



Coeur D'Alene
Airport Master Plan
2019

Mead & Hunt

In Association With



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TABLE OF CONTENTS

Introduction

Airport Background	1
Study Introduction	2
Plan Focus Areas	2
Plan Documentation	3
Stakeholder Coordination	3
Community Involvement	3
Airport Stakeholders and Advisory Committees.....	3

Chapter 1 – Inventory and Environmental

Chapter Organization and Purpose	1
Airport Overview	2
Airport and Community History	2
Airport Role.....	4
Coeur D’Alene Location and Transportation Network.....	5
Operational Overview.....	7
Airside Facilities	9
Runways, Navigational Aids, and Instrument Procedures	9
Critical Aircraft Design Standards	12
Runway Classification and Design	13
Runway Safety Areas.....	13
Runway Protection Zones	14
Non-Standard Conditions	14
Airspace.....	15
Hangar Building Plan.....	19
Aeronautical Setting	21
Commercial Airports.....	26
Regional Airports.....	26
Environmental	28
Summary	32
Next Steps	32



Chapter 2 – Aviation Activity Forecasts

Aviation Activity Forecasts..... 1

1. Introduction to Forecasts 2

2. Community Profile 4

 2.1 Population 4

 2.2 Employment and Economic Development 5

 2.3 Gross Regional Product 8

 2.4 Catchment Areas and Regional Airports 8

3. Aviation Activity Profile 11

 3.1 Operations Estimate 11

 3.2 General Aviation 12

4. General Aviation Forecasts 17

 Forecasting Techniques 17

 4.1 Itinerant General Aviation Operations 18

 4.2 Local Operations 20

 4.3 Based Aircraft 22

5. Peak Forecasts and Critical Aircraft 25

 5.1 Peak Period Forecasts 25

 5.2 Critical Aircraft 26

6. Forecast Summary and FAA Forecast Tables 29

Chapter 3 – Facility Requirements

Facility Requirements..... 1

 Airport Design Standards 1

Airside Facilities 4

 Runway System Analysis 4

 Runway Utilization and Capacity 4

 Runway Alignment 10

 Runway Length Analysis 12

 Runway Width, Shoulder, and Blast Pad 24

 Intersecting Runway Geometry 25

 Runway Pavement Strength..... 27

 Runway Design Surfaces 29

 Taxiway System Analysis 31

 Pavement Markings, Lighting, and Signage..... 36

 Navigational Aids (NAVAIDs) 37

 Instrument Approach Procedures..... 38

Landside Facilities 39

 Terminal Area and Support Facilities 39

 Facility Requirements Summary 50



Chapter 4 – Improvement Alternatives

Chapter Overview 1

1. Alternatives Approach 1

 Alternative Analysis Process 2

 2012 COE Master Plan Alternatives 2

 Community Involvement..... 2

 Summary of Facility Requirements 2

2. Runway Development Alternatives..... 3

 Runway Alternatives Evaluation Process..... 3

 Alternatives Shared Factors 4

 Runway Alternative I 5

 Runway Alternative II 8

 Runway Alternative III 10

 Runway Alternative IV 14

 Runway Alternative V 16

 Runway Alternatives Evaluation Summary 19

 Refined Alternatives 19

 Runway Alternative I-R..... 20

 Implementation and Costs..... 22

 Runway Alternative II-R..... 23

 Refined Runway Alternatives Summary..... 26

 Selection of a Preferred Runway Alternative 26

3. Taxiway System Improvements 27

 Taxiway Improvements 27

4. Landside Facility Development 30

 Landside Alternative Methodology 30

 Airport Administration Building 30

 Aircraft Hangars 31

 Aircraft Parking Aprons and Tie-Down Access 31

 Integration of Local Transportation Planning 32

 Future Airport Property Interests..... 36

5. Alternatives Summary 36

 Runway 6/24..... 36

 Runway 2/20..... 36

 Taxiways..... 37



Chapter 5 – Land Use

Importance of Compatible Land Use Planning..... 1

Airport Land Use Planning Considerations 2

 Encroachment 2

 Safety and Quality of Live 2

 Economic Benefit 2

 Local Land Use Planning Act 2

 Knowledge of Airport and Operations 3

 Inverse Condemnation 3

 Title Code of Federal Regulations (CFR) Part 77 3

 Grant Assurances and Sponsor Obligations 4

 Federal Noise Regulations 5

 Idaho Airport Land Use Guidelines (ALUG) 8

COE Aircraft Noise Analysis..... 9

 Methodology 10

 Aircraft Fleet Mix 10

 Airport Operations 10

 Day-Nighttime Operations 10

 Runway Utilization 10

 Flight Tracks 11

Existing Noise Contours 11

Future Noise Contours 12

 Comparison Between 2012 and 2018 Master Plan Noise Modeling 15

 Difference Between the 55 DNL and 65 DNL Contours 15

Airport Safety Compatibility Zones..... 17

 Runway Protection Zone 17

 Lateral Safety Zone..... 18

 Inner and Outer Critical Zones..... 18

 Airport Traffic Pattern Area 19

 Airport Influence Area (AIA) 19

 Impact Coordination Zone (ICZ) 19

Existing Land Use Evaluation 21

 Comprehensive Plans 21

 Height Restrictive (Part 77) Zoning..... 23

 Compatible Land Use Zoning 24

 Kootenai County 25

 City of Hayden 27

 Cities of Coeur D’Alene, Post Falls, Rathdrum, Hayden Lake, and Dalton Gardens 27

Planned Land Use..... 28

 Kootenai County 28

 City of Hayden 29

 City of Coeur D’Alene 30

 Other Jurisdictions 31



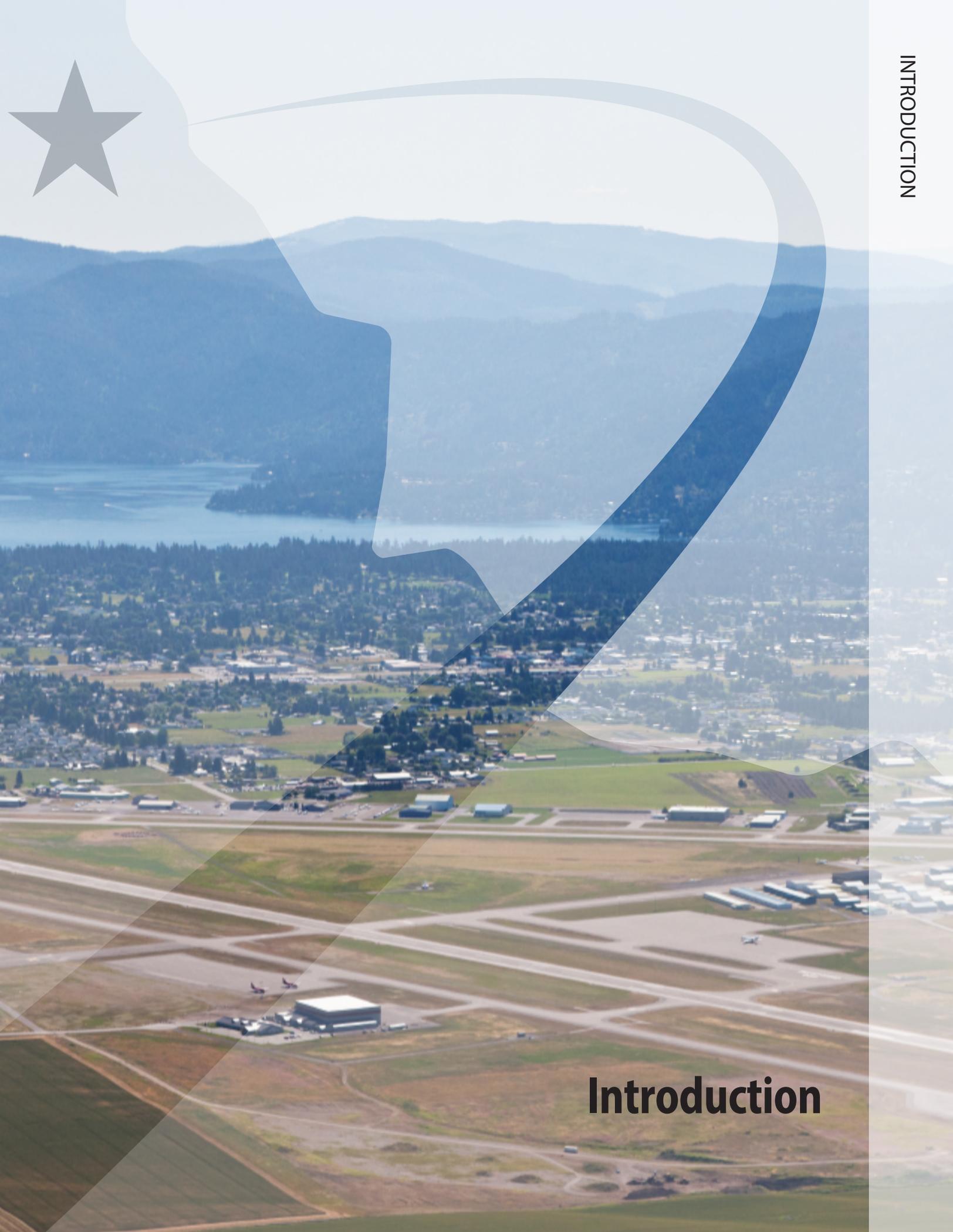
Land Use Recommendations 31
Land Use Compatibility Recommendations 32
Land Use Summary 34
Importance of Compatible Land Use Planning 34
COE Aircraft Noise Analysis 34
Airport Safety Compatibility Zones 34
Existing Land Use 35
 Planned Land Use 35
 Land Use Recommendations 35

Chapter 6 – Implementation Plan

Development and Cost Estimates 1
Development Layouts..... 3
 Short-Term Development Projects – Phase I 3
 Mid-Term Development Projects – Phase II 8
 Long-Term Development Projects – Phase III 11
Cost Estimate Summary 14
Capital Improvement Funding 14
FAA Funding 14
Idaho Transportation Department (ITD) Funding 15
 Idaho Airport Debt Amendment..... 15
Local Funding 15
 Airport Revenue 15
 Bonding 15
 Leasehold Financing 16
 Non-Aeronautical Development 16
 Special Events..... 16
 General Fund 16
Airport Grant History 16
Current Fiscal Policy 17
 Revenue and Expenses 17
 Rates and Charges 18
Summary..... 19

Appendix – Airport Layout Plan





Introduction

INTRODUCTION

The Kootenai County Board of Commissioners has initiated an update to the Coeur d'Alene Master Plan (Plan) to document the development of the Coeur d'Alene Airport (COE or "the Airport"). The Plan serves as a roadmap for bringing projects, people, and funding together in a coordinated manner, and provides strategic direction regarding the Airport's 20-year capital development plan and investment of resources.



The Plan is conducted in accordance with Federal Aviation Administration (FAA) guidance, as prescribed by grand assurances and mandated by regulatory standards. Conformance with FAA standards enables Kootenai County to apply for federal and state funding to support the maintenance, expansion, and upgrade of airport facilities.

The consulting team assisting the Airport with this effort is led by Mead & Hunt, in association with T-O Engineers, Verdis, Maul Foster & Alongi, and GeoTera. The Plan will update the 2012 COE Master Plan to address key issues facing the Airport and the surrounding communities.

Airport Background

The Coeur d'Alene Airport is in Kootenai County, Idaho, seven miles northwest of downtown Coeur d'Alene. Nearby municipalities include the cities of Coeur d'Alene, Post Falls, Rathdrum, Hayden Lake, and Dalton Gardens. The Airport, built in 1942, is publicly-owned and operated by Kootenai County. The Airport hosts flight training, business aviation, recreational pilots, emergency response, and U.S. Forest Service aerial firefighting activities.

COE features two runways and instrument landing systems, which keep the Airport open during periods of low visibility. A system of taxiways connects the runways to aircraft parking and storage facilities. There are currently two privately-run businesses providing fueling services, as well as multiple maintenance shops on the Airport property. Airport staff are employed by Kootenai County.



The Airport plays a vital role in the County by supporting emergency response, firefighting, and law enforcement aviation uses. It is a vibrant hub of general aviation users, including corporate jets, propeller aircraft, and helicopters. COE is an economic catalyst for Kootenai County. The 2008 Idaho Airport System Plan found that the Airport generated over 1,000 jobs and \$130 Million in economic impact per year. The State of Idaho is in the process of updating the economic impact numbers for airports statewide and a revised figure is expected to be released in 2018.

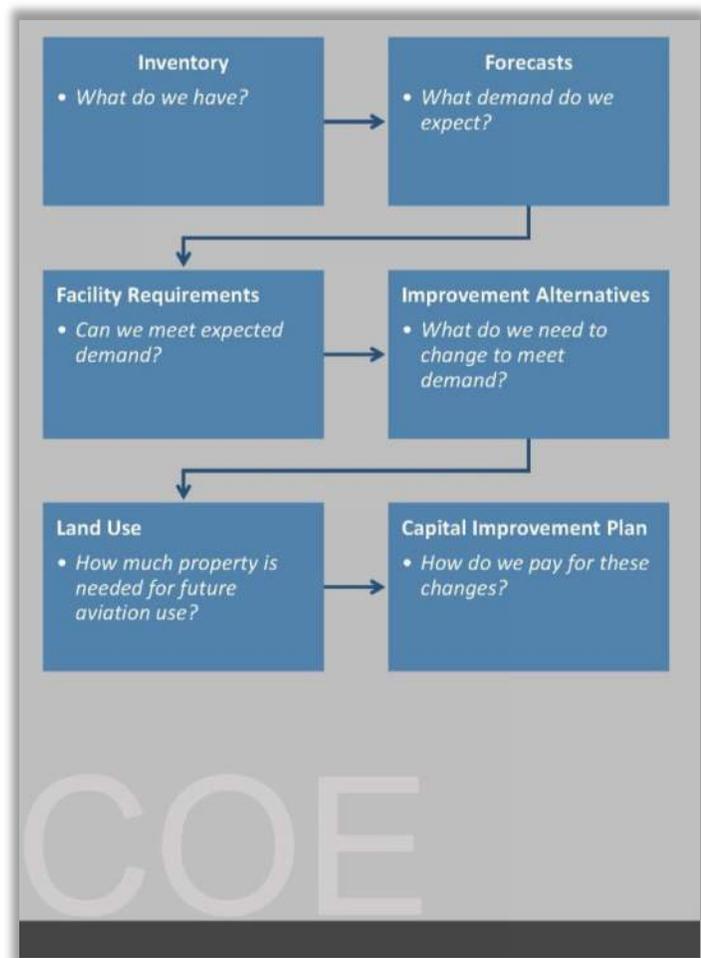
Study Introduction

The Airport Master Plan is primarily a facilities plan, with the purpose of documenting the development of the Airport's infrastructure in response to future demand. The updated plan will focus on the future airfield layout, which will help plan development in surrounding areas. This update will result in the 20-year development strategy, complimentary with community interests. The Plan is primarily funded by a Federal Aviation Administration (FAA) Airport Improvement Program grant, with support from the Idaho Transportation Department and Kootenai County.

Plan Focus Areas

This Plan will focus on the future airfield layout so that the Airport's neighbors can plan for land development in the surrounding areas. Plan focus areas include the following:

- ▶ Aircraft operations counts
- ▶ Disposition of runways 6/24 and 2/20
- ▶ Roadway development
- ▶ Airfield Taxiway Layout
- ▶ Development north of runway 6/24
- ▶ Airport office and storage Requirements
- ▶ Street access and automobile wayfinding
- ▶ Land use compatibility and noise



Plan Documentation

The Master Plan will be organized into six chapters and an Airport Layout Plan. The purpose of each chapter is explained above.

- I. Introduction
1. Inventory
2. Aviation Activity Forecasts
3. Facility Requirements
4. Improvement Alternatives
5. Airport Land Use
6. Capital Improvement Plan
7. Airport Layout Plan

Stakeholder Coordination

The Master Plan is intended to be responsive to airport and community needs. Stakeholder coordination will occur throughout the development of the Master Plan, and provide the community with the opportunity to provide input throughout the process and interact with Airport management and consultant staff.

Community Involvement

The community involvement process is designed to provide stakeholders and communities with the opportunity to share information and engage with the Master Plan process, learn about issues under consideration, and provide feedback. Four community outreach meetings will occur as part of the Master Plan. The Master Plan chapters and stakeholder meeting materials will be posted to the Airport website. Comments will be reviewed by the consultant and Airport management and addressed or incorporated into the Plan.

Airport Stakeholders and Advisory Committees

There are two advisory committees assembled to provide input on Plan materials, described below. Some members will serve on both committees.

▶ Community Advisory Committee (CAC)

The CAC is made up of community stakeholders, including airport tenants, land use planning bodies, and economic development agencies. CAC members are tasked with reviewing Master Plan materials and providing comment from the perspective of the organizations of which they are a member of.

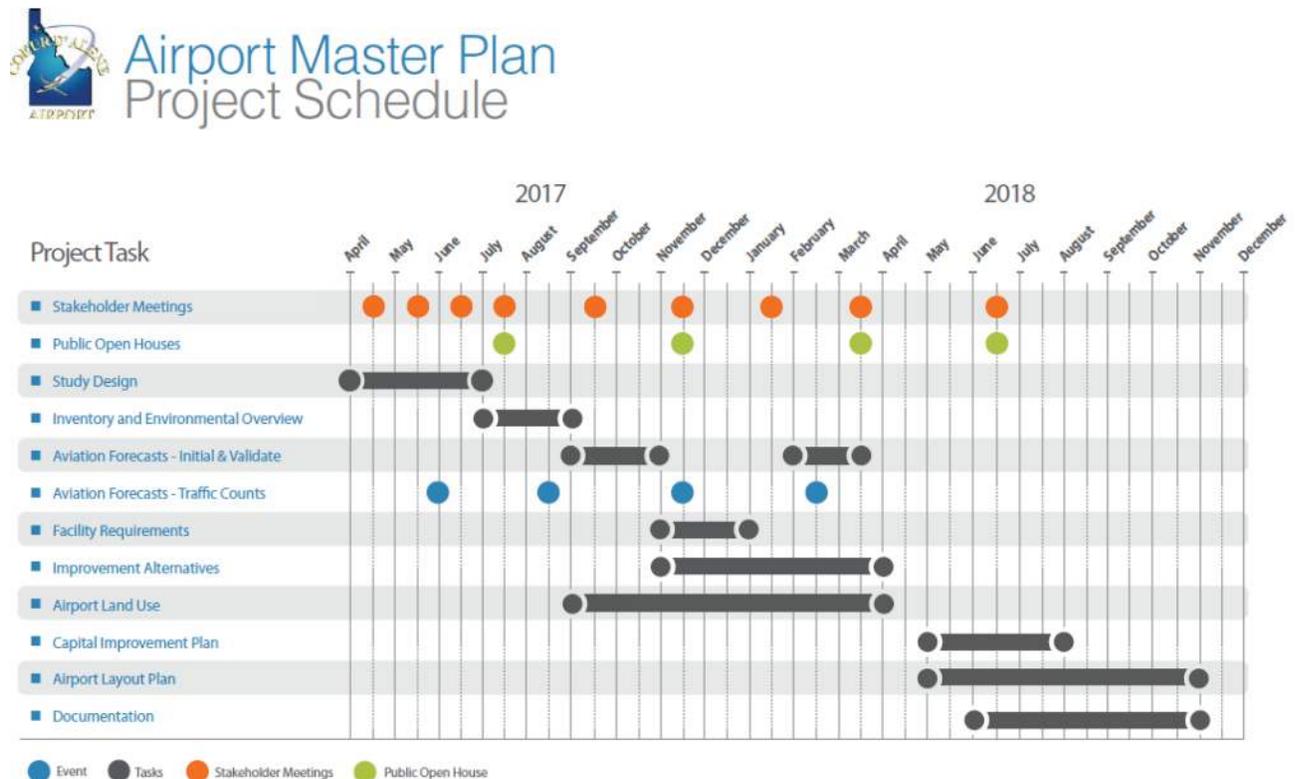


► Technical Steering Committee (TSC)

The TSC is made up of Airport staff, members of the Airport Advisory Board, and others with an in-depth understanding of aviation. TSC members are tasked with becoming familiar with how the Airport operates and what facilities pilots and aviation-related businesses require.

Further coordination will occur with the Federal Aviation Administration’s Helena Airports District Office and the Idaho Transportation Department’s Division of Aeronautics. These agencies are financial sponsors of the Plan and some of the subsequent improvement projects that will be recommended.

Stakeholder meetings will occur throughout the development of the Master Plan so that opportunity to comment on proposed airport development is available before final decisions have been made. This will result in the development of a Master Plan that responds to community interests. The Master Plan schedule is shown on the following page.



The project schedule is subject to revision as the project progresses. Future meeting dates are estimates.





Chapter 1
Inventory and Environmental

INVENTORY AND ENVIRONMENTAL

The Inventory and Environmental chapter describe existing Airport conditions and provide a baseline to begin evaluation and assessment of how the Airport can best meet the needs of the community being served. With a foundation of the existing conditions, the Plan chapters that follow can be built to address how the Airport is currently being used, aviation use forecasts, facility regulatory requirements, areas for improvements, surrounding land use. The following chapters can also address alternatives for how best to meet the anticipated changes and provide a structured plan for the Airport’s future.

CHAPTER PURPOSE AND ORGANIZATION

The Inventory Chapter is intended to document the number, type, and general condition of existing facilities. This includes all systems, airside facilities, landside facilities and their general physical characteristics.

The Inventory Chapter documents the use, design, and condition of these two areas:

- ▶ **Airside facilities:** Airport operations areas restricted from general-public access. This includes runways and taxiways, facilities for general aviation parking and maintenance, air cargo, and other private business facilities with direct access to the runway. Airport administration, safety, and maintenance facilities are considered airside.
- ▶ **Landside facilities:** Areas that support Airport activities without direct access to the airfield. They include roadways, parking areas, and non-aeronautical development areas.

Environmental factors, such as temperature and wind direction, impact aircraft performance and drive facility design considerations. The chapter’s environmental review collects the existing baseline conditions for protected wildlife, wetlands, historic sites, cultural importance, and air quality. The baseline will be used to evaluate potential environmental impacts associated with proposed improvements later in the planning process. All this information was collected in several ways, including a site visit to the Airport, and review of documents provided by the Airport, the City of Hayden, Kootenai County, the Kootenai Metropolitan Planning Organization, the Federal Aviation Administration (FAA), and other public agencies.



AIRPORT OVERVIEW

The Coeur d'Alene Airport (COE) is in Idaho's Kootenai County, bordered on three sides by the City of Hayden, Idaho. Nearby municipalities are the cities of Coeur d'Alene, Post Falls, Rathdrum, Hayden Lake, and Dalton Gardens. U.S. Highway 95 and Interstate 90 are the primary roadways in the area. State Highways 53 and 41 also serve the surrounding area and may be used to access the Airport locales. The Airport is 30 miles east of Spokane, Washington; 140 miles west of Missoula, Montana; and 290 miles north of the Idaho state capital in Boise. The airport's location and neighboring city jurisdictions are shown in **Exhibit 1-1**.

AIRPORT AND COMMUNITY HISTORY

COE was constructed by the U.S. Army Corps of Engineers (USACE) in 1942. The U.S. Government turned over the Airport to the City of Coeur d'Alene in 1946, and the City gave the Airport to Kootenai County. Major improvements have been made to COE since then:

- ▶ Construction of a precision instrument landing system (ILS) to Runway 05 in the 1970s
- ▶ Closure of crosswind Runway 14/32 in the 1980s
- ▶ Construction of Taxiway N and opening of the north airfield in 2008 and 2009

The Airport was formally known as Coeur d'Alene Air Terminal until September 2007, when it was renamed Coeur d'Alene Airport/Pappy Boyington Field to honor World War II Ace Colonel Gregory "Pappy" Boyington, a Medal of Honor recipient born in Coeur d'Alene.



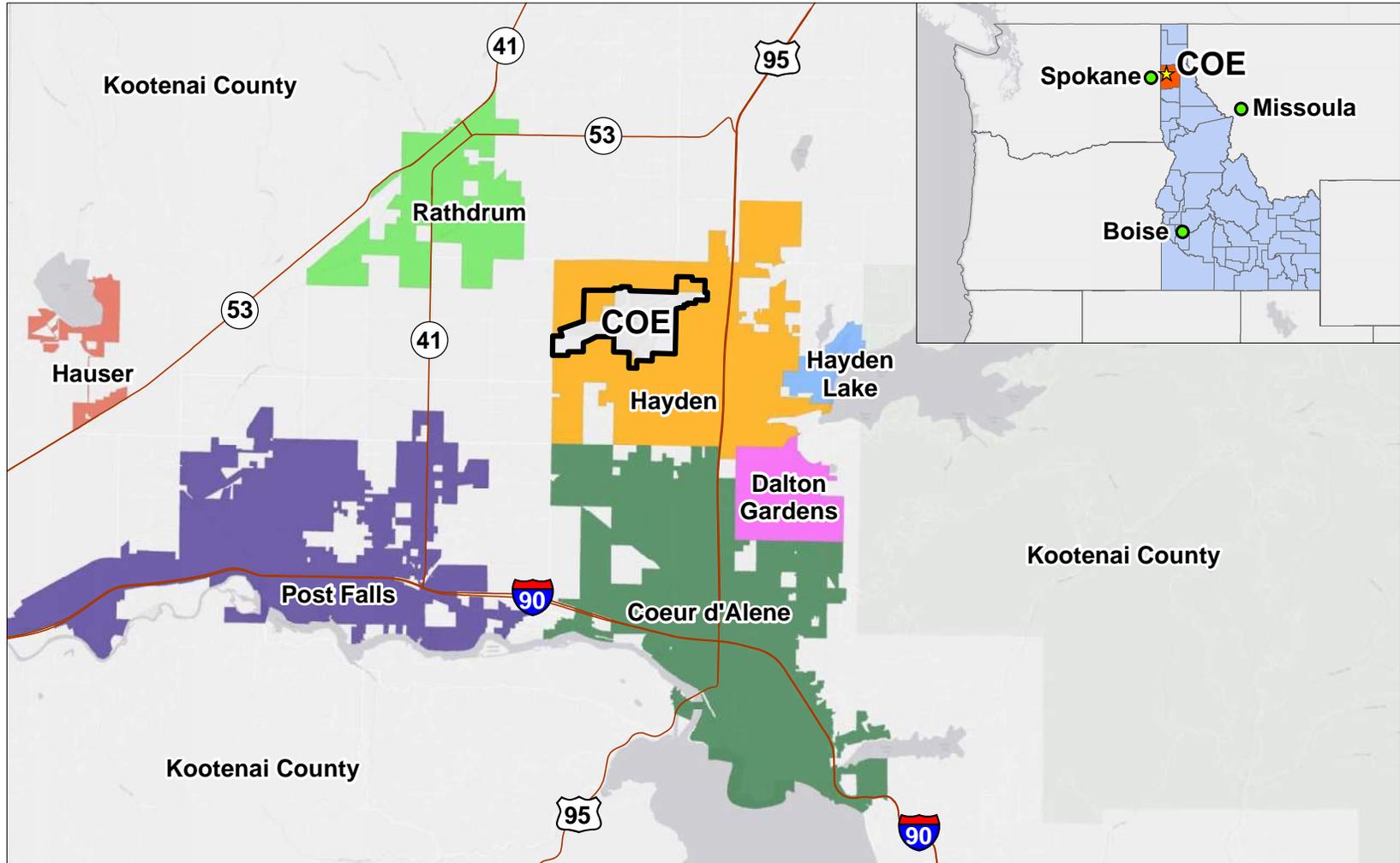
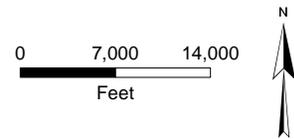


Exhibit 1-1 Airport Location



Airport Role

The Coeur d’Alene Airport provides the residents and businesses of Kootenai County and surrounding region access to the National Airspace System (NAS). The Airport connects people through aviation, much in the way roads and rail have historically done. The Airport serves the community as a point of connectivity to medical transport, forest firefighting, business, recreation, flight charter, and flight training. The Airport is an economic driver in the community, connecting people, and facilitating business ventures and relationships.

COE is certified by the FAA per the standards outlined in Title 14 of the Code of Federal Regulations Part 139. Part 139 Certification positions the Airport to accept operations of scheduled air carrier aircraft with more than nine seats, and unscheduled commercial aircraft with more than 30 seats. Part 139 airport requirements include standards for aircraft rescue and firefighting (ARFF) equipment, staff training and certifications, airfield lighting equipment, fueling facilities, runways, taxiways, and administrative records. COE is a Class IV airport, defined as “airports that serve only unscheduled operations of large [at least 31 seats] air carrier aircraft.” Because service by air carrier aircraft is infrequent, Class IV airports are considered to have “limited” Part 139 certificates.

COE is also part of the FAA’s National Plan of Integrated Airport Systems (NPIAS). NPIAS is an active inventory of U.S. aviation infrastructure assets, and it identifies airports that are significant to the national air transportation system. Airports identified as NPIAS qualified can receive federal funding assistance, typically under the FAA’s Airport Improvement Program (AIP) grant process. The NPIAS system is used by the FAA to estimate the amount of AIP funding needed for infrastructure development projects that will bring the airports up to current design standards.

On a state level, the Idaho Transportation Department – Aeronautics classifies COE as a Regional Business Airport that supports regional economic activities. COE connects to state and national economies and serves all types of general aviation aircraft. Coeur d’Alene is one of three northern Idaho airports with that designation, along with Sandpoint and Bonners Ferry.



Table 1-1: Airport Attributes

Airport Attributes	Description
Airport Owner	Kootenai County
FAA NPIAS Airport Classification	General Aviation
	Site Number: 04177. NPIAS # 16-0010
FAA Part 139 Certification	Class IV AU 12/2005
FAA Part 139 ARFF Index	Index A
FAA Airport Reference Code	C-III
Critical/Demanding Aircraft	Bombardier Q400 Turboprop
Idaho Transportation Department – Aeronautics Airport Category	Regional Business Airport
Airport Traffic Control Tower	None
Airport Property	1,148 Acres (Total Fee)
Navigational Aids	ILS, VOR/DME, NDB
Automated Weather Station	Automated Weather Observation Service (AWOS)
Communications	Approach/Departure Control (Spokane App/Dep)
	Remote Communications Outlet
(ILS) Instrument Landing System; (VOR) VHF Omni-directional Radio Range; (DME) Distance Measuring Equipment; (NDB) Non-Directional Beacon	

Coeur d’Alene Location and Transportation Network

The Airport connects to U.S. Highway 95, Hayden Avenue, Huetter Road, and Lancaster Road via surface streets Wyoming Avenue, Miles Avenue, Lacey Avenue, Ramsey Road, Atlas Road, and Airport Drive. There is wayfinding signage to the Airport from Highway 95, and there are multiple routes along surface streets to East Apron, South Apron, and North Apron. Navigation from highway 95 to the south and west sides of the Airport can be difficult or confusing because drivers must pass through residential neighborhoods. Access to the north apron for the ARFF and Maintenance facility is from Lancaster Road to Atlas Road. The Airport Administration Building is located on Sensor Avenue, and Airport Maintenance is located south of Wyoming Avenue. The local road network is shown in **Exhibit 1-2**.

Coeur d’Alene Property Map

The Airport area is 1,148 acres in unincorporated Kootenai County. The Airport is divided by the runways into Northside, north of Runway 6/24; Westside, southeast of Taxiway A; and Southside, south of Runway 6/24 and east of Taxiway D. The Airport is bordered by the City of Hayden, with residential and commercial districts from northeast to southwest. Rural and agricultural lands border the Airport from the west to northeast.



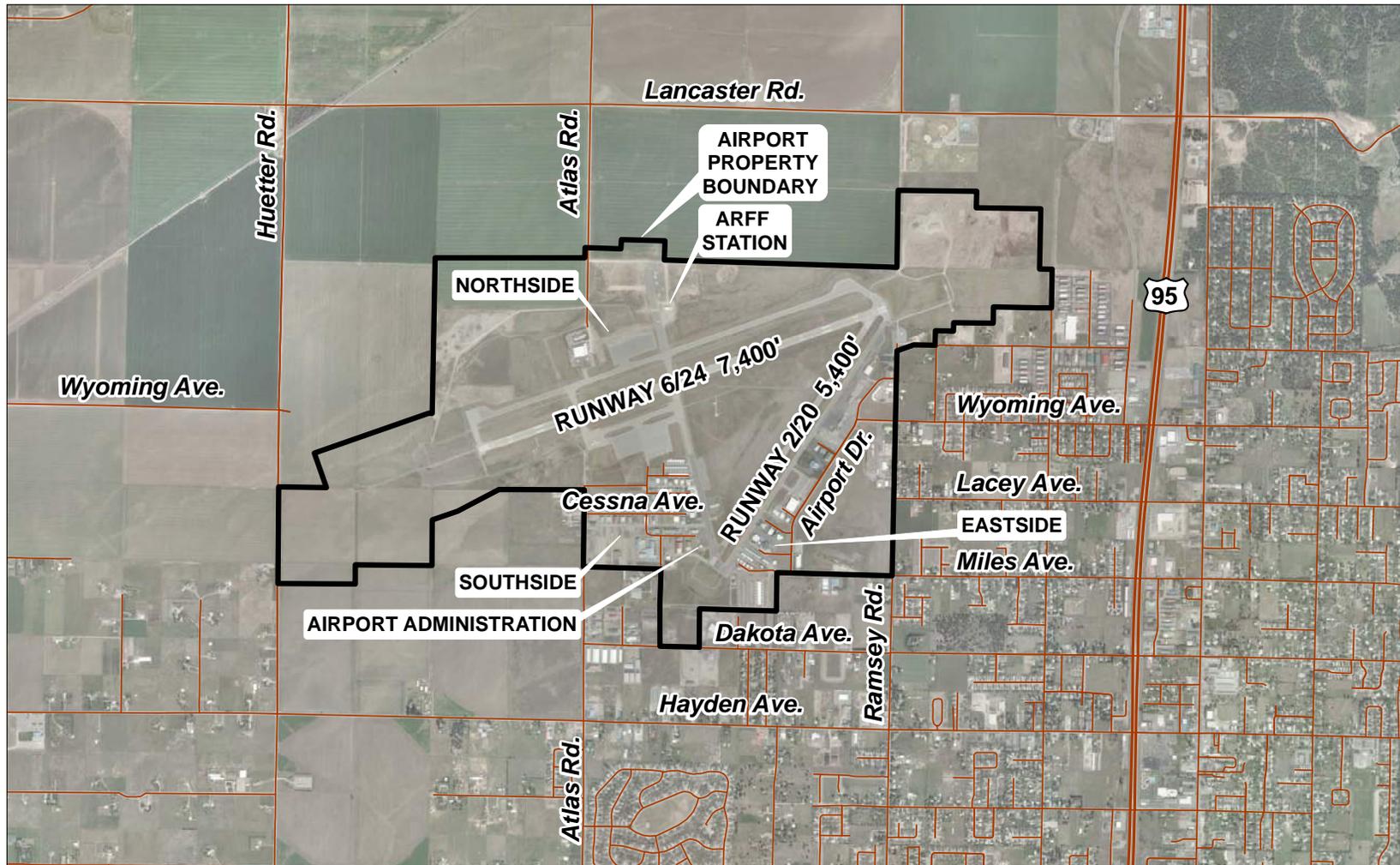


Exhibit 1-2 Airport Boundary and Road Network

0 1,500 3,000
Feet



Airport Facilities Map

The airport facilities map depicts the runway, taxiways, apron and supporting infrastructure for the Airport. The map is a snapshot of the Airport in 2017 and forms the basis for depicting layout configuration to meet existing and future criteria. The Airport has evolved from three runways to two runways over the years. A former crosswind runway, now Taxiway D, serves as the primary cross field connector for the south apron to Runway 6/24. The legacy of the previous runway configuration dictates where taxiways, aprons, and hangars exist today. Configuration of the Airport runways, taxiways, and aprons will continue to evolve as demands and requirements change. A role of this master plan is to evaluate standards compliance, safety, efficiency, and optimum layout to best serve the community and aviation users into the future. The airfield facilities are shown in **Exhibit 1-3**.

Operational Overview

Management

The Airport is owned by Kootenai County. The Board of County Commissioners (BOCC) is the governing body of Kootenai County. Consisting of three elected officials, the Board serves as the taxing authority, the contracting body, and the chief administrators of public funds. Among other duties, the Board enacts laws, ensures compliance of laws, and secures professional services for the County. The Airport Director, who reports to the BOCC, administrates the Airport. The Coeur d'Alene Airport Advisory Board makes recommendations to the Airport Director and BOCC on Airport matters.

The Airport employs operational staff responsible for maintenance, inspections, grounds keeping, and snow removal. Administrative staff handle property and facility leases, budgeting, records keeping, reporting, and airport business matters. The Airport Administration Building is located on Sensor Avenue, and Airport Maintenance is located south of Wyoming Avenue.



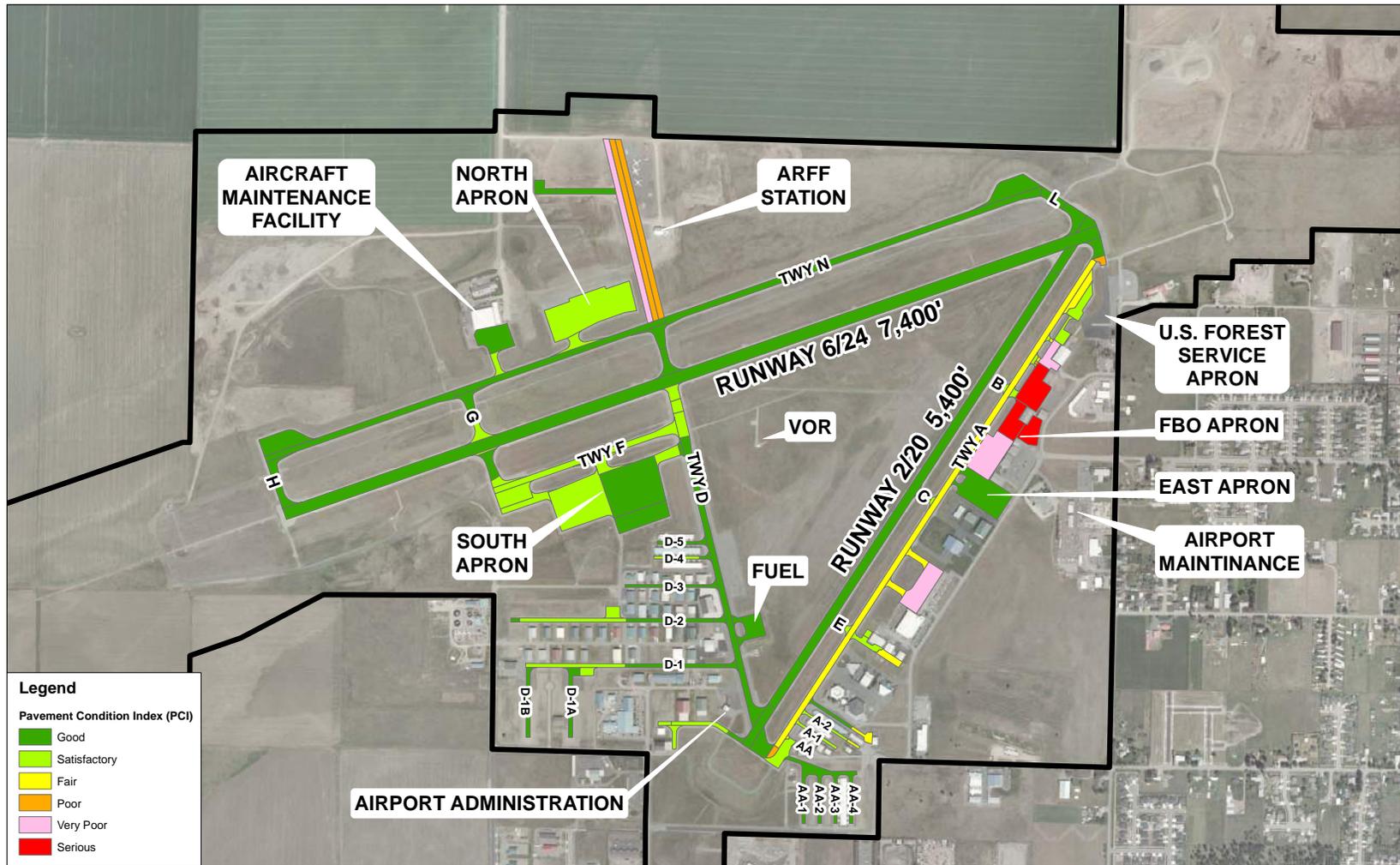
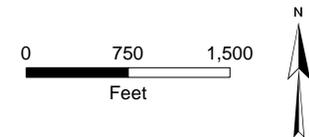


Exhibit 1-3 Airfield Facilities and Pavement Condition Index



AIRSIDE FACILITIES

“Airside” is a collective term for those areas of the Airport that are accessible to aircraft including runways, taxiways, aprons, and hangar areas. The Airport and the FAA continue to invest in the Airport’s facilities to maintain utility and function of the pavement surfaces and supporting infrastructure. Since the last Master Plan, the FAA AIP grants and local matches for runway, taxiway, and apron pavement projects have totaled \$6,553,500. Pavement projects included Taxilane AA development; Runway 2/20 and Taxiway D rehabilitation; Runway 6/24 pavement maintenance; Taxiway N pavement maintenance; and Taxilanes D1 – D5 rehabilitation. FAA AIP and local matching funds of \$1,506,200 provided for the construction of a new ARFF facility in 2011.

These facilities directly support aviation activity:

- ▶ Pavement: runways, taxiways, and aprons
- ▶ Structures: aircraft storage and maintenance hangars, fixed base operators (FBOs), fuel storage, snow removal equipment (SRE) storage, and an ARFF
- ▶ Navigation aids: airfield and approach lighting, weather monitoring systems, radio beacons
- ▶ Airfield signage and markings: indicators for precision and non-precision instrument runways
- ▶ Pilot and passenger support and services and administrative areas
- ▶ Safety areas: Property set aside to comply with FAA-mandated setbacks and clear zones

Runways, Navigational Aids, and Instrument Procedures

Runway Characteristics

Runway 6/24 is 7,400 feet long by 100 feet wide. The critical design aircraft for Runway 6/24 is the Dash 8 Q400 turboprop air carrier. Runway 6/24 is equipped with an Instrument Landing System (ILS), which allows aircraft to descend and land in ½-mile visibility and cloud ceilings as low as 200 feet above ground.

The crosswind runway 2/20, at 5,400 feet long by 75 feet wide, can accommodate large corporate aircraft such as the Dassault Falcon 900 and Citation X. **Exhibit 1-4** shows critical aircraft dimensions and characteristics. **Table 1-2** shows runway conditions, equipment, and characteristics.

Runway End 20 and Runway End 24 thresholds meet in the northeast corner of the Airport. The point of convergence is a concern for compliance with FAA design standards. Due to line of sight issues, and self-reporting communications at a non-towered airport, there is the potential for converging traffic to meet at the same point while operating simultaneously on the two runways,



and for aircraft to mistakenly enter one runway, thinking it is the other. Resolution to de-coupling the runway thresholds will be addressed in the facilities requirements and alternatives chapters of this Master Plan.

Table 1-2: Runway System

Facility Component	Runway 6/24		Runway 2/20	
	Runway End 6	Runway End 24	Runway End 2	Runway End 20
Runway Design Code (RDC)	C-III-2600		B-II-5400	
Taxiway Design Group (TDG)	Group 5		Group 3	
Critical Planning Aircraft	Q400		Falcon 900	
Runway Length x Width	7,400 x 100		5,400 x 75	
Runway Type	Primary		Crosswind	
Runway Shoulder Width	±20' Asphalt Width Varies		±12' Asphalt Width Varies	
Runway Blast Pad	None	None	150' x 200'	None
Pavement Surface Course	Asphalt (Grooved)		Asphalt (Grooved)	
Pavement Markings	Precision		Visual	
Distance-to-Go Markers	Yes	No	No	No
Pavement Strength – Pounds (Aircraft Gear Type)	57 (S); 95 (DWL); 165 (DTWL)		50 (S); 83 (DWL); 150 (DTWL)	
Runway Edge Lights	HIRL		MIRL	
Runway Lighting Systems	MALSR PAPI-4R	PAPI-4R	PAPI-2L, REIL	PAPI-2L, REIL
Runway Instrument Approaches	ILS, RNAV, LOC	Visual	VOR	Visual
Approach Minimums (Lowest)	1/2 Mile - 200' (A, B, C, D)	N/A	1-Mile/429'	N/A
			(A, B, C)	N/A
RUNWAY NAVIGATIONAL AIDS				
On-Airport	ILS, VOR/DME			
Off-Airport	RNAV			
(S) Single-Wheel Main Gear; (DME) Distance Measuring Equipment; (DWL) Dual-Wheel Landing gear; (DTWL) Dual-Tandem Wheel landing; (HIRL) High-Intensity Runway Lights (MIRL) Medium-Intensity Runway Lights (PAPI) Precision Approach Path Indicator; (2R) 2-box on left side of runway; (4R) 4-box on the right side;		(REIL) Runway End Identifier Lights (RNAV) Area Navigation – Typically GPS (LOC) Localizer (Provides course guidance on approach) (MALSR) Medium-Intensity Approach Light System with Runway Alignment Indicator Lights (VOR) VHF Omni-directional Radio Range		

Sources: ALP Drawings; Pavement strength obtained from 2016 FAA Form 5010-1, Airport Pavement Design.



Instrument Approaches

Instrument Approach Procedures (IAPs) consist of a series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight rules (IFR) conditions from the beginning of the initial approach to a landing, or to a point from which the landing can be made visually. IAPs are classified as *precision instrument*, with both horizontal and vertical guidance; *non-precision instrument*, with only horizontal guidance; and *visual*, without positional guidance.

COE has four non-precision IAPs: three into Runway End 6, and one into Runway End 2. Runway End 6 has the one precision IAP. The Very-High Frequency (VHF) Omni-directional Radio range/Distance Measuring Equipment (VOR/DME) approach to Runway End 2, is not aligned with the runway centerline. **Table 1-3** outlines the instrument approaches type, aircraft categories, minimum visibility, and minimum descent altitude for each approach. Aircraft Approach Category is based on approach speed and is the first letter in an aircraft's runway design code (RDC).

Table 1-3: Approach Details

Runway End	Procedure	Procedure Type	Aircraft Categories	Minimum Descent Altitude	Visibility Minimums (Statute Mile)	
6	ILS 6	Precision	A, B, C, D	2,490	1/2	
	LOC 6	Non-Precision	A, B	2,860	1/2	
	LOC 6	Non-Precision	C	2,860	1	
	LOC 6	Non-Precision	D	2,860	1 1/4	
	RNAV (GPS)	GPS		A, B, C, D	2,491	1/2
		LNAV/VNA		A, B, C, D	2,654	3/4
		LNAV MDA		A, B	2,740	1/2
		LNAV MDA		C, D	2,740	1
2	VOR/DME	Non-Precision	A, B	2,740	1	
		Non-Precision	C	2,740	1 1/2	
		Non-Precision	D	2,740	2	
	VOR	Non-Precision	A, B	3,180'	1	
		Non-Precision	C	3,180'	1 1/2	

(ILS) Instrument Landing System
(LOC) Localizer
(RNAV) Area Navigation
(GPS) Global Positioning System



Critical Aircraft Design Standards

The approach speed, wing span, and tail height of the critical aircraft determine its airport reference code (ARC). Classifications are shown in **Table 1-4**. The critical aircraft represents the most demanding aircraft with at least 500 annual operations. An *operation* is defined as either a takeoff or a landing. An aircraft that performs a touch and go counts as two operations, as it is a landing and a takeoff. Runway 6/24 critical aircraft is the Q400 turboprop, a C-III category aircraft. Runway 2/20 critical aircraft is the Falcon 900, a B-II category aircraft. Figure 1-1 and 1-2 provide examples of each aircraft type.

Table 1-4: Airport Reference Code Classifications

Approach Speed (A to E)	Wingspan (I to IV)
A: < 91 Knots	I: < 49'
B: '91 to < 121 Knots	II: 49' to < 79'
C: 121 to < 141 Knots	III: 79' to < 118'
D: 141 to < 166 Knots	IV: 118' to < 171'
E: >166 Knots	V: 171' to < 124'

Source: FAA AC 150/5300-13A

FIGURE 1-1: Q400



Aircraft Design Characteristics:

Aircraft Type:	Turboprop Transport
FAA ARC/TDG:	C-III; TDG 5
Approach Speed:	±121
Wingspan:	93'
Length:	107'-8"
Tail height:	27.4'
Maximum Weight:	65,200 Pounds
Seating Configuration	70 to 76 Passengers
Wheel Base:	45'- 10"
Main Gear Width:	31'-3"

FIGURE 1-2: Falcon 900



Aircraft Design Characteristics:

Aircraft Type:	Turbine Corporate
FAA ARC/TDG:	B-II; TDG 3
Approach Speed:	±100
Wingspan:	63'
Length:	66'
Tail height:	24.75'
Maximum Weight:	49,000 Pounds
Seating Configuration	12-14
Wheel Base:	25'-11"
Main Gear Width:	14'-7"

The ARC of the critical aircraft is used to set the design standards for the Airport. The design standards include safety areas, object free areas, runway protection zones, and runway setbacks for taxiways and other airport facilities. **Exhibit 1-4** shows the runway design surfaces for COE.



Airfield Design Standards

The Airport is required to maintain facilities in line with FAA standards as part of an agreement for accepting FAA grant money. FAA design standards for runways are determined by the FAA coding system called the RDC, shown in **Table 1-4**. The RDC is made up of the aircraft approach category (AAC), the airplane design group (ADG), and the runway approach visibility minimums. The most demanding AAC and ADG at an airport sets the ARC. The FAA codes taxiways using a standard called the Taxiway Design Group (TDG).

Runway Classification and Design

The design aircraft is an aircraft that uses an airport on a regular basis, which the FAA defines as more than 500 operations per year. The Bombardier Q400 is the existing critical aircraft as identified on the 2012 Airport Layout Plan. This aircraft is used commercially by Alaska Airlines; however, it does not serve COE in revenue service. Empire Aerospace performs maintenance work on the Q400 through a contract with Alaska Airlines, which causes it to visit the Airport. The Q400 has an approach speed of 120 knots, a wingspan of 93.3 feet, and tail height 27.4 feet. The Q400 is classified as a C-III aircraft.

The critical aircraft will be reevaluated as part of the Master Plan. Airfield design decisions are driven by the requirements of the critical aircraft; therefore, it is key that the Master Plan reflect the most up-to-date information available. Operations by aircraft type will be assessed by field collection, review of FAA flight plans and radar tracks, and consultation with airport staff and users. This information will be presented in **Chapter 2**.

Runway Design Code (RDC)

The FAA coding system comprised of three standards that determine the ARC: the Aircraft Approach Category, Airplane Design Group, and Approach Visibility Minimums.

Aircraft Approach Category (AAC)

This first standard is based on the approach speed (in knots) of the design aircraft.

Airplane Design Group (ADG)

This second standard is based on the wingspan and the tail height (in feet) of the design aircraft.

Approach Visibility Minimums

These are based on runway visual range (RVR), the approximate visibility (in feet) as measured by the RVR light transmission/reception equipment or equivalent weather observer report measurements. The depicted numerical value for RVR relates to runway visibility minimums represented in feet or forward visibility that have statute mile equivalents (4000 RVR = ¾ mile).



Runway Safety Areas

The FAA defines the Runway Safety Area (RSA) as a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft in the event of an aircraft undershoot, overshoot, or excursion from the runway. The runways at the Airport each have different RSA design standards. Runway 6/24 is designed to C-III standards, which is the ARC and the standard needed for commercial aircraft such as the Q400. Runway 2/20 is designed to B-II standards, suitable for handling aircraft with slower approach speeds. **Table 1-5** and **Exhibit 1-4** depict RSA dimensions.

Table 1-5: Runway Safety Areas

	6/24	2/20
Runway Design Standard	C-III	B-II
Width	500'	150'
Length	9,400	6,000
Length Beyond Runway Ends	1,000'	300'

Runway Protection Zones

The Runway Protection Zone (RPZ) is a trapezoidal area off the end of the runway. This area is designated to enhance safety for aircraft operations and for people and objects on the ground. The FAA recommends that incompatible land uses, objects, and activities be located outside of the RPZ. The FAA has issued a Memo titled *Interim Guidance on Land Uses Within a Runway Protection Zone* to help airport sponsors understand what land uses are and are not compatible within the RPZ. The FAA recommends that an airport operator maintain full control of an RPZ, ideally through fee simple property acquisition. If this is not feasible, land use control may be achieved by means of easements.

Runway Protection Zone (RPZ):

A trapezoid-shaped area off the end of each runway defined by the FAA as a zone to enhance the protection of people and property on the ground.

Table 1-6: Runway Protection Zone Dimensions for Runway Ends

Runway	Length (feet)	Inner Width (feet)	Outer Width (feet)
6	2,500'	1,000'	1750'
24	1,700'	500'	1,010'
2	1,000'	500'	700'
20	1,000'	500'	700'

Exhibit 1-4: Runway Design Surfaces



Non-Standard Conditions

There are two existing non-standard conditions at COE. The runway centerline to taxiway centerline between Runway 2/20 and Taxiway A are 225 feet apart, 15 feet closer than standard. The runway hold positions and signs on Runway 2/20 are at 125 feet rather than the required 200 feet. The following are known considerations for complying with the design standard.

- ▶ There is a lack of apron space along Taxiway A. Addressing the separation by moving Taxiway A away from Runway 2/20 would further reduce available space.
- ▶ Moving Runway 2/20 to the west could meet the design criteria; however, a 15-foot move will not address the intersection of Runway End 20 and Runway End 24.
- ▶ Movement of Runway 2/20 to the west by more than 15 feet to meet the runway/taxiway separation requirements and de-couple Runway End 20 and Runway End 24 requires an analysis of required runway length, runway safety and object free areas, runway protection zones, and instrument approach procedures.

Solutions to these non-standard conditions will be addressed in the improvement alternatives section of the Master Plan.

Electronic Navigational Aids

Navigational aids (NAVAIDs) provide guidance and positional information to aircraft. NAVAIDs can be airborne or located on the ground, and visual or electronic. NAVAIDs include lighting systems, radio beacons, signage, global positioning system (GPS) satellites, and pavement markings. NAVAIDs can transmit weather and airport operational information to aircraft enroute and allow pilots to operate in periods of reduced visibility.

The ILS has two components that work in tandem to provide precision instrument approach guidance to Runway End 6. The localizer antenna (LOC) is installed beyond the end of Runway End 24 and provides final course guidance. The glideslope is installed near Runway End 6 and provides vertical guidance on the descent path. COE is equipped with an automated weather observation system (AWOS), an on-airport VOR, a rotating light beacon, and wind indicators. The VOR is owned by the FAA and serves as guidance for a non-precision approach (no vertical guidance) to Runway End 2. The VOR also serves as a navigational fix for aircraft enroute along low altitude airways.



Taxiways and Taxilanes

The Airport has parallel taxiways for both runways. Taxiway N parallels Runway 6/24, and Taxiway A parallels Runway 2/20. Taxiway D is the primary cross-field taxiway. Connector Taxiway H provides access to Runway 6, and Taxiway L provides access to Runway 24. A network of taxilanes provides access between aprons, hangars, and tie-downs, and the taxiway and runway system. Taxiway widths are presented in **Table 1-7**.

Taxiway Design and Standards

The TDG determines taxiway design standards. The TDG relates to the undercarriage dimensions of aircraft, based on the overall Main Gear Width and the Cockpit to Main Gear Distance. TDG also determines the taxiway edge safety margin and shoulder width of taxiways. Taxiway protection is determined by the ADG of the critical design aircraft. The ADG of an aircraft determines the taxiway protection areas, taxiway separation, and required wingtip clearance for aircraft using the taxiways.

Aprons

The Airport has three apron areas: General Aviation North Apron, General Aviation South Apron, and the US Forest Service (USFS) Apron. The aprons serve the landside facilities including the general aviation hangar facilities and FBOs, cargo facilities, and the USFS. The Airport's aprons locations, sizes, and surface pavements are listed in **Table 1-8** and **Table 1-9**.



Table 1-7: Taxiway System

TAXIWAY SYSTEM				
Taxiway Segment	TWY A	TWY B	TWY C	TWY D
Type	Crosswind Parallel	Exit/Connector	Exit/Connector	Exit/Connector /Crossfield
Dimension (Length x Width)	5,420' x 50'	160 x 40'	160' x 40'	3,420' x 50'
Taxiway Design Group (TDG)	3 to 5	3	3	3
Paved Shoulder Width	12'	12'	12'	50'
Pavement Surface Course	Asphalt	Asphalt	Asphalt	Asphalt
Edge Lighting	MITL	MITL	MITL	MITL
Pavement Strength (Gear Type)	57,000# (S) 95,000# (DWL)	57,000# (S) 95,000# (DWL)	57,000# (S) 95,000# (DWL)	57,000# (S) 95,000# (DWL)
Runway-Taxiway CL Separation	225'	--	--	--
Hold Short Separation	125' (200' std)	125' (200' std)	125' (200' std)	125' (200' std)
Taxiway Segment	TWY E	TWY F	TWY G	TWY H
Type	Exit/Connector	Exit/Connector	Exit/Connector	Connector
Dimension (Length x Width)	160' x 40'	1,550' x 50'	800' x 50'-65'	420' x 55'
Taxiway Design Group (TDG)	3	5	5	3
Paved Shoulder Width	12'	20'	15' - 20'	20'
Pavement Surface Course	Asphalt	Asphalt	Asphalt	Asphalt
Edge Lighting	MITL	MITL	MITL	MITL
Pavement Strength (Gear Type)	57,000# (S) 95,000# (DWL)	57,000# (S) 95,000# (DWL)	57,000# (S) 95,000# (DWL)	57,000# (S) 95,000# (DWL)
Runway-Taxiway CL Separation	--	400'	--	--
Hold Short Separation	125' (200' std)	250'	--	250'
Taxiway Segment	TWY L	TWY N	--	--
Type	Entrance	Primary Parallel	--	--
Dimension (Length x Width)	450' x 70'	7,085' x 50'	--	--
Runway Design Code (RDC)	C-III	B-II	--	--
Taxiway Design Group (TDG)	5	3	--	--
Paved Shoulder Width	20'	20'	--	--
Pavement Surface Course	Asphalt	Asphalt	--	--
Edge Lighting	MITL	MITL/Reflectors	--	--
Pavement Strength (Gear Type)	57,000# (S) 95,000# (DWL)	57,000# (S) 95,000# (DWL)	--	--
Runway-Taxiway CL Separation	--	500'	--	--
Hold Short Separation	250'	125'	--	--
Taxiway Signs	Yes	No	--	--

(S) Single wheel Main Gear; **(DWL)** Dual Wheel Main Gear; **(MITL)** Medium Intensity Taxiway Light



Table 1-8: General Aviation – County-Owned Aprons

Location	Function	Area(SF)	Surface	Parking Spaces
South of Runway 6/24, West of Taxiway D	Based and Transient Parking; Aircraft Maneuvering; Access to T-Hangars	300,000	Asphalt	25 Tie-Downs
North of Runway 6/24, West of ARFF Station	Transient Parking	205,000	Asphalt	No marked parking
East of Runway 2/20, either side of FBO	Tie-down space	155,000	Asphalt	45 Tie-downs
TOTAL	--	660,000	--	70 Tie-Downs

Table 1-9: General Aviation - Other/Tenant/Private Use Aprons

Name	Function	Area(SF)	Surface	Parking Spaces
Resort Aviation	Aircraft parking and fueling	70,000	Asphalt	Transient parking
USFS/Firefighting (USFS)	Parking and Staging	115,000	Asphalt	Helicopter and fixed wing parking
Empire Airlines	Private Business	45,000	Asphalt	No marked parking
Southfield Fuel	Private Business	35,000	Asphalt	No marked parking
TOTAL	--	265,000	--	--



Airspace

The Airport is in controlled Class E airspace, bordered by uncontrolled Class G airspace. The airspace is configured to contain instrument flight procedures at non-towered facilities. The Class E control zone airspace extends outward beyond the runway ends to accommodate instrument approach and departure procedures. Air traffic control services within the Airport vicinity are provided by the Spokane Approach and Departure Control, Seattle Air Route Traffic Control Center, and with the Seattle Flight Service Station providing flight planning and advisory services. **Exhibit 1-6** depicts the various types of airspace classified by the FAA and **Exhibit 1-5** shows the aeronautical chart for the surrounding airspace structure, navigational routes, and public use airports.

Exhibit 1-5: Class E Airspace at COE

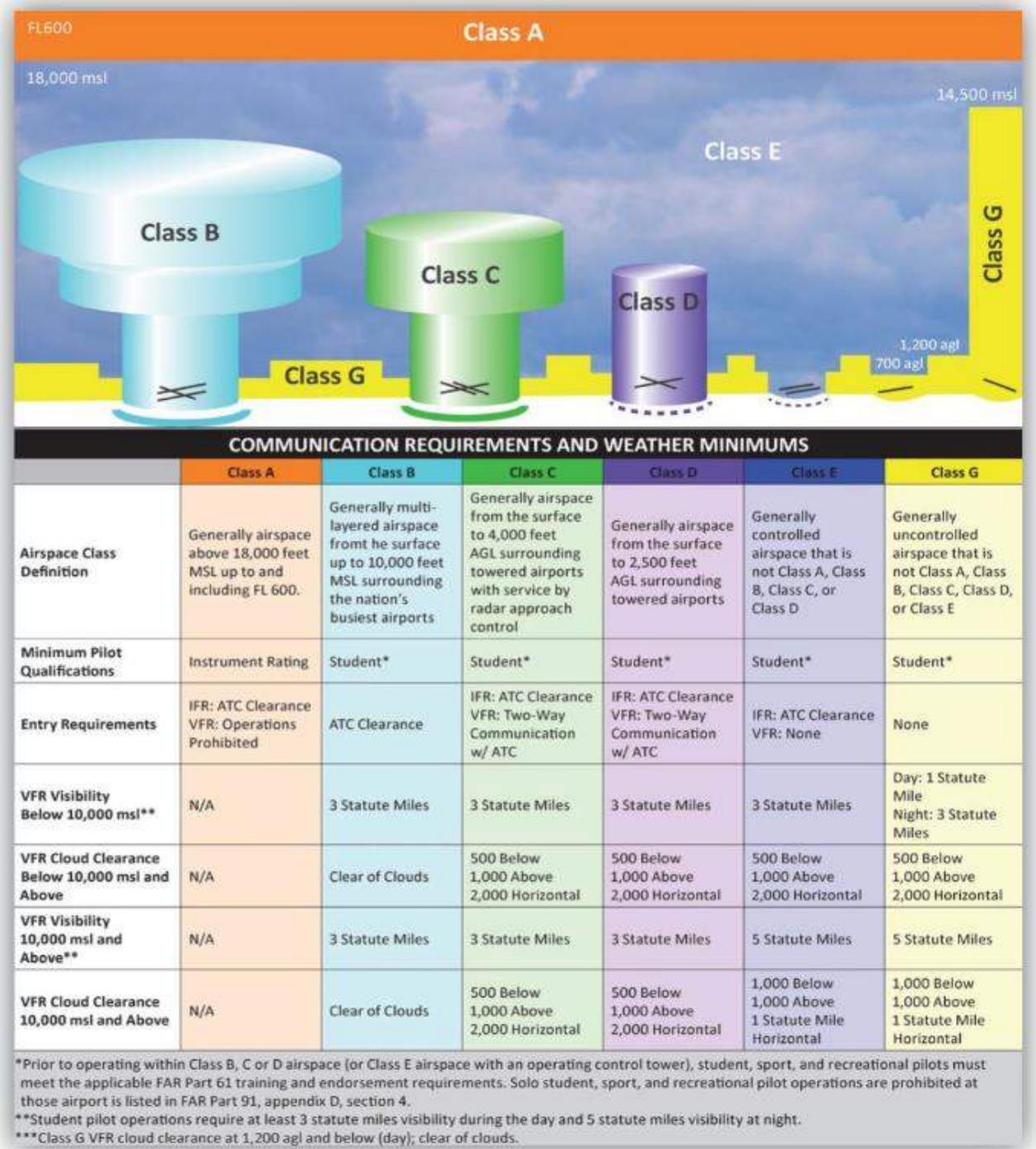


Source: FAA Sectional

The surrounding airspace does not contain designated restricted or special-use airspace, other than traffic patterns reserved for nearby public and private airports. The COE VOR Station provides multiple civilian airway routes for visual and low-level instrument flight conditions and supports the Runway 2 VOR/DME instrument approach and missed approach procedures.



Exhibit 1-6: Airspace Classification Diagram



Source: Federal Aviation Administration



Hangar Building Plan

Fixed Base Operators

COE offers one full-service FBO. Resort Aviation provides pilot services, aircraft maintenance, hangar and tie down space and fuel delivery. Southfield Fuel provides Jet-A and 100 low-lead (LL) fuel, maintenance, and oxygen. Action Flying Service runs a flight training facility located on the East side of the airfield but does not operate as an FBO. Fuel capacity is presented in **Table 1-10**.

Table 1-10: Fuel Delivery and Storage Capacity

Fuel Delivery and Storage Capacity			
Company	Vessel Type	Fuel Type	Number & Capacity
Resort Aviation	Tank	100LL	One at 12,000 gallons One at 4,000 gallons
	Truck	100LL	One at 1,200 gallons
	Tank	Jet-A	One at 30,000 gallons
	Truck	Jet-A	Two at 3,000 gallons
Southfield Fuel	Tank	100LL	One at 15,000 gallons
	Truck	100LL	One at 2,200 gallons One at 1,600 gallons
	Tank	Jet-A	One at 15,000 gallons
	Truck	Jet-A	One at 4,000 gallons One at 2,500 gallons
Annual Fuel Volume Sales (5-Year Average)			Annual Fuel Volume Sales (2016)
Jet-A	747,743 gallons		763,252 gallons
100LL	81,381 gallons		82,778 gallons
Jet A, also known as “jet fuel,” is used by turbine engines in business jets, turbo-props, and some helicopters. 100LL, also known as “low lead” or “av-gas,” is used by piston engines in single- and multi-engine propeller planes and some helicopters. Five-year average is for period ending December 31, 2016.			



Based Aircraft

Based aircraft are those that are stored in hangars and tie downs at COE and not at other airports. The Airport's 2016 master record indicates that there are 280 aircraft based at COE. Single-engine pistons are the most common aircraft type, making up 84 percent of the fleet. Multi-engine pistons make up six percent of the fleet, and business

Table 1-11: Based Aircraft

Based Aircraft	Number	Percent
Single-engine piston	235	84%
Multi-engine piston	18	6%
Jet and Turbo props	11	4%
Helicopters	14	5%
Gliders	1	<1%
Ultra lights	1	<1%
TOTAL	280	100%

Source: 2016 FAA 5010 Master Record

jets and turbo props make up four percent of the fleet. Helicopters are five percent of the fleet. Based aircraft generally park in hangars, and the types of based aircraft stored at the Airport will influence aircraft parking and storage alternative design. Based aircraft are shown in **Table 1-11**.

Aircraft Rescue and Firefighting

ARFF requirements are determined by an airport's ARFF Index, as defined by Part 139. COE is an ARFF Index A airport. ARFF standards require the Airport to own one vehicle with at least 500 pounds of sodium-based dry chemical for fighting metal fires, or 450 pounds of potassium-based dry chemical and 100 gallons of water proportioned with Aqueous Film Forming Foam (AFFF) to create an oxygen barrier on aviation fuel fires. ARFF is staffed as-needed by the Airport's operations staff with a 48-hour Prior Permission Required (PPR) notification for aircraft over 90 feet in length. The Airport has one fire vehicle, a 2001 E-One Titan 4X4. The vehicle has a 1,500-gallon water tank, and 200 gallons of AFFF capacity, meeting ARFF Index A requirements.

The Airport completed construction of a new ARFF facility in 2011, located adjacent to Taxiway D, north of Runway 6/24. The project included a 5,000-square-foot building consisting of two vehicle parking bays; a 92,500-square-foot paved approach to the building; extension of water, sewer, and utilities; and storm drainage structures.



Table 1-12: Airport Equipment

Item #	Vehicle	Year	Stored Inside or Outside
Snow Removal			
1	John Deere 644K 4WD 4.25 yard Loader /18' plow	2010	Inside
2	John Deere 624H 4WD 3.25 yard Loader /18' plow	1998	Inside
3	Oshkosh HB-2518-MP3 Snow Blower	1992	Inside
4	Schmidt CDRB 48/HDC 350 Snow Blower	1991	Inside
5	Oshkosh/Sweepster H-2723B 18' Broom	2001	Inside ARFF
6	Oshkosh/Sweepster HB-2518 MP3 18' Broom	1992	Outside
7	108" Cutting Edge Snow Plow Blade		Outside
8	International 1954 5-yard Dump Truck /11' plow	1984	Inside
9	International 1954 5-yard Dump Truck /12' plow	1983	Inside
10	Chevy CD-30903 1-ton truck w/Hiniker V Plow		Outside
Airfield Maintenance – Machinery			
11	John Deere 650G Dozer with Blade	1993	Outside
12	John Deere 770-BH Motor Grader w/Wing	1986	Outside
13	Champion 740 Motor Grader w/Wing	1979	Outside
14	Forklift		Inside
15	Forklift		Inside
16	Trailer		Outside
17	Crane		Outside
Airfield Maintenance – Accessories			
18	18' Ramp Plow	2010	Outside
19	12' Snow Basket	2010	Outside
20	12' Snow Basket	1998	Outside
21	Monroe 8-Yard Snow Basket		Outside
22	Kodiak Loader Mounted Snow Blower		Outside
23	One-Tone Urea Spreader	1985	Outside
24	Skidsteer L-190 Bucket	2008	Outside
ARFF			
1	2001 E-1 Titan	ARFF	Inside

Source: Airport Operations Records

Snow Removal Equipment

The Airport is required to prepare, maintain, and carry out a snow and ice control plan as part of its Part 139 certification. The prompt removal or control of snow and ice on movement areas must be as complete as soon as practicable. The FAA Advisory Circular (AC) 150/5200-30D for airfield condition assessments and winter operations safety bases SRE requirements on two parameters: the square footage of priority paved area, and the Airport's service classification. These parameters are used to determine the type and numbers of runway brooms, solid material spreaders, and liquid material spreaders.



COE is required to have the SRE capacity to clear priority areas (main runway and supporting taxiways) within two hours of snow removal operations commencing. The FAA AC 150/5200-30D states that non-commercial service airports with over 10,000 operations and at least 15 inches of annual snowfall should have, as a minimum, one high-speed rotary plow (snow blower) supported by two snow plows of equal snow removal capacity. COE experiences an average of 45.8" of snowfall per year. See **Table 1-14** for additional climate data.

Security Fencing and Gates

Airfield access is controlled by 21 electric gates, and 20 manual gates. The Airport has a fence that secures aviation areas to the north, south, and east. Fencing is not complete around the Airport on the northwest and west sides of the airfield. Airport certification manual requirement under Part 139.335 for public protection stipulates that safeguards must be in place to prevent inadvertent entry to the movement area by unauthorized persons or vehicles and reasonable protection of persons and property from aircraft blast. Fences control wildlife access to the airport and serve to mitigate aircraft strikes by larger animals such as deer and coyotes. Currently, access can be gained from public roads to airport movement area surfaces. Fencing layout and plans will be addressed further in facility requirements and alternatives chapters. The Airport fencing is shown in **Exhibit 1-7**.



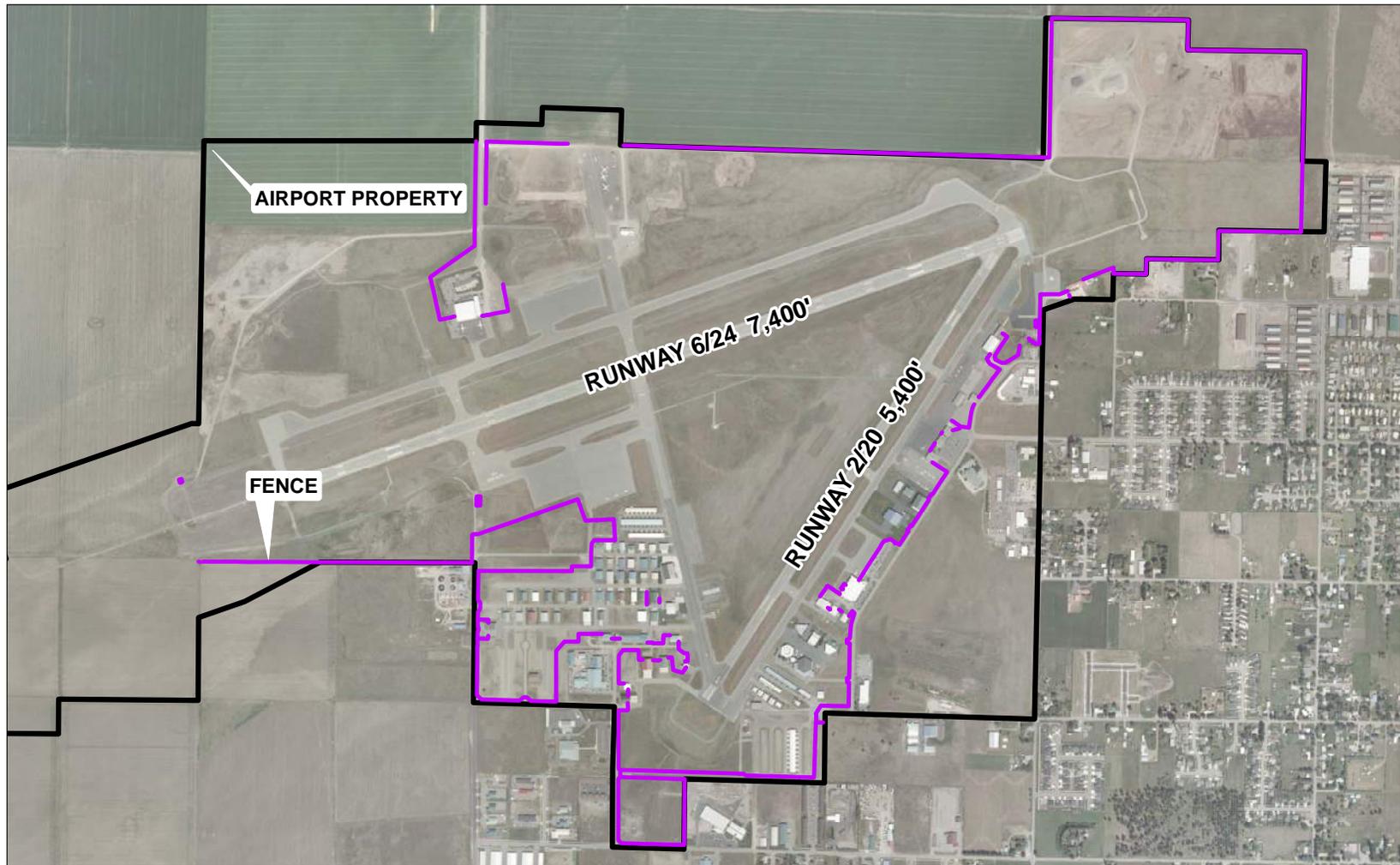
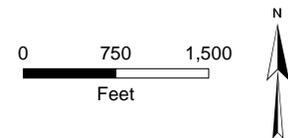


Exhibit 1-7 Airport Fencing



Aeronautical Setting

This section describes the aeronautical setting surrounding the Airport, including details about neighboring airports and their facilities. The COE aviation activity is affected by other airports in the region, and a healthy aviation market offers users choice, competition, and specialty services. By identifying the mutually supportive and competitive forces in the local aviation market, the Airport can focus development and build a sustainable future and meet the needs of airport tenants and visitors.

Commercial Airports

Spokane International Airport (GEG)

GEG is located 30 miles to the west of Coeur d’Alene in Washington State and represents the largest commercial service airport in the region. GEG offers domestic and international flights served by Alaska, Delta, United, American, and Southwest Airlines. GEG Runway 3/21 is 11,002 feet by 150 feet, served by ILS approaches to each runway end. Runway 7/25 is 8,199 feet by 150 feet and has non-precision RNAV approaches to each end. The Airport has general aviation traffic with fuel and hangar services provided by Signature Flight Support FBO.

Regional Airports

Felts Field (SFF)

SFF is 21 miles to the west of the Airport and has two parallel runways. The primary runway is 4L/22R, a 4,499-foot by 150-foot runway, served by an ILS. Runway 4R/22L is 2,650 feet by 75 feet and does not have an instrument approach. There are 176 based aircraft and offers 100LL and Jet-A fuel. Aviation services include major airframe and powerplant maintenance, aircraft parking, and bottled oxygen.

The Idaho Transportation Department – Aeronautics classifies two other airports in North Idaho as regional business airports. This includes Sandpoint Airport (SZT) 33 miles to the north, and Boundary County Airport (65S) in Bonners Ferry, 61 miles to the northwest. Unlike COE, these airports do not have straight-in instrument approach procedures. The runways at each are shorter than at COE.

Brooks Seaplane Base at Lake Coeur d’Alene is Kootenai County’s other public access airport but serves amphibian and seaplane aircraft that require water access. There are eight smaller private airfields in Kootenai County that are open to public use but require prior permission to use.

Nearby public airports serving local communities include Priest River (1S6), Magee (S77), Shoshone County (S83) to the east, and St. Maries (S72) in Benewah County to the south.

Exhibit 1-8 shows the locations and geographic information.



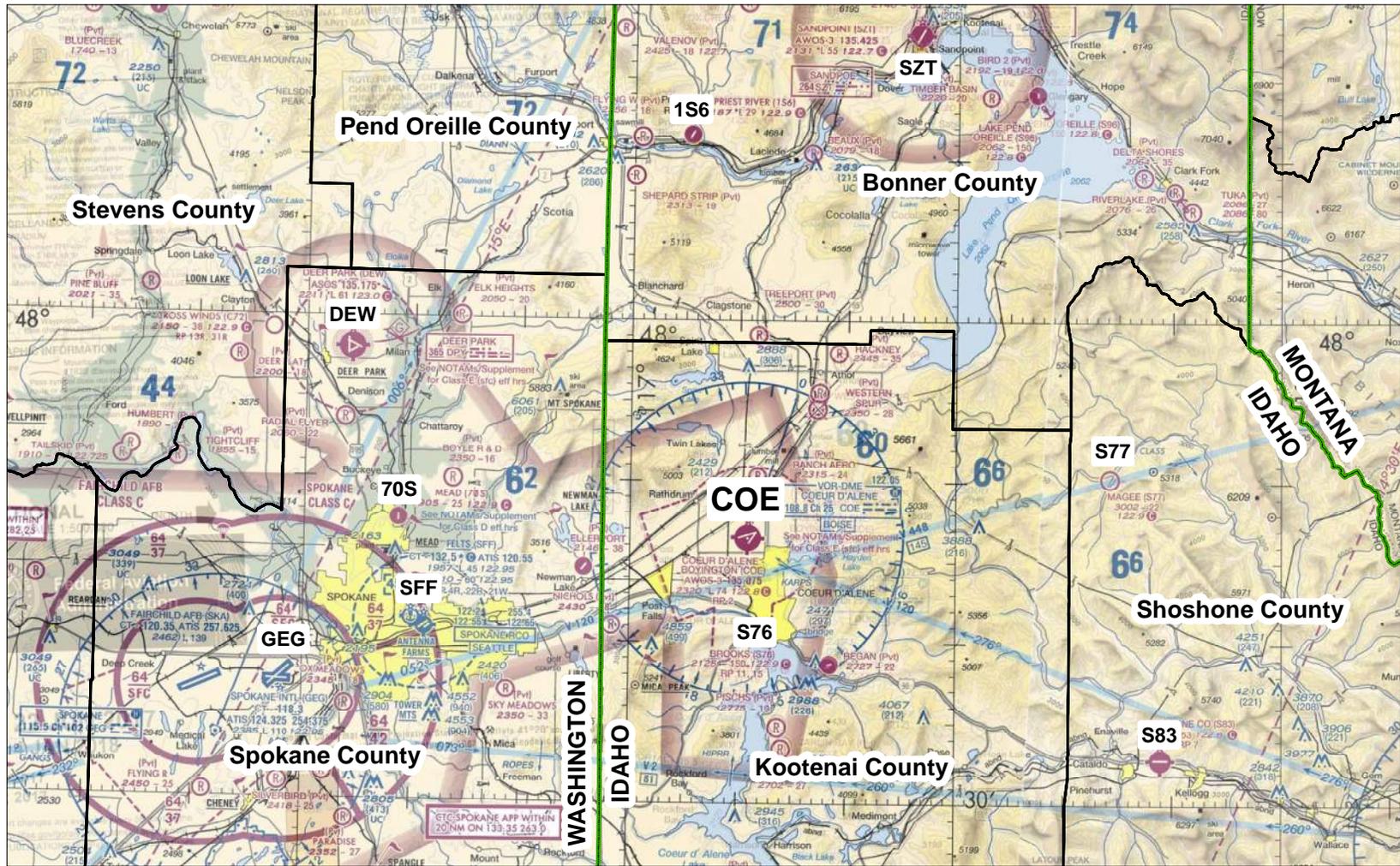


Exhibit 1-8 Regional Airports

Environmental

This section identifies key environmental considerations pertaining to the operation and improvements of the Airport. Environmentally sensitive areas identified during the inventory will be used to screen future development for the Airport.

Threatened and Endangered Species

The U.S. Fish and Wildlife Service (USFWS) and the Idaho Department of Fish and Game work jointly on conservation efforts for threatened and endangered species. In 2015, the USFWS identified seven threatened species within Kootenai County, listed in **Table 1-13**, but none of these species or their habitat has been documented as occurring on airport property.

Table 1-13: Threatened and Endangered Species

Mammals, Birds, Fish
Gray Wolf (<i>Canis lupus</i>)
Canadian Lynx (<i>Lynx canadensis</i>)
North American wolverine (<i>Gulo gulo luscus</i>)
Spalding's Catchfly (<i>Silene Spaldingii</i>)
Yellow-billed Cuckoo (<i>Coccyzus americanus</i>)
Bell Trout (<i>Salvelinus confluentus</i>)
Plants
Water Howellia (<i>Howellia aquatilis</i>)

Floodplains

Flood insurance rate maps provided by the Federal Emergency Management Agency (FEMA) indicate that the Airport does not lie on a floodplain. The Airport lies in an area of “minimal flood hazards.” Future development is not expected to be affected by 100-year floodplains.

Wetlands and Navigable Waters

Provisions in the Clean Water Act of 1972, as amended, that pertain to navigable waters of the U.S. are enforced by the USACE. Airport improvement projects that occur in, or impact, navigable waters or connected wetland areas require USACE consultation and permitting. Airport environmental documents do not identify wetlands and navigable waters occurring on Airport property.

Executive Order 11990, Protection of Wetlands, 1977, proposes to “minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.” FEMA prepares the implementation of the protection of wetlands to minimize the impact of potential danger. Wetlands are important to preserve and to maximize the services and functions of the wildlife habitat, maintain water flow, and improve water quality. According to the National Wetlands Inventory, there are no wetlands and deep-water habitats within one mile of the Airport.



Farmland

Pursuant to the Farmland Protection Policy Act of 1981, as amended, the U.S. Department of Agriculture Natural Resources Conservation Service (NCRS) reviews federal actions that convert undeveloped or agricultural land that is considered prime, unique, or of statewide or local importance into non-agricultural use. The NCRS soil survey classifies the soil on and around the Airport as Avonville Fine Gravelly Silt Loam, which is considered prime farmland if irrigated. Airport improvement projects that involve conversion of farmland to non-agricultural use may require coordination with the NCRS.

Water Quality

COE is located above the Rathdrum Prairie Aquifer, which the Idaho Department of Environmental Quality identifies as the primary water supply for Kootenai County. The Rathdrum Prairie Aquifer extends into the Washington border and becomes part of the larger Rathdrum-Spokane Aquifer, which supplies the drinking water for Kootenai County and Spokane County. Stormwater runoff contaminated with materials associated with Airport operations, leaks, and spills can potentially seep into the aquifer, contaminating the water. Stormwater is not treated at a treatment plant before it directly flows into the surrounding bodies of water. The Hayden Area Regional Wastewater Treatment plant handles the sewage system.

Wildlife Hazard Assessment

The Airport completed a 12-month long wildlife hazard site assessment consisting of field surveys and data collection. Following completion of the site assessment a Wildlife Hazard Management Plan (WHMP) was developed by the Airport. The WHMP identified wildlife attractants within critical zones for wildlife hazards; outlined wildlife hazard management measures; and identified the protocol for monitoring, documenting, and reporting potential wildlife hazards, implementing procedures, and reporting wildlife strikes to the FAA. The purpose for the Wildlife Hazard Assessment and Management Plan is to reduce the risk of conflicts and strikes with aircraft operations and is not equivalent to an assessment of threatened or endangered species on the airport.

Weather and Climate

Weather characteristics affect aircraft performance, which influences airport operations and runway design considerations. The on-airport AWOS provides hourly and special weather condition data for pilots. The weather data is also collected by the National Oceanic and Atmospheric Administration (NOAA). NOAA provides the historical climatic data in which the key weather events are temperature, precipitation, winds, visibility, and cloud ceiling heights. This climatic data is used to assess aircraft operating conditions and airport facility and equipment needs.



Kootenai County has mild, dry summers and cool winters. Most precipitation falls between November and March, with a drier period between July and September. The area receives snow as early as October, with most falling between November and January. The Western Regional Climate Center reports an average on-the-ground snow depth of five inches in January. **Table 1-14** provides additional climatic data for annual temperature, precipitation, and sky conditions.

Table 1-14: COE Climate Data

Climate Event	Climate Description	Value
Temperature	Average Annual Maximum	59°
	Average Annual Minimum	36.9°
	Hottest Month	July
	Highest Extreme Temperature (Month)	108°F (August)
	Average Annual Days Above 65°F	139
	Average Annual Days Above 90°F	18
Precipitation	Average Annual Precipitation	25.33"
	Maximum Average Monthly Precipitation	3.61" (December)
	Average Total Snowfall	45.8"
	Average Maximum Snowfall Month	12.6" (December)
Sky Conditions	Visual Flight Rule (VFR) Conditions	88.2%
	Instrument Flight Rule (IFR) Conditions	9.3%
	Low Instrument Flight Rule (IFR) Conditions	2.9%
	Days with Fog	101
	Days with Thunderstorms	11

Source: NOAA Climatic Meteorological Data Disk and NOAA Website Data, and Western Regional Climate Center (WRCC) Obtained September 2017

Prevailing Wind Direction and Speed

Predominant wind direction varies depending upon the time of year. According to NOAA records, the prevailing wind is from the southwest between March to September, and from the northeast between October and February. A breakdown of prevailing winds, average speed, and maximum gusts are presented in **Table 1-15**.



Table 1-15: Prevailing wind by Month

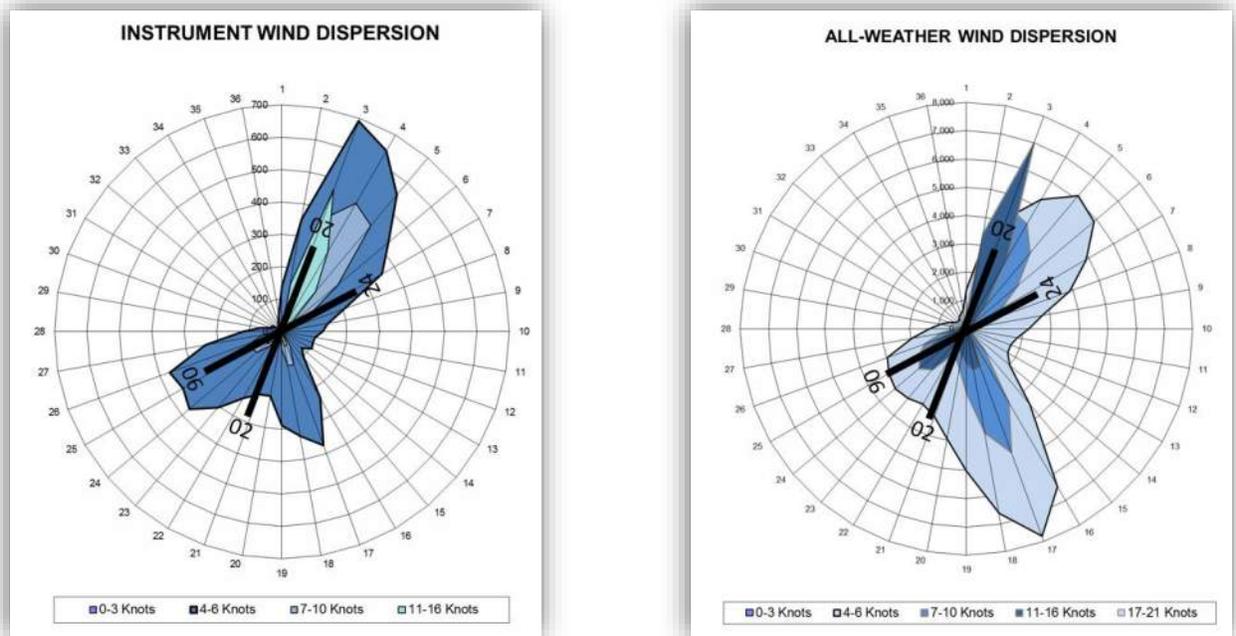
Prevailing Wind			
Month	Direction (From)	Average Speed	Maximum Gust
January	NE	6	58
February	NE	7	48
March	SW	12	56
April	SW	12	54
May	SW	10	46
June	SW	10	43
July	SW	9	44
August	SW	9	47
September	SW	10	41
October	NE	6	54
November	NE	6	50
December	NE	6	48

Prevailing winds influence runway orientation design for takeoff and landing. A runway should be aligned so that aircraft can take off and land into the prevailing winds. **Exhibit 1-9** illustrates the annual average wind direction and speed. The seasonal differences appear as lobes to the Northeast and Southeast. The runway alignments have been superimposed over the top to show correlation between the existing runway layouts and the prevailing wind directions.

Additional analysis of crosswind coverage and optimal runway layout will be made in the facilities requirements chapter.



Exhibit 1-9: Wind for IFR and All-Weather Conditions



SUMMARY

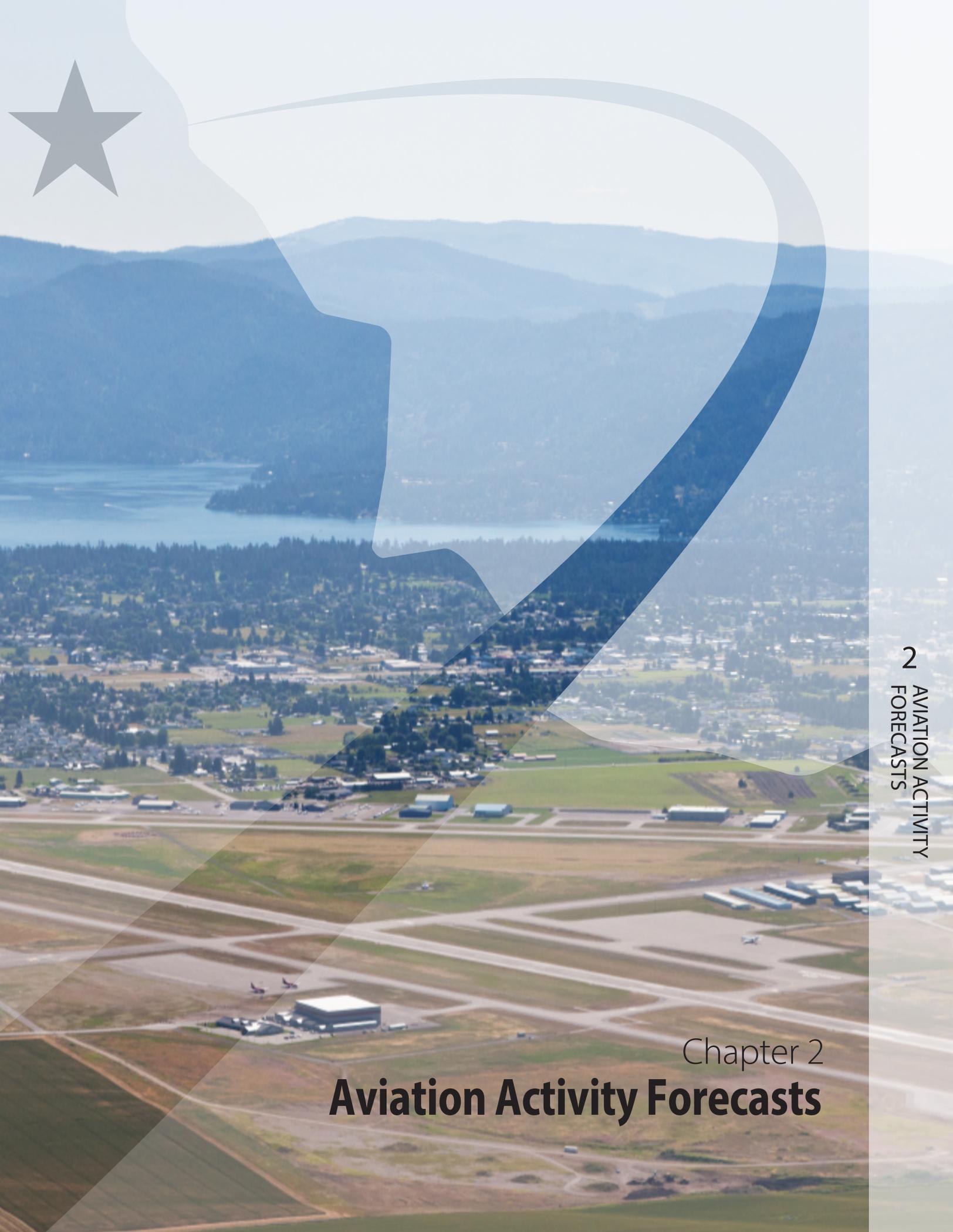
The Coeur d'Alene Airport serves a wide variety of general aviation users. The Airport and FAA continue to invest in aviation facilities to support current and future use of the Airport. The Airport continues to serve as a link to the NAS. These key Airport attributes identified in this Inventory and Environmental chapter will be assessed and evaluated in further detail:

- ▶ Non-standard conditions for centerline separation distance of Runway 2/20 and Taxiway A
- ▶ Perimeter fencing layout for security and wildlife control

NEXT STEPS

The Forecast chapter will evaluate current activity levels, and the factors that affect activity level at an airport including national trends and regional socio-economic factors, such as population, employment, income levels, and economic development. The Forecast chapter evaluates aircraft fleet mix for potential changes to the designated critical aircraft category. The critical aircraft designation in turn affects runway and taxiway design criteria dimensions, which are discussed in the Facilities Requirements chapter.





Chapter 2
Aviation Activity Forecasts

AVIATION ACTIVITY FORECASTS

The forecast chapter presents a 20-year vision of aviation activity at the Coeur d’Alene Airport (COE or “the Airport”). A summary of the forecasts is included as **Table 2-1** and detailed in the accompanying chapter. Forecasts guide the Airport’s capital improvement program, pairing improvements with demand. Forecasts are an estimate of future activity levels and provide guidance that assists decision makers in making judgments for future airport development scenarios.

Kootenai County (or “the County”) has experienced 15 percent population growth, 19 percent gross regional product growth, and 13 percent employment growth between 2007 and 2017. COE has seen an 11 percent increase in takeoffs and landings between 2007 and 2017, and the number of based aircraft, aircraft stored in hangars and on aprons, has grown by 41 percent during these 10 years. The forecasts indicate that this growth will continue, spurred on by community economic development and a growing population.

Table 2-1: Forecast Summary

Forecast Element	2007	CAGR	2017	2037	CAGR
Aircraft Operations	79,846	0.8%	86,876	136,900	2.3%
Itinerant Operations	46,526	2.6%	59,912	99,300	2.6%
Local Operations	33,320	-2.1%	26,964	37,600	1.7%
Based Aircraft	186	3.5%	262	373	1.8%
Single-Engine Piston	150	4.0%	221	308	1.7%
Jet & Turbo-Prop	9	2.9%	12	26	3.9%
Multi-Engine Piston	15	-0.7%	14	12	-0.9%
Helicopter	9	-1.2%	8	12	2.0%
Other	3	8.8%	7	15	3.9%
<small>Single Engine Piston includes experimental and light sport aircraft. CAGR: Compound Annual Growth Rate Sources: Operations: 2007 and 2017 calculated from IFR records, 2037 = Forecast Based Aircraft: 2007 from TAF, 2017 from BasedAircraft.com, 2037 = Forecast</small>					



1. INTRODUCTION TO FORECASTS

Aviation activity forecasts evaluate future demand at the Airport. This chapter is organized into the following sections:

1. Introduction to the Forecasts
2. Community Profile
3. Aviation Activity Profile
4. General Aviation Forecasts
5. Peak Forecasts and Critical Aircraft
6. Forecast Summary and FAA Forecast Tables

The forecasts have a base year of 2017 and use the FAA Fiscal year (October to September). The forecast period is 20 years with reporting intervals of every five years. Preferred forecasts are compared with the FAA TAF. Forecasts help determine if existing airport facilities have the capacity to handle future demand or if modifications are needed to meet future demand. Demand forecasts are prepared for aircraft operations, which are counts of landings and takeoffs, and based aircraft parked and stored at COE. The Airport does not have scheduled commercial passenger or cargo service, so these activity indicators are not included in the demand forecasts. The FAA Helena Airports District Office (ADO) will review forecasts for rationality and comparison to the FAA TAF. **Table 2-2** describes the data sources used in this chapter.

Table 2-2: Description of Data Sources

Source	Description
FAA TAF	<p>The FAA TAF, published in January 2017, provides historical records and forecasts for aircraft operations and based aircraft at COE. These forecasts serve as a comparison for forecasts prepared as part of this planning effort and provide historical information on aircraft activity. The TAF is included as Attachment 1.</p> <p>A key element of these forecasts is verification of TAF operations estimates. TAF numbers may be inaccurate because they have not changed over the years. Thus, this forecast will reevaluate operations counts to verify the TAF numbers.</p>
FAA Aerospace Forecast	<p>The Aerospace Forecast 2017-2037 is a national-level forecast of aviation activity. The Aerospace Forecast helps guide local forecasts by serving as a point of comparison between local trends and national trends. The Aerospace Forecast is used to estimate trends where specific data for COE is not available.</p>
Table is continued on the next page.	



Table 2-2: Description of Data Sources (Continued)

Source	Description
FAA Traffic Flow Management System Counts Data (TFMSC)	The TFMSC includes data collected from flight plans. These operations are categorized by aircraft type and used to identify trends in the COE fleet mix. The advantage of the TFMSC data is its degree of detail and its insights into the itinerant users of COE. A disadvantage of TFMSC data is it does not include local operations or operations that did not file a flight plan. As such, the utility of TFMSC data is limited to larger aircraft, including charter operators, and private business jets.
Socioeconomic Data	Socioeconomic data is provided by data vendor Woods & Poole Inc. (W&P). W&P provides data for gap years in the U.S. Census. The W&P dataset considers the Coeur D'Alene Metropolitan Statistical Area (MSA) which is equivalent to the boundary of Kootenai County. The dataset provides 124 data categories with records from 1970 to 2016 and forecast through 2040. Data categories considered include population, employment, earnings and income, and gross regional product.
Stakeholder Interviews	The Consultant team sent a survey to pilots based at COE, and airport management solicited feedback from key tenants such as the U.S. Forest Service and Empire Aerospace. Forecasts were presented to an advisory committee made up of Stakeholders for feedback.
FlightWise	FlightWise is a third-party data provider that keeps records of instrument flight plans. FlightWise data supplemented TFMSC data, which did not have a complete set of FY2017 operations records when the forecast was prepared.
OPSNET	OPSNET (Operations Network) is the source of National Airspace System (NAS) air traffic operations and delay data. Provided information about IFR (instrument flight rules) and VFR (visual flight rules) operations. As COE does not have a ATCT, data from Felts Field (SFF) was utilized to determine ratio of IFR to VFR operations. SFF was chosen due to geographic proximity and similarity.
On-site Traffic Count	A member of the Consultant team spent seven consecutive days of 8 hour shifts on site. The shifts alternated between morning and afternoon observations to count operations at the Airport. The purpose of these counts was to fill in gaps in the TFMSC data.
FAA Radar Data	FAA provided IFR and VFR radar for fiscal year 2016. FAA reports that the IFR data is complete, and the VFR data is a sample.
Kootenai Metropolitan Planning Organization (KMPO)	A population estimate from the KMPO Metropolitan Transportation Plan 2010-2035 was compared to the Woods & Poole population data for the County and U.S Census population estimates. KMPO population estimates for 2007-2030 are higher than Woods & Poole estimates, and higher than the 2016 U.S. Census estimate for Kootenai County.



2. COMMUNITY PROFILE

The community profile describes the characteristics of the area served by COE. The Airport is located within the Coeur d’Alene Metropolitan Statistical Area (MSA) and serves Northern Idaho. Key socioeconomic indicators described in this section help tell the story behind why COE has experienced growth in the past decade, and socioeconomic projections will be used to forecast aviation activity. Analysis was done to determine whether there is any correlation between aviation activity and community socioeconomic indicators.

2.1 POPULATION

The boundaries of the Coeur d’Alene MSA are coincident with those of Kootenai County. The County is the third most populous in Idaho. The largest city is Coeur d’Alene, which has 33 percent of the County’s residents. County population grew at a compound annual growth rate (CAGR) of 1.4 percent between 2007 and 2017. Woods & Poole projections show County population growing at a 1.6 percent CAGR to a total population of over 210,000 by 2037. These projections were compared to the Kootenai Metropolitan Planning Organization’s (KMPO) 2007-2030 population estimates provided in the 2010 Metropolitan Transportation Plan. The KMPO estimates are 23 percent higher than Woods & Poole in 2030; However, KMPO estimates are seven years old and the 2016 U.S. Census Population Estimate shows that Woods & Poole estimates are closer to the County’s actual population for 2017.

Table 2-3 shows the population records from 2007 to 2017 and the Woods & Poole forecast through 2037.

Table 2-3: Kootenai County Population

Year	Woods & Poole	Percent Change	KMPO	Percent Change
2007	134,211	-	148,955	
2012	142,278	6.0%	165,505	11.1%
2017	153,828	8.1%	183,895	11.1%
2022	166,916	8.5%	204,327	11.1%
2027	180,922	8.4%	227,030	11.1%
2032	195,514	8.1%	246,163	8.4%
2037	210,472	7.7%	266,287	8.2%
CAGR ('07-'17)	1.4%	N/A	2.1%	N/A
CAGR ('17-'37)	1.6%	N/A	1.9%	N/A

CAGR = Compound Annual Growth Rate
 U.S. Census 2016 Population Estimate 154311
 Sources: Woods & Poole, KMPO Metropolitan Transportation Plan 2010-2035. KMPO projections beyond 2030 were extrapolated as part of this Master Plan.



2.2 EMPLOYMENT AND ECONOMIC DEVELOPMENT

Kootenai County has experienced economic growth since the end of the 2007-2009 recession with total employment increasing at CAGR of 1.4 percent from 2007 to 2017. Employment increased by 12.2 percent between 2007 and 2012. This jump within the five years is reflective of the growth in the region. Employment per capita within the County has remained stable with about 0.54 jobs per resident. Proximity to the employment center of Spokane is expected to have some impact on County employment numbers. Total employment and employment per capita are presented in **Table 2-4**.

Table 2-4: Kootenai County Employment

Year	Employment	Percent Change	Employment/Capita
2007	72,398		0.539
2012	74,014	2.2%	0.520
2017	83,010	12.2%	0.540
2022	90,816	9.4%	0.544
2027	98,674	8.7%	0.545
2032	106,341	7.8%	0.544
2037	114,058	7.3%	0.542
CAGR (2007-2017)	1.4%	N/A	0.0%
CAGR (2017-2037)	1.6%	N/A	0.0%

CAGR = Compound Annual Growth Rate
 County Population included in **Table 2-3**
 Source: Woods & Poole

Top industries by total employment in 2007 were retail trade (13 percent of total county employment), state and local government (12 percent), and construction (10 percent). By 2017, top industries were retail trade (14 percent), state and local government (13 percent), and healthcare (10 percent). The healthcare and accommodation industries have moved past the construction industry in terms of employment. This indicates diversification in the regional economy as well as increased tourism in the area. The Idaho Panhandle features mountains, lakes, and rivers that are attractive to outdoors enthusiasts.

Top industries by sales have consistently been Motor Vehicles, General Merchandise, and Gas Stations. The top five industries by sales has not changed in the past decade nor is it projected to change in the future. However, the Eating & Drinking Places industry is projected to surpass the Food & Beverage Retail industry by 2037. This consistency is an indication that the community needs will remain relatively constant and will grow with population increases.

Top industries by employment and sales are presented in **Table 2-5** and **Table 2-6**.



Table 2-5 Kootenai County Top 5 Industries by Employment and Sales 2007-2017

Top Industries by Employment								
Rank	2007		2012			2017		
	Industry	Jobs	Industry	Jobs	Δ	Industry	Jobs	Δ
1	Retail Trade	9,457	Retail Trade	10,135	7.2%	Retail Trade	11,421	12.7%
2	State and Local Government	8,803	State and Local Government	9,338	6.1%	State and Local Government	10,624	13.8%
3	Construction	7,094	Health Care	7,388	11.2%	Health Care	8,265	11.9%
4	Health Care	6,643	Accommodation & Food Service.	6,202	2.8%	Accommodation & Food Service	7,034	13.4%
5	Accommodation & Food Service.	6,031	Construction	5,269	-25.7%	Construction	6,125	16.2%
Top Industries by Retail Sales								
Rank	2007		2012			2017		
	Industry	Sales (\$M)	Industry	Sales (\$M)	Δ	Industry	Sales (\$M)	Δ
1	Motor Vehicles	\$531.88	Motor Vehicles	\$559.12	5.1%	Motor Vehicles	\$719.13	28.6%
2	General Merchandise	\$388.99	General Merchandise	\$459.30	18.1%	General Merchandise	\$499.53	8.8%
3	Gas Stations	\$266.59	Gas Stations	\$373.26	40.0%	Gas Stations	\$384.02	2.9%
4	Food & Bev. Retail	\$249.34	Food & Bev. Retail	\$278.32	11.6%	Food & Bev. Retail	\$305.97	9.9%
5	Eating & Drinking Places	\$179.43	Eating & Drinking Places	\$210.97	17.6%	Eating & Drinking Places	\$242.99	15.2%

Values in 2009 dollars Percentages represent percent of total employment/retail sales.
Source: Woods & Poole



Table 2-6 Kootenai County Top 5 Industries by Employment and Sales 2017-2037

Top Industries by Employment								
Rank	2017		2027			2037		
	Industry	Jobs	Industry	Jobs	Δ	Industry	Jobs	Δ
1	Retail Trade	11,421	Retail Trade	13,458	17.8%	Retail Trade	15,656	16.3%
2	State and Local Government	10,624	State and Local Government.	13,115	23.4%	State and Local Government.	15,488	18.1%
3	Health Care	8,265	Health Care	10,258	24.1%	Health Care	12,479	21.7%
4	Accommodation & Food Service	7,034	Accommodation & Food Service	8,611	22.4%	Accommodation & Food Service	10,058	16.8%
5	Construction	6,125	Construction	7,289	19.0%	Construction	7,939	8.9%
Top Industries by Retail Sales								
Rank	2017		2027			2037		
	Industry	Sales (\$M)	Industry	Sales (\$M)	Δ	Industry	Sales (\$M)	Δ
1	Motor Vehicles	\$719.13	Motor Vehicles	\$896.16	24.6%	Motor Vehicles	\$1,043.92	16.5%
2	General Merchandise	\$499.53	General Merchandise	\$638.88	27.9%	General Merchandise	\$805.37	26.1%
3	Gas Stations	\$384.02	Gas Stations	\$470.78	22.6%	Gas Stations	\$576.94	22.5%
4	Food & Beverage Retail	\$305.97	Food & Beverage Retail	\$351.17	14.8%	Eating & Drinking Places	\$409.55	29.6%
5	Eating & Drinking Places	\$242.99	Eating & Drinking Places	\$316.11	30.1%	Food & Beverage Retail	\$399.91	13.9%
Values in 2009 dollars Percentages represent percent of total employment/retail sales.								
Source: Woods & Poole								



2.3 GROSS REGIONAL PRODUCT

Gross regional product (GRP) is the value of goods and services produced in the County and serves as a health index of the overall economy. GRP grows with the production of more goods, more valuable goods, and a combination of the two. GRP per capita decreased in 2012 due to the recession and population growth exceeding GRP growth; however, total GRP continued to grow during this time as the region continued to be productive. GRP increased by 18.2 percent between 2012 and 2017. This increase is reflective of the growth in the region. The Woods & Poole GRP projections show GRP increasing at a faster rate than the County population. This can be attributed to the increases in efficiency and growth in the health care and accommodation industries, which are predicted to grow faster than the retail trade industry in 2027 and 2037. Retail trade, healthcare, and accommodation industries, are all among the top 5 employers in the county, with retail trade employing the most people (**Table 2-5** and **Table 2-6**). As the health care industry provides high value per employee, it can generate more GRP growth per job than retail trade. **Table 2-7** shows the GRP of the County from 2007 to 2037.

Table 2-7 Kootenai County Gross Regional Product

Year	GRP (\$M)	Δ	GRP/Capita
2007	\$4,621		\$34,000
2012	\$4,651	0.6%	\$33,000
2017	\$5,499	18.2%	\$36,000
2022	\$6,279	14.2%	\$38,000
2027	\$7,115	13.3%	\$39,000
2032	\$7,991	12.3%	\$41,000
2037	\$8,926	11.7%	\$42,000
CAGR (2007-2017)	1.8%	N/A	0.6%
CAGR (2017-2037)	2.5%	N/A	0.8%

CAGR = Compound Annual Growth Rate
Source: Woods & Poole

2.4 CATCHMENT AREAS AND REGIONAL AIRPORTS

An airport's "catchment area" is the geographic boundary from which it draws its users, and airport activity is primarily influenced by the movement of people and products to and from the catchment area. Catchment areas are defined by the types of services offered at an airport, proximity of competitor airports, and the tendency of the local population to use the airport. The Airport's catchment area is based on the proximity of surrounding airports and is shown in **Exhibit 2-1**.



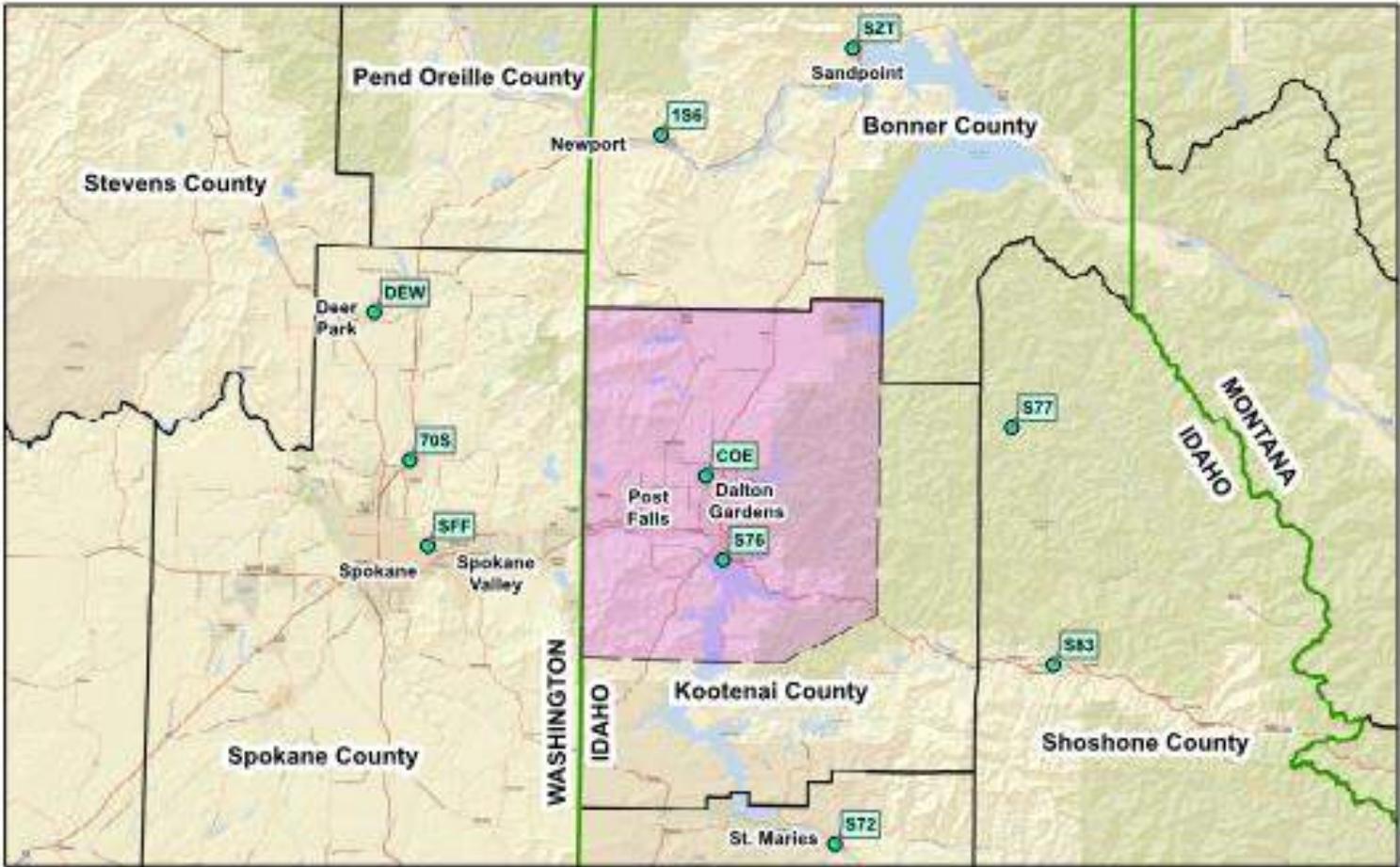


Exhibit 2-1 Catchment Area



COE is the only Airport with paved runways in the catchment area. Brooks Sea Plane Base (S76) is located 6 miles south of COE and has a water runway on the north shore of Lake Coeur D’Alene. As such, Brooks does not compete directly with Coeur d’Alene Airport for tenants or transient aircraft. Other airports in proximity to the catchment area includes Spokane International (GEG), Mead Flying Service Airport (70S), Deer Park Airport (DEW), Priest River Municipal Airport (1S6), Sandpoint Airport (SZT), Magee Airport (S77), St Maries (S72), Spokane-Felts (SFF), and Shoshone County Airport (S83). Key facilities and primary markets of regional general aviation airports are summarized in **Table 2-8**.

Table 2-8: Regional General Aviation Airports

Airport	Characteristics			Primary Markets			
	Runway Length	IAP	Jet A	Large Jets	Small Jets	Turbo-Props	Piston
Priest River (1S6)	2,950'	No	No	No	No	Yes	Yes
Magee (S77)	2,200'	No	No	No	No	Yes	Yes
Shoshone County (S83)	5,316'	No	No	No	Yes	Yes	Yes
St Maries (S72)	3,354'	Non-Precision	No	No	No	Yes	Yes
Sandpoint (SZT)	5,501	Non-Precision	Yes	No	Yes	Yes	Yes
Spokane Felts (SFF)	4,499'	Precision	Yes	No	Yes	Yes	Yes
Spokane Int'l (GEG)	11,002	Precision	Yes	Yes	Yes	Yes	Yes
Coeur d’Alene (COE)	7,400	Precision	Yes	Yes	Yes	Yes	Yes

Source: FAA Airport Facilities Directory. Market determination based on instrumentation, runway length, and fuel availability.
IAP: Instrument Approach Procedure

Determination of a primary market does not suggest that a market that is not currently served will never use an airport. Rather, it reflects the presence of facilities at an airport that cater to the needs of a certain market. For example, piston aircraft are versatile in that they do not need Jet A fuel or a long runway, and due to their susceptibility to strong winds and turbulence, they tend not to be operated when visibility is particularly low due to stormy weather. For this reason, piston aircraft owners have fewer requirements for the airport where they base their aircraft than the business jet owners.

Business jets need a long runway to operate at their full payload, and owners generally need the aircraft available to fly regardless of the weather, so airport instrumentation is important. Large jets cannot use any of the other regional airports surrounding the COE catchment area except for GEG and SFF. Runway length at SZT and SFF limits the types of jets that can be served.



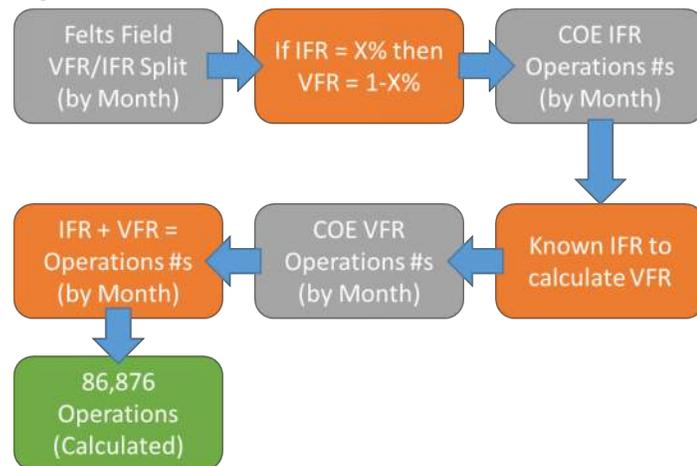
3. AVIATION ACTIVITY PROFILE

The aviation activity profile provides a baseline for the forecasts by showing trends in activity at the Airport and the context for any changes in aviation activity that have occurred. Sources of information include the FAA, Airport management, and Airport tenants. This section includes information on operations and based aircraft.

3.1 OPERATIONS ESTIMATE

COE does not have a control tower; therefore, historical operations counts may be inaccurate. Thus, operations need to be adjusted to provide a baseline for the forecasts. Adjusted operation totals were calculated using a combination of FAA TFMSC and OPSNET data. Historical general aviation operations were estimated by using the process described below and shown in **Exhibit 2-2: Operations estimates were checked against traffic counts collected in the field for concurrence.**

Exhibit 2-2: Method for Estimating 2017 COE Operations



Source: Prepared by Mead & Hunt, Inc.

- ▶ TFMSC operations data from 2007 to 2016 and Flightwise operations data for 2017 were used as a baseline for IFR operations. TFMSC do not include VFR data. TFMSC data for fiscal year 2017 was incomplete at the time of this forecast.
- ▶ OPSNET from Spokane/Felts Field (SFF) ATCT data was used to determine the number of IFR and VFR operations for each year to calculate the ratio of IFR to VFR operations per month for each year. SFF data were used due to the Airport's geographic proximity to COE, the similar instrument flight procedures available, and the similar weather pattern.
- ▶ Multiplying the IFR/VFR ratio to the TFMSC operations data provided the calculated number of IFR and VFR operations.
- ▶ The sum of IFR and VFR operations is equal to the total annual operations.
- ▶ Operations for 2007 to 2017 were calculated using this method and used instead of the TAF for the operations baseline.



3.2 GENERAL AVIATION

Itinerant Operations

Itinerant operations are those that originate and terminate at different airports. Operators include student pilots performing cross country training flights, business travelers, and recreational pilots. Itinerant general aviation and air taxi operations made up 69 percent of overall operations at COE in 2017. Itinerant operations have increased at a 2.6 percent CAGR compared to a -2.8 percent CAGR for national itinerant operations. One reason behind COE’s national trend reversal is that the region’s GRP growth (1.6 percent CAGR) has outperformed the national GDP growth (1.4 percent CAGR) from 2007 to 2017, as discussed in section 2.3. Itinerant general aviation operations are shown in **Table 2-9**.

Table 2-9: Itinerant General Aviation Operations

Year	COE	% Change	U.S.A.	% Change
2007	46,526		18,575,000	-0.7%
2008	52,843	13.6%	17,493,000	-5.8%
2009	56,591	7.1%	15,571,000	-11.0%
2010	56,893	0.5%	14,864,000	-4.5%
2011	41,790	-26.5%	14,528,000	-2.3%
2012	47,842	14.5%	14,522,000	0.0%
2013	46,262	-3.3%	14,117,000	-2.8%
2014	47,586	2.9%	13,979,000	-1.0%
2015	48,083	1.0%	13,887,000	-0.7%
2016	43,605	-9.3%	13,904,000	0.1%
2017	59,912	37.4%	13,936,000	0.2%
CAGR	2.6%		-2.8%	

CAGR = Compound Annual Growth Rate.
Source: 2017 TAF, OPSNET, TFMSC

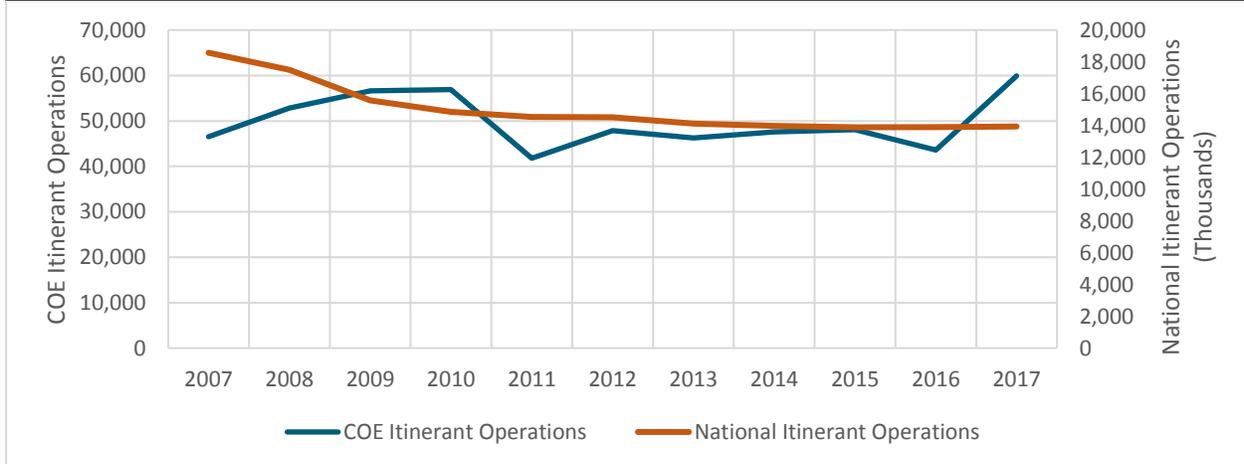


Table 2-10 shows itinerant operations at the Airport by type. Itinerant general aviation operations have declined since 2007; however, Air Taxi operations have grown. This increase in Air Taxi operations is due to the local economy growing with factors, such as income per capita and employment rates, increasing throughout the years. There are relatively few military operations at the Airport as there are no based military aircraft at COE. Military activity is performed as needed and is not driven by market forecasts like general aviation.

Table 2-10: COE Itinerant Operations by Type

Year	Air Taxi	Military	General Aviation	Total Itinerant
2007	65	1,019	45,442	46,526
2008	16,588	871	35,384	52,843
2009	17,765	933	37,894	56,591
2010	17,859	938	38,096	56,893
2011	13,118	689	27,983	41,790
2012	15,018	788	32,035	47,842
2013	14,522	762	30,977	46,262
2014	14,938	784	31,864	47,586
2015	15,094	792	32,196	48,083
2016	13,546	711	29,347	43,605
2017	18,418	967	40,527	59,912
CAGR	N/A	-0.5%	-1.1%	2.6%

CAGR = Compound Annual Growth Rate.
Source: 2017 TAF, OPSNET, TFMSC

Itinerant operations are expected to continue to grow with changes in the local and national economies. Unlike local operations, which are more sensitive to the performance of the local economy, itinerant operations can be impacted by economic contraction across the world. Many itinerant visitors come from other parts of the Country and economic contractions in their home areas could impact itinerant operations levels at COE.

Local General Aviation Operations

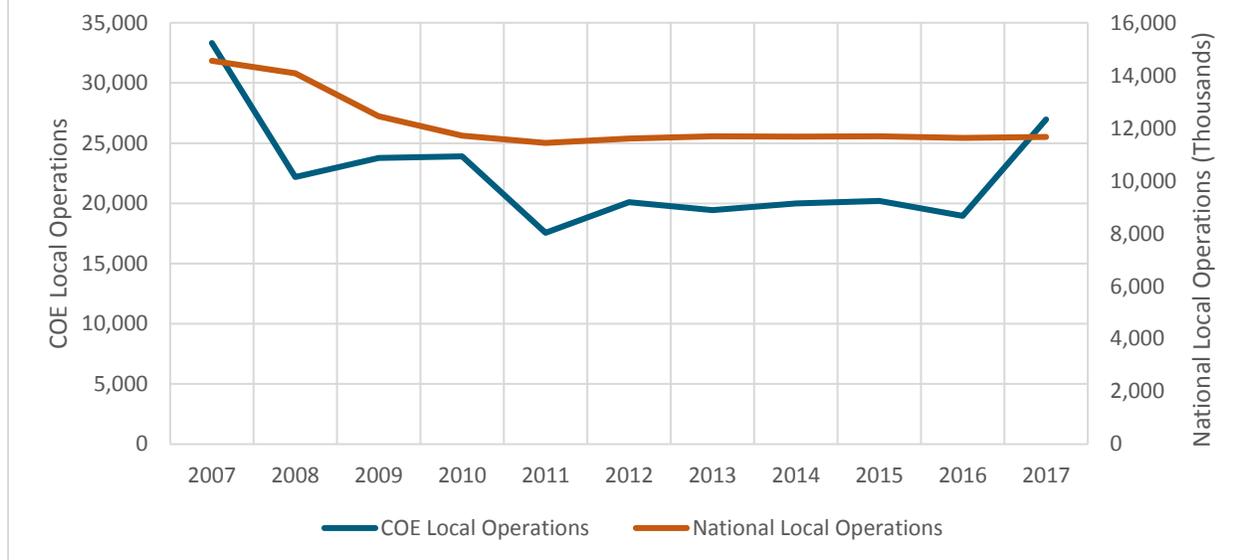
Local general aviation operations are those that originate and terminate at the same airport and are generally performed by pilots that are practicing landings. Local operations can vary greatly based on the level of flight training at an airport and how active the resident GA community is. Local operations include touch-and-go landings where the aircraft lands, slows, then accelerates and takes off without leaving the runway. Touch-and-goes count as two operations. COE has two businesses that offer flight instruction but does not have a full-time flight school. Local general operations are shown in **Table 2-11**.



Table 2-11: Local General Aviation Operations

Year	COE	% Change	U.S.A.	% Change
2007	33,320	-	14,556,771	-22.2%
2008	22,199	-33.4%	14,081,157	-3.3%
2009	23,773	7.1%	12,447,957	-11.6%
2010	23,900	0.5%	11,716,274	-5.9%
2011	17,556	-26.5%	11,437,028	-2.4%
2012	20,098	14.5%	11,608,306	1.5%
2013	19,434	-3.3%	11,688,301	0.7%
2014	19,990	2.9%	11,675,040	-0.1%
2015	20,199	1.0%	11,691,338	0.1%
2016	18,961	-6.1%	11,632,078	-0.5%
2017	26,964	42.2%	11,664,410	0.3%
CAGR	-2.1%	N/A	-2.2%	N/A

CAGR = Compound Annual Growth Rate.
Source: 2017 TAF, OPSNET, TFMSC



Based Aircraft

Terminology	
<p>Single Engine Piston (SEP): SEP have one piston-powered engine. These aircraft are generally smaller and are often used for flight training and recreational flying. SEP may be used for regional business trips. Depending on weight and operator certification, these aircraft generally require only one pilot. Sub-categories within SEP include “experimental” and “sport.”</p> <ul style="list-style-type: none"> - Experimental aircraft refer to kit airplanes that are built by users, or third-parties besides the original manufacturer. Experimental aircraft share many characteristics with SEP – the key differentiator is how and where the aircraft is assembled. - Sport aircraft are airplanes that have a specific weight and maximum speed in level flight. Sport aircraft require less training and a less strict medical certificate to pilot the aircraft. <p>Jet: Jet aircraft are characterized for having a turbine engine instead of a piston engine. Jet aircraft range in size from small four-passenger business jets to the largest airliners. They can generally fly faster and at higher altitudes than SEP and MEP, making them better suited for business travel and emergency response. It is less common, but not unheard of, to see a jet used for recreational flying and flight instruction. Some smaller civilian jets can operate with a single pilot; however, most civilian jet aircraft require two.</p>	<p>Turboprop: Turboprop aircraft use gas turbine engines to drive a propeller. These aircraft tend to be slower than jets but are capable of using grass airfields. Turboprops are used as small commuter aircraft due to lower fuel and maintenance costs.</p> <p>Multi-Engine Piston (MEP): MEP have two or more engines and are typically larger than SEP. Multiple engines make the aircraft more capable, and require additional flight instruction beyond what is needed to operate an SEP. MEP are primarily used for flight training and business aviation. MEP may require two pilots, but many variants can be operated with one.</p> <p>Helicopters: Helicopters are characterized by having a rotor mounted above the cabin for lift and propulsion. Helicopters are commonly used for flight training, by law enforcement and emergency response, and by aerial businesses such as pipeline inspection, forestry, and aerial agriculture. Helicopters can be piston or turbine powered, and depending on the complexity of the model, can be operated by one pilot or two.</p> <p>Other: The category of “Other” includes experimental, sport, glider, and ultralight aircraft. These aircraft are used for recreational flying.</p> <ul style="list-style-type: none"> - Gliders are unpowered aircraft that are towed into flight, and use thermal uplift to sustain altitude. - Ultralight aircraft weigh less than 155 pounds and do not require the pilot operating the aircraft to have a private pilot’s license or medical certificate.

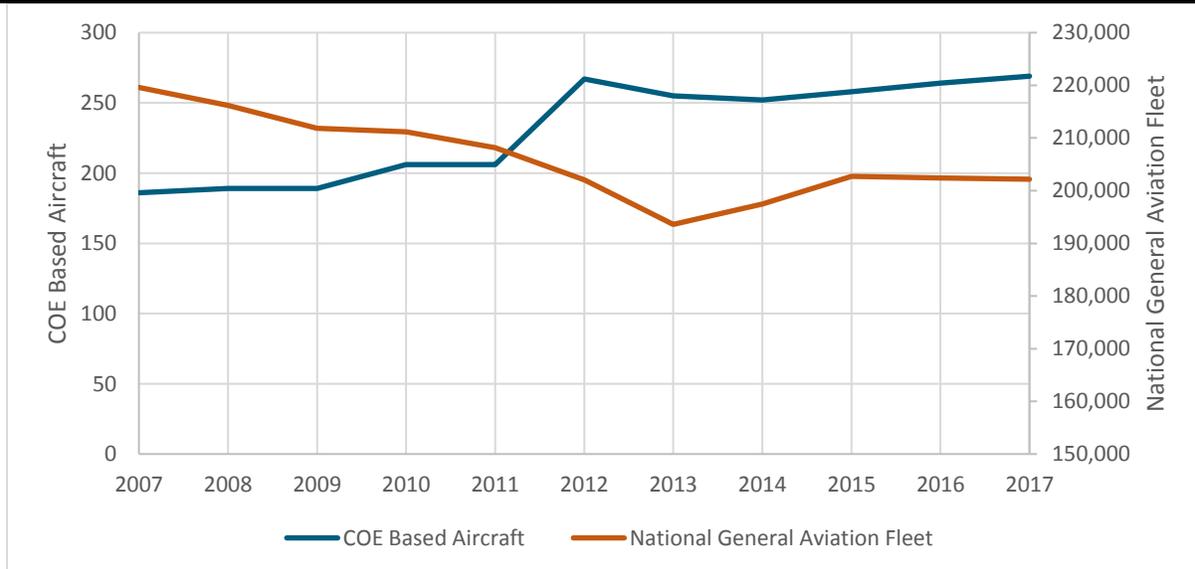
Based aircraft are those that are stored at the Airport. Based aircraft numbers do not include visiting or itinerant aircraft. The FAA separates based aircraft into different categories based on an aircraft’s propulsion system, engine configuration, and weight. **Table 2-12** shows based aircraft records from 2007 to 2017.



Table 2-12: COE Based Aircraft Fleet

Year	Single	Multi	Jet	Helicopter	Other	Total	% Change
2007	150	15	9	9	3	186	-
2008	143	18	12	14	2	189	1.6%
2009	143	18	12	14	2	189	0.0%
2010	170	15	4	17	0	206	9.0%
2011	170	15	4	17	0	206	0.0%
2012	221	20	7	17	2	267	29.6%
2013	216	16	7	14	2	255	-4.5%
2014	213	16	7	14	2	252	-1.2%
2015	215	17	11	13	2	258	2.4%
2016	218	17	11	14	4	264	2.3%
2017	221	14	12	8	7	262	-0.8%
CAGR	4.0%	-0.7%	2.9%	-1.2%	8.8%	3.5%	

CAGR = Compound Annual Growth Rate.
Source: 2017 TAF, BasedAircraft.com, Airport Management



Single-Engine-Piston (SEP) are the most common aircraft based at COE, making up 84 percent of the fleet. Multi-Engine-Piston (MEP) and Jet each make up an additional five percent of the fleet, while helicopter and “others” make up the remaining six percent. Other aircraft include gliders and a balloon. There are four unmanned aerial vehicles (UAS or “drones”) at COE, but these do not count as based aircraft and cannot use airport facilities. The COE based fleet is made up of 90 percent aircraft reference code (ARC) A-I aircraft, five percent B-I aircraft, three percent helicopters, two percent C-II jets, and one percent B-II jets, turbo-props, and MEP. Based jets include a Gulfstream IV, two Hawker 800’s, two Cessna Citations, and a Bombardier Challenger. ARC is defined in **Chapter 1** and discussed in in **Section 6**.



4. GENERAL AVIATION FORECASTS

FORECASTING TECHNIQUES

Forecasts look at historical trends and future opportunities to project future activity. This includes observing how market forces outside of aviation (discussed in **Section 3**) impact demand for air travel. The method of evaluating the relationship between variables for the purposes of establishing a relationship is called a correlation analysis.

A correlation analysis ignores units and orders of magnitude, and instead measures how closely the variables change in proportion to one another using percentages. This means that ten percent growth in an index with a starting level of 1,000 would show a perfectly positive correlation to a ten percent growth in an index with a starting level of 1,000,000,000. Correlation can also be negative, indicating that as one index grows, the other declines. Correlation is measured by the correlation coefficient (denoted as “*r*”), which ranges from -1 to +1. A score close to +/-1 suggest stronger positive/negative correlation, and a score closer to zero suggests that the two variables are not correlated.

Correlation shows potential interrelatedness between two variables; however, it cannot be the sole factor to determine that growth of one variable is caused by the other. Often, there are unrelated factors and additional variables that impact the growth in both variables. An example is a ten percent growth in the sale of luxury goods correlating to the ten percent growth in travel by private aircraft in a community. Purchasing luxury goods does not directly cause people to fly by private aircraft, nor vice versa – but the strong correlation suggests that a third factor may be causing both variables to grow (such as local growth in an industry with high paying jobs or an influx of high net worth individuals to a community for an event). For this reason, correlation is augmented by professional judgement. **Table 2-13** shows the results of the correlation analysis for the three activity indicators.

Table 2-13: COE Airport Activity Correlation Analysis

Rank	Itinerant Ops	<i>r</i>	Local Ops	<i>r</i>	Based Aircraft	<i>r</i>
1	Nat'l Loc GA Ops	0.37	Nat'l Loc GA Ops	0.62	MSA Income/Cap	0.90-
2	Nat'l ltn GA Ops	0.28	Nat'l ME Fleet	0.62	MSA Retail Sales	0.90
3	GA Fleet	0.23	Nat'l ltn GA Ops	0.58	Nat'l Jet Fleet	0.87
4	MSA GRP	0.14	GA Fleet	0.56	GDP	0.82
5	MSA Pop	0.12	Nat'l SE Fleet	0.33	MSA Population	0.82
Strong: $-0.75 \geq r \geq 0.75$				Medium: $-0.75 < r \leq -0.50$ or $0.50 \leq r < 0.75$		
Weak: $-0.50 < r \leq -0.25$ or $0.25 \leq r < 0.50$				None: $-0.25 < r < 0.25$		



Itinerant and local operations did not show strong correlation with any of the variables assessed. The number of based aircraft however, showed strong correlation with national and local indicators. The impact of this analysis on each activity measure is described later in this section.

4.1 ITINERANT GENERAL AVIATION OPERATIONS

Methods

Trends in itinerant general aviation are discussed in **Section 3.2**. Itinerant general aviation operations were found to have a weak positive correlation with all variables checked, and the closest three were national itinerant general aviation operations ($r=0.28$), national local general aviation operations ($r=0.37$), and the national general aviation fleet ($r=0.23$). The weak correlation is likely due to inaccurate historical records for COE. Due to the weak correlation, forecast methods based on regression analysis were not used. Forecasts for itinerant general aviation use the following methods:

- ▶ Application of the FAA Aerospace Forecast 2017-2037 growth rate for itinerant operations.
- ▶ Application of COE growth rate from the 2017 TAF for itinerant operations.
- ▶ Application of the historical 10-year growth rate for itinerant operations.

The forecasts are presented alongside the 2017 TAF for comparison purposed in **Table 2-14**.

Preferred and TAF Comparison

COE operations were not highly correlated with the national operations trends so there is need to look at the historical data. The preferred itinerant operations forecast uses the 10-year growth rate, which estimates that itinerant general aviation operations will grow at 2.6 percent CAGR. This growth rate exceeds the TAF projection of 1.1 percent CAGR; however, due to the adjustment in operations numbers, the TAF remains above the preferred forecast for the 20-year period.

The growth rate utilizing historical local trends is preferred over forecasts using national trends like the Aerospace Forecast and TAF growth rate. The 5-year growth rate was found to have 4.6 percent annual growth which is considered unsustainable over a 20-year period. Strong local economic growth, shown in **Section 3**, is expected to support continued general aviation growth at COE.

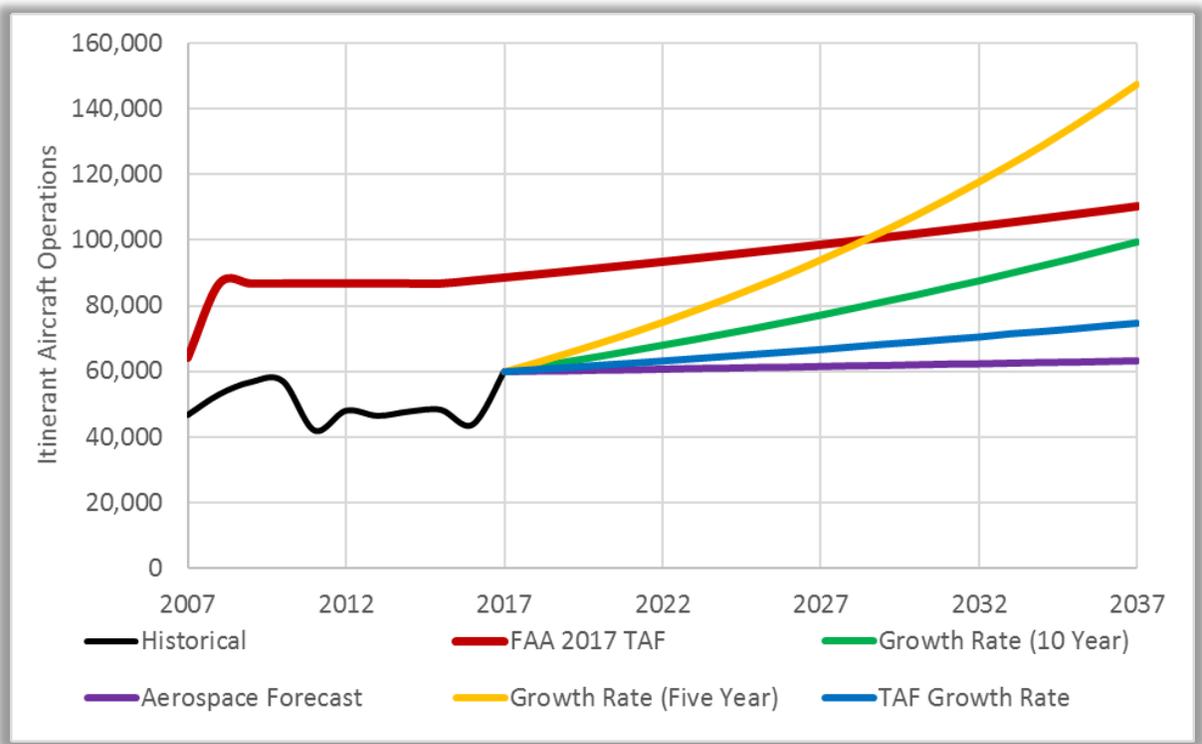
The preferred forecast is compared to the TAF in **Table 2-15**. The difference between the two forecasts lies in the operations adjustment that was done as part of this forecast. TAF numbers are too high and will need to be adjusted to reflect the findings of this study. The TAF uses a Top Down Model for airports of COE's size which does not take local factors into account. The TAF



assumes market share based on an arbitrary variable and is based primarily on time series analysis; thus, if the base year is incorrect and the growth rate is assigned arbitrarily the TAF will become less accurate as time goes on.

Table 2-14: Itinerant Operations Forecast

Year	FAA 2017 TAF	Aerospace Forecast	TAF Growth Rate	Growth Rate (Five Year)	Growth Rate (10 Year)
2017	88,478	59,912	59,912	59,912	59,912
2022	93,310	60,700	63,200	75,000	68,000
2027	98,532	61,500	66,700	94,000	77,200
2032	104,175	62,300	70,500	117,700	87,500
2037	110,276	63,200	74,700	147,400	99,300
CAGR	1.1%	0.3%	1.1%	4.6%	2.6%



CAGR = Compound Average Growth Rate
 Source: TAF Issued January 2017, Master Plan Forecasts



Table 2-15: Itinerant Operations Forecast – TAF Comparison

Year	FAA 2017 TAF	Preferred	Difference	
2017	88,478	59,912	-28,566	-32.3%
2022	93,310	68,000	-25,310	-27.1%
2027	98,532	77,200	-21,332	-21.6%
2032	104,175	87,500	-16,675	-16.0%
2037	110,276	99,300	-10,976	-10.0%
CAGR	1.1%	2.6%	N/A	N/A

CAGR = Compound Average Growth Rate
Source: TAF Issued January 2017

4.2 LOCAL OPERATIONS

Methods

Local general aviation operations were found to have a relatively weak positive correlation with all variables checked. The top three were national itinerant operations ($r=0.58$), national local operations ($r=0.62$), and the national multi-engine fleet ($r=0.62$). Due to the weak correlation, forecast methods based on regression analysis were not used. Forecasts for local general aviation use the following methods:

- ▶ Application of the FAA Aerospace Forecast 2017-2037 growth rate for local operations.
- ▶ Application of the operations per based aircraft method.
- ▶ Application of the historical five and 10-year growth rates for local operations.

The FAA Aerospace Forecast and historical growth rate methods are simple linear growth rate formulas. The Operations per based aircraft method ties local activity to the number of aircraft based at COE. There has been an average of 101 local operations per based aircraft per year from 2007 to 2017, and this ratio is applied to the based aircraft forecast in **Section 4.3** to calculate future operations. Forecasts are presented alongside the 2017 TAF for comparison purposed in **Table 2-16**.

Preferred and TAF Comparison

The preferred method uses the projected number of based aircraft and the ratio of operations per based aircraft calculated with 2017 TAF data. The forecast has a 1.7 percent CAGR through the 20-year period and projects 37,600 local operations in 2037. The five-year growth rate method has a CAGR of 6.1 percent which is not considered sustainable over a 20-year period. The 10-year growth rate method has a CAGR of -2.1 percent, which produces a decline in local operations over the next 20 years. The Aerospace Forecast method remains nearly flat, with a 0.4 percent CAGR over the forecast period.

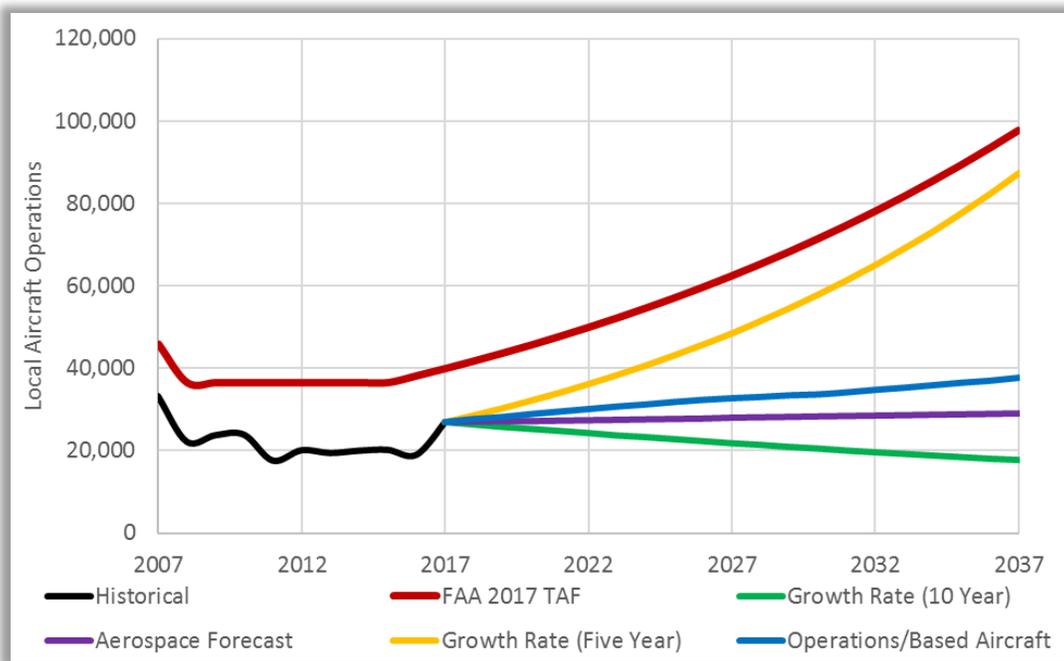


The TAF forecasts strong local operation growth with a CAGR of 4.6 percent through 2037. This is due to the higher estimated historical number of operations compared to the calculated historical local operations discussed in **Section 3.2**, and projections that far exceed the national average (per the Aerospace Forecast method). TAF projections are unlikely to occur unless COE gets an institutional flight school. As of November 2017, there are no plans for such a facility at COE.

The preferred forecast is compared to the TAF in **Table 2-17**. The difference between the two forecasts lies in the operations adjustment that was done as part of this forecast. TAF numbers are too high and will need to be adjusted to reflect the findings of this study. The TAF growth rate is not considered realistic for COE.

Table 2-16: Local Operations Forecast

Year	FAA 2017 TAF	Ops / Based Aircraft	Aerospace Forecast	Growth Rate (5 Year)	Growth Rate (10 Year)
2017	39,820	26,964	26,964	26,964	26,964
2022	49,843	30,100	27,400	36,200	24,300
2027	62,386	32,700	28,000	48,500	21,800
2032	78,091	34,700	28,500	65,100	19,600
2037	97,757	37,600	29,000	87,400	17,700
CAGR	4.6%	1.7%	0.4%	6.1%	-2.1%



CAGR = Compound Average Growth Rate
 Source: TAF Issued January 2017



Table 2-17: Local Operations Forecast – TAF Comparison

Year	FAA 2017 TAF	Operations / Based Aircraft	Difference	
2017	39,820	26,964	-12,856	-32.3%
2022	49,843	30,100	-19,743	-39.6%
2027	62,386	32,700	-29,686	-47.6%
2032	78,091	34,700	-43,391	-55.6%
2037	97,757	37,600	-60,157	-61.5%
CAGR	4.6%	1.7%	NA	NA

CAGR = Compound Average Growth Rate
Source: TAF Issued January 2017

4.3 BASED AIRCRAFT

Methods

Historical trends and composition of the based aircraft fleet at COE are discussed in **Section 3.2**. Unlike aircraft operations, based aircraft historically showed strong correlation with local socioeconomic indicators. The top five were MSA Retail Sales ($r=0.90$), MSA Income per Capita ($r=0.90$), the National Jet Fleet ($r=0.89$), U.S. Gross Domestic Product ($r=0.82$), and MSA Population ($r=0.82$). It is unlikely that any one of these indicators driving based aircraft on its own; however, each suggest that based aircraft growth at COE has performed in line with growth of the local and national economy, and in line with the sale of jet and turbo-prop aircraft.

Three methods are used to project the based aircraft fleet.

- ▶ Application of the FAA Aerospace Forecast 2017-2037 growth rate for each based aircraft type.
- ▶ Application of the historical 10-year growth rate for each based aircraft type.
- ▶ Application of a regression model based on MSA employment and income per capita.

The regression model is based on the underlying logic that growth in based aircraft at COE relies on a strong local economy. The correlation analysis provides historical support and the forecast assumes that these relationships will continue. This method forecasts total based aircraft, and the future fleet is then determined by looking at expected growth rates for each sub-market (e.g. SEP, MEP, Jet, Helicopter, Other). The other two methods look at local (10-year growth rate) and national (Aerospace Forecast) methods that consider fluctuations within the different market segments of general aviation. Forecasts are presented alongside the 2017 TAF for comparison purposed in **Table 2-18**.

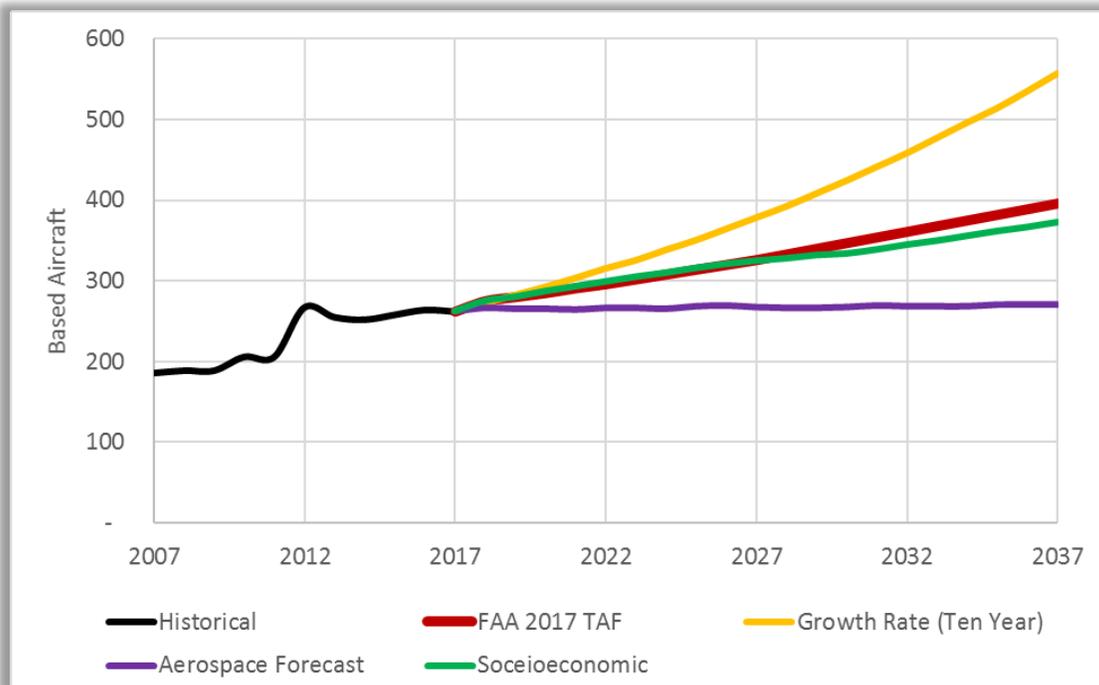


Preferred and TAF Comparison

The regression model is the preferred based aircraft forecast. This method produces a based aircraft forecast that is similar to TAF projections and is in line with the correlation analysis done to identify potential demand drivers in the community. The Aerospace Forecast was not selected because SEP activity is projected to decline nationally, whereas this market has seen some growth at COE in recent years. The ten-year growth rate forecast projects that based aircraft will more than double in the next 20 years, which is not expected to happen given the general slowing of the industry, lack of available storage space at COE, and competition from nearby airports. The preferred forecast is compared to the TAF in **Table 2-19**

Table 2-18: Based Aircraft Forecasts

Year	FAA 2017 TAF	Growth Rate (Ten-Year)	Aerospace Forecast	Socioeconomic
2017	262	262	262	262
2022	296	315	266	299
2027	326	378	267	325
2032	361	458	268	356
2037	396	557	270	373
CAGR	2.1%	3.8%	0.2%	1.8%



CAGR = Compound Average Growth Rate
 Source: TAF Issued January 2017



Table 2-19: Based Aircraft Forecasts – TAF Comparison

Year	FAA 2017 TAF	Socioeconomic	Difference	
2017	262 ¹	262	0	0.0%
2022	296	299	3	1.0%
2027	326	325	-1	-0.3%
2032	361	356	-5	-1.4%
2037	396	373	-23	-5.8%
CAGR	2.1%	1.8%	NA	NA

1: TAF value for 2017 changed to reflect actual counts from Airport Management and BasedAircraft.com

Table 2-20 shows the breakdown of COE based aircraft growth rate by aircraft type. The standard SEP fleet is expected to decline as these aircraft are retired faster than they are replaced. Growth within this segment comes from the light sport and experimental aircraft types. Both sub-sets of the SEP market are already present at COE and there were nearly 50 experimental aircraft at COE in 2017. Jet and Turbo-prop aircraft are expected to continue to grow in line with strong local economic growth. COE has property available for development of box hangars along the north side of Runway 6/24 which will be attractive to new jet operators based on proximity to the primary runway. A look at the regional airports shows that SFF has limited space for additional box hangars, GEG is too far away from Kootenai County, and the other airports lack the facilities needed to accommodate medium and large jets (e.g. an instrument approach, long runway, and Jet A fuel).

Table 2-20: Preferred Based Aircraft Forecast

Type	2017	2022	2027	2032	2037	CAGR
SEP	221	252	272	286	308	1.7%
*Standard	162	156	149	143	137	-0.8%
*Light Sport	10	16	22	27	31	5.8%
*Experimental	49	80	101	116	140	5.4%
MEP	14	13	13	13	12	-0.8%
Business Jet	10	12	13	15	16	2.4%
Turbo-prop	2	4	6	8	10	8.4%
Helicopter	8	9	10	11	12	2.0%
Other	7	9	11	12	15	3.9%
Total	262	299	325	345	373	1.8%

An item of note is that based aircraft do not include contractors that work for the U.S. Forest Service, and they do not include the aircraft that are being worked on by Empire Aerospace. These aircraft are some of the largest types that use COE and have facility requirements that exceed many of the based aircraft except the business jets. Facility requirements analysis will address the needs of both the based and itinerant fleets.



5. PEAK FORECASTS AND CRITICAL AIRCRAFT

5.1 PEAK PERIOD FORECASTS

Peak forecasts estimate when airport facilities are busiest. Peak forecasts are used to assess level of service of airfield and terminal facilities and the scale of improvement projects. Improvement projects are not typically designed for the busiest moment of the year, but rather for busy periods that occur throughout the year. The forecast uses historical records to project future peaking and will need to be reevaluated if a change in user or aircraft type occurs.

Historically, July has been the peak month with some years having August see peak activities. In 2017 and 2016, June was the peak month with 18.6 percent and 19.5 percent of annual operations respectively. On average, peak months see 20.7 percent of total annual operations. Peak day is the average number of operations per day during the peak month. Peak hour is the busiest hour (as a percentage of peak day operations) based on on-site counts. **Table 2-21** presents peak operations forecasts.

Table 2-21: Peak Period Operations Forecasts

Year	Annual	Peak Month	Peak Day	Peak Hour
2017	86,876	17,964	583	75
2022	98,100	20,285	659	85
2027	109,800	22,704	737	95
2032	122,200	25,268	820	105
2037	136,900	28,308	919	118



Sources: TFMSC, FlightWise



5.2 CRITICAL AIRCRAFT

The critical aircraft is the most demanding type, or group of aircraft with similar characteristics, to operate more than 500 times per year at an airport. Critical aircraft are categorized by airport reference code (ARC), which is made up of the aircraft approach category (AAC) and aircraft design group (ADG), as defined in **Chapter 1**. The critical aircraft will be used to design and scale improvement projects and setbacks in subsequent chapters.

Counts of operations by aircraft type from TFMSC and surveys sent to key tenants Empire Aerospace and the U.S. Forest Service, are used to estimate operations by itinerant aircraft. Based aircraft records are used to estimate the distribution of local operations. Unlike itinerant operations, local operations are generally performed by smaller aircraft, so the only aircraft reference codes included in the analysis are A-I, A-II, B-I, and helicopters. Source data used in the itinerant operations estimates are shown in **Table 2-22**, and source data used in the local operations estimates are shown in **Table 2-23**.

Table 2-22: Itinerant Operations Records

Reference Code	2012	2013	2014	2015	2016	2017	Average
A-I	542	406	540	518	508	534	11.5%
A-II	180	164	232	268	350	386	5.8%
A-III	0	0	0	0	4	4	0.0%
B-I	1,004	954	926	758	756	778	19.0%
B-II	1,300	1,352	1,544	1,834	1,608	1,632	34.0%
B-III	186	164	156	148	148	146	3.5%
C-I	392	412	468	556	626	590	11.2%
C-II	324	284	254	298	390	374	7.1%
C-III	34 ¹	24 ¹	22 ¹	930 ¹	234 ¹	334 ¹	5.7%
C-IV	6	0	0	10	2	6	0.1%
D-I	46	18	34	46	34	54	0.9%
D-III	22	36	48	50	50	66	1.0%
H-H	6	2	38	6	16	2	0.3%
Total TFMSC Operations.	4,042	3,816	4,262	5,508	4,726	4,902	100.0%
Total Operations ² Itn.	47,841	46,261	47,596	48,082	43,604	59,912	
TFMSC % of Total Itn. Operations	8.4%	8.2%	9.0%	11.5%	10.8%	8.2%	

1: U.S. Forest Service (USFS) did not provide counts for operations performed by civil contractors for 2012-2014. C-III operations for 2015-2017 include USFS civil contractor operations counts.
2: Total itinerant operations are estimated due to the absence of an airport traffic control tower at COE.
Sources: TFMSC for FAA Fiscal Years 2012 – 2017, Empire Airlines Survey, USFS Survey, Master Plan Itinerant Operations Estimates. Itn. = Itinerant



Table 2-23: 2017 Based Aircraft and Local Operation by ARC

Reference Code	Aircraft Count	% of Based	Performs Local Ops.?	Local Ops. Estimate	% of Local Ops.
A-I	236	90%	Yes	24,955	92%
B-I	12	5%	Yes	1,269	5%
B-II	3	1%	No	0	0%
C-II	4	1%	No	0	0%
Helicopter	7	3%	Yes	740	3%
Total	262	-	-	26,964	-

Sources: BasedAircraft.com, COE Airport Management. Ops. = Operations

Future operations by ARC are calculated differently depending on the type of aircraft. Aircraft with an ARC of B-II, and those with approach categories of C or greater and design groups of III or greater are expected to be well accounted for in the TFMSC records and user surveys. While some aircraft cancel flight plans prior to landing at COE and are thus missing from the TFMSC, it is expected that the order of magnitude presented by the TFMSC, combined with the user surveys, is generally accurate. Counts by type are included as **Attachment 1**.

Smaller aircraft types, (A-I, B-I, and B-II) are also accounted for in TFMSC but these aircraft often fly under VFR and are therefore not always included in TFMSC. Future operations by these ARCs are estimated by identifying the relative percentage of these aircraft types operations relative to total estimate operations less operations by larger aircraft. These smaller aircraft essentially make up the balance of remaining operations for COE. Total operations by ARC are shown in **Table 2-24**.



Table 2-24: Total Operations by ARC

ARC	2017	2022	2027	2032	2037	Average
A-I	74,930	84,582	94,578	105,102	117,628	86.1%
A-II	3,473	3,942	4,469	5,072	5,756	4.1%
A-III	17	19	21	24	28	0.0%
B-I	4,089	4,616	5,167	5,752	6,444	4.7%
B-II	1,700	1,929	2,188	2,483	2,818	2.0%
B-III	167	189	214	243	276	0.2%
C-I	600	681	772	876	994	0.7%
C-II	333	378	429	487	552	0.4%
C-III	267	303	343	389	442	0.3%
C-IV	10	11	13	15	18	0.0%
D-I	60	68	77	88	99	0.1%
D-III	70	79	90	102	116	0.1%
H-H	1,160	1,303	1,439	1,567	1,729	1.3%
Total	86,876	98,100	109,800	122,200	136,900	100%

Sources: Master Plan Operations Estimates, TFMSC, Based Aircraft Records

The most demanding AAC to exceed the substantial use threshold of 500 operations is C, with 1,210 operations in 2017 and 2,006 operations forecast in 2037. The most demanding ADG to exceed the substantial use threshold of 500 operations is III, with 521 operations in 2017 and 862 operations forecast in 2037. Therefore, the existing and future ARC for COE is C-III. There is no single C-III aircraft that exceeds the substantial use threshold, so a representative C-III aircraft is selected to be the critical aircraft. The most common C-III aircraft is the BAe-146, which is used by private contractors working for the U.S. Forest Service and operated 300 times in 2017. In busy fire seasons, such as 2015, the BAe-146 and similar large air tankers operated over 870 times. Crosswind Runway 2/20 is not built to the same length and width as primary Runway 6-24. This runway typically serves smaller business jets, turbo-props, and piston aircraft; however, the Gulfstream G450 based at COE uses Runway 2/20 frequently. Given the existing dimensions and typical users of Runway 2/20, the runway should be designed to B-II standards. The most common demanding B-II aircraft to use the runway are the Cessna family of small- and medium-cabin business jets, such as the Citation V, Citation Excel, and Citation II. These jets had over 800 operations in 2017.

- ▶ Runway 6/24 Critical Aircraft: BAe-146 (C-III)
- ▶ Runway 2/20 Critical Aircraft: Cessna Citation V (B-II)



6. FORECAST SUMMARY AND FAA FORECAST TABLES

Aviation demand at COE will be driven by strong economic growth in Kootenai County. Forecasts for the County’s population, gross product, and employment indicate that the next 20 years will experience growth of around two percent annually. COE is the premier general aviation airport in Northern Idaho and has the facilities needed to host a wide variety of business jets and turbo-props. The Airport’s primary users, single engine piston aircraft, will continue to grow although the makeup of the fleet with change from one where standard aircraft are the most common to one where light sport and experimental aircraft make up a larger percentage.

The Airport will continue to provide employment through the surrounding businesses like Empire Aerospace, aircraft maintenance shops, and fixed base operators. Public safety will remain a critical role through use by the U.S. Forest Service during fire season. The highlights of the demand forecast are shown in **Table 2-25**, and FAA reporting forms are included as **Exhibit 2-3** and **Exhibit 2-4**.

Table 2-25: Forecast Summary

Forecast Element	2007	CAGR	2017	2037	CAGR
Aircraft Operations	79,846	0.8%	86,876	136,900	2.3%
Itinerant Operations	46,526	2.6%	59,912	99,300	2.6%
Local Operations	33,320	-2.1%	26,964	37,600	1.7%
Based Aircraft	186	3.5%	262	373	1.8%
Single-Engine Piston	150	4.0%	221	308	1.7%
Jet & Turbo-Prop	9	2.9%	12	26	3.9%
Multi-Engine Piston	15	-0.7%	14	12	-0.9%
Helicopter	9	-1.2%	8	12	2.0%
Other	3	8.8%	7	15	3.9%
<small>Single Engine Piston includes experimental and light sport aircraft. CAGR: Compound Annual Growth Rate Sources: Operations: 2007 and 2017 calculated from IFR records, 2037 = Forecast Based Aircraft: 2007 from TAF, 2017 from BasedAircraft.com, 2037 = Forecast</small>					

The demand forecasts will be carried forward to **Chapter 3, Facility Requirements**. Here, the expected level of demand will be compared to the Airport’s existing facilities and recommendations for facility improvements and modifications will be made.



Exhibit 2-3: Master Plan Forecast Comparison to TAF

AIRPORT NAME:		Coeur d'Alene Airport		
	<u>Year</u>	<u>Airport Forecast</u>	<u>TAF</u>	<u>AF/TAF (% Difference)</u>
Passenger Enplanements				
Base yr.	2017	0	36	-100.0%
Base yr. + 5yrs.	2022	0	36	-100.0%
Base yr. + 10yrs.	2027	0	36	-100.0%
Base yr. + 15yrs.	2032	0	36	-100.0%
Commercial Operations				
Base yr.	2017	18,418	27,200	-32.3%
Base yr. + 5yrs.	2022	21,400	27,200	-21.3%
Base yr. + 10yrs.	2027	24,400	27,200	-10.3%
Base yr. + 15yrs.	2032	27,700	27,200	1.8%
Total Operations				
Base yr.	2017	86,876	128,298	-32.3%
Base yr. + 5yrs.	2022	98,100	143,153	-31.5%
Base yr. + 10yrs.	2027	109,800	160,918	-31.8%
Base yr. + 15yrs.	2032	122,200	182,266	-33.0%
NOTES: TAF data is on a U.S. Government fiscal year basis (October through September). AF/TAF (% Difference) column has embedded formulas.				

The Airport Forecast and the TAF differ substantially due to the revision of baseline operations numbers. A combination of TFMSC, OPSNET IFR/VFR splits, and on-site counts were used to better estimate aircraft operations at COE. The results were 32.3 percent lower than the TAF estimates for the base year. Commercial operations (on demand air taxi at COE) grow more quickly than TAF estimates; however, the TAF projects substantial growth (4.6 percent CAGR) for local operations.

Airport management and tenants do not expect local operations to grow at this rate without the presence of an institutional flight school. No plans for such as school exist as of Winter 2017; therefore, the Master Plan forecasts project a slower growth rate than the TAF.

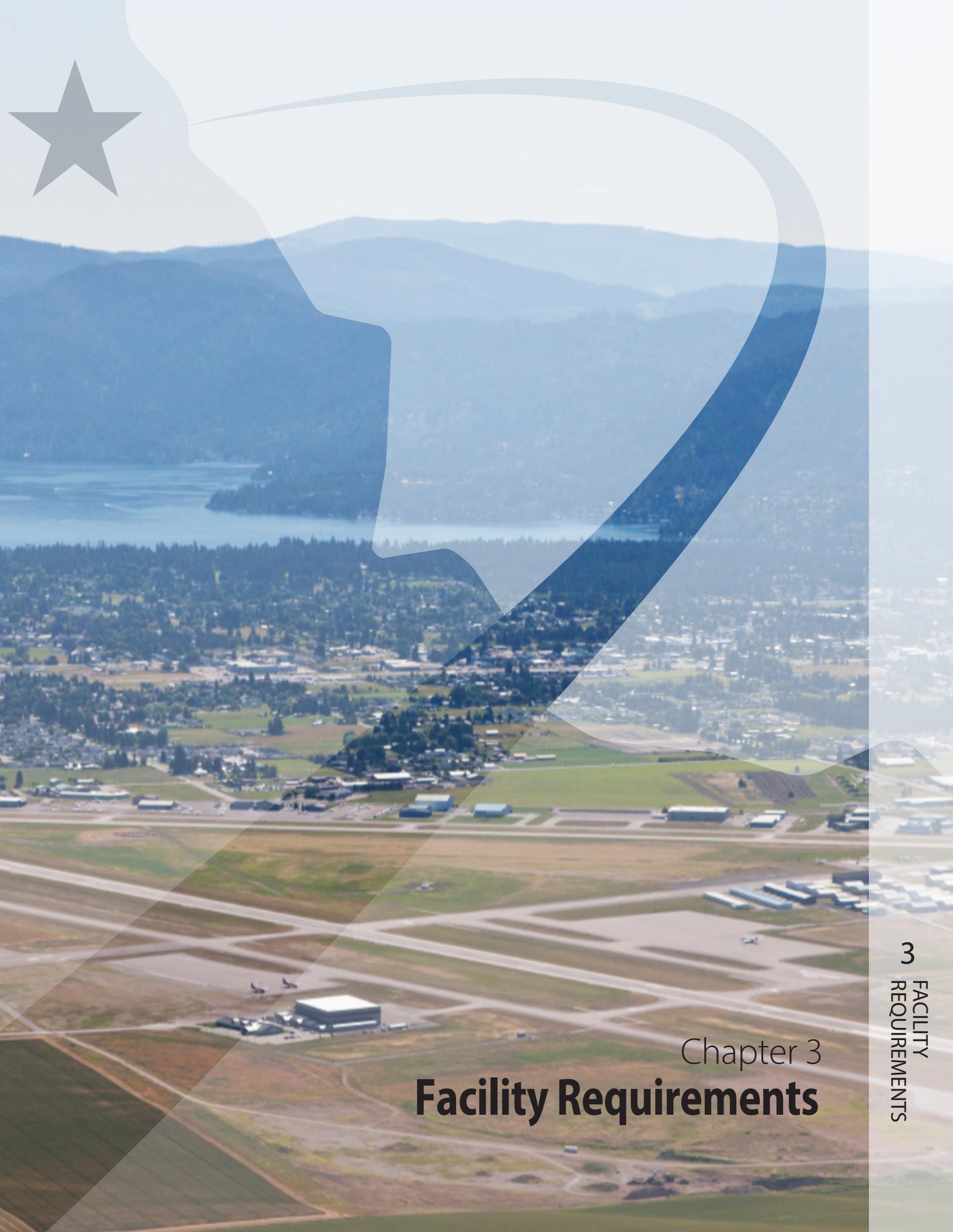
An FAA HQ forecast review is not required as total operations is less than 200,000 and there are no projects that require an Environmental Impact Statement (EIS) or Benefit-Cost Analysis (BCA) for the Airport Improvement Program (AIP).



Exhibit 2-4: Master Plan Forecast in FAA Format

AIRPORT NAME:	Specify base year:					Average Annual Compound Growth Rates			
Coeur d'Alene Airport	2017								
	<u>Base Yr. Level</u>	<u>Base Yr. + 1yr.</u>	<u>Base Yr. + 5yrs.</u>	<u>Base Yr. + 10yrs.</u>	<u>Base Yr. + 15yrs.</u>	<u>Base yr. to +1</u>	<u>Base yr. to +5</u>	<u>Base yr. to +10</u>	<u>Base yr. to +15</u>
Passenger Enplanements									
Air Carrier (Not Present at COE)	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Commuter (No Scheduled Service at COE)	36	0	0	0	0	-100.0%	-100.0%	-100.0%	-100.0%
TOTAL	36	0	0	0	0	-100.0%	-100.0%	-100.0%	-100.0%
Operations									
<u>Linerair</u>									
Air carrier (Not Present at COE)	0	0	0	0	0	N/A	N/A	N/A	N/A
Commuter/air taxi	18,418	19,300	21,400	24,400	27,700	4.8%	3.0%	2.9%	2.8%
Total Commercial Operations	18,418	19,300	21,400	24,400	27,700	4.8%	3.0%	2.9%	2.8%
General aviation	40,527	40,700	45,200	51,300	58,400	0.4%	2.2%	2.4%	2.5%
Military	967	1,400	1,400	1,400	1,400	44.8%	7.7%	3.8%	2.5%
<u>Local</u>									
General aviation	26,964	27,700	30,100	32,700	34,700	2.7%	2.2%	1.9%	1.7%
Military (Not Present at COE)	0	0	0	0	0	N/A	N/A	N/A	N/A
TOTAL OPERATIONS	86,876	89,100	98,100	109,800	122,200	2.6%	2.5%	2.4%	2.3%
Instrument Operations	7,639	7,835	8,626	9,655	10,745	2.6%	2.5%	2.4%	2.3%
Peak Hour Operations	75	77	85	95	105	2.7%	2.5%	2.4%	2.3%
Cargo/mail (enplaned+deplaned tons)	0	0	0	0	0	N/A	N/A	N/A	N/A
Based Aircraft									
Single Engine (Nonjet, inc. LSA & Exp.)	221	231	252	272	286	4.5%	2.7%	2.1%	1.7%
Multi Engine (Nonjet)	14	13	13	13	13	-7.1%	-1.5%	-0.7%	-0.5%
Jet Engine & Turbo Prop	12	14	16	19	23	16.7%	5.9%	4.7%	4.4%
Helicopter	8	9	9	10	11	12.5%	2.4%	2.3%	2.1%
Other	7	8	9	11	12	14.3%	5.2%	4.6%	3.7%
TOTAL	262	275	299	325	345	5.0%	2.7%	2.2%	1.9%
LSA = Light Sport Aircraft. Exp. = Experimental Aircraft									
B. Operational Factors									
	<u>Base Yr. Level</u>	<u>Base Yr. + 1yr.</u>	<u>Base Yr. + 5yrs.</u>	<u>Base Yr. + 10yrs.</u>	<u>Base Yr. + 15yrs.</u>				
Average aircraft size (seats)									
Air carrier (Not present at COE)	0.0	0.0	0.0	0.0	0.0				
Commuter (Not present at COE)	0.0	0.0	0.0	0.0	0.0				
Average enplaning load factor									
Air carrier (Not present at COE)	0.0%	0.0%	0.0%	0.0%	0.0%				
Commuter (Not present at COE)	0.0%	0.0%	0.0%	0.0%	0.0%				
GA operations per based aircraft	258	249	252	258	270				





Chapter 3
Facility Requirements

FACILITY REQUIREMENTS

This chapter documents the recommended Airport facilities to satisfy the 20-year aviation forecast demand for the Coeur d’Alene Airport (“Airport” or “COE”). The facility improvements are identified to accommodate user demand, and address strategic developments envisioned by Kootenai County. The facility requirements identify the gap between what the Airport has and what it needs.

The following sections detailing the facility requirements are organized as follows:

Airside Facilities

- ▶ Airport Design Standards and Compliance
- ▶ Runway Systems Analysis
- ▶ Runway Utilization and Capacity
- ▶ Taxiway System Analysis
- ▶ Pavement Markings, Lighting, Signage
- ▶ Instrument Approaches

Landside Facilities

- ▶ Terminal Area and Support Facilities

Airside:

Facilities that are accessible to aircraft, such as runways and taxiways.

Landside:

Facilities that support airside operations, but are not part of the aircraft movement area, such as terminal buildings, hangars, aprons, access roads, and parking facilities.

Support:

Facilities that can be either airside or landside facilities that aid in the operation of the airport.

AIRPORT DESIGN STANDARDS

FAA Advisory Circular (AC) 150/5300-13A, *Airport Design*, (AC 5300-13A) uses a coding system to determine design standards for an airport. When combined, the Aircraft Approach Category (AAC) and Airplane Design Group (ADG) yield the Airport Reference Code (ARC), which is the FAA classification for the airfield design. The Runway Design Code (RDC) builds on the ARC by adding a third component for runway approach visibility minimums, expressed as Runway Visual Range (RVR). The design aircraft and RDC determine the scale and setbacks of airfield facilities.

Airport facility design is prescribed by FAA standards. The FAA uses an aircraft classification system based on the Airport’s critical design airplane’s approach speed, wingspan, tail height, and gear configuration characteristics.



Design Aircraft

The critical aircraft is the most demanding aircraft type, or group of aircraft with similar characteristics, regularly using the Airport with more than 500 annual operations. The Runway Design Code (RDC) builds on the ARC by adding a third component for runway approach visibility minimums as expressed in Runway Visual Range (RVR).

The following identifies, for each runway, the existing and future FAA design category and representative critical aircraft for facility requirement purposes:

Runway 6/24 (Primary):

- ▶ Existing Critical Aircraft RDC: C-III, TDG 2
- ▶ Future Critical Aircraft RDC: C-III, TDG 2
- ▶ Critical Design Aircraft: Avro RJ-85 (The Avro RJ-85 is an Avro RJ-85 specifically modified for the aerial tanker role)

For future planning and design purposes, Runway 6/24 should accommodate a critical aircraft with an AAC approach speed less than 141 knots, an ADG aircraft wingspan less than 117 feet, and a tail height of less than 45 feet.

Runway 2/20 (Crosswind):

- ▶ Existing Critical Aircraft RDC: B-II, TDG 2
- ▶ Future Critical Aircraft RDC: B-II, TDG 2
- ▶ Critical Design Aircraft: Cessna Citation 500 Series (Small Cabin Business Jet)

For future planning and design purposes, Runway 2/20 should accommodate a critical aircraft with an AAC approach speed less than 121 knots, an ADG aircraft wingspan less than 79 feet, and a tail height of less than 30 feet.

Design Aircraft:

This is an aircraft with characteristics that determine the application of airport design standards for a specific runway, taxiway, taxilane, apron, or other facility. This can be a specific aircraft type or a composite of several aircraft currently using, expected to use, or intended to use the airport or part of the airport. This is also called the “critical design aircraft.”

Aircraft Approach Category (AAC):

Alphabetic letter designating the approach speed in knots.

Airplane Design Group (ADG):

A roman numeral designating wingspan and tail height in feet.

Taxiway Design Group (TDG):

Number designating aircraft wheel gear configuration.

Runway Visibility Range (RVR):

Instrument approach visibility minimums in feet.

Airport Reference Code (ARC):

The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport.

Runway Design Code (RDC):

The RDC defines the design standards applicable to a specific runway.



Runway 6/24 Design Aircraft – Avro RJ-85



Aircraft Design Characteristics:

Aircraft Type:	Large Aerial Tanker
FAA ARC/TDG:	C-III; TDG 2
Approach Speed:	±121 Knots
Wingspan:	86 feet
Length:	85.9 feet
Tailheight:	28.3 feet
Maximum Weight:	95,000 pounds
Seating Configuration:	4 (Air crew only)
Cockpit to Main Gear (CMG)	36.75 feet
Wheelbase	36.75 feet
Main Gear Width (MGW)	19 feet

Runway 2/20 Design Aircraft - Citation 500 Series



Aircraft Design Characteristics:

Aircraft Type:	Business Jet (Light/Small)
FAA ARC/TDG:	B-II; TDG 1B to 2
Approach Speed:	±107 Knots
Wingspan:	50 feet
Length:	52 feet
Tailheight:	16.8 feet
Maximum Weight:	16,300 Pounds
Seating Configuration:	4 to 8 Passengers
Cockpit to Main Gear (CMG)	20 feet
Wheelbase	27 feet
Main Gear Width (MGW)	10 feet



AIRSIDE FACILITIES

RUNWAY SYSTEM ANALYSIS

The airfield facilities are the runway, taxiway, and navigation systems used to support aeronautical operations. The facility requirements analysis involves an assessment of aircraft utilization, airfield capacity, and airfield configuration to accommodate forecast activity. Facility requirements are predicated on FAA design standards, which must be met for the Airport to receive FAA funding for improvement projects.

RUNWAY UTILIZATION AND CAPACITY

Airport Capacity

Airfield capacity is a measure of airport operational performance, assessed by the relationship of demand to facility capacity. Capacity analysis is used to identify the type and timing of future airfield capacity enhancement improvements required to meet the forecast of aviation demand, and to ensure operational safety and efficiency.

The Annual Service Volume (ASV) is the FAA method to quantify airport capacity. The ASV, as defined in FAA Advisory Circular 150/5060-5, “Airport Capacity and Delay,” (AC 5060-5) is the number of annual aircraft operations accommodated by the runway and taxiway configuration. The ASV is calculated from the Airport’s annual, monthly, and hourly operational levels, in consideration of the following factors:

- ▶ Runway orientation and taxiway system configuration
- ▶ Runway traffic volume and utilization during peak periods
- ▶ (aircraft types, categories, and operational mix usage)
- ▶ Meteorological/weather conditions (visual, instrument, low instrument-airport closed)
- ▶ Runway instrumentation and lighting systems

Annual Service Volume (ASV):

A reasonable estimate of an airport's annual operational capacity

Demand:

The magnitude of aircraft operations to be accommodated in a specified period, provided by the forecasts

Capacity:

A measure of the maximum number of aircraft operations that can be accommodated on an airport in one hour

Delay:

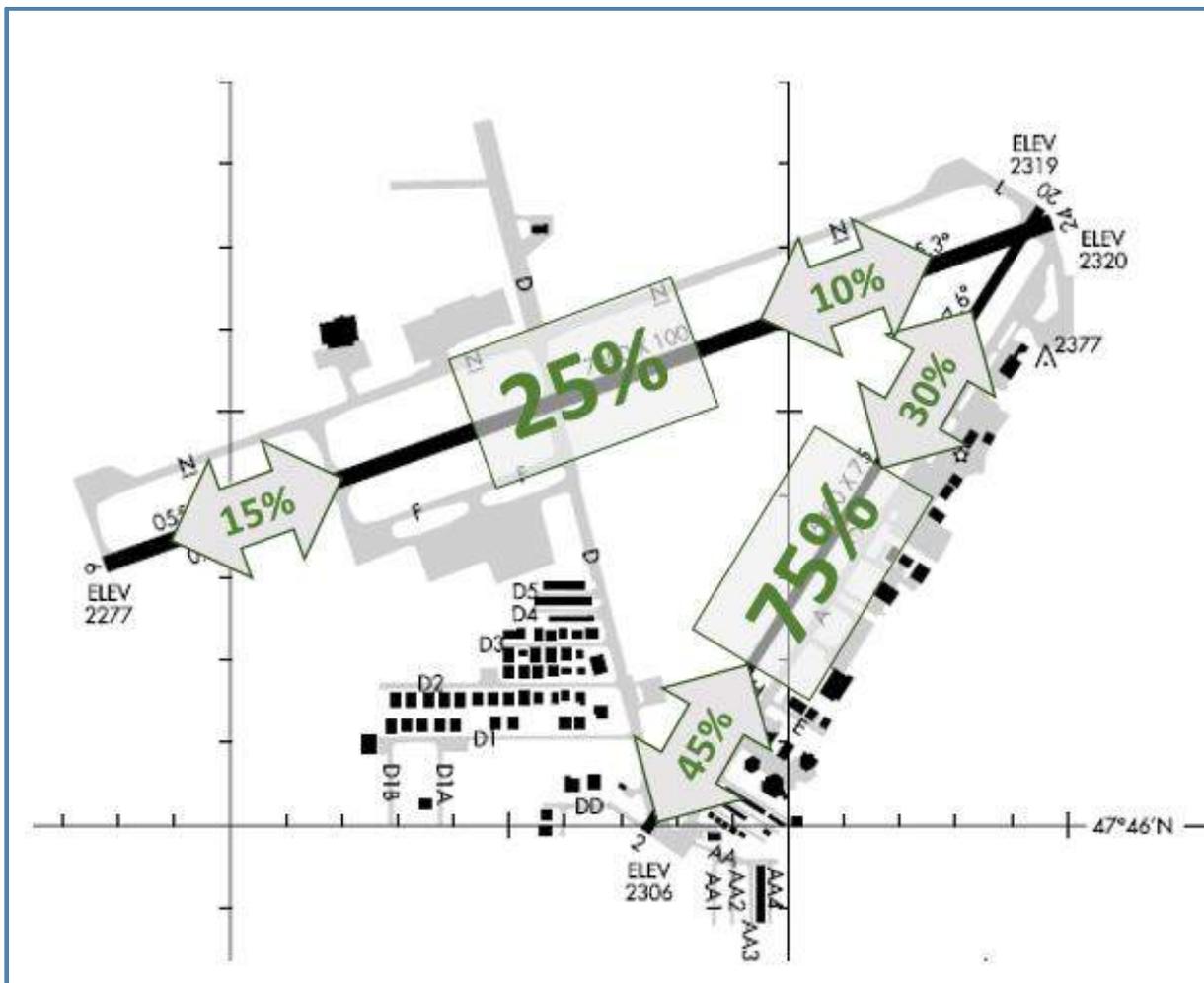
The difference between the actual time it takes an aircraft to operate on the airfield and the time it would take the aircraft if it were operating without interference from other aircraft, usually expressed in minutes



The ASV is calculated by formula using the weighted hourly capacity (C), average daily demand (D), and average peak hour demand (H) by equation ($ASV = C \times D \times H$). FAA Order 5090.38, “Field Formation of the National Plan of Integrated Airport Systems (NPIAS)” recommends proceeding with a planning process to preserve and enhance capacity when 60 percent of the ASV has been reached.

Runway layout and utilization influences ASV. While COE has two runways, they are not oriented or separated in a manner where they can be used simultaneously. When an aircraft is using one runway, aircraft using the other runway must wait. **Exhibit 3-1** illustrates the runway utilization as determined from Airport staff observations, traffic count, radar traffic data, and analysis of wind observations.

Exhibit 3-1: Runway Operational Utilization (Percent Runway Use)



Annual Service Volume (ASV) Analysis

Table 3-1 summarizes the ASV analysis. Metrics in AC 5060-5 provide an airfield capacity of 262,000 aircraft operations per year base on the runway layout at COE. There were 86,876 operations in 2017, and the forecasts project 136,900 operations in 2037. This indicates that the airfield is at 33 percent of annual capacity in 2017 and will be at 52 percent of annual capacity in 2037. **Exhibit 3-2** graphs ASV in relation to the aircraft operations forecast.

Table 3-1: Annual Service Volume (ASV) and Demand/Capacity Analysis

ASV Capacity Components	2017	2022	2027	2032	2037
Annual Aircraft Operations (Existing & Forecasted)	86,876	98,100	109,800	122,200	136,900
Airport Operational Peaking (FAA ASV Equation)					
Peak Month Operations	9,122	10,301	11,529	12,831	14,375
Average Day Peak Month (ADPM) Operations	300	339	379	422	473
Peak Hour Operations	36.0	40.7	45.5	50.6	56.7
ASV Formula Inputs:					
Daily Demand 'D' (Annual Operations ÷ Peak Day)	289.5	289.5	289.5	289.5	289.5
Hourly Demand Ratio 'H' (Peak Day ÷ Peak Hour)	8.3	8.3	8.3	8.3	8.3
Weighted Hourly Capacity 'C' (FAA ASV Diagrams)	108.9	108.9	108.9	108.9	108.9
ASV Outputs:					
Annual Service Volume (ASV)	262,000	262,000	262,000	262,000	262,000
ASV Demand/Capacity (Percent Capacity Used)	33%	37%	42%	47%	52%

ASV Inputs:

Percent VFR Traffic = 90.7% | Percent IFR Traffic = 9.3% | Percent Closed Airport = 1.50%

Percent (C+3D) Traffic = 1.85% | Percent Touch & Go = 40.0% | Percent Arrivals = 50.0%

Note: Weighted Hourly Capacity (C) factors: 1) touch and go traffic and 2) taxiway exit configuration.

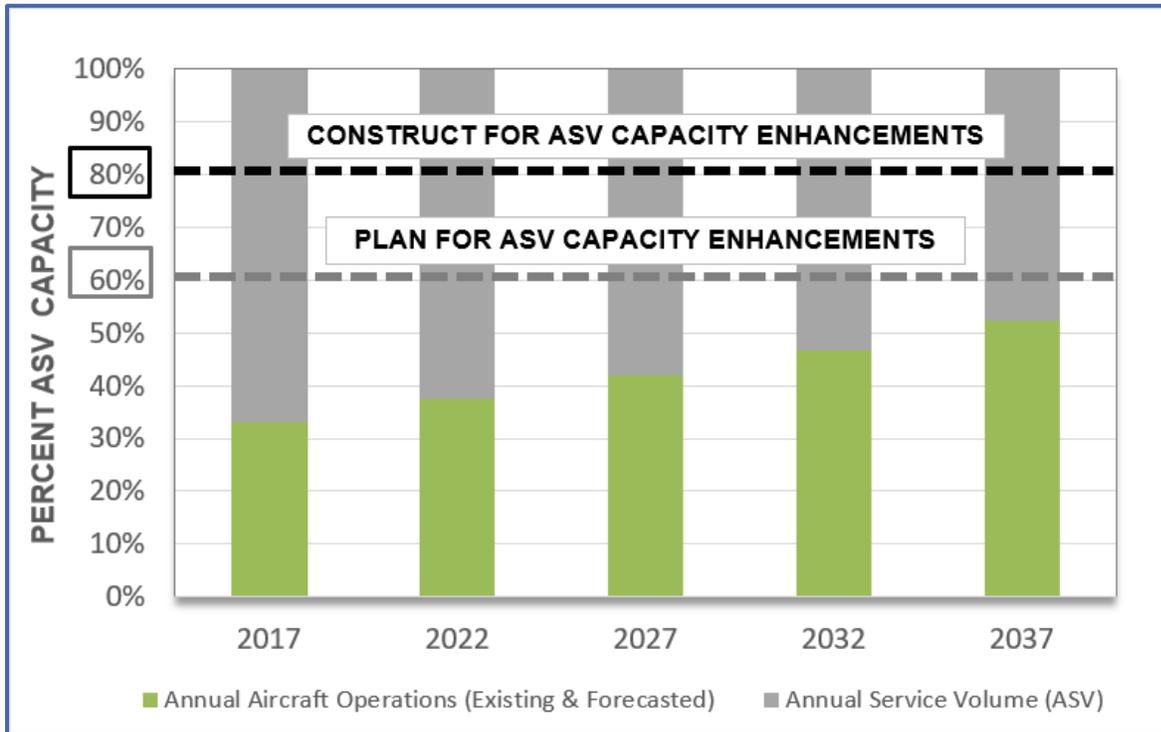
Note: VFR Traffic: FAA ASV Diagram 3-3 and 3-4 | IFR Traffic: FAA ASV Diagram 3-43 and 3-44.

Note: Peak month, day and hour values computed using FAA ASV formulas.

Note: ASV computation involves using individual and simultaneous runway use.



Exhibit 3-2: Annual Service Volume (ASV) Used



The ASV analysis does not indicate areas of systemic airfield capacity challenges on an annual basis. Future operations do not exceed the FAA 60 percent threshold to trigger planning for airfield capacity improvements. ASV analysis suggests that capacity enhancing improvements should be planned for at 157,200 annual operations; however, this metric can be misleading at airports with highly seasonal activity patterns, such as COE.

COE is much busier during summer months than it is during other times of the year. FAA flight records indicate that 52 percent of annual operations occur in the four months from June to September. In contrast, only 14 percent of annual operations occur in the four months from November to February. The level of summer activity can cause delay as aircraft wait to access runways, backing up taxiways and interfering with airfield circulation. For this reason, ASV is not the only metric used to assess airfield capacity and make recommendations for capacity improvements. The Plan considers peak hour demand to augment ASV findings.



Peak Hour Volume Delay Analysis

Airport traffic counts indicate that there were up to 60 peak hour operations during the peak month in 2017. Should seasonal activity remain similarly distributed in the future, there will be 115 operations per hour by 2037. The existing average delay per aircraft is estimated at 20 seconds in 2017, increasing to 40 seconds in 2037.

Individual aircraft may experience delays greater than the average 20 seconds during peak hour operations. Table 2-2 in FAA AC 5060-5 notes that for this runway configuration, an average delay of 2.6 minutes is considered low. While planning for runway capacity and delay improvements are not expected to be needed for COE there are identified points of congestion in airfield circulation.

Airfield Design and Peak Hour Capacity

Some forms of delay can be mitigated through airfield design. Improvements will be developed as part of **Chapter 4**, and Exhibit **3-3** illustrates the location of airfield circulation focus areas that can be modified to improve traffic flow and reduce delay during peak periods. The circulation focus areas are described below.

- #1:** Taxiway D at Runway End 2 has potential to become congested with activity on the FBO apron, the runway, and taxilanes. Circulation restrictions can occur when multiple aircraft are holding for the runway.
- #2:** Taxiway A at Runway End 2 has potential to become congested with activity on the taxilanes and aircraft holding for the runway.
- #3:** Taxiway A at Runway End 24 has potential to become congested with activity coming in and out of the U.S. Forest Service (USFS) area conflicting with aircraft holding at Runway End 24.
- #4:** Taxiway D at the crossing of Runway 6/24 is in the middle third of the runway. FAA design guidance recommends that taxiways cross runways in the first and last third, but not in the middle. FAA design guidance permits exit taxiways in the middle third of the runway.
- #5:** Taxiway L at Runway End 24 also serves Runway End 20 for aircraft on the north side of the Airport. As the north side develops, it is expected that an increasing number of aircraft will require access to and from both runways at this location, which may lead to congestion.



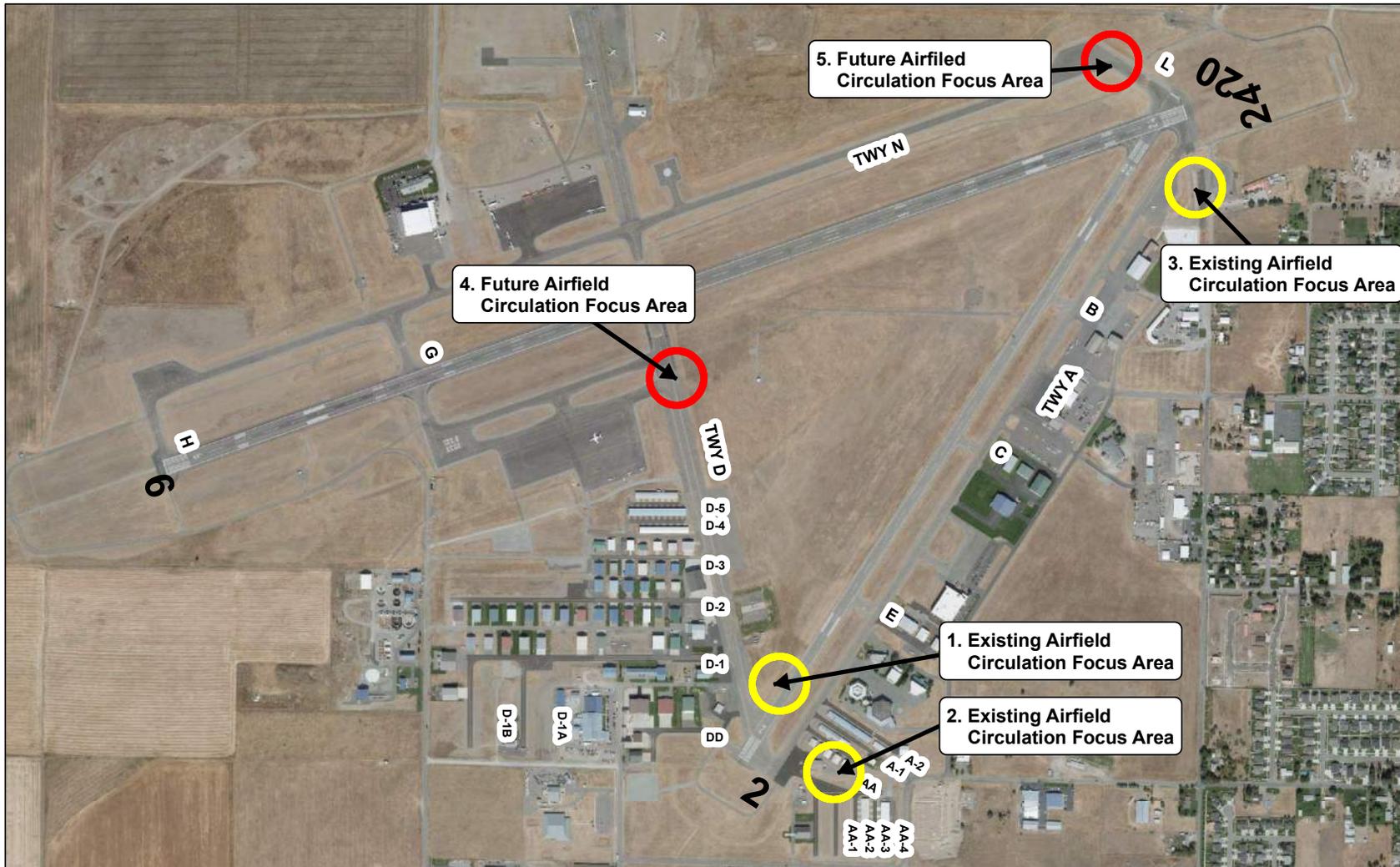
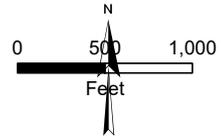


Exhibit 3-3 Airport Circulation Focus Areas



Airport Capacity Findings:

The following are findings of the ASV and peak hour capacity analyses, and recommendations to be carried forward into **Chapter 4, Improvement Alternatives**.

- ▶ The airfield configuration provides adequate capacity for the 136,900 annual operations forecasted for 2037 as the demand approaches but does not exceed 60 percent of the ASV (capacity).
- ▶ FAA traffic counts indicate that 52 percent of annual aircraft operations occur from June to September, and up to 60 operations per hour (one per minute) can occur during the summer. Delays during these peak months will increase as the Airport becomes busier.
- ▶ There are locations on the airfield where runway and taxiway geometry can be designed to reduce potential for delay – shown in **Exhibit 3-3**.

Airport Capacity Recommendations:

- ▶ Facility expansion and development should be evaluated with respect to airfield capacity. Airfield circulation improvements may be needed when expansion and development projects are likely to cause aircraft queuing.
- ▶ A full-parallel taxiway system with bypass and run-up areas should be considered for each runway end to help alleviate congestion and delay during peak periods.

RUNWAY ALIGNMENT

Wind data from the COE Automated Weather Observation System (AWOS). Runway alignment should be dictated by prevailing wind patterns. Crosswinds, when the wind direction and runway direction are not aligned, can adversely impact landing aircraft. Runway crosswind coverage, expressed as a percent of time, is assessed by reviewing the wind direction in relation to runway orientation. FAA design standards state that if the primary runway is not aligned with the prevailing wind 95 percent of the time annually, then a crosswind runway may be justified.

Crosswind Standards and Analysis

The windspeed threshold for crosswind coverage depends on the type of aircraft that use the runway. Runway 6/24 is built for ARC C-III aircraft and the crosswind threshold is 16 knots. This means that the runway should be aligned with the prevailing wind up to 16 knots at least 95 percent of the time. Runway 2/20 is built for ARC B-II and the crosswind threshold is 13 knots.

Table 3-2 shows the runway crosswind coverage for individual and combined runways during all-weather, instrument, and visual conditions. The crosswind coverage was computed using 10



years of wind observations (2007-2017) and filtered for daytime period from 7 AM to 7 PM, which captures the majority of operations at the airport.

Table 3-2: Runway Crosswind Coverage (7AM to 7PM Wind Observation Period)

Runway	10.5-Knot	13-Knot	16-Knot	20-Knot
All-weather wind data observations (percent coverage)				
Runway 6-24	94.15%	97.61%	99.60%	99.98%
Runway 2-20	97.70%	99.22%	99.84%	99.96%
Runway 6-24 & Runway 2-20	99.27%	99.82%	99.97%	100.00%
Instrument wind data observations (percent coverage)				
Runway 6-24	95.28%	97.89%	99.59%	99.96%
Runway 2-20	99.25%	99.73%	99.90%	99.95%
Runway 6-24 & Runway 2-20	99.73%	99.91%	99.98%	100.00%
Visual wind data observations (percent coverage)				
Runway 6-24	94.05%	97.57%	99.65%	99.96%
Runway 2-20	97.57%	99.16%	99.81%	99.94%

Crosswind Coverage Per FAA Runway Design Code (RDC):

10.5 Knots = A-I, B-I | 13.0 = A-II, B-II | 16 Knots = A-III, B-III, C-I, C-II, C-III, D-I, D-II, D-III

Crosswind Coverage Color Coding:

Greater than 95%
Less Than 95%
Beyond Runway Design Code

Runway Alignment Findings:

- ▶ Both runways provide acceptable wind coverage for their design aircraft; however, Runway 6/24 provides less than 95 percent wind coverage for ARC A-I and B-I aircraft.
- ▶ Prevailing winds are most favorably with Runway End 2, and Runway 2/20 provides greater than 95 percent wind coverage for ARC A-I and B-I aircraft.
- ▶ The demand forecasts indicate that ARC A-I and B-I aircraft performed 95 percent of annual aircraft operations.
- ▶ As shown in Exhibit 3-1, 75 percent of all aircraft operations occur on Runway 2/20.

Runway Alignment Recommendations:

- ▶ The two-runway system at COE should be maintained to provide adequate wind coverage throughout the year.



- ▶ Although the crosswind runway is not needed for wind coverage for aircraft larger than A-I and B-I by FAA design recommendations, consideration should be given to how aircraft use Runway 2/20. It is better aligned with the prevailing winds than Runway 6/24. Pilots and Airport operations staff have indicated that business jets prefer to land on Runway 2/20, particularly in the winter, because it is better aligned with the wind.
- ▶ Improvement alternatives should consider maintaining Runway 2/20 as a B-II runway and assess the impact to Airport operations should Runway 2/20 be reclassified as a B-I runway.

RUNWAY LENGTH ANALYSIS

The runway length analysis recommends the length necessary to meet existing and future demand. The analysis identifies a single length for each runway and is prepared in consideration of aircraft design characteristics and annual activity levels.

FAA Advisory Circular 150/5325-4B, “Runway Length Requirements for Airport Design” (AC 5325-4B) provides guidance for this assessment. For planning purposes, the recommended runway length should be suitable to meet the takeoff and landing requirements of the most demanding aircraft (or family of aircraft with similar characteristics) that exceed the substantial use threshold.

Runway length is not necessarily determined by the largest or heaviest aircraft that use the Airport. The U.S. Forest Service aircraft that operate at COE have larger wingspans and higher maximum takeoff weights (MTOW) than many of the business jets; but business jets generally require more runway length. This section considers the length of the runway only. Aircraft approach category (AAC) and aircraft design group (ADG), described in **Chapter 3**, do not have direct bearing on runway length. The design aircraft for runway length is not necessarily the same aircraft (or group of aircraft) that will be used to assess runway geometry.

Runway Length Terms

Design Aircraft:

The aircraft (or group of aircraft with similar characteristics) with the greatest runway length requirements that meet the substantial use threshold.

Similar Characteristics:

Aircraft having comparable operational performance or physical dimensions.

Substantial Use Threshold:

FAA-funded projects require design aircraft to have at least 500 annual operations (landings and takeoffs) to demonstrate “substantial use.” The substantial use threshold can be met by an individual aircraft or a family of aircraft with similar characteristics.

Useful Load:

The amount of payload and fuel that an aircraft can carry. The useful load is the difference between the operating empty weight and the maximum takeoff weight.



Runway length is assessed using the following steps.

- ▶ Select the design aircraft (or family of aircraft).
- ▶ Find appropriate runway length assessment method in AC 5325-4B.
- ▶ Input factors that influence runway length (temperature, elevation, safety factors).
- ▶ Determine recommended runway length based on AC 5325-4B.
- ▶ Assess existing runway length adequacy and gauge benefit of extension.
- ▶ Adjust runway length if necessary, provide recommended runway length.

The following sections cover these six steps and explain how the recommended runway length was determined.

Step 1: Select the Design Aircraft (or Family of Aircraft)

AC 5325-4B categorizes runway length design aircraft as small (MTOW of less than 12,500 pounds), large (MTOW of between 12,500 pounds and 60,000 pounds), and as having a MTOW of more than 60,000 pounds. There are different methods of runway length analysis recommended for each. The FAA Traffic Flow Management System Counts (TFMSC) and **Chapter 2 Demand Forecasts** show that business jets categorized as large aircraft exceeded the substantial use threshold at COE with 2,734 operations in 2017 and 4,520 operations in 2037. Counts are included as **Attachment 1**.

Aircraft with a MTOW of more than 60,000 pounds do not meet the substantial use threshold and are not used to determine recommended runway length. TFMSC show 220 operations by business jets with a MTOW of more than 60,000 pounds in 2017. These aircraft are generally in ADG II or III and part of the fleet mix used to determine pavement strength; therefore, the airfield is designed to accommodate them. If these aircraft use COE more frequently in the future, then the recommended runway length should be revisited.

Runway length assessment uses AC 5325-4B methods for large aircraft in this assessment.

Step 2: Find Appropriate Runway Length Assessment Method

AC 5325-4B has four possible takeoff performance charts for the selected family of design aircraft. The charts differ based on whether the aircraft is operating at 60 percent of useful load or 90 percent of useful load, and whether the fleet mix under consideration represents 75 percent of the fleet, or 100 percent of the fleet. In general, 75 percent of the fleet aircraft are smaller than 100 percent of the fleet aircraft, and specific types are shown in AC 5325-4B.



The rationale for the selection of takeoff performance charts is that the Airport should plan to accommodate the users of the national airspace system that exceed the substantial use threshold. Aircraft operations counts are presented in **Attachment 1** and summarized in **Step 5**. The counts show that COE should have at least one runway capable of handling 100 percent of the fleet without requiring these aircraft to sacrifice payload during normal summer weather.

The crosswind runway does not need to be built to the same standards as the primary runway. It typically serves smaller aircraft (a function of its existing length, width, alignment, and instrumentation). Aircraft that are unable to use the crosswind runway due to insufficient length can use the primary runway. As a system of runways, COE should be able to support the full range of aircraft that routinely use the Airport under normal conditions.

The following takeoff performance charts were chosen for runway length analysis.

Runway 2/20: 75 percent of the fleet operating at 60 percent of useful load

Runway 6/24: 100 percent of the fleet operating at 90 percent of useful load

Step 3: Input factors that Influence Runway Length

Aircraft takeoff performance is influenced by environmental factors (elevation, temperature, and runway surface conditions) aircraft settings (engine thrust setting, takeoff weight, flap setting, etc.), and FAA safety margins to account for rejected takeoff and runway overrun. This provides for adequate runway length when an aircraft needs to decelerate and stop part-way through a takeoff, and when an aircraft is unable to stop as quickly as it should on landing. Aircraft settings and FAA safety margins are generally accounted for by the AC 5325-4B curves; therefore, this step focuses on environmental factors. FAA safety margins are explained for clarity.

Elevation

Runway length requirements are greater at high elevations than they are at lower elevations – all other factors being equal. Unlike other variables in a runway length analysis, elevation is constant. The field elevation at COE is 2,320 feet above mean sea level (AMSL).

Temperature

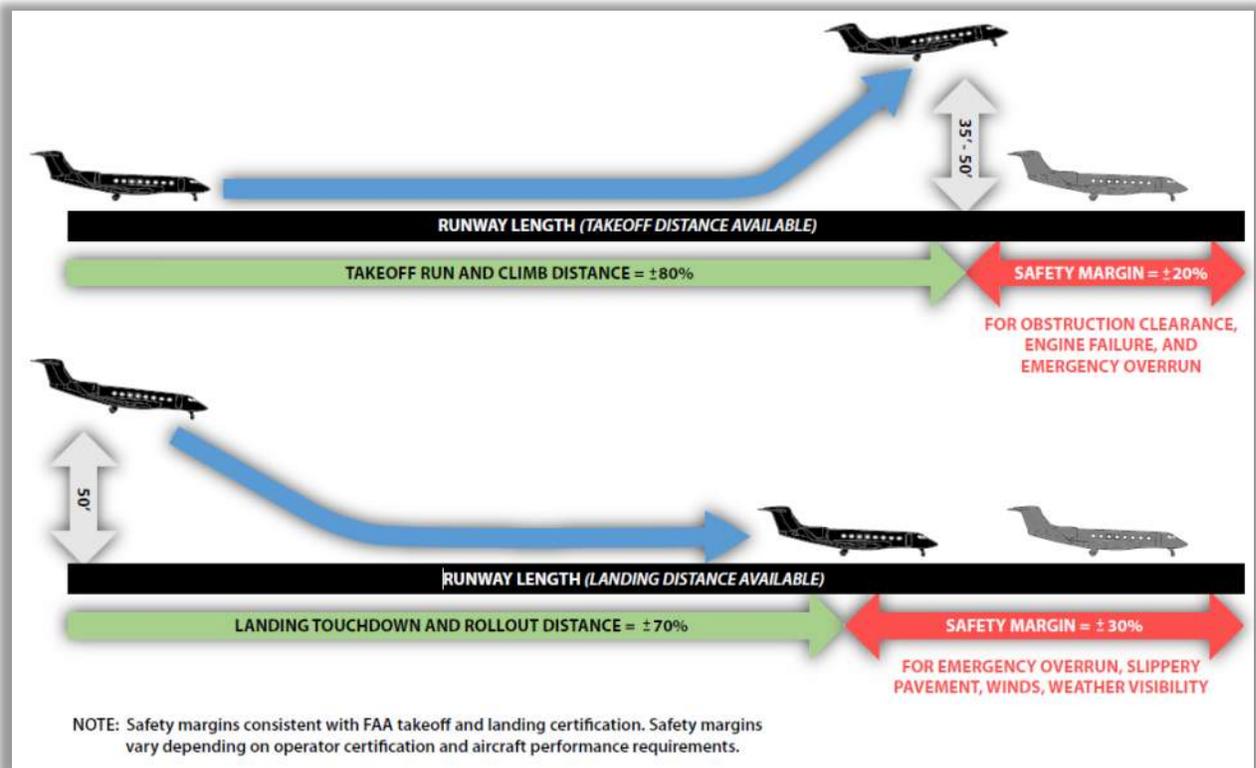
Temperature affects air density and runway length requirements are greater during hotter temperatures than they are during cooler temperatures – all other factors being equal. Temperature varies throughout the year and AC 5325-4B recommends that runway length assessment uses the average daily high temperature of the hottest month. The hottest month at COE is typically July or August, and the average high temperature during these months is 85° Fahrenheit.



FAA Runway Safety Margins

FAA safety margins that influence runway takeoff and landing distance add required runway length beyond what is recommended by the manufacturer. These margins provide runway length to account for emergency conditions such as loss of braking ability and rejecting a takeoff. The FAA safety margins can increase runway length by up to 20 percent for departing aircraft and 30 percent for arriving aircraft. FAA safety margins include allowances for runway gradient and “wet and slippery” conditions. Examples of FAA safety margins are shown in **Exhibit 3-4**.

Exhibit 3-4: FAA Runway Safety Margins



Use of Environmental Factors in AC 5325-4B Takeoff Performance Charts

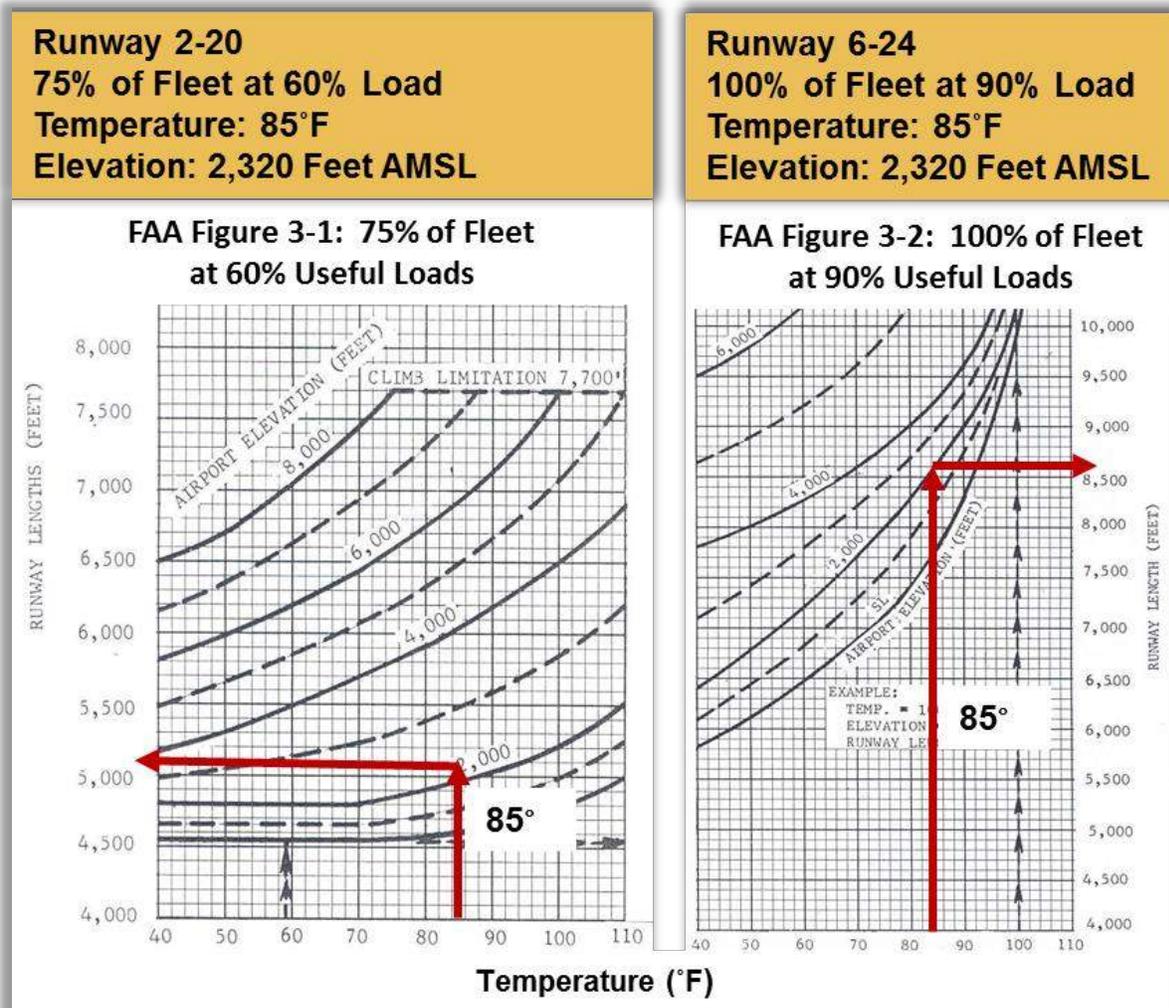
AC 5325-4B requires users to input airport elevation and temperature for the selected aircraft fleet to produce a recommended runway length. The takeoff performance charts feature seven elevation curves at 1,000-foot increments, from sea level to 6,000 feet above mean sea level. The model, shown in **Step 4**, illustrates the effect that temperature and elevation have on aircraft performance and required runway length, and how variation in temperature can as much as double runway length required.



Step 4: Determine the Recommended Runway Length

The recommended runway length is determined using the charts discussed in Step 2 and the environmental factors discussed in Step 3. The AC 5325-4B charts have temperature on the horizontal axis and recommended runway length on the vertical axis. Runway length is determined by drawing a vertical line from the bottom of the chart to the curve that best matches Airport elevation (2,000 feet for COE), then drawing a horizontal line from the intercept of the vertical line and the elevation curve to show the recommended runway length. The results are presented in Exhibit 3-5

Exhibit 3-5: FAA Runway Length Charts



The recommended length for Runway 2/20 is 5,100 feet and the recommended length for Runway 6/24 is 8,600 feet. These lengths are expected to accommodate the design aircraft throughout the year; however, there will be occasions when some aircraft may need to make concessions (takeoff with less weight) to operate at COE. The magnitude of this impact is assessed in **Step 5**.

Step 5: Assess Existing Runway Length and Gauge Extension Benefit

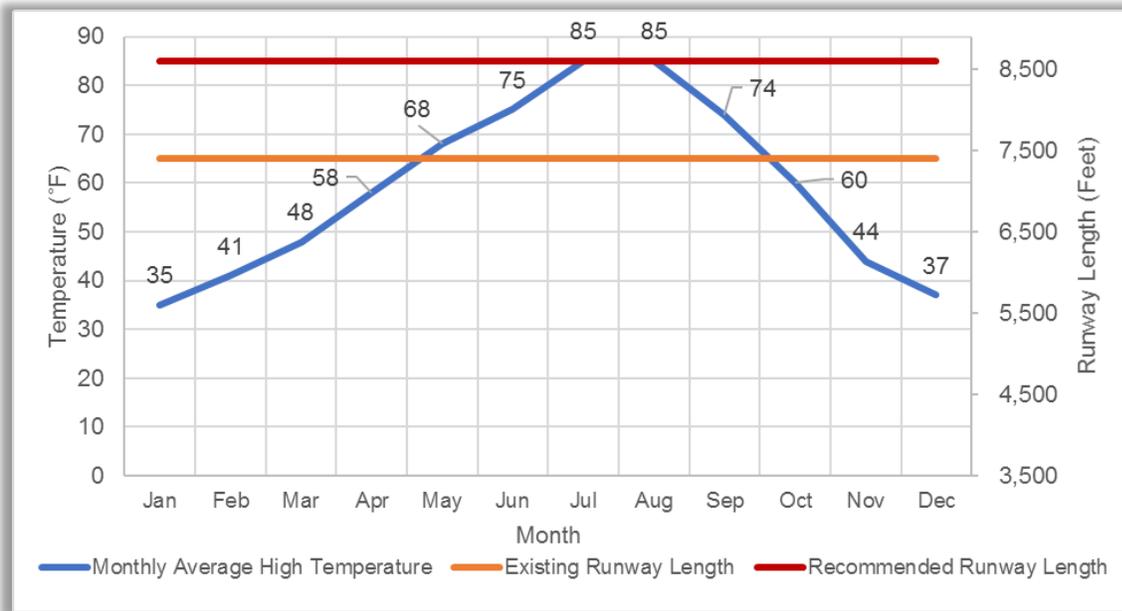
Runway 2/20 is 5,400 feet long, and it is recommended that the runway be at least 5,100 feet long. Therefore, it is expected that the length of Runway 2/20 is adequate. Runway 6/24 is 7,400 feet long and it is recommended that the runway be at least 8,600 feet long, a difference of 1,200 feet. Therefore, it is possible that Runway 6/24 is too short for some of the existing users of the Airport under certain circumstances, and that an extension may provide benefit for Airport users.

Potential benefit of a runway extension is measured by a two-step process. The first step is to quantify the number of days when the temperature is hot enough that a length longer than 7,400 feet is recommended by the AC 5325-4B takeoff performance charts. The second step is to quantify the number of aircraft operations that could be potentially impacted.

The AC 5325-4B performance charts in **Exhibit 3-5** are generally used to determine runway length based on temperature and elevation, but they can also be used to determine temperature based on length and elevation by working backwards. A 7,400-foot-long runway is recommended when the temperature is 62°F for the 2,000-foot elevation curve. This means that at the elevation of COE, the existing runway is shorter than recommended when the temperature exceeds 62°F. As shown in **Exhibit 3-6**, there are five months when the daily high temperature exceeds 62°F. The annual average high at COE is 62°F; however, it is not known if this was the reason behind the existing runway length, or if this is a coincidence.



Exhibit 3-6: Temperature Effect on Runway Length



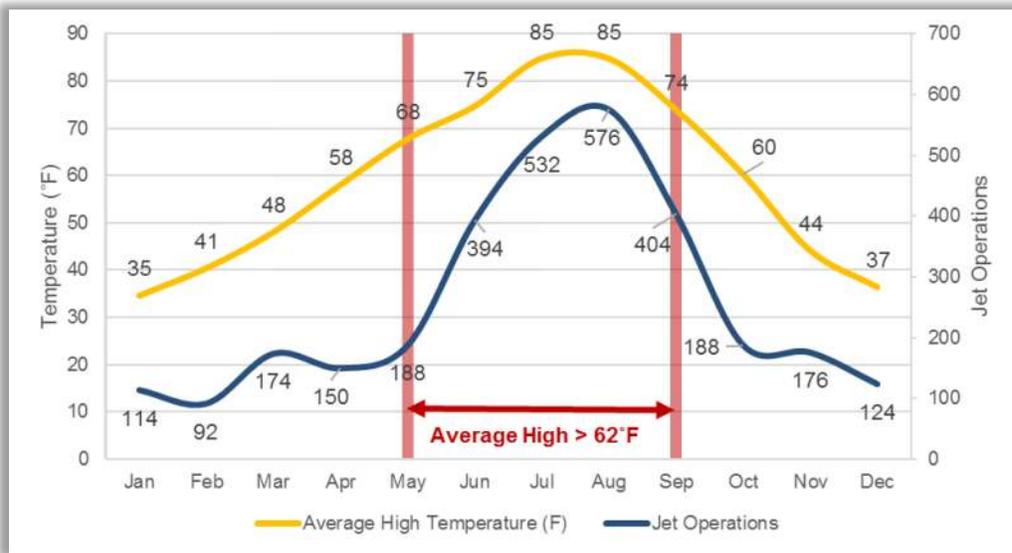
Existing runway length = 7,400 feet, recommended runway length = 8,600 feet at 85°F (AC 5325-4B).
 Source: National Oceanic and Atmospheric Administration (NOAA) and COE weather station.

The next step is to quantify operational impact based on existing and projected activity levels. The TFMSC database provides operations counts by month. Data was collected for FAA fiscal year 2017, the most recent complete year available. Demand forecasts, included in **Chapter 2**, were used to assess trends over the past ten years, and to project future activity levels through 2037. Runway length requirements were paired with the operations data and impact was assessed by determining how many operations by aircraft needing a longer runway occurred between May and September, when 7,400 feet may not have been sufficient.

Exhibit 3-7 presents the 2017 TFMSC counts for all jet operations and the monthly average high temperatures. In 2017, 72 percent of all jet operations occurred during months when daily high temperatures may result in weight limitations due to runway length.

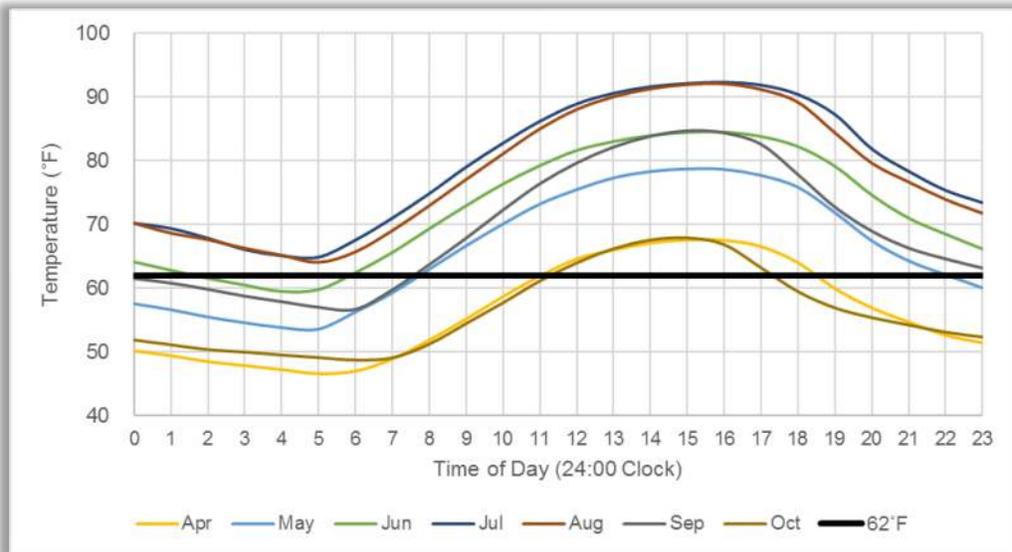


Exhibit 3-7: 2017 Monthly High Temperatures and Jet Operations



Aircraft operations occur throughout the day, and not necessarily during the hottest part of the day. To more thoroughly assess potential impact to activity throughout the day, traffic counts collected by the Airport for 14 days in July 2017, and ten days in December 2017 and January 2018, were compared to the average high temperature per hour for each month. This comparison shows when jet operations typically occur at COE, and what the average temperature is at that time. This assessment is shown in **Exhibit 3-8** and **Exhibit 3-9**.

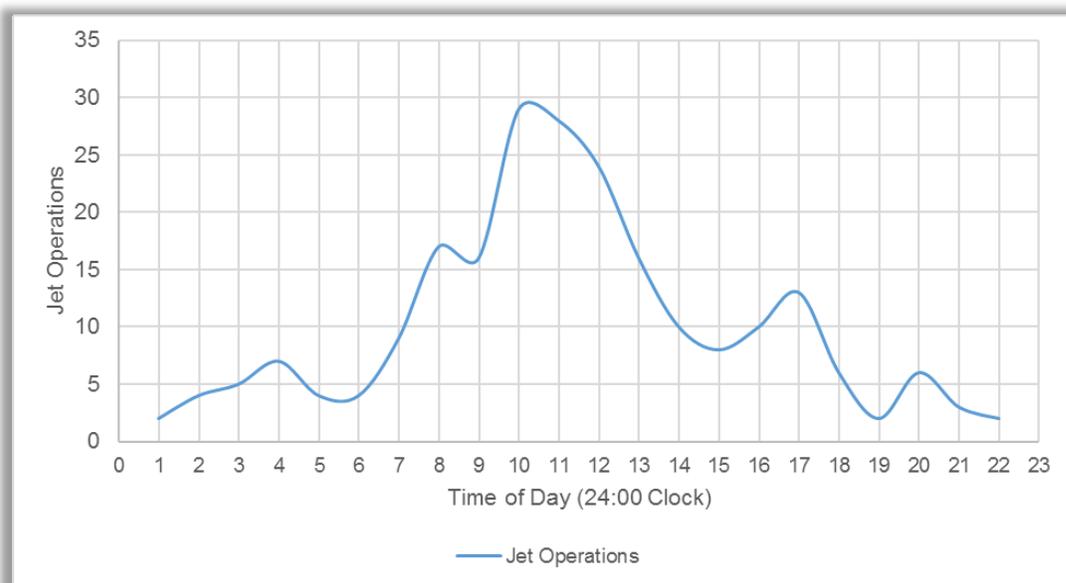
Exhibit 3-8: Temperature by Hour



Source: NOAA National Centers for Climate Information, Hourly Normal Temperatures from 1981-2010
 The high in Jan., Feb., Mar. Nov., and Dec. do not exceed 62°F so these months are not included.



Exhibit 3-9: Jet Operations by Hour



Source: COE Traffic Counts, July 1-14, December 23-31, 2017 and January 2, 2018. Jet operations only.

The results indicate that jet operations peak at 10:00 a.m., with smaller upticks in activity at 8:00 a.m. and 5:00 p.m. In warmer months, the average high temperature exceeds 62°F during peak periods of jet activity. Distribution of jet operations throughout the day from summer and winter the traffic count samples are applied to the TFMSC operations counts throughout the year. This information is compared to the hourly average high temperatures to estimate how many operations, by aircraft type, occurred when the temperature was above 62°F. These data are included as **Attachment 2** and summarized in **Table 3-3**.

Table 3-3: Operations Impacted by High Temperatures

Month	Jet Operations	Hours Temp. Above 62°F	Jet Operations When Above 62°F	Percent of Total Operations
April	150	1200-1800	59	39%
May	188	0800-2200	158	84%
June	394	0600-0200 ¹	363	91%
July	532	0000-2300 ²	532	100%
August	576	0000-2300 ²	576	100%
September	404	0800-2300	342	84%
October	188	1200-1700	67	36%

1: Temperature above 62°F until 0200 the next day. 2: Temperature above 62°F all day.

Source: Jet operations from 2017 FAA TFMSC. Temperature data from NOAA.



Potentially impacted operations are estimated by multiplying the number of aircraft observed in the hot months by the average percent of operations that occur in the months when the average high temperature exceeds 62°F. The runway length assessment presents total operations for aircraft in the remaining 25 percent of the fleet, and aircraft over 60,000 pounds that operated more than ten times in 2017. While the recommended runway length is set by the remaining 25 percent of the fleet, aircraft that weigh over 60,000 pounds occasionally require a runway longer than 7,400 feet and should be considered when evaluating the overall benefit of a future extension. The results of the runway length assessment are presented in **Table 3-4**.

Table 3-4: Runway 6/24 Length Assessment

Aircraft Type	Runway Length	Surplus (Deficit)	Operations		Impacted Ops.	
			2017	2037	2017	2037
Remaining 25% of Fleet	8,600'	(1,200')	974	1,622	662	1,104
Aircraft Over 60,000 Pounds	See Below					
Avro RJ-85* (Seasonal)	5,400'	2,000'	540	810	0	0
Gulfstream G450*	8,100'	(700')	118	196	86	142
Gulfstream G500	8,100'	(700')	40	68	28	46
Gulfstream G650	8,400'	(1,000')	28	48	20	34
Bombardier Global Express	8,400'	(1,000')	24	42	18	30
TOTAL			3,662	5,904	814	1,356

Sources: FY2017 Operations: TFMSC and U.S. Forest Service. FY2037 Operations: FAA-Approved Forecasts. Surplus / (Deficit) calculations based on existing 7,400-foot long runway. Ops. = Operations
Impacted operations calculated based on the percent of operations that are estimated to occur when temperature exceeds 62°F.

The analysis summarized in **Table 3-4** estimates that 662 operations by aircraft in the remaining 25 percent of the fleet occurred when the temperature exceeded 62°F in fiscal year 2017. Demand forecasts project that 1,104 operations may occur when the temperature exceeds 62°F in fiscal year 2037. Over 152 operations by aircraft that weigh over 60,000 pounds may have been impacted in 2017, and that number is expected to grow to 252 by 2037.

TFMSC data does not provide takeoff weight information so it is not possible to tell whether all these operations needed the maximum runway length available. However, FAA airport planning guidance recommends that airports plan to provide the necessary runway length so that aircraft that use the Airport frequently do not need to make performance concessions in the event they wish to take off at maximum takeoff weight.



Step 6: Runway Length Adjustments and Length Recommendation

Information presented in the previous five steps shows that runway extension to 8,600 feet may benefit the existing operators of COE by allowing them to carry more weight on takeoff, thus operating their aircraft to their full potential when they need to. **Exhibit 3-10** shows that a runway extension of up to 1,200 feet, for a total length of 8,600 feet, will allow 100 percent of the business jet fleet that weigh less than 60,000 pounds to takeoff at up to 90 percent useful load.

Runway Length Findings:

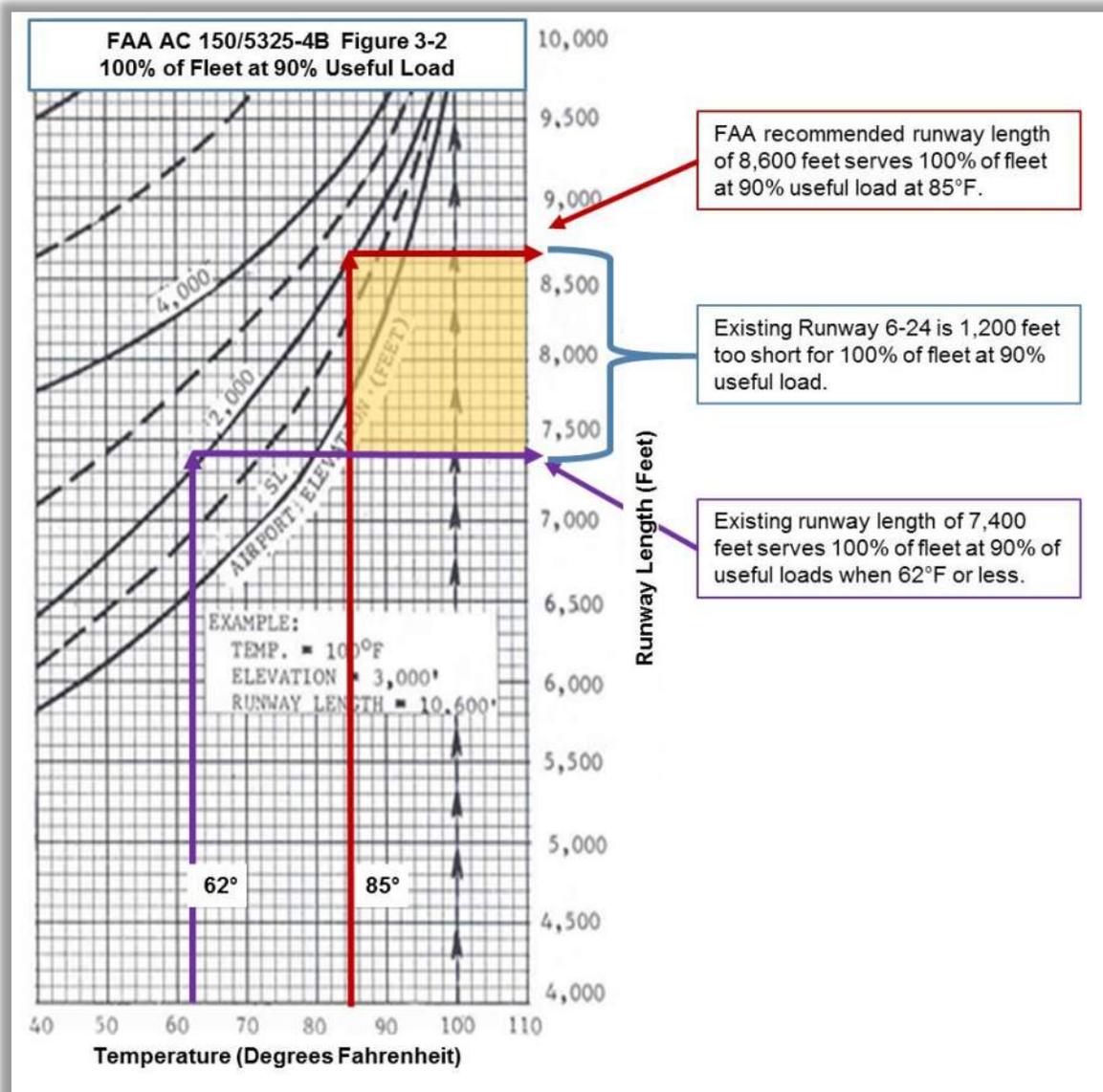
- ▶ Runway length was determined by the methods outlined in AC 5325-4B.
- ▶ Analysis considered specific aircraft type, time of year, and time of day.
- ▶ Jet operations at COE occur most frequently in the summer months and tend to occur during daylight hours when temperatures are higher than at night.
- ▶ Crosswind Runway 2/20 provides adequate length for 75 percent of the business jet fleet under 60,000 pounds MTOW.
- ▶ Primary Runway 6/24 does not provide adequate length for the remaining 25 percent of the business jet fleet under 60,000 pounds MTOW when the temperature exceeds 62°F.
- ▶ The average monthly high temperature exceeds 62°F from May to September, and 81 percent (2,964 of 3,644) of jet aircraft operations recorded by TFMSC and the user surveys occurred during these months in fiscal year 2017.
- ▶ The average hourly high temperature exceeds 62°F for at least part of the day from April to October, and 71 percent (2,598 of 3,644) jet aircraft operations recorded by TFMSC and user surveys occurred during these hours in fiscal year 2017.
- ▶ TFMSC and user surveys report that of the 2,598 business jet operations, 662 were performed by the remaining 25 percent of the fleet in fiscal year 2017. Demand forecast project that this number will grow to 1,104 in fiscal year 2037.
- ▶ TFMSC reports that of the 2,598 business jet operations, there were 152 operations by business jets with a MTOW greater than 60,000 pounds that may need a longer runway. Demand forecasts project that this number will grow to 252 by fiscal year 2037.
- ▶ The number of annual operations by aircraft that could benefit from a longer runway exceeds the FAA substantial use threshold of 500 operations.



Runway Length Recommendations:

- ▶ Runway 2/20 should be maintained at a length of at least 5,000 feet if it is to remain a B-II runway. A shorter length can be considered if the design aircraft changes.
- ▶ It is recommended that the Airport preserve property to extend primary Runway 6/24 to a length of 8,600 feet to accommodate the most demanding users that exceed the FAA substantial use threshold.

Exhibit 3-10: FAA Runway Takeoff Performance Curves



Source: FAA AC 150/5325-4B Figure 3-2



RUNWAY WIDTH, SHOULDER AND BLAST PAD

Runway width standards are a function of the design aircraft characteristics (airplane design group), aircraft takeoff weight, and runway visibility minimums. FAA terminology for visibility minimums expresses them both in statute miles, and as runway visibility range (RVR), which is expressed in feet. Runway 6/24 is a C-III runway with visibility minimums as low as half a mile (RVR 2,400) and is designed for aircraft that weigh less than 150,000 pounds. Runway 2/20 is a B-II runway with visibility minimums as low as one mile (RVR 5,000) and is designed for aircraft that weigh more than 12,500 pounds but less than 150,000 pounds.

Runway 6/24 (Primary):

Runway 6/24 is 100 feet wide, meeting the FAA recommended width of 100 feet. The runway shoulders are 20 feet wide, meeting the FAA recommended width of 20 feet. Runway 6/24 does not have blast pads. FAA standards recommend that runways that handle jet operations have blast pads to reduce erosion in the safety areas. The recommended runway blast pad dimensions are 140 feet wide by 200 feet long.

Runway 2/20 (Crosswind):

Runway 2/20 is 75 feet wide, meeting the FAA recommended width of 75 feet. The runway shoulders are 12 feet wide, exceeding the FAA recommended width of 10 feet. Runway 2/20 does not have blast pads. FAA standards recommend that runways that handle jet operations have blast pads to reduce erosion in the safety areas. The recommended runway blast pad dimensions are 95 feet wide by 150 feet long.

Runway Width, Shoulder and Blast Pad Findings:

- ▶ The width of both runways and their shoulders meets FAA standards.
- ▶ There are no blast pads at COE.

Runway Width, Shoulder and Blast Pad Recommendations:

- ▶ It is recommended that future capital improvement projects maintain the width of runways and shoulders for both runways.
- ▶ It is recommended that future capital improvement projects consider adding blast pads to runways that are expected to handle jet operations.



INTERSECTING RUNWAY GEOMETRY

As illustrated in **Exhibit 3-11** Runway End 20 and Runway End 24 intersect. FAA design standards recommend that airports avoid the following conditions and correct this type of geometry.

- ▶ Runway Safety Area (RSA) that are overlapping
- ▶ Obstacle Free Zone (OFZ) areas that are overlapping
- ▶ Runway centerline to parallel taxiway centerline with insufficient separation spacing
- ▶ Taxiway connector geometry that is not perpendicular to the runway centerline
- ▶ Converging landing and takeoff during simultaneous runway use.

Intersecting Runway Geometry Findings:

- ▶ Intersecting runway ends are a common feature at airfields across the country. Recent changes in FAA design standards require airports to address intersecting geometry through capital projects when possible.
- ▶ Decoupling of the intersecting runway can be achieved by extending both runway ends to a more traditional crossing runway configuration.
- ▶ Decoupling of the intersecting runway can also be achieved by shortening one runway until the RSA and OFZ are clear.

Intersecting Runway Geometry Recommendations:

- ▶ The intersecting runway end geometry should be corrected by decoupling the runway ends.
- ▶ Consideration should be given to ultimate runway length, width, and intended design aircraft when planning decoupling alternatives.



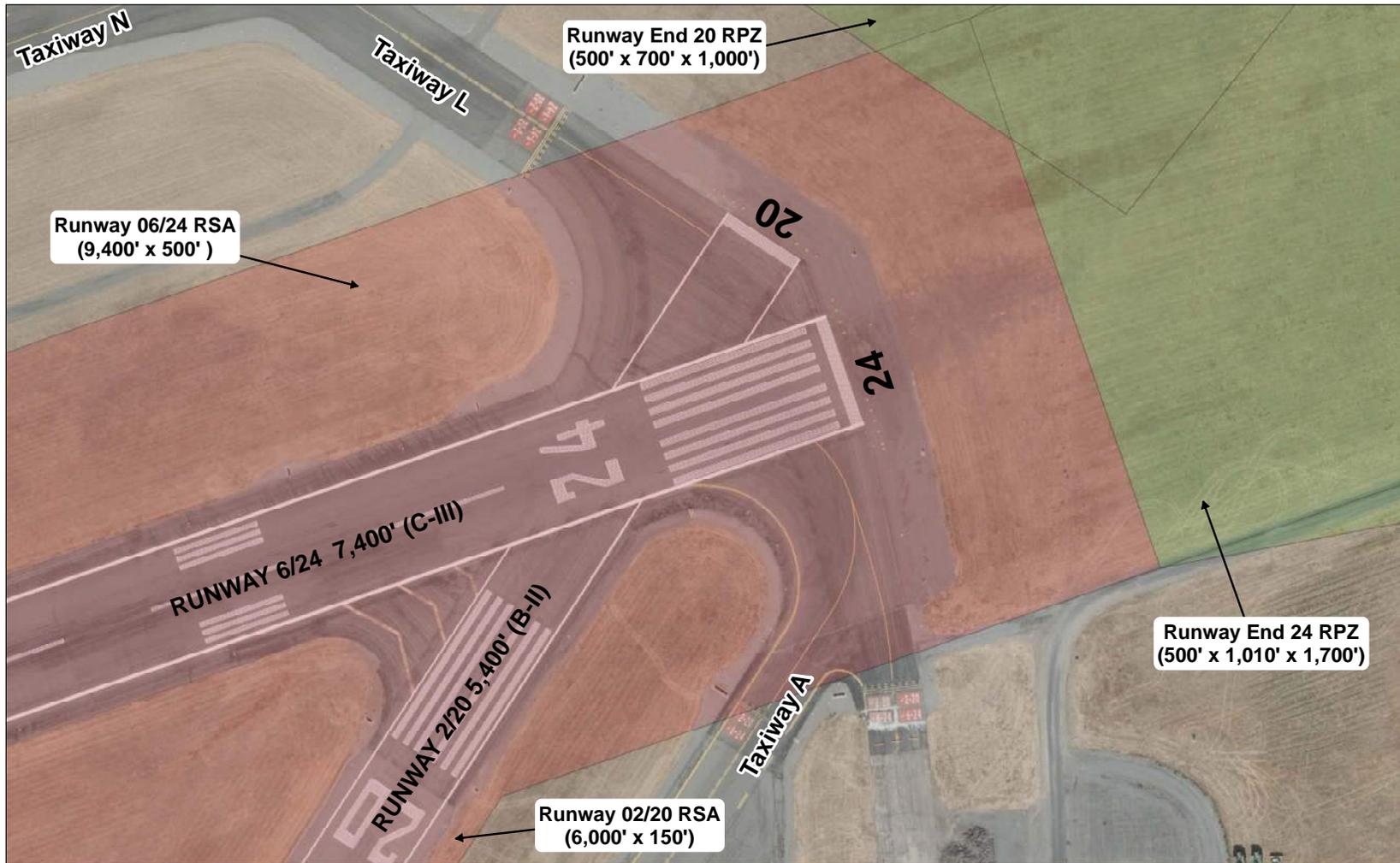
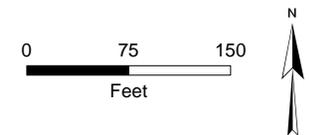


Exhibit 3-11 Runway 24 & 20 Thresholds



RUNWAY PAVEMENT STRENGTH

FAA pavement design considers wear resulting from pavement use based on the fleet of aircraft expected to frequently use the pavement. There is no single critical design aircraft designated for pavement strength. Pavement design strength does not necessarily prohibit airport use by heavier aircraft; however, if an aircraft heavier than the pavement was designed for were to routinely use the Airport, then it would be recommended that pavement strength be increased during the next capital project.

Pavement strength ratings are presented for multiple landing gear configurations. The reason for this is that aircraft with more tires distribute their weight differently than aircraft with fewer tires. For this reason, a section of pavement will have a higher strength rating for aircraft with multiple tires than for aircraft with single tires.

Table 3-5 presents aircraft weight characteristics and recommended aircraft pavement strength requirements.

Runway 6/24: The Runway 6/24 pavement strength is 57,000 pounds single wheel configuration, 95,000 pounds dual wheel gear (DWG), and 165,000 pounds dual tandem wheel gear (DTWG). Runway 6/24 is occasionally used by narrow body jets due to its length, width, and instrument approach capabilities.

Runway 2/20: The Runway 2/20 pavement strength is 50,000 pounds single wheel configuration, 83,000 pounds dual wheel gear (DWG), and 150,000 pounds dual tandem wheel gear (DTWG). The Citation 650, at 16,300 pounds MTOW with single wheel gear (SWG), is the Runway 2/20 critical aircraft. On occasions, Runway 2/20 experiences departing traffic by medium and large-cabin business jets weighting up to 60,000 pounds, and typically operating at less than MTOW.



Table 3-5: Aircraft Weight Characteristics

Aircraft Type/Category	Aircraft Seats (Typical)	FAA ARC	Aircraft Type	Aircraft Maximum Takeoff Weight (MTOW) - Pounds	Gear Type	Applicable Airfield Pavement
Existing Runway 6-24 Pavement Strength: 57,000 (SWG), 95,000 (DWG), 165,000 (DTWG)						
Existing Runway 2-20 Pavement Strength: 50,000 (SWG), 83,000 (DWG), 150,000 (DTWG)						
Airport critical design aircraft						
Avro RJ-85	4	C-III	Transport jet	95,000	DWG	Runway 6-24
Citation 560 Series	8	B-II	GA Business Jet	16,300	SWG	Runway 2-20
Representative aircraft categories						
Narrowbody - BBJ-700	40+	C-III	Transport Jet	110,000 to 145,000	DWG	GA Apron
Large Cabin Business Jet	10 to 16	C/D-III	GA Business Jet	65,000 to 90,000	DWG	GA Apron
Medium Cabin Business Jet	8 to 12	C/D-II	GA Business Jet	28,000 to 60,000	DWG	GA Apron
Small Cabin Business Jet	6 to 8	B/C-II	GA Business Jet	15,000 to 22,000	SWG	GA Apron
Turboprop	4 to 10	B-II	GA Turboprop	10,500 to 15,000	DWG	GA Apron
Single/Twin Piston	2 to 6	A/B-I	GA Piston	2,500 to 6,500	SWG	GA Taxilane
Helicopters	4 - 8	N/A	Turbine	20,000 to 50,000	--	GA Apron
Note: The gear type and configuration dictate how the aircraft weight is distributed to the pavement and determines the pavement response to aircraft loadings. (SWG): single-wheel gear aircraft – each landing gear is supported by a single tire. (DWG): dual-wheel gear aircraft – each landing gear consists of a single axle with two tires per axle that equally share the weight of the aircraft and provide for greater weight distribution.						

Runway Pavement Strength Findings:

- ▶ The existing pavement strength of Runway 6/24 is adequate for the most frequent runway users, although it occasionally is used by heavier narrow-body aircraft.
- ▶ The existing pavement strength of Runway 2/20 is adequate for the most frequent runway users.

Runway Pavement Strength Recommendations:

- ▶ The recommended pavement strength for Runway 6/24 is 100,000 pounds for DWG aircraft. This will accommodate the large business jets and narrow body transports that are expected to use the Airport on a routine basis.
- ▶ The recommended pavement strength for Runway 2/20 is 50,000 pounds for SWG aircraft. This will accommodate the business jets that are expected to use the runway on a routine basis.



RUNWAY DESIGN SURFACES

Runway design surfaces are defined in AC 5300-13A The Runway Design Code (RDC) is used to determine the standards that apply to a specific runway and parallel taxiway to allow unrestricted operations by the design aircraft under desired meteorological conditions. **Table 3-6** shows design standards based on RDC and identifies areas where the standards are not met. Key findings from design standards not addressed previously in this chapter are outline below.

Runway 6/24 RDC is C-III-2400. Runway 2/20 RDC is B-II-5000.

This section will evaluate the following design elements:

- ▶ Runway Safety Area (RSA)
- ▶ Runway Object Free Area (ROFA)
- ▶ Precision Obstacle Free Zone (POFZ)
- ▶ Runway Protection Zone (RPZ)
- ▶ Runway to Taxiway separation standards

Runway Design Criteria Findings:

- ▶ The existing RSA's meet design standards. Runway 6/24 RSA is 500 feet wide and runs the full length plus 1,000 feet past the departure ends. Runway 2/20 RSA is 150 feet wide and runs the full length plus 300 feet past the departure ends.
- ▶ The existing ROFA meet design standards. Runway 6/24 ROFA is 800 feet wide and extends 1,000 feet beyond the runway ends. Runway 2/20 ROFA is 500 feet wide and extends 300 feet beyond the runway ends.

Runway Safety Area (RSA):

Centered on the runway, this area has to be cleared and graded and 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 that need to be located in the RSA because of their function. Objects higher than 3 inches above grade must be constructed, to the extent practical, on frangibly mounted structures

Runway Object Free Area (ROFA):

The ROFA is centered on the runway centerline. The ROFA clearing standard requires clearing the ROFA of above-ground objects protruding above the nearest point of the RSA.

Precision Object Free Zone (POFZ)

The POFZ is defined as a volume of airspace above an area beginning at the threshold at the threshold elevation and centered on the extended runway centerline 200 feet long by 800 feet wide.

Runway Protection Zone (RPZ):

The RPZ is trapezoidal in shape and centered about the extended runway centerline. The central portion and controlled activity area are the two components of the RPZ.

The RPZ function is to enhance the protection of people and property on the ground. Where practical, airport owners should own the property under the runway approach and departure areas to at least the limits of the RPZ. It is desirable to clear the entire RPZ of all above-ground objects. Where this is impractical, airport owners, as a minimum, should maintain the RPZ clear of all facilities supporting incompatible activities.



- ▶ The POFZ is only in effect when 3 conditions are in effect. The approach includes vertical guidance; The reported ceiling is below 250 feet or visibility is less than ¾ statute mile, and; An aircraft is on final approach within 2 miles. Runway 6 is the only runway with instrument approaches with vertical guidance.

The Runway 6 POFZ meets runway design standards at 200 feet long and 800 feet wide.

- ▶ The existing separation distance between Runway 2/20 centerline and parallel Taxiway ‘A’ centerline is 225 feet. This distance is 15 feet short of the 240 feet required.
- ▶ The existing separation distance between the Runway 2/20 centerline and holding position line is 125 feet. This distance is 75 feet short of the 200 feet required.

Table 3-6: Runway Design Criteria Assessment

Runway Design	FAA Design Standards Runway 6-24 RDC C-III-2400	Runway 6-24 D-III-2400		FAA Design Standards Runway 2-20 RDC B-II-5000 (1-mile)	Runway 2-20 B-II-5000 (1-mile)
		Runway End 6	Runway End 24		
*Runway Width	100'	100'		75'	75'
Paved Shoulder Width	20'	± 20'		10'	± 12'
Runway Safety Areas (RSA)					
Length beyond departure end	1,000'	1,000'		300'	300'
Length prior to threshold	600'	600'		300'	300'
Width	500'	500'		150'	150'
Runway Object Free Area (ROFA)					
Length beyond runway end	1,000'	1,000'		300'	300'
Length prior to threshold	600'	600'		300'	300'
Width	800'	800'		500'	500'
Precision Obstacle Free Zone (POFZ)					
Length	200'	200'		N/A	N/A
Width	800'	800'		N/A	N/A
Approach RPZ					
	ILS	ILS	Visual	Non-Precision	Non-Precision / Visual
Length	2,500'	2,500'	1,700'	1,000'	1,000'
Inner Width	1,000'	1,000'	500'	500'	500'
Outer Width	1,750'	1,750'	1,010'	700'	700'
Departure RPZ					
Length	1,700'	1,700'		1,000'	1,000'
Inner Width	500'	500'		500'	500'
Outer Width	1,010'	1,010'		700'	700'
<i>Runway Centerline to:</i>					
Holding position*	250'	250'		200'	125'
Parallel Taxiway / Taxilane centerline	400'	400'		240'	225'
Aircraft parking area	500'	500'		250'	250'
Tan cells indicate noncompliance with RDC standards					
*FAA 150/5300-13A RDC Tables Note 12: Design Aircraft under 150,000 C-III standard for runway width is 100' feet wide					



Runway Design Recommendation:

- ▶ The Runway 2/20 centerline to parallel taxiway centerline separation distance can be corrected by shifting the runway 15 feet to the north, shifting Taxiway 'A' 15 feet to the south, or reducing Runway 2/20 to B-I separation standard of 225 feet. Runway centerline to taxiway centerline alternatives should be evaluated in **Chapter 4 Improvement Alternatives**.
- ▶ The Runway 2/20 centerline to holding position separation distance should be corrected by increasing the distance to 200 feet. Markings layout should be evaluated in **Chapter 4, Improvement Alternatives**.

TAXIWAY SYSTEM ANALYSIS

This section identifies taxiway system recommendations to meet forecast demand and FAA standards.

Taxiway Design Principles

FAA AC 5300-13A provides taxiway design concepts and methodologies outlined in the following section. Several design considerations should be kept in mind when analyzing taxiway layouts as described below.

Increase Pilot Awareness

Taxiway intersections should be kept simple by utilizing the “three-node concept”, which means that a pilot is presented with no more than three choices at each intersection – ideally, left, right, and straight ahead.

Limit Runway Crossings

Opportunities for human error can be reduced by limiting the need for runway crossings, especially crossings within the middle third of runways. Limiting runway crossings to the outer thirds of the runway keeps the portion of the runway clear where pilots can least maneuver to avoid collisions.

Increase Visibility

Right angle intersections provide the best visibility for a pilot. A right angle turn at the end of the parallel taxiway is a clear indication of approaching a runway. Acute angle exit taxiways can improve runway capacity but should not be used for runway entrance or crossing.

Limit Direct Access

Taxiways should not lead directly from an apron to a runway without requiring a turn. Direct access from the apron to the runway can cause incidental runway incursions, particularly for pilots unfamiliar with the airfield that are expecting to encounter a parallel taxiway. Two Taxiway 'A'



connectors supporting Runway 2/20, Taxiway ‘B’ and Taxiway ‘E’, lead directly from the aircraft parking apron to the runway. Taxiway ‘D’ is a long straight section that leads onto Runway 6/24 without direction change and represents a direct access taxiway.

Taxiway Design Group

The Taxiway Design Group (TDG) is based on the Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance. The most demanding aircraft that expected to operate in the future are TDG 2 aircraft. TDG 2 includes the Avro RJ-85 used by the U.S. Forest Service and most medium and large business jets. The Airport sees occasional use by TDG 3 aircraft, such as the Boeing 737 business jet; however, this use does not exceed the substantial use threshold of 500 annual operations. The following are the design aircraft standards applicable to the taxiway systems for existing and future conditions.

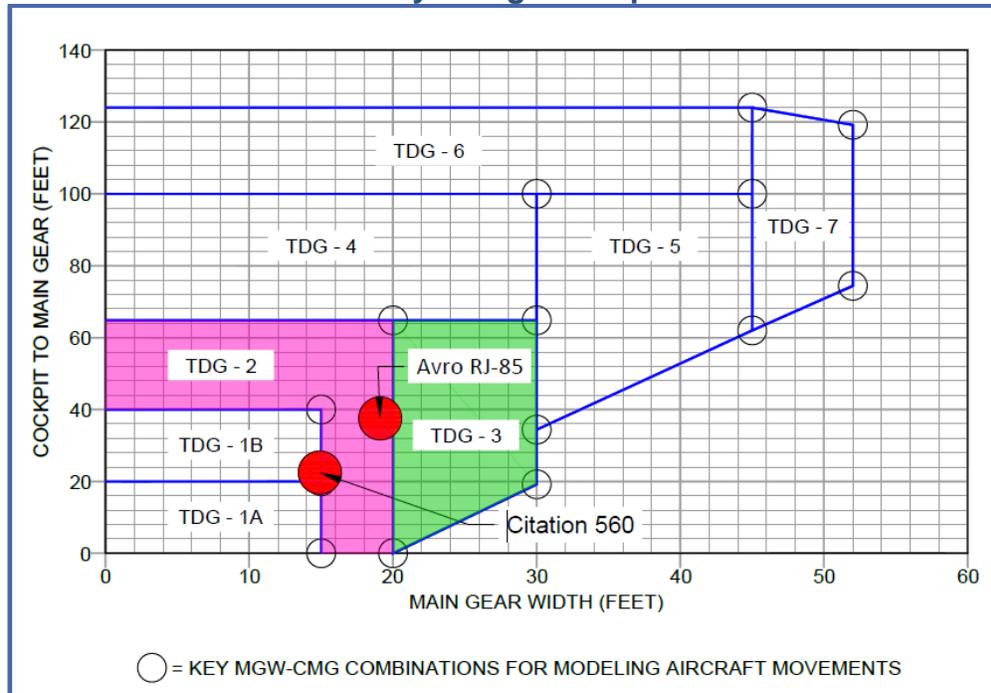
Runway 6/24 Parallel Taxiway System: ADG III, TDG 2 (AVRO RJ-85)

Runway 2/20 Parallel Taxiway System: ADG II, TDG 2 (Citation 500 Series)

Taxiway Dimensional Criteria

ADG III and TDG 2 are appropriate for the design of the taxiway system serving Runway 6/24, and ADG II and TDG 2 are appropriate for Runway 2/20 based on the existing and projected fleet mix at COE, presented in **Chapter 2**. Summary of each taxiway segment design criteria and dimensions are presented in **Table 3-7**. TDG classifications are presented in **Exhibit 3-12**.

Exhibit 3-12: Future Taxiway Design Group Classifications



Source: FAA AC 150/5300-13A, Airport Design



Runway Design Criteria Findings:

- ▶ Taxiway 'D' is a primary crossing point for Runway 6/24 located at midfield where aircraft on the runway are least able to maneuver to avoid a conflict.
- ▶ Taxiway D is a direct runway access with no turn prior to entering the runway and constitutes a runway incursion risk.
- ▶ Runway entrance taxiway are not perpendicular to the runway centerline at the following locations. Exhibit 3-13 displays the runway entrance taxiways that do not meet design standards:
 - Runway 6/24 - Taxiway 'L'
 - Runway 24 - Taxiway 'A'
 - Runway 2 - Taxiway 'A' and Taxiway 'D'
- ▶ Taxiway 'B' is a direct access from apron to runway.
- ▶ Runway 6/24 taxiway system was designed and built to support ADG III and TDG 3 category aircraft. The design standards for Runway 6/24 for existing and future design critical aircraft are ADG III and TDG 2.
- ▶ Runway 2/20 taxiway system was built to support ADG II and TDG 3. The design standards for existing and future design critical aircraft are ADG II and TDG 2.

Table 3-7 summarizes the facility requirements for taxiway design criteria dimensions.



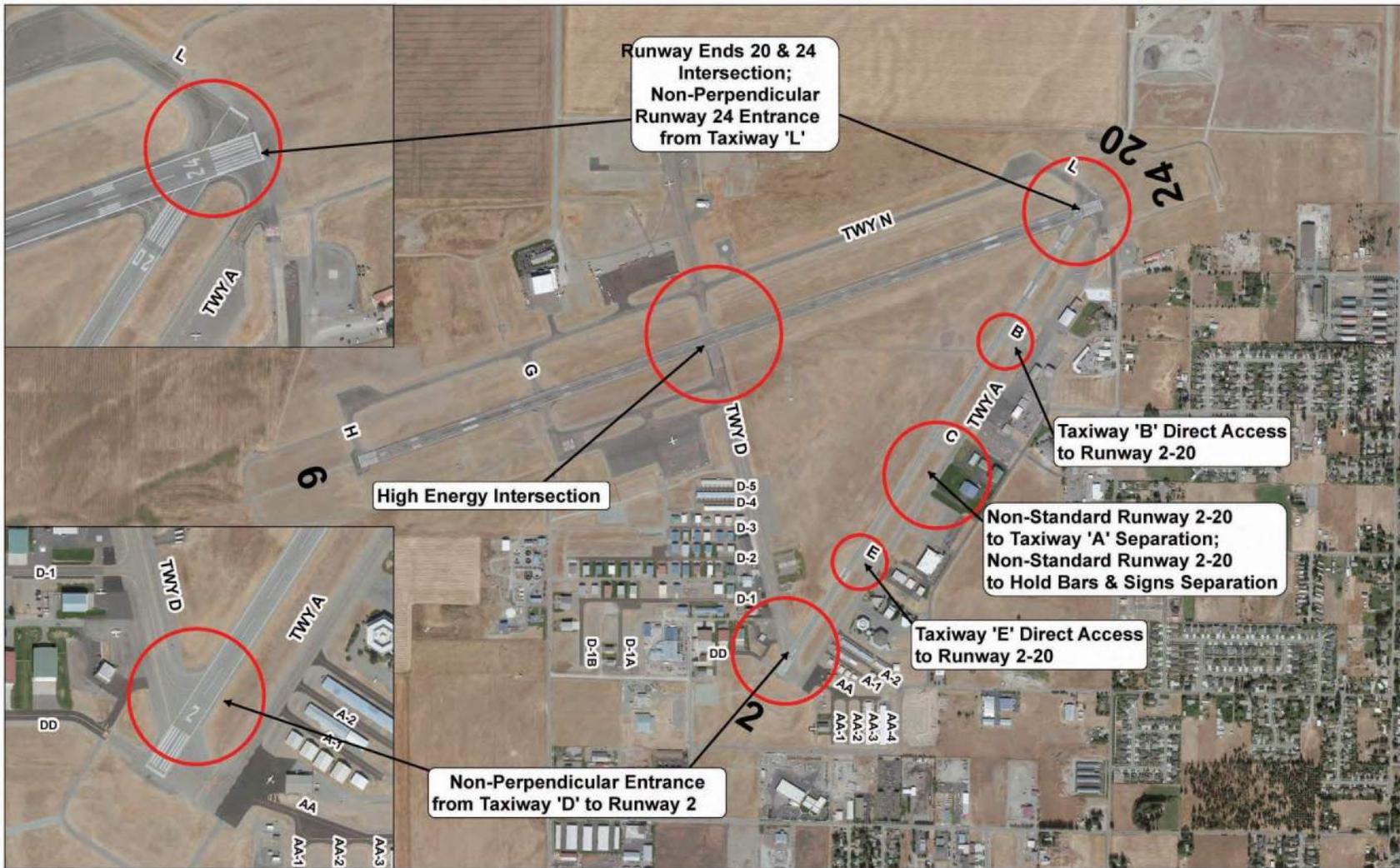


Exhibit 3-13 Taxiway Geometry Analysis

Table 3-7: Taxiway System Summary

TAXIWAY SYSTEM				
Taxiway Segment	TWY 'A'	TWY 'B'	TWY 'C'	TWY 'D'
Type	Crosswind Parallel	Exit/Connector	Exit/Connector	Exit/Connector / Crossfield
Dimension (Length x Width)	5,420' x 50'	160 x 40' (FAA 35')	160 x 40' (FAA 35')	3,420' x 50'
Runway Design Code (RDC)	C-III	B-II	B-II	C-III
Taxiway Design Group (TDG)	3 (2)	3 (2)	3 (2)	3 (2)
Shoulder Width	12' (15' FAA)	12' (15' FAA)	12' (15' FAA)	20' (15' FAA)
Edge Lighting	MITL	MITL	MITL	MITL
Runway-Taxiway CL Separation	225' (240' FAA)	--	--	--
Hold Short Separation	125' (200' FAA)	125' (200' FAA)	125' (200' FAA)	200' at Rwy 2 250' at Rwy 6-24
Taxiway Signs	Yes	Yes	Yes	Yes
Taxiway Segment	TWY 'E'	TWY 'F'	TWY 'G'	TWY 'H'
Type	Exit/Connector	Exit/Connector	Exit/Connector	Connector
Dimension (Length x Width)	160' x 40' (FAA 35')	1,550' x 50'	800' x 50'-65'	420' x 55' (FAA 50')
Runway Design Code (RDC)	B-II	C-III	C-III	C-III
Taxiway Design Group (TDG)	3 (2)	3 (2)	3 (2)	3 (2)
Shoulder Width	12' (15' FAA)	20' (15' FAA)	20' (15' FAA)	20' (15' FAA)
Edge Lighting	MITL	MITL	MITL	MITL
Runway-Taxiway CL Separation	--	400'	--	--
Hold Short Separation	125' (200' FAA)	250'	--	250'
Taxiway Signs	Yes	Yes	Yes	Yes
Taxiway Segment	TWY 'L'	TWY 'N'	MITL = Medium Intensity Taxiway Light () Recommended Future Condition (FAA) Minimum FAA standard Tan cells indicate noncompliance with FAA standards	
Type	Entrance	Primary Parallel		
Dimension (Length x Width)	450' x 70'	7,085' x 50'		
Runway Design Code (RDC)	C-III	C-III		
Taxiway Design Group (TDG)	3 (2)	3 (2)		
Shoulder Width	20' (15')	20' (15')		
Edge Lighting	MITL	MITL/Reflectors		
Runway-Taxiway CL Separation	--	500' (FAA 400')		
Hold Short Separation	250'	250'		
Taxiway Signs	Yes	Yes		

Taxiway Recommendations:

- ▶ Correct the Taxiway 'B' direct access from ramp to Runway 2/20.
- ▶ Correct the Taxiway 'D' midfield crossing and direct access conditions by removing both intersections with Runway 6/24 (Note: an ARFF access road is needed to facilitate access to rest of the airfield).
- ▶ Correct the Taxiway 'L' acute angle runway entry connection to Runway End 24.
- ▶ Correct the Taxiway 'A' acute angle runway entry connections to Runway 2/20.



- ▶ Correct the Taxiway 'D' acute angle runway entry connections to Runway 2.
- ▶ Design future taxiway projects at TDG 2 width of 35 feet.

PAVEMENT MARKINGS, LIGHTING, AND SIGNAGE

The minimum requirements for surface marking schemes used for runways are a direct function of the approach category for each runway threshold. A Precision Runway is a runway end having an instrument approach procedure that provides course and vertical path guidance conforming to Instrument Landing System (ILS) minimums. Runway 6 is the only runway with a precision approach COE. However, Runway End 24 is also marked with precision markings but has no approach procedures associated with it. Non-precision Runway is a runway end having an instrument approach procedure that provides course guidance without vertical path guidance. Runway 2 has a non-precision VOR procedure with a final approach course that is not aligned with the runway heading. **Table 3-8** summarizes the Markings, Lighting, and Signage compliance.

Table 3-8: Markings Lighting and Signage Summary

Markings, Lighting and Signage	Runway		Runway	
	6	24	2	20
Runway Markings	Precision	Precision	Non-Precision	Non-Precision
Aim Points	Yes	Yes	Yes	Yes
Centerline	Yes	Yes	Yes	Yes
Threshold Bars	Yes	Yes	Yes	Yes
Runway Number and Edge lines	Yes	Yes	Yes	Yes
TDZE Distance Markers	Yes	Yes	NA	NA
Taxiway Holding Position Lines	Yes	Yes	Yes	Yes
Taxiway Centerline	Yes	Yes	Yes	Yes
Runway Lighting	HIRL	HIRL	MIRL	MIRL
MALSR	Yes	None	None	None
Precision Approach Path Indicator	4 box on Left	4 box on Right	2 box on Left	2 box on left
Runway End Identifier Lights	Yes	Yes	Yes	No
Rotating Beacon - On Airport				
Runway and Taxiway Signage				
Distance Remaining Signs	Yes	Yes	No	No
Runway Entry Hold Signs	Yes	Yes	Yes	Yes
Taxiway Location Signs	Yes	Yes	Yes	Yes
Taxiway Directional Signs	Yes	Yes	Yes	Yes
TDZE = Touch Down Zone	Distance remaining signs required for runways serving turbine aircraft			
HIRL = High Intensity Runway Light				
MIRL = Medium Intensity Runway Light				
MALSR = Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights				



Pavement Markings, Lighting and Signage Findings:

- ▶ FAA Advisory Circular 150/5340-18G, *Standards for Airport Signs Systems* (AC 5340-18G) requires airports with frequent turbojet aircraft operations to include distance remaining signs. Runway 2/20 is not equipped with distance remaining signs.
- ▶ Runway 2/20 has standard non-precision markings. The standard holding position distance on each connector taxiway from the runway centerline is 200'. The Runway 2/20 connector holding position lines are located 125 feet from runway centerline, 75 feet closer than standard.
- ▶ Runway 24 is marked as a precision approach runway but does not have an associated approach.
- ▶ The lighting, and signage facilities at COE support the existing airfield conditions, Instrument Approach Procedures (IAP), and comply with the airfield signage plan. The 2015 Part 139 commercial airport certification inspection found no deficiencies with lighting and signage on the Airport.

Pavement Markings, Lighting and Signage Recommendations:

- ▶ Include alternatives to correct the Taxiway 'A' connector holding position lines distance to meet B-II standards of 200 feet from Runway 2/20 centerline.
- ▶ Include alternatives for a runway marking plan with Runway 24 marked for non-precision runway by removing the distance markers.
- ▶ Include alternatives for updating Approach Lighting Systems (ALS) to Runway 2 and 24.
- ▶ Include alternatives for distance remaining signs on Runway 2/20 for turbine aircraft operations.

NAVIGATIONAL AIDS (NAVAIDS)

The following are NAVAID facilities that are associated with instrument approach procedures at COE. For a full listing of on-Airport NAVAIDs refer to **Chapter 1, Inventory Table 1-2**. On Airport NAVAIDs include:

- ▶ The Glide Slope (GS) and Localizer (LOC) antennas that make up the instrument landing system (ILS);
- ▶ VHF Omni-directional Radio Range with Distance Measuring Equipment (VOR/DME).

The FAA is transitioning away from instrument procedures that use ground-based NAVAID's to those that utilize the satellite-based Global Positioning System (GPS). GPS procedures exist at



COE but have no ground-based facilities or equipment associated with them. Future GPS-based procedures are coordinated with the FAA Western Flight Procedures.

NAVAID Findings:

- ▶ ILS: The existing ILS provides Category II precision instrument approach to Runway 6 with approach minimums of 200-foot ceilings and ½ mile visibility.
- ▶ COE VOR/DME: The COE VOR has been identified by the FAA Minimum Operating Network (MON) as programmed for deactivation between 2021 to 2025, as part of the FAA transitioning to the satellite-based GPS system.

NAVAID Recommendations:

- ▶ No additional On-Airport NAVAIDS are needed to provide sufficient instrument approaches procedures to COE.
- ▶ The Airport should prepare for the FAA to decommission and remove the VOR/DME facility.

INSTRUMENT APPROACH PROCEDURES

Instrument approaches provide guidance during inclement weather. For a complete listing of instrument approach procedures and the associated minimums refer to Chapter 1, Inventory, Table 1-3. The Airport has three instrument approach procedures to two runway ends; two to Runway End 6 and one to Runway End 2; Runway Ends 20 and 24 are visual with no instrument approach procedures.

An analysis conducted by Dailey Airspace Consulting in 2015 indicated that an instrument approach procedure to Runway End 24 would likely involve intermediate and final approach segment obstacle penetrations, resulting in a high final approach fix, which would possibly raise minimums and restrict certain aircraft approach categories. Further Terminal Instrument Procedures (TERPS) analysis is required by the FAA to determine the feasibility of establishing an instrument procedure to Runway End 24, including the possibility of a 'curved' RNP procedure.

Instrument Approach Findings:

- ▶ **Runway End 6** has a precision ILS approach. The ILS satisfies most GA aircraft operational requirements to make an approach during instrument weather conditions with minimums for the approach at 200-foot ceiling and 1,800-foot Runway Visual Range (RVR) which is Category II precision. Lower minimums on the ILS approach may be attained with airfield improvements such as runway centerline lighting, in-runway approach zone lighting, and verified NAVAID precision. However, the justification for lower instrument approach



minimums are not anticipated during the planning period and no recommendations are made to lower the ILS approach minimums.

- ▶ **Runway End 2** has a non-precision VOR/DME approach. The VOR/DME approach final course is not aligned with Runway 2 so has higher minimums. With the expected decommissioning of the VOR/DME NAVAID the approach procedure will also be decommissioned. Runway 2 will revert from a non-precision to a visual runway without a replacement GPS approach. Reversion would not entail a change to FAA design standards.
- ▶ **Runway 24 Instrument Approach:** Terrain and trees beyond Runway End 24 limit or restrict a straight-in instrument approach procedure.
- ▶ **GPS RNAV Required Navigation Performance (RNP):** RNP are highly accurate satellite-based instrument procedures. To fly these procedures, aircrews must be trained and FAA-authorized, and aircraft must be certified. Development of RNP approaches by FAA Air Traffic Control would enable an instrument approaches to the Runway 2, 20, and 24 ends.

Instrument Approach Recommendations:

- ▶ The Runway End 6 precision ILS procedure will continue to be the primary instrument approach for the Airport throughout the 20-year planning period.
- ▶ Runway 2, 20, and 24 are recommended as future GPS/RNAV straight-in instrument approach runway ends, based on FAA feasibility.

LANDSIDE FACILITIES

This section describes areas and facilities that support Airport activity. Some facilities, such as the Airport maintenance facility and aircraft rescue and firefighting (ARFF) station have access to the runways and taxiways. Landside facilities also include those such as terminal buildings, hangars, aprons, access roads, and parking facilities

TERMINAL AREA AND SUPPORT FACILITIES

Aircraft Rescue and Fire Fighting (ARFF)

COE is classified as an Index A airport. The ARFF Index is based on the length of transport aircraft that may operate at COE as an unscheduled charter. **Table 3-9** lists the ARFF Index based on the length of typical commercial aircraft. Description of existing airport ARFF equipment and facilities are in **Chapter 1, Inventory**.



ARFF Findings:

- ▶ The Airport completed construction of a new ARFF facility in 2011.
- ▶ The ARFF station is located to the east of the North apron facing Runway 6/24. The Airport has one fire vehicle, a 2001 E-One Titan 4X4. The vehicle has a 1,500-gallon water tank, and 200 gallons of Aqueous Film Forming Foam (AFFF) capacity, meeting ARFF Index B requirements.
- ▶ The COE commercial airport certification requires the primary response ARFF vehicle to reach the center of the primary runway within 3 minutes in response to an aircraft incident. The ARFF facility is located midfield with unobstructed access to the airfield to meet this requirement.

Table 3-9: ARFF Index

ARFF Index	Aircraft Length	Representative Aircraft
A	less than 90 feet	RJ-85
B	at least 90 feet but <126 feet	Bombardier Q400; EMB-175; Airbus A319/A320
C	at least 126 feet but <159 feet.	MD-80; 737-800; Airbus A321neo
D	at least 159 feet but <200 feet	B757; B767; Airbus A330
E	at least 200 feet	B747-400; B777;

Source: FAA Part 139.315 ARFF Index Determination

ARFF Recommendation:

No change in the ARFF location, facilities and equipment is recommended. The building is adequate for equipment and materials storage and to meet response times to the primary runway.

Snow Removal Equipment (SRE)

The FAA Advisory Circular 150/5200-30D *Airport Field Condition Assessments and Winter Operations Safety* (AC 5200-30D) states that non-commercial service airports with over 10,000 operations and at least 15 inches of annual snowfall should have, as a minimum, one high-speed rotary plow (snow blower) supported by two snow plows of equal snow removal capacity. COE experiences an average of 45.8" of snowfall per year. See Chapter 1 Inventory Table 1-14 for additional climate data. The Airport meets the stated level of equipment to clear snow and ice from primary surfaces. Equipment attachments such as plow blades are less sensitive to outdoor exposure and may be stored outside. The complete list of the Airport's SRE can be found in Chapter 1 Inventory Table 1-12.



SRE Findings:

- ▶ The Airport’s SRE is stored both indoors and outdoors. Airport SRE vehicles are kept in existing Airport maintenance facilities near the Airport office and in available space within the ARFF station.
- ▶ The SRE storage facility location provides adequate access to the Airport operations areas.
- ▶ The newest piece of SRE equipment is the JD 644K tractor purchased in 2010 and is in good working condition.
- ▶ The other Airport broom trucks, plow trucks and snow blowers are at least 15 years old and will be nearing the expected end of service life.
- ▶ The two International 5-yard dump trucks with 11-foot plow blades were purchased in 1983 and 1984 and are now more than 30 years old making them difficult to maintain and operate with reliability.

SRE Recommendation:

- ▶ No change in the SRE facility location.
- ▶ It is recommended that snow removal equipment that have reached the end of their useful lives be removed from service to reduce inventory storage needs.
- ▶ Replacement equipment needed to maintain the operational capacity should have similar performance to meet the operational snow clearing guidelines found in FAA AC 150/5220-20A *Airport Snow and Ice Control Equipment* and AC 5200-30D.

AIRCRAFT PARKING AND STORAGE

Hangars

Chapter 2, Aviation Activity Forecast projects an increase of 111 based aircraft at COE over the next 20 years. It is forecasted that 20 of these aircraft will be jets and 10 will be helicopters. Most of these aircraft could use available apron parking sites. Square footage for hangars required to accommodate the forecasted increase in based aircraft will depend on the types of aircraft and should be developed as demand dictates.

Hangars Findings:

- ▶ Aircraft based at COE are primarily stored in T-hangars and Box hangars located south of Runway 6/24 to the west of Taxiway ‘D’ and south of Runway 2/20.
- ▶ Aircraft are stored on the apron or in private group hangars.
- ▶ The available in-fill areas in existing hangar developments will not accommodate the total number of additional hangar spaces required.



- ▶ New hangar development sites, including the associated utilities and supporting infrastructure will be required.
- ▶ Executive box hangar spaces may be needed to accommodate larger aircraft that exceed standard T-hangar spaces.

Hangars Recommendation:

- ▶ To accommodate larger aircraft, new hangar development areas should be designated and preserved for future use as demand dictates
- ▶ The previous Airport Master Plan identified hangar area development areas and layouts. It is recommended that those plans be carried forward and referenced when hangar development is needed.
- ▶ New hangar development should be based on demonstrated tenant demand and not on the operational forecasts.

Aircraft Tie-Downs

Based aircraft tiedowns are provided for aircraft stored outside of hangars. AC 5300-13A, *Appendix 5 General Aviation Aprons and Hangars* states that tiedown aprons at general aviation airports usually are designed to accommodate aircraft in Airplane Design Groups (ADGs) I and II. Some tiedown stands should be provided for larger twin engine aircraft as needed to handle the demand. Tiedown spaces should be spaced to allow 10 feet between wingtips of design aircraft. This allows for aircraft parking and circulation between rows of parked aircraft. The space allocation assumes pilots have a certain degree of familiarity with the parking layout and represents the minimum that should be provided. **Chapter 1 Inventory, Table 1-8** lists the square feet and number of tiedown spaces on each of the aprons.

Aircraft Tie-Down Findings:

- ▶ The Airport has developed apron space with 70 available tie-downs to meet existing and forecast based aircraft and transient aircraft needs.
- ▶ There is an average of 34 itinerant arrivals per day and these can be accommodated on existing apron space.
- ▶ Itinerant aircraft are typically on the Airport for a short-term stay. Wheel chocks are generally used rather than tiedown anchors.
- ▶ Itinerant parking is generally associated with an FBO as a place for pilots and passengers to access services.



Aircraft Tie-Down Recommendation:

- ▶ The previous Airport Master Plan identified apron development areas and layouts. It is recommended that those plans be carried forward and referenced when demand for additional tiedown and apron space development is needed.
- ▶ New apron development should be based on demonstrated tenant demand and not on the operational forecasts.

Airport Fencing

The Airport is required to implement the recommendations of its 2016 Wildlife Hazard Management Plan (WHMP) as part of its Part 139 commercial airport certification. The WHMP recommends completing the installation of perimeter fence around the Airport. Installing perimeter fencing is listed as a critical priority in the WHMP to prevent deer and large mammals from entering the Airport property. Fencing along the west and north property lines would also prevent unauthorized access to the runways and aircraft operations areas. The preferred fence identified in the WHMP would consist of 8-foot chain link with 3-foot barbed wire outriggers and a buried apron to prevent animals from digging under it.

Airport Fencing Findings:

- ▶ The south and east sides of the Airport property boundary are fenced with 7-foot chain link fence and 3-strand barbed wire along the top.
- ▶ The Airport is not fenced west of the City of Hayden’s sewer treatment plant to Huetter Road, along Huetter, and along most of the northern property boundary.

Airport Fencing Recommendation:

- ▶ Projects to complete Airport perimeter fencing should follow WHMP recommendations for 8-foot chain link fence with 3-foot of barbed wire outriggers.
- ▶ Future fencing location be included on the updated ALP.
- ▶ Determining gate types at future access points would be part of fencing project design scope and are not included in the alternatives evaluation.

Security Gates

As airfield developments occur, the Airport will update the requirements for additional access points. To protect airport facilities and tenant’s property the Airport should maintain positive control over who has access inside the airport perimeter fence. Access through gate codes and



automated systems such as proximity card readers can be controlled by the Airport staff to tenants and those authorized to have access.

Security Gate Findings:

- ▶ The perimeter fence contains 40 gates that provide vehicle and pedestrian access to FBO's, hangars, businesses, and aprons.
- ▶ Vehicle access to the airside operations area is through twenty-two automated and eighteen manual vehicle gates.
- ▶ The automated gates are controlled through a keypad or remote-control device.
- ▶ An additional twenty pedestrian gates exist along the perimeter fence at various locations with access from parking spaces.

Recommendation:

- ▶ The Airport gate access for vehicles and pedestrians is sufficient to serve Airport operations and tenant areas.
- ▶ As new hangar and tenant areas are developed, security gates are recommended to provide access control.

Perimeter Road

The Airport has a network of dirt and paved service roads that allow Airport personnel to access different areas of the airfield. As a FAR Part 139 certificated facility, an airfield perimeter roadway system is recommended for providing secured access to various airfield locations by authorized Airport vehicles and machinery. This is intended to improve emergency response, and to reduce how frequently Airport service vehicles operate on aircraft movement areas.

Perimeter Road Findings:

- ▶ The existing perimeter road is not complete around the airport perimeter and limits Airport staff access to some areas.
- ▶ The existing perimeter road is made up various surfaces and materials that do not conform to recommended standards of at least 12 feet wide and capable of supporting 60,000-pound vehicles.



Perimeter Road Recommendation:

- ▶ Standardize airfield access road surfaces to be paved with strengths and dimensions of perimeter road to 12 feet wide and capable of supporting 60,000 pounds to meet ARFF and SRE equipment access requirements.
- ▶ Perimeter Roadway route alternative be included with the preferred alternative proposal in conjunction with an updated perimeter fence location

Vehicle Circulation

The Airport is served by two-lane roads that connect to state highways. The City of Hayden performed a Transportation Strategic Plan Update in 2013. This plan reviewed roadways and intersections throughout the City. Results from the study are shown in **Table 3-10**. The Level of Service (LOS) shows values between A (free flow) and F (gridlock or breakdown of flow). Calculations for the LOS are the roadway volume to capacity. The Level of Service is correlated closer with conditions at intersections than the roadway segments up to intersections.

Table 3-10: Roadway Level of Service

Location	Level of Service 2010	Level of Service - No Build 2020*	Level of Service - Build 2020**
Huetter & Hayden Intersection	F	F	C
Atlas & Hayden Intersection	F	F	C
Ramsey & Hayden Inter.	F	F	C
Ramsey & Dakota Intersection	C	F	F
Ramsey & Miles Intersection	B	F	F
Ramsey & Lacey Intersection	A	D	C
Ramsey & Wyoming Inter.	B	C	B
Huetter & Lancaster Inter.	B	F	B
Atlas & Lancaster Intersection	A	F	B

Source: Kootenai Metropolitan Planning Organization Transportation Maps

* 2020 No Build includes upgrade of Ramsey between Wyoming and Lancaster.

** 2020 Build includes upgrading Hayden Avenue between Government Way and Huetter.

Vehicle Circulation Findings:

- ▶ The City of Hayden adopted a minimum level of service of “D” during peak hours and “C” at non-peak traffic times.
- ▶ Vehicle access to the Airport funnels in from the principal arterials of US-95, SH-41, and SH-53 to minor arterials of Atlas Road, Wyoming Road, Ramsey Road, Hayden Avenue, and Lancaster Road.



- ▶ Remaining roadways to access the Airport are on the major collectors of Atlas Road, Huetter Road, Lacey Avenue, Miles Avenue, Dakota Avenue, and Warren Street.
- ▶ The Airport accesses from the principal arterials route vehicles through residential areas along all of the major collectors and a few minor arterials. These roadways are typically two-lane with no center turn lanes, curbing, or sidewalk.

Vehicle Circulation Recommendations

- ▶ The City of Hayden’s study recommends Hayden Avenue to be upgraded from a two-lane to five-lane road between Huetter Road and Government Way by 2020.
- ▶ Coordinate with Idaho Transportation Department, Highway Districts and the City of Hayden to encourage improvements to Wyoming, Hayden and Ramsey Roads (widening and condition).
- ▶ Vehicle access to the Airport should be included in Chapter 4, Improvement Alternatives to evaluate City of Hayden proposed Ramsey Road alignment.
- ▶ Vehicle access to the Airport should be included in Chapter 4, Improvement Alternatives to evaluate KMPO Huetter Roadway alignment and highway access to the Airport’s north side.

Signage and Wayfinding

The public and Airport users need vehicle access to three zones around the Airport. Due to the runway and taxiway layout the three separate areas with operations, aprons and hangar development do not allow for direct on-Airport access from one area to another. Most notably, the northern ramp is isolated from the rest of the Airport. **Exhibit 3-14** provides examples of local signage to the Airport.

Exhibit 3-14: Wayfinding Examples



Westbound I-90 at US-95 Exit.



US-95 traveling south at Wyoming Avenue.



Signage and Wayfinding Findings:

- ▶ Signage directing visitors to the Airport is not specific about which area on the Airport the road will take them and has potential to cause confusion to anyone not familiar with the Airport environment.
- ▶ There are no signs to indicate the Airport is north of Hayden Avenue.
- ▶ Travelers on Hayden Avenue would benefit from signs at the intersections of Atlas and Ramsey Roads. Additional signage to direct access to the north side of the Airport is recommended at the Lancaster Road intersections with US-95 and SH-41, and the intersection of Lancaster and Atlas.
- ▶ **East Apron Access:** Visitors going to the east apron are directed by signage off US-95 onto Wyoming Avenue. This roadway consists of two-lanes with mainly residential development on both sides. Portions of the roadway have been reconstructed with subdivision developments and sidewalks. Alternate access to the east apron is north on Ramsey Road to Wyoming and turning west.
- ▶ **Southwest Apron Access:** To access the Airport's southwest apron area, visitors travel along Hayden to Atlas Road. Atlas Road is a two-lane road with no residential development along the segment between Hayden Avenue and the Airport resulting in an improved travel-way.
- ▶ **North Apron Access:** To access the Airport's north apron for Empire Airlines and future corporate hangars, the route is from US-95 or the Warren Frontage Road onto Lancaster Road, then south on Atlas Road.
- ▶ Idaho Transportation Department lists upgrades to Ramsey Road between Wyoming and Lancaster in 2022, which will improve connectivity between the east and north sides of the Airport.
- ▶ Huetter Bypass project lends itself to increasing access between the south and north sides. Signage for access to this area is non-existent.

Signage and Wayfinding Recommendations:

- ▶ Add signage along main routes to access areas (Hayden, US-95 and Lancaster);
- ▶ Wayfinding to the Airport should be included in Chapter 4, Improvement Alternatives to evaluate locations and types of signage.
- ▶ Signage to improve Airport access will need to be coordinated with jurisdictions in control of the roadways and comply with local, state and federal standards.



Parking

There are a total of approximately 940 vehicle parking spaces on 54,000 square yards of parking lot. Refer to Exhibit 7 showing auto parking areas at various locations around the Airport. Two of the Airport manufacturing and maintenance tenants have exceeded their available parking areas as shown by parking in gravel areas. **Exhibit 3-15** shows auto parking areas around the Airport. The following **Table 3-11** lists parking areas and identifies additional parking necessary.

Table 3-11: Apron Area Parking

Parking Zones	Spaces Provided	Area Provided (sq ft)	Spaces Needed
North Apron			
Empire	170 (65 gravel)	104,500	65 paved
ARFF	11	6,020	None
South West Apron			
Unitech	145 (75 gravel)	72,000	75 paved
Hangars	179 (48 gravel)	61.9	48 marked (D4 & D5)
Airport Office	27 (18 gravel)	18,400	10 paved
East Apron			
Forest Svc.	46	17,600	None
Resort Av.	91	53,400	None
Infinite	171	86,000	None
Mach Aero	50	29,600	None
Hangars	47	32,300	20 Space

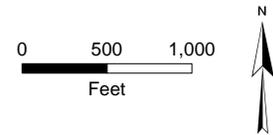
Parking Findings:

- ▶ In review of the lease agreements for the two manufacturing tenants that exceed their parking areas, the lease agreement does not have a reference to parking and providing parking for the employees. One of the lease agreements is for parking of vehicles. This lease does not address the parking surface provided by lessee. The lease agreement does state that “the County shall not be required to repair or maintain Leased Premises in any way.”
- ▶ Paved parking is not required by the Airport, but if a tenant were to modify a building then paved parking would be required under county building code.
- ▶ Building construction or expansion typically cues the building codes to require a certain number of parking spaces based on the square foot of office space/manufacturing space.





Exhibit 3-15 Airfield Parking



Parking Recommendations:

- ▶ Designate and reserve areas for future vehicle parking.
- ▶ The Airport should internally review the Airport lease agreements to include standards for paving and marking for vehicle parking.
- ▶ Add paving and marked parking at Unitech, Airport Office, Empire, D-4/D-5, AA Development.

FACILITY REQUIREMENTS SUMMARY

Consistent with the Coeur d’Alene region, the Airport is projected to experience sustained growth, as evidence of forecasted aircraft operations and based aircraft, with greater frequency towards large-cabin general aviation business jets. To accommodate future demand, the Airport will need to increase the primary runway length to mitigate effects of high ambient temperatures that impact jet aircraft useful loads. The Airport is constrained, in terms existing adjacent road systems, property development and city boundaries. The primary Runway 6/24 needs to accommodate the largest business jets in production, including transport airplanes flown from international destinations. The crosswind Runway 2/20 needs to accommodate the majority of Airport traffic, because it is aligned with the prevailing winds. The areas beyond the airfield need to accommodate new aircraft hangars, aeronautical tenants, and airport operating areas. Therefore, Airport improvements will be needed to meet the region’s future transportation needs and land use interests.

The recommended improvements and tasks from the facility requirements assessment are listed here:

Runway Utilization and Capacity

- ▶ Include alternatives to improve aircraft circulation when expansion and development projects are likely to cause aircraft queuing.
- ▶ Include alternatives for an ultimate design for full-parallel taxiway system with bypass and run-up areas should be considered for each runway end to help alleviate congestion and delay during peak periods.



Runway Design Criteria

- ▶ Include alternatives to consider maintaining Runway 2/20 as a B-II runway and assess the impact to Airport operations should Runway 2/20 be reclassified as a B-I runway.
- ▶ Develop alternatives to correct Intersecting Runway End 20 and Runway End 26 geometries to meet FAA standards.
- ▶ Include alternatives to Runway 2/20 to be maintained at a length of at least 5,000 feet if it is to remain a B-II runway. A shorter length can be considered if the design aircraft changes.
- ▶ It is recommended that the Airport preserve property to extend primary Runway 6/24 to a length of 8,600 feet to accommodate the most demanding users that exceed the FAA substantial use threshold.
- ▶ Include alternatives to lengthen Runway 6/24 to 8,600 feet.
- ▶ Future capital improvement projects maintain the width of runways and shoulders for both runways.
- ▶ Include alternatives to add blast pads to runways that are expected to handle jet operations.
- ▶ Consideration should be given to ultimate runway length, width, and intended design aircraft when planning decoupling alternatives.
- ▶ The recommended pavement strength for Runway 6/24 is 100,000 pounds for DWG aircraft.
- ▶ The recommended pavement strength for Runway 2/20 is 50,000 pounds for SWG aircraft.
- ▶ Include alternatives to correct the Runway 2/20 centerline to Taxiway A centerline separation deficiency.

Taxiway Design Criteria

- ▶ Include alternatives to correct the Taxiway 'B' direct access from ramp to Runway 2/20.
- ▶ Include alternatives to correct the Taxiway 'D' midfield crossing and direct access conditions by removing both intersections with Runway 6/24
- ▶ Include alternatives to correct the Taxiway 'L' acute angle runway entry connection to Runway End 24.
- ▶ Include alternatives to correct t the Taxiway 'A' acute angle runway entry connections to Runway 2/20.



- ▶ Include alternatives to correct the Taxiway 'D' acute angle runway entry connections to Runway 2.
- ▶ Design future taxiway projects at TDG 2 width of 35 feet.

Pavement Markings, Lighting and Signage

- ▶ Include alternatives to correct the Taxiway 'A' connector holding position lines distance to meet B-II standards of 200 feet from Runway 2/20 centerline.
- ▶ Include alternatives for a runway marking plan with Runway 24 marked for non-precision runway.
- ▶ Include alternatives for updating Approach Lighting Systems (ALS).
- ▶ Include alternatives for distance remaining signs on Runway 2/20 for turbine aircraft operations.

NAVAIDS

- ▶ The Airport should prepare for the FAA to decommission and remove the VOR/DME facility.
- ▶ Runway 2, 20, and 24 are recommended as future GPS/RNAV straight-in instrument approach runway ends, based on FAA feasibility.

Terminal Area Support Facilities

- ▶ Snow removal equipment that have reached the end of their useful lives be removed from service to reduce inventory storage needs.
- ▶ Replacement equipment needed to maintain the operational capacity should have similar performance to meet the operational snow clearing guidelines found in FAA AC 150/5220-20A *Airport Snow and Ice Control Equipment* and AC 5200-30D.
- ▶ The previous Airport Master Plan identified hangar area development areas and layouts and that those plans be carried forward and referenced when hangar development is needed.
- ▶ New hangar development should be based on demonstrated tenant demand and not on the operational forecasts.
- ▶ The previous Airport Master Plan identified apron development areas and layouts. It is recommended that those plans be carried forward and referenced when demand for additional tiedown and apron space development is needed.
- ▶ New apron development should be based on demonstrated tenant demand and not on the operational forecasts.



- ▶ Include alternatives for future fencing location be included on the updated ALP.
- ▶ Include alternatives to standardize airfield access road surfaces to be paved with strengths and dimensions of perimeter road to 12 feet wide and capable of supporting 60,000 pounds.
- ▶ Include alternatives for a Perimeter Roadway route in conjunction with an updated perimeter fence location

Vehicle Access and Wayfinding

- ▶ Include alternatives for Vehicle access to the Airport to evaluate City of Hayden proposed Ramsey Road alignment.
- ▶ Include alternatives for Vehicle access to the Airport to evaluate KMPO Huetter Roadway alignment and highway access to the Airport’s north side.
- ▶ Include alternatives for Wayfinding to the Airport to evaluate locations and types of signage.
- ▶ Include alternatives to designate and reserve areas for future vehicle parking.

ATTACHMENT 1

Average High Temperature During Hour of the Month

Time	MONTH											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
00:00	37	40	44	50	58	64	70	70	62	52	44	37
01:00	37	39	43	49	57	63	69	69	61	51	44	37
02:00	37	39	43	49	55	62	68	68	60	50	43	36
03:00	37	38	42	48	55	60	66	66	59	50	43	36
04:00	37	38	42	47	54	59	65	65	58	49	43	36
05:00	37	38	41	47	54	60	65	64	57	49	43	36
06:00	37	38	41	47	56	62	68	66	57	49	43	36
07:00	37	38	41	49	59	66	71	69	60	49	42	36
08:00	37	38	43	52	63	69	75	73	64	51	43	36
09:00	37	39	46	55	67	73	79	77	68	54	44	37
10:00	38	41	49	59	70	76	83	81	72	58	45	38
11:00	40	43	52	62	73	79	86	85	76	61	47	39
12:00	41	45	54	65	75	82	89	88	80	64	49	39
13:00	42	47	56	66	77	83	91	90	82	66	50	40
14:00	42	48	57	67	78	84	92	91	84	68	50	40
15:00	42	48	57	68	79	84	92	92	85	68	50	40
16:00	41	48	57	68	79	84	92	92	84	67	48	39
17:00	40	46	56	67	78	84	92	91	83	63	47	38
18:00	39	43	52	64	76	82	90	89	78	59	46	38
19:00	39	42	50	60	72	79	87	84	73	57	45	37
20:00	39	41	48	57	67	75	82	80	69	55	45	37
21:00	38	40	47	55	64	71	78	77	66	54	44	37
22:00	38	40	46	53	62	68	75	74	65	53	44	37
23:00	38	40	45	51	60	66	73	72	63	52	44	37

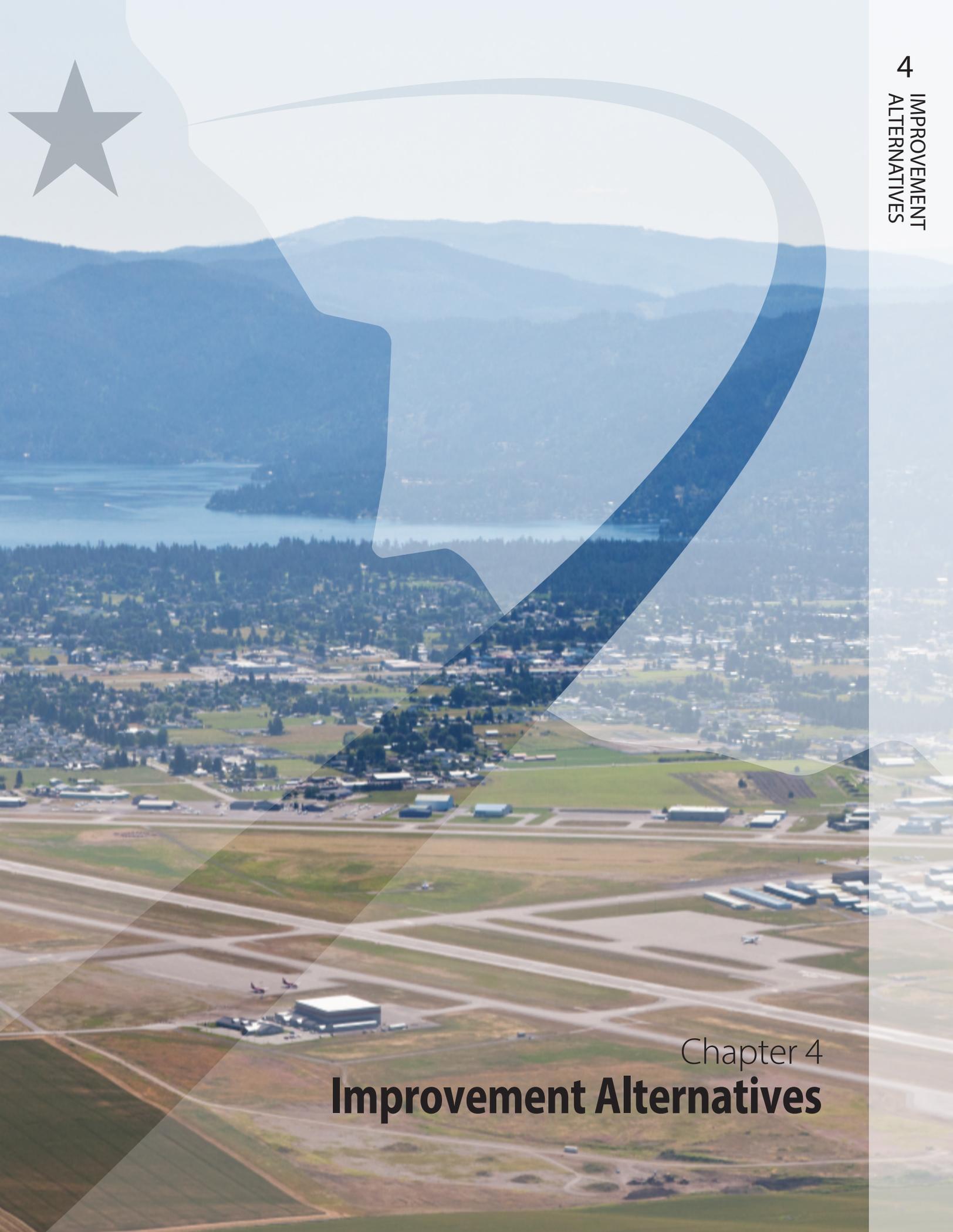


ATTACHMENT 2

Number of jet Operations During Hour of the Month

Number of Jet Operations During Hour of the Month	Time	MONTH											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	1	1	2	1	2	4	5	5	4	2	2	1	
02:00	2	2	3	3	3	7	9	10	7	3	3	2	
03:00	3	2	4	3	4	9	12	13	9	4	4	3	
04:00	4	3	5	5	6	12	17	18	13	6	5	4	
05:00	2	2	3	3	3	7	9	10	7	3	3	2	
06:00	2	2	3	3	3	7	9	10	7	3	3	2	
07:00	5	4	7	6	8	16	21	23	16	8	7	5	
08:00	9	7	13	11	14	30	40	44	31	14	13	9	
09:00	8	7	12	11	13	28	38	41	29	13	13	9	
10:00	15	12	22	19	24	51	69	74	52	24	23	16	
11:00	14	11	22	19	23	49	66	72	50	23	22	15	
12:00	12	10	19	16	20	42	57	61	43	20	19	13	
13:00	8	7	12	11	13	28	38	41	29	13	13	9	
14:00	5	4	8	7	8	18	24	26	18	8	8	6	
15:00	4	3	6	5	7	14	19	20	14	7	6	4	
16:00	5	4	8	7	8	18	24	26	18	8	8	6	
17:00	7	5	10	9	11	23	31	33	23	11	10	7	
18:00	3	2	5	4	5	11	14	15	11	5	5	3	
19:00	1	1	2	1	2	4	5	5	4	2	2	1	
20:00	3	2	5	4	5	11	14	15	11	5	5	3	
21:00	2	1	2	2	3	5	7	8	5	3	2	2	
22:00	1	1	2	1	2	4	5	5	4	2	2	1	
23:00	0	0	0	0	0	0	0	0	0	0	0	0	
Jet Operations		114	92	174	150	188	394	532	576	404	188	176	124
Sum >62 F					59	158	363	532	576	342	67		
% of Monthly					39%	84%	91%	100%	100%	84%	36%		





Chapter 4
Improvement Alternatives

IMPROVEMENT ALTERNATIVES

CHAPTER OVERVIEW

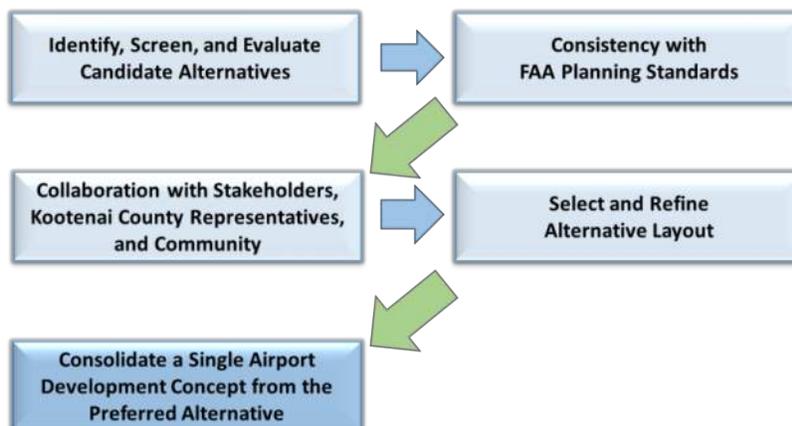
This chapter documents improvement alternatives and recommended development plan to satisfy the facility requirements described in **Chapter 3** for the Coeur d'Alene Airport (COE or “the Airport”). This chapter is organized in the following sections.

1. Alternatives Approach
2. Runway Development Alternatives
3. Taxiway System Improvements
4. Landside Facilities Alternatives
5. Alternatives Summary

1. ALTERNATIVES APPROACH

Alternatives are systematically evaluated so that a preferred alternative can be selected. The preferred alternatives make up the 20-year development plan for COE. The process used to develop, evaluate, refine, and select preferred alternatives is shown in **Exhibit 4-1**, and key considerations are described in the following sections

Exhibit 4-1: Alternatives Selection Process



ALTERNATIVE ANALYSIS PROCESS

The alternatives are developed to identify various space allocation and site layout options to accommodate future facility demands in accordance with FAA design standards. The preferred alternative, as selected by the Airport and Kootenai County, is carried-forward into the Master Plan Capital Improvement Plan (CIP) and depicted on the Airport Layout Plan (ALP).

2012 COE MASTER PLAN ALTERNATIVES

The 2012 COE Master Plan identified terminal area development alternatives which have been carried forward as part of this Master Plan. These alternatives pertain to aircraft parking and storage development. This Master Plan continues to identify aircraft parking and storage areas to accommodate the FAA-approved 20-year aviation demand forecast.

COMMUNITY INVOLVEMENT

Master Plan community involvement included collaborative efforts with local governments and other stakeholders. Two advisory committees were part of the planning process: the Technical Steering Committee (TSC) and the Community Advisory Committee (CAC). The TSC included pilots, County officials, and airport board members. The CAC included local governments, planning agencies, airport tenants, and community stakeholders. Participation included advisory committee meetings, an online survey of the advisory committee members related to runway alternatives, and public open houses. Feedback gathered as part of the community involvement process was used to refine alternatives and provided the Airport and County with input for their decision-making process.

SUMMARY OF FACILITY REQUIREMENTS

Facility requirements to be addressed by the improvements include the following items.

- ▶ Decouple the intersection of Runway End 20 and Runway End 24;
- ▶ Correct the Runway 2/20 to Taxiway A centerline separation;
- ▶ Provide up to 8,600 feet of length for Runway 6/24;
- ▶ Provide up to 5,100 feet of length for Runway 2/20;
- ▶ Plan for future GPS instrument approach into Runway 2/20;
- ▶ Correct taxiway connector geometry where it deviates from FAA guidance;
- ▶ Remove taxiway segments with direct runway access to aircraft parking aprons;
- ▶ Provide a taxiway system that minimizes runway crossings;



- ▶ Identify landside access and roadway network improvements to support Airport development and promote compatibility with airport and regional transportation plans;
- ▶ Designate on-airport land uses to preserve areas for future development;
- ▶ Identify future Airport property interests for land acquisition and release.

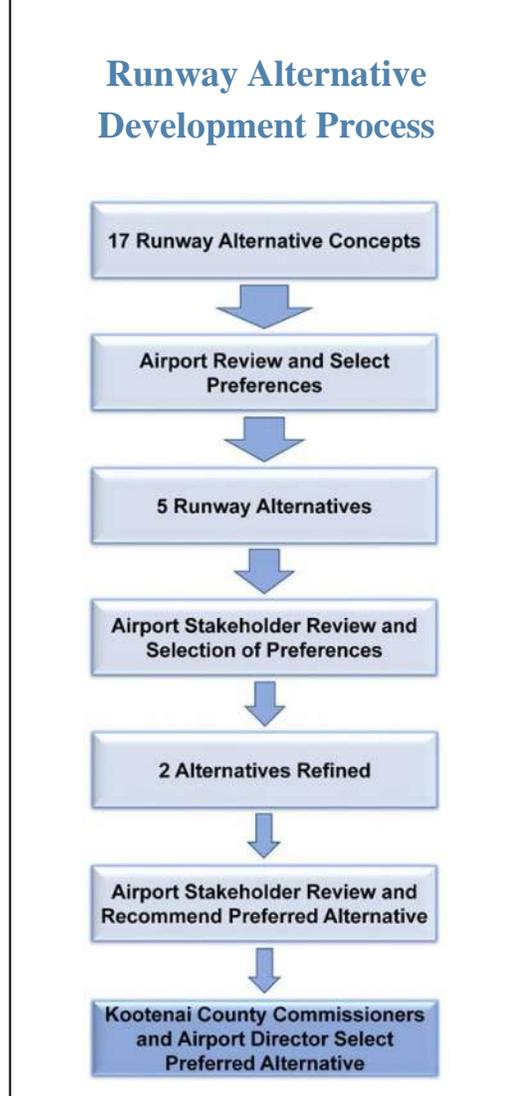
2. RUNWAY DEVELOPMENT ALTERNATIVES

The runways set the development for the rest of the Airport. Runway layout determines where taxiways need to go, and runway and taxiway design surfaces determine where buildings and aircraft parking areas can be located. The runway alternatives evaluation process included a robust effort to solicit feedback from a wide array of stakeholders. The preferred runway alternative will be carried forward to the CIP and ALP.

RUNWAY ALTERNATIVES EVALUATION PROCESS

The runway alternatives evaluation process began with 17 runway alternatives. These 17 alternatives involved a comprehensive assessment of Runway 6/24 and Runway 2/20 design factors. The alternatives were reviewed by the Airport, and five of the 17 were carried forward for more detailed evaluation and refinement (Alternatives I, II, III, IV and V). The other 12 alternatives were eliminated from further consideration because they did not meet FAA design standards, caused extensive impact to off-airport property, or were going to be cost-prohibitive to implement. The five runway alternatives were presented to the CAC and TSC in March 2018, and an online survey followed where CAC and TSC members ranked and provided input on the alternatives. Alternatives I and II were ranked highest of the five. Alternative I and II were further refined and evolved

Exhibit 4-2: Alternative Process



into Alternative I-R and II-R ('R' indicating refined). The alternative development process for COE is outlined in **Exhibit 4-2**.

Attachment 1 includes **Table A1-1**, which categorizes the initial 17 runway alternatives based on individual runway evaluation factors. **Exhibits 4-3** through **4-9** illustrate the five runway alternatives that received further evaluation (I, II, III, IV, V) and the two that were further refined (I-R and II-R).

ALTERNATIVES SHARED FACTORS

There are several attributes that are common for each of the alternatives. These are presented below, and the following sections focus on the attributes that make each alternative unique.

FAA Runway Design Standards:

- ▶ Runway End 20 and Runway End 24 are decoupled.
- ▶ Runway 6/24 is designed to runway design code (RDC) C-III-2400 standards for aircraft with maximum takeoff weight under 150,000 pounds.
- ▶ Runway 6/24 is 100 feet wide.
- ▶ Runway Protection Zones (RPZ) for Runway Ends 2, 6, and 20 do not change size.
- ▶ RPZ for Runway End 24 is increased in size to reflect lower visibility minimums.

FAA Taxiway Design Standards:

- ▶ Taxiway connectors with direct access from apron to Runway 2/20 are removed to eliminate the direct access.
- ▶ Non-perpendicular entrance taxiway connectors to the runways are corrected to perpendicular.

Navigational Aid (NAVAID) Systems and Instrument Flight Procedures:

- ▶ NAVAIDs associated with the Instrument Landing System (ILS) glideslope (GS); Medium Approach Lighting System with Runway alignment lights (MALSR); and, Precision Approach Path Indicator (PAPI) lights system for Runway End 6 are relocated proportionally to the shift in the runway end.
- ▶ ILS Localizer (LOC) antenna and PAPI light system for Runway End 24 are relocated proportionally to the shift in the runway end.



- ▶ PAPI light systems for Runway Ends 2 and 20 are relocated proportionally to the shift in the runway ends.
- ▶ Approach and departure instrument flight procedures into runway ends that move will require redesign.
- ▶ The on-airport very high frequency, omnidirectional range (VOR) antenna is expected to be removed by the FAA.

RUNWAY ALTERNATIVE I

Runway 6/24 is extended to 8,600 feet by relocating Runway End 6 to the west by 530 feet and Runway End 24 to the east by 670 feet.

Runway 2/20 is extended to 5,955 feet long and the width is maintained at 75 feet. The runway is designed to FAA RDC B-II standards. Runway End 2 is shortened by 245 feet, and Runway End 20 is extended by 800 feet, for a net shift of 555 feet to the northwest. Runway 2/20 centerline is shifted 30 feet west to meet FAA runway centerline to taxiway centerline separation distance requirements to minimize off airport RPZ area and to improve holding position line geometry. Alternative I is illustrated in **Exhibit 4-3. Table 4-1** summarizes Alternative I costs and difficulty ranking

Runway Protection Zones

The FAA recommends that airports own property within the RPZ to the extent possible, and work with neighboring communities to avoid land uses that are potentially incompatible. Land uses that could potentially be incompatible are described in the 2012 FAA memo *Interim Guidance on Land Uses Within a Runway Protection Zone*, and include buildings, recreational land use, roads and railroads, fuel storage, and utility infrastructure.

Alternative I RPZs move with the runway ends. The Runway End 6 RPZ remains on airport property and the Runway End 24 RPZ has one corner located off airport property in the existing configuration and two corners in the future configuration. The Runway End 2 RPZ shifts onto airport property by 245 feet, which improves but does not fully resolve airport ownership of property within the RPZ. The Runway End 20 RPZ remains on airport property.

Property Acquisition

Future Airport property acquisition is needed to implement Alternative I. The proposed Taxiway N realignment connecting to the future Runway End 20 extends beyond the existing Airport property. Airport property acquisition for aeronautical purposes is required to accommodate the proposed Taxiway Object Free Area (TOFA) and the Building Restriction Line (BRL), which



extends nearly 390 feet laterally from the Runway 2/20 centerline. In addition, the RPZ areas for the Runway End 2 and 24 extend beyond the existing Airport property boundary. It is recommended the Airport acquire property or obtain an aviation easement to properly control the land uses within the entire RPZ area.

Advantages/Disadvantages

The primary advantages of Alternative I include:

- ▶ Constructing perpendicular taxiway entrances and connectors.
- ▶ Shifting Runway 2/20 to meet taxiway separation standards without reducing apron and taxiway area to the east.
- ▶ Increasing the length of Runway 6/24 to capture 100 percent of large aircraft fleet mix at 90 percent useful load on hot summer days.
- ▶ Increasing the length of Runway 2/20 from 5,400 feet to 5,955 feet to better support the business jets that use it.

The primary disadvantages of Alternative I include:

- ▶ Adding more pavement than other alternatives considered, which will increase project costs.
- ▶ Shifting Runway 2/20 requires additional coordination with the FAA Flight Procedures Office than leaving it in its existing location.
- ▶ Acquiring land prior associated with Taxiway N connectors to Runway End 20.
- ▶ Relocating the ILS GS, LOC, MALSR, and PAPIs on Runway 6/24.
- ▶ Demolishing the existing airport office building to remove obstacle in Runway 2/20 object free area (ROFA).

Table 4-1: Alternative I Implementation and Costs

Runway Alternative	Estimated Project Cost	Years to Complete	Difficulty Rank
Alternative I	\$19,500,000	5	4

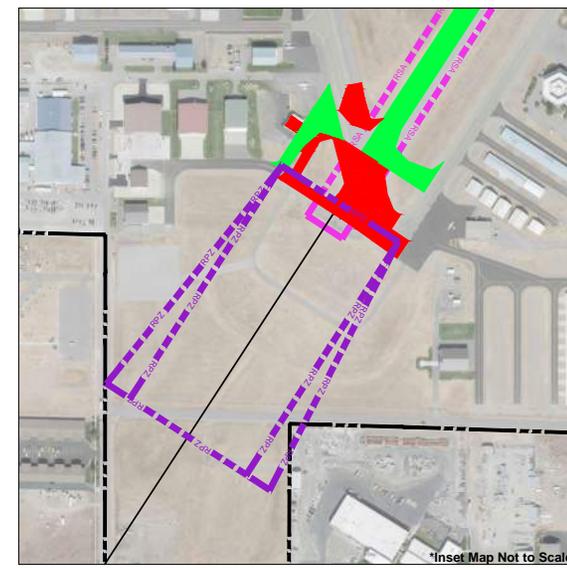
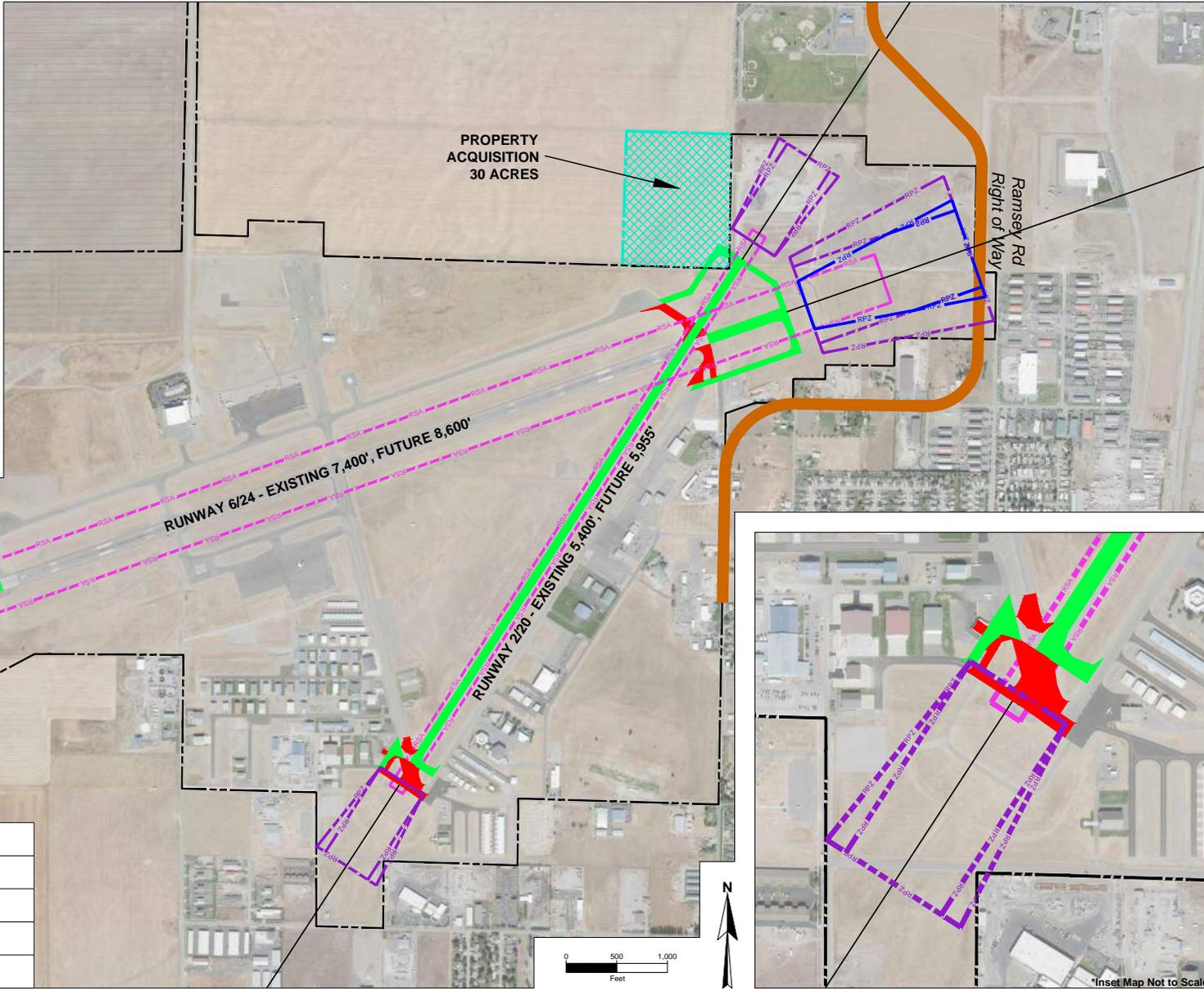
Table note: Difficulty Ranking established from implementation rating of 1 = Easiest to 5 = Most Difficult.

Stakeholder Feedback

The stakeholders ranked Alternative I first of the five alternatives considered. Stakeholders commented that the additional length on Runway 2/20 will provide greater utility for airport users; however, there was concern that the Runway 24 RPZ overlays the right of way for a realignment of Ramsey Road to the east of the Airport. Alternative I was selected for additional refinement based on the stakeholder feedback.



COE Exhibit 4-3: Runway Alternative I



Runway End	Relocation ft	Runway Length ft	RPZ
6	375	8,600	1/2 Mile
24	825		1 or 3/4 Mile
2	-245	5,955	1 Mile
20	800		1 Mile

RUNWAY ALTERNATIVE II

Runway 6/24 is extended to 8,600 feet. Runway End 6 is relocated 375 feet to the west. Runway End 24 is relocated 825 feet to the east.

Runway 2/20 is shortened to a length of 4,145 feet and narrowed to 60 feet wide. The runway is designed to FAA RDC B-I standards. Runway End 20 is relocated 1,010 feet to the southeast. The runway centerline remains in its existing location. Runway 2/20 centerline to Taxiway A centerline distance requirement is reduced to the B-I standard of 225 feet. The existing distance between Runway 2/20 and Taxiway A centerline is 225 feet and complies with B-I standards.

Alternative II is illustrated in **Exhibit 4-4. Table 4-2** summarizes Alternative II costs and difficulty ranking.

Runway Protection Zones

Alternative II RPZs move with their respective runway ends. The Runway End 6 RPZ remains on airport property and the Runway End 24 RPZ has one corner located off airport property in the existing configuration and two corners in the future configuration. The Runway End 2 RPZ shifts onto airport property by 245 feet, which improves but does not fully resolve airport ownership of property within the RPZ. The Runway End 20 RPZ remains on airport property.

Property Acquisition

Small corners of the RPZs for Runway Ends 2 and 24 extend beyond the existing property boundary. It is recommended that the Airport consider purchasing property or easement to control the land uses within the future RPZs

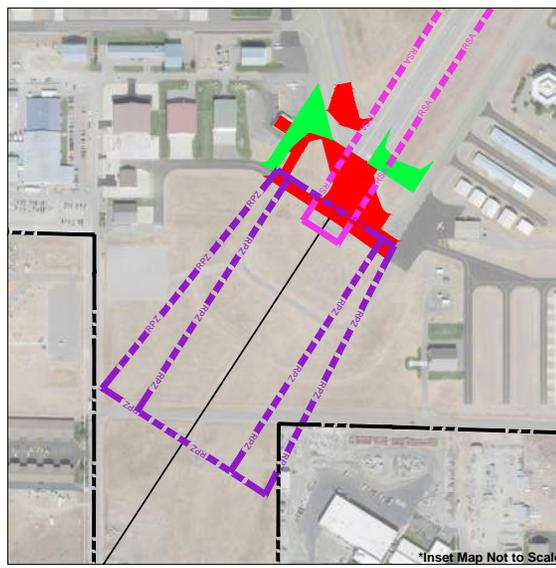
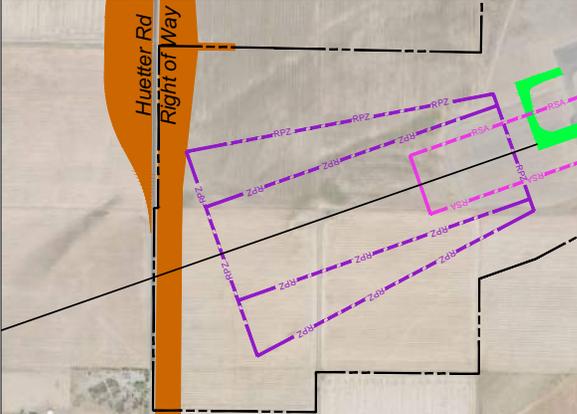
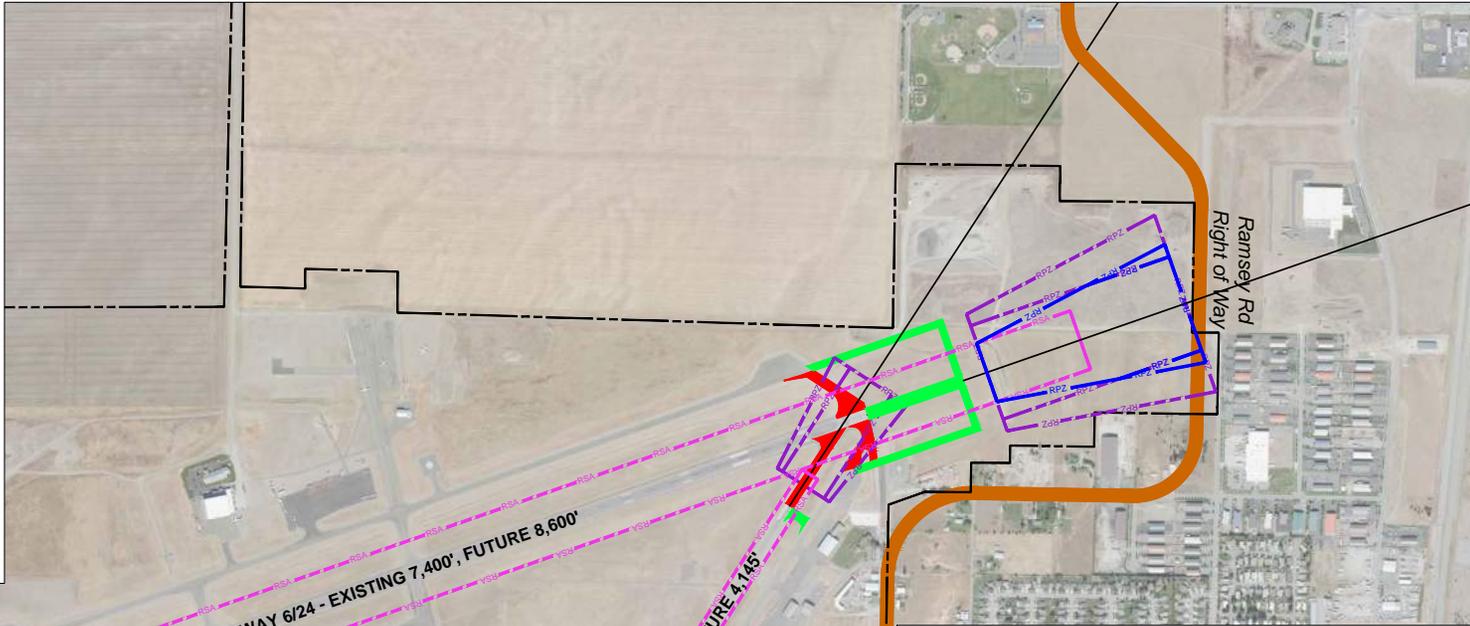
Advantages/Disadvantages

The primary advantages of Alternative II include:

- ▶ Constructing perpendicular taxiway entrances and connectors.
- ▶ Avoiding relocation of Runway 2/20 by reclassifying it as a B-I RDC.
- ▶ Avoiding impact to the southeast apron and Taxiway A by reclassifying Runway 2/20 as a B-I RDC.
- ▶ Increasing the length of Runway 6/24 to capture 100 percent of large aircraft fleet mix at 90 percent useful load on hot summer days.



COE Exhibit 4-4: Runway Alternative II



Runway End	Relocation ft	Runway Length ft	RPZ
6	375	8,600	1/2 Mile
24	825		1 or 3/4 Mile
2	-245	4,145	1 Mile
20	-1,010		1 Mile



The primary disadvantages of Alternative II include:

- ▶ Reducing Runway 2/20 to a length of 4,145 feet and a width of 60 feet. A runway of this size will accommodate small jet aircraft and pistons, but it will not accommodate larger jet aircraft on a regular basis. These aircraft can operate from Runway 6/24.
- ▶ Relocating holding position lines to meet B-I RDC requirements, which places hold lines on the edge of Taxiway A. This means that aircraft holding for Runway 2/20 will block other aircraft on Taxiway A.
- ▶ Demolishing the existing airport office building to remove obstacle in Taxiway D object free area (TOFA).

Table 4-2: Alternative II Implementation and Costs

Runway Alternative	Estimated Project Cost	Years to Complete	Difficulty Rank
Alternative II	\$14,000,000	4	3

Table note: Difficulty Ranking established from implementation rating of 1 = Easiest to 5 = Most Difficult.

Stakeholder Feedback

The stakeholders ranked Alternative II second of the five alternatives considered. Stakeholders noted that reduced length for Runway 2/20 was not ideal but would likely be easier to obtain FAA funding. There was concern that the Runway 24 RPZ overlays the right of way for a realignment of Ramsey Road to the east of the Airport. Alternative II was selected for additional refinement based on the stakeholder feedback.

RUNWAY ALTERNATIVE III

Runway 6/24 is extended to 8,600 feet by relocating Runway End 6 to the west by 1,200 feet. Runway End 24 does not move.

Runway 2/20 is shortened to 4,145 feet long and narrowed to 60 feet wide. The runway is designed to FAA RDC B-I standards. Runway End 20 is relocated 1,010 feet to the southeast. Alternative III rectifies the non-standard runway centerline to taxiway centerline distance between Runway 2/20 and Taxiway A and meets the 200-foot runway centerline to holding position line distance requirement. Acute-angled taxiway entrance and connectors are perpendicular with the runway centerline. Alternative III is illustrated in **Exhibit 4-5**. **Table 4-3** summarizes Alternative III costs and difficulty ranking.



Runway Protection Zones

Alternative III RPZs move with the runway ends. The Runway End 6 RPZ crosses existing Huetter Road and the Huetter Bypass right-of-way. The Runway End 24 RPZ is on airport property in the existing configuration and has one corner located off airport property in the future configuration. The Runway End 2 RPZ shifts onto airport property by 245 feet, which improves but does not fully resolve airport ownership of property within the RPZ. The Runway End 20 RPZ remains on airport property.

Property Acquisition

Property acquisition will be required to implement Alternative III. The extension of Runway End 6 may require up to 35 acres of property acquisition or easement to bring property in the RPZ under Airport control. Small corners of the RPZs for Runway Ends 2 and 24 extend beyond the existing property boundary. It is recommended that the Airport consider purchasing property or easement to control the land uses within the future RPZs.

Advantages/Disadvantages

The primary advantages of Alternative III include:

- ▶ Constructing perpendicular taxiway entrances and connectors.
- ▶ Shifting Runway 2/20 to meet taxiway separation standards without reducing apron and taxiway area to the east.
- ▶ Increasing the length of Runway 6/24 to capture 100 percent of large aircraft fleet mix at 90 percent useful load on hot summer days.
- ▶ Simplifying construction by moving only one end of Runway 6/24 instead of both ends.
- ▶ Simplifying taxiway layout around the proposed runway ends.
- ▶ Avoiding relocation of the PAPI on Runway End 24.

The primary disadvantages of Alternative III include:

- ▶ Complicating local transportation planning related to the Huetter Bypass right-of-way and existing Huetter Road in the RPZ.
- ▶ Reducing Runway 2/20 length to 4,145 feet which makes it unfavorable for large turbine aircraft.
- ▶ Reducing Runway 2/20 from a width of 75 feet to 60 feet, which require relocation of lights and remarking of pavement.



- ▶ Relocating holding position lines to meet B-I RDC requirements, which places hold lines on the edge of Taxiway A. This means that aircraft holding for Runway 2/20 will block other aircraft on Taxiway A.
- ▶ Demolishing the existing airport office building to remove obstacle in Taxiway D object free area (TOFA).

Table 4-3: Alternative III Implementation and Costs

Runway Alternative	Estimated Project Cost	Years to Complete	Difficulty Rank
Alternative III	\$12,400,000	4	2

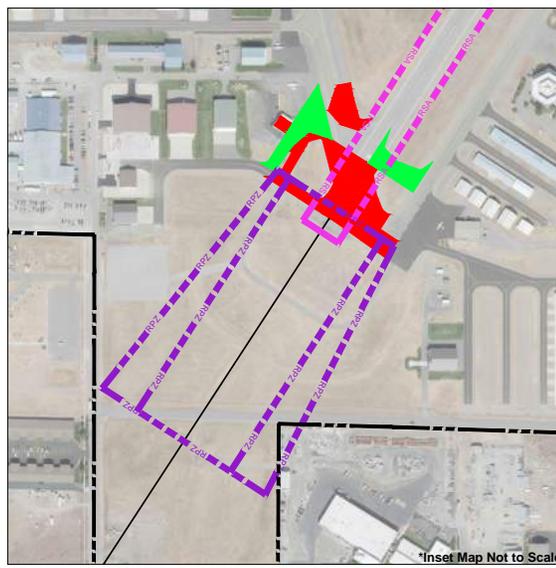
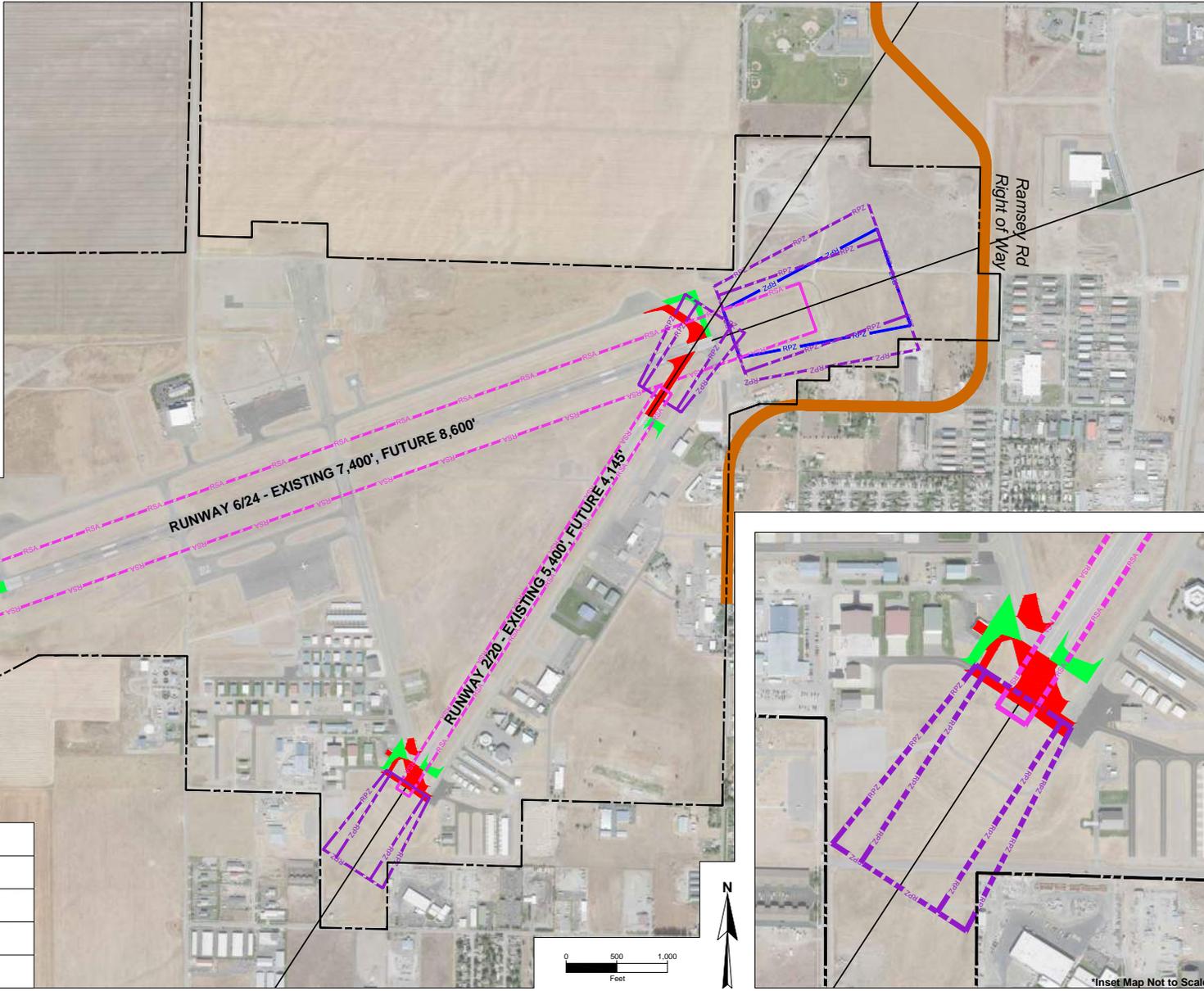
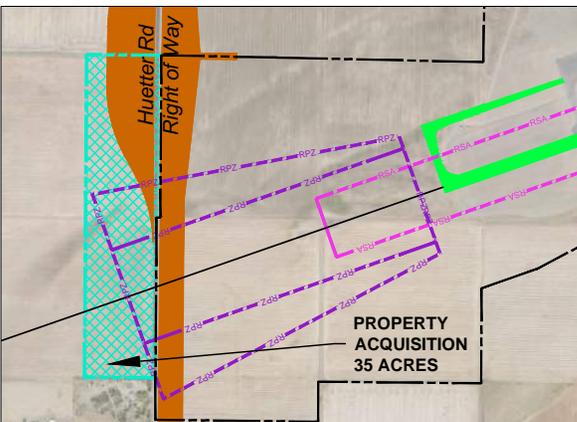
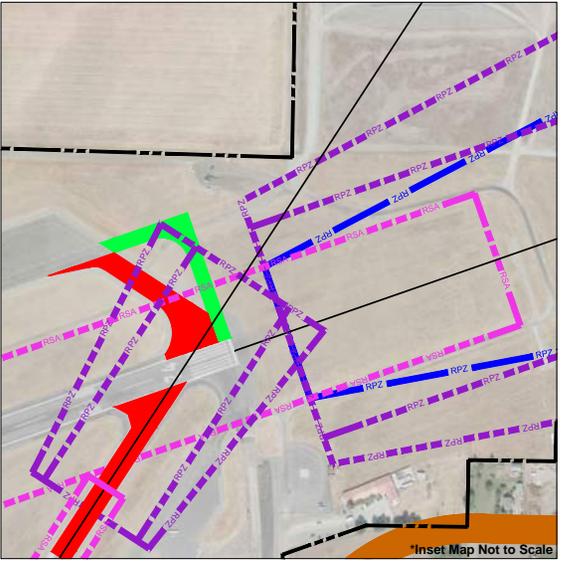
Table note: Difficulty Ranking established from implementation rating of 1 = Easiest to 5 = Most Difficult.

Stakeholder Feedback

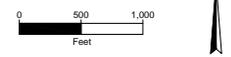
The stakeholders ranked Alternative III third of the five alternatives considered, in a tie with Alternative V. Stakeholders noted that distance from the Ramsey Road rights-of-way is desirable but the conflict with Huetter Road and the Huetter Bypass right-of-way were not desirable. Alternative III was not selected for additional refinement based on the stakeholder feedback.



COE Exhibit 4-5: Runway Alternative III



Runway End	Relocation ft	Runway Length ft	RPZ
6	1,200	8,600	½ Mile
24	0		1 or ¾ Mile
2	-245	4,145	1 Mile
20	-1,010		1 Mile



RUNWAY ALTERNATIVE IV

Runway 6/24 is extended to 7,775 feet by relocating Runway End 6 to the west by 375 feet. Runway End 24 does not move.

Runway 2/20 length is shortened to 4,145 feet long and narrowed to 60 feet wide. Runway End 20 is relocated 1,010 feet to the southeast. Alternative IV rectifies the non-standard runway centerline to taxiway centerline distance between Runway 2/20 and Taxiway A, and meets the 200-foot runway centerline to holding position line distance requirement. Acute-angled taxiway entrance and connectors are perpendicular with the runway centerline. This alternative is illustrated in **Exhibit 4-6. Table 4-4** summarizes Alternative IV costs and difficulty ranking.

Runway Protection Zones

Alternative IV RPZs will move with the runway ends. The Runway End 6 RPZ is located 375 feet further west, stopping just short of the Huetter Bypass right-of-way. The Runway End 24 RPZ does not move and is on airport property in the existing configuration and has one corner located off airport property in the future configuration. The Runway End 2 RPZ shifts onto airport property by 245 feet, which improves but does not fully resolve airport ownership of property within the RPZ. The Runway End 20 RPZ remains on airport property.

Property Acquisition

Small corners of the RPZs for Runway Ends 2 and 24 extend beyond the existing property boundary. It is recommended that the Airport consider purchasing property or easement to control the land uses within the future RPZs.

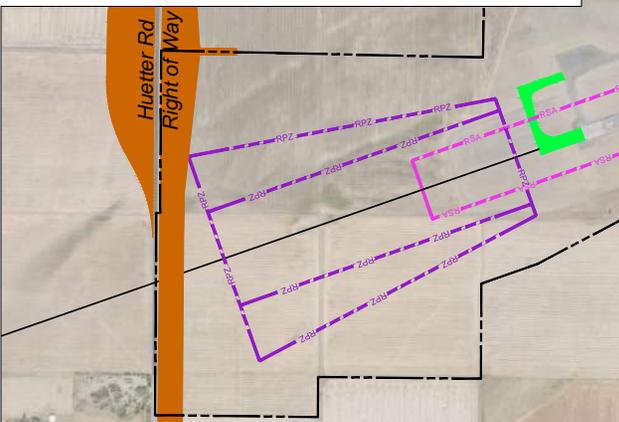
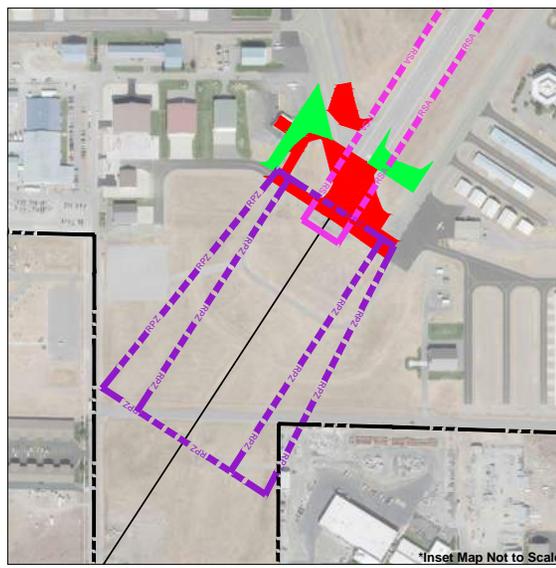
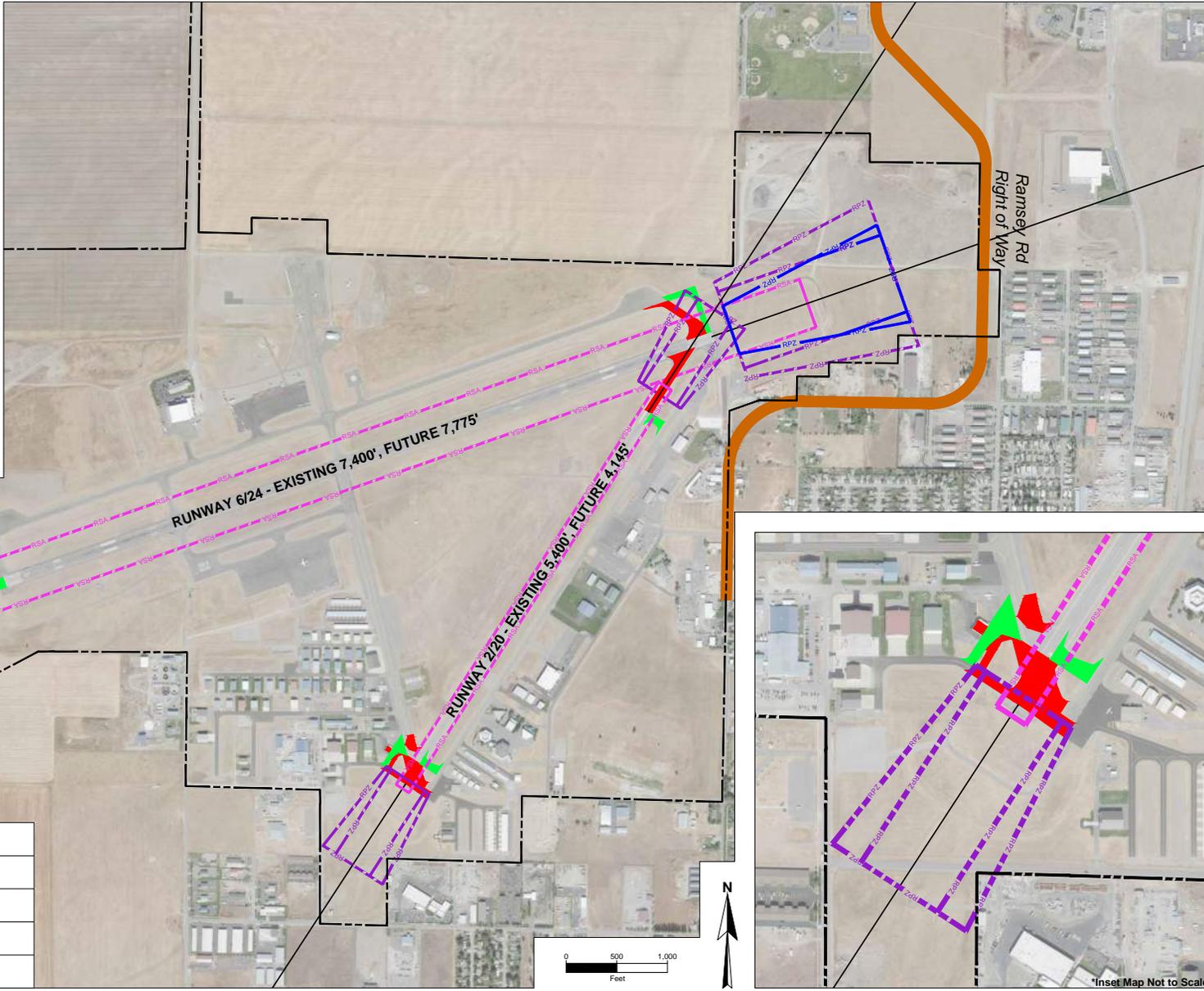
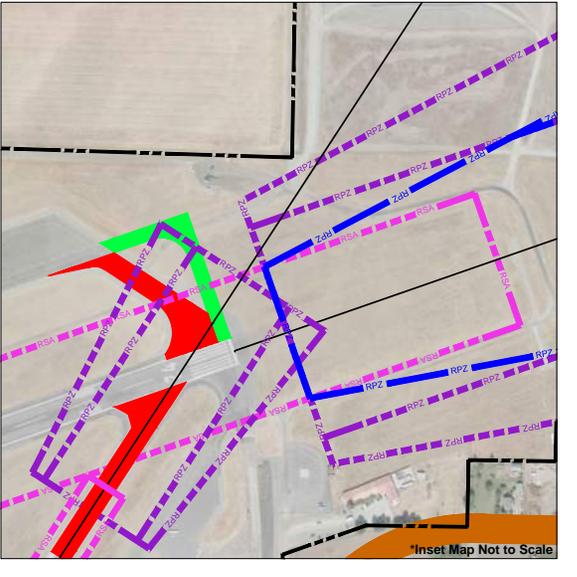
Advantages/Disadvantages

The primary advantages of Alternative IV include:

- ▶ Constructing perpendicular taxiway entrances and connectors.
- ▶ Shifting Runway 2/20 to meet taxiway separation standards without reducing apron and taxiway area to the east.
- ▶ Simplifying construction by moving only one end of Runway 6/24 instead of both ends.
- ▶ Simplifying taxiway layout around the proposed runway ends.
- ▶ Avoiding relocation of the PAPI on Runway End 24.
- ▶ Reducing construction cost and complexity by adding less pavement when compared to other alternatives.
- ▶ Avoiding impact to existing roads and rights-of-way.



COE Exhibit 4-6: Runway Alternative IV



Runway End	Relocation ft	Runway Length ft	RPZ
6	375	7,775	½ Mile
24	0		1 or ¾ Mile
2	-245	4,145	1 Mile
20	-1,010		1 Mile

The primary disadvantages for this alternative include:

- ▶ Constructing Runway 6/24 to a length of 7,775 feet does not meet the runway length requirements of 100 percent of large aircraft fleet mix at 90 percent useful load on hot summer days
- ▶ Reducing Runway 2/20 length to 4,145 feet makes it unfavorable for large turbine aircraft.
- ▶ Reducing Runway 2/20 from a width of 75 feet to 60 feet, which require relocation of lights and remarking of pavement.
- ▶ Relocating holding position lines to meet B-I RDC requirements, which places hold lines on the edge of Taxiway A. This means that aircraft holding for Runway 2/20 will block other aircraft on Taxiway A.
- ▶ Demolishing the existing airport office building to remove obstacle in Taxiway D object free area (TOFA).

Table 4-4: Alternative IV Implementation and Costs

Runway Alternative	Estimated Project Cost	Years to Complete	Difficulty Rank
Alternative IV	\$10,500,000	3	1

Table note: Difficulty Ranking established from implementation rating of 1 = Easiest to 5 = Most Difficult.

Stakeholder Feedback

The stakeholders ranked Alternative IV fifth of the five alternatives considered. Stakeholders noted that avoiding rights-of-way is desirable but shorter runway length was not desirable. Alternative IV was not selected for additional refinement based on the stakeholder feedback.

RUNWAY ALTERNATIVE V

Runway 6/24 is extended to 8,600 feet. Runway End 6 is relocated 375 feet to the west. Runway End 24 is relocated 825 feet to the east.

Runway 2/20 is replaced with a realigned runway (expected to called Runway 18/36) which is better oriented with the prevailing wind than either of the exiting runways. Runway 18/36 is 5,000 feet long and 75 feet wide. The runway is designed to FAA RDC B-II standards. Alternative V requires new parallel taxiway system to the east of Runway 18/36, and reconfiguration of the existing airfield taxiway system to reflect the new alignment. Runway End 36 and associated safety areas and RPZ are located outside of airport property. This alternative is illustrated in **Exhibit 4-7. Table 4-5** summarizes Alternative V costs and difficulty ranking.



Runway Protection Zones

Alternative V RPZs move with their respective runway ends. The Runway End 6 RPZ moves 375 feet farther west, remaining on Airport property. The Runway End 24 RPZ is on airport property in the existing configuration and has one corner located off airport property in the future configuration. The Ramsey Road rights-of-way falls inside of the Runway End 24 RPZ in Alternative V.

The Runway End 18 RPZ includes farmland not owned by the Airport. The Runway End 36 RPZ remains on airport property and overlays the existing airport administration building.

Property Acquisition

Property acquisition will be required to implement Alternative V. It is recommended that the Airport consider purchasing up to 150 acres of farmland north of the Airport to accommodate Runway 18/36, the taxiway, FAA design surfaces, and the RPZ. It would be beneficial to acquire property over to Atlas Road for future development along the new runway. The Runway End 18 and approach RPZ would require property acquisition of approximately 150 acres. Additional areas would be available for hangar and apron development north of Runway 6/24.

Advantages/Disadvantages

The primary advantages provided by this alternative include:

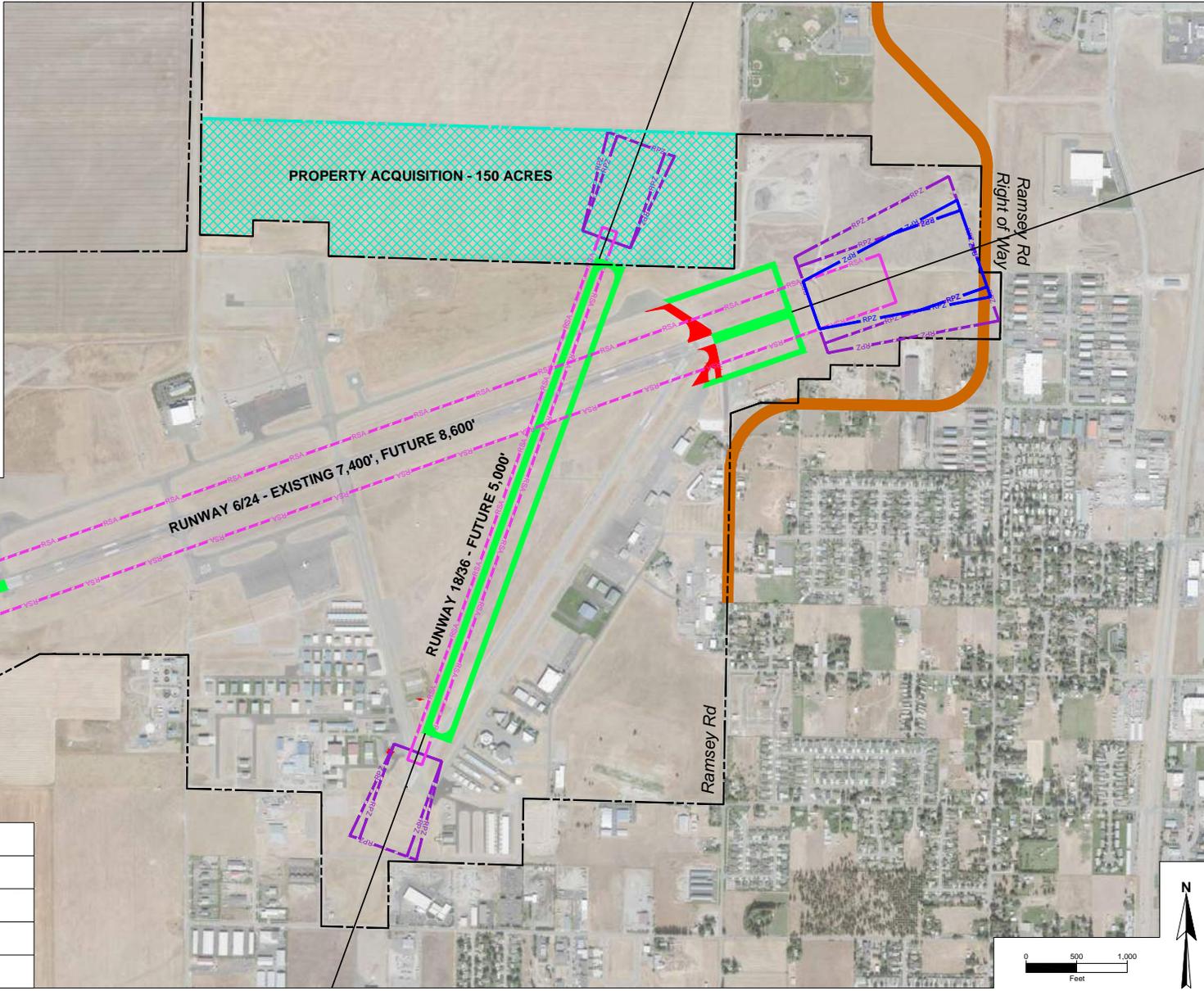
- ▶ Constructing perpendicular taxiway entrances and connectors.
- ▶ Improving the wind alignment of the crosswind runway.
- ▶ Retaining B-II design standards for crosswind runway.
- ▶ Freeing up property along existing Taxiway A and Runway 2/20 for infill development

The primary disadvantages of Alternative V include:

- ▶ Requiring the most property acquisition relative to the other alternatives considered.
- ▶ Requiring a redesign of the Airport taxiway system.
- ▶ Involving complex construction phasing due to the amount of construction required for the runway and taxiways.
- ▶ Costing up to twice as much as other alternatives before the costs of the taxiway system are considered.
- ▶ Demolishing the existing airport office building to remove obstacle Runway End 36 RPZ.
- ▶ Demolishing the existing structure adjacent to the fuel island to remove obstacle from the Runway 18/36 ROFA.



COE Exhibit 4-7: Runway Alternative V



Runway End	Relocation ft	Runway Length ft	RPZ
6	375	8,600	½ Mile
24	825		1 or ¾ Mile
2	Realigned	5,000	1 Mile
20	Realigned		1 Mile

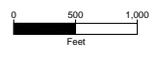


Table 4-5: Alternative V Implementation and Costs

Runway Alternative	Estimated Project Cost	Years to Complete	Difficulty Rank
Alternative V	\$24,100,000*	5	5

Table note: Difficulty Ranking established from implementation rating of 1 = Easiest to 5 = Most Difficult.

* Project costs do not include reconfiguration of taxiway system.

Stakeholder Feedback

The stakeholders ranked Alternative V third of the five alternatives considered, in a tie with Alternative III. Stakeholders noted that the ability to redesign the runway system would be beneficial; however, it was likely not a wise use of the Airport's funds. Alternative V was not selected for additional analysis based on stakeholder feedback.

RUNWAY ALTERNATIVES EVALUATION SUMMARY

Runway alternatives I, II, III, IV and V are summarized in **Table 4-6**. Alternatives I and II were carried forward for additional analysis.

Table 4-6: Runway Alternatives Evaluation Summary

Runway Alternative	Stakeholder Ranking	Estimated Project Cost	Years to Complete	Difficulty Rank
Alternative I	1	\$19,500,000	5	4
Alternative II	2	\$14,000,000	4	3
Alternative III	3	\$12,400,000	4	2
Alternative IV	5	\$10,500,000	3	1
Alternative V	3	\$24,100,000	5	5

Table note: Difficulty Ranking established from implementation rating of 1 = Easiest to 5 = Most Difficult.

Table note: Project costs include the runway system, NAVAIDs, and entrance/parallel taxiways.

REFINED ALTERNATIVES

Alternatives I and II were favored by stakeholders and carried forward for further planning assessment and refinement. The refined alternatives are hereafter referred to as Alternative I-R and II-R. Refinement took a closer look at implementation and coordination with planned roadway projects near the Airport and involved additional discussion with the FAA Helena Airports District Office. Runway 6/24 is the same length, width, and location in both alternatives; therefore, descriptions focus on the disposition of Runway 2/20.



RUNWAY ALTERNATIVE I-R

Runway 2/20 is 6,020 feet long by 75 feet wide and is extended by 620 feet at Runway End 20. Runway End 2 remains in its existing location. The runway length of 6,020 feet exceeds runway length recommendations of 5,100 feet to meet the design standards for decoupling the intersecting runway thresholds. Runway 2/20 is an RDC B-II runway. The Alternative I-R decouples Runway Ends 20 and 24 using runway extensions. One ADG III sized aircraft can hold between the two runway ends while remaining clear of RSA and obstacle free zone (OFZ) for both runways. Alternative I-R is illustrated in **Exhibit 4-8**, and construction phasing and cost estimates are summarized in **Table 4-7**.

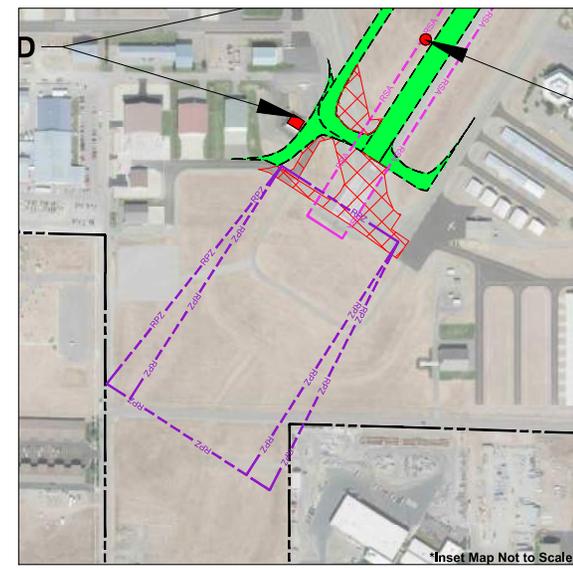
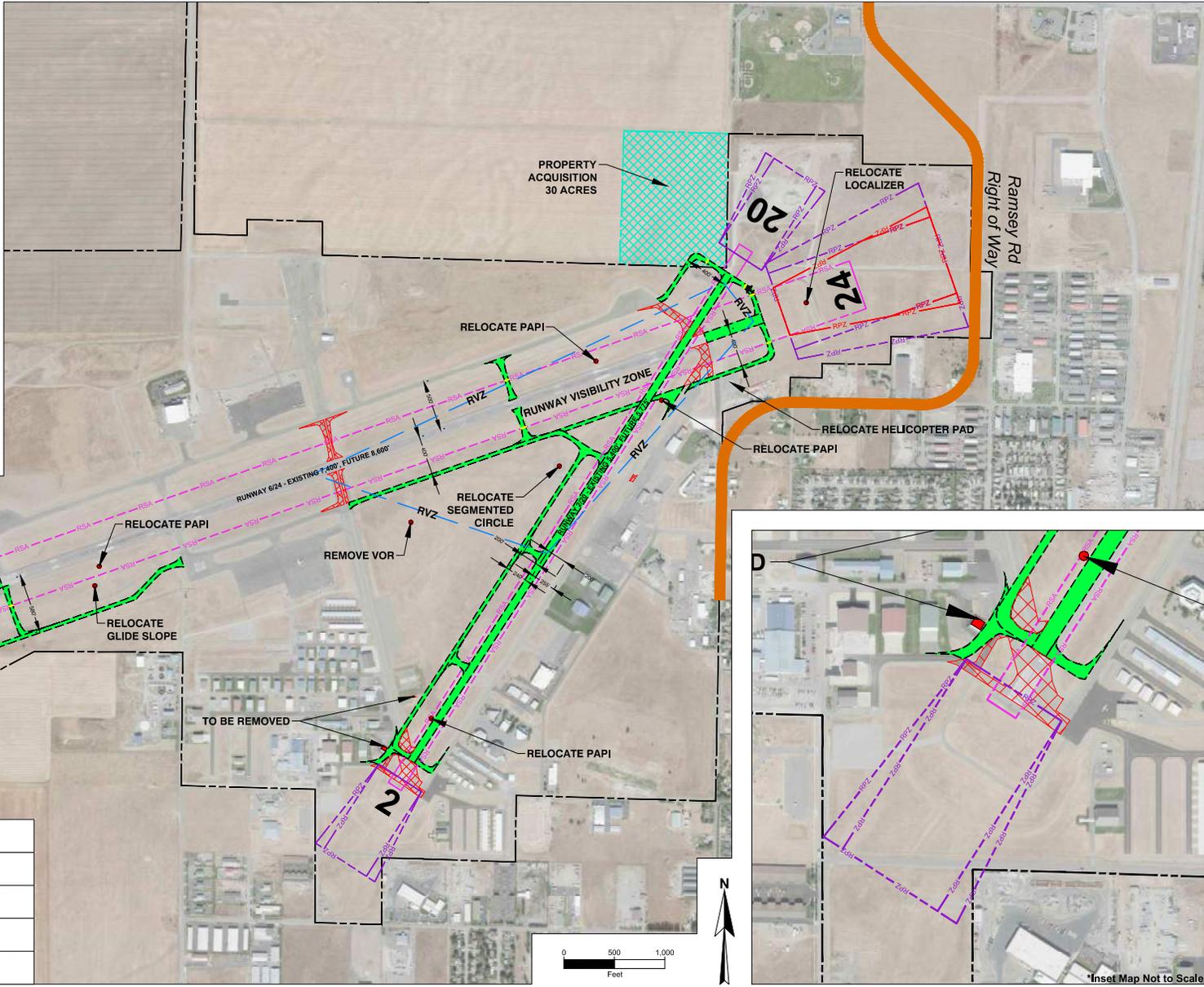
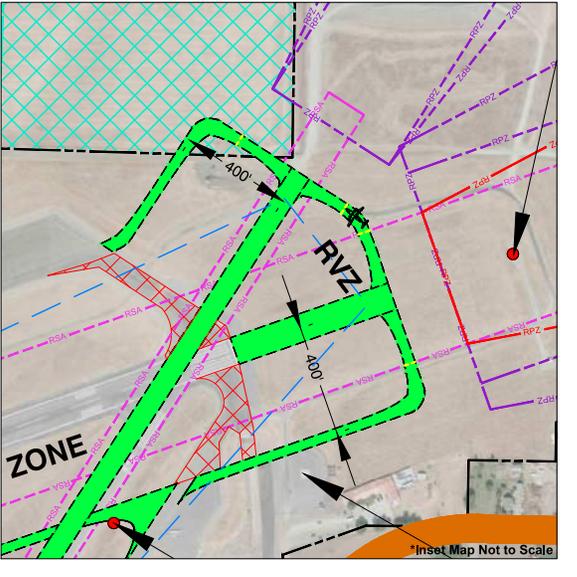
Runway Protection Zones

Alternative I-R RPZs move with the runway ends. The northern corner of the controlled activity area of the Runway End 6 RPZ overlays the Huetter Bypass rights-of-way. The Runway End 24 RPZ has one corner located off airport property in the future configuration. The Runway End 2 RPZ does not move from its existing location and includes some 0.32 acres of property not owned by the Airport. The Runway End 20 RPZ remains on airport property.

Property Acquisition

Property acquisition will be required to implement Alternative I-R. The proposed Taxiway N connector to Runway End 20 leaves airport property. Acquisition of 30 acres will accommodate the taxiway object free area (TOFA) and provide additional property for development. The RPZs for Runway Ends 2 and 24 extend beyond the existing property boundary. It is recommended that the Airport consider purchasing property or easement to control the land uses within the RPZs.





Runway End	Relocation ft	Runway Length ft	RPZ
6	600	8,600	1/2 Mile
24	600		1 or 3/4 Mile
2	-245	5,775	1 Mile
20	620		1 Mile

Advantages/Disadvantages

The primary advantages provided by this alternative are the same as Alternative I with the following differences:

- ▶ Adding taxiways to Runway 6/24 reduces occupancy time and improves crossings;
- ▶ Extending Taxiway F to both ends of Runway 6/24 so aircraft south of the runway do not need to cross the runway to access the runway ends;
- ▶ Providing sufficient space between Runway Ends 20 and 24 for the critical design aircraft (RJ-85) to hold while the runways are in use;
- ▶ Balancing the extensions of Runway End 6 and Runway End 24 so that it minimizes disruption to the existing runway lighting system.
- ▶ Leaving Runway End 2 in its existing location means that the PAPI does not have to be relocated, and the instrument approach procedure can remain until the VOR is removed.

The primary disadvantages provided by this alternative are the same as Alternative I with the following differences:

- ▶ Locating Runway End 6 so that the RPZ overlays part of the Huetter Bypass rights-of-way;
- ▶ Displacing airfield maintenance roads for the Runway End 6 and 20 extensions;
- ▶ Adjusting the north side perimeter fence to include the property acquisition.

IMPLEMENTATION AND COSTS

Alternative I-R is divided into six phases, shown below and summarized in **Table 4-7**. The time from the start of the environmental assessment to the end of construction is seven years. The land acquisition processes can be carried out concurrently. Extension of Runway End 6 is implemented in Phase 3 to mitigate the temporary loss of runway length due to the Phase 4 Runway End 24 threshold displacement. Runway 2/20 would not be closed during Phase 4.

- ▶ Phase 1 – Environmental Assessment.
- ▶ Phase 2 – Land Acquisition (Fee Simple and Avigation Easements).
- ▶ Phase 3 – Runway End 6 and Taxiway N extension.
- ▶ Phase 4 – Runway 2/20 shifted 30 feet; Runway End 24 extension; Taxiway A connection to Runway End 24. Taxiway N to Runway End 20.
- ▶ Phase 5 – Extend Taxiway F to Runway Ends 6 and 24.
- ▶ Phase 6 Construct northside parallel taxiway for Runway 2/20.



Table 4-7: Alternative I-R Implementation and Costs

Runway Alternative	Estimated Project Cost	Years to Complete	Difficulty Rank
Alternative I-R	\$27,065,000	7	2

Table note: Difficulty Ranking established from implementation rating of 1 = Easiest to 2 = Most Difficult.

RUNWAY ALTERNATIVE II-R

Runway 2/20 is 4,400 feet long by 75 feet wide and is shortened by 1,000 feet at Runway End 20. Runway Ends 20 and 24 are decoupled through the shortening of Runway 2/20. Runway 2/20 is an RDC B-I runway; however, the pavement width of 75 feet is maintained to support continued use of the runway by design group II aircraft with hangars along Taxiway A. Alternative II-R is illustrated in **Exhibit 4-9**. Alternative II-R construction phasing and cost estimates are summarized in **Table 4-8**.

Runway Protection Zones

Alternative II-R RPZs move with the runway ends. The northern corner of the controlled activity area of the Runway End 6 RPZ overlays the Huetter Bypass rights-of-way. The Runway End 24 RPZ has one corner located off airport property in the future configuration. The Runway End 2 RPZ does not move from its existing location and includes some 0.32 acres of property not owned by the Airport. The Runway End 20 RPZ remains on airport property.

Property Acquisition

Property acquisition may be required to implement Alternative II-R. The northern corner of the controlled activity area of the Runway End 6 RPZ is owned by the Airport but overlays the Huetter Bypass rights-of-way which will require additional FAA coordination. The RPZs for Runway Ends 2 and 24 extend beyond the existing property boundary. It is recommended that the Airport consider purchasing property or easement to control the land uses within the RPZs

Advantages/Disadvantages

The primary advantages provided by this alternative are the same as Alternative II with the following differences:

- ▶ Extending Taxiway F to avoid unnecessary crossing of Runway 6/24 by aircraft on the south side of the runway going to Runway End 6.
- ▶ Leaving Runway End 2 in its existing location means that the PAPI does not have to be relocated, and the existing instrument approach procedure can remain until the VOR is removed.



The primary disadvantages provided by this alternative are the same as Alternative II with the following differences:

- ▶ Locating Runway End 6 so that the RPZ overlays part of the Huetter Bypass rights-of-way.
- ▶ Locating Runway End 20 so that Taxiway cannot be extended as a full parallel taxiway to Runway 6/24.

Implementation and Costs

Alternative II-R is divided into five phases, shown below and summarized in **Table 4-8**. The time from the start of the environmental assessment to the end of construction is five years. The land acquisition processes can be carried out concurrently. Like Alternative I-R, extension of Runway End 6 is implemented in Phase 2 to mitigate the temporary loss of runway length due to the Phase 3 Runway End 24 threshold displacement. Runway 2/20 would not be closed during Phase 3.

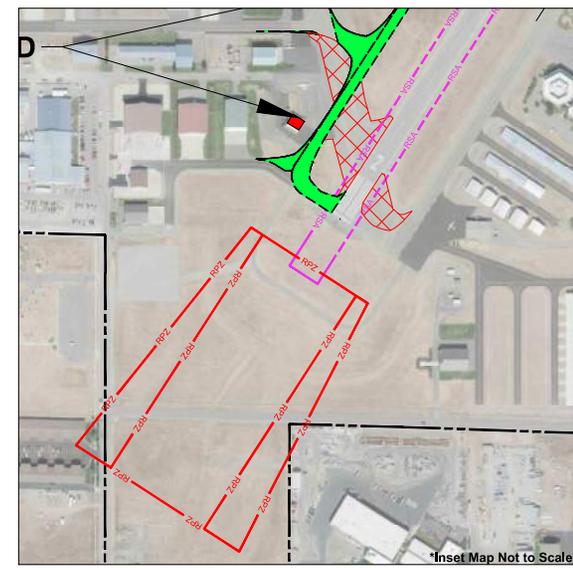
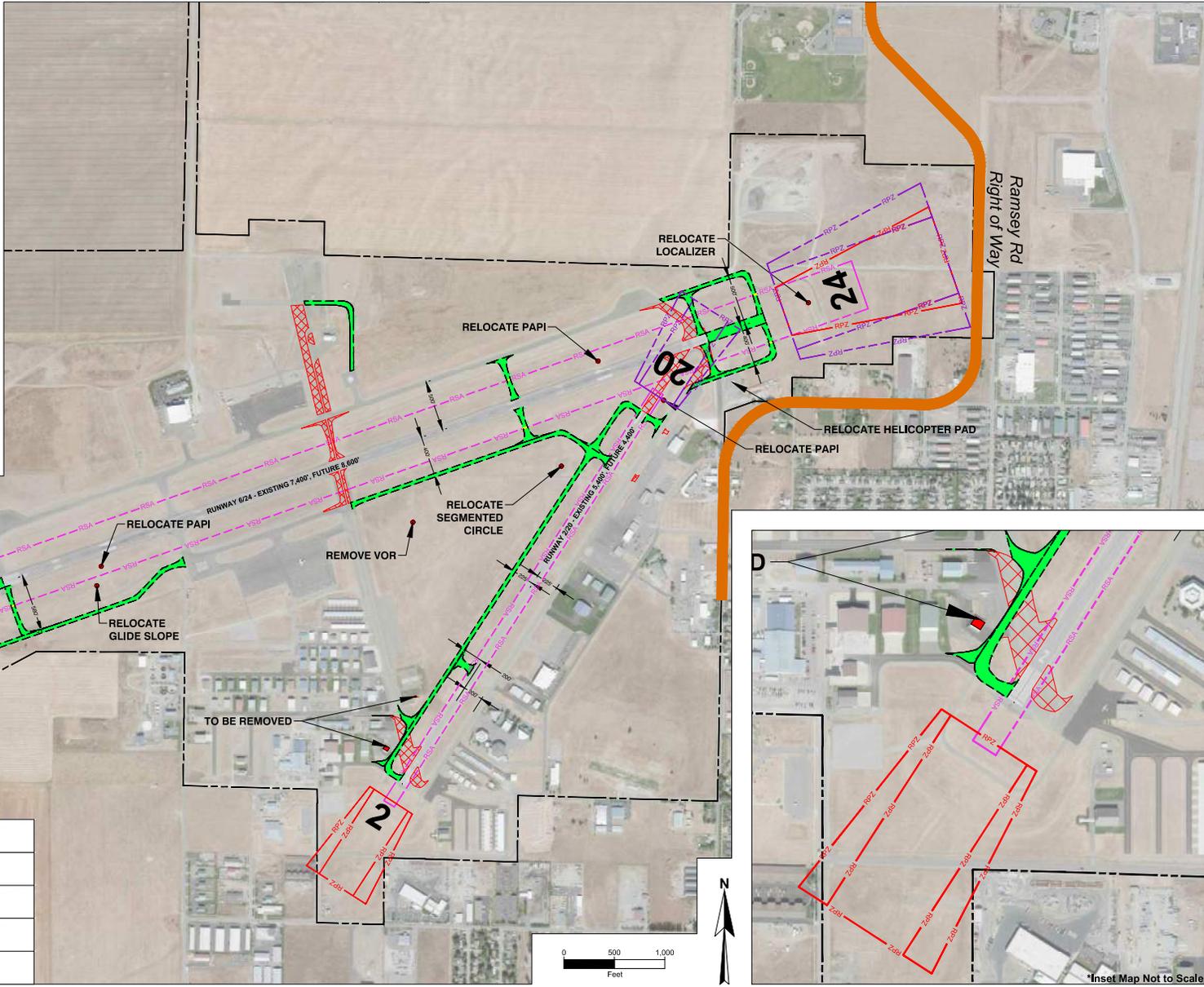
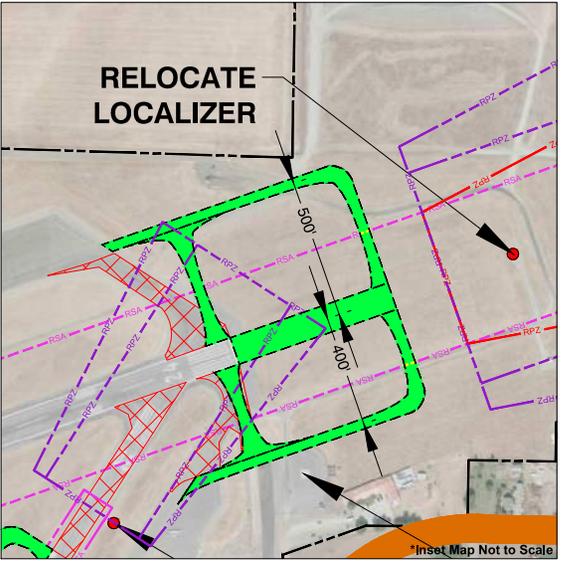
- ▶ Phase 1 – Environmental Assessment and Land Acquisition (Avigation Easements).
- ▶ Phase 2 – Runway End 6 and Taxiway N extension.
- ▶ Phase 3 – Runway 2/20 shortened; Runway 24 extension; Taxiway A connection to Runway End 20. Taxiway N to Runway End 24.
- ▶ Phase 4 – Extend Taxiway F to Runway End 6 and Runway End 20.
- ▶ Phase 5 – Construct northside parallel taxiway for Runway 2/20.

Table 4-8: Alternative II-R Implementation and Costs

Runway Alternative	Estimated Project Cost	Years to Complete	Difficulty Rank
Alternative II-R	\$21,100,000	5	1

Table note: Difficulty Ranking established from implementation rating of 1 = Easiest to 2 = Most Difficult.





Runway End	Relocation ft	Runway Length ft	RPZ
6	600	8,600	1/2 Mile
24	600		1 or 3/4 Mile
2	0	4,400	1 Mile
20	-1,000		1 Mile

REFINED RUNWAY ALTERNATIVE SUMMARY

Runway Alternative I-R and II-R are the planning concepts advanced for further master plan consideration because they offer a strategic development solution. Both runway alternatives accommodate forecast Airport demand, surrounding land use and roadway development, and satisfy airfield facility requirements per current FAA design standards and decoupled runway geometry. The runway alternatives differ primarily in the length and position of Runway 2/20.

Alternative I-R is an unconstrained runway concept, with a future 6,020-foot crosswind length reconstructed with a 30-foot westward runway centerline shift to meet runway-taxiway separation standards for Taxiway A. Alternative I-R maintains an intersection between the two runways; however, the extension of both runway decouples Runway Ends 20 and 24. Alternative I-R would continue to accommodate similar runway aircraft utilization and traffic mix to existing.

Alternative II-R is a constrained runway concept, with a future 4,400-foot crosswind runway length positioned along the existing runway centerline. Alternative II-R decouples Runway Ends 20 and 24 without a physically crossing. Alternative II-R will result in the larger and more demanding turbine aircraft activity transferring from the crosswind Runway 2/20 to the primary Runway 6/24.

SELECTION OF A PREFERRED RUNWAY ALTERNATIVE

Runway alternatives I-R and II-R were presented to the stakeholder groups and at a public open house on May 29, 2018, and to the FAA Helena Airports District Office at an in-person meeting on June 5, 2018. Stakeholders supported Alternative I-R because it maintains a longer Runway 2/20; however, it was understood that the FAA Helena Airports District Office would need to support this alternative for it to receive funding. Alternative II-R was an acceptable compromise to many stakeholders because it provides an extension of Runway 6/24 and maintains Runway 2/20 for piston, turboprop, and light jet use.

The FAA Helena Airports District Office supported the decoupling of Runway Ends 20 and 24 provided by both alternatives, and preferred Alternative II-R for the following reasons.

- ▶ The wind analysis shown in **Chapter 3**, Facility Requirements, indicates that Runway 6/24 has sufficient (greater than 95 percent) wind coverage for all but design group I aircraft. Most jets that need longer length for Runway 2/20 are in design group II and larger; therefore, they can be accommodated on Runway 6/24 and additional length on Runway 2/20 is not eligible for FAA funding. It is noteworthy that the wind data from the 2012 Master Plan indicated that Runway 6/24 did not provide sufficient wind coverage for design group II aircraft; therefore, it is recommended that the Airport continue to monitor wind coverage as design nears.



- ▶ A non-intersecting runway layout is preferable for a non-towered airport like COE.

The FAA Helena Airports District Office confirmed that it would be preferable to maintain the existing Runway 2/20 width of 75 feet even after shortening the runway. Runway design code B-I standards are applied to this runway to assess safety areas, object free areas, and separation from other pavement and markings.

The preferred runway alternative must be implementable, financially attainable, and meet the needs of the existing and future users of COE. Alternative I-R provides a more capable airfield through the longer runway, but it may not be financially achievable without FAA support. Alternative II-R meets the facility requirements for Runway 6/24 and the overall airport layout will continue to accommodate a wide variety of business jet, U.S. Forest Service, and other general aviation users into the future.

The preferred runway alternative is Alternative II-R. Runway 6/24 will be maintained at C-III design standards and extended to 8,600 feet long. Runway 2/20 will be maintained at B-I standards, kept at 75 feet wide, and shortened to 4,400 feet long. Runway End 2 remains in its existing position and Taxiways D and A become perpendicular entrances. Reconfiguration of the taxiway system to reflect the preferred alternative is discussed in the following section.

3. TAXIWAY SYSTEM IMPROVEMENTS

Taxiway system improvements tie the preferred runway alternative to aircraft parking and storage areas. Taxiways are designed to accommodate the most demanding users of the taxiway system, which include business jets and contractors working for U.S. Forest Service. Taxilanes serving hangars may be designed for smaller aircraft if the hangars that they lead to are too small for larger aircraft. Taxiway development alternatives were evaluated as part of the runway alternatives described in **Section 2**. The section below describes the taxiway improvements.

TAXIWAY IMPROVEMENTS

The taxiway improvements are shown in **Exhibit 4-10**, and the key features are described below.

Runway 6/24 Taxiway System

- ▶ Taxiway N is extended southwest to meet relocated Runway End 6, and northeast to meet the relocated Runway End 24.
- ▶ Taxiway F is extended to meet relocated Runway Ends 6 and 20. Taxiway F provides Runway End 6 access for the west and east apron and hangar areas without having to cross



Runway 6/24. This layout should reduce the number of runway crossings and runway occupancy time.

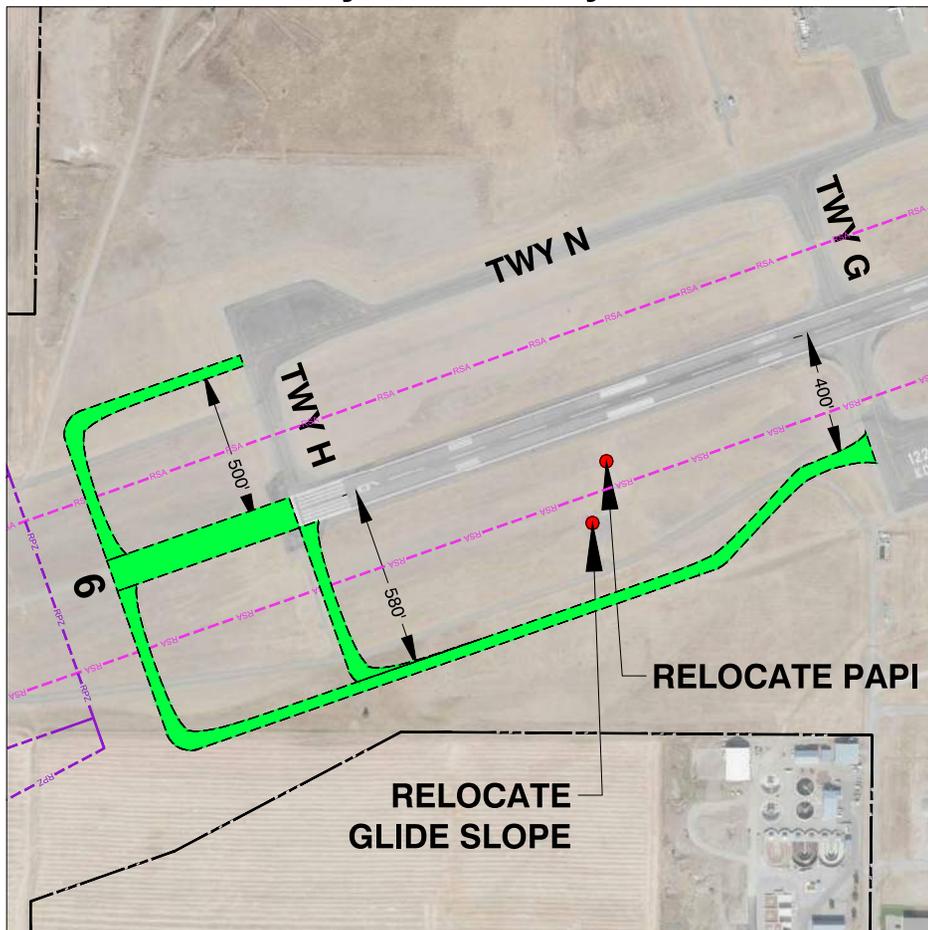
- ▶ Taxiway N and Taxiway F connectors are located 6,000 feet from Runway End 6. These locates are expected to capture 92 percent of large aircraft landing on Runway 6, reducing runway occupancy time. The connectors replace the existing Taxiway D crossing of Runway 6/24, which is in the middle third of the runway. FAA design guidance recommends avoiding taxiway crossings in the middle third of the runway.
- ▶ New Taxiway N and Taxiway A connectors to the existing Runway End 24 resolve the existing non-standard entrance taxiway alignments and provide a future bypass taxiway at Runway End 24.

Runway 2/20 Taxiway System

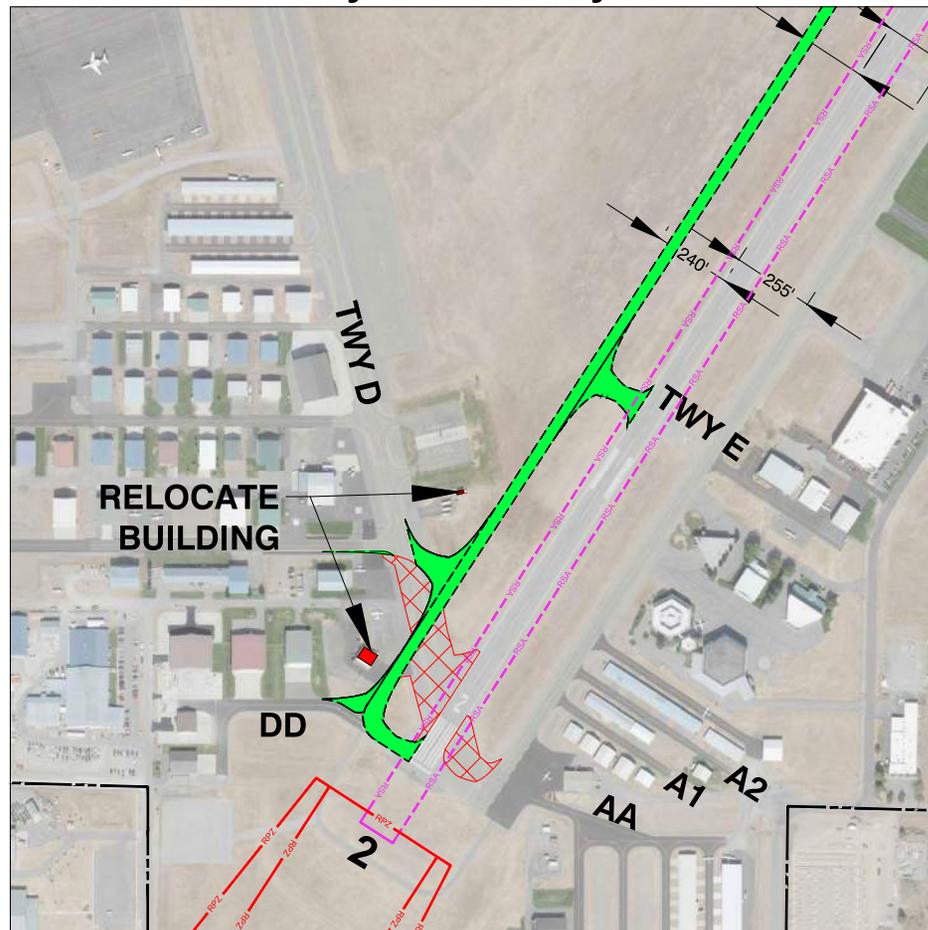
- ▶ Taxiway A connects to the relocated Runway End 2 with a perpendicular connector to match the new Taxiway D connector.
- ▶ Taxiway A extends to the northeast to provide access to Runway End 24.
- ▶ The new taxiway on the north side of Runway 2/20 provides shorter taxi route from the west hangar area to Runway 2/20 without requiring a runway crossing.
- ▶ Taxiway A and infield parallel connectors meet at relocated Runway End 20. The connectors allow aircraft from the east hangar and apron areas to access Taxiway F to facilitate cross airfield taxiing.
- ▶ Taxiway connector to the new parallel located opposite Taxiway B provides a runway exit 3,245 feet from Runway End 2. A connection is made to the Taxiway F at this point to facilitate access to Runway 6/24 from the West and East hangar areas.
- ▶ Taxiway connector to the infield parallel is located opposite Taxiway E to provide a runway exit 3,000 feet from the Runway End 20.



Taxiways for Runway End 6



Taxiways for Runway End 2



4. LANDSIDE FACILITY DEVELOPMENT

The following section describes the future landside facilities, which are on-airport areas outside of the airfield used to support aircraft parking and storage; on-airport businesses; and airport administration, operations, and maintenance. The 2012 Master Plan included a detailed analysis of the landside development areas. This Master Plan recommends following the 2012 development concept, except where noted in the section below.

LANDSIDE ALTERNATIVE METHODOLOGY

The landside is divided into three functional areas based on the existing and planned layout of the runway and taxiway system.

- ▶ The Northside includes property north of Runway 6/24.
- ▶ The Southside included property south of Runway 6/24 and west of Runway 2/20.
- ▶ The Eastside includes property east of Runway 2/20 along Taxiway A.

The following facilities and plans are addressed by the landside alternatives.

- ▶ Airport Administration Building
- ▶ Aircraft Hangars
- ▶ Aircraft Parking Aprons and Tie-Down Areas
- ▶ Local Transportation Plans and Improvements
- ▶ Future Airport Property Interests

AIRPORT ADMINISTRATION BUILDING

The existing airport administration building located near the Runway End 2. The facility is approaching the end of its functional life, and expansion is limited by the surrounding taxiways and taxilanes. The building penetrates the Runway 2/20 Part 77 airspace surfaces and the building fence and paved areas are within the future Taxiway D object free area. The building will be removed as part of the Runway 2/20 improvement project to comply with FAA taxiway design standards.



A replacement building is recommended on the northside of the airfield, next to the aircraft rescue and firefighting (ARFF) facility. A co-located building provides operational efficiencies by centralizing airport staff with ARFF and equipment storage. Although the northside site is farther from most hangars and the two FBOs than the existing location, the northside site will consolidate airport operational functions and ARFF activities.

AIRCRAFT HANGARS

Hangar development areas are shown for general planning purposes, and it is expected that most hangar development will be privately financed. Hangar size and site layout will be determined by the developer based on their needs. The preferred runway alternative will encourage development of hangar facilities for jet aircraft and supporting maintenance and service businesses on the Northside. It is expected that replacement and infill hangars on the eastside will cater towards smaller aircraft. There is room for some infill development Southside, and this location can support users of both runways due to its location in between them.

Exhibit 4-11 depicts the landside areas available for hangar development. Future hangars can be accommodated on existing airport property based on the demand forecasts; however, the Airport may consider purchasing additional property on the Northside to support development of large corporate hangars and workshops for maintenance providers (MROs) and service providers (SASOs). Additional airport infrastructure (taxiways, apron/ramp, utilities, vehicle access, fencing) will be required to support hangar development, particularly on the Northside.

The 2012 Master Plan included additional hangar development areas east of Taxiway A, north of Miles Avenue and west of Ramsey Road. This location is occupied by a shooting club, and the property is owned by the Airport. This hangar development area is not carried forward in this Master Plan because of the complications relating to extending taxilanes and realigning public roads. There is sufficient property to support the hangar development elsewhere on the Airport.

AIRCRAFT PARKING APRONS AND TIE-DOWN AREAS

The 2012 COE Master Plan recommended the apron area north of Runway 6/24 be expanded to provide an additional parking for transient aircraft, and support apron needs of businesses that locate on the North. As the Northside of the airfield is developed, the north apron is a possible location for a new or relocated fixed base operator (FBO).

There is no room for additional parking aprons on the Eastside unless existing structures are removed and redeveloped. There may be interest in providing more tie-downs for single-engine piston aircraft along Taxiway A should existing tenants relocate elsewhere. The shortening of



Runway 2/20 may incentivize business jet owners with hangars on the eastside to relocate elsewhere on the Airport which would open some property for development.

The Southside has a large apron west of Taxiway D and south of Taxiway F, which will continue to serve itinerant aircraft in this part of the Airport. The Southside apron does not have a FBO or connected hangars, but it does have street access through a gate, which connects it to the rest of the Southside. There is opportunity to expand this apron if necessary as Taxiway F is planned to be extended to Runway End 6. The presence of service providers (FBOs, SASOs, or MROs) may incentivize additional use of the Southside apron.

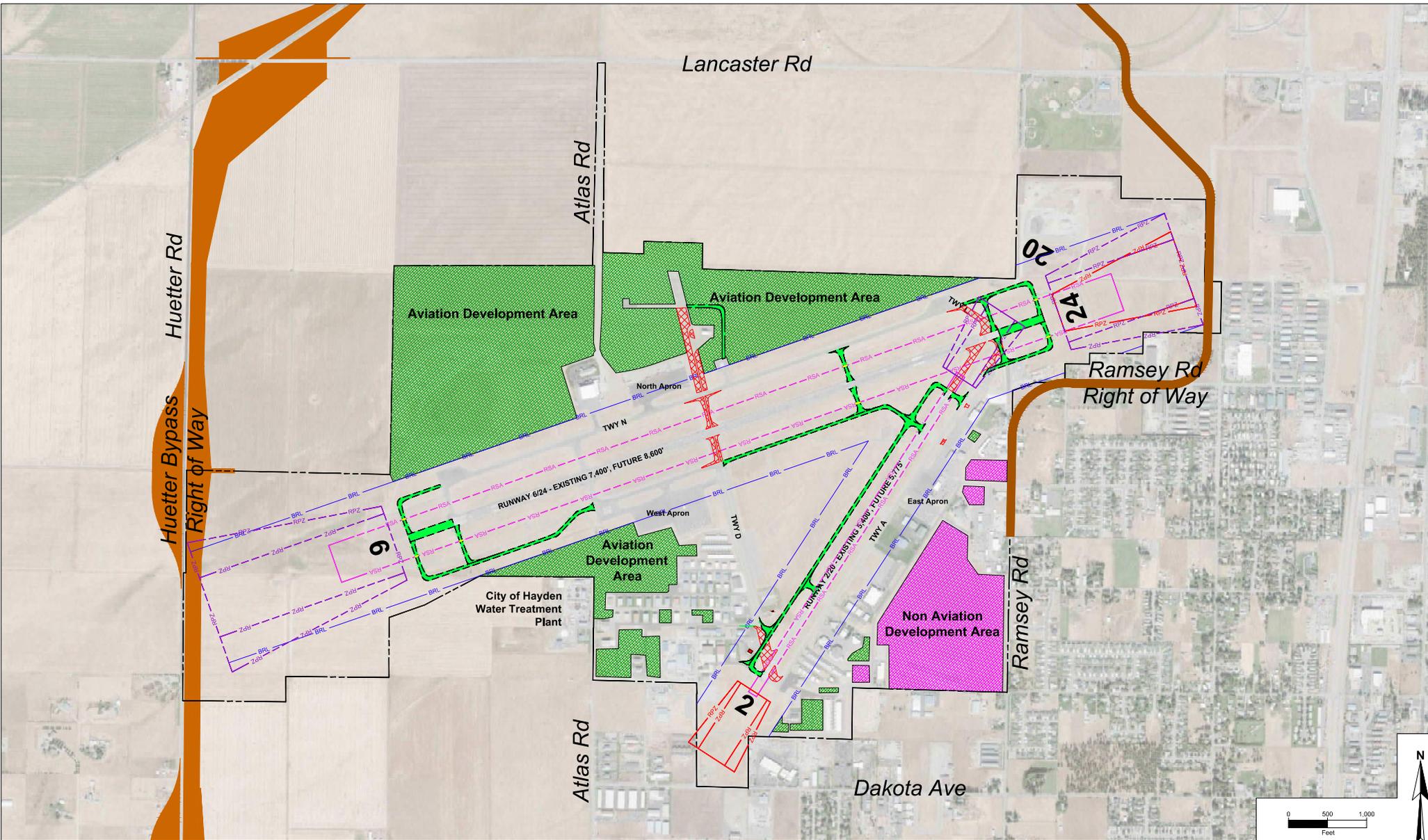
INTEGRATION OF LOCAL TRANSPORTATION PLANNING

Two roadway transportation corridor projects are planned adjacent to the Airport: Ramsey Road to the east and Huetter Corridor to the west. The City of Hayden is in the process of planning for the extension, lane widening, and partial re-alignment of Ramsey Road. The route as planned requires that the Airport, the City of Hayden, and the FAA work together to release a parcel from aeronautical obligation. This parcel will accommodate the future Ramsey Road rights-of-way alignment. The Kootenai County Metropolitan Planning Organization (KMPO) is in the process of planning improvements to the Huetter Bypass, a future limited access highway with improved access to Interstate I-90. The Huetter Bypass improvements involve potential re-alignment, below-grade reconstruction, and new roadway exit lane connections.

Both roadways were considered during the development and analysis of the runway alternatives because FAA guidance recommends avoiding roadways inside of RPZs when possible. The preferred runway alternative avoids the proposed Ramsey Road improvements and minimizes the amount of overlap between the Runway End 6 RPZ and the Huetter Bypass rights-of-way while meeting the runway length facility requirement of 8,600 feet. The RPZs in relation to the two roadway projects are shown in **Exhibit 4-12** and **Exhibit 4-13**.

The Huetter Bypass and Ramsey Road projects will improve vehicle access from the cities of Hayden, Post Falls, and Coeur d'Alene to the Northside as they connect with West Lancaster Road to the north of the Airport.





Proposed Ramsey Road Realignment:

According to the *City of Hayden 2013 Transportation Strategic Plan*, the Ramsey Road corridor extension from Wyoming Avenue to Lancaster Road is slated for completion in 2020. The segment of roadway transitioning along the eastern Airport boundary is planned to be a 3-lane non-divided roadway with a 100-foot right of way; including two direction lanes and a center turn-lane. The Ramsey Road section south of the Airport is planned as a 5-lane route. The proposed Ramsey Road rights-of-way planning depiction shown on the alternative exhibits were obtained from the City of Hayden.

Proposed Huetter Bypass:

The Kootenai Metropolitan Planning Organization (KMPO) indicates that the proposed Huetter Bypass project will establish a limited access highway, with access points on Hayden Avenue, Wyoming Avenue, and Lancaster Road. The segment of roadway transitioning along the western Airport boundary is planned to be a 4-lane divided roadway with a 265-foot right of way; with a wider right of way required for the proposed intersection(s) segments. The Huetter Bypass project generally follows the alignment of existing Huetter Road but will need additional rights-of-way to accommodate new interchanges and grade separations along its route.

The proposed Huetter Bypass rights-of-way alignment shown on the runway alternatives exhibits was obtained from KMPO. The proposed interchange at Wyoming Road does not have plan view depictions available so the final design location for road surfaces within the rights-of-way are not known. Huetter Bypass will be depressed from current surface grade between 16 feet to 26 feet to mitigate noise.

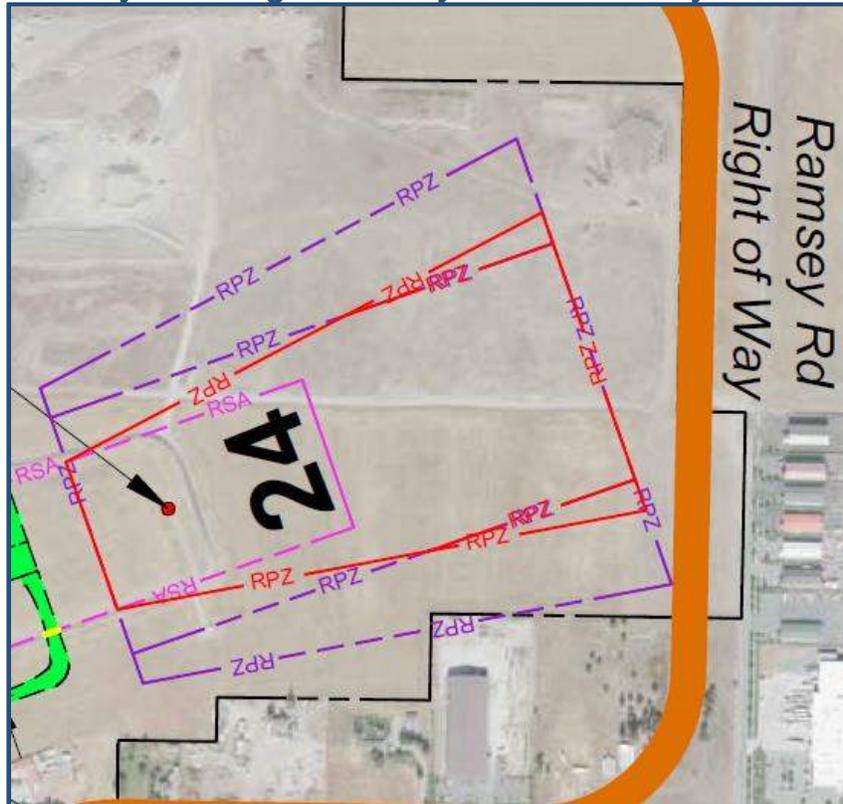
FAA Advisory Circular 70/7460.2K, *Proposed Construction or Alteration of Objects That May Affect the Navigable Airspace* requires FAA notification for any construction and alterations adjacent to an airport. As designs are finalized for Ramsey Road and the Huetter Bypass, the project proponents will need to submit design data to the FAA. The FAA will perform an airspace evaluation and issue a determination on the impact of the road to navigable airspace.



Exhibit 4-12: Huetter Bypass Right-Of-Way and Runway End 6 RPZ



Exhibit 4-13: Ramsey Road Rights-Of-Way and the Runway End 24 RPZ



FUTURE AIRPORT PROPERTY INTERESTS

Property and easement acquisition related to the preferred runway alternative are discussed in **Section 2**. There are sections of the RPZs for Runway Ends 6, 20, and 24 that leave airport property and it is recommended that the Airport obtain land use control through acquisition or easement if possible. When acquisition or easement is not possible, it is recommended that the Airport work with the County and surrounding municipalities to promote the development of land uses that are compatible with aviation activity in these areas.

The Ramsey Road project requires the release of Airport-owned property just east of the Runway End 24 RPZ. This property is currently encumbered by FAA grant assurances and release will require coordination between the Airport, the City of Hayden, and the FAA Helena Airports District Office.

It is recommended that the Airport consider purchasing property on the Northside up to Lancaster Road to support development of aircraft storage and service facilities, and other development that will improve the Airport's revenue stream.

5. ALTERNATIVES SUMMARY

Future runway disposition was the focus of the alternatives analysis for this Master Plan. Robust stakeholder coordination occurred throughout the Master Plan and the preferred alternative represents a compromise between desires of the Airport, the neighboring communities, airport tenants, and the FAA. The Preferred Alternative meets the facility requirements for Runway 6/24. Future overall airport layout will continue to accommodate a wide variety of business jets, U.S. Forest Service, and other general aviation users. Key improvement recommendations are summarized below.

RUNWAY 6/24

- ▶ Runway End 20 and Runway End 24 are decoupled.
- ▶ Runway 6/24 RDC C-III standards.
- ▶ Runway 6/24 is 8,600 feet long by 100 feet wide.

RUNWAY 2/20

- ▶ Runway 2/20 RDC B-I standards.
- ▶ Runway 2/20 is 4,400 feet long by 75 feet wide.



TAXIWAYS

- ▶ Runway 2/20 future full-length parallel taxiway system
- ▶ Future taxiway design to TDG 2 standards

The airport facility improvement alternatives and layout options have been coordinated with the Airport and planned in accordance with FAA design standards and guidance.



ATTACHMENT 1

Table A1-1: Initial Runway System Alternatives

COE Runway System Alternatives							
	Runway Alternative	Runway Shift - Short Runway Length	Runway Shift - Long Runway Length	Taxiway Shift - Short Runway Length	Taxiway Shift - Long Runway Length	Realigned Runway	B-I Runway
		Runway 2-20					
Runway 6-24	Extend Both Runway Ends to Reach 8,600' Total.	1	2	3	4	5	6
	Runway End 24 stationary; Extend runway end 6 to reach 8,600' total.	7	8	9	10	11	12
	Decouple Runway end 24 from 20; Extend Runway end 6 to reach 8,600' total.	13	14	15	16	17 (Eliminated)	18 (Renamed 17)

NOTE: Alternative 17 eliminated by consultant when runway design standards could not be met. Option 18 was renamed 17.

NOTE: Alternate Numbers do not correlate with Roman numerals on five alternatives reviewed.



ATTACHMENT 2

Table A2-1: Runway Alternatives I to V Comparison Evaluation

Summary Evaluation of Runway Alternatives I-V					
Impact Category	Alternative I	Alternative II	Alternative III	Alternative IV	Alternative V
Runway length (Primary) 8,600 feet recommended	8,600 feet	8,600 feet	8,600 feet	7,750 feet	8,600 feet
Runway length (Crosswind) 5,000 feet recommended	5,955 feet	4,145 feet	4,145 feet	4,145 feet	5,000 feet
Runway Protection Zones Property Acquisition Recommended	Yes Runway 24 Approach RPZ	Yes Runway 24 Approach RPZ	Yes Runway 6 Approach RPZ	No	Yes Runway 24 Approach RPZ
Potential for Runway 2 GPS/RNP approach (4,200 feet)	Yes	No			Yes
Navigation/Lighting Systems					
ILS Glide Slope Antenna	Relocation Required				
ILS Localizer Antenna	Relocate		No Relocation	No Relocation	Relocate
Guidance Lighting Systems Relocation	PAPI (4 Units) MALSR		PAPI (3 Units) MALSR		PAPI (4 Units) MALSR
Instrument Approach Procedure(s) (Deactivated During Construction)	Runway End 6: Yes Runway End 2: Yes				
Instrument Approach Procedure(s) Post-construction Amendment	Runway End 6: Yes Runway End 2: Yes				
Land Use					
Huetter Bypass Right-Of-Way in RPZ	No		Yes	No	
Ramsey Road Right-Of-Way in RPZ	Yes		No	No	Yes
Property Acquisition Recommended	Yes (30.5 acres)	Yes (.15 acres)	Yes - (35.2 acres)	Yes (.2 acres)	Yes - (150 acres)
Changes to Airport Structure Use	Airport Administration Building Removed				Airport Admin Building and Fuel Truck Storage Removed
Construction					
Planning-Level Cost Estimate (Includes Runways and NAVAIDs)	\$19,500,000	\$14,000,000	\$12,400,000	\$10,500,000	\$24,100,000
Construction Duration (Years to Implement)	5	4	4	3	5
ALTERNATIVE EVALUATION					
Difficulty Ranking	4	3	2	1	5
Stakeholder Ranking	1	2	3	5	3
DETERMINATION	Advance	Advance	Not advanced	Not Advanced	Not Advanced
Meets Facility Requirements	Not a Facility Requirement				
Temporarily Does Not Meet Facility Requirements	Note: Stakeholder Survey Conducted March 2018				
Does Not Meet Facility Requirements	Note: Difficulty Ranking for Construction, Phasing and Operations impacts				



Table A2-2: Refined Alternatives I-R and II-R

Summary Evaluation of Runway Alternatives I-R and II-R		
Impact Category	Alternative I-R	Alternative II-R
Runway length (Primary) 8,600 feet recommended	8,600 feet	8,600 feet
Runway length (Crosswind) 5,000 feet recommended	5,775 feet	4,400 feet*
Runway Protection Zones Property Acquisition Recommended	Yes	
Potential for Runway 2 GPS/RNP approach (4,200 feet)	Yes	No
Navigation/Lighting Systems		
ILS Glide Slope Antenna	Relocate	
ILS Localizer Antenna	Relocate	
Guidance Lighting Systems Relocation	PAPI (3 Units) / MALSR	
Instrument Approach Procedure(s) (Deactivated During Construction)	Runway End 6: Yes Runway End 2: Yes	
Instrument Approach Procedure(s) Post-construction Amendment	Runway End 6: Yes Runway End 2: No	
Land Use		
Huetter Bypass Right-Of-Way in RPZ	Yes	
Ramsey Road Right-Of-Way in RPZ	No	
Property Acquisition Recommended	Yes (30.3 acres)	Yes (.47 acres)
Changes to Airport Structure Use	Airport Administration Building and Fuel Truck Storage Removed	Airport Administration Building Removed
Construction		
Planning-Level Cost Estimate (Includes Runways, NAVAIDs and Taxiways)	\$27,100,000	\$21,100,000
Construction Duration (Years to Implement)	7	5
ALTERNATIVE EVALUATION		
Difficulty Ranking	2	1
Stakeholder Ranking	1	2
DETERMINATION	Not advanced	Preferred Alternative
Meets Facility Requirements	Not a Facility Requirement	
Temporarily Does Not Meet Facility Requirements		
Does Not Meet Facility Requirements		

*Does not meet recommended runway length, however reduction to B-I standards meets needs for light turboprop aircraft





Chapter 5
Land Use

LAND USE

All Airports present challenges to a local jurisdiction in that its operations can have far-reaching impacts well beyond the ends of the runway. While located in one jurisdiction, aircraft operations can and do impact nearby communities. Effective compatible land use planning by the airport sponsor as well as communities adjacent to the airport, would find that it is mutually beneficial to mitigate impacts for both parties. This chapter presents the existing land use surrounding Coeur d'Alene Airport (COE), evaluates land use compatibility of communities nearby, and analyzes the potential impact of aircraft noise resulting from normal airport operations. The chapter is organized in the following sections.

- ▶ Importance of Compatible Land Use
- ▶ Aircraft Noise Analysis
- ▶ Airport Compatibility Zones
- ▶ Existing Land Use Evaluation
- ▶ Future Land Use Evaluation
- ▶ Land Use Recommendations

This chapter identifies existing and future land use compatibility concerns and provides recommendations to address these concerns. It is vital that Kootenai County and the surrounding municipalities coordinate their land use efforts, as this is a key element in enacting land use compatibility policies that will protect the airport and maintain its current and future viability.

IMPORTANCE OF COMPATIBLE LAND USE PLANNING

According to the Idaho Transportation Department (ITD), through State and Federal Land Use Guidelines, adequate land use planning around airports addresses airspace, safety, and noise considerations. The FAA, through grant assurances, requires airports that receive federal funds to protect the airport through zoning. It's of note that the FAA has no authority over local zoning and off-airport land use. Airport sponsors also may not have zoning authority over land surrounding the airport. In many instances, the airport sponsor and the overall community's willingness to take a proactive approach in addressing compatible land use planning around their airport prevents the need to be reactive and prevents more severe and costly conflicts in the future.



There are fundamental differences between height restrictive zoning and basic land use zoning. Height restrictive zoning aims to protect airport airspace, typically in conformance with 14 CFR Part 77 regulations. These regulations intend to protect airport airspace from objects or structures which may pose hazards to aircraft operators. Land use zoning should be used to prevent incompatible land uses near an airport where operations could negatively impact the surrounding land or where the use of land directly surrounding the airport could negatively impact the airport.

AIRPORT LAND USE PLANNING CONSIDERATIONS

Encroachment

Encroachment of incompatible land uses is widely considered to be among one of the greatest threats to airports. Development, such as high-density residential, near a runway end, raises issues with compatibility as this an area with both the highest aircraft accident likelihood and level of aircraft noise.

Safety and Quality of Life

Proper land use planning around an airport considers both the safety of aircraft operations and the surrounding community when protecting areas with a high potential for aircraft accidents. Proper land use planning also protects the surrounding communities' quality of life by encouraging compatible development that would not be impacted by aircraft noise, dust or fumes.

Economic Benefit

Airports provide an important economic benefit to the state and its citizens. Users of COE contribute to the local economy. According to the ITD Airport System Plan, as of 2009 COE contributes \$130 million in direct and indirect economic impact to the local community. Protecting COE will allow the airport to continue to provide access to the community and economic benefits for many years to come.

Local Land Use Planning Act – Idaho Code 67-6501 to 67-6538

The Local Land Use Planning Act (LLUPA) grants Idaho counties and cities the authority to engage in planning and zoning. The LLUPA requires local governments to adopt a comprehensive plan and as of 2014, to include a section on public use airports. The LLUPA also requires local jurisdictions to adopt zoning ordinances in accordance with the policies and goals of the approved comprehensive plan. This requirement also prevents local jurisdictions from adopting zoning ordinances to protect a resource, such as an airport, which is not addressed in the comprehensive plan. The status of the comprehensive plans and zoning ordinances of Kootenai County and each of the cities with land use control around the airport are discussed in the Existing Land Use Evaluation section.



Knowledge of Airport and Operations

According to ITD, many local planning and zoning commissions are not always privy to the intricacies related to airport operations and management. The responsibility to convey the intricacies of describing and defining what needs protecting falls on the local airport through outreach and coordination.

The planning and zoning commission of each local jurisdiction is individually responsible for its own comprehensive planning, ordinance preparation and adoption, enforcement and ongoing updating and maintenance efforts. These efforts can only be successful with regular contribution and collaboration with COE to include the airport in the planning and zoning processes of each jurisdiction.

Inverse Condemnation

Airports that are encroached upon by incompatible development risk inverse condemnation when enacting zoning ordinances that change existing zoning designations and potentially reduce the value of a property. Inverse condemnation is a term used in the law to describe a situation in which the government takes private property but fails to pay the compensation required, and the property's owner seeks legal recourse to obtain the required just compensation. In the case of airport land use, this can become an issue when a zoning change reduces the value of a property.

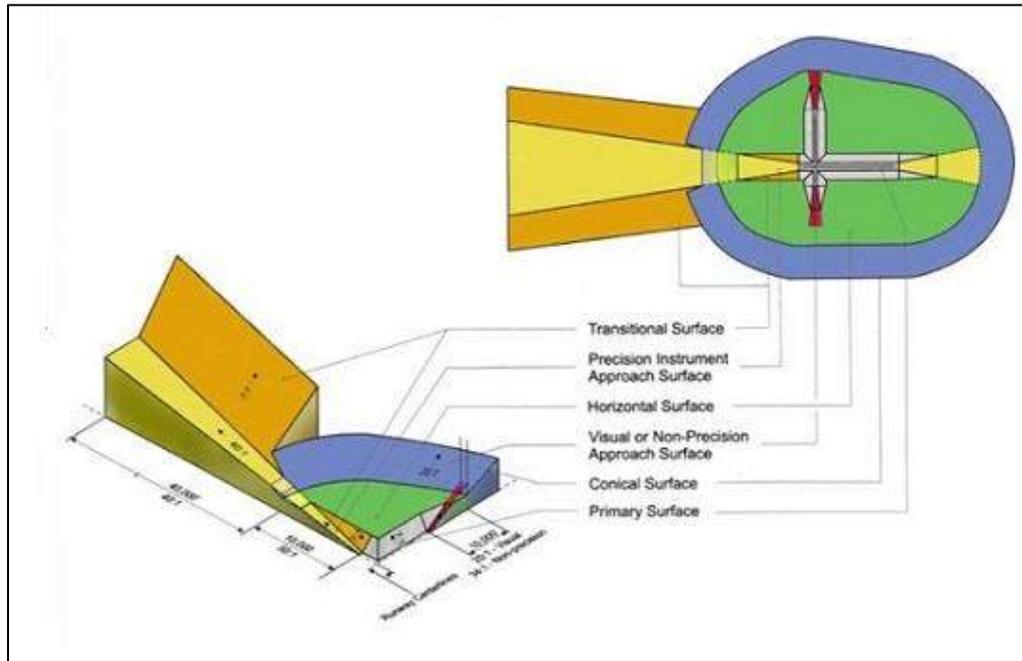
Property rights are one of the most important considerations for local jurisdictions when conducting comprehensive planning and land use zoning. The 5th Amendment of United States Constitution and Article I, Section 14 of Idaho State Constitution address private property rights asserting that private property may not be taken for public purposes without just compensation.

Title Code of Federal Regulations (CFR) Part 77

Airport operators must work with local governments to maintain airspace protection surfaces to FAA standards. This includes keeping approach and departure paths, and the surfaces contained in Title 14 CFR Part 77, clear of obstacles and hazards to air navigation.

Failure to keep CFR Part 77 surfaces free of obstructions can be a violation of an airport's grant assurances. A diagram of CFR Part 77 surfaces is included in **Exhibit 5-1**, and CFR Part 77 surfaces for COE are shown on the Airport Layout Plan (ALP).



Exhibit 5-1: CFR Part 77

Source: DOAV.Virginia.gov

Grant Assurances and Sponsor Obligations

Airport sponsors agree to federal grant assurances as part of their FAA project funding applications. Upon acceptance of FAA grant funds, these assurances are incorporated into and become part of the grant agreement, and the airport sponsor is obligated to comply. As previously mentioned, the FAA utilizes Grant assurances and coordination efforts related to local zoning to protect the airport's airspace and prevent incompatible land uses around the airport. Failure to do so may result in the FAA and ITD no longer funding the airport. Typically, grant assurances are for a period of 20 years from when the airport sponsor received the last grant except for grant assurances associated with land acquisitions which exist in perpetuity or until the grant is repaid.

Several grant assurances specific to land use include #6 – Consistency with Local Plans, #20 – Hazard Removal and Mitigation for airspace and #21 – Compatible Land Use for land use.

FAA Grant Assurance #6 states “Local Plans. All projects must be consistent with local plans, transportation plans, zoning ordinances, development codes, and hazard mitigation plans. The airport sponsor and planners should all familiarize themselves with local planning documents before a project is considered and ensure all projects follow local plans and ordinances.”

In addition to understanding local plans, airport sponsors should be proactive to prevent noncompliance with the assurances. Airport sponsor should assist in the development of local



plans that incorporate the airport and consider its unique aviation related needs. Sponsor efforts should include the development of goals, policies, and implementation strategies to protect the airport as part of local plans and ordinances.

FAA Grant Assurances #20 states “Hazard Removal and Mitigation. Airport sponsors will take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport will be adequately cleared and protected...” Communities protect the Part 77 airspace surfaces defined in the approved ALP by further identifying them in ordinance or code and requiring that no object penetrates these airspace surfaces because of development. Per Part 77, anyone proposing development at a certain height above the ground or within a certain proximity to the airport is required to submit FAA Form 7460-1 to the FAA for a determination that such development will not adversely impact airspace or the safety of aircraft operators.

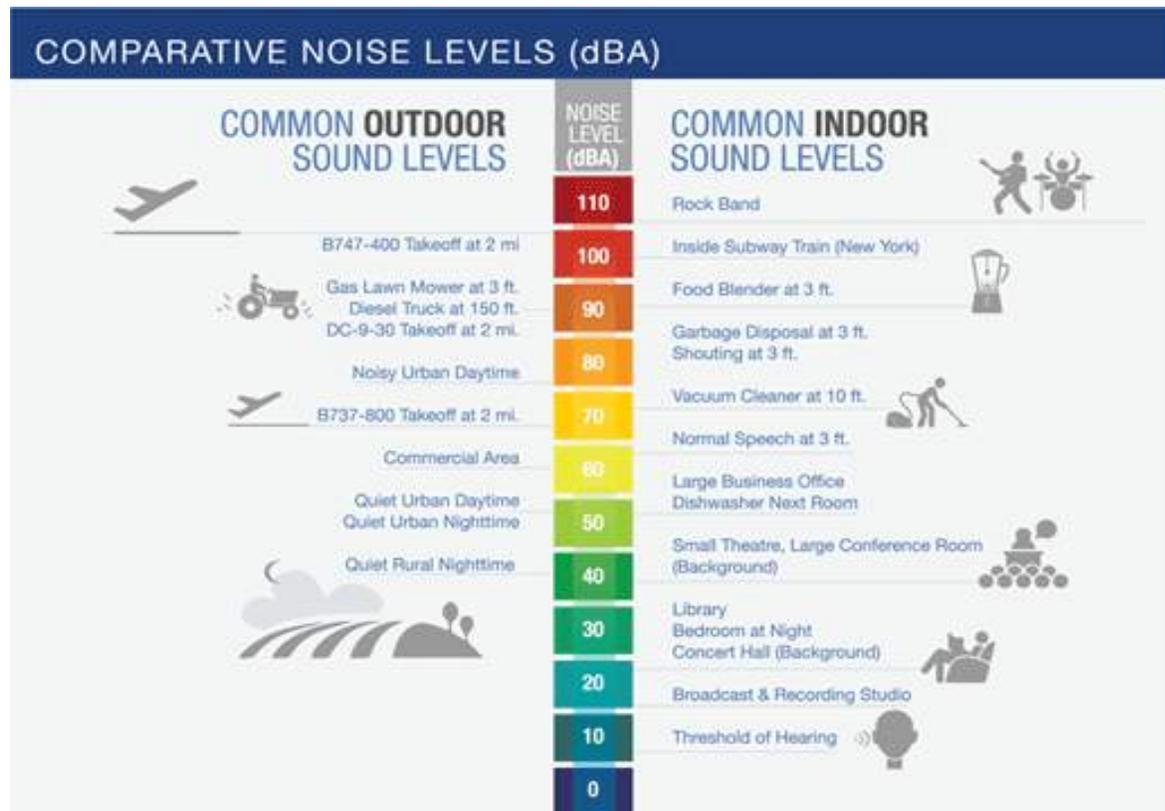
FAA Grant Assurance #21 states, “It (sponsor) will take appropriate action, to the extent reasonable, including the adoption of zoning laws, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. In addition, if the project is for noise compatibility program implementation, it will not cause or permit any change in land use, within its jurisdiction, that will reduce its compatibility, with respect to the airport, of the noise compatibility program measures upon which Federal funds have been expended.”

Federal Noise Regulations

Aircraft noise can be perceived as an annoyance to noise sensitive land uses surrounding an airport. Noise sensitive land uses can include residences, hotels, schools, and places of worship. Noise can be a detrimental factor in the relationship between an airport and the surrounding community. Proper land use planning and protection are essential to mitigate the negative impacts of airport noise, to keep the airport free of operational restrictions and incompatible land uses. **Exhibit 5-2** provides information on comparable noise levels.



Exhibit 5-2: Comparative Noise Levels



Source: FAA

Noise is measured on a logarithmic scale rather than a linear one, meaning a sound at 60 dB has 10 times the energy as a sound at 50 dB. Humans perceive any sound level increase of 10 dB as representing a doubling of loudness regardless of whether the increase is from 40 to 50 dB or from 80 to 90 dB. In each case, though, the acoustic energy or magnitude of the sound is increasing by a factor of 10.

To evaluate noise projects for funding, the FAA has established the 65-decibel day-night sound level (65 DNL) as a threshold for determination of significant noise impacts. This is the average sound level for a 24-hour period averaged over one year with a 10 dB penalty for operations between 10 PM and 7 AM. Areas experiencing aircraft noise levels at or above 65 DNL are considered to have significant noise impacts and noise mitigation projects such as acquisition or noise insulation can be eligible for FAA funding pending review under CFR Title 14 Part 150 Airport Noise Compatibility Planning. **Exhibit 5-3** below shows a 24 Hour DNL and the penalties that apply for night time operations.



Exhibit 5-3: 24 Hour Day-Night Average Sound Level



Source: FAA

As the 65 DNL is an **average annual** sound level, it may not be an accurate measure of when aircraft noise is perceived as an annoyance on a specific day or during a period of higher than average operations. **Exhibit 5-2** above shows the comparative noise levels of both common indoor and outdoor events along with aircraft sound levels. As an example, several loud events such as a 747 takeoff, at 100 dBA single event level (SEL), could occur on a day with relatively low activity levels and result in an average sound level that does not exceed the 65 DNL.

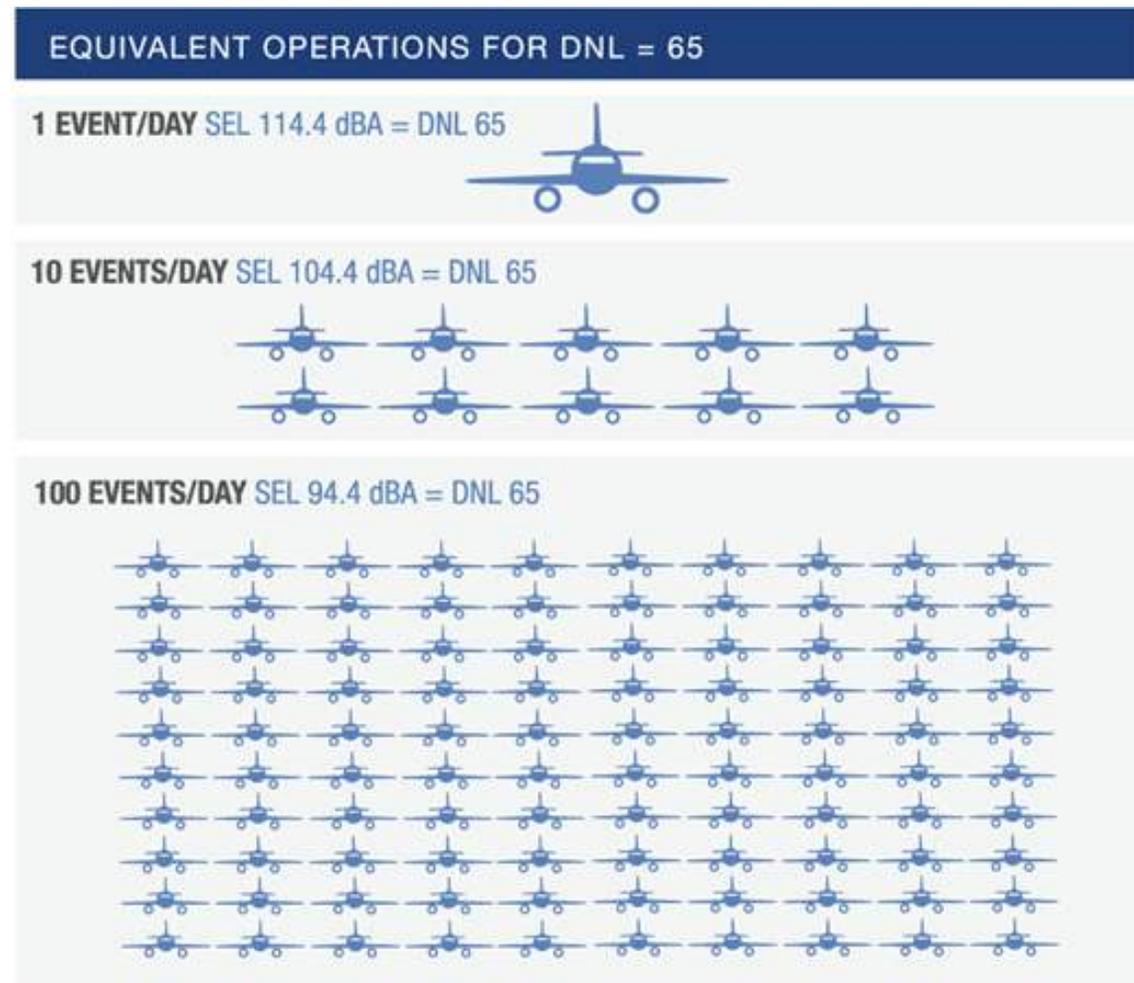
The FAA measures the DNL over 365 days. An airport could experience significant operations on one day or over one month, yet these time periods are averaged into a full year and may result in the 65 DNL remaining on airport property on an annual basis but areas outside the 65 DNL experiencing average daily or monthly noise levels in excess of 65 DNL.

A low number of operations by a single aircraft at a high SEL or a high number of operations by multiple aircraft at a lower SEL can both result in the same DNL. **Exhibit 5-4** below shows three different levels of aircraft operations by different aircraft which all result in the same 65 DNL.

If the number and type of operations varies throughout the year, additional noise modeling beyond the 65 DNL should be performed for understanding the seasonal impacts of noise on the community. Noise modeling including peak day and peak month of the year can be reviewed to more accurately determine noise sensitive areas



Exhibit 5-4: Equivalent Operations for 65 DNL



Source: FAA

Idaho Airport Land Use Guidelines (ALUG)

In July of 2016, the ITD Division of Aeronautics updated the Idaho ALUG to provide a more streamlined document to educate airport sponsors, local planning and zoning representatives, local elected officials, and the public in order to better understand the unique aspects of airports as they relate to compatible land use planning throughout the state. The ALUG provides recommended techniques and mechanisms to assist these stakeholders in developing and implementing effective compatible land use measures around their airports and their community.



The update addressed several topics, including an:

- ▶ Explanation of the purpose and need for planning and zoning controls
- ▶ Steps needed to prepare a 'Comprehensive Plan' and a 'Zoning Ordinance'
- ▶ Expanded graphics to enhance understanding
- ▶ Recommended Airport Safety Compatibility Zones (ASCZ)
- ▶ Relative size of ASCZs at various sized airports
- ▶ Examples of proper terminology and language to use (appendix)
- ▶ Model Zoning Ordinance (appendix)

The ALUG identifies noise associated with aircraft approach, departure, and overflight as the primary source of land use incompatibility. The ALUG recommends airports conduct a noise analysis using the FAA's Aviation Environmental Design Tool (AEDT) software to better understand aircraft noise near the airport.

The ALUG identifies land use compatibility concerns in areas with a high potential for aircraft accidents. The ALUG references studies from the 2011 California Airport Land Use Planning Handbook on the frequency and location of aircraft accidents. These studies indicate that areas adjacent to the approach and departure ends of the runway are more likely to experience accidents than other property near airports.

COE AIRCRAFT NOISE ANALYSIS

Aircraft noise is a concern in communities around airports. Noise-sensitive land uses such as hospitals, schools, and residences are especially concerned with maintaining low ambient noise levels. Noise can be a detrimental factor in the relationship between an airport and the surrounding community. Proactive land use planning and protection are key airport noise mitigation techniques as limited options for mitigation are available once an incompatible land use is established.

The FAA requires the use of AEDT to model aircraft performance in space and time to estimate fuel consumption, emissions, noise, and air quality. Existing and forecasted noise contours were generated using AEDT and are presented in the following sections and used in land use compatibility analysis in the Existing and Future Land Use Evaluation sections.



Methodology

To prepare a noise exposure map, AEDT requires information concerning the number of aircraft operations, the types of aircraft (fleet mix), the time of day (day or night), runway utilization, and the typical flight tracks. Coordination with airport staff and aircraft operators and evaluation of the aviation demand forecasts presented in **Chapter 2** provide the necessary information to model existing and forecasted noise exposure levels at COE.

Aircraft Fleet Mix

COE has a diverse fleet mix. As discussed in the forecast chapter, aircraft range from small, single-engine general aviation aircraft such as the Cessna 172 to cargo aircraft such as the ATR 42 that visit COE for maintenance and business jets including the Gulfstream IV, Bombardier Challenger 600, and Learjet 60. The Airport accommodates private corporate turboprop and jet aircraft, military aircraft, and helicopters. COE's fleet mix was provided by airport management.

Airport Operations

The frequency of aircraft operations is based on the FAA-approved aviation activity forecasts. Aircraft operations, except for touch and go operations, were divided into approach and departure operations. According to COE staff, touch and go operations account for 40 percent of annual aircraft operations.

Day-Nighttime Operations

Nighttime operations occur between 10:00 pm and 7:00 am. AEDT assigns a 10 dB penalty to nighttime operations because aircraft noise is perceived to be louder at night when ambient sound levels are lower. COE staff estimate that 95 percent of aircraft operations occur during the daytime and 5 percent occur during the nighttime.

Runway Utilization

Runway utilization includes the number, location, and orientation of the active runways, as well as the directions and types of operations that occur on each runway. Runway utilization depends primarily on wind direction and speed but is also a function of pilot preference for terminal area location, taxiing distances, and runway lengths. Runway utilization percentages are presented in **Table 5-1**.



Table 5-1: Runway Utilization

Runway End	Percent of Annual Operations
2	45%
6	15%
20	30%
24	10%

Source: COE Staff and Aircraft Operation Estimates

Flight Tracks

Flight track information represents the path over the ground followed by an aircraft. Instead of using all the tracks created by individual aircraft for one year, the FAA suggests that tracks be consolidated to represent corridors of average flight tracks. A combination of radar flight tracks from the FAA and those based on discussions with COE staff and aircraft operators were used in the model.

EXISTING NOISE CONTOURS

Existing noise contours are modeled on aircraft operations that occurred in 2017. Existing runway endpoints are used. The FAA threshold for significant noise impact is 65 DNL; however, areas outside of the 65 DNL contour are also subject to aircraft noise and overflight. The existing 65 DNL contour is largely contained within airport property, except beyond the Runway End 02. The existing 65 DNL covers an area of approximately 1.4 square miles.

The 55 DNL contour helps identify properties that will be subject to aircraft noise and overflight outside of airport property, although noise impacts within the 55 DNL contour are not considered significant by the FAA, they can be perceived as an annoyance depending on the normal ambient noise level of the area. The City of Hayden 2008 Comprehensive Plan Update (Hayden Plan) states that “noise generated from aircraft should be considered in areas with noise levels as low as 55 DNL when planning future development.” The 55 DNL contour generally follows a similar shape as the 65 DNL contour but covers a greater area especially to the south from Runway 02. The existing 55 DNL covers an area of 6.4 square miles.



FUTURE NOISE CONTOURS

Future noise contours are modeled on 2037 aircraft operations levels described in **Chapter 3**, and the preferred runway alternative, described in **Chapter 4**. Aircraft operations are forecast to grow at an average annual rate of 2.3 percent between 2017 and 2037. Unlike the noise modeling completed as part of the previous master plan, scheduled commercial airline operations forecasts are not included in the noise modeling.

As expected with growing operations, forecasted noise exposure covers a greater area than existing noise exposure. The forecast 65 DNL contour expands uniformly around the existing 65 DNL, in some locations, extending further over existing residential development. The forecast 65 DNL contour covers an area of approximately 2.4 square miles an increase of 71% from the 2017 65 DNL.

The forecast 55 DNL follows a similar pattern with a relatively uniform expansion of approximately 1 mile along the extended centerlines of Runway 06, 20 and 24. Unlike the other runway ends, the forecast 55 DNL along Runway 02 extends for a distance of over 2 miles across Interstate 90 and the Spokane River. The forecast 55 DNL covers an area of 11.8 square miles an increase of 84% from the 2017 55 DNL.

Existing (2017) and forecasted (2037) noise contours are presented in **Exhibit 5-5 and 5-6**



Exhibit 5-5: Existing (2017) Noise

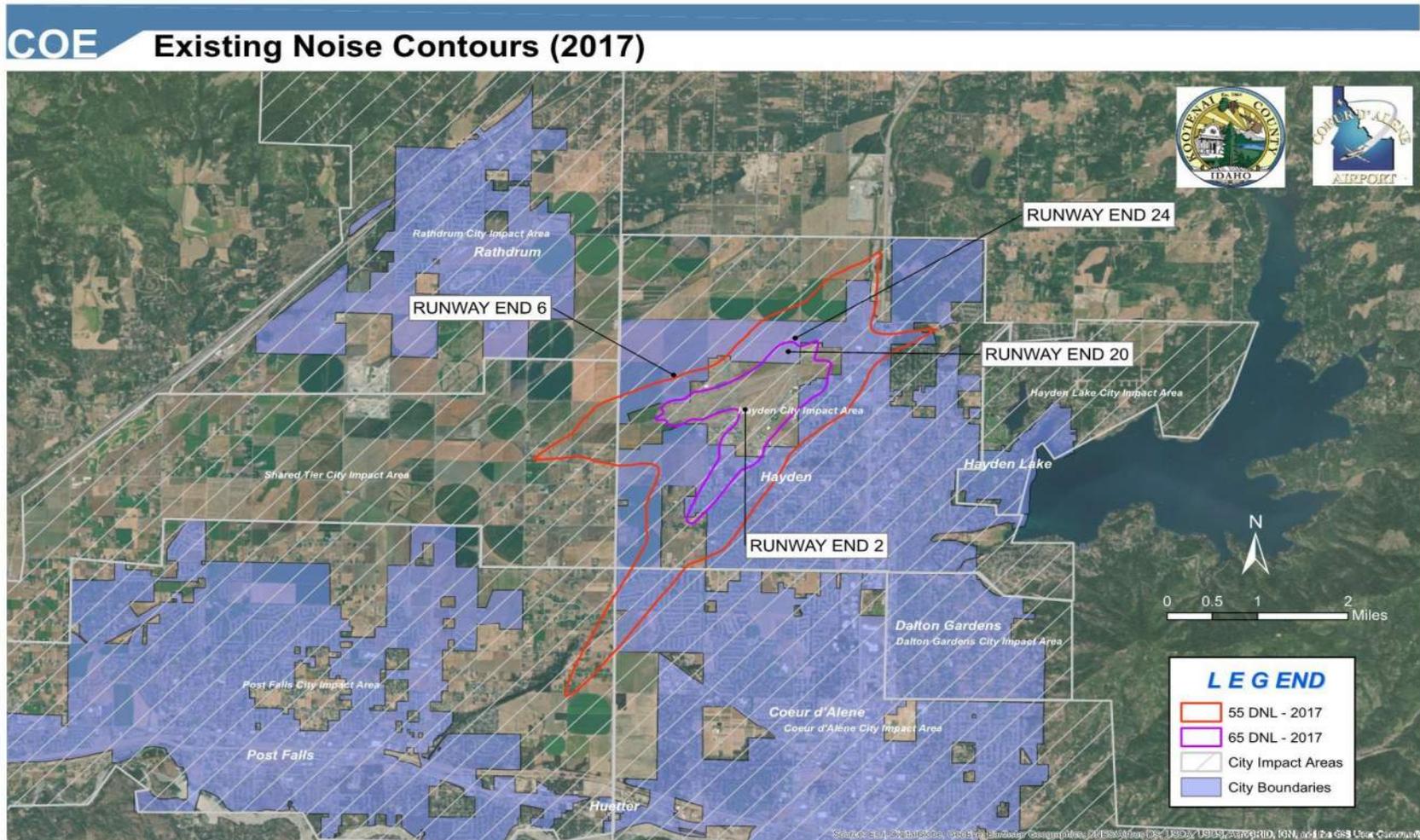
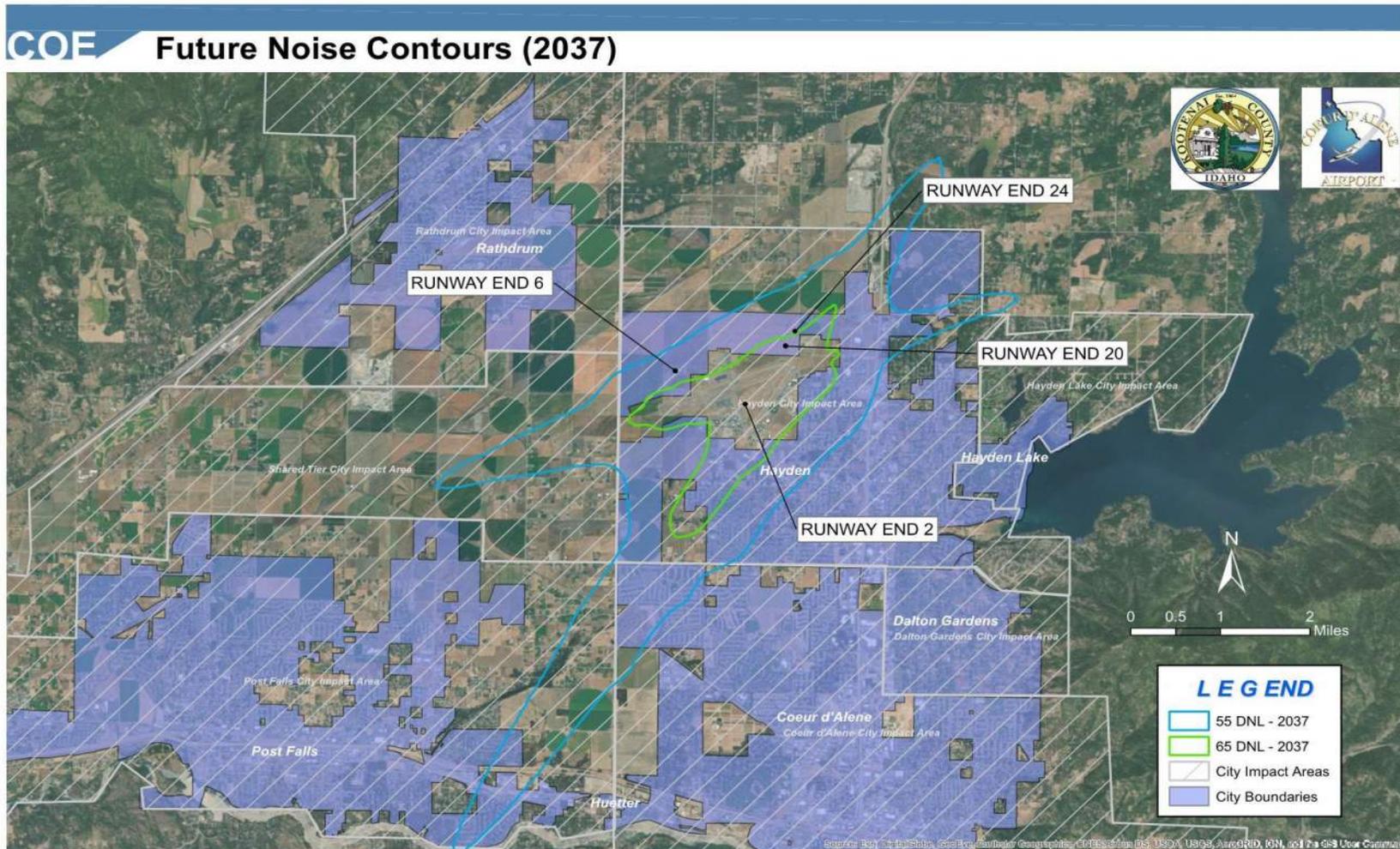


Exhibit 5-6: Future Noise Contours (2037)



COMPARISON BETWEEN 2012 AND 2018 MASTER PLAN NOISE MODELING

New 20-year contours (for year 2037) were prepared as a part of this 2018 Master Plan. In comparing the prior master plan's future contours (2028) to the 2037 noise contour, there is a reduction in some areas and expansion in others. The 2028 and 2037 noise contours are presented in **Exhibit 5-7**. The 55 dB Day-Night Average Sound Level (DNL) contour reduction on the Runway Ends 6 and 24 is likely due to the reduction in overall operations (197,000 reduced to 136,899 operations) between the 2028 and 2037 noise contours. However, there was also a change in runway use distribution from the 2012 Master Plan to this 2018 Master Plan. Runway use distribution from the 2012 Master Plan for the 2028 contours is shown in Table 5-2.

Table 5-2: Runway Utilization from 2012 Plan

Runway 02	Runway 20	Runway 06	Runway 24
15.0%	37.5%	27.5%	20.0%

Source: COE Airport

Airport staff documented aircraft operations during two periods in 2017 to document the time of day, aircraft type, operation type (departure, arrival, touch-and-go), and which runway was utilized. The runway utilization percentages were updated using the operational sampling. The 2018 Master Plan uses the runway use distribution for the future (2037) contours shown in **Table 5-3**.

Table 5-3: Runway Utilization from 2018 Plan

Runway 02	Runway 20	Runway 06	Runway 24
45.0%	30.0%	10.0%	15.0%

Source: COE Airport

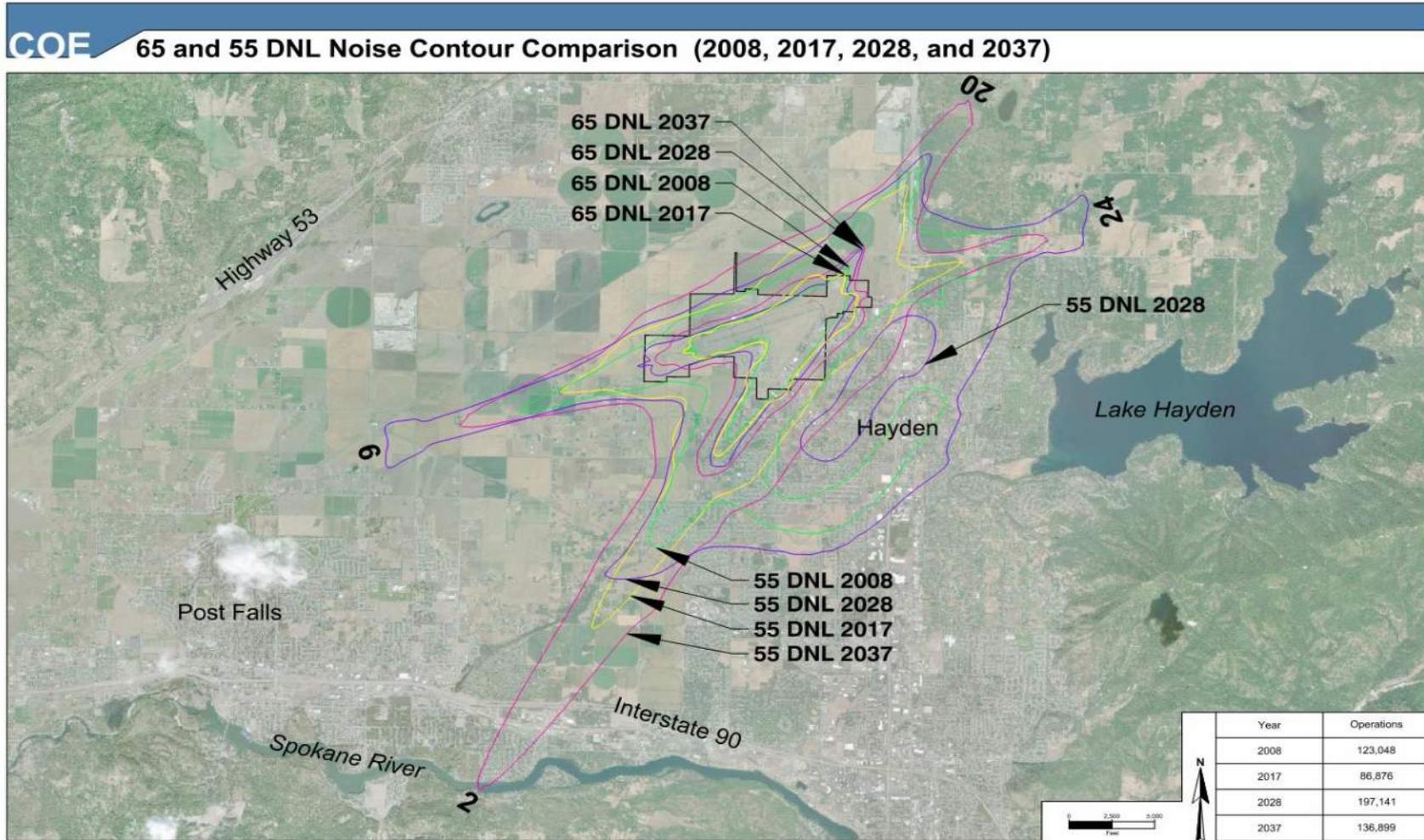
That shift of operations to Runway 2/20 contributes to the reduction of the contours associated with Runway 6/24. It also contributes to the expansion of the contour on Runway 2/20.

Difference Between the 55 DNL and 65 DNL Contours

Humans perceive any sound level increase of 10 dB as representing a doubling of loudness regardless of whether the increase is from 40 to 50 dB or from 80 to 90 dB. In each case, though, the acoustic energy or magnitude of the sound is increasing by a factor of 10. This results in the 55 DNL contour being much more sensitive to changes in operations, fleet mix or runway use distribution than the 65 DNL contour. Thus, the shift in operations away from Runway 6/24 and onto Runway 2/20 has a more noticeable impact on the 55 DNL contour than on the 65 DNL contour.



Exhibit 5-7: Future 2028 and 2037 Noise Contour Comparison



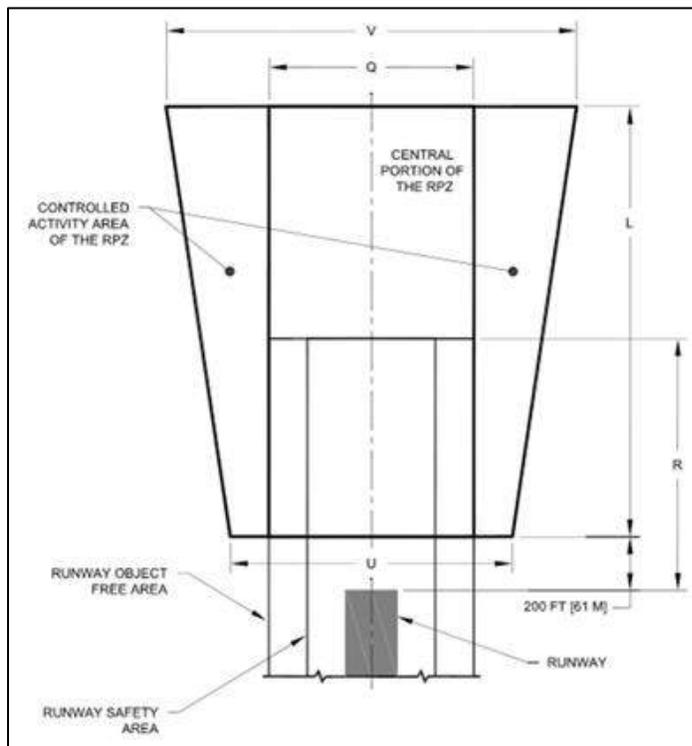
AIRPORT SAFETY COMPATIBILITY ZONES

The Idaho ALUG airport safety and compatibility zones (ASCZs, or Zones) were developed for COE to assess existing land use compatibility. There are multiple ASCZs, defined by proximity to the runway end and the types of aircraft operations that generally occur within each zone. ASCZs have recommended dimensions; however, the Idaho ALUG states that these dimensions can be modified to reflect local conditions. The recommend ASCZs are shown in **Exhibit 5-9** and described in detail below.

Runway Protection Zone

The RPZ is the only Land Use zone established by the FAA. In evaluating land use in the RPZ, the FAA will not approve new incompatible land uses to be established but will allow existing non-compatible land uses to remain until there is a change in use which may consist of moving a runway end, changing an instrument procedure or development proposal. The RPZ is shown below in **Exhibit 5-8**.

Exhibit 5-8: Runway Protection Zone



Source: FAA



The dimensions of the RPZ depend on the characteristics and operational capabilities of each runway end and the type of operation as there are both Approach and Departure RPZs. FAA guidance prohibits development in the RPZ, though prohibitions on development are only enforceable by the airport and cooperating local jurisdictions. Similar to an obstruction to an approach surface, incompatible land uses in the RPZ can result in the FAA requiring displacement of the runway threshold as mitigation. The Idaho ALUG recommendations for land use in the RPZ include:

- ▶ Airport ownership encouraged
- ▶ Maintain RPZs clear of incompatible uses or objects such as roads and structures of any kind

Lateral Safety Zone

The purpose of this zone is to enhance the protection of property and people on the ground and adjacent to the runway. This zone should encompass the Runway Safety Area (RSA), Runway Object Free Area (OFA), the Object Free Zone (OFZ) and the Part 77 Primary Surface. General recommendations for land use in the Lateral Safety Zone include:

- ▶ Prohibit residential uses unless airport related
- ▶ Allow aviation uses that meet height requirements
- ▶ Avoid high intensities of non-residential land uses
- ▶ Prohibit schools, hospitals, and nursing homes

Inner and Outer Critical Zones

The Critical Zones protect aircraft approach and departure paths of the ends of the runway beyond the RPZ. As their name implies, these land use compatibility zones protect some of the most critical areas around the airport. Review of aircraft accident statistics show most aircraft accidents and incidents occur during the landing and departing phases of flight. The Critical Zone shape and size is based on aircraft crash statistics and represents an area where most aircraft accidents occur near an airport. This area typically also covers the areas with the highest noise impacts. Appropriately sized Critical Zones based on the size of the aircraft using the airport and approach capabilities can ensure additional protection to both aircraft operators and people on the ground by preventing incompatible uses in these flight corridors.

Since the runways at COE are used by jet aircraft and available for instrument operations, the airport should protect both inner and outer critical zones. The width of the inner critical zone is typically larger than the outer critical zone.



General recommendations for land use in the Inner Critical Zone include:

- ▶ Prohibit residential except on agricultural parcels
- ▶ Limit non-residential uses
- ▶ Discourage uses that attract large numbers of people
- ▶ Prohibit schools, hospitals, and nursing homes
- ▶ Prohibit hazardous material storage

General recommendations for land use in the Outer Critical Zone include:

- ▶ Limit residential to low densities (unless prohibited)
- ▶ Avoid high-intensities of non-residential land uses
- ▶ Prohibit schools, hospitals, and nursing homes

Airport Traffic Pattern Area

The Traffic Pattern Area represents an area where aircraft are commonly operating for the purposes of landing and take-off. The standard airfield traffic pattern is rectangular and typically uses left-hand turns, except where otherwise prescribed. General recommendations for land use in the TPA include:

- ▶ Allow residential use
- ▶ Allow most non-residential use, prohibit large gathering areas in areas with a high accident potential
- ▶ Avoid schools, hospitals, and nursing homes

Airport influence Area (AIA)

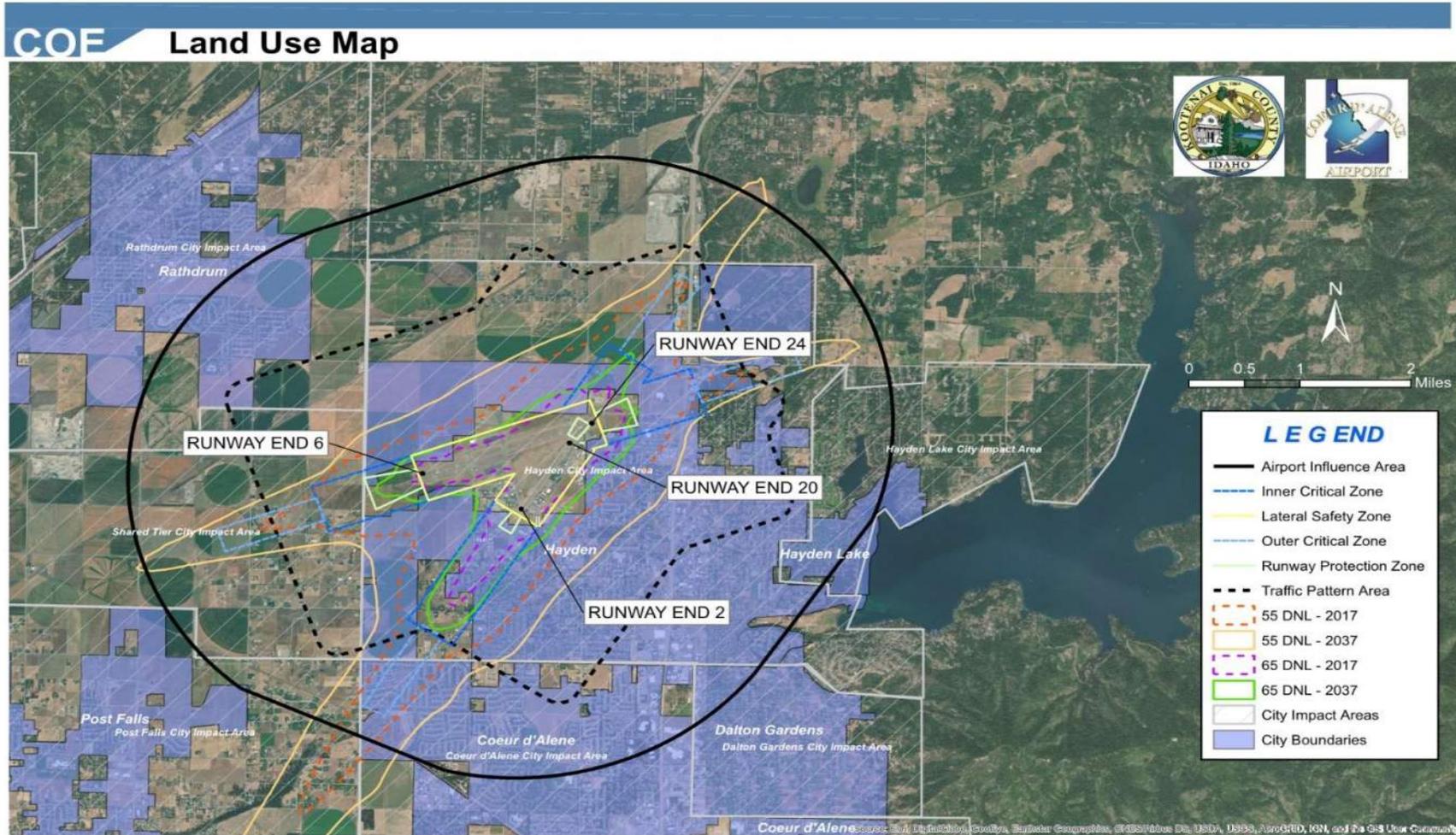
The AIA is a broad area defined by factors including the traffic patterns, departure and arrival corridors, safety zones, and instrument flight procedures. The purpose of the area is to determine which political subdivisions and authorities may be affected by the operation of the airport.

Impact Coordination Zone (ICZ)

The ICZ establishes land use restrictions to enhance the protection of property and people on the ground while considering legal agreements and influences defined by the Area of City Impact (ACI). The size and shape of the ICZ should mirror established ACI agreements. In the case of COE, all areas currently under the authority of the county but that may be annexed into one of the surrounding cities in the future fall in the ICZ.



Exhibit 5-9: Coeur d'Alene Airport Recommended Safety Compatibility Zones



EXISTING LAND USE EVALUATION

Evaluation of existing land use includes review of local code, zoning maps, and aerial photography to assess existing and planned development near COE in comparison with the land use compatibility strategies and recommendations from the Idaho ALUG. ASCZ dimensions incorporate the preferred runway lengths and planned airport improvement projects from **Chapter 4**.

One of the key focus areas for COE is the City Impact Area Agreements between Kootenai County and the surrounding municipalities. City Impact Areas can be broadly defined as a geographical area where a city is expected to grow into and annex at some future time. Currently, whenever a property is annexed from Kootenai County into one of the surrounding municipalities, the land use controls change from the county to the municipalities and the zoning such as Part 77, no longer protects the airport. There are currently six municipalities that have land use control under the airports Part 77 airspace. These include the cities of Hayden, Rathdrum, Post Falls, Coeur d'Alene, Hayden Lake, and Dalton Gardens. **Exhibit 5-9** shows the City Impact Areas surrounding the airport.

When reviewing existing land use policies for each municipality, there are three areas to reviews related to the airport:

- ▶ Comprehensive Plans
- ▶ Height Restrictive or Part 77 Zoning
- ▶ Compatible Land Use Zoning

COMPREHENSIVE PLANS

In Idaho, addressing the airport in a community's comprehensive plan is the required first step to protect the airport through zoning. In 2014, Idaho Code was updated to require a community to include a separate section "q" in their comprehensive plan specifically addressing Public Airport Facilities within their jurisdiction or if impacted by an airport outside their jurisdiction. Each of the comprehensive plans for Kootenai County and the surrounding municipalities was reviewed first to determine if there was a Section "q" and then to determine if the airport was addressed to a degree it could be protected through zoning. The results are summarized below in **Table 5-4**.



Exhibit 5-9: City Impact Areas

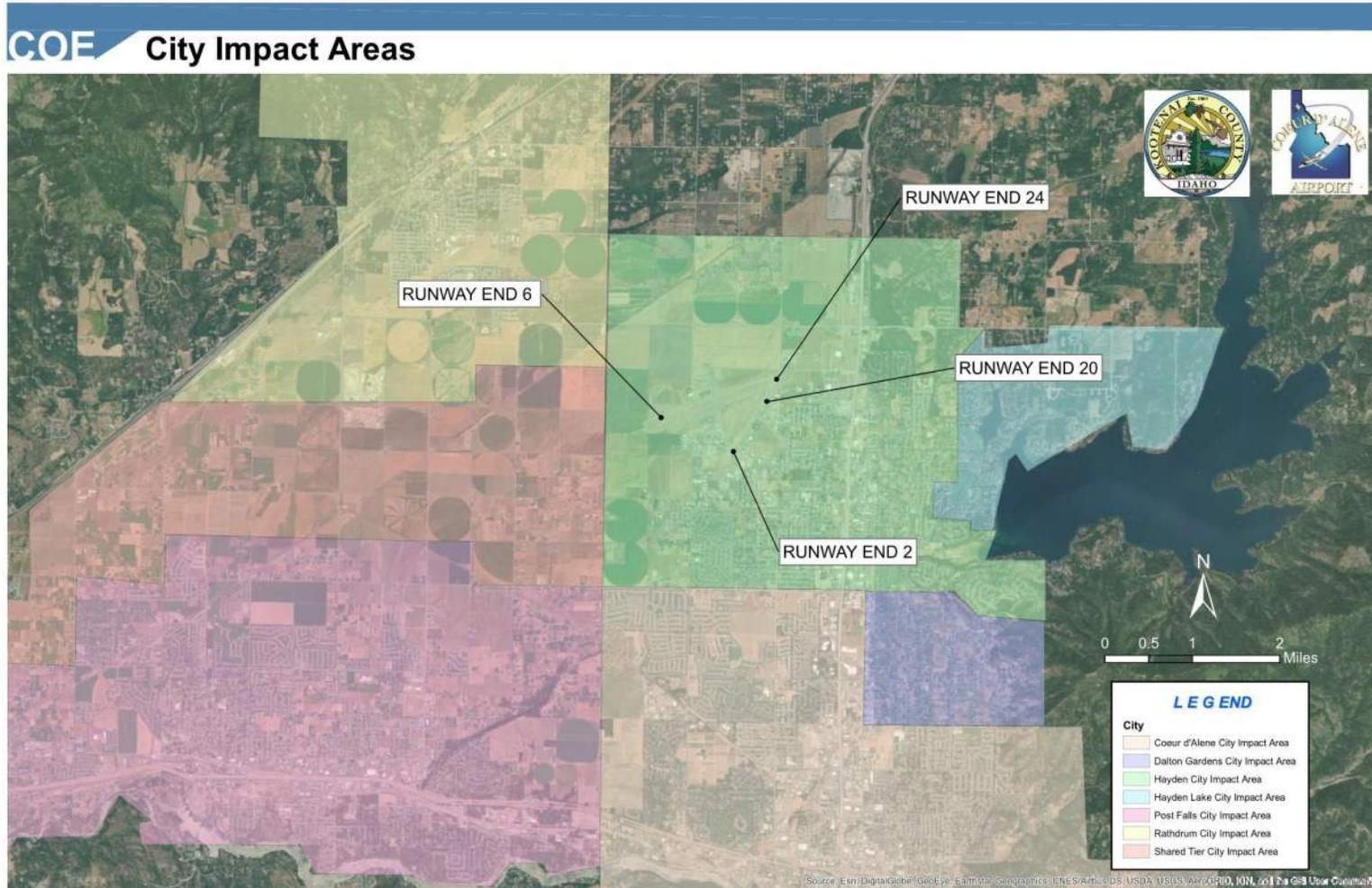


Table 5-4: Comprehensive Plan Review

Municipality	Section “q”	Addresses Airport?
Kootenai County	No	Yes
Hayden	No	Yes
Rathdrum	No	No
Coeur d’ Alene	No	No
Hayden Lake	No	No
Dalton Gardens	No	No
Post Falls	No	No

None of the comprehensive plans have a section “q” specifically addressing the airport. The 2014 law change did not require comprehensive plans to immediately add a section “q” but to add one the next time their comprehensive plan was updated. Of the seven comprehensive plans reviewed, only Kootenai County and the City of Hayden address the airport. By including the airport in their comprehensive plans, Kootenai County and the City of Hayden have the legal authority to implement zoning ordinances to protect the airport.

HEIGHT RESTRICTIVE (PART 77) ZONING

The zoning code of the seven municipalities with land use control under the airport’s Part 77 airspace was reviewed to determine if any height restrictive zoning specific to the airport has been implemented. In review, only Kootenai County has implemented height restrictive zoning in accordance with Part 77 protecting the airport airspace. All the municipalities have maximum building heights associated with each of their different land uses zones, but none of the remaining municipalities have height restrictive zoning protecting the Part 77 airspace around the airport. In addition, none require submittal of an FAA form 7460, which is required by federal law, to evaluate potential airspace obstructions as a condition of development that penetrate either a 100:1 from any runway surface or are more than 200 feet above ground level. Development within a certain distance or height requires the completion of an FAA form 7460. **Table 5-5** summarizes the status of Height Zoning protecting the airport.



Table 5-5: Height Restrictive (Part 77) Zoning Review

Municipality	Height Restrictive - Part 77
Kootenai County	Yes
Hayden	No
Rathdrum	No
Coeur d' Alene	No
Hayden Lake	No
Dalton Gardens	No
Post Falls	No

Source: Kootenai County

COMPATIBLE LAND USE ZONING

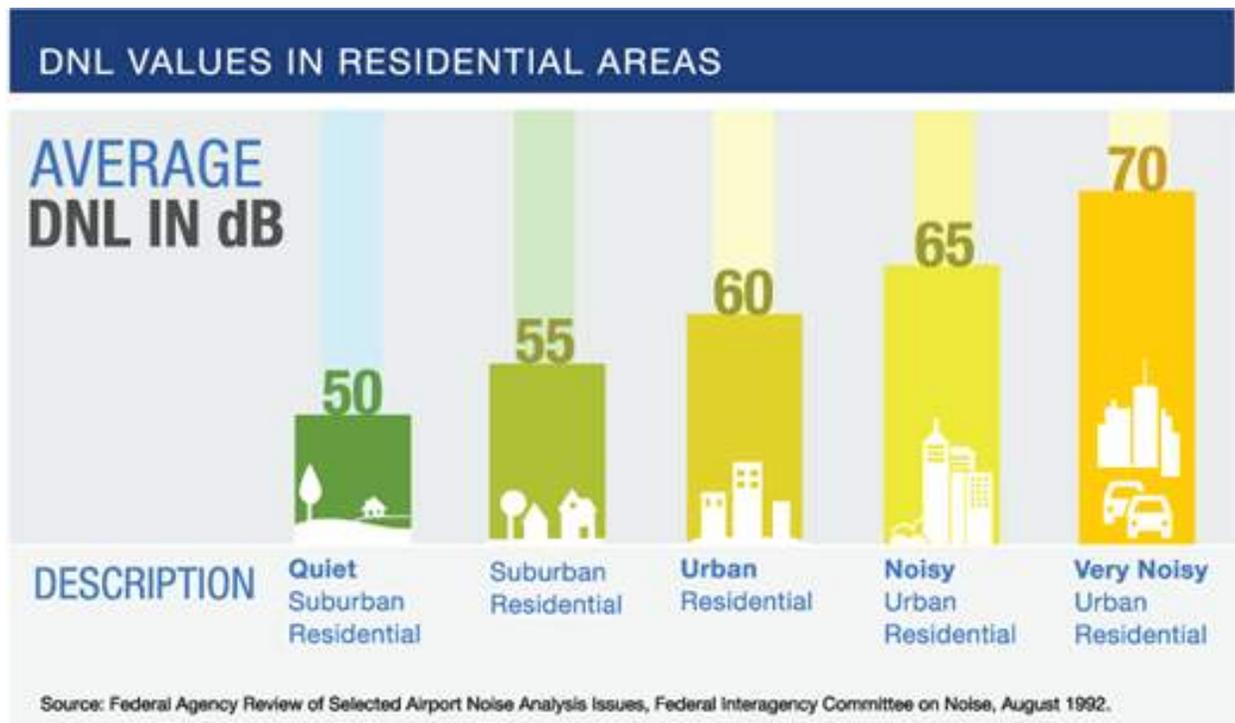
Unlike zoning to Part 77 airspace, there are no federal, state, or local standards that specifically define compatible land use zones. What is deemed as compatible land use can vary depending on the airport and the community. As an example, an area's normal ambient noise level has a large effect on whether aircraft noise is perceived as a nuisance. **Exhibit 5-10** below shows the varying ambient noise levels of different residential areas.

If ambient noise levels are higher, aircraft noise may be perceived as less of an annoyance than in areas with a lower ambient noise level. This is important as areas around the airport continue to develop and transition from rural to urban and as the noise contours expand farther from the airport. Currently the areas of the Runway Ends 06, 20 and 24 would be considered suburban residential while the areas off the Runway End 02 would be suburban residential.

Ideally, a community would adopt land use zoning in compliance with the recommendations in the Idaho ALUG designating the zones described previously in Section 3 of this chapter. Adoption of these types of zones helps to specifically address many of the issues raised in Section 2 of this chapter. A community does not necessarily need to adopt the specific zones but ensure the zoning around the airport is compatible when considering noise, safety, and general compatibility.



Exhibit 5-10: DBL Values in Residential Areas



Source: FAA

The impact of the airport on each of the surrounding municipalities varies depending on many factors such as the distance from the airport, runway ends or flight paths. Those communities that are located farther from the airport such as Dalton Gardens and Hayden Lake will have less of an impact on the airport and the airport will have less impact on those communities. Land use in the cities of Hayden and Coeur d' Alene currently have the potential to have a more significant impact on the airport. The cities of Rathdrum and Post Falls are currently far enough from the airport that land use impacts are minimal, but this will change as the cities grow toward the airport and the airport operations increase.

KOOTENAI COUNTY

The Kootenai County Comprehensive Plan addresses the airport to the degree it can be protected in the local zoning code. The Kootenai County Code §9-16 Airport District (Overlay District) consists of 13 parts addressing zoning and development near Coeur d'Alene Airport. The area of applicability applies to Part 77 surface dimensions, specifically the transitional, horizontal, conical, and approach areas as well as noise contours which are known as the 'land use guide (LUG) area'. The County airport overlay district addresses the main points of airport protection, but it does not contain the specific ASCZs as recommended in the Idaho ALUG.



The following are several of the most relevant parts of the section (paraphrased):

§ 9-15-4 Restrictions

Restrictions include uses of land that could create interference with electromagnetic frequencies utilized by the airport or aircraft, or that could result in bird strike hazards, glare or interfere with the maneuvering of an aircraft in the air. Public facilities are not allowed in the LUG area. Finally, all new subdivisions in the LUG are subject to avigation easements.

§ 9-15-5 Marking and Lighting

Current and future owners of nonconforming structures waive the right to object to the installation and maintenance of or markers and lights. Installation is at the expense of the Coeur d'Alene Airport.

§ 9-15-6 Variances

A variance can be granted to the provisions of the Airport Overlay District but is subject to a public hearing and the approval of the airport board and the FAA.

§ 9-15-7 Airport Area Designations

There are three area designations beginning with the Operation Area which is defined as the area outside of the building restriction line (BRL) and is used for airport operations only. The second area is called the Terminal Support Area and it is defined as the area which supports airport terminal related activities such as passenger boarding, deplaning, etc. The final area is the Light Industrial Area which is essentially light industrial areas located within the overlay district.

§ 9-15-9 Height Restrictions

All penetrations to airspace are prohibited. Development within the airspace footprint with a height greater than 35 feet is required to be reviewed by the County and the Airport Advisory Board. Development in the Operations area must not exceed 50 feet.

Kootenai County zoning code via the Airport Overlay Zone addresses height restrictive zoning and land use zoning around the airport. It should be updated to include the ASCZs as recommended in the Idaho ALUG. There are several low density rural residential developments off the Runway 2 and 6 ends. These developments are located in the Inner and Outer Critical Zones. The development off the Runway 2 end is also near the existing 2017 65 DNL and will fall under the future 2037 65 DNL. Recommendations for improving the zoning around the airport are included in Section 5.



CITY OF HAYDEN

The City of Hayden Comprehensive Plan addresses the airport to the degree it can be protected in the local zoning code. City of Hayden zoning code Section 11-9-3 has two sections that address the airport.

B. No building hereafter created or structurally altered that is located within three hundred feet (300') of the runway edges shall exceed the height of any building on the airport property.

C. When the building is located within three hundred feet (300') of a residential zoning district or is within the Airport Runway Protection Zone established in the Coeur d'Alene airport master plan the maximum building height shall be forty five feet (45').

Paragraph B limits heights of buildings with 300 feet of the runway, however no point within 300 feet of either runway falls outside of airport property line and thus is under control of the airport sponsor, Kootenai County. Paragraph C limits the heights of buildings within 300' of a residential zone or Runway Protection Zone to a maximum height of 45'. This height limitation does not prevent development in the Runway Protection Zones and could lead to a structure with a height of less than 45' being constructed which is an obstruction or hazard to air navigation.

Several residential developments are near Runway 2/20 including several along the extended centerline of Runway End 2. These developments fall into the Inner and Outer Critical Zones of Runway 2/20 and some fall within the 2017 65 DNL. The Atlas School at near the intersection of Honeysuckle and Atlas is currently inside the 2017 55 DNL and will be on the edge of the 2037 65 DNL in the future. Croffoot Park to the north of Runway End 20 falls within the Inner Critical Zone and is also inside the 2017 55 DNL. It will also fall partially within the future 2037 65 DNL.

CITIES OF COEUR D'ALENE, POST FALLS, RATHDRUM, HAYDEN LAKE, AND DALTON GARDENS

As of August 2018, the airport is not addressed in the Comprehensive Plan or zoning code of these municipalities. All the cities should adopt height restrictive zoning protecting the airport. At this time, existing land use concerns are mainly associated with the City of Coeur d'Alene as the current limits of the other cities are not near the airport. This is subject to change as the land from the county is annexed into each of the cities. The current areas of concern in Coeur d'Alene include the residential development along extended centerline of Runway End 2 this development is near the end of the Runway 2 Outer Critical Zone and will fall under both the 2017 55 DNL and the future 2037 55 DNL.



PLANNED LAND USE

The ACI Agreements between Kootenai County and the surrounding municipalities affect planned land use around the airport. As shown in **Exhibit 5-9** previously, nearly all land near the airport can be annexed into a municipality other than Kootenai County at some point in the future. There are two types of impact areas in Kootenai County, exclusive and shared. The exclusive impact areas of Coeur d’Alene, Dalton Gardens, Hayden, Hayden Lake, Post Falls and Rathdrum are well defined while Hayden, Post Falls, and Rathdrum also can annex land in the “Shared Tier” impact area. The “Shared Tier” area lies to the west of the airfield off the Runway End 6 . As of August 2018, no land use planning has been completed by the cities in the “Shared Tier” area. Kootenai County and the cities of Hayden and Coeur d’Alene have completed future land use planning in other areas near the airport. The cities of Dalton Gardens and Hayden Lake are not a concern from a compatible land use perspective but should institute height restrictive zoning to protect the airport’s airspace.

In Idaho, future land use is addressed through a community’s comprehensive plan. Future zoning designations are contained in a future land use map as part of the comprehensive plans. Future land use maps reviewed do not include location information for future schools, stadiums, hospitals, and nursing homes. Per the ITD ALUG, it is recommended that the ASCZs and 2037 noise contours be used to evaluate the location of each facility considering impacts from noise and aircraft accidents.

Kootenai County has entered a Memorandum of Understanding (MOU) with the City of Hayden for land use planning near the Coeur d’Alene Airport. The MOU covers several issues raised by the City of Hayden with the 2012 Airport Master Plan as well as issues raised by Kootenai County with transportation plans and land use near the airport. The MOU also identifies this Master Plan update as the vehicle to address the concerns raised by both parties. This memo is included in **Appendix X**.

KOOTENAI COUNTY

Planned land use in Kootenai County comes from the Kootenai County Comprehensive Plan (Kootenai Plan), adopted in December 2010. The airport is addressed in multiple sections as a resource to be protected. This gives the county the ability to enact zoning to protect the airport. One goal the Kootenai Plan contains is PS-3B which states, *“Encourage cooperation and coordination among all jurisdictions that impact airport activity by renegotiating Area of City Impact agreements with appropriate cities.”* This goal should be the highest priority in protecting the airport.



Future Land Use Map

All the land surrounding the airport has been designated as transitional in the Kootenai Plan. Transitional is defined as “Land designated for future annexation into an incorporated area. This land will remain undeveloped until adequate roads and services are in place. The Transitional designation gives the surrounding cities the ability to properly plan for growth in conformance with a agreements with the County.” This designation allows the existing County zoning to remain in place until the property is annexed into one of the surrounding cities. If the surrounding cities address the airport in their comprehensive plans and zoning, this designation would be deemed compatible. Review of the planned land use of the other jurisdictions is contained in their respective sections.

CITY OF HAYDEN

Planned land use comes from the city of Hayden’s Comprehensive Plan (Hayden Plan). The Hayden Plan addresses Coeur d’Alene Airport in Section I – Hayden’s Comprehensive Plan, Section II – Current Conditions under subsection C, and Section III – Goals and Policies under subsections G and M. According to the Hayden Plan “The definition of the community’s identity and development of the plan was facilitated through addressing fifteen key issues and opportunities that face Hayden.” The seventh of 15 key issues address the airport directly and is titled Airport Impact/Expansion. The Airport Impact/Expansion issue states: “Current and future activity and development in and around the County airport impacts the adjoining areas located in Hayden. Proposed land use and the development of infrastructure in these areas should be coordinated to minimize the future impact of one upon the other.” The Hayden Plan vision statement states that “we seek to encourage and promote light industrial development in and around the Coeur d’Alene Airport.”

Section II-C-3 Coeur d’Alene Airport of the Hayden Plan covers the airport’s history, future expansion, and airport impacts such as traffic, airport influence zones, economic development, and land use concerns. The airport influence zone is generally described as having to do with aircraft noise impacts and flight patterns. The comprehensive plan does not specifically describe the boundary of the airport influence zone. However, it does discuss the need to strongly consider types of development within the 55DNL contour.

There are eight land use issues associated with the airport outlined in the Comprehensive Plan as concerns that seem to largely address developments in noise sensitive areas, or areas subject to extensive aircraft overflights though the plan references noise contours from the 2000 Master Plan update. Issues addressing the preservation of airport capacity are not addressed. To comply with Idaho Code, it is recommended the Hayden Plan include more detail describing the items contained in the ITD ALUG including economic impact, airspace, wildlife attractants, and other factors that must be taken into consideration when planning for the future of Coeur d’Alene Airport.



Section III-M-1 of the Hayden Plan addresses the City of Hayden’s goals regarding COE. City of Hayden goals includes coordinating development near the Airport with Kootenai County and developing an Airport Impact Area overlay zone to address height restrictions and noise mitigation strategies, and construction standards. It is expected that an updated Airport Influence Zone will be created based on and following the guidance of this Airport Master Plan.

Future Land Use Map

The City of Hayden is approaching full development within existing city limits. Property within the ASCZs, indicated in the Hayden Plan for potential annexation, is designated as “Agricultural-Suburban.” The Hayden Plan residential density map indicates that properties annexed into the City of Hayden are planned to have a lot density of one to four dwelling units per acre. It is recommended that COE coordinate with the City of Hayden to promote low density residential within Inner and Outer Critical Areas, shown on **Exhibit 5-8**, beyond Runway 2, 20 and 24 ends as these properties are annexed into the City of Hayden.

The 2037 65 DNL contour falls within the existing and future jurisdiction of the City of Hayden on the Hayden Plan land use map. Properties are generally planned to remain light industrial beyond Runway Ends 6, 20, and 24. The 2037 65 DNL contour is contained within the ALGU recommended Inner Critical Zone, which includes existing single-family residential development. Properties in this area may experience increasing aircraft overflight as operations increase at COE. It is recommended that no additional single-family residential properties be developed within Inner Critical Zone.

The 2037 55 DNL contour extends over the City of Hayden. Residential land use and other land uses such as schools and churches should be carefully evaluated to determine the potential impacts of the airport on the development. Several reports are available from the Airport Cooperative Research Program (ACRP) on the impacts of aircraft noise on student learning.

CITY OF COEUR D’ALENE

The City of Coeur d’Alene does not address the airport in their comprehensive plan. To comply with Idaho Code, it is recommended the city add a Chapter on the airport the next time their comprehensive plan is updated. A draft Comprehensive Plan Chapter is included as Appendix X. The future land use map of the City of Coeur d’Alene contains a small portion of land in the Outer Critical Area that is already fully developed and a small portion of undeveloped land under the Traffic Pattern Area. As the city of Hayden has recognized the 55 DNL as having the potential for noise impacts, the City of Coeur d’Alene should review development in the Traffic Pattern Area using a similar metric to ensure it is compatible with the airport.



OTHER JURISDICTIONS

As of August 2018, the cities of Dalton Gardens, Hayden Lake, Post Falls and Rathdrum do not address the airport in their comprehensive plans. To comply with Idaho Code, it is recommended that each city should add a section on the airport as part of their next comprehensive plan update.

No land use is being planned in areas that fall under the ASCZs in these cities. As land use plans are developed, both height restrictive and compatible land use zoning should be developed

LAND USE RECOMMENDATIONS

Airport land use compatibility addresses both the safety and viability of airports, and the health, safety, and welfare of the communities that surround the airport. The goal of airport land use compatibility planning is to allow airports to serve communities while minimizing the negative impacts each can have on the other. Existing and future land uses around the Coeur d'Alene Airport are complex. Many of the recommendations below will require the coordination of multiple municipalities and will take years to implement.

Comprehensive plans need updating and zoning ordinances need enacting. It cannot be understated the importance of starting this process now while most of the land surrounding the airport is still undeveloped. According to the Idaho Department of Labor, the Coeur d'Alene metro area ranked 11th highest in the nation for population growth from July 1, 2015, to July 1, 2016, at 2.6 percent. Once an incompatible land use is established, limited options are available outside of removal.

The ideal order of implementation would be for Kootenai County update their comprehensive plan and the Airport Overlay Zone in accordance with this chapter and the Idaho ALUG. Kootenai County already has Part 77 height restrictive zoning in place. The next step is for Kootenai County to revise the ACI agreements to require height restrictive and compatible land use zoning around the airport. As the land is annexed into each municipality, the height restrictive and Airport Overlay Zoning would remain. The allowable density of development in each of the ASCZs would be subject to review as the land transitions from rural to urban.

In the cities of Coeur d'Alene Dalton Garden, Hayden Lake, Post Falls, and Rathdrum, the adoption of height restrictive zoning and Airport Overlay Zone can be done with little impact on existing uses. In the City of Hayden, several incompatible uses have already been established and as the city continues to grow, more could be introduced.



Land use compatibility guidelines in the Idaho ALUG provide communities with a baseline for land use within the different ASCZs. The Idaho ALUG includes land use compatibility guidelines for planning within noise contours.

LAND USE COMPATIBILITY RECOMMENDATIONS

Land use compatibility recommendations for COE and the surrounding communities consider ASCZs along with 2018 and 2037 noise contours. Recommendations are intended to protect the Airport from encroachment by incompatible land uses while supporting growth and development in the surrounding communities and protecting the communities from the potential impacts of the airport.

Multi-jurisdictional Coordination

The first step in ensuring compatible land use around the airport is continued coordination between the surrounding municipalities. This includes notification of the airport of proposals in the surrounding community that could affect the airport and notification of proposals at the airport that could affect the surrounding community. The county may consider the formation of a joint multi-jurisdiction airport land use planning and zoning commission to develop zoning recommendations or an overlay zone with homogenous standards across the multiple jurisdictions.

Area of City Impact Agreements

It is recommended that Kootenai County look to renegotiate its ACI agreements with surrounding municipalities. Ideally, the height restrictive and compatible land use zoning protecting the airport put in place by the County should transfer through to the annexing municipality. This will require coordination and revision of the each of the municipality's comprehensive plans and zoning ordinances. Specific recommendations on each of those elements are contained in the following sections. Specific care should be taken in developing zoning ordinances that reflect the values and vision established in each of the comprehensive plans while protecting the airport.

Comprehensive Plans

The City of Hayden and Kootenai County Comprehensive plans address the airport as a resource to be protected and allow both municipalities to enact zoning protecting the airport. Both plans should be updated at the next opportunity to include a Chapter specifically addressing the airport. The Comprehensive Plans of Coeur d'Alene, Dalton Gardens, Hayden Lake, Post Falls and Rathdrum do not address the airport. To comply with Idaho Code, it is recommended each of the comprehensive plans attempt to update to include a Chapter specifically addressing the airport. A sample chapter is provided in Appendix X for each of the municipalities.



Height Restrictive Zoning

It is recommended that surrounding municipalities adopt height restrictive zoning mirroring what has been adopted by Kootenai County. The cities of Coeur d'Alene, Dalton Gardens, Hayden Lake, Post Falls and Rathdrum will need to first update their comprehensive plans while the city of Hayden can implement height restrictive zoning immediately.

Airport Overlay Zone

Airport overlay zones and airport specific zoning are two land use controls commonly employed to enhance land use compatibility. Multiple jurisdictions surrounding COE present a challenge to developing a comprehensive zoning solution that benefits all stakeholders. The Idaho ALUG suggests that local governments establish a joint multi-jurisdiction airport land use planning and zoning commission to develop a zone or overlay zone with homogenous standards across multiple jurisdictions.

The 2016 Idaho ALUG includes a draft airport zoning ordinance that protects the FAR Part 77 surfaces from height obstructions and ASCZs. Kootenai County Zoning Chapter 16 includes an airport overlay zone that uses FAR Part 77 surfaces as a basis for determining height limitations. The ASCZs assist local governments in identifying existing land use incompatibilities, and in planning for future land use compatibility. The ASCZs and the forecasted noise contours help local government site noise-sensitive land uses (such as residential properties, schools, and hospitals) in locations less likely to experience overflight. This helps protect the health, safety, and welfare of citizens on the ground, and allows COE to operate at full functionality.

The zoning ordinance defining the ASCZs should also:

- ▶ Clearly define the process for reviewing developments, addressing variances, and issuing permits.
- ▶ Require applicants for zoning application and building permits to pursue a 7460-1 and receive a determination that does not impact airport utility before issuing approval.
- ▶ Clearly state that a variance will not be issued if a proposed object is an airport hazard or reduces the utility/usability of the airport thereby devaluing the public's investment and violating federal grant assurances.
- ▶ Limit height restriction in all codes to match Part 77 imaginary surface boundaries and slopes.
- ▶ Clearly restrict/prohibit residential development as well as other special uses such as schools, hospitals, etc. inside the 55 DNL contour.



- ▶ Reference specific advisory circulars, guidance documents, and state/federal regulations in both the codes and comprehensive plans.
 - AC 150/5340-1L
 - AC 150/5200-33B
 - 14 CFR Part 77
 - State Statutes – Airport Zoning
 - ITD Airport Land Use Guidelines

Land use compatibility measures include attaching a notice of airport proximity to the title of the property. This will inform property owners about the Airport’s existence, and what types of activity to expect.

LAND USE SUMMARY

The following is a summary of the research and recommendations contained in Chapter 5.

IMPORTANCE OF COMPATIBLE LAND USE PLANNING

- ▶ The airport is a resource and economic engine worth protecting
- ▶ One of the greatest threats facing the long-term viability of the airport is the encroachment of incompatible land use

COE AIRCRAFT NOISE ANALYSIS

- ▶ The 65 DNL contour is the federal threshold for a significant noise impact but may not be an appropriate measure for noise impacts to all types of land use
- ▶ Measures other than the 65 DNL should be considered when evaluating land use compatibility
- ▶ The noise impact of the airport will continue to grow as operations increase,
- ▶ and the airport expands

AIRPORT SAFETY COMPATIBILITY ZONES

- ▶ The ITD ALUG recommends the size, shape and allowable use for land use compatibility zones around the airport



EXISTING LAND USE

- ▶ Some incompatible land uses have been established near the airport
- ▶ Most municipalities surrounding the airport lack the language in their comprehensive plans to enact zoning to protect the airport

PLANNED LAND USE

- ▶ Most of the land surrounding the airport can be annexed into one of the surrounding municipalities
- ▶ As land is annexed, the zoning will revert from Kootenai County to the surrounding municipalities and the height restrictive Part 77 zoning and Airport Overlay Zone will no longer exist

LAND USE RECOMMENDATIONS

- ▶ Continued coordination between the municipalities is key
- ▶ Area of City Impact Agreements should be revised to require zoning protecting the airport
- ▶ Kootenai County should update their comprehensive plan and Airport Overlay Zone in accordance with this chapter and the Idaho ALUG
- ▶ Each of the surrounding municipalities should update their comprehensive plan in accordance with Appendix X and the Idaho ALUG
- ▶ Each of the municipalities should adopt height restrictive Part 77 zoning similar to that found in Kootenai County code
- ▶ The cities of Coeur d'Alene, Hayden, Post Falls and Rathdrum should adopt an Airport Overlay Zone in accordance with Appendix X and the Idaho ALUG





Chapter 6
Implementation Plan

IMPLEMENTATION PLAN

A goal of this Airport Master Plan was to review the requirements and alternatives necessary for the Coeur d’Alene Airport to meet the identified current and future demand. With this analysis complete, the financial commitment needed to implement the recommendations over the next 20 years can be estimated. This chapter:

- ▶ Outlines the Coeur d’Alene Airport development plan (or capital improvement program)
- ▶ Discusses the potential sources of funding for implementing the projects outlined in the development plan
- ▶ Presents an evaluation of the airport’s current financial operating environment
- ▶ And recommends enhancements to increase airport revenue

The Idaho Airport System Plan (IASP), initiated by ITD Division of Aeronautics, in 2009, evaluates the economic impact of Coeur d’Alene Airport. The direct economic benefits related to on-airport business tenants and the indirect benefits associated with visitor related expenditures were determined for each study airport. The multiplier effect of these benefits was then calculated to determine the total airport related impact. The total economic activity is the sum of all direct (on-airport) and indirect (off-airport), and multiplier impacts.

The Idaho Aviation System Plan (IASP) was released in the 2010. The overall economic impact of COE was estimated at \$129 million in 2009 and the airport also directly and indirectly provided the community with 1,058 jobs.

When considering the financial implications of implementing this master plan and the possible increases or new fees needed to support development, it is important to discuss the inherent value of the airport to the community and the airport’s economic contribution. The airport’s economic value should be articulated to airport users, county decision-makers, and the public to help understand why such fees and investment are justified and necessary.

DEVELOPMENT PLAN AND COST ESTIMATES

A list of capital improvement projects has been assembled based on the preferred development alternatives established in Chapter 4 of this airport master plan. This project list has been coordinated with the Airport Layout Plan (ALP) drawing set and the development plan used to create the airport’s Capital Improvements Program (CIP). The airport’s CIP should be routinely updated by airport management and submitted to the FAA through the ITD Division of



Aeronautics. In addition to identifying improvement projects, this CIP also presents a reasonable order of implementation along with estimated total costs and anticipated funding sources of the projects.

Proposed projects from this development plan are generally prioritized by project and timeframe. When formulating the following development plan, only FAA, State and Local funding sources were considered. At this time, no private or other revenue sources have been identified to assist with any airport development. Also, the cost shares are based on the current 90 percent Federal participation and an assumed level of 2.5 percent for state participation for eligible projects, with local funding making up the difference.

It is important to note that inclusion of a project in a CIP provides no guarantee a project will be funded in that timeframe or year. Additionally, all or some component of a project, shown on the ALP, may not be eligible for federal grant participation. The detailed funding plan for an individual project is typically defined during the predesign or formulation phase of the project.

Projects are organized by phases with Phase I (Short Term) in the 0-5-year timeframe; Phase II (Mid Term) in the 6-10-year timeframe; and Phase III (Long Term) in the 11-20-year timeframe. Project descriptions which relate to development based on demand are by nature general as projects will need to be planned in greater detail as specific project goals and need become more defined. The CIP is driven by planning horizons. By using planning horizons instead of specific years, Coeur d'Alene Airport will have greater flexibility to fine-tune capital needs as demand dictates. **Table 6-1** reviews the key milestones for each of the three planning horizons.

Table 6-1: Forecast Summary

Forecast Element	Base	Short Term	Mid Term	Long Term	CAGR
Aircraft Operations	86,876	98,100	109,900	136,900	2.30%
Itinerant Operations	59,912	68,000	77,200	99,300	2.60%
Local Operations	26,964	30,100	32,700	37,600	1.70%
Based Aircraft	262	299	325	373	1.80%
Single-Engine Piston	221	252	272	308	1.70%
Jet & Turbo-Prop	12	16	19	26	3.90%
Multi-Engine Piston	14	13	13	12	-0.90%
Helicopter	8	9	10	12	2.00%
Other	7	9	11	15	3.90%
Single Engine Piston includes experimental and light sport aircraft. CAGR: Compound Annual Growth Rate Sources: 2017 calculated from IFR records, 2037 = Forecast Based Aircraft: 2017 from BasedAircraft.com, 2027 & 2037 = Forecast					

It should also be noted that the projects below are shown as individual projects however due to the high cost of completing small projects, multiple projects should be combined into larger projects to reduce the overall cost.



DEVELOPMENT LAYOUTS

This chapter depicts various layouts for the proposed development at the airport. These layouts are also depicted on the updated Airport Layout Plan (ALP) or were derived from the previous version of the ALP approved in 2012. Some modifications were made based on comments from the airport's staff and the public, occurring during the redaction of this implementation plan. Therefore, these final layouts may also differ slightly from previous exhibits presented in other chapters of this airport master plan.

The approved layouts shown in the 2012 ALP were modified as followings:

- ▶ **Northwest development area** (Projects M3 and L3 shown below): revised after comments from the airport manager to minimize conflicts between taxiing aircraft. The new layout adds a taxilane for split access and alleviate a bottleneck for many hangars with only one access point.
- ▶ **North Taxiway D** (Project S1 shown below): this project realigns the access to the executive hangar area. It will improve the access to the ARFF building, avoid the compass calibration pad, and will provide additional hangar space.
- ▶ **Property line along Phantom Drive** (Project L7 shown below): the owner contacted the airport and the airport manager requested the land to be shown for acquisition on the ALP. It will allow for additional hangar development and a future extension of Taxilane D-1B.
- ▶ **Parcel at Ramsey Rd and Miles Ave**: the change from aeronautical use to non-aeronautical use is in progress with an official release requested by the airport manager
- ▶ **T-Hangar development** (Project L6 shown below): the airport manager identified this space for additional T-hangars.

Short-term Development Projects – Phase I (0-5 Years)

- ▶ The short-term projects are those anticipated to be needed in years zero through five of the 20-year CIP. The short-term list of projects is further divided by priority and allotment of capital. Projects related to safety have the highest priority. The short term considers eleven projects for the planning period as presented in **Table 6-2**.



Projects in the short-term phase include rerouting traffic and reconfiguring pavement to address important safety issues for the airport. The projects are organized to provide access to the north side before removing sections of pavement. The outer third connector to the north-east must be constructed before the access onto Runway 6/24 from Taxiway D is removed. Also, the Administration Building will need to be constructed before reconfiguring the Runway 2 and Taxiway A/D intersection. These projects are planned numerically to provide logical flow and access onto runways until the short-term projects are complete. Projects are split into design and construction but can be combined as funding allows.

Table 6-2: Short-term Development Projects and Cost Estimates 0-5 Years

PROJECT DESCRIPTION	DEVELOPMENT CATEGORY	FUNDING SOURCE			TOTAL PROJECT COST
		FEDERAL (90%)	STATE (2.5%)	LOCAL (7.5%)	
S1. Construct Taxiway D North and Connecting Taxiway K (Design)	Safety, Business Opportunities	\$288,000	\$8,000	\$24,000	\$320,000
S2. Procure Multi-Function SRE	Maintenance, Safety	\$630,000	\$17,500	\$52,500	\$700,000
S3. Construct SRE Building and Airport Manager's Office (Design)	Maintenance, Safety	\$324,000	\$9,000	\$27,000	\$360,000
S4. Construct Taxiway D North and Connecting Taxiway K	Safety, Business Opportunities	\$1,044,000	\$29,000	\$87,000	\$1,160,000
S5. Construct SRE Building & Managers Office	Safety, Maintenance	\$1,080,000	\$30,000	\$90,000	\$1,200,000
S6. Runway 20/24 Decouple (Design)	Safety	\$265,500	\$7,375	\$22,125	\$295,000
S7. Runway 2 Intersection Geometry (Design)	Safety	\$265,500	\$7,375	\$22,125	\$295,000
S8. Acquire Avigation Easements – R/W 2	Safety	\$45,000	\$1,250	\$3,750	\$50,000
S9. Construct Runway 20/24 Decouple & Taxiways	Safety	\$990,000	\$27,500	\$82,500	\$1,100,000
S10. Perimeter Fence Extensions (W, N & SW)	Safety, Environmental	\$900,000	\$25,000	\$75,000	\$1,000,000
S11. Construct Runway 2 Intersection Geometry and Taxiways	Safety	\$990,000	\$27,500	\$82,500	\$1,100,000
S12. Demolish Airport Managers Office	Efficiency, Safety	\$108,000	\$3,000	\$9,000	\$120,000
S13. Rehabilitate Taxiway A	Maintenance, Safety	\$2,664,000	\$74,000	\$222,000	\$2,960,000
Short Term Total		\$9,594,000	\$266,500	\$799,500	\$10,660,000

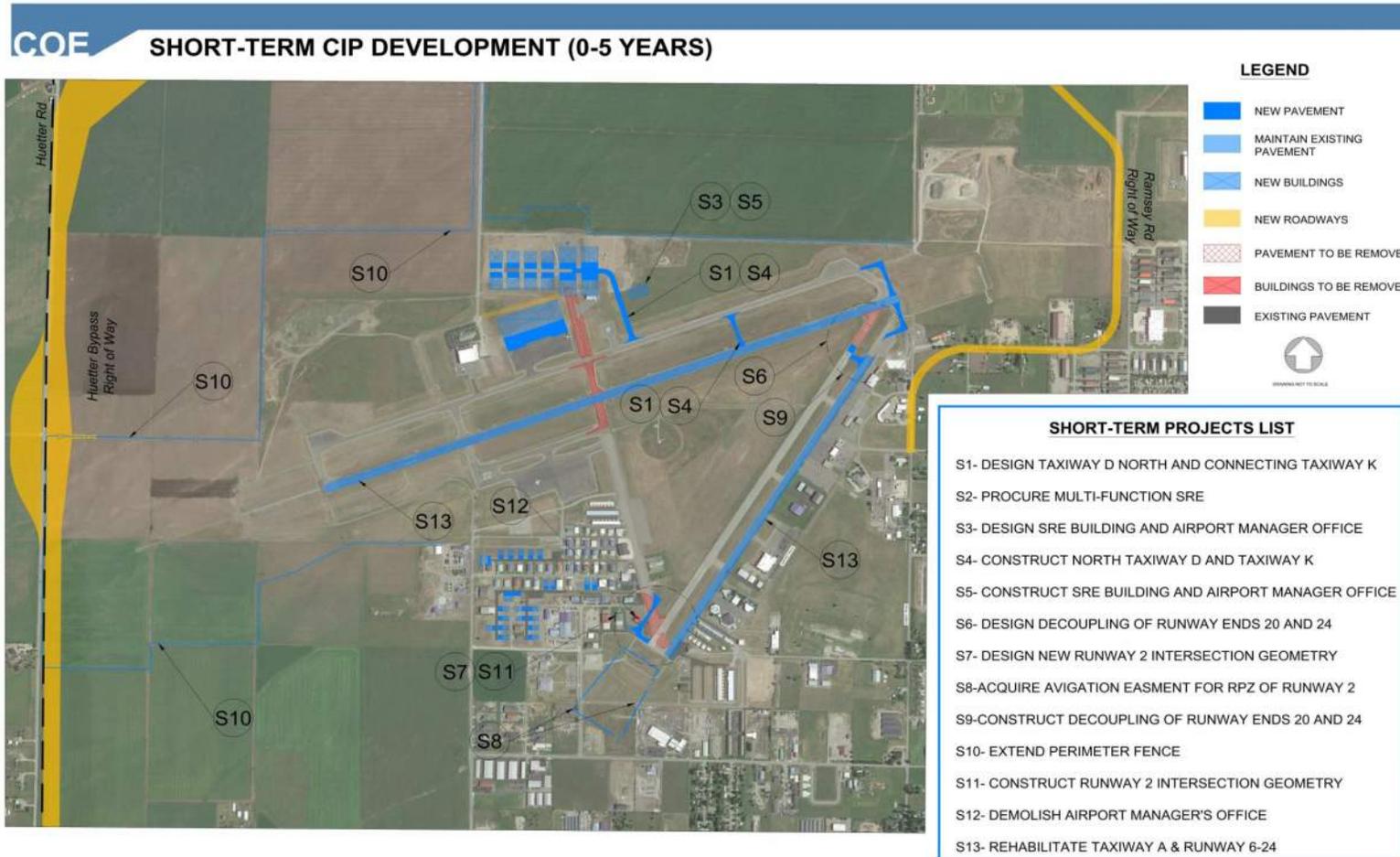
Source: T-O Engineers, Inc.

Note: All estimates are in 2018 dollars.

Refer to the following descriptions and **Exhibit 6-3** for location of proposed projects in the Short-Term.



Exhibit 6-3: Short-term Development Projects and Cost Estimates 0-5 Years



S-1 Construction of Taxiway D North and Connecting Taxiway K (Design)

This project consists of the design of extension and reroute of Taxiway D North from the Compass Rose to the Executive Hangar Development Site on a new alignment. The existing Taxiway D exhibits large block cracking and the pavement has not been maintained since it was abandoned as a runway. The Executive Hangar Development Site has been designated as the area to accommodate new hangars for large aircraft.

Taxiway D from Taxiway F onto Runway 6-24 and ending at Taxiway N is considered a hot spot as it crosses the runway in the middle third. This section of taxiway will be removed and new connecting taxiway (K) will be constructed between Taxiway N and Runway 6-24. This taxiway will also allow for more efficient use of Runway 6 as it will allow aircraft to exit the runway before the end.

S-2 Procure Multi-Function Snow Removal Equipment Vehicle

This project will consist of a purchasing a multi-function Snow Removal Equipment (SRE) Vehicle. The equipment will consist of a snow plow, broom, blower and de-ice connected in tandem; and should increase the efficiency of snow removal operations.

S-3 Construct SRE Building and Airport Managers Office (Design)

This project will consist of the design of a maintenance and storage building for the multi-function SRE equipment as well as other SRE Equipment. Design for this building will include utility extensions and access to the building. The prepared site for the SRE Building will also house the relocated Airport Manager’s Office. The existing Manager’s Office is currently a Part 77 Obstruction and will also be in the object free area of future north parallel taxiway 2-20.

S-4 Construct Taxiway D North and Connecting Taxiway K

This project consists of the construction of S1.

S-5 Construct SRE Building and Managers Office

This project consists of the construction of S3.

S-6 Decouple Runway 20/24 with Relocating Threshold Lights and PAPI (Design Only)

The project includes removing pavement and shortening Runway 20 by 940-feet. With the shortening, it is necessary to relocate the Runway 24 threshold lights and PAPI-2. It may also be needed to adjust runway light spacing depending upon the ultimate length selected. Design of this project also includes connecting taxiway for new runway end at Taxiway A.



S-7 Runway 2 Intersection Geometry (Design)

Runway 2 has a non-perpendicular intersection, which does not allow pilots to see adequately in each direction. The project includes realigning the access to Taxiway D with a segment of north parallel taxiway. The Taxiway A access point is wide and undefined; and pavement will need to be removed due to simplify the taxiway path.

S-8 Acquire Avigation Easements Runway 2

Buildings and roadways exist in the Runway 2 Runway Protection Zone. FAA encourages airports to control these areas and recommends purchase of the Avigation Easement over the area at a minimum. Two separate parcels and a roadway right-of-way are not owned by the airport – this project consists of acquisition of easements over these parcels.

S-9 Construction of Decoupling Runway 20/24 with relocating Threshold Lights and PAPI

As described in paragraph S-6, the decoupling is a high safety priority under the FAA. Taxiways will be connected to the new Runway 20 end location with associated lighting relocation.

S-10 Construction Perimeter Fence Extensions (N, W and SW)

A recent Wildlife Hazard Management Plan recommended extending the perimeter fence to surround the airport. The fencing is also a requirement of Part 139 Certification. Fence extensions will also prevent unauthorized access to the airport on the west edge where there is no fence and other areas replacing old barbed wire fence line with taller wildlife fence.

S-11 Construct Runway 2 Intersection Geometry

Reconfiguring the intersection of Runway 2 will decrease pilot confusion at this location and improves approach visibility by squaring up the intersection.

S-12 Demolish Airport Managers Office

Removal of the Airport Manager’s Office will clear obstructions for a partial parallel taxiway north-west of Runway 2 end. Currently, the Airport Manager’s office is located northwest of the approach end of Runway 2, and south of North Sensor Ave.

S-13 Rehabilitate Taxiway A and Runway 6/24

Rehabilitate Taxiway A pavement at existing alignment and dimensions. This taxiway was constructed in 1996 and needs significant rehabilitation work. Runway 6/24 will need routine maintenance in the short term due to age.

*Note: Coeur d’Alene Airport (COE) is planning to perform some of the construction tasks in the Short-Term Development Phase for in-kind grant match. COE can provide site preparation by stripping topsoil or removing existing pavement as a form of grant match.



Mid-term Development Projects – Phase II (5-10 Years)

The mid-term projects are those that are anticipated to be necessary in years six through ten of the Master Plan. These projects are not tied to specific years for implementation, instead they have been prioritized so that Airport Management has the flexibility to determine when they need to be pursued based on current conditions. The mid-term planning period includes eight projects as presented in **Table 6-3**.

Table 6-3: Mid-Term Development Projects and Cost Estimates 6-10 Years

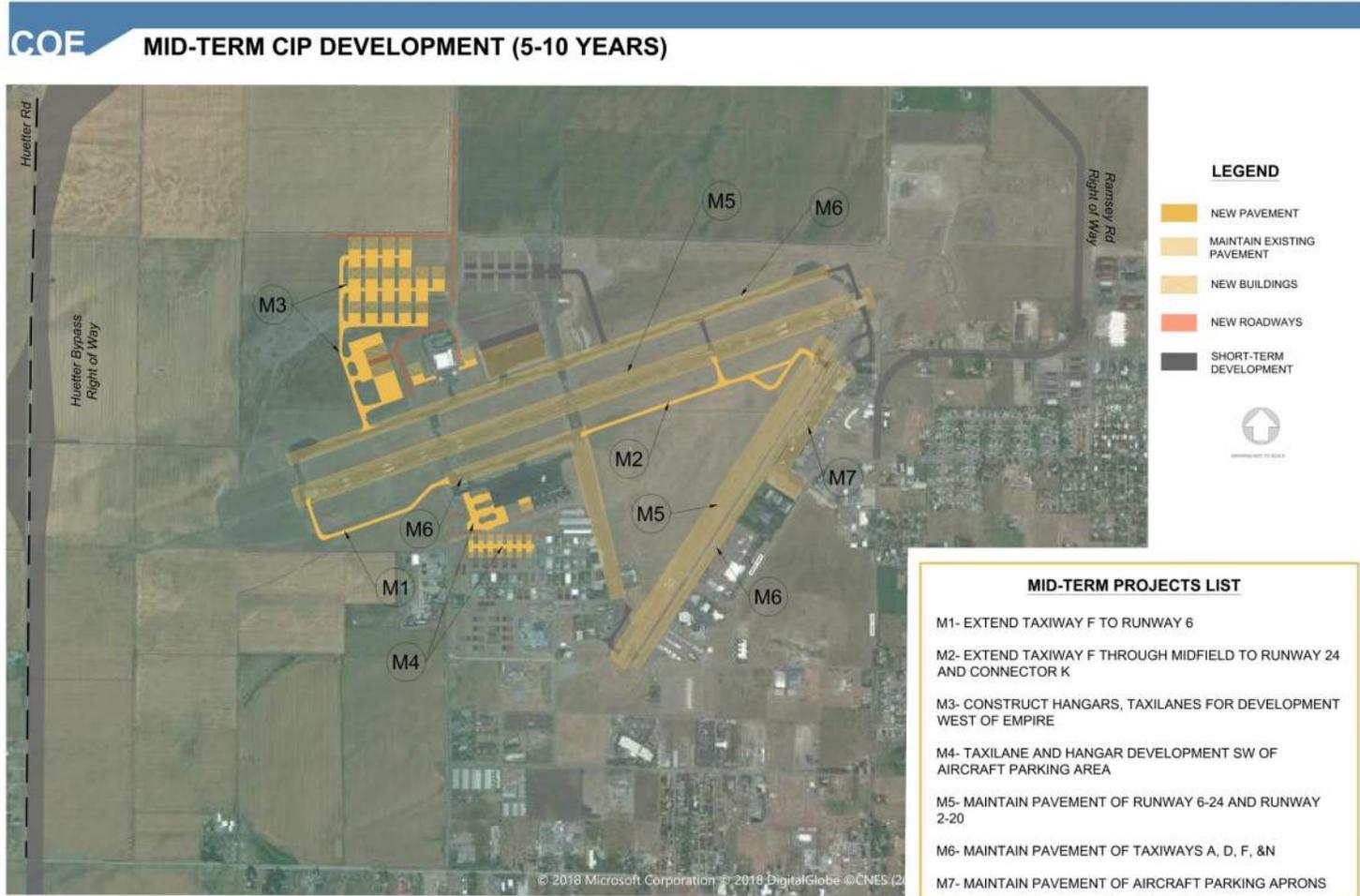
PROJECT		DEVELOPMENT CATEGORY	FUNDING SOURCE			TOTAL PROJECT COST
ID	DESCRIPTION		FEDERAL (90%)	STATE (2.5%)	LOCAL (7.5%)	
M-1	Extend Taxiway F to Runway 6	Safety, Demand	\$1,071,000	\$29,750	\$89,250	\$1,190,000
M-2	Extend Taxiway F through midfield to Runway 24 with Connector K	Safety, Demand	\$2,025,000	\$56,250	\$168,750	\$2,250,000
M-3	Construct Hangar Taxilanes for Development West of Empire	Business Opportunities, Demand	\$2,043,000	\$56,750	\$170,250	\$2,270,000
M-4	Construct Taxilanes for Development near SW Aircraft Parking Apron	Business Opportunities, Demand	\$450,000	\$12,500	\$37,500	\$500,000
M-5	Pavement Maintenance on Runways 6-24 and 2-20	Maintenance, Safety	\$675,000	\$18,750	\$56,250	\$750,000
M-6	Pavement Maintenance on Taxiways A, D, F & N	Maintenance, Safety	\$315,000	\$8,750	\$26,250	\$350,000
M-7	Pavement Maintenance on Aircraft Parking Aprons	Maintenance, Safety	\$279,000	\$7,750	\$23,250	\$310,000
M-8	Conduct Environmental Assessment Runway 6-24 Extension and Land Acquisition for Future Development	Environmental	\$450,000	\$12,500	\$37,500	\$500,000
MID-TERM TOTAL			\$7,119,000	\$197,750	\$593,250	\$7,910,000

Source: T-O Engineers, Inc.

Note: All estimates are in 2018 dollars.



Exhibit 6-4: Mid-Term Development Projects and Cost Estimates 6-10 Years



Refer to the following descriptions and **Exhibit 6-4** for location of proposed projects in the Mid-Term.

M-1 Extend Taxiway F to Runway 6 End

This project will consist of extending Taxiway F from the connecting Taxiway G intersection to the west end of Runway 6. Taxiway F extension 1,700-feet to the west will improve continuity and access for aircraft.

M-2 Extend Taxiway F through Midfield to Runway 24 with Connector K

This project will consist of extending Taxiway F 3,400-feet to the east to complete the south parallel taxiway. The portion of midfield taxiway will aide in easier access to facilities along Taxiway A. Construction of the taxiway will necessitate the removal of the VOR building. Taxiway F is currently a partial parallel Taxiway and to provide better access to the east side of the airport. The bypass shown is configured for future Runway 2/20 north parallel.

M-3 Construct Hangar Taxilanes for Development West of Empire

Construction of the hangar taxilane development area is necessary support growth and demand for storage at the airport. This development area is for large corporate or commercial style aircraft.

M-4 Construct Taxilanes for Development

This project will consist of constructing taxilanes for additional Hangar Development south of Runway 6-24. The existing Group II Hangar Sites are approaching build out and are predicted to be full by the end of the Short-Term.

M-5, M-6, M-7 Pavement Maintenance of All Airport Pavements

This project will consist of seal coat for continued maintenance of all airport pavements. Maintaining the pavement also involves remarking the runways, taxiways and aprons.

M-8 Environmental Assessment

An Environmental Assessment is necessary for several projects in the Long-Term Development Phase. These projects are the Runway 6 and 24 Extensions; and land acquisition for future development north of the airport.



Long-term Development Projects – Phase III (11-20 Years)

Table 6-4: Long-term Development Projects and Costs Estimates 11-20 Years

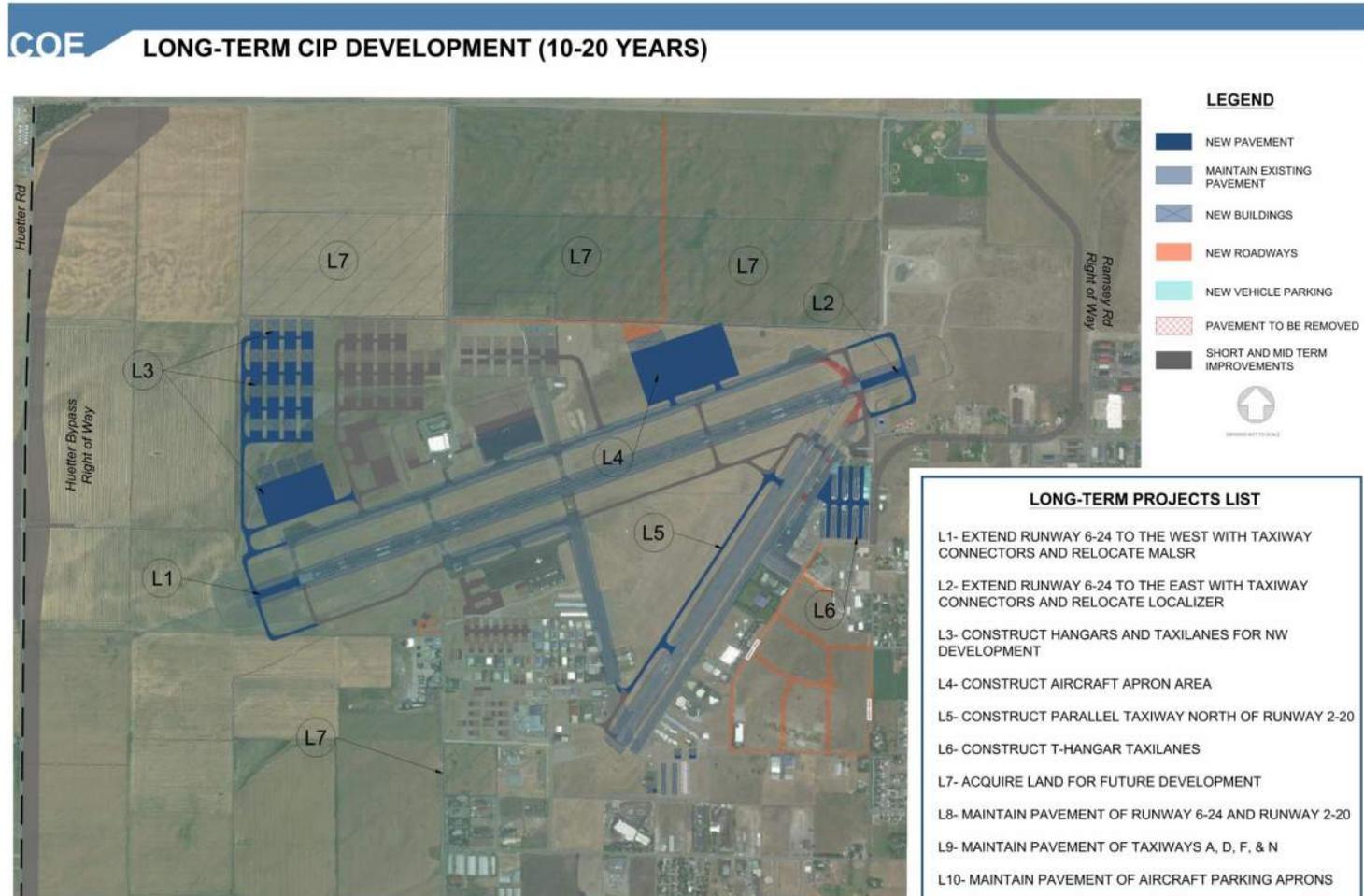
PROJECT		Development Category	FUNDING SOURCE			TOTAL PROJECT COST
ID	DESCRIPTION		FEDERAL (90%)	STATE (2.5%)	LOCAL (7.5%)	
L-1	Extend Runway 6 with Taxiway Connectors and MALSR Relocation	Demand, Safety	\$6,192,000	\$172,000	\$516,000	\$6,880,000
L-2	Extend Runway 24 with Taxiway Connectors and Localizer Relocation	Demand, Safety	\$4,689,000	\$130,250	\$390,750	\$5,210,000
L-3	Construct Hangar Taxilanes and Apron in NW Development Area	Demand, Business Opportunities	\$1,962,000	\$54,500	\$163,500	\$2,180,000
L-4	Construct Aircraft Parking Apron North of Midfield R/W 6-24 (Terminal Area)	Demand, Business Opportunities	\$7,299,000	\$202,750	\$608,250	\$8,110,000
L-5	Construct North Parallel Taxiway for Runway 2-20	Demand, Safety	\$2,286,000	\$63,500	\$190,500	\$2,540,000
L-6	Construct T-Hangar Development Area near Runway 20 End	Demand, Business Opportunities	\$828,000	\$23,000	\$69,000	\$920,000
L-7	Land Acquisition – Future Development Area (238 acres)	Business Opportunities, Demand	\$4,926,600	\$136,850	\$410,550	\$5,474,000
L-8	Pavement Maintenance on Runways	Maintenance	\$675,000	\$18,750	\$56,250	\$750,000
L-9	Pavement Maintenance on Taxiways	Maintenance	\$315,000	\$8,750	\$26,250	\$350,000
L-10	Pavement Maintenance on Aircraft Parking Aprons	Maintenance	\$279,000	\$7,750	\$23,250	\$310,000
LONG-TERM TOTAL			\$29,451,600	\$818,100	\$2,454,300	\$32,724,000

Source: T-O Engineers, Inc.

Note: All estimates are in 2018 dollars.



Exhibit 6-5: Long-term Development Projects and Costs Estimates 11-20 Years



Refer to the following descriptions, **Table 6-4**, and **Exhibit 6-5** for location of proposed projects in the Long-Term.

L-1 Construct Taxilanes for Northwest Development Area

This project will consist of extending Runway 6 to the west by 600-feet and relocating the MALSR Approach Lighting System. Other items to be constructed with this runway extension include parallel Taxiways F and N, associated connector Taxiways, relocate PAPI-4 and adjust or relocate Glide Slope antenna.

L-2 Extend Runway 24 with Taxiway Connectors and Localizer Relocation

This project will consist of Runway 24 extension by 600-feet to the east. Runway extension involves relocating the Localizer Antenna and extending the taxiways to connect to the Runway 24 end.

L-3 Construct Hangar Taxilanes and Apron for Northwest Development Area

This project will extend taxilanes for future Group III Size hangars. Development also allows space for another FBO type operation similar to Empire Airlines

L-4 Construct Aircraft Parking

The Aircraft Parking Apron will serve the future Terminal Area.

L-5 Construct North Parallel Taxiway for Runway 2-20

This project involves constructing a Group II North Parallel Taxiway to Runway 2-20 with associated connectors.

L-6 Construct T-Hangar Development Area near Runway 20 End

This project will open-up space for future T-Hangar Construction and small aircraft storage sites.

L-7 Land Acquisition – Future Development Area (238 Acres)

Land Acquisition is necessary for preserving space for future growth and protection of the airport.

L-8, L-9, L-10 Pavement Maintenance on Runways, Taxiways, and Aprons

This project will consist of seal coat for continued maintenance of all airport pavements. Maintaining the pavement also involves remarking the runways, taxiways and aprons.

The Coeur d'Alene Airport Management plans to perform in-kind work as grant match for some of the above referenced projects. Types of in-kind activities include stripping sites and preparing subgrade.



COST ESTIMATE SUMMARY

The total CIP proposes approximately \$51,504,000 million in Airport development needs, of which approximately \$47 million will be federal grants and the rest will be completed using local funding. It is important to reiterate that the development plan (and the Master Plan Update process in general) is a 20-year plan created using present day information and variables relevant at the time of its drafting. The funding and CIP process changes occasionally as the airport needs are updating. To be successful, Kootenai County must work very closely with FAA and ITD to schedule the projects presented in this ALP Update into the Federal CIP when appropriate and revise the plan as circumstances at the airport warrant.

CAPITAL IMPROVEMENT FUNDING

This section describes the funding sources available to Kootenai County to fund the proposed projects included in the development plan. As previously noted, the FAA's AIP is expected to be the primary source of funding for all eligible projects. The FAA, ITD, local, and other funding sources will be described in greater detail below.

FAA FUNDING

The current FAA funding program, known as the Airport Improvement Program (AIP), was initially established by the Airport and Airway Improvement Act of 1982. Since 1982, the AIP program has been reauthorized and appropriated on a on-going basis. Funding for this program is in a dedicated Trust Fund with revenues generated from a tax on airline tickets, freight waybills, international departure fees, a tax on general aviation fuel, and a tax on aviation jet fuel. This is a user fee-based program.

Current FAA legislation funds eligible airports and eligible projects up to a maximum of 90% of total project costs for general aviation airports. Coeur d'Alene Airport is an eligible airport and has received FAA funds for multiple previous projects. Recent project funding has been at the 90% level for General Aviation Airports. The remaining 10% of capital construction costs are required to come from State and local sources.

FAA State Apportionment (ST) funding is formulated for each of the 50 states. ST funding is a discretionary fund available to all eligible Non-Primary airports in Idaho. State Apportionment funding is typically reserved for large scale, high priority projects. It is anticipated that ST funding will be necessary to complete some or most of the projects included in the proposed development plan. As noted above, ST funds are often combined with Non-Primary Entitlement (NPE) funds to accomplish larger projects. ITD provides the FAA with input as to the use of ST funds at eligible airports in Idaho, but FAA determines which airports receive ST project funding.



FAA Discretionary (DI) funding is typically reserved for high cost, high priority projects at primary airports and large General Aviation Reliever airports. Such projects and airports compete for Discretionary funds on a national and regional basis. It is anticipated DI funding may be necessary to complete several projects.

IDAHO TRANSPORTATION DEPARTMENT (ITD) FUNDING

State project funding is available from ITD Division of Aeronautics. According to ITD, the Idaho Airport Aid Program (IAAP) provides for the discretionary allocation of state grant funds to Idaho airport owners. Only public entities are eligible to participate in the IAAP. The funds are collected from Idaho's Aviation fuel tax. The primary goal of the allocation program is to further the development of a statewide system and fair distribution of aviation tax money.

Idaho Airport Debt Amendment

In November 2010, Idaho voters approved a new constitutional amendment The Idaho Airport Debt Amendment, also known as House Joint Resolution 5 (HJR 5). The Idaho Constitution now allows local governments that operate airports to issue revenue bonds and special facility bonds improve facilities, equipment and acquisitions such as real property so long as those debts are paid back exclusively through airport revenues.

LOCAL FUNDING

Local funds come from income resulting from the operation of the airport itself, or contributions by the sponsoring agency (or agencies) of the airport from general or other funds. Local funds are typically used for FAA AIP grant local match requirements and to fund airport operations; including administration, maintenance, or other projects not eligible for FAA or State funding support. FAA Grant Assurance #25 requires revenue generated by the airport be expended to for the capital or operating costs of the airport.

Airport Revenues

An airport's revenues are collected through of variety rates and charges. These revenues are set and maintained by the airport specifically. It is recommended that airports establish and proactively maintain rates and charges.

Bonding

Bonding is a common way in which airports can fund large scale projects. A bond is a fixed income investment in which an investor loans money to an entity, for a defined period at a variable or fixed interest rate.



Leasehold Financing

Leasehold financing is when a developer or tenant finances improvements under a long-term lease. The benefits of leasehold financing are it relieves the airport of responsibility of having to raise capital for the project. A common example of this is when an FBO will develop a new hanger and charging fair market lease rates, while paying the airport for a ground lease.

Non-Aeronautical Development

In addition to traditional aeronautical development revenues, an airport can permit non-aeronautical land use development. The developer then pays the monthly lease rate and constructs the facility. Non-aeronautical development must be approved by ITD and the FAA for use of airside facilities.

Special Events

Airports can also generate revenue by allowing special events on airport property. Examples are car shows, video productions, airshows, and trade shows. This type of revenue generation must be reviewed and approved by ITD and the FAA.

General Fund

COE is supported by the Kootenai County General Fund. Each year, varying funds are granted to the airport that assist with local contributions for CIP projects. While the specific percentage changes each year, the general fund is a source of capital for local contributions.

AIRPORT GRANT HISTORY

Receipt of airport improvement grants is one source of funding for capital projects at the airport. Such grants are the backbone for capital improvement/development and maintenance projects. Kootenai County and COE have received grants from the FAA AIP fund and ITD Aeronautics IAAP for such projects. Since 2005, COE has received over \$15 million from the FAA AIP for capital improvement projects. **Table 6-6** summarizes these federal grants.



Table 6-6: COE Federal Grant History

Fiscal year	Federal	Local	Work Description
2005	\$28,500	\$750	Conduct Airport Master Plan Study
2005	\$2,650,000	\$69,736	Construct Apron, Construct Taxiway, Install Perimeter Fencing
2006	\$1,876,210	\$49,373	Construct Apron
2007	\$300,000	\$7,894	Extend Taxiway, Install Perimeter Fencing
2008	\$558,000	\$53,222	Extend Taxiway, Install Perimeter Fencing, Rehabilitate Taxiway
2009	\$1,021,232	26,874	Construct Taxiway, Install Perimeter Fencing
2010	\$122,100	\$3,213	Construct Aircraft Rescue & Fire Fighting Building
2010	\$425,000	\$11,184	Collect airport data for Airports Geographic Information System
2010	\$450,500	\$11,855	Acquire Snow Removal Equipment
2011	\$200,000	\$5,263	Rehabilitate Runway - 01/19, Rehabilitate Taxiway
2011	\$361,926	\$95,243	Airport Master Plan
2011	\$1,228,532	\$32,329	Construct Aircraft Rescue & Fire Fighting Building
2012	\$2,746,355	\$72,272	Install NAVAIDS, rehabilitate both Runways/Rehabilitate Twy
2013	\$125,000	\$7,291	Wildlife Hazard Assessments
2013	\$262,687	\$21,890	Rehabilitate Apron, Rehabilitate Taxiway
2013	\$300,000	\$17,500	Sustainable Management Plan
2014	\$163,164	\$9,971	Conduct Environmental Study, Rehabilitate Apron
2015	\$607,303	\$37,112	Install Perimeter Fencing, Rehabilitate Apron
2016	\$461,927	\$28,228	Rehabilitate Taxiway, Rehabilitate Taxiway
2016	\$559,312	\$34,180	Acquire Land for Approaches
2017	\$568,178	\$34,721	Update Airport Master Plan Study

Source: Faa.gov

CURRENT FISCAL POLICY

The following section is a summary of the current fiscal policy at COE and how the Airport is positioned to operate within its forecasted development.

Revenue and Expenses

Airport operating revenues are collected at COE from various sources. Airport revenues are used to pay expenses, which at COE include utilities, maintenance, and grant match. Airport revenues come primarily from hangar rent and ground lease fees. These fees are steady and can be indexed for inflation. **Table 6-7** summarizes the revenue and expenses at COE since the previous Master Plan.



Table 6-7: Coeur d'Alene Airport Revenues/Expenses since previous Master Plan

	2012	2013	2014	2015	2016	2017
Revenues	\$817,770	\$808,045	\$815,447	\$1,003,685	\$1,588,460	\$1,032,900
Other Sources (total)	-	\$10,517	\$18,107	\$522,033	(\$439,829)	\$32,054
Funds at Beginning of Year	\$400,610	\$494,317	\$341,673	\$425,832	\$425,041.00	\$536,412
Expenses	\$724,063	\$971,206	\$749,395	\$1,526,509	\$1,058,874	\$1,043,340
Profit/Loss	\$494,317	\$341,673	\$425,832	\$425,041	\$514,798	\$558,026

Source: Kootenai County CAFR

Rates and Charges

With nearly 87,000 operations, and 262 based aircraft, COE in a strong position to collect beneficial revenues from its rates and charges for lease property, fuel flowage fees, and sewer fees. **Table 6-8** summarizes the posted rates and charges at COE. It is recommended that the airport continue to proactively offer fair market rates and charges. Additionally, it is recommended that the airport enforce its rates and charges to provide fair market values of airport assets.

Table 6-8: COE Rates and Charges

	Amount	Note
Lease Rate - per sq. ft. per. Yr.		
Private – Aeronautical	\$0.20	
Commercial – Aeronautical	\$0.25	
Non-Aeronautical	\$0.50	
County T-Hanger Month Rental	\$175.00	
ARFF	\$250.00	Per Event
Lease Application Fee	25% of 1st yr. rent	
Lease change administrative fee	\$200.00	
Sewer Use Fee	\$37.50	
Sewer Hook Up Fee	\$3,033.00	
Fuel Flowage Fee		
100LL	\$0.07	per gallon
Jet A	\$0.09	per gallon
Self-fueling Fee	\$100.00	per year
Commercial Fueling Permit Fee	\$1,000.00	per year
Airport Use Permit Fee (Itinerant Mechanics)	\$500.00	per year
Staff Costs	\$90.00	Per Hour
Driver's Training Fee		
Initial FBO Fee	\$500.00	
Renewal FBO Fee	\$300.00	
Individual Test & Permit	\$20.00	
Re-test Fee	\$20.00	
Individual Renewal Fee	\$10.00	

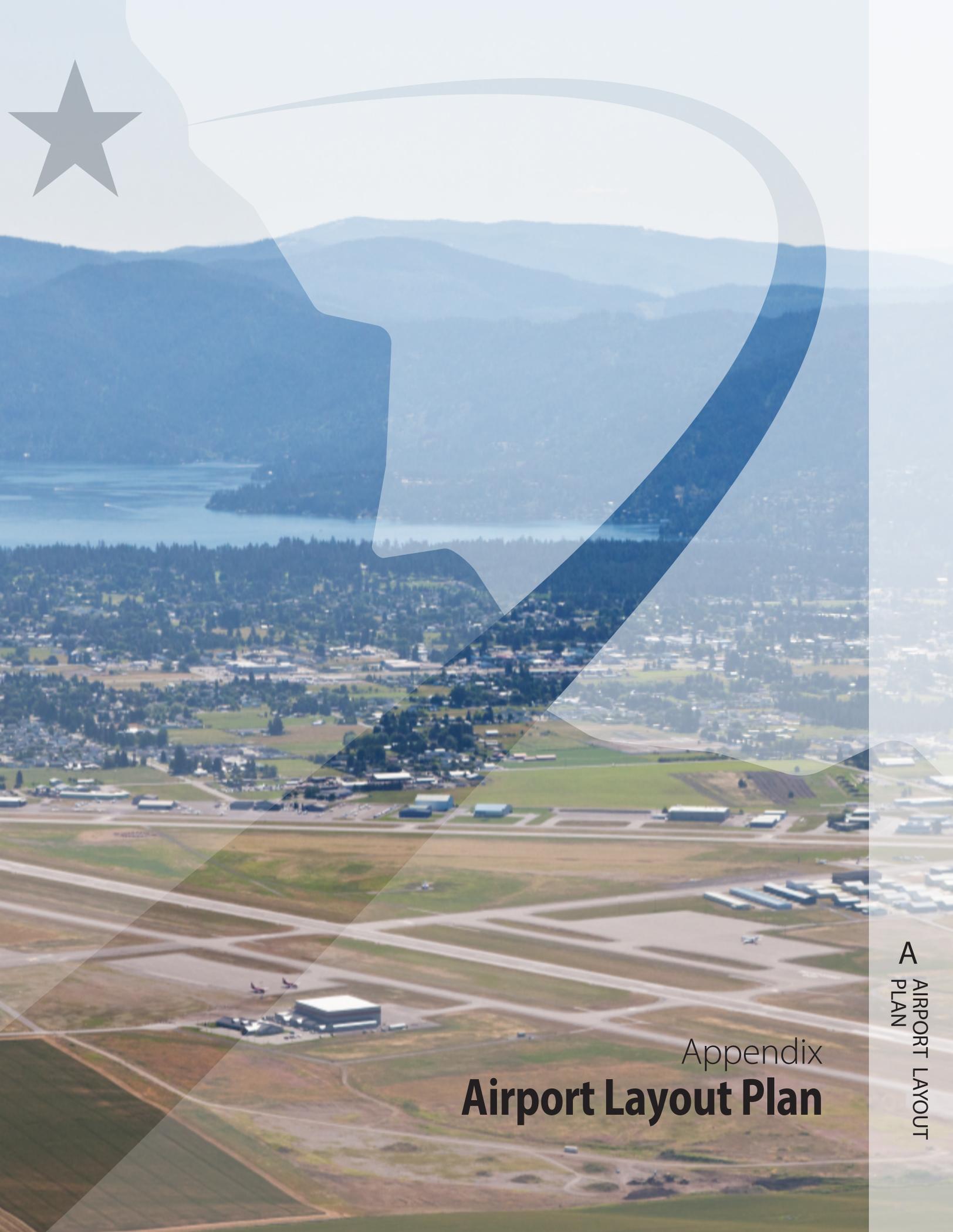
Source: COE website



SUMMARY

This chapter presents an implementation plan for recommended airport improvements including project descriptions and estimated costs. Some projects are needed to correct non-standard deficiencies in existing facilities ability to provide infrastructure for existing users; while other projects are driven by anticipated demand. Revenue sources for financing of projects are also reviewed. The FAA/AIP grant program has been and will remain the primary source for funding eligible facility improvements. The applicability of the AIP Grants to all desired airport improvements must be applied for compliance with grant assurances and eligibility. Some components of aircraft hangar development such as access roads, utilities and the hangars are not AIP eligible and will require a private funding source or some form of a private/public partnership to finance.





Appendix
Airport Layout Plan

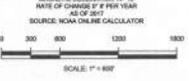
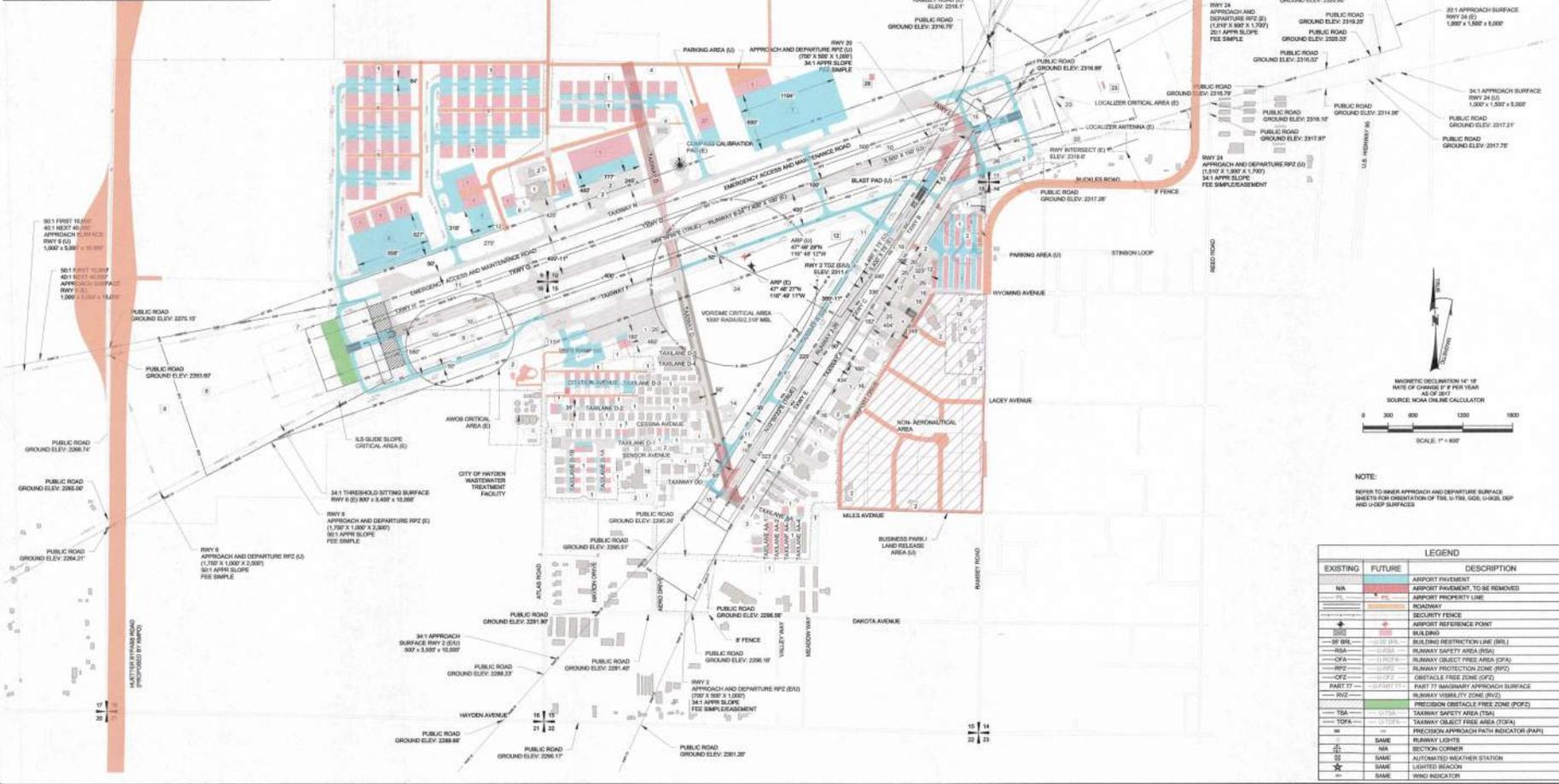
A
AIRPORT LAYOUT
PLAN

BUILDINGS AND FACILITIES		
CURRENT	ULTIMATE	DESCRIPTION
○	□	EMBARCADERO
○	□	OFFICE BUILDING
○	□	WATER RESERVOIR
○	□	FIRE TRAINING FACILITY
○	□	APRY BUILDING
○	□	STORAGE BAY
○	□	WALKER EQUIPMENT BUILDING
○	□	WALKER
○	□	LS SLIDE SLOPE ANTENNA / AWOS
○	□	FAIR
○	□	WIND CONE / SEGMENTED CIRCLE
○	□	ELECTRICAL CONTROL BUILDING
○	□	SCHEMATIC LIFT STATION
○	□	PUBLIC FACILITY
○	□	REL.
○	□	VEHICLE PARKING
○	□	FRS
○	□	TERMINAL BUILDING
○	□	MAINTENANCE BUILDING
○	□	ROTATING BEACON
○	□	GA TERMINAL / ADMINISTRATION BUILDING
○	□	LOCAL USER EQUIPMENT BUILDING
○	□	LOCAL USER ANTENNA
○	□	LOCAL USER EQUIPMENT BUILDING (TO BE DECOMMISSIONED)
○	□	WARRANTY PARTS / TROUBLE SHOOT
○	□	HELICOPTER PAD
○	□	USE / GA TERMINAL / ADMINISTRATION BUILDING
○	□	CONTROL TOWER

APRON DATA TABLE		
EXISTING	ULTIMATE	DIMENSIONS / SQUARE FOOTAGE
○	□	867' X 100' 15,000
○	□	777' X 240' / 98,386, 177' X 487' 391,358
○	□	424' X 100' 42,400
○	□	404' X 200' 80,800
○	□	380' X 200' 76,000
○	□	1,146' X 200' 229,200
○	□	310' X 270' 83,700

FAA APPROVAL STAMP

CONDITIONALLY APPROVED
 Per our letter dated 6-7-19
 Signed: [Signature]
 Date: 6-7-19
 Hilary Aspinen District Office
 Federal Aviation Administration
 Airport Approval Div. 7-55-19
 Amdt/Chg. No. 2019-04-01-1515-A-CA



NOTE:
 REFER TO OTHER APPROACH AND DEPARTURE SURFACE SHEETS FOR ORIENTATION OF TBL, U-FW, GDL, U-GDL, DEP AND U-DEP SURFACES

LEGEND		
EXISTING	FUTURE	DESCRIPTION
NA	APR	AIRPORT PAVEMENT TO BE REMOVED
APR	APR	AIRPORT PAVEMENT
APR	APR	AIRPORT PROPERTY LINE
APR	APR	ROADWAY
APR	APR	SECURITY FENCE
APR	APR	SECURITY FENCE POINT
APR	APR	BUILDING
APR	APR	BUILDING RESTRICTION LINE (BRL)
APR	APR	BLANKET SAFETY AREA (BSA)
APR	APR	OBSTACLE FREE AREA (OFA)
APR	APR	BLANKET PROTECTION ZONE (BPZ)
APR	APR	OBSTACLE FREE ZONE (OFZ)
APR	APR	PART 77 MAINTENANCE APPROACH SURFACE
APR	APR	BLANKET SAFETY AREA (BSA)
APR	APR	PRECISION APPROACH FREE ZONE (PAFZ)
APR	APR	TAXIWAY SAFETY AREA (TSA)
APR	APR	TAXIWAY OBJECT FREE AREA (TOFA)
APR	APR	PRECISION APPROACH PATH INDICATOR (PAPI)
APR	APR	BLANKET SAFETY AREA (BSA)
APR	APR	SECTION CORNER
APR	APR	AUTOMATED WEATHER STATION
APR	APR	LIGHTED WEATHER
APR	APR	WIND INDICATOR

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 BOISE & COEUR D'ALENE OFFICES
 MONTANA & WYOMING OFFICES

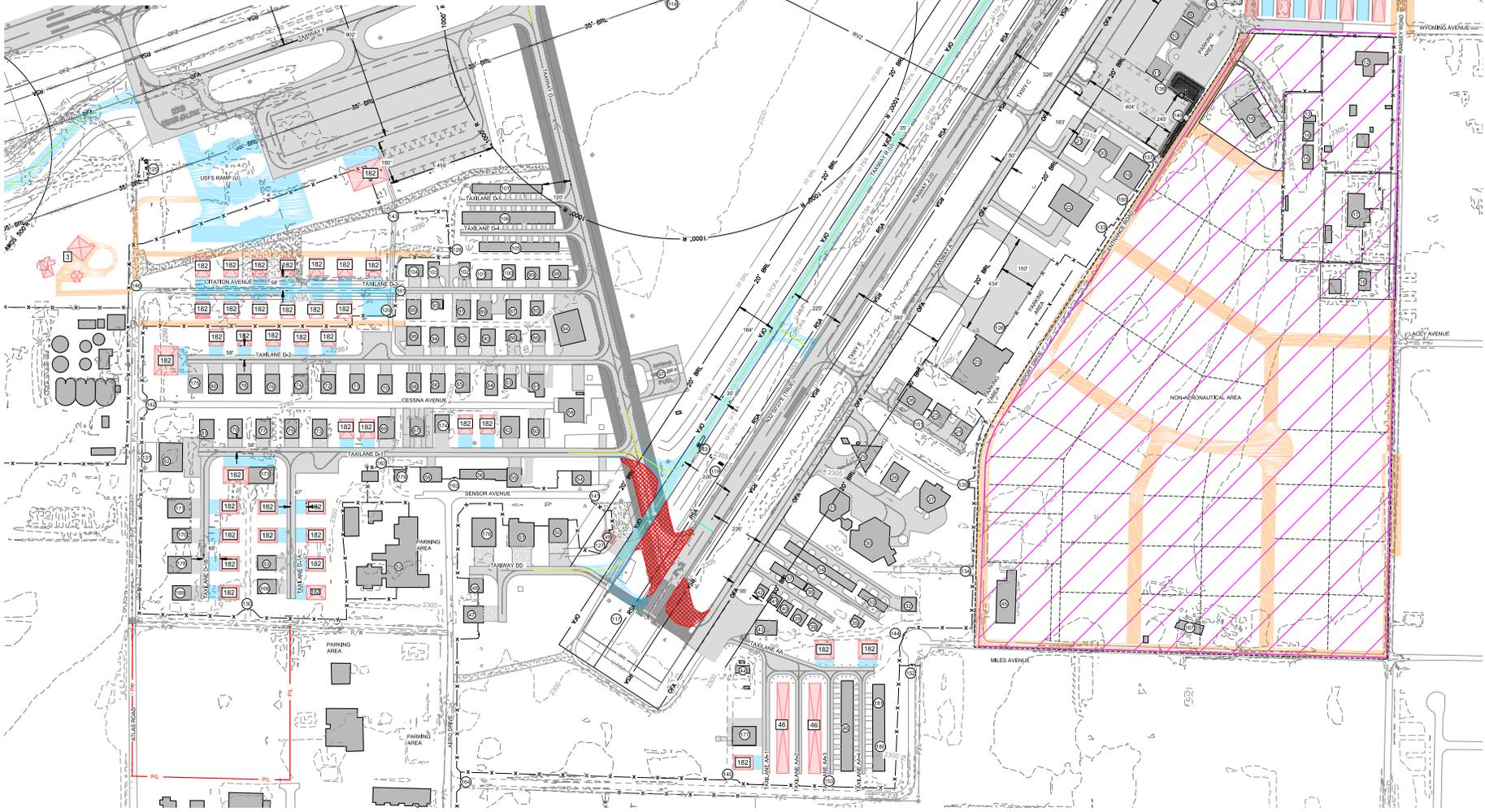
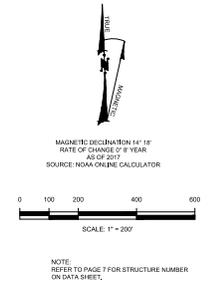
COEUR D'ALENE AIRPORT
HAYDEN, IDAHO
AIRPORT LAYOUT PLAN SET
AIRPORT LAYOUT PLAN DRAWING

DATE: MARCH 2019
 PROJ. NO.: 190001
 SHEET 02 OF 23

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EXISTING	FUTURE	LEGEND	DESCRIPTION
N/A	ARROW	ARROW	ARROW PAVEMENT, TO BE REMOVED
PL	PL	PL	ARROW PROPERTY LINE
X	X	X	ROADWAY
X	X	X	SECURITY FENCE
ARROW	ARROW	ARROW	ARROW REFERENCE POINT
BR	BR	BR	BUILDING
BR	BR	BR	BUILDING RESTRICTION LINE (BRL)
RS	RS	RS	RUNWAY SAFETY AREA (RSA)
RF	RF	RF	RUNWAY OBSTACLE FREE AREA (OFA)
RPZ	RPZ	RPZ	RUNWAY PROTECTION ZONE (RPZ)
OFZ	OFZ	OFZ	OBSTACLE FREE ZONE (OFZ)
RVZ	RVZ	RVZ	RUNWAY VERBLY ZONE (RVZ)
PT 77	PT 77	PT 77	PART 77 IMAGINARY APPROACH SURFACE
TS	TS	TS	THRESHOLD STRIP SURFACE (TS)
CS	CS	CS	CLEAR PATH QUALIFICATION SURFACE (CQS)
POFZ	POFZ	POFZ	PRECISION OBSTACLE FREE ZONE (POFZ)
LSA	LSA	LSA	LANeway SAFETY AREA (LSA)
TOFA	TOFA	TOFA	TAXIWAY OBSTACLE FREE AREA (TOFA)
PAPI	PAPI	PAPI	PRECISION APPROACH PATH INDICATOR (PAPI)
SC	SC	SC	SECTION CORNER
AS	AS	AS	AUTOMATED WEATHER STATION
MS	MS	MS	MOUNTED SIGN
MI	MI	MI	MIND INDICATOR



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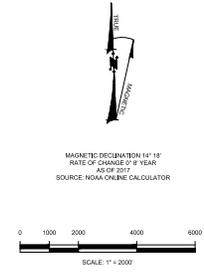
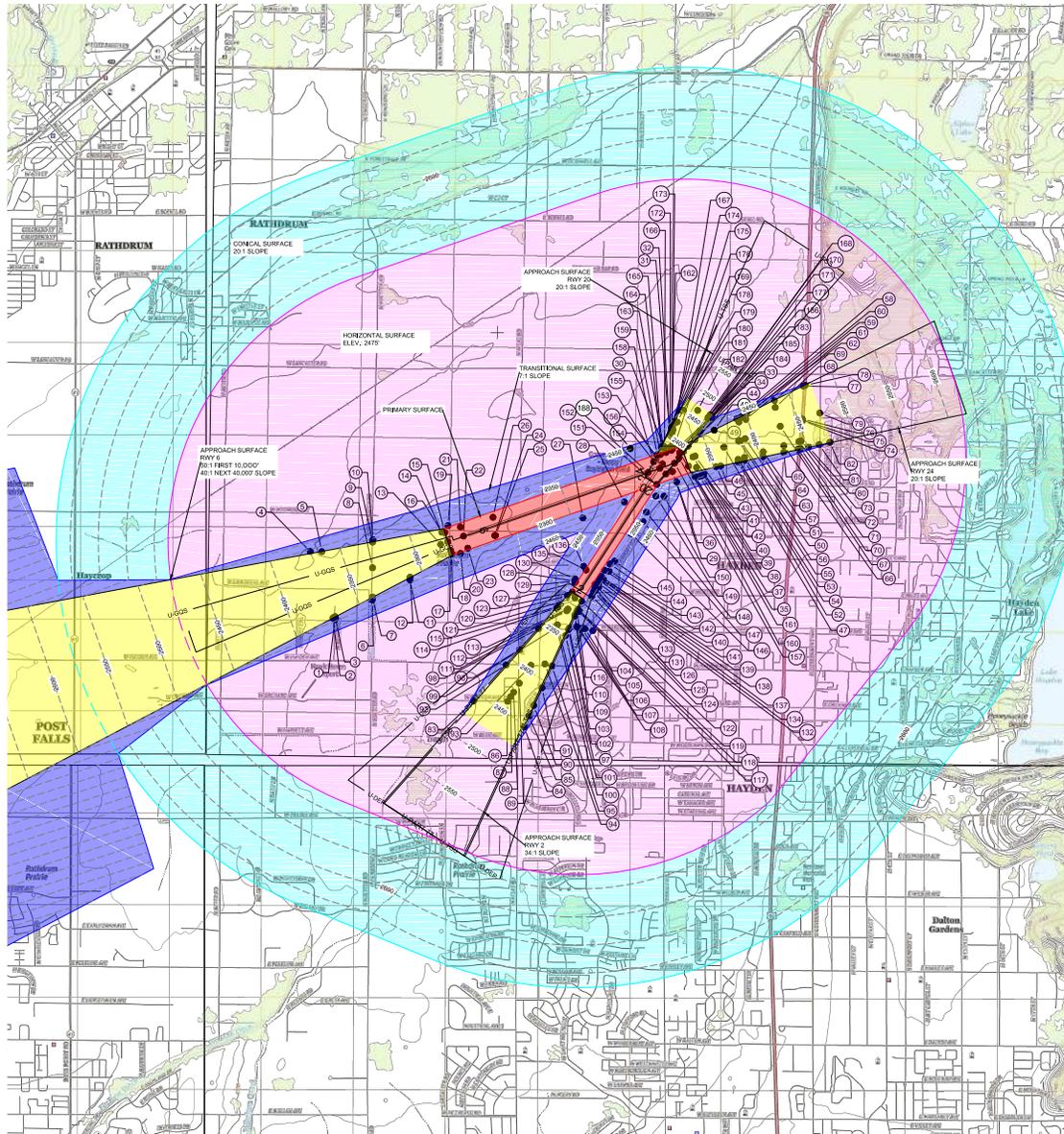
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PROJECT: 190281
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COEUR D'ALENE AIRPORT
HAYDEN, IDAHO
AIRPORT LAYOUT PLAN SET
TERMINAL AREA PLAN - WEST

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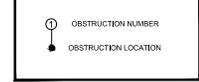
AIRPORT FACILITIES						AIRPORT FACILITIES						AIRPORT FACILITIES								
EXISTING	FUTURE	DESCRIPTION	HEIGHT (FT)	TOP ELEVATION (FT)	OBSTRUCTION	OBSTRUCTION MARKINGS	EXISTING	FUTURE	DESCRIPTION	HEIGHT (FT)	TOP ELEVATION (FT)	OBSTRUCTION	OBSTRUCTION MARKINGS	EXISTING	FUTURE	DESCRIPTION	HEIGHT (FT)	TOP ELEVATION (FT)	OBSTRUCTION	OBSTRUCTION MARKINGS
0		LOCALIZER EQUIPMENT BUILDING	10	2328	NO		0		CONVENTIONAL HANGAR	37	2337	NO		0		OFFICE BUILDING - CDA TRAP CLUB	16	2323	NO	
0		OFFICE BUILDING - HUMANE SOCIETY	18	2329	NO	TO BE REMOVED	0		CONVENTIONAL HANGAR	25	2323	NO		0		CORPORATE HANGAR	30	2329	NO	
0		OFFICE BUILDING - U.S. FOREST SERVICE	24	2336	NO		0		CORPORATE HANGAR	22	2322	NO		0		CORPORATE HANGAR	40	2326	NO	
0		CORPORATE HANGAR	16	2329	NO		0		CONVENTIONAL HANGAR	28	2325	NO		0		CORPORATE HANGAR	255	2324	NO	
0		CONVENTIONAL HANGAR	29	2342	YES	OBSTRUCTION LIGHT	0		CORPORATE HANGAR	23	2323	NO		0		CORPORATE HANGAR	40	2322	NO	
0		OFFICE BUILDING - LAMES HIGHWAY DISTRICT	26	2337	NO		0		CONVENTIONAL HANGAR	24	2322	NO		0		ARFF BUILDING	32	2324	NO	
0		CORPORATE HANGAR - RESORT AVIATION	26	2346	NO		0		CORPORATE HANGAR	30	2330	NO		0		CORPORATE HANGAR	40	2321	NO	
0		CORPORATE HANGAR	27	2340	NO		0		CORPORATE HANGAR	28	2325	NO		0		CORPORATE HANGAR	40	2326	NO	
0		FBO - RESORT AVIATION	21	2332	NO		0		CORPORATE HANGAR	29	2328	NO		0		CORPORATE HANGAR	40	2321	NO	
0		TERMINAL BUILDING - RESORT AVIATION	34	2343	NO		0		CORPORATE HANGAR	20	2317	NO		0		CORPORATE HANGAR	40	2340	NO	
0		FBO - RESORT AVIATION	22	2330	NO		0		CONVENTIONAL HANGAR	27	2336	NO		0		CORPORATE HANGAR	40	2324	NO	
0		OFFICE BUILDING - U.S. ARMY RESERVE	20	2329	NO		0		CORPORATE HANGAR	28	2324	NO		0		SELF HANGAR	33	NO		
0		MAINTENANCE BUILDING - AIRPORT	18	2324	NO		0		CORPORATE HANGAR	29	2327	NO		0		VAN BATAVIA HANGAR	35	NO		
0		STORAGE SHED - AIRPORT	13	2319	NO		0		FUELING FACILITY	20	2324	NO		0		CORPORATE HANGAR	40	NO		
0		OFFICE BUILDING - AIRPORT	22	2338	NO		0		CONVENTIONAL HANGAR	24	2323	NO		0		CORPORATE HANGAR	40	NO		
0		OFFICE BUILDING - PANHANDLE AREA COUNCIL	25	2332	NO		0		CONVENTIONAL HANGAR	22	2319	NO		0		CORPORATE HANGAR	25	NO		
0		OFFICE BUILDING - PARKS AND WATERWAYS	26	2331	NO		0		CONVENTIONAL HANGAR	35	2333	NO		0		HANGAR	25	NO		
0		OFFICE BUILDING - SEARCH AND RESCUE	17	2323	NO		0		CONVENTIONAL HANGAR	23	2321	NO		0		PAINT FACILITY	40	NO		
0		CORPORATE HANGAR	53	2359	NO		0		CONVENTIONAL HANGAR	21	2318	NO		0		FBO	40	NO		
0		CORPORATE HANGAR	25	2332	NO		0		CONVENTIONAL HANGAR	20	2317	NO		0		SHE / GA TERMINAL / ADMINISTRATION BUILDING	40	NO		
0		CORPORATE HANGAR	24	2332	NO		0		CONVENTIONAL HANGAR	21	2316	NO		0		ARR TRAFFIC CONTROL TOWER	130	NO		
0		CORPORATE HANGAR	40	2347	NO		0		CONDOMINIUM HANGARS	25	2322	NO		0						
0		OFFICE BUILDING - TRANSECTOR SYSTEMS	39	2346	NO		0		HANGARS	17	2313	NO		0						
0		CONVENTIONAL HANGAR	23	2328	NO		0		CONDOMINIUM HANGARS	17	2313	NO		0						
0		CORPORATE HANGAR	22	2328	NO		0		U.S. SLOPE ANTENNAWINGS	32	2309	YES		0						
0		CORPORATE HANGAR	24	2330	NO	REMOVAL OR ACQUISITION IF AVAILABLE	0		MALS EQUIPMENT BUILDING	10	2282	YES		0						
0		CORPORATE HANGAR	32	2334	NO		0		ELECTRICAL VAULT BUILDING	10	2289	NO		0						
0		CORPORATE HANGAR	26	2330	NO		0		STORAGE SHED - EMPIRE AIRLINES	12	2284	NO		0						
0		CORPORATE HANGAR - MACH AERO	20	2326	YES	OBSTRUCTION LIGHT / REMOVAL OR ACQUISITION IF AVAILABLE	0		CORPORATE HANGAR - EMPIRE AIRLINES	54	2337	NO		0						
0		CORPORATE HANGAR - MACH AERO	37	2339	NO		0		OFFICE BUILDING - EMPIRE AIRLINES	26	2308	NO		0						
0		OFFICE BUILDING - MACH AERO	34	2335	YES	OBSTRUCTION LIGHT / REMOVAL OR ACQUISITION IF AVAILABLE	0		VOR/DME EQUIPMENT BUILDING	12	2305	NO		0						
0		CONVENTIONAL HANGAR	31	2332	NO		0		FIRE TRAINING FACILITY	40	2332	NO		0						
0		T-HANGAR	14	2315	NO		0		RIBL	4	2324	YES		0						
0		T-HANGAR	17	2320	YES	OBSTRUCTION LIGHT / REMOVAL OR ACQUISITION IF AVAILABLE	0		RIBL	4	2307	YES		0						
0		CONVENTIONAL HANGAR	27	2328	NO		0		PAH 2	3	2318	YES		0						
0		T-HANGAR	20	2323	NO		0		PAH 2	3	2308	YES		0						
0		T-HANGAR	19	2322	YES	OBSTRUCTION LIGHT / REMOVAL OR ACQUISITION IF AVAILABLE	0		PAH 4	3	2282	YES		0						
0		CONVENTIONAL HANGAR	22	2325	NO		0		PAH 4	3	2312	YES		0						
0		CONVENTIONAL HANGAR	26	2329	NO		0		ELECTRICAL VAULT	9	2322	NO		0						
0		CONVENTIONAL HANGAR	23	2326	NO		0		LOCALIZER ANTENNA	8	2325	NO		0						
0		CONVENTIONAL HANGAR	24	2327	NO		0		MALS	2	2276	YES		0						
0		CONVENTIONAL HANGAR	21	2323	YES	TO REMAIN LIGHTED / REMOVAL OR ACQUISITION IF AVAILABLE	0		SEWERLIFT STATION	9	2289	NO		0						
0		CONVENTIONAL HANGAR - CIVIL AIR PATROL	23	2327	NO		0		AUTOMATED SECURITY GATE	8	2315	NO		0						
0		WATER RESERVOIR	14	2316	NO		0		AUTOMATED SECURITY GATE	8	2313	NO		0						
0		OFFICE BUILDING - BLUE WATER TECHNOLOGIES	25	2326	NO		0		AUTOMATED SECURITY GATE	8	2303	NO		0						
0		T-HANGAR	17	2315	NO		0		AUTOMATED SECURITY GATE	8	2305	NO		0						
0		CORPORATE HANGAR	34	2337	NO	OBSTRUCTION LIGHT	0		AUTOMATED SECURITY GATE	8	2312	NO		0						
0		CORPORATE HANGAR	30	2331	NO		0		AUTOMATED SECURITY GATE	8	2303	NO		0						
0		GA TERMINAL / ADMINISTRATION BUILDING	24	2329	YES	TO BE RELOCATED	0		AUTOMATED SECURITY GATE	8	2291	NO		0						
0		CORPORATE HANGAR	30	2333	NO		0		AUTOMATED SECURITY GATE	8	2317	NO		0						
0		CORPORATE HANGAR	37	2340	NO		0		AUTOMATED SECURITY GATE	8	2286	NO		0						
0		OFFICE BUILDING - WHITECH COMPOSITES	32	2335	NO		0		AUTOMATED SECURITY GATE	8	2311	NO		0						
0		CORPORATE HANGAR	29	2328	NO		0		AUTOMATED SECURITY GATE	8	2315	NO		0						
0		CORPORATE HANGAR - HELLPROP	30	2333	NO		0		AUTOMATED SECURITY GATE	8	2315	NO		0						
0		CORPORATE HANGAR - MAHEU ENGINEERING	32	2334	NO		0		AUTOMATED SECURITY GATE	8	2327	YES		0						
0		OFFICE BUILDING - MAHEU ENGINEERING	20	2322	NO		0		AUTOMATED SECURITY GATE	8	2289	NO		0						
0		ROTATING BEACON	30	2342	NO		0		AUTOMATED SECURITY GATE	8	2306	NO		0						
0		CORPORATE HANGAR	31	2332	NO		0		AUTOMATED SECURITY GATE	8	2311	NO		0						
0		CORPORATE HANGAR - PANHANDLE HELICOPTER	29	2331	NO		0		AUTOMATED SECURITY GATE	8	2300	NO		0						
0		CORPORATE HANGAR	25	2326	NO		0		AUTOMATED SECURITY GATE	8	2296	NO		0						
0		CORPORATE HANGAR	28	2330	NO		0		AUTOMATED SECURITY GATE	8	2307	NO		0						
0		CORPORATE HANGAR	26	2328	NO		0		AUTOMATED SECURITY GATE	8	2321	NO		0						
0		CORPORATE HANGAR	26	2327	NO		0		AUTOMATED SECURITY GATE	8	2297	NO		0						
0		CORPORATE HANGAR	23	2324	NO		0		MANUAL SECURITY GATE	8	2322	NO		0						
0		CORPORATE HANGAR	27	2327	NO		0		MANUAL SECURITY GATE	8	2320	NO		0						
0		CORPORATE HANGAR	26	2326	NO		0		MANUAL SECURITY GATE	8	2315	NO		0						
0		CORPORATE HANGAR	30	2329	NO		0		MANUAL SECURITY GATE	8	2316	NO		0						
0		CORPORATE HANGAR	25	2324	NO		0		MANUAL SECURITY GATE	8	2314	NO		0						
0		CORPORATE HANGAR	30	2330	NO		0		MANUAL SECURITY GATE	8	2287	NO		0						
0		CORPORATE HANGAR	29	2323	NO		0		MANUAL SECURITY GATE	8	2307	NO		0						
0		CORPORATE HANGAR	28	2324	NO		0		MANUAL SECURITY GATE	8	2322	NO		0						
0		CORPORATE HANGAR	27	2323	NO		0		MANUAL SECURITY GATE	8	2319	NO		0						
0		CORPORATE HANGAR	29	2327	NO		0		MANUAL SECURITY GATE	8	2315	NO		0						
0		CORPORATE HANGAR	30	2325	NO		0		MANUAL SECURITY GATE	8	2301	NO		0						
0		CORPORATE HANGAR	29	2325	NO		0		MANUAL SECURITY GATE	8	2294	NO		0						
0		CORPORATE HANGAR	27	2320	NO		0		MANUAL SECURITY GATE	8	2291	NO								



NOTES

1. LOOKUP AND OBSTRUCTION SOURCE DATA - USGS, FAA OEA(AADOP), NO GROUND SURVEY WAS CONDUCTED AS PART OF THE MASTER PLAN.
2. SEE SHEETS 9 THROUGH 17 FOR PROFILE VIEWS AND CLOSE-UP OBSTRUCTIONS.
3. TRAVERSE WAY ELEVATIONS INCLUDE THE TRAVERSE WAY ADJUSTMENT (22' FOR RAILROAD, 17' FOR HIGHWAY, 8' FOR FENCE, 12' FOR PUBLIC ROAD AND 10' FOR PRIVATE ROAD).
4. SURFACES CONFORM TO OPR PART 77 FOR ULTIMATE RUNWAY CONSTRUCTION.
5. ALL ELEVATIONS AND HEIGHTS ARE IN FEET.
6. OBSTRUCTIONS ARE SHOWN ONLY UP TO THE FIRST 2000' FROM END OF RUNWAYS.
7. OBSTRUCTION DATA NUMBER IS SHOWN ON TABLE SHEET 11.

OBSTRUCTION LEGEND



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	DESIGNED		
	DRAWN		
	CHECKED		
	APPROVED		

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**COEUR D'ALENE AIRPORT
 HAYDEN, IDAHO
 AIRPORT LAYOUT PLAN SET
 PART 77 (FULL VIEW)**

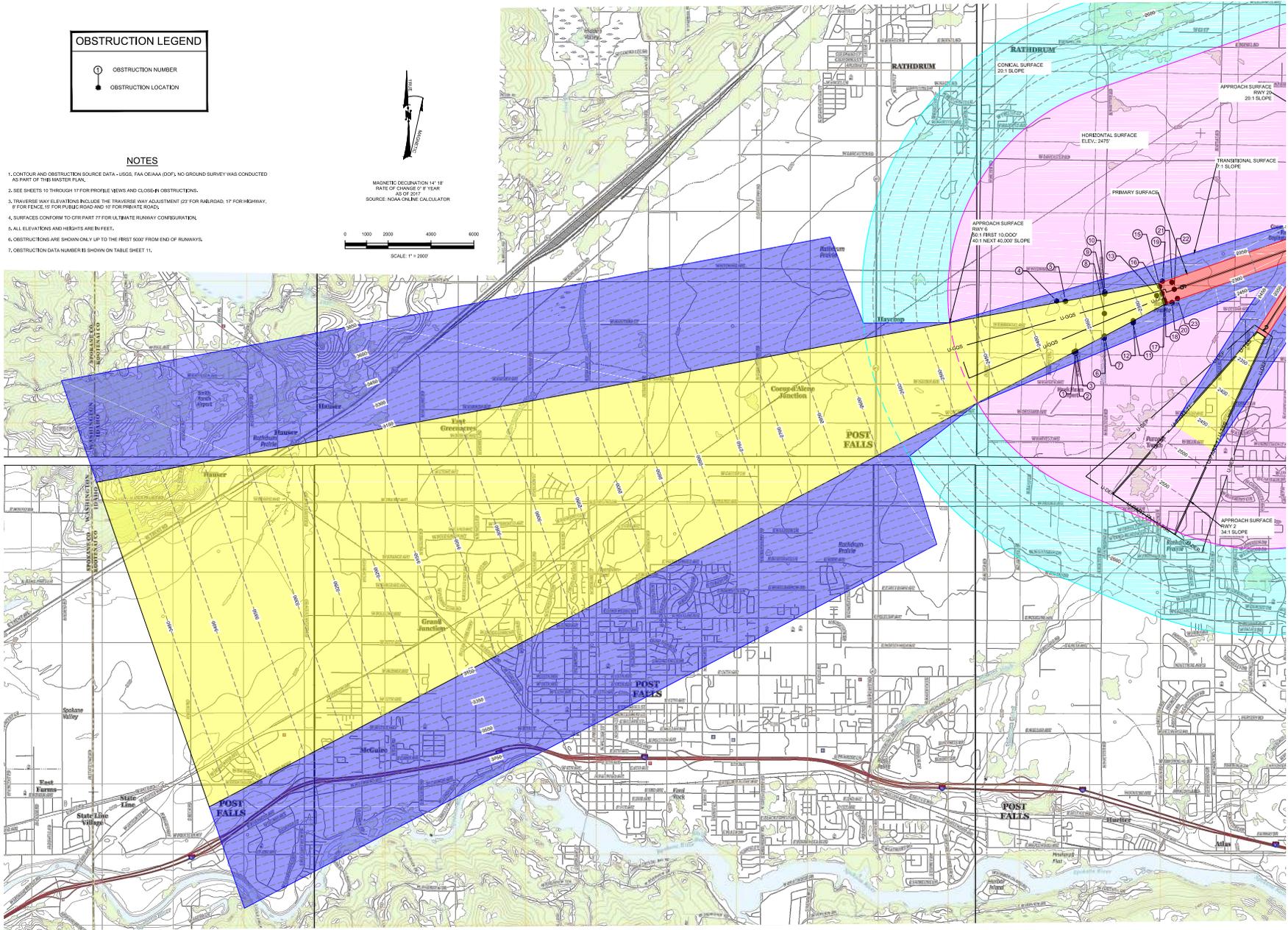
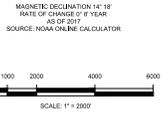
DATE: MARCH 2019
 PROJECT: 160281
 SHEET 08 OF 23

OBSTRUCTION LEGEND

-  OBSTRUCTION NUMBER
-  OBSTRUCTION LOCATION

NOTES

1. CONTOUR AND OBSTRUCTION SOURCE DATA - USGS, FAA DEAAA (DOPL) NO GROUND SURVEY WAS CONDUCTED AS PART OF THIS INSTRUMENT.
2. SEE SHEETS 10 THROUGH 17 FOR PROFILE VIEWS AND CLOSE-IN OBSTRUCTIONS.
3. TRAVERSE WAY ELEVATIONS INCLUDE THE TRAVERSE WAY ADJUSTMENT (23) FOR RAILROAD, 17 FOR HIGHWAY, 8 FOR FENCE, 17 FOR PUBLIC ROAD AND 17 FOR PRIVATE ROAD.
4. SURFACES CONFORM TO CH PART 77 FOR ULTIMATE RUNWAY CONFIGURATION.
5. ALL ELEVATIONS AND HEIGHTS ARE IN FEET.
6. OBSTRUCTIONS ARE SHOWN ONLY UP TO THE FIRST 500' FROM END OF RUNWAYS.
7. OBSTRUCTION DATA NUMBER IS SHOWN ON TABLE 11.



DATE	REVISIONS
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REVISED	
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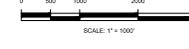
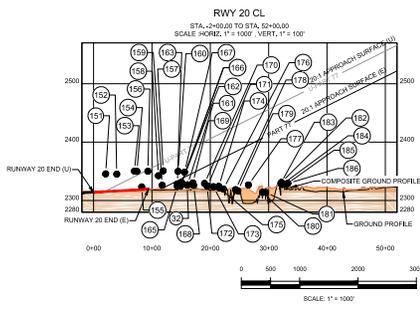
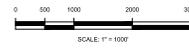
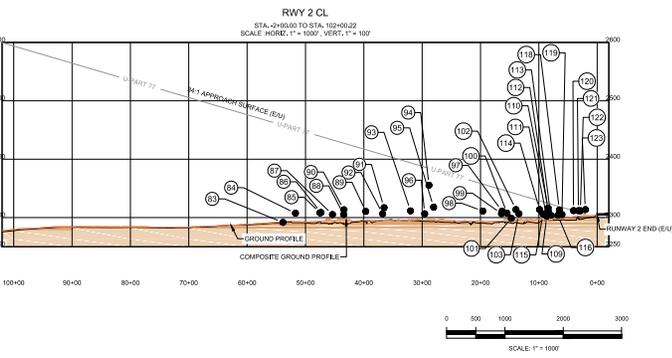
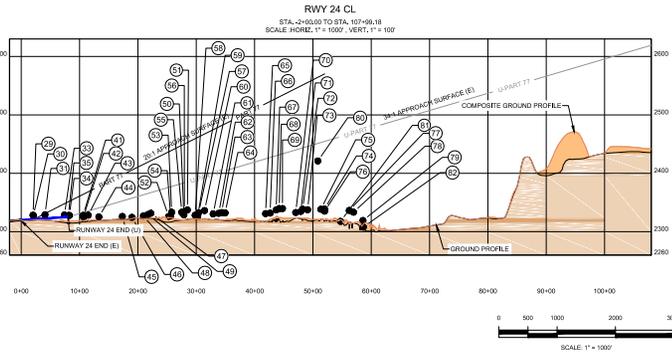
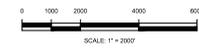
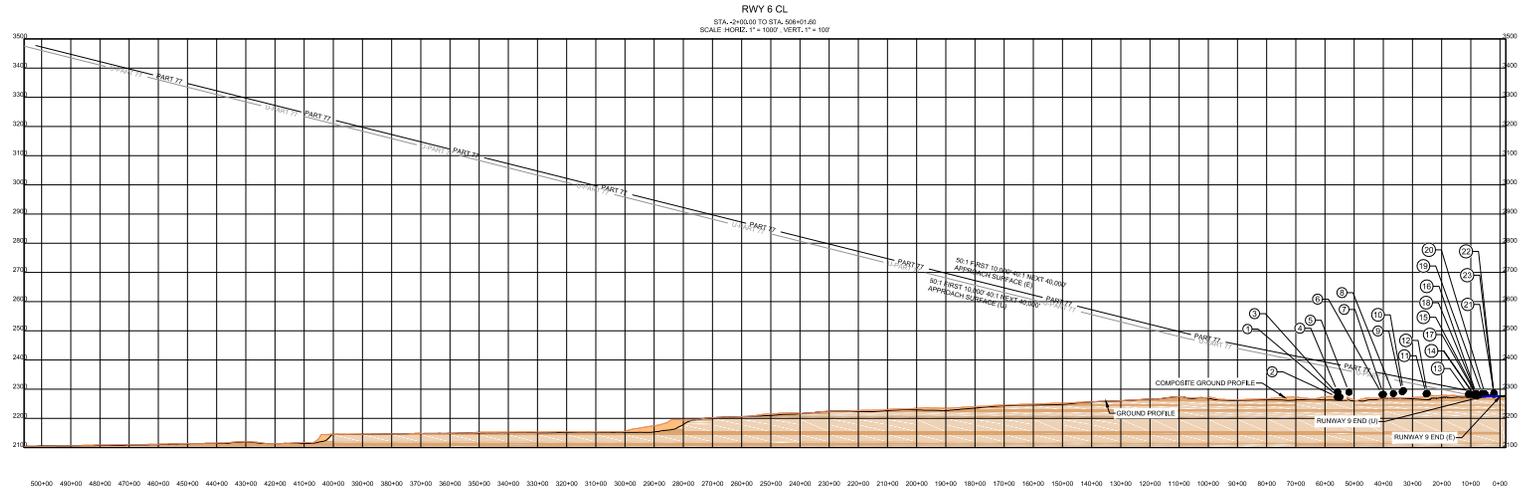
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**COEUR D'ALENE AIRPORT
 HAYDEN, IDAHO
 AIRPORT LAYOUT PLAN SET
 PART 77 PLAN - PRECISION APPROACH**

DATE: MARCH 2019
 PROJECT: 190281

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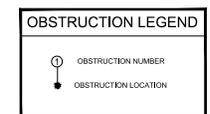
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MAGNETIC DECLINATION 11° 18'
RATE OF CHANGE 0° 8' YEAR
AS OF 2017
SOURCE: NOAA ONLINE CALCULATOR

NOTES

1. CONTOUR AND OBSTRUCTION SOURCE DATA - USGS, FAA ODEMA (DOT), NO GROUND SURVEY WAS CONDUCTED AS PART OF THIS MASTER PLAN.
2. TRAVERSE WAY ELEVATIONS INCLUDE THE TRAVERSE WAY ADJUSTMENT (23' FOR RAILROAD, 17' FOR HIGHWAY, 8' FOR FENCE, 15' FOR PRIVATE ROAD AND 10' FOR PUBLIC ROAD).
3. SURFACES CONFORM TO CFR PART 77 FOR ULTIMATE RUNWAY CONFIGURATION.
4. ALL ELEVATIONS AND HEIGHTS ARE IN FEET.
5. OBSTRUCTIONS ARE SHOWN ONLY UP TO THE FIRST 500' FROM END OF RUNWAYS.
6. AIRPORT ELEVATION = 2,303.3 FEET MSL
7. OBSTRUCTION DATA NUMBERS SHOWN ON TABLE SHEET 11.



DATE		DATE	
DESIGNED		DATE	
DRAWN		REVISIONS	
CHECKED		NO.	
BY			
APPROVED			

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**COEUR D'ALENE AIRPORT
HAYDEN, IDAHO
AIRPORT LAYOUT PLAN SET
PART 77 PLAN - RUNWAYS 6-24 & 2-20**

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PART 77 DATA TABLE										
ITEM NO.	DESCRIPTION	SURVEY	SURVEY DATE	GROUND ELEVATION	OBJECT ELEVATION (ft)	OBJECT HEIGHT (ft)	SURFACE PENETRATED	SURFACE ELEVATION	PENETRATION	EXISTING PROPOSED SEPARATION
1	PRIVATE ROAD	USGS	2018	20827	20728	99	NA	NA	NONE	NONE
2	PRIVATE ROAD	USGS	2018	20921	20921	0	NA	NA	NONE	NONE
3	PRIVATE ROAD	USGS	2018	20926	20926	0	NA	NA	NONE	NONE
4	PRIVATE ROAD	USGS	2018	20928	20928	0	NA	NA	NONE	NONE
5	PRIVATE ROAD	USGS	2018	20848	20848	0	NA	NA	NONE	NONE
6	PUBLIC ROAD	USGS	2018	20824	20824	0	NA	NA	NONE	NONE
7	PUBLIC ROAD	USGS	2018	20824	20824	0	NA	NA	NONE	NONE
8	PUBLIC ROAD	USGS	2018	20823	20823	0	NA	NA	NONE	NONE
9	PUBLIC ROAD	USGS	2018	20823	20823	0	NA	NA	NONE	NONE
10	PUBLIC ROAD	USGS	2018	20823	20823	0	NA	NA	NONE	NONE
11	PRIVATE ROAD	USGS	2018	20849	20849	0	NA	NA	NONE	NONE
12	PRIVATE ROAD	USGS	2018	20728	20728	0	NA	NA	NONE	NONE
13	PRIVATE ROAD	USGS	2018	20728	20728	0	NA	NA	NONE	NONE
14	PRIVATE ROAD	FAM DOP (2018)	2018	20728	20728	0	NA	NA	NONE	NONE
15	PRIVATE ROAD	USGS	2018	20817	20817	0	NA	NA	NONE	NONE
16	PRIVATE ROAD	USGS	2018	20816	20816	0	NA	NA	NONE	NONE
17	PRIVATE ROAD	USGS	2018	20723	20723	0	NA	NA	NONE	NONE
18	PRIVATE ROAD	USGS	2018	20824	20824	0	NA	NA	NONE	NONE
19	PRIVATE ROAD	USGS	2018	20824	20824	0	NA	NA	NONE	NONE
20	PRIVATE ROAD	USGS	2018	20824	20824	0	NA	NA	NONE	NONE
21	FENCE	USGS	2018	20821	20821	0	NA	NA	NONE	NONE
22	PRIVATE ROAD	USGS	2018	20824	20824	0	NA	NA	NONE	NONE
23	PRIVATE ROAD	USGS	2018	20724	20724	0	NA	NA	NONE	NONE
24	TOWER	USGS	2018	20729	2081	3121	PRIMARY RAY 240 (E)	20829	241	DESTRUCTION LIGHT
25	BLDG	FAM DOP (2018)	2018	20823	20823	0	PRIMARY RAY 240 (E)	20828	5	DESTRUCTION LIGHT
26	WINDSOCK	USGS	2018	20824	2081	2083	PRIMARY RAY 240 (E)	20829	1631	DESTRUCTION LIGHT
27	NAVAID	USGS	2018	20827	207	2079	NA	NA	NONE	NONE
28	WINDSOCK	USGS	2018	20828	239	342	TRANSFORMAL RAY 240 (E)	20828	541	DESTRUCTION LIGHT
29	PRIVATE ROAD	USGS	2018	20728	20728	0	APPROACH RAY 24 (E)	20828	728	RELOCATION
30	PRIVATE ROAD	USGS	2018	20728	20728	0	APPROACH RAY 24 (E)	20828	541	RELOCATION
31	PRIVATE ROAD	USGS	2018	20727	20727	0	NA	NA	NONE	NONE
32	GATE	USGS	2018	20828	207	728	NA	NA	NONE	NONE
33	PRIVATE ROAD	USGS	2018	20828	20721	157	NA	NA	NONE	NONE
34	PRIVATE ROAD	USGS	2018	20828	20828	0	APPROACH RAY 24 (E)	20828	541	RELOCATION
35	PRIVATE ROAD	USGS	2018	20722	20722	0	APPROACH RAY 24 (E)	20828	228	RELOCATION
36	TREE	USGS	2018	20828	20721	362	TRANSFORMAL RAY 240 (E)	20828	541	REMOVAL
37	PRIVATE POLE	FAM DOP (2018)	2018	20828	20721	362	NA	NA	NONE	NONE
38	POWERSPOLE	FAM DOP (2018)	2018	20828	20721	362	NA	NA	NONE	NONE
39	TREE	USGS	2018	20828	20827	1	NA	NA	NONE	NONE
40	TREE	USGS	2018	20824	20824	0	TRANSFORMAL RAY 240 (E)	20828	541	DESTRUCTION LIGHT
41	BLDG	FAM DOP (2018)	2018	20824	20721	153	NA	NA	NONE	NONE
42	NAVAID	USGS	2018	20828	20721	157	NA	NA	NONE	NONE
43	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
44	PRIVATE ROAD	USGS	2018	20827	20827	0	NA	NA	NONE	NONE
45	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
46	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
47	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
48	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
49	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
50	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
51	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
52	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
53	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
54	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
55	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
56	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
57	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
58	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
59	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
60	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
61	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
62	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
63	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
64	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
65	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
66	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
67	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
68	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
69	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
70	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
71	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
72	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
73	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
74	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
75	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
76	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
77	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
78	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
79	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
80	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
81	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
82	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
83	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
84	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
85	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
86	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
87	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
88	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
89	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
90	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
91	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
92	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
93	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
94	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
95	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
96	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
97	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
98	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
99	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
100	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
101	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE

PART 77 DATA TABLE										
ITEM NO.	DESCRIPTION	SURVEY	SURVEY DATE	GROUND ELEVATION	OBJECT ELEVATION (ft)	OBJECT HEIGHT (ft)	SURFACE PENETRATED	SURFACE ELEVATION	PENETRATION	EXISTING PROPOSED SEPARATION
102	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
103	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
104	POLE	USGS	2018	20842	20828	16	NA	NA	NONE	NONE
105	POLE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
106	POLE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
107	POLE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
108	POLE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
109	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
110	POLE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
111	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
112	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
113	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
114	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
115	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
116	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
117	BLDG	FAM DOP (2018)	2018	20828	20828	0	NA	NA	NONE	NONE
118	PUBLIC ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
119	FENCE	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
120	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
121	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
122	PRIVATE ROAD	USGS	2018	20828	20828	0	NA	NA	NONE	NONE
123	BLDG	FAM DOP (2018)	2018	20828	20828	0	NA	NA	NONE	NONE
124	BLDG	FAM DOP (2018)	2018	20828	20828	0	NA	NA	NONE	NONE
125	BLDG	FAM DOP (2018)	2018	20828	20828	0	NA	NA	NONE	NONE
126	ANTENNA	USGS	2018	20828	20828	0	TRANSFORMAL RAY 240 (E)	20828	441	DESTRUCTION LIGHT
127	LIGHT POLE	USGS	2018	20848	20848	30	TRANSFORMAL RAY 240 (E)	20828	1748	DESTRUCTION LIGHT
128	BLDG	FAM DOP (2018)	2018	20828	20828	0	TRANSFORMAL RAY 240 (E)	20828	1124	DESTRUCTION LIGHT
129	ANTENNA	USGS	2018	20828	20828	0	TRANSFORMAL RAY 240 (E)	20828	2522	DESTRUCTION LIGHT
130	LIGHT POLE	USGS	2018	20842	20842	32	TRANSFORMAL RAY 240 (E)	20828	845	DESTRUCTION LIGHT
131	BLDG	FAM DOP (2018)	2018	20828	20828	0	NA	NA	NONE	NONE
132	BLDG	FAM DOP (2018)	2018	20828	20828	0	NA	NA	NONE	NONE
133	BLDG	FAM DOP (2018)	2018	20828	20828	0	TRANSFORMAL RAY 240 (E)	20828	511	DESTRUCTION LIGHT
134	BLDG	FAM DOP (2018)	2018	20828	20828	0	NA	NA	NONE	NONE
135	WINDSOCK	USGS	2018	20828	20828	0	PRIMARY RAY 240 (E)	20828	1072	DE

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PART 77 DATA

ITEM NO.	DESCRIPTION	SURVEY	SURVEY DATE	GROUND ELEVATION	OBJECT ELEVATION (MSL)	OBJECT HEIGHT (AAL)	SURFACE PENETRATED	SURFACE ELEVATION	PENETRATION	EXISTING/PROPOSED MITIGATION	TRIGGERING EVENT
1	PRIVATE ROAD	USGS	2018	2263.37	2273.36	9.99	N/A	N/A	NONE	NONE	NONE
2	PRIVATE ROAD	USGS	2018	2263.21	2273.22	10.01	N/A	N/A	NONE	NONE	NONE
3	PRIVATE ROAD	USGS	2018	2263.38	2273.39	10.01	N/A	N/A	NONE	NONE	NONE
4	PRIVATE ROAD	USGS	2018	2280.05	2290.02	9.97	N/A	N/A	NONE	NONE	NONE
5	PRIVATE ROAD	USGS	2018	2270.57	2289.66	10.09	N/A	N/A	NONE	NONE	NONE
6	PUBLIC ROAD	USGS	2018	2266.64	2281.64	15	N/A	N/A	NONE	NONE	NONE
7	PUBLIC ROAD	USGS	2018	2267.44	2282.44	15	N/A	N/A	NONE	NONE	NONE
8	PUBLIC ROAD	USGS	2018	2269.53	2284.87	15.34	N/A	N/A	NONE	NONE	NONE
9	PUBLIC ROAD	USGS	2018	2276.32	2291.32	15	N/A	N/A	NONE	NONE	NONE
10	PUBLIC ROAD	USGS	2018	2278.81	2294.81	15	N/A	N/A	NONE	NONE	NONE
11	PRIVATE ROAD	USGS	2018	2274.46	2294.46	10	N/A	N/A	NONE	NONE	NONE
12	PRIVATE ROAD	USGS	2018	2275.19	2285.22	10.03	N/A	N/A	NONE	NONE	NONE
13	PRIVATE ROAD	USGS	2018	2272.56	2282.63	10.07	APPROACH RWY 6 (U)	2282.04	0.59	RELOCATE	RUNWAY EXTENSION
14	BLDG	FAA DOF (2018)	2018	2272.08	2281.93	9.85	APPROACH RWY 6 (U)	2277.72	4.21	OBSTRUCTION LIGHT	RUNWAY EXTENSION
15	PRIVATE ROAD	USGS	2018	2271.75	2281.7	9.95	APPROACH RWY 6 (U)	2275.47	6.23	RELOCATE	RUNWAY EXTENSION
16	PRIVATE ROAD	USGS	2018	2273.99	2283.95	9.96	APPROACH RWY 6 (U)	2275.61	8.34	RELOCATE	RUNWAY EXTENSION
17	PRIVATE ROAD	USGS	2018	2269.53	2279.53	10	APPROACH RWY 6 (U)	2275.61	3.92	RELOCATE	RUNWAY EXTENSION
18	FENCE	USGS	2018	2276.94	2284.89	7.95	APPROACH RWY 6 (U)	2275.71	9.18	RELOCATE	RUNWAY EXTENSION
19	PRIVATE ROAD	USGS	2018	2275.3	2284.88	9.58	N/A	N/A	NONE	NONE	NONE
20	FENCE	USGS	2018	2275.31	2283.31	8	N/A	N/A	NONE	NONE	NONE
21	PRIVATE ROAD	USGS	2018	2275.07	2285.11	10.04	APPROACH RWY 6 (E), TSS (E)	2277.48, 2277.40	7.63, 7.73	RELOCATE	EXISTING
22	PRIVATE ROAD	USGS	2018	2276.77	2286.76	9.99	APPROACH RWY 6 (E), TSS (E)	2277.57, 2277.40	9.19, 9.03	RELOCATE	EXISTING
23	PRIVATE ROAD	USGS	2018	2272.14	2282.14	10	APPROACH RWY 6 (E)	2277.55	4.59	RELOCATE	EXISTING

NOTES

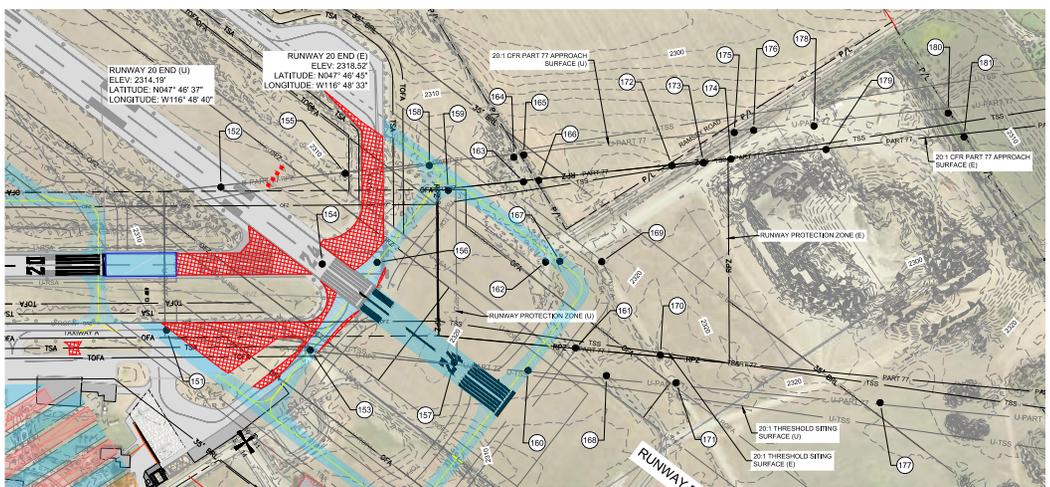
REFER TO SHEET 12 FOR LOCATION OF ITEMS LISTED ON THIS TABLE.

DATE	DATE	REVISIONS	NO.
CREATED			
DRAWN			
CHECKED			
APPROVED			

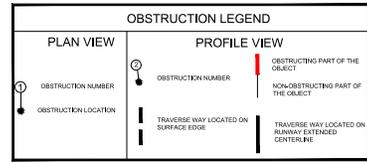
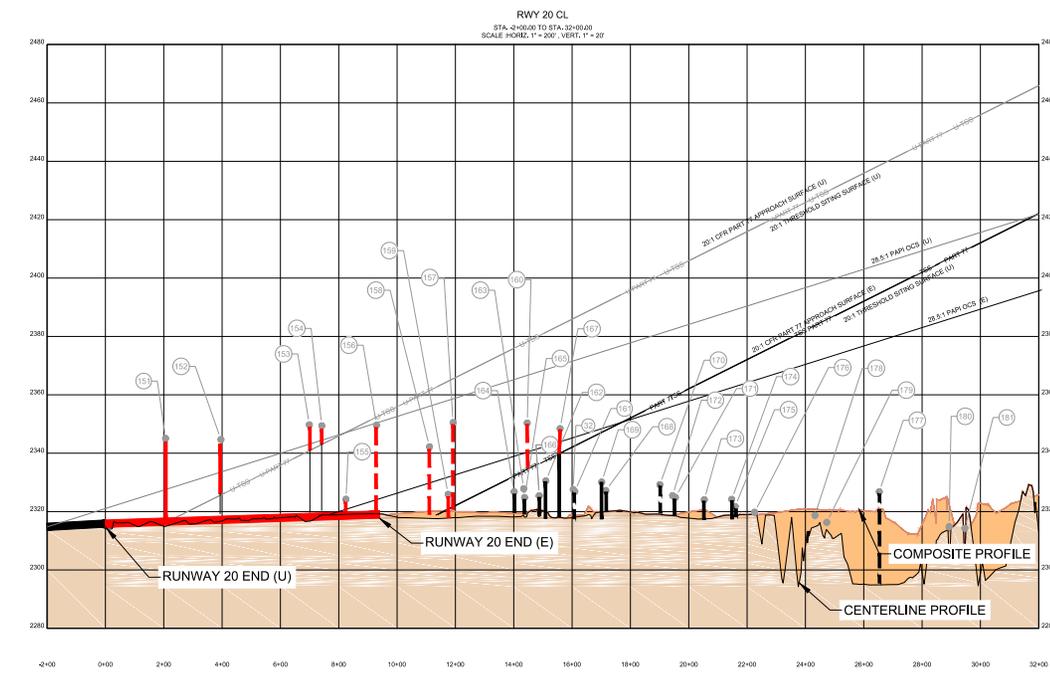
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COEUR D'ALENE AIRPORT
HAYDEN, IDAHO
AIRPORT LAYOUT PLAN SET
INNER APPROACH PLAN - RWY 6 DATA

DATE: MARCH 2019
PROJECT: 160281



PART 77 DATA											
ITEM NO.	DESCRIPTION	SURVEY	SURVEY DATE	GROUND ELEVATION	OBJECT ELEVATION (MSL)	OBJECT HEIGHT (AAL)	SURFACE PENETRATED	SURFACE ELEVATION	PENETRATION	EXISTING/PROPOSED OBSTRUCTION	TRIGGERING EVENT
32	GATE	USGS	2018	2316.08	2327	7.92	N/A	N/A	NONE	NONE	NONE
151	AIRCRAFT	USGS	2018	2316.2	2343.79	28.53	APPROACH RWY 20 (E)	2316.26	28.47	MARKING	RUNWAY EXTENSION
152	AIRCRAFT	USGS	2018	2316.45	2344.77	28.67	APPROACHES RWY 20 (E)	2325.78	16.71	MARKING	RUNWAY EXTENSION
153	AIRCRAFT	USGS	2018	2316.45	2343.37	25.92	APPROACHES RWY 20 (E)	2343.01	6.49	MARKING	RUNWAY EXTENSION
154	AIRCRAFT	USGS	2018	2316.9	2348.8	30	APPROACHES RWY 20 (E)	2343.05	5.95	MARKING	RUNWAY EXTENSION
155	PRIVATE ROAD	USGS	2018	2313.98	2333.79	9.86	PRIMARY (E)	N/A	9.86	RELOCATE	RUNWAY EXTENSION
156	AIRCRAFT	USGS	2018	2316.21	2346.23	30.02	PRIMARY (E)	N/A	30.02	RELOCATE	RUNWAY EXTENSION
157	AIRCRAFT	USGS	2018	2316.76	2348.83	32.07	PRIMARY (E)	N/A	32.07	MARKING	RUNWAY EXTENSION
158	AIRCRAFT	USGS	2018	2315.11	2343.58	26.77	PRIMARY (E)	N/A	26.77	RELOCATE	RUNWAY EXTENSION
159	PRIVATE ROAD	USGS	2018	2315.56	2325.49	9.93	APPROACHES RWY 20 (E)	2325.77	4.72	RELOCATE	RUNWAY EXTENSION
160	AIRCRAFT	USGS	2018	2316.39	2345.37	28.98	N/A	N/A	NONE	NONE	NONE
161	PRIVATE ROAD	USGS	2018	2316.41	2326.71	10.3	N/A	N/A	NONE	NONE	NONE
162	PRIVATE ROAD	USGS	2018	2320.24	2330.35	10.31	N/A	N/A	NONE	NONE	NONE
163	PRIVATE ROAD	USGS	2018	2317.29	2337.34	10.05	N/A	N/A	NONE	NONE	NONE
164	PRIVATE ROAD	USGS	2018	2316.39	2326.39	10	N/A	N/A	NONE	NONE	NONE
165	FENCE	USGS	2018	2316.08	2326.39	6.33	N/A	N/A	NONE	NONE	NONE
166	FENCE	USGS	2018	2316.58	2326.38	0	N/A	N/A	NONE	NONE	NONE
167	AIRCRAFT	USGS	2018	2316.64	2346.25	30.01	N/A	N/A	NONE	NONE	NONE
168	PRIVATE ROAD	USGS	2018	2315.11	2327.21	10	N/A	N/A	NONE	NONE	NONE
169	PRIVATE ROAD	USGS	2018	2316.9	2329.9	10	N/A	N/A	NONE	NONE	NONE
170	PRIVATE ROAD	USGS	2018	2316.39	2329	5.61	N/A	N/A	NONE	NONE	NONE
171	PRIVATE ROAD	USGS	2018	2316.58	2324.73	16.17	N/A	N/A	NONE	NONE	NONE
172	PRIVATE ROAD	USGS	2018	2315.23	2325.23	10	N/A	N/A	NONE	NONE	NONE
173	FENCE	USGS	2018	2315.84	2323.84	0	N/A	N/A	NONE	NONE	NONE
174	PRIVATE ROAD	USGS	2018	2313.99	2323.99	10	N/A	N/A	NONE	NONE	NONE
175	PRIVATE ROAD	USGS	2018	2313.58	2323.58	10	N/A	N/A	NONE	NONE	NONE
176	FENCE	USGS	2018	2313.79	2323.6	7.81	N/A	N/A	NONE	NONE	NONE
177	PRIVATE ROAD	USGS	2018	2316.58	2326.58	10	N/A	N/A	NONE	NONE	NONE
178	PRIVATE ROAD	USGS	2018	2326.54	2316.54	0.94	N/A	N/A	NONE	NONE	NONE
179	PRIVATE ROAD	USGS	2018	2325.79	2316.16	10.27	N/A	N/A	NONE	NONE	NONE
180	FENCE	USGS	2018	2326.02	2316.02	0	N/A	N/A	NONE	NONE	NONE
181	FENCE	USGS	2018	2326.02	2316.02	0	N/A	N/A	NONE	NONE	NONE



LEGEND		DESCRIPTION
EXISTING	NA	AIRCRAFT PAVEMENT
EXISTING	PI	AIRCRAFT PAVEMENT TO BE REMOVED
EXISTING	PL	AIRCRAFT PROPERTY LINE
EXISTING	RD	ROADWAY
EXISTING	RF	SECURITY FENCE
EXISTING	RP	AIRCRAFT REFERENCE POINT
EXISTING	RS	BUILDING
EXISTING	RSB	BUILDING RESTRICTION LINE (BRL)
EXISTING	RSA	RUNWAY SAFETY AREA (RSA)
EXISTING	RFZ	RUNWAY OBSTACLE FREE AREA (OFA)
EXISTING	RPZ	RUNWAY PROTECTION ZONE (RPZ)
EXISTING	RFZ	OBSTACLE FREE ZONE (OFZ)
EXISTING	RFVZ	RUNWAY VISIBILITY ZONE (RVZ)
EXISTING	RFVZ	PART 77 BARRIERS APPROACH SURFACE
EXISTING	TSB	THRESHOLD SITING SURFACE (TSB)
EXISTING	GSB	GRASS PAVEMENT SURFACE (GSB)
EXISTING	POFZ	PRECEDENCE OBSTACLE FREE ZONE (POFZ)
EXISTING	TSA	TAXIWAY SAFETY AREA (TSA)
EXISTING	TOFA	TAXIWAY OBSTACLE FREE AREA (TOFA)
EXISTING	PAPI	PRECEDENCE APPROACH PATH INDICATOR (PAPI)
EXISTING	NA	SECTION CORNER
EXISTING	AW	AUTOMATED WEATHER STATION
EXISTING	LS	LIGHTED SECTION
EXISTING	WI	WIND INDICATOR
EXISTING	TO	TOPOGRAPHIC CONTOURS

NOTES

1. TRAVERSE WAY ELEVATIONS INCLUDE THE TRAVERSE WAY ADJUSTMENT (2' FOR AIR ROAD, 1' FOR HIGHWAY, 8' FOR FENCE, 15' FOR PUBLIC ROAD AND 10' FOR PRIVATE ROAD).
2. CONTOUR AND OBSTRUCTION SOURCE DATA - USGS, FAA OMAHA (DOP), NO GROUND SURVEY WAS CONDUCTED AS PART OF THE MASTER PLAN.
3. ALL ELEVATIONS AND HEIGHTS ARE IN FEET.



MAGNETIC DECLINATION 14° 18'
 RATE OF CHANGE 0.08° PER YEAR
 AS OF 2017
 SOURCE: NOAA ONLINE CALCULATOR

DATE: _____
 DRAWN: _____
 CHECKED: _____
 BY: _____
 APPROVED: _____

REVISIONS:
 NO. _____
 DATE _____
 DESCRIPTION _____

TO ENGINEERS
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COEUR D'ALENE AIRPORT
 HAYDEN, IDAHO
 AIRPORT LAYOUT PLAN SET
 INNER APPROACH PLAN - RWY 20

DATE: MARCH 2019
 PROJECT: 190281

SHEET 16 OF 23

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