000 new commercial airline pilots will be needed to fly the world fleet. In North America, the forecast for new pilots is 117,000 over the forecast period.

3. Aircraft Maintenance Operators

From 2017 – 2036, the Boeing Technician Outlook indicates that 648,000 new technicians will be needed to maintain the world fleet. In North America, the forecast for new technicians is 118,000 over the forecast period. It is significant to note the higher forecast for technicians as compared with new pilots through 2036.



An underlying driver to the aircraft maintenance industry is the average age of aircraft. Based on GAMA reports, the average age of all general aviation aircraft has fluctuated since 2009 (ranging from 39.5 years in 2009 to a low of 33.2 years in 2013 and increasing to 37.2 years in 2016 – the last year data was available). However, for general aviation single-engine piston aircraft, the average age in 2016 (the last year data was available) was 45.7 years.

This is further supported by the FAA's Best Practices Guide for Maintaining Aging General Aviation Airplanes (2003) which states the average age for general aviation single-engine piston aircraft could approach 50 years by 2020. According to the FNL Airport Master Record 5010, approximately 85% of the current aircraft based at the Airport are single-engine. As these aircraft continue to age, demands for aircraft maintenance services will likely continue to increase.

VI. FBO AND SASO BACKGROUND

A. Fixed Base Operators (FBOs)

From a practical standpoint, the term “FBO” is defined within the context of the marketplace. Accordingly, AMCG utilizes the following definition for an FBO, “An FBO is an airport-based aircraft service organization which operates under a lease, use, or operating agreement with an airport owner or operator for the specific purpose of providing aircraft fueling and engaging in a minimum of one of six of the remaining primary product, service, and facilities areas.” It is important to note that the products, services, and facilities provided by FBOs are not limited to the general aviation segment of the market (products and services are provided to air carriers and the government as well.)

FBOs who provide aircraft fueling and engage in multiple primary products, services, and facilities are commonly known as “full service” FBOs. FBOs who provide aircraft fueling, aircraft ground handling services, and passenger/crew services and facilities only are known as “limited” FBOs. It is estimated that there are approximately 3,400 FBOs in operations in the United States at airports having a paved runway of 3,000 feet or more.

B. Specialized Aviation Service Operators (SASOs)

While FBOs are more rigidly defined, a specialized aviation service operator (SASO) typically provides products and/or services in only one of the following primary product, service, or facilities categories: aircraft storage, technical services, flight services, or aircraft sales. Accordingly, SASOs provide products and services within a very narrow segment of the general aviation marketplace.

In addition, SASOs do not necessarily operate under a lease with an airport and in many cases, SASOs are subtenants of an FBO. Most importantly, SASOs do not provide aircraft fueling products and services. At this time, it is estimated that there are more than 20,000 SASOs in operation in the United States at airports having a paved runway of 3,000 feet or more.

1. Aircraft Charter Operators (14 CFR Part 135)

In the United States, there are approximately 1,339 certificated aircraft charter operators providing passenger transportation services (1,100), air ambulance transportation services (81), and air cargo transportation services (158) operating over 11,000 aircraft.

2. Pilot Schools (14 CFR Part 141)

In the United States, there are approximately 680 certificated flight schools providing flight training services consistent with 14 Code of Federal Regulations (CFR) Part 141 – Pilot Schools. However, it is important to note that there are thousands more flight schools and flight instructors providing flight training under CFR Part 61 - Certification: Pilots, Flight Instructors, and Ground Instructors versus Part 141 training. Regardless of how flight training is provided, the FAA regulates the minimum requirements for pilot training and certification.

3. Aircraft Repair Stations (14 CFR Part 145)

There are approximately 4,040 aircraft repair stations in the United States that are rated to provide airframe, powerplant, instrument, radio, propeller, or accessory repair and maintenance. It is important to note that some of these repair stations may be dedicated to the air carrier segment of the industry. It is also important to note that there are over 300,000 Airframe and/or Powerplant (A&P) Mechanics that either individually or through a technical service company (not certified as an aircraft repair station) that also provides technical services.

4. Fractional Companies (14 CFR Part 91, Subpart K)

There are two major fractional aircraft companies (NetJets and Flight Options), down from approximately six major companies. In addition, there are several smaller fractional aircraft companies that operate either specific airframes or in specific regions of the country. Combined, these companies operate approximately 800 aircraft that have approximately 4,000 aircraft owners.

VII. LOCAL MARKET OVERVIEW

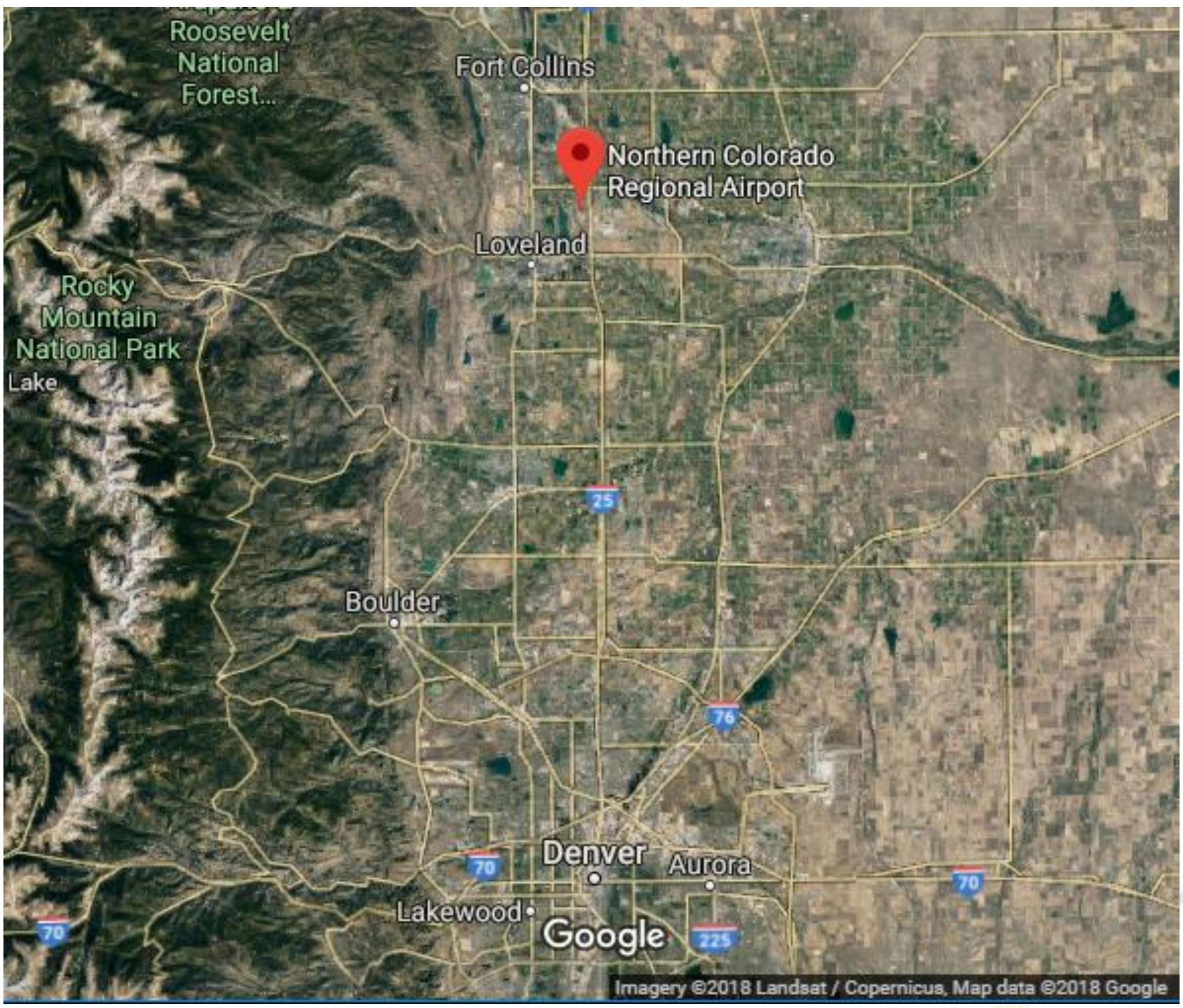
A. Airport Sponsor

The Airport is owned and operated jointly by the cities of Fort Collins and Loveland through the Northern Colorado Regional Airport Commission. The Northern Colorado Regional Airport Commission was established by an intergovernmental agreement between the two cities and is comprised of seven members; two members from the City of Loveland Council, two members from the City of Fort Collins Council and three citizens.

B. Geographic Location

The Airport is located approximately 50 miles north of Denver, Colorado and approximately 9 miles southeast of Fort Collins and 5 miles northeast of Loveland. The Airport is located east of Boyd Lake State Park. As identified in Figure 1, the Airport is located west of the Interstate 25 corridor.

Figure 6 – Geographic Location



C. Demographics

The population of the City of Fort Collins has increased a total of 21.4% or a compounded annual increase of 2.0% from 118,652 in 2000 to 143,986 in 2010 (U.S. Census Bureau). Since 2010, the population has increased to 165,080 in 2017 (U.S. Census Bureau estimate) which reflects a total increase of 14.7% or a compounded annual increase of 2.0%.

The population of the City of Loveland has increased a total of 32.5% or a compounded annual increase of 2.9% from 50,608 in 2000 to 67,049 in 2010 (U.S. Census Bureau). Since 2010, the population has increased to 76,701 in 2017 (U.S. Census Bureau estimate) which reflects a total increase of 14.4% or a compounded annual increase of 1.9%.

D. Business and Industry

The largest employment sectors of the City of Fort Collins are (1) educational services, health care and social assistance and (2) arts, entertainment, and recreation, and accommodation and food services. These employment sectors account for approximately 40.9% of the employment in the City of Fort Collins.

The largest employment sectors of the City of Loveland are (1) educational services, health care and social assistance and (2) retail trade. These employment sectors account for approximately 33.9% of the employment in the City of Loveland.

E. Economic Factors

In general, the civilian labor force of the City of Fort Collins has increased from 81,760 in 2010 to 91,205 in 2016 (U.S. Census Bureau), which represents a total increase of 11.6% or a compounded annual increase of 1.8%. The civilian labor force of the City of Loveland has increased from 34,701 in 2010 to 38,778 in 2016 (U.S. Census Bureau), which represents a total increase of 11.7% or a compounded annual increase of 1.9%.

F. Number of Registered Aircraft

Based on 2018 (estimated) United States Census data and FAA registered aircraft data (as of December 5, 2018), the Table 1 identifies the total and average number of registered aircraft per 1,000 residents in the United States, the State of Colorado, and the surrounding counties.

Table 1 – Number of Registered Aircraft

Number of Registered Aircraft				
Location	**Population**	**Registered Aircraft**	**Average per 1,000 persons**	**Market Share**
United States	329,037,263	292,356	0.89	
State of Colorado	5,607,154	6,791	1.21	2.32%
Boulder County	322,514	627	1.94	42.71%
Larimer County	343,976	315	0.92	21.46%
Weld County	304,633	526	1.73	35.83%
Total (Select Counties)	**971,123**	**1,468**	1.51*	21.62%

*Average

G. Number of Licensed Pilots

Based on 2018 (estimated) United States Census data and FAA licensed pilot data (as of December 1, 2018), Table 2 identifies the total and average number of licensed pilots per 1,000 residents in the United States, the State of Colorado, and the surrounding counties.

Table 2 – Number of Licensed Pilots

Number of Licensed Pilots				
Location	**Population**	**Licensed Pilots**	**Average per 1,000 persons**	**Market Share**
United States	329,037,263	637,122	1.94	
State of Colorado	5,607,154	18,995	3.39	2.98%
Boulder County	322,514	1,494	4.63	41.16%
Larimer County	343,976	1,247	3.63	34.35%
Weld County	304,633	889	2.92	24.49%
Total (Select Counties)	**971,123**	**3,630**	3.74*	19.11%

*Average

VIII. SUBJECT AIRPORT OVERVIEW

A. Airport Description

The Airport, which consists of approximately 1,065 acres of land, has two runways, as follows:

- Runway 06/24: 2,273 feet long and 40 feet wide, asphalt in good condition.
- Runway 15/33: 8,500 feet long and 100 feet wide, grooved asphalt in good condition.

The Airport was selected to be Colorado's first airport to implement the Remote Air Traffic Control Technology, also known as the Colorado Remote Tower Project. The selection was based on the Airport's traffic mix, operational levels, proximity to Denver International Airport, and local support, Currently, Searidge Technologies is in the process of installation, testing, and certification of the remote tower equipment. Ultimately, the Remote Air Traffic Control Project utilizes advanced technology to increase air traffic efficiency and is a cost-effective solution for FNL and other Colorado public-use airports.

Once implemented and fully operational, the Airport will become what is known as a 'towered' airport with a full array of aircraft operational and radar services. This is significant to note, as such services will increase the likelihood of air carrier operations.

The Airport is served by one Instrument Landing Systems (ILS) precision approach for Runway 33 and multiple non-precision approaches (Localizer, RNAV (GPS), and VOR). The Airport is designated a Commercial Service Airport in the *FAA National Plan of Integrated Airports System (NPIAS)*. Total aircraft operations are approximately 94,896 per year and 256 aircraft are currently based at the airport, as reported by Airport Management.

B. Commercial Operators

One fixed base operator (Fort Collins – Loveland JetCenter) provides fueling (jet and avgas), line services, and aircraft parking (hangar and tiedown). Aircraft maintenance is provided by Avionics Specialist, LLC., The New Firewall Forward and Professional Aircraft Services. Flight training and aircraft rental is provided by The Flying School, Front Range Helicopters, LLC., and Leading Edge Flight Training. Aircraft charter service is provided by Trans Aero Helicopters.

IX. SUMMARY

Regionally, the general aviation industry is relatively healthy and growing at a reasonable rate based on current market conditions. FNL's role as a regional airport when compared with competing and comparable airports remains viable based on factors such as local community business and industry, traditional economic analysis, airport infrastructure, licensed pilots, registered aircraft and overall demographics.

Considerations supporting FNL's current and future opportunities for continued growth and success to strongly influence the region's aviation industry include:

- FNL's testing and implementation of the Remote Air Traffic Control Tower (RATCT), which once certified will add value to the airport's overall safety, efficiency and capacity. RATCT revolutionizes airport and aircraft operations and demonstrates FNL's leadership to incorporate new technology as an avenue to improve the National Airspace System (NAS).
- FNL's ability to secure the Aims Community College (ACC) flight training program from the Greeley airport becomes another avenue to increase aircraft operations through regular flight training. ACC established an airline 'bridge' program with Republic Airways, which provides new pilots a clear and direct path for student applicants to be hired immediately upon completion of the ACC program and prior to the required 1,500 hours total time (or, R-ATP of 1,250 hours total time).
- FNL's efforts to maintain and secure new types of commercial service operators (specialized aviation service operators – SASO) will increase service and support for both based and itinerant aircraft operators.
- FNL's ability, efforts and desire to secure future air service will be critical to support a select market segment known as leisure travel, which is broadly supported by such air carriers as Allegiant Air, Sun Country Airlines, and Spirit Airlines. With air service, secondary business opportunities become prevalent and a further benefit the airport.

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APPENDIX E:

FACILITY NEEDS ASSESSMENT

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AMCG
Aviation Management Consulting Group

Operator Facility Needs Assessment

Mead & Hunt

Northern Colorado Regional Airport

February 20, 2019

AMCG
Aviation Management
Consulting Group

February 25, 2019

Mr. Ryan Hayes, C.M.
Project Manager Aviation Services
Mead & Hunt
1743 Wazee Street, Suite 400
Denver, Colorado 80202

RE: Facility Needs Assessment

Dear Mr. Hayes:

Pursuant to our engagement, Aviation Management Consulting Group (AMCG) has completed an Operator Facility Needs Assessment for the Northern Colorado Regional Airport. This report conveys key findings, and observations.

The Facility Needs Assessment analyzes general size requirements and location attributes necessary for the successful operation of Fixed Base Operators and Specialized Aviation Service Operators.

We are pleased to have been called upon to conduct this assessment. Please contact me if you have any questions about this report. Thank you for the opportunity to be of service.

Sincerely,

Bryan E. Johnson, A.A.E.
Consultant

I. LIMITING CONDITIONS

This report is subject to the following conditions and to other specific and limiting conditions as described by the AMCG team in this report.

1. The data utilized in compiling this report was provided by and/or obtained from sources considered reliable and authentic. Aviation Management Consulting Group (AMCG) has accepted the information provided by and/or obtained from others without audit or cross verification. As such, AMCG assumes no liability for its accuracy or correctness.
2. The estimates, conclusions, and projections contained in this report are included to assist the reader in understanding the uniqueness of the aviation services industry. As assumptions are a necessary component of future projections, the assumptions made in this report are based upon reasonable and prudent estimates. These estimates are, however, subject to unforeseen and unpredictable influences such as, competition, local, regional, national, and global economies, fuel supply volatility, pricing, and discounting, quality of management, supervision, and operating-level employees, and the implementation of effective sales, marketing, and promotional programs. Therefore, actual outcomes may vary from the estimates, projections, and conclusions contained herein.
3. It is intended that this report be considered as a total product, the components of which must not be considered independently.
4. Compensation for preparing this report is not, in any manner, contingent upon the conclusions suggested or drawn herein.
5. This report is made for the client to whom it is addressed and is delivered to the client on the condition that it is to be used by the client only for the purpose stated in the report. No reliance is to be placed on this report for any other purposes.
6. Neither all nor any part of this report (especially any conclusions reached or the identity of the individuals or the firm with which they are connected) shall be disseminated to the public through the advertising media, public relations media, news media, sales media or any other public means of communication without prior written consent and approval of the individuals or the firm.

II. FACILITY NEEDS ASSESSMENT

AMCG evaluated the facility needs of commercial aeronautical operators at Northern Colorado Regional Airport (Airport) based on the Airport's current infrastructure, discussions with Airport management and the Airport's Minimum Standards for the Provision of Commercial Aeronautical Activities. Additionally, AMCG has also evaluated the land and facility requirements for commercial aeronautical operators for five benchmarking airports.

Based on data available from various sources including the Federal Aviation Administration (FAA), state and local agencies, and Airport management and staff, a profile of the Airport has been developed. The Airport profile provides the basis for establishing the criteria and parameters for identifying benchmarking airports.

The selection of benchmarking airports is typically based on a number of criteria. For the Airport, the selection of benchmarking airports was based on historical activity levels, total based aircraft, the presence of a precision instrument approach, runway length, total airport acreage, and FAA National Plan of Integrated Airport Systems (NPIAS) classification. Parameters were then established in each of these areas to facilitate the selection process.

- The Airport is utilized by the general aviation segment of the market. As such, airports with significant air carrier operations were not considered comparable.
- For the 12-month period ending December 31, 2018 (as reported on the FAA Master Record 5010), general aviation itinerant operations at the Airport totaled 56,000. As such, the range for itinerant operations was established at 42,000 to 70,000.
- The number of based aircraft at the Airport as of December 31, 2018 (as reported on the FAA Master Record 5010) was 255. As such, the range for based aircraft was set at 70 to 430.
- The Airport has two runways, one of which is 8,500 feet long. Airports with at least one runway that is 6,000 feet or longer were considered comparable.
- The Airport has 1,065 acres of land. Airports having total acreage between 500 and 1,700 acres were considered comparable.
- The Airport is classified as a Primary Commercial Service Nonhub airport in the FAA NPIAS. As such, airports ranging from General Aviation classification to Primary Commercial Service Nonhub (with a primary focus of general aviation) were considered comparable.

Based on the criteria and parameters identified, AMCG has developed a list of five benchmarking airports which, in the opinion of AMCG, are considered comparable to the Airport, as follows:

Benchmark Airports			
Airport	**Identifier**	**Location**	**Number of FBOs**
Arlington Municipal Airport	GKY	Arlington, Texas	1
Charles M. Schulz – Sonoma County Airport	STS	Santa Rosa, California	2
Coeur d'Alene Airport – Pappy Boyington Field	COE	Coeur d'Alene, Idaho	2
Rocky Mountain Metropolitan Airport	BJC	Denver, Colorado	2
Texas Gulf Coast Regional Airport	LBX	Angleton, Texas	1

In addition to the land and improvement requirements for each commercial aeronautical operator, AMCG analyzed the related location attributes associated with each operator at the Airport as well. AMCG evaluated the needs of Fixed Base Operators (FBOs) and Specialized Aviation Service Operators (SASOs), which are considered likely to be located at the Airport. In addition to the FBO, the SASOs considered during this process are as follows:

- Fixed Base Operator
- Aircraft Maintenance Operator
- Avionics or Instrument Maintenance Operator
- Aircraft Rental or Flight Training Operator
- Aircraft Charter or Management Operator
- Aircraft Storage Operator
- Limited Aircraft Services and Support Operator
- Experimental Aircraft Services and Support Operator
- Other Air Transportation Services for Hire Operator
- Commercial Airline Service

Currently, the Airport is served by an FBO (Fort Collins – Loveland Jet Center), aircraft maintenance operators (The New Firewall Forward and Professional Aircraft Services), an avionics and instrument maintenance operator (Avionics Specialist, LLC.), flight training and aircraft rental operators (The Flying School and Leading-Edge Flight Training), and an aircraft charter operator (Trans Aero Helicopters).

A. Fixed Base Operator (FBO)

An FBO is a commercial operator engaged in the sale of products, services, and facilities to include, at a minimum, the following aeronautical activities at the Airport: aviation fuels (jet fuel and avgas) and aircraft lubricants; passenger, crew, and aircraft ground services, support and amenities; aircraft maintenance; and aircraft parking, hangar, office, and shop. AMCG recommends relocation of the fuel farm to either the north or south ends of the Airport. While the location of the current fuel farm is convenient, the current fuel farm's location impedes future growth, especially regarding air carrier operations.

The Airport's current FBO provides the products, services and facilities as required within the Airport's Minimum Standards. It is significant to note that industry wide there are approximately 3,300 plus airports with one or zero FBOs (91.7% - based on 2017 numbers). AMCG's opinion is that a second FBO is unlikely in the short-term based on current fuel volumes, aircraft operations, based aircraft as well as the significant capital and financial obligations necessary for such facilities.

Table 1 outlines AMCG's opinion of the facility requirements necessary (at a minimum) and location attributes desired by an FBO at the Airport:

Table 1 – Fixed Base Operator (FBO)

<table>
<tr><th colspan="7">Fixed Base Operator</th><th>Current Size (SF)</th></tr>
<tr><td rowspan="10">Facility Needs</td><td colspan="2">Aircraft Type</td><td colspan="3">Component</td><td>Recommended Size (SF)</td><td>Ft. Collins Loveland Jet Center</td></tr>
<tr><td colspan="2" rowspan="9">Single Engine Piston
Multi Engine Piston
Turboprop
Turbojet</td><td colspan="3">Commercial Improved Land (total leasehold)</td><td>140,000</td><td>448,423</td></tr>
<tr><td colspan="3">Apron</td><td>70,000</td><td>297,760</td></tr>
<tr><td colspan="3">Terminal Building</td><td>4,000</td><td>2,500</td></tr>
<tr><td colspan="3">Customer areas</td><td>4,000</td><td>3,194</td></tr>
<tr><td colspan="3">Administrative Area (Aircraft Maintenance)</td><td>500</td><td>258</td></tr>
<tr><td colspan="3">Maintenance Area</td><td>500</td><td>868</td></tr>
<tr><td colspan="3">Maintenance Hangar</td><td>7,500</td><td>N/A</td></tr>
<tr><td colspan="3">Hangar</td><td>15,000</td><td>22,360</td></tr>
<tr><td colspan="3">Fuel storage facility (gallons)</td><td>30,000</td><td>30,000</td></tr>
<tr><td rowspan="2">Location Attributes</td><td>Vehicle Parking</td><td>Location</td><td>Street Frontage</td><td>Adjacent Hangar</td><td>Visibility</td><td>Available Tiedowns</td><td></td></tr>
<tr><td>Adjacent to main facility</td><td>Central location</td><td>Yes</td><td>Yes</td><td>Primary (landside and airside)</td><td>Yes (10)</td><td></td></tr>
</table>

B. Aircraft Maintenance Operator (SASO)

An Aircraft Maintenance Operator is an operator engaged in providing aircraft maintenance, parts, accessories, and related components (as defined in 14 CFR Part 43) and sheet metal repair for aircraft other than those owned, leased, and/or operated by and under the full and exclusive control of the operator.

Table 2 outlines AMCG's opinion of the facility requirements necessary (at a minimum) and location attributes desired by an Aircraft Maintenance Operator at the Airport:

Table 2 – Aircraft Maintenance Operator (SASO)

	Aircraft Maintenance Operator						Current Size (SF)	
Facility Needs	Aircraft Type		Component			Recommended Size (SF)	New Firewall Forward	Professional Aircraft Services
	Single Engine Piston Multi Engine Piston		Commercial Improved Land (total leasehold) Apron Customer/Administrative/Maintenance Areas Maintenance Hangar			10,890 4,500 1,200 3,600	47,858 13,144 5,620 8,568	5,718 Non-exclusive 708 5,010
	Turboprop Turbojet		Commercial Improved Land (total leasehold) Apron Customer/Administrative/Maintenance Areas Maintenance Hangar			21,780 10,000 1,200 7,500	N/A N/A N/A N/A	N/A N/A N/A N/A
Location Attributes	Vehicle Parking	Location	Street Frontage	Adjacent Hangar	Visibility	Available Tiedowns		
	Adjacent to main facility	Close proximity to FBO	Yes	Yes	Primary (landside and airside)	Yes		

C. Avionics or Instrument Maintenance Operator (SASO)

An Avionics or Instrument Maintenance Operator is an operator engaged in the business of maintenance or alteration of one or more of the items described in 14 CFR Part 43, Appendix A (i.e., aircraft radios, electrical systems, or instruments) for aircraft other than those owned, leased, and/or operated by (under the full and exclusive control of) Operator on the Airport. Avionics or Instrument Maintenance is typically divided into two classes, "benchwork" and "beyond benchwork". Benchwork services do not include removal or replacement services and therefore do not require hangar facilities.

Table 3 outlines AMCG's opinion of the facility requirements necessary (at a minimum) and location attributes desired by an Avionics or Instrument Maintenance Operator at the Airport:

Table 3 – Avionics or Instrument Maintenance Operator (SASO)

	Avionics or Instrument Maintenance Operator						Current Size (SF)
Facility Needs	Aircraft Type		Component			Recommended Size (SF)	Avionics Specialist
	Benchwork Only						
	Single Engine Piston Multi Engine Piston Turboprop Turbojet		Commercial Improved Land (total leasehold) Customer/Administrative/Maintenance Areas			10,890 1,200	N/A N/A
	Beyond Benchwork						
	Single Engine Piston Multi Engine Piston Turboprop Turbojet		Commercial Improved Land (total leasehold) Apron Customer/Administrative/Maintenance Areas Maintenance Hangar			32,670 10,000 1,200 7,500	9,600 N/A 900 8,700
Location Attributes	Vehicle Parking	Location	Street Frontage	Adjacent Hangar	Visibility	Available Tiedowns	
	Adjacent to main facility	All locations	Not necessary	Yes (beyond benchwork)	Secondary (landside and airside)	Yes (beyond benchwork)	

D. Aircraft Rental or Flight Training Operator (SASO)

An Aircraft Rental Operator is a commercial operator engaged in the rental of aircraft to the general public. A Flight Training Operator is a commercial operator engaged in providing flight instruction to the general public.

Table 4 outlines AMCG's opinion of the facility requirements necessary (at a minimum) and location attributes desired by an Aircraft Rental or Flight Training Operator at the Airport:

Table 4 – Aircraft Rental or Flight Training Operator (SASO)

Aircraft Rental or Flight Training Operator				Current Size (SF)	
	Aircraft Type	Component	Recommended Size (SF)	The Flying School	Leading Edge Flight Training
Facility Needs	Single Engine Piston Multi Engine Piston Turboprop Turbojet	Commercial Improved Land (without hangar)	10,890	N/A	N/A
		Commercial Improved Land (with hangar)	21,780	6,411	2,788
		Apron	4,500	Non-exclusive	Non-exclusive
		Customer/Administrative Areas	500	1,411	2,788
		Maintenance Area	360	N/A	N/A
		Hangar	3,600	5,000	Shared with New Firewall

Location Attributes	Vehicle Parking	Location	Street Frontage	Adjacent Hangar	Visibility	Available Tiedowns
	Adjacent to main facility	All locations	Yes	Yes	Primary (landside)	Yes

E. Aircraft Charter or Management Operator (SASO)

An Aircraft Charter Operator is an operator engaged in on-demand common carriage for persons or Property (as defined in 14 CFR Part 135) or operates in private carriage (as defined in 14 CFR Part 125) on the Airport. An Aircraft Management Operator is an operator engaged in the business of providing Aircraft management including, but not limited to, flight dispatch, flight crews, or Aircraft Maintenance coordination to the public on the Airport.

Table 5 outlines AMCG's opinion of the facility requirements necessary (at a minimum) and location attributes desired by an Aircraft Charter or Management Operator at the Airport:

Table 5 – Aircraft Charter or Management Operator (SASO)

<table>
<tr><th colspan="6">Aircraft Charter or Management Operator</th><th>Current Size (SF)</th></tr>
<tr><td rowspan="2">Facility Needs</td><td colspan="2">Aircraft Design Group</td><td colspan="2">Component</td><td>Recommended Size (SF)</td><td>Trans Aero Helicopters</td></tr>
<tr><td colspan="2">Single Engine Piston
Multi Engine Piston
Turboprop
Turbojet</td><td colspan="2">Commercial Improved Land (without hangar)
Commercial Improved Land (with hangar)
Apron
Customer/Administrative Areas
Maintenance Area
Hangar</td><td>10,890
21,780
4,500
500
360
3,600</td><td>N/A
90,858
43,674
7,754
N/A
12,000</td></tr>
<tr><td rowspan="2">Location Attributes</td><td>Vehicle Parking</td><td>Location</td><td>Street Frontage</td><td>Adjacent Hangar</td><td>Visibility</td><td>Available Tiedowns</td></tr>
<tr><td>Adjacent to main facility</td><td>All locations</td><td>Yes</td><td>Yes</td><td>Primary (landside)</td><td>No</td></tr>
</table>

F. Aircraft Storage Operator (SASO)

An Aircraft Storage Operator is an operator that develops and/or owns or leases an aircraft storage facility and/or associated office or shop space and sells (or subleases) such space to entities engaging in commercial or non-commercial aeronautical activities.

Table 6 outlines AMCG's opinion of the facility requirements necessary (at a minimum) and location attributes desired by an Aircraft Storage Operator at the Airport:

Table 6 – Aircraft Storage Operator (SASO)

<table>
<tr><th colspan="7">Aircraft Storage Operator</th></tr>
<tr><td rowspan="3">Facility Needs</td><td colspan="2">Aircraft Design Group</td><td colspan="3">Component</td><td>Size (SF)</td></tr>
<tr><td colspan="2">Single Engine Piston
Multi Engine Piston</td><td colspan="3">Commercial Improved Land (total leasehold)
Apron
Hangar</td><td>21,780
8,000
6,400</td></tr>
<tr><td colspan="2">Turboprop
Turbojet</td><td colspan="3">Commercial Improved Land (total leasehold)
Apron
Hangar</td><td>32,670
12,500
10,000</td></tr>
<tr><td rowspan="2">Location Attributes</td><td>Vehicle Parking</td><td>Location</td><td>Street Frontage</td><td>Adjacent Hangar</td><td>Visibility</td><td>Available Tiedowns</td></tr>
<tr><td>In close proximity to main facility</td><td>All locations</td><td>No</td><td>Yes</td><td>Secondary (landside and airside)</td><td>No</td></tr>
</table>

G. Other Commercial Aeronautical Operators (SASO)

Other commercial aeronautical operators pertain to other SASOs engaging in limited aircraft services and support activities, miscellaneous commercial services and support activities, or air transportation services for hire activities.

Limited Aircraft Services and Support are defined as limited Aircraft, engine, or accessory services and support (e.g., cleaning, washing, waxing, painting, upholstery, propeller repair, etc.).

Table 7 outlines AMCG's opinion of the facility requirements necessary (at a minimum) and location attributes desired by a Limited Aircraft Services and Support Operator at the Airport:

Table 7 – Limited Aircraft Services and Support Operator (SASO)

Limited Aircraft Services and Support Operator			
	Aircraft Design Group	Component	Size (SF)
Facility Needs	Single Engine Piston Multi Engine Piston Turboprop Turbojet	Commercial Improved Land (without hangar) Commercial Improved Land (with hangar) Apron Customer/Administrative/Maintenance Areas Maintenance Hangar	10,890 21,780 12,000 1,200 10,000

	Vehicle Parking	Location	Street Frontage	Adjacent Hangar	Visibility	Available Tiedowns
Location Attributes	In close proximity to main facility	All locations	No	No	Secondary (landside and airside)	As Needed

Experimental Aircraft Services and Support are defined as construction assistance to owners of experimental and/or amateur-built Aircraft (as defined in 14 CFR Section 21.191).

Table 8 outlines AMCG's opinion of the facility requirements necessary (at a minimum) and location attributes desired by an Experimental Aircraft Services and Support Operator at the Airport:

Table 8 – Experimental Aircraft Services and Support Operator (SASO)

Experimental Aircraft Services and Support Operator			
	Aircraft Design Group	Component	Size (SF)
Facility Needs	Single Engine Piston Multi Engine Piston Turboprop	Commercial Improved Land (without hangar) Commercial Improved Land (with hangar) Apron Customer/Administrative/Maintenance Areas Maintenance Hangar	10,890 21,780 4,500 1,200 3,600

	Vehicle Parking	Location	Street Frontage	Adjacent Hangar	Visibility	Available Tiedowns
Location Attributes	In close proximity to main facility	All locations	Yes	No	Secondary (landside and airside)	Yes

Other Air Transportation Services for Hire are defined as non-stop sightseeing flights (flights which begin and end at the Airport and are conducted within a 25-statute mile radius of the Airport); flights for aerial photography or survey, firefighting, and power line, underground cable, or pipe line patrol; helicopter operations relating to construction or repair work; or, other related air transportation services for hire.

Table 9 outlines AMCG's opinion of the facility requirements necessary (at a minimum) and location attributes desired by Other Air Transportation Services for Hire Operators at the Airport.

Table 9 – Other Air Transportation Services for Hire Operator (SASO)

<table>
<tr><th colspan="7">Other Air Transportation Services for Hire Operator</th></tr>
<tr><td rowspan="2">Facility Needs</td><td colspan="2">Aircraft Design Group</td><td colspan="3">Component</td><td>Size (SF)</td></tr>
<tr><td colspan="2">Single Engine Piston
Multi Engine Piston
Turboprop</td><td colspan="3">Commercial Improved Land (without hangar)
Commercial Improved Land (with hangar)
Apron
Customer/Administrative/Maintenance Areas
Maintenance Hangar</td><td>10,890
21,780
4,500
1,200
3,600</td></tr>
<tr><td rowspan="2">Location Attributes</td><td>Vehicle Parking</td><td>Location</td><td>Street Frontage</td><td>Adjacent Hangar</td><td>Visibility</td><td>Available Tiedowns</td></tr>
<tr><td>Adjacent to main facility</td><td>All locations</td><td>Yes</td><td>No</td><td>Primary (landside)</td><td>Yes</td></tr>
</table>

H. Advancements in New Aircraft Technology

Advancements in aerospace and aircraft manufacturing include 3-D printed metal components for certain jet and piston engine types, metal powder atomization, and additive metal parts. In addition to how aircraft and engines are being developed and manufactured, new types of alternative fuels have been introduced as an effort to reduce the amount of petroleum-based fuels used by airplanes, today.

Alternative fuels which include sustainable alternative jet fuels (SAJF), battery (electrical only), solar, and a hybrid-electric (jet and electric power – combined) will not change the demand and need for airports but may require the Airport to amend policy and compliance documents. These include the Airport's minimum standards, rules and regulations, fee policies and alternative types of infrastructure (bulk storage). Autonomous and ride-share aircraft may increase hangar storage requirements; therefore, such transformation needs to be thoughtful and truly reflect the appropriate change based on market demand.

Based on industry research, alternative fuels can be successful over the long-term if the fuels are (1) sustainable in terms of reducing net life-cycle carbon emissions relative to conventional fuels as well as (2) enhance environmental, societal, and economic factors. However, it is important to note, not all alternative fuels will result in a net reduction in life-cycle carbon use. For example, extraction or use of the source material utilized in developing alternative fuels can have a greater net carbon impact than use of conventional fuels.

The Airport's success and potential impacts with advancements in new aircraft technology will be attributed to further understanding the industry trends at all levels. These may include federal, state, and local regulation and legal considerations as well as the industry drivers for development and concepts in the areas of electric propulsion or electric vertical takeoff and landing (eVTOL), and simplified vehicle operations (SVO).

I. Future Outlook

Based on AMCG's understanding of the strategic outlook for the Airport, the development of the remote air traffic control tower, and along with the preceding analysis, AMCG believes that the Airport should consider a market/demand analysis to validate and vet the different types and kinds of commercial aeronautical operators are more probable at the Airport.

It is significant to note AMCG has not conducted a market assessment/feasibility analysis which would determine if the current level of demand exceeds the current capacity at the Airport and in the immediate vicinity based on the general conditions, trends, and demographics in the market.

AMCG believes the Airport's future development goals should consider the following:

- Secure air service to utilize the existing passenger terminal building.
- Encourage retention of existing commercial aeronautical operators and preserve the area on the north side of the Airport for future facility development.
- Explore opportunity for land acquisition to eliminate need for operators to operate "through-the-fence".

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APPENDIX F:

AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION PLAN

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APPENDIX F.

AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION PLAN

F.1 Summary

Northern Colorado Regional Airport (FNL or the Airport) and the Northern Colorado Regional Airport Commission (the Commission) can reduce waste generation and increase landfill diversion by:

- Tracking and voluntarily reporting waste metrics and diversion progress.
- Improving purchasing practices, reducing disposable items, and reusing supplies.
- Enhancing the existing recycling program.
- Including waste diversion in tenant expectations or requirements.

These recommended strategies have the potential to divert at least an additional 1.5 tons of waste annually.

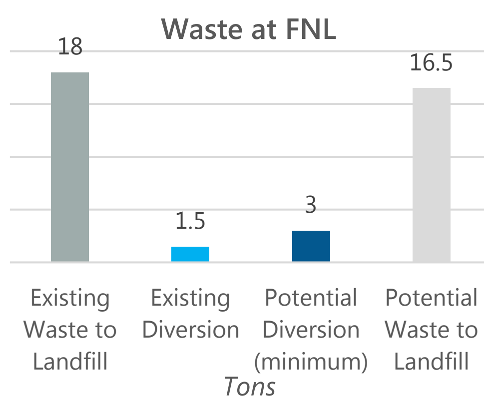
The recommended strategies support and supplement the Airport's existing waste management program, which includes:

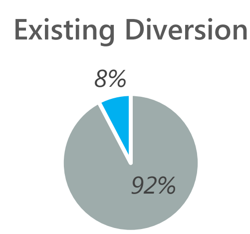
- Single-stream recycling of paper, plastic bottles, aluminum cans, and glass.
- Separate cardboard recycling.

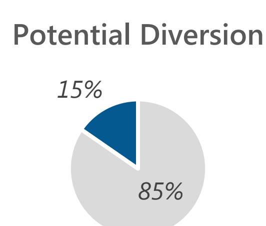
The existing program diverts approximately 1.5 tons of waste annually; the remaining 18 tons of waste generated at the facility are landfilled.

Reducing waste generation and increasing landfill diversion align with the strategic plan for the Airport (**Attachment F.3.1**).

Planning for solid waste fulfills the Airport's obligation under the Federal Aviation Administration (FAA) Modernization and Reauthorization Act of 2012 and subsequent regulation.







F.2 Recommendations

The following recommendations to improve waste management at FNL include waste reduction, reuse, and recycling strategies. Evaluation for each recommendation considered estimated relative cost and diversion potential; the suggested implementation time frame; and noted alignment with best practices or standard programs. **Table F-1** shows the key for quick comparison of the impact of each recommendation on diversion.

Table F-1: Recommendation Key

Item	Icons	Significance
Relative Cost	\$	Low cost
	\$ \$	Medium cost
	\$ \$ \$	High cost
Estimated Diversion Potential		Low diversion potential
		Medium diversion potential
		High diversion potential
Suggested Implementation Time Frame		Short range (<1 year)
		Medium range (1-3 years)
		Long range (3+ years)
Alignment	BMP	Best Management Practice
	TRUE	BMP and Total Resource Use and Efficiency (TRUE) Certification program element

F.2.1 Recommendation 1: Tracking & Reporting

Description

Monitoring waste metrics provides feedback on the efficiency of diversion efforts. Sharing this information with stakeholders has been shown to increase participation in diversion practices.

Action

It is recommended that the Airport begin to regularly estimate and track the volume of waste sent to the landfill and the volume of material collected for recycling as well as the estimated costs associated with these services. It is recommended that the Airport consider proactively reporting annual waste data to the Airport Commission to establish a sense of accountability and basis for improvement.

Justification

Trends associated with FNL's waste generation, landfill, diversion, and associated costs could indicate opportunities for improvement within the waste and recycling plan. Sharing annual waste data with the Airport Commission could drive further improvement and create a positive feedback loop.

Information Needed

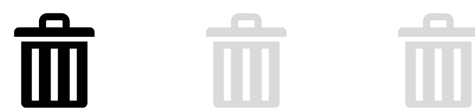
- Waste generation, disposal, and cost estimates.
- Simple tracking tool (spreadsheet).
- Estimates of volume of waste diverted by various strategies and avoided costs.
- Mechanism for communicating progress to stakeholders.

Action Plan

- Develop a plan to measure or estimate waste disposal.
- Obtain estimate of associated costs from the City of Loveland.
- Enter estimates into simple tracking tool.
- As strategies are implemented, update tracking tool to reflect waste avoided, diverted, and costs.
- Evaluate data for additional opportunities to set and pursue waste diversion goals.
- Share and celebrate progress with stakeholders.

Relative Cost

Estimated Diversion



Time Frame

Alignment

TRUE

F.2.2 Recommendation 2: Improve Purchasing Practices, Reduce, & Reuse

Description

To reduce the facility's volume of waste sent to the landfill, the Airport should reduce waste generation and reuse materials where possible. FNL staff's existing purchasing practices may generate waste in the form of single-use and/or disposable items and supplies and tracking of these items could reveal opportunities for reduction and reuse.

Action

It is recommended that FNL adopt a purchasing policy prioritizing durable (versus disposable) items and supplies that are reusable, recyclable, compostable, and/or made from recycled content. It is also recommended that FNL identify supplies and materials which can be avoided, reused on site, or donated to a third party.

Justification

Waste reduction is the most environmentally preferred waste management strategy as determined by the Environmental Protection Agency (EPA). Reduction and reuse simultaneously lower waste program costs by producing a smaller material stream.

Information Needed

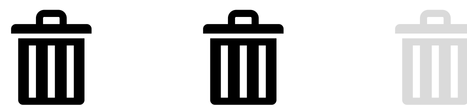
- Purchasing records.
- Waste stream information.

Action Plan

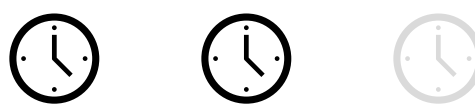
- Adjust practices which generate waste (printing, housekeeping, etc.)
- Substitute durable alternatives for single use or disposable items in the administration office and other staff areas.
- Reuse items and materials where possible and encourage reuse by passengers, tenants, and contractors.

Relative Cost

Estimated Diversion



Time Frame



Alignment

TRUE

F.2.3 Recommendation 3: Enhance Existing Recycling Program

Description

To reduce the facility's volume of waste sent to the landfill, the Airport should continue to recycle materials that cannot be reused or avoided.

Action

It is recommended that the Airport maintain its existing recycling program and supplement current practices with additional receptacles, signage, and an education campaign.

Justification

Convenient receptacles, effective signage, and educational campaigns have been shown to increase participation and improve compliance with a recycling program.

While FNL maintains designated recycling receptacles throughout the facility, there are no recycling receptacles within the terminal's sterile area. Instructional recycling signage is also limited, and the Airport does not have an awareness campaign in place for employees, tenants, or visitors.

Information Needed

- Inventory of existing garbage cans, recycling bins, and related signage.
- Areas of high traffic or significant waste generation.
- Protocol for communicating program to employees, tenants, and visitors.

Action Plan

- Convert surplus garbage cans into recycling bins with labeling. Collocate all recycling bins and garbage cans into pairs and place throughout the facility.
- Install color-coded, graphic instructional signage in public areas.
- Train employees on the recycling program to explain its purpose, requirements, and importance.
- Communicate information about the recycling program to tenants and visitors.
- Monitor and adjust recycling program using data and feedback from hauler.

Relative Cost

Estimated Diversion

Time Frame

Alignment

TRUE

F.2.4 Recommendation 4: Tenant Requirements

Description

Rules and Regulations, Minimum Standards, leases, and contracts are all vehicles through which the Airport can influence tenant behavior, including recycling.

Action

It is recommended that the Airport consider adding language pertaining to the waste diversion program, including recycling, to the facility's Rules and Regulations and/or Minimum Standards.

It is also recommended that as contracts and leases expire, extend, or renew, the Airport revise contract agreements to include waste management requirements or preferences, such as support of the recycling program.

Justification

The Airport's existing governance documents and agreements do not explicitly encourage or require waste diversion. Updating these documents to include a provision stating this preference or requirement could advance FNL's waste diversion program in areas beyond its direct control. Private hangar tenants, who are responsible for obtaining their own waste collection services, could be encouraged to consider their own waste diversion practices through these mechanisms.

Information Needed

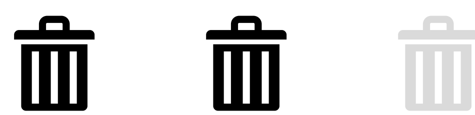
- Existing Rules and Regulations and/or Minimum Standards.
- Current contracting template and protocol for revising.

Action Plan

- Revise Rules and Regulations and/or Minimum Standards to encourage or require waste diversion, including recycling.
- Encourage private hangar tenants to divert waste and encourage or require these tenants to obtain both waste and recycling collection services.
- Review governance documents and contracts on a regular basis to ensure they reflect FNL's goals.

Relative Cost

Estimated Diversion



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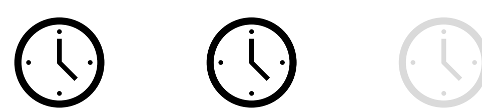


Alignment

TRUE

F.3 Attachments

F.3.1 Alignment with Airport Strategic Plan

Efficient waste management aligns with the aim of **organizational excellence**, specifically the Airport's goals to demonstrate "responsible, ethical, and accountable leadership."

Reducing waste disposal demonstrates **innovation**, through "collaborative and engaged partnerships" with the hauler and/or tenants.

Managing waste in a responsible way promotes **fiscal sustainability** because, though FNL does not receive a bill per say, there is a cost to disposing of waste generated at the Airport. Responsible waste management also reduces risk – a "fiscally sound financial practice" and "responsible management of assets."

Lastly, as a leader in sustainability, FNL demonstrates its commitment to **regional collaboration**, including supporting and protecting the surrounding partners and communities. Sustainability is a useful marketing tool and creates a positive impression of the Airport with "partners, elected officials, and communities."

F.3.2 Additional Recommendations for Consideration

In addition to the primary recommendations previously stated, the Master Plan Team suggested several other items that could be implemented in the FNL Waste and Recycling Plan. These supplementary recommendations may be found in **Table F-2**.

Table F-2: Additional Waste Diversion Recommendations for FNL

Recommendations Summary
Objectives and Targets ▪ Set specific, measurable, achievable, realistic, and time-bound (SMART) goals for the Airport and its waste/recycling program.
Paper/Paper Products, Plastic Bottles/Cups, Aluminum Cans, Glass ▪ Expand entire recycling program to additional areas (air carrier/rental car offices, encourage tenant recycling). ▪ Recycle through separated streams for best rates of recovery.
Cardboard ▪ Continue recycling through a separated stream.
Other Recyclables and Compost ▪ Work with the City of Loveland Solid Waste Division to expand the existing recycling program and introduce new materials (where possible). ▪ Implement a composting program for items that cannot directly be recycled but may be diverted from a landfill.
Additional Facilities and New Development ▪ Expand the landfill diversion program to additional areas, such as those excluded from the plan. ▪ Consider waste diversion and management in the design and construction process of future Airport projects.
Continuous Improvement ▪ Maintain and improve the recycling and waste program per the *Plan Do Check Act* cycle.

SOURCE: Mead & Hunt.

F.3.3 Regulatory Background

The FAA's definition of airport planning includes planning for recycling and waste minimization. Airports are specifically required to address solid waste as part of airport master planning projects. **Figure F-1** outlines the timeline and specifics of this requirement as well as resources available from the FAA to support such efforts. (Federal Aviation Administration 2019)

The FAA provides guidance on airport waste and recycling in the September 2014 memo on the topic as well as in a synthesis document prepared in 2013 (both available on the FAA's website).

Figure F-1: FAA Solid Waste Planning Requirement Timeline and Details

Febuary 2012

FAA Modernization and Reform Act (FMRA) of 2012 Section 132(b) expanded the definition of airport planning to include:

"*developing a plan for recycling and minimizing the generation of airport solid waste.*"

Section 133 of the FMRA specifies airports must develop an "Airport Waste Reduction, Reuse, and Recycling Plan" during master planning projects.

September 2014

FAA issues a memorandum entitled "Guidance on Airport Recycling, Reuse, and Waste Reduction Plans."

This memo details the FAA's expectations of and suggestions for an airport's solid waste plan, including the five elements listed in the FMRA and two additional elements.

October 2018

The FAA Reauthorization Act of 2018 Section 148(a)(1-2) amends 49 U.S.C. 47106(a) to update requirements for solid waste plans.

July 2019

Reauthorization Program Guidance Letter (R-PGL) 19-02 provides details about the changes found in the October 2018 regulation:

"*Any airport that applies for a funding grant for a project described in the facility's master plan must 1) have a waste plan in place or 2) develop one concurrently with the project grant.*"

SOURCE: FAA; Mead & Hunt.

Figure F-2 details the elements that are required for a solid waste plan per the FMRA, marked with an asterisk (*) or suggested for inclusion in a plan in the FAA Memo, marked with two asterisks (**).

Figure F-3 lists the factors influencing the scope and nature of an airport's waste program, as described in the FAA memo.

Figure F-2: Elements of Airport Solid Waste Management

- Facility description and background**
- Waste audit**
- Feasibility of solid waste recycling*
- Operation and maintenance requirements*
- Review of waste management contracts*
- Potential for cost savings or revenue generation*
- Plan to minimize the generation of solid waste*

SOURCE: FAA; Mead & Hunt.

Figure F-3: Factors Influencing Airport Solid Waste Management Programs

- Airport size, location, layout, and logistics
- Amount and type of waste generated
- Markets for recyclable commodities
- Costs to transport and process materials
- Local infrastructure
- Willingness of an airport and tenants to implement waste diversion practices
- Interaction between reduction, reuse, recycling, composting, landfill, and other alternatives

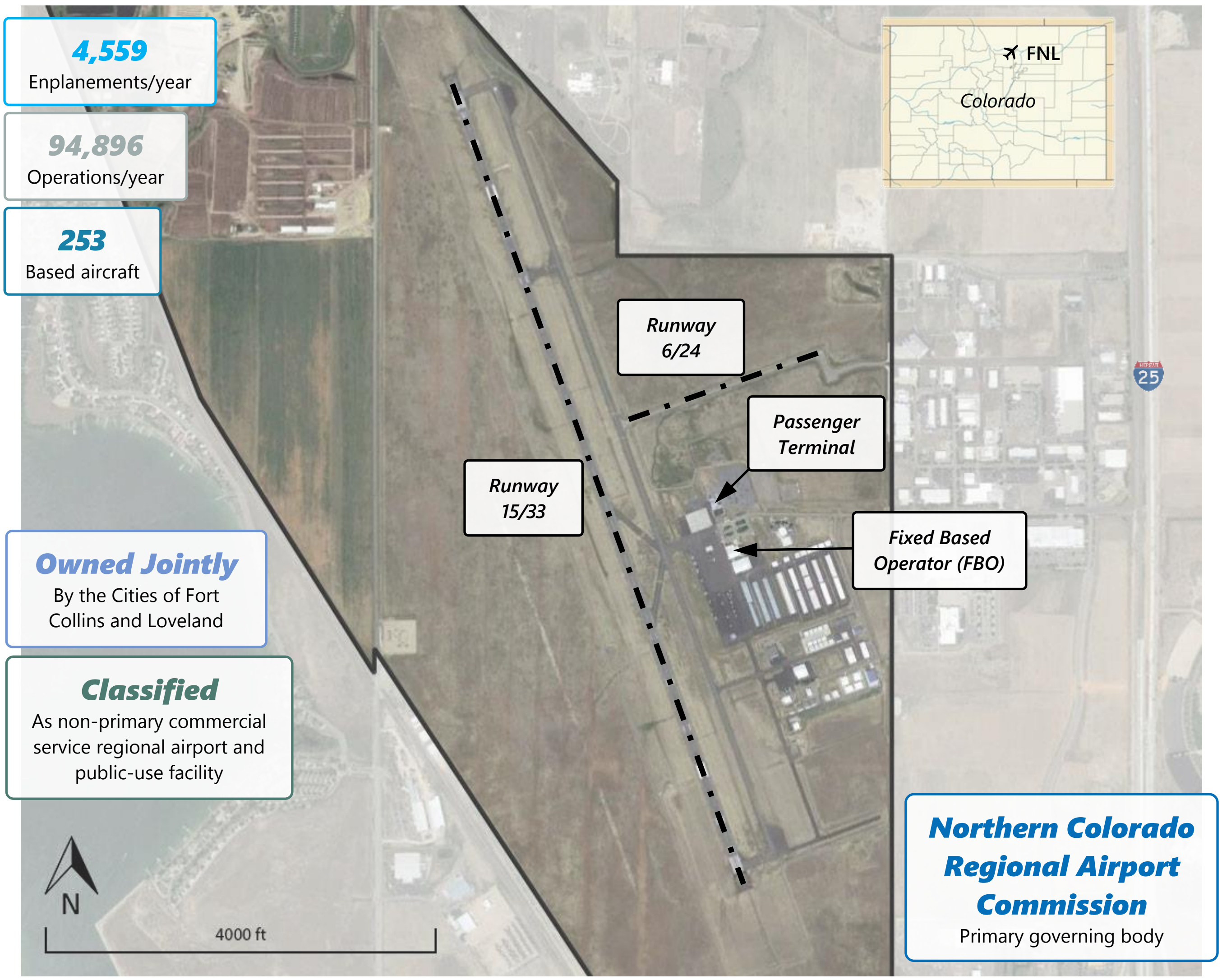
SOURCE: FAA; Mead & Hunt.

F.3.4 Airport Information

Figure F-4 shows a summary of background information about FNL, including its location, classification, governance, operations, and layout.

More information about FNL, including a facility inventory and operations data can be found in the primary chapters of the master plan.

Figure F-4: FNL Background Information



SOURCE: Northern Colorado Regional Airport; Mead & Hunt.
Google Basemap (Earth n.d.); Colorado County Map (NordNordWest 2009).

F.3.5 Plan Scope

Municipal Solid Waste (MSW) consists of everyday items that are used and then discarded. This plan focuses on the management of MSW and other materials that may be recycled or disposed of a municipal solid waste landfill. There are five primary types of MSW generated at airports: **general MSW**, **food waste**, **green waste (yard waste)**, **deplaned waste**, and **construction and demolition (C&D) waste**. This plan does not address the management of other waste types regulated by federal, state, or local laws, specifically: hazardous, universal, or industrial waste; waste from international flights, or C&D waste that is subject to special requirements/handling.

Facilities at FNL include buildings and areas where the Airport has a varying degree of control or influence over waste management practices. Some areas fall under direct control of the Airport and its staff, while others the Airport has influence over, but not direct control. According to FAA guidance, areas over which the Airport has direct control or influence should be included in the Recycling, Reuse, and Waste Reduction Plan; areas outside Airport control or influence may be excluded.

Table F-3 lists a breakdown of the areas FNL controls, influences, and neither controls nor influences.

Table F-3: Waste Management Areas at FNL

Management Level	Description
Areas under direct control	▪ Passenger Terminal Public Use Areas Non-sterile area, restrooms, security screening queuing area, sterile gate areas, baggage claim area ▪ Airport Administration Building ▪ Airport Rescue and Firefighting (ARFF) & Snow Removal Equipment (SRE) Building ▪ Airport Maintenance
Areas under influence	▪ Air Carrier Leased Areas – Terminal Offices, ticketing counters, breakrooms, and deplaned waste ▪ Rental Car Areas – Terminal (currently vacant) Offices, counters, return areas, service areas, and breakrooms ▪ Fixed-Base Operator (FBO) Building (owned by the Airport, leased by the tenant) ▪ General Aviation (GA) Hangars (owned by the Airport, leased by the tenant)
Areas *not* under control or influence	▪ Aims Community College ▪ Avionics Specialists ▪ CRJ Aviation ▪ Groome Transportation ▪ The Flying School ▪ The New Firewall Forward ▪ The New Leading-Edge Flight Training ▪ Professional Aircraft Services ▪ TransAero Helicopters ▪ Wildfire Air Tanker Base

SOURCE: Northern Colorado Regional Airport.

F.3.6 Current Waste Management Program

The waste diversion program at FNL primarily consists of recycling practices that facilities staff maintain. Tenant participation in the program is voluntary. **Figure F-5** details the existing waste and recycling infrastructure in place at FNL.

Figure F-5: Existing FNL Infrastructure

SOURCE: Northern Colorado Regional Airport; Mead & Hunt.

The City of Loveland Solid Waste Division provides collection service to FNL. FNL's tenants (rental car companies, airline, FBO, and GA hangar tenants) are responsible for custodial activities in their areas including transferring waste to the appropriate dumpsters.

Figure F-6 shows materials accepted in FNL's existing recycling program.

Figure F-6: Items Currently Recycled at FNL

Aluminum (comingled)	Plastic (comingled)
Glass (comingled)	Cardboard (single-stream)

SOURCE: Northern Colorado Regional Airport; Mead & Hunt.

F.3.7 Waste Audit

Information about the following categories was collected to assist with this plan:

- Airport buildings and facilities
- Areas that generate waste
- Types of waste generated in each area
- Materials that can be recycled under the current program.

An evaluation of FNL's information and records, as well as aviation industry waste and recycling trends, supported efforts to identify the source, composition, and quantity of waste generated at FNL, including areas under the Airport's direct control or influence. This information then served as a foundation to identify opportunities to improve and monitor program effectiveness.

Quantity

It is estimated a total of 18 tons of waste and 1.5 tons of recycling are generated at FNL annually. This volume is based upon the capacity of and frequency of collection service for each of the facility's dumpsters and the EPA's volume-to-weight conversion factors for MSW.

Sources & Composition

Based on the activities taking place at FNL, a varied waste stream can be expected. **Table F-4** lists each area included in the scope of this plan and the type(s) of waste likely generated there.

A physical waste material sort could provide more detailed information about the specific composition of waste at FNL. This information may include:

- Types of items included in each general category
- Contamination rate of the recycling stream (items that are not recyclable in the recycling bins)
- Recovery rate for recycling (the proportion of recyclable items that are segregated properly).

The data from a sort could also be used to identify opportunities to improve the composition of the waste stream (by item substitution, by improving recycling to reduce the volume of waste, etc.).

Table F-4: FNL Waste by Area and Material

Area | Material	Office Paper	Newspapers	Magazines	Plastic	Aluminum	Cardboard	Glass	Food Waste	Paper Products	Liquids	Toiletries	Packaging	Styrofoam	Metals	Deplaned Waste	Green / Yard Waste	C & D Waste	Other Waste
Terminal Building																		
Public passenger areas Curbs, ticketing lobby, restrooms, security screening queuing area, gate areas, hold rooms, baggage claim area		x	x	x	x		x	x	x	x	x	x						x
Tenant areas Drink/snack machines, associated activities		x	x	x	x	x	x	x	x	x		x						x
Airport Support Buildings																		
ARFF/SRE Building		x	x	x	x			x	x	x	x	x						x
Maintenance Building	x	x	x	x	x	x	x	x	x	x		x		x				x
Airport Maintenance Activities	x	x	x	x	x	x		x	x	x		x		x			x	x
Airport Administration Offices	x	x	x	x	x	x	x	x	x			x	x					x

SOURCE: Northern Colorado Regional Airport; Mead & Hunt.

Purchases

FNL staff do not currently track the quantity and type of disposable items and supplies purchased for the facility. This information could provide insight on some of the materials coming into the Airport that will go back out as waste (other materials are brought on-site by visitors, employees, and vendors). Identifying and tracking the type and quantity of all disposable items purchased for use at FNL will allow the Airport to identify opportunities to reduce outgoing waste, including:

- Items that have reusable or recyclable alternatives
- Some items that could be eliminated
- Some that indicate scale of the activity at the Airport (for example, paper towel and garbage bags).

F.3.8 Feasibility analysis

Many factors impact the feasibility of recycling at FNL; some are universal, and others are specific to the facility. The following sections describe the more influential of these factors.

Commitment and Support

The willingness of the Commission, FNL staff, and the Airport's contractors and tenants to support the facility's recycling program are critical to the success of such a program. Without the commitment of resources such as funding, labor and time, space, and access to secure areas, a waste management program could struggle.

Airport Policy and Contractor Dedication

FNL's administration has supported the recycling program in the past, and it is expected this will continue in the foreseeable future. Based on the resources allocated to recycling programs, the Northern Colorado Regional Airport Commission, Cities of Fort Collins/Loveland, and Larimer County each appear to generally support responsible waste management and sustainable operations.

The City of Loveland Solid Waste Division, FNL's waste management service provider, offers a wide range of recycling opportunities to area residents. These services align with continued support of the City, the County, the Commission, and FNL's recycling programs.

Technical and Economic Factors

Local Markets and Infrastructure

Markets for recycled materials fluctuate widely based on many factors and interactions. Local waste haulers typically accept materials that can be recycled cost-effectively in the area. Manufacturers purchasing recycled material want it to be predictable and ready for use; therefore, recycling facilities are discriminatory about what materials they accept. They almost unilaterally prefer materials that are of high value, clean, and easy to separate.

The materials listed in **Table F-5** are accepted under the County's commercial recycling program. As noted above, inclusion in such programs typically indicates that the market and/or infrastructure for these materials is strong. FNL currently recycles all the materials the County's commercial recycling program accepts.

Table F-5: Larimer County – Materials Accepted for Recycling

Recyclable Materials – Larimer County Landfill
Office Paper
Brochures, copy paper, envelopes, file folders, shredded paper
Newspapers Plus
Catalogs, junk mail, magazines, newspapers
Paperboard & Low-Grade Paper
Brown envelopes, cartons, paper bags, paper egg cartons, paperback books, paperboard boxes, phone books, wrapping paper
Mixed Containers
Aluminum cans, foil and pans; empty aerosol cans; plastic bottles, jars, jugs, and tubes; steel cans
Corrugated Cardboard & Brown Paper Bags
Corrugated cardboard boxes and brown paper bags
Glass Bottles & Jars
Food and beverage glass bottles and jars

SOURCE: Larimer County.

Larimer County also helps in the recycling of e-waste, appliances, and ink cartridges. Additional service fees may apply for the recycling of these items.

Larimer County operates a single multi-purpose landfill within a 20-minute drive of FNL. There are also two recycling centers in the Fort Collins/Loveland area, with one in each city. It is anticipated that the landfill and recycling centers have adequate capacity to serve FNL and the area for the foreseeable future.

Logistical Considerations and Constraints

To maintain a recycling program at FNL, certain elements must be in place. These include:

- A proactive and engaged custodial staff
- A willing and affordable hauling service provider
- Space for bins, dumpsters, and compactors
- Access to secure areas of the facility (including airside ramps and sterile terminal areas).

Currently, these elements appear unconstrained. Additional resources including custodial labor, waste hauling services, space, and airport access are anticipated to be available to support the continuation and/or expansion of the recycling program at FNL.

Contractual Issues

FNL's contractual agreements are not anticipated to pose issues to maintaining and/or improving the facility's waste diversion program. For more information, see **Section F.3.9**.

Recycling, Landfill, and Energy-From-Waste Facility Requirements

The recycling facilities and landfill that accept waste from FNL have specific acceptance criteria and requirements. Adherence to these specifications protects the safety of employees handling these materials, the integrity and operation of the equipment and infrastructure used to transfer, sort, and convert these materials, and the value of the recyclable stream.

Components that seem recyclable (plastic, glass, or metal parts) may make up some items generated at FNL; however, the recycling facility has specific material standards, so it is important that non-recyclable items are not included in the facility's recycling stream.

The City of Loveland Recycling Center accepts many materials, including those listed in **Table F-6** and generated at the Airport.

Table F-6: City of Loveland Recycling Center – Acceptable Materials

Recyclable Materials – City of Loveland Recycling Center
Wire
Printer cartridges
Paper milk and juice cartons
Clean plastic bags (grocery, newspaper, dry cleaning)
Auto/truck tires (at a fee)
Motor oil, filters, and antifreeze
Shredded paper
Batteries (auto/truck, household)
All items accepted through the blue cart recycling program:
Glass bottles/jars
Aluminum drink cans
Mixed office paper
Magazines
Comingled plastics and metal cans
Cardboard and paperboard

SOURCE: (City of Loveland, Recycling Center: City of Loveland n.d.).

Waste material that may be generated at FNL but is prohibited by the Larimer County Landfill includes hazardous waste, radioactive waste, lead-acid batteries, yard waste compost, and construction and demolition (C&D) waste. Yard waste compost is processed at the Loveland Recycling Center or the City of Fort Collins Timberline Recycling Center. The remainder of these items must be managed through hazardous or universal waste programs or disposed of at a specialized landfill.

Costs

The Airport strives to be as self-sustaining as is feasible; therefore, it is imperative that programs implemented and maintained at FNL, including recycling, are as cost-effective as possible.

Guidelines and Policies

To evaluate FNL's existing recycling plan in the context of local, state, and national requirements, the consultant reviewed federal, State of Colorado, and local waste and recycling regulations and policies/factors.

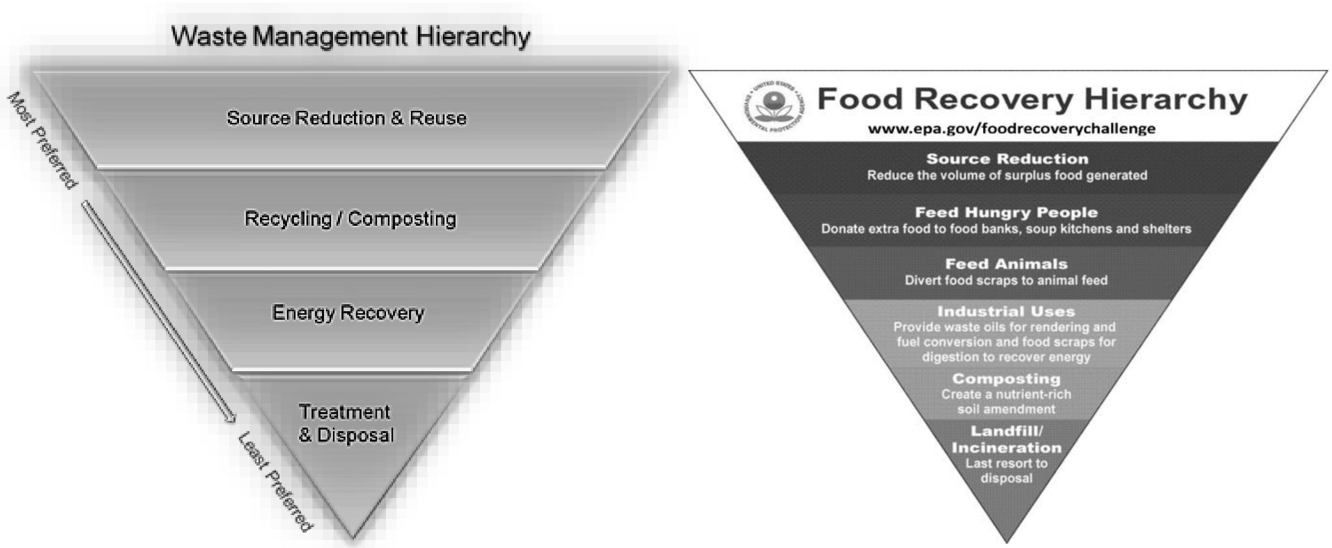
Federal

As described in **F.3.3**, the FAA's definition of airport planning includes planning for recycling and waste minimization.

The United States Environmental Protection Agency (EPA) is responsible for developing a solid waste management program under the Resource Conservation and Recovery Act (RCRA) and related policies and guidance. RCRA provides the framework for management of hazardous and non-hazardous waste. All generators of hazardous waste, including airports, are required to comply with RCRA and all other federal waste laws and regulations.

Figure F-7 shows a hierarchy of waste management strategies developed by the EPA. This hierarchy on the left ranks these strategies from most- to least-environmentally preferred and places emphasis on reducing, reusing, and recycling. In addition to the general waste management hierarchy, the EPA has also developed a preference ranking of management strategies for food waste, as shown in the figure at the right.

Figure F-7: Waste Management and Food Recovery Hierarchies



SOURCE: United States Environmental Protection Agency.

State

The State of Colorado has established the *Colorado Integrated Solid Waste & Materials Management Plan* as a roadmap for solid waste management in the state. The Plan introduced a series of goals to evaluate diversion measures across the state:

- 28 percent diversion by 2021
- 35 percent diversion by 2026
- 45 percent diversion by 2036.

More urbanized counties, such as Larimer, will be more readily able to reach this threshold largely due to local support and closer proximity to participating centers. (Burns & McDonnell and Skumatz Economic Research Associates 2016)

Local

Larimer County acknowledges and endorses the State's environmental initiative goals for diversion. The County encourages residents and businesses to divert waste through a public education campaign that encourages participation in waste reduction programs, recycling, yard waste composting, and hazardous waste disposal in an effort to keep pace with the State's diversion goals. (Larimer County n.d.)

To support these goals, the County provides local business recycling program managers with tools that help lower their costs and encourage higher levels of recycling.

F.3.9 Review of Waste Management Contracts

The FAA memorandum titled "Guidance on Airport Recycling, Reuse, and Waste Reduction Plans" explains that the purpose of reviewing waste management contracts is to "identify opportunities for improving (waste) program scope and efficiency, as well as identify constraints."

The City of Loveland Solid Waste Division collects garbage and recyclable materials from the Airport's dumpsters; no formal contractual agreement is in place for the service. (Private tenants are responsible for contracting for trash and recycling collection services for their areas.)

According to Airport staff, in general, the Airport's service contracts and tenant leases address housekeeping requirements and related expectations for managing trash and provide limited information about waste diversion, including recycling. These contracts and leases do not necessarily impede recycling or other waste management strategies; however, they do not explicitly require conformance with or support of the Airport's recycling and related efforts.

F.3.10 Financial analysis

A financial analysis was not conducted at FNL. This was because the waste provider, the City of Loveland Solid Waste Division, is operated directly by the City. Therefore, no invoices are created for any waste or recycling duties at the Airport. While the Airport does not receive a bill for these services, there are costs associated with the collection, transport, and disposal of waste generated at the facility. The City of Loveland should be able to provide or estimate these costs (for example, based on the fees they charge external entities or their budget for items like transportation, tipping fees, etc.).

Citations

Sources

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Additional Reading

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Glossary

Federal Aviation Administration (FAA) – regulatory body of the US government that regulates all national aviation activities.

FAA Modernization and Reform Act of 2012 (FMRA) – legislation that seeks to improve aviation safety and capacity of the national airspace system and provide a stable funding system.

Environmental Protection Agency (EPA) – independent agency of the US government that establishes policies that protect the natural environment.

FAA Reauthorization Act of 2018 – reauthorization of FMRA 2012 to extend funding and administrative authority to the FAA.

Reauthorization Program Guidance Letter (R-PGL) 19-02 – implements provisions to FAA Reauthorization Act of 2018 that changed project eligibility, scope, or funding under 49 U.S.C., Chapter 471.

Municipal Solid Waste (MSW) – everyday items that are used and then discarded. There are five primary types of MSW generated at airports:

1. **General MSW** – common inorganic waste, such as product packaging, disposable utensils, plates and cups, bottles, and newspaper. Less common items, such as furniture and clothing, are also considered general MSW.
2. **Food waste** – either food that is not consumed or the waste generated and discarded during food preparation. Food waste and green waste make up a waste stream known as compostable waste.
3. **Green waste (yard waste)** – tree, shrub and grass clippings, leaves, weeds, small branches, seeds, pods, and similar debris generated by landscape maintenance activities. Food waste and green waste make up a waste stream known as compostable waste.
4. **Deplaned waste** – waste removed from passenger aircraft. These materials include bottles and cans, newspaper and mixed paper, plastic cups, service ware, food waste, food-soiled paper, and paper towels.
5. **Construction and demolition (C&D) waste** – any non-hazardous solid waste from land clearing, excavation, and/or the construction, demolition, renovation or repair of structures, roads, and utilities. C&D waste commonly includes concrete, wood, metals, drywall, carpet, plastic, pipes, land clearing debris, cardboard, and salvaged building components.

Resource Conservation and Recovery Act (RCRA) – federal law of the US governing the disposal of solid or hazardous waste.

APPENDIX G:

AIRPORT LAYOUT PLAN

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NORTHERN COLORADO REGIONAL AIRPORT

AIRPORT LAYOUT PLAN UPDATE

4900 EARHART RD

LOVELAND, CO 80538

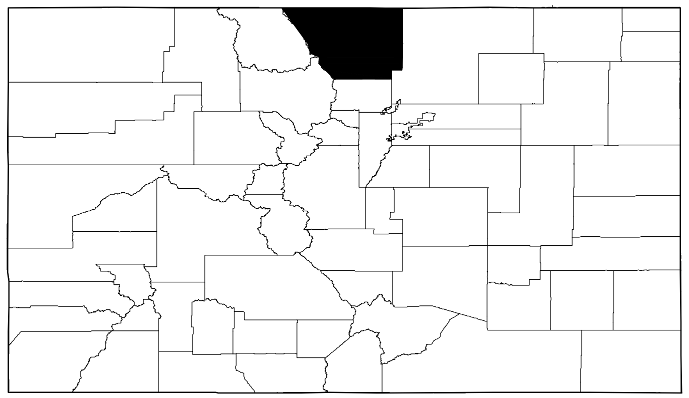
M&H No.:3115300-160154.01

AIP NO.: 3-08-0023-036-2018

AIP NO.: 3-08-0023-037-2019

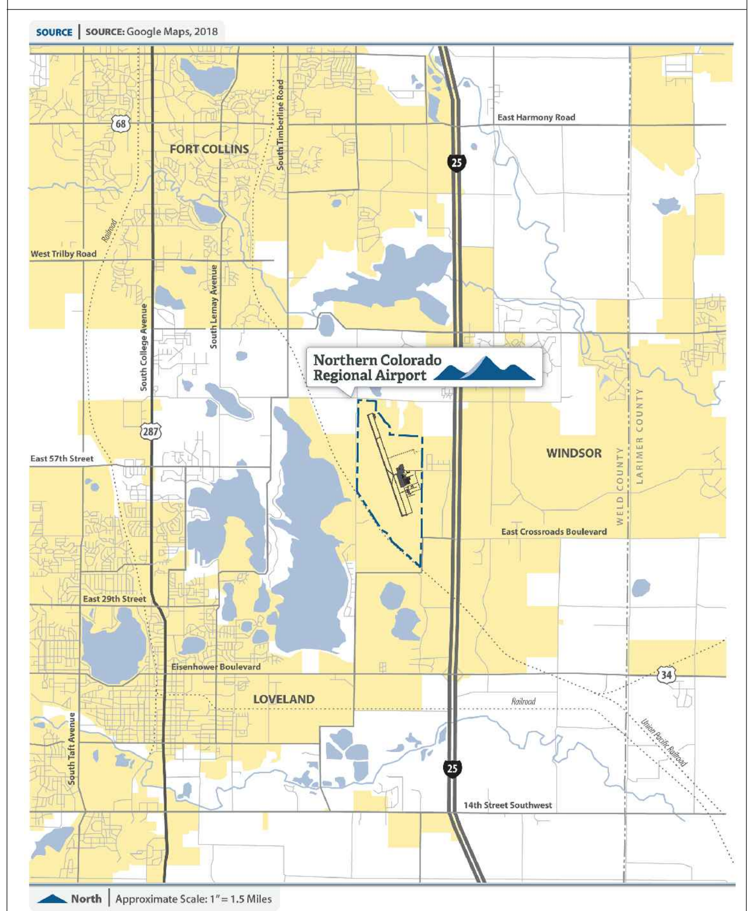
JUNE 2020

LARIMER COUNTY

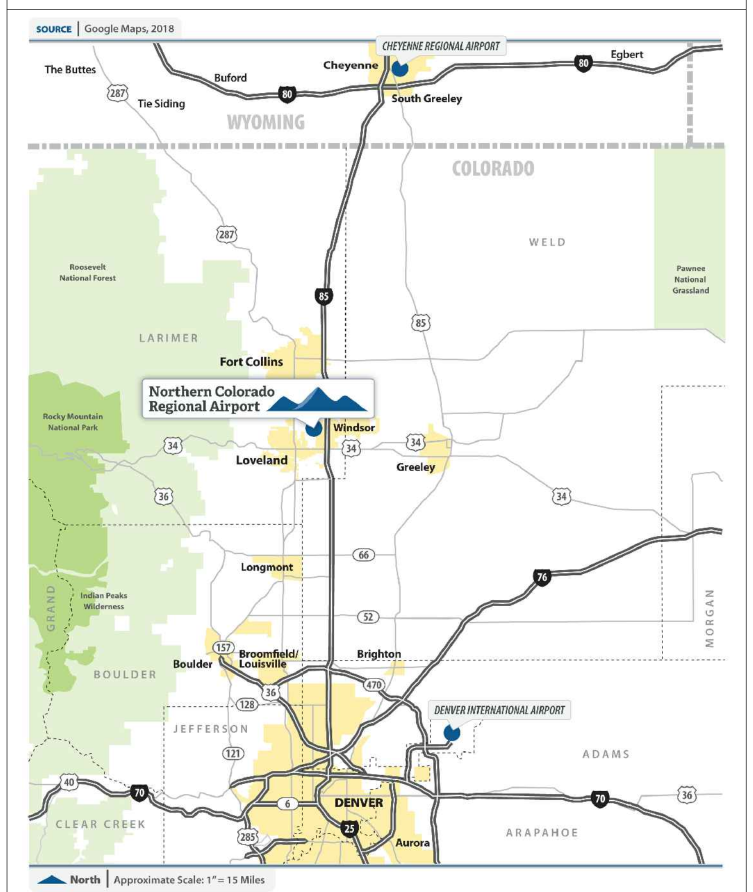


COLORADO

VICINITY MAP



LOCATION MAP



Drawing Set		
Sheet Number	Sheet Title	Revision
1	COVER SHEET	JUNE 2020
2	AIRPORT DATA	JUNE 2020
3	EXISTING AIRPORT LAYOUT	JUNE 2020
4	FUTURE AIRPORT LAYOUT PLAN	JUNE 2020
5	AIRPORT AIRSPACE PLAN - CONICAL SURFACE	JUNE 2020
6	AIRPORT AIRSPACE - RUNWAY 15 APPROACH	JUNE 2020
7	AIRPORT AIRSPACE - RUNWAY 33 APPROACH	JUNE 2020
8	AIRPORT AIRSPACE - RUNWAY PROFILES	JUNE 2020
9	INNER APPROACH - RUNWAY 15	JUNE 2020
10	INNER APPROACH - RUNWAY 33	JUNE 2020
11	INNER APPROACH - RUNWAY 6	JUNE 2020
12	INNER APPROACH - RUNWAY 24	JUNE 2020
13	INNER APPROACH - FUTURE RUNWAY 15R	JUNE 2020
14	INNER APPROACH - FUTURE RUNWAY 33L	JUNE 2020
15	DEPARTURE SURFACES - RUNWAY 15-33	JUNE 2020
16	TERMINAL AREA PLAN	JUNE 2020
17	AIRPORT LAND USE PLAN	JUNE 2020
18	EXHIBIT 'A' AIRPORT PROPERTY INVENTORY MAP	JUNE 2020

REVISIONS		
NO.	DESCRIPTION	DATE

Mead & Hunt

Mead and Hunt, Inc.
1743 Wazee Street,
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Denver, CO 80202
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meadhunt.com

NORTHERN COLORADO REGIONAL AIRPORT
AIRPORT LAYOUT PLAN UPDATE

4900 EARHART RD
LOVELAND, CO 80538

ISSUED

NOT FOR CONSTRUCTION

M&H NO.:	3115300-160154.01
DATE:	JUNE 2020
DESIGNED BY:	M&H
DRAWN BY:	JWB
CHECKED BY:	CAL

DO NOT SCALE DRAWINGS

SHEET CONTENTS

COVER SHEET

SHEET NO.

1

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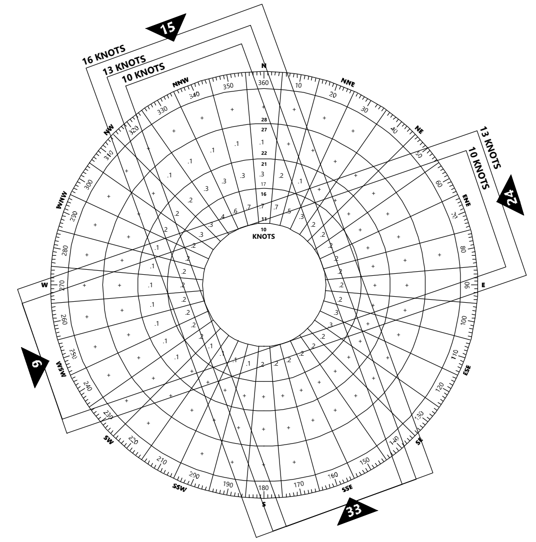
6/25/2020 11:05:41 AM

ALL WEATHER WINDROSE

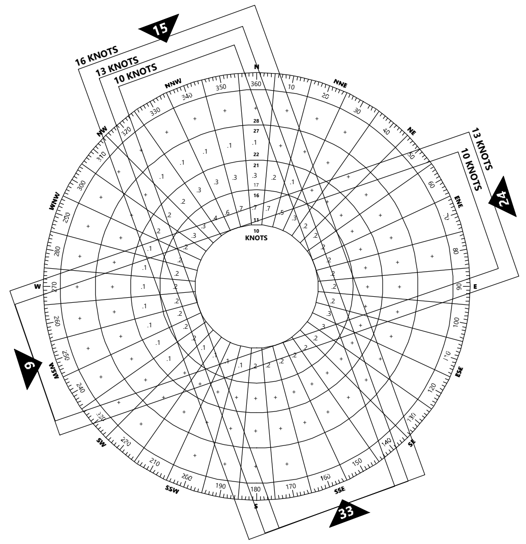


ALL WEATHER WIND COVERAGE SUMMARY

Runway Designation	10.5 Knot	13 Knot	16 Knot
Runway 6/24	91.57%	94.51%	97.38%
Runway 15/33	95.24%	97.26%	98.93%
Combined	98.95%	99.68%	99.93%

Data obtained from AWOS Station 724769, Fort Collins, Loveland, Colorado.
Period of record 2008-2017.

IFR WINDROSE



IFR WIND COVERAGE SUMMARY

Runway Designation	10.5 Knot	13 Knot	16 Knot
Runway 6/24	89.41%	92.84%	99.52%
Runway 15/33	96.29%	98.22%	99.46%
Combined	99.21%	99.82%	99.97%

Data obtained from AWOS Station 724769, Fort Collins, Loveland, Colorado.
Period of record 2008-2017.

RUNWAY DATA

	RUNWAY 15		RUNWAY 33		RUNWAY 6		RUNWAY 24		FUTURE RUNWAY 15R		FUTURE RUNWAY 33L	
	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE
RUNWAY DESIGN CODE (RDC)	C/D-III-5000	C/D-III-4000	C/D-III-2500	SAME	B-I-VIS	SAME	B-I-VIS	SAME	N/A	B-II-VIS	N/A	B-II-VIS
APPROACH REFERENCE CODE (APRC)	B/III/5000	B/III/4000	B/III/2400	SAME	B/I(S)/VIS	SAME	B/I(S)/VIS	SAME	N/A	B/II/VIS	N/A	B/II/VIS
DEPARTURE REFERENCE CODE (DPRC)	B/III D/II	SAME	B/III D/II	SAME	B/I(S)	SAME	B/I(S)	SAME	N/A	B/II	N/A	B/II
RUNWAY PAVEMENT TYPE	ASPHALT	SAME	ASPHALT	SAME	ASPHALT	SAME	ASPHALT	SAME	N/A	ASPHALT	N/A	ASPHALT
RUNWAY PAVEMENT STRENGTH (IN 1000 LBS.)	50(S), 65(D), 130(DT)	90(S), 130(D), 180(DT)	50(S), 65(D), 130(DT)	90(S), 130(D), 180(DT)	12.5(S)	SAME	12.5(S)	SAME	N/A	30(S)	N/A	30(S)
RUNWAY PAVEMENT STRENGTH (PCN)	49/F/C/W/T	SAME	49/F/C/W/T	SAME	.	SAME	.	SAME	N/A	.	N/A	.
RUNWAY SURFACE TREATMENT	GROOVED	SAME	GROOVED	SAME	.	SAME	.	SAME	N/A	.	N/A	.
EFFECTIVE RUNWAY GRADIENT %	0.005	SAME	0.005	SAME	0.007	SAME	0.007	SAME	N/A	0.003	N/A	0.003
PERCENT WIND COVERAGE (16-kt)	98.93	SAME	98.93	SAME	97.38	SAME	97.38	SAME	N/A	98.93	N/A	98.93
RUNWAY WIDTH X LENGTH	100' x 8500'	150' x 9500'	100' x 8500'	150' x 9500'	40' x 2189'	60' x 2189'	40' x 2189	60' x 2189'	N/A	75' X 6700'	N/A	75' X 6700'
DISPLACED THRESHOLD LENGTH	N/A	SAME	N/A	1000'	N/A	SAME	N/A	SAME	N/A	N/A	N/A	N/A
RUNWAY SAFETY AREA (RSA) WIDTH	500'	SAME	500'	SAME	120'	SAME	120'	SAME	N/A	150'	N/A	150'
RSA LENGTH BEYOND STOP END	1000'	SAME	1000'	SAME	240'	SAME	240'	SAME	N/A	300'	N/A	300'
RUNWAY LIGHTING	HIRL	SAME	HIRL	SAME	REFLECTORS	SAME	REFLECTORS	SAME	N/A	MIRL	N/A	MIRL
RUNWAY PROTECTION ZONE (RPZ) DIMENSIONS	500' X 1010' X 1700'	1000 ' X 1510' X 1700'	1000' X 1750' X 2500'	SAME	250' X 450' X 1000'	SAME	250' X 450' X 1000'	SAME	N/A	500' X 700' X 1000'	N/A	500' X 700' X 1000'
RUNWAY MARKING	PRECISION	SAME	PRECISION	SAME	VISUAL	SAME	VISUAL	SAME	N/A	VISUAL	N/A	VISUAL
FAR PART 77 APPROACH SLOPE	34:1	SAME	50:1	SAME	20:1	SAME	20:1	SAME	N/A	20:1	N/A	20:1
FAR PART 77 APPROACH TYPE	NON-PRECISION (C)	PIR	PIR	SAME	VISUAL	SAME	VISUAL	SAME	N/A	VISUAL	N/A	VISUAL
APPROACH VISIBILITY MINIMUMS	1-MILE	3/4-MILE	1/2-MILE	SAME	VISUAL	SAME	VISUAL	SAME	N/A	VISUAL	N/A	VISUAL
AERONAUTICAL SURVEY REQUIRED	VERTICALLY GUIDED	SAME	VERTICALLY GUIDED	SAME	NON-VERT. GUIDED	SAME	NON-VERT. GUIDED	SAME	N/A	NON-VERT. GUIDED	N/A	NON-VERT. GUIDED
DEPARTURE SURFACE	YES	SAME	YES	SAME	N/A	SAME	N/A	SAME	N/A	N/A	N/A	N/A
RUNWAY OBJECT FREE AREA (ROFA) WIDTH	800'	SAME	800'	SAME	250'	SAME	250'	SAME	N/A	500'	N/A	500'
ROFA LENGTH BEYOND STOP END	1000'	SAME	1000'	SAME	240'	SAME	240'	SAME	N/A	300'	N/A	300'
RUNWAY OBSTACLE FREE ZONE (ROFZ) WIDTH	400'	SAME	400'	SAME	250'	SAME	250'	SAME	N/A	250'	N/A	250'
ROFZ LENGTH	200'	SAME	200'	SAME	200'	SAME	200'	SAME	N/A	200'	N/A	200'
INNER APPROACH OFZ (IAOFZ) WIDTH	N/A	400'	400'	SAME	N/A	SAME	N/A	SAME	N/A	N/A	N/A	N/A
INNER APPROACH OFZ (IAOFZ) LENGTH	N/A	2600'	2600	SAME	N/A	SAME	N/A	SAME	N/A	N/A	N/A	N/A
INNER TRANSITIONAL OFZ (ITOFZ) WIDTH	N/A	SAME	645'	SAME	N/A	SAME	N/A	SAME	N/A	N/A	N/A	N/A
PRECISION OBSTACLE FREE ZONE	N/A	200' X 800'	200' X 800'	SAME	N/A	SAME	N/A	SAME	N/A	N/A	N/A	N/A
THRESHOLD SITING SURFACE (EB99)	TYPE 4	SAME	TYPE 6	SAME	TYPE 2	SAME	TYPE 2	SAME	N/A	TYPE 3	N/A	TYPE 3
VISUAL APPROACH AIDS	PAPI, REILS	PAPI, REILS, MALS	PAPI, MALSR	PAPI, REILS, MALSR	N/A	SAME	N/A	SAME	N/A	PAPI	N/A	PAPI
INSTRUMENT APPROACH AIDS	GPS, VOR	SAME	ILS,GPS, VOR	SAME	N/A	SAME	N/A	SAME	N/A	N/A	N/A	N/A

RUNWAY END DATA

		RUNWAY 6/24		RUNWAY 15/33		RUNWAY 15R/33L
		EXISTING	FUTURE	EXISTING	FUTURE	FUTURE
RUNWAY END COORDINATES NGS 405 01/03 (NAD 83)		LAT. N 40°27'10.08" LON. W 105°00'41.66"	SAME	LAT. N 40°27'44.21" LON. W 105°01'02.70"	SAME	LAT. N 40°27'25.13" LON. W 105°01'03.50"
		LAT. N 40°27'17.53" LON. W 105°00'13.93"	SAME	LAT. N 40°26'25.08" LON. W 105°00'25.89"	LAT. N 40°26'15.77" LON. W 105°00'21.56"	LAT. N 40°26'22.76" LON. W 105°00'34.42"
RUNWAY ELEVATIONS						
	END	4993.4'/4991.3'	SAME	4977.2'/5020.3'	4977.2'/5025.3'	4983.0'/5019.6'
	DISPLACED THRESHOLD ELEVATION	-	-	-	5020.3'	-
NGS 405 01/03 (NAVD 88)	HIGH POINT	4993.4'	SAME	5020.3'	5025.3'	5019.6'
	LOW POINT	4991.3'	SAME	4977.2'	SAME	4983.0'
	TOUCHDOWN ZONE ELEVATION	4993.4'/4993.4'	SAME	4990.0'/5020.3	4990.0'/5020.3	5006.0'/5019.6'

DECLARED DISTANCES

ITEM	RUNWAY 6/24		RUNWAY 15L/33R		RUNWAY 15R/33L
	EXISTING	FUTURE	EXISTING	FUTURE	FUTURE
TAKEOFF RUN AVAILABLE (TORA)	2189'/2189'	2189'/2189'	8500'/8500'	9500'/9500'	6700'/6700'
TAKE OFF DISTANCE AVAILABLE (TODA)	2189'/2189'	2189'/2189'	8500'/8500'	9500'/9500'	6700'/6700'
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	2189'/2189'	2189'/2189'	8500'/8500'	9500'/9500'	6700'/6700'
LANDING DISTANCE AVAILABLE (LDA)	2189'/2189'	2189'/2189'	8500'/8500'	9500'/8500'	6700'/6700'

NON-STANDARD CONDITIONS

ITEM	AIRPLANE DESIGN GROUP		STANDARD		NON-STANDARD CONDITION		COMMENTS
	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	
RUNWAY 6/24 WIDTH	B-I SMALL	SAME	60'	SAME	40'	NONE	RECOMMENDED TO BE WIDENED
RUNWAY 15L/33R WIDTH	C-III>150,000 LBS	SAME	150'	SAME	100'	NONE	RECOMMENDED TO BE WIDENED

TAXIWAY DATA

	T/W 'A'		T/W 'B'		T/W 'C'		T/W 'D'		FUTURE 'E'		FUTURE 'F'		FUTURE 'G'	
	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE
TAXIWAY DESIGN GROUP (TDG)	4	SAME	2	SAME	4	SAME	2	SAME	N/A	2	N/A	2	N/A	2
WIDTH IN FEET (STANDARD)	50' (50')	SAME	35' (35')	SAME	92' (50')	SAME	35' (35')	SAME	N/A	35' (35')	N/A	35' (35')	N/A	35' (35')
SAFETY AREA WIDTH (IN FEET)	118' (ADG III)	SAME	79' (ADG II)	SAME	118 (ADG III)	SAME	79' (ADG II)	SAME	N/A	79' (ADG II)	N/A	79' (ADG II)	N/A	79' (ADG II)
OBJECT FREE AREA WIDTH (IN FEET)	186' (ADG III)	SAME	131' (ADG II)	SAME	186' (ADG III)	SAME	131' (ADG II)	SAME	N/A	131' (ADG II)	N/A	131' (ADG II)	N/A	131' (ADG II)
SEPARATION (IN FEET) T/W TO T/W	152' (ADG III)	SAME	105' (ADG II)	SAME	152' (ADG III)	SAME	105' (ADG II)	SAME	N/A	105' (ADG II)	N/A	105' (ADG II)	N/A	105' (ADG II)
T/W TO OBJECT	93' (ADG III)	SAME	65.5' (ADG II)	SAME	93' (ADG III)	SAME	65.5' (ADG II)	SAME	N/A	65.5' (ADG II)	N/A	65.5' (ADG II)	N/A	65.5' (ADG II)
T/W TO R/W	400'	SAME	N/A	SAME	N/A	SAME	895'	SAME	N/A	240'	N/A	240'	N/A	240'
LIGHTING	MITL	HITL	MITL	SAME	MITL	SAME	REFLECTORS	SAME	N/A	MITL	N/A	MITL	N/A	MITL
TAXIWAY EDGE SAFETY MARGIN	10'	SAME	7.5'	SAME	10'	SAME	7.5'	SAME	N/A	7.5'	N/A	7.5'	N/A	7.5'
TAXIWAY SHOULDER WIDTH	20'	SAME	15'	SAME	20'	SAME	15'	SAME	N/A	15'	N/A	15'	N/A	15'

MODIFICATION TO STANDARDS

ITEM	AIRPLANE DESIGN GROUP		STANDARD		NON-STANDARD CONDITION		COMMENTS
	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	
NOT APPLICABLE							

REVISIONS

NO.	DESCRIPTION	DATE

NOTES

1. This drawing reflects current planning standards applicable to Northern Colorado Regional Airport to the greatest extent possible. This drawing should not be used as a standard for planning or design.
2. Airports GIS data provided by Quantum Spatial, Dec 2018.
3. All coordinate and elevation data is NAD83/NAVD88.
4. The preparation of this plan was financed in part through a planning grant from the Federal Aviation Administration as provided under Section 505 of the Airport and Airway Improvement Act of 1982, as amended. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this plan by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public laws.

AIRPORT DATA

	EXISTING	FUTURE
AIRPORT REFERENCE CODE	C/D-III	SAME
MEAN MAX. TEMPERATURE (HOTTEST MONTH)	87°F (JULY)	SAME
AIRPORT ELEVATION (AMSL) NGS 405 (NAVD 88)	5020.3'	5025.3'
AIRPORT & TERMINAL NAVAIDS	BEACON,VOR,ILS	SAME
AIRPORT REFERENCE POINT (ARP) NGS 405 (NAD 83)	LAT. N 40°27'06.58" LON. W 105°00'40.81"	LAT. N 40°26'59.56" LON. W 105°00'42.90"
MISCELLANEOUS FACILITIES	LIGHTED WINDCONE, AWOS, REMOTE TOWER/MASTS	SAME
GPS APPROACHES	RW 15/33	SAME
CRITICAL AIRCRAFT	A320	SAME
WINGSPAN	111.9'	
APPROACH SPEED	135 Kts.	
UNDERCARRIAGE WIDTH	24.9'	
LENGTH OF HAUL	630 NM (LAS VEGAS)	SAME
MAGNETIC VARIATION (DATE)	8° 9' E (OCT 2019)	
NPIAS CATEGORY	PRIM. COMM. SERV.	
STATE (CO) EQUIVALENT SERVICE ROLE	PRIM. COMM. SERV.	
COMBINED WIND COVERAGE (16KT, 13KT, 10.5KT)	99.93% 99.68% 98.95%	

Mead &Hunt

Mead and Hunt, Inc.
1743 Wazee Street,
Suite 400
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phone: 303-825-8844
meadhunt.com

NORTHERN COLORADO REGIONAL AIRPORT
AIRPORT LAYOUT PLAN UPDATE

4900 EARHART RD
LOVELAND, CO 80538

ISSUED

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M&H NO.: 3115300-160154.01
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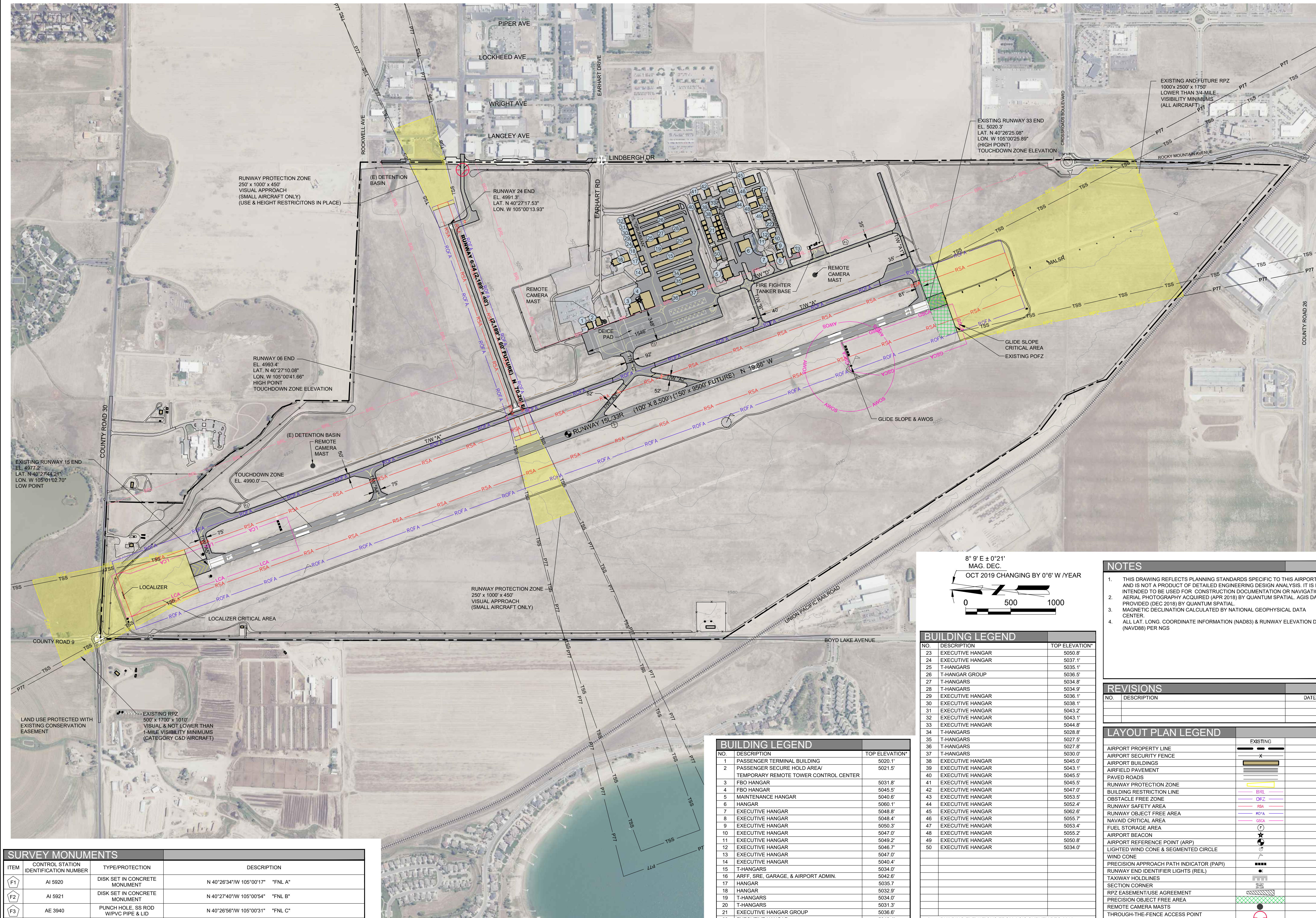
SHEET CONTENTS
AIRPORT DATA

SHEET NO.
2



SURVEY MONUMENTS

ITEM	CONTROL STATION IDENTIFICATION NUMBER	TYPE/PROTECTION	DESCRIPTION
F1	AI 5920	DISK SET IN CONCRETE MONUMENT	N 40°26'34"/W 105°00'17" "FNL A"
F2	AI 5921	DISK SET IN CONCRETE MONUMENT	N 40°27'40"/W 105°00'54" "FNL B"
F3	AE 3940	PUNCH HOLE, SS ROD W/PVC PIPE & LID	N 40°26'56"/W 105°00'31" "FNL C"

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATION*
1	PASSENGER TERMINAL BUILDING	5020.1'
2	PASSENGER SECURE HOLD AREA/ TEMPORARY REMOTE TOWER CONTROL CENTER	5021.5'
3	FBO HANGAR	5031.8'
4	FBO HANGAR	5045.5'
5	MAINTENANCE HANGAR	5040.6'
6	HANGAR	5060.1'
7	EXECUTIVE HANGAR	5048.8'
8	EXECUTIVE HANGAR	5048.4'
9	EXECUTIVE HANGAR	5050.3'
10	EXECUTIVE HANGAR	5047.0'
11	EXECUTIVE HANGAR	5049.2'
12	EXECUTIVE HANGAR	5046.7'
13	EXECUTIVE HANGAR	5047.0'
14	EXECUTIVE HANGAR	5040.4'
15	T-HANGARS	5034.0'
16	ARFF, SRE, GARAGE, & AIRPORT ADMIN.	5042.6'
17	HANGAR	5035.7
18	HANGAR	5032.9'
19	T-HANGARS	5034.0'
20	T-HANGARS	5031.3'
21	EXECUTIVE HANGAR GROUP	5036.6'
22	EXECUTIVE HANGAR	5048.4'
*	BUILDING ELEVATIONS FROM AGIS SURVEY DEC 2018.	

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATION*
23	EXECUTIVE HANGAR	5050.8'
24	EXECUTIVE HANGAR	5037.1'
25	T-HANGARS	5035.1'
26	T-HANGAR GROUP	5036.5'
27	T-HANGARS	5034.8'
28	T-HANGARS	5034.9'
29	EXECUTIVE HANGAR	5036.1'
30	EXECUTIVE HANGAR	5038.1'
31	EXECUTIVE HANGAR	5043.2'
32	EXECUTIVE HANGAR	5043.1'
33	EXECUTIVE HANGAR	5044.8'
34	T-HANGARS	5028.8'
35	T-HANGARS	5027.5'
36	T-HANGARS	5027.8'
37	T-HANGARS	5030.0'
38	EXECUTIVE HANGAR	5045.0'
39	EXECUTIVE HANGAR	5043.1'
40	EXECUTIVE HANGAR	5045.5'
41	EXECUTIVE HANGAR	5045.5'
42	EXECUTIVE HANGAR	5047.0'
43	EXECUTIVE HANGAR	5053.5'
44	EXECUTIVE HANGAR	5052.4'
45	EXECUTIVE HANGAR	5062.6'
46	EXECUTIVE HANGAR	5055.7'
47	EXECUTIVE HANGAR	5053.4'
48	EXECUTIVE HANGAR	5055.2'
49	EXECUTIVE HANGAR	5050.8'
50	EXECUTIVE HANGAR	5034.0'
*	BUILDING ELEVATIONS FROM AGIS SURVEY DEC 2018.	

NOTES

1. THIS DRAWING REFLECTS PLANNING STANDARDS SPECIFIC TO THIS AIRPORT, AND IS NOT A PRODUCT OF DETAILED ENGINEERING DESIGN ANALYSIS. IT IS NOT INTENDED TO BE USED FOR CONSTRUCTION DOCUMENTATION OR NAVIGATION.
2. AERIAL PHOTOGRAPHY ACQUIRED (APR 2018) BY QUANTUM SPATIAL. AGIS DATA PROVIDED (DEC 2018) BY QUANTUM SPATIAL.
3. MAGNETIC DECLINATION CALCULATED BY NATIONAL GEOPHYSICAL DATA CENTER.
4. ALL LAT. LONG. COORDINATE INFORMATION (NAD83) & RUNWAY ELEVATION DATA (NAVD88) PER NGS

REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING
AIRPORT PROPERTY LINE	
AIRPORT SECURITY FENCE	
AIRPORT BUILDINGS	
AIRFIELD PAVEMENT	
PAVED ROADS	
RUNWAY PROTECTION ZONE	
BUILDING RESTRICTION LINE	BRL
OBSTACLE FREE ZONE	OFZ
RUNWAY SAFETY AREA	RSA
RUNWAY OBJECT FREE AREA	ROFA
NAVAID CRITICAL AREA	GSCA
FUEL STORAGE AREA	F
AIRPORT BEACON	
AIRPORT REFERENCE POINT (ARP)	
LIGHTED WIND CONE & SEGMENTED CIRCLE	
WIND CONE	
PRECISION APPROACH PATH INDICATOR (PAPI)	
RUNWAY END IDENTIFIER LIGHTS (REIL)	
TAXIWAY HOLDLINES	
SECTION CORNER	20 21 29 28
RPZ EASEMENT/USE AGREEMENT	
PRECISION OBJECT FREE AREA	
REMOTE CAMERA MASTS	
THROUGH-THE-FENCE ACCESS POINT	

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NORTHERN COLORADO REGIONAL AIRPORT
AIRPORT LAYOUT PLAN UPDATE

4900 EARHART RD
LOVELAND, CO 80538

ISSUED

NOT FOR CONSTRUCTION

M&H NO.: 3115300-160154.01
DATE: JUNE 2020
DESIGNED BY: M&H
DRAWN BY: JWB
CHECKED BY: CAL
DO NOT SCALE DRAWINGS

SHEET CONTENTS
EXISTING AIRPORT LAYOUT

SHEET NO.
3

\\CORP.MEADHUNT.COM\SHAREDFOLDERS\ENT\P\3115300\160154.01\TECH\CAD\ALP\AIRPORT LAYOUT PLAN.DWG
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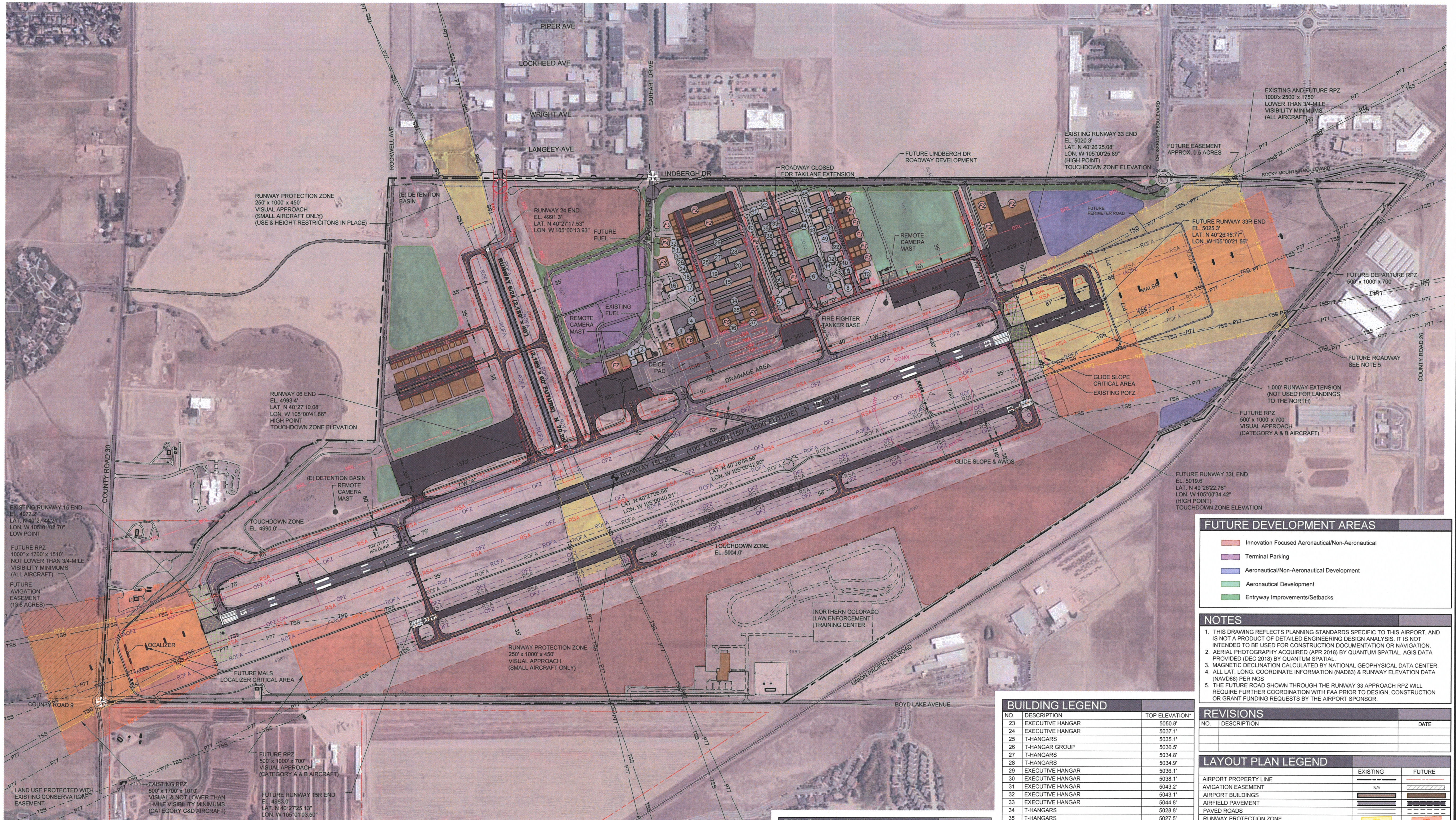

FUTURE DEVELOPMENT AREAS

- Innovation Focused Aeronautical/Non-Aeronautical
- Terminal Parking
- Aeronautical/Non-Aeronautical Development
- Aeronautical Development
- Entryway Improvements/Setbacks

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4. ALL LAT. LONG. COORDINATE INFORMATION (NAD83) & RUNWAY ELEVATION DATA (NAVD88) PER NGS
5. THE FUTURE ROAD SHOWN THROUGH THE RUNWAY 33 APPROACH RPZ WILL REQUIRE FURTHER COORDINATION WITH FAA PRIOR TO DESIGN, CONSTRUCTION OR GRANT FUNDING REQUESTS BY THE AIRPORT SPONSOR.

8° 9' E ± 0°21'
MAG. DEC.
OCT 2019 CHANGING BY 0°6' W /YEAR

0 500 1000

FAA APPROVAL

CONDITIONALLY APPROVED

SUBJECT TO LETTER DATED: July 16, 2020

John Bauer (Jul 20, 2020 11:10 MDT)

Federal Aviation Administration
Denver Airports District Office
Airspace Case Number: 2020-ANM-1213-NRA

SPONSOR APPROVAL

Jason R. Licon, Airport Director

NAME/TITLE

SIGNATURE

July 7, 2020

DATE

SURVEY MONUMENTS

ITEM	CONTROL STATION IDENTIFICATION NUMBER	TYPE/PROTECTION	DESCRIPTION
F1	AI 5920	DISK SET IN CONCRETE MONUMENT	N 40°26'34"/W 105°00'17" "FNL A"
F2	AI 5921	DISK SET IN CONCRETE MONUMENT	N 40°27'40"/W 105°00'54" "FNL B"
F3	AE 3940	PUNCH HOLE, SS ROD W/PVC PIPE & LID	N 40°26'56"/W 105°00'31" "FNL C"

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATION*
1	PASSENGER TERMINAL BUILDING	5020.1'
2	PASSENGER SECURE HOLD AREA/ TEMPORARY REMOTE TOWER CONTROL CENTER	5021.5'
3	FBO HANGAR	5031.8'
4	FBO HANGAR	5045.5'
5	MAINTENANCE HANGAR	5040.6'
6	HANGAR	5060.1'
7	EXECUTIVE HANGAR	5048.8'
8	EXECUTIVE HANGAR	5048.4'
9	EXECUTIVE HANGAR	5050.3'
10	EXECUTIVE HANGAR	5047.0'
11	EXECUTIVE HANGAR	5049.2'
12	EXECUTIVE HANGAR	5046.7'
13	EXECUTIVE HANGAR	5047.0'
14	EXECUTIVE HANGAR	5040.4'
15	T-HANGARS	5034.0'
16	ARFF, SRE, GARAGE & AIRPORT ADMIN.	5042.6'
17	HANGAR	5035.7
18	HANGAR	5032.9'
19	T-HANGARS	5034.0'
20	T-HANGARS	5031.3'
21	EXECUTIVE HANGAR GROUP	5036.6'
22	EXECUTIVE HANGAR	5048.4'
*	BUILDING ELEVATIONS FROM AGIS SURVEY DEC 2018.	

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATION*
23	EXECUTIVE HANGAR	5050.8'
24	EXECUTIVE HANGAR	5037.1'
25	T-HANGARS	5035.1'
26	T-HANGAR GROUP	5036.5'
27	T-HANGARS	5034.8'
28	T-HANGARS	5034.9'
29	EXECUTIVE HANGAR	5036.1'
30	EXECUTIVE HANGAR	5038.1'
31	EXECUTIVE HANGAR	5043.2'
32	EXECUTIVE HANGAR	5043.1'
33	EXECUTIVE HANGAR	5044.8'
34	T-HANGARS	5028.8'
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41	EXECUTIVE HANGAR	5045.5'
42	EXECUTIVE HANGAR	5047.0'
43	EXECUTIVE HANGAR	5053.5'
44	EXECUTIVE HANGAR	5052.4'
45	EXECUTIVE HANGAR	5062.6'
46	EXECUTIVE HANGAR	5055.7'
47	EXECUTIVE HANGAR	5053.4'
48	EXECUTIVE HANGAR	5055.2'
49	EXECUTIVE HANGAR	5050.8'
50	EXECUTIVE HANGAR	5034.0'
F1	FUTURE EXECUTIVE HANGAR	5048' EST.
F2	FUTURE T-HANGARS	5036' EST.
F3	FUTURE REMOTE TOWER BUILDING	5027' EST.
F4	FUTURE FUEL FACILITIES	5027' EST.
F5	FUTURE FBO HANGARS	5032' EST.
F6	FUTURE FBO HANGARS	5050' EST.
F7	FUTURE PASSENGER TERMINAL BUILDING	5016' EST.
F8	FUTURE EXECUTIVE HANGAR	5036' EST.
F9	FUTURE EXECUTIVE HANGAR	5036' EST.
*	BUILDING ELEVATIONS FROM AGIS SURVEY DEC 2018.	

REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AVIGATION EASEMENT	N/A	
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE	RPZ	RPZ
GLIDE PATH QUALIFICATION SURFACE		
PART 77 APPROACH SURFACE	P77	P77
THRESHOLD SITING SURFACE	TSS	TSS
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	N/A
PRECISION OBSTACLE FREE ZONE		
GLIDE SLOPE CRITICAL AREA	GSCA	N/A
LOCALIZER CRITICAL AREA	LCA	N/A
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
TAXIWAY SAFETY AREA	TSA	TSA
TAXIWAY OBJECT FREE AREA	TOFA	TOFA
TAXIWAY SHOULDER		
TAXIWAY EDGE SAFETY MARGIN		
AIRPORT SECURITY FENCE (8' HEIGHT)		N/A
APRON/TAXIWAY/TAXILANE MARKING		
AIRPORT BEACON	★	N/A
LIGHTED WIND CONE & SEGMENTED CIRCLE		N/A
WIND CONE		N/A
PRECISION APPROACH PATH INDICATOR (PAPI)	■■■■	N/A
RUNWAY END IDENTIFIER LIGHTS (REIL)		
AIRPORT REFERENCE POINT (ARP)		⊕
REMOTE CAMERA MASTS	●	N/A
THROUGH-THE-FENCE ACCESS POINT		N/A

Mead & Hunt

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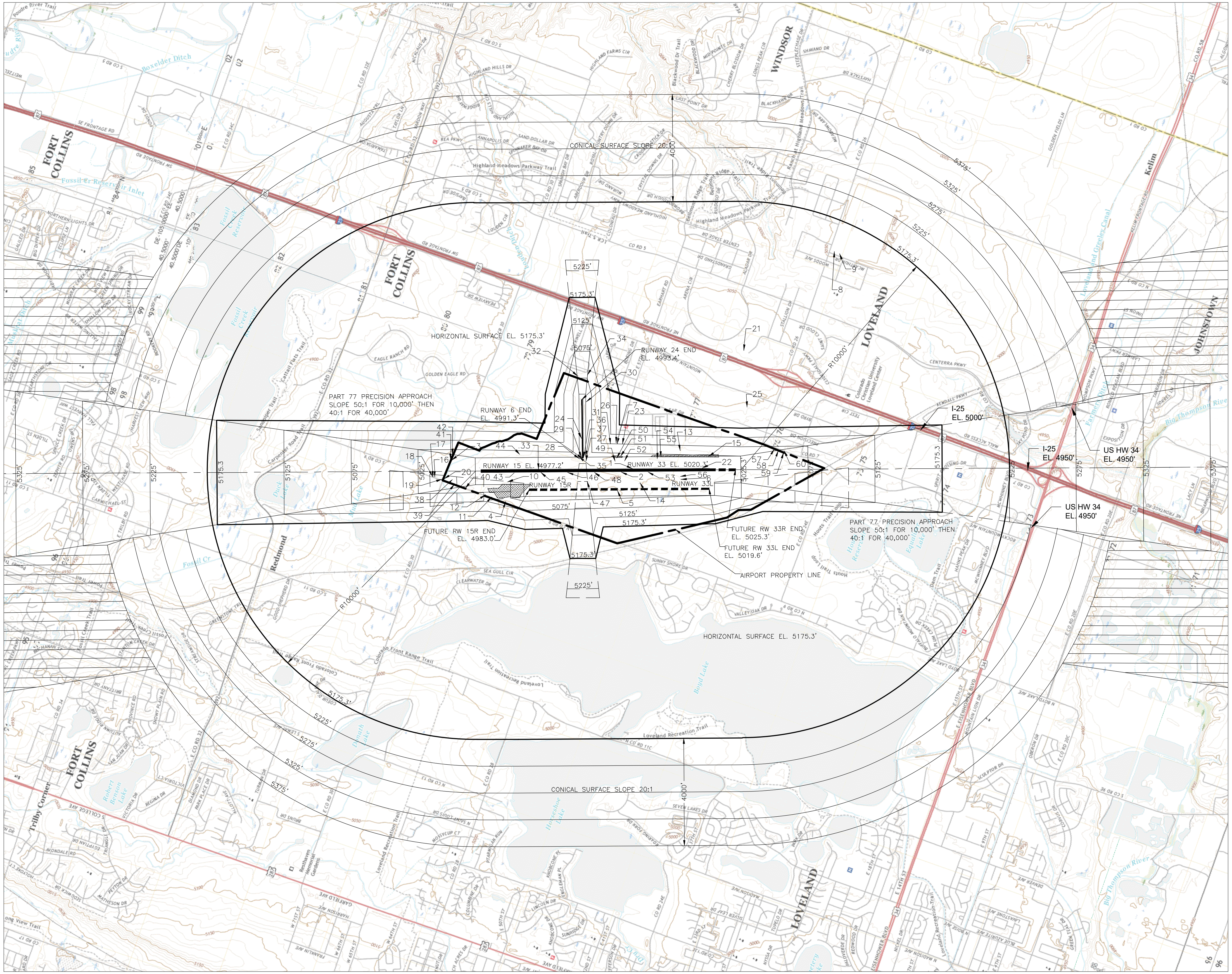
SHEET CONTENTS
FUTURE AIRPORT LAYOUT PLAN

SHEET NO.
4



OBSTRUCTIONS

NO.	DESCRIPTION	TOP ELEVATION/ GROUND ELEVATION	PENETRATION	SURFACE	DISPOSITION
1	AIRPORT GUIDANCE SIGN	5009'/5006'	1'	PRIMARY	TO REMAIN
2	AIRPORT GUIDANCE SIGN	5008'/5005'	1'	PRIMARY	TO REMAIN
3	UTILITY POLE	4995'/4959'	-3'	RW 15 APPROACH	TO REMAIN
4	UTILITY POLE	5036'/5001'	-19'	TRANSITIONAL	TO REMAIN
5	POST	5004'/4999'	3'	FUTURE RW PRIMARY	TO BE REMOVED
6	ANTENNA	5045'/5011'	28'	PRIMARY	TO REMAIN
7	LIGHT POLE	5070'/5005'	-6'	TRANSITIONAL	TO REMAIN
8	WATER TOWER	5220'/5055'	46'	HORIZONTAL	TO REMAIN
9	WATER TOWER	5206'/5055'	32'	HORIZONTAL	TO REMAIN
10	WINDSOCK	4997'/4980'	13'	PRIMARY	TO BE RELOCATED
11	UTILITY POLE	5027'/4991'	-16'	TRANSITIONAL	TO REMAIN
12	UTILITY POLE	5021'/4986'	-20'	TRANSITIONAL	TO REMAIN
13	POLE	5042'/5017'	-9'	TRANSITIONAL	TO REMAIN
14	SEGMENTED CIRCLE	5007'/5001'	-2'	PRIMARY	TO REMAIN
15	AIRPORT GUIDANCE SIGN	5021'/5018'	-3'	TRANSITIONAL	TO REMAIN
16	TREE	5015'/4955'	4'	RW 15 APPROACH	TO BE TRIMMED
17	TREE	5008'/4954'	-5'	RW 15 APPROACH	TO REMAIN
18	TREE	5007'/4950'	-7'	RW 15 APPROACH	TO REMAIN
19	LIGHT POLE	4998'/4964'	-9'	RW 15 APPROACH	TO REMAIN
20	LIGHT POLE	4998'/4964'	-6'	RW 15 APPROACH	TO REMAIN
21	BUILDING	5168'/5067'	-3'	HORIZONTAL	TO REMAIN
22	AIRPORT GUIDANCE SIGN	5021'/5016'	3'	PRIMARY	TO REMAIN
23	LT POLE	5052'/5008'	-24'	TRANSITIONAL	TO REMAIN
24	HEADWALL	4986'/4981'	-6'	PRIMARY	TO REMAIN
25	COMM. TOWER	5125'/5047'	-76'	HORIZONTAL	TO REMAIN
26	AIRPORT BEACON	5065'/5020'	-17'	TRANSITIONAL	TO REMAIN
27	AIRPORT GUIDANCE SIGN	4997'/4994'	3'	PRIMARY	TO REMAIN
28	AIRPORT GUIDANCE SIGN	4994'/4991'	1'	PRIMARY	TO REMAIN
29	AIRPORT GUIDANCE SIGN	4995'/4992'	2'	PRIMARY	TO REMAIN
30	AIRPORT GUIDANCE SIGN	4993'/4990'	-3'	TRANSITIONAL	TO REMAIN
31	LIGHT POLE	5068'/5004'	-6'	TRANSITIONAL	TO REMAIN
32	HANGAR	5026'/4982'	-2'	RW 24 APPROACH	TO REMAIN
33	AIRPORT GUIDANCE SIGN	4990'/4987'	3'	PRIMARY	TO REMAIN
34	BUILDING	5029.6'/4999'	2'	RW 24 APPROACH	TO REMAIN
35	AIRPORT GUIDANCE SIGN	4996.4/4993'	3'	PRIMARY	TO REMAIN
36	AIRPORT GUIDANCE SIGN	4995.3'/4993'	2'	PRIMARY	TO REMAIN
37	AIRPORT GUIDANCE SIGN	4993.6'/4991'	2'	PRIMARY	TO REMAIN
38	ANTENNA	5000.8'/4987'	6'	RW 15 APPROACH	TO REMAIN
39	LIGHT POLE	5000.8'/4987'	7'	RW 15 APPROACH	TO BE OB LIGHTED
40	UTILITY POLE	5001.1'/4987'	4'	TRANSITIONAL	TO REMAIN
41	TREE	5001.8'/4980'	6'	RW 15 APPROACH	TO BE REMOVED
42	TREE	4999.6'/4980'	4'	TRANSITIONAL	TO REMAIN
43	AIRPORT GUIDANCE SIGN	4987.8/4984'	1'	PRIMARY	TO REMAIN
44	POLE	5002.5'/4978'	2'	TRANSITIONAL	TO REMAIN
45	AIRPORT GUIDANCE SIGN	4990.8'/4987'	1'	PRIMARY	TO REMAIN
46	AIRPORT GUIDANCE SIGN	4992.4'/4989'	1'	PRIMARY	TO REMAIN
47	POLE	4999.8'/4987'	2'	PRIMARY	TO REMAIN
48	AIRPORT GUIDANCE SIGN	5001.1'/4998'	1'	PRIMARY	TO REMAIN
49	AIRPORT GUIDANCE SIGN	5006.6'/5003'	1'	PRIMARY	TO REMAIN
50	AIRPORT GUIDANCE SIGN	5007.4'/5004'	1'	PRIMARY	TO REMAIN
51	AIRPORT GUIDANCE SIGN	5008.3'/5005'	4'	TRANSITIONAL	TO REMAIN
52	AIRPORT GUIDANCE SIGN	5008.6'/5005'	1'	PRIMARY	TO REMAIN
53	AIRPORT GUIDANCE SIGN	5011.4'/5008'	1'	PRIMARY	TO REMAIN
54	AIRPORT GUIDANCE SIGN	5013.2'/5010'	1'	PRIMARY	TO REMAIN
55	AIRPORT GUIDANCE SIGN	5013.3'/5010'	1'	PRIMARY	TO REMAIN
56	WINDSOCK	5024.4'/5017'	7'	PRIMARY	TO REMAIN
57	UTILITY POLE	5059.1'/5040'	5'	TRANSITIONAL	TO BE OB LIGHTED
58	LIGHT POLE	5057.3'/5040'	9'	RW 33 APPROACH	TO BE OB LIGHTED
59	LIGHT POLE	5053.1'/5033'	1'	RW 33 APPROACH	TO BE OB LIGHTED
60	LIGHT POLE	5053.7'/5033'	1'	RW 33 APPROACH	TO BE OB LIGHTED

DATE OF SURVEY: DEC 2018
NEGATIVE PENETRATION VALUES REPRESENT CLEARANCE TO PART 77 SURFACE

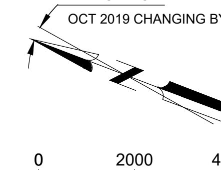
NOTES

1. HEIGHT HAZARD, AIRCRAFT NOISE AND TRAFFIC PATTERNS CONSIDERED IN FORMULATION OF AIRPORT INFLUENCE AREA MAP AND INCORPORATED INTO CITY OF LOVELAND LAND USE PLAN.

2. AIRPORT INFLUENCE AREA ADOPTED AND CODIFIED IN THE CODE OF ORDINANCES FOR LARIMER COUNTY AND THE CITY OF LOVELAND: CITY OF LOVELAND DIVISION 18.02.07, LARIMER COUNTY LAND USE CODE CHAPTER 4.1.21.

3. THE PREPARATION OF THIS PLAN WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS PLAN BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

8° 9' E ± 0°21'
MAG. DEC.
OCT 2019 CHANGING BY 0°6' W /YEAR



REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
RUNWAYS		
PART 77 CONTROLLING SURFACE	N/A	
PART 77 NON-CONTROLLING SURFACE	N/A	
TERRAIN PENETRATION TO PART 77 SURFACE	N/A	

Mead & Hunt

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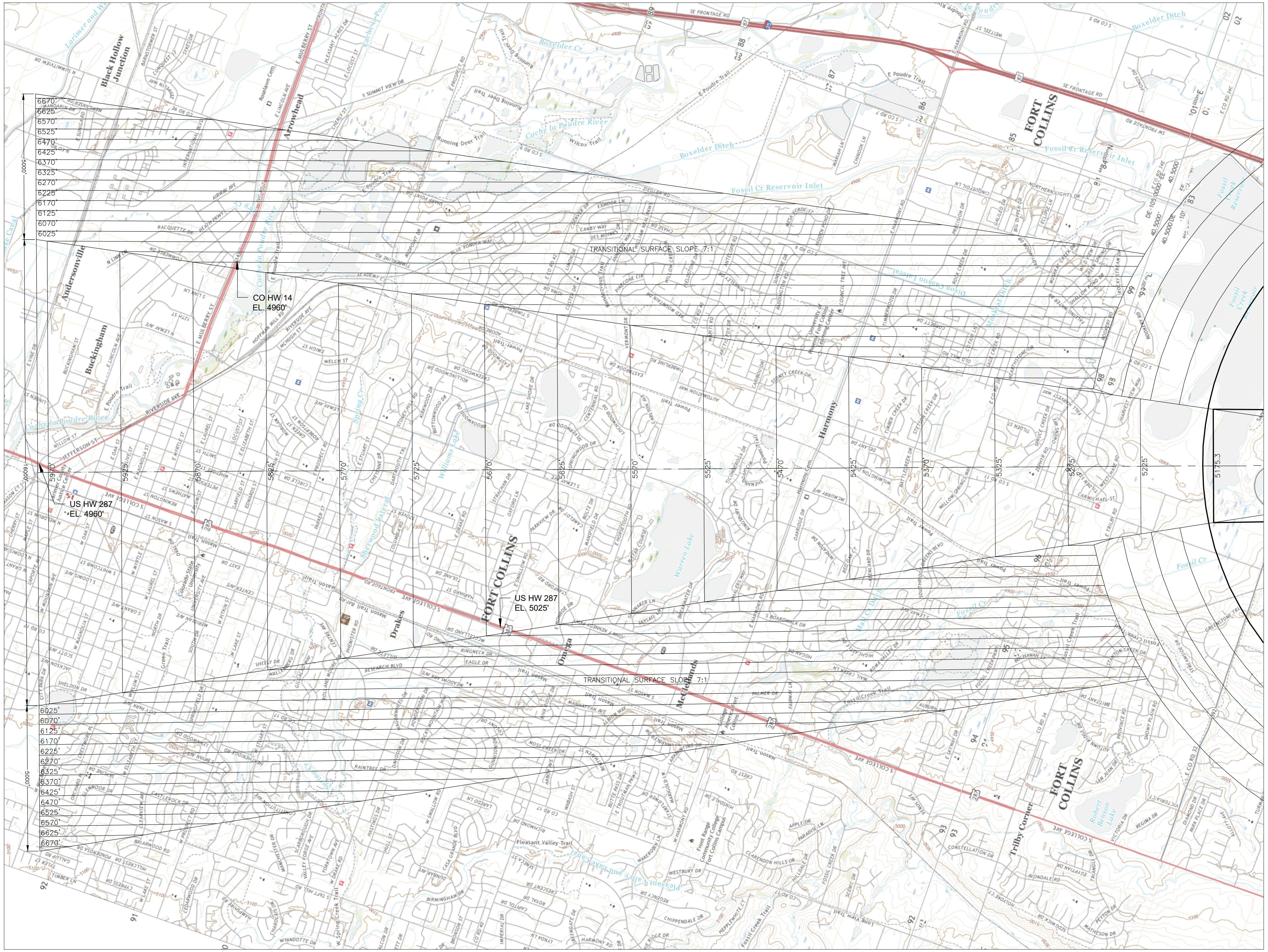
SHEET CONTENTS
AIRPORT AIRSPACE PLAN - CONICAL SURFACE

SHEET NO.
5



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0 2000 4000

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REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		N/A
RUNWAYS		
PART 77 CONTROLLING SURFACE	N/A	
PART 77 NON-CONTROLLING SURFACE	N/A	
TERRAIN PENETRATION TO PART 77 SURFACE	N/A	

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SHEET CONTENTS
AIRPORT AIRSPACE - RUNWAY 15 APPROACH

SHEET NO.
6

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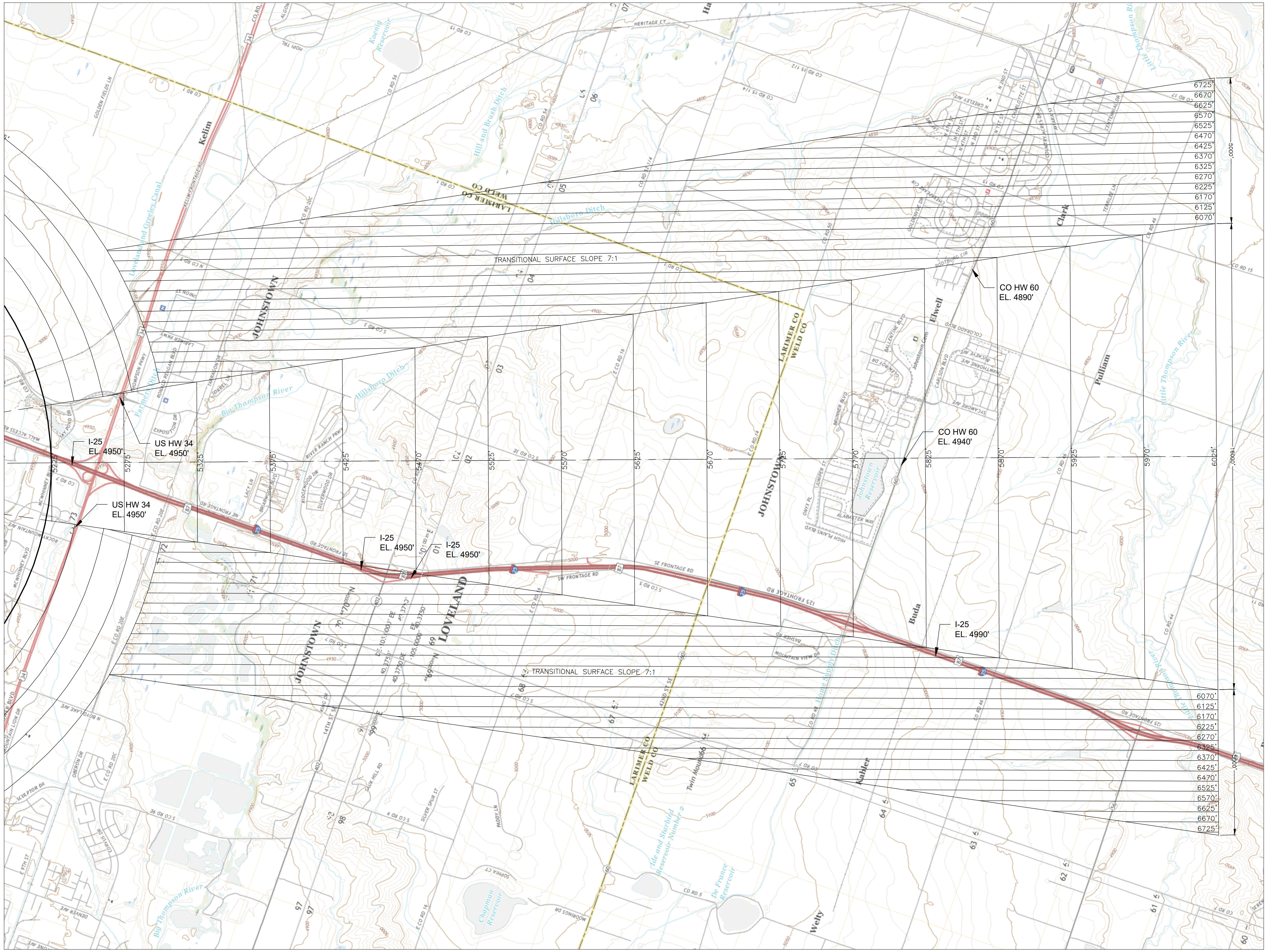

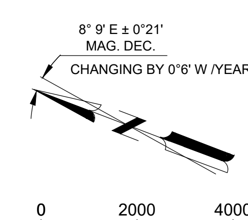

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REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		N/A
RUNWAYS		
PART 77 CONTROLLING SURFACE	N/A	
PART 77 NON-CONTROLLING SURFACE	N/A	
TERRAIN PENETRATION TO PART 77 SURFACE	N/A	

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LOVELAND, CO 80538

ISSUED

NOT FOR CONSTRUCTION

M&H NO.: 3115300-160154.01
DATE: JUNE 2020
DESIGNED BY: M&H
DRAWN BY: JWB
CHECKED BY: CAL

DO NOT SCALE DRAWINGS

SHEET CONTENTS

AIRPORT AIRSPACE - RUNWAY 33 APPROACH

SHEET NO.

7

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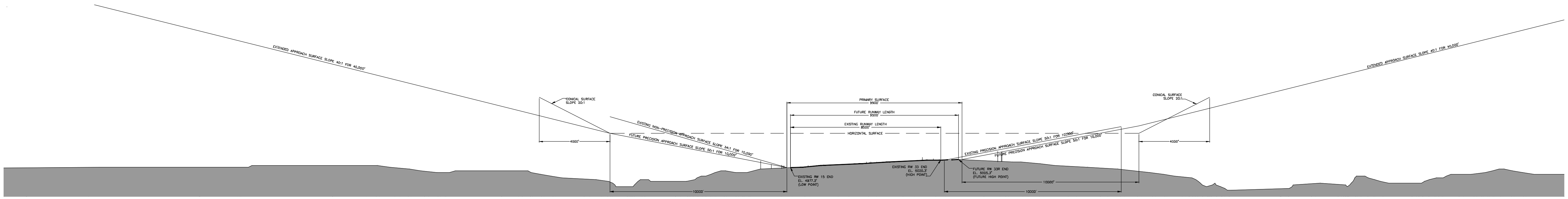
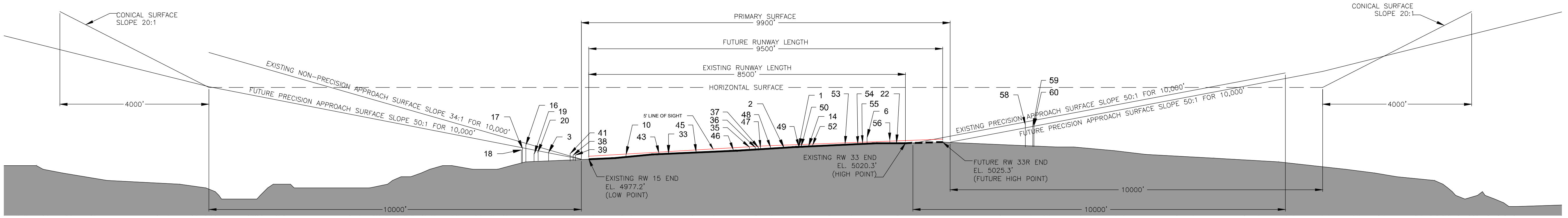
6/25/2020 11:17:15 AM



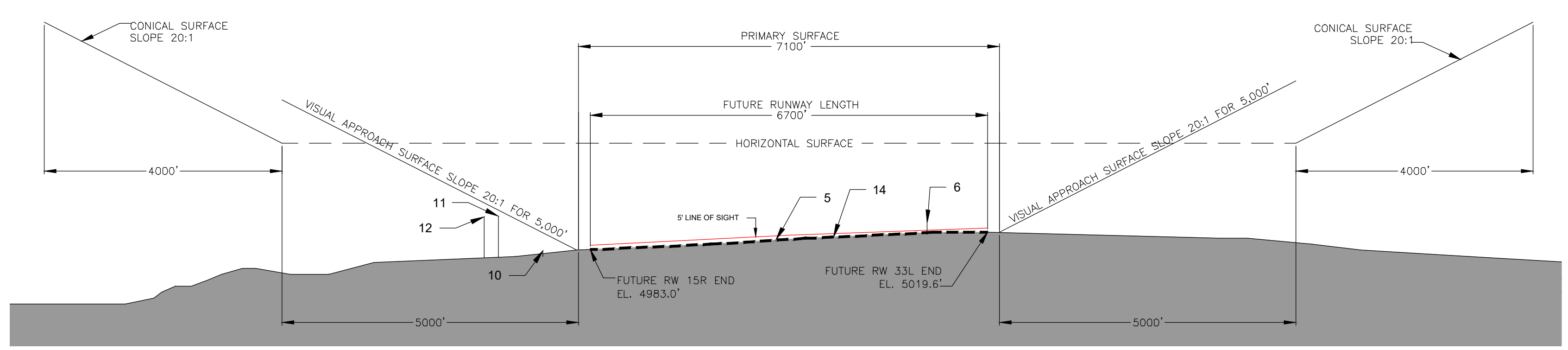
Runway 15/33- Extended Approach Profile View

1" = 3000' HORIZONTALLY
1" = 300' VERTICALLY



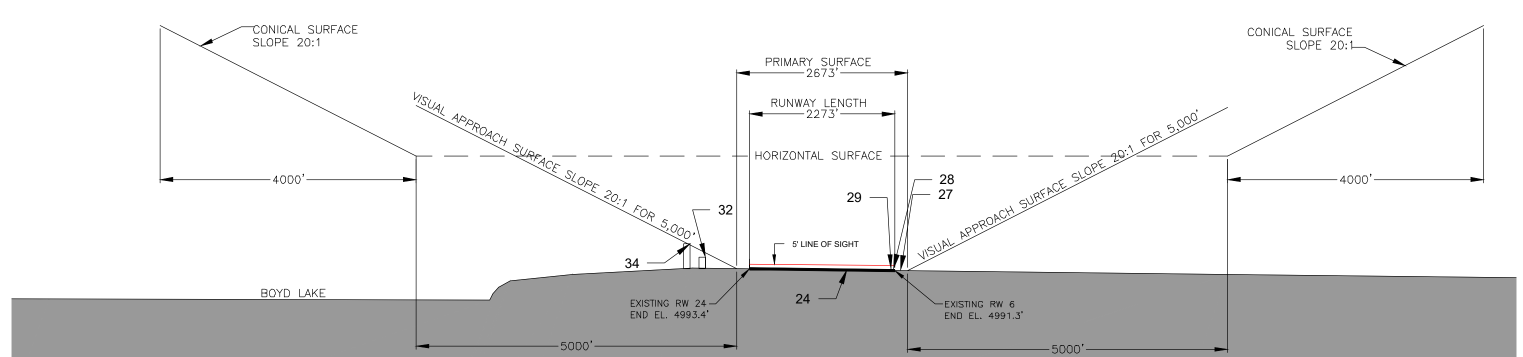
Runway 15/33 - Approach Profile View

1" = 1500' HORIZONTALLY
1" = 150' VERTICALLY



Future Parallel Runway 15R/33L - Approach Profile View

1" = 1500' HORIZONTALLY
1" = 150' VERTICALLY



Runway 06/24 - Approach Profile View

1" = 1500' HORIZONTALLY
1" = 150' VERTICALLY

OBSTRUCTIONS

NO.	DESCRIPTION	TOP ELEVATION/ GROUND ELEVATION	PENETRATION	SURFACE	DISPOSITION
1	AIRPORT GUIDANCE SIGN	5009'/5006'	1'	PRIMARY	TO REMAIN
2	AIRPORT GUIDANCE SIGN	5008'/5005'	1'	PRIMARY	TO REMAIN
3	UTILITY POLE	4995'/4959'	–3'	RW 15 APPROACH	TO REMAIN
5	POST	5004'/4999'	3'	FUTURE RW PRIMARY	TO BE REMOVED
6	ANTENNA	5045'/5011'	28'	PRIMARY	TO REMAIN
10	WINDSOCK	4997'/4980'	13'	PRIMARY	TO BE RELOCATED
11	UTILITY POLE	5027'/4991'	–16'	TRANSITIONAL	TO REMAIN
12	UTILITY POLE	5021'/4986'	–20'	TRANSITIONAL	TO REMAIN
14	SEGMENTED CIRCLE	5007'/5001'	–2'	PRIMARY	TO REMAIN
16	TREE	5015'/4955'	4'	RW 15 APPROACH	TO BE TRIMMED
17	TREE	5008'/4954'	–5	RW 15 APPROACH	TO REMAIN
18	TREE	5007'/4950'	–6'	RW 15 APPROACH	TO REMAIN
19	LIGHT POLE	4998'/4964'	–9'	RW 15 APPROACH	TO REMAIN
20	LIGHT POLE	4998'/4964'	–6'	RW 15 APPROACH	TO REMAIN
24	HEADWALL	4986'/4981'	–2'	PRIMARY	TO REMAIN
27	AIRPORT GUIDANCE SIGN	4997'/4994'	3'	PRIMARY	TO REMAIN
28	AIRPORT GUIDANCE SIGN	4994'/4991'	1'	PRIMARY	TO REMAIN
29	AIRPORT GUIDANCE SIGN	4995'/4992'	2'	PRIMARY	TO REMAIN
32	HANGAR	5026'/4982'	–2'	RW 24 APPROACH	TO REMAIN
33	AIRPORT GUIDANCE SIGN	4990'/4987'	3'	PRIMARY	TO REMAIN
34	BUILDING	5029.6'/4999'	2'	RW 24 APPROACH	TO REMAIN
35	AIRPORT GUIDANCE SIGN	4996.4/4993'	3'	PRIMARY	TO REMAIN
36	AIRPORT GUIDANCE SIGN	4995.3'/4993'	2'	PRIMARY	TO REMAIN
37	AIRPORT GUIDANCE SIGN	4993.6'/4991'	2'	PRIMARY	TO REMAIN
38	ANTENNA	5000.8'/4987'	6'	RW 15 APPROACH	TO REMAIN

DATE OF SURVEY: DEC 2018
NEGATIVE PENETRATION VALUES REPRESENT CLEARANCE TO PART 77 SURFACE

OBSTRUCTIONS

NO.	DESCRIPTION	TOP ELEVATION/ GROUND ELEVATION	PENETRATION	SURFACE	DISPOSITION
39	LIGHT POLE	5000.8'/4987'	7'	RW 15 APPROACH	TO BE OB LIGHTED
41	TREE	5001.8'/4980'	6'	RW 15 APPROACH	TO BE REMOVED
43	AIRPORT GUIDANCE SIGN	4987.8/4984'	1'	PRIMARY	TO REMAIN
45	AIRPORT GUIDANCE SIGN	4990.8'/4987'	1'	PRIMARY	TO REMAIN
46	AIRPORT GUIDANCE SIGN	4992.4'/4989'	1'	PRIMARY	TO REMAIN
47	POLE	4999.8'/4987'	2'	PRIMARY	TO REMAIN
48	SIGN	5001.1'/4998'	1'	PRIMARY	TO REMAIN
49	AIRPORT GUIDANCE SIGN	5006.6'/5003'	1'	PRIMARY	TO REMAIN
50	AIRPORT GUIDANCE SIGN	5007.4'/5004'	1'	PRIMARY	TO REMAIN
52	AIRPORT GUIDANCE SIGN	5008.6'/5005'	1'	PRIMARY	TO REMAIN
53	AIRPORT GUIDANCE SIGN	5011.4'/5008'	1'	PRIMARY	TO REMAIN
54	AIRPORT GUIDANCE SIGN	5013.2'/5010'	1'	PRIMARY	TO REMAIN
55	AIRPORT GUIDANCE SIGN	5013.3'/5010'	1'	PRIMARY	TO REMAIN
56	WINDSOCK	5024.4'/5017'	7'	PRIMARY	TO REMAIN
58	LIGHT POLE	5057.3'/5040'	9'	RW 33 APPROACH	TO BE OB LIGHTED
59	LIGHT POLE	5053.1'/5033'	1'	RW 33 APPROACH	TO BE OB LIGHTED
60	LIGHT POLE	5053.7'/5033'	1'	RW 33 APPROACH	TO BE OB LIGHTED

DATE OF SURVEY: DEC 2018
NEGATIVE PENETRATION VALUES REPRESENT CLEARANCE TO PART 77 SURFACE

NOTES

1. HEIGHT HAZARD, AIRCRAFT NOISE AND TRAFFIC PATTERNS CONSIDERED IN FORMULATION OF AIRPORT INFLUENCE AREA MAP AND INCORPORATED INTO CITY OF LOVELAND LAND USE PLAN.

2. AIRPORT INFLUENCE AREA ADOPTED AND CODIFIED IN THE CODE OF ORDINANCES FOR LARIMER COUNTY AND THE CITY OF LOVELAND: CITY OF LOVELAND DIVISION 18.02.07, LARIMER COUNTY LAND USE CODE CHAPTER 4.1.21.

3. THE PREPARATION OF THIS PLAN WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS PLAN BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

PART 77 CONTROLLING SURFACE	———————
PART 77 NON-CONTROLLING SURFACE	— — — — — —
RUNWAY LINE OF SIGHT 5' ABOVE ANY POINT	———————

Mead &Hunt
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1743 Wazee Street,
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phone: 303-825-8844
meadhunt.com

NORTHERN COLORADO REGIONAL AIRPORT
AIRPORT LAYOUT PLAN UPDATE

4900 EARHART RD
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SHEET CONTENTS
AIRPORT AIRSPACE - RUNWAY PROFILES

SHEET NO.
8

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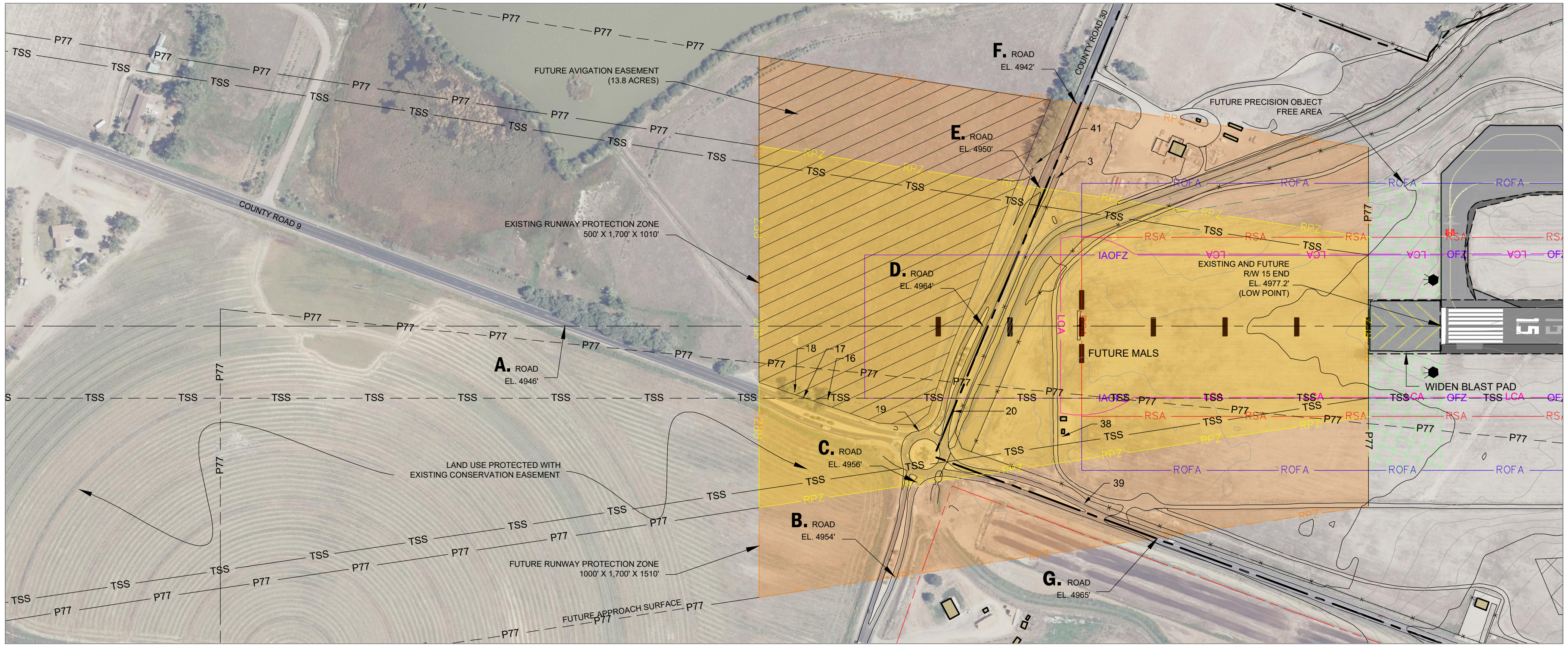
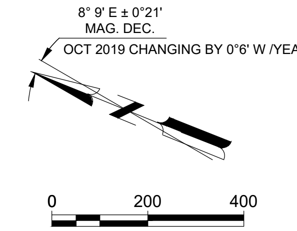


RUNWAY 15L PLAN

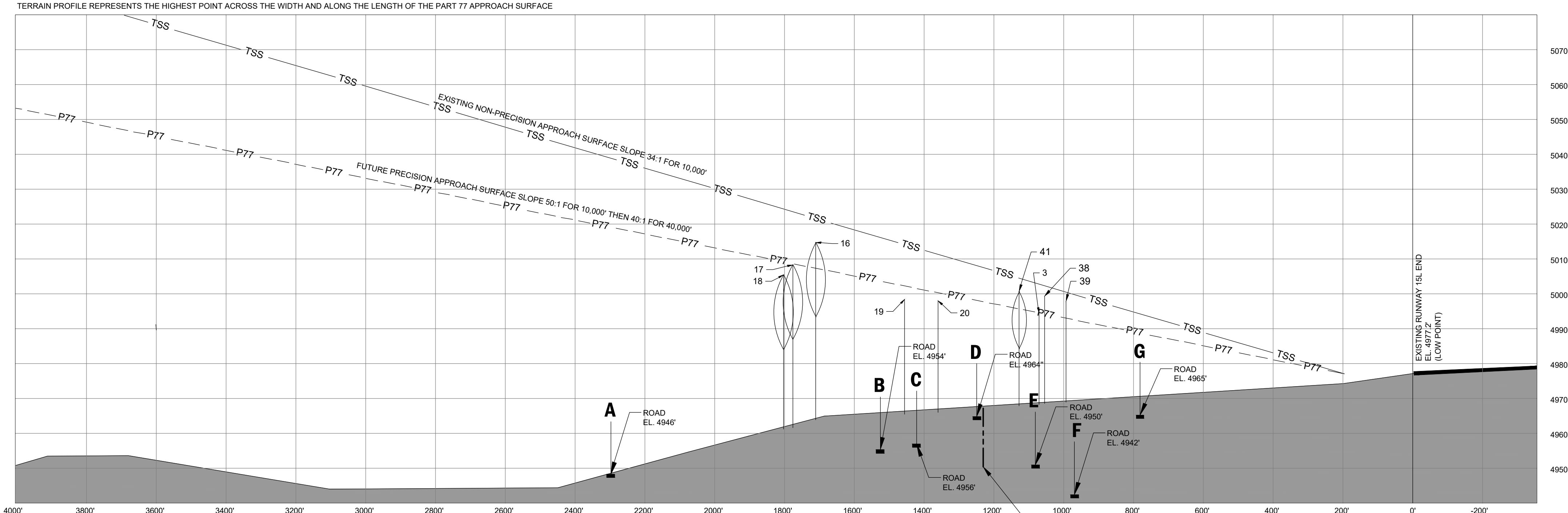
1" = 200' HORIZONTALLY



OBSTRUCTIONS					
NO.	DESCRIPTION	TOP ELEVATION/ GROUND ELEVATION	PENETRATION	SURFACE	DISPOSITION
3	UTILITY POLE	4995'/4959'	-3'	RW 15 APPROACH	TO REMAIN
4	UTILITY POLE	5036'/5001'	-19'	TRANSITIONAL	TO REMAIN
16	TREE	5015'/4955'	4'	RW 15 APPROACH	TO BE REMOVED
17	TREE	5008'/4954'	-5'	RW 15 APPROACH	TO REMAIN
18	TREE	5007'/4950'	-6'	RW 15 APPROACH	TO REMAIN
19	LIGHT POLE	4998'/4964'	-9'	RW 15 APPROACH	TO REMAIN
20	LIGHT POLE	4998'/4964'	-6'	RW 15 APPROACH	TO REMAIN
38	ANTENNA	5000.8'/4987'	6'	RW 15 APPROACH	TO REMAIN
39	LIGHT POLE	5000.8'/4987'	7'	RW 15 APPROACH	TO BE OB LIGHTED
41	TREE	5001.8'/4980'	6'	RW 15 APPROACH	TO BE REMOVED

DATE OF SURVEY: JUNE 2018
NEGATIVE PENETRATION VALUES REPRESENT CLEARANCE TO PART 77 SURFACE

TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE



RUNWAY 15L PROFILE

1" = 200' HORIZONTALLY
1" = 20' VERITICALLY

NOTES

1.) HEIGHT HAZARD, AIRCRAFT NOISE AND TRAFFIC PATTERNS CONSIDERED IN FORMULATION OF AIRPORT INFLUENCE AREA MAP AND INCORPORATED INTO CITY OF LOVELAND LAND USE PLAN.

2.) THE PREPARATION OF THIS PLAN WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS PLAN BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

REVISIONS		
NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AVIGATION EASEMENT	N/A	
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE	RPZ	RPZ
GLIDE PATH QUALIFICATION SURFACE	GQS	N/A
PART 77 APPROACH SURFACE	P77	P77
THRESHOLD SITING SURFACE	TSS	TSS
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	N/A
PRECISION OBSTACLE FREE ZONE		
GLIDE SLOPE CRITICAL AREA	GSCA	N/A
LOCALIZER CRITICAL AREA	LCA	N/A
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
AIRPORT SECURITY FENCE (8' HEIGHT)		N/A
APRON/TAXIWAY/TAXILANE MARKING		
AIRPORT BEACON		N/A
LIGHTED WIND CONE & SEGMENTED CIRCLE		N/A
WIND CONE		N/A
PRECISION APPROACH PATH INDICATOR (PAPI)		N/A
RUNWAY END IDENTIFIER LIGHTS (REIL)		N/A
AIRPORT REFERENCE POINT (ARP)		

Mead & Hunt

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NORTHERN COLORADO REGIONAL AIRPORT
AIRPORT LAYOUT PLAN UPDATE

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SHEET CONTENTS
INNER APPROACH - RUNWAY 15

SHEET NO.
9

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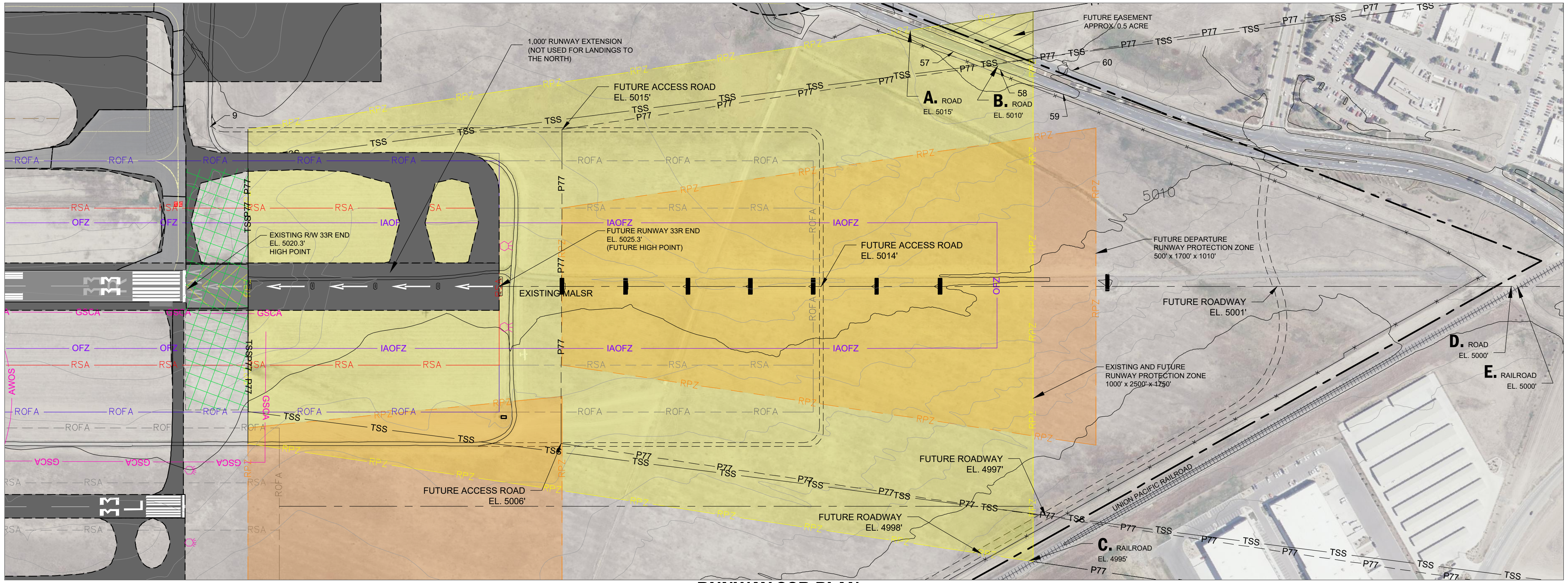
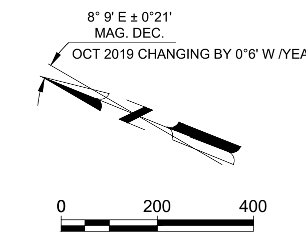
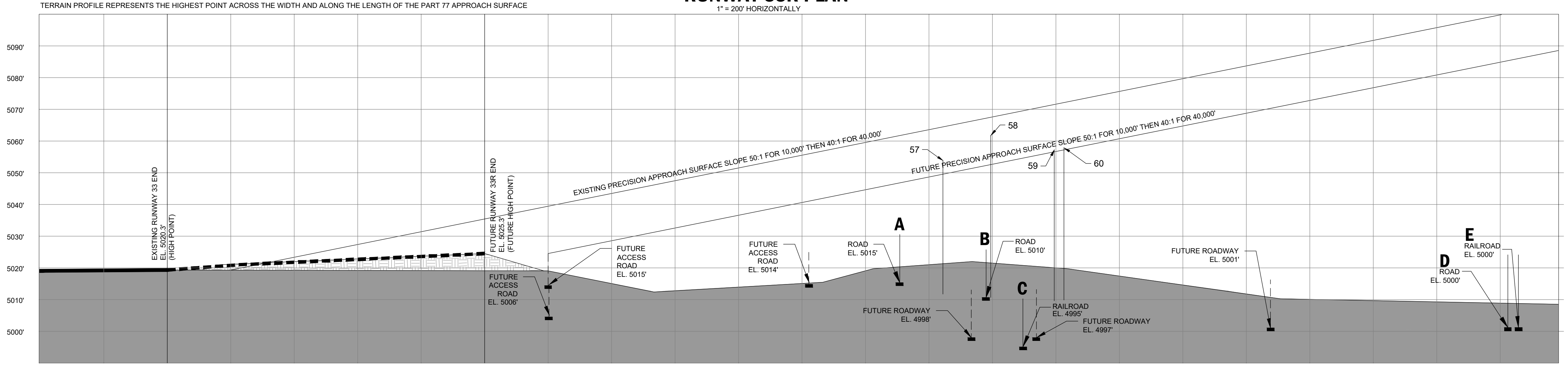


RUNWAY 33R PLAN

1" = 200' HORIZONTALLY



TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE



RUNWAY 33R PROFILE

1" = 200' HORIZONTALLY
1" = 20' VERITICALLY

OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	APPROACH SURFACE	DISPOSITION
9	GROUND	5018'	2'	RW 15	TO BE GRADED
57	UTILITY POLE	5059.1'/5040'	5'	TRANSITIONAL	TO BE OB LIGHTED
58	LIGHT POLE	5057.3'/5040'	9'	RW 33 APPROACH	TO BE OB LIGHTED
59	LIGHT POLE	5053.1'/5033'	1'	RW 33 APPROACH	TO BE OB LIGHTED
60	LIGHT POLE	5053.7'/5033'	1'	RW 33 APPROACH	TO BE OB LIGHTED

NOTES

1.) HEIGHT HAZARD, AIRCRAFT NOISE AND TRAFFIC PATTERNS CONSIDERED IN FORMULATION OF AIRPORT INFLUENCE AREA MAP AND INCORPORATED INTO CITY OF LOVELAND LAND USE PLAN.

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REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		N/A
AVIGATION EASEMENT	N/A	
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE	RPZ	RPZ
GLIDE PATH QUALIFICATION SURFACE	GQS	N/A
PART 77 APPROACH SURFACE	P77	P77
THRESHOLD SITING SURFACE	TSS	TSS
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	N/A
PRECISION OBSTACLE FREE ZONE		
GLIDE SLOPE CRITICAL AREA	GSCA	N/A
LOCALIZER CRITICAL AREA	LCA	N/A
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
AIRPORT SECURITY FENCE (8' HEIGHT)		N/A
APRON/TAXIWAY/TAXILANE MARKING		
AIRPORT BEACON		N/A
LIGHTED WIND CONE & SEGMENTED CIRCLE		N/A
WIND CONE		N/A
PRECISION APPROACH PATH INDICATOR (PAPI)		N/A
RUNWAY END IDENTIFIER LIGHTS (REIL)		N/A
AIRPORT REFERENCE POINT (ARP)		

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SHEET CONTENTS

INNER APPROACH - RUNWAY 33

SHEET NO.

10

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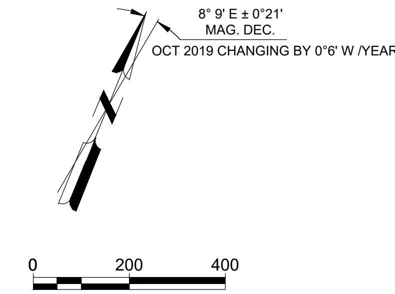
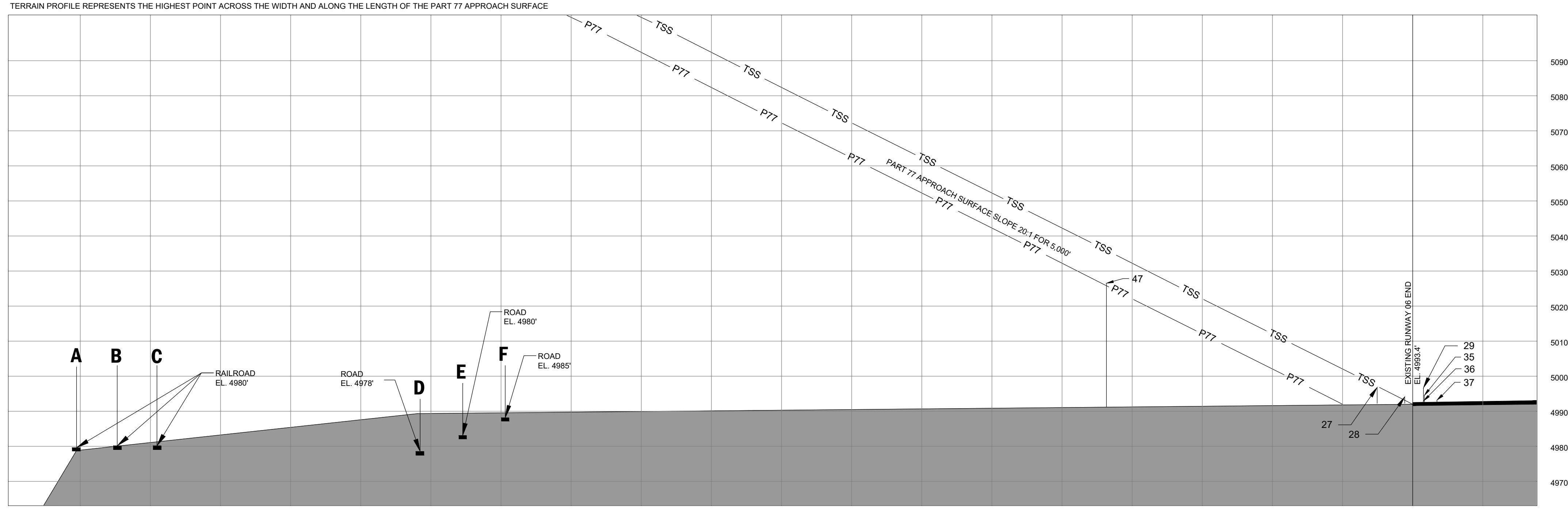
RUNWAY 06 PLAN

1" = 200' HORIZONTALLY



TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE



RUNWAY 06 PROFILE

1" = 200' HORIZONTALLY
1" = 20' VERITICALLY

OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	APPROACH SURFACE	DISPOSITION
27	AIRPORT GUIDANCE SIGN	4997'/4994'	3'	PRIMARY	TO REMAIN
28	AIRPORT GUIDANCE SIGN	4994'/4991'	1'	PRIMARY	TO REMAIN
29	AIRPORT GUIDANCE SIGN	4995'/4992'	2'	PRIMARY	TO REMAIN
35	AIRPORT GUIDANCE SIGN	4996.4/4993'	3'	PRIMARY	TO REMAIN
36	AIRPORT GUIDANCE SIGN	4995.3'/4993'	2'	PRIMARY	TO REMAIN
37	AIRPORT GUIDANCE SIGN	4993.6'/4991'	2'	PRIMARY	TO REMAIN
47	POLE	4999.8'/4987'	2'	RW 6	TO REMAIN

NOTES

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REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AVIGATION EASEMENT	N/A	N/A
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE	RPZ	RPZ
GLIDE PATH QUALIFICATION SURFACE	GQS	N/A
PART 77 APPROACH SURFACE	P77	P77
THRESHOLD SITING SURFACE	TSS	TSS
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	N/A
PRECISION OBSTACLE FREE ZONE		
GLIDE SLOPE CRITICAL AREA	GSCA	N/A
LOCALIZER CRITICAL AREA	LCA	N/A
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
AIRPORT SECURITY FENCE (8' HEIGHT)		N/A
APRON/TAXIWAY/TAXILANE MARKING		
AIRPORT BEACON		N/A
LIGHTED WIND CONE & SEGMENTED CIRCLE		N/A
WIND CONE		N/A
PRECISION APPROACH PATH INDICATOR (PAPI)		N/A
RUNWAY END IDENTIFIER LIGHTS (REIL)		N/A
AIRPORT REFERENCE POINT (ARP)		

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SHEET CONTENTS
INNER APPROACH - RUNWAY 6

SHEET NO.
11

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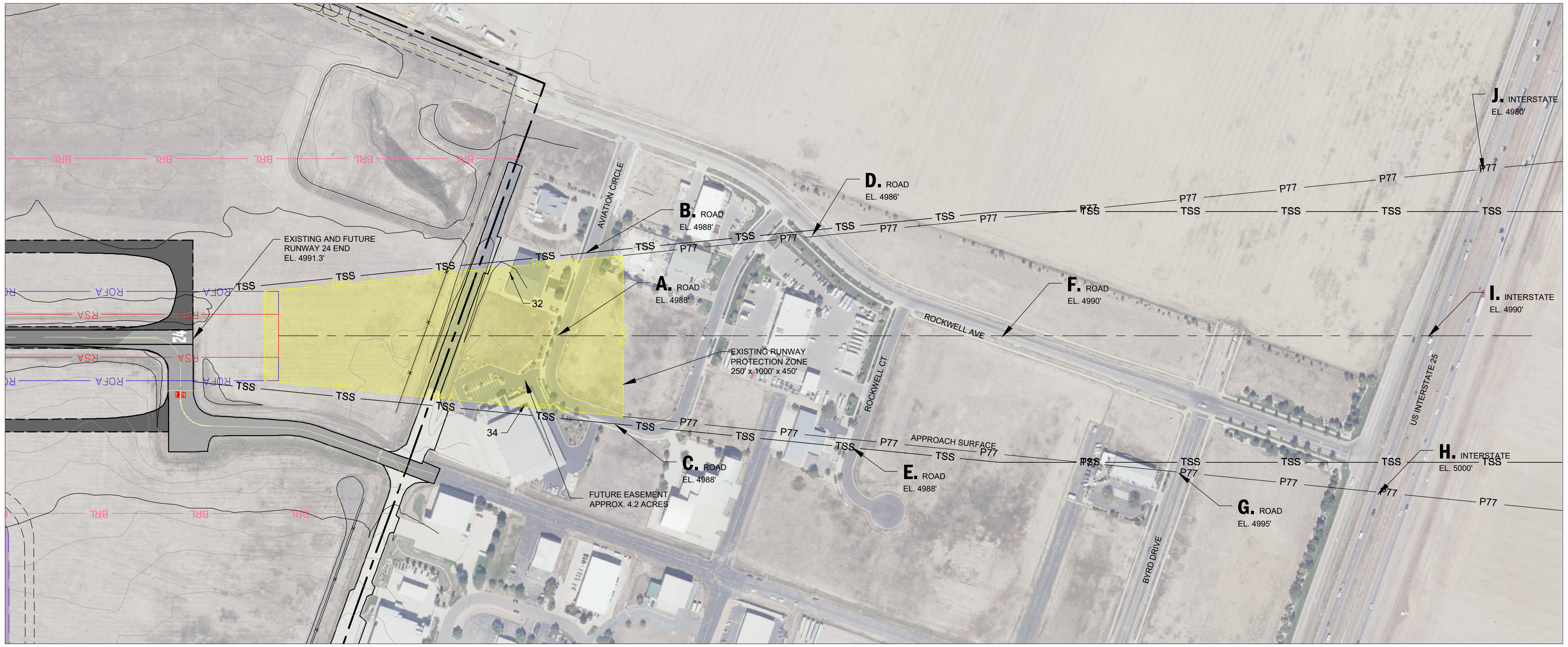
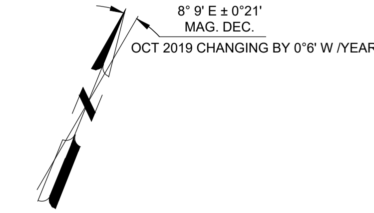
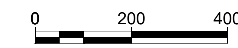


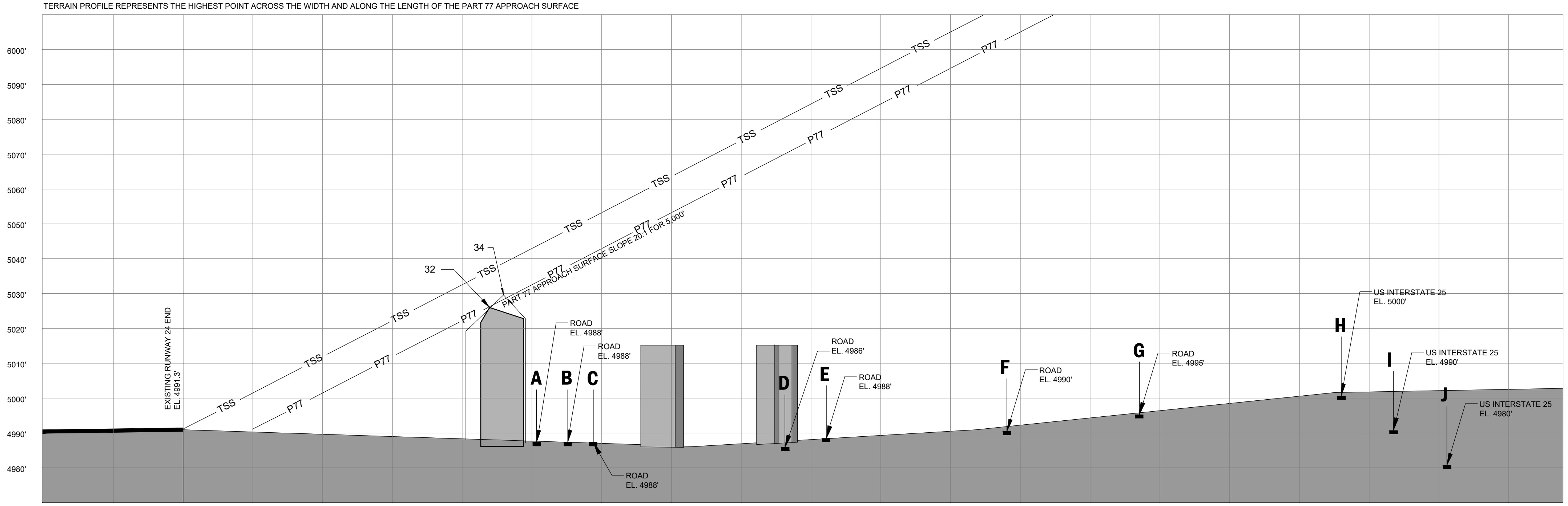




RUNWAY 24 PLAN

1" = 200' HORIZONTALLY

TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE



RUNWAY 24 PROFILE

1" = 200' HORIZONTALLY
1" = 20' VERITICALLY

OBSTRUCTIONS

NO.	DESCRIPTION	TOP ELEVATION/ GROUND ELEVATION	PENETRATION	SURFACE	DISPOSITION
32	HANGAR	5026'/4982'	-2'	RW 24 APPROACH	TO REMAIN
34	BUILDING	5029.6'/4999'	2'	RW 24 APPROACH	TO REMAIN

DATE OF SURVEY: JUNE 2018
NEGATIVE PENETRATION VALUES REPRESENT CLEARANCE TO PART 77 SURFACE

NOTES

1.) HEIGHT HAZARD, AIRCRAFT NOISE AND TRAFFIC PATTERNS CONSIDERED IN FORMULATION OF AIRPORT INFLUENCE AREA MAP AND INCORPORATED INTO CITY OF LOVELAND LAND USE PLAN.

2.) THE PREPARATION OF THIS PLAN WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS PLAN BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		N/A
AVIGATION EASEMENT	N/A	N/A
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE	RPZ	RPZ
GLIDE PATH QUALIFICATION SURFACE	GQS	N/A
PART 77 APPROACH SURFACE	P77	P77
THRESHOLD SITING SURFACE	TSS	TSS
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	N/A
PRECISION OBSTACLE FREE ZONE		
GLIDE SLOPE CRITICAL AREA	GSCA	N/A
LOCALIZER CRITICAL AREA	LCA	N/A
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
AIRPORT SECURITY FENCE (8' HEIGHT)		N/A
APRON/TAXIWAY/TAXILANE MARKING		
AIRPORT BEACON		N/A
LIGHTED WIND CONE & SEGMENTED CIRCLE		N/A
WIND CONE		N/A
PRECISION APPROACH PATH INDICATOR (PAPI)		N/A
RUNWAY END IDENTIFIER LIGHTS (REIL)		N/A
AIRPORT REFERENCE POINT (ARP)		

Mead & Hunt

Mead and Hunt, Inc.
1743 Wazee Street,
Suite 400
Denver, CO 80202
phone: 303-825-8844
meadhunt.com

NORTHERN COLORADO REGIONAL AIRPORT
AIRPORT LAYOUT PLAN UPDATE

4900 EARHART RD
LOVELAND, CO 80538

ISSUED

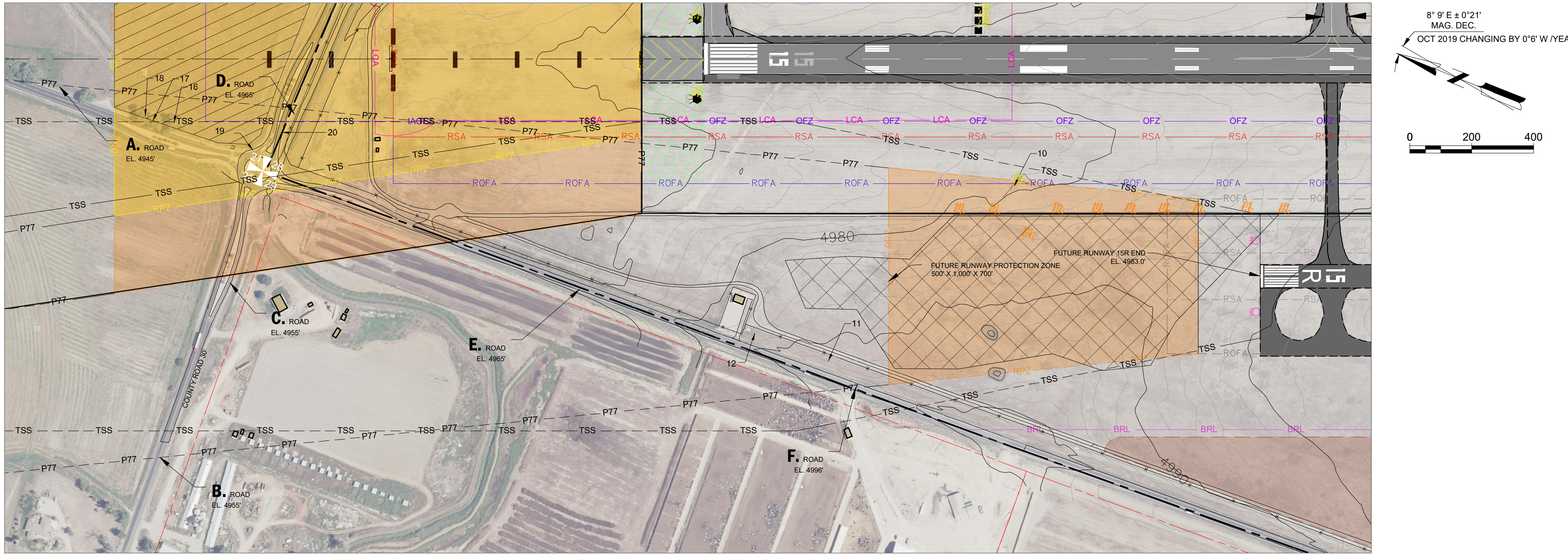
NOT FOR CONSTRUCTION

M&H NO.: 3115300-160154.01
DATE: JUNE 2020
DESIGNED BY: M&H
DRAWN BY: JWB
CHECKED BY: CAL

DO NOT SCALE DRAWINGS

SHEET CONTENTS
INNER APPROACH - RUNWAY 24

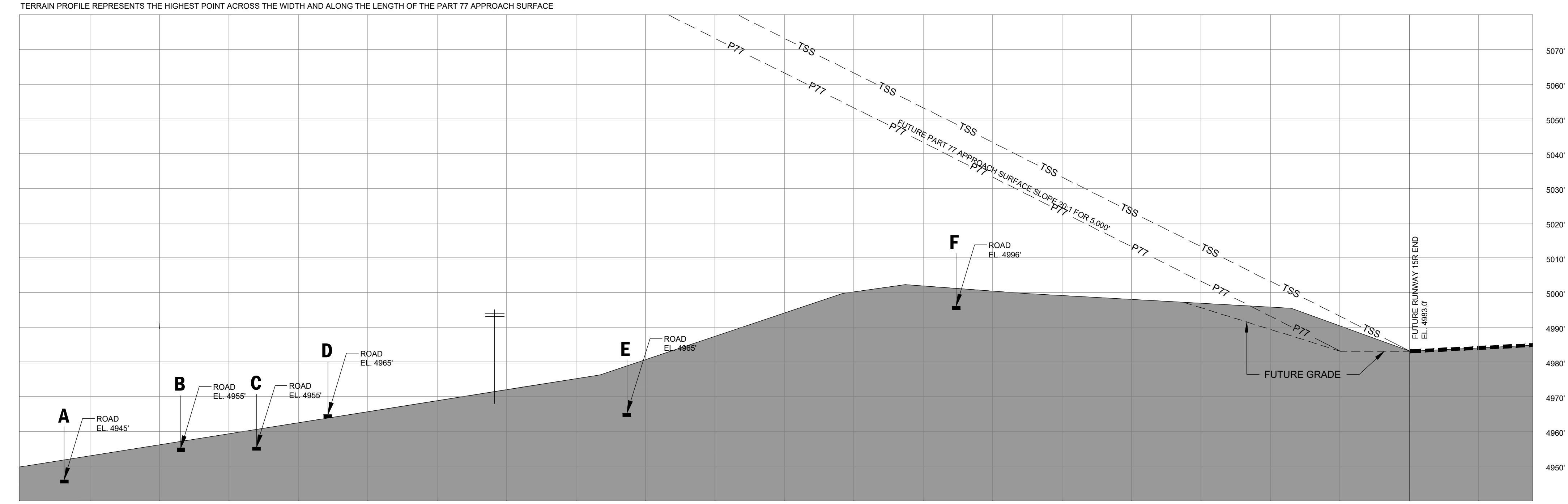
SHEET NO.
12



RUNWAY 15R PLAN

1" = 200' HORIZONTALLY

TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE



RUNWAY 15R PROFILE

1" = 200' HORIZONTALLY
1" = 20' VERITICALLY

OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	APPROACH SURFACE	DISPOSITION
	NONE IDENTIFIED FOR THIS AREA				

NOTES

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REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		N/A
AVIGATION EASEMENT	N/A	
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE	RPZ	RPZ
GLIDE PATH QUALIFICATION SURFACE	GQS	N/A
PART 77 APPROACH SURFACE	P77	P77
THRESHOLD SITING SURFACE	TSS	TSS
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	N/A
PRECISION OBSTACLE FREE ZONE		
GLIDE SLOPE CRITICAL AREA	GSCA	N/A
LOCALIZER CRITICAL AREA	LCA	N/A
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
AIRPORT SECURITY FENCE (8' HEIGHT)		N/A
APRON/TAXIWAY/TAXILANE MARKING		
AIRPORT BEACON		N/A
LIGHTED WIND CONE & SEGMENTED CIRCLE		N/A
WIND CONE		N/A
PRECISION APPROACH PATH INDICATOR (PAPI)		N/A
RUNWAY END IDENTIFIER LIGHTS (REIL)		
AIRPORT REFERENCE POINT (ARP)		

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SHEET CONTENTS
INNER APPROACH - FUTURE RUNWAY 15R

SHEET NO.
13

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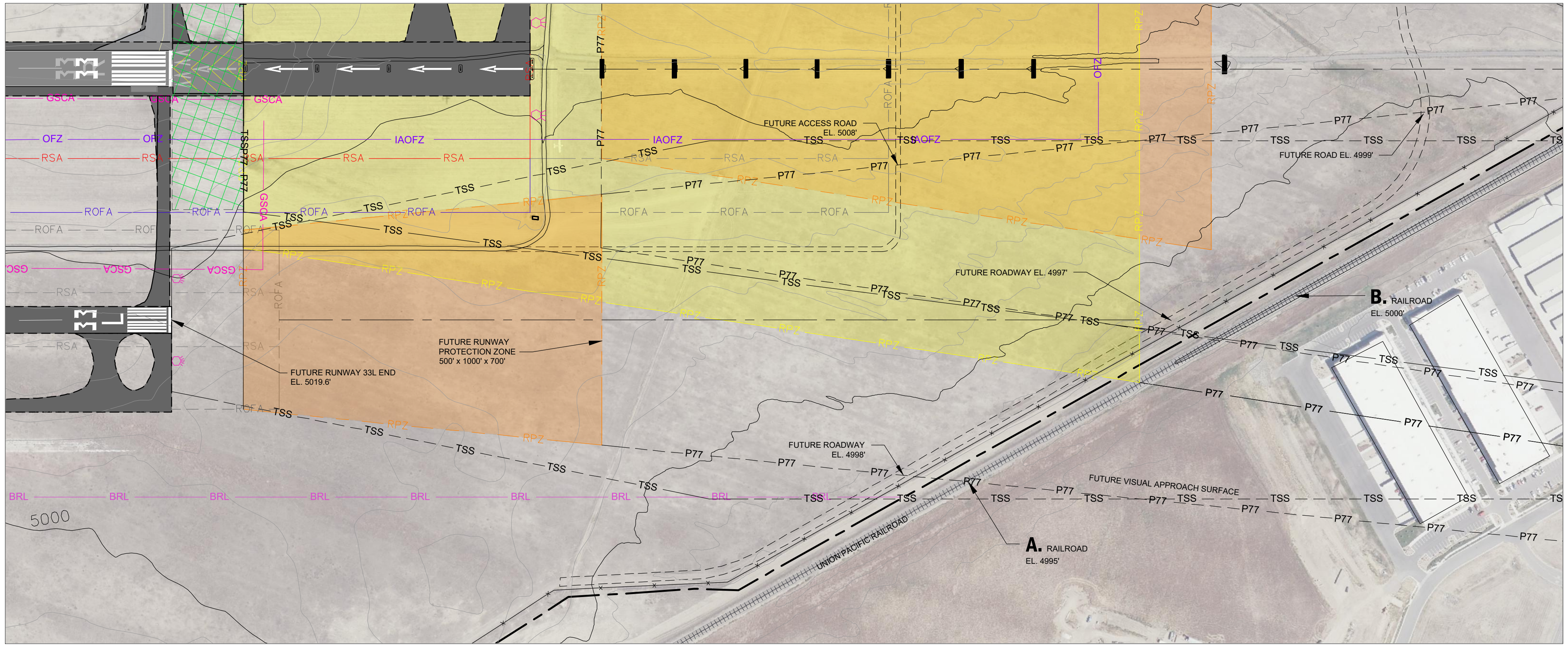
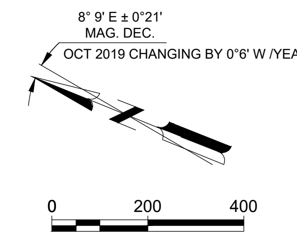
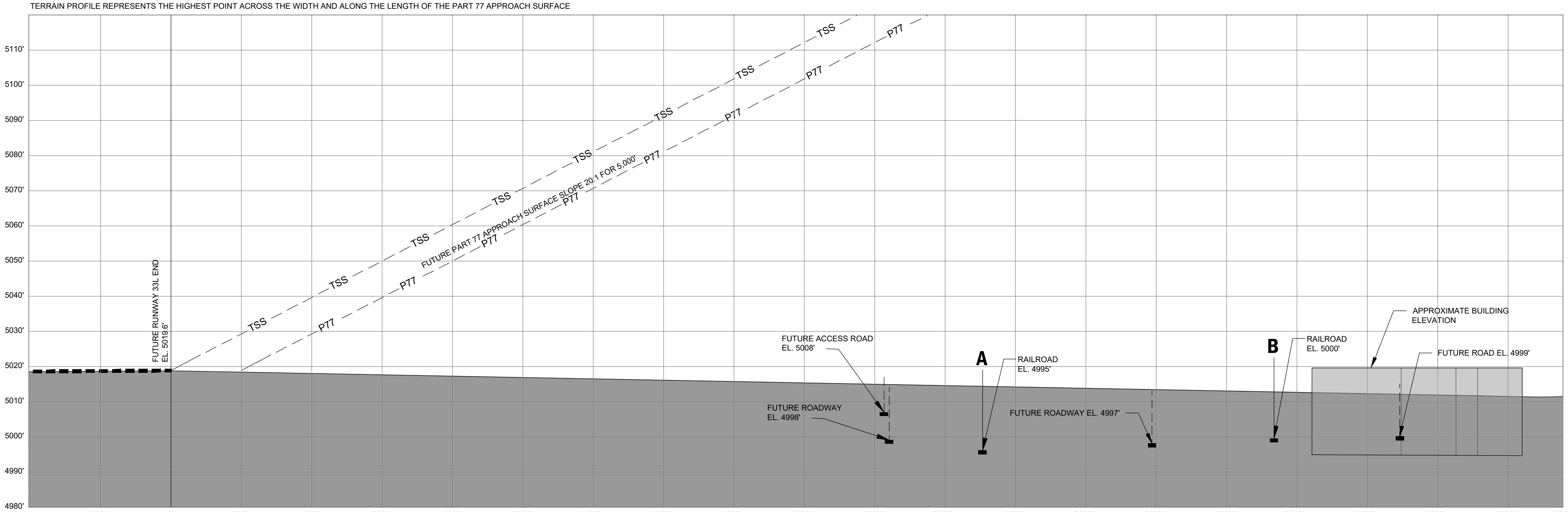




RUNWAY 33L PLAN

1" = 200' HORIZONTALLY

TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE



RUNWAY 33L PROFILE

1" = 200' HORIZONTALLY
1" = 20' VERITICALLY

OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	APPROACH SURFACE	DISPOSITION
	NONE IDENTIFIED FOR THIS AREA				

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REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		N/A
AVIGATION EASEMENT	N/A	N/A
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE	RPZ	RPZ
GLIDE PATH QUALIFICATION SURFACE	GQS	N/A
PART 77 APPROACH SURFACE	P77	P77
THRESHOLD SITING SURFACE	TSS	TSS
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	N/A
PRECISION OBSTACLE FREE ZONE		
GLIDE SLOPE CRITICAL AREA	GSCA	N/A
LOCALIZER CRITICAL AREA	LCA	N/A
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
AIRPORT SECURITY FENCE (8' HEIGHT)		N/A
APRON/TAXIWAY/TAXILANE MARKING		
AIRPORT BEACON		N/A
LIGHTED WIND CONE & SEGMENTED CIRCLE		N/A
WIND CONE		N/A
PRECISION APPROACH PATH INDICATOR (PAPI)		N/A
RUNWAY END IDENTIFIER LIGHTS (REIL)		
AIRPORT REFERENCE POINT (ARP)		

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SHEET CONTENTS

INNER APPROACH - FUTURE RUNWAY 33L

SHEET NO.

14

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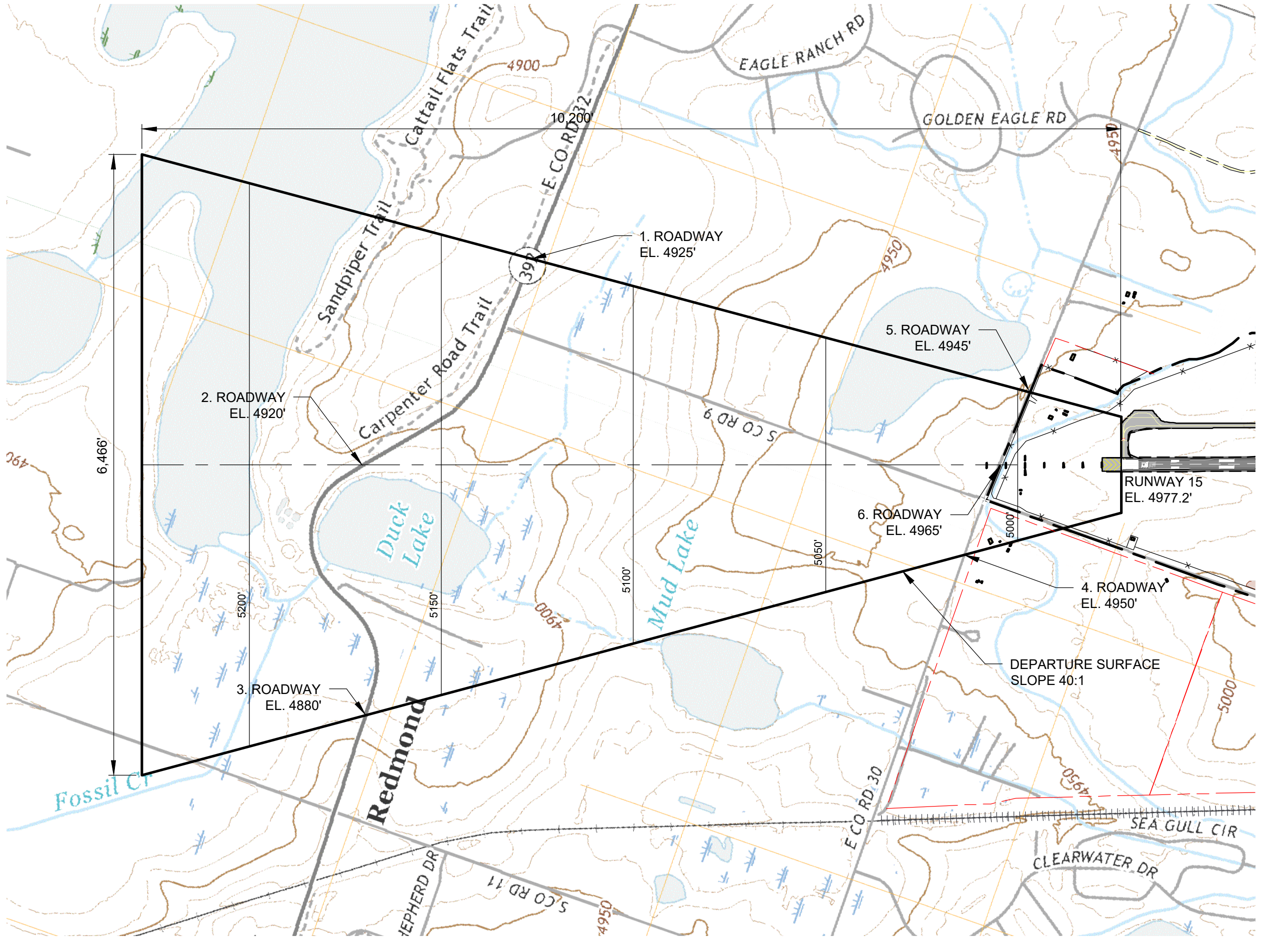
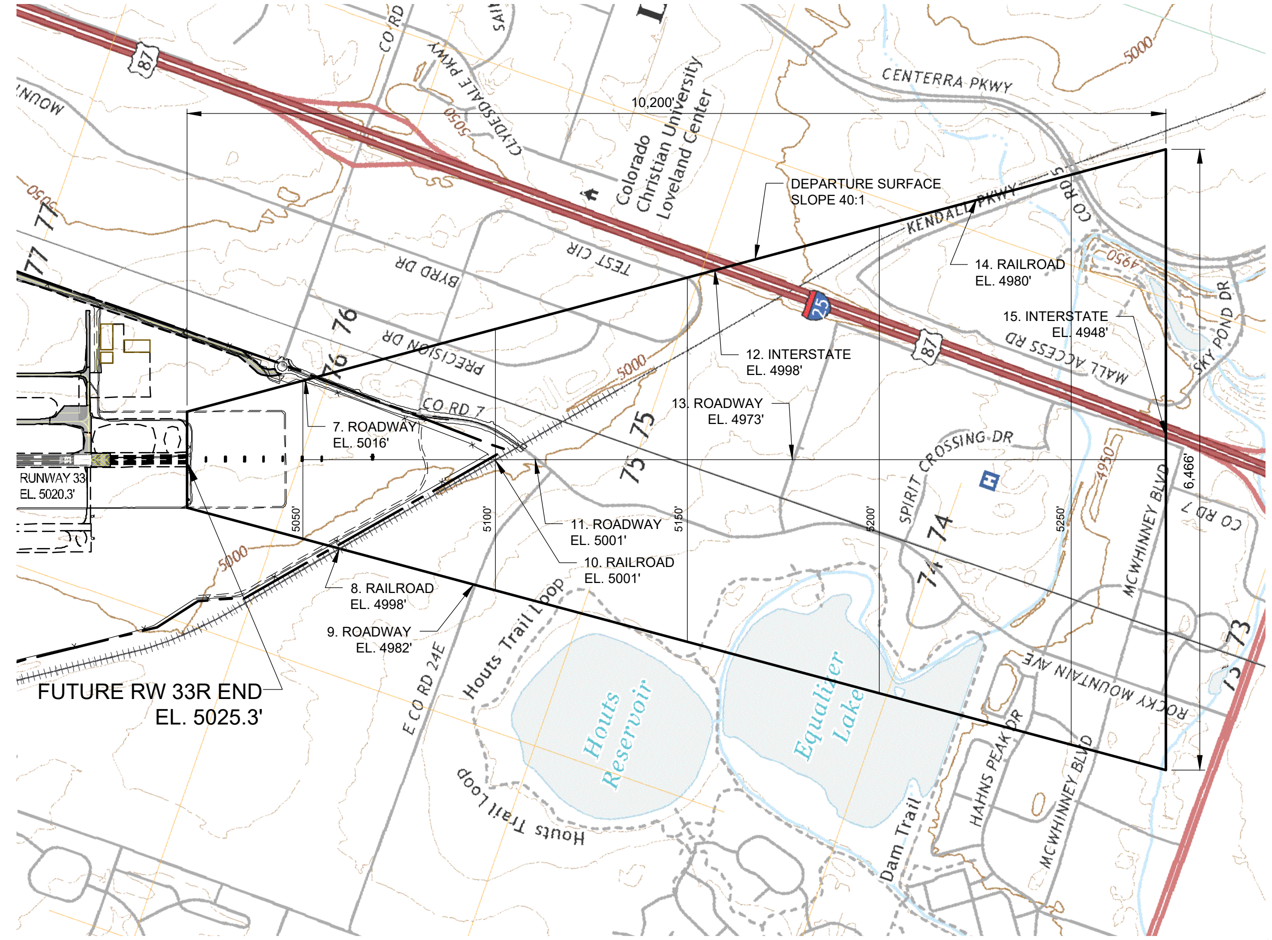
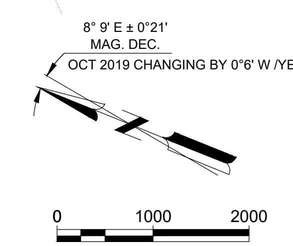
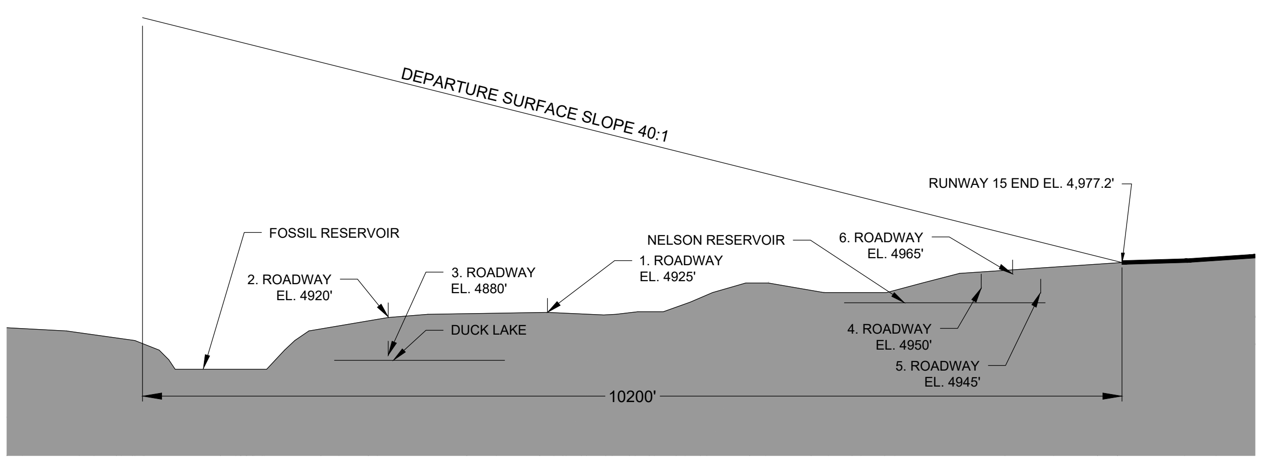


RUNWAY 33 DEPARTURE SURFACE PLAN
1" = 1000'

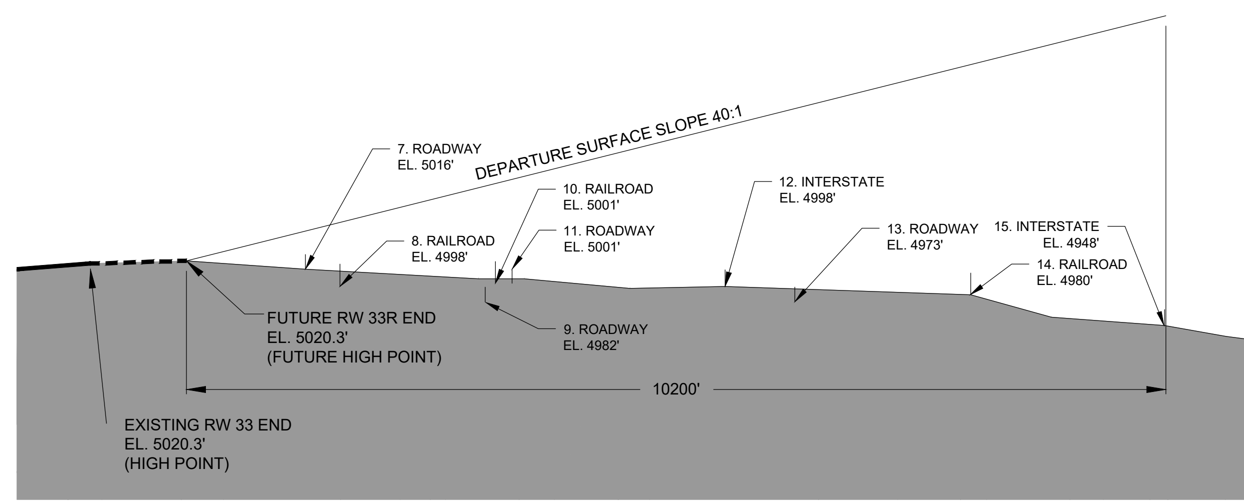


RUNWAY 15 DEPARTURE SURFACE PLAN
1" = 1000'





RUNWAY 33 DEPARTURE SURFACE PROFILE
1" = 1000' HORIZONTALLY
1" = 100' VERTICALLY



RUNWAY 15 DEPARTURE SURFACE PROFILE
1" = 1000' HORIZONTALLY
1" = 100' VERTICALLY

SIGNIFICANT OBJECTS

NO.	DESCRIPTION	DISPOSITION	ELEVATION	ABOVE GROUND	CLEARANCE	SURFACE	PENETRATION
1	ROADWAY	TO REMAIN	4926'	15'	180'	RW33 DEP	NONE
2	ROADWAY	TO REMAIN	4920'	15'	229'	RW33 DEP	NONE
3	ROADWAY	TO REMAIN	4880'	15'	268'	RW33 DEP	NONE
4	ROADWAY	TO REMAIN	4950'	15'	43'	RW33 DEP	NONE
5	ROADWAY	TO REMAIN	4945'	15'	34'	RW33 DEP	NONE
6	ROADWAY	TO REMAIN	4965'	15'	21'	RW33 DEP	NONE

SIGNIFICANT OBJECTS

NO.	DESCRIPTION	DISPOSITION	ELEVATION	ABOVE GROUND	CLEARANCE	SURFACE	PENETRATION
7	ROADWAY	TO REMAIN	5016'	15'	18'	RW15 DEP	NONE
8	RAILROAD	TO REMAIN	4998'	23'	36'	RW15 DEP	NONE
9	ROADWAY	TO REMAIN	4982'	15'	98'	RW15 DEP	NONE
10	RAILROAD	TO REMAIN	5001'	23'	73'	RW15 DEP	NONE
11	ROADWAY	TO REMAIN	5001'	15'	86'	RW15 DEP	NONE
12	INTERSTATE	TO REMAIN	4998'	17'	144'	RW15 DEP	NONE
13	ROADWAY	TO REMAIN	4973'	15'	178'	RW15 DEP	NONE
14	RAILROAD	TO REMAIN	4980	23'	210'	RW15 DEP	NONE
15	INTERSTATE	TO REMAIN	4948'	17'	298'	RW15 DEP	NONE

REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRFIELD PAVEMENT		
ROADS		

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AIRPORT LAYOUT PLAN UPDATE

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SHEET CONTENTS
DEPARTURE SURFACES - RUNWAY 15-33

SHEET NO.
15

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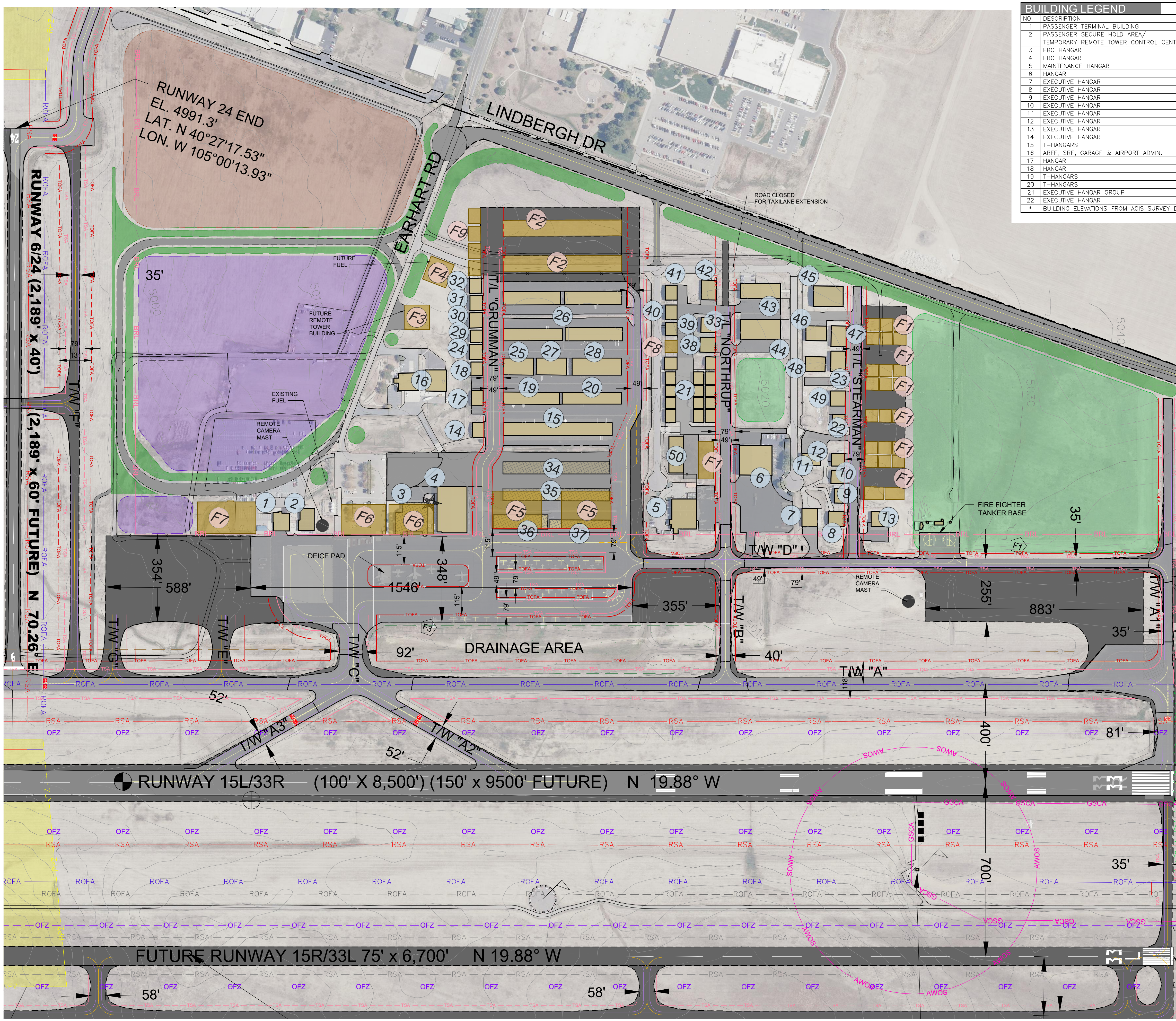

8° 9' E ± 0°21'
MAG. DEC.
OCT 2019 CHANGING BY 0°6' W /YEAR

0 200 400

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATION*
1	PASSENGER TERMINAL BUILDING	5020.1'
2	PASSENGER SECURE HOLD AREA/ TEMPORARY REMOTE TOWER CONTROL CENTER	5021.5'
3	FBO HANGAR	5031.8'
4	FBO HANGAR	5045.5'
5	MAINTENANCE HANGAR	5040.6'
6	HANGAR	5060.1'
7	EXECUTIVE HANGAR	5048.8'
8	EXECUTIVE HANGAR	5048.4'
9	EXECUTIVE HANGAR	5050.3'
10	EXECUTIVE HANGAR	5047.0'
11	EXECUTIVE HANGAR	5049.2'
12	EXECUTIVE HANGAR	5046.7'
13	EXECUTIVE HANGAR	5047.0'
14	EXECUTIVE HANGAR	5040.4'
15	T–HANGARS	5034.0'
16	ARFF, SRE, GARAGE & AIRPORT ADMIN.	5042.6'
17	HANGAR	5035.7
18	HANGAR	5032.9'
19	T–HANGARS	5034.0'
20	T–HANGARS	5031.3'
21	EXECUTIVE HANGAR GROUP	5036.6'
22	EXECUTIVE HANGAR	5048.4'
*	BUILDING ELEVATIONS FROM AGIS SURVEY DEC 2018.	

BUILDING LEGEND

NO.	DESCRIPTION	TOP ELEVATION*
23	EXECUTIVE HANGAR	5050.8'
24	EXECUTIVE HANGAR	5037.1'
25	T–HANGARS	5035.1'
26	T–HANGAR GROUP	5036.5'
27	T–HANGARS	5034.8'
28	T–HANGARS	5034.9'
29	EXECUTIVE HANGAR	5036.1'
30	EXECUTIVE HANGAR	5038.1'
31	EXECUTIVE HANGAR	5043.2'
32	EXECUTIVE HANGAR	5043.1'
33	EXECUTIVE HANGAR	5044.8'
34	T–HANGARS	5028.8'
35	T–HANGARS	5027.5'
36	T–HANGARS	5027.8'
37	T–HANGARS	5030.0'
38	EXECUTIVE HANGAR	5045.0'
39	EXECUTIVE HANGAR	5043.1'
40	EXECUTIVE HANGAR	5045.5'
41	EXECUTIVE HANGAR	5045.5'
42	EXECUTIVE HANGAR	5047.0'
43	EXECUTIVE HANGAR	5053.5'
44	EXECUTIVE HANGAR	5052.4'
45	EXECUTIVE HANGAR	5062.6'
46	EXECUTIVE HANGAR	5055.7'
47	EXECUTIVE HANGAR	5053.4'
48	EXECUTIVE HANGAR	5055.2'
49	EXECUTIVE HANGAR	5050.8'
50	EXECUTIVE HANGAR	5034.0'
F1	FUTURE EXECUTIVE HANGAR	5048' EST.
F2	FUTURE T–HANGARS	5036' EST.
F3	FUTURE REMOTE TOWER BUILDING	5027' EST.
F4	FUTURE FUEL FACILITIES	5027' EST.
F5	FUTURE FBO HANGARS	5032' EST.
F6	FUTURE FBO HANGARS	5050' EST.
F7	FUTURE PASSENGER TERMINAL BUILDING	5016' EST.
F8	FUTURE EXECUTIVE HANGAR	5036' EST.
F9	FUTURE EXECUTIVE HANGAR	5036' EST.
*	BUILDING ELEVATIONS FROM AGIS SURVEY DEC 2018.	

FUTURE DEVELOPMENT AREAS

- Innovation Focused Aeronautical/Non-Aeronautical
- Terminal Parking
- Aeronautical/Non-Aeronautical Development
- Aeronautical Development
- Entry Way Improvements

NOTES

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3. MAGNETIC DECLINATION CALCULATED BY NATIONAL GEOPHYSICAL DATA CENTER.
4. ALL LAT. LONG. COORDINATE INFORMATION (NAD83) & RUNWAY ELEVATION DATA (NAVD88) PER NGS

REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AVIGATION EASEMENT	N/A	N/A
AIRPORT BUILDINGS		
AIRPORT BUILDINGS TO BE REMOVED	N/A	
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE	RPZ	RPZ
GLIDE PATH QUALIFICATION SURFACE	GQS	N/A
PART 77 APPROACH SURFACE	P77	P77
THRESHOLD SITING SURFACE	TSS	TSS
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	N/A
PRECISION OBSTACLE FREE ZONE		
GLIDE SLOPE CRITICAL AREA	GSCA	N/A
LOCALIZER CRITICAL AREA	LCA	N/A
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
TAXIWAY SAFETY AREA	TSA	TSA
TAXIWAY OBJECT FREE AREA	TOFA	TOFA
TAXIWAY SHOULDER		
TAXIWAY EDGE SAFETY MARGIN		
AIRPORT SECURITY FENCE (8' HEIGHT)		N/A
APRON/TAXIWAY/TAXILANE MARKING		
AIRPORT BEACON		N/A
LIGHTED WIND CONE & SEGMENTED CIRCLE		N/A
WIND CONE		N/A
PRECISION APPROACH PATH INDICATOR (PAPI)		N/A
RUNWAY END IDENTIFIER LIGHTS (REIL)		N/A
AIRPORT REFERENCE POINT (ARP)		
REMOTE CAMERA MASTS		N/A

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SHEET CONTENTS
TERMINAL AREA PLAN

SHEET NO.
16

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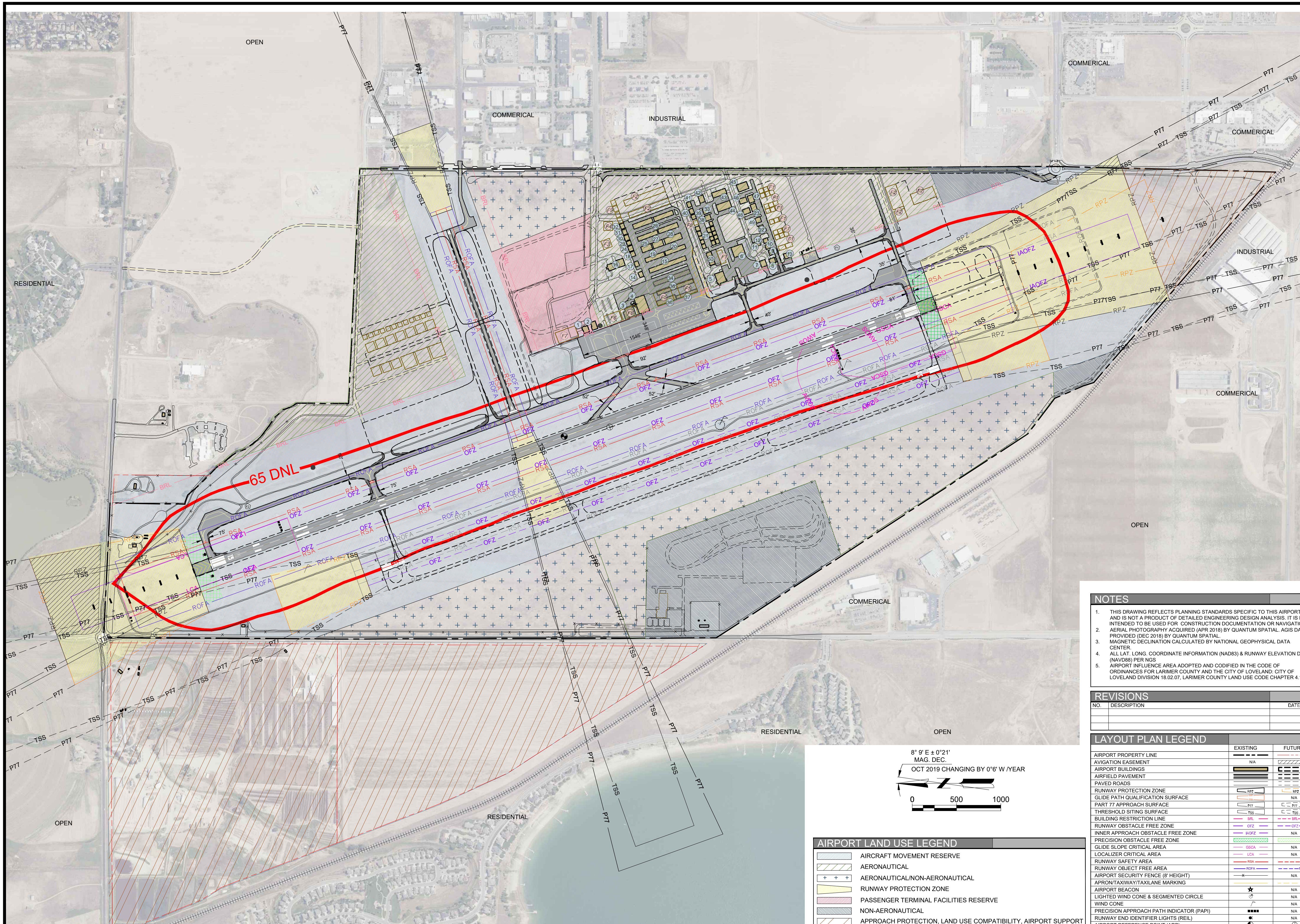

AIRPORT LAND USE LEGEND

- AIRCRAFT MOVEMENT RESERVE
- AERONAUTICAL
- AERONAUTICAL/NON-AERONAUTICAL
- RUNWAY PROTECTION ZONE
- PASSENGER TERMINAL FACILITIES RESERVE
- NON-AERONAUTICAL
- APPROACH PROTECTION, LAND USE COMPATIBILITY, AIRPORT SUPPORT

NOTES

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REVISIONS

NO.	DESCRIPTION	DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AVIGATION EASEMENT	N/A	
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
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NORTHERN COLORADO REGIONAL AIRPORT
AIRPORT LAYOUT PLAN UPDATE

4900 EARHART RD
LOVELAND, CO 80538

ISSUED

NOT FOR CONSTRUCTION

M&H NO.: 3115300-160154.01
DATE: JUNE 2020
DESIGNED BY: M&H
DRAWN BY: JWB
CHECKED BY: CAL

DO NOT SCALE DRAWINGS

SHEET CONTENTS

AIRPORT LAND USE PLAN

SHEET NO.

17

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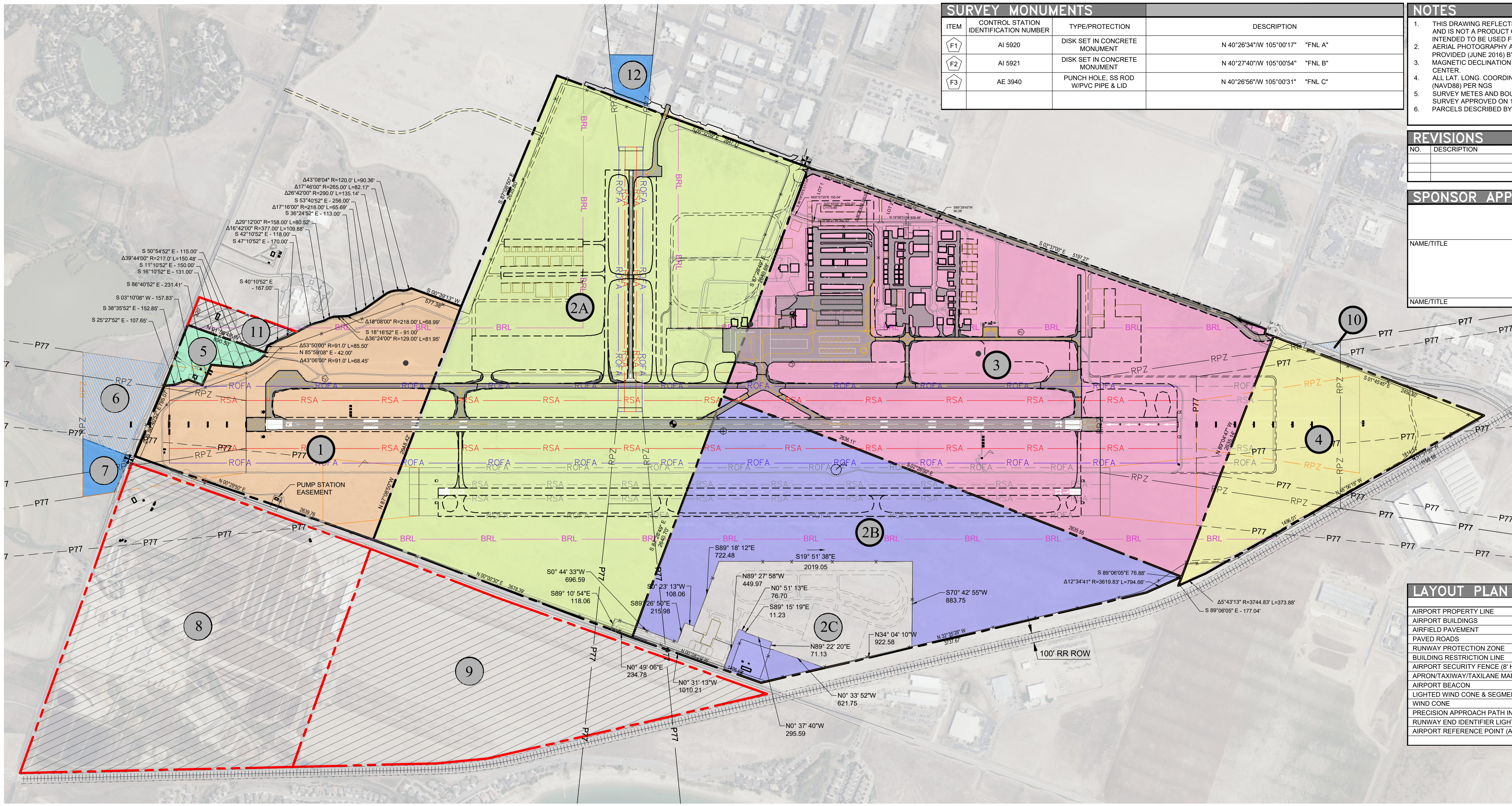
6/25/2020 12:02:02 PM



SURVEY MONUMENTS

ITEM	CONTROL STATION IDENTIFICATION NUMBER	TYPE/PROTECTION	DESCRIPTION
F1	AI 5920	DISK SET IN CONCRETE MONUMENT	N 40°26'34"/W 105°00'17" "FNL A"
F2	AI 5921	DISK SET IN CONCRETE MONUMENT	N 40°27'40"/W 105°00'54" "FNL B"
F3	AE 3940	PUNCH HOLE, SS ROD W/PVC PIPE & LID	N 40°26'56"/W 105°00'31" "FNL C"

NOTES

1. THIS DRAWING REFLECTS PLANNING STANDARDS SPECIFIC TO THIS AIRPORT, AND IS NOT A PRODUCT OF DETAILED ENGINEERING DESIGN ANALYSIS. IT IS NOT INTENDED TO BE USED FOR CONSTRUCTION DOCUMENTATION OR NAVIGATION.
2. AERIAL PHOTOGRAPHY ACQUIRED (MAY 2016) BY QUANTUM SPATIAL. AGIS DATA PROVIDED (JUNE 2016) BY QUANTUM SPATIAL.
3. MAGNETIC DECLINATION CALCULATED BY NATIONAL GEOPHYSICAL DATA CENTER.
4. ALL LAT. LONG. COORDINATE INFORMATION (NAD83) & RUNWAY ELEVATION DATA (NAVD88) PER NGS
5. SURVEY METES AND BOUNDS TAKEN FROM ROCKY MOUNTAIN CONSULTING, INC. SURVEY APPROVED ON 12/23/1985
6. PARCELS DESCRIBED BY METES AND BOUNDS ON MAP

REVISIONS

NO.	DESCRIPTION	DATE

SPONSOR APPROVAL

NAME/TITLE DATE

NAME/TITLE DATE

LAYOUT PLAN LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
RUNWAY PROTECTION ZONE	RPZ	RPZ
BUILDING RESTRICTION LINE	BRL	BRL
AIRPORT SECURITY FENCE (8' HEIGHT)		N/A
APRON/TAXIWAY/TAXILANE MARKING		
AIRPORT BEACON		N/A
LIGHTED WIND CONE & SEGMENTED CIRCLE		N/A
WIND CONE		N/A
PRECISION APPROACH PATH INDICATOR (PAPI)		N/A
RUNWAY END IDENTIFIER LIGHTS (REIL)		N/A
AIRPORT REFERENCE POINT (ARP)		

LAND PARCEL DATA – EXISTING PROPERTY

REFERENCE NO.	LARIMER COUNTY PARCEL NO.	GRANTOR	GRANTEE	INTERESTS	TYPE OF CONVEYANCE INSTRUMENT	PURPOSE	ACREAGE	BOOK & PAGE/ RECEPTION NO.	DATE OF RECORDING	FAA GRANT NO.
1	8633006902/TR B	RUTH A. GEESEN	CITY OF FORT COLLINS CITY OF LOVELAND	FEE SIMPLE	WARRANTY DEED	AERONAUTICAL	119.36	NO. 856748 BOOK 1232 PAGE 595	1/2/1964	AIP 9-05-038-01
2A	8633006902/TR B	RUTH A. GEESEN	CITY OF FORT COLLINS CITY OF LOVELAND	FEE SIMPLE	WARRANTY DEED	AERONAUTICAL	335.00	NO. 856748 BOOK 1232 PAGE 595	1/2/1964	AIP 9-05-038-01
2B	8633006901/TR A	CARL A. WILSON	CITY OF FORT COLLINS CITY OF LOVELAND	FEE SIMPLE	WARRANTY DEED	AERONAUTICAL	220.96	NO. 857101 BOOK 1233 PAGE 316	1/8/1964	AIP 9-05-038-01
2C	8633006901/TR A	FAA	CITY OF FORT COLLINS CITY OF LOVELAND	RELEASE		NON AERONAUTICAL	43.77	NO.8644345	7/28/2015	AIP 9-05-038-C501
3	8633006902/TR B	RUTH A. GEESEN	CITY OF FORT COLLINS CITY OF LOVELAND	FEE SIMPLE	WARRANTY DEED	AERONAUTICAL	307.22	NO. 856748 BOOK 1232 PAGE 595	1/2/1964	AIP 9-05-038-01
4	8633006902/TR B	RUTH A. GEESEN	CITY OF FORT COLLINS CITY OF LOVELAND	FEE SIMPLE	WARRANTY DEED	AERONAUTICAL	82.25	NO. 856748 BOOK 1232 PAGE 595	1/2/1964	AIP 9-05-038-01
5	8628000910	RAY W. HEIN FAMILY TRUST LARIMER COUNTY PUBLIC TRUSTEE LARIMER COUNTY TREASURER ALICE HEIN MCCURRY MID VALLEY MORTGAGE CORP. CONNIE E. MUNIZ RICHARD MUNIZ PLATTE VALLEY MORTGAGE CORP.	CITY OF FORT COLLINS CITY OF LOVELAND	FEE SIMPLE	RULE AND ORDER	AERONAUTICAL	8.08	NO. 92003739	1/23/1992	AIP 3-08-0023-02

Source: Larimer County Assessor's Office Records and 1993 Fort Collins - Loveland Municipal Airport. Exhibit "A" Prepared by Isbill Associates Inc.

Note: Since 1985, Larimer County, CO. has replaced Book and Page numbers with Reception Numbers.

LAND PARCEL DATA – POTENTIAL PROPERTY ACQUISITION

REFERENCE NO.	LARIMER COUNTY PARCEL NO.	GRANTOR	GRANTEE	INTERESTS	TYPE OF CONVEYANCE INSTRUMENT	PURPOSE	ACREAGE	BOOK & PAGE/ RECEPTION NO.	DATE OF RECORDING	FAA GRANT NO.
6	8621305702	JESSICA DONALDSON	CITY OF FORT COLLINS CITY OF LOVELAND	FEE SIMPLE		AERONAUTICAL	15.41	---	---	TO BE ACQUIRED
8	8629000001 8629000008 8629000009 8629000010 8629000012 8629000011	DUO DAIRY LTD LLLP, DICKINSON LAND AND CATTLE CO LLC ROBERT A/KAREN DICKINSON MICHAEL B. DICKINSON DICKINSON LAND AND CATTLE CO LLC DICKINSON LAND AND CATTLE CO LLC GREELEY-LOVELAND IRRIGATION CO.	CITY OF FORT COLLINS CITY OF LOVELAND	FEE SIMPLE		AERONAUTICAL	176.0	---	---	TO BE ACQUIRED
9	8629005001 8629005002 8629006001 8629006002	PDZ, LLC PDZ, LLC.	CITY OF FORT COLLINS CITY OF LOVELAND	FEE SIMPLE		AERONAUTICAL	134.0	---	---	TO BE ACQUIRED
10	8503219001	CIP 401 INVESTMENTS, LLC	CITY OF FORT COLLINS CITY OF LOVELAND	EASMENT		APPROACH PROTECTION	0.5	---	---	TO BE ACQUIRED
11	8628205001	AIRPORT BOAT AND RV STORAGE LLC	CITY OF FORT COLLINS CITY OF LOVELAND	FEE SIMPLE		AERONAUTICAL	7.0	---	---	TO BE ACQUIRED

LAND PARCEL DATA – SPONSOR OWNERSHIP NOT REQUIRED

REFERENCE NO.	LARIMER COUNTY PARCEL NO.	OWNER	GRANTEE	INTERESTS	TYPE OF CONVEYANCE INSTRUMENT	PURPOSE	ACREAGE	BOOK & PAGE/ RECEPTION NO.	DATE OF RECORDING	PROJECT NO.
7	8620410001	KRM LLC		EXISTING CONSERVATION EASMENT		APPROACH PROTECTION	4.59	---	---	NONE
12	8627333001 8627328003 8627328002 8627328004 8627329002 8627329007 8627336001 8627337001	LOVELAND-FORT COLLINS INDUSTRIAL AIRPARK BRAIDED TRIO DEVELOPMENT, LLC FLIGHTLINE 6230, LLC BOHEMIAN REAL ESTATE, II, LLC CONNOR AVIATION AND RESTORATION, LLC SOLSBURY HILL LAND COMPANY, LLC SOLSBURY HILL LAND COMPANY, LLC SOLSBURY HILL LAND COMPANY, LLC		EXISTING USE/ HEIGHT RESTRICTIONS		APPROACH PROTECTION	4.33	---	---	NONE

Source: Larimer County Assessor Property Records Inquiry Website.

Mead & Hunt

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EXHIBIT 'A' AIRPORT PROPERTY INVENTORY MAP

SHEET NO.
18

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Northern Colorado Regional Airport

NOCO

Mead & Hunt