DRAFT

Riverton Regional Airport Master Plan

August 18, 2011

As required by Paragraph 425.B(4) of FAA Order 5100.38C, Airport Improvement Program (AIP) Handbook:

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1.0 INTRODUCTION

The City of Riverton was founded in 1906 during the "land rush" to settle acreage withdrawn by a treaty from the Wind River Indian Reservation. Today Riverton is home to approximately 10,000 people, who are primarily employed in mining and hospitality industries. The City is located near where the Big Wind River and Little Wind River join in Wind River Country. Riverton is surrounded by the Wind River Indian Reservation, home to over 8,000 members of the Shoshone and Arapahoe tribes[1].

The Riverton Regional Airport (RIW) is a publicly owned facility that serves the aviation needs of the greater Riverton area. The Airport is located approximately three miles northwest of the Riverton Central Business District. According to the 2008 Wyoming Statewide Airport Economic Impact Study, RIW contributes over $4.5 million in economic activity for the State.[2]

The Riverton Regional Airport provides the community with scheduled service to and from Denver International Airport through Great Lakes Airlines. The airport serves a diverse aviation community with facilities for scheduled air service, military, general aviation, and recreational activities.

The primary objective of this study is to update the Airport's Master Plan and Airport Layout Plan (ALP), which were last updated in 2000. The main objectives for this study are summarized below:

- Assess the condition and adequacy of existing facilities;
- Create forecasts of aviation activity for a 20-year timeframe, to include: operations, based aircraft, and passenger enplanements;
- Determine the needed improvements over the next 20 years and prepare a realistic Capital Improvement Plan (CIP);
- Prepare a financial plan that considers the Airport's budget, revenue, and expenses along with likely grant funding scenarios.

[1] Riverton Chamber of Commerce. http://www.rivertonchamber.org/community/RegionalFacts.asp
[2] WYDOT Wyoming Statewide Airport Economic Impact Study. 2008.

2.0 INVENTORY

The objective of the Inventory is to document the type and general condition of the existing facilities that comprise the Riverton Regional Airport (RIW). It is a complete compilation of all systems, including airfield, terminal area, NAVAIDs, ground access, parking, pavement conditions, utilities, and physical characteristics of the Airport.

2.1 Airport Reference Code

The Federal Aviation Administration (FAA) classifies airports with a coding system known as the Airport Reference Code (ARC) to apply design criteria appropriate to operational and physical characteristics of the types of aircraft that operate at the airport. The ARC is made up of two components: aircraft approach category designated with letters A through E, and wingspan or tail height, called the Airplane Design Group (ADG), denoted by roman numerals I through VI.

The aircraft approach category is an alphabetical classification of an aircraft based upon 1.3 times the stall speed in a landing configuration at their maximum certified landing weight, letter A being the slowest approach speed and E being the fastest. The approach category for an airport is determined by the approach speed of the fastest aircraft that operates at the airport at least 500 times per year. The categories are list below:

Category A: Speed less than 91 knots.
Category B: Speed 91 knots or more but less than 121 knots
Category C: Speed 121 knots or more but less than 141 knots.
Category D: Speed 141 knots or more but less than 166 knots.
Category E: Speed 166 knots or more.

The Airplane Design Group (ADG) is a ***numerical*** classification aircraft based on wingspan or tail height. If an airplane is in two categories, the most demanding category should be used. Similar to the approach category, the ADG for an airport is determined by the largest aircraft operating at least 500 times per year at the facility. The groups are identified in **Table 2-1**. Examples of ARC aircraft types are shown in **Figure 2-1**.

TABLE 2-1 - AIRPLANE DESIGN GROUP (ADG)

Group #	Tail Height (ft.)	Wingspan
I	<20	<49
II	20≤30	49≤79
III	30≤45	79≤118
IV	45≤60	118≤171
V	60≤66	171≤214
VI	66≤80	214≤262

Source: FAA AC 150/5300-12, Airport Design

FIGURE 2-1 - ARC AIRCRAFT TYPES

AIRPORT REFERENCE CODE (ARC)

Source: Jviation, Inc.

2.2 Runway and Taxiway Dimensional Criteria

The primary consideration for runway and taxiway design is the standards established by the FAA. These standards are based upon a critical aircraft. **Table 2-2** shows the FAA design standards from FAA Advisory Circular (AC) 150/5300-13, *Airport Design* (Change 14). The existing Airport Reference Code (ARC) of Riverton Regional Airport is C-II and design standards will be detailed to those standards.

Runway dimensional design standards define the widths and clearances required to optimize safe operations in the landing and takeoff area. These dimensional standards vary depending upon the ARC for the runway and the type of approach that is provided. The critical aircraft for the current users at RIW is a C-II; however in the past, Runway 10/28 was developed to meet C-III standards, which can accommodate a Boeing 737 type aircraft. Runway 1/19 complex is designed to B-II standards. At many airports, the secondary runways are not designed to standards for all the potential airport users. This is normally due to economic reasons. Many times the funds needed to build the second runway to the higher ARC for the infrequent larger aircraft use of the airport is not available or justifiable. The standards for RIW are shown in **Table 2-2** and **Table 2-3**.

TABLE 2-2- ARC A (RW 1/19) FAA RUNWAY DESIGN STANDARDS

Standard	Current Conditions	B-II Design Standards
Runway Width	75'	75'
Runway Shoulder Width	10'	10'
Runway Safety Area Width	150'	150'
RSA beyond runway end	300'	300'
Runway Object Free Area Width	500'	250'
ROFA beyond runway end	300'	500'
Runway CL to Parallel TW CL	240'	240'
Runway CL to Aircraft Parking	250'	250'
RWY Holding Position Markings	200'	200'

Source: FAA AC 150/5300-13, Change 14

TABLE 2-3 - ARC C&D (RW 10/28) FAA RUNWAY DESIGN STANDARDS

Standard	Current Conditions	C-II Design Standards	C-III Design Standards
Runway Width	150'	100'	100'
Runway Shoulder Width	10'	10'	20'
Runway Safety Area Width	500'	500'	500'
RSA beyond runway end	1,000'	1,000'	1,000'
Runway Object Free Area Width	800'	800'	800
ROFA beyond runway end	1,000'	1,000'	1,000
Runway CL to Parallel TW CL	400'	400'	400'
Runway CL to Aircraft Parking	400'	500'	500'
RWY Holding Position Markings	250'	250'	250'

Source: FAA AC 150/5300-13, Change 14

2.3 Existing Airfield Design Standards

Riverton Regional Airport is presently a C-II airport; however Runway 10/28 is constructed to C-III standards and the crosswind Runway 1/19 is currently constructed to B-II standards.

Table 2-4 summarizes the major landside and airside components of RIW. These items are discussed in detail throughout the remainder of this chapter.

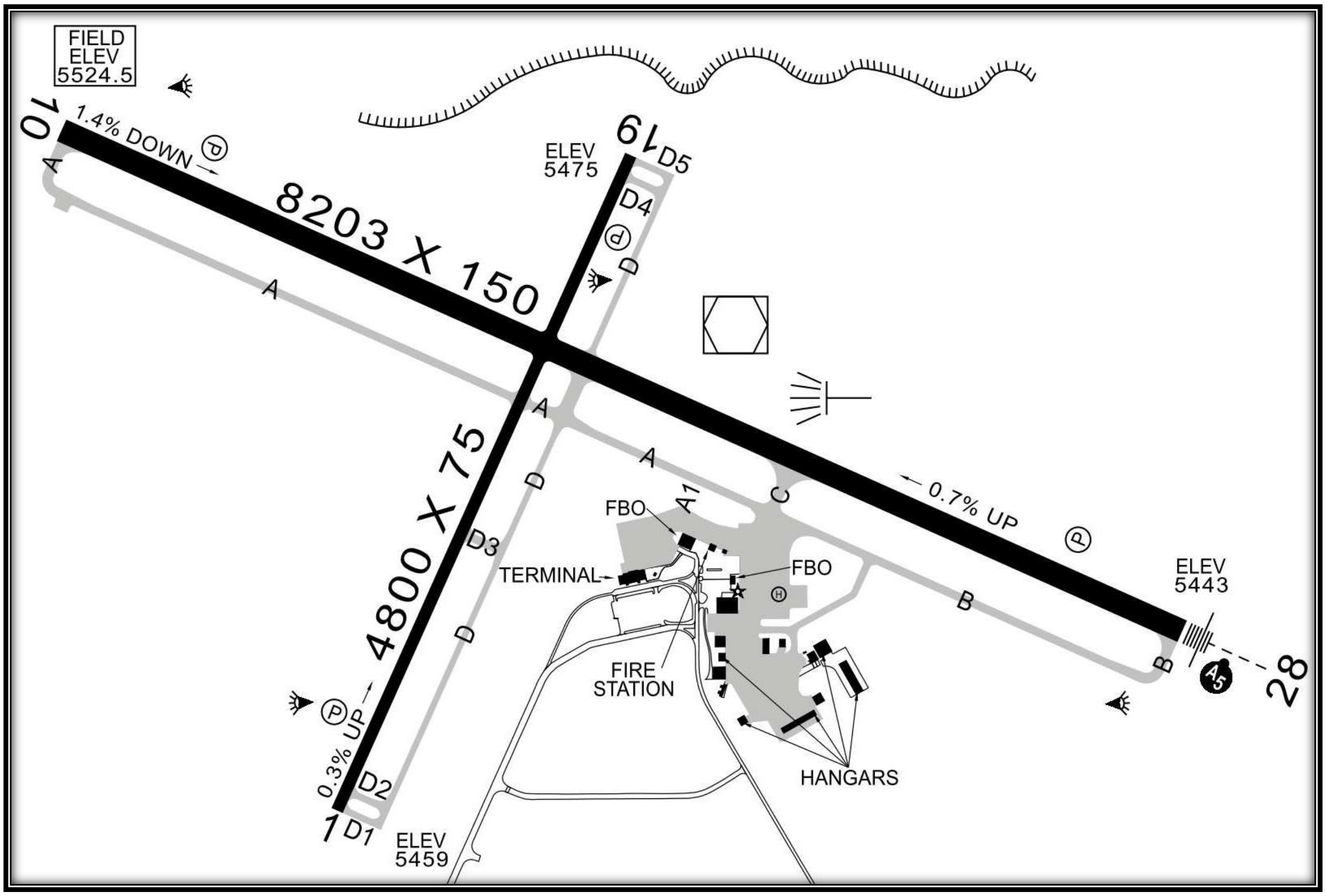
TABLE 2-4- AIRPORT INVENTORY

Item	Description	Condition
Runway 10/28	Primary Runway; 8,203' x 150'; High Intensity Runway Lighting (HIRL); Precision Approach Markings; Asphalt; Strength 75,000 SWG, 110,000 DWG, & 190, 000 DTG	Good/Fair
Runway 1/19	Crosswind Runway; 4,800'x75'; Medium Intensity Runway Lighting (MIRL); Non-Precision Approach Markings; Asphalt; Strength 30,000 SWG, 50,000 DWG	Good/Fair
Taxiways	Medium Intensity Taxiway Lighting (MITL); Pavement Strength is variable.	Good/Fair
Commercial Apron	3,890 Square yards of concrete; Strength 12,500 SWG, with a concrete pad with strength of 75,000 SWG, 110,000 DWG, & 190,000 DTG	Good
General Aviation Apron	62,300 Square yards of asphalt; Strength of 75,000 SWG, 110,000 DWG, & 190,000 DTG; south end of apron is 12,500 SWG	Fair/Poor
Navigational Aids	VOR/DME; ILS, GPS	Good
Visual Aids	Precision Approach Path Indicators (PAPI) for all runways; Medium-Intensity Approach Light System with Runway Alignment Indicator (MALSR) for Runway 28	Good
Terminal Building	11,013 Square feet	Good
FBO	Privately Owned - Jim's Aircraft Services	Fair
Auto Parking Lot	Long-, Short-term, and employee parking	Good/Fair

Source: Jviation, Inc.

The airfield is shown in the Airfield Diagram below in **Figure 2-2.** The following pages describe each component of the airport in detail.

FIGURE 2-2 - AIRPORT DIAGRAM



Source: Jeppesen

The previous Master Plan stated the non-standard conditions at RIW, list in **Table 2-5**. This non-standard condition is planned to be corrected with the Runway 10 reconstruction project that is currently scheduled for 2015.

TABLE 2-5 - EXISTING NON-STANDARD CONDITIONS

Description	Standard	Condition
Longitudinal Grade on Runway	Maximum longitudinal grade change may not exceed ±0.8% in the first and last quarter of the runway length	Grade for first quarter of Runway 10 is ±1.38%

Source: 2000 Airport Layout Plan

2.4 WYDOT AERONAUTICS WYOMING STATEWIDE AIRPORT INVENTORY AND IMPLEMENTATION PLAN REPORT CARD

In November 2009, the Wyoming Department of Transportation (WYDOT) Division of Aeronautics (Aeronautics) published the Wyoming Statewide Airport Inventory and Implementation Plan (AI&I Plan). The AI&I Plan studied the inventory and evaluated the Wyoming Aviation System of 40 publicly owned airports, while assessing the conditions and performance-related measures of existing and future needs of each airport. The AI&I Plan defined a new classification system for the airports in Wyoming into four classifications: Commercial Service Airports, Business Airports, Intermediate Airport, and Local Airports. For this Plan, RIW is classified as a Commercial Service Airport, which is defined as an airport that serves major populations, economic centers, and areas of tourism providing a connection to national and global economies, and are designed to accommodate commercial air service and business general aviation activity consistent with user demand. **Table 2-6** is the "Report Card" the AI&I Plan created for RIW, which evaluates the airport's current facilities and service objectives as a commercial service airport in Wyoming. Each airport should strive to the minimum objectives established by WYDOT for their category. RIW's "Report Card", shown in **Table 2-6,** illustrates the "Objectives" that RIW does not currently meet.

TABLE 2-6 - WYDOT AERONAUTICS AIRPORT INVENTORY AND IMPLEMENTATION PLAN RIW REPORT CARD

WYDOT Airport Inventory Report Card - Riverton Regional Airport			
Facility/Service Objectives	**Objective**	**RIW**	**Objective Met?**
AIRSIDE (Primary Runway)	ARC C-II	C-II	Yes
Runway Length	7700 Feet	8203 Feet	Yes
Runway Width	100 Feet	150 Feet	Yes
Runway Lights	HIRL	HIRL	Yes
Pavement Strength	Dual 55000 lbs	Dual 110000	Yes
Taxiway	Full Parallel, Width = 35 Feet	Full Parallel - Width = 50 Feet	Yes
Taxiway Lights	MITL	MITL	Yes
Instrument Approach	Precision	Precision	Yes
Approach Lighting System	MALSR (one end)	MALSR - One End MALS - None ODALS - None	Yes
Visual Aids	PAPI or VASI (both runway ends). Combination of REIL, MALSR, MALS or ODALS on each runway end. Beacon and Lighted Wind Cone	PAPIs - All Ends REIL - One End Beacon - Yes Wind Cone - Yes Lighted Wind Cone - Yes	Yes
Wind Coverage	Greater than or Equal to 95%	99.84%	Yes
RSA	Standard RSA on all paved runways	No	**No**
LANDSIDE			
Weather Reporting	AWOS or ASOS	ASOS	Yes
Terminal	Terminal Commercial	Terminal Commercial - Yes General Aviation - Yes	Yes
Perimeter Fencing	Security or Wildlife Fence	Perimeter – Yes Type - Wildlife Fence	Yes
Hangars	100% of Based Aircraft	75%	**No**
Lighted Hangar Areas	Lighted Hangar Areas	Yes	Yes
Paved Auto Parking	Paved Auto Parking	Number of Spaces - 154	Yes
SERVICES			
FBO	Suggested	Yes	Not an Objective
Fuel	Jet A and 100LL	Jet A and 100LL	Yes
Ground Transportation	On-Airport Rental Car	On-Airport Rental Car Taxi Service & Courtesy Car	Yes
Pilot Lounge and Planning Room	Pilot Lounge & Planning Room	Pilot Lounge – Yes Planning Room - Yes	Yes
Public Restrooms	Public Restrooms – 24/7	Yes - Not 24 Hour	**No**
Public Phone	Public Phone – 24/7	Yes - Not 24 Hour	**No**
Food	Restaurant Suggested	Restaurant – Yes Vending Machines - Yes	Not an Objective
Aircraft Maintenance	Major Airframe & Powerplant	Major Airframe & Powerplant	Yes
Aircraft De-icing System	De-icing	De-icing - Yes	Yes
De-icing Containment System	Containment System	Containment System - No	**No**
ADMINISTRATION			
Airport Master Plan	Less than 10 years old	11/2000	Yes
Airport Layout Plan	Less than 5 years old	11/2000 (Update in Progress)	**No**
Land Use Protection Plan	On record with Aeronautics	Yes	Yes
Noise Contour Map	Less than 10 years old	10/2000	Yes
Pavement Management Plan	On record with Aeronautics	Yes	Yes
Minimum Standards	On record with Aeronautics	No	**No**
Airport Manager	Airport Manager	Yes	Yes
Legislative Liaison	Legislative Liaison	No	**No**
RPZ Ownership	Fee or Easement Ownership of all RPZs	No	**No**

Source: 2009 WYDOT Aeronautics Wyoming Statewide Airport Inventory and Implementation Plan

2.5 WYDOT DESIGN STANDARDS INVENTORY 2007

In 2007, WYDOT Division of Aeronautics undertook a study to review each airport in the state for compliance with FAA design standards. The study included a review of aerial survey data and ground survey/observations. The study noted several non-standard items and obstructions, shown in **Table 2-7** and **Table 2-8**. Many of these non-standard items have been corrected since the study, as indicated in the table on the next page.

TABLE 2-7 - WYDOT DESIGN STANDRDS INVENTORY 2007

#	Non-Standard Item	Correction Date	Project No.	Comments
1	Runway 10-28 Safety Area Slope is flatter than standard on north side of 28 threshold.	10/2009	AIP 3-56-0024-29	
2	3 non-frangible stop signs are in runway 10-28 object free area, 257'-328' from runway centerline.	5/2009	Corrected by airport.	
3	Non-frangible windcone and segmented circle are in runway 10-28 object free area, 298' from runway centerline.	2015	To be corrected with Runway 10 Reconstruction project.	
4	4 non-frangible ILS critical signs are in the runway 10-28 object free area, 264'-313' from runway centerline.	10/2009	AIP 3-56-0024-29	
5	Runway 10 Quarter End longitudinal slope exceeds 0.8%.	2015	To be corrected with Runway 10 Reconstruction project.	
6	Runway 28 quarter end longitudinal slope end exceeds 0.8%.	10/2009	AIP 3-56-0024-29	
7	Terrain Southwest of runway intersection obstructs visibility between runway 10-28 and runway 1-19.		Corrected by airport.	Vegetation must be kept at a minimum to meet criteria.
8	Runway 10-28 edge light have 12' spacing from pavement edge on south side near 10 threshold.	2015	To be corrected with Runway 10 Reconstruction project.	
9	Metal T-post is in Runway 10 end object free area, abeam the threshold and 362' from runway centerline.			FAA owned signs. Responsibility of FAA.
10	Antenna post is in runway 28 end safety area/object free area, 320' beyond threshold. Unable to determine frangibility of wooden post.	10/2009	AIP 3-56-0024-29	
11	Hangar A is in taxilane object free areas for taxilanes to the south and west, 23' and 25' from centerline of respective taxilane pavements.			Not completed.
12	Hangar B is in taxilane object free areas for taxilanes to the east and west, 27' and 28' from respective taxilanes centerlines.		To be corrected with G.A. (AIP #32) Development construction project.	
13	Hangar C is in taxilane object free area for taxilane to the south, 41' from center of taxilane pavement.		To be corrected with G.A. (AIP #32) Development construction project.	
14	Segmented circle is 96' in diameter, minimum diameter is 100'.	2015	To be corrected with Runway 10 Reconstruction project.	
15	Enhanced taxiway centerline markings are not present at any runway holdlines.	10/2008	AIP 3-56-0024-26/27/28	
16	Surface painted holding signs are not present at any runway holdlines.	10/2008	AIP 3-56-0024-26/27/28	
17	Runway 10-28 threshold markings stripes are 12' wide.	10/2008	AIP 3-56-0024-26/27/28	
18	Runway 10-28 threshold marking stripe spacings are 3' wide.	10/2008	AIP 3-56-0024-26/27/28	
19	Runway 10-28 threshold markings center spacings are 16' wide.	10/2008	AIP 3-56-0024-26/27/28	
20	Runway 10 threshold markings are 29' from threshold.	10/2008	AIP 3-56-0024-26/27/28	
21	Runway 10-28 aiming markings are 1,007'/99' from respective thresholds.	10/2008	AIP 3-56-0024-26/27/28	
22	Heliport has non-standard designation marking.	10/2008	AIP 3-56-0024-26/27/28	

Source: WYDOT Design Standards Inventory 2007: Riverton Regional Airport

TABLE 2-8 - WYDOT DESIGN STANDARDS INVENTORY 2007: OBSTRUCTIONS

No.	Obstructions Noted	Correction Date	Project No.
A	3 stop signs penetrate runway 10-28 primary surface.	10/2009	AIP 3-56-0024-29
B	2 ILS critical area signs penetrate runway 10-28 primary surface.	10/2009	AIP 3-56-0024-29

Source: WYDOT Design Standards Inventory 2007: Riverton Regional Airport

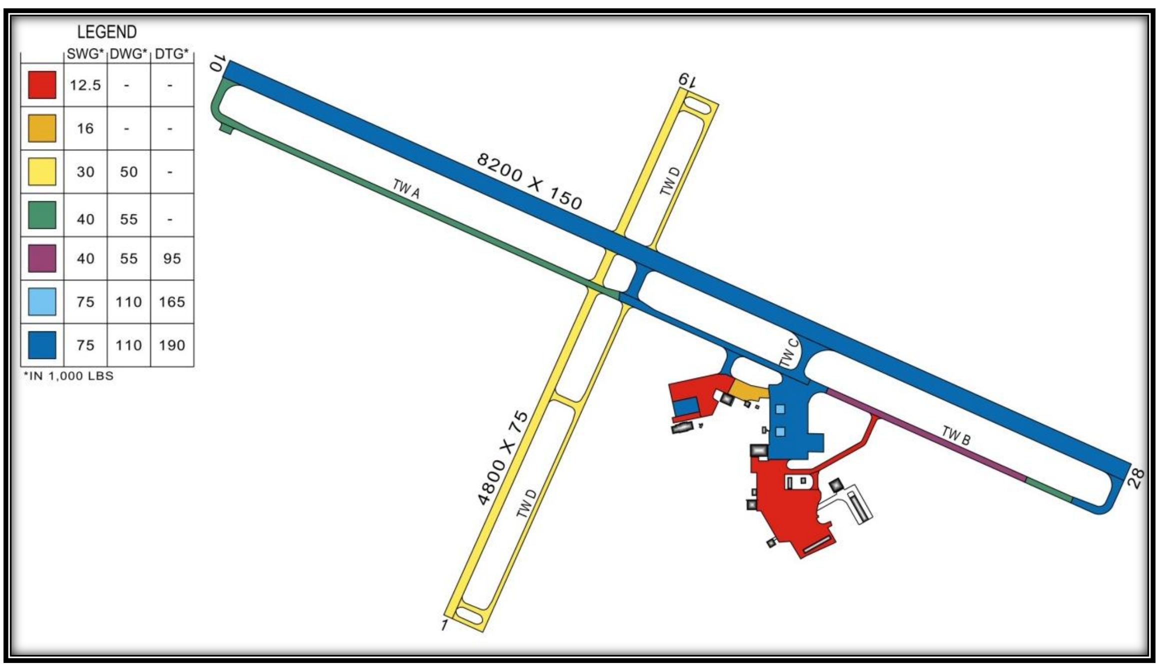
2.6 AIRFIELD/AIRSPACE

2.6.1 Runways

The existing airfield at RIW has two active runways, identified as Runway 10/28 and Runway 1/19, as shown in Figure 2-2.

Runway 10/28 is the primary runway, and is orientated southwest/northeast. The runway is 150 feet wide by 8,203 feet long and has a weight-bearing capacity that allows 75,000 pound for Single Wheel Gear (SWG) equipped aircraft, 110,000 pound Double Wheel Gear (DWG) equipped aircraft, and 190,000 pound Dual Tandem Gear (DTG) equipped aircraft, as shown in **Figure 2-3**.

FIGURE 2-3 - PAVEMENT STRENGTH



Source: WYDOT Aeronautics; Image: Jviation, Inc.

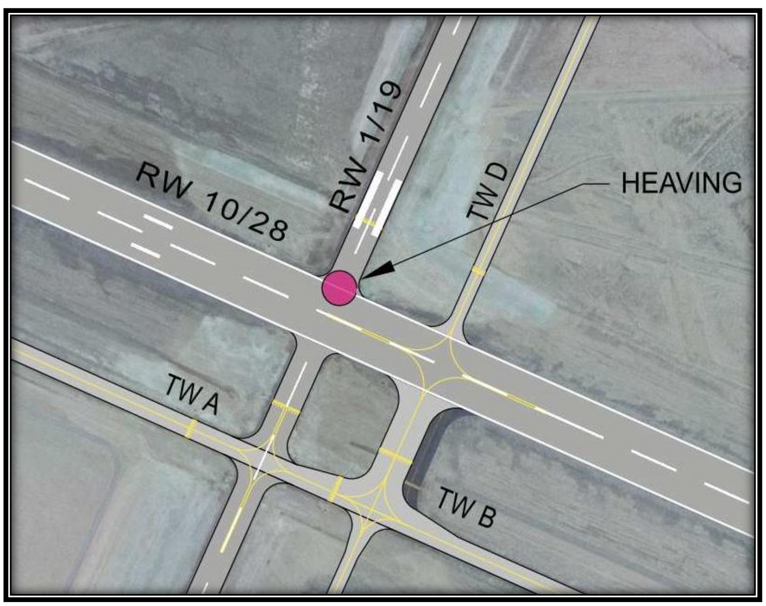
Currently, the longitudinal gradient on Runway 10/28 does not comply with current FAA criteria. The maximum longitudinal gradient of a C or D category runway (see **Section 2.1** for more information on airport categories) is ±0.8% in the first and last quarter of the runway. In 2009, 600 feet of Runway 28 and 700 feet of parallel Taxiway B was rehabilitated and reconstructed. This reconstruction included adjusting the elevation on the end of Runway 28 up approximately 2.25 feet in order to achieve the longitudinal gradient criteria. The longitudinal grade was reduced from 1.26% to 0.8%.

Additionally, scheduled in RIW's 2010 Capital Improvement Plan, the end of Runway 10 will be adjusted approximately 12 feet down in elevation in 2015 (pending funding) to correct the longitudinal gradient to FAA criteria, adjusting the gradient from +1.38% to +0.8%. The project consists of rehabilitation and reconstruction of 3,350 feet of runway and approximately 2,100 feet of parallel taxiway, as well as one 90-degree connector taxiway. By correcting the longitudinal gradients, this will increase the level of safety during landing and take-off procedures, while adhering to FAA runway design criteria.

Runway 1/19, the crosswind runway, is orientated north/south, and is 75 feet wide by 4,800 feet long. This runway was constructed for light aircraft use under high crosswind conditions, having a weight-bearing capacity no greater than 30,000 pounds for Single Wheel Gear (SWG) aircraft, and 50,000 for Double Wheel Gear (DWG). The runway is constructed of asphalt.

The intersection of Runway 10/28 and Runway 1/19 is experiencing isolated heaving, in the location shown in **Figure 2-4**. This should be investigated further to determine whether this occurrence will cause the gradient and/or the transverse slope to exceed the FAA runway standards.

FIGURE 2-4 – PAVEMENT HEAVING



The Airport Reference Point (ARP) is the latitude and longitude of the approximate center of the runway(s) at an airport. The current ARP is located at Latitude 43°03'51.246"N and Longitude 108°27'35.428". The established airport elevation, which is defined as the highest point long the Airport's runway(s) is 5524.5' above mean sea level (MSL), and is located at the end of Runway 10.

RIW currently has a magnetic declination 11°1' east, changing by 0°8' west each year. The current true bearing for Runway 10/28 is 114°18'00.32" with a magnetic declination 103.3° for Runway 10 and 283.3° for Runway 28. The current true bearing for Runway 1/19 is 24° 18' 43.55" with a, with a magnetic declination 13.8° for Runway 1 and 193.3° for Runway 19. The current runway designations of 10, 28, 1 and 19 are correct; the magnetic heading for the runway should be revaluated every year.

2.6.2 Taxiways

The existing paved taxiway systems at RIW consist of two full-length parallel taxiways, with connecting taxiways to the runways. Taxiway A and B compromise of the full-length parallel taxiway for Runway 10/28, and has three connecting taxiways. Taxiway D is the full-length parallel taxiway for Runway 1/19 and has five connecting taxiways. The pavement design strengths for all the taxiways are shown in **Figure 2-3**, and varies in strength from medium sized aircraft to heavy aircraft.

2.6.3 Apron

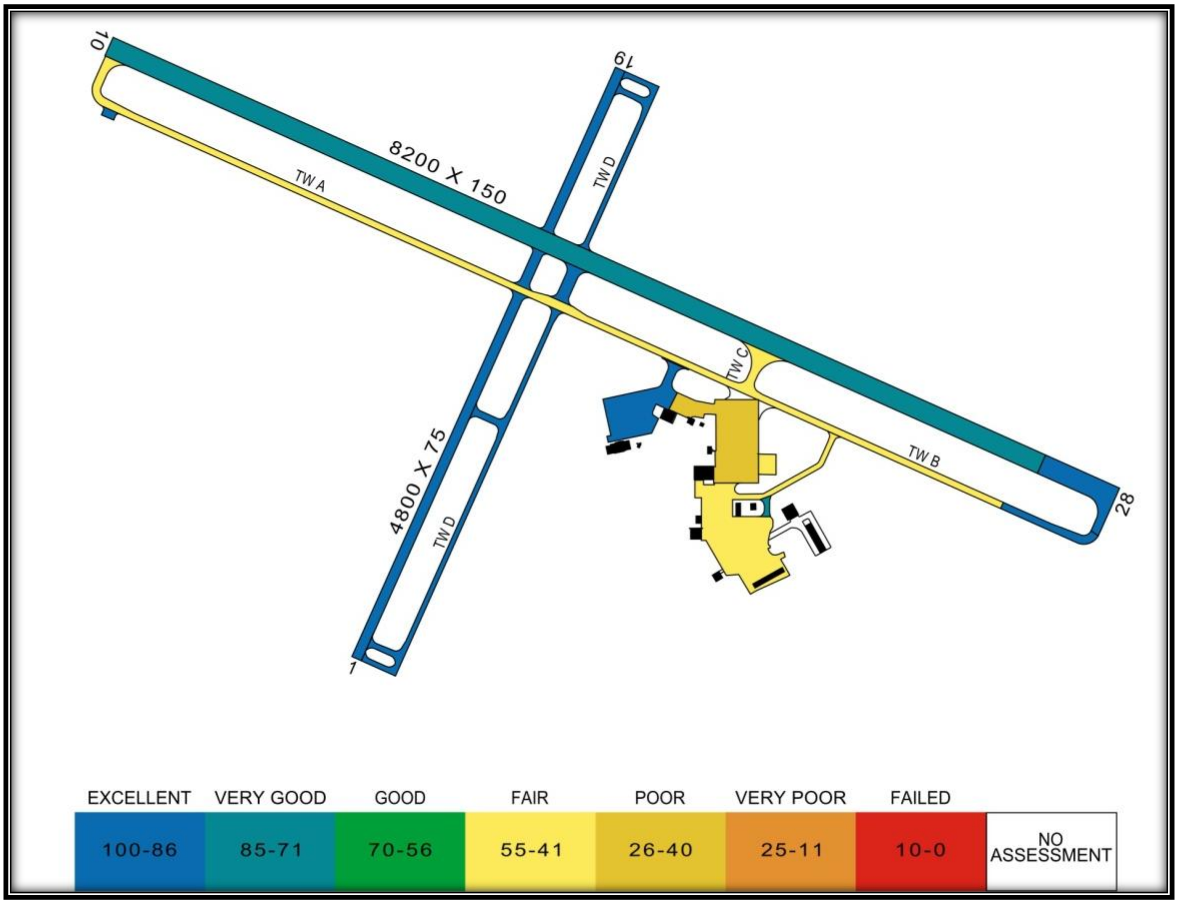
RIW has two primary apron areas: the commercial apron and the general aviation (GA) apron. The commercial apron is north of the terminal building, and is made up of roughly 3,890 square yards of concrete with pavement strength of 12,500 pounds SWG aircraft up to 190,000 pounds for DTG equipped aircraft, shown in **Figure 2-3**. The commercial apron has two parking positions, one immediately adjacent to the terminal building for easy passenger loading, with additional positions slightly further from the building on the apron.

The GA apron is located east of the terminal building and is composed of roughly 62,300 square yards of asphalt pavement, which includes the former commercial apron. The GA apron has a pavement strength of 12,500 pound for SWG aircraft; except the old commercial apron which has a pavement strength of 75,000 SWG, 110,000 DWG, and 190,000 DTWG. Additionally, there are two concrete fueling pads on this apron with a pavement strength of 75,000 SWG, 110,000 DWG, and 165,000 DTG, shown in **Figure 2-3**.

2.6.4 Pavement Condition

The 2009 Pavement Index Condition Study performed by the WYDOT Division of Aeronautics found that the runway pavement at RIW was in "Very Good" or "Excellent" condition. However, the majority of the taxiway and apron pavements were in "Fair" or "Poor" condition, as shown below in **Figure 2-5**.

FIGURE 2-5 - RIW PAVEMENT CONDITION INDEX



Source: 2009 WYDOT Pavement Index Condition Study; Image: Jviation

2.6.5 Lighting, Markings, and Signage of Runways and Taxiways

Runway 10/28 has High Intensity Runway Lighting (HIRL) and Precision Runway Markings. Runway 1/19 has Medium Intensity Runway Lighting (MIRL) and Non-Precision Runway Markings. Taxiways A, B, C and D are equipped with Medium Intensity Taxiway Lights (MITLs). Additionally, all of the taxiway and runway lights are equipped with Pilot Controlled Lighting, meaning that the lights can be activated by keying the aircraft's radio on the Common Traffic Advisory Frequency (CTAF) of 122.8 MHz. The commercial apron is equipped with flood lighting for safety and security.

The FAA recently established new airfield marking standards with new enhanced taxiway centerline and runway hold signs for airports. These new marking standards can be found in Change 2 of AC 150/5340-1J, *Standards for Airport Markings*. In summer 2008, RIW's airfield was painted with the new airfield markings standard. The taxiways at the runway intersections are marked with a yellow enhanced centerline and enhanced runway hold bars. Runway 10/28 is marked with precision markings, which includes centerline, edge stripes, aiming points, threshold, and touchdown zone markings. While Runway 1/19 has non-precision markings, which only includes the centerline, threshold, and aiming point markings.

RIW is equipped with airfield signage, which provides essential guidance information that is used to identify items and locations on an airport. Airfield signage gives pilots visual guidance information for all phases of movement on the airfield. RIW is equipped with a wide array of signage which includes the five sign types mandated by the FAA (AC 150/5300-13), instruction signs, location signs, direction signs, destination signs, and information signs.

In addition, the Airport has a segmented circle on the airfield located on the north side of Runway 10/28, adjacent to Taxiway C. A segmented circle includes a lighted wind cone, and provides a centralized location for wind and traffic pattern indicators for the airport's runways. The airfield also has a standard rotating beacon located directly south of the FBO, Jim's Aircraft Services.

2.6.6 Visual and Navigational Airport Aids

All the runways at RIW are equipped with Precision Approach Path Indicators (PAPIs) which provide visual descent guidance. A PAPI is a light system positioned on the normally located on left side of the runways and is constructed with four box lights in one row. The PAPIs for Runways 1, 19, and 10 are located on the left side of the runways, and the PAPI for Runway 28 is on the non-standard right side of the runway. These lights can be detectable from up to five miles during the day, and 20 miles or more at night. The approach ends of Runways 10, 1 and 19 have Runway End Identification Lights (REILs) to indicate to approaching aircraft where the beginning of the usable runway begins.

The Riverton VOR/DME (Very High Frequency Omni-directional Radio-range/Distance Measuring Equipment) is located on the airport, north of Runway 10/28 and east of Runway 1/19. This equipment is used in the precision approaches on Runways 10 and 28, and the non-precision approaches Runways 1 and 19.

An Instrument Landing System (ILS) is installed on Runway 28. An ILS provides both horizontal and vertical guidance to an approaching aircraft. The horizontal position of the aircraft, which is relative to the runway centerline, is provided by the localizer. The vertical guidance, which is relative to the runway end elevation, is provided by the glideslope. Additionally, Runway 28 is equipped with a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) for transition from instrument flying to a visual approach and landing. It allows the pilot to visually identify and align the aircraft with the runway environment once the pilot has arrived at a prescribed point on the approach. The MALSR is installed with U.S. standard configuration for the ILS operation of a Category I approach.

The VOR, ILS System, MALSR and PAPIs on Runway 28 are owned and maintained by the FAA. The PAPIs on Runways 1, 19, and 10 are owned and maintained by the City of Riverton.

2.6.7 Approach Equipment and Procedures

RIW currently has one precision and four non-precision approaches. A non-precision approach only provides horizontal guidance, while a precision approach provides horizontal and vertical guidance to approaching aircraft.

Runway 10 has two published approaches: a RNAV (GPS) approach and a VOR approach. Runway 28 has three published approaches: a RNAV (GPS) approach, VOR approach, and an ILS approach. Runway 1/19 has no instrument approaches and is currently used in visual conditions only. **Table 2-9** gives information about each approach at RIW, including the lowest minimums and decision height or minimum descent altitudes. Minimum descent altitude is associated with non precision approaches and is the lowest altitude an aircraft can fly until the pilot sees the airport environment. If the pilot has not found the airport environment by the Missed Approach Point (MAP) a missed approach is initiated. Decision Height (DH) is associated with precision approaches and the aircraft is continually descending on final approach. When the aircraft reaches the DH, the pilot must make a decision to land or execute the missed approach procedure. The current instrument approach charts and departure procedures are included in **Appendix B**.

TABLE 2-9 – RIW INSTRUMENT APPROACH MINIMUMS

Runway 10 - Approach	Lowest Minimums	Decision Height (feet-AGL)
RNAV (GPS)	5,919’ - 1¼ mile	357’
VOR	5,940’ – 1 mile	415’
Runway 28 - Approach	**Lowest Minimums**	**Decision Height (feet-AGL)**
RNAV (GPS)	5,656’ - ½ mile	364’
VOR	5,940’ - ½ mile	324’
ILS or LOC	5,656’ - ½ mile	200’

Source: FAA Instrument Approach Charts

Additionally, there are airports in the vicinity of Riverton that have instrument approach procedures. These airports include Casper/Natrona County International, Big-Piney-Marbleton Airport, Ralph Wenz Field, Rawlins Municipal, South Big Horn County, and Worland Municipal. These airports are listed in **Table 2-10**.

TABLE 2-10- NEARBY AIRPORTS WITH INSTRUMENT APPROACHES

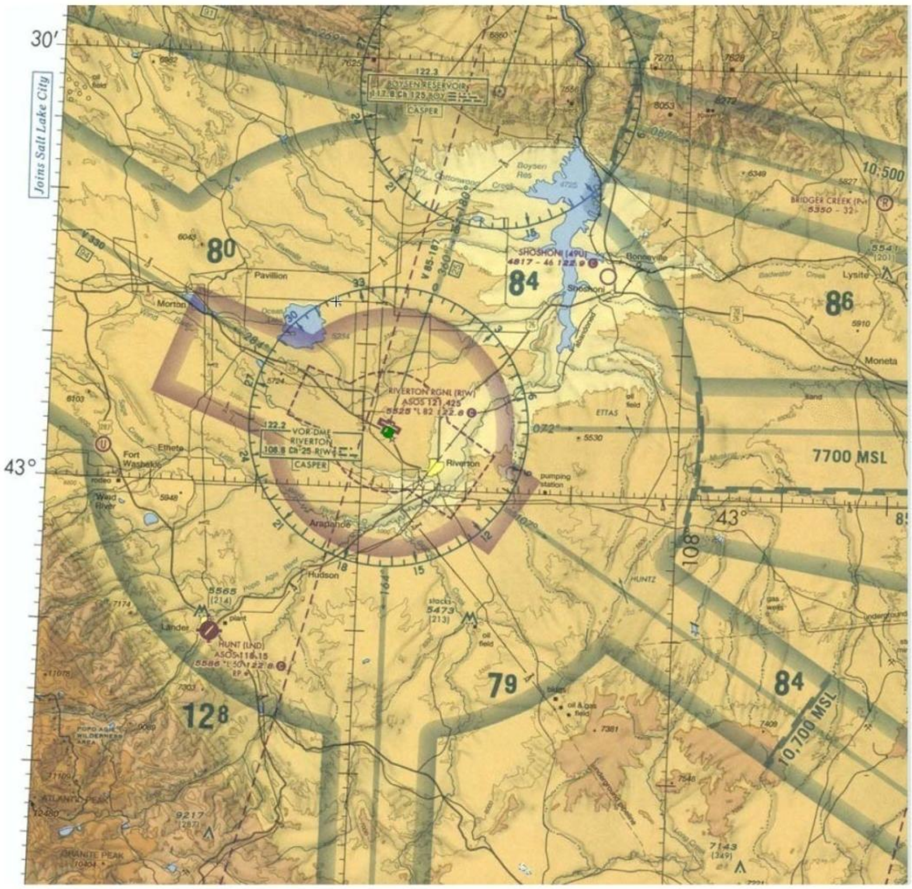
Airport	Identifier	Dist. From RIW	Procedures Available
Worland Municipal Airport	WRL	58nm Northeast	VOR, GPS
Pinedale/Ralph Wenz Field	PNA	61nm West	RNAV, GOS, NDB-A
Big Piney-Marbleton Airport	BPI	78nm West	VOR, GPS
Casper/Natrona County International Airport	CPR	88nm East	ILS, LOC, RNAV, GPS, VOR/DME, TACAN
Greybull/South Big Horn County Airport	GEY	89nm North-Northeast	RNAV, GPS, NDB
Rawlins Municipal Airport	RWL	104nm Southeast	RNAV, GPS, VOR/DME

Source: Jviation, Inc.

2.6.8 Airport Airspace Usage

RIW is in Class E Airspace, situated inside a corridor of four intersecting Victor Airways, which are imaginary "highways in the sky" connecting two ground-based navigational aids. Class E Airspace is the least restrictive classification of controlled airspace. Class E Airspace extends upward from either the surface or a designated altitude or overlaying or adjacent controlled airspace. It also includes control of IFR aircraft, and is only traffic advisory when able to VFR aircraft. There is no special use airspace (i.e. restricted airspace, or Military Operations Areas) in the immediate vicinity. The airspace environment can be seen in the aircraft sectional chart shown in **Figure 2-6**.

FIGURE 2-6 - SECTIONAL CHART



Source: Aeronautical Sectional Chart

2.6.9 Noise Abatement Procedures

Currently, there are no noise abatement procedures for Riverton Regional Airport. The Airport is located far enough from the large population center, making noise less of an issue for the surrounding areas. As the population grows in Riverton, actions may need to be taken to ensure that future noise issues are minimized.

2.6.10 Obstructions to Air Navigation

TO BE COMPLETED PENDING OBSTRUCTION SURVEY

2.7 Commercial Passenger Facilities

2.7.1 Passenger Service

This Airport was subsidized by the Essential Air Service (EAS) program until October 1, 2006, when Great Lakes Airlines began providing subsidy-free service to the facility. The EAS program was created following the Airline Deregulation Act of 1978, to minimize loss of air service to the 746 communities that had air service prior to deregulation. In order to keep service to those communities, Congress added Section 419 to the Federal Aviation Act, establishing the EAS Program.

Currently Great Lakes Aviation provides passenger service for RIW to and from Denver International Airport in Denver, Colorado. The daily flight schedule for Great Lakes Aviation is shown in **Table 2-11**. The aircraft used include the 19-seat Beech 1900D and the 30-seat Embraer EMB-120, which is also called the "Brasilia". Both aircraft are turboprop commuter aircraft. The average age of Great Lakes Airlines' aircraft is about 15 years.[3] Great Lakes has firm orders for five new Embraer 120s. As Great Lakes fleet continues to age, new aircraft types and sizes may be needed to serve RIW.

TABLE 2-11 - GREAT LAKES FLIGHT SCHEDULE - EFFECTIVE 02/11/11

Riverton to Denver				
Departure Time	**Arrival Time**	**Flight Number**	**Aircraft**	**Days***
7:37am	8:47am	5006	EMB-120	1, 2, 3, 4, 5, 6, 7
1:17pm	2:35pm	5093	BEECH 1900D	1, 2, 3, 4, 5, 6, 7
3:49pm	4:59pm	5008	EMB-120	1, 2, 3, 4, 5, 7
Denver to Riverton				
Departure Time	**Arrival Time**	**Flight Number**	**Aircraft**	**Days**
11:45am	1:07am	5092	BEECH 1900D	1, 2, 3, 4, 5, 6, 7
2:14pm	3:29pm	5009	EMB-120	1, 2, 3, 4, 5, 7
6:48pm	8:03pm	5011	EMB-120	1, 2, 3, 4, 5, 7
5:33pm	6:52pm	5007	EMB-120	6

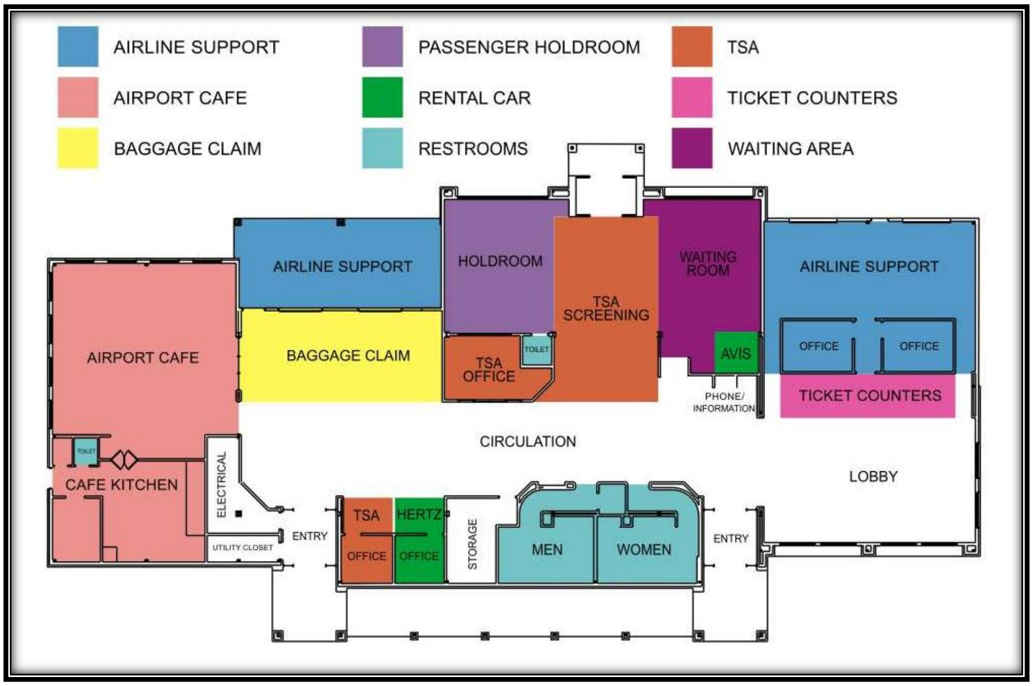
*Source: Great Lakes Aviation, *Days 1= Mon, 2=Tues, 3=Wed, etc.*

2.7.2 Terminal Building

The terminal building was constructed in 1998, and includes approximately 11,013 square feet of enclosed area and 12,888 square feet of gross building area; with the ability for expansion to the east for an additional 10,500 square feet. The terminal is located on the southeast corner of the commercial apron. Inside the terminal are two rental car companies, Hertz and Avis, passenger ticketing, Great Lakes operations/office area, passenger screening, passenger hold room, baggage claim, and the Aircraft Café. The terminal has been overcrowded since 9/11 and the addition of TSA. TSA has taken up former rental car and gift shop space. As a result, Avis relocated to a desk situated in the non-secure passenger waiting area due to the lack of space and the gift shop closed.

[3] Great Lakes Aviation. Form 10-K Fiscal Year End 12/31/09.

FIGURE 2-7- TERMINAL BUILDING



Source: Jviation, Inc.

2.7.2.1 Airline Spaces

The ticket counters are located just inside the main entrance of the terminal. There are two counters, each with two positions. Currently, Great Lakes Airlines leases only one of the ticket counters. Behind each ticket counter is about 125 square feet for the Airline Ticket Office (ATO). An enclosed and heated baggage make-up space is located behind the ATOs and allows pull-in and out baggage cart operations. The airline has a motorized cart that hauls the checked baggage to and from the aircraft, airline support areas, and baggage claim. The baggage claim uses small garage doors and a slide to get bags to the baggage claim area.

2.7.2.2 Aircraft Parking and Gates

Commercial aircraft parking is located directly north of the terminal building and can accommodate up to two commuter aircraft. The terminal has one holdroom for scheduled passenger service with all the outgoing passengers into the existing a single gate door to the ramp.

2.7.2.3 Concessions

The Airport Café, a popular local restaurant, is located on the northwest side of the terminal. The Café offers a full service menu, and is open seven days a week, from 5:30am to 10:00pm. The majority of the Airport Café's business comes from non-aviation related customers. The Café has 1,120 square feet of seating area and a fully equipped 535 square foot kitchen. Currently, the Café does not have a liquor license, but if it were to acquire one it could possibly generate significantly more revenue.

2.7.2.4 Rental Car Facilities

There are two rental car companies located within the terminal, Avis and Hertz. Both of the companies' business hours correspond with the arrival and departures of the scheduled air service. The rental car companies utilize the parking lot in front of the terminal where signage is in place to designate parking positions for each.

Additionally, Jim's Aircraft Service (FBO) offers rental cars for the GA users of the airport.

2.7.2.5 Passenger and Baggage Screening (TSA Facilities)

Since 9/11, security measures took effect authorizing the creation of the Transportation Security Administration (TSA) to perform all passenger and checked bags screening. TSA passenger screening is located in the center of the terminal. Passenger screening facilities consist of one Walk Through Metal Detector (WTMD) and one X-Ray Conveyor belt machine. Based on the current volume of commercial airline traffic, the quantity and configuration of the TSA equipment is sufficient.

Baggage screening is performed using two General Electric Itemizer Trace Detection (ETD) machines, where the exterior of all checked bags are swabbed by TSA personnel and tested with an ETD machine for explosive materials. This type of baggage screening is far slower than the automated Explosive Detection System (EDS). However, due to the low volume of passenger traffic the current method is adequate.

As stated previously, the terminal wasn't initially designed for TSA facilities. TSA office needs resulted in the loss of the gift shop and relocation of the Avis Rental Car to relocate to a desk situated in the non-secure passenger waiting. Also, TSA procedures and equipment are continually evolving in reaction to new threats. Changes to space in the terminal may be needed to meet evolving TSA security methods.

2.7.2.6 Curb Front

The curb front is located direct in front (south) of the terminal. The curb front is only used for passenger drop off and pickup. There is no curbside check-in due to low passenger volumes.

2.8 GENERAL AVIATION FACILITIES

General Aviation (GA) facilities provide services to GA operators at an airport. GA facilities include the Fixed Base Operator (FBO), hangars, and apron/tiedown space.

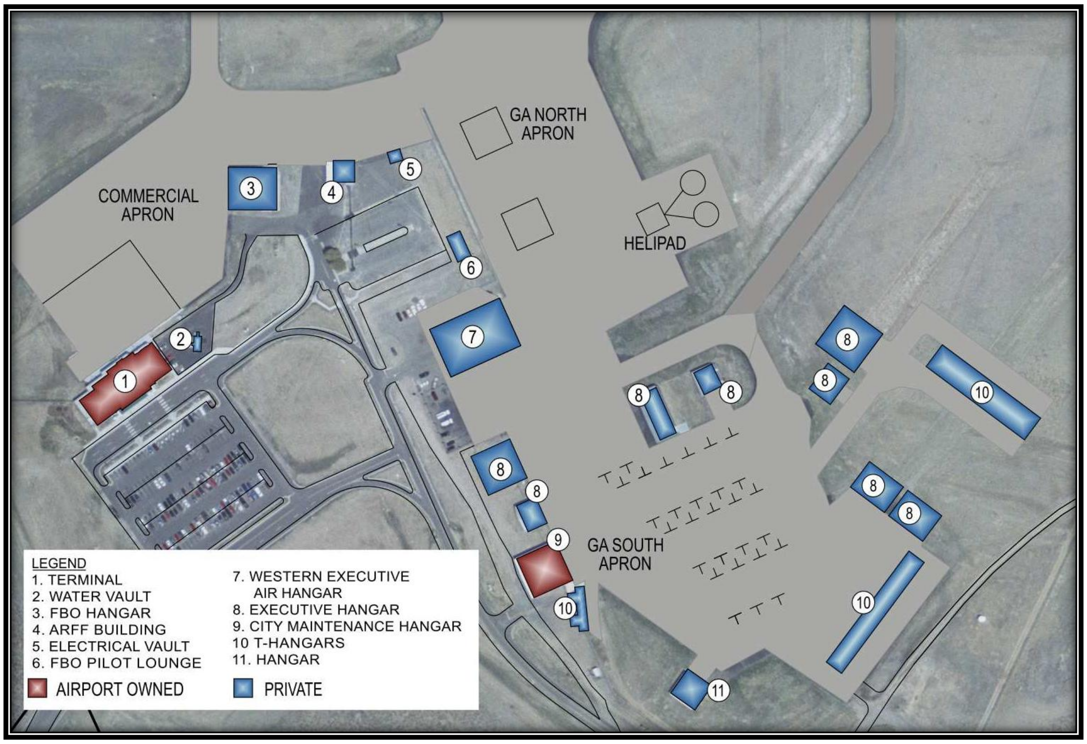
2.8.1 Fixed Base Operator

RIW has one FBO, Jim's Aircraft Services. The FBO is open during normal business hours, which includes weekdays from 7:00am to 5:30pm, weekends 8:00am to 4:00pm. After hour call-service is offered with prior arrangement and/or a callout fee. Jim's Aircraft Service is a full service FBO. 100 Low Lead (AvGas) and Jet A are available for purchase, in addition to other services such as oxygen service, aircraft parking on the ramp, tie-downs, a GPU/Power cart, pilot lounge, aircraft rental, aircraft maintenance, pilot supplies, and rental cars. The fueling and maintenance facilities are located on GA apron, directly south of Taxiway A1. The pilot lounge is located on the northwest side of the GA ramp.

2.8.2 Airport Hangars

The hangars at RIW as shown in **Figure 2-8** include two T-hangar units, six executive hangars, one private hangar, Jim's Aircraft Services hangar, the City Maintenance Hangar, and the old Western Executive Air hangar. The only buildings owned by the Airport are the City Maintenance Hangar and the Terminal Building, shown in red in **Figure 2-8**. The rest of the hangars are privately owned (hangars in blue), with the land leased from the Airport. The land leases are normally for five years, with the option to renew for another five year, and there is a reversion clause, meaning once the lease has expired anything built on airport property will become property of to the airport. The land lease rate is $0.13 per square foot, and increases each year according the Consumer Price Index.

FIGURE 2-8- AIRPORT HANGARS



Source: Jviation, Inc.

2.8.3 Based & Transient Aircraft Parking Aprons & Tiedowns

Jim's Aircraft Services manages all the tiedowns while the airport keeps a current list of the hangars with the airplanes and their owners. There are 37 designated tie-downs. The airport/FBO do not charge tie-downs fees. This may need to be re-assessed, to determine if a significant amount of revenue can be generated from tie-down fees.

2.9 AIRPORT EQUIPMENT

The Airport owns and operates several pieces of large equipment to perform maintenance, snow removal, and Aircraft Rescue and Fire Fighting (ARFF). ARFF & Snow Removal Equipment (SRE) are eligible for FAA funding, most other maintenance equipment is eligible for WYDOT Aeronautics funding.

2.9.1 ARFF Equipment

Aircraft Rescue and Firefighting (ARFF) is a special category of firefighting on airports for response, evacuation, and possible rescue of passengers and crew in an aircraft. Since RIW is a Federal Aviation Regulations (FAR) Part 139 airport, it is required to provide ARFF service during air carrier operations. Riverton Regional Airport (RIW) has an ARFF Index of A. RIW has one ARFF truck. It is a 2001 KME/Walters ARFF Vehicle with a capacity of 1,500 gallons of water, 150 gallons of Aqueous Film Forming Foam (AFFF), and 500 pounds of dry chemical. See **Section 2.14** for more information on Part 139.

2.9.2 Snow Removal Equipment (SRE)

Snow removal equipment (SRE) requirements are also regulated under FAR Part 139. RIW's category requires it to have enough equipment to clear one inch of falling snow per hour from the primary runway, taxiway(s), and commercial service apron. RIW's snow removal equipment includes two snowplows and two tractors. One snowplow is a 1980 Sincard with an 18-foot blade and the other is a 2003 Kodiak Northwest with a 20-foot blade and snowblower. The tractors are the 1999 John Deere tractor 5510 2x4 with a snow blower, and the 2009 John Deere 5095M 4x4 with bucket, broom, snowblower, and rear blade attachments. The SRE is adequate to meet FAR Part 139 standards for snow removal. The snow removal equipment is operated by the airport's operations staff and is stored in the maintenance hangar on the GA ramp.

2.10 Support Facilities

2.10.1 Aircraft Rescue and Firefighting (ARFF) Station

The Airport's Aircraft Rescue and Firefighting (ARFF) Station is located on the commercial apron. It is a 40 by 40 foot metal building, and is adequate for housing the ARFF truck. The ARFF building is also the on-site airport operation's office. Since the ARFF Station was built, the sewer line leading into the old terminal was replaced due to freezing in the winter months. Also a new stairway to the upper storage area was installed, the previous method was a ladder. Additionally, the ARFF Station's garage doors are showing signs of deterioration and will need to be repainted or may need to be replaced.

2.10.2 Snow Removal Equipment (SRE) Building

The Snow Removal Equipment is stored in the maintenance hangar on the GA ramp. The maintenance hangar is not an ideal method of storage for the SRE equipment, as the hangar could be leased for aircraft storage.

2.10.3 Aircraft Fuel Storage

RIW has two fuel tanks located on the southwest corner of the GA ramp. The fuel tanks are above ground with one tank able to hold 12,000 gallons of fuel and the other tank capable of holding 15,000 gallons Jet A fuel. The fuel tanks are owned by the Airport and leased and operated by Jim's Aircraft Services (FBO). Additionally, Jim's Aircraft Services owns and operates four fuel trucks: 1995 Ford 2,500 gallon Jet A truck, 1998 Ford 1,600 gallon Jet A truck, 1983 Ford 1,200 gallon AvGas truck, and 1979 GMC 1,400 gallon 100 Octane Low Lead (100LL) truck.

2.11 Access, Circulation, and Parking

Adequate vehicular access to the Airport, as well as parking facilities, are necessary for effective operation. The following summarizes existing road and parking conditions at the Airport.

2.11.1 Airport Access Road Network

RIW's public entrance roads, Chandelle Boulevard and Airport Road (Old Highway 26) are located on the southeast side of the airport. Chandelle Boulevard provides direct access to the terminal building, and Airport Road provides access to the GA side of the Airport's aprons. Airport Road approaching the Airport is in poor condition; however it is off airport property and is not eligible for repair through the federal or state grants.

2.11.2 Circulation Roads

A loop road circles the parking lots providing curb front access as well as general circulation.

2.11.3 Auto Parking

RIW has free long- and short-term paved parking, located in front of the terminal building. There are 153 parking spaces in front of the terminal: two for TSA, 20 allocated to Hertz Rental Car, 10 allocated to Avis Rental, 5 for handicap, and 116 for general parking. Additionally, there are seven parking spaces on the east side of the terminal: six for employees and one handicap parking space.

2.12 Utilities

RIW has a variety of basic utilities including water and sewer, telecommunications, gas, and electricity. The utility lines serving the Airport are buried underground and provide service to the buildings and airfield facilities.

2.12.1 Water & Sanitary Sewer

The City of Riverton provides water and sanitary sewer to RIW. The municipal water system has two separate sources, a well field of 13 wells ranging from 450 to 1,300 feet below the surface for the use during the winter months, and a surface water treatment plant for use during the summer months. The sustained combined yield of the water production facilities is slightly in excess of eight million gallons per day, sufficient to accommodate a population of 35,000 people.

2.12.2 Fiber Optics and Communications

Qwest Communications provides both residential and business telephone and broadband for the area. Additionally, Bresnan Communications competes with Qwest by providing residential telecommunication services and McLeod USA provides business services.

2.12.3 Natural Gas

KN Energy is the natural gas utility provider for the Riverton area.

2.12.4 Electricity

Rocky Mountain Power and High Plains Power, Inc. provide electricity for the City of Riverton.

2.13 METEOROLOGICAL DATA

Since the City of Riverton is surrounded by the Wind River Mountains and Rocky Mountains to the west and north, it has some of the mildest year-round weather in the state of Wyoming.

2.13.1 Wind Coverage

Wind conditions are particularly important for runway use at an airport. Each aircraft has an acceptable crosswind component for landing and takeoff. The crosswind component is a calculation of the speed of wind at a right angle to the runway centerline. When the acceptable crosswind component of an aircraft is exceeded the aircraft must divert to another runway or a completely different airport. Per the FAA Advisory Circular (AC) 150/5300-13, *Airport Design*, when the current runway(s) provide less than 95% wind coverage for any aircraft that use the airport on a regular basis, a crosswind(s) runway should be considered. The crosswind components of 10.5, 13, 16, and 20 knots were used for this analysis to look at different size aircraft's allowable crosswind component. A 10.5 knot crosswind component is used for small aircraft weighing 12,500lbs or less, and a crosswind component 20 knots is used for an aircraft the size of a Boeing 767.

The weather observations taken at Riverton Regional Airport were obtained from the National Climatic Data Center (NCDC). Observations were taken at RIW from 2000 to 2007. This data indicates that during All Weather conditions, the current runway orientations provide 97.48% coverage for a 10.5 knot crosswind, 99.04% coverage for a13 knot crosswind, 99.74% coverage for a 16 know crosswind, and 99.97% coverage for a 20 knot crosswind.

Moreover, the data taken indicated that during Instrument Flight Rules (IFR) conditions, the existing runway orientations provide 99.35% coverage for a 10.5 knot crosswind, 99.80% coverage for a13 knot crosswind, 99.85% coverage for a 16 knot crosswind, and 99.86% coverage for a 20 knot crosswind.

Looking closer at the wind data, **Table 2-11** shows that a runway with a northwest/southeast orientation provides the highest percent of wind coverage for "All Weather" conditions, which is Runway 10/28. It also shows that a north/south runway orientation is best during IFR conditions, which is Runway 1/19.

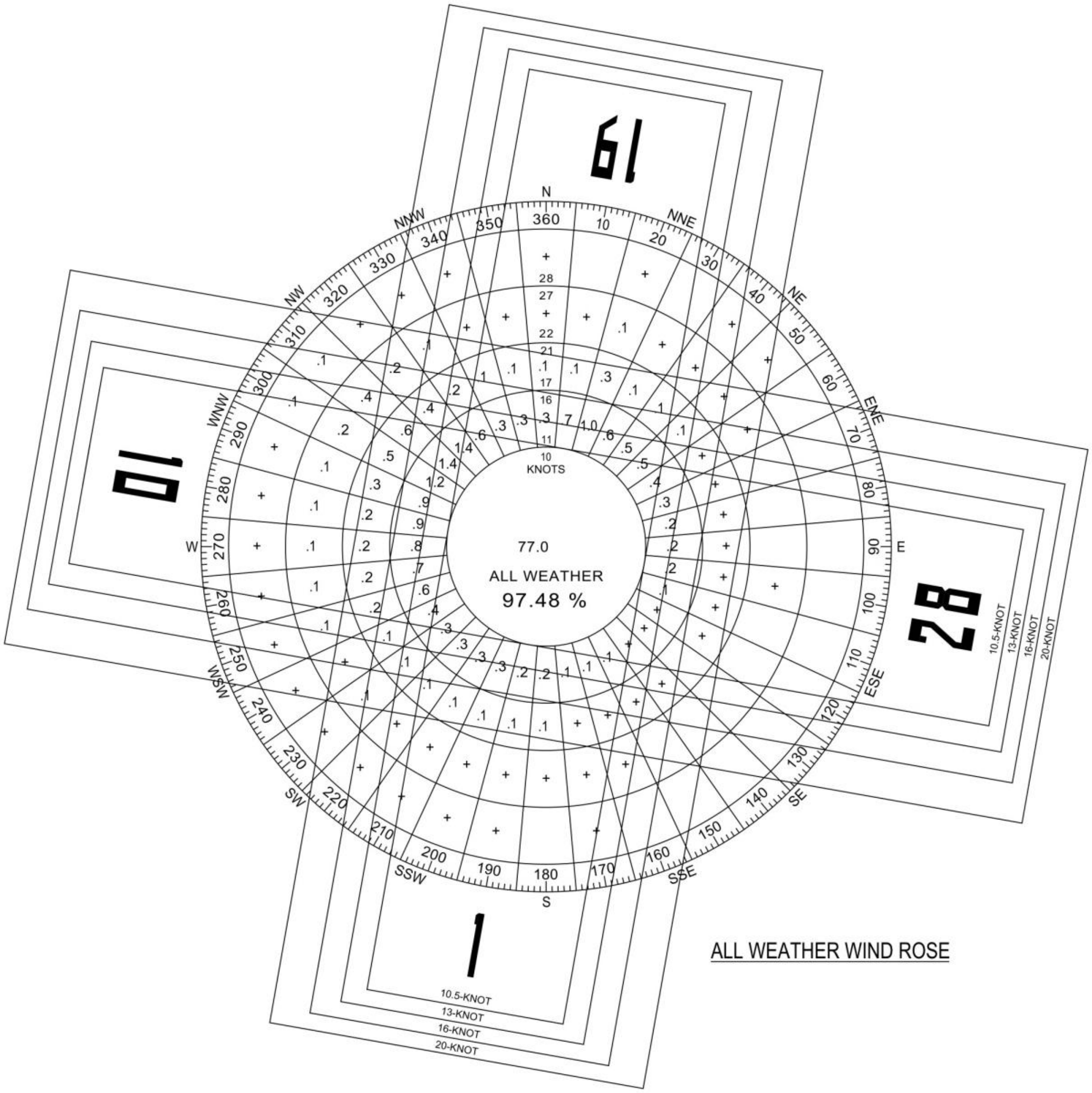
TABLE 2-12- RUNWAY ALIGNMENT WIND COVERAGE (10.5 KNOTS)

Runway Orientation	% Coverage (All Weather)	% Coverage (IFR)
1/19	**87.07**	**96.41**
2/20	87.10	96.99
3/21	87.41	96.90
4/22	87.81	96.02
5/23	88.19	94.27
6/24	88.44	91.06
7/25	88.71	88.10
8/26	89.14	85.91
9/27	89.71	84.21
10/28	**90.47**	**83.13**
11/29	90.79	82.40
12/30	90.56	82.27
13/31	90.09	83.23
14/32	89.62	85.19
15/33	89.17	88.01
16/34	88.58	90.95
17/35	87.99	93.86
18/36	87.45	93.86

Source: Jviation, Inc.

The FAA All Weather and IFR weather wind roses are depicted in **Figure 2-9** and **Figure 2-10** on the following pages.

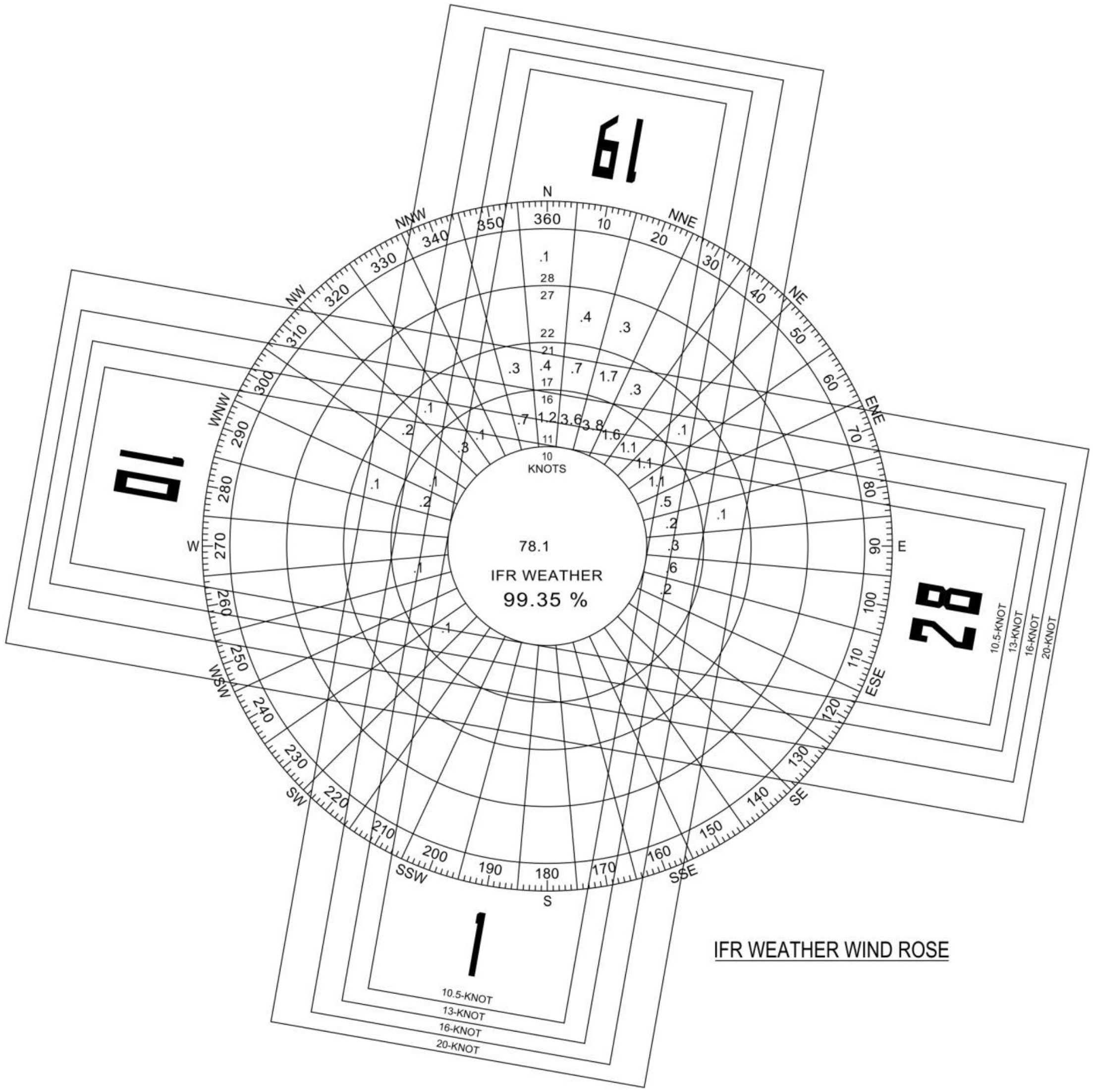
FIGURE 2-9 - ALL WEATHER WIND ROSE



ALL WEATHER WIND ROSE

Runway Designation	20-Knot Crosswind Component	16-Knot Crosswind Component	13-Knot Crosswind Component	10.5-Knot Crosswind Component
RUNWAY 01/19	98.53%	96.27%	91.85%	87.07%
RUNWAY 10/28	99.26%	97.78%	94.43%	90.47%
COMBINED	99.97%	99.74%	99.04%	97.48%

FIGURE 2-10 - IFR WIND ROSE



IFR WEATHER WIND ROSE

Runway Designation	20-Knot Crosswind Component	16-Knot Crosswind Component	13-Knot Crosswind Component	10.5-Knot Crosswind Component
RUNWAY 01/19	99.87%	99.48%	98.20%	96.41%
RUNWAY 10/28	98.13%	95.03%	88.67%	83.13%
COMBINED	99.86%	99.85%	99.80%	99.35%

2.13.2 Temperature

The mean maximum temperature of the hottest month, also known as the airport reference temperature, occurs in July with a temperature of 88.8 ºF. The average temperature in January is 29.4ºF and in June it is 79.6 ºF. These temperatures are recorded by the Western Region Climate Center. [4]

2.13.3 Precipitation

May is typically the rainiest month in Riverton, and the total precipitation averages 8.79 inches per year. The average snowfall for the city averages 33.6 inches per year, with most of the snow fall occurring in March, April, and November.[5] High winds can continue to cause hazardous blowing snow conditions even when no new snow is accumulating.

2.13.4 Instrument Meteorological Conditions (IMC)

From the information provided by National Climatic Data Center (NCDC), Instrument Meteorological Conditions (IMC) occur 2.1% of the time at RIW. IMC is defined as a period when cloud ceiling are less than 1,000 feet above ground and/or visibility is less than three miles. When IMC occurs, Instrument Flight Rules (IFR) must be adhered to. A review of the data indicates that periods of IFR mostly occur between October and April, as displayed in **Table 2-13**.

TABLE 2-13 - PERCENT IMC OCCURS PER MONTH

Month	IMC%
January	2.3%
February	4.6%
March	2.4%
April	3.5%
May	1.2%
June	0.2%
July	0%
August	0.05%
September	0.9%
October	2.5%
November	4.1%
December	2.9%
Annual	**2.1%**

Source: Jviation, Inc.

[4] Western Region Climate Center, Colorado Climate Summaries. http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?wyrive
[5] Western Region Climate Center, Colorado Climate Summaries. http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?wyrive

2.14 AIRPORT CERTIFICATION AND REGULATIONS

Riverton Regional Airport (RIW) is a commercial service airport, meaning that it provides scheduled passenger service on commercial airliners. As a commercial service airport, RIW is required to follow the Federal Aviation Regulation (FAR) Part 139, *Certification Requirements*, and Transportation Security Regulations (TSR) Title 59, Part 1542, *Airport Security*.

2.14.1 FAR Part 139

FAR Part 139, *Certification Requirements*, requires the FAA to issue airport operating certificates to commercial service airports to ensure safety in air transportation. Part 139 sets forth regulations for certification and operation of land airports that serve any scheduled or unscheduled passenger operations of an air carrier having aircraft with a seating capacity of more than 9 passengers. To obtain a certificate, an airport must agree to these certain operational and safety standard requirements. These requirements vary depending on the size of the airport and the type of flights available. As a commercial service airport, RIW must meet the requirements for Part 139 as listed in **Table 2-14**.

TABLE 2-14 - PART 139 CONTENTS

Subpart D – Operations	
139.301	Records
139.303	Personnel
139.305	Paved areas
139.307	Unpaved areas
139.309	Safety areas
139.311	Marking, signs, and lighting
139.313	Snow and ice control
139.315	Aircraft rescue and firefighting: Index determination
139.317	Aircraft rescue and firefighting: Equipment and agents
139.319	Aircraft rescue and firefighting: Operational requirements
139.321	Handling and storing of hazardous substances and materials
139.323	Traffic and wind direction indicators
139.325	Airport emergency plan
139.327	Self-inspection program
139.329	Pedestrian and Ground vehicles
139.331	Obstructions
139.333	Protection of NAVAIDs
139.335	Public protection
139.337	Wildlife hazard management
139.339	Airport condition reporting
139.341	Identifying, marking, and reporting construction and other unserviceable areas
139.343	Noncomplying conditions

Source: FAR Part 139, Certification Requirements

2.14.1.1 FAA Certification Inspection

The last FAA Certification Inspection was in May 19, 2010. There were four corrective actions needed.

139.311C1 - Operations: Marking, Signs, and Lighting. Runway edge lighting system on Runway 10/28 is failing. Airport operations are replacing bulbs continuously. The illumination of runway edge lights is inconsistent with several lights in a row being dim then two or three being as bright as medium intensity. Moisture in system is creating maintenance problems and unsafe conditions for personnel when replacing bulbs. The lighting system is over 20 years old and direct buried wire. *To be corrected with Runway 10 Reconstruction when funds become available.*

139.311F -Operations: Marking, Signs, and Lighting. Road stop signs shall be placed at any service road at intersection of a runway, taxiway, or ramp where aircraft are transitioning. *The Airport corrected on June 22, 2010.*

139.321B5 – Operations: Handling and Storing of Hazardous Substances and Materials. FBO small Ford fuel truck does not have fire extinguisher mounted on outside of truck. Extinguisher enclosed in cabinet of truck. Nozzle is rough with metal spars and needs to be filed down so spars aren't dislodged. *The Airport corrected on June 8, 2010.*

139.321.B5 – Operations: Handling and Storing of Hazardous Substances and Materials. FBO Ford 100LL truck needs faded placarding replaced. No Smoking, AVGAS 100LL, and Flammable. *The Airport corrected on June 8, 2010.*

2.14.1.2 Part 139: Aircraft Rescue and Firefighting

A major item of Part 139 pertains to Aircraft Rescue and Firefighting (ARFF). Part 139 dictates the number of personnel, type and quantity of firefighting equipment required based on the largest commercial aircraft with five or more flights daily. An Index is assigned to each airport based on a combination of air carrier aircraft lengths, as shown in **Table 2-15**. This Index determines the required number and type of ARFF vehicles the airport must have.

TABLE 2-15 - ARFF INDEX DETERMINATION

ARFF Index	Aircraft Length (Feet)
A	<90
B	>90≤126
C	>126≤159
D	>159≤200
E	>200

Source: FAR Part 139, Certification Requirements

The Beech 1900D operated by Great Lakes operates at RIW on an average of six times per day and are 57'10" long, which means RIW has an ARFF Index of A.

Part 139 requires Index A airports to have the following[6]:

- One vehicle carrying at least:
- 500 pounds of sodium-based dry chemical, halon 1211, or clean agent; or
- 450 pounds of potassium-based dry chemical and water with a commensurate quantity of Aqueous Film Forming Foam (AFFF) to total 100 gallons for simultaneous dry chemical and AFFF application.

RIW meets the requirements of Index A with the KME/Walters ARRF Vehicle, because it has a capacity of 1,500 gallons of water, 150 gallons of AFFF, and 500 pounds of dry chemical.

The airport has five certified firefighters to provide coverage during commercial flights.

2.14.2 TSR Part 1542

The Code of Federal Regulations (CFR), Title 49, Part 1542, *Airport Security*, shown in **Table 2-16**, defines the security measures required at a commercial airports to be in compliance with the Aviation and Transportation Security Act (ATSA) of 2001. Before September 11th, the majority of airport security was the responsibility of the airport, aside from passenger and baggage screening, which was the responsibility of the individual airlines.

Since the inception of ATSA and Part 1542, the responsibilities of airport security have shifted. The Transportation Security Administration (TSA), a division of the Department of Homeland Security formed under Part 1542, is responsible for the screening process of passengers and baggage, but all other aspects of airport security remain are the responsibility of the airport. Additionally, under Part 1542 the airport assumes supplementary

[6] Federal Aviation Regulations (FARs) Part 139, Airport Certification

responsibilities: developing an Airport Security Program (ASP), appointing an airport security coordinator (ASC) who enforces the ASP, managing access control, and accessing the system and credentials required for aviation employees.[7] However, TSA continues to migrate into many other areas of airport security that have traditionally been the responsibility of the airport, including: bomb detection and assessment officers, K-9 officers, and visible intermodal protection and response teams. To ensure compliance, every airport must keep in mind that TSA regulations are subject to frequent change and should review the most up to date Part 1542 of the CFR for the current airport security regulations. Presently, RIW is in compliance with all the applicable security regulations and requirements.

TABLE 2-16 - PART 1542 CONTENTS

Part 1542 – Airport Security	
1542.201	Security of secured area
1542.203	Security of air operations area (AOA)
1542.205	Security of security identification display area (SIDA)
1542.207	Access control systems
1542.209	Fingerprint-based criminal history records checks (CHRC)
1542.211	Identification systems
1542.213	Training
1542.215	Law enforcement support
1542.217	Law enforcement personnel
1542.219	Supplementing law enforcement personnel
1542.221	Records of law enforcement response

Source: Part 1542, Airport Security

However, because RIW's terminal was designed and constructed prior to the creation of Part 1542, the additional rental car space, as well as the gift shop area, have been unexpectedly occupied by the TSA. Avis has relocated to a desk situated in the non-secure passenger waiting area due to the lack of space and the gift shop closed.

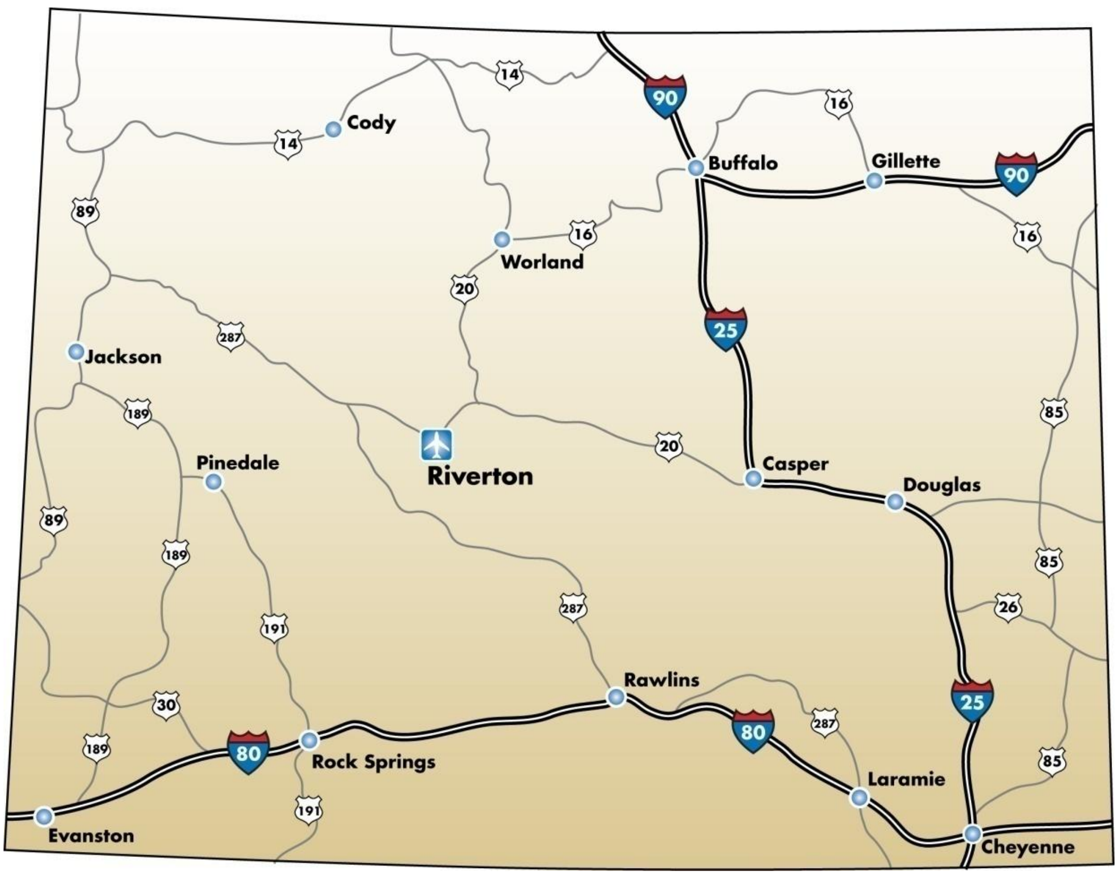
The airport provides three Law Enforcement Officers (LEOs) for all commercial flights. All three LEOS are cross trained as ARFF responders.

[7] Code of Federal Regulations (CFR), Title 49, Part 1542, *Airport Security*

2.15 Regional Setting

RIW is located in central Wyoming, approximately 100 miles west of Casper, shown in **Figure 2-11**. The City of Riverton is in Wind River Country, located where the Big Wind and Little Wind River join. It is surrounded by Owl Creek (to the north), Wind River Mountain Ranges (south & west), and Gas Hills to the east. Surrounding Riverton is the Wind River Indian Reservation.[8] The Reservation is the seventh largest reservation in the country, with more than 2.2 million acres, and is home to over 8,000 members of the Eastern Shoshone and the Northern Arapahoe tribes.[9]

FIGURE 2-11 - LOCATION MAP



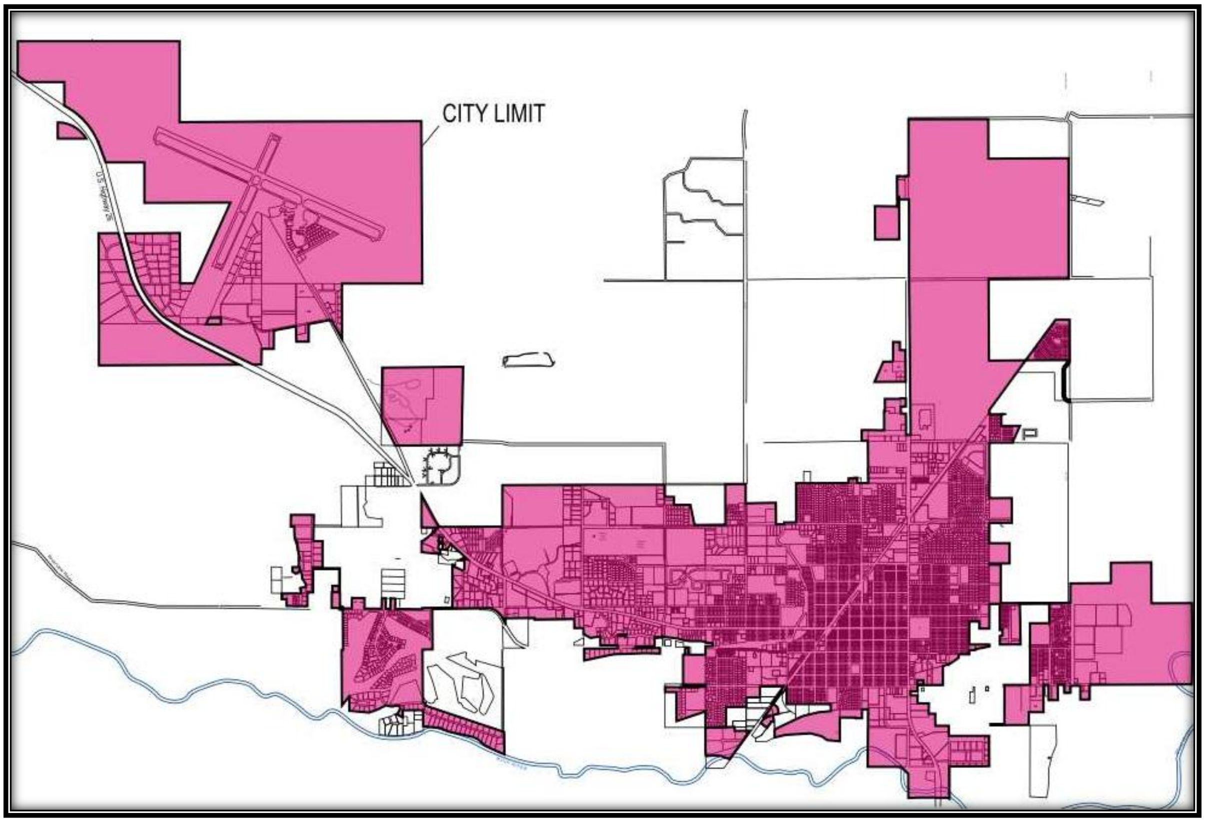
Source: Jviation, Inc.

The City of Riverton boundary incorporates the airport property, as shown in **Figure 2-12**. The City of Riverton is compromised of 6,251 acres; of that 2,249 are currently developed or pending development applications; 2,794 acres are in active use for parks, schools, utilities, and other major public facilities, and 1,208 are vacant lands, agricultural uses, and right-of-way. Almost half (45%) of the City is public/quasi-public land, the remainder is privately owned. Additionally, a large portion

8 Riverton Chamber of Commerce. http://www.rivertonchamber.org/community/RegionalFacts.asp
9 Wyoming's Wind River Country. http://www.wind-river.org/

of the public land is zoned for the airport, Central Wyoming College, the State Honor Farm, and the Rendezvous site.[10]

FIGURE 2-12 - CITY OF RIVERTON BOUNDARY



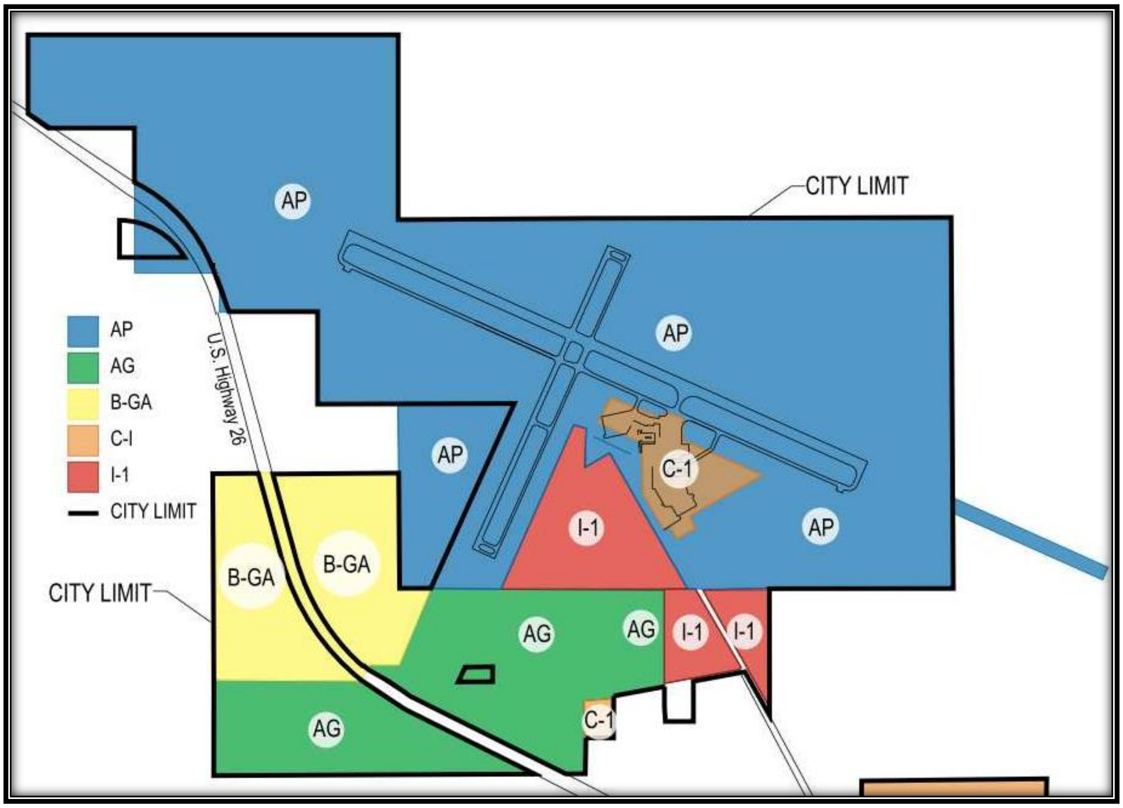
Source: City of Riverton; Map: Jviation

[10] City of Riverton Master Plan, Adopted April 2007.

2.16 AIRPORT PROPERTY AND LAND USE

The Airport presently owns approximately 1,301 acres of land, which encompasses the airfield and the property surrounding the Airport (**Figure 2-13**). On the east side of the Airport property, is an 11.61-acre parcel that the Airport acquired from the Department of interior in 1983. This area is to accommodate Runway 28's MALSR system.

FIGURE 2-13 - CITY ZONING



Source: City of Riverton Future Land Use Plan, Adopted April 2007

Figure 2-13 shows the zoning areas within the Airport property. The map depicts Agricultural (AG), Commercial (C-1), Industrial (I-1), and Residential (B-GA) zoning adjacent to or within the Airport's property. Each zoning uses and characteristics are explained in **Table 2-17**.

TABLE 2-17 - LAND USE

Category	Description
Airport (AP)	Compatible land use includes airports, single family dwellings located on the unsubdivided tracts of one acre or more, agricultural activity and public parks and recreational areas. Height restrictions within this district dictate that no structure or tree shall be erected, altered, allowed to grow, or be maintained to a height in excess of the applicable height limitations established by the FAR Part 77 Imaginary Surface that surround the Airport. No dwellings are to be erected or located within the 65 DNL noise contour.
Agricultural (AG)	Compatible land use includes any form of agricultural activity, but excluding feed lots and sales or auction yards, single family dwelling located on unsubdivided tracts of one acre or more, and public parks and recreation areas. There are no height restrictions placed within this zone.
Estate Residential (B-GA)	Compatible land use includes single and multiple family dwelling on the lots that are a minimum of 5,000 square feet, parks, churches, libraries, barns, one livestock unit per ½ acre, and pasturage or the production of crops. A 45- height restriction is placed on any buildings or structures in this zone.
Commercial (C-1)	Compatible land use includes offices, automobile parking, airport hangars, and FBO's that can service and fuel aircraft. A 45-foot height restriction is placed on any building or structure in this district.
Industrial (I-1)	Compatible land use includes, among others, animal hospitals, auto body repair shops, billboards, greenhouses, motor vehicle and machinery sales and services, and warehouses. Buildings located with 150 feet from a residential district have a height restriction of 45 feet.

Source: City of Riverton Master Plan, Adopted April 2007

2.17 Wind River Job Corps

Job Corps is the nation's largest residential education and vocational training program for economically disadvantaged youth, with centers in 48 states. In 2007, Riverton was selected as a site for one of these centers, and the City has since worked to secure funding for its completion. The Job Corps training center will be located approximately one mile south of the airport off of Airport Road, and is not on airport property nor will it affect any development at the airport. Much work has been completed, but the project is awaiting $35 million of capital construction dollars from the U.S. Department of Labor for this outstanding project. When completed, Wind River Job Corps will handle 300 students and employ 100 fulltime staff. It will be a great asset for the community, the county and the state.

2.18 Community Socioeconomic Analysis

During the master planning process it is essential to know the social and economic health of the community that serves the airport. The foundation for development of aviation forecasts is typically centered on this information. Three socioeconomic indicators are population, employment, and income, all of which have an impact on the levels of aviation activity at an airport.

2.18.1 Population

According to the U.S. Census Bureau and the Wyoming Department Transportation between 2000 and 2008, the City of Riverton has grown as fast as the cities of the nearby competitor airports. Moreover, it has grown approximately 2% faster than Fremont County, as shown in **Table 2-18.**

TABLE 2-18 - POPULATION DATA

Place	Census 2000 Population	July 2004 Population	July 2005 Population	July 2006 Population	July 2007 Population	July 2008 Population	% Change July 2007 to July 2008	% Change 2000 to 2008
Fremont County	35,804	35,941	36,273	36,770	37,461	38,113	1.7	6.45
City of Riverton	9,310	9,300	9,428	9,608	9,820	10,032	2.16	8.36
Town of Dubois	962	975	985	1,008	1,032	1,053	2.03	9.26
Town of Hudson	407	409	412	416	423	429	1.41	5.40
City of Lander	6,867	6,837	6,878	6,989	7,132	7,264	1.85	5.08
Town of Shoshoni	635	652	655	661	677	689	1.77	8.50
Town of Pavilion	165	163	163	164	167	169	1.2	2.4
Balance of Fremont County	17,458	17,605	17,752	17,924	18,210	18,477	1.5	5.8

Source: State of Wyoming, Economic Analysis Division

2.18.2 Employment

The Fremont County School District is the largest employer of the City of Riverton. **Table 2-19** shows the top employers in Riverton.

TABLE 2-19 – RIVERTON'S PROFILE OF MAJOR EMPLOYERS

COMPANY	EMPLOYEES	PRODUCT/SERVICE
Fremont County School District 25	525	Education
Central Wyoming College	500	Education
Wal-Mart	390	Retail
Wind River Casino	300+	Entertainment
Riverton Memorial Hospital	218	Medical
Community Entry Services	189	Government
City of Riverton	114	Government
BTI	93	Trucking
Pertech Resources, Inc.	87	Retail
Brunton	76	Retail

Source: Wyoming Business Council 2009

The U.S. Bureau of Economic Analysis (BEA) tracks employment by category (NAICS – North American Industry Classification System) in every county in the nation. **Table 2-20** shows the latest data and numbers for Fremont County.

TABLE 2-20 - 2007 NAICS TOTALS FOR FREMONT COUNTY

		Number of establishments of employment-size class								
	Total	1-4	5-9	10-19	20-49	50-99	100-249	250-499	500-999	1000 or more
Forestry, Fishing, Hunting, and Agriculture Support	8	7	1	0	0	0	0	0	0	0
Mining	54	26	5	7	12	3	1	0	0	0
Utilities	5	1	2	1	1	0	0	0	0	0
Construction	242	166	49	20	6	1	0	0	0	0
Manufacturing	35	18	6	7	3	1	0	0	0	0
Wholesale Trade	38	18	13	4	2	1	0	0	0	0
Retail Trade	208	95	62	31	12	5	2	1	0	0
Transportation and Warehousing	61	41	9	5	5	1	0	0	0	0
Information	30	12	7	6	4	1	0	0	0	0
Finance and Insurance	60	35	19	2	4	0	0	0	0	0
Real Estate and Rental and Leasing	78	65	5	5	2	0	1	0	0	0
Professional, Scientific, and Technical Services	117	88	19	9	1	0	0	0	0	0
Management of Companies and Enterprises	1	0	0	0	1	0	0	0	0	0
Administrative and Support and Waste Management and Remediation Services	36	25	8	2	1	0	0	0	0	0
Educational Services	14	5	2	2	2	1	2	0	0	0
Health Care and Social Assistance	128	69	19	19	11	7	3	0	0	0
Arts, Entertainment, and Recreation	32	24	3	4	0	1	0	0	0	0
Accommodation and Food Services	134	52	34	24	22	2	0	0	0	0
Other Services (except Public Administration)	121	93	20	6	1	1	0	0	0	0
Unclassified	4	4	0	0	0	0	0	0	0	0
Total	1406	844	283	154	90	25	9	1	0	0

Source: Census County Business Patterns. NAICS for Fremont County

2.18.3 Income

The per capita income in Fremont County is slightly lower than the State of Wyoming and the U.S. Average. However, in 2009 the cost of living index for Riverton was 85.5, which means it is 14.5% less expensive to live in Riverton than the "average" U.S. city.

TABLE 2-21- PER CAPITA PERSONAL INCOME COMPARISON

Place	2003	2004	2005	2006	2007	2008
Fremont County	$26,656	$28,560	$30,699	$34,047	$35,887	$37,431
State of Wyoming	$33,920	$36,261	$39,446	$44,677	$46,726	$48,580
U.S. Average	$32,271	$33,881	$35,424	$39,698	$39,392	$40,166

Source: U.S. Department of Commerce: Bureau of Economic Analysis

2.19 ENVIRONMENTAL OVERVIEW

FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, and Order 5050.4B, National *Environmental policy Act: Implementation Instruction for Airport Actions,* address specific environmental categories that are evaluated in environmental documents through the National Environmental Policy Act (NEPA). The following section inventories these categories and their existence at the airport.

2.19.1 Air Quality

The Airport is located in Fremont County, which is designated by the U.S. Environmental Protection Agency as being in attainment status for all parts of the county in all criteria. The criteria includes: 1-Hour Ozone, 8-Hour Ozone , Carbon Monoxide, Nitrogen Dioxide, Sulfur Dioxide, Particulate Matter PM-10, Particulate Matter PM-2.5, and Lead. Sheridan County is the only county in Wyoming designated as non-attainment, with only part of the county included.

TABLE 2-22 - NONATTAINMENT AREA, WY

County	Pollutant	Area Name	Nonattainment in Year	Classification	Cnty Whole/Part	Pop (2000)
WYOMING						
Sheridan	PM-10	Sheridan, WY	1992 - 2010	Moderate	Part	15,782

Source: U.S. Environmental Protection Agency, Nonattainment Status for Each County by Year, WY, 2010

2.19.2 Department of Transportation Act: Section 4(f)

The Department of Transportation (DOT) Act, Section 4(f)[11] provides that the "Secretary of Transportation will not approve any program or project that requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national,

[11] *U.S. Department of Transportation Act, section 4(f),* recodified and renumbered as § 303(c) of 49 U.S.C.

state, or local significance or land from an historic site of national, state, or local significance unless there is no feasible or prudent alternative and the use of such land includes all possible planning to minimize harm resulting from the use".

An analysis of DOT 4(f) properties in the vicinity of the Airport was completed (see **Table 2-23** for a list of properties). The City has seven City parks and the Fremont County Fairgrounds. Jaycee Park is the closet park to the Airport, located 2.5 miles to the southeast.

TABLE 2-23 - DOT 4(F) PROPERTIES

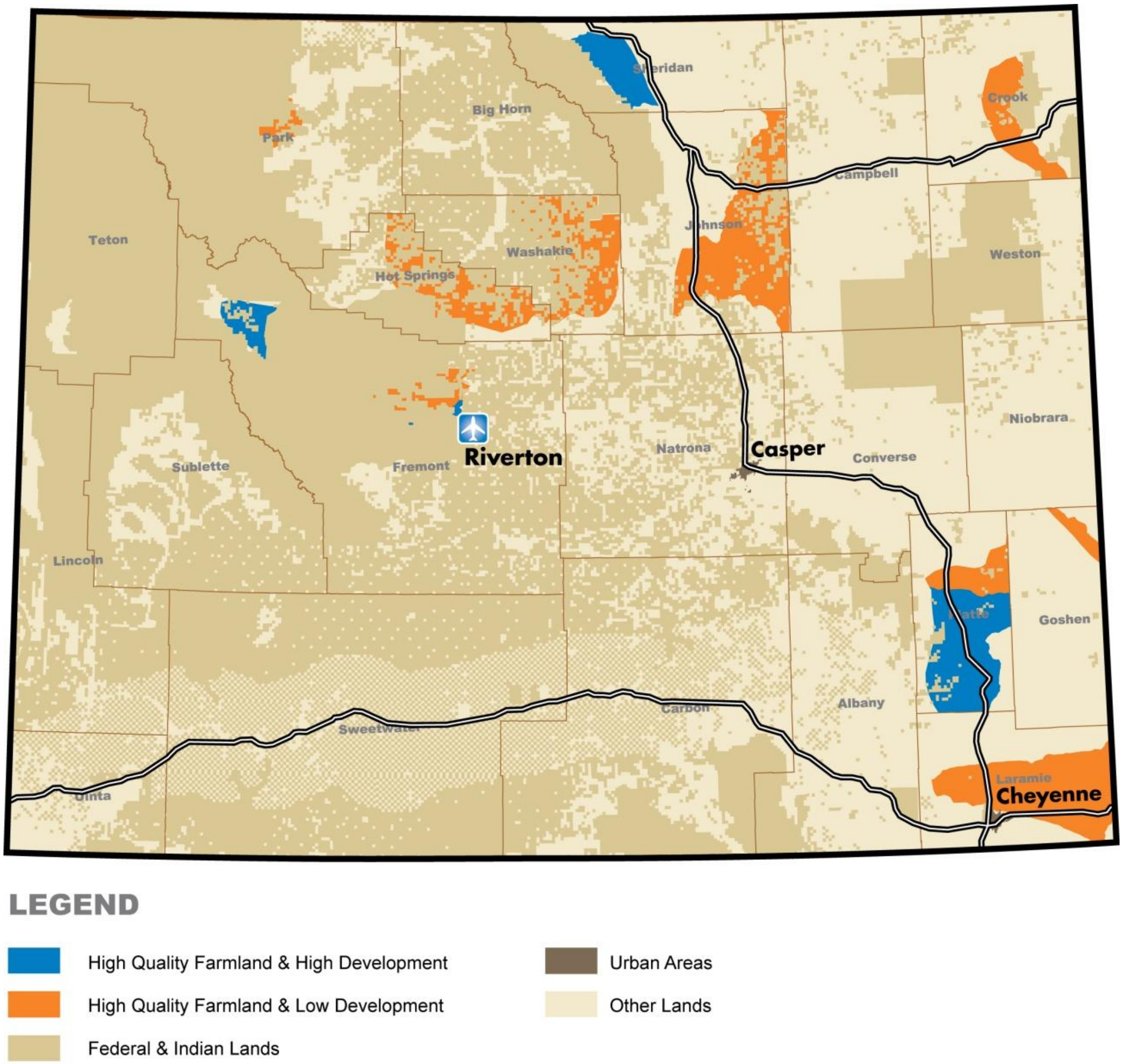
Property	Address	Type	Distance to Airport
Sunset Park	North 8th St. and W. Sunset Dr.	Park	3 miles
Jaycee Park	Major Ave and W. Sunset Dr.	Park	2.5 miles
Teter Park	N Broadway and Elk Dr.	Park	3 miles
City Park	S. Federal Blvd. and E Washington Ave	Park	4 miles
Aspen Park	N. 16th St. and E. Sunset Dr.	Park	4 miles
Monroe Park	Monroe Ave	Park	4 miles
Fremont County Fairgrounds	S. 6th St. and S. 8th St.	Fairgrounds	4 miles
Rein Park	W. Monroe and Spire Dr.	Park	4 miles

Source: Google Earth, 2009 and www.rivertonwy.gov

2.19.3 Farmlands

The Farmland Protection Policy Act (FPPA) regulates federal actions that may impact or convert farmland to a non-agricultural use. FPPA defines farmland as "prime or unique land as determined by the participating state or unit of local government and considered to be of statewide or local importance". Fremont County has a small amount of "prime and unique" farmland with a combination of high and low development associated with the farmland. The land of Fremont County is predominantly federal, Indian, and/or "other" land. "Other" land is land that is not have relatively large amounts of prime or unique farmlands or have rapid loss of high-quality farmland.

FIGURE 2-14 - FARMLAND



2.19.4 Fish, Wildlife, and Plants

Requirements have been set forth by The Endangered Species Act[12], The Sikes Act[13], The Fish and Wildlife Coordination Act[14], The Fish and Wildlife Conservation Act[15], and the Migratory Bird Treaty Act[16], for the protection of fish, wildlife, and plants of local and national significance.

Fremont County has several species listed by the US Fish and Wildlife Service as being threatened or endangered as depicted in **Table 2-24**.

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[12] Endangered Species Act of 1973, U.S. Congress, Public Law 93-205, 16 U.S.C §1531-1544
[13] Sikes Act, Amendments of 1974, U.S. Congress, Public Law 93-452
[14] Fish and Wildlife Coordination Act of 1958, U.S. Congress, Public Law 85-624, 16 U.S.C §661-666c
[15] Fish and Wildlife Conservation Act of 1980, U.S. Congress, Public Law 96-366, 16 U.S.C §2901-2912
[16] Migratory Bird Treaty Act of 1981, 16 U.S.C §703-712

TABLE 2-24 - THREATENED & ENDANGERED SPECIES (FREMONT COUNTY)

Fremont County, WY			
Species/Critical Habitat	**Scientific Name**	**Status**	**Habitat**
Black-footed Ferret	*Mustela nigripes*	Endangered	Prairie dog towns
Blowout Penstemon	*Penstemon haydenii*	Endangered	Sand blowouts or dunes
Canada Lynx	*Lynx canadensis*	Threatened	Montane forests
Canada Lynx Critical Habitat	Designated areas include boreal forest landscapes within Fremont, Lincoln, Park, Sublette, and Teton Counties of Wyoming (see 50 CFR 17.95(a))		
Colorado River Fish (Bonytail, Colorado Pikeminnow, Humpback Chub, Razorback Sucker)	*Gila elegans* *Ptychocheilus lucius* *Gila cypha* *Xyrauchen texanus*	Endangered Endangered Endangered Endangered	Downstream riverine habitat in the Yampa, Green, and Colorado River systems*
Colorado River Fish Critical Habitat	Designated for Colorado River Fish in Colorado and Utah in downstream riverine habitat in the Yampa, Green, and Colorado River systems (50 CFR 17.95(e))*		
Desert Yellowhead	*Yermo xanthocephalus*	Threatened	Beaver Rim, Fremont County
Desert Yellowhead Critical Habitat	Designated for desert yellowhead in Fremont County, Wyoming and consists of 360 acres of Bureau of Land Management administered lands within portions of Township 31 North, Range 95 West, Sections 27 and 34 (50 CFR 17.96(a))		
Gray Wolf	*Canis lupus*	Experimental	Greater Yellowstone Ecosystem
Greater Sage-grouse	*Centrocercus urophasianus*	Candidate	Sagebrush communities
Grizzly Bear	*Ursus arctos horribilis*	Threatened	Montane forests
Mountain Plover	*Charadrius montanus*	Proposed	Grasslands and prairie dog towns
Platte River Species (Interior Least Tern, Pallid Sturgeon, Piping Plover, Whooping Crane, Western Prairie Fringed Orchid)	*Sternula antillarum* *Scaphirhynchus albus* *Charadrius melodus* *Grus Americana* *Platanthera praeclara*	Endangered Endangered Threatened Endangered Threatened	Downstream riverine habitat of the Platte River system*
Platte River Species Critical Habitat	Designated for whooping crane in Nebraska in riverine habitat of the Platte River system (50 CFR 17.95(b))*		
Ute Ladies'-tresses	*Spiranthes diluvialis*	Threatened	Seasonally moist soils and wet meadows of drainages below 7,000 ft. elevation
Wolverine	*Gulo gulo luscus*	Candidate	Subalpine to alpine
Yellow-billed Cuckoo (Western)	*Coccyzus americanus*	Candidate	Riparian areas west of Continental Divide

** If the consumption or quality of water in the Platte or Colorado River Systems is affected, there may be impacts to threatened and endangered species inhabiting the downstream reaches of these river systems.*

Source: U.S. Fish and Wildlife Services, Federal Endangered, Threatened, Candidate Species, Fremont County, WY, 2010

2.19.5 Floodplains

Executive Order 11988, *Floodplain Management*[17] directs federal agencies to "avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and

[17] Executive Order 11988, Floodplain Management, 1977

modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative".

An examination of the Flood Insurance Rate Maps (FIRM) for Fremont County shows that the area surrounding the Airport is not mapped, but is considered Zone D by the National Flood Insurance Program as stated "Areas with possible but undetermined flood hazards. Zone D are areas in which flood hazards are undetermined, but possible. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk".

2.19.6 Hazardous Materials, Pollution Prevention, and Solid Waste

The Resource Conservation and Recovery Act (RCRA)[18], Comprehensive Environmental Response, Compensations, and Liability Act (CERCLA)[19], Superfund Amendments and Reauthorization Act (Superfund)[20], and the Community Environmental Response Facilitation Act (CERFA)[21] are the four predominant laws regulating actions related to the use, storage, transportation, or disposal of hazardous materials, chemicals, substances, and wastes. Federal actions that pertain to the funding or approval of airport projects require the analysis of the potential for environmental impacts per the regulating laws. Furthermore, property listed or considered for the National Priority List (NPL) should be evaluated in relation to the Airport's location.

One NPL site is located in Fremont County, a groundwater investigation in Pavilion, WY. Pavilion is located approximately 17 miles northwest of the Airport.

2.19.7 Historical, Architectural, Archaeological, and Cultural Resources

The National Historic Preservation Act[22] and the Archaeological and Historical Preservation Act[23] regulate the preservation of historical, architectural, archaeological and cultural resources. Federal actions and undertakings are required to evaluate the impact on these resources.

The National Register of Historic Places lists four properties within and near the city of Riverton. The properties are listed in **Table 2-25**. The closest property to the airport is Riverton Railroad Depot, which is approximately 3.5 miles to the southeast of the airport.

[18] U.S. Code, 1976, Resource Conservation and Recovery Act, 42 USC, §6901
[19] U.S. Code 1980, Comprehensive Environmental Response, Compensation and Liability Act, 42 USC, §9601-9628
[20] U.S. Code 1986, Superfund Amendments and Reauthorization Act, 42 USC
[21] U.S. Code 1992, Community Environmental Response Facilitation Act, Public Law 102-426
[22] U.S. Code, 1966, National Historic Preservation Act of 1966, Public Law 89-665
[23] U.S. Code, 1974, Archaeological and Historical Preservation Act of 1974, 16 USC 469

TABLE 2-25 - NRHP PROPERTIES

	Property Name	Address	Added to Registry	Distance to Airport
1	BMU's Bridge over Wind River	WY 132, Ethete	1985	16 miles
2	Delfelder Schoolhouse (Hall)	North of Riverton off US 26, Riverton	1978	4 miles
3	Riverton Railroad Depot	1st and Main Street, Riverton	1978	3.5 miles
4	St. Michael's Mission	Ethete	1971	15 miles

Source: National Register of Historic Places, Fremont County, 2010

2.19.8 Light Emissions and Visual Impacts

Federal regulations do not specifically regulate airport light emissions; however, the FAA does consider airport light emissions on communities and properties in the vicinity of the airport. A significant portion of light emissions at airports are a result of safety and security equipment and facilities. The Airport has seven primary sources of light including:

- Airport beacon: rotating light used to locate the airport
- Taxiway Lighting: lights outlining the taxiways and classified by the intensity or brightness the lights are capable of producing
- Medium Intensity Runway Lighting (MIRL): lights outlining the runway and classified by the intensity or brightness the lights are capable of producing
- Runway End Intensity Lights (REIL): two synchronized flashing lights located one on each corner of the runway landing threshold
- Precision Approach Path Indicator (PAPI): row of lights that provide visual glide slope guidance in non-precision approaches
- Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR): combination of threshold lamps, steady burning light bars and flashers, that provide visual information to pilots on runway alignment, height perception, role guidance, and horizontal references.
- Other sources of light can include parking lot lights, ramp/apron lights, building lights, and passenger/airport vehicle lights and aircraft lights.

All seven sources of light aid in the safety of operations at the airport and produce an insignificant amount of light on the areas outside the immediate airport property.

2.19.9 Noise

Aircraft noise and noise surrounding airports are two of the most notorious issues related to the environment at airports. The FAA examines actions and development that may change runway configurations, airport/aircraft operation and/or movements, aircraft types, and flight patterns, all of which could ultimately alter the noise impacts on the communities in the vicinity of the airport.

The Airport does not currently have a published noise abatement procedure plan. The land surrounding the Airport both inside the Airport property boundary and land directly bordering Airport property are zoned AP – Airport property. Thus, sensitive land uses are not located or approved in the vicinity of the Airport.

Noise contours will be generate for the current and future condition during this study and will be discussed in the in the report.

2.19.10 Water Quality

The Clean Water Act[24] provides the federal government the "authority to establish water quality standards, control discharges, develop waste treatment management plans and practices, prevent or minimize the loss of wetlands, location with regard to an aquifer or sensitive ecological area such as a wetland area, and regulate other issues concerning water quality".

The city of Riverton has wastewater collection, treatment and distribution systems in place to ensure optimum water quality for the community. The wastewater treatment plant is designed to treat 4.9 million gallons of waste per day, and currently averages approximately 1.8 million gallons per day. In addition to the wastewater treatment plant, the system is composed of thirteen water wells, one booster station, and five reservoirs. The water wells are located throughout the city and at the Airport, and are used primarily in the off peak season as the reservoirs are used when demand is highest.

2.19.11 Wetlands

Executive Order 11990, Protection of Wetlands, defines wetlands as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction." Federal agencies are required to minimize the destruction, loss, or degradation of wetlands.

An examination of the National Wetlands Inventory depicts that no wetlands exist on or near Airport property.

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

2.19.12 Wild and Scenic Rivers

The Wild and Scenic Rivers Act of 1968, as amended[25], describes those river segments designated as, or eligible to be included in, the Wild and Scenic Rivers System. Impacts should be avoided or minimized to the extent possible when the rivers or river segments that fall under this Act may be affected by a proposed action. In addition, the President's 1979 *Environmental Message Directive* on Wild and Scenic Rivers[26], directs Federal agencies to avoid or mitigate adverse effects on rivers identified in the Nationwide Rivers Inventory as having potential for designation under the Wild and Scenic Rivers Act.

Wyoming has two rivers nationally designated as Wild and Scenic Rivers, the Snake River Headwaters and the Yellowstone River (Clark Fork). The Snake River Headwaters is approximately 70 miles to the west and the Yellowstone River is approximately 120 miles to the north of the Airport.

2.19.13 Aviation Industry Sustainability Initiatives

Sustainability can be defined as "meeting the needs of the present without sacrificing the ability of future generations to meet their own needs". The aviation industry has developed numerous sustainable initiatives that are utilized throughout the country. These initiatives can be federal, state or local mandates; however, they are more effective when the airport independently realizes sustainability makes good business sense. A few of the various benefits airports can gain from embracing sustainability are:

- Reduced capital asset life cycle costs
- Reduced operating costs
- Better customer service and satisfaction
- Enhanced relationships with the community

2.19.14 Local Sustainability Initiatives

The City of Riverton has one significant sustainable initiative that both benefits the community as well as the surrounding environment. The city developed a wastewater collection, treatment, and distribution plant. The plant collects an average of 1.8 million gallons per day and removes approximately 95 percent of pollutants. The city initiated sustainable practices through the plant as the by-product of the cleaning process (sludge) is used by the public as a soil amendment for lawns and gardens throughout the community. The Plant has sold an average of 250 cubic yards of the bi-product in the last three years to be reused rather than disposed of.

[25] U.S. Code, The Wild and Scenic Rivers Act of 1968, 16 USC 1271-1287, 1977
[26] Office of Environmental Policy, 1979, Policy Guidelines for Wild and Scenic Rivers, 1980

2.20 FINANCIAL INFORMATION

Airport facilities that are self-sustaining can provide services with minimal outside funding and reciprocal influence. Unfortunately few airports are able to accomplish this, including RIW. Airports sponsors should continually strive to become an agent for economic development and self-sufficiency. **Table 2-26** below shows the financial summary for 2009 for Riverton Regional Airport as reported to the FAA via Form 127.

TABLE 2-26 - 2009 RIW AIRPORT FINANCIAL SUMMARY

Category	2009
1.0 Passenger Airline Aeronautical Revenue	$87,325
2.0 Non-Passenger Aeronautical Revenue	$87,779
3.0 Total Aeronautical Revenue	$175,104
4.0 Non-Aeronautical Revenue	$51,247
5.0 Total Operating Revenue	$226,351
6.0 Operating Expenses	$655,144
7.0 Operating Income (Loss)	$(428,793)
8.0 Non-Operating Revenue (Expenses) & Capital	$4,433,864
9.0 Net Assets	$0
10.0 Capital Expenditures & Construction in Progress	$3,658,651
11.0 Indebtedness at End of Year	$180,000
12.0 Restricted Assets	$0
13.0 Unrestricted Net Assets	$2,196,366
14.0 Reporting Year Proceeds	$0
15.0 Debt Service	$0

Source: 2009 RIW FAA Form 127

2.20.1 Revenues

RIW's operating aeronautical revenue consists of Operating Revenue from Aeronautical and Non-Aeronautical, and Non-Operating Revenue. These revenue sources include landing fees , hangar land leases, aviation fuel tax, aviation fuel flowage fee, terminal concession lease agreements, and FBO fees.

Landing Fee: Commercial service airports typically charge a landing fee to airlines (and sometimes GA aircraft) for landing an aircraft at the airport. Landing fees can be based on a many factors, including: weight, numbers of seats, time of day, etc. The landing fee charged at RIW is $0.35 per 1,000 pounds per aircraft.

Hangar Land Leases: The majority of airports make a large portion of their revenue from hangar rental fees. However, since RIW only own the maintenance hangar and does not own any of the other hangars on the airport the land under the hangars is leased. The land lease rate at RIW is $0.13 per square foot per year.

Fuel Flowage Fee: This fee is charged to the users of the airport and the airport's commercial tenants, such as the FBO, based on a percentage of the fuel sold. RIW charges Jim's Aircraft Services $0.05 per gallon for fuel flowage fee.

Indirect Revenue: This is revenue that is usually property taxes on hangars and aircraft. Unlike direct airport revenue, indirect may be placed in the City or County's general fund and may be used for other purposes.

Non-Aeronautical Revenue: RIW's non-aeronautical revenues include land and non-terminal facilities, terminal food and beverage, retail stores, and rental cars.

Non-Operating Revenue: An airport's non-operating revenue consists of interest income, grant receipts, and passenger facility charges.

2.20.2 Expenses

Typical operating and non-operating expenditures to airports include personnel compensation and benefits, communications and utilities, maintenance, contractual services, and insurance. Personnel compensation and benefits costs are the expense of a full- or part-time manager and support staff. Primary utility expenses are the cost of electricity to operate airfield lighting and visual aids, airport buildings and the cost of water for public use areas or irrigation. Pavement maintenance cost includes annual crack sealing and seal coating, and remarking pavements every three to eight years. Facility maintenance costs are mowing, snow removal, repair and replacement of equipment, and building up-keep on airport property. The insurance cost is a non-operating expense and consists of the airport's liability insurance and property insurance.

2.20.3 Contributed Capital

Currently the FAA and Wyoming Department of Transportation (WYDOT) Division of Aeronautics contributed funding for the projects that are eligible for federal funding. The FAA provides 95 percent grant funding for eligible projects in the Sate of Wyoming, and WYDOT Aeronautics provides three percent. Presently, without contributed capital from the FAA and WYDOT Aeronautics, Riverton Regional Airport is operating at a loss.

2.21 Airport User Surveys

To assess the adequacy of the airport facility and desired improvements, surveys were mailed to local airport owners, pilots, and Great Lakes Airlines to solicit their input. The list of aircraft owners and pilots were provided by the FBO, Jim's Aircraft Services. A total of 69 surveys were sent to aircraft owners and pilots, and one survey was sent to Great Lakes Airlines. The surveys were mailed out in mid-September with a requested return date of two weeks. If a response was not received within the two week period, a second survey was mailed with a new requested return date of November 2, 2010. A total of 31 surveys were returned, resulting in an overall response rate of 44%. Examples of the surveys sent out are located in **Appendix C**.

From the returned surveys, the respondents overwhelmingly indicated the substantial need for a 24-hour self service fuel and hangar space. In the survey, respondents were asked to specify the most essential facilities and capabilities of the Airport. They most frequently indicated that aircraft fueling services, aircraft maintenance, GA terminal facilities, and aircraft tiedowns/hangars are the most essential facilities for the Airport. The least essential was tourism/entertainment related activities. Additionally, survey respondents were asked to rate the Airport's facilities and capabilities from "1" to "10", "1" being poor and "10" being excellent. The lowest scored categories were hangar space, hangar availability, and hangar lease rates, with an average score of "4.5". The remainder of the categories (runway, pavement, NAVAIDs, FBO, etc.) scored high, with averages between "8" and "10".

In the comments section of the survey, many respondents indicated a need for a 24-hour self-service fueling station, as the FBO is only opened during normal business hours. The second most common request noted was the need for more hangars and hangar space on the airport. Additional comments included: rehabilitation of the GA apron, improvement of the FBO's pilot lounge, a run-up for Runway 28, and the need for a more affordable and reliable airline service.

2.22 Historical Aviation Activity

2.22.1 Commercial Activity

Table 2-27 below shows data for the last 11 years of enplanement history at RIW. The information was obtained from the Terminal Area Forecast (TAF) provided by the FAA. It is important to note that when enplanements drop below 10,000 per year an airport is at risk of losing a substantial portion of their FAA entitlement funding; however RIW has little risk with its recent enplanement activity. Funding levels are further discussed in **Chapter 7**, *Capital Improvement Planning*.

TABLE 2-27 - ENPLANEMENT INFORMATION

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Air Carrier	0	0	40	116	311	165	36	0	0	0	0
Commuter	13,320	12,934	9,729	9,830	11,241	11,938	14,027	14,949	16,920	15,713	14,040
Total	**13,320**	**12,934**	**9,769**	**9,946**	**11,552**	**12,103**	**14,063**	**14,949**	**16,920**	**15,713**	**14,040**

Source: FAA TAF (Terminal Area Forecast)

2.22.2 Number & Mix of Based Aircraft

According to information provided by the Airport Management, RIW has 48 aircraft based. Of the 48 aircraft, 43 are single engine aircraft, three are multi-engine aircraft, one turboprop aircraft, and one is a jet. The 2000 Master Plan indicated that RIW had 27 based aircraft, meaning in the last ten years RIW has increased its based aircraft count by 77.8%.

2.22.3 Aircraft Operations

An aircraft operation is a landing, take-off, or touch-and-go procedure by an aircraft on a runway at an airport. Since RIW does not have an air traffic control tower, it should be noted precise records for aircraft operations are not available. The FAA data is based on estimates of operations is provided to the FAA by the airport.

TABLE 2-28 - AIRCRAFT OPERATIONS ESTIMATES

Operations	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Itinerant Air Carrier	0	0	0	0	0	0	0	0	1,957	1,957
Itinerant Air Taxi & Commuter	4,689	4,698	4,707	4,717	4,726	2,524	2,529	2,534	2,468	2,473
Itinerant Military	12	12	12	12	12	12	12	12	31	31
Itinerant GA	4,457	4,506	4,506	4,506	4,506	4,506	4,506	4,506	2,216	2,216
Local Military	0	0	0	0	0	0	0	0	0	0
Local GA	4,527	4,578	4,578	4,578	4,578	4,578	4,578	4,578	2,369	2,369
Total	**13,685**	**13,794**	**13,803**	**13,813**	**13,822**	**11,620**	**11,625**	**11,630**	**9,041**	**9,046**

Source: FAA TAF (Terminal Area Forecast)

3.0 AVIATION ACTIVITY FORECASTS

Aviation activity forecasts are essential for airport master plans because they determine future demand activity levels. Per FAA Advisory Circular (AC) 150/5070-6B: *Airport Master Plans*, aviation forecasts should be realistic, based upon the latest available data, reflect current conditions at the airport, and provide adequate justification for airport planning and development. Additionally, forecasts must be prepared for short- (5 year), medium- (10 year), and long-term (20 year) periods, and specify the existing and future critical aircraft.

It is important to note that while forecasting is essential for a successful master plan, they are only approximations of future activity based on historical data and present conditions. There are many factors that can influence forecasts positively and negatively as time goes on. For this reason, forecasts and the projects that they justify, should be revisited frequently.

3.1 Forecasting Aviation Activity Measures and Metrics

The forecasting parameters are determined by the level and type of aviation activity expected at RIW. As a commercial service airport, the forecast focus for Riverton Regional Airport (RIW) is on commercial passenger (e.g. passenger enplanements) as well as General Aviation (GA) (e.g. aircraft operations and based aircraft) activity levels. The forecasts must also take into account demographic and economic activity, because demand for aviation is primarily a function of these. The data sources for these metrics are from the FAA Terminal Area Forecast (TAF), and Woods & Poole, Inc. socioeconomic data.

3.1.1 Commercial Aviation

Commercial aviation consists of all scheduled and unscheduled air service, and is measured by passenger enplanements. The scheduled air service at RIW is provided by Great Lakes Airlines, who offers three daily round trip flights from Riverton to Denver on a Beach 1900D aircraft. Great Lakes Airlines was provided with a subsidy by the federal government to operate the flights under a program called the Essential Air Services (EAS) until October 1, 2006 when Great Lakes Airlines began providing subsidy-free service to the facility, as explained earlier in **Section 2.7.1**.

3.1.1.1 Passenger Enplanements

If an airport is served by commercial air carriers, an important activity measure is the number of passenger enplanements. A passenger enplanement is the act of a passenger boarding a plane that is departing RIW. A deplanement is the opposite, when a passenger exits an airplane when arriving at RIW. At most airports enplanements and deplanements are almost the equal since most passengers have round trip itinerary. For planning purposes, only enplanements are considered when forecasting. Enplanements are important for forecasting as a commercial service airport because it helps determine the size of the terminal and the number of gates needed.

3.1.2 General Aviation Overview

Forecasting metrics of General Aviation (GA) activity normally consists of aircraft operations and number of based aircraft.

3.1.2.1 Aircraft Operations

Generally, the most important activity forecast for airfield planning is the level and type of aviation demand generated at the airport, which is measured by aircraft operations and identifies the critical aircraft. It is by this demand that the runway and taxiway requirements are defined. An aircraft operation is defined as either a take-off or a landing of aircraft.

Since RIW is a non-controlled airport, meaning it does not have an Air Traffic Control Tower (ATCT), it is more difficult to obtain an exact count of the airport's current aircraft operations. The existing counts for RIW were derived from estimates provided by airport management.

3.1.2.2 Based Aircraft

Based aircraft forecasts are directly related to the need for specific types of hangars and aircraft parking apron. Based aircraft include all aircraft that are registered with the FAA at RIW as their home base, or aircraft that spend more time on the ground at RIW than any other airport.

3.1.3 Demographic and Economic Factors

The demand for aviation is largely a function of demographic and economic activity, given there is a causal relationship. When preparing forecasts, planners should consider socioeconomic data, demographics, disposable income, and geographic attributes. This socioeconomic data was collected from Woods & Poole Economics, an independent firm that specializes in long-term economic and demographic projections. Woods & Poole has a database for every county in the United States, with forecasts through 2040 for more than 900 variables.

According to Woods & Poole, the Western region, consisting of the Southwest, Rocky Mountain (including Wyoming), and Far West regions, will experience the most growth of any region in the nation for the next thirty years. The population in the Western region is forecast to increase by 45.9 million people between 2008 and 2040. By the year 2040, 36% of all Americans are expected to reside in the West; this is up from 24% in 1970 and 33% in 2008. It is also expected to generate 29.1 million jobs from 2007 to 2040, with a projected total U.S.

job gain of 39%. Moreover, Woods & Poole predicts that specifically Fremont County in Wyoming will grow between 0.0% and 0.92% annually by 2040.

3.2 National Aviation Forecasts

The FAA prepares a national forecast each year. This forecasting attempts to project commercial and General Aviation (GA) demand so that the FAA can use the data to determine funding needs for various sections of the FAA, such as Air Traffic Control. The current forecast documents are for Fiscal Years 2010-2030.

Despite of the impacts of September 11th, the bankruptcy of four legacy airlines, record high fuel prices, and the economic downturn, the FAA states that the number of airline passengers will continue to grow over the long-term, accentuating the importance of the air transportation industry. Moreover, the FAA predicts that the aviation industry will continue to grow despite current global economic conditions. Even though there has been a slowdown in air travel growth recently, the FAA predicts that one billion passengers will be flown in 2023.

The 2010 FAA forecast predicts a slow growth in the near-term for commercial aviation, but that the growth will return to "normal" in the long-term. Additionally, system capacity will drop 1.6% this year, after a 7.4% decrease in 2009, and will then grow at an average of 3.6% per year through to 2030. In the domestic market, capacity will decrease by 1.1% in 2010; however, regional carrier market capacity will increase by 1.9%. Enplanements will grow by 0.4% for the year, and will then grow at an average annual rate of 2.5% for the remainder of the forecast.

Furthermore, the average size of domestic aircraft is expected to decrease by 0.3 seats in Fiscal Year (FY) 2010, for an average of 121.6 seats. While demand for 70-90 seat aircraft continues to increase, the FAA expects the number of 50 seat regional jets in service to fall, increasing the average regional aircraft size in 2010 to 56.2 seats per mile.

For GA, the economic downturn has slowed near-term growth, but the long-term forecast remains encouraging. The FAA predicts growth for business aviation demand over the long-term due to the growing U.S. and world economies. As the fleet grows, the number of GA hours flown is forecasted to grow by an average of 2.5% each year through 2030.[27]

3.3 Review of Existing Forecasts

Several existing forecasts for Riverton Regional Airport were examined. Each of the existing forecasts that were examined are discussed in the following text.

3.3.1 2000 Master Plan Forecasts

The 2000 Airport Master Plan Update forecasted enplanements, operations, and based aircraft, as shown in **Table 3-1**.

[27] FAA Aerospace Forecast Fiscal Years 2010-2030

TABLE 3-1 - 2000 AIRPORT MASTER PLAN FORECAST

	2005	2010	2015	2020
Enplanements	12,699	13,346	14,026	14,744
Operations	13,685	15,117	15,888	16,698
Based Aircraft	28	30	32	34

Source: 2000 Airport Master Plan Update

3.3.2 FAA Terminal Area Forecast

The FAA prepares a Terminal Area Forecast (TAF) for each airport in the National Plan of Integrated Airport Systems (NPIAS) annually. The NPIAS is an inventory of the nation's aviation infrastructure. It identifies all airports in the United States that are considered significant to the national aviation infrastructure network. The TAFs are the FAA's official airport-specific forecast used for budgeting and staffing purpose. The latest TAF for RIW was published 2010, and is presented in **Table 3-2**. The TAF forecasts at airport the size of RIW often show little or no growth. These forecasts are not always site specific, so the FAA uses a conservative approach when site specific data cannot be obtained.

TABLE 3-2 - FAA TAF FORECAST FOR RIW

	2010	2015	2020	2025	2030
Air Carrier Enplanements	0	0	0	0	0
Commuter Enplanements	15,786	16,158	16,536	16,923	17,324
TOTAL ENPLANEMENTS	15,786	16,158	16,536	16,923	17,324
Iterant Operations					
Air Taxi & Commuter	4,435	4,460	4,486	4,512	4,537
GA	2,216	2,216	2,216	2,216	2,216
Military	31	31	31	31	31
Total Itinerant	6,682	6,707	6,733	6,759	6,784
Local Operations					
GA	2,369	2,369	2,369	2,369	2,369
Military	0	0	0	0	0
Total Local GA	2,369	2,369	2,369	2,369	2,369
TOTAL OPERATIONS	9,051	9,076	9,102	9,128	9,153
Based Aircraft	38	38	38	38	38

Source: 2009 FAA Terminal Area Forecast

3.3.3 WYDOT Aviation Forecast

In November 2009, the Wyoming Department of Transportation (WYDOT) Division of Aeronautics (Aeronautics) published the Wyoming Statewide Airport Inventory and Implementation Plan (AI&I Plan). The AI&I Plan studied the inventory and evaluated the Wyoming Aviation System of 40 publicly owned airports, while assessing the conditions and performance-related measures of existing and future needs of each airport. In this Plan, a forecast was created for commercial and general (GA) activity from the years 2007 to 2027. High and low forecasts were prepared using the compound annual growth rates (CAGR).

Table 3-3 shows the growth rates for the State of Wyoming, while **Table 3-4** shows the growth rate projected for RIW. These forecasts utilized a variety of methods that will be explained further in **Section 3.4**.

TABLE 3-3 - WYDOT AI&I PLAN STATEWIDE FORECASTS

Type	2007-2027 CAGR		2027	
	Low	High	Low	High
Enplanements	1.25%	2.00%	644,139	736,642
Operations	0.12%	1.54%	435,957	577,340
Based Aircraft	0.09%	1.92%	981	1,410

Source: WYDOT AI&I Plan

TABLE 3-4 - WYDOT AI&I PLAN RIW FORECASTS

Type	2007-2027 CAGR		2027	
	Low	High	Low	High
Enplanements	0.14%	2.00%	16,280	23,524
Operations	0.13%	2.85%	8,645	14,776
Based Aircraft	0.14%	1.92%	52	68

Source: WYDOT AI&I Plan

The forecasts generated for RIW by WYDOT indicate that the based aircraft and aircraft operations are projected to grow slightly faster than the statewide forecast; however, the enplanement forecast is predicted to grow at a slower rate than the rest of the state.

3.4 Forecasting Methodologies

There are several types of methodologies that can be used when developing aviation forecasts. Each forecast methodology must show short- (5 years), medium- (10 years), and long-term (beyond 10 years) periods, while keeping in mind that a forecast prepared through the use of mathematical relationships must ultimately withstand the test of rationality/judgment. The different methodologies are briefly described below.

3.4.1 Time Series Analysis

A Time Series Trend Analysis, also known as a Trend Analysis, uses historic patterns of activity and projects this trend into the future. The time series analysis is a regression analysis with time as the independent variable. The linear extrapolation uses the least squares method to fit a straight line between the historical points and projects that line into the future. This type of forecasting is widely used and is highly valuable because it is relatively simple to apply. However, its limitation is that it simply uses past historical data, and variables that are not present in past data, such as change in fuel prices and the economic downturn, are not considered in the result.

3.4.2 Regression Analysis

Regression Analysis is a statistical technique that ties aviation demand (dependent variable), such as operations, to economic measures (independent variables), such as population and income. The independent variable is considered the explanatory variable because it "explains" the projected estimated value. The explanatory power of this approach is measured by the R^2 statistic (called the correlation coefficient or the coefficient of determination). An R^2 helps determine if there is a correlation between the dependent and the independent variables; R^2 of 0 means there is no statistical relationship between changes of the variable, while a R^2 of 1.0 means there is a very strong statistical relationship. Regression Analysis should be restricted to relatively simple models with independent variables for which reliable forecast are available. Additionally, most regression models for aviation use gross economic measures like income, population, and employment to forecast activity levels.

3.4.3 Market Share Analysis

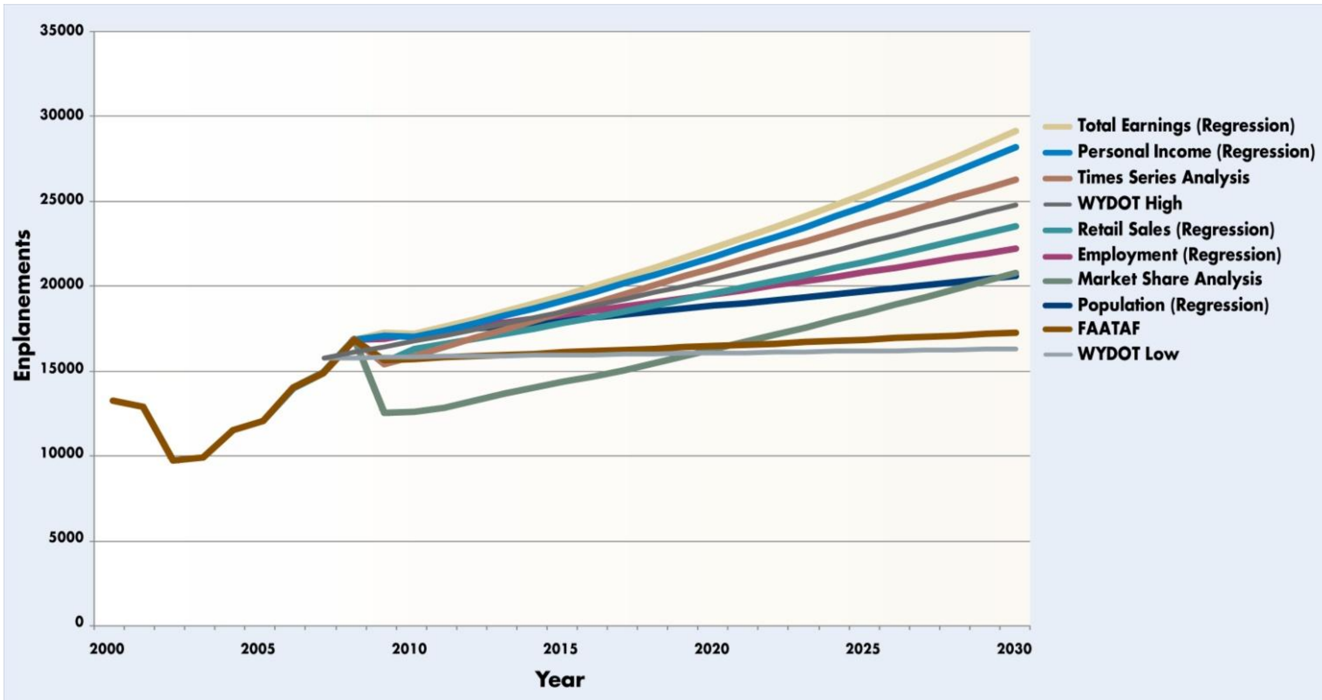
Market Share Analysis assumes a top-down model, and uses a relationship between national, regional, and local forecasts to predict the trends at the airport. This approach uses the forecast of large aggregates, such as the entire nation, which are used to derive forecasts for a smaller area (e.g. airport). One example is to determine an airport's percentage (market share) of the national enplanements and then forecast the airports growth rate based on the national forecast growth rate. However, the market share analysis approach to forecasting has a weakness. The national forecasts are composed of airports that are growing fast, those that are growing slowly, and those that are not growing at all. Since this analysis is based off the national or larger aggregate, the planner must take into account historical trends, as well as local airport judgment, to better estimate the forecast.

3.5 Passenger Enplanement Forecast

Due to the number of scheduled flights and few unscheduled flights at RIW, forecasting enplanements is relatively simple. Because of this, scheduled enplanements have remained so consistent over the past 10 years that any major growth is unforeseen and could not be justified. However, different forecasting methodologies were tested. Socioeconomic regression analyses were employed using population, employment, total earnings, personal income, and retail sales as the independent variables, were all obtained from Woods & Poole Economic data as previously discussed in **Section 3.1.3**. The airport management records were purged before 2005, so FAA TAF was used as the baseline for this forecasting.

Additionally, time series analysis and market share analysis were employed for forecasting passenger enplanements. The market share analysis was based on the percentage of enplanements at RIW compared to the total FAA forecasted regional airline enplanements. The outputs from the different forecasting methods are shown in **Figure 3-1**. Additionally, **Figure 3-1** illustrates the comparison of the FAA TAF, as well as WYDOT's Low and High enplanement forecasts.

FIGURE 3-1 - ENPLANEMENT FORECAST



Source: Jviation, Inc.

Table 3-5 presents the high, medium, and low enplanements forecasts. The lowest forecast is the WYDOT I&I Plan's Low forecast, the medium is the WYDOT I&I Plan High forecast, and the highest forecast is regression analysis for total earnings. The forecasting scenarios represent a range in enplanements of 16,348 to 29,287 in final year of the forecast period (2030). This represents a range in annual compounded growth rates of between 0.47% (WYDOT Low) and 2.68% (Total Earnings). The medium forecast will be used for planning purposes.

TABLE 3-5 - ENPLANEMENT FORECAST

Year	LOW	MEDIUM	HIGH
2010	15,898	16,820	17,268
2015	16,009	18,570	19,588
2020	16,122	20,503	22,354
2025	16,235	22,637	25,568
2030	16,348	24,855	29,287

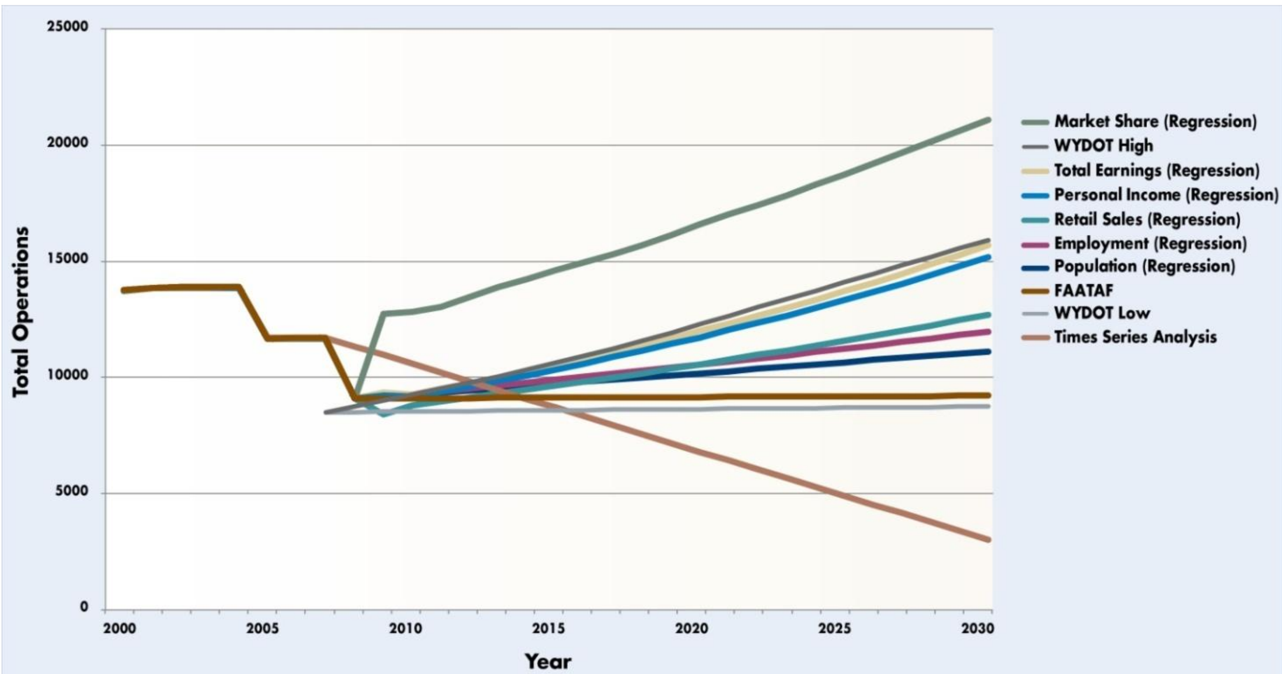
Source: Jviation, Inc.

3.6 Aircraft Operations Forecast

Since RIW is a non-controlled airport, meaning that it does not have an Air Traffic Control Tower (ATCT), it is more difficult to obtain an exact count of aircraft operations. Airport management records of aircraft operations were logged by airport staff while operating/monitoring the CTAF frequency and by visual observations. The airport management records were purged before 2006, so FAA TAF was used as the baseline for forecasting.

The same methodologies that were used for passenger enplanement forecasting were used for forecasting aircraft operations: socioeconomic regression analysis, time series analysis, and market share analysis. Regression analyses were used for population, employment, total earnings, personal income, and retail sales. The outputs from the methodologies are shown in **Figure 3-2.**

FIGURE 3-2 – OPERATIONS FORECAST



Source: Jviation, Inc.

Table 3-6 represents the high, medium, and low operations forecasts. The lowest forecast is the time series analysis, the medium is the retail sales regression analysis, and the high is the market share analysis. The forecasting scenarios represent a range in the total operations of 2,951 to 21,029 in final year of the forecast period (2030). This represents a range in annual compounded growth rates of between 0.06% (FAA TAF) and 2.68% (Total Earnings). Again, the medium forecasts will be carried forward for planning purposes.

TABLE 3-6 - OPERATIONS FORECAST

Year	LOW	MEDIUM	HIGH
2010	10,516	8,741	9,051
2015	8,625	9,578	9,076
2020	6,733	10,500	9,102
2025	4,842	11,515	19,692
2030	2,951	12,634	21,029

Source: Jviation, Inc.

3.6.1 Military Operations

Historically, military operations have not contributed to any significant number of operations at the Airport. Military operations are not dependent on the same stimuli as general aviation or commercial activity; therefore, for purposes of this study it is projected that military operation will remain constant throughout the forecast period.

3.6.2 Local/Itinerant Operations

Local Operations are aircraft operations performed by aircraft that are based at the airport (RIW) and operate in the local traffic pattern and/or within sight of the airport These operations are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport. Itinerant or transient operations are operations by aircraft that leaves the local airspace, and are usually operations by aircraft not based at the local airport (RIW). The majority of operations at RIW are GA itinerant operations.

3.6.3 Aircraft Operations Forecast Summary

In all forecast scenarios, commercial operations were projected to grow at a similar rate as the enplanement forecasts, 1.9%. GA operations were directly tied to the economic variables and projected using that data. For planning purposes, the preferred forecast is related to the regression analysis – retail sales model. This model represents an overall 20 year annual compounded growth rate of 1.86% and is summarized in **Table 3-7**. The scenario is on the middle-lower end of the forecast scenarios, but may accurately portray the increased flying that typically accompanies increased income. The data presented in **Table 3-7** assumes that the current distribution of aircraft per operations category will remain the same in the future.

TABLE 3-7 - AIRCRAFT OPERATION FORECAST SUMMARY

	2010	2015	2020	2025	2030
Itinerant Operations					
Commuter/Air Taxi	0	0	0	0	0
Air Carrier	2,920	3,203	3,514	3,855	4,229
Military	180	180	180	180	180
GA Itinerant	3,216	3,531	3,879	4,263	4,688
Local Operations					
GA Local	2,426	2,664	2,926	3,216	3,537
Total Operations	**8,741**	**9,578**	**10,500**	**11,515**	**12,634**

Source: Jviation, Inc.

3.6.4 Design Hour Operations

An additional measure of airport activity is the design hour operations. The design hour is the estimate of the peak hour of the average day in the busiest month for an airport. Since RIW does not have an air traffic control tower, design hour is estimated.

- Peak Month Operations is the busiest month in a year that has the most operations. The Peak Month for RIW is August, having approximately 11% of the annual operations.
- Design Day is the Peak Month operations divided by 30 days. The Design Day for RIW in 2010 is 32 operations.
- Design Hour is the average highest amount of operations within the most active hour of the day. Typically, these operations will range between 10 and 15 percent of the design day operations; for planning purposes, 12 percent was used to determine the Design Hour. The Design Hour Operations at RIW in 2010 is four.

Table 3-8 shows the forecasted Design Hour for the planning period of this report.

TABLE 3-8 - DESIGN HOUR OPERATIONS FORECAST

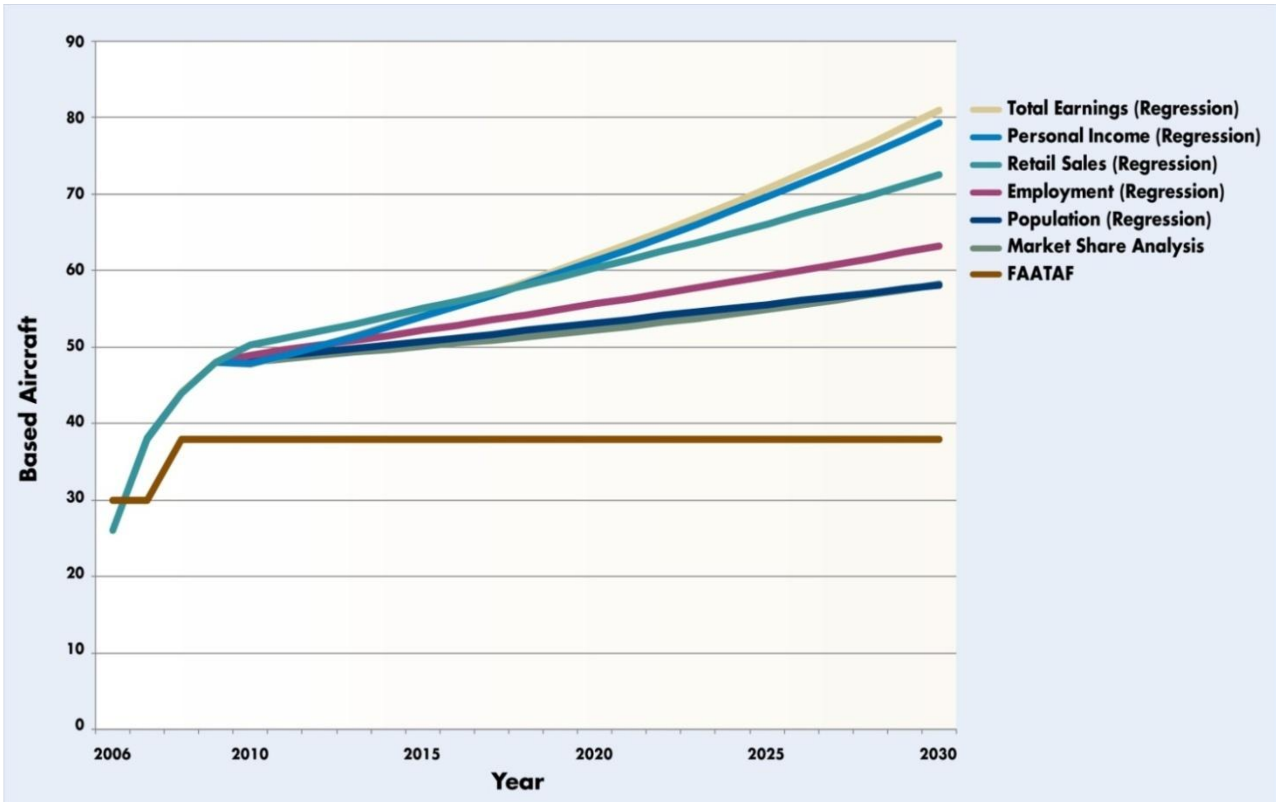
Operations	2010	2015	2020	2025	2030
Annual	8,741	9,578	10,500	11,515	12,634
Peak Month	961	1,054	1,155	1,267	1,390
Design Day	32	35	39	42	46
Design Hour	4	4	5	5	6

Source: Jviation, Inc.

3.7 Based Aircraft Forecast

The based aircraft forecast is a valuable indicator in determining the future activity levels and the need for expanded or improved airport facilities. Airport management records indicated a higher number of current based aircraft (48) than the FAA TAF (38), so the airport records were used as a baseline for this forecasting. The same forecasting methods were used for based aircraft as enplanements and operations: regression analysis and market share analysis. The time series analysis was not used because due to the large growth of based aircraft at RIW over the past four years, the times series analysis shows RIW having 243 based aircraft in 2030, which is completely illogical. **Figure 3-3** shows the different forecasting methods used.

FIGURE 3-3 - BASED AIRCRAFT FORECAST



Source: Jviation, Inc.

As shown in **Table 3-9**, there are presently 48 aircraft based at RIW, which is composed of 43 single-engine, three multi-engine, one turbo prop, and one jet. It is anticipated that based aircraft will grow at a rate similar to operations, 1.82%. The national growth rate for each aircraft type was used for forecasting the based aircraft. Nationally, the FAA projects strong growth in the business market, including jets and turboprops, with less growth expected for the recreational market, which primarily consists of single-engine piston powered aircraft. The based aircraft are expected to grow to a total of 73 over the planning period, with the largest increase in the number of jets. RIW currently represented in jet and helicopter aircraft. A typical airport with 48 based aircraft would have four jets and three helicopters. The based aircraft forecasts reflect a movement towards national distribution of types of GA aircraft.

TABLE 3-9 - RIW BASED AIRCRAFT FORECAST SUMMARY

	2010	2015	2020	2025	2030
Single Engine Piston	43	46	47	48	51
Multi-Engine Piston	4	3	4	4	5
Turbo Prop	0	1	2	3	4
Jet	1	2	3	5	7
Helicopter	0	2	2	3	4
Other	0	0	0	1	2
Total	48	54	58	64	73

Source: Jviation, Inc.

3.8 Critical Aircraft

The FAA considers that once reaching a level of 500 annual operations of an aircraft that falls into the next highest ARC level, the airport should upgrade its facilities in order to meet the design standards of that level. Airport Reference Code (ARC) is further explained in **Section 2.1**. Presently, RIW has an ARC of C-II, meaning that it is designed for aircraft with a maximum approach speed of 121 knots but less than 141 knots, and maximum wingspan of 49 feet but less than 79 feet or tail height of 20 feet but less than 30 feet. Aircraft that are in this category include corporate aircraft and smaller commercial jets, such as Gulfstream 350 and CRJ 700. The current ARC of C-II for RIW should be appropriate for future critical commercial and GA aircraft.

3.9 Annual Instrument Operations

According to data provided by the National Climatic Data Center (NCDC), Instrument Meteorological Conditions (IMC) exist at a rate of 2.1% at RIW. By applying this percentage to the current number of current operations results in 184 current IFR operations. This figure is potentially over simplified since no precise count exists for the number of instrument operations; nonetheless, it certainly accounts for a reasonable percentage of current operations. **Table 3-10** details the estimated instrument operations based on the chosen operations forecast.

TABLE 3-10 - FORECAST IMC OPERATIONS

	2010	2015	2020	2025	2030
Instrument Ops	184	201	220	242	265

Source: IMC data from NCDC

3.10 Comparison to Existing FAA TAF

The FAA requires that study-related forecasts be consistent with the TAF or include sufficient documentation to explain the difference. A forecast is considered to be consistent with the TAF if it:

a) Differs by less than 10 percent in the 5-year forecast and 15 percent in the 10-year forecast, or

b) Does not affect the timing or scale of an airport project, or

c) Does not affect the role of the airport as defined in the current version of FAA Order 5090.3, *Field Formulation of the National Plan of Integrated Airport Systems.*

3.10.1 Passenger Enplanement Forecast

As discussed in **Section 3.3.3**, the WYDOT forecasts project a range of 16,348 to 24,855 enplanements in 2030. The FAA TAF projects enplanements to with a compound annual growth rate of 0.47%, with an enplanement forecast of 17,324 in 2030. The forecasts prepared for this study use the WYDOT High forecast of 24,855 for 2030.

The enplanement forecasts in the 10-year period only differ by 14.9%, which is below the 15% threshold allowed. However, the 20-year forecast presented in this document represents a 43.5% increase over the TAF forecasts in 2030. Nonetheless, the increase in enplanement projections will not impact the timing or scale of any projects or affect the role of the airport as described in Items b) and c) above. The enplanement forecasts prepared for this report are therefore consistent with existing state and federal planning forecasts.

3.10.2 Aircraft Operations Forecast

The FAA TAF projects an operations forecast of 9,153 in 2030 with a compound annual growth rate 0.06%. The forecasts prepared for this study uses the regression analysis using retail sales with 12,634 operations projected for 2030, which is the middle range for this forecast. The FAA forecasts almost no growth in operations, while WYDOT forecasts between 0.13% and 2.77% average annual growth.

The operations forecasts in the 10-year period only differ by 5.5%, which is well below the 15% threshold allowed. However, the 20-year forecast presented in this document represents a 38.0% increase over the TAF forecast for 2030. Nonetheless, the increase in operations projections will not impact the timing or scale of any projects or affect the role of the airport as described in Items b) and c) above. The operations forecasts prepared for this report are therefore consistent with existing state and federal planning forecasts.

3.10.3 Based Aircraft Forecast

The forecast shows 73 based aircraft at the end of the planning period. For the same time period, the WYDOT forecasts anticipate 36 to 49 based aircraft in 2027 and the FAA predicts no growth for based aircraft, predicting 38 for the duration of the forecast. Both of these forecasts do not apply because RIW currently has 48 aircraft based at the airport

The growth for based aircraft is also justified as previously discussed in **Section 2.21**, as many pilots and aircraft owners indicated the need for more hangars at RIW.

3.11 Factors that May Create Changes in the Forecast

A forecast of aviation activity attempts to predict the future based on known factors and conditions. Numerous factors, on a local and/or national scale, can greatly affect the future of the airport and are unknown at this time. Oil prices, local economic activity , costs of aircraft owner's insurance, airline stability, and the potential for national GA user fees are just a few items that are beyond that airport's control that may change future activity dramatically.

The infrastructure needed to attract these types of operations to the airport will be explored in later chapters of this report.

4.0 FACILITY REQUIREMENTS

The objective of the Airport Master Plan is to determine the adequacy of the existing facilities and the facilities needed to handle future activity levels forecasted in **Chapter 3**. This chapter evaluates the airside and landside facilities and gives recommendations for each. In **Chapter 5**, alternatives for providing these facilities will be identified and evaluated to determine the most efficient and cost-effective means of implementation.

4.1 SUMMARY

A summary of the recommended improvements are provided in **Table 4-1**. Certain improvement will be further examined in **Chapter 5**, *Alternatives* to evaluate the option to accommodate the facility requirements.

TABLE 4-1 - RIW FACILITY REQUIREMENT SUMMARY

Facility	Improvements Recommended
Runway Capacity	No Improvement Needed
Runway Orientation	No Improvement Needed
Runway Length	Runway 10/28 – Adequate ***Runway 1/19 – Extension Recommended***
Runway Pavement Strength	No Improvement Needed
Runway Surface	No Improvement Needed
Runway Safety Areas	No Improvement Needed
Runway Object Free Areas	No Improvement Needed
Runway Protection Zones	***Acquire all land under RPZs***
Runway Visibility Zone	No Improvement Needed
Taxiways	***Add bypass taxiways; change airport signage layout***
Airfield Markings	No Improvement Needed
Navigational Aids	No Improvement Needed
Instrument Approaches	***GPS approach for Runway 1 and 19***
Obstructions	*To be completed pending obstruction survey*
Terminal Requirements	No Improvement Needed
Hangar Facilities	GA Development Plan
Airport Equipment	No Improvement Needed
Support Facilities	***New ARFF and SRE Facility***
Fuel Storage Requirements	***Add Self-Service Fuel Station***

Source: Jviation, Inc.

4.2 AIRFIELD REQUIREMENTS

4.2.1 Runway Capacity

FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, specifies the capacity of an airport based on the number and configuration of its runways. The two intersecting runway configuration at RIW has an airfield theoretical hourly capacity of 98 aircraft in VFR conditions and 59 in IFR conditions. Additionally, the airfield has an Annual Service Volume (ASV) of 230,000 operations per year. FAA planning standards state that when 60% of the ASV is reached (138,000 operations per year for RIW), the airport should start planning ways to increase capacity; when 80% of ASV is reached (184,000 operations per year for RIW), construction of facilities to increase capacity should begin. The hourly and annual capacities of the runway system far exceed the operations forecasted in **Chapter 3** for the entire 20 year planning horizon. ***The 12,634 operations forecasted for 2030 will not exceed the 60% ASV level, requiring no additional runways on the basis of capacity.***

4.2.2 Runway Orientation

The most important factor that affects a runway's orientation (in relation to magnetic north) is the wind. The ideal runway orientation would be aligned with the prevailing wind so that aircraft can minimize crosswind operations. All aircraft have an acceptable level of crosswind they can handle during landing; when the acceptable crosswind component of an aircraft is exceeded, the aircraft must divert to another runway or airport. For planning purposes, a 10.5 knot crosswind component is used for A-I and B-I aircraft, a 13 knot crosswind component is used for B-II aircraft, and a 16 knot crosswind component is used for a C-II aircraft. Per the FAA Advisory Circular (AC) 150/5300-13*, Airport Design*, the current runway(s) need to provide 95% or greater wind coverage for aircraft that use the airport on a regular basis. For RIW, the runway configuration needs to accommodate the least capable aircraft, those using a crosswind component of 10.5 knots.

As discussed in **Section 2.13.1** the best runway orientation in Riverton during All Weather conditions is northwest/southeast. The current runway orientations at RIW provide 97.48% coverage in All Weather conditions and 99.3% in IFR conditions for a crosswind component of 10.5 knots. Additionally, it is important to note that according to the wind data, Runway 1/19 more often aligned with the wind during instrument conditions. The IFR windrose shows that B-II aircraft (13 knots) need the crosswind runway for the 95% wind coverage, but the larger C-II aircraft (16 knots) can safely operate on Runway 10/28.***The runway orientations at RIW are adequate, so no reconfiguration or additional crosswind runway is desired.***

4.2.3 Runway Length

The purpose of the runway length analysis is to determine if the lengths of the existing runways are adequate, or if more length is required for existing or future airplanes operating at RIW and to determine the amount of additional length needed. Runway length for a given aircraft can be affected by numerous factors including aircraft elevation, ambient air temperature, operating weight, length of haul, and runway gradient. The current length of Runway 10/28 is 8,203 feet, while Runway 1/19 is 4,800 feet.

Table 4-2 shows the FAA runway length requirements for RIW computed using the FAA Airport Design Version 4.2B software program. This program helps determine the runway length needs at an airport based on the airport's elevation, average maximum daily temperature of hottest month, the runway gradient, and the length of haul for aircraft weighing more than 60,000 pounds. The recommended runway length according to the FAA Airport Design Version 4.2B software program is detailed in **Table 4-2**. It is important to note that the runway length determined by Airport Design Version 4.2B software program indicates the length requirements on the average hottest day of the summer with no wind conditions.

TABLE 4-2 - FAA RUNWAY LENGTH REQUIREMENTS

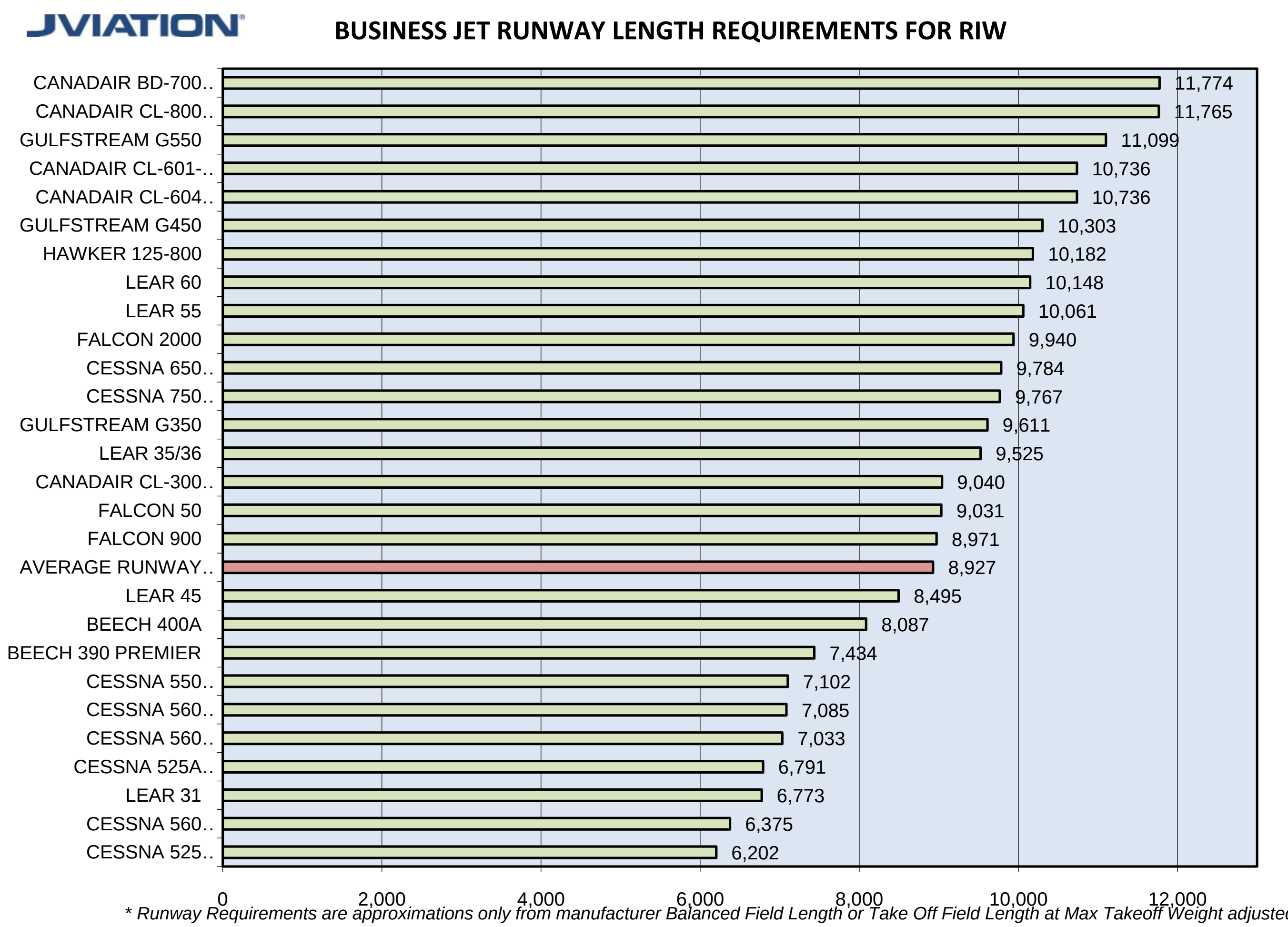
FAA RUNWAY LENGTH REQUIREMENTS

Airport elevation	5,528′
Mean daily maximum temperature of the hottest month	88.80° F
Maximum difference in runway centerline elevation	87′
Length of haul for airplanes of more than 60,000 lbs.	500 miles
RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN	
Small airplanes with approach speeds of less than 30 knots	470′
Small airplanes with approach speeds of less than 50 knots	1,240′
Small airplanes with less than 10 passenger seats	
75% of these small airplanes	4,860′
95% of these small airplanes	6,890′
100% of these small airplanes	6,890′
Small airplanes with 10 or more passenger seats	6,890′
Large airplanes of 60,000 lbs. or less	
75% of these large airplanes at 60% useful load	7,730′
75% of these large airplanes at 90% useful load	9,470′
100% of these large airplanes at 60% useful load	11,870′
100% of these large airplanes at 90% useful load	11,870′

Source: Chapter 2 of AC 150/5325-4B, Runway Length Requirement for Airport Design.
Calculated using FAA Airport Design Software Version 4.2B

Graph 4-1 shows the runway length needs for a variety of business jets based on data from their respective Operations Manuals. The runway length indicated in the graph should also be used with some caution, as they show length requirement for a fully loaded aircraft with no wind conditions – a situation that rarely occurs. Aircraft can operate on a shorter runway by altering the amount of useful load (i.e. passengers, fuel, or cargo). In other words, a large aircraft operating under full load requires a longer runway, but by reducing the weight it can use a shorter runway. If a significant change in the useful load is required, an aircraft operator may choose to not operate at the airport. As indicated in **Graph 4-1**, the average runway length requirement for the fully loaded business jet fleet is 8,495 feet. ***Runway 10/28's current length is sufficient to accommodate the most common business jet types with minimal weight penalties that operate at RIW***.

GRAPH 4-1 - BUSINESS JET RUNWAY LENGTH REQUIREMENT FOR RIW



Source: Jviation, Inc.

4.2.3.1 Runway 10/28 Length Analysis

The FAA Runway Length Analysis shows that Runway 10/28 currently accommodates 75% of large airplanes weighing less than 60,000 pounds at 60% useful load. The runway length needed for aircraft weighing more than 60,000 pounds must be calculated for the individual aircraft rather than the category.

Runway 10/28 was originally designed and constructed to meet the standards for a Boeing 737, and the Runway 28 reconstruction and rehabilitation in 2008 was also designed and constructed for a Boeing 737-300. Boeing 737s have operated at RIW in the past, providing charter services. Since the development costs for accommodating this aircraft have already occurred, it is recommended that the airport maintain the runway to accommodate Boeing 737 class aircraft so as to not preclude operation by these aircraft types in the future. The Aircraft Characteristics Manual from Boeing states that the Boeing 737-700 requires approximately 7,250 foot long runway with Maximum Take-Off Weight (MTOW) on a Standard Day at 63°F. The existing runway length for Runway 10/28 is sufficient to accommodate these types of aircraft.

The 2000 Airport Master Plan discussed the consideration of a runway extension on Runway 10/28 to a total length of 9,800 feet. When the design for the reconstruction of Runway 10/28 was being performed, it was realized that in order to plan for a future extension of the runway, extensive additional work and cost would be required for the runway reconstruction project; including relocation of the transmission lines, relocation of Paradise Valley Road, and runway gradient changes associated with the extension. At the time, due to the projected aircraft forecasts the FAA recommended that a runway extension is not feasible within the planning period, and made the decision to proceed as if there will not be an extension. ***Due to the costs associated with this extension along with the undemonstrated need from an aeronautical perspective, it is recommended that no extension of Runway 10/28 be planned or be shown on the Airport Layout Plan.***

4.2.3.2 Runway 1/19 Length Analysis

Currently, Runway 1/19 is 4,800 feet long. According to the available wind data, Runway 1/19 is used more frequently during IFR conditions. An extension to 6,890 feet would be required to better serve the majority of aircraft operating at RIW. The extension would allow the runway to accommodate larger aircraft during crosswind conditions.

Due to terrain and cost challenges, an extension of this runway to 6,890 feet is considered impractical. A length should be considered that allows for potential scheduled airlines to operate during crosswind condition while minimizing cost and environmental impacts.

In order to maximize the potential for scheduled airline service to operate at the airport, the crosswind runway should be able to accommodate the 30 seat Embraer-120 Brasilia and the 19 seat Beech 1900D operated by Great Lakes Airlines. At RIW the Brasilia has a take-off requirement of roughly 5,118 feet at MTOW, with a landing length requirement of approximately 4,528 feet at Maximum Landing Weight (MLW). The Beech 1900D has a take-off distance of approximately 5,235 feet at MTOW, and a landing distance of roughly 2,790 feet at MLW. A 600 foot extension, for a total runway length of 5,400 feet, is planned in the airport's CIP beyond the 20-year planning period, which would better accommodate the runway length requirements for the Beech 1900D and the Brasilia EMB-120.

Currently, Runway 1/19 does not adhere to the FAA recommendations or meet the runway length needs of Great Lakes' aircraft. Runway 1/19 should be extended in order to better serve intended users. This extension will have to take into account numerous factors; including: terrain, property acquisition, funding, and other facts, which will be examined in detail in **Chapter 5**, Alternatives.

4.2.4 Runway Width

Current users of Runway 10/28 support an ARC of C-II, requiring a minimum width of 100 feet. However, Runway 10/28 was constructed with a width of 150 feet meeting C-III standards using the Boeing 737-300 as the design aircraft. Since the initial costs have already been incurred, it is recommended that the C-III width be maintained on Runway 10/28 so that larger charter aircraft can use the airport as they have in the past. Runway 1/19 is currently 75 feet wide meeting B-II standards, sufficient for current and projected future runway use.

Currently, the Great Lakes' Brasilia cannot land on Runway 1/19 because the Jeppesen aeronautical chart states that Runway 1/19 is only 70 feet wide. Great Lakes operational specifications require minimum 75 foot runway width. The chart has been submitted for update, which includes the 75 foot width of Runway 1/19 and other additional changes to the chart that are not current with the airport's existing facilities. ***This change may provide for increased use of Runway 1/19.***

The runway widths are adequate to meet the facility's current and projected needs; therefore, no widening is required.

4.2.5 Runway Strength

Runway 10/28 is the primary runway, and has a weight-bearing capacity that supports 75,000 pound Single Wheel Gear (SWG) equipped aircraft, 110,000 pound Double Wheel Gear (DWG) equipped aircraft, and 190,000 pound Dual Tandem Gear (DTG) equipped aircraft. The current critical aircraft operating on Runway 10/28 is a Gulfstream 350, which has a MTOW of 70,900 pounds. It is recommended that the pavement strength be maintained at the current level on Runway 10/28 so the airport will be able to accommodate Boeing 737 type operations in the future. Additionally, this strength will also accommodate the occasional C-130 and Gulfstream V aircraft that operate at the airport. ***Runway 10/28 pavement strength is adequate to accommodate all existing and forecasted aircraft, and therefore strengthening is not required***.

Runway 1/19, the crosswind runway, was constructed for light aircraft use, having a weight-bearing capacity no greater than 30,000 pounds for SWG equipped aircraft, and 50,000 for DWG equipped aircraft. The critical aircraft utilizing Runway 1/19 is the Cessna Citation III with a maximum takeoff weight of 22,000 pounds. In addition, Great Lakes' Embraer-120's have a MTOW of 26,433 pounds and the Beech 1900Ds have a MTOW of 17,120 pounds.[28] ***RIW's current runway pavement strength accommodates the current operators and their existing fleet mix aircraft.***

4.2.6 Runway Surface

As discussed in **Section 2.6.1**, both runways are constructed of asphalt. Currently, the longitudinal gradient on Runway 10/28 does not comply with current FAA criteria. The maximum longitudinal gradient of a C or D category runway (see **Section 2.1** for more information on airport categories) is ±0.8% in the first and last quarter of the runway. In 2009, 600 feet of Runway 28 and 700 feet of parallel Taxiway B were rehabilitated and reconstructed. This reconstruction included adjusting the elevation on the end of Runway 28, reducing the longitudinal gradient from 1.26% to 0.8%.

The airport's Capital Improvement Plan, current at the time of this report (2010 CIP), has scheduled the remaining phase of the Runway 10/28 rehabilitation project, which includes adjusting the Runway 10 end down approximately 12 feet in elevation, in the year 2015 (pending funding). The project will consist of rehabilitation and reconstruction of 3,350 feet of runway and approximately 2,100 feet of parallel taxiway, as well as one 90-degree connector taxiway, decreasing the gradient from +1.38% to +0.8%.

The intersection of Runway 10/28 and Runway 1/19 is experiencing isolated heaving at the runway intersection, on the north side of Runway 10/28. The intersection should be surveyed for a better assessment of the need and method for reconstruction. ***The heaving should be monitored and repaired with the Runway 10 rehabilitation project, unless it becomes a safety concern, at which time it should be repaired immediately.***

4.2.7 Taxiways

Taxiway systems are designed to provide freedom of movement to and from the runways and between developed areas on the airport. RIW has parallel taxiway systems that include entrance and exit taxiways, taxiway run-up areas, and apron taxilanes. Some of the basic design

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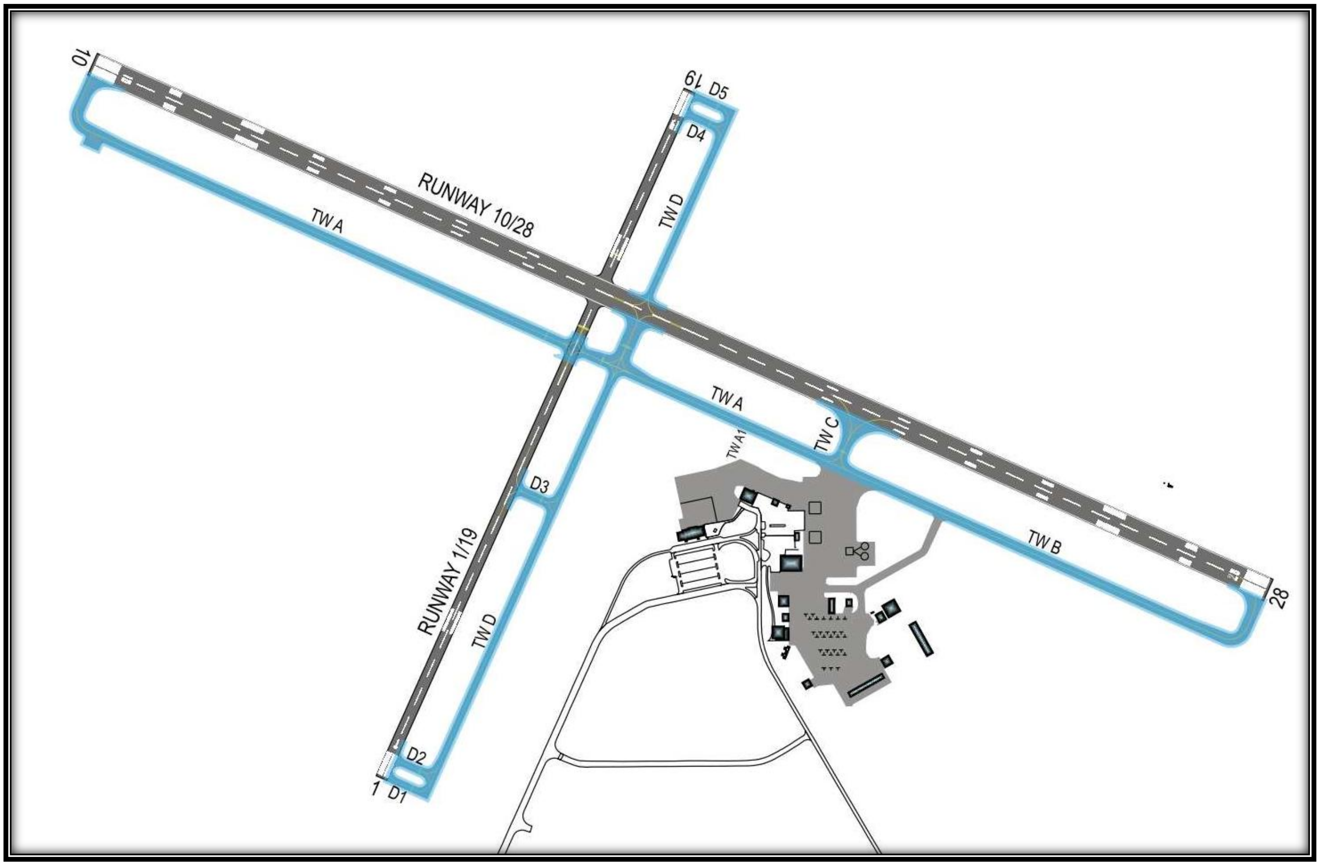
[28] Aircraft Characteristics. 9th Ed. Burns & McDonnell.

principles for a taxiway system are outlined by the FAA AC 150/5300, *Airport Design*, and include the following:

- Construct as many by-pass, multiple access, or connector taxiways as possible to each runway and runway end
- Provide taxiway run-up areas for each runway end
- Provide each active runway with a full parallel taxiway
- Build all taxiways routes as direct as possible
- Avoid developed areas, which might create ground traffic congestion

Taxiway A, Taxiway C, and the majority of Taxiway B are in "Fair" condition; and Taxiway D (Runway 1/19 parallel) is in "Excellent" condition, as previously discussed in **Chapter 2**, *Inventory*. All taxiways at RIW are equipped with Medium Intensity Taxiway Lighting (MITL), which is also in good condition. The current taxiway systems at RIW are shown in **Figure 4-1**.

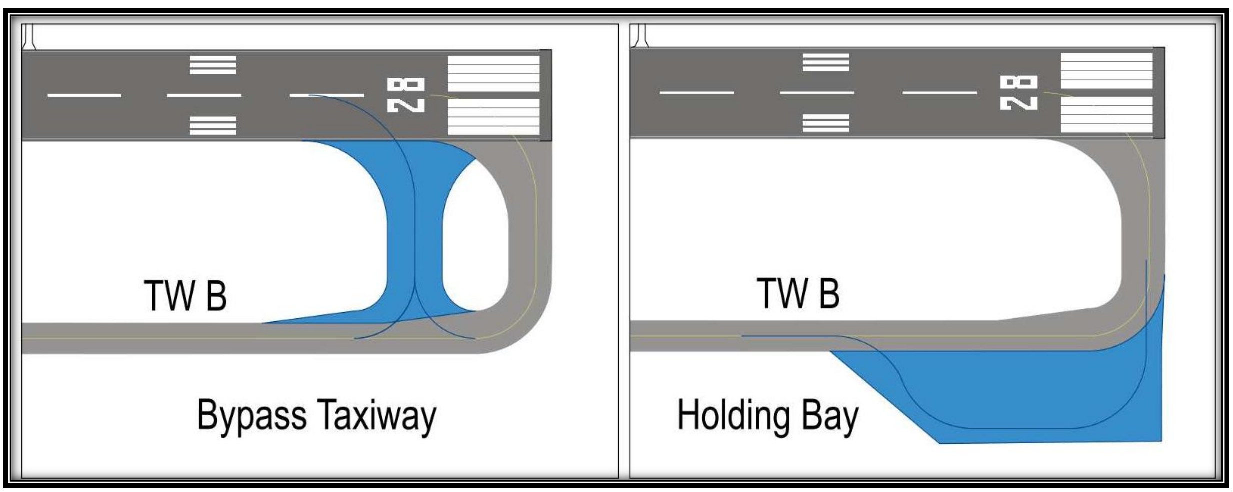
FIGURE 4-1 – RIW'S TAXIWAY SYSTEM



Source: Jviation, Inc.

Currently, the Runway 28 end does not have a run-up area (also known as a holding bay). The run-up area was removed and not rebuilt during the 2009 Runway 28 Reconstruction project due to the cost that would be required to construct a holding bay that meets FAA standards. The previous holding bay on Runway 28 and the current one on Runway 10 do not meet current standards. As a result, the Runway 28 end on Taxiway B is periodically a bottle neck when a preceding aircraft is not ready for takeoff and blocks the access to Runway 28. To enhance and improve the current taxiway system for Runway 10/28, a bypass taxiway, also known as a teacup taxiway, should be considered on Taxiway B at Runway 28 end. Bypass taxiways provide flexibility in runway use by permitting ground maneuvering of steady streams of departing airplanes, as an aircraft can enter the runway on the adjacent intersection if an another aircraft is occupying the primary entrance taxiway. A holding bay (run-up pad) instead of bypass taxiways would also enhance capacity, as holding bays provide space for airplanes awaiting final ATC clearance. Holding bays should be provided when operations exceed 30 per hour. RIW Peak Hour capacity currently does not exceed and is not projected to exceed 30 operations per hour in the 20 year forecasting period. Additionally, the run-up on Taxiway A at Runway 10 is smaller than FAA standards and should either be upgraded or a bypass taxiway should be constructed during the scheduled 2015 Reconstruction project. Examples of a bypass taxiway and holding bay are shown in **Figure 4-2**. This will be examined further in **Chapter 5**, *Alternatives*.

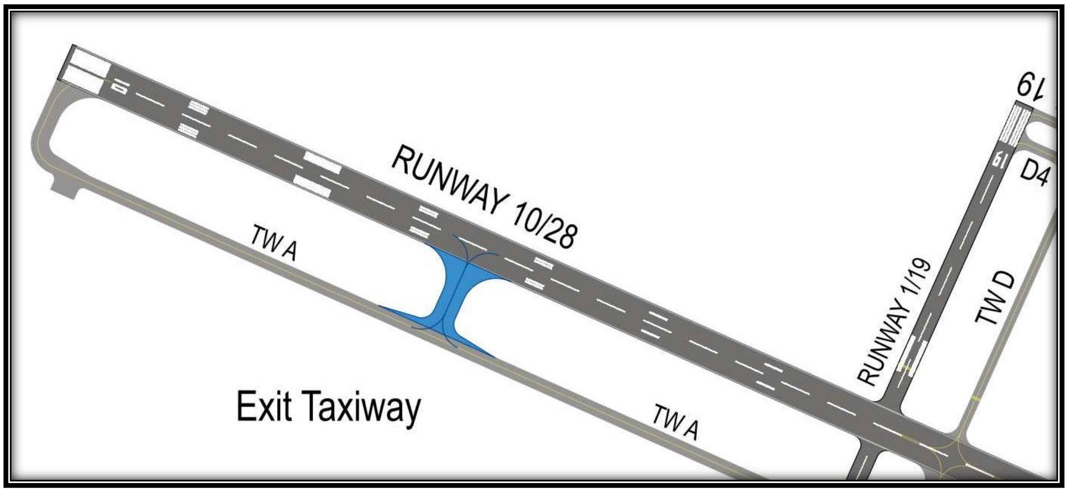
FIGURE 4-2 – BYPASS TAXIWAY VS HOLDING BAY



Source: Jviation, Inc.

Additionally, an exit taxiway should be considered on Runway 10/28, between the Runway 1/19 and Runway 10 end. The distance between exit taxiways is over 3,000 feet and many aircraft landing on Runway 28 either have an excessive taxi distance to the end of Runway 10 or turn around on the active runway to exit at Runway 1/19. A location for the additional connecting taxiway is shown in **Figure 4-3**.

FIGURE 4-3 - RUNWAY 10/28 EXIT TAXIWAY



Source: Jviation, Inc.

A decision between right-angled exit taxiways or acute-angled exit taxiways (commonly referred to as "high speed" taxiways) depends on the capacity analysis of the existing and forecast traffic. The purpose of a "high speed" taxiway is to enhance capacity at an airport because the aircraft can exit the runway at a higher speed than when using a right angle turn. They are used at an airport when the peak hour capacity exceeds 30 operations. ***Since there is no capacity issue now or in the forecasted future, "high speed" taxiways are not needed at RIW. The current right-angled taxiways will achieve an efficient traffic flow in the future and are less costly.*** This connector taxiway will cost approximately $820,000; and should be constructed with the Runway 10 Reconstruction project or after.

4.2.8 FAA Design Standards

For all airport planning efforts, FAA design standards are the primary consideration. **Table 4-3** shows the FAA design standards from FAA Advisory Circular (AC) 150/5300-13, *Airport Design* (Change 16). As stated previously, RIW is a C-II airport based on current operations; however, Runway 10/28 is constructed to C-III standards, while the Runway 1/19 complex meets B-II standards. Runway dimensional design standards define the widths and clearances required to optimize safe operations for landing, take-off, and taxi.

TABLE 4-3 - FAA DESIGN STANDARDS (AC 150/5300-13, CHANGE 16)

	Existing Runway 10/28	ARC C-II	ARC C-III	Existing Runway 1/19	ARC B-II
Runway Width	150'	100'	100'	75'	75'
Taxiway (Parallel) Width	50'	35'	50'	35'	35'
Runway Safety Area					
Width	500'	500'	500'	150'	150'
Length Beyond RW End	1,000'	1,000'	1,000'	300'	300'
Runway Object Free Area					
Width	800'	800'	800'	500'	500'
Length Beyond RW End	1,000'	1,000'	1,000'	300'	300'
Taxiway Safety Area Width	118'	79'	118'	79'	79'
Taxiway Object Free Area Width	186'	131'	186'	131'	131'
Runway CL to Parallel TW CL	400'	400'	400'	240'	240'
Runway CL to Aircraft Parking	590'	500'	500'	250'	250'
Taxiway CL to Parallel TW CL	N/A	105'	152'	N/A	105'
Runway Holdline	250'	250'	250'	250'	200'
Taxiway FOMO* Distance	93'	65.5'	93'	65.5'	65.5'

**Distance to Fixed or Movable Object (FOMO) from taxiway centerline*

4.2.8.1 Runway and Taxiway Shoulders

The Airport currently does not have shoulders on either the runways or taxiways. **Chapter 8** of AC 150/5300-13 recommends 10-foot paved shoulders for ADG-III and higher. ***Although Runway 10/28 is currently designed to ADG-III, at this time the level of activity from ADG-III aircraft does not justify the cost of paved shoulders.*** However, on the ALP they will be shown as a future condition so that they can be added in the future if needed.

4.2.8.2 Safety Areas

A safety area is a defined surface surrounding the runway or taxiway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the paved surface. According to the 2009 WYDOT AI&I Plan Report Card, RIW does not meet the required Runway Safety Area (RSA) standard due to a slope that was out of compliance. However, this RSA slope was corrected in October 2009 with the AIP 3-56-0024-29 project for the reconstruction of the Runway 28 end. ***The safety areas meet the current standard.***

4.2.8.3 Object Free Area (OFA)

An object free area is an area on the ground that is centered on a runway, taxiway, or taxilane centerline, provided to enhance the safety of aircraft operations by clearing the area of above-ground objects. Some objects are acceptable in the OFA, including provided objects that need to be located in that area for air navigation or aircraft ground maneuvering purposes, or are less than three inches tall. ***All portions of the runway and taxiway OFAs are free of objects.*** However, Hangar A is in a Taxilane OFA, 23 feet and 25 feet from centerline respectively, per the 2007 WYDOT Design Standard Inventory.

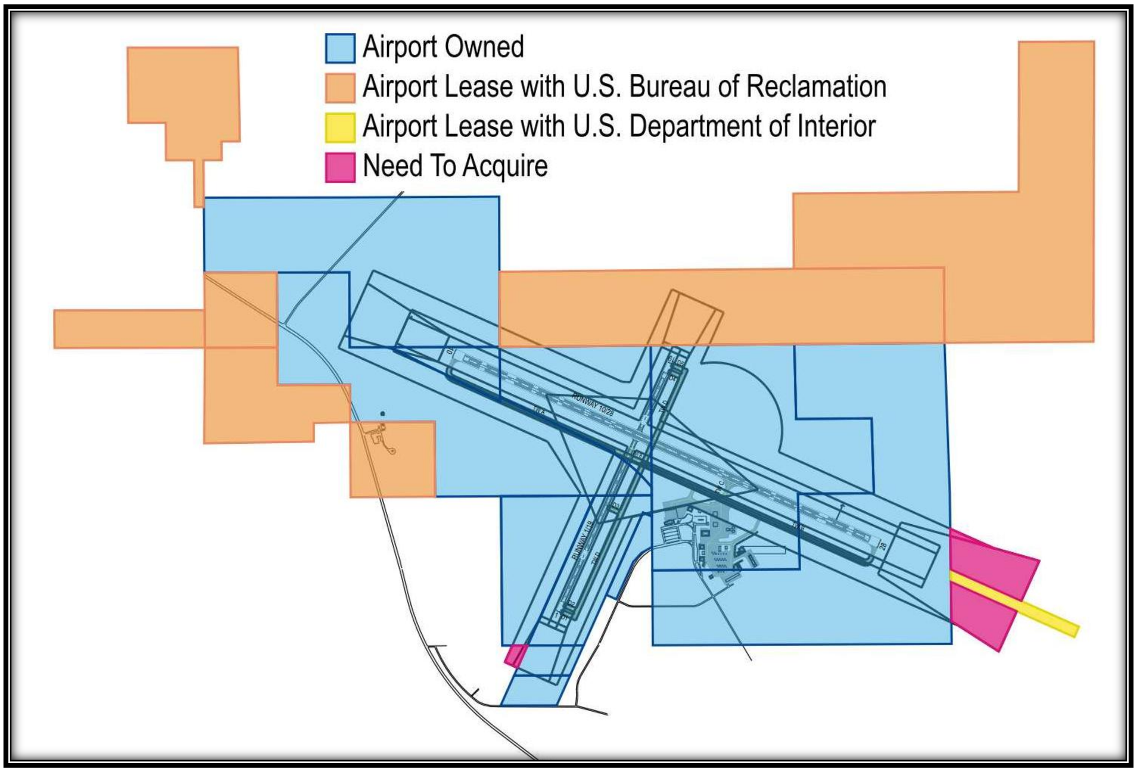
4.2.8.4 Obstacle Free Zone (OFZ)

The OFZ is a volume of airspace intended to protect aircraft in the early and final stages of flight. It must remain clear of object penetrations, except for frangible NAVAIDs located in the OFZ because of their function. The OFZ is comprised of the Runway OFZ and, where applicable, the Precision OFZ, the Inner-Approach OFZ, and the Inner Transitional OFZ. ***All portions of the OFZ are free of restricted obstacles.***

4.2.8.5 Runway Protection Zone (RPZ)

The RPZ is an area off of each runway end designed to enhance the protection of people and property on the ground. In order to ensure that the RPZs are kept clear of incompatible uses, the land included in the RPZ should be owned by the airport or protected via an avigation easement. Several portions of the RPZs are not owned by the Airport. The areas the Airport owns and leases are shown in **Figure 4-4**. The airport lease land from the U.S Bureau of Reclamation and the U.S. Department of Interior. However, it may be difficult to acquire the land on the east end of Runway 28 since the acquisition area is part of the Wind River Indian Reservation. ***The airport should acquire all land with the RPZ.***

FIGURE 4-4 - AIRPORT RPZ OWNERSHIP



Source: Jviation, Inc.

4.2.8.6 Building Restriction Lines (BRLs)

The BRLs are lines that run parallel to each of the runways and offset at a distance that ensures that new construction is below the FAR Part 77 Airport Imaginary Surfaces. The BRLs at RIW are calculated based on a 35 foot tall structure. Structures that are taller than 35 feet will require additional analysis to ensure compliance with the FAR Part 77 surfaces. Currently the airport does not own all of the land required for the BRLs for the planned precision instrument runways, as shown in **Figure 4-4**. ***The Airport should acquire all land within the BRL. The land is area shown in magenta near Runway 1 on*** **Figure 4-4**.

4.2.8.7 Runway Visibility Zone (RVZ)

The RVZ is required to ensure clear visibility for converging aircraft when an airport has intersecting runways. The RVZ is a four-sided polygon that connects at the midpoint of the runway intersection to each of the runway ends. The terrain needs to be graded and permanent objects need to be designed or sited so that there will be an unobstructed line of sight from any point five feet above one runway centerline to any point within the runway visibility zone. ***The airport must maintain the grassy areas in the RVZ so that clear visibility is ensured. The RVZ is presently clear.***

4.2.8.8 Line of Sight

The Line of Sight standard requires that two points five feet above the runway centerline be mutually visible for the entire length of the runway length. However if there is a parallel taxiway, the two five foot points must be visible for one-half of the runway length. ***There are no line of sight issues on the airport.***

4.2.9 Airfield Markings

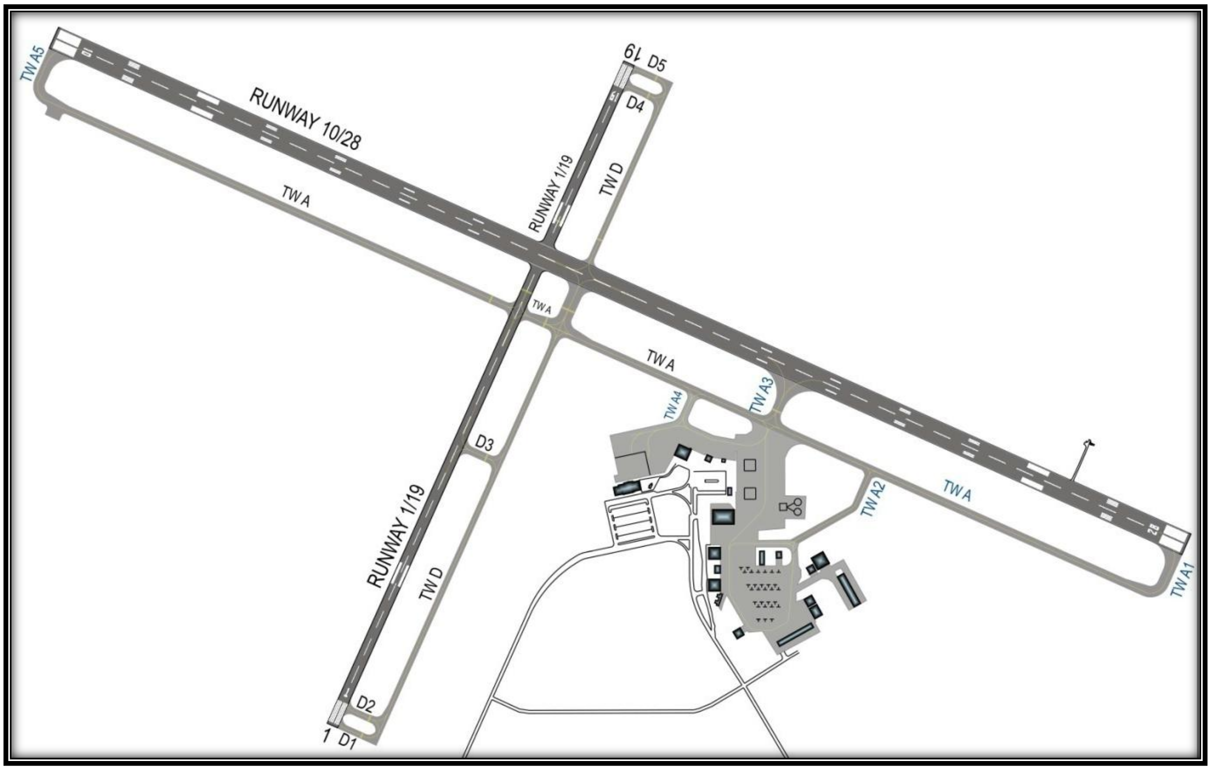
Runway 10/28 is marked with precision markings, which include the centerline, edge stripes, aiming points, threshold, and touchdown zone markings. Runway 1/19 has non-precision markings, which only includes the centerline, threshold, and aiming point markings. The taxiways are marked with yellow centerline striping and at the runway intersections are marked with a yellow enhanced centerline and enhanced runway hold bars to meet the new Airport Marking Standards found in Change 2 of AC 150/5340-1J, *Standards for Airport Markings*. ***The markings are consistent with current requirements and only need to be repainted as part of scheduled maintenance.***

4.2.10 Airfield Signage

Presently, the taxiway designations on the parallel taxiway and connectors to Runway 10/28 can be confusing to pilots that are unfamiliar with the airport because Runway 10/28's parallel taxiway has three different designations (Taxiways A, B, and C). The parallel taxiway and connectors for Runway 10/28 should be renamed to enhance situational awareness on the airport. *Engineering Brief No. 75: Incorporating Runway Incursion Prevention into Taxiway and Apron Design* published on November 19, 2007, provides guidance for the planning and design of taxiway and apron improvements to minimize the likelihood of runway incursions and to increase situational awareness. It states that taxiway designation should "avoid taxiway nomenclature assigning the same name along to a taxiway making several turns along its route. By designating different taxiway names along a prescribed route pilots are forced to look for the next taxiway segment where a turn is required promoting situational awareness."

To increase situation awareness at RIW, Runway 10/28's parallel taxiway and connectors should be renamed, as shown in Figure 4-5. If the bypass taxiways previously discussed are to be implemented, their naming should be considered in the overall plan.

FIGURE 4-5 – NEW AIRFIELD SIGNAGE LAYOUT



Source: Jviation, Inc.

4.3 Visual Navigational Aids (NAVAIDs)

The existing NAVAIDs for RIW provide a precision instrument approach to Runway 28 and a non-precision approach to Runway 10. All of the runways at RIW are equipped with Precision Approach Path Indicators (PAPIs) which provide visual descent guidance. The approach ends of Runways 10, 1 and 19 have Runway End Identification Lights (REILs) to indicate to approaching aircraft where the usable runway begins. Additionally, Runway 28 is equipped with Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) approach lighting for transition from instrument flying to a visual approach and landing. ***No improvements are recommended.***

4.4 Instrument Approach Procedures

There are two types of Instrument Approach Procedures (IAP): traditional ground based and satellite based (GPS). Approach minimums are based upon several factors, including obstacles, navigation equipment, approach lighting, and weather reporting equipment.

There are two primary classifications of ground based navigation systems. Both are used at RIW, and either provide horizontal guidance only (e.g. VOR, NDB, TACAN, etc.), or both horizontal and vertical guidance (e.g. ILS). In most cases, the lowest possible minimums with horizontal guidance only is 300-1 (i.e. 300 feet cloud ceiling allowance and one mile visibility).

ILS (Instrument Landing Systems) approaches are broken into three categories: I, II, and III. Categories II (CAT II) and III (CAT III) require greatly increased airport investments, such as in-pavement runway and taxiway lighting, duplicate equipment installations, and longer approach lighting systems. Additionally, many airlines do not use CAT II and CAT III approaches because of the added aircraft equipment and crew training. CAT I ILS approaches are common at commercial service airports such as RIW.

GPS (Global Positioning Systems) satellite based instrument approaches follow the same basic guidelines as ground based systems, with the lowest possible minimums for approaches with horizontal only guidance being 300-1. With the addition of vertical guidance through Wide Area Augmentation System (WAAS) or Local Area Augmentation System (LAAS), the lowest minimums are generally 200-½. The visibility can be reduced by ¼ mile with the installation of a MALS.

4.4.1 Instrument Approach for Runway 10/28

RIW has a VOR/DME (Very High Frequency Omni-directional Radio-range/Distance Measuring Equipment) located on the airfield. The VOR/DME is used for the approaches on Runways 10 and 28. An Instrument Landing System (ILS) is installed on Runway 28 and provides both horizontal and vertical guidance. This CAT I ILS approach has minimums of 200 feet cloud ceiling and half mile visibility (200-½). (For more information on NAVAIDs see **Section 2.6.6**). Additionally, Runway 28 is equipped with a MALSR. The visibility approach minimums for Runway 28 could be lowered to Runway Visual Range (RVR) of 1,800 feet with runway centerline lights and RVR equipment. Runway centerline lights are rarely installed at non-hub airports due to minimal benefit and the high installation and operating costs. Improving the approach to CAT II or III would be unrealistic, as there are no current users or foreseen users that are equipped and qualified for these approaches. ***The instrument approaches on Runway 10 and 28 are adequate for aircraft operations at RIW.***

4.4.2 Instrument Approach for Runway 1/19

Currently, there are no instrument approach procedures for Runways 1 or 19. As previously discussed in **Section 2.13.4**, IMC conditions occur 2.1% of the time, meaning that in 2010, of the 8,741 operations (take-offs and landings), approximately 184 were in IMC weather. Of the 184 aircraft operations, half (92) were arrivals. During IMC, the winds exceed a 13-knot crosswind limit on Runway 10/28 11.33% of the time. It is estimated that 10 arrivals (92 arrivals x 11.33%) may have occurred during times with excessive crosswinds, causing delays or cancellations. These 10 flights could have avoided delay or cancellation if an instrument approach were available on Runway 1 or 19.That being said, it would be impractical to install an ILS for Runway 1 or 19 to reduce delays and cancelations to help approximately 10 flights per year. However, a GPS approach to Runway 1 and 19 would be reasonable solution.

GPS based instrument approach systems are much easier to implement than ground-based solutions. To request a GPS approach procedures for a runway, an airport must have a recent obstruction survey which meets the latest FAA regulations. As part of this master plan project, a survey meeting these requirements is being completed. A GPS approach could be requested by the airport by submitting an Instrument Flight Procedures Request (IFP) Form. More information, including the requirements for an approach, and an online request form can be found through the link below:

http://www.faa.gov/air_traffic/flight_info/aeronav/ifpinitiation/

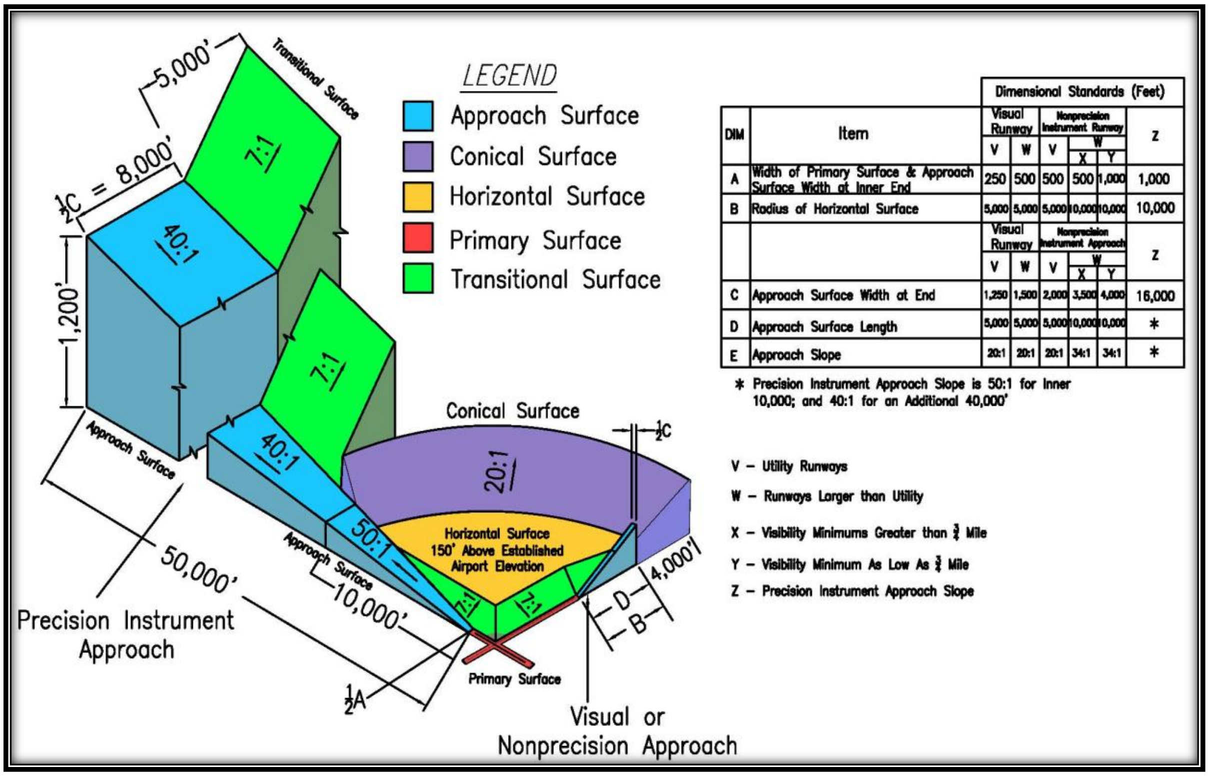
A GPS approach is recommended for Runway 1 and Runway 19.

4.5 Obstructions and Airspace Requirements

FAR Part 77 defines and establishes the standards for determining obstructions that affect airspace in the vicinity of an airport. Prior to any airport development, a FAR Part 77 evaluation must be conducted regardless of project scale to verify that there will be no hazardous effect to air navigation due to construction. FAR Part 77 defines the airport's imaginary surfaces. Imaginary Surfaces are geometric shapes that are in relation to the airport and each runway. The size and dimensions of these imaginary surfaces is based on the category of each runway for current and future airport operations. The five imaginary surfaces are the Primary, Approach, Horizontal, Conical and Transitional, shown in **Figure 4-6**, and are defined below. Any object which penetrates these surfaces is considered an obstruction and affects navigable airspace.

In respect to FAR Part 77, Runway 28 is a larger than utility runway with a precision instrument approach and visibility minimums lower than ¾ mile. Runway 10 is a larger than utility runway with a non-precision instrument approach and visibility minimums lower than 1 mile. Runways 1 and 19 are utility runways with visual approaches only; however, they should be considered as non-precision runways in the future.

FIGURE 4-6 - PART 77 IMAGINARY SURFACES



Source: Jviation, Inc.

Primary Surface - The Primary Surface is an imaginary obstruction-limiting surface that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are functions of types of approaches existing or planned for the runway.

Approach Surface - The Approach Surface is an imaginary obstruction-limiting surface that is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance upon the type of available or planned approach by aircraft to a runway.

Horizontal Surface - The Horizontal Surface is an imagery obstruction-limiting surface that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimension of this surface is a function of the types of approaches existing or planned for the runway.

Conical Surface - The Conical Surface is an imaginary obstruction-limiting surface that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

Transitional Surface - The Transitional Surface is an imaginary obstruction-limiting surface that extends outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface.

4.5.1 Obstructions

Obstructions are defined as any object of natural growth, terrain, permanent or temporary construction equipment, or permanent or temporary manmade structure that penetrates an imaginary surface.

This section will be completed following the completion of the obstruction survey.

4.6 Airspace Class and Air Traffic Control

The airspace that surrounds an airport is classified according to the activity level of the facility and the presence of an air traffic control tower. RIW is currently in Class E airspace, which is airspace that surrounds an airport without an operating control tower. The next highest level of airspace is Class D, which involves an operating control tower. ***The activity levels that are currently forecasted for RIW do not support the expense of a control tower; therefore, the airspace should remain Class E.***

All aircraft that are on an instrument approach require contact with an air traffic facility. The aircraft on approach to RIW remain in contact with the controller at the Denver Air Route Traffic Control Center (Denver Center) in Longmont, Colorado, until the pilot has visual contact with the airport and then cancels their instrument flight plan. The communications link with Denver Center fulfills the current and future air traffic control needs at RIW.

4.7 Landside Requirements

Landside facilities are facilities that support airside operations, such as the facilities necessary for handling aircraft and passengers while on the ground. The landside facilities consist of terminal buildings, access roads, hangars, and other support facilities. The capabilities and capacities of the various landside components are examined in relation to the project demand to help identify future landside facility needs.

4.7.1 Regional Transportation Network

Chandelle Boulevard and Airport Road (Old Highway 26) provide direct access to the terminal building, and Airport Road provides access to the GA side of the Airport. ***The current roads that access the airport are adequate for the current and projected demand at RIW. Airport Road is in poor condition; however, it is off airport property and is not eligible for repair through airport grant programs***

4.7.2 On-Airport Circulation Roadways

Ground access to the passenger terminal is provided by a loop road circling the parking lots, and provides curb front access as well as general circulation. The public parking and rental car parking lot is located in the middle of the terminal access loop. ***The on-airport circulation roads are adequate for current and projected demand at RIW.***

4.7.3 Parking

RIW has free paved parking in front of the terminal building. There are 153 parking spaces in front of the terminal for TSA, Hertz Rental Car, Avis Rental Car, and general parking. Additionally, there are seven parking spaces located on the east side of the terminal for airport employees and handicap parking. As can be seen in **Figure 4-7**, occasionally the current parking lot fills up, and vehicles park in the overflow parking area located east of the current terminal parking lot. This area has been filled with compacted asphalt millings to better accommodate the overflow parking in this area. This space could provide an estimated 60 additional parking spaces. ***It is recommended that the overflow parking area be paved and marked. Additional parking expansion alternatives will be examined further in Chapter 5.***

FIGURE 4-7 - OVERFLOW PARKING

Source: Jviation, Inc.

4.8 Terminal Requirements

The airport terminal is the link between the community and the airport, and is often a visitor's first and last impression of Riverton. As such, the need for a clean, attractive terminal facility has many potential benefits beyond the obvious.

4.8.1 Terminal Building Requirements

The terminal building is in good condition and includes approximately 11,013 square feet, with a planned expansion to the east for an additional 10,500 square feet. Inside the terminal are two rental car companies (Hertz and Avis), passenger ticketing, Great Lakes operations/office area, passenger screening, passenger hold room, baggage claim, and the Aircraft Café. **Table 4-4** shows the current approximate size of the existing terminal and it functional areas.

TABLE 4-4 - SQUARE FOOTAGE OF TERMINAL FUNCTIONAL AREAS

Functional Area	Square Feet
Secure Hold Room	530
Unsecure Hold Room	555
Circulation	2,060
Concessions	
Café	1,430
Rental Car	215
Restrooms	691
Utility/Storage	386
Circulation	2,945
Airline	
Baggage	631
Ticket Counter	523
TSA	
Passenger Screening	690
Offices	357
TOTAL	**11,013**

Source: Jviation, Inc.

As a general rule for terminal planning, hold rooms and circulation areas (e.g. lobby) should be sized at 15 square feet per passenger on an 80% load factor. Using Great Lakes' largest aircraft the Brasilia, Embraer 120, a 30 seat aircraft, this would equal 360 square feet needed for the hold rooms [(30 x 0.8) x 15 = 360]. More often than not, Great Lakes has only one aircraft parked on the commercial apron, but if Great Lakes were to have two aircraft (two Beech 1900s) the hold rooms would need a total area of 450 square feet. If a charter operation is to begin service at the airport, or scheduled service is offered with larger aircraft, the hold room will be undersized. ***The terminal has adequate hold room and circulation space for the existing and forecasted level of commercial operations and enplanements; however, a change in airline service could change this requirement.***

Conversely, the terminal has been crowded since 9/11 due to the addition of TSA. TSA has taken up former rental car and gift shop space. As a result, Avis relocated to a desk situated in the non-secure hold room due to the lack of space and the gift shop closing. ***Relocating TSA offices to another location should be considered. The airport would be able to relocate Avis back to its preferred spot and reopen the gift shop.***

Chapter 5, *Alternatives* will examine possibilities to reconfigure or expand the terminal to better accommodate existing uses and to have a plan should the air service environment change and larger aircraft need to be accommodated.

4.8.2 Gates and Apron Frontage

The commercial apron includes roughly 3,890 square yards of concrete. It can accommodate up to two commuter aircraft. The commercial apron was reconstructed in 2008, and is rated in

"Excellent" condition according to the 2009 WYDOT Pavement Index Condition Report. The terminal has one hold room for scheduled passenger service with all outgoing passengers using a single gate door to the ramp. RIW is scheduled to construct the deicing containment facility and apron on the west side of the commercial apron by 2020. This project also consists of a connector taxiway, connecting the commercial apron to Taxiway A. ***The commercial apron aircraft parking and terminal gates are adequate for the current and forecasted demand at RIW.***

4.8.3 Airline Hangar Storage

The need of a hangar for Great Lakes' aircraft in winter months has been mentioned by the RIW Airport Board. A hangar for Great Lakes in the winter months and large GA aircraft in the summer could be a possible revenue stream for the airport and may justify the cost of construction. This hangar would need to be large enough to accommodate Great Lakes largest aircraft, the Embraer-120, with a length of 65 feet-8 inches and wingspan of 64 feet-11 inches. The minimum hangar size would be 85 feet by 75 feet. If the airport were to build a 100' by 100' box hangar, it could house larger corporate jet aircraft in the summer months, generating more revenue for the airport. The hangar could also house additional office space, which the current commercial tenants need. ***Possible hangar sizes and locations will be discussed further in Chapter 5, Alternatives.***

4.9 General Aviation Requirements

The number and types of projected General Aviation (GA) operations and based aircraft can be converted into a generalized projection of GA facility needs. GA facilities include the Fixed Base Operator (FBO), hangars, and apron/tiedown space.

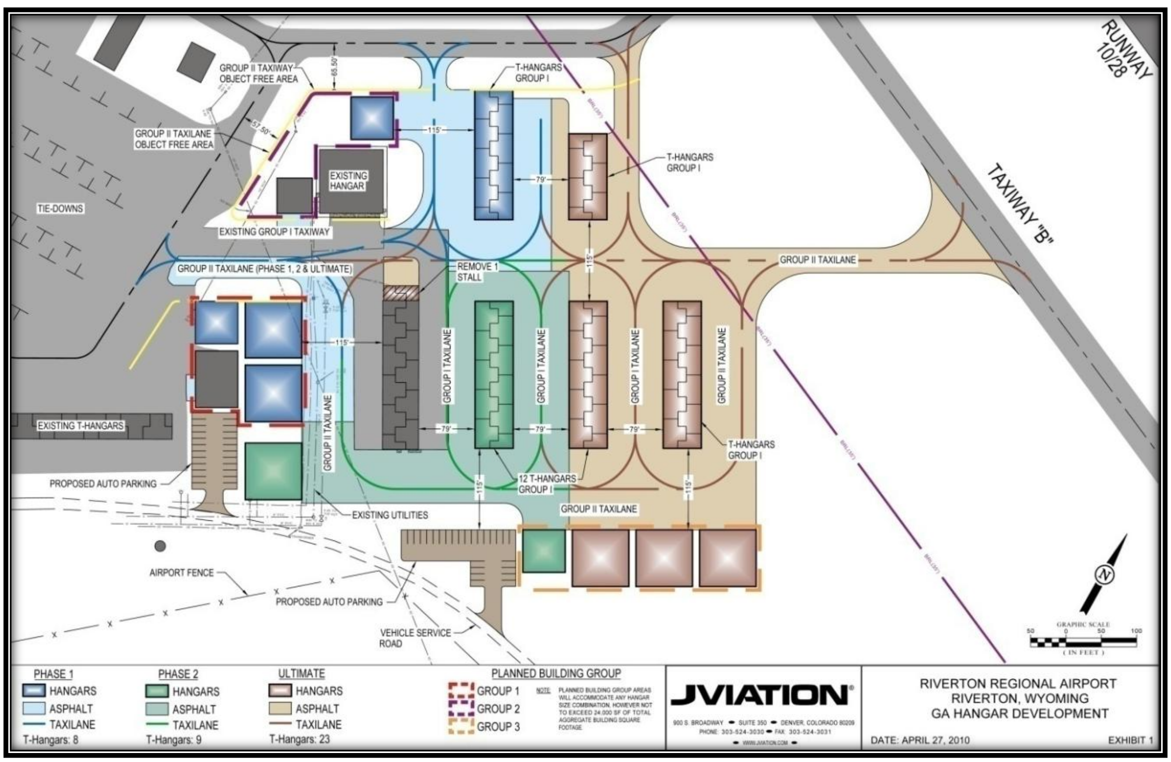
4.9.1 Aircraft Storage Facilities

Hangar demands depend upon a variety of variables, such as the airport's location, types of aircraft housed, hangar rental costs, prevailing weather conditions, and future demand. During the planning process, it is essential to evaluate the mix of aircraft that park on the aprons and those in hangars, and how it may change in the future. The space required for hangar facilities is dependent on the number and types of aircraft that are expected to be based at the airport. Aircraft based at RIW are stored in one of three areas: box hangars, t-hangars, or tiedowns. Currently, the airport has 48 based aircraft.

From the returned surveys, the respondents overwhelmingly indicated the need for additional hangar space on the airport. Additionally, the survey response revealed the lowest scored categories were hangar space, hangar availability, and hangar lease rates. Moreover, the 2009 WYDOT AI&I Plan Report Card requires that the airport have enough hangar and hangar space to house 100% of the based aircraft. Currently, RIW has only enough hangars and hangar space to house 75% of their based aircraft. The WYDOT AI&I Plan also recommends that hangar area be lighted, with 24/7 access to public phone and public restrooms. Currently, the airport has neither. ***It is recommended the airport install a restroom, or at a minimum add portable toilets and a phone near the FBO for after hours use. Additionally, the main GA apron area should include apron flood lighting for safety and security.***

In order to accommodate immediate needs, a GA development plan was prepared in the early stages of this master plan. Several alternatives were evaluated in order to accommodate the growing demand for hangars and to ensure that the development will follow a logical sequence. The plan was roughly equivalent to a 30% design effort, reflecting the overall potential for the site at a full build-out. Taxilanes necessary to access the hangar site were planned, and an assessment of the utilities required for the development was performed. See **Figure 4-8** for 30% Design of GA Development. The GA development plan will be incorporated in the Airport Layout Plan update.

FIGURE 4-8 - 30% DESIGN FOR HANGAR BUILD OUT



Source: Jviation, Inc.

4.9.2 Aircraft Parking Aprons

The GA apron includes roughly 62,300 square yards of asphalt pavement. This area includes the former commercial apron with two concrete fueling pads. The north GA apron is in "Poor" condition, while the south GA apron is in "Fair" to "Poor" condition. The southern and northern portions of the GA apron are scheduled to be rehabilitated in 2015 per the current CIP, pending available funding. In addition, comments were received regarding inadequate lighting in the GA apron area. ***Installation of basic lighting in the GA apron area is recommended.***

4.9.3 FBO Facility Needs

Jim's Aircraft Services is RIW's only FBO, and is a full service FBO. 100 Low Lead (AvGas) and Jet A are available for purchase, in addition to other services such as oxygen service, aircraft parking on the ramp, tie-downs, a GPU/Power cart, pilot lounge, aircraft rental, aircraft maintenance, pilot supplies, and rental cars. From the returned surveys, respondents said they would like to see the FBO pilot lounge improved. Also more convenient tie-downs were requested near FBO facility.

The FBO is open during normal business hours, which includes weekdays from 7:00 a.m. to 5:30 p.m., and weekends from 8:00 a.m. to 4:00 p.m. After hours call-service is offered with prior arrangement and/or a callout fee. Survey respondents overwhelmingly indicated the need for a 24-hour self-service fueling station. This is further discussed in **Section 4.12.1**.

4.10 Airport Equipment

The Snow Removal Equipment (SRE) needs to be replaced to maintain an adequate fleet so that snow removal may be completed in an efficient manner with the least amount of impact on airport operations, and allow the airport to meet the snow removal requirements as regulated by the FAA. Refer to **Section 2.9**, for more information RIW's current equipment.

In 2011, the CIP includes the acquisition of two new pieces of SRE equipment at a total cost $360,000. These pieces of equipment are both tandem wheel plow/dump trucks with 16 and 20 foot wide plows.

4.11 Support Facilities

4.11.1 Aircraft Rescue and Firefighting

The Airport's Aircraft Rescue and Firefighting (ARFF) Station is in a 40' by 40' metal building, and is adequate for housing the ARFF truck. The ARFF building is also the on-site airport operation's office. Since the ARFF Station was built, the sewer line leading into the old terminal was replaced due to freezing in the winter months, and a new stairway to the upper storage area was installed, replacing a ladder. The future maintenance needs are garage doors which are showing signs of deterioration and will need to be repainted or replaced. The current ARFF Station is inadequate to accommodate the office space needed for airport management, ARFF, and police personnel. ***A new facility that accommodates the ARFF and SRE needs is recommended.*** A future ARFF facility should be planned and will be discussed in **Chapter 5**, *Alternatives*.

4.11.2 Airport Maintenance Facilities

The SRE is stored in the maintenance hangar on the GA ramp. The maintenance hangar is not an ideal method of storage for the SRE, as the hangar could instead be leased for aircraft storage. ***A new facility that accommodates the ARFF and SRE needs is recommended.*** A location for a future SRE storage building should be planned and will be discussed in **Chapter 5**, *Alternatives*.

4.12 Fuel Storage Requirements

RIW has two above ground fuel tanks located on the southwest corner of the GA ramp. The fuel tanks are owned by the Airport and leased to the operator, Jim's Aircraft Services (FBO). Jim's Aircraft Services dispenses the AvGas and Jet A fuel required by Great Lakes as well as the Airport's GA users. One tank holds 12,000 gallons of AvGas and the other tank holds 15,000 gallons of Jet A fuel. Additionally, the FBO owns and operates four (4) fuel trucks: a 1995 Ford 2,500 gallon Jet A truck, a 1998 Ford 1,600 gallon Jet A truck, a 1983 Ford 1,200 gallon AvGas truck, and a 1979 GMC 1,400 gallon 100 Octane Low Lead (100LL) truck. ***The fuel trucks and the fuel tanks meet the fueling requirements and safety standards.*** The airport could also purchase the private fuel tanks currently owned by Western Executive Air if additional storage is necessary.

4.12.1 Self-Service Fueling

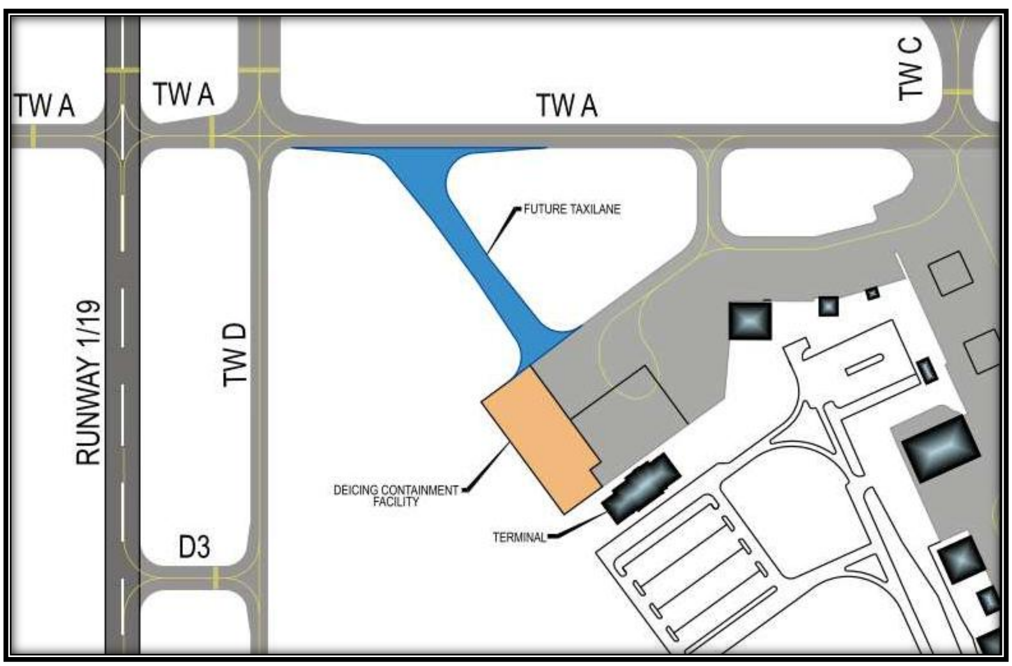
From the returned surveys, the respondents overwhelmingly indicated a need for a 24-hour self-service fuel station, since the FBO is only open during normal business hours (weekdays from 7:00 a.m. to 5:30 p.m. and weekends from 8:00 a.m. to 4:00 p.m). There are several decisions needed for self-service fueling, including the location for aircraft accessibility without blocking ground traffic, as well as the size and type of tank. WYDOT is unable to issue grants for funding the self-service fuel farm since RIW is a primary airport and the fuel tank will generate revenue. However, WYDOT can provide the airport with a low interest loan, which currently is at 5%. Information needed when applying for a WYDOT Aeronautics loan is a full description of the proposed project, including a licensed engineer's statement of feasibility for the project; the loan amount; proposed source of repayment; and a description of other project funding sources, including any future loan applications. The self-service fueling station will have to account for all of these factors. ***A self-service fueling station is recommended***, and will be examined further in **Chapter 5**, *Alternatives.*

4.13 Deicing Facilities

Deicing is the removal of frost, ice, slush, or snow through the application of heated water and propylene or ethylene glycol to ensure safe operations of aircraft. Deicing operations use large amounts of chemicals, which drain off the airport facilities into nearby rivers, lakes, and streams. This can have major impacts on water quality, including reductions in dissolved oxygen, reduced organism abundance and species diversity, and contamination of drinking water. The EPA issued a proposed rule 40 CFR 449, entitled *Effluent Limitation Guidelines and New Source Performance Standards* *for the Airport Deicing Category,* in the Federal Register in August 2009. The proposed rule would require the certain airports to collect either 20% or 60% of Aircraft Deicing Fluid (ADF). For more information on Effluent Limitation Guidelines for Airport Deicing see **Section 4.15.4**. ***From a review of the proposed rule, RIW will not be required to collect de-icing fluid.***

The 2008 commercial apron reconstruction project was designed with the ability to transition the commercial apron drainage system to allow for glycol containment and disposal. RIW is scheduled to construct the deicing containment facility on the west side of the commercial apron by 2020, as shown in **Figure 4-9**. This work could be completed sooner if future environmental regulations require immediate action. The containment facility will capture the flows that may be contaminated by deicing and/or fueling operations on the apron. The facility will allow glycol (deicing agent) to either be treated, or properly disposed of. This project will cost approximately $1.5 million for the apron expansion and deicing facility, and $870,000 for the taxilane. The WYDOT AI&I Plan has an objective that all commercial services airports in the State have aircraft deicing system and deicing containment system. RIW has a deicing system, but does not have the deicing containment system.

FIGURE 4-9 - COMMERCIAL APRON EXPANSION



Source: Jviation, Inc.

4.14 Utilities

Utilities provide the airport with potable water, sanitary sewer, fiber optics and phone, electric, storm water, and natural gas. Currently, all of the existing utilities are adequate to meet the existing demand. The utilities need to be accessed to accommodate the requirements of any future development at the airport (i.e. hangar development, apron expansions, new facility, facility expansion, etc.). Each utility will be further evaluated throughout the recommended developments and improvement for the airport in **Chapter 5**, *Alternatives*.

4.15 Regulatory Requirements

4.15.1 Wildlife Assessments

Following the US Airways Flight 1549 bird strike and subsequent emergency landing in the Hudson River on January 15, 2009, the FAA began the process of mandating Wildlife Assessments for airports.

The FAA issued a Certification Alert to FAA Part 139 certificated airport operators on June 11, 2009 which was a reminder that they are obligated to conduct a Wildlife Hazard Assessment if they experience a triggering event. These triggering events are defined in CFR FAR 139.337(b) as the following:

- An air carrier experiences multiple wildlife strikes;
- An air carrier aircraft experiences substantial damage from striking wildlife;
- An air carrier aircraft experiences an engine ingestion of wildlife;
- Wildlife of a size, or in numbers, capable of causing any of the items described above exists.

Initially there were 96 airports that were identified as needing this assessment. The 96 airports were then subsequently notified that they were required to conduct an assessment. Going forward, any airport that experiences a triggering event is required to initiate an assessment immediately.

It is the intention of the FAA to mandate that all Part 139 certificated airports be required to conduct a Wildlife Hazards Assessment even without a triggering event. A Notice of Proposed Rule Making (NPRM) was initiated in March 2010 to begin the process of mandating these assessments.

As the NPRM currently stands, if this schedule is maintained it is anticipated that this mandated rule would go into effect either in late 2011 or early 2012.

The Airport should plan on conducting a Wildlife Hazards Assessment by the required ruling.

4.15.2 Airports Geographic Information Systems (AGIS)

In a move to better support the future systems and technologies called NextGen by the FAA, Geographical Information Systems (GIS) standards have been introduced and are being phased in gradually over time. The goal with this system is to create a system wide standard for collection and input of aviation data.

The FAA introduced three (3) new Advisory Circulars (AC's) to provide guidance for these new standards. These AC's became mandatory for all federally obligated airports on September 2009. These AC's replaced the now obsolete FAA Survey Standard No. 405 which was officially sunset when the AC's became mandatory. The AC's described below dictate not only what type of data is to be collected, but how the data is collected and processed.

AC 150/5300-16A provides general guidance and specifications for establishing a control system for aeronautical surveys. This system dictates how the control system is to be set up and how to verify if the control is accurate. Additionally, it dictates how the control is to be submitted to the National Geodetic Survey (NGS) for approval before an actual survey can be performed.

AC 150/5300-17B provides guidance and specifications the actual acquisition of Aerial survey and accuracy. It also provides guidance on how this data should be submitted to the NGS for verification and approval.

AC 150/5300-18B provides guidance and specifications for how to appropriately collect data using field survey. Additionally, it provides guidance on how this data is to be submitted to the NGS for verification and approval.

In addition to following these guidelines the FAA plans to further standardize the data collection process so that in the future all Airport Layout Plans (ALPs) are uniform and easily obtained through an online depository. As these methods and technologies are created, they will be rolled out to the system in a phased manner.

RIW will be compliant with the AGIS requirement at the completion of this Master Plan.

4.15.3 Airport Emergency Plan

After the events of 9/11, the FAA released a revision to AC 150/5200-31C, *Airport Emergency Plan* (AEP). The change provided guidance for airports to develop and implement the now mandated FAA approved emergency plan outlined by Title 14 Code of Federal Regulations (CFR) 139.325.

Significant changes were included in the new AC to allow airports to better respond to emergencies. In particular the National Incident Management System (NIMS) and the Incident Command System (ICS) have now been incorporated. This inclusion required changes in organizational structure and response methodology. These changes would require additional training and resources for airports.

Recognizing that many airports would need time to create or update their AEP and to learn the new NIMS and ICS guidelines, a deadline was given for submission of the AEP to the FAA. There have been several extensions to this deadline and currently all airports have until June 30, 2011.

RIW is activity completing the Airport Emergency Plan, and will be finished by the deadline.

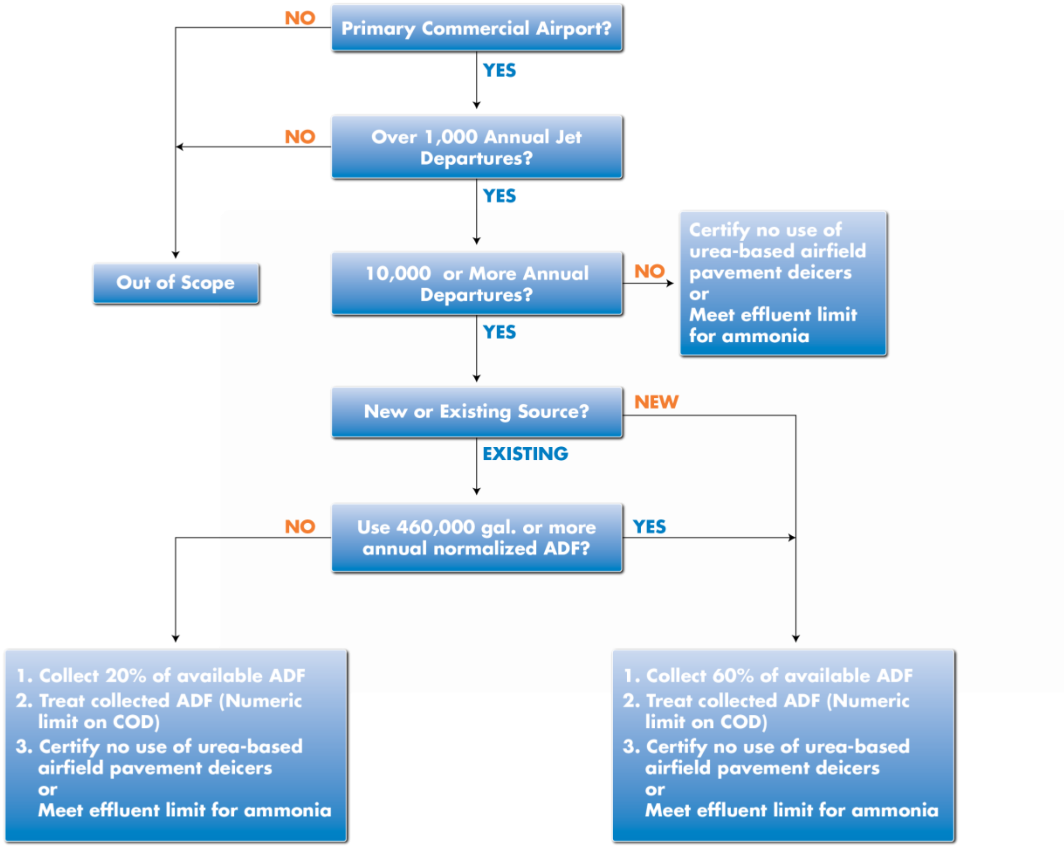
4.15.4 Effluent Limitation Guidelines for Airport Deicing

According to the U.S. Environmental Protection Agency (EPA), airport discharges from deicing operations may "affect water quality, including reductions in dissolved oxygen, fish kills, reduced organism abundance and species diversity, contamination of drinking water sources (both surface and groundwater), creation of noxious odors and discolored water in residential areas and parkland, and other effects." The operations included in these discharges involve the removal of ice from aircraft, the application of chemicals to prevent initial icing or further icing (anti-icing), and the removal of (and preventing) ice from airfield pavement (runways, taxiways, aprons, and ramps). In order to mitigate the potential negative impacts of deicing operations, the EPA has proposed rules to manage the impact by addressing both the collection and treatment measures used.

On August 28, 2009, the EPA issued their proposed rule 40 CFR 449, entitled *Effluent Limitation Guidelines and New Source Performance Standards for the Airport Deicing Category,* in the Federal Register. Due to pressure from airports and industry organizations, the EPA extended the comment period on the proposed rule from December 28, 2009 until February 26, 2010. The EPA was anticipating a final rule in March of 2011.

As proposed, the rule would require that airports over a certain size, as determined by the number of operations, collect either 20% or 60% of Aircraft Deicing Fluid (ADF) depending on the total amount of gallons dispensed per year. The flow chart presented in **Figure 4-10** further defines the process of determining whether, and to what extent, an airport is required to collect ADF under the proposed rule.

FIGURE 4-10 - AIRPORT DEICING EFFLUENT GUIDELINES AND STANDARDS



Source: 40 CFR 449, Effluent Limitation Guidelines and New Source Performance Standards for the Airport Deicing Category

Following the flow chart, it appears that if the rule is implemented as proposed, RIW would not be required (Out of Scope) to capture the ADF because RIW currently has fewer than 1,000 annual jet departures and fewer than 10,000 annual total departures. Deicing activities currently take place at the commercial apron, north of the terminal building. The airport currently does not collect ADF. In 2020, RIW's CIP indicates the construction of a deicing containment facility on the west side of the commercial apron. This is to capture flows that may be contaminated by deicing and/or fueling operations. The containment facility will allow the glycol to break down, and will then be released into the airport's sanitary sewer.

RIW is not required to capture the ADF according to this proposed rule.

4.15.5 Safety Management Systems

In 2009 the FAA issued a Notice of Proposed Rule Making (NPRM) for Safety Management Systems (SMS). This rule would require airport operators to create and institute a safety management system at their airport. This is being done to not only improve safety system wide, but to also bring the national airspace system in line with current International Civil Aviation Organization (ICAO) standards. ICAO is a specialized agency of the United Nations, and is the international aviation organization that develops the principles, techniques, and guides the planning and development of international air navigation.

The FAA has identified four (4) components to an SMS program which it calls the four pillars. These components will be incorporated into every airport SMS program. These components work together to create a safer airport environment.

The first pillar is Safety Policy and represents senior management's commitment to improving safety as well as defines the methods and processes necessary to meet safety goals. The second pillar is Safety Assurance and serves as a continuous evaluation of a program's effectiveness in risk control. It also serves as a mechanism to identify new hazards that may arise. The third pillar is Safety Risk Management which serves to determine if current risk controls need to be adjusted or if new controls should be implemented based on the assessment of accessible risk. Finally, the fourth pillar is Safety Promotion and occurs throughout the entire process. It serves as a constant reminder about an organization's safety programs and initiatives. This is accomplished through training and awareness programs inside the airport organization.

Currently the NPRM is still undergoing a public comment period that has been delayed to July 5, 2011. This may delay the publication of the rule until late 2011 or early 2012. The FAA will begin implementation of this rule starting June 1, 2011 for all large, medium, and small hub Part 139 airports. The remaining Part 139 airports will be phased in starting June 1, 2012.

Once the implementation process begins, FAA Order 5200.11 states that the following projects will be subject to Safety Risk Management Requirements (SRM):

- Submittal of new or revised Airport Layout Plans (ALP)
- FAA airspace determinations for construction safety plans
- FAA airspace determinations for airport sponsor requests for non-construction airport changes submitted by FAA Form 7480-1, Notice of Landing Area Proposal
- FAA approval for Part 150 noise compatibility programs and program changes that may affect aviation safety
- FAA approval of an airport sponsor's request for a Modification of Standards
- Final FAA approval of new and updated airport planning, design, or construction standards

RIW should continue to monitor the rule making process and be prepared to initiate a Safety Management Systems study once the rule is completed.

5.0 ALTERNATIVE ANALYSIS

5.1 INTRODUCTION

There are several key areas at Riverton Regional Airport (RIW) that can be developed to accommodate future aviation needs. These development projects will increase operations and safety for RIW. Alternatives for these key areas have been closely examined to determine the most efficient and cost-effective development approach. Each area has several alternatives that are described in more detail in the following sections.

The key development areas evaluated include:

- Extension of Runway 1/19
- Aircraft Run-up/Holding Areas for Runway 10/28
- Terminal Building Reconfiguration/Expansion
- Terminal Public Parking Expansion
- New Aircraft Rescue and Firefighting (ARFF) and Snow Removal Equipment(SRE) Building
- Hangar for Commercial Service Operator
- Self-Service Fuel Farm

5.2 EVALUATION CRITERIA

The evaluation criteria for the alternatives are:

- Operational Criteria – the ability to accommodate current and forecasted aircraft, passengers, and vehicles
- Economic Criteria – an estimate of costs to provide a basis for comparison of each alternative.
- Environmental Criteria – development that provides for minimal environmental disruption.
- Feasibility Criteria –tangible and intangible factors that affect an airport's ability to implement certain development projects.

5.3 RUNWAY 1/19 EXTENSION

5.3.1 Overview

As discussed in **Section 2.6.1**, Runway 1/19 is 4,800 feet long and is designated as a non-precision instrument runway. However, winds actually tend to favor Runway 1/19 over the primary runway (Runway 10/28) during inclement weather as described in **Section 2.13**. To safely accommodate the users of the airport, an instrument approach upgrade (GPS) and an extension on Runway 1/19 are desirable.

Section 4.2.3.2 of the Facility Requirements Chapter explained in detail the desirable runway length needs for Runway 1/19. In summary, an extension to 6,890 feet would accommodate all users; however, this is impractical because it would require an Airport Reference Code (ARC) increase of the runway due to the attraction of larger and faster jets. Therefore, three alternatives have been evaluated for an extension for Runway 1/19. These include extensions of 450, 600, and 1,000 feet, all of which are to the north. An extension to the south for Runway 1/19 is not feasible because of the location of existing transmission power lines and Highway 26. These issues are compounded if an instrument GPS approach is added to Runway 1.

5.3.2 Assumptions

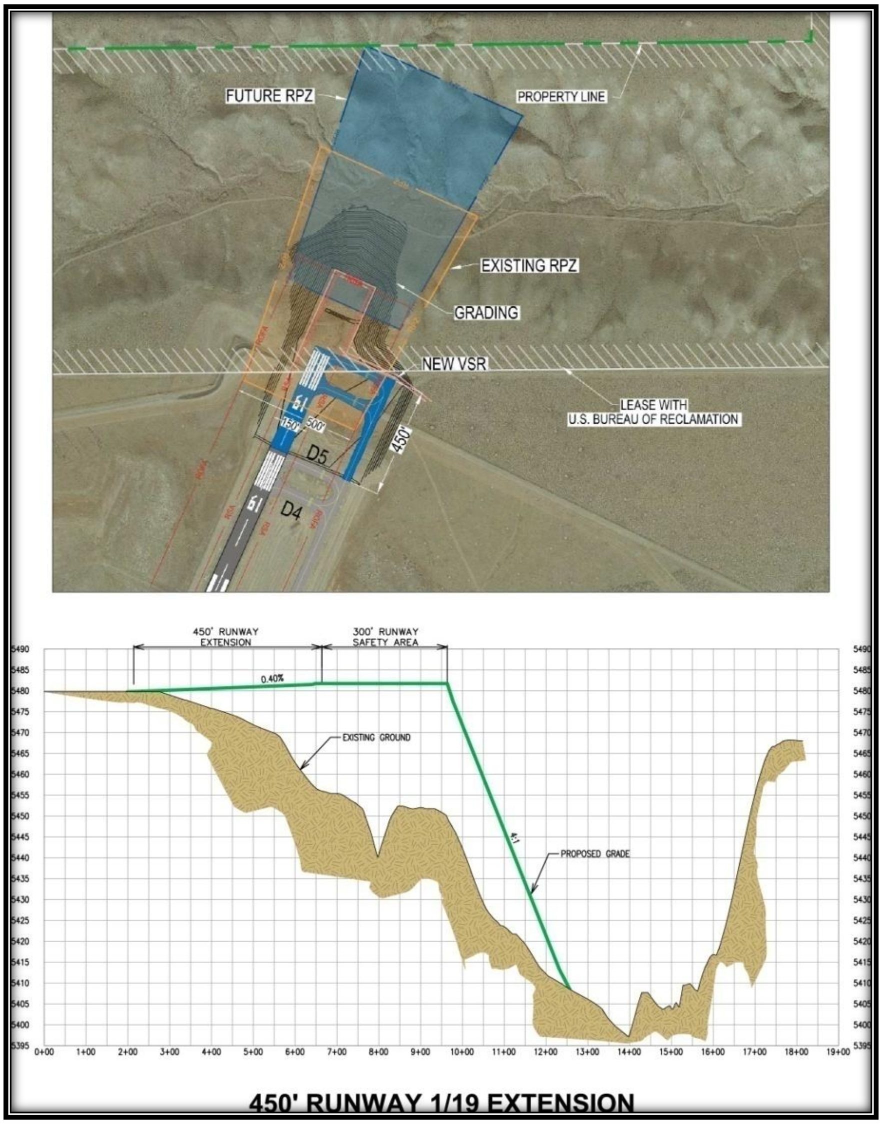
For the preparation of Runway 1/19 alternatives, the following assumptions were made:

1. Runway 1/19 will remain designed for ARC B-II aircraft and should not be extended to a length that will attract C-II class aircraft. If the runway attracts C-II aircraft it will require extensive upgrades to the runway width, safety areas, and increased separation between the runway and Taxiway D.
2. Parallel Taxiway D will also need to be extended accordingly with the runway.
3. Alternatives only assume runway alternatives that are usable at full-length in both directions. No declared distances (displaced threshold) alternatives were evaluated.
4. A small parcel of privately owned land can be acquired on the north side of the airport for approach protection.
5. The U.S. Bureau of Reclamation will renew RIW's current land lease and permit RIW to build on leased land.
6. Approximately one million cubic yards (CY) of fill dirt will come from previously completed, or future projects (approximately 290,000 CY of dirt will come from the existing stock pile on the northwest corner of the airport property and 700,000 CY of dirt will come from the Runway 10 reconstruction project currently scheduled for 2015).
7. All cost estimates assumed minimal dirt moving costs due to 700,000 CY of dirt from the Runway 10 reconstruction, and are prepared in 2011 dollars. Cost estimates are inclusive of design, construction, and construction management/administration.

5.3.3 Alternative 1 – 450 Foot Extension

This alternative allows expansion to a runway length of 5,250 feet, as shown in **Figure 5-1**. This extension limit is being evaluated to avoid having to rechannel the large drainage on north side of the airport. This alternative would not require additional land acquisition as the Runway Protection Zone (RPZ) would be included on existing airport lease interests. This length will barely accommodate the takeoff distance needs for the Brasilia of 5,118 feet at Maximum Takeoff Weight (MTOW). Moreover, this extension will not accommodate the current majority of B-II users of the airport. This extension is estimated to cost approximately $2 million.

FIGURE 5-1 - 450' EXTENSION FOR RUNWAY 1/19

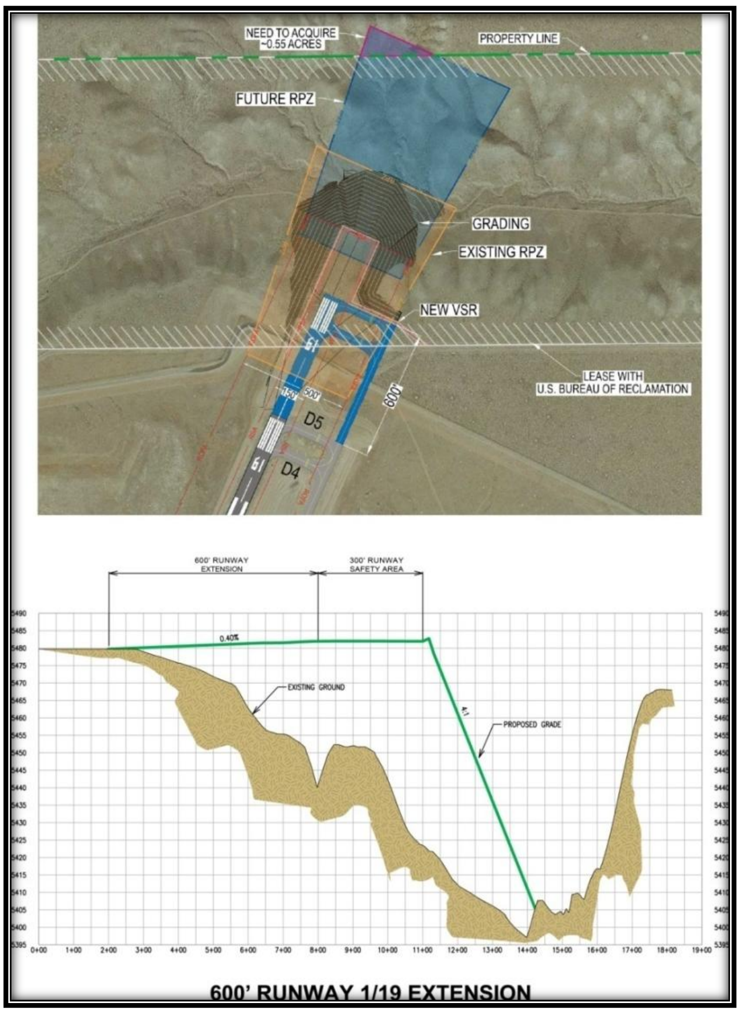


Source: Jviation, Inc.

5.3.4 Alternative 2 – 600 Foot Extension

This alternative evaluates the extension recommended in the 2000 Airport Master Plan, allowing an expansion of Runway 1/19 to 5,400 feet, as shown in **Figure 5-2**. This extension will accommodate both current commercial aircraft operating at the airport, the 30 seat Embraer 120 Brasilia and Beech 1900D. The Brasilia requires roughly 5,118 feet of takeoff at MTOW and the 1900D requires roughly 5,235 feet at MTOW. The length of 5,400 feet will better accommodate the scheduled airlines to operate on Runway 1/19 during crosswind conditions. It will also accommodate the length needed for a DeHavilland Dash-8-200, an aircraft that commonly operates at small commercial airports, with a needed takeoff distance of 5,356. However, this extension will require the rechannelization of the drainage on the north side of the airfield. This alternative will also require either RIW to acquire land or obtain an avigation easement of approximately 0.5 acres to the north for the RPZ. The cost of this alternative is estimated to be $2.5 million.

FIGURE 5-2 - 600' EXTENSION FOR RUNWAY 1/19

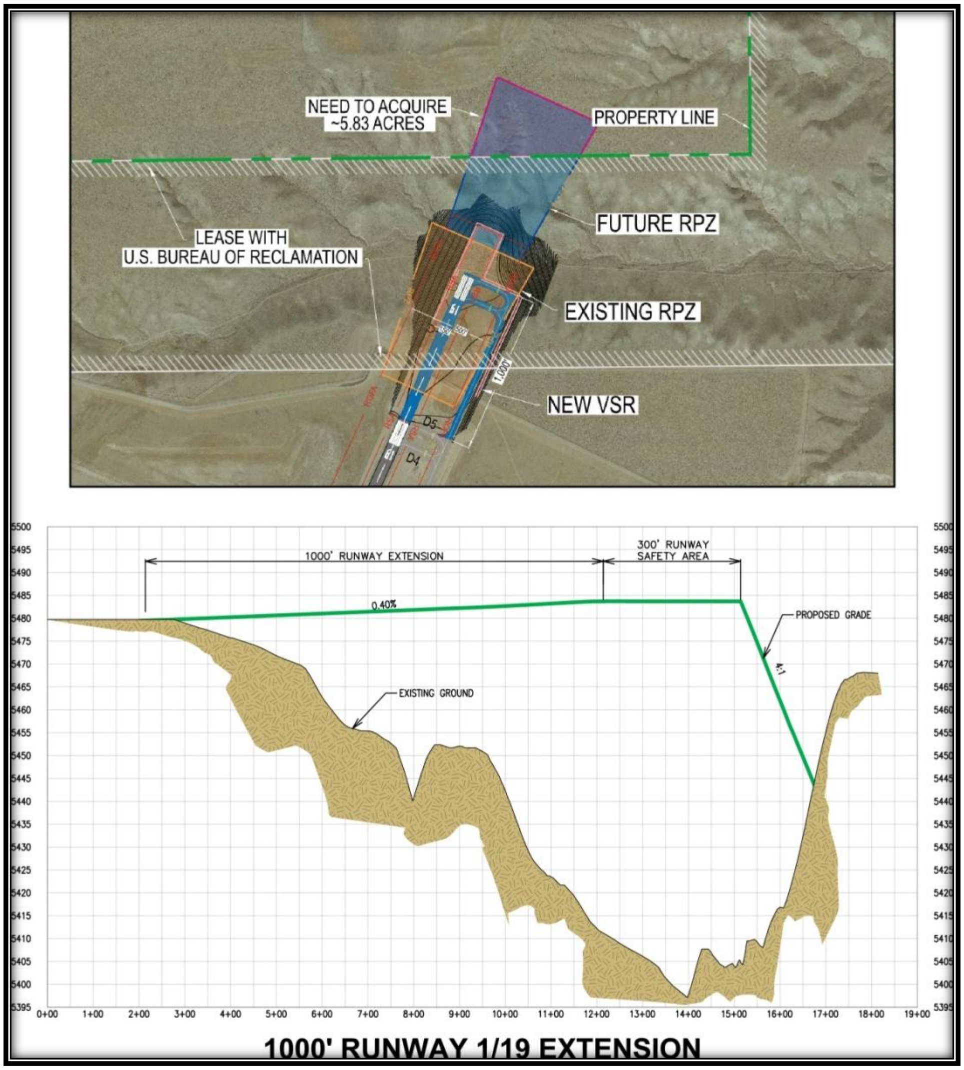


Source: Jviation, Inc.

5.3.5 Alternative 3 – 1,000 Foot Extension

This alternative allows for an expansion to a total runway length of 5,800 feet, as shown in **Figure 5-3**. This length will accommodate the requirements for a Saab 340, another common small commercial aircraft, and meets 80% of the length requirements for the average B-II type aircraft. However, the drainage will need to be conveyed through an 96 inches in diameter culvert or an equivalent alternative method, which will significantly increase the construction costs. Cost of this alternative is estimated to be approximately $5.3 million.

FIGURE 5-3 - 1,000' EXTENSION FOR RUNWAY 1/19



Source: Jviation, Inc.

5.3.6 Preferred Alternative

Table 5-1 summarizes the runway extension alternatives for Runway 1/19. After analyzing the alternatives for extending Runway 1/19, it is recommended that Runway 1/19 be extended 600 feet (Alternative 2) for a total length of 5,400 feet. This alternative provides the greatest return on investment, meeting the needs of the intended aircraft with the least cost. It is recommended that the space be reserved for the 1,000 foot extension on the ALP; however, that extension should not be included in the CIP at this time. This approach also gives flexibility in the design of the runway extension for additional length once a more detailed pre-design effort is complete.

TABLE 5-1 - RUNWAY 1/19 EXTENSION COMPARISON MATRIX

	Alternative 1 - 450' Extension	Alternative 2 – 600' Extension	Alternative 3 – 1,000' Extension
Economic	$2 Million	$2.5 Million	$5.3 Million
Operational - Additional Aircraft Types Accommodated	NONE	Beech 1900D Embraer 120 Saab 340	Dash-8-200 Meets 80% of length requirements for the average B-II aircraft
Environmental	No disturbance to drainage	Rechannelization of drainage	Drainage must be conveyed via culvert
Safety	All have an equal level of safety for the intended aircraft		

Source: Jviation, Inc.

5.4 Aircraft Run-up/Holding Area for Runway 10/28

5.4.1 Overview

Previously holding bays were provided at each end of Runway 10/28 in order for aircraft to pull off the main taxiway until they were ready. With the reconstruction of the east end of Runway 28 in the summer of 2008, it was determined that the holding bay on that end of the runway did not meet current FAA standards. Upgrading to the current FAA standards required a significantly larger holding bay with increased separation from the taxiway and the associated cost of the project increased substantially. Therefore, the east end holding bay was removed and not replaced.

The user surveys distributed for this study indicate that many users see the lack of a holding bay on the east end of the runway as a significant operational concern. This concern will escalate further when the west end of runway is lowered, and Runway 10's non-standard holding bay is removed as well. The alternatives analyze two options for this issue:

1. Alternative 1 - Construct bypass taxiways
2. Alternative 2 - Construct holding bays that meet FAA standards

Both options provide flexibility in runway use and increase capacity on the airfield.

5.4.2 Assumptions

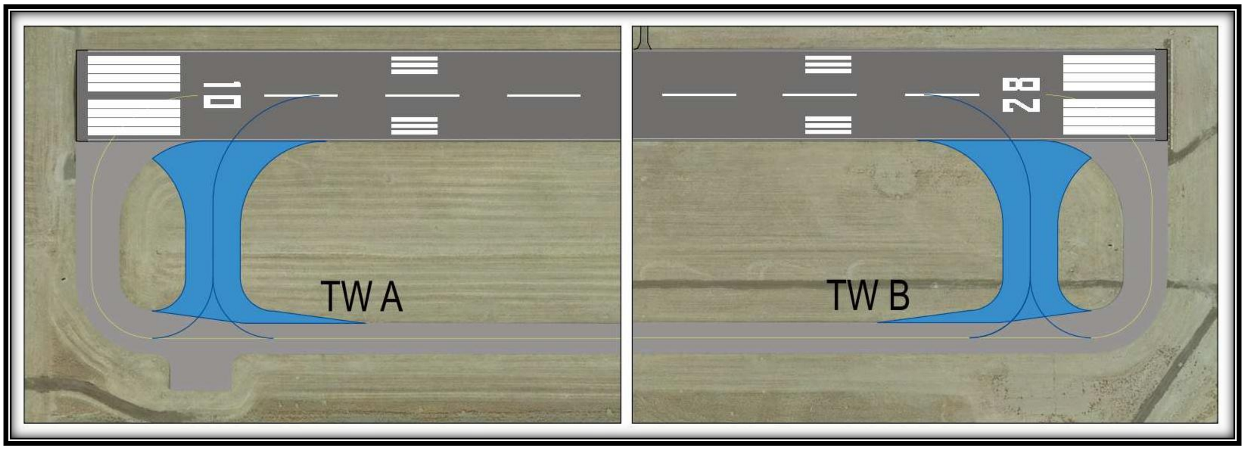
For the preparation of the alternatives the following was assumed:

1. All taxiway separations and object free areas are to be designed to Aircraft Design Group (ADG) III (i.e. 737)
2. Runway 10 will not have a bypass taxiway or holding bay constructed until the Runway 10 end is lowered.

5.4.3 Alternative 1 – Bypass Taxiways

Bypass taxiways provide flexibility in runway use by permitting a constant flow of departing airplanes. This is done by allowing an aircraft to enter the runway on the adjacent intersection if another airplane is occupying the primary taxiway. Each bypass taxiway is estimated to cost approximately $690,000 unless constructed with other airport improvements, and are shown in **Figure 5-4**

FIGURE 5-4 - ALTERNATIVE 1 - BYPASS TAXIWAYS

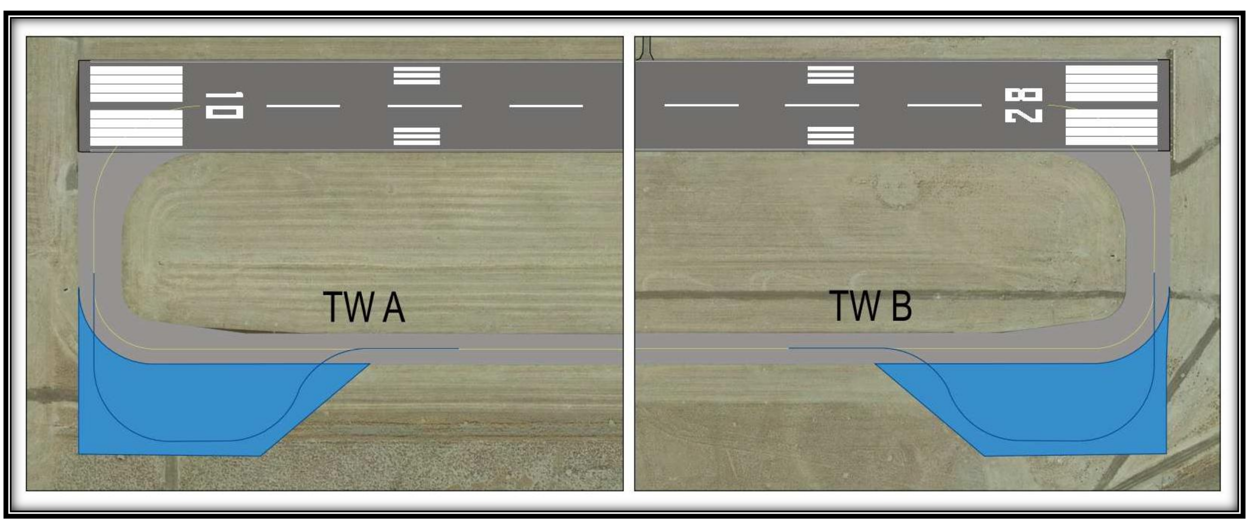


Source: Jviation, Inc.

5.4.4 Alternative 2 – Holding Bays

Holding bays enhance capacity on an airfield by providing space for airplanes to pull off of the main taxiway when performing run-up operations or awaiting departure clearance. The holding bay on Taxiway A (Runway 10 end) will cost approximately $1.5 million, while the holding bay on Taxiway B (Runway 28 end) will cost approximately $1.01 million. The cost difference is a result of the different earth work required at each location. The design criteria of the holding bays are based on parallel taxiway to taxiway separation standards of an ADG III aircraft per AC 150/5300-13, *Airport Design*. The construction cost of a holding bay is much greater than that of a bypass taxiway, since a larger amount of pavement and earth work is required, as shown in **Figure 5-5**.

FIGURE 5-5 - ALTERNATIVE 2 - HOLDING BAYS



Source: Jviation, Inc.

5.4.5 Preferred Alternative – Bypass Taxiways

After analyzing both alternatives, bypass taxiways were chosen for both runway ends due to Airport Management and Airport Advisory Board preference and the associated cost savings of this alternative. This alternative allows freedom of movement at each runway end, with flexibility in runway use. Depending on total funds available, the bypass taxiway for Taxiway A, on the Runway 10 end, should be added to the Runway 10 reconstruction project currently scheduled for 2015.

TABLE 5-2 – AIRCRAFT RUNUP/HOLDING BAY COMPARISON MATRIX

	Alternative 2 – Bypass Taxiways	Alternative 1 – Holding Bays
Economic	Taxiway A - $690,000 Taxiway B - $690,000	Taxiway A - $1.5 M Taxiway B - $1.01 M
Operational	Aircraft would be able to bypass an aircraft that is holding on the taxiway at the departure end of the runway by using the adjacent bypass taxiway.	Aircraft would stage on the holding bay while performing run-ups or awaiting clearances allowing other aircraft to access the departure end of the runway.
Environmental	All construction would take place in the infield between the runway and taxiway in previously disturbed areas.	Some construction would be involved in areas that have not been previously disturbed.
Safety	1. Pilots may be unfamiliar with the concept of the bypass taxiway. 2. Runway length available for departure may be slightly reduced. 3. Reduced pressure to quickly finish run-up procedures.	1. Aircraft need to remain on the centerline in the holding bay to ensure adequate separation. 2. Reduced pressure to quickly finish run-up procedures.

Source: Jviation, Inc.

5.5 Terminal Building Reconfiguration/Expansion

The terminal building is the link between the community and the airport, and is often a visitor's first and last impression of City of Riverton. Currently, the terminal comprises approximately 11,013 square feet.

Since the terminal was opened in 1998, several significant changes have occurred in the commercial aviation industry, altering the way passenger terminals operate. One of the most significant changes is the presence of the Transportation Security Administration (TSA) and the increased space requirements for passenger and baggage screening.

The changes in security requirements have impacted the terminal significantly. As a result, the TSA has taken over a former rental car and gift shop space in RIW's terminal. Consequently, the gift shop cannot reopen and Avis Rental Car has relocated to a desk situated in the non-secure hold room. The hold rooms have been compressed to one third of their original size. The original area is partitioned to serve the growing TSA screening needs and provide a non-secure waiting room for meet and greeters.

Relocating TSA offices to another location, moving Avis Rental Car back to its preferred space, and reopening the gift shop should be considered for the future.

5.5.1 Terminal General Considerations

In determining the need for a terminal renovation, addition, or reconstruction, consideration should be given to how well the terminal facility is functioning and what level of service the functional areas are providing. The evaluation should consider both the square footage available for each functional area, and the efficiency of the layout. It should be determined which areas are effective and which ones are deficient. The various areas should be evaluated on how well the spaces are presently laid out and how well the adjacent areas work together as a whole. Considerations should also be given to how well the terminal is meeting the needs of both the passengers and the employees at the airport, and if there is reasonable space to accommodate anticipated future growth. Increasing the level of service comes with a cost, and cost should be considered in determining the extent and size of a renovation or expansion.

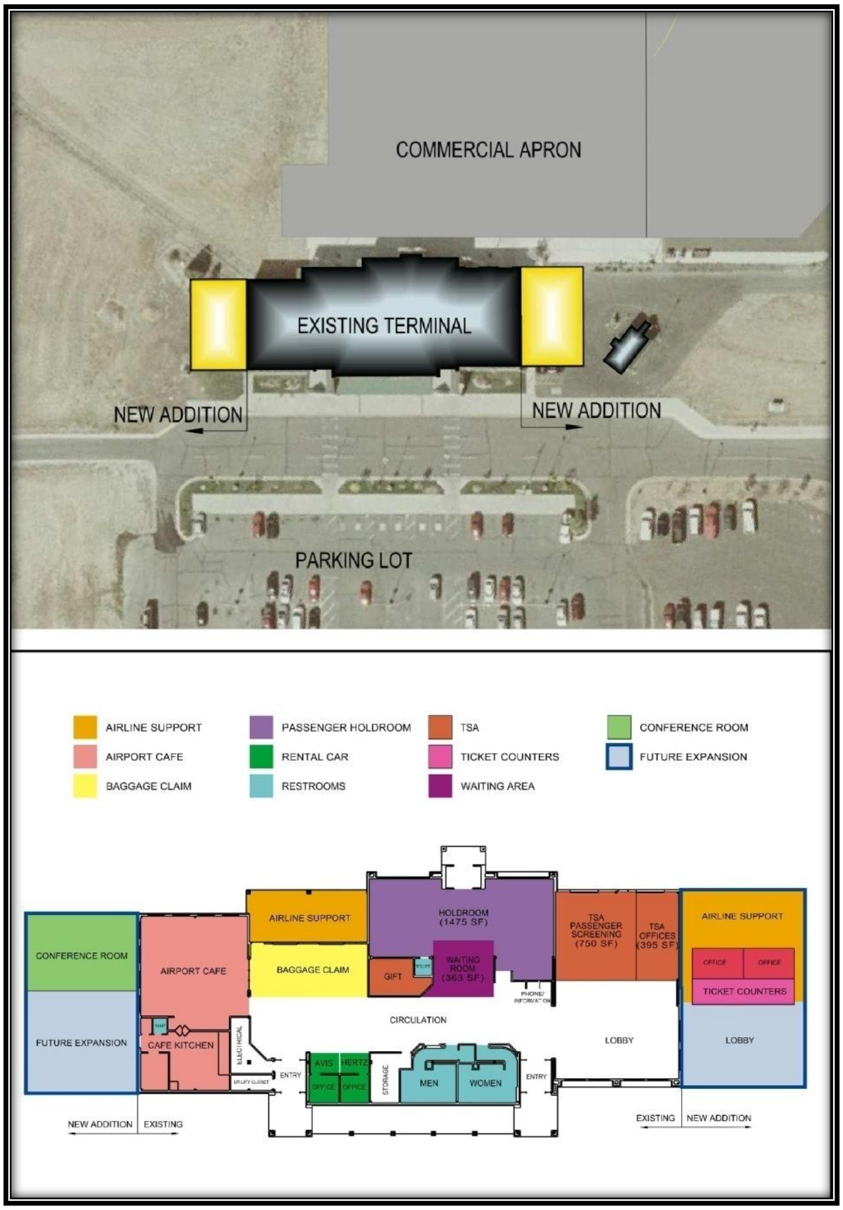
Section 5.5.2 below outlines a modest renovation/expansion alternative layout that would address the immediate deficiencies and inefficiencies within the existing terminal configuration.

5.5.2 Terminal Expansion Alternative

This renovation/expansion alternative provides for a modest addition and reconfiguration of the existing terminal facility to enhance functionality and efficiency. This alternative would optimize the function of the terminal, allowing the spaces that have been adversely impacted by the TSA to return to function as they were designed. It would also improve the public circulation of the facility, accommodate the forecasted 2030 passenger levels with excellent levels of service, and could be completed with minimal financial impact.

The terminal is shown with a 2,600 square foot addition to relocate the Airline Support spaces and Ticketing Counters to the east, as shown in **Figure 5-6**. This move allows many of the terminal spaces to return to their original function. The TSA would have ample space to move their operations to the area currently occupied by Airline Support; Avis could return their counter and office to the preferred location; gift shop space would be available, and the hold room would be returned to its original design size with the ability to accommodate future growth. **Figure 5-6** also shows the possible ultimate future expansion to the west of 2,400 square feet to address the terminal needs for more than 20 years. The cost of this expansion will depend on the degree of aesthetics and level of amenities.

FIGURE 5-6 - TERMINAL EXPANSION



Source: Jviation, Inc.

The new addition to the east would still allow Airline Support staff to have direct access to the commercial apron. This addition would have a slight impact on the existing site and may require the reconfiguration of the nearby employee parking lot.

The 2,500 square foot terminal expansion to the east would consolidate TSA operations and increase their usable area. The TSA would have better screening and queuing locations, with space for additional equipment that may be required in the future. The passenger screening space would be increased by 9% from 690 square feet to 750 square feet. There would be additional space for peak hour screening lines. The TSA office space would be increased by 11% from the current 357 square feet to 395 square feet.

This renovation/expansion would allow the hold room to return to the originally designed layout. The secure hold room area would be increased by 278% from 530 square feet to 1,475 square feet. The waiting area would be located immediately adjacent to the hold room and the main circulation/lobby area.

The ultimate terminal expansion to the west, shown in **Figure 5-6**, provides an additional 2,000 square feet of development to be used as space for a conference room, expansion of the restaurant, or other future needs. The expansion capability to the west can be greater, if required. Conversely, the expansion to the east is limited by the existence of a pump house.

Assuming the average aesthetics and amenities, the renovation (5,000 SF) and expansions (5,000 SF) described will cost an estimated $1.2 million. This cost assumes $75/SF for renovations and $150/SF for new construction.

5.6 Terminal Parking Lot Expansion

The current parking lot provides 153 parking spaces for TSA, Hertz Rental Car, Avis Rental Car, and general short- and long-term public parking. This lot is often at capacity requiring vehicles to park in the overflow parking area located east of the current terminal parking lot. The alternatives below examine possible parking expansion options.

5.6.1 Alternative 1 – Expand Parking Lot to the East

The overflow parking area located to the east of the current parking lot is filled with compacted asphalt millings. To expand the parking lot to the east, this area should be paved and marked within existing road boundaries, as shown in **Figure 5-7**. Utilizing this area will provide roughly 125 additional parking spaces and cost approximately $250,000.

FIGURE 5-7 - PARKING LOT EXPANSION TO THE EAST

Source: Jviation, Inc.

5.6.2 Alternative 2 – Expand Parking Lot to the West

There is also space to expand parking on the west of the current parking lot, as shown in Figure 5-8. This area can provide roughly 110 additional parking spaces and cost roughly $250,000.

FIGURE 5-8 – PARKING LOT EXPANSION TO THE WEST

Source: Jviation, Inc.

5.6.3 Alternative 3 – Simultaneous Parking Lot Expansions to the East and West

This alternative expands the parking lot on both sides of the existing lot. As shown in **Figure 5-9**, this expansion will provide approximately 235 additional spaces. A simultaneous parking lot expansion provides economy of scale for RIW and is estimated to cost $475,000, saving $25,000 when compared to two separate expansions.

FIGURE 5-9 – PARKING LOT EXPANSION TO EAST AND WEST

Source: Jviation, Inc.

5.6.4 Preferred Alternative

Space for expanding in either direction should be reserved. The actual extents and configuration of the parking expansion should be determined during the design phase and based on the budget available.

5.7 New ARFF/SRE Building

The current ARFF Station, which is a 40 ft by 40 ft metal building, is adequate for housing the ARFF truck. However, it is inadequate to accommodate the office needs for Airport Management, ARFF, and police personnel. Additionally, the current SRE and maintenance facility is a hangar in the GA area of the airport. This is not an ideal method for storage of SRE and maintenance equipment, as it is separated from the office space and utilizes a valuable airside hangar that could be leased for aircraft storage. Having a heated garage dedicated to the ARFF and SRE fleet will facilitate better maintenance on the vehicles, and further protect them from the elements, thus extending their service life. A new facility would have the additional benefit of freeing the existing county maintenance hangar for revenues through leasing and creating more office space for Airport Management, ARFF, and security personnel.

There are numerous design criteria that must be followed in order to meet the intentions of the FAA Advisory Circulars *150/5210-15A, Aircraft Rescue and Firefighting Station Building Design;* and *150/5220-18A, Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials.*

5.7.1 Siting Criteria

In addition to the standard requirements for building on an airport, such as proximity to utilities, adherence to FAR Part 77 imaginary surfaces, and Building Restriction Lines (BRL), there are other siting criteria critical to the successful layout of an ARFF/SRE facility. They include:

ARFF

- Immediate access for timely response to runways, taxiways, and terminal apron, with a three minute response time to the midpoint of the farthest runway (FAR Part 139.319).
- Integration with the airport security system (i.e. fences and gates).
- Allows for future expansion (e.g. increasing apparatus bays, personnel living quarters, parking, etc.).

SRE

- Ingress/egress does not interfere with ARFF activities, or impede aircraft taxiing.
- Direct access to runways, taxiways, and apron areas while allowing easy access to the landside areas.
- Accessible to airport staff without requiring crossing of active runways or taxiways.
- Avoids conflict with revenue generating areas of the airport (i.e. airport parking, tiedowns).

The existing ARFF location satisfies all of the required siting criteria mentioned above. It is relatively central to all the operational areas of the airport, and there appears to be adequate room at this site to accommodate future expansion.

5.7.2 Station Elements

The key programmatic elements that the optimal ARFF facility would include are:

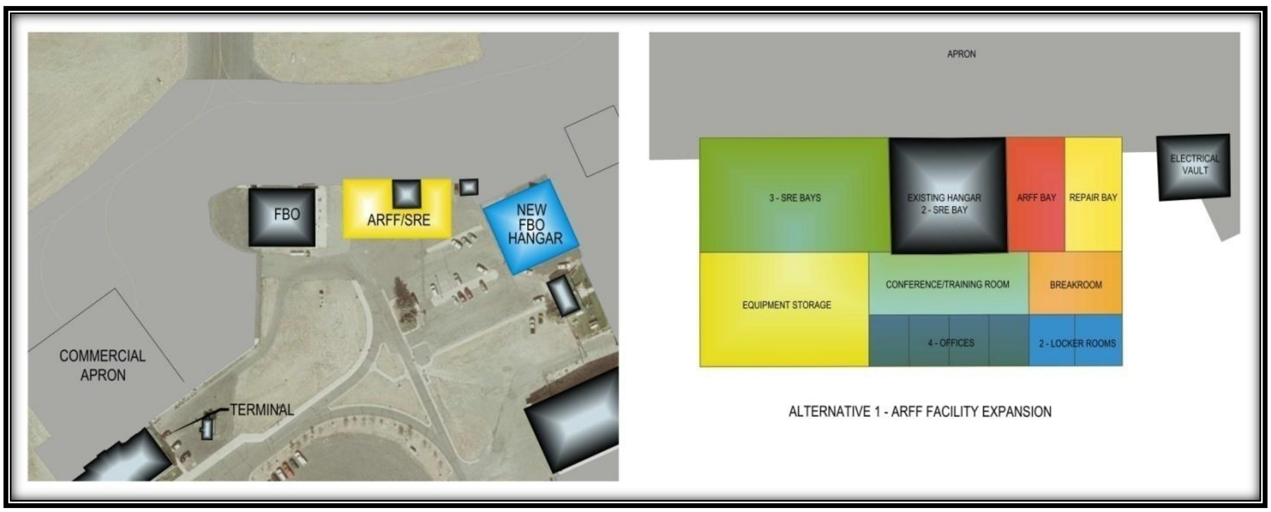
- Four (4) offices for law enforcement officers, ARFF responders, and other airport personnel
- Break room – kitchenette, dining area
- Conference/training room
- Locker rooms/bathrooms
- One (1) ARFF apparatus bay to house the existing KME/Walters ARFF truck
- Five (5) SRE bays:
  - One (1) snowplow – 2003 Kodiak Northwest with 20 ft blade and snow blower
  - One (1) tractor – 1999 John Deere 5510 with a snow blower
  - One (1) tractor – 2009 John Deere 5095M with a bucket, a broom, a snow blower, and a rear blade

  - Two (2) new tandem wheel plow/dump trucks with 16 ft and 20 ft blades, scheduled to be purchased in 2011. These will replace the existing 1980 Sincard snow plow with an 18 ft blade.
- One (1) repair and maintenance bay

5.7.3 Alternative 1 – ARFF Building Expansion

This alternative proposes adding additional bays and office space onto the existing ARFF facility, as shown in **Figure 5-10**. This facility would meet the elements mentioned above with an approximately 10,500 square feet addition onto the existing 1,600 square foot facility. It is assumed that any advantages of building reuse will be nullified with the additional challenges inherent to the design and construction connecting to existing structures. The cost of this expansion will range from $500,000 to $1 million, depending on the degree of aesthetics and level of amenities, but will be similar to the cost of a new building.

FIGURE 5-10 - ALTERNATIVE 1 - ARFF BUILDING EXPANSION

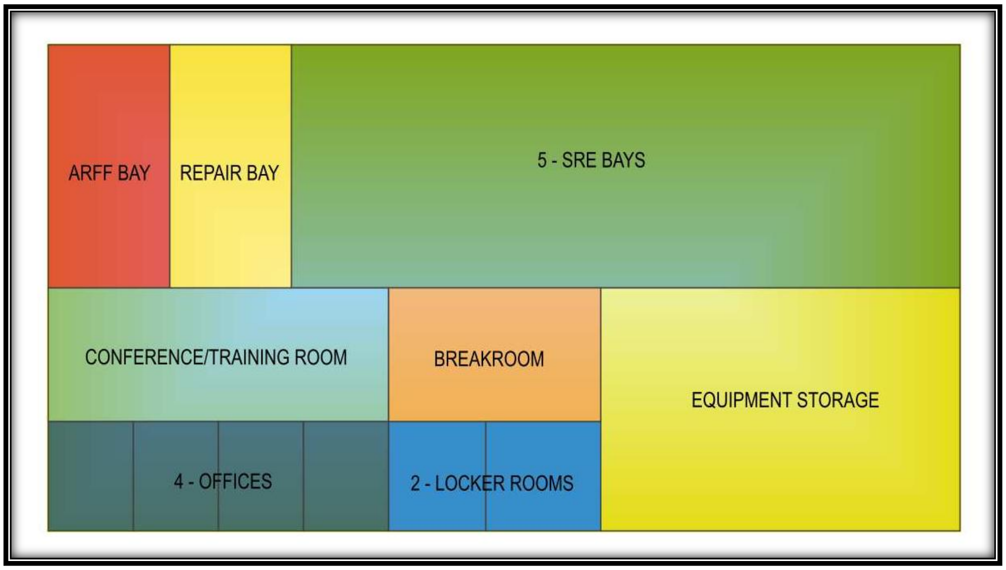


Source: Jviation, Inc.

5.7.4 Alternative 2 - New ARFF/SRE Building

The following alternatives propose erecting a new ARFF facility. The new facility would include the necessary elements mentioned above in approximately 12,000 square feet, as shown in **Figure 5-11**. A new facility has the advantage of being less complicated to construct and can be tailored to fit the ideal space layout. The disadvantage is that new construction is often more expensive than remodeling existing structures. The cost of this new facility will range from $500,000 to $1.5 million, depending on the degree of aesthetics and level of amenities.

FIGURE 5-11 - ALTERNATIVE 2 - NEW ARFF/SRE BUILDING

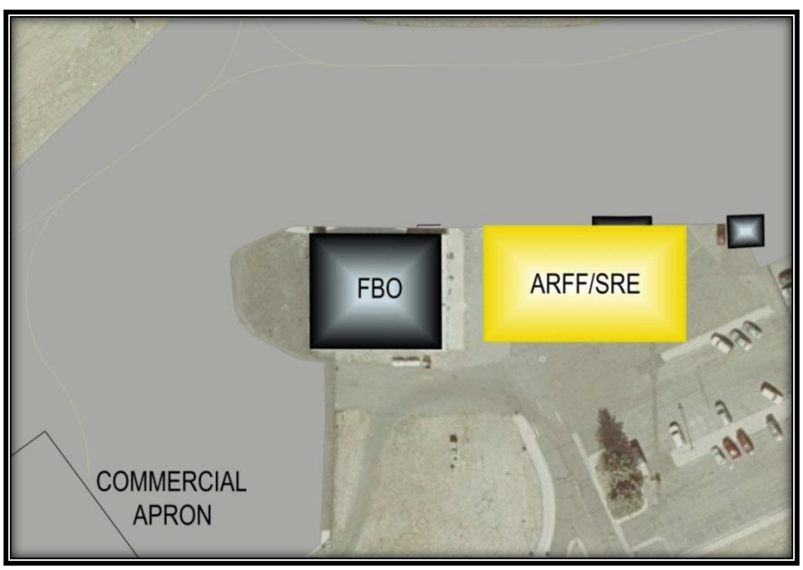


Source: Jviation, Inc.

5.7.4.1 Alternative 2A

This alternative proposes erecting a new ARFF/SRE facility in the location of the current building between the FBO and the Electrical Vault as shown in **Figure 5-12**. The new facility would need to provide adequate spacing so that a generator is able to gain access on the west side of the electrical vault. The problem with this alternative is that RIW will be without an ARFF facility while the new facility is being built and the airport personnel and ARFF vehicle will need to be temporarily relocated until the completion of the new facility.

FIGURE 5-12 – ALTERNATIVE 2A - NEW ARFF/SRE BUILDING

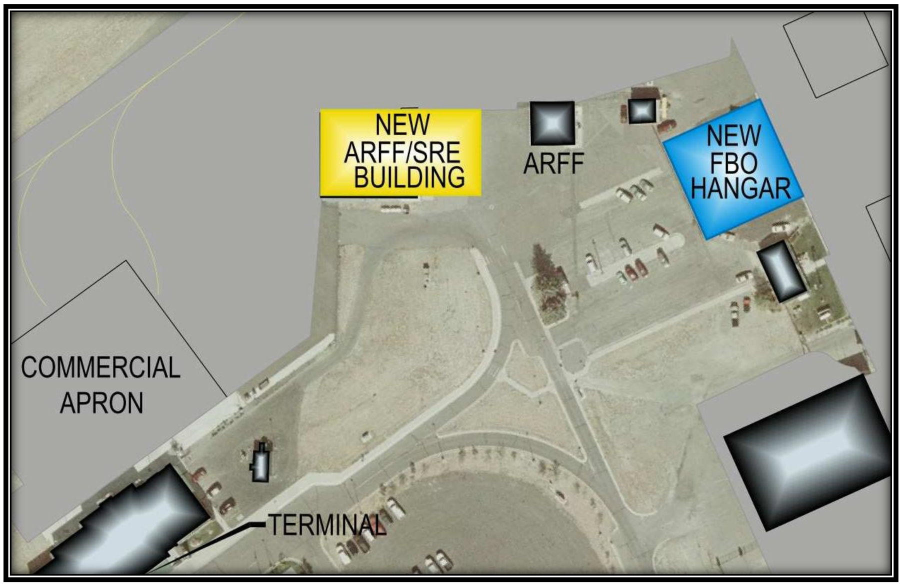


Source: Jviation, Inc.

5.7.4.2 Alternative 2B

This alternative positions the new ARFF/SRE facility where the existing FBO (Jim's Aircraft Services) hangar is located. The airport would have to purchase the FBO hangar at current market value, which is going much less than the replacement cost to build a new hangar. This alternative could require the airport to either construct a new hangar to be leased to the FBO or lease the maintenance hangar to the FBO. The details of the purchase are beyond the scope of this study and may affect the details of the alternative shown. A possible location to construct a new FBO hangar (100'x100') is shown in **Figure 5-13**.

FIGURE 5-13 – ALTERNATIVE 2B - NEW ARFF/SRE BUILDING

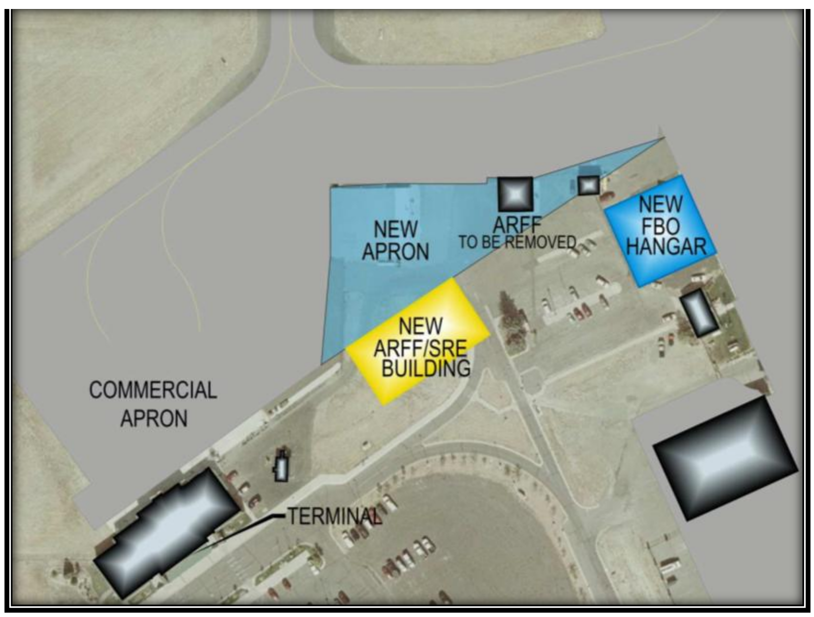


Source: Jviation, Inc.

5.7.4.3 Alternative 2C

Alternative 2C reconfigures the commercial apron by squaring off the apron, and has the new ARFF/SRE building matching the alignment of the Terminal, as shown in **Figure 5-14**. This alternative creates more apron space; however the majority of the new apron space cannot be used for any additional aircraft parking because aircraft cannot block the ingress and egress of the ARFF and SRE vehicles. The estimated cost of this apron expansion is approximately $900,000. Similar to Alternative 2B, this alternative will require RIW to purchase the existing FBO hangar at current market value, which is going much less than the replacement cost to build a new FBO hangar. Also the existing ARFF building will have to be removed for this alternative. Alternative 2C is the most costly due to the amount of additional pavement for the apron, and does not have any additional benefits when compared to the other alternatives.

FIGURE 5-14 - ALTERNATIVE 2C - NEW ARFF/SRE BUILDING

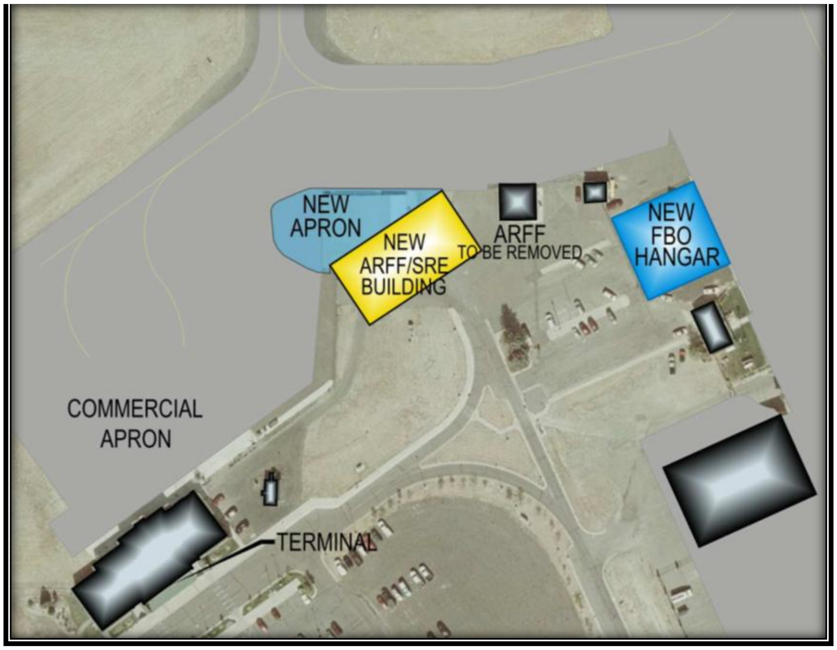


Source: Jviation, Inc.

5.7.4.4 Alternative 2D

This alternative also positions the new facility in an alignment parallel to the terminal; however a much smaller apron addition is needed, as shown in **Figure 5-15**. Again, like Alternative 2B and 2C, the existing FBO hangar will have to be purchased at current market value, which is going much less than the replacement cost to build a new hangar. The cost of the apron expansion is approximately $450,000. The benefits of this alternative are the existing ARFF building does not have to be removed and could be used for other purposes, the new facility will be in a better alignment with the commercial apron, and a smaller apron addition is needed in comparison to Alternative 2C. Additionally, the existing ARFF building could be left intact to use for other purposes.

FIGURE 5-15 - ALTERNATIVE 2D - NEW ARFF/SRE BUILDING



Source: Jviation, Inc.

5.7.5 Preferred Alternative – Alternative 2A

Table 5-3 summarizes the ARFF/SRE Facility alternatives. Alternative 2A is the preferred alternative for the future ARFF/SRE Facility. Alternative 2A positions the new facility in the same location as the existing ARFF building, and is least expensive of the New Building Alternatives. This alternative will require the ARFF vehicle to be relocated in another building or in the maintenance hangar while the new facility is being built. However, the ARFF vehicle would have to be staged near Taxiway A1 or Taxiway C 15 minutes before and 15 minutes after any air carrier operation (takeoff or landing) to meet the three minute response time to the midpoint of the farthest runway according to FAR Part 139.319.

TABLE 5-3 – ARFF BUILDING EXPANSION/NEW BUILDING COMPARISON MATRIX

	Alternative 1 – Building Expansion	New ARFF/SRE Building			
		Alt. 2A – Current Location	Alt. 2B – FBO Hangar Location	Alt. 2C – Parallel to Terminal	Alt. 2D – Parallel to Terminal, Less Apron
Economic	***ARFF/SRE Building:*** $500K - $1M	***New Building:*** $500K - $1.5M ***Demo Existing:*** $80,000	***New Building:*** $500K - $1.5M ***Acquire FBO Hangar:*** $47,500[1]	***New Building:*** $500K - $1.5M ***Apron:*** $900,000 ***Acquire FBO Hangar:*** $47,500[1]	***New Building:*** $500K - $1.5M ***Apron:*** $450,000 ***Acquire FBO Hangar:*** $47,500[1]
Operational	May require the ARFF Vehicle to be staged near Taxiway C and stored in the maintenance hangar during the construction of new building.	Requires the ARFF Vehicle to be staged near Taxiway C and stored in the maintenance hangar during the construction of new building.	Requires purchase of current FBO Hangar[1] and construction of new FBO Hangar.[2]		
Environmental	Minimal additional pavement needed.			Significant increase in paved area.	Increase in paved area.
Safety	1. Location meets three minute response time rule per Part 139.319. 2.Close proximity to Terminal for quicker response in case of emergency.				

[1]The existing FBO Hangar value is based on the Fremont County's assessed value, not market value.

[2]Private funds will be required to build the new FBO hangar.

Source: Jviation, Inc.

5.8 Hangar for Commercial Service Operator

The need for a hangar for Great Lake's aircraft in the winter months has been mentioned by the RIW Airport Board as a possible new revenue stream. By storing this aircraft in a hangar overnight, the need to deice the aircraft in the morning would be eliminated. This hangar will need to accommodate, at a minimum, the Embraer-120 Brasilia, with a length of 65 feet-8-inches and a wingspan of 64 feet-11 inches; resulting in a minimum hangar size of 85 feet by 85 feet, with a 75 foot wide door opening. Additionally, RIW's Maintenance/SRE Hangar is 80 feet by 80 feet but the hangar door is only 58 feet 7 inches wide, which is too small to accommodate the Brasilia. The following alternatives examine possible options for a hangar to accommodate commercial aircraft that land at RIW.

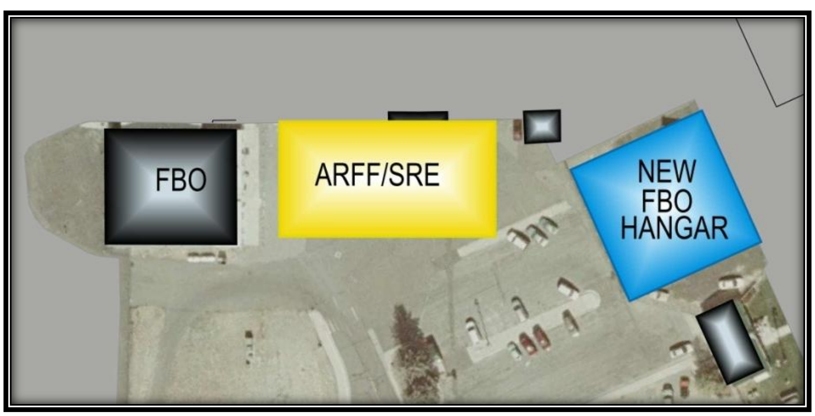
5.8.1 Alternative 1 - Build New Hangar

One alternative is for the airport to build its own hangar and lease it the FBO to rent to the airline or to directly lease it to Great lakes Airlines. The hangar would need to be a minimum of 85 feet by 85 feet, but if RIW were to construct a 100 foot by 100 foot hangar it could house large corporate jet aircraft in the summer months, generating additional revenue for the airport.

5.8.1.1 Alternative 1A – FBO Hangar

This alternative involves construction of a new hangar for the FBO adjacent to the existing FBO pilot lounge. The benefit of this alternative is that no new hangar will be needed specifically for the commercial operator and the FBO operator would manage the lease with Great Lakes. In order to effectively allow storage of the GA aircraft and a commercial aircraft, as well as FBO aircraft maintenance operations, the hangar would have to be sized to approximately 120 feet by 120 feet or 150 feet by 100 feet.

FIGURE 5-16 – ALTERNATIVE 1A - NEW FBO HANGAR

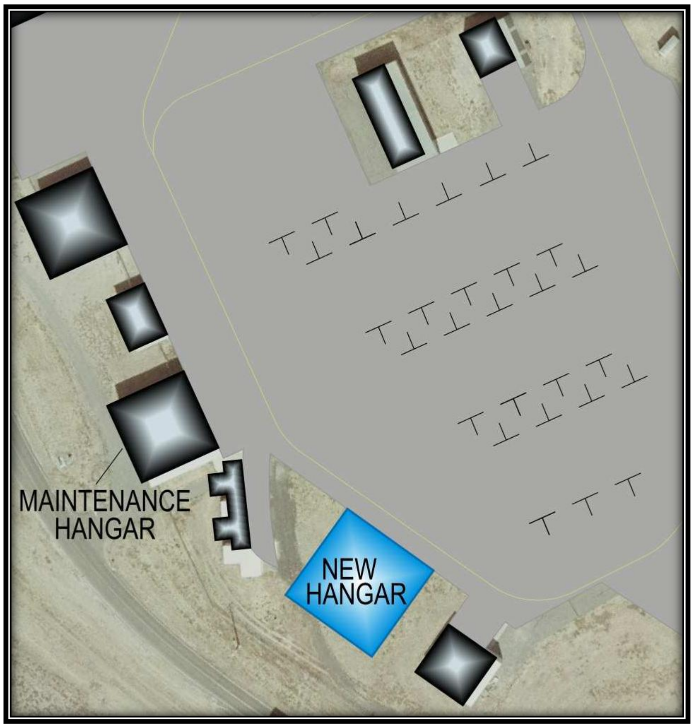


Source: Jviation, Inc.

5.8.1.2 Alternative 1B – New Airport Hangar

This alternative positions a new hangar on the south end of the GA apron, south of the Maintenance Hangar, shown in **Figure 5-17**. For this alternative the airport would have to build a new hangar, which would cost anywhere from $500,000 to $1 million depending on the degree of aesthetics and level of amenities, and whether office space is added to the hangar.

FIGURE 5-17 - ALTERNATIVE 1B - NEW HANGAR

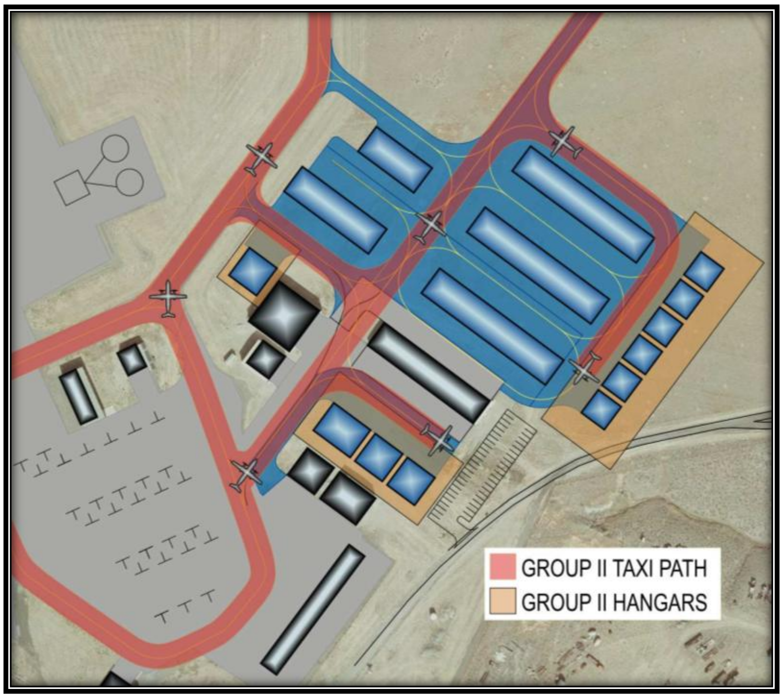


Source: Jviation, Inc.

5.8.2 Alternative 2 - Lease Space from Private Hangar Owner

A local private party has indicated interest in leasing their hangar to Great Lakes in the winter months. This alternative involves a local private party with a hangar, or plans to build a hangar at RIW to lease hangar space to Great Lakes. This alternative does not require RIW to pay for the construct of the hangar. The private hangar would be located in the GA Development area on the east side of the airport (GA Development area is discussed in **Section 4.9.1**). However, this location is far from the commercial apron and is difficult for larger aircraft to taxi or be tugged to that location. Acceptable access routes for the commercial aircraft in and out of the GA Development area are shown by the red colored taxi paths in **Figure 5-18**. Additionally, this location may be difficult for the airport to clear a path during snow removal operations in a timely manner so that the aircraft can gain access to the commercial apron.[29]

FIGURE 5-18 – ALTERNATIVE 2 – LEASE PRIVATE HANGAR



Source: Jviation, Inc.

[29] FAA AC 150/5200-30, *Airport Winter Safety and Operations* "Commercial airports with annual airplane operations greater than 10,000 operations but less than 40,000 operations should have sufficient equipment to clear one inch of snow weighing up to 25 lb/ft^3 within one hour."

5.8.3 Preferred Alternative – Alternative 2

Table 5-4 summarizes the Commercial Operator Hangar location alternatives. Alternative 2 is the preferred alternatives because of the lower cost to RIW. If the private hangar owner(s) withdraws their interest in leasing their hangar to the commercial operator, the other two alternatives (1A and 1B) are practical.

TABLE 5-4 – COMMERCIAL OPERATOR HANGAR COMPARISON MATRIX

	Airport Builds New Hangar		Alternative 2 – Lease from Private Hangar Owner
	Alternative 1A – FBO Hangar	Alternative 1B – South End of GA Apron	
Economic	$500,000 to $1M	$500,000 to $1M	Potential taxilane and utility construction costs
Operational	1. Close proximity to Terminal. 2. Access in and out of hangar would decrease apron parking.	1. Distant from Commercial Apron, meaning longer tug distance.	1. Longer tug distance from GA Development to Commercial Apron. 2. More difficult to complete snow removal operations in a timely manner.
Environmental	1. Eliminates need for deicing. 2. Potential impact from building and apron construction.		
Safety	1. Proximity to FBO parking apron could create aircraft movement hazards.	1. Distant from Terminal, meaning longer tug distance, which increases possibility of aircraft incident.	1. Longer tug distance from GA Development to Commercial Apron, which increases possibility of aircraft incidents.

Source: Jviation, Inc.

5.9 Self-Service Fuel Farm

Since the FBO is only open during normal business hours, a self-service fueling station is recommended. There are several decisions that need to be made before self-service fueling can be implemented; including the location for aircraft accessibility without blocking ground traffic, visibility for customers to find the tanks, and the size and type of tank. Through results from the user surveys and consultation with Airport Management, it was determined that the self-service fuel tank needs to be a minimum of 1,000 gallons, a maximum of 5,000 gallons, and provide 100LL AvGas.

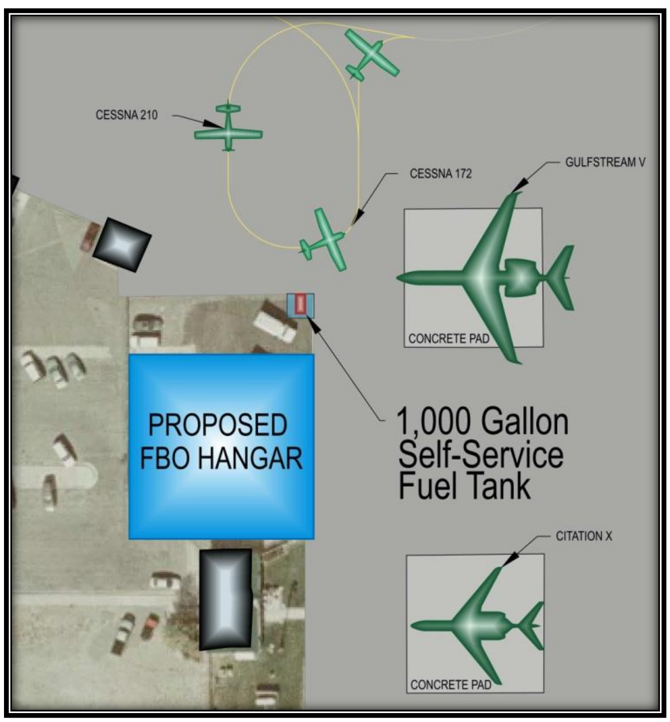
A 1,000 gallon self-service fuel tank is ideal because any fuel tank that holds more than 1,320 gallon is required by 40 CFR 112 to have an active Spill Prevention Control and Countermeasures (SPCC) Plan, along with all of the infrastructure considerations that go with an SPCC Plan. This can be extremely costly and is not ideal for the type of fuel distribution anticipated at RIW, therefore a

1,000 gallon tank is recommended. The cost of a 1,000 gallon self-service ready fuel tank with a credit card reader is approximately $80,000. As the tanks provide a revenue source, they are not eligible for FAA grant funds. WYDOT will be able to provide the airport with a low interest loan, which currently is at 5%, to help finance the installation of the self-service fueling station. Additional sources of funding could include business-ready grants from the Wyoming Business council. The alternatives examine the possible locations for the self-service fuel tank and distribution system.

5.9.1 Alternative 1 – Adjacent to FBO

Alternative 1 locates the self-service fuel station directly north of the FBO building, adjacent to the proposed FBO hangar as discussed in **Section 5.7.4**. The location is on the north side of the GA apron, making it easy for transient and local pilots to find the fueling station. Conversely, this alternative makes it difficult for jets to park on the concrete pads west of the FBO and would prove difficult for smaller piston aircraft to maneuver around the parked jets to access the self-service fuel station, as shown in **Figure 5-19**.

FIGURE 5-19 - ALTERNATIVE 1 – ADJACENT TO FBO

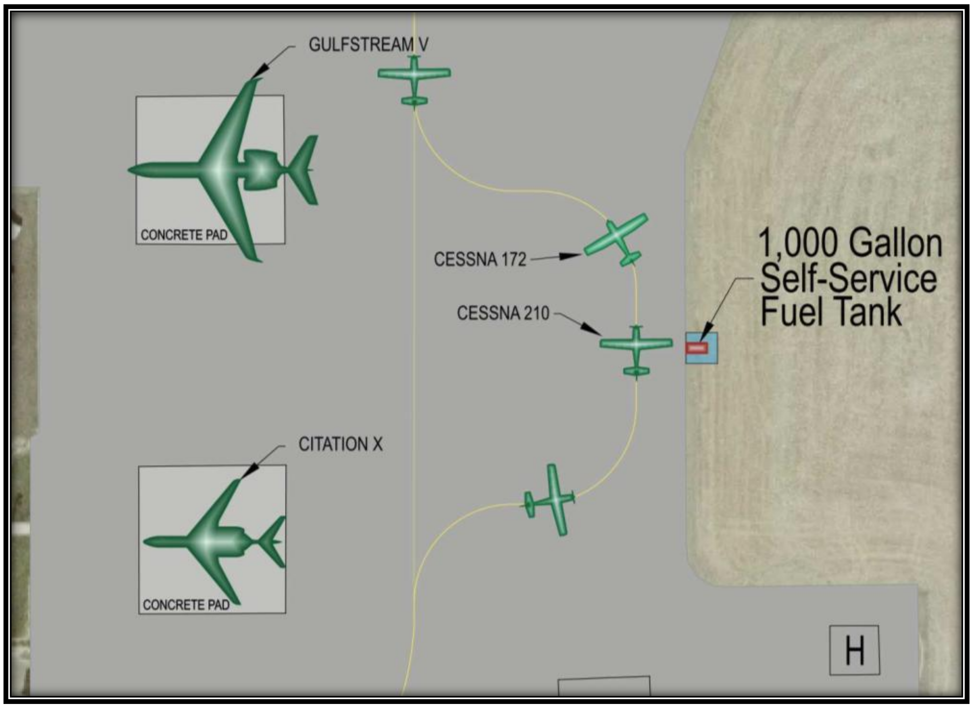


Source: Jviation, Inc.

5.9.2 Alternative 2 – East of GA Apron

Alternative 2 locates the self-service fuel station adjacent to the helicopter landing pads, on the east side of the north GA apron. This location places the self-service fuel outside of the jet parking location, and the location is easy for both transient and local pilots to find. However, this location does not have utilities. As a result, utilities would have to be relocated to the east side of the GA apron, or solar panels could be used for the electrical utility needs. Both options would add additional costs to the project, as shown in **Figure 5-20**.

FIGURE 5-20 - ALTERNATIVE 2 – EAST OF GA APRON

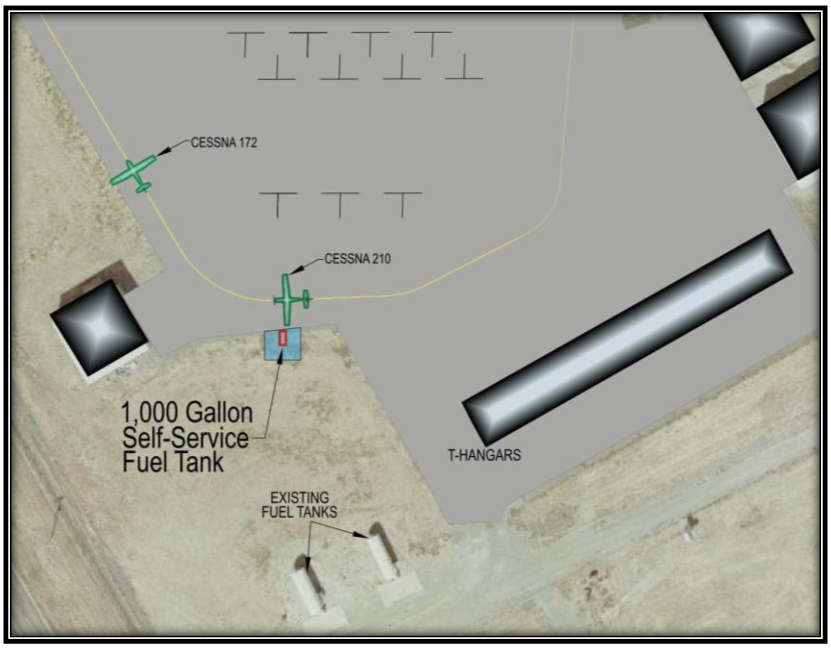


Source: Jviation, Inc.

5.9.3 Alternative 3 – South GA Apron

Alternative 3 locates the proposed self-service fuel station adjacent to the existing fuel tanks on the south side of the GA apron. This location is near existing utilities and a fire hydrant, and is easily accessible to GA pilots, as shown in **Figure 5-21**. However, this location may make it difficult for transient pilots to find the fueling station if they are unfamiliar with RIW, since it is located on the south end of the apron and not near the FBO.

FIGURE 5-21 - ALTERNATIVE 3 – SOUTH GA APRON



Source: Jviation, Inc.

5.9.4 Preferred Alternative – Alternative 3

Table 5-5 summarizes the self-service fuel station location alternatives. Alternative 3 is the preferred alternative for the location of a self-service fuel farm. Signage should be added in the GA apron area so that transient pilots that are unfamiliar with RIW can easily locate the self-service fuel farm. It is also recommended that public restrooms, such as porta-johns, be placed near the self-service fueling station.

TABLE 5-5 – SELF-SERVICE FUEL TANK COMPARISON MATRIX

	Alternative 1 - Adjacent to FBO	Alternative 2 - East of GA Apron	Alternative 3 - South end of GA Apron
Economic	$80,000	$80,000	$80,000
Operational	1. Easily visible to local and transient pilots. 2. Caution needed when taxing around parked on the concrete pad adjacent to the FBO.	1. Easily visible to local and transient pilots. 2. Utilities would need to be relocated to the east side of the GA apron.	1. Easily accessible for local and transient pilots. 2. Limited visibility for transient pilots, additional signage required. 3. Fuel tank is located near existing fuel tanks and utilities.
Environmental	All have equal environmental impacts.		
Safety	1. Close proximity to ARFF Station for faster response in emergency.	1. Close proximity to ARFF Station for faster response in emergency.	1. Distant from ARFF Station, creating longer response time in case of an emergency. 2. Close proximity to existing fire hydrant.

Source: Jviation, Inc.

6.0 ENVIRONMENTAL ANALYSIS