MASTER PLAN UPDATE

for BOISE AIRPORT

april 2010

MASTER PLAN UPDATE

for BOISE AIRPORT

RICONDO® & ASSOCIATES

in association with:

WHPacific, Inc.

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I. Introduction

Boise Airport ("the Airport") is located approximately three miles south of downtown Boise, as shown on **Exhibit I-1**. The Airport is owned by the City of Boise, Idaho, and is operated by the City of Boise Department of Aviation and Public Transportation. The facility is overseen by a seven-member Airport Commission.

This document provides the detailed analyses and assessments associated with the Boise Airport Master Plan. It is organized into nine sections. This section provides a concise history of the Airport and a summary of the Master Plan. The following eight sections, as shown below, project future demand at the Airport, identify facility requirements, define development concepts, provide a strategy for implementing the recommended improvements, analyze funding for the development program, and identify environmental issues associated with the recommended development. A narrative summarizing the Airport Layout Plan (ALP) is also included.

- Section II – Existing Conditions
- Section III – Aviation Activity Forecasts
- Section IV – Facility Requirements
- Section V – Concepts Analysis
- Section VI – Implementation Plan
- Section VII – Financial Analysis
- Section VIII – Environmental Overview
- Section IX – ALP Narrative

1.1 History of Boise Airport[1]

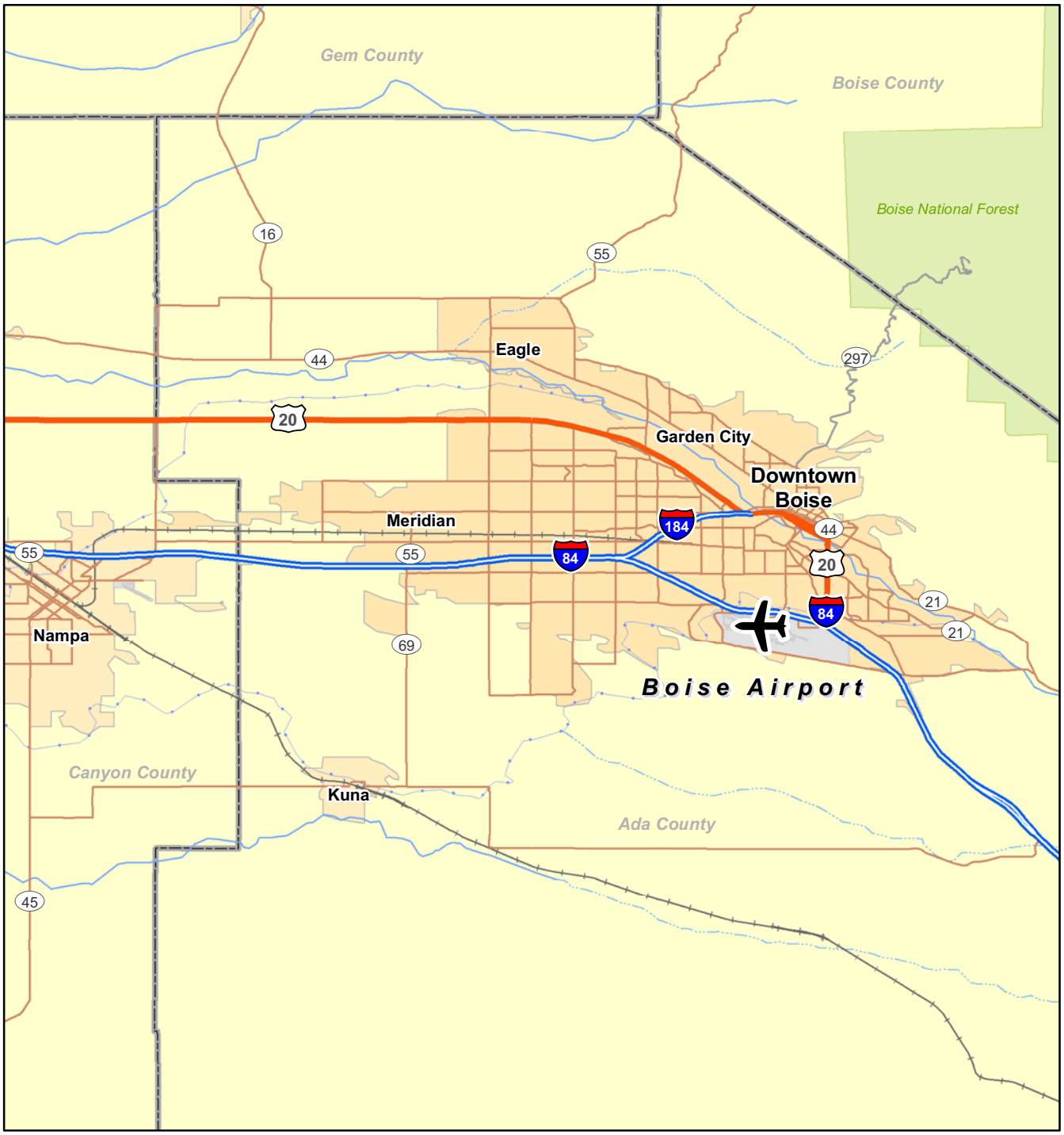
Boise's first municipal airport was built in 1926 on a gravel bed beside the Boise River where State University is located today. In April 1926, Varney Airlines flew the first contract airmail flight in the U.S. from Pasco, Washington, to Boise, Idaho, and on to Elko, Nevada. Five years later Vamey Airlines constructed a steel hangar. A highlight of local aviation history is September 4, 1927, when Charles A. Lindbergh landed his "Spirit of St. Louis" single-engine monoplane in Boise.

Between 1936 and 1938, the City of Boise bought and leased the land where the present Airport is located. The Varney Airlines' steel hangar was moved from the original airfield to the present Airport in 1939. When the hangar was no longer adequate to house modern aircraft, it was enclosed and used as a passenger terminal. Varney Airlines later joined other airlines to form United Airlines. When the new Airport opened, it boasted the nation's longest runway, at 8,800 feet.

During World War II, the Army Air Corps leased Boise's field and built a major training base—known as Gowen Field—for B-17 and B-24 bomber crews. More than 6,000 Corps personnel were stationed there for most of the war years. When the war was over, Gowen Field was returned to City of Boise, which then leased it to the Idaho National Guard—which still uses it today.

By 1952, Boise's airport consisted of a passenger terminal (the old Varney steel hangar) and a new air traffic control tower. United Airlines, which traces its beginnings to Boise, inaugurated jet service to the city on October 26, 1964. It is the only airline to have served Boise continuously since

[1] City of Boise, Department of Aviation and Public Transportation, September 2008.



Source: ESRI Data and Maps.
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit I-1

0 5 miles

north

Boise Airport Location

1933. Over the next 40 years, various modernization and expansion projects for the terminal, airfield, and support facilities were completed.

In June 2003, the Airport opened a new passenger terminal and elevated roadway system. The new terminal opened in two phases. Phase I included the ticket lobby, baggage claim, food and beverage concessions, news and gifts concessions, and a conference center. The elevated roadway system also opened as part of Phase I. Phase II included a new security checkpoint, food court, Concourse C, and expanded concessions. Concourse B is part of the original terminal facility and was renovated in 2005.

1.2 Master Plan Summary

Development of the Airport's Master Plan was initiated in March 2006. Various stakeholders' meetings were held during the first year to discuss community needs, future Airport requirements, development concepts, etc. The initial draft of the Aviation Activity Forecasts was completed in September 2006 and approved by the Federal Aviation Administration (FAA) in March 2007. The final technical analysis for the Master Plan was completed in August 2008 and a Final Draft Report and Draft ALP were submitted to the Airport and FAA for review in September 2008. The period between September 2008 and publication of the Master Plan in November 2009 was used for review by Airport staff, the public, the Airport Commission, City Council, and the FAA. As part of their review, the FAA conducted a separate capacity study for Boise Airport that was completed in the summer of 2009.

This Master Plan addresses potential activity and related improvements through 2027. Recommended development was divided into four phases: immediate (2008-2012), short-term (2013-2017), intermediate (2018-2022), and long-term (2023-2027), to accommodate the growth that could occur. Long-range planning is essential because some elements of airport development, such as new runways and terminal expansion, can take many years to implement once the need is identified. It is prudent for an airport to update its Master Plan periodically to ensure that planning initiatives respond to contemporary market conditions.

This Master Plan was designed so that projects could be initiated when demand dictates the need for development. The forecasts identify a projected timeline in which development could occur. However, the actual timeline for project implementation is based on actual activity reaching specific Planning Activity Levels identified in the study. Therefore, if activity does not materialize as quickly as forecast, specific development projects envisioned by this master plan could be delayed accordingly. The recent downturn in the economy is good example of why a project could potentially be delayed. Conversely, if growth were to accelerate, projects could be initiated prior to the timeline associated with the master plan forecasts. The Airport would monitor aviation activity annually to determine whether activity is tracking as projected, and which projects from the Master Plan should be adjusted in the Airport's Capital Improvement Program (CIP) based on that activity.

II. Existing Conditions

An initial step in the preparation of an airport master plan is the collection and identification of the physical, operational, and functional characteristics of the airport and its immediate environs. There have been significant changes in activity and facilities at Boise Airport ("the Airport") since the last master plan was completed in 2001. This section presents an inventory of existing facilities and conditions at the Airport and its surrounding area to provide a foundation for subsequent planning analyses. A presentation of historical aeronautical activity at the Airport is included in Section III, *Aviation Activity Forecasts,* as part of the Aviation Demand Forecast.

2.1 Airport Facilities

This section describes the existing airport facilities, including airfield, terminal, air cargo, general aviation (GA), military, government, support, and non-aviation tenant facilities. An overview of the Airport layout is provided on **Exhibit II-1**.

2.1.1 Airfield Facilities

The airfield facilities consist of the runways, taxiways, and apron areas, along with associated markings, lighting systems, and instrumentation. These facilities are depicted on **Exhibit II-2**. The airport reference point, which defines the midpoint of the airfield, is latitude 43° 33' 51.70" N and longitude 116° 13' 22.30" W. The airport elevation, the highest point on the airfield pavement, is 2,871 feet above mean sea level (MSL).

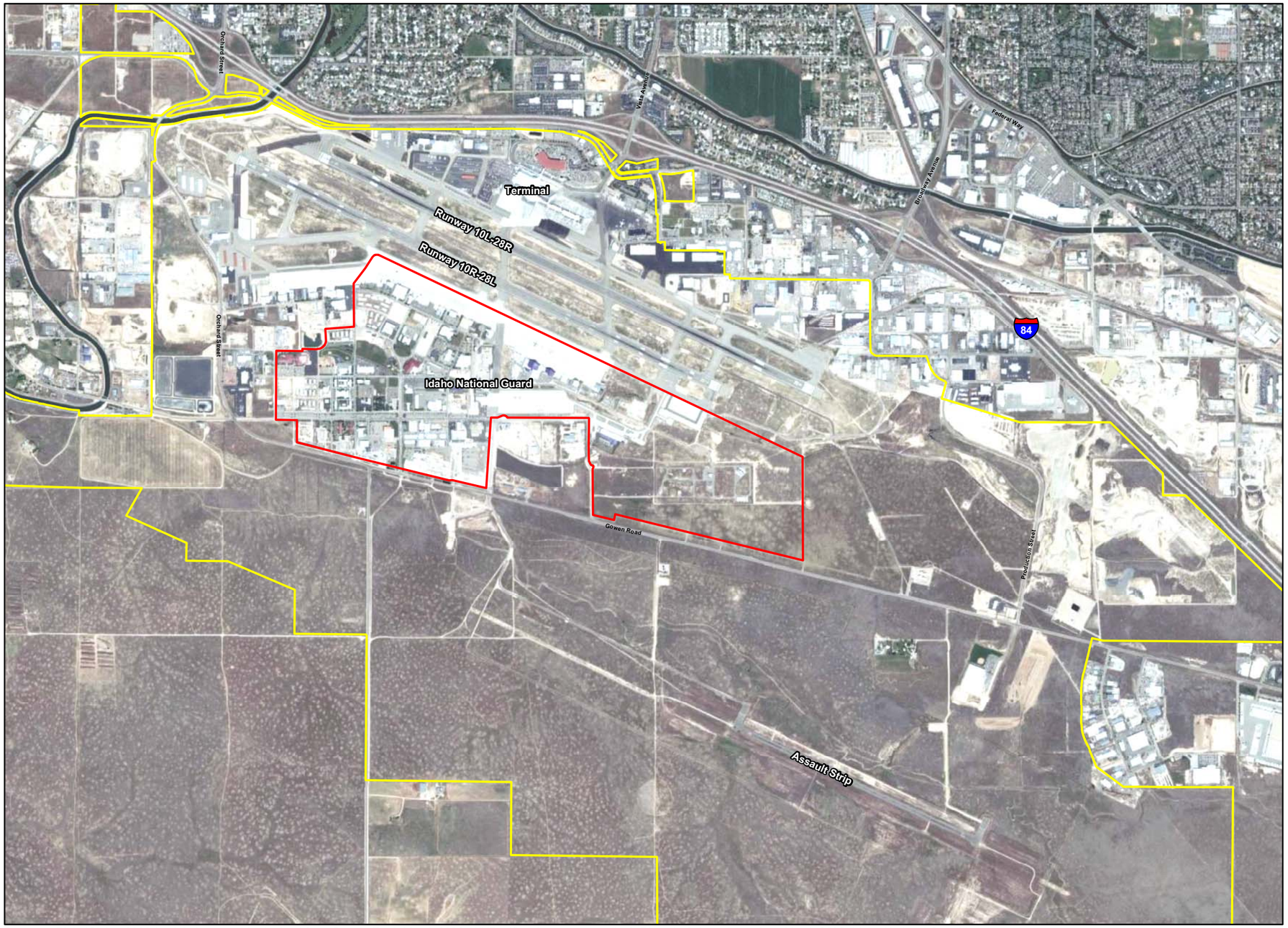
2.1.1.1 Runways

The existing runway configuration consists of two parallel runways: 10L-28R and 10R-28L. Both runways are oriented northwest-southeast and have a centerline-to-centerline separation of 700 feet. An assault strip, located south of Gowen Road with a centerline-to-centerline separation of 5,450 feet from Runway 10R-28L, is used primarily for military training activity associated with the Idaho Air National Guard (IDANG) and is not available for commercial aircraft use. The physical characteristics of the runways, along with their associated lighting, markings, and instrumentation, are described in the following sections, and summarized in **Table II-1**.

Runway 10L-28R

Runway 10L-28R is 10,000 feet long and 150 feet wide and is the longest runway at the Airport. It also has 25-foot paved shoulders on both sides. A blast pad extends 200 feet beyond the Runway 28R threshold to protect the ground from erosion during aircraft departures; it also serves as an emergency stopway for aircraft landing on Runway 10L. Taxiway Z precedes Runway 10L and serves as a stopway in emergency situations for aircraft landing on Runway 28R. Runway elevation slopes up from 2,831 feet above MSL at the 10L end to 2,871 feet above MSL at the 28R end (0.4 percent slope).

Runway 10L-28R consists of asphalt pavement over base and subbase material, with a porous friction course (PFC) overlay to improve surface drainage and increase aircraft braking action. The load bearing capacity of the runway is 200,000 pounds for dual wheel aircraft and 400,000 pounds for dual tandem and dual double tandem aircraft. Half of the runway was rehabilitated in late 2007, with the other half scheduled for rehabilitation in 2008.



Legend

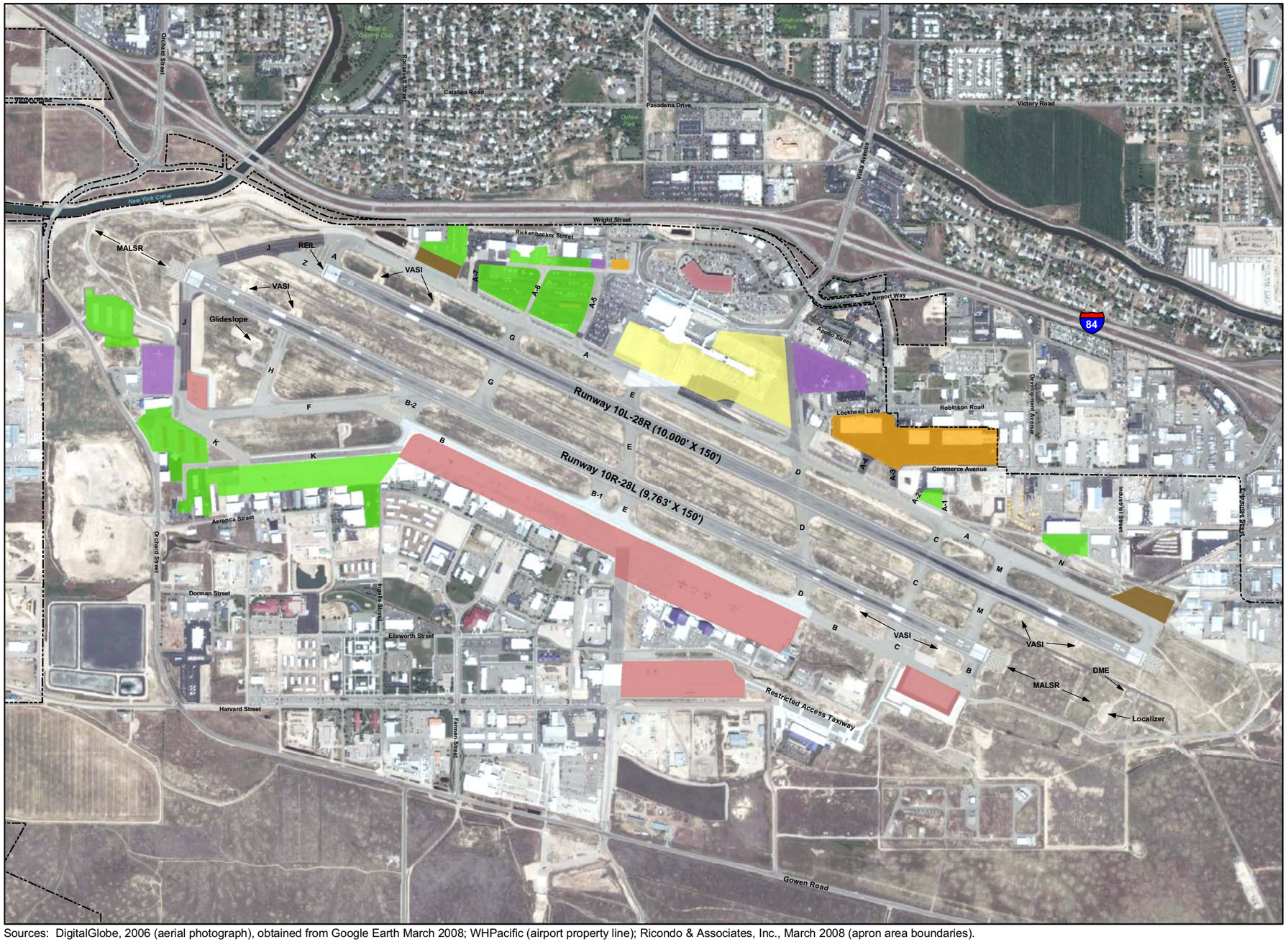
- Airport property line
- Idaho National Guard lease area

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; WHPacific (airport property line); Ricondo & Associates, Inc., March 2008 (Idaho National Guard lease area).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit II-1

0 2,000 feet north

Airport Layout



Legend

Airport property line

Apron Areas

- Terminal
- Air cargo
- General aviation
- Government
- Military
- De-ice

Notes: DME = Distance measuring equipment
REIL = Runway end identifier lights
MALSR = medium intensity approach lighting system with REIL
VASI = Visual approach slope indicator

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; WHPacific (airport property line); Ricondo & Associates, Inc., March 2008 (apron area boundaries).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit II-2

0 1,200 feet north

Airfield Facilities

Table II-1

Runway Characteristics

	Runway 10L-28R		Runway 10R-28L		Assault Strip
Runway Data					
Length (feet)	10,000		9,763		5,000
Width (feet)	150		150		90
Pavement type	Asphalt – PFC overlay – Grooved		Asphalt – PFC overlay		Asphalt
Pavement strength					
Single Wheel	75,000		75,000		--
Dual Wheel	200,000		200,000		--
Dual Tandem	400,000		400,000		--
Double Dual Tandem	400,000		400,000		--
Marking	Nonprecision		Precision		--
	10L	28R	10R	28L	
Lighting/Approach Aids					
Lighting					
Runway	HIRL		HIRL		--
Runway end/approach	REIL	--	MALSR	MALSR	--
Centerline	No	No	Yes	Yes	--
Touchdown zone	No	No	Yes	Yes	--
Approach Aids					
Visual	VASI	VASI	VASI	VASI	--
Electronic	--	--	LOC, GS	LOC	--
Threshold crossing height	53 feet	52 feet	55 feet	50 feet	--
RVR equipment location	--	Midfield	Touchdown	Touchdown	--
Obstruction Data					
FAR Part 77 category [1/]	D	D	PIR	C	--
Controlling obstruction	Antenna	--	--	--	--
Obstruction identified	Lighted	--	--	--	--
Height above runway end	16 feet	--	--	--	--
Distance from runway end	600 feet	--	--	--	--
Centerline offset	300 feet right	--	--	--	--
Obstruction clearance slope	34:1	34:1	50:1	50:1	--

Notes: PFC = porous friction course; RVR = runway visual range; VASI = visual approach slope indicator; LOC = localizer; GS = glideslope; HIRL = high intensity runway lights; REIL = runway end identifier lights; MALSR = medium intensity approach lighting with REIL.

1/ For the purposes of identifying an obstruction, Part 77 of the Federal Aviation Regulations (FAR) categorizes runways based on the type of runway and type of instrument approaches currently serving or planned to serve the runway. C = other than utility runway with nonprecision approach and visibility minimums greater than ¾ statute mile. D = other than utility runway with nonprecision approach and visibility minimums ¾ statute mile or less. PIR = precision instrument runway.

Source: Airport Master Record, FAA Form 5010, effective February 14, 2008.
Prepared by: Ricondo & Associates, Inc., April 2008.

Runway 10L-28R is equipped with high intensity runway lights (HIRL) and threshold lights that outline the edges and ends of the runway. Runway end identifier lights (REIL) provide positive identification of the approach end of Runway 10L to pilots and consist of a pair of synchronized flashing lights located on each side of the runway threshold. REILs are typically installed on runways where approach lighting is not available.

To aid pilots in judging the correct approach slope of the aircraft toward the touchdown zone of the runway in conditions of poor visibility and at night, both ends of Runway 10L-28R are equipped with a two-bar visual approach slope indicator (VASI) comprised of two wingbars, with each wingbar consisting of two light units. A VASI system works by showing pilots a combination of red and white lights indicating the slope at which the aircraft is descending toward the touchdown point. The two wingbars are located on the left side of each approach end. On Runway 10L the wingbars are spaced approximately 600 feet and 1,200 feet from the threshold. On Runway 28R, the wingbars are spaced approximately 700 feet and 1,400 feet from the threshold.

Runway 10L-28R is marked with designation markings, threshold and runway edge markings, centerline markings, and aiming point markings. All markings are reported to be in good condition.

Runway 10R-28L

Runway 10R-28L is 9,763 feet long and 150 feet wide, with 25-foot paved shoulders on both sides. Blast pads extend 200 feet beyond each runway end to protect the ground from erosion during aircraft departures; they also serve as emergency stopways for landing aircraft. Runway elevation slopes up from 2,824 feet above MSL at the 10R end to 2,858 feet above MSL at the 28L end (0.4 percent slope).

Runway 10R-28L consists of asphalt pavement over base and subbase material. The load bearing capacity of the runway is 200,000 pounds for dual wheel aircraft and 400,000 pounds for dual tandem and dual double tandem aircraft. A 15-inch (on average) asphalt concrete overlay and a 1-inch PFC overlay were applied to the runway in 1998. The pavement was last surveyed in 2006 and was reported to be in very good/excellent condition.

Runway 10R-28L is equipped with HIRL and threshold lights that outline the edges and ends of the runway, as well as centerline lighting and touchdown zone lighting. The runway also has a medium intensity approach lighting system with runway alignment indicator lights, known as MALSR,on each end. This approach system is an arrangement of white and red lights, essentially extended centerline lighting, with crossbars sited at specific intervals along the approach path from the threshold out to a distance of 2,600 feet.

Both ends of the runway are equipped with a two-bar/four-light VASI. The two wingbars are located on the left side of either approach end to the runway. On Runway 10R the wingbars are spaced approximately 600 feet and 1,200 feet from the threshold. On Runway 28L, the wingbars are spaced approximately 500 feet and 1,500 feet from the threshold.

Runway 10R-28L is marked as a precision instrument runway and includes designation markings, threshold and runway edge markings, centerline markings, aiming point markings, and touchdown zone markings. All markings are reported to be in good condition.

Runway 10R-28L is equipped with instrumentation that allows aircraft to make both precision and non-precision approaches to the runway,[1,2] and includes the following:

- **Localizer (LOC)** – A localizer provides directional guidance along the extended centerline of a runway. One localizer antenna is installed at the Airport, approximately 1,400 feet off the approach end of Runway 28L. The localizer equipment building is located approximately 300 feet northeast of the localizer antenna.
- **Glideslope (GS)** – A glideslope provides vertical guidance toward the runway touchdown point, usually at a slope of approximately 3 degrees to the horizontal. The glideslope is located 979 feet from the approach end of Runway 10R, with a lateral spacing of approximately 500 feet from the runway centerline.
- **Distance measuring equipment (DME)** – DME is used to provide a pilot with the distance from a DME ground station. DME uses radar principles to measure this distance, which is the slant distance in nautical miles (nm), rather than the horizontal distance (or range). At the Airport, a DME ground station is incorporated as part of the Instrument Landing System (ILS) to provide pilots with indications of the distance remaining to the runway threshold during an ILS approach to the runway. The DME ground station is co-located with the localizer equipment building.
- **Runway visual range (RVR)** – An RVR system enables monitoring of visibility conditions on the runway, as seen from the runway level. The system processes data from sensors and distributes it to local and remote monitoring stations. RVR equipment is installed near each end of Runway 10R-28L, as well as near the midfield of Runway 10L-28R.

Assault Strip

In 2002, with funding acquired from the Department of Defense, an assault strip was constructed south of Gowen Road to support training in short and unimproved runway operations for C-130 crews associated with the Idaho National Guard.[3] The assault strip is 5,000 feet long and 90 feet wide, with safety areas graded on both sides and at both ends. The pavement consists of six inches of asphalt concrete pavement over approximately 18 inches of base and subbase material.

As shown on Exhibit II-1, the assault strip is located on Airport property and is owned and controlled by the City of Boise. The Idaho National Guard has preferential use of the assault strip for C-130 and helicopter training operations. Civilian use of the strip is allowed by permission and typically consists of helicopter training activity.

The assault strip is unmarked and is not equipped with runway lighting or other instrumentation.

2.1.1.2 Taxiways

As shown on Exhibit II-2, the taxiway system at the Airport is comprised primarily of two parallel taxiways and several connecting taxiways.

Runway 10L-28R has a full-length parallel taxiway (Taxiway A) located north of the runway, with a centerline-to-centerline separation of 400 feet from the runway. This taxiway is constructed

1 Additional discussion of instrument approaches available at the Airport is provided in Section 2.3.3.2.
2 Additional equipment is located in the vicinity of the Airport to support general navigation and instrument approaches, and is described in Section 2.3.2.
3 Additional information regarding the mission of the Idaho Air National Guard is provided in Section 2.1.3.3.

primarily of asphalt pavement and provides access to the passenger terminal, GA, and cargo facilities, as well as other facilities located on the north side of the airfield.

Runway 10R-28L has a partial parallel taxiway (Taxiway B) located south of the runway, with a centerline-to-centerline separation of 437.5 feet from the runway. This taxiway is constructed primarily of Portland cement concrete (PCC) pavement and provides access to the IDANG facilities.

A restricted access military taxiway is located south of Taxiway B and provides access to the military helicopter apron.

All taxiways at the Airport are at least 75 feet wide and have either 25- or 35-foot shoulders. The exceptions are Taxiway N, which is 50 feet wide, and Taxiways A-1 and A-2 which are 45 feet wide and allow for helicopter taxiing operations associated with Idaho Helicopters, Inc. All taxiways are equipped with medium intensity taxiway lights (MITL).

2.1.1.3 Apron Areas

For the purposes of this Master Plan Update, major apron areas were identified throughout the airfield and organized into six separate categories based on usage. These apron areas are listed in **Table II-2** and depicted on Exhibit II-2.

Table II-2

Apron Areas

Apron Area	Total Apron Area (square yards) [1/]
Terminal	250,000
Air cargo	51,000
General aviation	250,000
Military [2/]	288,000
Other government [3/]	88,000
De-ice	33,000
Total	960,000

Notes:

1/ Apron areas were derived from the City of Boise interactive mapping system and are approximate.

2/ Military apron areas include the main aircraft apron, military helicopter apron, and arm/de-arm aprons.

3/ Other government apron areas include the Idaho Transportation Department apron and the National Interagency Fire Center apron.

Source: Ricondo & Associates, Inc., March 2008.
Prepared by: Ricondo & Associates, Inc., April 2008.

The terminal is located on the northern portion of the airfield adjacent to Runway 10L-28R, and provides 22 aircraft gates for commercial aircraft. The terminal apron surrounds the terminal building and provides access for air carrier traffic to and from the taxiways. The apron area is approximately 250,000 square yards and constructed of PCC and asphalt pavement.

Three air cargo aprons are located on the Airport. The largest cargo apron is located north of Runway 10L-28R and east of the terminal. This apron is approximately 29,000 square yards and constructed of asphalt pavement. A 20,000-square-yard cargo apron is located south of the Runway

10R threshold along Taxiway J, and is constructed of asphalt pavement. A small cargo apron is located west of the terminal roadway circulation system at the end of Taxiway A-5. This apron is approximately 2,000 square yards and is used by Western Air Express, an integrated all-cargo carrier.

GA apron areas on the southwest portion of the airfield consist of a large PCC pavement apron, two T-hangar aprons, and several smaller apron areas associated with tenant facilities such as fixed base operators (FBOs) and non-commercial tenants. Additional GA aprons are located north of Runway 10L-28R and west of the terminal apron, and can be accessed by way of Taxiways A, A-5, A-6, and A-7. The combined apron area is approximately 15 acres and constructed primarily of asphalt pavement. GA aprons are also located southeast of the terminal apron along Taxiway A.

Several apron areas on the airfield are used exclusively by the IDANG. The main aircraft apron is located south of Runway 10R-28L along Taxiway B. This apron is approximately 208,000 square yards and constructed of PCC pavement. A 56,000-square-yard PCC helicopter parking apron is located south of the main aircraft apron. Two arm/de-arm ramp areas are used for the loading and unloading of live weapons and munitions onto military aircraft. One area is located on the southern end of Taxiway B and the other is located adjacent to the south cargo apron along Taxiway J. Both arm/de-arm areas are constructed of PCC pavement.

Various other federal and state government apron areas are located throughout the airfield. The National Interagency Fire Center (NIFC) apron is located southeast of the north cargo apron along Taxiway A. This apron has an area of approximately 85,000 square yards and is constructed of asphalt pavement. A small asphalt apron located northwest of the terminal apron is used by the Idaho Transportation Department (ITD) Division of Aeronautics.

Two deicing aprons are located on the airfield: one near the Runway 28R threshold and one on the northwest corner of the airfield. Although these aprons are designed for deicing operations, most deicing activity at the Airport involving commercial aircraft occurs on the terminal apron. The deicing aprons are generally used more often as holding areas.

2.1.1.4 Pavement Conditions

In 1990, a Pavement Maintenance-Management Program was implemented at the Airport to support decisions about the timing and type of maintenance and rehabilitation activities that should be completed on the Airport pavements to maintain an acceptable surface operational condition and adequate load-carrying capacity. This program complies with Appendix 1 of Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5380-6A, *Guidelines and Procedures for Maintenance of Airport Pavements*, and FAA Grant Assurance Number 11, which requires airports to have a pavement maintenance-management program in place before federal funds will be allocated for pavement improvement projects.

Detailed pavement inspection surveys were performed at the Airport in March 2000, September 2002, April 2004, June 2006, and July 2007. The surveys were performed using the Pavement Condition Index (PCI) methodology developed by the U.S. Army Corps of Engineers during the 1970s. The PCI is a numerical representation of the condition of a pavement section at the time of its inspection. An index of "100" indicates new pavement, while an index of "0" indicates pavement that has failed. Indices that fall between these numbers indicate proportionate pavement conditions. The PCI rating is primarily based on the accurate identification of certain visual indications of pavement distress and deterioration. The procedures for conducting these investigations are outlined in AC 150/5380-6A.

Not all pavement areas at the Airport are surveyed each year. Detailed results of the 2007 survey, along with the results of the surveys conducted in previous years, can be found in the Airport's 2007 Pavement Management Program Update.[4]

2.1.2 Terminal Facilities

The passenger terminal complex consists of three primary components—the main terminal, one connected concourse, and an integrated ground load concourse—with a total area of approximately 418,000 square feet and 22 aircraft gates in all. Services associated with the terminal complex include passenger processing, baggage claim, concessions, and support functions. The main terminal building, Concourse B, and Concourse C are depicted on **Exhibit II-3** and described in the following sections. **Table II-3** identifies the general space allocation of the terminal complex. Detailed drawings and space programming of the terminal facilities can be found in the schematic design manual for the terminal.[5]

2.1.2.1 Main Terminal

The current terminal building was built in two phases. Phase I was completed in June 2003 and consisted of a ticket lobby, airline ticket offices (ATO), baggage claim, food and beverage concessions, news and gifts concessions, and third floor administration and conference areas. Phase II included a new security checkpoint, food court, expanded concessions, Concourse C, and a connector to the existing Concourse B. The new terminal building was constructed on three levels plus a basement level, consisting of approximately 327,000 square feet, excluding Concourse C.

Basement Level

The basement level of the terminal provides space for a large mechanical room, electrical room, refrigeration equipment, HVAC equipment, computer and telephone equipment, and an employee break room, as well as storage, supplies, and offices. Total space equates to approximately 44,000 square feet.

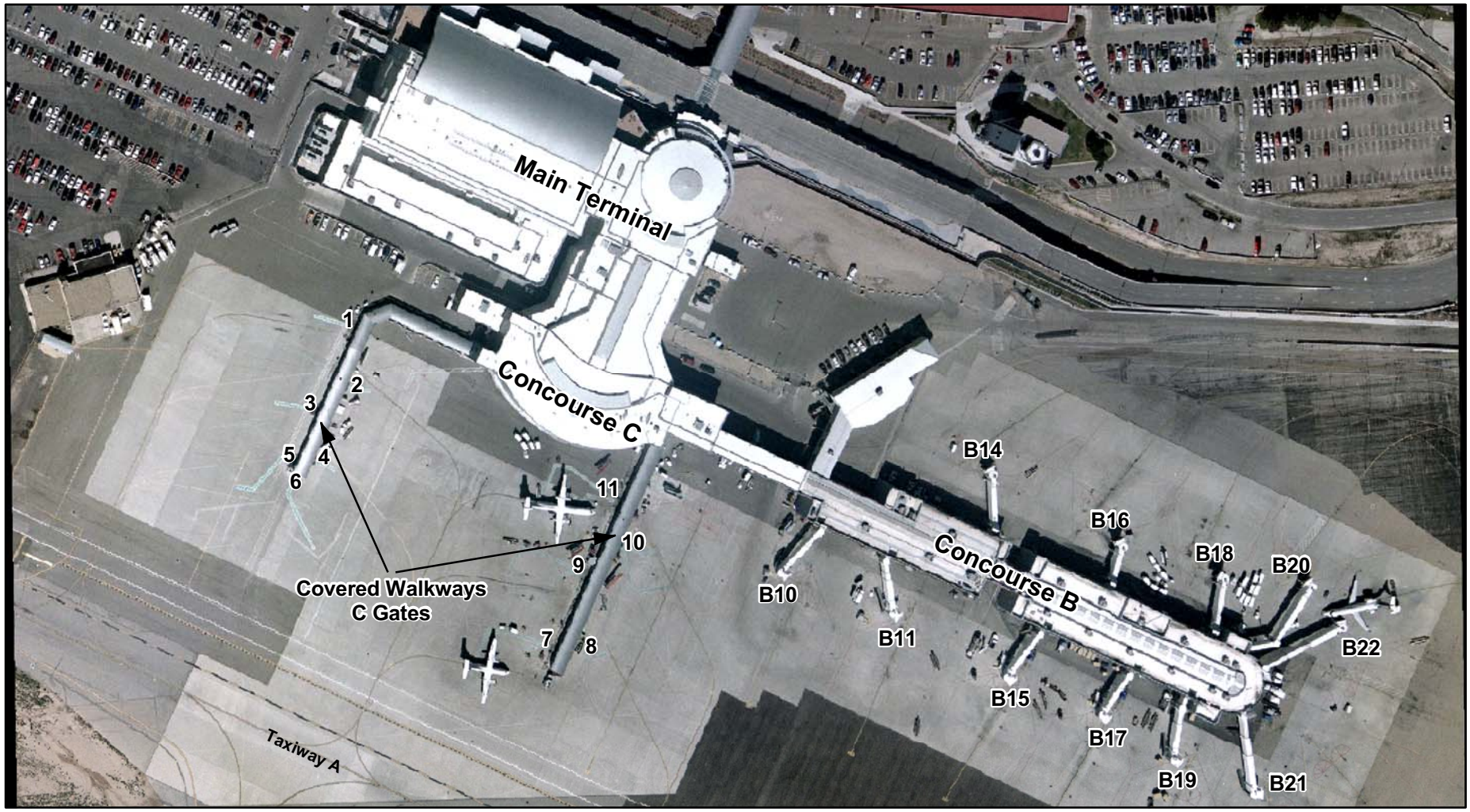
First Level

The first level of the terminal totals approximately 114,000 square feet (excluding Concourse C) and includes baggage claim, the baggage handling and screening system, baggage make-up areas and sortation piers, concessions, car rental counters and offices, restrooms, storage, and mechanical equipment.

The terminal is equipped with a fully automated inline baggage handling and screening system, with three oversize baggage conveyors, which provide redundancy during system failures and maintenance. The baggage system includes five CTX 5000 screening machines and is capable of handling 1,000 bags per hour. The floor of the ticket lobby is capable of supporting CTX baggage screening equipment.

[4] Pavement Consultants, Inc., *Final Report: 2007 Pavement Condition Survey – Boise Air Terminal*, August 2007.

[5] CSHQA and HNTB Corporation, *Boise Air Terminal Project, Passenger Terminal Building – Schematic Design Manual*, February 15, 1999.



Source: City of Boise interactive mapping system, July 2007 (aerial photograph), accessed March 2008.
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit II-3

0 200 feet north

Terminal Area Overview

Table II-3

Airport Terminal Space Allocation

Area Use	Main Terminal					Concourse B			Concourse C Total	Total Terminal
	Basement	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Total		
Break rooms	1,077		1,774	211	3,062				855	3,917
Concessions	13,339	1,845	35,657		50,842		4,583	4,583	1,701	57,125
Concourse/holdrooms							37,560	37,560	15,305	52,864
Inbound baggage [1/]		43,965			43,965					43,965
Mezzanine				4,699	4,699					4,699
Miscellaneous [2/]	14,338	8,425	16,558	7,042	46,363	3,485	5,320	8,805	2,504	57,672
Offices [3/]		8,117	22,312	24,243	54,672	9,777		9,777	791	65,240
Outbound baggage		23,197			23,197					23,197
Passenger lobby		14,760	36,651		51,411					51,411
Rental car lobby		6,844			6,844					6,844
Restrooms	405	1,934	3,160	699	6,198		2,340	2,340	1,251	9,789
Security		378	614		992					992
Systems [4/]	14,686	3,052	2,575	6,249	26,561				2,036	28,597
Walkway		1,772	4,695	1,606	8,074		1,490	1,490	2,518	12,082
Total [5/]	43,845	114,288	123,997	44,749	326,879	13,262	51,292	64,554	26,961	418,395

Notes: Areas are in square feet.

1/ Inbound baggage includes baggage claim areas and inbound baggage make-up areas.

2/ Miscellaneous area includes storage space, stairs, and service corridors.

3/ Offices include airline, rental car, Airport administration, and operations offices.

4/ Systems include mechanical, electrical, computer, and telecommunications support areas.

5/ Totals may not add to the sum of the columns due to rounding.

Source: Ricondo & Associates, Inc., March 2008, based on terminal programmed areas contained in CSHQA and HNTB Corporation, *Boise Air Terminal Project, Passenger Terminal Building – Schematic Design Manual*, February 15, 1999.

Prepared by: Ricondo & Associates, Inc., April 2008.

The baggage claim lobby includes four large carousels and two oversize baggage slides. A backcountry terminal area is located adjacent to the baggage claim, currently served by Salmon Air and Sun Valley Express.

Adjacent to the baggage claim lobby is the rental car lobby with associated counters and offices for the seven rental car companies operating at the Airport: Avis, Budget, Enterprise, Dollar, Hertz, National, and Thrifty.

Second Level

The second level of the main terminal consists of approximately 124,000 square feet, and includes passenger ticketing, airline ticket offices, security screening, and a food court containing a majority of the concession space within the terminal.

Airline ticketing is conducted on the second level of the main terminal. Ticket counters are leased on a preferential basis and there are currently several open positions. Several airlines also offer curbside check-in, with a total of 11 positions, several of which are open. In addition to ticket counters, most airlines provide self-serve kiosks either at the counter or within their queuing areas. The Airport is considering the use of Common Use Self-Service (CUSS) kiosks to conserve space. While changes in airline check-in policies and kiosk use are extending the life of the existing ticket counter, expansion is possible to the west of the ticket lobby.

Behind the ticket counters is space occupied by the airline ticket offices, administrative offices for the Transportation Security Administration (TSA), and Airport Police. Some of this space is currently vacant. The TSA, which occupies approximately 11,000 square feet in support passenger screening activities, is expected to vacate their offices in 2009.

Five passenger security screening checkpoint lanes are provided on the second level, with room for a sixth. The security screening function is currently adequate, with wait times under five minutes during peak periods.

Third Level

The Airport operations center, Airport administrative offices, conference rooms, TSA office space, and restrooms are located on the third level. Conference rooms can be rented by the hour or day, and provide a convenient place for business travelers to hold meetings without leaving the airport.

2.1.2.2 Concourse B

Concourse B was originally constructed in 1981. In 1994, the Concourse B extension was added to meet the growing demand for more aircraft gates. The entire concourse was renovated in 2005. Level 1 of Concourse B consists of airline operations offices. Level 2 of Concourse B consists of 11 gates, holdrooms, concessions, and restrooms. In total, Concourse B consists of approximately 65,000 square feet.

Concourse B currently serves Delta (B20 and B22), U.S. Airways (B18), United (B10, B11, and B21), Southwest (B15, B17, and B19), Northwest (B16), and Frontier (B14). Gate space is leased on

a preferential, but not exclusive basis. All gates are fully occupied at night, along with one or two of the three available remain overnight (RON) positions.[6]

Jet bridges provide access to parked aircraft, and are equipped with ground power and potable water. Preconditioned air units are in the process of being installed on all jet bridges. The jet bridges are capable of handling aircraft ranging from regional jets to Boeing 767s, although the south side of Concourse B (Gates B10, B11, B15, B17, and B19) is limited to Boeing 757s or smaller aircraft due to Federal Aviation Regulations (FAR) Part 77 height restrictions from Runway 10L-28R.

2.1.2.3 Concourse C

Concourse C is located on the southern (airside) end of the main terminal building on the first floor under the second-level food court. The concourse consists of approximately 27,000 square feet, including eight gates, a food and beverage concession, restrooms, and a business center. Horizon Air is the primary tenant of Concourse C and operates regional jets as well as Bombardier Q-200 and Q-400 turboprop aircraft. Concourse C is located at apron level with two covered walkways provided for passenger safety and protection when accessing the 11 aircraft parking positions.

2.1.2.4 Information Technology Services

The terminal building and associated facilities include a number of information technology systems designed for passenger and tenant convenience, safety, and security. These systems include the following:

- **Paging system** – The terminal paging system was designed to be both expandable and customizable to serve current and future airport modifications. Some features of the system include a modular design for flexibility and unlimited future expansion, automatic level control, background noise cancellation, various programmable features, a digital feedback terminator, and an internal DC power supply with battery backup.[7]
- **Security system** – The security system at the Airport consists of access control, surveillance, and intrusion detection systems. Access is controlled with magnetic cards and keypads that grant access and monitor movement throughout secure areas. The surveillance system consists of closed-circuit television cameras installed at selected locations around the Airport. Video images are transmitted to an operations center where they are monitored by security personnel and recorded for potential use in Airport or police matters. Intrusion detection is facilitated by the access control and surveillance systems.[8]
- **Wireless (WiFi) system** – Free, secure, high-speed (T1 performance) wireless Internet service is available to all Boise Airport customers throughout the terminal. The system is sponsored by the Idaho Business Review and works with any WiFi notebook or PDA.
- **PBX phone system** – Telephone communications throughout the Airport are based on a PBX system.

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6 The three RON positions at the Airport are capable of accommodating up to Boeing 757-sized aircraft.

7 CSHQA and HNTB Corporation, *Boise Air Terminal Expansion – Schematic Design, Communications Systems*, February 9, 1999.

8 CSHQA and HNTB Corporation, *Boise Air Terminal Expansion – Schematic Design, Airport Terminal Security Systems*, February 8, 1999.

2.1.3 Aviation Tenant Facilities

Aviation tenants include all tenants that engage in flying or aircraft maintenance and have access to the airfield. Aviation tenants can be grouped into the following categories: air cargo, GA, military, and other government tenants. Hangar and apron facilities operated by these aviation tenants provide parking and storage for 286 based aircraft and any number of transient aircraft at the Airport. Based aircraft include 166 single-engine aircraft, 29 multi-engine aircraft, 19 jets, 27 helicopters, and 45 military aircraft.[9] **Exhibit II-4** shows the location of aviation tenant facilities at the Airport.

2.1.3.1 Air Cargo Facilities

During 2007, the cargo carriers at the airport transported 46,676 tons of freight and 253 tons of mail through the Airport.[10] Federal Express (FedEx) and United Parcel Service (UPS) lease land for cargo operations at the Airport. The FedEx facility is located in the cargo area east of the terminal apron and is used for package sorting, equipment storage, and office space. UPS is the sole tenant of the cargo area south of the Runway 10R threshold, which includes one building and ramp space.

Many of the passenger airlines at the Airport also transport mail in the baggage compartment, or "belly," of their aircraft. United Airlines, Delta Airlines, Horizon Air, and Southwest Airlines have cargo facilities located in the cargo area east of the terminal apron. Information about air cargo tenants and facilities at the Airport is presented in **Table II-4**.

Table II-4

Air Cargo Tenants and Facilities

Air Cargo Tenant	Street Address	Type of Business/Facility	Total Building Area (square feet) 1/
Delta Airlines Cargo	2775 Apollo St.	Cargo building	6,020
Federal Express	2622 Lockheed Ln.	Cargo building	37,670
Horizon Air/Southwest Airlines Cargo	2703 Apollo St.	Cargo building	11,430
United Airlines Cargo	2827 Apollo St.	Cargo building	7,460
United Parcel Service	4030 S. Orchard St.	Cargo building	11,110
Total			73,690

Note:

1/ Areas listed represent the approximate gross area of the building footprint on the Airport, based on drawings provided by WHPacific.

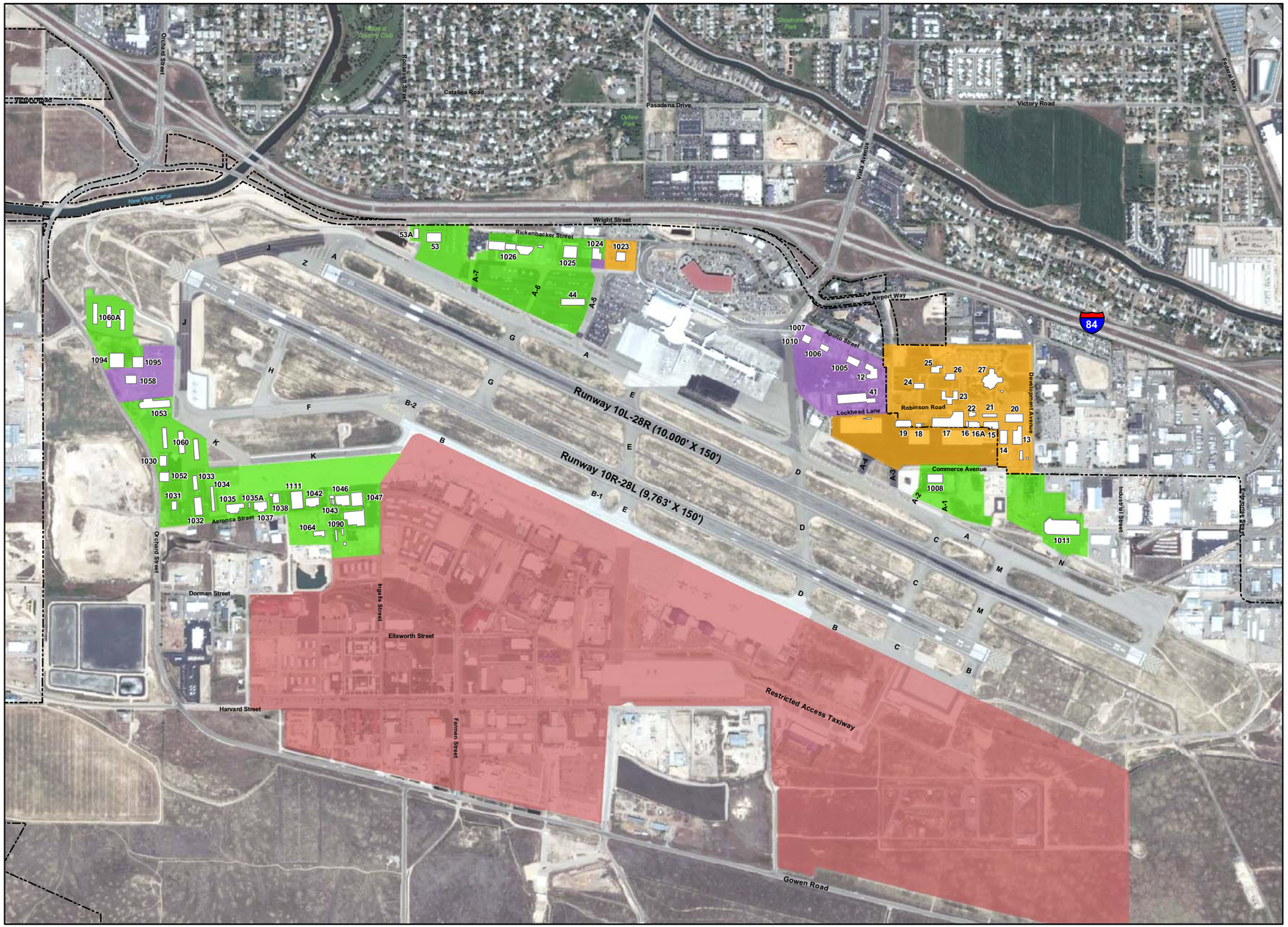
Source: Ricondo & Associates, Inc., March 2008, based on information provided by the City of Boise and WHPacific.
Prepared by: Ricondo & Associates, Inc., April 2008.

2.1.3.2 General Aviation Facilities

GA tenants include FBOs, T-hangar tenants, and non-commercial tenants. **Table II-5** presents information about GA tenants and facilities at the Airport.

[9] Based aircraft information was obtained from the Airport's Master Record (FAA Form 5010) dated February 14, 2008.

[10] Cargo/mail statistics obtained from the City of Boise.



Legend

Airport property line

Aviation Tenant Facility Areas

- Air cargo
- General aviation
- Other government
- Military

Aviation Tenant Facilities

Building	Facility Description
12	U.S. Postal Service
13	NIFC returns warehouse
14	NIFC raws
15	NIFC incident command support
16	NIFC Forest Service fire operations
16A	NIFC Forest Service hangars
17	NIFC warehouse
18	NIFC ramp service
19	NIFC smoke jumpers loft
20	NIFC maintenance equipment
21	NIFC information
22	NIFC tool shop
23	NIFC barracks
24	NIFC administration
25	NIFC National Weather Service building
26	NIFC training building
27	NIFC Jack F. Wilson building
41	Federal Express
44	Shade hangar
53	Jackson Jet Center
53A	Jackson Jet Center
1005	Horizon/Southwest cargo
1006	Delta cargo/inflight kitchen
1007	United cargo
1008	Idaho Helicopters
1010	U.S. Customs
1011	Albertsons Aviation
1023	Idaho State Division of Aeronautics
1024	Jackson Jet Center
1025	Jackson Jet Center
1026	Jackson Jet Center
1030	J.B. Scott
1031	Conyan Aviation
1032	Conyan Aviation
1033	Conyan Aviation
1034	Western Aircraft hangars
1035	Western Aviation
1035A	Western Aviation
1037	J.R. Simplot Company
1038	Atwood Properties (Aviation Air)
1042	Western Aircraft
1043	Western Aircraft
1046	Western Aircraft
1047	Western Aircraft
1052	J.B. Scott
1053	Turbo Air
1058	United Parcel Service cargo building
1060	T-hangars (10 units nested)
1060A	T-hangars (10 units nested)
1064	Western Aircraft
1090	Western Communication
1094	Appleton hangar
1095	Micron hangar
1111	Western Air hangar

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; WHPacific (airport property line and buildings); Ricondo & Associates, Inc., March 2008 (aviation tenant area boundaries).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit II-4

0 1,200 feet

north

Aviation Tenant Facilities

Table II-5

General Aviation Tenants and Facilities

General Aviation Tenant	Street Address	Type of Business/Facility	Total Building Area (square feet) [1/]
Albertsons Aviation	4180 S. Orchard St.	Corporate hangar	62,590
Appleton AirSports, LLC	3850 S. Orchard St.	Private hangar	25,600
Atwood Properties, LLC	4632 Aeronca St.	Helicopter hangar	8,910
Conyan Aviation	4970 Aeronca St.	Fixed base operator	30,120
Idaho Helicopters	2471 Commerce Ave.	Fixed base operator	16,100
Jackson Jet Center	3815 Rickenbacker St.	Fixed base operator	84,360
J.B. Scott	Orchard St.	Aviation hangars	19,770
J.R. Simplot Company	4640 Aeronca St.	Corporate hangar	14,660
Micron Technology	2800 S. Orchard St.	Corporate hangar	14,400
Turbo Air	4000 S. Orchard St.	Fixed base operator	29,830
Various	--	T-hangars (60 units)	72,900
Western Aircraft	4444 Aeronca St.	Fixed base operator	153,690
Total			532,930

Note:

1/ Areas listed represent the approximate gross area of the building footprint on the Airport, based on drawings provided by WHPacific.

Source: Ricondo & Associates, Inc., March 2008, based on information provided by the City of Boise and WHPacific.
Prepared by: Ricondo & Associates, Inc., April 2008.

FBOs typically offer a broad range of GA services such as maintenance, fuel sales, tiedown/hangar storage, flight instruction, and charter services. FBO facilities often include offices, hangars, ramps/aprons, and automobile parking areas. Currently, five FBOs maintain facilities at the Airport:

- **Conyan Aviation** – Conyan Aviation provides on-demand charter services with a fleet ranging from single-engine piston aircraft to a corporate jet. The FBO is located in the southwest corner of the Airport and occupies three buildings, which include an office building, a main aircraft hangar, and a shade hangar.
- **Idaho Helicopters** – Idaho Helicopters, Inc., is a helicopter FBO that offers comprehensive helicopter charter and maintenance services. The FBO leases one hangar facility located north of Runway 10L-28R at Taxiways A-1 and A-2 along Commerce Avenue.
- **Jackson Jet Center** – Jackson Jet Center is a full-service FBO with services ranging from fueling, deicing, and maintenance services to flight planning, pilot lounges, and parking for based and itinerant aircraft. The FBO occupies five buildings in the northwest part of the Airport, which include offices, lounges, and hangar facilities. Two additional buildings, located west of Taxiway A-7, are occupied by Jetstream Aviation, which is Idaho's largest FAR Part 141-approved flight school, and offers a range of flight training, aircraft rental, and charter services.
- **Turbo Air** – Turbo Air is a full-service FBO that provides services such as aircraft parking, fueling, maintenance, charters, a passenger terminal, and pilot lounges. The FBO leases one hangar building between the UPS cargo facility and the south T-hangars.

- **Western Aircraft** – Western Aircraft, Inc., is a large full-service FBO, located south of Runway 10R-28L along Aeronca Street. The FBO provides a broad range of services such as aircraft maintenance, sales, fueling, catering, and car rentals, and offers amenities such as a passenger terminal, pilot lounge, and a pilot shop. The FBO occupies several buildings including five large aircraft hangars, a main terminal building, and a parts building.

Sixty T-hangars are located at the Airport, contained within six separate buildings that are available for aircraft owners to lease for storage of their aircraft. The T-hangars are located south of Runway 10R-28L on both sides of the UPS cargo facility. The T-hangars can accommodate aircraft as large as a small twin-engine and are fully occupied.

Non-commercial aviation tenants are those that provide services for aircraft storage and/or maintenance only for the aircraft that are housed in their hangars. Their services are not provided to the general public. In some cases, only a single aircraft may be stored in a facility. However, other facilities may hangar more than one aircraft, and the aircraft may have separate owners or operators. Non-commercial tenants include corporate aviation tenants as well as miscellaneous companies or operators that own or lease hangars for personal or business use. Non-commercial aviation facilities may include hangars, office and storage space, aircraft ramp, and automobile parking areas.

2.1.3.3 Military Facilities

The Airport has historically had a significant military presence. Originally established in 1941, Gowen Field is a National Guard installation located on the south side of the airfield, and is the only joint military installation in Idaho. The combined area within the Airport boundaries under exclusive-use military lease is 576 acres. Another 1,500 acres on the Airport is under a joint-use agreement between the City of Boise and the military. Gowen Field is used by both the Air National Guard (ANG) and Army National Guard (ARNG) units of the State of Idaho. The installation is also home to reserve units of the Army, Navy, and Marines.

The 124th Wing of the Idaho ANG (IDANG) is the host unit at Gowen Field, and currently provides support for federal interests by providing combat-ready A-10 Thunderbolt II close air support aircraft and C-130 Hercules intratheater airlift capability. The 124th Wing currently flies and maintains 15 A-10 and four C-130 aircraft in support of its close air and airlift support missions.

In its 2005 Base Realignment and Closure (BRAC) Recommendations, the Department of Defense recommended realigning Gowen Field by distributing the four C-130 aircraft of the 124th Wing to Cheyenne, Wyoming, and increasing the number of A-10 aircraft to a total of 18. Gowen Field is a valuable A-10 base because of its proximity to air-to-ground ranges with score-able strafing and bombing, threat emitters, and integrated air combat training. To accommodate the realignment of the 124th Wing, the National Guard Bureau has proposed to implement several construction projects at Gowen Field and correct several facility deficiencies. In December 2007, an Environmental Assessment (EA) was conducted and resulted in a Finding of No Significant Impact (FONSI) for the proposed construction.[11]

[11] National Guard Bureau, *Final Environmental Assessment for the Implementation of the Base Realignment and Closure (BRAC) – Final Recommendations for the Mission Change and Construction Activities of the 124th Wing at Boise Air Terminal (Gowen Field), Boise, Idaho,* December 2007.

The Idaho ARNG is also very active at Gowen Field, and consists of armor, helicopter, and other training units. The Idaho ARNG's aviation battalions are the 1-183 (Apache AH-64A) and 1-189 (Blackhawk UH-60A).

The installation also includes the Regional Training Site – Armor School, the Regional Training Site – Maintenance School, the Maneuver Area Training Equipment Site, the 116th Armor Brigade Headquarters, the U.S. Army Reserve 321st EN BN, the U.S. Army Reserve Center, the U.S. Naval Reserve Center, the U.S. Marine Corps Reserve Center, and the Idaho Military Academy.

A Master Plan was prepared and adopted for Gowen Field in October 1997.[12] The plan identifies existing conditions, assesses alternative development scenarios, and seeks to ensure the orderly future development of the installation. Facilities at Gowen Field include aircraft hangars, command and support offices, commercial and service facilities, and residential barracks. Open space associated with landscaping, recreation, and undeveloped areas comprises approximately 30 percent of the land area.

2.1.3.4 Other Aviation Government Facilities

In addition to the military, various other governmental agencies are aviation tenants at the Airport. The NIFC, U.S. Postal Service (USPS), U.S. Customs and Border Protection (CBP), and the Idaho Transportation Department (ITD) Division of Aeronautics have facilities at the Airport. **Table II-6** presents information about non-military government tenants and facilities at the Airport.

Table II-6

Government Aviation Tenants and Facilities

Government Aviation Tenant	Street Address	Type of Business/Facility	Total Building Area (square feet) 1/
ITD Division of Aeronautics	3483 Rickenbacker St.	State aeronautics	10,080
National Interagency Fire Center	3833 Development Ave.	Government agency	209,360
U.S. Customs and Border Protection	2873 Apollo St.	Government agency	--
U.S. Postal Service	2625 Apollo St.	Sorting facility	16,500
Total			235,940

Notes: ITD = Idaho Transportation Department.

1/ Areas listed represent the approximate gross area of the building footprint on the Airport, based on drawings provided by WHPacific.

Source: Ricondo & Associates, Inc., March 2008, based on information provided by the City of Boise and WHPacific.
Prepared by: Ricondo & Associates, Inc., April 2008.

The NIFC at the Airport is the major fire-fighting coordination center in the United States, serving to stage, supply, and manage efforts to fight wildfires throughout the country. The efforts of the NIFC are primarily logistical support. Facilities include hangars, maintenance, warehouses, barracks, administration and training buildings, ramp service, communications, and operations buildings. Additional space is provided for offices, storage, and automobile parking.

The USPS operates an airmail facility adjacent to the FedEx facility east of the terminal building, to provide timely and efficient sorting of mail in conjunction with airline mail-carrying activity.

[12] National Guard Bureau, *Idaho National Guard Master Plan – Gowen Field/Boise Air Terminal*, October 1997.

The Airport is a Port of Entry and as such contains a CBP facility. The Airport is a landing rights airport, meaning that prior to the landing of international flights, permission must be obtained by speaking directly to a CBP officer. Upon landing, a CBP officer inspects the aircraft and individual(s). The CBP facility is located adjacent to the United Airlines cargo facility east of the terminal building.

The ITD Division of Aeronautics maintains a building and aircraft ramp along Rickenbacker Street, adjacent to the Western Air Express cargo apron.

2.1.4 Non-Aviation Tenant Facilities

Non-aviation tenants are tenants that are located on Airport property but are not involved in an aviation-related business. Examples include hotels, light manufacturing, warehousing, distribution and transportation, call centers, retail, and restaurants. Non-aviation tenants that lease land, buildings, and/or grounds on Airport property are listed in **Table II-7**. Non-aviation tenant areas in the vicinity of the airfield are depicted on **Exhibit II-5**.

2.1.5 Support Facilities

Support facilities include aircraft rescue and fire fighting (ARFF) facilities, air traffic control (ATC) facilities, airport equipment and snow removal equipment (SRE) facilities, and fueling facilities. These facilities are depicted on **Exhibit II-6**.

2.1.5.1 Airport Rescue and Fire Fighting Facilities

The ARFF station is located at the end of Lockheed Lane, adjacent to the NIFC apron area. The facility accommodates the vehicles and personnel necessary for compliance with FAR Part 139 Index C aircraft operations.[13] ARFF equipment at the Airport is operated and maintained by the City of Boise Fire Department and consists of one 3,000-gallon vehicle, one 1,500-gallon vehicle, and one spare 1,500-gallon vehicle. The equipment meets the FAA-mandated response requirements of three minutes to the midpoint of the farthest runway served by airlines.

IDANG operates an ARFF facility adjacent to the military aircraft apron. Under the joint Fire Protection Agreement between IDANG and the City of Boise Fire Department, the IDANG and Airport ARFF facilities provide mutual aid during aircraft crash and rescue incidents, with overall responsibility delegated based on the type of aircraft involved (civil or military) and the location on or in the vicinity of the Airport.

[13] This Index is defined in FAR Part 139, *Certification and Operations: Land Airports Serving Certain Air Carriers*, which categorizes airports according to the length of air carrier aircraft serving them. For example, Index C includes aircraft with a length of at least 126 feet, but less than 159 feet. Should an airline use aircraft longer than 159 feet (such as a Boeing 767 at 180 feet) to begin scheduled service with at least five daily departures, the Airport's Index would increase to Index D.

Table II-7

Non-Aviation Tenants and Facilities

Non-Aviation Tenant	Street Address	Lease Facility
Airport Chevron	2828 Airport Way	Land lease
Artcraft Refinishing	4655 MacArthur St.	Land lease
Avis Car Rental	3001 Wright St.	Car rental service facility and overflow lot
Boise Trucking Division	4904 Zeppelin	Land lease
Boise City Equipment Services	4855 Dorman St.	Land lease
Boise City Parks Department (Forestry Division)	4969 Dorman St.	Land lease
Boise Police Department	4663 Enterprise St.	Building & grounds
Buss Automotive	4560 S. Orchard St.	Building & grounds
BW Equipment, LLC	Curtis & Malad St.	Land lease
Best Western Vista Inn	2645 Airport Way	Land lease
Contech Construction Supplies	4778 Dorman St.	Land lease
Cripe Distributing, LLC	4909 & 4631 W. Aeronca St., 4470 Lindberg St.	Portion of building & land lease
Delta Airlines Cargo	2775 Apollo St.	Portion of building & grounds
F&C Corporation	2700 Airport Way	Land lease
Hertz Car Rental	2996 Airport Way	Car rental service facility and overflow lot
Idaho Humane Society	2525 S. Liberty, 4775 Dorman St., 4755 & 4781 Ellsworth St.	Building, grounds, and land lease
Idaho Timber Corp., LLC	5401 Kendall	Land lease
Les Bois Federal Credit Union	4416 Guard St.	Land lease
Linda K. Leach Trust	3559 & 3669 Wright St.	Land lease
MAC Transportation, LLC (Naylor Towing)	4477 S. Kennedy St.	Building & grounds
McDan, LLC	6434 W. Gowen Rd.	Land lease
Moore Tree Service	2901 S. Curtis	Land lease
National Car Rental	3043 Wright St.	Car rental service facility
Sleep Inn	2799 Airport Way	Land lease
Nelson Construction	Gravel pit off of Production & I-84	Land lease
Odd Duck Enterprizes	Diamond	Hot dog vendor
PatRick Corporation, Inc.	2049 Commerce Ave.	Building & grounds
Precision Propeller Services	4777 W. Aeronca St.	Land lease
Quality Tile Roofing, Inc.	2711 S. Curtis	Land lease
Qwest/Equis Corp.	1315 Amity	Land lease
Best Western Airport Inn	2660 Airport Way	Land lease
Sommer Builders, Inc.	2920 S. Empire Way	Land lease
Splat Paintball/System Tech	3131 Harvard St.	Land lease
Tactical Solutions, Inc.	2181 Commerce Ave.	Building & grounds
US Bank – Corporate Real Estate	2730 Airport Way	Land lease
Valley Regional Transit	4788 S. Orchard St.	Land lease

Source: Ricondo & Associates, Inc., March 2008, based on information provided by the City of Boise.
Prepared by: Ricondo & Associates, Inc., April 2008.

Legend

Airport property line

Non-aviation tenant facility area

Non-Aviation Tenant Facilities

Building	Facility Description
7	Boise Police
54	Linda Leach Trust
55	Linda Leach Trust
56	Avis rental car overflow lot
57	Hertz rental car overflow lot
1001	Airport Chevron gas station
1002	Hertz rental car service facility
1003	Avis rental car service facility
1004	National rental car
1012	Sleep Inn
1018	West One Bank
1019A	Airport business park
1019	F&C office building
1020	Kopper Kitchen
1021	Best Western Vista Inn
1022	Best Western Airport Motor Inn
1048	Brookover Storage
1051	Precision Propellers
1063	Cripe Distributing
1063A	Cripe Distributing
1063B	Cripe Distributing
1063C	Cripe Distributing
1066	Vacant
1067	Boix Trucking
1067A	Boix Trucking
1067B	Boix Trucking
1068	System Tech & Splat Paintball
1086	City vehicle shop
1089	Contech culvert
1093	Idaho Humane Society
1098	Boise City Forestry
1099	Valley Ride

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; WHPacific (airport property line and buildings); Ricondo & Associates, Inc., March 2008 (non-aviation tenant area boundaries).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit II-5

0 1,200 feet

north

Non-Aviation Tenant Facilities

Legend

- Airport property line
- Support facility area
- Fuel tanks/fuel farm

Support Facilities

Building	Facility Description
5	BLM Helitack & snow removal equipment
5A	Snow removal equipment
9	Airport chemical building
1009	Airport ARFF station
1013	FAA control tower (existing)
1014	FAA control tower (future)
1027	FAA - Duvall building (flight service station)
1054	Snow removal equipment building
1055	Equipment storage building
1083	Airfield lighting & electrical building
1092	Idaho Air National Guard ARFF station
1105	RTR site

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; WHPacific (airport property line and buildings); Ricondo & Associates, Inc., March 2008 (support facility area boundaries).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit II-6

0 1,200 feet

north

Support Facilities

2.1.5.2 Air Traffic Control Facilities

The FAA provides ATC services to aircraft arriving at or departing from the Airport, or over-flying the immediate area. The ATC facility houses the FAA staff and equipment necessary to facilitate the safe, efficient, and expeditious movement of air traffic. The facility is located north of Runway 10L-28R between the parking garage and the terminal roadway curb, and consists of offices, equipment rooms, radar rooms, storage, and the air traffic control tower (ATCT). Vehicle parking for ATC personnel is located adjacent to the ATC facility.

Due to the current location of the ATCT, line-of-sight issues exist on several areas of the airfield. ATCT non-visibility areas on the airfield include Taxiways A-5, A-6, and A-7; Taxiway A between Taxiway A-5 and the northwest de-ice apron; and a portion of Taxiway A between Taxiway A-1 and Taxiway N. In addition, line-of-sight requirements for the ATCT and the assault strip located south of Gowen Road are not in compliance with regulations. To manage this issue, the 124th Wing of the IDANG has coordinated with the FAA and stations crash response equipment at the site when it is active (with military aircraft).

Construction of a new ATCT began in January 2008 at the corner of Ulm and Harvard streets, south of the airfield and north of Gowen Road. This 12,350-square-foot ATCT will be approximately 289 feet tall, allowing proper line-of-sight for controllers directing aircraft on the two existing runways as well as on the assault strip. Construction is scheduled to be completed in September 2009. Following a period of equipment installation and testing, the new tower is expected to be commissioned in early 2011.

In support of ATC functions, an FAA Flight Service Station (FSS) facility is located on the Airport to assist pilots. Services offered through the FSS facility include weather briefings, flight plans, and search and rescue operations.

2.1.5.3 Airport Equipment and Snow Removal Facilities

The Airport's primary equipment facilities complex is located on the northeast side of the Airport off of Taxiway N, adjacent to the Albertsons corporate hangar. The facilities consist of an SRE building and two equipment buildings. The Airport operates a variety of equipment for maintaining the airfield and grounds, including snow plows, runway deicing trucks, sweepers, mowers, and tractors. An additional SRE building, as well as the Airport's chemical building, are located at the northeast corner of the airfield. The airfield lighting and electrical building is located south of the NIFC apron and east of the Idaho Helicopters FBO facility.

2.1.5.4 Fueling

Various tenants at the Airport fuel private as well as airline aircraft. Western Aircraft, the largest FBO at the Airport, is also the largest fuel provider. In addition to a fuel facility at its location on the southwest corner of the Airport, the company operates a fuel farm adjacent to the cargo area east of the terminal apron between the Delta Airlines and United Airlines cargo facilities. The underground tanks at this facility provide a one-day supply of fuel for all of the commercial aircraft at the Airport. Fuel is trucked in from an off-Airport facility, pumped into the underground storage tanks, and then pumped onto fuel trucks for delivery to the aircraft. Fueling services are also provided by the other FBOs to their respective local and transient customers. In addition, other tenants on the airfield fuel only their own locally based or owned aircraft.

2.2 Airport Ground Access

The Airport ground access system includes the regional and local access roadways, on-Airport circulation roads, and associated ground access facilities. Information on the ground access roadways, facilities, existing traffic conditions, and planned roadway improvements in the Airport vicinity was obtained from drawings, aerial photography, visual inspection, and interviews with Airport staff. Additional information was obtained from an Airport ground transportation master plan,[14] an EA for planned improvements on I-84,[15] and an Airport parking master plan.[16]

2.2.1 Airport Roadway and Curbside Facilities

This section describes the regional off-Airport roadway network serving the Airport, the on-Airport roadways, and the terminal curbside facilities.

2.2.1.1 Regional Access

Exhibit II-7 depicts the regional roadway system in relation to the Airport. Access to the Airport is provided by way of Orchard Street, Vista Avenue, Broadway Avenue, and West Gowen Road. Each of these roadways (and their intersection with I-84) provides a critical link between the Airport and the regional transportation network, and is described as follows:

- **Interstate 84** – I-84 is the major east-west highway link in southwestern Idaho and generally forms the northern and eastern boundaries of the Airport. I-84 is a four-lane interstate freeway with 12-foot-wide travel lanes and shoulders at least 6 feet wide in the vicinity of the Airport. The posted speed limit on I-84 is 65 miles per hour (mph) from west of the Orchard Street interchange to east of the Broadway Avenue interchange, and 75 mph east of the Broadway Avenue interchange eastbound.
- **Orchard Street** – This is a north-south principal arterial roadway that generally forms the western boundary of the Airport. South of I-84, Orchard Street is a two-lane road that extends around the end of the runways and provides access to GA, cargo, and Idaho National Guard facilities on the southwestern part of the Airport before connecting with Gowen Road. To the north, Orchard Street is a five-lane roadway that extends into the west side of downtown Boise, but is not used as a major access to downtown. The bulk of the traffic using the Orchard Street/I-84 interchange is urban area traffic with a relatively small portion being directly terminal-related. A larger element of this traffic is related to the Idaho National Guard and other commercial uses on the south side of the Airport. The interchange is a basic diamond configuration with one entry lane and one exit lane, and is signalized at both ramp terminals. The posted speed limit on Orchard Street is 35 mph.

  Approximately 300 feet south of the Orchard Street/I-84 interchange, Orchard Street intersects with Victory Road and Wright Street. Wright Street extends east from this intersection and acts as a frontage road to I-84, providing access to GA facilities on the northwestern edge of the airfield. Wright Street continues east and intersects with Vista Avenue to define the beginning of the terminal circulation system.

[14] CSHQA and HNTB Corporation, *Draft Report: Boise Air Terminal Ground Transportation Master Planning*, September 1998.

[15] Idaho Transportation Department, *Environmental Assessment: I-84, Orchard Interchange to Gowen Interchange*, June 2007.

[16] Jacobs Consultancy, *Final Report: Parking Master Plan – Boise Airport*, July 2007.

Source: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008.
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit II-7

0 1/2 mile north

Regional Roadway Access

- **Vista Avenue** – This is a north-south five-lane principal arterial roadway that provides major access to downtown Boise. The Vista Avenue/I-84 interchange serves as the primary access point for the Airport. The interchange is a basic diamond configuration with one entry lane and one exit lane, and is signalized at both ramp terminals. The posted speed limit on Vista Avenue is 35 mph.
- **Broadway Avenue** – This is a north-south five-lane principal arterial roadway that serves as a major access to the eastern end of downtown Boise. The Broadway Avenue/I-84 interchange is heavily used, although very little traffic is directly related to the Airport. The majority of traffic on this interchange is freeway- and urban area-related. The interchange is a basic diamond configuration with one entry lane and one exit lane, and is signalized at both ramp terminals. South of the interchange, Broadway Avenue veers west and becomes Commerce Avenue, providing access to GA and commercial/industrial facilities on the northeastern side of the airfield. The posted speed limit on Broadway Avenue is 35 miles per hour.
- **Gowen Road** – This two-lane minor arterial roadway runs roughly east-west and generally forms the southern boundary of the Airport. The Gowen Road/I-84 interchange is a basic diamond configuration with one entry lane and one exit lane, and does not currently serve a significant volume of traffic destined for the Airport terminal. However, Gowen Road is the primary access roadway for the Gowen Field Idaho National Guard installation. The posted speed limit on Gowen Road is 35 mph.

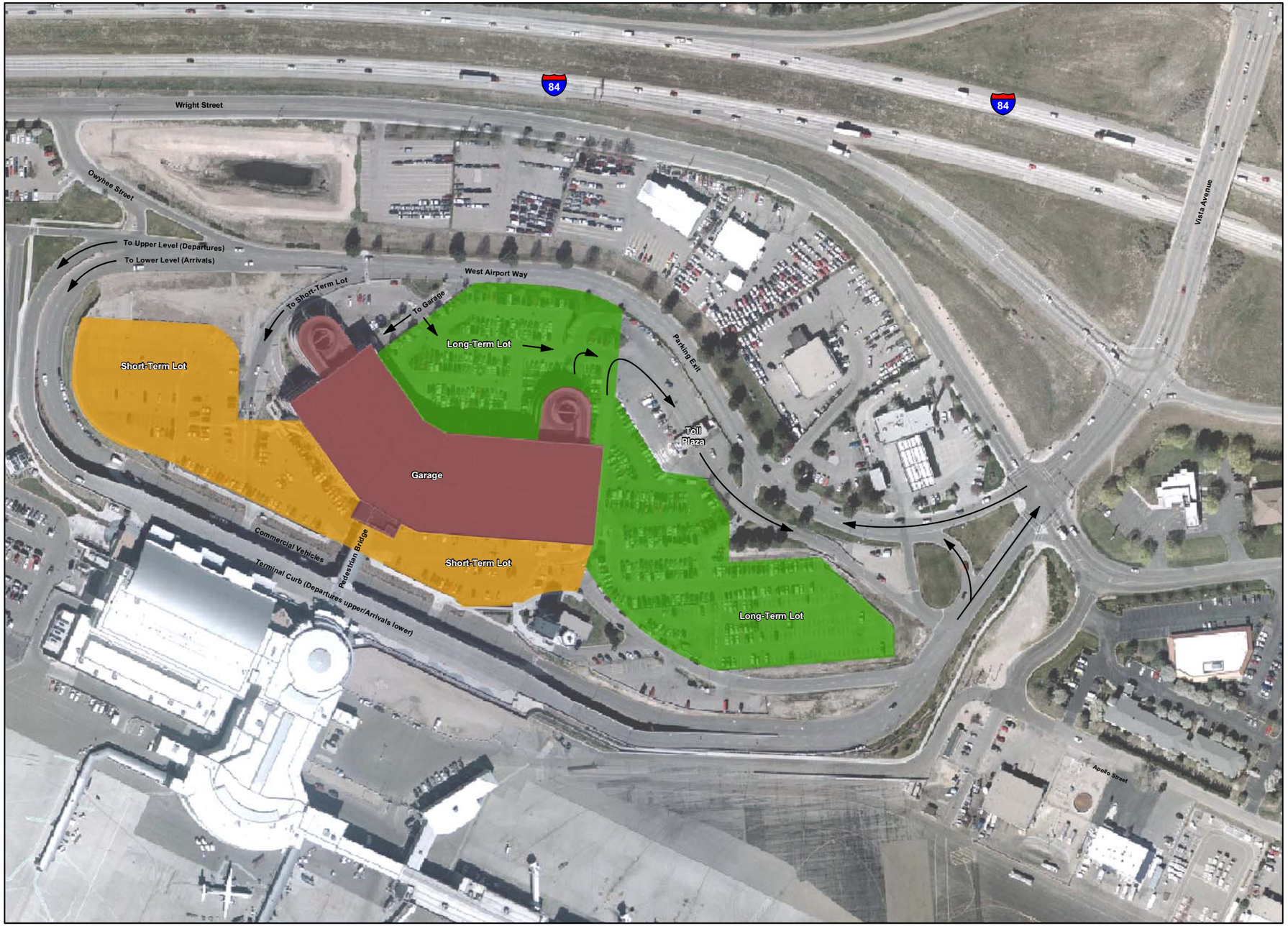
2.2.1.2 Terminal Roadway Circulation System

Primary access to the Airport is via Vista Avenue, with much of the traffic using the I-84/Vista Avenue interchange. Less than 200 feet south of the I-84 eastbound ramp/Vista Avenue intersection, the Wright Street/Vista Avenue intersection currently serves as the primary entrance to the Airport. Wright Street and Owyhee Street collectively function as a secondary access, serving approximately 25 percent of Airport traffic.[17]

The existing terminal circulation system is depicted on **Exhibit II-8**. Upon entering the terminal circulation system at the Wright Street/Vista Avenue intersection, traffic enters West Airport Way, a counterclockwise one-way circulation loop. West Airport Way is a three-lane roadway from the recirculation lane entrance (approximately 200 feet west of the Wright Street/Vista Avenue intersection) westward to the left lane surface parking turnoff. Traffic destined for the parking garage turns left prior to the surface parking turnoff. Past the surface parking turnoff, traffic on the remaining two lanes may exit the airport by veering right onto Owyhee Street or continuing straight onto South Rickenbacker Street, or vehicles may follow West Airport Way south to the two-level terminal curb.

Passenger departure traffic is directed to the upper level roadway. Arrival traffic, as well as commercial vehicles, proceed along the lower level roadway, which is directly below the departure level roadway. Leaving the arrival level, the roadway passes to the left out from under the departure level, provides departure access for the commercial vehicle lanes, and forms the left lanes of the approach to the Wright Street/Vista Avenue intersection. Traffic departing the garage and surface parking lots passes through a toll plaza before merging in a single lane onto West Airport Way toward the Wright Street/Vista Avenue intersection.

[17] CSHQA and HNTB Corporation, *Draft Report: Boise Air Terminal Ground Transportation Master Planning*, September 1998.



Legend

Parking Facilities

- Garage
- Short-term
- Long-term

Sources: City of Boise interactive mapping system, July 2007 (aerial photograph); Ricondo & Associates, Inc., March 2008, based on information obtained from the City of Boise.
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit II-8

0 200 feet north

Terminal Roadway Circulation System

2.2.1.3 Terminal Curbsides

The passenger terminal has a two-level curbfront serving departing passengers on the upper level and arriving passengers on the lower level. Each level provides approximately 800 feet of available frontage. There are four curbfront lanes on the upper level: one for passenger unloading/drop-off and three for through traffic. The lower level curbfront consists of one passenger loading/pick-up lane, three through lanes, and three lanes for commercial vehicle passenger loading/pick-up, separated by a median. The commercial vehicle curb is serviced by taxis, courtesy shuttles, revenue shuttles, and buses.

One pedestrian crossing is available on the upper level, which leads to a covered bridge that spans the lower level commercial vehicle lanes, providing access to the parking garage. Pedestrian crossings on the lower level lead to the commercial vehicle median and across the commercial vehicle lanes to the short- and long-term parking lots. A photograph of the two-level terminal curb is shown on **Exhibit II-9**.

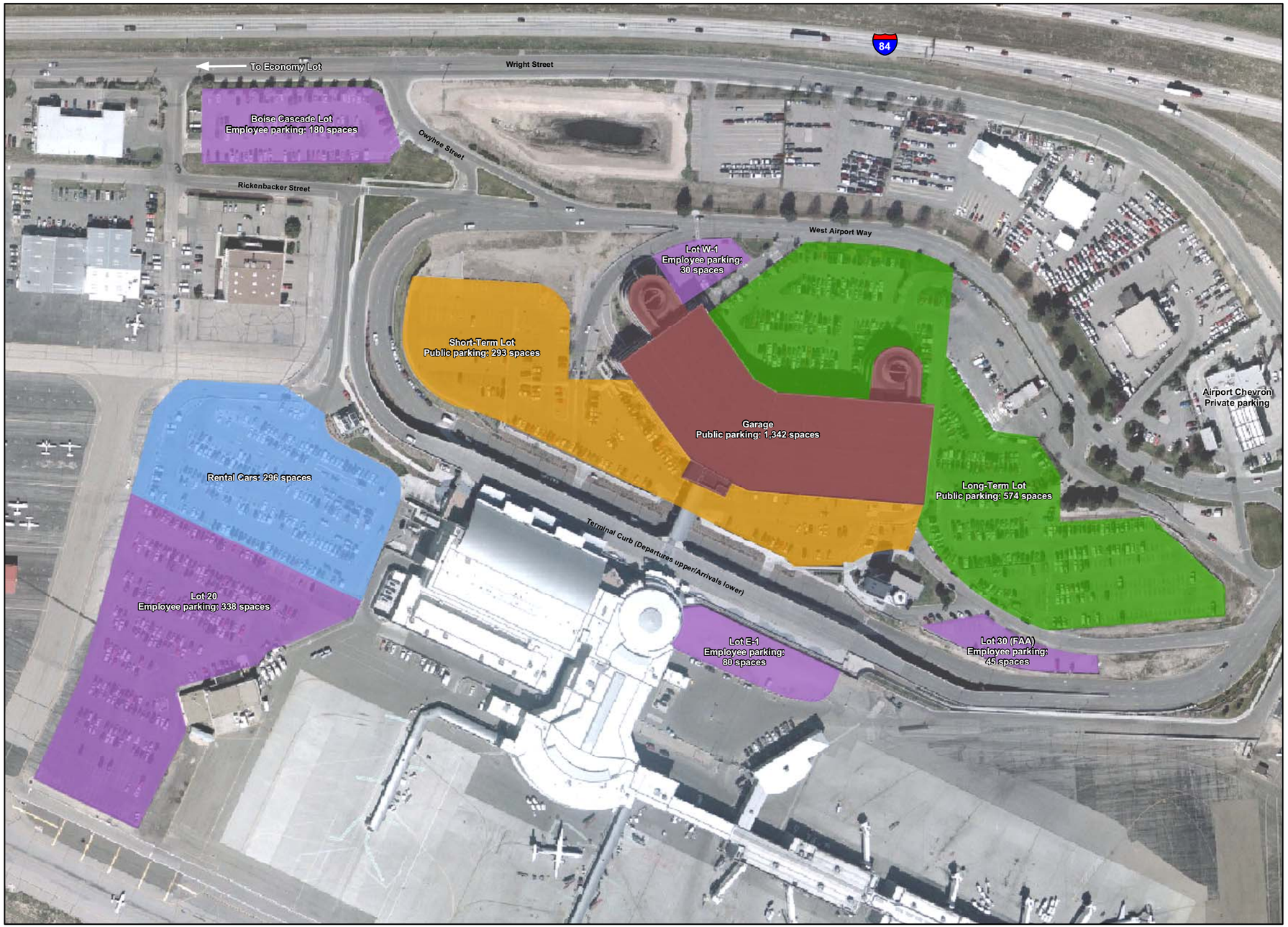
Exhibit II-9

Terminal Curbs

Source: Ricondo & Associates, Inc., February 2008.
Prepared by: Ricondo & Associates, Inc., April 2008.

2.2.2 Parking Facilities

Vehicle parking facilities at the Airport include spaces for public parking, employee parking, and rental car parking. These parking facilities are depicted on **Exhibit II-10**.



Legend

Parking Facilities

- Garage
- Short-term
- Long-term
- Employee
- Rental car

Note: FAA = Federal Aviation Administration

Economy Lot

Sources: City of Boise interactive mapping system, July 2007 (aerial photograph); Jacobs Consultancy, Final Report: Parking Master Plan - Boise Airport, July 2007; Airport staff interviews (parking facilities).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit II-10

0 200 feet north

Existing Parking Facilities

2.2.2.1 Public Parking

A total of 2,209 public parking spaces are available within the terminal roadway circulation system in facilities operated by AMPCO System Parking. The four-level garage, constructed in 1996, is located north of the two-level terminal curbfront and provides 1,342 spaces. The Short-Term Lot is located adjacent to the garage and the commercial vehicle lanes, and consists of 293 spaces. The Long-Term Lot borders the garage to the north and east and provides 574 spaces. In 2008, the Short-Term and Long-Term lots are scheduled to be expanded by 50 spaces and 60 spaces, respectively.

Additional parking is provided in the Economy Lot located on Airport property along Victory Road, near the intersection of Victory Road/Wright Street and Orchard Street. Parkers using the Economy Lot are transported to and from the terminal building on a shuttle bus; a one-way trip takes approximately 15 minutes. The Economy Lot consists of 1,067 spaces, with an additional 1,000 spaces to be added in 2008.

During busy summer months, public parking spaces in the garage and the adjacent long-term surface lots are filled to capacity and the short-term lot is frequently more than 90 percent full. During peak but non-holiday periods, the economy lot is approximately 40 percent full.[18]

Privately-operated public parking is offered by an on-Airport Chevron station, located at the Wright Street/Vista Avenue intersection. Patrons drop their vehicles off at the Chevron station and are transported to the terminal. Upon the patron's return, a Chevron employee picks them up at the terminal building in the patron's car and the patron drops the employee off at the Chevron station. This operation has storage capacity to accommodate up to 138 vehicles during normal operations and can park up to 180 vehicles during holiday and other high-demand periods.[19]

2.2.2.2 Employee Parking

The Airport operates 653 employee parking spaces distributed among multiple lots. The largest employee lot (Lot 20) consists of 338 spaces and is located adjacent to the rental car ready/return lot. Lot W-1 is located north of the garage, and consists of 30 spaces. Lot 30 is adjacent to the control tower and provides 45 spaces for FAA personnel. An additional employee lot (the Boise Cascade Lot) consists of 180 spaces and is located northwest of the garage, between Wright Street and Rickenbacker Street. A temporary 80-space employee surface lot located east of the terminal building along the arrival curb was constructed in 2008.

2.2.2.3 Rental Car Facilities

Seven rental car companies currently operate at the Airport: Avis, Enterprise, Hertz, National, Budget, Thrifty, and Dollar. The rental car companies share the ready and return area in a 296-space surface lot located immediately west of the terminal building, accessed directly from the baggage claim level (Level 1). Some rental car service and storage facilities are located on Airport property located between West Airport Way and Wright Street (immediately across from the Long-Term Lot) while others are located away from the terminal.[20]

[18] Jacobs Consultancy, *Final Report: Parking Master Plan – Boise Airport*, July 2007.
[19] Ibid.
[20] Ibid.

2.2.3 Existing Traffic Conditions and Planned Roadway Improvements

2.2.3.1 Traffic Counts

In 1998, in support of planning efforts associated with the terminal redevelopment project, average daily traffic (ADT) counts were taken at critical locations throughout the internal airport roadway system and on each of the four interchanges adjacent to the Airport. Detailed results of these traffic counts can be found in the transportation master plan report.[21] The Idaho Transportation Department has established traffic counting programs that provide traffic counts for each of the primary regional roadways and intersections that provide access to the Airport. In 2005 this data was compiled and supplemented with additional localized traffic counts as part of a study to support roadway improvements on I-84 in the vicinity of the Airport.[22]

2.2.3.2 Level of Service

Level of Service (LOS) is a grading system that identifies how efficiently traffic flows on a roadway segment. LOS ratings range from an "A," the best traffic operation, to "F," the poorest. It is generally accepted that for urbanized areas, the minimum acceptable LOS is D. A description of each LOS is provided in **Table II-8**.

Table II-8

Roadway Segment Level of Service Description

Level of Service	Description	Traffic Loading Percent of Roadway Capacity
A	Free-flowing traffic	< 50%
B	Low-density stable traffic	51% - 70%
C	Medium-density stable traffic flow	71% - 80%
D	High-density stable traffic flow	81% - 90%
E	Unstable flow at or near capacity levels	91% - 100%
F	Breakdown of traffic flow	> 100%

Source: Idaho Transportation Department, March 2008.
Prepared by: Ricondo & Associates, Inc., March 2008.

In support of an EA for I-84 improvements between the Orchard Street interchange and the Gowen Road interchange, a capacity analysis was conducted on all eastbound and westbound I-84 mainline segments from west of the Orchard Street interchange to the Eisenman Road interchange, interchange ramps from Orchard Street to Eisenman Road, and ramp intersections where traffic counts were performed. The analysis was completed using Highway Capacity Software (HCS) 2000. The methodology and results of the capacity analysis are documented in the EA[23] and summarized in **Table II-9**.

[21] CSHQA and HNTB Corporation, *Draft Report: Boise Air Terminal Ground Transportation Master Planning*, September 1998.

[22] Washington Group International, *Interstate 84 Traffic Analysis, Orchard Street Interchange to Gowen Road Interchange*, 2005.

[23] Idaho Transportation Department, *Environmental Assessment: I-84, Orchard Interchange to Gowen Interchange*, June 2007.

Table II-9

Existing and Projected Capacity of Interstate 84 Mainline and Ramps

	Level of Service (2006)	Level of Service (2035)
Mainline		
Eastbound Cole Avenue to Vista Avenue	E (AM/PM)	F
Eastbound Vista Avenue to Broadway Avenue	D (AM/PM)	F
Westbound Broadway Avenue to Vista Avenue	E (PM)	F
Westbound Vista Avenue to Cole Avenue	F (PM)	F
All other segments	C (AM/PM)	N/A
Ramps		
I-84/Orchard Street on and off ramps	F (PM)	B for on and F for off
I-84/Vista Avenue on and off ramps	F (PM)	B for wb, on; F for others
Eastbound I-84/Broadway Avenue off ramp	D (AM/PM)	F
Westbound I-84/Broadway Avenue on ramp	F (PM)	F
All other ramps	C (AM/PM)	N/A
Intersections		
Gowen Road and I-84 westbound on and off ramp intersections	F (AM/PM)	F for on and B for off
Broadway Avenue and I-84 eastbound on and off ramp intersections	D (PM)	A for on and F for off
All other interchange intersections	C or better (AM/PM)	N/A

Notes: AM/PM = morning/afternoon; wb = westbound; N/A = not available

Source: Idaho Transportation Department, *Environmental Assessment: I-84, Orchard Interchange to Gowen Interchange*, June 2007.
Prepared by: Ricondo & Associates, Inc., March 2008.

As shown, several mainline sections and ramps that provide access to the Airport already need improvement in order to maintain the desirable LOS D for the existing traffic conditions. The estimated future growth of the region (and the Airport) indicates the need for additional capacity on I-84. I-84 was constructed in the late 1960s and was designed for an ADT volume of 70,000 and a LOS D mobility standard. Existing traffic volumes on the segment of I-84 in the vicinity of the Airport—75,000 vehicles per day—already exceed the operational thresholds of the existing roadway system. Additionally, the pavement has experienced significant increases in cracking, roughness, and rutting. By 2035, traffic volumes on this segment are forecast to be as high as 151,000 vehicles per day.[24]

2.2.3.3 Planned Roadway Improvements

In May 2006, the Idaho Legislature authorized the sale of nearly $200 million in Grant Anticipation Revenue Vehicle (GARVEE) bonds to finance the first phase of the Connecting Idaho roadway improvement plan. GARVEE financing allows Idaho to sell bonds and use the proceeds to build highway projects. The bonds will be repaid with future federal highway dollars.

[24] Idaho Transportation Department, *Environmental Assessment: I-84, Orchard Interchange to Gowen Interchange*, June 2007.

Six corridors are currently financed through GARVEE bonds. The project that will have the greatest impact to the Airport is the Orchard to Isaacs Canyon Corridor on I-84.[25] The goal of this project is to reconstruct existing lanes, add new lanes, and reconstruct interchanges to meet LOS E conditions through 2035 between the west end of the Orchard Street interchange and the east end of the Eisenman Road interchange. The project includes the following components:[26]

Interstate 84 Mainline Improvements

- **Sound wall construction** – Sound walls will be constructed on the north side of I-84 from the existing sound walls west of the Orchard Street interchange east to the Broadway Avenue interchange. Construction began in April 2008 and is expected to end in January 2009.
- **Cole Avenue to Vista Avenue** – Improvements to this segment of the mainline will increase the number of lanes from four to eight and rehabilitate the existing road surface, which is beginning to fail.
- **Vista Avenue to Broadway Avenue** – Improvements to this segment of the mainline will increase the number of lanes from four to eight. Right-of-way purchases, as necessary, are scheduled to begin in 2008, and construction is programmed for 2010. Final design for the additional lanes began in July 2007.
- **Broadway Avenue to Eisenman Road** – Improvements to this segment of the mainline will increase the number of lanes from two to three in each direction. Construction began in September 2007 and was completed in May 2008.

Interstate 84 Interchange Improvements

- **Orchard Street interchange** – The Orchard Street bridge that crosses over I-84 will be relocated to the west to better align with the arterial to the south, realign ramps to minimize the need to acquire right-of-way, and and allow widening of the roadways and ramps to provide additional capacity and meet current design standards. The improved interchange will include an additional lane at the ramp intersections, on Orchard Street, and at the intersection of Victory Road and Orchard Street. The new layout will also improve traffic signal timing. Construction is scheduled to begin in late 2008.
- **Vista Avenue interchange** – A single point urban interchange (SPUI) will replace the existing conventional diamond. A SPUI functions by combining the two ramp terminals into one intersection, facilitating simultaneous left turns from the ramps and the arterial approaches. The ramps will also be widened to provide additional capacity. Final design of the interchange began in January 2008, with construction scheduled to be completed in mid-2009.
- **Broadway Avenue interchange** – A SPUI will replace the existing conventional diamond. The project involves construction of a new wider bridge structure (in generally the same location as the existing bridge) and replacement of the existing ramps with wider ramps to increase capacity.
- **Gowen Road interchange** – Improvements to this interchange will involve removal and reconstruction of the existing I-84 bridge structures, widening Gowen Road to five lanes, and

[25] Isaacs Canyon refers to the I-84/Eisenman Road interchange, which is located approximately 2.5 miles south of the I-84/Gowen Road interchange.

[26] This list consists of proposed improvements which constitute the full build-out of the corridor. However, funding has not been obtained for all of these individual projects.

reconstruction of the existing ramps to increase capacity and meet current design standards. A loop ramp will be added in the southeast quadrant to facilitate traffic from eastbound I-84 to eastbound Gowen Road.

In addition to the improvement projects associated with the Orchard to Isaacs Canyon Corridor, multiple roadway improvement projects are planned within the same area to address immediate transportation needs and to preserve the pavement condition on I-84 until long-term improvements are completed. These projects will maintain, replace, or repair various features of I-84 including pavement, overpass bridges, canal bridges, and on-ramps. Planned projects include:

- rehabilitating the existing pavement between the Orchard Street interchange and the Eisenman Road interchange, and
- rehabilitating the Orchard Street interchange underpass.

At a state level, the improvements to I-84 and associated interchanges discussed in this section are identified in the Idaho State Highway Plan[27] and the 2004-2008 State Transportation Improvement Program.[28] The Destination 2030 Limited Plan Update is the regional plan that summarizes projects from multiple local and state studies, plans, and improvement programs, such as the Destination 2025 and Destination 2020 plans (the previous regional plans).

Improvements to the I-84 mainline and reconstruction of three interchanges (Orchard Street, Vista Avenue, and Broadway Avenue) are identified as recommended projects in Chapter 5 of Destination 2025. Improvements to the Gowen Road eastbound off-ramp are identified as committed projects in Chapter 5 of Destination 2025. Preservation of additional right-of-way along the segment of I-84 from Gowen Road to the Eisenman Road interchange for potential future widening is identified in Chapter 4 of Destination 2030.

2.2.4 Public Transportation

Valley Regional Transit (VRT) is the regional public transportation authority for Ada and Canyon counties. The primary responsibilities of VRT are to coordinate public transportation services in the two-county region and develop a regional public transportation system. VRT owns and operates the public bus system in Boise and contracts for transit services for Nampa/Caldwell and between Ada and Canyon counties. These services are operated under the name ValleyRide. ValleyRide operates the following buses to/from the Airport:

- **#1 Parkcenter (Monday through Friday)** – This route provides service between downtown, southeast Boise, Federal Way, and the Boise Airport. Route 1 runs every 30 minutes during the peak and every 60 minutes during the midday.
- **#3 Vista (Monday through Saturday)** – This route serves the Vista corridor between downtown Boise and the Airport. Route 3 runs every 30 minutes during the peak and every 60 minutes during the midday.
- **#43 Caldwell Express** – A single express trip operates in each direction from Caldwell to Boise with connections made in downtown Boise and at the Airport.

[27] Idaho Transportation Department, Idaho State Highway Plan, 1997.

[28] Idaho Transportation Department, FY2008-2012 Statewide Transportation Improvements Program, approved by the Idaho Transportation Board, September 20, 2007.

Sun Valley Express operates daily bus service between the Airport and Sun Valley, Idaho. The company also operates on-demand charter transportation services between the Airport and anywhere in the U.S. or Canada.

2.2.5 Existing Railroads

One freight rail line, operated by Union Pacific, has a termination point located on the Airport, adjacent to the snow removal and general equipment storage buildings on the northeast side of the airfield. The line is part of a branch line that serves Boise, while the main line passes to the south of the city itself.

2.3 Airspace and Air Traffic Control

This section describes the airspace surrounding the Airport, navigational aids used by pilots to navigate within the airspace, and ATC facilities and procedures implemented to safely control aircraft flying to or from the Airport.

Aircraft operating to or from an airport do so under either Visual Flight Rules (VFR) or Instrument Flight Rules (IFR). VFR governs the procedures for flying under visual conditions, when a pilot is able to safely control and navigate an aircraft by visual reference to the environment outside of the cockpit. Meteorological conditions that meet the minimum requirements for VFR flight are called visual meteorological conditions (VMC).[29] Conditions that do not meet the minimum requirements for VFR flight are called instrument meteorological conditions (IMC), under which a flight may only operate under IFR. IFR are a set of regulations and procedures for flying aircraft whereby navigation and obstacle clearance is maintained with reference to aircraft instruments only, while separation from other aircraft is provided by ATC. The terms VFR and IFR are also used by pilots and controllers to indicate the type of flight plan.

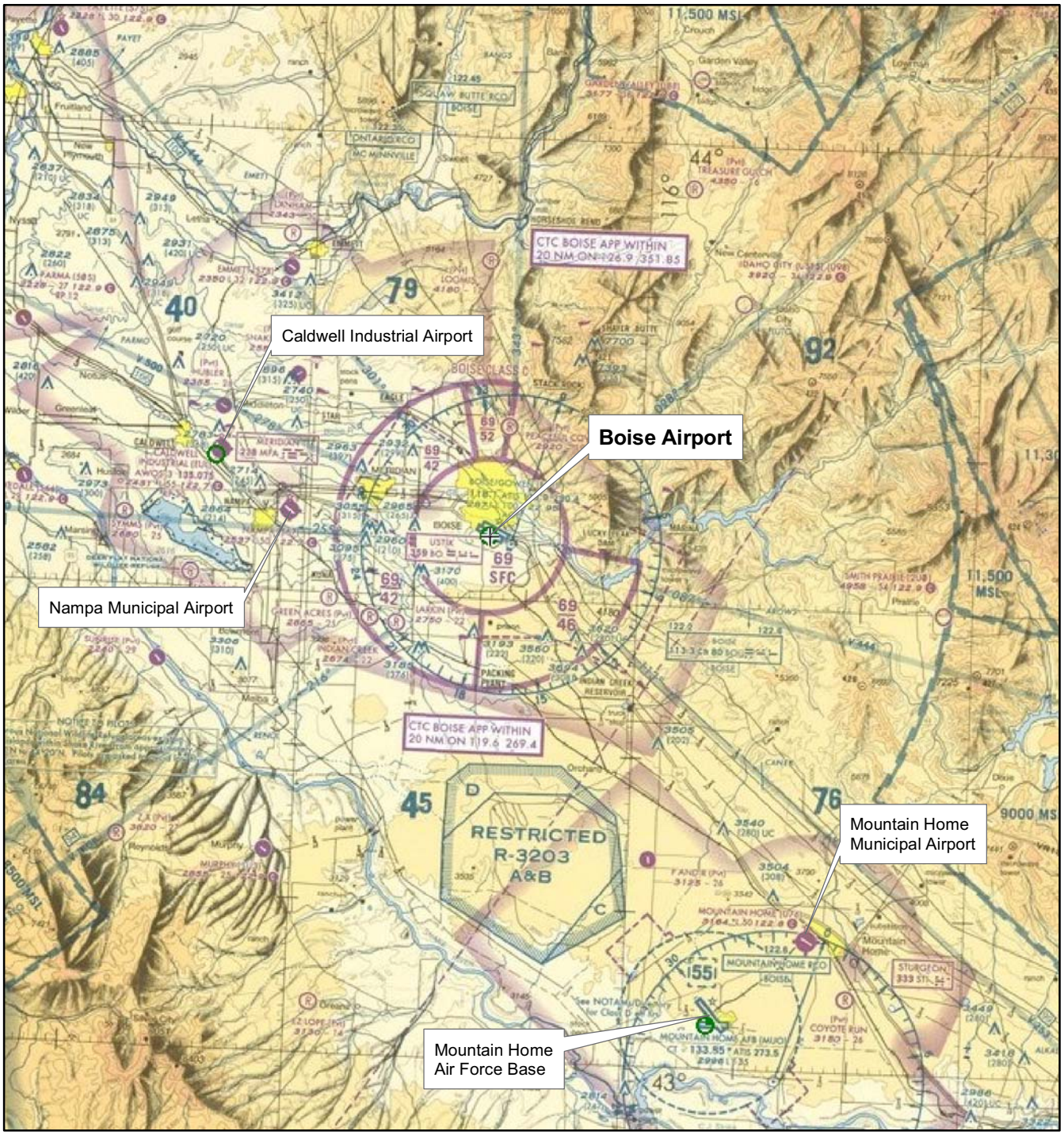
2.3.1 Airspace Structure

Airspace in the United States is classified as controlled, uncontrolled, or special use. Controlled airspace encompasses those areas where there are specific certification, communication, and navigation equipment requirements that pilots and aircraft must meet to operate in that airspace. Airspace is classified as Class A, B, C, D, E, G, or special use airspace.

Exhibit II-11 depicts the airspace in the vicinity of the Airport. All airspace at and above 18,000 feet above MSL in the vicinity of the Airport is classified as Class A. Class B airspace is established around the nation's largest airports and is not found in the vicinity of Boise Airport.

The airspace immediately surrounding the Airport is classified as Class C, which consists of a surface area with a 5-nm radius and an outer circle with a 10-nm radius. The surface area vertically extends to 6,800 feet above MSL, while the outer circle extends from 4,200 or 4,600 feet above MSL to 6,900 feet above MSL, depending on the airspace segment. The Boise Class C airspace area is depicted on Exhibit II-11 between the two magenta rings encircling the Airport. VFR aircraft are separated from IFR aircraft within the airspace.

[29] AC 150/5060, *Airport Capacity and Delay*, defines VMC as a cloud ceiling height of at least 1,000 feet above ground level (AGL) and visibility greater than three nautical miles (nm). IMC is defined as a ceiling height less than 1,000 feet AGL and visibility less than three nm.



Source: SkyVector.com (Salt Lake City Sectional chart effective October 25, 2007 to April 10, 2008).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit II-11

0 Not to scale north

Airspace Structure

Mountain Home Air Force Base, located approximately 35 nautical miles southeast of the Airport, has Class D airspace that extends from the surface up to and including 5,500 feet above MSL. This airspace area is depicted on Exhibit II-11 within a dashed blue circle around the airport.

Exhibit II-11 also shows areas of Class E airspace with a lower limit of either 700 feet or 1,200 feet above ground level (AGL), and an upper limit of either 18,000 feet above MSL or the lower limit of overlying airspace. Most of the country has a Class E lower limit of 1,200 feet AGL. Where it drops to 700 feet AGL is depicted by a broad magenta line with a faded side. The faded side is the side where the floor of Class E is 700 feet AGL, while the more defined side of the line indicates areas where the floor of Class E rises to 1,200 feet. The Class E airspace areas in the vicinity of the Airport ensure that IFR aircraft remain in controlled airspace while conducting instrument approaches into airports without Class D airspace, such as Caldwell Industrial Airport, Nampa Municipal Airport, and Mountain Home Municipal Airport.

Class G airspace is uncontrolled airspace. VFR aircraft can operate in Class G airspace; IFR aircraft will not. Class G airspace begins at the surface throughout much of the area surrounding the Airport, except for the areas where Class C or D airspace extends to the surface.

An additional classification of airspace in the vicinity of the Airport is special use airspace. As shown on Exhibit II-11, Restricted Area R-3203 A&B is located 10 nautical miles south of the Airport. Restricted areas are a type of special use airspace that are identified by an area within which the flight of aircraft, while not wholly prohibited, is subject to restrictions. Restricted areas denote the existence of unusual, often invisible, hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. Restricted Area R-3203 A&B extends up to 22,000 feet above MSL and aircraft may not enter the area unless permission has been obtained from the Salt Lake City Air Route Traffic Control Center (ARTCC).

2.3.2 Navigational Aids

Navigational aids (NAVAIDS) are established to maintain accurate enroute air navigation using ground-based transmission facilities and onboard receiving instruments. NAVAIDS can be used for enroute navigation as well as for instrument approaches to a runway. There are a number of different navigational aids in the vicinity of the Airport, as shown on Exhibit II-11. The primary types of NAVAIDS used to guide aircraft in the Boise airspace are:

- **NDB** – The non-directional beacon (NDB) is the simplest form of radio navigation aid used by aircraft. It is a ground-based transmitter which transmits low-frequency or medium-frequency radio waves in all directions. The automatic direction finder (ADF) installed in an airplane has a needle which indicates the direction from which the signals of the selected NDB ground station are being received.
- **VOR** – The very high frequency (VHF) omnidirectional radio range (VOR) is a navigation aid that is used extensively in instrument flying. A VOR ground transmitter radiates individual signals in all directions. By convention, 360 different tracks away from the VOR are used, each separated from the next by one degree, and each with its own direction related to magnetic north. Each of these 360 VOR courses is called a radial. Using an onboard VOR indicator coupled with a VHF navigation radio, a pilot is able to indicate the desired course and the angular deviation from that course, as well as to navigate an aircraft directly to or from the VOR station along any of the 360 radials.

As described in Section 2.1.1.1, DME is used to provide a pilot with the slant distance from a DME ground station. Most civil VORs have an associated DME, therefore providing both azimuth and distance information, and are known as VOR/DMEs.

- **VORTAC** – A VORTAC facility combines a VOR/DME ground station with a tactical air navigation system (TACAN), which is used exclusively by military aircraft. The end result for a civil pilot using a VORTAC is the same as using a VOR/DME—both VOR and DME information is available. The Boise VORTAC, used for enroute navigation and nonprecision approaches to the Airport, is located off the southeast corner of the airfield, approximately 5,000 feet from the Runway 28L threshold.

Table II-10 provides information for all NAVAIDS in the vicinity of the Airport.

Table II-10

Navigational Aids in the Vicinity of Boise Airport

Name	ID	Type	Distance (nm)	Course (degrees)
BOISE	BOI	VORTAC	1.5	117
LIBERATOR	LIA	VOR	40.1	150
USTIK	BO	NDB	4.5	296
MERIDIAN	MPA	NDB	14.0	280

Notes: NDB = non-directional beacon; VOR = very high frequency (VHF) omnidirectional radio range; VORTAC = combined VOR and tactical air navigation system (TACAN).
Distance (nautical miles) and course (degrees true) are both measured from the Airport Reference Point.

Source: www.aeroplanner.com (accessed March 15, 2008).
Prepared by: Ricondo & Associates, Inc., March 2008.

2.3.3 Air Traffic Control

Air traffic control in the United States is managed by three primary types of facilities: Air Traffic Control Towers (ATCT), Terminal Radar Approach Control (TRACON), and Air Route Traffic Control Centers (ARTCC). A brief overview of these facilities and how they control flight to and from the Airport follows.

The ATCT controllers are responsible for separating aircraft in the air and on the ground, sequencing aircraft in the traffic pattern, expediting arrivals and departures from the Airport, and providing clearances and weather information to pilots. From the ATCT, FAA personnel maintain air traffic control and communications with pilots operating aircraft on the runways or within the Airport's Class C airspace.

The Boise TRACON facility is located inside the Airport's ATCT. The TRACON controllers are responsible for ensuring that arriving aircraft can be safely and efficiently transitioned from the enroute environment to the approach control environment and from the approach control environment to the airfield proper. Likewise, the TRACON controllers are responsible for ensuring that departing aircraft can transition from the airfield to the terminal environment and ultimately to the enroute environment.

The enroute phase of flight generally occurs when aircraft are operating between departure and destination terminal areas. The FAA's Salt Lake City ARTCC, located in Salt Lake City, Utah, is responsible for controlling aircraft across a multi-state area including Idaho, Montana, Utah, Nevada, and parts of Oregon, Wyoming, and North and South Dakota, making it the largest ARTCC area in the nation. ARTCC controllers provide separation services and traffic advisories to aircraft operating on IFR flight plans during the enroute phase of flight, and to VFR aircraft on request. Generally aircraft are transitioned to and from ARTCC control near the boundary of the TRACON airspace at designated arrival and departure areas. A letter of agreement (LOA) delegates areas of control jurisdiction and establishes procedures for coordinating air traffic between the Salt Lake City ARTCC and related TRACON facilities (including Boise).

2.3.3.1 Departure Procedures

Pilots of aircraft departing the Airport contact controllers in the ATCT for authorization to taxi to a particular runway and for clearance to take off. Once the aircraft is airborne, the controller will instruct the pilot to contact the Boise TRACON. Pursuant to the LOA between the Boise TRACON and Salt Lake City ARTCC, once under TRACON control, aircraft are provided a radar vector or routing which will establish them on the cleared route prior to leaving the lateral boundaries of the TRACON airspace. A radar vector is a heading that provides navigational guidance, and can be issued during any phase of flight.

Most aircraft enter or exit the Boise area via one of several available federal airways. Aircraft above 18,000 feet use the Jet Route System. Other aircraft, including those being vectored in and out of the Airport, use low altitude airways, also known as Victor Airways. Victor Airways are 8-mile-wide corridors of controlled (Class E) airspace between 1,200 feet AGL and 18,000 feet above MSL, used to transition between the terminal and enroute environments. Federal airways are defined between VOR or VORTAC facilities. As shown on Exhibit II-11, the Boise VORTAC plays an important role in enroute and local air navigation, serving as the originating/termination point for seven Victor Airways, including V113, V500, V4-444, V253, V113, V444, and V4-330.

2.3.3.2 Arrival Procedures

Aircraft under ARTCC control intending to land at the Airport are "handed off" to TRACON controllers prior to entering TRACON airspace. Arrival aircraft altitudes are established by the LOA. Aircraft not under ARTCC control are required to contact the Boise TRACON prior to entering the Airport's Class C airspace. Aircraft are then vectored by the TRACON in terminal airspace to the appropriate arrival runway at the Airport. Aircraft operating under IFR will then execute an instrument approach procedure to the Airport.

Published Instrument Approach Procedures

Instrument approach procedures are published by the U.S. Department of Commerce and describe in graphic and tabular form the headings and altitudes that pilots must observe when flying the approach procedure. These procedures allow pilots to land aircraft safely at an airport during poor weather conditions or when cloud cover is very low and visibility conditions are very limited. **Table II-11** summarizes the published instrument approach procedures available at the Airport.

Two types of instrument approaches are available at the Airport: precision approaches and nonprecision approaches. A precision approach provides pilots with electronic glideslope (vertical) guidance as well as course tracking (horizontal) guidance. The ILS to Runway 10R at the Airport is an example of a precision approach.

Table II-11

Instrument Approach Procedures by Runway

Approach by Runway	Approach Type	Decision Height [1/]	Visibility [2/]
Runway 10L			
RNAV (GPS) RWY 10L	Nonprecision	3,094	1 sm
VOR/DME or TACAN RWY 10L	Nonprecision	3,180	1 sm
Runway 10R			
ILS or LOC RWY 10R	Precision	3,036	1,800 feet RVR
HI-ILS RWY 10R [3/]	Precision	3,033	1,800 feet RVR
ILS RWY 10R (CAT II) [4/]	Precision	2,936	1,200 feet RVR
RNAV (GPS) RWY 10R	Nonprecision	3,086	2,400 feet RVR
HI-VOR/DME or TACAN RWY 10R [3/]	Nonprecision	3,160	5,000 feet RVR
VOR/DME RWY 10R	Nonprecision	3,160	5,000 feet RVR
VOR RWY 10R	Nonprecision	3,300	5,000 feet RVR
NDB RWY 10R	Nonprecision	3,220	5,000 feet RVR
Runway 28L			
RNAV (GPS) RWY 28L	Nonprecision	3,108	2,400 feet RVR
LOC BC RWY 28L	Nonprecision	3,300	5,000 feet RVR
HI-VOR/DME or TACAN RWY 28L [3/]	Nonprecision	3,360	6,000 feet RVR
VOR/DME or TACAN RWY 28L	Nonprecision	3,360	6,000 feet RVR
Runway 28R			
RNAV (GPS) RWY 28R	Nonprecision	3,121	4,000 feet RVR

Notes: NDB = non-directional beacon; VOR = very high frequency (VHF) omnidirectional radio range; TACAN = tactical air navigation system (TACAN); LOC = localizer; BC = backcourse; DME = distance measuring equipment; ILS = instrument landing system; RNAV = area navigation; GPS = global positioning system.

1/ Decision height is the height in feet above mean sea level at which a pilot, while on the approach, must execute a missed approach procedure if the runway (or the runway lights) is not in sight.

2/ Visibility minimums are reported in either statute miles (sm) or feet as measured by runway visual range (RVR) equipment. Visibility (and decision height) minimums sometimes vary depending on the approach category (A through D) of the approaching aircraft. For the purpose of this table, any variations in minimums are reported assuming approach category D, meaning aircraft approaching at speeds between 141 and 165 nautical miles per hour.

3/ Approaches with the prefix "HI" indicate a high altitude approach and may be used by military aircraft.

4/ Category (CAT) II ILS approaches allow for lower minimums than conventional (CAT I) ILS approaches. Special aircrew and aircraft certification is required when executing a CAT II approach. Although not yet published, a CAT III approach was activated on November 15, 2007, allowing approaches to Runway 10R to be conducted with visibility minimums down to 600 feet RVR.

Source: www.aeroplanner.com (accessed March 15, 2008).
Prepared by: Ricondo & Associates, Inc., March 2008.

A nonprecision approach is an approach flown by reference to navigation aids or in which electronic glideslope (vertical) guidance is not available. An approach utilizing area navigation (RNAV) and/or global positioning system (GPS) technology is also classified as a nonprecision approach. During

nonprecision approaches, pilots descend to a minimum descent altitude (MDA) and look for the runway. These procedures have higher minimums than precision approaches provided by an ILS.

VFR Approach Procedures

Aircraft operating under VFR conditions are instructed by the TRACON to contact the ATCT for instructions as to where and how the aircraft is to enter the local traffic pattern for landing. The local traffic pattern consists of a downwind leg, base leg, and final approach leg. The standard traffic pattern direction is to the left. However, in the case of the Airport, which has parallel runways, non-standard or right direction traffic patterns are used to ensure separation of aircraft operating on the parallel runways. The Boise ATCT is responsible for the ATC services provided to aircraft operating in the local traffic pattern within sight of the tower. The ATCT ensures that aircraft operating in the local traffic pattern are separated from other aircraft operating in the local traffic pattern and from itinerant arrival and departure traffic.

2.3.4 Ground Operations and Runway Use

FAA controllers in the ATCT control ground movements of both civil and military aircraft on the Airport. However, IDANG operates a ramp tower to facilitate the movement of military aircraft on the IDANG apron. ATCT controllers assume positive control of military aircraft prior to any movement onto an active taxiway.

To enhance taxiing capabilities in low visibility conditions and reduce the potential for runway incursions, the Airport has implemented a Surface Movement Guidance and Control System (SMGCS).[30] SMGCS is a strategy that requires a low visibility taxi plan for any airport with take-off or landing operations with less than 1,200 feet RVR visibility conditions. This plan includes the improvement of taxiway and runway signs, markings, and lighting, as well as development of an SMGCS low visibility taxi route chart. The chart specifically designates taxi routes to and from the SMGCS runway (Runway 10R-28L) and applies to both aircrews and airport vehicle operators. The SMGCS taxi route chart for the Airport is available from Jeppesen Sanderson, Inc.

Runway use is determined by several factors including safety, wind, weather, traffic demand, runway capacity, direction of flight, and prescribed runway use procedures. The ATCT assigns runway use with consideration to all of these factors. Runway use at the Airport is detailed in the 2004 FAR Part 150 Study Update.[31] In general, runway use between the two runways at the Airport is fairly even, with departures and arrivals to the east in the morning and to the west in the afternoon.

2.4 Utilities and Stormwater

The utility companies serving the Airport and its facilities are from both the public and private sectors. The six major systems within Airport property are sanitary sewer, water, storm drainage, power, communications, and natural gas.

- **Sanitary sewer** – Sewer services at the Airport are provided by the City of Boise Public Works Department. The Public Works Department maintains the system, operates two

[30] Additional information about the SMGCS program is available in FAA Advisory Circular 120-57A, *Surface Movement Guidance and Control System*.

[31] HNTB Corporation, CSHQA, Wyle Laboratories, and Synergy Consulting, *Boise Airport 14 CFR Part 150 Study Update*, July 2004 (approved February 23, 2006).

wastewater treatment plants, and regulates industrial and commercial wastewater discharges into the sewer system through its pretreatment program.

- **Water** – United Water Idaho operates the water storage and distribution system that supplies potable water to the Airport. United Water's delivery capacity is 97 million gallons per day. The company operates a total of 88 wells with an average well volume of 560 gallons per minute. The wells draw water from a deep aquifer fed by the Boise River.
- **Storm drainage** – Sheet flow and drainage inlets are used to remove excess water from the airfield and funnel it into one of several retention basins. The basins capture and retain the excess water until it can be infiltrated into the existing soil or evaporated.
- **Power** – Idaho Power provides electric power to the Airport that powers buildings and airfield lighting. Several generators are located throughout the terminal building to provide power in the event of power failure. Airfield lighting and other critical systems can be operated on 100 percent generator power during periods of reduced visibility to ensure air traffic safety in the event of a power failure. Detailed information regarding the electrical systems at the Airport can be found in the terminal building schematic design manual.[32]
- **Communications** – A fiber optic system is located in the airport for communications and is connected with the City of Boise's Wide Area Network.
- **Natural gas** – Intermountain Gas Company is a privately-owned company headquartered in Boise that supplies natural gas to more than 275,000 customers, including the Airport.

Detailed information regarding the location and availability of utilities serving the Airport can be found in the utility study for roadway improvements along the I-84 corridor from Orchard Street to Gowen Road.[33] In general all utility lines serving the Airport are located either underground or overhead along I-84 and Gowen Road. All utility systems at the Airport have been upgraded to serve the needs of planned future growth of the Airport.[34]

2.5 Socioeconomic Data and Analysis

Socioeconomic data and analysis for the Airport's market area provides an indication of the air travel demand at the Airport. Historical socioeconomic data was gathered to develop an understanding of the characteristics of the region, the change in these characteristics over time, and to identify any associated regional trends.

The Airport market area includes 27 counties in Idaho, six counties in Oregon, and two in Nevada.[35] For the basis of the Master Plan effort, including the Aviation Demand Forecasts, the Airport market area has been divided into two groups: a primary market area and a secondary market area. The primary market area was determined by using the county passenger capture percentages. County capture percentages of 80 percent and above defined the primary market area for the Airport. County capture percentages below 80 percent were considered the secondary market area. As shown on

[32] CSHQA and HNTB Corporation, *Boise Air Terminal Project, Passenger Terminal Building – Schematic Design Manual*, February 15, 1999.

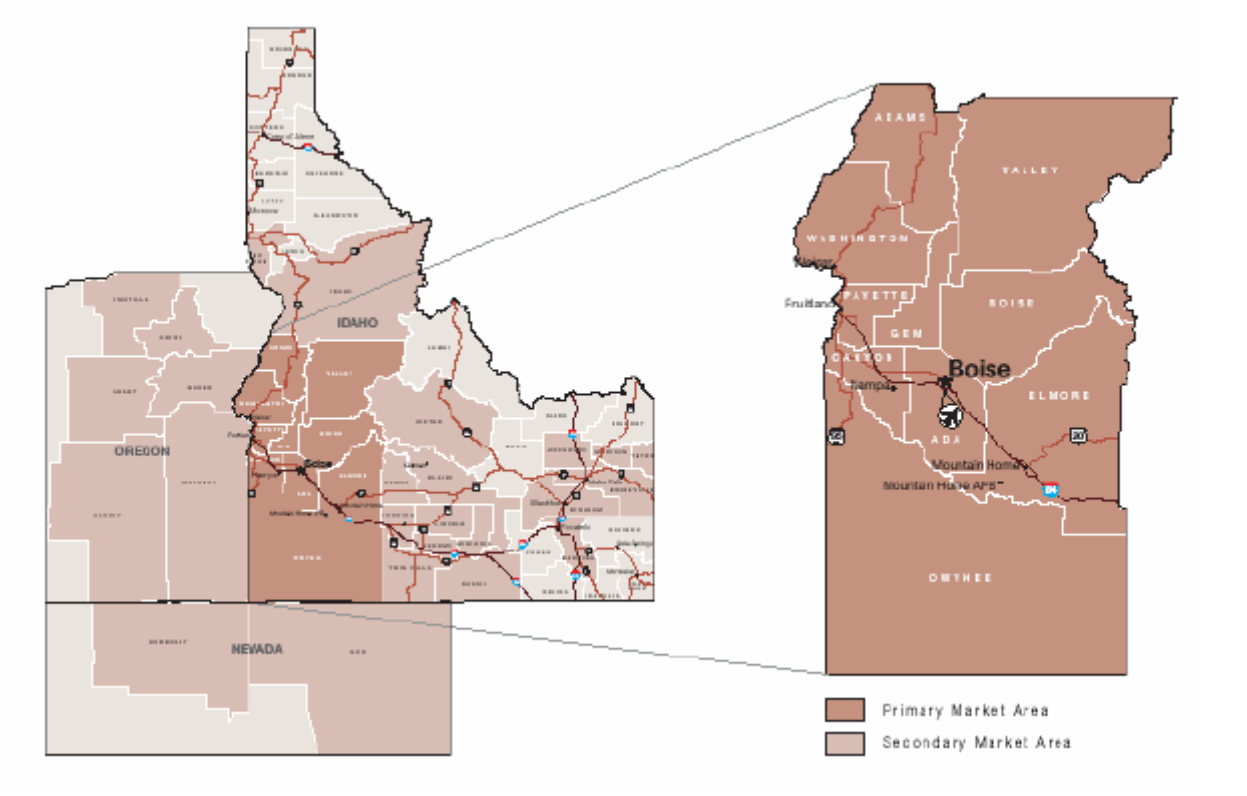
[33] Doherty and Associates, Inc., *Utility Study for the I-84 Orchard Street IC to Gowen Road IC Corridor Study*, 2004.

[34] Interview with Airport staff, February 27, 2008.

[35] Idaho counties within the Airport market area are identified in the 2003 Air Passenger Study. Counties in Oregon and Nevada included in the market area have been determined by the City of Boise, Department of Aviation.

Exhibit II-12, ten counties comprise the primary market area: Ada, Adams, Boise, Canyon, Elmore, Gem, Owyhee, Payette, Valley, and Washington.

Exhibit II-12
Airport Market Area



Source: 2003 Idaho Air Passenger Study, City of Boise, Airport Department.
Prepared by: Ricondo & Associates, Inc., April 2008.

The economic indicators included in this analysis are population, employment and industry, per capita personal income, per capita effective buying income (also known as disposable income), economic development, and tourism tax. The historical and forecast data used in this report for population, employment, industry, and per capita personal income were developed and compiled by Idaho Power. Recent forecasts developed by Idaho Power have been accurate within 3 to 5 percent and are also used by other local agencies such as the Community Planning Association of Southwest Idaho. Each economic category is summarized in the following sections.

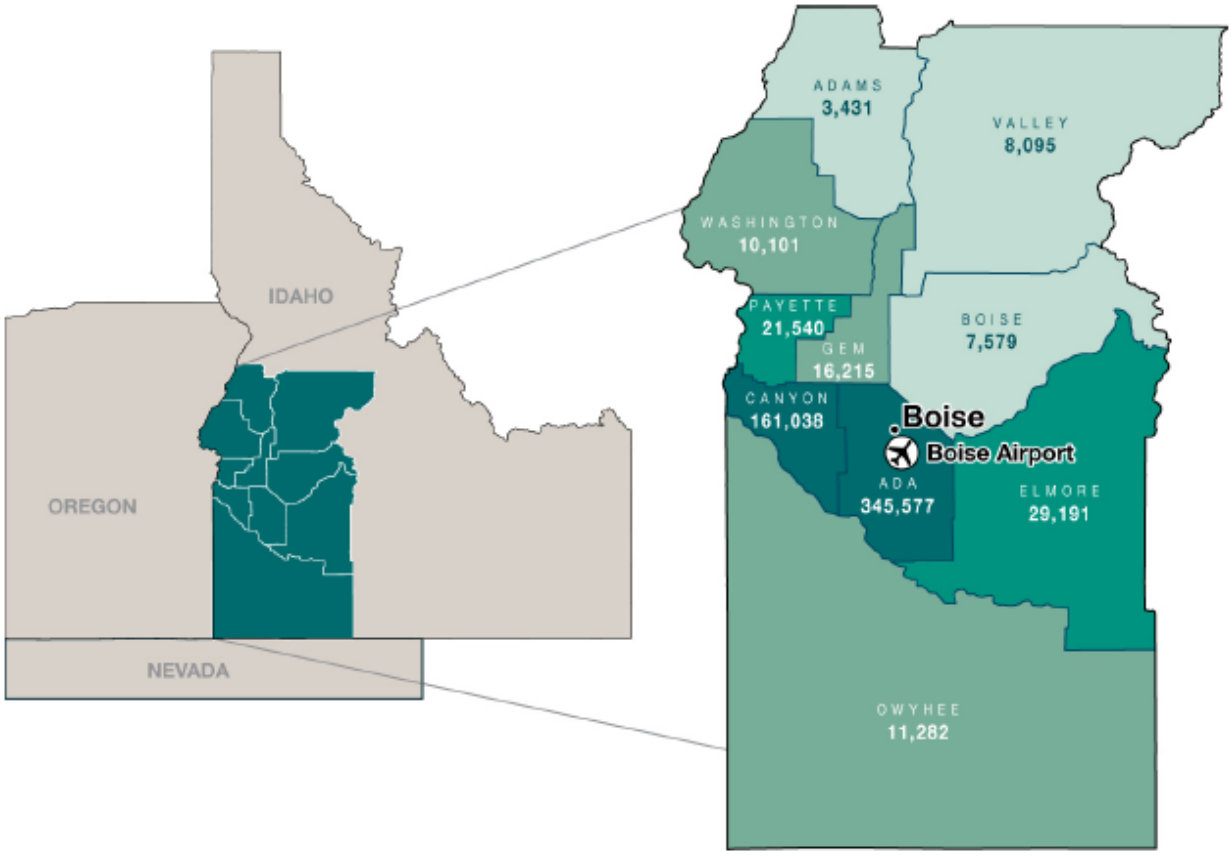
2.5.1 Population

According to statistics provided by Idaho Power, population in the Airport primary market area totaled 614,049 people in 2005. Populations for the individual counties in the primary market area in 2005 are shown on **Exhibit II-13**. As shown in **Table II-12**, population in the primary market area increased 33.3 percent between 1995 and 2005. This equals an average annual growth rate of 2.9 percent over this 10-year period. Counties with the largest growth since 1995 include Canyon (46.4

percent), Boise (46.2 percent), and Ada (34.5 percent). Adams County was the only county with a decrease in population (-6.7 percent) during this period.

Exhibit II-13

2005 Primary Market Area Population



Source: Idaho Power, 2005.
Prepared by: Ricondo & Associates, Inc., April 2008.

As shown in **Table II-13**, population for the primary market area is projected to increase from 614,049 in 2005 to 1,023,460 in 2030, which represents an increase of 66.7 percent. This equates an average annual growth rate of 2.1 percent between 1995 and 2030. According to Idaho Power estimates, the strongest annual percentage of population growth in the primary market area between 2005 and 2030 is projected for Valley County (87.7 percent). In addition, Ada, Canyon, and Boise counties—the counties that have experienced the highest growth rates since 1995—are also projected to experience strong annual growth in population during this same period (79.7, 56.8, and 53.7 percent, respectively).

Table II-12

Population Changes (1995-2005) – Primary Market Area

County	1995	2000	2005	1995-2005 % Change	Average Annual % Change 1995-2005
Ada	256,860	303,043	345,577	34.5%	3.0%
Adams	3,676	3,467	3,431	-6.7%	-0.7%
Boise	5,184	6,746	7,579	46.2%	3.9%
Canyon	109,976	133,085	161,038	46.4%	3.9%
Elmore	25,052	29,087	29,191	16.5%	1.5%
Gem	13,794	15,217	16,215	17.6%	1.6%
Owyhee	9,568	10,691	11,282	17.9%	1.7%
Payette	19,237	20,634	21,540	12.0%	1.1%
Valley	7,697	7,642	8,095	5.2%	0.5%
Washington	9,455	9,974	10,101	6.8%	0.7%
Total market area	460,499	539,586	614,049	33.3%	2.9%

Source: Idaho Power, 2005.
Prepared by: Ricondo & Associates, Inc., April 2008.

Table II-13

Population Forecast (2005-2030) – Primary Market Area

County	2005	2010	2020	2030	2005-2030 % Change	Average Annual % Change 2005-2030
Ada	345,577	392,118	495,347	620,998	79.7%	2.4%
Adams	3,431	3,517	3,754	3,987	16.2%	0.6%
Boise	7,579	8,200	9,729	11,645	53.7%	1.7%
Canyon	161,038	178,498	214,297	252,563	56.8%	1.8%
Elmore	29,191	31,096	35,097	40,299	38.1%	1.3%
Gem	16,215	17,356	19,592	21,216	30.8%	1.1%
Owyhee	11,282	11,935	13,219	14,857	31.7%	1.1%
Payette	21,540	23,070	26,398	29,970	39.1%	1.3%
Valley	8,095	9,141	11,743	15,198	87.7%	2.6%
Washington	10,101	10,650	11,684	12,726	26.0%	0.9%
Total market area	614,049	685,581	840,860	1,023,459	66.7%	2.1%

Source: Idaho Power, 2005.
Prepared by: Ricondo & Associates, April 2008.

2.5.2 Employment and Industry

2.5.2.1 Labor Force

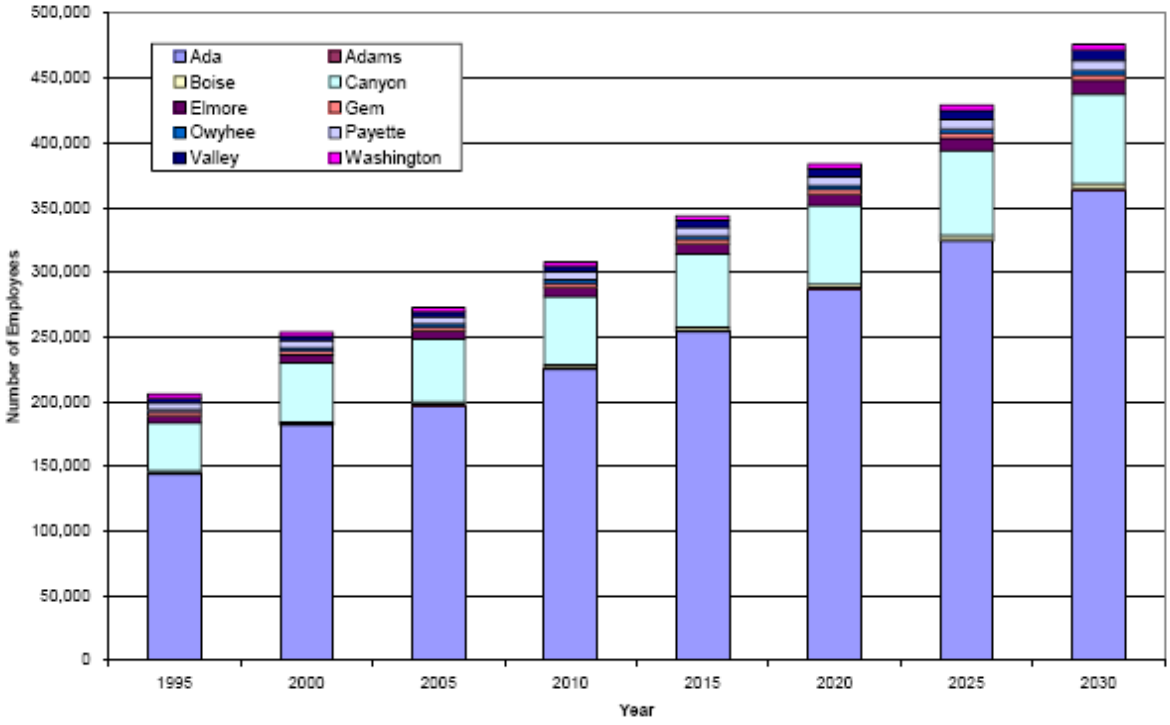
Total nonagricultural employment for the primary market area increased from 205,900 workers in 1995 to 272,466 workers in 2005. This increase represents an average annual growth rate of 2.8 percent. With the exception of Washington County, each of the counties in the primary market area experienced positive growth in employment between 1995 and 2005, with the highest growth

occurring in Ada and Canyon counties (an average annual growth of 3.2 and 2.7 percent, respectively). Employment in Washington County decreased slightly from 3,128 workers in 1995 to 3,079 workers in 2005. This decrease represents an average annual change of -0.2 percent.

Employment projections for the primary market area through 2030 indicate that the largest increase in the actual number of workers will occur in Ada and Canyon counties, which will add another 385,930 and 49,646 workers, respectively. This growth equates to an average annual growth of 2.4 percent for Ada County and 1.4 percent for Canyon County. The largest growth trend for the job market will come from Boise and Valley counties, which are projected to grow at average rates of 3.2 and 3.0 percent, respectively. **Exhibit II-14** presents historical and projected employment totals for the primary market area.

Exhibit II-14

Total Employment (2005-2030) – Primary Market Area



Source: Idaho Power, 2005.
Prepared by: Ricondo & Associates, Inc., April 2008.

2.5.2.2 Industry

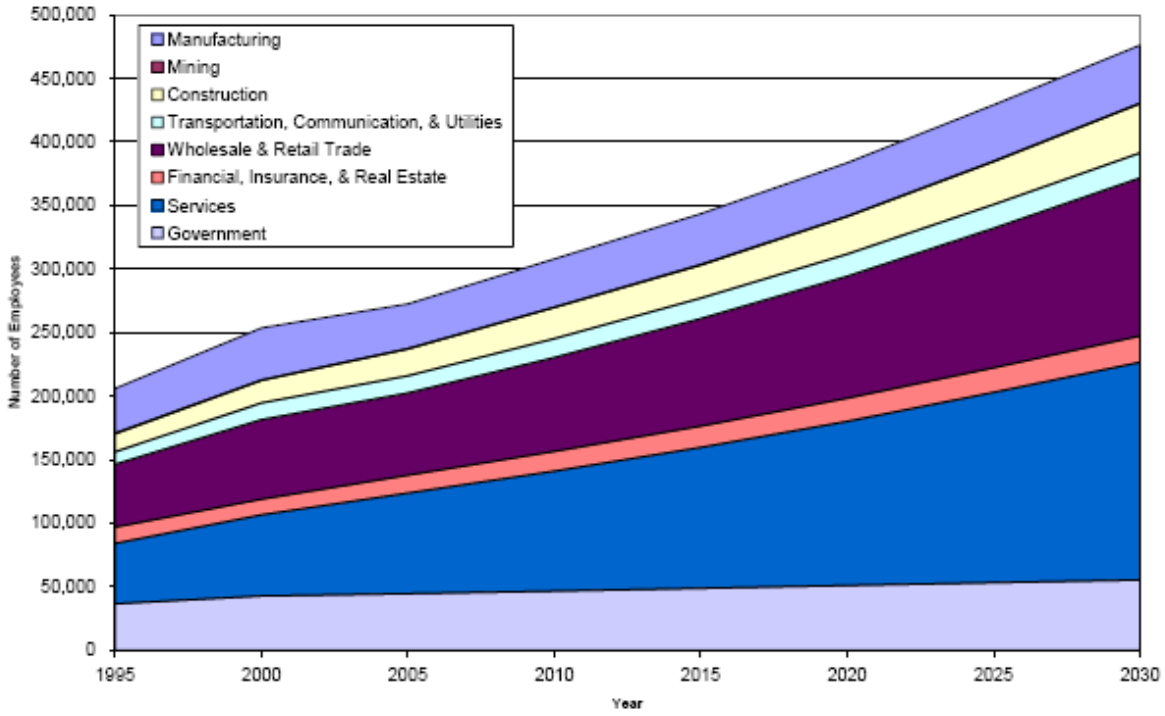
In 2005, the largest employment sector for the primary market area was the Services sector, with 78,959 workers. The Services sector surpassed the Wholesale and Retail Trade sector in 1997 as the largest employment sector. It continues to grow faster than all other sectors in the primary market area with an average annual growth rate of 5.2 percent. Although the Wholesale and Retail Trade sector is still the second largest employment sector in the primary market area with 64,547 workers, the Construction sector is the second fastest growing sector with an average annual growth of 4.1

percent over the past 10 years. The Mining sector was the only sector in the primary market area that experienced a decline in employment with an average annual change of -7.4 percent.

As shown in **Exhibit II-15**, the Services sector will continue to be the largest and fastest growing employment sector in the primary market area over the next 25 years. The number of workers in the Services sector is expected to increase by 92,379 workers for a total of 171,338 workers by 2030. This increase represents an average annual growth rate of 3.1 percent during this period. The smallest employment sector, Mining, is projected to continue its decline in the primary market area with an average annual change of -0.2 percent through 2030.

Exhibit II-15

Total Employment by Sector (1995-2030) – Primary Market Area



Source: Idaho Power, 2005.
Prepared by: Ricondo & Associates, Inc., April 2008.

2.5.3 Per Capita Personal Income

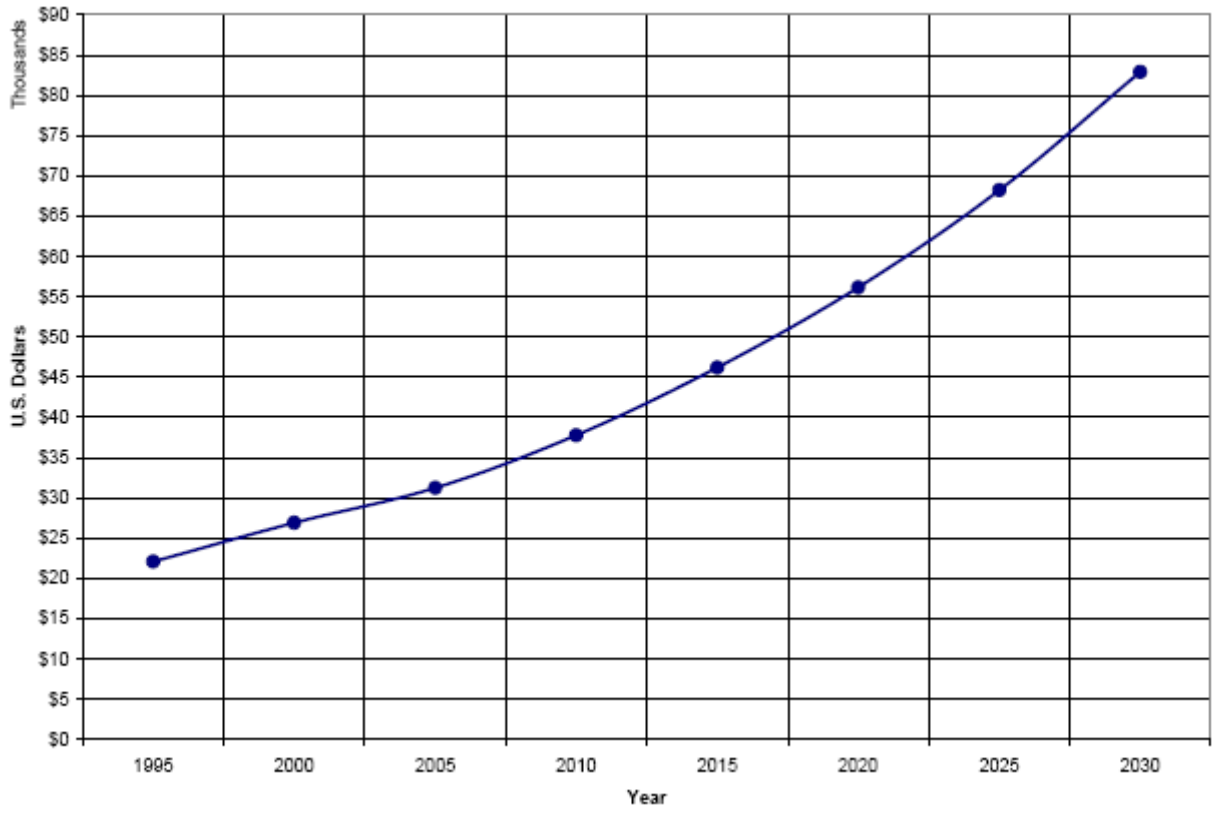
The relative wealth of an area gives a good indication of economic strength, which relates to a comparatively greater demand in air travel than an area of similar size with a weaker economy. The economic strength of the primary market area, as gauged by the per capita personal income (PCPI), compares favorably with that of the State of Idaho (Idaho) and the nation. Between 1995 and 2005, the average annual percentage growth rate for the primary market area was 3.5 percent, while Idaho[36] and the nation[37] were both at 3.9 percent. As shown on **Exhibit II-16**, the PCPI for the primary market area grew from $22,075 in 1995 to $31,231 in 2005. The PCPI for the primary market area is

[36] Idaho Power, 2005.
[37] U.S. Department of Commerce, Bureau of Economic Analysis, 2005.

projected to increase to $82,900 by 2030, which represents an average annual growth rate of 4.0 percent between 2005 and 2030.

Exhibit II-16

Average Annual Per Capita Personal Income (1995-2030) – Primary Market Area

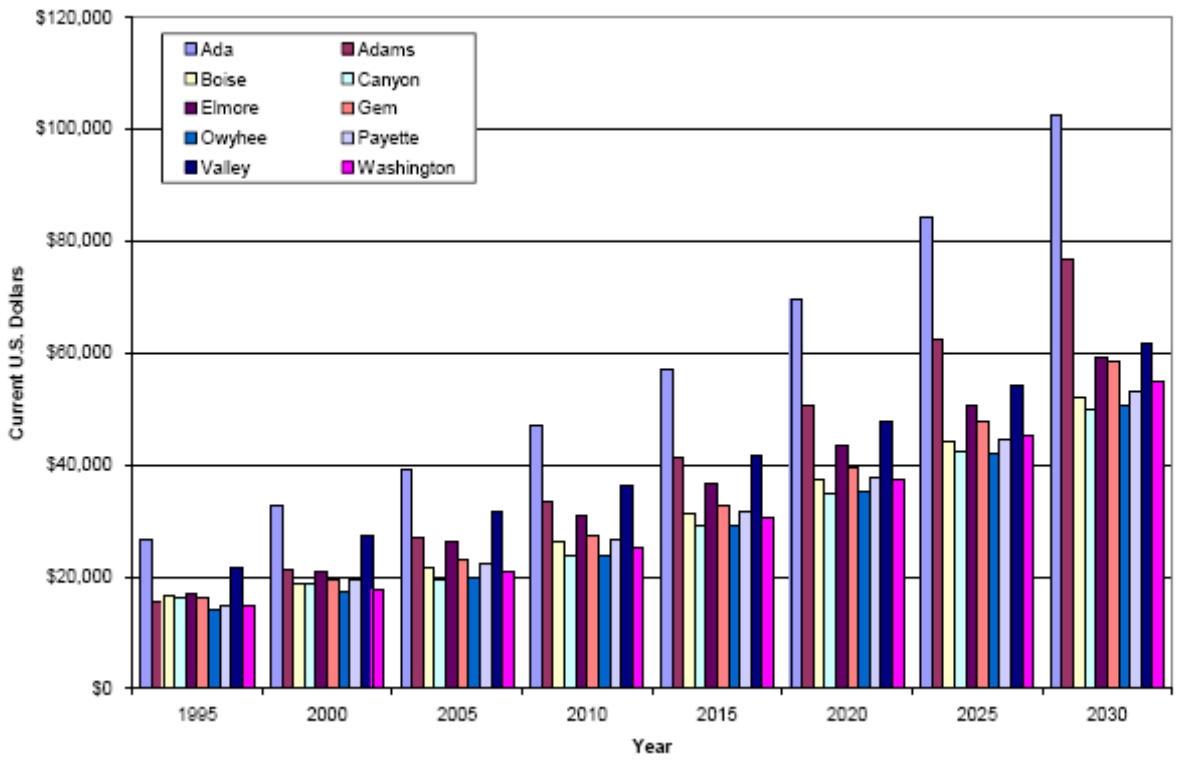


Source: Idaho Power, 2005.
Prepared by: Ricondo & Associates, Inc., April 2008.

Exhibit II-17 depicts the PCPI of the individual counties of the primary market area, as well as the annual growth trends since 1995. Ada County continues to have the highest PCPI with $26,748 in 1995 and $38,955 in 2005. The counties in the market area with the lowest PCPI include Owyhee County with $14,124 in 1995 and Canyon County with $19,532 in 2005. The largest percentage growth in PCPI was in Adams County, which grew from $15,589 in 1995 to $27,075 in 2005. This increase represents a total growth of 73.7 percent, or 5.7 percent annually. The smallest growth was recorded in Owyhee County, which increased from $14,124 in 1995 to $19,705 in 2005. This represents a total growth of 39.5 percent, or 3.4 percent annually.

Exhibit II-17

Per Capita Personal Income (1995-2030) – Primary Market Area



Source: Idaho Power, 2005.
Prepared by: Ricondo & Associates, Inc., April 2008.

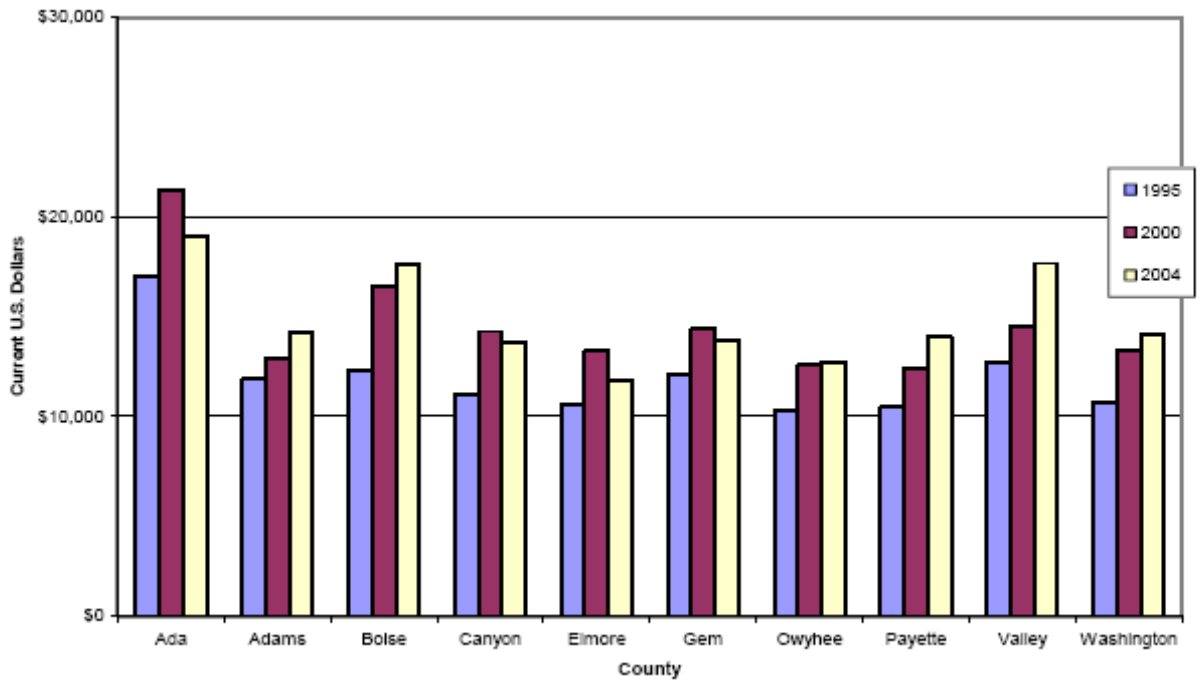
Future projections indicate that Ada County will have the highest PCPI in 2030 at $102,596, while Canyon County will have the lowest at $50,040. The largest percentage growth of PCPI is expected to occur in Adams County with a total growth of 182.8 percent, or 4.2 percent annually over the next 25 years. The smallest percentage growth is projected in Valley County with a total growth of 95.5 percent, or 2.7 percent annually.

2.5.4 Per Capita Effective Buying Income

Another key indicator of economic strength of a given area is the per capita effective buying income (EBI). EBI is defined as income less personal tax and non-tax payments and is often referred to as "disposable" or "after-tax" income. The average EBI for the primary market area grew modestly from $14,408 in 1995 to $16,760 in 2004. This increase represents an average annual growth rate of 1.7 percent. As shown on **Exhibit II-18**, the largest EBI growth for the primary market area occurred in Boise County, which grew from $12,347 in 1995 to $17,632 in 2004, or 4.0 percent annually. The smallest growth occurred in Ada and Elmore counties. Ada County increased from $17,036 in 1995 to $19,073 in 2004, or 1.3 percent annually. Elmore County increased from $10,617 in 1995 to $11,772 in 2004, or 1.2 percent annually. EBI projections are not available for all counties.

Exhibit II-18

Per Capita Effective Buying Income (1995-2004) – Primary Market Area



Source: Sales & Marketing Management, 1996-2005.
Prepared by: Ricondo & Associates, Inc., April 2008.

2.5.5 Economic Development

2.5.5.1 Building/Construction Permits

The number of building/construction permits issued from a municipality is a good indicator of economic development. From 1996 to 2005, the City of Boise approved a total of 157,985 building/construction permits. By far, the largest number of permits issued was for 127,668 Utilities projects including electrical, plumbing, heating, and cooling projects of all sizes. The next largest group of permits issued between 1996 and 2005 was 10,417 permits for Residential Upgrades and 10,369 for New Residential Dwellings. The remaining permits issued by the City of Boise are shown in **Table II-14**. The Demolition category experienced significant growth in the number of permits issued between 1996 and 2005, which includes both commercial and residential units.

Table II-14

Building/Construction Permits Issued (1996-2005) – City of Boise

Building/Construction Type	1996	2000	2005	Total Permits Issued 1996-2005	Average Annual % Change 1996-2005
New Residential Dwellings	1,046	1,129	1,111	10,369	0.7%
New Commercial Buildings	66	67	78	882	1.9%
Commercial Upgrades	657	846	705	7,141	0.8%
Residential Upgrades	1,090	1,027	939	10,417	-1.6%
Utilities	11,646	13,850	13,548	127,668	1.7%
Demolition	28	43	120	567	17.6%
Religious	20	13	20	250	0.0%
Governmental	38	26	20	290	-6.9%
Educational	33	44	23	401	-3.9%
Total permits	14,624	17,045	16,564	157,985	1.4%

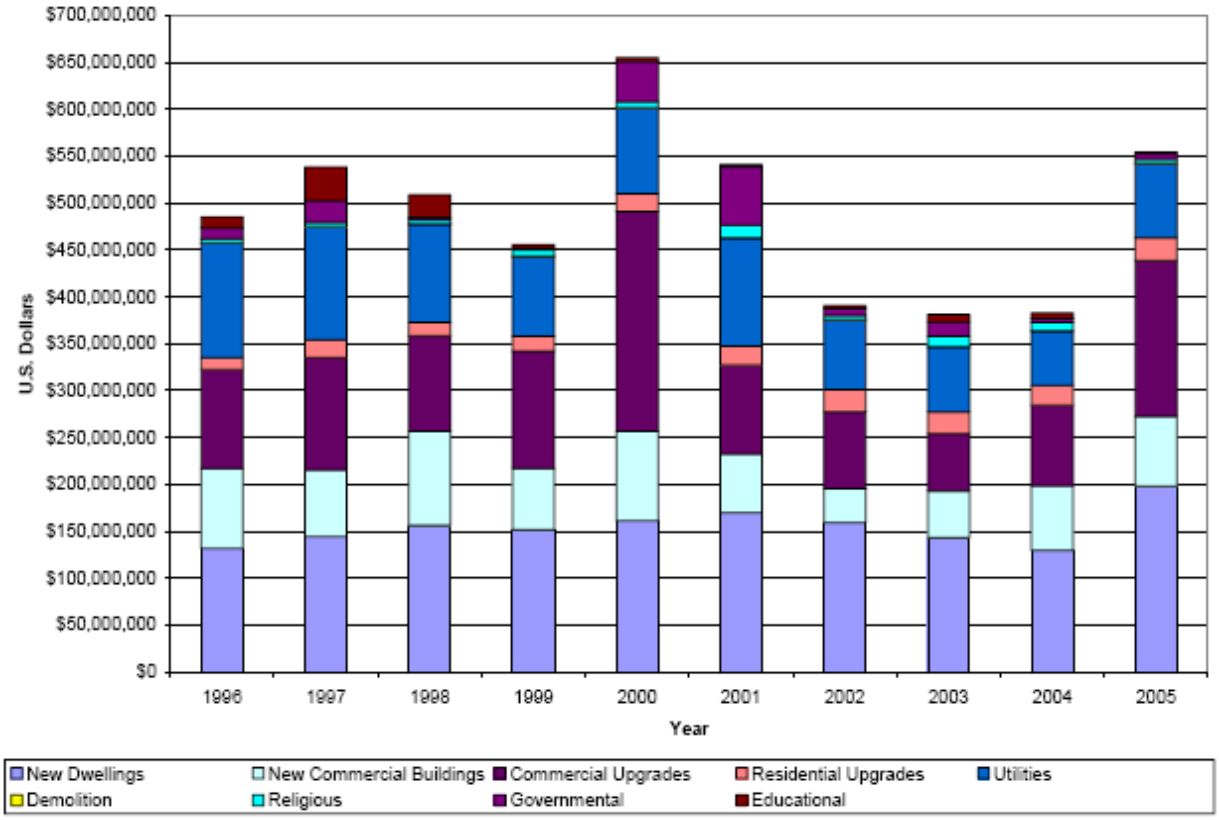
Source: City of Boise, Idaho, 2006.
Prepared by: Ricondo & Associates, April 2008.

2.5.5.2 Valuation of Permits

From 1996 to 2005, the City of Boise approved construction permits with a total value of over $4.8 billion. During this period, the economic growth of the City of Boise followed national trends. The year of strongest economic growth occurred in 2000 with more than $655 million in approved construction projects. The lowest year of growth occurred in 2003 with just over $381 million in approved construction projects. Although the 10 years between 1996 and 2005 averaged $489 million in annual construction, the value of construction grew from $485 million in 1995 to $554 million in 2005—an average annual growth rate of only 1.5 percent. **Exhibit II-19** shows the valuation of all building/construction permits between 1996 and 2005.

Exhibit II-19

Valuation of Permits (1996-2005) – City of Boise



Source: City of Boise, Idaho, 2006.
Prepared by: Ricondo & Associates, Inc., April 2008.

2.5.6 Tourism Tax

Tourism in the primary market area is measured by the State Tax Commission through travel/lodging and convention revenues. As shown in **Table II-15**, the taxable travel and convention sales for the primary market area grew from $61,276,932 in 1995 to $112,542,775 in 2005. This increase represents an 83.7 percent increase over 10 years. The counties that experienced the strongest growth in tourism tax revenue were Valley (100.2 percent), Canyon (92.6 percent), and Ada (85.4 percent) counties. With the exception of Owyhee County, each of the counties in the primary market area experienced positive growth in tourism tax revenue between 1995 and 2005. Tourism tax revenue in Owyhee County decreased at -17.6 percent during this same period. Future tourism tax revenue projections for the primary market area are not available.

Table II-15

Tourism Tax Revenues (1995-2005) – Primary Market Area

County	1995	2000	2005	1995-2005 % Change	Average Annual % Change 1995-2005
Ada	$47,130,258	$65,822,289	87,361,299	85.4%	6.4%
Adams	291,011	377,096	480,459	65.1%	5.1%
Boise	549,216	819,377	562,658	2.4%	0.2%
Canyon	5,176,373	7,090,076	9,968,291	92.6%	6.8%
Elmore	2,362,556	2,586,727	3,256,275	37.8%	3.3%
Gem	142,815	182,760	229,085	60.4%	4.8%
Owyhee	98,245	81,862	80,911	-17.6%	-1.9%
Payette	79,429	80,942	91,363	15.0%	1.4%
Valley	5,022,641	5,870,323	10,056,032	100.2%	7.2%
Washington	424,388	345,767	456,402	7.5%	0.7%
Total market area	$61,276,932	$83,257,219	$112,542,775	83.7%	6.3%

Source: Idaho State Tax Commission, 1995-2005.
Prepared by: Ricondo & Associates, April 2008.

2.6 Regional Planning and Development

Land development policies can influence the characteristics of the Airport and local region. This section identifies the political entities that have jurisdiction over land use and development in the vicinity of the Airport, and describes the existing land use and zoning in the region.

2.6.1 Political Jurisdictions

2.6.1.1 City and County Jurisdictions

The Airport lies at the southern edge of the City of Boise in Ada County. The City of Boise extends north and west of the Airport, while unincorporated Ada County surrounds the remaining area. In the State of Idaho, counties and municipalities each have individual control to amend their comprehensive plans and municipal zoning ordinances. Both the City of Boise and Ada County have developed comprehensive plans to manage development within their jurisdictions.

2.6.1.2 Metropolitan Planning Organization

The federal government requires the formation of a Metropolitan Planning Organization (MPO) when an urban area reaches 50,000 people. The MPO for the Greater Boise area is the Community Planning Association of Southwest Idaho (COMPASS). COMPASS is an association of local governments working together to plan for the future of the region, which includes northern Ada County and Canyon County.

COMPASS has served as the MPO for the greater Boise area since 1977 and for Canyon County (Nampa area) since early 2003. Northern Ada County became a "Transportation Management Area" when the population reached 200,000. This designation includes additional requirements for COMPASS to satisfy federal regulations, but also entitles the region to federal funds earmarked for large urban areas.

2.6.1.3 Neighborhood Associations

There are 36 registered neighborhood associations in the City of Boise. The highest concentration of these civic groups is north of the Airport. In association with the Boise City Comprehensive Plan, each neighborhood association develops a Neighborhood Plan that serves as the long-term comprehensive policy guide for the social, environmental, and economic development of the neighborhood. The three neighborhood associations adjacent to the Airport are Hillcrest, Sunrise Rim, and Southeast Boise.

2.6.2 Land Use and Zoning

The City of Boise Comprehensive Plan identifies Airport Influence Areas (AIA) based on noise levels within the respective areas and establishes policies to protect the Airport from encroachment of incompatible uses.[38] Compatible land uses include commercial, industrial, office, grazing, agriculture, mining, and low-intensity recreational use. The Ada County Comprehensive Plan has adopted the same AIA and policies as the City of Boise plan and coordinates with the City of Boise to ensure consistent city and county development regulations in the AIA.[39] Planned land uses within the AIA are shown on **Exhibit II-20**.

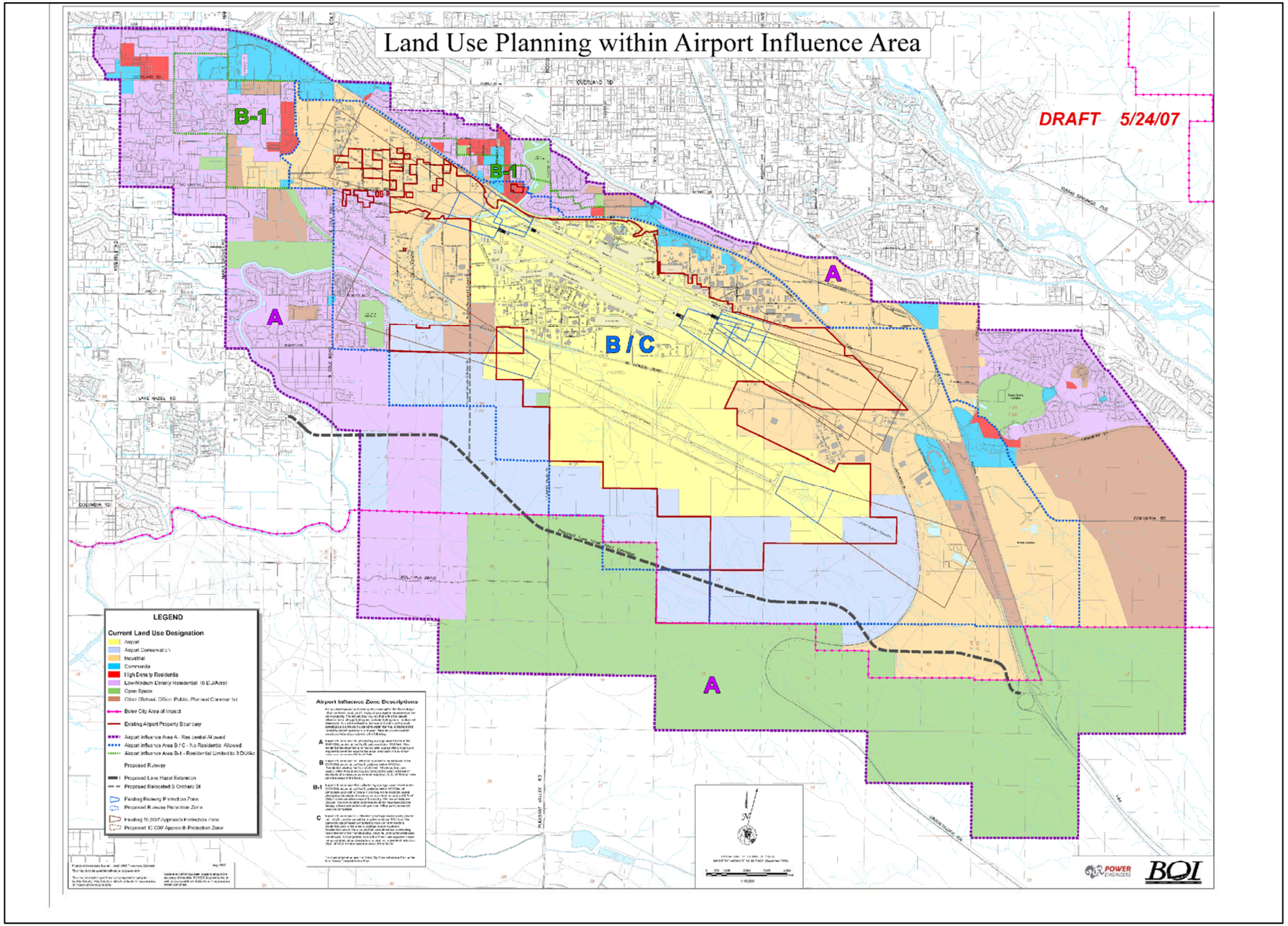
Existing land use in the vicinity of the Airport was examined in detail in the 2004 FAR Part 150 Study Update. While land uses have changed somewhat in the four years since the study was completed, **Exhibit II-21** presents a figure from that study depicting existing and potential development areas, and the projected year 2009 Day-Night Average Sound Level (DNL) noise exposure contours.

As shown on Exhibit II-21, the area north of the Airport is fully developed and contains residential housing and commercial businesses. The area east of the Airport is partially developed and is used primarily for industrial purposes. The area to the south of the Airport is sparsely developed rangeland/agricultural land with some industrial development, and is largely classified for airport conservation. The area west of the Airport is partially developed and includes industrial development and open space.

The Part 150 Study recommended measures to ensure long-term compatibility of the Airport with the surrounding area and was subsequently approved in a Record of Approval by the FAA on February 23, 2006. The City of Boise is currently implementing several recommendations of the study.

Zoning in the vicinity of the Airport was identified using the City of Boise interactive mapping system.[40] The Airport and the area north lie within the City of Boise and have been zoned by the City, while the areas to the east, south, and west contain areas zoned by both the City of Boise and Ada County. The Airport itself is zoned for commercial, industrial, and open space. The area north of the Airport is zoned for commercial, limited office, light industrial, and residential. The area south of the Airport is primarily zoned for industrial, rural preservation, and open lands. Areas adjacent to the Airport to the west are zoned for Airport industrial usage and open lands, with small residential districts interspersed. The area east of the Airport is zoned for industrial and as open lands.

[38] City of Boise, *Boise Comprehensive Plan*, adopted January 1997, updated in 2005.
[39] Ada County, *Ada County Comprehensive Plan*, adopted June 17, 1996, updated November 2007.
[40] City of Boise Interactive Mapping System, accessed March 21, 2008.



Legend

Current Land Use Designation

- Airport
- Airport Conservation
- Industrial
- Commercial
- High Density Residential
- Low-Medium Density Residential (6 DU/Acre)
- Open Space
- Other (School, Office, Public, Planned Community)
- Boise City Area of Impact
- Existing Airport Property Boundary
- Airport Influence Area A - Residential Allowed
- Airport Influence Area B / C - No Residential Allowed
- Airport Influence Area B-1 - Residential Limited to 3 DU/Ac
- Proposed Runway
- Proposed Lake Hazel Extension
- Proposed Relocated S Orchard St
- Existing Runway Protection Zone
- Proposed Runway Protection Zone
- Existing 10,000' Approach Protection Zone
- Proposed 10,000' Approach Protection Zone

Airport Influence Zone Descriptions

All new development and existing structures within the Boise Airport Influence Areas must grant the airport an avigation easement on the entire property. The airport also requires that within the airport influence area, all sign lighting and exterior lighting must be directed downward. No visible emissions that would interfere with aircraft operations are allowed. No standing water that would create a bird hazard to aircraft operations is allowed. New structures must be soundproofed and are subject to the following:

A Airport influence area A - affected by average sound levels in the 60-65 DNL, and/or aircraft traffic patterns below 1000 feet. New residential development and new schools located within Area A are required to meet the sound attenuation standards of a minimum noise level reduction (NLR) of 25db.

B Airport influence area B - affected by average sound levels in the 65-70 DNL and/or aircraft traffic patterns below 1000 feet. Residential development is not allowed. All compatible uses located within Area B are required to meet the sound attenuation standards of a minimum noise level reduction (NLR) of 30db in noise sensitive areas of the facility.

B-1 Airport influence area B-1 - affected by average sound levels in the 65-70 DNL and/or aircraft traffic patterns below 1000 feet. All compatible uses within Area B-1 are required to meet the sound attenuation standards of a minimum noise level reduction (NLR) of 30db in noise sensitive areas of the facility. No new schools are allowed. For new residential development the maximum allowed density is three residential units per acre. Office and commercial uses are compatible.

C Airport influence area C - affected by average sound levels greater than 70 DNL and/or aircraft traffic patterns below 1000 feet. The approved Airport Noise Compatibility Plan identifies existing residential uses in this area to undergo sound insulation. Residential uses in this area shall be considered non-conforming. Non-noise sensitive manufacturing, industrial, and commercial uses are allowed. All compatible uses within Area C are required to meet the sound attenuation standards of a minimum noise level reduction (NLR) of 30db in noise sensitive areas of the facility.

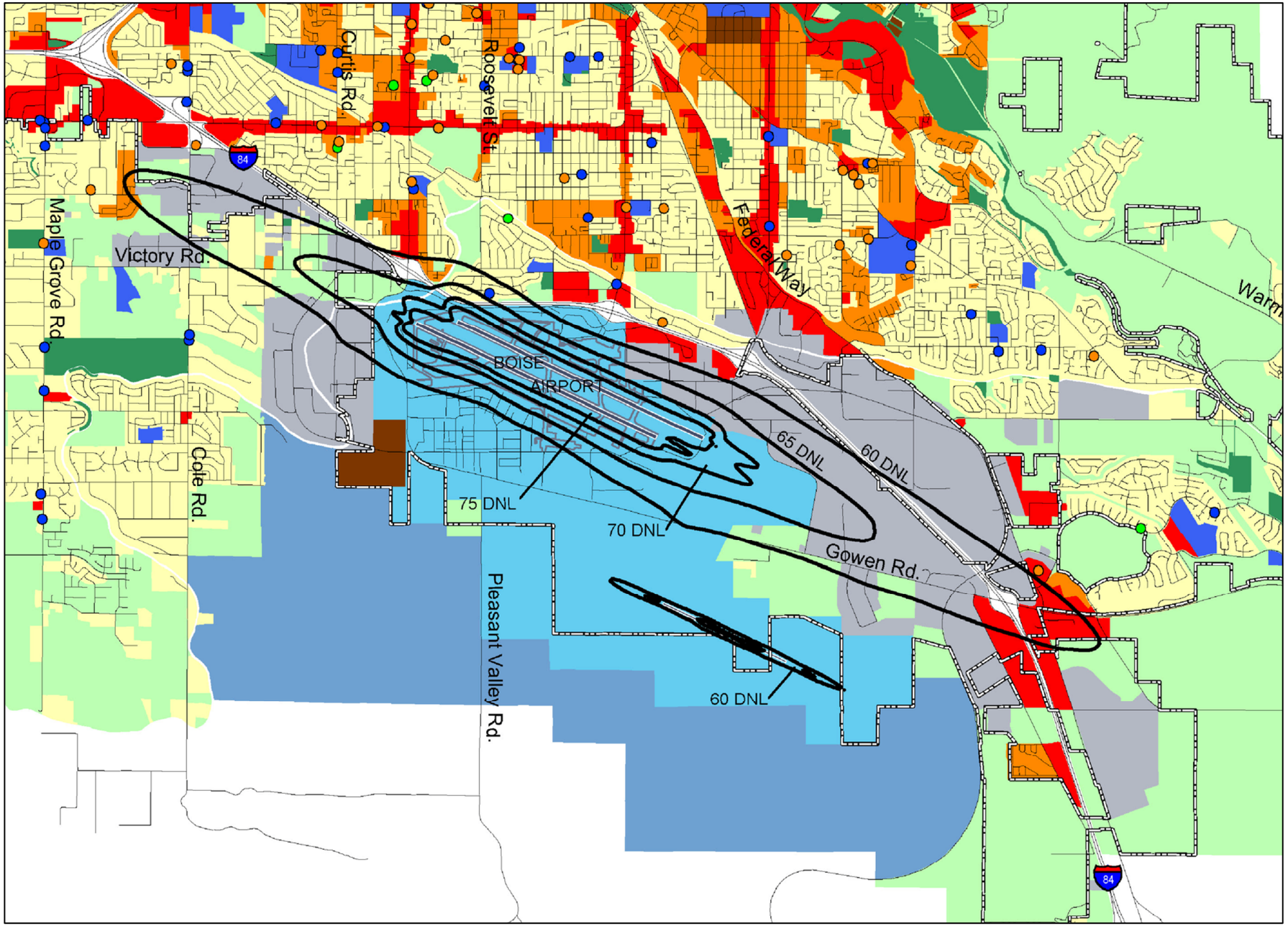
For more information see the Boise City Comprehensive Plan or the Ada County Comprehensive Plan.

Source: Power Engineers, May 2007.
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit II-20

0 Not to scale north

Planned Land Uses
Within the Airport Influence Area



Legend

2009 DNL noise exposure contour

DNL = Day-Night Average Sound Level - A metric used to describe the existing and predicted cumulative noise exposure for communities surrounding an airport. DNL is expressed in A-weighted decibels (dBA) and represents the average noise level over a 24-hour period. In calculating DNL, the average sound level for each hour during the nighttime period (10:00 p.m. to 5:59 a.m.) is increased by a 10-decibel weighting penalty.

Generalized existing land uses

- Low density residential
- High/medium density residential
- Commercial
- Industrial
- Mixed use
- Public facility/institutional
- Open space
- Airport property
- Airport conservation
- Park
- School

Noise sensitive facilities

- Pre-school/Kindergarten
- Nursing home
- Hospital
- Place of worship
- Cemetery

Other features

- Street centerline
- Boise city limits

Source: HNTB Corporation, CSHQA, Wyle Laboratories, and Synergy Consulting. Boise Airport 14 CFR Part 150 Study Update. July 2004 (approved February 23, 2006).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit II-21

0 4,000 feet north

2009 Noise Exposure Contours over Generalized Existing Land Uses

III. Aviation Activity Forecasts

This section presents a discussion of historical aviation activity trends at the Airport, and summarizes forecasts of aviation demand through the year 2030. The forecasts were developed for passenger enplanements, air carrier and commuter/air taxi airline operations, general aviation and based aircraft activity, air cargo volume, and aircraft fleet mix. They provide the basis for determining facility requirements and for performing the environmental, financial and other analyses necessary for preparation of the Airport Master Plan.

The forecasts were prepared in 2006, using 2005 as the base year, and approved by the FAA in March of 2007. The aviation activity projections presented in this section are based on assumptions about aviation activity in the Boise Market Area and other factors that may affect future aviation demand at the Airport including:

- National aviation industry trends
- Policy goals and objectives of the Airport
- Historical activity levels and trends in air service at the Airport, including comparisons of historical U.S. market shares
- Local socioeconomic and demographic trends, compared with State and national trends

The forecasts represent estimates of activity at the Airport and are typically shown as linear growth trends. However, actual activity levels may vary from the forecast due to unforeseen events such as the recent global economic downturn that has affected passenger, operations, and cargo totals at the Airport. These unforeseen events will drive actual passenger totals below and/or above the forecasted trend line. The forecast horizon represents a long-term projection that includes unforeseen events that occur throughout the forecast period.

In addition to the baseline forecasts, alternative forecast scenarios are presented in this section to account for potential changes in air service patterns that could emerge during the planning period. This range of forecasts is intended to be used to guide long-term Airport facility development decisions.

The remainder of this section is organized as follows:

- Historical Activity Levels and Trends
- Passenger Enplanement Projections
- Air Cargo Volume Projections
- Aircraft Operations and Fleet Mix Projections
- Peak Hour Activity Projections

3.1 Historical Aviation Activity and Trends

Historical aviation activity at the Airport and key factors affecting this activity are discussed below.

3.1.1 Airlines Serving the Airport

As shown in **Table III-1**, as of September 2006, seven air carrier airlines and three commuter/air taxi airlines provided the primary scheduled passenger service at the Airport. Additionally, a number of smaller operators provide air charter and other air taxi services from BOI[1].

[1] As of September 2006, the operators providing charter other air taxi services included Access Air, Conyan Aviation, Jackson JetCenter, McCall Aviation, Salmon Air, Turbo Air, and Western Aircraft.

Table III-1

Scheduled Airlines Serving the Airport[1/]

Air Carriers	Commuters/Air Taxi
Alaska	Big Sky
Delta	Horizon Air
Frontier	SkyWest
Northwest	
Southwest	
United	
US Airways	

Note:
1/ As of September 2006

Source: City of Boise, Aviation Department, 2006
Prepared by: Ricondo & Associates, Inc., 2006

3.1.2 Enplaned Passengers

The Federal Aviation Administration (FAA) classifies BOI as a small hub[2] facility based on its percentage of nationwide enplanements. The Airport ranked 77th nationwide in total passengers in the FAA's fiscal year of 2004.[3] **Table III-2** presents historical data on enplaned passengers at the Airport and the nation between 1976 and 2005. As shown, the number of enplaned passengers at the Airport increased from 392,278 in 1976 to 1,567,143 in 2005. The Airport's share of U.S. enplaned passengers increased from 0.166 to 0.214 percent during this same period.

Specific details concerning enplaned passengers at the Airport between 1976 and 2005 are discussed below:

- **1976 – 1992.** The number of enplaned passengers at the Airport increased from 392,278 in 1976 to 650,846 in 1992. This increase represents a compounded annual growth rate of 2.75 percent during this period, compared to 4.92 percent nationwide. This was a period of stable growth for BOI but it remained behind the annual passenger growth for the nation.
- **1992 - 2000.** The number of enplaned passengers at the Airport increased significantly from 794,032 in 1992 to 1,504,888 in 2000. This increase represents a compounded annual growth rate of 11.05 percent, far surpassing the nationwide growth rate of 4.11 percent. The strong growth during this period can be attributed to the beginning of low-cost service by Morris Air that merged with Southwest Airlines in 1994.
- **2000 - 2005.** Between 2000 and 2005, the aviation industry witnessed some of its most difficult times that began with a downturn of the economy during the late 1990s and was intensified by the terrorist attacks of September 11, 2001. During this period, passenger enplanements were down significantly around the nation. The enplanements at BOI fell from an all-time high (at that time) of 1,504,888 in 2000 to a low of 1,350,250 in 2003. However, annual passenger totals at BOI have rebounded and 2005 ended with an all-time high of 1,567,143.

2 A small hub airport is defined as an airport that enplanes less than 0.25 percent of total U.S. air passenger traffic.

3 FAA, *Terminal Area Forecast*, March 2006.

Table III-2

Historical Passenger Enplanements

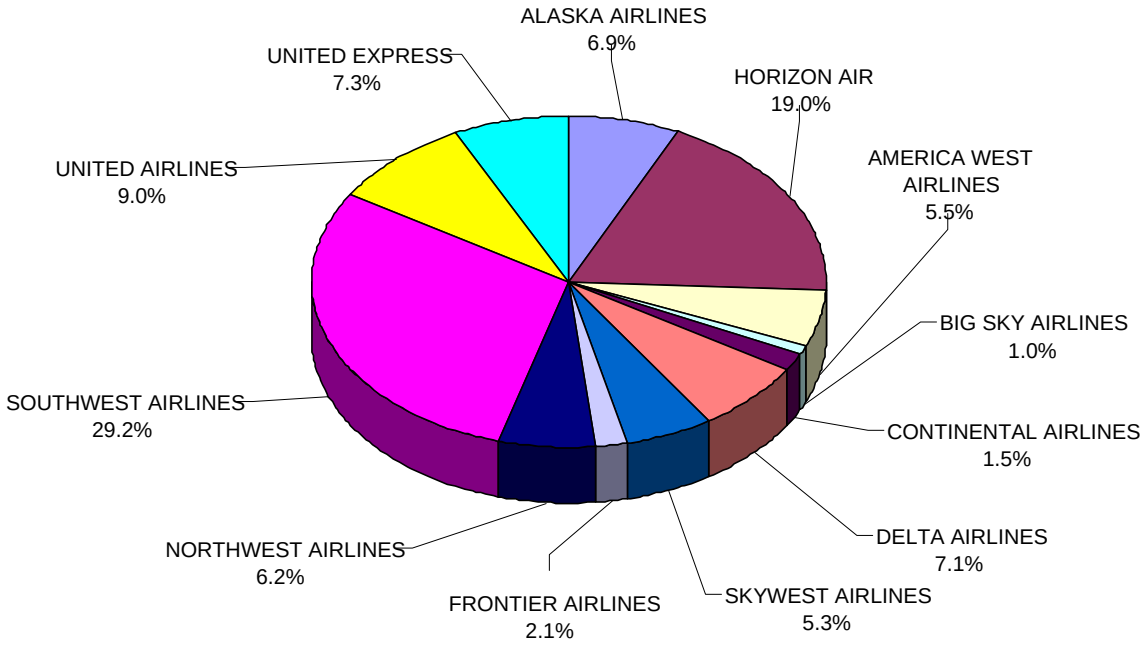
	Airport		United States		
Year	Total Enplanements	Annual Growth	Total Enplanements	Annual Growth	Airport Share of U.S. Enplanements
1976	392,278	n.a.	236,641,251	n.a.	0.166%
1977	413,641	5.2%	254,129,533	6.9%	0.163%
1978	474,105	12.8%	292,025,660	13.0%	0.162%
1979	499,749	5.1%	326,249,064	10.5%	0.153%
1980	458,615	-9.0%	309,873,558	-5.3%	0.148%
1981	412,407	-11.2%	291,823,728	-6.2%	0.141%
1982	440,377	6.4%	305,213,790	4.4%	0.144%
1983	453,138	2.8%	328,639,304	7.1%	0.138%
1984	460,174	1.5%	355,786,265	7.6%	0.129%
1985	480,174	4.2%	399,557,821	11.0%	0.120%
1986	578,556	17.0%	431,448,116	7.4%	0.134%
1987	573,935	-0.8%	470,284,152	8.3%	0.122%
1988	553,875	-3.6%	481,821,937	2.4%	0.115%
1989	595,149	6.9%	481,130,649	-0.1%	0.124%
1990	613,929	3.1%	495,391,280	2.9%	0.124%
1991	588,948	-4.2%	489,134,685	-1.3%	0.120%
1992	650,846	9.5%	510,571,810	4.2%	0.127%
1993	794,032	18.0%	520,009,557	1.8%	0.153%
1994	959,540	17.2%	562,026,688	7.5%	0.171%
1995	1,107,519	13.4%	582,014,082	3.4%	0.190%
1996	1,262,080	12.2%	613,609,364	5.1%	0.206%
1997	1,261,322	-0.1%	637,688,362	3.8%	0.198%
1998	1,297,457	2.8%	649,059,977	1.8%	0.200%
1999	1,421,851	8.7%	675,555,685	3.9%	0.210%
2000	1,504,888	5.5%	704,888,349	4.2%	0.213%
2001	1,422,850	-5.8%	693,179,287	-1.7%	0.205%
2002	1,386,639	-2.6%	627,684,013	-10.4%	0.221%
2003	1,350,250	-2.7%	643,260,786	2.4%	0.210%
2004	1,437,862	6.1%	688,313,141	6.5%	0.209%
2005	1,567,143	8.2%	731,770,095	5.9%	0.214%
Compounded Annual Growth Rate					
1976-1992		3.21%		4.92%	
1992-2000		11.05%		4.11%	
2000-2005		0.81%		0.75%	

Source: Boise Part 150 Study (1976-1989); Boise Master Plan 2001 (1990-1994); Boise Airport Activity Reports (1995-2005).
Prepared by: Ricondo & Associates, Inc., April 2006

Exhibit III-1 presents market share by airline grouping at the Airport in 2005. As shown, Southwest enplaned the largest share of passengers in 2005, accounting for 29.2 percent of the Airport's total. Horizon Air enplaned the second-highest share of passengers at the Airport in 2005, with 19.0 percent.

Exhibit III-1

2005 Enplaned Passenger Market Shares at the Airport by Airline[1/]



Note:
1/ Totals may not add due to rounding.

Source: City of Boise, Department of Aviation, 2006.
Prepared by: Ricondo & Associates, Inc., 2006

3.1.3 Monthly Enplaned Passengers

Table III-3 presents total numbers of enplaned passengers at the Airport by month from January 2000 through December 2005. As the table shows, between June of 2001 and December of 2004, passenger totals for each month were down over year 2000 activity levels except for December of 2002 and 2004. Since April of 2005, the Airport has experienced strong monthly growth numbers when compared to 2000 levels. This table indicates the Airport's recovery from the declining passenger levels of the early part of the decade.

Table III-3

Monthly Enplaned Passenger Comparisons at the Airport (2000-Present)

	Annual Enplanements						Percent Difference				
Month	2000	2001	2002	2003	2004	2005	(01 vs. 00)	(02 vs. 00)	(03 vs. 00)	(04 vs. 00)	(05 vs. 00)
January	110,161	114,172	100,149	108,908	101,873	113,677	3.6%	-9.1%	-1.1%	-7.5%	3.2%
February	113,626	111,060	97,177	101,919	101,518	109,447	-2.3%	-14.5%	-10.3%	-10.7%	-3.7%
March	131,718	135,637	115,303	115,717	119,150	130,672	3.0%	-12.5%	-12.1%	-9.5%	-0.8%
April	111,957	113,947	103,629	97,443	106,222	117,190	1.8%	-7.4%	-13.0%	-5.1%	4.7%
May	118,766	122,933	116,762	107,032	113,950	124,966	3.5%	-1.7%	-9.9%	-4.1%	5.2%
June	134,883	135,215	126,263	121,161	129,213	142,461	0.2%	-6.4%	-10.2%	-4.2%	5.6%
July	143,899	140,879	131,924	131,179	137,500	152,149	-2.1%	-8.3%	-8.8%	-4.4%	5.7%
August	147,127	144,569	136,060	127,387	136,938	152,025	-1.7%	-7.5%	-13.4%	-6.9%	3.3%
September	121,489	83,415	109,798	104,180	119,235	131,025	-31.3%	-9.6%	-14.2%	-1.9%	7.8%
October	122,837	106,120	113,679	111,300	120,494	130,278	-13.6%	-7.5%	-9.4%	-1.9%	6.1%
November	123,993	107,825	109,040	106,863	122,064	128,881	-13.0%	-12.1%	-13.8%	-1.6%	3.9%
December	124,432	107,078	126,855	117,161	129,705	134,372	-13.9%	1.9%	-5.8%	4.2%	8.0%
Annual Total	1,504,888	1,422,850	1,386,639	1,350,250	1,437,862	1,567,143	-5.5%	-7.9%	-10.3%	-4.5%	4.1%

Source: City of Boise, Department of Aviation, 2006
Prepared by: Ricondo & Associates, Inc., 2006

3.1.4 Aircraft Operations

Table III-4 presents historical operations at the Airport by category from 1976 through 2005. These are operational totals as recorded by the FAA air traffic control facility at BOI. The totals for the air carrier and commuter/air taxi categories include all passenger, air cargo, charter, and air taxi operations. These categories are recorded separately by the Airport. Specific points concerning trends in operational activity by these carriers are discussed below. These trends are broken down into the same three periods identified in Section 3.1.2, Enplaned Passengers; 1976 to 1992, 1992 to 2000, and 2000 to 2005.

- **Air Carriers.** Operations by the air carriers between 1976 and 1992 fluctuated up and down but basically did not change during this period. The period began with 18,760 operations in 1976 and ended with 18,613 in 1992. A significant increase in air carrier operations came between 1992 and 2000 when low-cost air carrier service was introduced at the Airport. During this period, air carrier operations increased from 18,613 in 1992 to 43,707 in 2000, a compounded annual growth rate of 11.26 percent. However, since that time, air carrier operations have declined. Between 2000 and 2005, the number of air carrier operations declined at an annual rate of -1.87 percent annually. This reduction has been caused for various reasons but primarily began with the terrorist events of September 11th, 2001, a subsequent nationwide economic downturn, and fundamental operational changes within the air carrier industry due to various factors such as high operating costs and stiff competition. Passenger activity is on its way back up but air carrier operators are becoming more efficient with their aircraft which normally results in higher load factors and reduced number of flights.

- **Commuters/Air Taxi.** Service from commuter and air taxi operations grew significantly between 1976 and 1992 primarily due to deregulation of the airline industry and subsequent agreements between air carrier and smaller commuter operators to feed the expanding air carrier hub operations. This resulted in commuter/air taxi operations at BOI growing from 6,338 operations in 1976 to 36,420 in 1992, a compounded annual growth rate of 11.55 percent. This rapid growth slowed and then began to decline as low-cost air carrier service began its growth at the Airport. Commuter/air taxi operations declined from 36,420 in 1992 to 27,576 in 2000. Since 2000, commuter/air taxi operations have grown to 31,390 in 2005. This increase is due to the fundamental changes by air carrier operators who have reduced larger aircraft service with smaller commuter and regional type aircraft.

- **General Aviation.** Over the past 25 years, general aviation operations have fluctuated up and down significantly at BOI. During this period, the highest recorded total for annual operations was 186,445 in 1978 with the lowest being 76,218 in 1988. Between 2000 and 2003, general aviation operations declined from 90,177 to 79,449. Since 2003, general aviation operations have increased and 2005 ended with 87,425. Over the past five years, general aviation operations at BOI have decreased at an average annual compound rate of -0.62 percent. For comparison purposes during the same period, nationwide general aviation operations have decreased at a compounded annual rate of -3.08 percent4. Economic and demographic factors have generally led to the decrease in general aviation operations across the country. Specifically, lower income levels, high insurance costs, and the increasing age of general aviation aircraft have slowed general aviation activity.

[4] Federal Aviation Administration, Aerospace Forecast, Fiscal Years 2006-2017, 2006

Table III-4

Historical Aircraft Operations

Year	Air Carrier	Commuter & Air Taxi	General Aviation	Military	Total Operations
1976	18,760	6,338	169,231	35,077	229,406
1977	19,130	5,180	178,187	29,333	231,830
1978	20,498	6,011	186,445	26,960	239,914
1979	20,478	18,470	178,743	22,057	239,748
1980	25,140	11,029	146,778	24,848	207,795
1981	26,309	7,231	138,118	24,349	196,007
1982	22,534	10,264	97,412	23,665	153,875
1983	19,287	15,841	90,632	24,299	150,059
1984	16,185	25,059	83,102	21,526	145,872
1985	15,211	30,365	81,791	21,446	148,813
1986	17,379	27,098	78,853	21,817	145,147
1987	14,452	30,856	80,621	20,390	146,319
1988	16,419	31,330	76,218	20,365	144,332
1989	18,018	35,121	84,010	22,733	159,882
1990	18,761	40,140	88,140	21,409	168,450
1991	18,058	35,069	80,592	19,027	152,746
1992	18,613	36,420	88,137	18,264	161,434
1993	21,255	31,982	81,028	20,901	155,166
1994	25,536	33,348	86,392	18,030	163,306
1995	31,509	32,218	83,995	18,777	166,499
1996	38,502	31,096	95,316	14,929	179,843
1997	38,913	24,470	104,826	21,324	189,533
1998	39,608	20,540	105,811	18,088	184,047
1999	40,812	22,154	101,745	15,444	180,155
2000	43,707	27,576	90,177	13,432	174,892
2001	42,998	27,713	81,833	11,846	164,390
2002	43,768	27,135	81,181	12,122	164,206
2003	41,094	32,017	79,449	10,764	163,324
2004	38,768	27,179	88,533	12,921	167,401
2005	39,765	31,390	87,425	13,317	173,054
Compounded Annual Growth Rate					
1976-1992	-0.05%	11.55%	-4.00%	-4.00%	-2.17%
1992-2000	11.26%	-3.42%	0.29%	-3.77%	1.01%
2000-2005	-1.87%	2.62%	-0.62%	-0.17%	-0.21%

Source: Federal Aviation Administration Terminal Area Forecast (1976-1999); Boise Airport Activity Reports (2000-2005)
Prepared by: Ricondo & Associates, Inc., 2006

- **Military.** The Airport has historically had a significant presence of military activity (both aviation and non-aviation). Gowen Field is a National Guard installation located on the south side of the airfield and is used by both the Air National Guard (ANG) and Army National Guard (ARNG) units of the State of Idaho. Gowen's military reservation consists of a 570-

acre parcel of land leased by the ANG from the City of Boise. The 124th Fighter Wing of the Idaho ANG is the host unit at Gowen Field. The Wing formerly operated fighter aircraft, but was recently given a new mission to train crews in the operation of ground-support aircraft that include the A-10s and C-130s. The Idaho ARNG contains armored, helicopter, and training units. The primary mission of the post is to provide training in combat-ready air defense artillery. Since 1976, military activity at the Airport has been reduced from a high of 35,077 operations in 1976 to a low of 10,764 in 2003. Since 2000, military activity at BOI has remained relatively stable and 2005 closed with a total of 13,317 operations.

3.2 Enplaned Passenger Forecasts

This section presents forecasts of total enplaned passengers at the Airport. The forecasts were prepared using local socioeconomic and demographic factors, the Airport's historical share of U.S. enplaned passengers, and anticipated trends in activity at the Airport. The factors and assumptions underlying the forecasts for the Airport are presented below, as follows:

- Market Share Analysis
- Regression Analyses
- Evaluation of Enplaned Passenger Forecasts

3.2.1 Market Share Analysis

The market share methodology included an examination of the Airport's historical and forecast share of total enplaned passengers as compared to the nation, the northwest region, and the State of Idaho. The market share methodology allows local, regional, and national factors to be reflected in the forecasts by showing an increase or decrease in the airport's share of the total passenger market. This type of approach is common to most master plans and facility planning studies undertaken at commercial service airports. Market share projections were based on three passenger growth trends scenarios; a one year trend (2004-2005), a five year trend (2000-2005), and a ten year trend (1995-2005). The selection of these time periods for analysis will typically capture periods of growth and decline in the economy and the aviation industry. The FAA's *Terminal Area Forecast, Fiscal Years 2005-2025*[5] is the source for passenger projections for the nation, the northwest region[6], and the State of Idaho. The FAA's projections reflect the way in which industry traffic, in general, is anticipated to grow during the next 20 years. This effort considers such factors as the nation's economic health, aviation industry trends, airline fuel and fare pricing trends, etc.

- **BOI and the U.S.**: The historical and forecast enplaned passengers using the Airport's market share of total U.S. passengers are shown in **Table III-5**. Similar to the total number of enplaned passengers at the Airport, the Airport's share of enplaned passengers for the entire U.S. has fluctuated up and down over the past 30 years. During this time, the Airport's lowest percent of total U.S. passenger was 0.115 percent in 1988 and a high of .221 percent in 2002. For 2005, enplaned passengers at BOI equaled 0.214 percent of the national total. The forecasts columns in Table III-5 identify the various market share growth scenarios (see previous paragraph) that are based on past growth trends that are projected into the future. The results of these projections identify three very different growth patterns. Of the three scenarios, the strongest growth pattern reflects the increase in the BOI/U.S. market share

[5] FAA Terminal Area Forecasts were calculated by the FAA through Federal Fiscal Year 2025. For the purpose of these analyses, the forecasts were extrapolated to 2030 using applicable growth rates.

[6] The FAA's Northwest Region includes airports in Idaho, Washington, Oregon, Utah, Colorado, Wyoming, and Montana.

between 2004 and 2005. If this rate-of-increase where to continue throughout the planning horizon, the enplaned passenger totals for the Airport would grow at a compounded annual increase of 5.54 percent and reach 6,031,678 in 2030. This growth would be significantly higher than the 2.95 percent increase projected for the nation. The next strongest market share growth trend occurred between 1995 and 2005. At a compounded annual increase of 4.17 percent, this growth trend would reach 4,351,693 in 2030. As expected, the market share trend with the least amount of growth occurred between the years 2000 and 2005. Even though passenger activity has increased significantly in the past couple of years, the difficult industry times experienced during the early part of this decade kept the average annual growth rate at 3.01 percent between 2000 and 2005. If this growth rate were to be maintained into the future, the enplanements at BOI would reach 3,289,411 in 2030. This scenario closely resembles the national growth projections.

- **BOI and the Northwest Region.:** The historical and forecast enplaned passengers using the Airport's market share of the northwest region are shown in **Table III-6**. Similar to the Airport's share of U.S. passengers, the Airport's share of passengers in the northwest region has fluctuated up and down over the past 30 years. During this time, the Airport's lowest market share was 1.48 percent in 1985 and a high of 2.67 percent in 2002. For 2005, enplaned passengers at BOI equaled 2.59 percent of the northwest regional total. Although the FAA's projections for passenger growth in the region are less than for the national average, all the scenarios under this market share category (BOI/NW Region) indicate that BOI would increase its market share during the planning period. This is a strong indication that passenger levels at BOI will likely grow faster than the region as a whole.

  As shown in Table III-6, the market share period of 2004 to 2005 is the strongest of the growth scenarios and would result in a compounded annual rate increase of 5.87 percent. This growth, which is much higher that the FAA projected regional growth, is also the highest of all the market share scenarios. At this aggressive rate, the Airport would reach 6,522,408 passengers in 2030. The growth trend for the period of 2000 to 2005 is also aggressive at 5.26 percent. This trend increases BOI enplanements to 5,642,154 by 2030. The ten year market share trend between 1995 and 2005 has a growth rate of 3.77 percent which increases the Airport's enplanements total to 3,950,306 in 2030. This rate is still well above the FAA's projected growth rate of 2.63 percent for northwest region.

- **BOI and the State of Idaho:** The historical and forecast enplaned passengers using the Airport's market share of the State of Idaho are shown in **Table III-7**. The Airport's share of Idaho's passenger total has grown steadily since 1976. This share has increased from 59.2 percent in 1976 to 81.8 percent in 2005. This steady growth has caused little difference in the one, five, and ten year trends in the market share between BOI and Idaho. As shown in Table III-7, the three growth scenarios range from 3.46 to 3.64 percent which result in enplanement totals between 3,664,968 and 3,833,229. These annual rates are all above the FAA's growth rate of 3.43 percent for the State of Idaho.

Table III-5

Enplaned Passenger Forecasts – Market Share Methodology – BOI/U.S

Year	Historical U.S. Enplanements[1/]	Annual U.S. Growth %	Historical BOI Enplanements[2/]	Annual BOI Growth %	Airport Share of U.S. Total	2004-2005 Ratio[3/]	Airport Share of U.S. Total	2000-2005 Ratio[4/]	Airport Share of U.S. Total	1995-2005 Ratio[5/]	Airport Share of U.S. Total
Historical											
1976	236,641,251	n.a.	392,278	n.a.	0.166%						
1977	254,129,533	6.9%	413,641	5.2%	0.163%						
1978	292,025,660	13.0%	474,105	12.8%	0.162%						
1979	326,249,064	10.5%	499,749	5.1%	0.153%						
1980	309,873,558	-5.3%	458,615	-9.0%	0.148%						
1981	291,823,728	-6.2%	412,407	-11.2%	0.141%						
1982	305,213,790	4.4%	440,377	6.4%	0.144%						
1983	328,639,304	7.1%	453,138	2.8%	0.138%						
1984	355,786,265	7.6%	460,174	1.5%	0.129%						
1985	399,557,821	11.0%	480,174	4.2%	0.120%						
1986	431,448,116	7.4%	578,556	17.0%	0.134%						
1987	470,284,152	8.3%	573,935	-0.8%	0.122%						
1988	481,821,937	2.4%	553,875	-3.6%	0.115%						
1989	481,130,649	-0.1%	595,149	6.9%	0.124%						
1990	495,391,280	2.9%	613,929	3.1%	0.124%						
1991	489,134,685	-1.3%	588,948	-4.2%	0.120%						
1992	510,571,810	4.2%	650,846	9.5%	0.127%						
1993	520,009,557	1.8%	794,032	18.0%	0.153%						
1994	562,026,688	7.5%	959,540	17.2%	0.171%						
1995	582,014,082	3.4%	1,107,519	13.4%	0.190%						
1996	613,609,364	5.1%	1,262,080	12.2%	0.206%						
1997	637,688,362	3.8%	1,261,322	-0.1%	0.198%						
1998	649,059,977	1.8%	1,297,457	2.8%	0.200%						
1999	675,555,685	3.9%	1,421,851	8.7%	0.210%						
2000	704,888,349	4.2%	1,504,888	5.5%	0.213%						
2001	693,179,287	-1.7%	1,422,850	-5.8%	0.205%						
2002	627,684,013	-10.4%	1,386,639	-2.6%	0.221%						
2003	643,260,786	2.4%	1,350,250	-2.7%	0.210%						
2004	688,313,141	6.5%	1,437,862	6.1%	0.209%						
2005	731,770,095	5.9%	1,567,143	8.2%	0.214%						
Forecast											
2006	740,624,706					**1,626,054**	0.220%	**1,587,092**	0.214%	**1,604,958**	0.217%
2007	769,399,245					**1,731,775**	0.225%	**1,649,779**	0.214%	**1,687,132**	0.219%
2008	793,823,527					**1,831,751**	0.231%	**1,703,209**	0.215%	**1,761,379**	0.222%
2009	818,683,186					**1,936,695**	0.237%	**1,757,640**	0.215%	**1,838,131**	0.225%
2010	844,241,432					**2,047,457**	0.243%	**1,813,639**	0.215%	**1,918,045**	0.227%
2011	869,119,369					**2,160,878**	0.249%	**1,868,244**	0.215%	**1,998,035**	0.230%
2012	894,702,400					**2,280,512**	0.255%	**1,924,433**	0.215%	**2,081,297**	0.233%
2013	921,151,014					**2,407,063**	0.261%	**1,982,554**	0.215%	**2,168,292**	0.235%
2014	948,472,374					**2,540,880**	0.268%	**2,042,626**	0.215%	**2,259,141**	0.238%
2015	976,428,569					**2,681,654**	0.275%	**2,104,140**	0.215%	**2,353,373**	0.241%
2016	1,005,038,912					**2,829,749**	0.282%	**2,167,141**	0.216%	**2,451,121**	0.244%
2017	1,034,572,456					**2,986,268**	0.289%	**2,232,211**	0.216%	**2,553,139**	0.247%
2018	1,065,022,147					**3,151,587**	0.296%	**2,299,339**	0.216%	**2,659,523**	0.250%
2019	1,096,429,213					**3,326,244**	0.303%	**2,368,617**	0.216%	**2,770,495**	0.253%
2020	1,128,914,877					**3,511,054**	0.311%	**2,440,313**	0.216%	**2,886,487**	0.256%
2021	1,162,300,499					**3,705,933**	0.319%	**2,514,043**	0.216%	**3,007,173**	0.259%
2022	1,196,754,478					**3,911,894**	0.327%	**2,590,177**	0.216%	**3,133,118**	0.262%
2023	1,232,266,477					**4,129,424**	0.335%	**2,668,696**	0.217%	**3,264,434**	0.265%
2024	1,268,909,344					**4,359,315**	0.344%	**2,749,762**	0.217%	**3,401,461**	0.268%
2025	1,306,718,987					**4,602,276**	0.352%	**2,833,457**	0.217%	**3,544,449**	0.271%
2026	1,345,413,702					**4,857,906**	0.361%	**2,919,176**	0.217%	**3,692,785**	0.274%
2027	1,385,280,630					**5,127,833**	0.370%	**3,007,546**	0.217%	**3,847,402**	0.278%
2028	1,426,356,197					**5,412,862**	0.379%	**3,098,650**	0.217%	**4,008,569**	0.281%
2029	1,468,677,993					**5,713,844**	0.389%	**3,192,575**	0.217%	**4,176,569**	0.284%
2030	1,512,284,810					**6,031,678**	0.399%	**3,289,411**	0.218%	**4,351,693**	0.288%
Compounded Annual Growth Rate: 2005-2030	**2.95%**					**5.54%**		**3.01%**		**4.17%**	

Notes:

1/ FAA, *Terminal Area Forecast, FY 2006-2025*, March 2006. Projections for 2026 to 2030 are extrapolated.

2/ BOI Part 150 Study (1976-1989); BOI Master Plan 2001 (1990-1994); BOI Airport Activity Reports (1995-2005).

3/ Based on the BOI/U.S. market share remaining constant at a rate of 2.23% (average growth years from 2004 to 2005.

4/ Based on the BOI/U.S. market share growing at a constant rate of 0.25% (average growth for the five years from 2000 to 2005).

5/ Based on the BOI/U.S. market share growing at a constant rate of 1.25% (average growth for the ten years from 1995 to 2005).

Sources: FAA, *Terminal Area Forecast, FY 2006-2025*, March 2006; BOI Part 150 Study (1976-1989); BOI Master Plan 2001 (1990-1994); and BOI Airport Activity Reports (1995-2005)
Prepared by: Ricondo & Associates, Inc., 2006.

Table III-6

Enplaned Passenger Forecasts – Market Share Methodology – BOI/Northwest Region

Year	Historical NW Region Enplanements[1/]	Annual NW Region Growth %	Historical BOI Enplanements[2/]	Annual BOI Growth %	Airport Share of NW Region	2004-2005 Ratio[3/]	Airport Share of NW Total	2000-2005 Ratio[4/]	Airport Share of NW Total	1995-2005 Ratio[5/]	Airport Share of NW Total
Historical											
1976	16,707,911	n.a.	392,278	n.a.	2.35%						
1977	18,670,283	10.5%	413,641	5.2%	2.22%						
1978	22,004,773	15.2%	474,105	12.8%	2.15%						
1979	23,868,729	7.8%	499,749	5.1%	2.09%						
1980	22,941,416	-4.0%	458,615	-9.0%	2.00%						
1981	22,205,473	-3.3%	412,407	-11.2%	1.86%						
1982	24,474,671	9.3%	440,377	6.4%	1.80%						
1983	26,638,634	8.1%	453,138	2.8%	1.70%						
1984	29,171,577	8.7%	460,174	1.5%	1.58%						
1985	32,358,304	9.8%	480,174	4.2%	1.48%						
1986	36,506,450	11.4%	578,556	17.0%	1.58%						
1987	37,309,611	2.2%	573,935	-0.8%	1.54%						
1988	36,598,585	-1.9%	553,875	-3.6%	1.51%						
1989	34,628,545	-5.7%	595,149	6.9%	1.72%						
1990	34,369,452	-0.8%	613,929	3.1%	1.79%						
1991	36,030,061	4.6%	588,948	-4.2%	1.63%						
1992	38,973,454	7.6%	650,846	9.5%	1.67%						
1993	42,020,428	7.3%	794,032	18.0%	1.89%						
1994	45,912,654	8.5%	959,540	17.2%	2.09%						
1995	47,746,048	3.8%	1,107,519	13.4%	2.32%						
1996	52,151,211	8.4%	1,262,080	12.2%	2.42%						
1997	53,943,236	3.3%	1,261,322	-0.1%	2.34%						
1998	54,053,132	0.2%	1,297,457	2.8%	2.40%						
1999	56,522,985	4.4%	1,421,851	8.7%	2.52%						
2000	57,090,075	1.0%	1,504,888	5.5%	2.64%						
2001	56,349,923	-1.3%	1,422,855	-5.8%	2.53%						
2002	51,984,769	-8.4%	1,386,639	-2.6%	2.67%						
2003	53,388,226	2.6%	1,350,250	-2.7%	2.53%						
2004	57,248,091	6.7%	1,437,862	6.1%	2.51%						
2005	60,483,288	5.3%	1,567,143	8.2%	2.59%						
Forecast											
2006	62,202,770					**1,662,647**	2.67%	**1,653,033**	2.66%	**1,629,630**	2.62%
2007	64,175,634					**1,769,610**	2.76%	**1,749,204**	2.73%	**1,700,025**	2.65%
2008	66,128,267					**1,881,098**	2.84%	**1,848,655**	2.80%	**1,771,243**	2.68%
2009	67,993,854					**1,995,313**	2.93%	**1,949,562**	2.87%	**1,841,479**	2.71%
2010	69,886,381					**2,115,685**	3.03%	**2,055,220**	2.94%	**1,913,795**	2.74%
2011	71,795,313					**2,242,186**	3.12%	**2,165,511**	3.02%	**1,987,948**	2.77%
2012	73,731,807					**2,375,458**	3.22%	**2,280,960**	3.09%	**2,064,285**	2.80%
2013	75,699,571					**2,515,956**	3.32%	**2,401,899**	3.17%	**2,142,961**	2.83%
2014	77,664,450					**2,662,863**	3.43%	**2,527,448**	3.25%	**2,223,049**	2.86%
2015	79,666,525					**2,817,860**	3.54%	**2,659,098**	3.34%	**2,305,731**	2.89%
2016	81,677,957					**2,980,338**	3.65%	**2,796,159**	3.42%	**2,390,251**	2.93%
2017	83,727,741					**3,151,716**	3.76%	**2,939,848**	3.51%	**2,477,502**	2.96%
2018	85,822,831					**3,332,710**	3.88%	**3,090,700**	3.60%	**2,567,754**	2.99%
2019	87,961,085					**3,523,728**	4.01%	**3,248,950**	3.69%	**2,661,014**	3.03%
2020	90,141,803					**3,725,247**	4.13%	**3,414,894**	3.79%	**2,757,330**	3.06%
2021	92,357,943					**3,937,496**	4.26%	**3,588,589**	3.89%	**2,856,555**	3.09%
2022	94,608,142					**4,160,939**	4.40%	**3,770,306**	3.99%	**2,958,713**	3.13%
2023	96,875,825					**4,395,369**	4.54%	**3,959,697**	4.09%	**3,063,344**	3.16%
2024	99,195,693					**4,642,905**	4.68%	**4,158,511**	4.19%	**3,171,605**	3.20%
2025	101,562,666					**4,903,973**	4.83%	**4,366,945**	4.30%	**3,283,419**	3.23%
2026	104,229,110					**5,191,825**	4.98%	**4,596,541**	4.41%	**3,407,118**	3.27%
2027	106,965,558					**5,496,573**	5.14%	**4,838,209**	4.52%	**3,535,477**	3.31%
2028	109,773,850					**5,819,210**	5.30%	**5,092,582**	4.64%	**3,668,672**	3.34%
2029	112,655,872					**6,160,784**	5.47%	**5,360,330**	4.76%	**3,806,886**	3.38%
2030	115,613,558					**6,522,408**	5.64%	**5,642,154**	4.88%	**3,950,306**	3.42%
Compounded Annual Growth Rate: 2005-2030	**2.63%**					**5.87%**		**5.26%**		**3.77%**	

Notes:

1/ FAA, *Terminal Area Forecast, FY 2006-2025*, March 2006. Projections for 2026 to 2030 are extrapolated. The FAA's NW Region includes airports in ID, WA, OR, UT, CO, WY, and MT.

2/ BOI Part 150 Study (1976-1989); BOI Airport Activity Reports (1995-2005).

3/ Based on the BOI/NW market share remaining constant at a rate of 2.87% (average growth years from 2004 to 2005.

4/ Based on the BOI/NW market share growing at a constant rate of 2.57% (average growth for the five years from 2000 to 2005).

5/ Based on the BOI/NW market share growing at a constant rate of 1.13% (average growth for the ten years from 1995to 2005).

Sources: FAA, *Terminal Area Forecast, FY 2006-2025*, March 2006; BOI Part 150 Study (1976-1989); and BOI Airport Activity Reports (1995-2005)
Prepared by: Ricondo & Associates, Inc., 2006.

Table III-7

Enplaned Passenger Forecasts – Market Share Methodology – BOI/State of Idaho

Year	Historical Idaho Enplanements[1/]	Annual Idaho Growth %	Historical BOI Enplanements[2/]	Annual BOI Growth %	Airport Share of Idaho	2004-2005 Ratio[3/]	Airport Share of Idaho Total	2000-2005 Ratio[4/]	Airport Share of Idaho Total	1995-2005 Ratio[5/]	Airport Share of Idaho Total
Historical											
1976	663,091	n.a.	392,278	n.a.	59.2%						
1977	698,915	5.1%	413,641	5.2%	59.2%						
1978	812,590	14.0%	474,105	12.8%	58.3%						
1979	843,641	3.7%	499,749	5.1%	59.2%						
1980	700,628	-20.4%	458,615	-9.0%	65.5%						
1981	602,845	-16.2%	412,407	-11.2%	68.4%						
1982	652,010	7.5%	440,377	6.4%	67.5%						
1983	616,108	-5.8%	453,138	2.8%	73.5%						
1984	666,154	7.5%	460,174	1.5%	69.1%						
1985	695,864	4.3%	480,174	4.2%	69.0%						
1986	691,599	-0.6%	578,556	17.0%	83.7%						
1987	781,626	11.5%	573,935	-0.8%	73.4%						
1988	787,136	0.7%	553,875	-3.6%	70.4%						
1989	832,427	5.4%	595,149	6.9%	71.5%						
1990	802,238	-3.8%	613,929	3.1%	76.5%						
1991	868,175	7.6%	588,948	-4.2%	67.8%						
1992	942,054	7.8%	650,846	9.5%	69.1%						
1993	1,052,530	10.5%	794,032	18.0%	75.4%						
1994	1,260,007	16.5%	959,540	17.2%	76.2%						
1995	1,381,868	8.8%	1,107,519	13.4%	80.1%						
1996	1,576,143	12.3%	1,262,080	12.2%	80.1%						
1997	1,574,959	-0.1%	1,261,322	-0.1%	80.1%						
1998	1,591,938	1.1%	1,297,457	2.8%	81.5%						
1999	1,714,275	7.1%	1,421,851	8.7%	82.9%						
2000	1,849,326	7.3%	1,504,888	5.5%	81.4%						
2001	1,800,761	-2.7%	1,422,855	-5.8%	79.0%						
2002	1,667,050	-8.0%	1,386,639	-2.6%	83.2%						
2003	1,694,152	1.6%	1,350,250	-2.7%	79.7%						
2004	1,735,447	2.4%	1,437,862	6.1%	82.9%						
2005	1,915,664	9.4%	1,567,143	8.2%	81.8%						
Forecast											
2006	1,986,020					**1,635,084**	82.3%	**1,626,420**	81.9%	**1,628,034**	82.0%
2007	2,052,597					**1,689,896**	82.3%	**1,682,722**	82.0%	**1,686,063**	82.1%
2008	2,121,551					**1,746,666**	82.3%	**1,741,093**	82.1%	**1,746,281**	82.3%
2009	2,192,973					**1,805,467**	82.3%	**1,801,613**	82.2%	**1,808,775**	82.5%
2010	2,266,959					**1,866,380**	82.3%	**1,864,368**	82.2%	**1,873,636**	82.6%
2011	2,343,603					**1,929,480**	82.3%	**1,929,442**	82.3%	**1,940,958**	82.8%
2012	2,423,009					**1,994,855**	82.3%	**1,996,928**	82.4%	**2,010,840**	83.0%
2013	2,505,284					**2,062,592**	82.3%	**2,066,922**	82.5%	**2,083,387**	83.2%
2014	2,590,532					**2,132,776**	82.3%	**2,139,517**	82.6%	**2,158,701**	83.3%
2015	2,678,872					**2,205,506**	82.3%	**2,214,820**	82.7%	**2,236,897**	83.5%
2016	2,770,418					**2,280,876**	82.3%	**2,292,934**	82.8%	**2,318,087**	83.7%
2017	2,865,294					**2,358,987**	82.3%	**2,373,969**	82.9%	**2,402,393**	83.8%
2018	2,963,632					**2,439,948**	82.3%	**2,458,045**	82.9%	**2,489,944**	84.0%
2019	3,065,561					**2,523,866**	82.3%	**2,545,278**	83.0%	**2,580,868**	84.2%
2020	3,171,223					**2,610,857**	82.3%	**2,635,796**	83.1%	**2,675,304**	84.4%
2021	3,280,759					**2,701,038**	82.3%	**2,729,726**	83.2%	**2,773,391**	84.5%
2022	3,394,320					**2,794,532**	82.3%	**2,827,205**	83.3%	**2,875,279**	84.7%
2023	3,512,065					**2,891,471**	82.3%	**2,928,375**	83.4%	**2,981,125**	84.9%
2024	3,634,153					**2,991,986**	82.3%	**3,033,382**	83.5%	**3,091,088**	85.1%
2025	3,760,754					**3,096,216**	82.3%	**3,142,379**	83.6%	**3,205,336**	85.2%
2026	3,889,759					**3,202,425**	82.3%	**3,253,614**	83.6%	**3,322,093**	85.4%
2027	4,023,189					**3,312,278**	82.3%	**3,368,787**	83.7%	**3,443,103**	85.6%
2028	4,161,197					**3,425,899**	82.3%	**3,488,037**	83.8%	**3,568,521**	85.8%
2029	4,303,938					**3,543,418**	82.3%	**3,611,508**	83.9%	**3,698,508**	85.9%
2030	4,451,576					**3,664,968**	82.3%	**3,739,349**	84.0%	**3,833,229**	86.1%
Compounded Annual Growth Rate: 2005-2030	**3.43%**					**3.46%**		**3.54%**		**3.64%**	

Notes:

1/ FAA, Terminal Area Forecast, FY 2006-2025, March 2006. Projections for 2026 to 2030 are extrapolated.

2/ BOI Part 150 Study (1976-1989); BOI Master Plan 2001 (1990-1994); BOI Airport Activity Reports (1995-2005).

3/ Based on the BOI/Idaho market share remaining constant at a rate of 82.6% (average growth for the five years from 2000 to 2005.

4/ Based on the BOI/Idaho market share growing at a constant rate of 0.07% (average growth for the five years from 2000 to 2005).

5/ Based on the BOI/Idaho market share growing at a constant rate of 0.22% (average growth for the ten years from 1995 to 2005).

Sources: FAA, *Terminal Area Forecast, FY 2006-2025*, March 2006; BOI Part 150 Study (1976-1989); BOI Master Plan 2001 (1990-1994); and BOI Airport Activity Reports (1995-2005)
Prepared by: Ricondo & Associates, Inc., 2006.

3.2.2 Regression Analyses

A regression analysis compares relationships between various socioeconomic variables for an airport's market area to aviation activity. A mathematical regression analysis model was developed to correlate the past relationship of these variables to enplaned passenger numbers at the Airport, and then to forecast this relationship using independent forecasts of the economic/demographic variables. Independent variable inputs were tested, and a simple trend line was also determined to test the resulting forecasts.

Four steps were required in the regression analysis:

- Selecting the dependent variable (i.e., enplaned passengers)
- Selecting the independent variable
- Developing the regression forecasts
- Testing the adequacy of the regression forecasts

The demand for airline service is generally driven by factors directly related to the demographic and economic characteristics of the airport service region. Four variables were used as the independent variables for the regression analysis:

- **Population** – The number of persons residing in the region was based on data reported by the Idaho Power. For this analysis, historical and projected population data for BOI Market Area (primary area) were used.
- **Per Capita Personal Income (PCPI)** – PCPI indicates a relationship between the wealth of the residents of the airport service region with the population of the region. Residents with higher relative incomes are more likely to travel by air. Historical and projected data for the independent variables listed above associated with the Airport's service region were obtained from Idaho Power.
- **Employment** – The number of persons employed in the region was based on nonagricultural employment data were provided by Idaho Power.
- **Linear Trend** – In addition to the socioeconomic regression analyses, a linear trend analysis was also undertaken. The linear trend analysis is used to examine the historical growth in numbers of enplaned passengers and then to produce a formula that best describes the Airport's historical activity by a straight line. The resulting straight line represents the *best fit*. This line is then extended outward to provide enplaned passenger forecasts.

The results of the various regression analyses are described below and shown in **Table III-8**.

- **Population Regression** – Using primary BOI Market Area population as the basis for the regression analysis, total Airport enplaned passengers are forecast to increase from 1,569,734 in 2005 to 3,222,300 in 2030 resulting in a compounded annual growth rate of 2.93 percent.
- **Per Capita Personal Income (PCPI) Regression** – Using PCPI as the basis for the regression analysis, total Airport enplaned passengers are forecast to increase from 1,569,734 in 2005 to 4,362,400 in 2030, resulting in a compounded annual growth rate of 4.18 percent.

Table III-8

Enplaned Passenger Forecasts – Regression Methodology

Year	Historical Enplanements	Annual Growth	Enplanements Projections (based on) Population	PCPI	Employment	Trend Analysis
Historical						
1976	392,278	n.a.				
1977	413,641	5.4%				
1978	474,105	14.6%				
1979	499,749	5.4%				
1980	458,615	-8.2%				
1981	412,407	-10.1%				
1982	440,377	6.8%				
1983	453,138	2.9%				
1984	460,174	1.6%				
1985	480,174	4.3%				
1986	578,556	20.5%				
1987	573,935	-0.8%				
1988	553,875	-3.5%				
1989	595,149	7.5%				
1990	613,929	3.2%				
1991	588,948	-4.1%				
1992	650,846	10.5%				
1993	794,032	22.0%				
1994	959,540	20.8%				
1995	1,107,519	15.4%				
1996	1,262,080	14.0%				
1997	1,261,322	-0.1%				
1998	1,297,457	2.9%				
1999	1,421,851	9.6%				
2000	1,504,888	5.8%				
2001	1,422,850	-5.5%				
2002	1,386,639	-2.5%				
2003	1,350,250	-2.6%				
2004	1,437,862	6.5%				
2005	1,567,143	9.0%				
Forecast						
2006			1,623,600	1,641,200	1,621,800	1,614,200
2007			1,682,300	1,713,400	1,673,500	1,661,300
2008			1,739,700	1,791,200	1,724,200	1,708,400
2009			1,797,600	1,869,600	1,778,200	1,755,500
2010			1,856,500	1,949,800	1,833,100	1,802,600
2011			1,915,400	2,038,500	1,887,200	1,849,600
2012			1,973,500	2,131,700	1,936,500	1,896,700
2013			2,033,900	2,222,200	1,988,300	1,943,800
2014			2,094,800	2,317,300	2,042,700	1,990,900
2015			2,157,700	2,414,200	2,099,800	2,038,000
2016			2,221,800	2,514,700	2,157,300	2,085,100
2017			2,285,300	2,620,600	2,215,700	2,132,200
2018			2,349,900	2,730,200	2,275,100	2,179,200
2019			2,415,700	2,842,100	2,336,500	2,226,300
2020			2,484,600	2,957,700	2,402,200	2,273,400
2021			2,553,400	3,074,800	2,466,100	2,320,500
2022			2,624,300	3,197,700	2,535,000	2,367,600
2023			2,696,100	3,325,200	2,604,200	2,414,700
2024			2,768,700	3,458,900	2,674,400	2,461,700
2025			2,842,700	3,597,100	2,744,500	2,508,800
2026			2,916,500	3,740,000	2,814,300	2,555,900
2027			2,991,400	3,887,800	2,884,100	2,603,000
2028			3,067,700	4,041,200	2,955,500	2,650,100
2029			3,145,200	4,199,400	3,025,600	2,697,200
2030			3,223,300	4,362,400	3,097,500	2,744,200
Compounded Annual Growth Rate 2005-2030:			2.93%	4.18%	2.76%	2.27%
		R-squared:	0.947061816	0.903003409	0.969638142	0.87589433

Sources: Boise Part 150 Study (1976-1989); Boise Master Plan 2001 (1990-1994); Boise Airport Activity Reports (1995-2005).
Prepared by: Ricondo & Associates, Inc., 2006.

- **Employment Regression** – Using employment as the basis for the regression analysis, total Airport enplaned passengers are forecast to increase from 1,569,734 in 2005 to 3,097,500 in 2030, resulting in a compounded annual growth rate of 2.76 percent.
- **Linear Trend Analysis** – As shown Table III-8, total Airport enplaned passenger for the straight linear trend analysis, are forecasted to increase from 1,569,734 in 2005 to 3,744,200 in 2030, representing a compounded annual growth rate of 2.27 percent.

Overall, the regression methodology resulted in very good correlations between the independent socioeconomic variables and the dependent enplaned passenger variable. The coefficient of determination (r^2) is a statistical measure showing the relationship between changes in the values of the independent variables with the changes in the values of the dependent variables. A perfect correlation of 1.0 would mean that each change in the value of the independent variable would translate into a change of equal magnitude in the dependent variable. In statistical analysis, the closer the r^2 value is to 1.0, the higher the confidence that movements in independent variables will produce the predicted movement in the dependent variable. In this analysis, the three socioeconomic variables of population, per capita personal income, and employment had r^2 values of 0.95, 0.90, and 0.97, respectively. Additionally, the linear trend analysis produced an r^2 value of 0.88.

3.2.3 Preferred Enplaned Passenger Forecasts

The forecasting analyses conducted in the previous sections provide multiple growth scenarios based on market share and regression methodologies. This section identifies a preferred or "base" enplaned passenger forecast that is used for further analysis in this master plan effort.

Selection of the base passenger projection is a critical element because it is used to complete the operational and peaking forecasting components, as well as utilized for subsequent facility requirement assessments and financial planning. The assumptions and logic used in selecting the base forecast must be appropriate, reasonable, and stand up to scrutiny from the public, the airlines, and the FAA.

In addition to the base forecast, additional alternative forecast are identified in this report. Because the level of airline passenger operations at an airport can change relatively quick, alternative forecast scenarios are needed for contingency planning. These provide a quick glance at passenger activity levels that could be expected if circumstances (planned or unplanned) were to change. The alternatives include both high and low scenarios. The low scenario, or a decline in passenger activity, could result from a prolonged economic downturn or a dramatic and negative shift in the business climate for the Boise area. A larger-than-normal increase could come from strong economic growth over many years, or the introduction of additional low-cost carriers.

Table III-9 includes the base forecast as well as the low and high alternative scenarios. Additionally, the FAA's *Terminal Area Forecast* for the years 2003 to 2005 are included for comparison purposes. As shown, a base forecast with a compounded annual grow rate of 3.64 percent has been identified as the preferred scenario. This growth rate would reach 3,833,229 enplaned passengers in 2030. This growth is higher than the FAA's forecast for the nation (2.95 percent), the northwest region (2.63 percent), and the State of Idaho (3.43 percent). This higher trend was selected for various reasons. The Airport has fully recovered from the industry downturn at the start of this decade and passenger growth over the past two years has been very strong.

Table III-9

Enplaned Passenger Forecasts

	Year	Historical Enplanements [1/]	Alternative Scenarios Forecast Base [2/]	Low [2/]	High [2/]	FAA Terminal Area Forecast [3/] 2005	2004	2003
Historical	1976	392,278						
	1977	413,641						
	1978	474,105						
	1979	499,749						
	1980	458,615						
	1981	412,407						
	1982	440,377						
	1983	453,138						
	1984	460,174						
	1985	480,174						
	1986	578,556						
	1987	573,935						
	1988	553,875						
	1989	595,149						
	1990	613,929						
	1991	588,948						
	1992	650,846						
	1993	794,032						
	1994	959,540						
	1995	1,107,519						
	1996	1,262,080						
	1997	1,261,322						
	1998	1,297,457						
	1999	1,421,851						
	2000	1,504,888						
	2001	1,422,850						
	2002	1,386,639						1,360,629
	2003	1,350,250						1,372,099
	2004	1,437,862						1,489,555
	2005	1,567,143					1,361,535	1,547,539
Forecast	2006		1,628,034	1,623,600	1,604,958	1,633,753	1,412,122	1,605,523
	2007		1,686,063	1,682,300	1,687,132	1,689,569	1,462,709	1,663,507
	2008		1,746,281	1,739,700	1,761,379	1,747,414	1,513,297	1,721,491
	2009		1,808,775	1,797,600	1,838,131	1,807,368	1,563,884	1,779,476
	2010		1,873,636	1,856,500	1,918,045	1,869,511	1,614,472	1,837,460
	2011		1,940,958	1,915,400	1,998,035	1,933,928	1,665,059	1,895,444
	2012		2,010,840	1,973,500	2,081,297	2,000,708	1,715,647	1,953,427
	2013		2,083,387	2,033,900	2,168,292	2,069,943	1,766,234	2,011,411
	2014		2,158,701	2,094,800	2,259,141	2,141,727	1,816,822	2,069,395
	2015		2,236,897	2,157,700	2,353,373	2,216,160	1,867,409	2,127,380
	2016		2,318,087	2,221,800	2,451,121	2,293,345	1,917,997	2,185,364
	2017		2,402,393	2,285,300	2,553,139	2,373,389	1,968,584	2,243,348
	2018		2,489,944	2,349,900	2,659,523	2,456,406	2,019,172	2,301,332
	2019		2,580,868	2,415,700	2,770,495	2,542,511	2,069,759	2,359,316
	2020		2,675,304	2,484,600	2,886,487	2,631,827	2,120,347	2,417,301
	2021		2,773,391	2,553,400	3,007,173	2,724,478		
	2022		2,875,279	2,624,300	3,133,118	2,820,597		
	2023		2,981,125	2,696,100	3,264,434	2,920,321		
	2024		3,091,088	2,768,700	3,401,461	3,023,792		
	2025		3,205,336	2,842,700	3,544,449	3,131,159		
	2026		3,322,093	2,916,500	3,692,785			
	2027		3,443,103	2,991,400	3,847,402			
	2028		3,568,521	3,067,700	4,008,569			
	2029		3,698,508	3,145,200	4,176,569			
	2030		3,833,229	3,223,300	4,351,693			
Average Annual Growth Rate:			3.64%	2.93%	4.17%	3.34%	2.46%	2.83%

▼**Preferred**

Sources: Boise Part 150 Study (1976-1989), Boise Master Plan 2001 (1990-1994), Boise Airport Activity Reports (1995-2005); Base - BOI/Idaho market share (1995-2005), Low - trend regression model, High - BOI/U.S. market share (1995-2005); and FAA Terminal Area Forecasts, 2003 to 2005.

Prepared by: Ricondo & Associates, Inc., 2006.

The Airport has over a decade of stable, low-cost passenger service from Southwest Airlines, and the economic climate for growth is positive. In two recent articles[15&16] from Forbes.com, the State of Idaho was ranked 6th in the country for the "best states for business" and the Boise metropolitan area was ranked 4th in country for "best metro area for business". Also within these reports, Idaho ranked 2nd nationally for best business climate and Boise ranked 22nd in job growth. Although these types of reports do not guarantee passenger growth, they do suggest that growth at the Airport could outpace the State of Idaho, the northwest region, and the nation. The base forecast growth rate may also elevate the Airport from a small hub to a medium hub facility by the end of the study period.

The alternative forecasts included in Table III-9 represent the low and high growth scenarios. Because the business climate is so positive in the Boise area, any long-term decline in the growth of passenger traffic would likely be limited. The low growth scenario projects passenger traffic to increase by a compounded annual rate of 2.93 percent through 2030, or similar to the FAA's passenger forecast for the nation through 2025. This lower growth rate would roughly double the BOI enplanement level to 3,223,300 in 25 years. The high grow scenario would increase the passenger traffic by a compounded annual increase of 4.17 percent. This rate would take the Airport's enplanement totals to 4,351,693 in 2030 and would likely change the Airport's status from a small hub to a medium hub facility by 2018.

For purposes of this master plan report, the base forecast is considered the preferred enplaned passenger forecasts for the Airport. The forecasts of aircraft operations, fleet mix, and the associated peak-period demand activity levels for the Airport presented later in this section were prepared using the preferred enplaned passenger forecasts.

3.3 Air Cargo Forecasts

Air cargo service at the Airport is provided by passenger airlines using the lower deck, or belly hold, of the aircraft and by the all-cargo airlines using freighter aircraft. **Table III-10** presents the Airport's historical and forecast cargo tonnage for air freight and air mail, both on (enplaned) and off (deplaned) aircraft.

As shown, total air freight volume at the Airport increased for both loads going on, as well coming off of aircraft. Freight going on to aircraft grew at a compounded annual growth rate of 3.4 percent between 1996 and 2005. Freight coming off of aircraft grew almost twice as fast with a compound annual growth rate of 6.3 percent. As can also be seen in Table III-10, air mail totals tell a completely different story. Air mail volumes (both on and off aircraft) witnessed strong growth between 1996 and 2000. However, the dramatic decrease in air mail at the Airport (resulting in a corresponding increase in freight), beginning in 2001, is a result of the United States Postal Service (USPS) changing the way it handles mail. In August 2001, the USPS entered into a long-term contract with FedEx to carry almost all of the nation's express mail. Additionally, after the terrorist attacks on September 11 of that year, passenger airlines were prohibited from carrying mail over 16 ounces, which increased the scope of the FedEx contract to include almost all domestic air mail. The USPS also increased the distance that domestic mail would be trucked rather than flown. A side effect of the FedEx USPS mail contract is that FedEx does not report mail as a separate category, but includes mail as part of the overall freight tonnages that it reports to airport operators.

[15] Kurt Badenhausen, "The Best State For Business", *Forbes.com,* August 16, 2006

[16] Kurt Badenhausen, "Special Report: The Best Places For Business and Careers", *Forbes.com,* May 4, 2006.

Table III-10

Air Cargo Forecast (freight & mail)

	Freight Volume (lbs)			Mail Volume (lbs)		
Historical	Enplaned	Deplaned	Total Freight	Enplaned	Deplaned	Total Mail
1996	30,056,441	29,432,181	59,488,622	5,312,020	8,833,540	14,145,560
2000	30,209,184	46,927,873	77,137,057	8,212,641	14,982,479	23,195,120
2005	40,588,604	50,952,034	91,540,638	334,285	1,814,980	2,149,265
Forecast						
2010	50,581,000	63,496,000	114,077,000	407,000	2,208,000	2,615,000
2015	61,836,000	77,624,000	139,460,000	485,000	2,635,000	3,120,000
2020	74,512,000	93,537,000	168,049,000	571,000	3,100,000	3,671,000
2025	88,497,000	111,093,000	199,590,000	662,000	3,594,000	4,256,000
2030	103,592,000	130,042,000	233,634,000	766,000	4,158,000	4,924,000
Annual Compound Growth Rate						
1996-2005	3.4%	6.3%	4.9%	-26.5%	-16.1%	-18.9%
2005-2010	4.5%	4.5%	4.5%	4.0%	4.0%	4.0%
2010-2015	4.1%	4.1%	4.1%	3.6%	3.6%	3.6%
2015-2020	3.8%	3.8%	3.8%	3.3%	3.3%	3.3%
2020-2025	3.5%	3.5%	3.5%	3.0%	3.0%	3.0%
2025-2030	3.2%	3.2%	3.2%	3.0%	3.0%	3.0%
2005-2030	3.8%	3.8%	3.8%	3.4%	3.4%	3.4%

Sources: Boise Airport, City of Boise, ID (historical); Ricondo & Associates, Inc. (projected)
Prepared by: Ricondo & Associates, Inc., 2006.

The rapid fluctuations in the U.S. economy as well as significant world effects make forecasting air cargo a difficult task at best. After the downturn in 2001, the domestic air cargo industry was rebounding between 2002 and 2004 only to see a decline by 2.6 percent for 2005[17]. Total freight volumes at BOI reflect this drop in 2005.

Specific forecasts for freight and mail at the Airport are summarized below:

- **Air Freight**. Air freight (both on and off aircraft) is projected to grow annually at greater than four percent a year for the first ten years. Beyond that time, the annual growth rate would likely continue between three and four percent. The slowing of the growth rate would likely result as the Boise air cargo market matures and other airports become more competitive. Although total freight volume was down for 2005, BOI freight will most likely continue to grow along with the rest of the country[18]. Additionally, the Airport may well be strategically positioned to realize larger air freight growth due to congested air cargo facilities and airfields at larger airports in the region as well as lower local operating costs. As shown in Table III-10, total air freight at BOI is projected grow from 91,540,638 pounds in 2005 to 233,634,000 pounds in 2030, a compounded annual increase 3.8 percent.

[17] *World Air Cargo Forecast 2006/2007*, Boeing Aircraft Corporation, 2006, pg. 21.
[18] *World Air Cargo Forecast 2006/2007*, Boeing Aircraft Corporation, 2006, pg. 27.

- **Air Mail.** The air mail market has more or less been redefined. Although the volume of air mail at BOI appears to have been dropping significantly since 2001, in reality, most air mail shipments have been moved over to all-cargo "freight" operators. Correspondingly, the air freight volumes have increased during the same period. In another sense, the volumes for BOI air mail shipments are starting over with new totals. Projecting air mail volumes for the short-term will be difficult at best. Volumes may still drastically rise or fall over the next few years, but baring no major security changes, longer term volumes should settle into a normal growth mode. Therefore, as shown in Table III-10, total air mail volumes are projected to increase from 2,149,265 pounds in 2005 to 4,924,000 pounds in 2030, a compounded annual increase of 3.4 percent.

3.4 Aircraft Operations Forecasts and Fleet Mix Projections

This section presents operations and fleet mix projections for air carrier, commuter/air taxi activity, general aviation, all-cargo, and military activity at the airport. Forecasts of aircraft operations for passenger carriers were developed using the preferred enplaned passenger forecast presented earlier, in conjunction with historical and expected trends in load factors and average aircraft seats-per-departure.

3.4.1 Air Carrier Aircraft Operations and Fleet Mix

Forecast of operations by air carrier operators are presented in **Table III-11**. The following points highlight the key assumptions that were used to derive the air carrier aircraft operations forecast for the Airport:

- The average number of seats-per-departure for the air carrier airlines varied slightly over the past five years, increasing from 136.9 seats in 2000 to 137.2 in 2005. Current fleet plans for air carrier airlines nationwide indicate that their average number of seats-per-departure is anticipated to decrease by .8 seats between 2005 and 2010 and grow at a rate of .5 seats a year beyond 2010. Applying this growth pattern to the BOI air carrier fleet, the average number of air carrier airline aircraft seats-per-departure at the Airport is projected to increase to approximately 148.0 seats by 2030.
- Similar to the average number of aircraft seats-per-departure, the load factors for the Airport's air carrier airlines also varied over the past five years but remained relatively unchanged. The load factor for the air carrier airlines in 2005 was 57.9 percent, down slightly from 58.3 percent in 2000. During this same period, nationwide load factors for U.S. airlines operating domestic flights increased from 71.2 percent in 2000 to 77.3 percent in 2005. The FAA is projecting load factors for air carrier airlines operating domestically to increase 0.1 percent per year (on average) between 2005 and 2017. For planning purposes, load factor at BOI are projected to increase to levels closer to the national average during the planning period. Therefore, air carrier load factors at BOI are anticipated to increase from 57.9 percent in 2005 to 75.0 percent in 2030.

Table III-11

Air Carrier Aircraft Operations Forecast

Year	Air Carrier Enplanements [1/]	Average Seats/ Departure	Load Factor	Departures	Operations	Annual Growth
Historical						
2000	996,693	136.9	58.3%	12,496	24,992	--
2001	949,816	133.4	59.5%	11,955	23,910	-4.3%
2002	793,645	134.6	55.2%	10,153	20,306	-15.1%
2003	777,702	134.6	54.1%	10,119	20,238	-0.3%
2004	880,069	134.9	59.1%	10,703	21,406	5.8%
2005	927,090	137.2	57.9%	10,989	21,978	2.7%
Forecast						
2010	1,152,286	138.0	61.0%	13,697	27,395	4.5%
2015	1,375,691	140.5	64.2%	15,252	30,503	2.2%
2020	1,645,312	143.0	67.6%	17,018	34,036	2.2%
2025	1,971,282	145.5	71.2%	19,028	38,057	2.3%
2030	2,357,436	148.0	75.0%	21,243	42,486	2.2%
Compounded Annual Growth Rate						
2000-2005	-1.4%				-2.5%	
2005-2010	4.4%				4.5%	
2010-2015	3.6%				2.2%	
2015-2020	3.6%				2.2%	
2020-2030	3.7%				2.2%	
2005-2030	3.8%				2.7%	

Note:

1/ Forecast of air carrier enplanements are estimated at 61.5% of the total enplanement forecast (2000 to 2005 average)

Sources: City of Boise, Aviation Department (Historical Airport Activity), Ricondo & Associates, Inc. (Forecast Airport Activity)
Prepared by: Ricondo & Associates, Inc.

As shown in Table III-11, total air carrier aircraft operations (arrivals and departures) are forecast to increase from 21,978 in 2005 to 42,486 in 2030. The forecast increase in air carrier aircraft operations at the Airport represents an annual compounded growth rate of 2.7 percent during this period.

The aircraft fleet mix projection for the air carrier airlines is presented in **Table III-12**. As shown, the air carrier aircraft fleet mix is expected to primarily consist of B-737, A319, and A320 (or their equivalent). The older 737-300/400/500s will be retired over time and replaced with the newer 737-700/800/900s. It is expected that the airport will continue to see occasional non-scheduled operations of widebody aircraft.

Table III-12

Air Carrier Aircraft Fleet Mix Projection

		2005		2010		2015		2020		2025		2030	
Aircraft [1/]	Seats	Departures	Percent	Departures	Percent	Departures	Percent	Departures	Percent	Departures	Percent	Departures	Percent
727-200	149	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
737-200	113	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
737-200	122	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
737-300	128	514	4.7%	274	2.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
737-300	134	1287	11.7%	1,233	9.0%	1,220	8.0%	0	0.0%	0	0.0%	0	0.0%
737-300	137	4915	44.7%	4,794	35.0%	1,373	9.0%	170	1.0%	0	0.0%	0	0.0%
737-400	138	570	5.2%	685	5.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
737-500	120	325	3.0%	137	1.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
737-500	122	13	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
737-700	120	26	0.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
737-700	137	1249	11.4%	3,424	25.0%	5,338	35.0%	5,105	30.0%	4,567	24.0%	3,611	17.0%
737-800	154	421	3.8%	411	3.0%	1,220	8.0%	3,914	23.0%	5,899	31.0%	8,072	38.0%
737-800	160	1	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
737-900	172	8	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
757-200	180	1	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
757-200	182	1	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
757-200	186	4	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
767-300ER	206	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
A319	124	373	3.4%	685	5.0%	1,678	11.0%	2,553	15.0%	1,903	10.0%	1,062	5.0%
A320	150	742	6.8%	1,644	12.0%	4,423	29.0%	5,276	31.0%	6,660	35.0%	8,497	40.0%
MD-80	140	365	3.3%	274	2.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
MD-90	150	174	1.6%	137	1.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total		10,989	100.0%	13,697	100.0%	15,252	100.0%	17,018	100.0%	19,028	100.0%	21,243	100.0%
Average Seats		137.2		138.0		140.5		143.0		145.5		148.0	

Notes: Columns may not add to totals shown because of rounding

1/ Denotes actual aircraft or physical equivalent

Sources: City of Boise, Aviation Department (Historical Airport Activity), Ricondo & Associates, Inc. (Projected Airport Activity)
Prepared by: Ricondo & Associates, Inc.

3.4.2 Commuter/Air Taxi Aircraft Operations and Fleet Mix

Forecasts of commuter/air taxi aircraft operations at the Airport are presented in **Table III-13**. The forecasts were developed based on historical numbers of enplaned passengers, load factors, and average aircraft seats-per-departure at the Airport.

- As shown in Table III-13, the average number of seats-per-departure has increased slightly from 53.1 in 2000 to 54.5 in 2005. Although the increase in commuter/air taxi aircraft size is relatively small, it is the beginning of a gradual shift toward larger aircraft. This is due primarily to the increase in use of regional jets over smaller turboprop aircraft and a shift by Horizon Air from the 37 seat Dash-8-200 to the 70 seat Dash-8-400. The trend toward larger commuter/air taxi aircraft is also seen across the country as the average aircraft seat size (i.e., number of seats) for the regional airlines nationwide increased from 59.5 seats in 2000 to 69.8 seats in 2005.
- Nationwide, the average commuter/air taxi aircraft seat capacity is forecast to increase by approximately 0.475 seats per year through 2017[19]. Because the recent growth of average seats-per-departure at the Airport has been less than the national average, the increase for BOI has been projected at .45 seats-per-departure. The average seats-per-departure for the BOI commuter/air taxi fleet is projected to grow from 54.5 in 2005 to 65.7 in 2030.
- Between 2000 and 2005, the load factors for the Airport's commuter/air taxi airlines have increased from 59.6 percent to 68.9 percent. This is similar to the commuter air line load factor for the rest of the nation which increased from 59.5 percent in 2000 to 69.8 in 2005. For planning purposes, average commuter/air taxi aircraft load factors at the Airport are projected to increase from 68.9 percent in 2005 to 71.1 percent in 2030.

Aircraft fleet mix projections for commuter/air taxi airlines serving the Airport are presented in **Table III-14**. The information in this table was developed using assumptions regarding increases in average seats-per-departure for the commuter/air taxi airlines, as presented in Table III-13, and reflects current aircraft fleet mixes for this airline grouping, as well as assumed trends in future commuter/air taxi aircraft in use nationwide. As shown in Table III-14, there is a gradual shift from the 37 seat turboprops and 50 seat regional jets to the larger 65 seat regional jets. The fleet is projected to see a growth in the 70 seat turboprop aircraft as well as the 70 and 80 seat regional jets. It is also projected that the commuter/air taxi fleet will continue to see smaller 10 and 19 seat air taxi operations service to smaller seasonal destinations in the Boise area.

3.4.3 General Aviation Operations

This section presents the forecast of general aviation based aircraft, operations, and fleet mix. General aviation represents all facets of civil aviation except activity by certificated route air carriers and air commuters.

[19] Federal Aviation Administration, *FAA Aerospace Forecast Fiscal Years 2006-2007*, 2006.

Table III-13

Commuter/Air Taxi Aircraft Operations Forecast

Year	Commuter/Air Taxi Enplanements[1]	Average Seats/ Departure	Load Factor	Departures	Operations	Annual Growth
Historical						
2000	508,195	53.1	59.6%	16,054	32,108	--
2001	473,034	55.5	61.4%	13,895	27,790	-13.4%
2002	592,994	58.5	60.4%	16,517	33,034	18.9%
2003	572,548	54.8	66.0%	15,511	31,022	-6.1%
2004	557,793	55.3	67.5%	14,759	29,518	-4.8%
2005	640,053	54.5	68.9%	16,481	32,962	11.7%
Forecast						
2010	721,350	56.7	69.3%	18,353	36,707	2.2%
2015	861,205	59.0	69.8%	20,939	41,879	2.7%
2020	1,029,992	61.2	70.2%	23,968	47,936	2.7%
2025	1,234,054	63.5	70.7%	27,522	55,044	2.8%
2030	1,475,793	65.7	71.1%	31,585	63,169	2.8%
Compounded Annual Growth Rate						
2000-2005	4.7%				0.5%	
2005-2010	2.4%				2.2%	
2010-2015	3.6%				2.7%	
2015-2020	3.6%				2.7%	
2020-2030	3.7%				2.8%	
2020-2030	3.7%				2.8%	

Note:

1/ Forecast of commuter/air taxi enplanements are estimated at 38.5% of the total enplanement forecast (2000 to 2005 average)

Sources: City of Boise, Aviation Department (Historical Airport Activity), Ricondo & Associates, Inc. (Forecast Airport Activity)
Prepared by: Ricondo & Associates, Inc.

Table III-14

Commuter/Air Taxi Aircraft Fleet Mix Projections

Aircraft Type [1/]	Seats	2005		2010		2015		2020		2025		2030	
		Departures	Percent	Departures	Percent	Departures	Percent	Departures	Percent	Departures	Percent	Departures	Percent
Piper/Cessna	10	652	4.0%	734	4.0%	838	4.0%	959	4.0%	1,101	4.0%	1,263	4.0%
Metro	19	1,032	6.3%	918	5.0%	838	4.0%	959	4.0%	1,101	4.0%	1,263	4.0%
EMB-120	30	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Dash 8-200	37	1,799	10.9%	1,285	7.0%	838	4.0%	0	0.0%	0	0.0%	0	0.0%
CRJ-100/200	50	5,201	31.6%	5,322	29.0%	5,235	25.0%	5,273	22.0%	3,578	13.0%	1,579	5.0%
CRJ-700	64	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
CRJ-700	65	817	5.0%	2,753	15.0%	4,188	20.0%	5,513	23.0%	7,156	26.0%	8,528	27.0%
CRJ-700	66	513	3.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
F28	69	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
CRJ-700/Dash 8-400	70	5,967	36.2%	6,424	35.0%	7,329	35.0%	8,389	35.0%	9,633	35.0%	11,055	35.0%
CRJ-900/BAE146	80	500	3.0%	918	5.0%	1,675	8.0%	2,876	12.0%	4,954	18.0%	7,896	25.0%
Total		16,481	100.0%	18,353	100.0%	20,939	100.0%	23,968	100.0%	27,522	100.0%	31,585	100.0%
Average Seats		54.5		56.7		59.0		61.2		63.5		65.7	

Note: Columns may not add to totals shown because of rounding.

1/ Denotes actual aircraft or physical equivalent.

Source: City of Boise, Aviation Department (Historical Airport Activity), Ricondo & Associates, Inc. (Projected Airport Activity)
Prepared by: Ricondo & Associates, Inc.

3.4.3.1 Based Aircraft and Fleet Mix

Table III-15 presents historical and forecast based aircraft at the Airport, the northwest region of the U.S., and the State of Idaho. Typically, the number of based aircraft is dependent on the local demand for aircraft storage facilities, the amenities provided by the airport, and the capacity of other airports in the vicinity with comparable facilities. As shown, the number of based aircraft at the Airport decreased from 337 in 2000 to 315 in 2005. The FAA forecasts growth in the number of based aircraft in the northwest region of the U.S., the State of Idaho, and for Boise Airport through 2025. For the purposes of this study, the FAA's base aircraft forecast for BOI were extrapolated to 2030. As shown in Table III-15, the number of based aircraft at the Airport is projected to increase from 315 in 2005 to 375 in 2030.

Table III-16 further examines based aircraft by fleet type. In 2005, single-engine aircraft accounted for 57.1 percent of the Airport's based aircraft; multi-engine piston and turboprop aircraft accounted for 15.2 percent; jet aircraft accounted for 7.3 percent; helicopters accounted 5.4, and other aircraft types accounted for the remaining 14.9 percent. The Airport's based aircraft fleet mix was projected by examining historical trends, as well as using national data for general aviation aircraft. As shown in Table III-16, the shares of based multi-engine, jet, and helicopter aircraft are projected to increase between 2005 and 2030, while the share of single engine aircraft at the Airport is projected to decrease. These trends are consistent with the FAA's terminal area forecast.

3.4.3.2 General Aviation Operations

Historical and forecast general aviation operations at the Airport are presented in **Table III-17**. As shown, total general aviation operations decreased from 90,177 in 2000 to 87,425 in 2005. However, during the same period, the Airport's share of total U.S. general aviation operations increased from 0.100 percent in 2000 to 0.103 percent in 2005.

General aviation operations at the Airport are forecast to increase at a faster rate than those forecast by the FAA for general aviation activity nationwide. Shown in Table III-17, total general aviation operations are forecast to increase from 87,425 in 2005 to 210,619 in 2030. The largest jump in general aviation operations will occur in 2011 when the air traffic control tower (ATCT) for BOI is projected to open and operations on the south runway are included in the Airport's annual totals. Currently, operations on this runway (estimated at 47,450 local operations annually) are not controlled by the ATCT and, therefore, not included in the official traffic count. With the south runway operations added to the annual totals, the overall operational increase represents a compounded annual growth rate of 3.6 percent between 2005 and 2030. This is much larger than the FAA's 0.9 percent annual growth forecasted for the nation. However, the additional south runway operations account for the larger growth percentage.

As also shown in Table III-17, general aviation operations are further broken out into itinerant and local operations. As defined by the FAA, local operations are performed by aircraft that:

- Operate in the local traffic pattern or within sight of an airport
- Are known to be departing for, or arriving from, flight in local practice areas located within a 30-mile radius of the airport
- Are executing simulated precision, nonprecision, and visual approaches or low passes at an airport (includes touch-and-go operations)

Table III-15

Based Aircraft Forecasts

Year	Based Aircraft							
	Northwest Mountain Region	Annual Growth Rate	State of Idaho	Annual Growth Rate	Idaho Share of Region Market	BOI Based Aircraft	Annual Growth Rate	Airport Share of Idaho Market
Historical								
2000	20,972	--	2,351	--	11.2%	337	--	14.3%
2001	22,076	5.3%	2,291	-2.6%	10.4%	352	4.5%	15.4%
2002	22,496	1.9%	2,320	1.3%	10.3%	317	-9.9%	13.7%
2003	22,655	0.7%	2,265	-2.4%	10.0%	316	-0.3%	14.0%
2004	23,667	4.5%	2,275	0.4%	9.6%	312	-1.3%	13.7%
2005	23,869	0.9%	2,359	3.7%	9.9%	315	1.0%	13.4%
Forecast								
2010	25,112	1.0%	2,822	3.6%	11.2%	325	0.6%	11.5%
2015	26,495	1.1%	3,050	1.6%	11.5%	336	0.7%	11.0%
2020	28,027	1.1%	3,306	1.6%	11.8%	347	0.6%	10.5%
2025	29,696	1.2%	3,597	1.7%	12.1%	362	0.8%	10.1%
2030	31,363	1.1%	3,997	2.1%	12.7%	375	0.7%	9.4%
Compounded Annual Growth Rate								
2000-2005	2.6%		0.1%			-1.3%		
2005-2010	1.0%		3.6%			0.6%		
2010-2015	1.4%		1.4%			1.4%		
2015-2020	1.3%		1.3%			1.3%		
2020-2030	1.1%		1.9%			0.8%		
2005-2030	1.1%		2.1%			0.7%		

Source: FAA Terminal Area Forecast 2005-2025, March 2006. Ricondo & Associates, Inc. (extrapolated: 2026-2030)
Prepared by: Ricondo & Associates, Inc.

Table III-16

General Aviation Based Aircraft Fleet Mix Projections

Year	Single Engine	Percent	Multi-engine	Percent	Business Jet	Percent	Helicopter	Percent	Other	Percent	Total	Percent Change
Historical												
2000	218	64.7%	22	6.5%	22	6.5%	16	4.7%	59	17.5%	337	-
2001	232	65.9%	33	9.4%	19	5.4%	20	5.7%	48	13.6%	352	4.5%
2002	194	61.2%	35	11.0%	22	6.9%	18	5.7%	48	15.1%	317	-9.9%
2003	193	61.1%	35	11.1%	22	7.0%	18	5.7%	48	15.2%	316	-0.3%
2004	180	57.7%	47	15.1%	22	7.1%	17	5.4%	46	14.7%	312	-1.3%
2005	180	57.1%	48	15.2%	23	7.3%	17	5.4%	47	14.9%	315	1.0%
Projected												
2010	179	55.0%	52	16.0%	29	9.0%	26	8.0%	39	12.0%	325	0.9%
2015	181	54.0%	54	16.0%	34	10.0%	30	9.0%	37	11.0%	336	0.6%
2020	184	53.0%	59	17.0%	38	11.0%	35	10.0%	31	9.0%	347	0.3%
2025	188	52.0%	65	18.0%	43	12.0%	36	10.0%	29	8.0%	362	0.8%
2030	191	51.0%	75	20.0%	49	13.0%	37	10.0%	22	6.0%	375	0.7%
Compounded Annual Growth Rate												
2000-2005	-3.8%		16.9%		0.9%		1.2%		-4.4%		-1.3%	
2005-2010	-0.1%		1.6%		4.9%		8.9%		-3.7%		0.6%	
2010-2015	0.3%		0.7%		2.8%		3.1%		-1.1%		0.7%	
2015-2020	0.3%		1.9%		2.6%		2.8%		-3.3%		0.6%	
2020-2030	0.4%		2.4%		2.5%		0.8%		-3.2%		0.8%	
2005-2030	0.2%		1.8%		3.0%		3.2%		-2.9%		0.7%	

Note: Columns may not add to totals shown because of rounding.

Sources: Federal Aviation Administration (Historical), Ricondo & Associates, Inc. (Projected)
Prepared by: Ricondo & Associates, Inc.

Table III-17

General Aviation Operations Forecasts

Year	General Aviation Operations								
	Boise Airport						Nation		
	Itinerant	Share	Local	Share	Total Operations [1/]	Annual Growth	Total U.S. Operations	Growth	BOI Share of U.S.
Historical									
2000	63,667	70.6%	26,510	29.4%	90,177	--	89,970,965	--	0.100%
2001	59,073	72.2%	22,760	27.8%	81,833	-9.3%	89,088,245	4.3%	0.092%
2002	57,285	70.6%	23,896	29.4%	81,181	-0.8%	88,700,221	-7.2%	0.092%
2003	54,602	68.7%	24,847	31.3%	79,449	-2.1%	86,355,849	-8.1%	0.092%
2004	58,251	65.8%	30,282	34.2%	88,533	11.4%	85,913,628	-2.8%	0.103%
2005	55,930	64.0%	31,495	36.0%	87,425	-1.3%	84,522,720	-6.4%	0.103%
Forecast									
2010	68,080	66.7%	33,960	33.3%	102,040	3.1%	88,765,805	1.0%	0.115%
2015	81,337	49.2%	84,003	50.8%	165,340	10.1%	93,164,564	1.0%	0.177%
2020	90,182	51.0%	86,795	49.0%	176,977	1.4%	96,977,213	0.8%	0.182%
2025	99,989	52.7%	89,800	47.3%	189,789	1.4%	101,141,003	0.8%	0.188%
2030	115,619	54.9%	95,000	45.1%	210,619	2.1%	105,782,957	0.9%	0.199%
Compounded Annual Growth Rate									
2000-2005	-2.6%		3.5%		-0.6%		-1.2%		
2005-2010	4.0%		1.5%		3.1%		1.0%		
2010-2015	3.6%		19.9%		10.1%		1.0%		
2015-2020	2.1%		0.7%		1.4%		0.8%		
2005-2030	2.9%		4.5%		3.6%		0.9%		

Note: Total local operations for 2015 and beyond include operations on south runway.

Sources: City of Boise, Aviation Department (Historical Airport Activity), Federal Aviation Administration (Historical Airport Activity), Ricondo & Associates, Inc. (Historical and Forecast US Activity)
Prepared by: Ricondo & Associates, Inc.

Itinerant operations constitute all other airport general aviation operations. Itinerant operations account for the majority of the Airport's general aviation operations, totaling 64.0 percent of general aviation operations in 2005. The percentage of local general aviation operations increased from 29.4 percent in 2000 to 36.0 percent in 2000. The share of local operations is expected to increase significantly in 2011 when the new air traffic control tower becomes active. As shown in Table III-17, local operations jump 10.1 percent between 2010 and 2015. The share of local operations also jumps from a 33.3 percent share in 2010 to a 50.8 percent share in 2015. For planning purposes, the percentage of itinerant general aviation operations is expected to grow at faster rate than local operations. The only exception is between 2010 and 2015 when local operations increase significantly. By 2030, the share of local operations is expected to decrease to 45.1 percent with itinerant operations increasing to 54.9 percent.

3.4.4 Military and Other Air Taxi Operations

Future military activity at the Airport will be influenced by U.S. Department of Defense policy, which largely dictates the level of military activity at an airport. Although the number of military operations fluctuated some between 2000 and 2005, there was relatively little change. For planning purposes, it is forecast that military operations at the Airport will be held constant at the 2005 level of 13,317.

Other air taxi operations include for-hire charters, fixed base operators, and miscellaneous transportation of property by aircraft. Other air taxi operations at the Airport are forecast to remain relatively steadily growing from 10,164 operations in 2005 to 11,086 in 2030.

3.4.5 All-Cargo Operations

Historical and forecast all-cargo aircraft operations at the Airport are presented in **Table III-18.** As shown, the Airport's all-cargo aircraft operations decreased from 10,412 in 2000 to 7,208 in 2005. In 2000, all-cargo operations accounted for 41.7 percent of all air carrier flights at the Airport. By 2005, that number had decreased to 32.8 percent. Although the overall number of all-cargo flights is projected to increase, the share of all-cargo operations is projected to decline. This is due in part to air cargo operators increasing the size of their aircraft. Starting in the fall of 2006, FedEx plans to upgrade their 727s operating out of BOI with two Airbus 300s. In 2008, UPS plans to upgrade their two B-757 aircraft with two Airbus 300s. Larger aircraft will allow operators to move more cargo with fewer flights. This increases payloads and reduces operating costs. Security regulations limiting the use of belly holds in passenger aircraft will also likely drive up payloads for all-cargo operations.

As shown in Table III-18, all-cargo aircraft operations are forecast to increase from 7,208 in 2005 to 11,427 in 2030, representing a compounded annual growth rate of 1.9 percent during this period. By comparison, the FAA forecast air carrier aircraft operations to increase 2.1 percent per year between 2005 and 2030.

3.4.6 Aircraft Operations Summary

Table III-19 summarizes historical and forecast aircraft operations for the Airport. As shown, total operations at the Airport are forecast to increase from 173,054 in 2005 to 352,105 in 2030, representing a compounded annual growth rate of 2.9 percent.

Table III-18

All-Cargo Aircraft Operations Forecasts

Year	Total Cargo Tonnage	Payload / Tons per flight	Annual Change	Operations	Annual Change	Share of BOI Air Carrier Operations	U.S. Air Carrier Operations [1/]	U.S. Growth
Historical								
2000	77,137,057		7,408	10,412	--	41.7%	15,235,282	--
2001	78,598,906	6,844	-7.6%	10,754	3.3%	45.0%	14,803,360	-2.8%
2002	81,893,439	9,791	43.1%	8,364	-22.2%	41.2%	13,713,555	-7.4%
2003	83,671,154	10,498	7.2%	7,970	-4.7%	39.4%	12,836,801	-6.4%
2004	93,729,210	12,750	21.4%	7,351	-7.8%	34.3%	13,004,297	1.3%
2005	91,540,638	12,699	-0.4%	7,208	-1.9%	32.8%	13,447,786	3.4%
Forecast								
2010	114,077,000	14,404	2.6%	7,920	1.5%	28.9%	14,711,399	1.8%
2015	139,460,000	16,028	2.2%	8,701	1.9%	28.5%	16,371,404	2.2%
2020	168,049,000	17,579	1.9%	9,560	1.9%	28.1%	18,220,364	2.2%
2025	199,590,000	19,003	1.6%	10,503	1.9%	27.6%	20,313,414	2.2%
2030	233,634,000	20,446	1.9%	11,427	1.7%	26.9%	22,519,874	2.1%
Compounded Annual Growth Rate								
2000-2005	3.5%	11.4%		-7.1%			-2.5%	
2005-2010	4.5%	2.6%		1.9%			1.8%	
2010-2015	4.1%	2.2%		1.9%			2.2%	
2015-2020	3.8%	1.9%		1.9%			2.2%	
2020-2030	3.3%	1.5%		1.8%			2.1%	
2005-2030	3.8%	1.9%		1.9%			2.1%	

Sources: City of Boise, Aviation Department (Historical Airport Activity), FAA (Historical and Forecast US Activity), Ricondo & Associates, Inc., (Forecast Airport Cargo Activity)
Prepared by: Ricondo & Associates, Inc.

Table III-19

Summary of Operations Forecasts

Year	Passenger Air Carrier	Passenger Commuters / Air Taxi	General Aviation	All-Cargo	Military	Other Air Taxis	Airport Total
Historical							
2000	24,992	32,108	90,177	10,412	13,432	3,771	174,892
2005	21,978	32,962	87,425	7,208	13,317	10,164	173,054
2010	27,395	36,707	102,040	7,920	13,317	7,734	195,112
2015	30,503	41,879	165,340	8,701	13,317	8,274	268,014
2020	34,036	47,936	176,977	9,560	13,317	8,677	290,503
2025	38,057	55,044	189,789	10,503	13,317	8,882	315,592
2030	42,486	63,169	210,619	11,427	13,317	11,086	352,105
Compounded Annual Growth Rate							
2000-2005	-2.5%	0.5%	-0.6%	-7.1%	-0.2%	21.9%	-0.2%
2005-2010	4.5%	2.2%	3.1%	1.9%	0.0%	-5.3%	2.4%
2010-2015	2.2%	2.7%	10.1%	1.9%	0.0%	1.4%	6.6%
2015-2020	2.2%	2.7%	1.4%	1.9%	0.0%	1.0%	1.6%
2020-2030	2.2%	2.8%	1.8%	1.8%	0.0%	2.5%	1.9%
2005-2030	2.7%	2.6%	3.6%	1.9%	0.0%	0.3%	2.9%

Sources: City of Boise, Aviation Department (Historical Airport Activity), Ricondo & Associates, Inc. (Projected Airport Activity)
Prepared by: Ricondo & Associates, Inc.

3.5 Planning Activity Levels and Design-Hour Activity

In addition to forecasting annual activity levels at the Airport, it was necessary to forecast design level activity, defined in this Master Plan as activity during the peak hour of an average day in the peak month. These forecasts are critical, as most airports are designed to accommodate peak hour and average daily demands. **Table III-20** presents the demand level forecasts for the Airport. Standard methodologies were used to develop these design level forecasts, as described in the following sections.

3.5.1 Enplaned Passengers

The number of passengers in the peak hour is the standard aviation industry parameter used to size passenger-related airport facilities. Unlike annual enplaned passenger numbers, which are an indicator of relative airport size, peak hour statistics more accurately describe the demand for airport facilities based on specific use patterns. More accurately defined as peak month, average day, peak hour (PMADPH) passenger numbers, this factor reflects the number of enplaned, deplaned, or total passengers boarding or disembarking from aircraft in an elapsed hour on a typical day.

Table III-20

Demand Level Forecasts

	Historical	Forecast				
Enplaned Passengers	2005	2010	2015	2020	2025	2030
Total Enplanements	1,567,143	1,873,636	2,236,897	2,675,304	3,205,336	3,833,229
Peak Month (9.71% of Annual)	152,149	181,905	217,173	259,737	311,196	372,156
Average Day (31 Days)	4,908	5,868	7,006	8,379	10,039	12,005
Peak Hour (14.4% of Avg Day)	708	847	1,011	1,209	1,449	1,733
Aircraft Operations						
Air Carriers						
Annual	21,978	27,395	30,503	34,036	38,057	42,486
Peak Month (8.9 % of Annual)	1,961	2,444	2,721	3,036	3,395	3,790
Average Day (Peak Month/31 Days)	63	79	88	98	110	122
Peak Hour (21.3 % of Avg Day)	13	17	19	21	23	26
Commuters/Air Taxi						
Annual	32,962	36,707	41,879	47,936	55,044	63,169
Peak Month (9.9% of Annual)	3,253	3,622	4,133	4,730	5,432	6,234
Average Day (Peak Month/31Days)	105	117	133	153	175	201
Peak Hour (14.1% of Avg Day)	15	17	19	22	25	28
General Aviation						
Annual	87,425	102,040	165,340	176,977	189,789	210,619
Peak Month (12.3% of Annual)	10,778	12,579	20,383	21,817	23,397	25,965
Average Day (Peak Month/31 Days)	348	406	658	704	755	838
Peak Hour (15.0% of Avg Day)	52	61	99	106	113	126

Sources: City of Boise, Aviation Department (historical airport activity); Official Airline Guide (OAG) (airline data); Ricondo & Associates, Inc. (Projected Airport Passenger, General Aviation)
Prepared by: Ricondo & Associates, Inc.

To estimate the PMADPH enplaned passengers for the Airport, the following assumptions were used:

- A ratio of peak month passengers to annual passengers was computed. Using historical passenger data obtained from Airport records between 2000 and 2005, July was determined to be the peak month of the year. As shown in Table III-20, July represented 9.71 percent of annual enplanements in 2005. It was assumed that this ratio of peak month to annual activity would continue through the planning period.
- The numbers of average day enplaned passengers were then calculated by dividing by the number of days (31) in the peak month.
- Peak hour enplaned passengers for the Airport were estimated based on an analysis of the Airport's scheduled aircraft operations during an average day in July 2005. Scheduled seats for the Airport during this day were obtained from the Official Airline Guide (OAG). Based on this analysis, the peak hour for enplaned passengers accounted for 14.4 percent of the average daily seats. It was assumed that, over the planning period, this percentage of enplaned passengers during the peak hour would remain constant.

As presented in Table III-20, peak-hour enplaned passengers are forecast to increase from an estimated 708 in 2005 to 1,733 in 2030.

3.5.2 Aircraft Operations

Design hour operations were calculated for air carrier airlines, commuter/air taxi airlines, and general aviation activity at the Airport. The following discussion presents key assumptions used to estimate the PMADPH aircraft operations for the Airport for each of these categories:

- July has historically been the peak month for scheduled air carrier and commuter/air taxi airline aircraft operations at the Airport. The percentage of peak month operations to annual operations for air carrier and commuter/air taxi airlines were determined to be 8.9 percent, and 9.9 percent, respectively.
- Average daily air carrier and commuter airline aircraft operations were then calculated by dividing peak month data by the number of days in the peak month (31).
- Peak hour air carrier and commuter/air taxi aircraft operations for the Airport were estimated based on a review of the Airport's scheduled aircraft operations during an average day in July 2005. Scheduled hourly aircraft operations for the Airport were obtained from the OAG. The peak period for scheduled air carrier airline aircraft operations was determined to be from 7:20 to 8:09 a.m., with five departures. The peak period for scheduled commuter/air taxi airline aircraft operations was determined to be from 9:00 to 9:59 a.m., with six departures. It was assumed that, over the planning period, the percentage of scheduled airline operations during the peak hour would remain constant.
- FAA ATCT data were used to estimate the peak month percentage for general aviation operations. The peak month in 2005 for general aviation operations is August and accounts for 12.3 percent of total annual general aviation operations.
- The average daily operations (during the peak month) in 2005 are estimated at 348. This is projected to grow to 838 operations by 2030.

- The peak hour operations for general aviation activity were determined to remain the same from the previous master plan and account for 15.0 percent of average day general aviation operations.

As shown in Table III-20, peak hour aircraft operations for each of the various components of activity at the Airport were projected as follows:

- Air carrier airline peak-hour aircraft operations are forecast to increase from 13 in 2005 to 26 in 2030.
- Commuter/air taxi airline peak hour aircraft operations are forecast to increase from 15 in 2005 to 28 in 2030.
- General aviation peak-hour operations are forecast to increase from 52 in 2003 to 126 in 2030.

As discussed earlier, these demand planning forecasts will be used to measure the Airport's capacity to efficiently process peak-hour and annual demand, as well as to identify future airside and landside facility requirements, as presented in subsequent sections of this Master Plan.

IV. Facility Requirements

This section identifies the airside and landside facility requirements for Boise Airport ("the Airport") through the planning period (2030). The relationships between demand and capacity with regard to airport facilities are complex. Numerous issues affect how efficiently a certain level of activity (demand) can be accommodated within a specific system or facility (capacity). Furthermore, acceptable levels of service or convenience vary by user, facility, and airport sponsor.

The purpose of this section is to explore the relationships between demand and capacity in the context of various Airport systems (facilities), and to provide general assessments of the ability of existing facilities to meet future demand. These assessments are then translated into specific facility requirements at the Airport through the planning period.

The remainder of this section is organized by functional Airport system. For clarity, each functional system was assessed separately. However, the facility requirements for each functional system will ultimately be combined in the Airport Development Plan and be refined to ensure that gross facility requirements can be met. Six functional systems are identified as summarized below:

- **Airfield facilities** include the runway and taxiway system, navigational aids (NAVAIDS), and lighting and marking. The ability of the airfield system to serve forecast demand was evaluated in terms of runway capacity and design standards.
- **Passenger terminal facilities** include the terminal building from the front interior ticket counters to the gates. Enplaning, deplaning, and connecting passenger demands define the need for various facilities such as ticket counters, baggage claim devices, security screening stations, and holdrooms, among other building elements. Terminal facility requirements are summarized from existing planning and design documents related to construction of the new passenger terminal building.
- **Aviation tenant facilities** include air cargo facilities, general aviation (GA)/fixed base operator (FBO) facilities, military facilities, and other government facilities.
- **Non-aviation tenant facilities** include commercial/industrial facilities that are located on the Airport but are not in an aviation-related business and/or do not have direct access to the airfield.
- **Support facilities** include aircraft rescue and fire fighting facilities, air traffic control facilities, airport equipment and snow removal equipment facilities, and fueling facilities.
- **Parking and ground access facilities** include on-Airport ground transportation and circulation systems, such as access roadways, terminal curbfront, and vehicular parking areas. The capacity needs associated with these facilities are driven by passenger demand and the distribution of the various modes of transportation that serve the Airport and local roadway system.

The methodology used to determine facility requirements and capacity generally follows industry standards, with planning factors adjusted, as appropriate, to reflect actual use characteristics at the Airport. In calculating demand/capacity, the information presented in Section II was used, along with any additional information that more accurately reflects existing or future conditions. In addition, facility requirements identified by other studies completed on behalf of the Airport and other entities have been incorporated and referenced, where applicable.

4.1 Airfield Facility Requirements

The planning and design of an airport and its airfield facilities are typically based on the airport's role and the critical aircraft types using the airport. The FAA provides guidance for airport planning and design through Advisory Circulars (ACs) that govern airport safety, economy, efficiency, and longevity. Airfield facilities must comply to design standards, such as those set forth in AC 150/5300-13, *Airport Design*, for runway and taxiway widths and clearances to ensure that the range of aircraft projected to operate at the airport can be accommodated.

The Airport Reference Code (ARC) is used to relate airport design criteria to the operational and physical characteristics of the aircraft intended to operate at an airport, and is calculated based on specifications in AC 150/5300-13. The ARC has two components relating to an airport's design aircraft. The design aircraft is typically defined as the most demanding aircraft in terms of size and approach speed that performs, or is projected to perform, at least 250 annual operations at the airport.

The first component of the ARC, represented by a letter, is the Aircraft Approach Category (AAC), which is defined by aircraft approach speed.[1] The second component, represented by a Roman numeral, is the Airplane Design Group (ADG), as determined by aircraft wingspan. Generally, aircraft approach speed applies to runways and runway dimensional clearances, while aircraft wingspan relates primarily to dimensional separation criteria involving taxiways and taxilanes. FAA aircraft classifications for determining the ARC are presented in **Table IV-1**.

Table IV-1

FAA Aircraft Classifications

FAA Aircraft Approach Category

Approach Category	Approach Speed (knots)
A	Less than 91
B	91 or more, but less than 121
C	121 or more, but less than 141
D	141 or more, but less than 166
E	166 or greater

FAA Airplane Design Group Classification

Airplane Design Group	Wingspan (feet)	Typical Aircraft Type
I	Less than 49	Piper PA-28, Learjet 35
II	49, up to but not including 79	Cessna Citation II, Saab 340
III	79, up to but not including 118	B-737, MD-80
IV	118, up to but not including 171	A300, B-757, B-767
V	171, up to but not including 214	B-747, B-777
VI	214, up to but not including 262	A380

Source: FAA Advisory Circular 150/5300-13, *Airport Design*.
Prepared by: Ricondo & Associates, Inc., May 2008.

The Airport currently accommodates a wide variety of civilian and military aircraft operations. Based and transient GA aircraft include small single- and multi-engines (ARC A-I and B-I) and

[1] AC 150/5300-13, *Airport Design*, defines an aircraft's approach speed as 1.3 times its stall speed in landing configuration at that aircraft's maximum certificated weight.

corporate turboprops and jets (ARC B-II, C-II, and D-II). The Airport is also used by transport aircraft, such as the B-737, A320, and A300, (ARC C-III and C-IV), for transporting passengers and cargo. Military aircraft at the Airport range from helicopters to fighter jets, with the largest military aircraft using the Airport on a regular basis being the C-130 (ARC C-IV).

Based on the forecasts presented in Section III, Aviation Activity Forecasts, the future fleet mix is expected to include a greater number of aircraft operations by transport aircraft such as the B-737 and A300, providing passenger and air cargo service.

Large transport aircraft are the design aircraft for defining airfield design standards. The previous Master Plan Update for the Airport included a recommendation to plan airfield elements to ARC D-IV standards.[2] Considering the existing and future fleet mix, it is recommended that airfield areas not exclusively planned for GA aircraft be subject to ARC D-IV design standards. The following sections assess the runways, taxiways, and airfield safety areas in relation to these standards. **Table IV-2** shows the FAA ARC D-IV design criteria.

Table IV-2

FAA Design Criteria

Airfield Elements	ARC D-IV Design Criteria (feet)
Runway width	150
Runway shoulder width	25
Runway blast pad	200
Runway centerline to:	
– Taxiway centerline	400
– Aircraft parking area	500
Runway Object Free Area (width)	800
– Length beyond runway end	1,000
Runway Obstacle Free Zone (width)	400
– Length beyond runway end	200
Runway Safety Area (width)	500
– Length beyond runway end	1,000
Taxiway (width)	75
Taxiway centerline to:	
– Parallel taxiway centerline	215
– Fixed or movable object	129.5
Taxiway Object Free Area (width)	259
Taxiway Safety Area (width)	171

Note: ARC = Airport Reference Code

Source: FAA Advisory Circular 150/5300-13, *Airport Design*.
Prepared by: Ricondo & Associates, Inc., May 2008.

[2] Coffman Associates, Inc. and WHPacific, *Airport Master Plan*, *Boise Airport*, February 2001.

Airfield requirements include the characteristics of those facilities related to the arrival and departure of aircraft. A review of the ability of existing airfield facilities to accommodate future demand is presented in the following sections:

- Airfield demand/capacity analysis
- Runway system
- Taxiway system
- Navigational aids
- Lighting and marking

4.1.1 Airfield Demand/Capacity Analysis

The purpose of the airfield demand/capacity analysis is to assess the capability of the airfield facilities at the Airport to accommodate existing and forecast aircraft operations. In analyzing the ability of Airport facilities to accommodate operational demand, airfield capacity and aircraft delay were calculated using the methodologies outlined in FAA AC 150/5060-5, *Airport Capacity and Delay*.

Airfield capacity, sometimes referred to as throughput, is defined in AC 150/5060-5 as the maximum number of aircraft operations that an airfield can accommodate during a specific period of time without incurring an unacceptable level of delay. Aircraft delays increase exponentially as the number of aircraft operations (aircraft demand) nears or exceeds airfield capacity under specific operating conditions. The following terms, as defined by the FAA, are used in this analysis:

- **Peak-Hour Capacity** – Peak-hour capacity is defined as the maximum number of aircraft operations that can occur in one hour under specific operating conditions. Peak-hour capacity can only be estimated, as many factors that affect capacity are not constant. For instance, aircraft demand is not usually constant throughout the peak period. Therefore, changes in peaking characteristics cause hourly capacity to fluctuate.
- **Annual Service Volume (ASV)** – As defined in AC 150/5060-5, ASV "is a reasonable estimate of an airport's annual capacity." Annual service volume accounts for the hourly, daily, and seasonal variations in aircraft demand associated with the airfield and the occurrence of low visibility conditions during which air traffic control (ATC) procedures for the Airport are modified to maintain operational safety.

4.1.1.1 Factors Affecting Airfield Capacity

The capacity of an airfield system, including the runways and associated exit taxiways, is not constant over time. A variety of factors can affect airfield capacity, each of which is discussed below. These include:

- Airfield geometry
- Meteorological conditions
- Aircraft fleet mix
- Frequency of touch-and-go operations
- Airfield operating configurations

Airfield Geometry

The Airport has two primary air carrier runways (Runways 10L-28R and 10R-28L) that serve aircraft and an assault strip primarily used for military training operations. The airfield geometry is described in Section II, Existing Conditions. It should be noted, however, that for the purposes of the

capacity analysis, it was assumed that only the two primary air carrier runways affect airfield capacity. The assault strip is not available for commercial aircraft operations and is not connected to the primary airfield. Therefore, the assault strip does not contribute significantly to air carrier operational capacity on the two primary runways.

Meteorological Conditions

Airfield capacity can vary significantly based on meteorological conditions at an airport. Prevailing winds (direction and speed) dictate which runways can be used for aircraft arrivals and departures. Aircraft typically land and take off into the wind, and can withstand limited crosswind and tailwind conditions. If the maximum crosswind or tailwind is exceeded, the aircraft may not be able to operate safely on a particular runway. Therefore, wind conditions may prevent the use of a higher capacity airfield operating configuration (as discussed later), thus increasing aircraft delays.

Other meteorological conditions affecting airfield capacity include cloud ceiling height and visibility. Low cloud ceilings and low visibility conditions result in increased spacing between aircraft in the airspace surrounding the airport. These conditions may also restrict which runways can be used, because arrivals in these conditions may require precision approach instrumentation (i.e., an instrument landing system [ILS]).

Visual flight rules (VFR) govern the procedures used to conduct flight operations under visual meteorological conditions (VMC). Similarly, instrument flight rules (IFR) govern the procedures used to conduct flight operations under instrument meteorological conditions (IMC). The criteria for determining the two operating conditions are summarized in **Table IV-3**.

Table IV-3

Operating Conditions for Airfield Capacity and Aircraft Delay Analysis

	Meteorological Conditions		
Classification	Visibility		Cloud Ceiling
VFR	Greater than or equal to 3 statute miles	and	Greater than or equal to 1,000 feet above ground level
IFR	Less than 3 statute miles	and/or	Less than 1,000 feet above ground level

Notes:
VFR = Visual Flight Rules
IFR = Instrument Flight Rules

Source: FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*.
Prepared by: Ricondo & Associates, Inc., May 2008.

During IFR conditions (i.e., IMC), both runways have the necessary instrumentation and clearances to support arrivals. However, only Runway 10R has precision approach capability, resulting in reduced airfield capacity when visibility is below minimum requirements for a non-precision approach. However, aircraft operational demand is also reduced during IMC, as many private pilots are prohibited from flying during these conditions unless they possess an instrument rating.

Based on an analysis of hourly wind and weather observations at the Airport collected from December 30, 1996, through January 1, 2007, VFR conditions prevail at the Airport more than 94 percent of the time, while IFR conditions occur slightly more than 5 percent of the time.

Aircraft Fleet Mix

Aircraft operational fleet mix is an important factor in determining an airport's operational capacity. For the purpose of calculating capacity, aircraft are categorized according to their approach speed and weight. Operational capacity decreases as the diversity of approach speeds and aircraft weights increase. This is because aircraft following each other, either on take-off or departure, are spaced according to the difference in their air speeds and weights. Heavy aircraft create wake vortices that require greater spacing between large and small aircraft. The greater the difference in size and speed of the aircraft in the fleet, the greater the space required between aircraft and, therefore, the lower the operational capacity.

A projected operational aircraft fleet mix for the Airport was developed as part of the forecasting task of this study. The projections developed in the Master Plan forecast are used for a variety of different analyses (e.g., noise analysis, capacity analysis, and runway length and strength analysis). For the airfield capacity analysis, the aircraft fleet mix was grouped into four aircraft categories, listed in **Table IV-4**.

Table IV-4

Aircraft Classifications for Airfield Capacity

Aircraft Classification	Take-off Weight (pounds)	Types of Aircraft	Estimated Approach Speed (knots)
A	12,500 or less	Small single-engine aircraft (such as Piper PA-28, Cessna 152, and Cessna 210)	95
B	12,500 or less	Small twin-engine aircraft (such as Beechcraft Duchess, Cessna Citation II, and Learjet 35)	120
C	12,500 to 300,000	Large aircraft (such as B-737, Saab 340, and MD-80)	130
D	300,000 or more	Heavy Aircraft (such as A300, B-767, and B-777)	140

Source: FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*.
Prepared by: Ricondo & Associates, Inc., May 2008.

Table IV-5 depicts the Airport's existing and projected VFR and IFR fleet mix based on the FAA capacity aircraft classifications. Design hour fleet mix projections for VFR and IFR conditions were developed based on a review of existing fleet mix data and discussions with FAA airport traffic control tower (ATCT) staff. To determine the aircraft fleet mix during IFR conditions, it was necessary to account for the decrease in operations of smaller and less sophisticated aircraft during IFR conditions. These aircraft do not have the type of equipment required to operate under IFR conditions, or, if they do, they generally choose not to fly in adverse weather conditions.

Frequency of Touch-and-Go Operations

Touch-and-go operations are defined as operations by a single aircraft landing and departing on a runway without stopping or exiting the runway. Pilots conducting touch-and-go operations usually stay in an airport's traffic pattern, as they are generally performing training exercises. Airport capacity increases with the ratio of touch-and-go operations to total operations because aircraft in the pattern are continually making approaches. Touch-and-go operations, however, may reduce the availability of the runway for other types of operations. Based on historical operating data, it is estimated that touch-and-go operations account for approximately 40 percent of total peak hour operations at the Airport.

Table IV-5

Aircraft Fleet Mix for Airfield Capacity

Year	Fleet Mix Percents (VFR Conditions)			Fleet Mix Percents (IFR Conditions)		
	A&B	C	D	A&B	C	D
2005	53.0%	46.6%	0.4%	10%	89%	1%
2010	54.3%	45.2%	0.4%	10%	89%	1%
2015	63.2%	36.5%	0.3%	10%	89%	1%
2020	62.5%	37.2%	0.3%	10%	89%	1%
2025	61.8%	37.9%	0.3%	10%	89%	1%
2030	61.5%	38.2%	0.3%	10%	89%	1%

Source: Ricondo & Associates, Inc., May 2007.
Prepared by: Ricondo & Associates, Inc., May 2008.

Airfield Operating Configurations

The Airport's two runways are operated in different combinations (configurations) depending on meteorological conditions and operational preferences. Discussions with ATCT staff indicate that runway configurations utilizing Runways 10L and 10R for operations toward the east are preferred for noise when wind conditions allow. The runway operating configurations are grouped into VFR and IFR categories. **Table IV-6** presents the available runway operating configurations and expected annual usage based on ATCT preferences and analysis of wind data.

Table IV-6

Runway Operating Configurations

Configuration	Expected Annual Usage	Runways Used	Visibility (V) and Ceiling Height (CH)
VFR East	62.8%	10L, 10R	V ≥ 3 miles and CH ≥ 1,000 feet
VFR West	31.6%	28L, 28R	V ≥ 3 miles and CH ≥ 1,000 feet
IFR East	4.3%	10L, 10R	V < 3 miles or CH < 1,000 feet
IFR West	1.3%	28L, 28R	V < 3 miles or CH < 1,000 feet

Notes:
VFR = Visual Flight Rules
IFR = Instrument Flight Rules

Source: Ricondo & Associates, Inc., May 2007, based on discussions with FAA ATCT staff and analysis of National Oceanic and Atmospheric Administration TD3280 Hourly Weather Data from December 30, 1996 to January 1, 2007.
Prepared by: Ricondo & Associates, Inc., May 2008.

4.1.1.2 Peak Hour Airfield Capacity Analysis

The peak hour airfield capacity is defined as the number of aircraft operations that can take place on the runway system in an hour with minimal capacity-related delay. Using AC 150/5060-5, *Airport Capacity and Delay*, and the FAA's Capacity Model, the ultimate capacity was computed for each of the predominant runway configurations (VFR and IFR) at the Airport. Input requirements for these calculations include the data discussed previously, including runway configurations, runway and taxiway dimensional criteria and spacing, fleet mix, touch-and-go assumptions, and runway exit ratings. **Table IV-7** depicts the results of the hourly airfield capacity analysis for each of the runway use configurations at the Airport.

Table IV-7

Hourly Airfield Capacity Estimates

Year	Peak Hour Capacity Estimates by Airfield Configuration (Operations per Hour assuming 50% Arrivals)				Weighted Peak Hour Capacity
	VFR East	VFR West	IFR East	IFR West	
2005	99.1	99.1	53.6	55.1	96.6
2010	99.0	99.0	52.9	54.6	96.4
2015	98.8	98.8	52.3	54.1	96.2
2020	98.7	98.7	51.6	53.5	96.1
2025	98.5	98.5	51.0	53.0	95.9
2030	98.4	98.4	50.3	52.5	95.7

Notes:
VFR = Visual Flight Rules
IFR = Instrument Flight Rules

Source: Ricondo & Associates, Inc., May 2007.
Prepared by: Ricondo & Associates, Inc., May 2008.

4.1.1.3 Annual Service Volume

ASV is defined as the maximum level of annual aircraft operations that can take place at an airport. ASV can be used as a reference point for the general planning of capacity-related improvements. As annual aircraft operations approach the ASV of an airport, annual aircraft delays increase rapidly with relatively small increases in aircraft operations.

To calculate the Airport's ASV, the weighted hourly capacity of the airfield (calculated in the previous section) is used, as well as two additional factors. These are the ratio of annual demand to average daily demand in the peak month of the year (referred to as the daily ratio or D), and the ratio of average daily demand to average peak hour demand for the peak month of the year (referred to as the hourly ratio or H). The following equation is used to calculate the ASV for the Airport:

$$ASV = Weighted\ Hourly\ Capacity \times D \times H$$

Table IV-8 presents the ASV calculations for the existing airfield. Also included are the forecast operational demand and the ratio of demand to ASV in Table IV-9.

Typically, when an airport's annual operations total exceeds 60 percent of its airfield capacity, some delay is experienced. Thus, at this level of capacity, new airfield facilities should begin to be planned. When airport activity reaches 80 percent of capacity, new airfield facilities should be constructed or demand management strategies should be in place. The 60 percent planning ratio and 80 percent action ratio were applied to the projected peak hour capacity and ASV of the Airport, to determine a specific timeframe in which these milestones could be expected to be reached. Based on the projected Airport operations presented in Section III, the Airport's annual demand already exceeds 60 percent of the Airport's ASV, and planning for a new air carrier runway should be under way. By 2010, annual demand is projected to reach almost 90 percent of the ASV, indicating that new facilities should be in development or demand management strategies should be in place to mitigate increasing demands and potential delays.

Table IV-8

Annual Service Volume Calculation and Comparison with Forecast Demand

Year	Weighted Hourly Capacity	Daily Ratio (D)	Hourly Ratio (H)	Annual Service Volume[1/]	Annual Demand
2005	96.6	276.31	8.43	225,000	173,054
2010	96.4	276.56	8.42	225,000	195,112
2015	96.2	270.96	8.60	224,000	268,014
2020	96.1	271.72	8.58	224,000	290,503
2025	95.9	272.51	8.60	223,000	315,592
2030	95.7	272.79	8.54	223,000	352,105

Note:

1/ ASV values are rounded.

Source: Ricondo & Associates, Inc., May 2007.
Prepared by: Ricondo & Associates, Inc., May 2008.

4.1.1.4 Aircraft Delay

Annual aircraft delay, expressed in minutes per aircraft operation, is also an important measure of an airport's ability to accommodate projected aircraft operations. The relationship between the ratio of annual demand to ASV and the average annual aircraft delay is shown in **Table IV-9**.

Table IV-9

Relationship Between Average Service Volume and Annual Aircraft Delay

Ratio of Annual Demand to Annual Service Volume	Estimated Average Annual Aircraft Delay (Minutes per Operation)
0.1	-
0.2	0.1
0.3	0.2
0.4	0.3
0.5	0.4
0.6	0.5
0.7	0.7
0.8	0.9
0.9	1.4
1.0	2.6
1.1	3.1
1.2	4.5
1.3	6.5
1.4	9.3
1.5	13.3
1.6	19.1

Source: Ricondo & Associates, Inc., May 2007, based on FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*.
Prepared by: Ricondo & Associates, Inc., May 2008.

These relationships were derived from FAA AC 150/5060-5, *Airport Capacity and Delay*, traffic records for a number of high-capacity airports in the United States, and a range of assumptions on likely operating conditions. As shown in Table IV-9, when annual aircraft operations equal the ASV (ratio of 1.0), the average annual aircraft delay is 2.6 minutes per aircraft. The actual delay at any given time for an individual aircraft depends on several conditions that can vary the average delay by a factor of 5 to 10. For example, when an airport's demand/capacity reaches 1.0, any individual aircraft may not be delayed at all or could be delayed as much as 13 to 26 minutes, depending upon the time of day the operation occurs.

The relationships between the ratio of annual demand to ASV and the average annual aircraft delays for the Airport over the forecast period are shown in **Table IV-10**.

Table IV-10

Annual Demand, Annual Service Volume, and Average Annual Aircraft Delay

Year	Annual Service Volume	Annual Demand	Ratio of Demand to ASV	Projected Average Delay (Minutes per Operation)	Projected Total Annual Delay (Hours)
2005	225,000	173,054	0.77	0.8	2,307
2010	225,000	195,112	0.87	1.3	4,227
2015	224,000	268,014	1.20	4.5	19,919
2020	224,000	290,503	1.30	6.4	31,005
2025	223,000	315,592	1.42	9.8	51,597
2030	223,000	352,105	1.58	17.7	103,868

Source: Ricondo & Associates, Inc., May 2007, based on FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*.
Prepared by: Ricondo & Associates, Inc., May 2008.

Demand/Capacity Summary

Previous Master Plan Updates for the Airport have documented the future need for expanded airfield capacity at the Airport.[3] The results of the airfield demand/capacity analysis indicate that the Airport should currently be finalizing plans to either add additional air carrier runway capacity or to implement congestion management strategies to lower demand peaks and spread demand out through the day. Based on projected demands and current traffic peaking characteristics and runway capacity, the Airport is expected to reach its ASV capacity by approximately 2012. After that point, unless additional runway capacity is added or demand management strategies are implemented to more evenly spread demand throughout the day, projected aircraft delays could increase rapidly.

4.1.2 Runway System Requirements

In addition to the airfield demand/capacity analysis, the Airport's existing runway system has been analyzed from a number of perspectives, including conformance with FAA design criteria and runway orientation, length, and pavement strength. From this information, requirements for runway improvements have been determined for the Airport.

[3] Coffman Associates, Inc., *Airport Master Plan, Boise Air Terminal*, March 1993; Coffman Associates, Inc. and WHPacific, *Airport Master Plan, Boise Airport*, February 2001.

4.1.2.1 Runway Design Criteria

The FAA-recommended runway design criteria for ARC D-IV is presented in Table IV-2 and restated in **Table IV-11**, along with existing runway specifications at the Airport. As shown, the existing runways at the Airport currently meet recommended design criteria. Therefore, no modifications to the runways are required in order to meet design standards.

Table IV-11

FAA Runway Design Criteria

Airfield Element	ARC D-IV Design Criteria (feet)	Existing Conditions Runway 10L-28R (feet)	Existing Conditions Runway 10R-28L (feet)
Runway width	150	150	150
Runway shoulder width	25	25	25
Runway blast pad	200	n.a.[1/] / 200	200 / 200
Runway centerline to:			
– Aircraft parking area	500	> 500	> 500

Notes: ARC = Airport Reference Code

1/ Runway 10L does not have a blast pad, although Taxiway Z precedes Runway 10L and serves as a stopway in emergency situations for aircraft landing on Runway 28R.

Source: FAA Advisory Circular 150/5300-13, *Airport Design*.
Prepared by: Ricondo & Associates, Inc., May 2008.

4.1.2.2 Runway Orientation

The existing runway system at the Airport consists of two parallel runways oriented in a northwest-southeast direction. For the operational safety and efficiency of an airport, it is desirable for the primary runway to be oriented as close as possible to the direction of the prevailing wind. This reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off (defined as a crosswind).

FAA design standards recommend additional runway configurations when the primary runway configuration provides less than 95 percent wind coverage at specific crosswind components. The 95 percent wind coverage is computed on the basis of crosswinds not exceeding 10.5 knots for small aircraft weighing less than 12,500 pounds, and crosswinds from 13 to 20 knots for aircraft weighing over 12,500 pounds.

According to wind data summarized on the current Airport Layout Plan (ALP) for the Airport, the existing parallel runway configuration provides more than 95 percent wind coverage in all crosswind conditions. Therefore, no additional runway orientations are needed to achieve minimum wind coverage. **Table IV-12** summarizes the wind coverage of the existing runway system.

Table IV-12

Existing Runway System Wind Coverage

Weather Conditions	10.5 Knots	13 Knots	16 Knots	20 Knots
All weather wind coverage	98.66%	99.54%	99.91%	99.98%
IFR weather wind coverage	99.59%	99.77%	99.84%	99.94%

Notes:
IFR = Instrument Flight Rules
Knot = nautical miles per hour

Source: WHPacific, April 10, 2008, *Airport Layout Plan*. Based on data obtained from the National Oceanic and Atmospheric Association National Climatic Center. All weather wind coverage based on 87,646 observations from 1981-1990. IFR weather wind coverage based on 3,962 observations from 1981-1990.
Prepared by: Ricondo & Associates, Inc., May 2008.

4.1.2.3 Runway Length Analysis

The runway length available for aircraft arrivals and departures is governed by the location and dimensions of the runway safety area (RSA), runway object free area (ROFA), and runway protection zone (RPZ). The need for additional runway length can be determined by analyzing the runway length requirements for the design aircraft at the airport.

Based on FAA criteria, the recommended length for the primary runway is determined by first considering either the family of aircraft or the specific aircraft needing the longest runway. In either case, the choice should be based on aircraft that are projected to use the runway on a regular basis (i.e., 500 or more operations per year).

To estimate the length of the primary runway needed to accommodate aircraft operating at the Airport, AC 150/5325-4A, *Runway Length Requirements for Airport Design*, was used. The runway length analysis set forth in AC 150/5325-4A relates to both arrivals and departures; however, departures normally require more runway length. The required departure distance can be defined as the longest of the following three distances:

- **Accelerate-take-off distance** – Assuming that one engine fails at the critical take-off speed (V_1), the aircraft is required to be able to continue take-off and climb to 35 feet above the runway elevation prior to the end of the runway (or clearway if present).
- **Accelerate-stop distance** – The distance needed for the aircraft to accelerate to V_1 and then brake to a full stop.
- **All-engine take-off distance** – 115 percent of the distance needed to reach 35 feet above the runway elevation with all engines working.

Note that as the critical take-off speed increases, the accelerate-take-off distance decreases, while the accelerate-stop distance increases. The design methodology provides for a "balanced field length" runway design, or a runway length at which the tradeoff between reduced accelerate-take-off distance approximately equals increased accelerate-stop distance.

To estimate the primary runway length needed to accommodate aircraft operating at the Airport, aircraft manufacturers' data for several aircraft expected to operate at the Airport were obtained. Runway length under the AC 150/5325-4A methodology is a function of the Airport's normal maximum operating temperature, elevation, aircraft loads, and the length of haul (stage length)

performed by the aircraft. As presented in Section III, the Airport is expected to accommodate more than 250 operations per year by the following commercial aircraft types in 2010:

- B-737-300, -400, -700, and -800 series (80 percent of fleet), with the B-737-300 representing 46 percent of the fleet in 2010, based on projected departures.
- A319 (5 percent of fleet)
- A320 (12 percent of fleet)
- MD-80 (2 percent of fleet)

The B-737-300 was used to represent air carrier aircraft performance based on its predominance in the fleet in 2010. Based on the *Boeing 737 Airplane Characteristics for Airport Planning*, and given a temperature of ISA[4] + 27 degrees Fahrenheit (i.e., 78.9°F), an airport elevation of 2,871 feet and zero wind, the B-737-300 (CFM56-3B-1 engines) requires a runway length of 10,800 feet at 96.7 percent of maximum take-off weight (maximum tire speed limit reached).

In addition, as noted in Section III, the Airport is expected to accommodate Airbus 300s as FedEx and UPS have either started or plan to start operating A300s at the Airport. Based on the *Airbus 300 Airplane Characteristics for Airport Planning*, and given a temperature of ISA + 27 degrees Fahrenheit (i.e., 78.9°F), an airport elevation of 2,871 feet, and zero wind, the A300-600 (GE CF6-80C2 engines) requires a runway length of 10,900 feet at 80 percent of its maximum take-off weight. Currently, Runway 10L-28R is 10,000 feet long and Runway 10R-28L is 9,763 feet long. Additional runway length is needed on at least one of the runways to meet the runway length requirements driven by the A300 aircraft operating at 80 percent of its maximum take-off weight.

4.1.2.4 Pavement Strength

Runway pavement strength can be expressed in terms of its load-bearing capacity under single wheel loading, dual wheel loading, and dual tandem wheel loading conditions. The aircraft gear type and configuration dictates how the aircraft weight is distributed on the pavement and determines pavement response to loading. Examination of gear configuration, tire contact areas, and tire pressure in common use areas indicates that pavement strength is related to aircraft maximum take-off weight.

Currently, the load-bearing capacities of Runways 10L-28R and 10R-28L are 75,000 pounds under single wheel loading, 200,000 pounds under dual wheel loading, and 400,000 pounds under dual tandem wheel loading, as stated in Section II, Existing Conditions.

Using the guidelines set forth in AC 150/5320-6D, *Airport Pavement Design and Evaluation*, the runway pavement needs to be able to accommodate frequent operations of aircraft that currently operate at the Airport as well as aircraft projected to operate in future years. **Table IV-13** summarizes the current and future fleet mix and its corresponding maximum take-off weights and load-bearing capacities required of Runways 10L-28R and 10R-28L. As shown, the existing runways can accommodate the pavement loading imposed by the aircraft currently using and projected to use the runway through the planning period. Pavement design typically allows for aircraft weighing more than the design pavement strength, such as the B-757-200, to operate occasionally on the runways.

[4] International Standard Atmosphere

Table IV-13

Existing Runway System Pavement Strength

Aircraft	Gear Type	Maximum Take-off Weight (pounds)	Existing Runway Load Bearing per Gear Type (pounds)
Fairchild A-10	Single Wheel	50,000	75,000
B737-300	Dual Wheel	139,000	
B737-400	Dual Wheel	150,000	
B737-500	Dual Wheel	136,000	
B737-700	Dual Wheel	154,500	
B737-800	Dual Wheel	174,200	
B737-900	Dual Wheel	174,200	200,000
B757-200	Dual Wheel	255,000	
A319	Dual Wheel	154,322	
A320	Dual Wheel	169,754	
MD-80	Dual Wheel	149,500	
MD-90	Dual Wheel	156,000	
Lockheed C-130	Dual Wheel	155,000	
A300-600	Dual Tandem Wheel	363,760	400,000

Source: FAA Advisory Circular 150/5300-13, *Airport Design, Appendix 13* (maximum take-off weight); www.airnav.com, accessed September 2007 (existing runway load bearing); Ricondo & Associates, Inc., February 2007 (fleet mix).
Prepared by: Ricondo & Associates, Inc., May 2008.

4.1.3 Taxiway System Requirements

The taxiway system at the Airport should be designed to provide for free movement of aircraft to and from the runways, terminal, and aircraft parking areas. It is desirable to maintain a smooth flow with a minimum number of changes required in an aircraft's taxiing speed.

FAA taxiway design criteria detailed in AC 150/5300-13, *Airport Design*, provide the basis for defining the taxiway system requirements. Specific criteria include the need to provide a full-length parallel taxiway to allow for the most efficient and safe movement of aircraft from the runway to the terminal area, crossfield taxiing capability, sufficient queuing areas, and high-speed runway exit taxiways to allow for reduced approach distances between arriving aircraft. Additional taxiway design principles, as stated in AC 150/5300-13, include:

- Build taxiways to provide as direct a route as possible.
- Provide bypass capability or multiple access to runway ends.
- Minimize runway crossings.
- Provide ample curve and fillet radii.
- Avoid traffic bottlenecks.

Table IV-2 presents the ARC D-IV FAA design criteria for taxiways. Currently, all taxiways meet or exceed the design criteria.

Runway 10L-28R has the full-length parallel Taxiway A located north of the runway and separated by 400 feet from its centerline to the runway centerline. Runway 10R-28L has the partial parallel Taxiway B located south of the runway and separated by 437.5 feet from its centerline to the centerline of the runway. Separations between both runway centerlines and their respective parallel

taxiway centerlines meet the design criteria of 400 feet of separation. Connecting taxiways are provided throughout the airfield: C, D, E, F, G, H, J, K, M, N, and Z.

As shown in Table IV-2, FAA design criteria specify that for ARC D-IV, taxiways should be 75 feet wide with at least 25-foot shoulders. Nearly all taxiways at the Airport meet or exceed this standard. The exceptions are Taxilane N, which is 50 feet wide, and Taxilanes A-1 and A-2, which are 45 feet wide. Taxilane N meets ADG III standards and Taxilanes A-1 and A-2 meet ADG II standards, which is adequate for the aircraft types utilizing these taxilanes.

No taxiway upgrades or improvements should be required through the planning period, except as may be necessary to support future runway, terminal, or other land use development.

4.1.4 Airfield Safety Areas

The FAA's design standards for the various airfield safety areas, as they relate to the Airport, are presented in this section. The following airfield safety areas were evaluated for the Airport:

- Runway Safety Area
- Runway Object-Free Area
- Obstacle-Free Zone
  - Runway Object-Free Zone
  - Inner-Approach Object-Free Zone
  - Inner-Transitional Object-Free Zone
- Runway Protection Zone
- FAR Part 77 Primary Approach and Transitional Surfaces

4.1.4.1 Runway Safety Area

Runway Safety Areas (RSAs) are rectangular areas centered on runway centerlines, which, under normal (dry) conditions, are capable of supporting aircraft without causing structural damage to the aircraft or injury to its occupants, should an aircraft inadvertently leave the paved runway surface. To serve this function, the FAA requires RSAs to be (1) cleared and graded, (2) drained by grading or storm sewers to prevent water accumulation, and (3) free of objects, except those that need to be located in the RSA because of their function (e.g., approach lighting, NAVAIDS, etc.).

Based on FAA design criteria for ARC D-IV, the RSAs for Runways 10L-28R and 10R-28L should be 500 feet wide (i.e., 250 feet on either side of the runway centerline) and extend 1,000 feet beyond the runway ends. Currently, all RSAs for Runways 10L-28R and 10R-28L meet or exceed these design criteria.

4.1.4.2 Runway Object-Free Area

Runway Object-Free Areas (ROFAs) are rectangular areas centered on runway centerlines that are required to be clear of objects protruding above the RSA edge elevation, with the exception of those objects that are essential to air navigation or aircraft ground maneuvering.

For runways serving Approach Category C and D aircraft, ROFAs must be 800 feet wide (i.e., extending 400 feet on either side of the runway centerline). Prior to 1991, ROFAs serving Approach Category C and D aircraft were required to extend 1,000 feet beyond the runway end, whether or not a stopway was provided. In 1991, the FAA changed ROFA design standards, requiring ROFAs serving Approach Category C and D aircraft to extend 1,000 feet beyond the end of the runway or

1,000 feet beyond the end of the stopway if a stopway is provided. Extensions of ROFAs beyond this distance are encouraged by the FAA, but are not required.

Currently, all ROFAs for Runways 10L-28R and 10R-28L, as shown on the ALP, meet FAA design criteria for ARC D-IV, and no changes except those that may be dictated by future runway development should be required through the planning period.

4.1.4.3 Obstacle-Free Zone

An Obstacle-Free Zone (OFZ) is a volume of airspace centered on a runway centerline, and is defined by the FAA as "the airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible NAVAIDS that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from a runway, and for missed approaches."[5] The OFZ is intended to protect an aircraft's transition from ground to airborne operations (and vice versa). Airports with non-precision runway approach procedures are only required to comply with the runway component of the OFZ criteria, while airports with precision instrument approach procedures or approach lighting systems are required to comply with additional area components. FAA criteria prohibit taxiing, parked aircraft, and object penetrations within OFZs, except for frangible NAVAIDS with fixed locations.

- **Runway OFZ** – The runway OFZ is a volume of airspace centered above the runway that supports the transition of ground to airborne aircraft (and vice versa). In general, the required runway OFZ is typically 400 feet wide for runways serving large aircraft and 250 feet wide for non-precision and visual approach runways serving smaller aircraft. All OFZs extend 200 feet beyond the runway ends lengthwise. Based on these factors, the runway OFZ for Runway 10R-28L, a precision instrument approach runway, should be 400 feet wide. The runway OFZ for Runway 10L-28R, a non-precision approach runway, should also be 400 feet wide, as this runway is not limited to small aircraft as defined by the FAA (less than 12,500 pounds take-off weight).
- **Inner-Approach OFZ** – The inner-approach OFZ is a volume of airspace centered on the approach area that applies only to runways equipped with approach lighting. For this reason, the inner-approach OFZ applies only to Runway 10R. The inner-approach OFZ begins 200 feet from the runway threshold and extends 200 feet beyond the last unit in the approach lighting system. It has the same width as the runway OFZ and rises at a slope of 50:1 away from the runway end. Any objects that penetrate the inner-approach OFZ are listed on the Airport Obstruction Chart.
- **Inner-Transitional OFZ** – The inner-transitional OFZ is a defined volume of airspace along the sides of the runway and inner-approach OFZ. It applies only to runways with lower than ¾-statute-mile approach visibility minimums. The ILS approaches for Runway 10L have visibility minimums of or less than ½ statute mile, while the Area Navigation (RNAV) approach for Runway 28L also has a ½-statute-mile visibility minimum. Therefore, Runway 10R-28L is the only runway at the Airport subject to inner-transitional OFZ object clearance restrictions. Any objects that penetrate the inner-transitional OFZ are listed on the Airport Obstruction Chart.

[5] FAA Advisory Circular 150/5300-13, *Airport Design*, 9/29/89, pg. 22.

4.1.4.4 Runway Protection Zone

The Runway Protection Zone (RPZ) is a trapezoidal area centered on the extended runway centerline. The length and width of the RPZ are contingent on the size of the aircraft operating on the runway as well as the type of approach (i.e., visual or instrument) and approach minima available. RPZs are designed to enhance the protection of people and property on the ground. To achieve this goal, the FAA recommends that the airport operator own the property in the RPZ. This area should be free of land uses that create glare and smoke. Additionally, the FAA recommends that airport operators keep the RPZs clear of incompatible land uses, specifically residences, fuel storage facilities, and places of public assembly (e.g., churches, schools, office buildings, and shopping centers). Typically, a single RPZ is associated with each runway end; however, the FAA has suggested that separate approach and departure RPZs be defined for any runway end with a displaced arrival threshold. The Airport does not have any displaced thresholds or declared distances.

The FAA provides dimensional criteria for RPZs that are based on runway approach visibility minimums and the ADG associated with each runway. All RPZ trapezoids begin 200 feet beyond the threshold of a runway. For runways with approach visibility minimums lower than ¾ statute mile, the RPZ dimensions are 1,000 feet wide at the closest end of the runway (inner width), 1,750 feet wide at the end farthest from the runway end (outer width), and 2,500 feet long. For runways with visual approaches and approach visibility minimums not lower than 1 statute mile, the RPZ dimensions for facilities expected to serve aircraft in Approach Categories C and D include an inner width of 500 feet, an outer width of 1,010 feet, and a length of 1,700 feet.

The ALP depicts and describes the existing and planned RPZs for the Airport. The RPZs for Runway 10L-28R are planned to be redefined to precision approach RPZs to accommodate the upgrade of the runway to ILS capabilities. Currently, except for small areas to the northwest of the airfield, all property within the runway RPZs falls within the Airport property boundary and is therefore controlled by the Airport. Land use within these RPZ areas is compatible. With the planned enlargement of the Runway 10L RPZ, attention should be paid to the land use within this area to maintain compatibility.

4.1.5 FAR Part 77 Primary Approach and Transitional Surfaces

Approach threshold siting requirements are controlled by imaginary airspace surfaces that extend from the ends of the runway at specified angles and slopes. These surfaces are described in FAR Part 77, *Objects Affecting Navigable Airspace Subpart C, Obstruction Standards*.

Part 77 Subpart C establishes standards for determining obstructions to air navigation. It applies to existing and proposed man-made objects, objects of natural growth, and terrain. The standards apply to the use of navigable airspace by aircraft, and to existing air navigation facilities, such as navigational aids, airports, federal airways, instrument approach or departure procedures, or approved off-airway routes. Additionally, the standards apply to a planned facility or use, or a change in an existing facility or use.

Part 77 surfaces include five standard surfaces established for each of the Airport runway ends, based on the category of each runway:

- **Primary Surface** – a rectangular surface aligned to the runway centerline that extends 200 feet beyond each end of the runway. The elevation of the primary surface is the same as the runway elevation.

- **Horizontal Surface** – an oval-shaped surface drawn 150 feet above the established airport elevation, based on 10,000-foot radius arcs from the center of each end of the primary surfaces.
- **Conical Surface** – a surface drawn based on the horizontal surface that extends outward and upward at a 20:1 slope ratio.
- **Transitional Surface** – a surface drawn based on the primary, horizontal, and conical surfaces, with transitional surfaces extending outward and upward at a 7:1 slope ratio.
- **Approach Surface** – a horizontal surface starting 200 feet beyond each runway end, with its size and width based on the existing and planned approaches available for each runway.

The current ALP set contains sheets illustrating plans and profiles of Part 77 surfaces and approaches. In addition, the sheets list objects that penetrate any of these surfaces, and describe how the penetration has been or will be resolved.

4.1.6 Navigational Aids

Air-to-air and ground navigation or navigational aid requirements for the Airport are based on recommendations contained in AC 150/5300-13, *Airport Design*.

The distinction between a precision and non-precision NAVAID is that the former provides electronic descent (vertical) and alignment (horizontal) guidance, while the latter provides only alignment guidance. An airport is equipped with either precision or non-precision capability based on safety considerations and airport operational requirements. The type and volume of aeronautical activity used in association with meteorological airspace and capacity data determine an airport's eligibility and need for various NAVAIDS.

Existing instrumentation and lighting systems at the Airport are summarized in Section II. For this Master Plan Update, required NAVAIDS are divided into the two general categories: electronic approach NAVAIDS and visual approach NAVAIDS. These two categories of NAVAIDS are discussed in the following sections.

4.1.6.1 Electronic Approach NAVAIDS

This category of NAVAIDS is used to assist pilots using instrument approaches to an airport. An instrument approach is a series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight from the beginning of its initial approach to its landing, or to a point from which a landing may be made visually.

A Category (CAT) II ILS precision approach is currently provided to Runway 10R, which provides guidance to the runway when visibility is ½-mile or greater and the ceiling is at least 200 feet above the Airport elevation. The Airport has received authorization from the FAA to conduct more precise CAT II ILS approaches using the CAT I system on Runway 10R. Because Runway 10R is not equipped with an ALSF-2 approach lighting system,[6] the CAT II ILS approach is limited to aircraft equipped with a Heads-up Guidance System (HGS). In November 2007, a CAT III ILS approach

[6] A high intensity approach lighting system with sequenced flashing lights (ALSF-2) consists of 247 steady burning lights plus an additional 15 flashing lights (strobes). The strobes flash in sequence starting with the strobe farthest from the runway and ending with the strobe closest to the runway threshold. The lights are spaced at 100-foot intervals from the runway threshold outward to 2,400 feet.

was activated for Runway 10R, but has not yet been published. The FAA is installing an ALSF-2 approach lighting system on 10R in the 2008-2009 timeframe.

In addition to the precision ILS approaches to Runway 10R, one or more non-precision approaches are available for each runway end at the Airport. Non-precision instrument approaches available at the Airport are detailed in Section II. Approach minimums vary among different types of non-precision approaches and the aircraft utilizing the approaches, but in general, the minimums are greater than those published for precision ILS approaches. The global positioning system (GPS) approaches published for each end of Runway 10R-28L allow for precision-level minimums of ½-mile for appropriately equipped aircraft.

To address the need for precision approach capability for aircraft arriving from the east, the FAA is installing a test ILS on Runway 28R. The system will be flight checked in 2008, with certification as a CAT I ILS in early 2009. Full implementation of the CAT I ILS will necessitate installation of a localizer off the end of the Runway 10L threshold, a glideslope antenna adjacent to the touchdown area on Runway 28R, and outer and middle distance markers along the approach path.

With the lowering of approach minimums for Runway 10R, GPS approaches to all runway ends, and programming and implementation of a CAT I ILS on Runway 28R, existing and planned electronic NAVAIDS are expected to be adequate for safely accommodating existing and projected demand at the Airport in all weather conditions through the planning period.

4.1.6.2 Visual Approach NAVAIDS

As described in Section II, all runway ends at the Airport are currently equipped with four-box visual approach slope indicator (VASI) systems, which aid pilots in maintaining the correct approach slope to the runway. However, the FAA considers precision approach path indicator (PAPI) installations easier to maintain and more precise. A PAPI consists of four bars that appear to project a red or white light depending on the position of the aircraft in reference to the glideslope. It is recommended that planning continue to provide for the future replacement of the existing VASI systems with PAPI systems, as suggested in the previous Master Plan Update.[7]

4.1.7 Lighting and Marking

As described in Section II, there are a number of lighting and pavement marking aids available at the Airport to assist pilots in locating the Airport at night or during poor weather conditions, as well as to assist in the movement of aircraft on the ground.

Airfield Lighting

Both runways at the Airport are equipped with high intensity runway lighting (HIRL), which is sufficient and should be maintained through the planning period. In addition, Runway 10R-28L is equipped with centerline and touchdown zone lighting. Approach lighting should be installed in support of the planned CAT I ILS on Runway 28R and the approved Surface Movement Guidance and Control Systems (SMCGS) program for IFR operations. Medium intensity taxiway edge lighting is available on all taxiways to facilitate the safe ground movement of aircraft at night.

Approach lighting systems provide the means to transition from instrument flight to visual flight for landing. A medium intensity approach lighting system with runway alignment lighting (MALSR) is

[7] Coffman Associates, Inc. and WHPacific, *Airport Master Plan, Boise Airport*, February 2001.

currently installed on both ends of Runway 10R-28L in support of approach minimums of ½-mile or less on this runway. As discussed previously, Runway 10R is not currently equipped with an ALSF-2 approach lighting system, thus requiring special onboard equipment for aircraft utilizing the CAT II ILS capability of this runway. Installation of an ALSF-2 system is currently programmed for Runway 10R, which will facilitate use of CAT II and ultimately CAT III ILS approaches for this runway. A MALSR approach lighting system should be installed on Runway 28R to support the CAT I ILS planned for the runway.

Airfield Marking

Runway markings are designed according to the type of instrument approach available on the runway. AC 150/5340-1F, *Marking of Paved Areas on Airports*, provides the guidance necessary to design an airport's markings.

Runway 10R-28L has precision runway markings, while Runway 10L-28R has non-precision markings. All runway markings are reported to be in good condition. Installation and implementation of a CAT I ILS on Runway 28R will require the runway to be marked as a precision instrument runway by adding touchdown zone markings. To ensure that aircraft remain on designated pavement areas, yellow centerline stripes are currently painted on all taxiway and apron surfaces at the Airport. Aircraft parking positions are also marked on each apron area. With routine maintenance, these markings are anticipated to be adequate through the planning period.

4.2 Passenger Terminal Facility Requirements

As described in Section II, the passenger terminal complex is comprised of a main terminal building, one connected concourse (Concourse B), and one integrated ground load concourse (Concourse C) located on the airside portion of the first floor of the main terminal building. Phase 1 and Phase 2 construction of the main terminal building and Concourse C were completed in 2003 and 2005, respectively.

Planning and design documents related to the programming, phasing, and construction of the terminal facility were compiled into a schematic design manual.[8] Among the planning efforts undertaken as part of the terminal development project was the development of facility requirements, the implementation of which is triggered by the following passenger activity levels (PALs):

- PAL 1 = 3,000,000 annual passengers
- PAL 2 = 4,500,000 annual passengers
- PAL 3 = 6,000,000 annual passengers

The main terminal building and integrated Concourse C were constructed to meet the demand requirements of PAL 1, which occurred in 2005. According to statistics obtained from the City of Boise, 3,139,158 passengers passed through the terminal complex in 2005. Total passengers increased to 3,365,303 in 2007. Based on the preferred forecast of enplaned passengers presented in Section III, PAL 2 is projected to occur by 2016, and PAL 3 is projected to occur by 2024.[9]

Programmed requirements for passenger terminal facilities were focused on aircraft gates and the passenger terminal building. **Table IV-14** presents the programmed airside terminal requirements,

[8] CSHQA and HNTB Corporation, *Boise Air Terminal Project, Passenger Terminal Building – Schematic Design Manual*, February 15, 1999.

[9] Timing for each PAL assumes that the number of total passengers is equal to twice the number of enplaned passengers.

which include aircraft gates and ramp frontage. As shown, additional gates and ramp frontage will be required through the planning period.

Table IV-14

Passenger Terminal Airside Facility Requirements

	PAL 1 (2005) [1/]	PAL 2 (2016)	PAL 3 (2024)
Gates			
Gates required	22 [2/]	23	31
Existing gates available	22	22	22
Additional gates required	0	1	9
Ramp frontage (linear feet)			
Ramp frontage required	2,610	2,760	3,830
Existing ramp frontage available	2,610	2,610	2,601
Additional ramp frontage required	0	150	1,229

Notes: PAL = Passenger Activity Level

1/ No significant terminal development has occurred since completion of Phase II of the new terminal project in 2005, which corresponds to PAL 1. Therefore, facilities programmed for PAL 1 are assumed to represent existing conditions.

2/ A total of 20 gates were programmed for PAL 1. Since 2005, two additional gates have been added to Concourse B, bringing the total number of existing gates to 22.

Source: CSHQA and HNTB Corporation, *Boise Air Terminal Project, Passenger Terminal Building – Schematic Design Manual*, February 15, 1999.

Prepared by: Ricondo & Associates, Inc., May 2008.

Programmed terminal building facility requirements were developed for functional areas of the terminal, such as ticketing, baggage areas, holdrooms, and concessions. As shown in **Table IV-15**, additional terminal building facilities/areas will be required to meet passenger demand associated with PAL 2 and PAL 3.

Interviews with Airport staff provided further assessment of the ability of existing terminal facilities to meet future demand as follows:

- Airline ticket offices are provided on the second level on a preferential basis. There is a need for additional small offices to accommodate potential future demand.
- Four sortation piers are available for airline use in sorting checked baggage. Additional sortation piers are needed, along with more space for the efficient flow of ground support equipment.
- Pre- and post-security concession areas are currently adequate, although more storage is needed for post-security concessions.
- Airline operations space beneath the terminal and Concourse B is limited.
- Airport administrative offices located on the third floor have adequate space, although additional space may be needed for expanding and reorganizing the operations center.

Table IV-15

Passenger Terminal Facility Requirements

	PAL 1 (2005) [1/]	PAL 2 (2016)	PAL 3 (2024)
Ticket counter frontage (linear feet)			
Ticket counter frontage required	230	290	380
Existing ticket counter frontage available	230	230	230
Additional ticket counter frontage required	0	60	150
Public ticketing area (square feet)			
Public ticketing area required	13,800	17,400	22,800
Existing public ticketing area available	13,800	13,800	13,800
Additional public ticketing area required	0	3,600	9,000
Baggage claim devices (units)			
Baggage claim devices required	4	6	8
Existing baggage claim devices available	4	4	4
Additional baggage claim devices required	0	2	4
Public baggage claim area (square feet)			
Public baggage claim area required	33,800	48,850	64,450
Existing public baggage claim area available	33,800	33,800	33,800
Additional public baggage claim area required	0	15,050	30,650
Baggage handling area (square feet)			
Baggage handling area required	21,100	27,400	36,400
Existing baggage handling area available	21,100	21,100	21,100
Additional baggage handling area required	0	6,300	15,300
Holdroom area (square feet)			
Holdroom area required	36,600	41,400	59,100
Existing holdroom area available	36,600	36,600	36,600
Additional holdroom area required	0	4,800	22,500
Concession retail area (square feet)			
Concession retail area required	20,900	26,600	37,100
Existing concession retail area available	20,900	20,900	20,900
Additional concession retail area required	0	5,700	16,200

Notes: PAL = Passenger Activity Level

1/ No significant terminal development has occurred since completion of Phase II of the new terminal project in 2005, which corresponds to PAL 1. Therefore, facilities programmed for PAL 1 are assumed to represent existing conditions.

Source: CSHQA and HNTB Corporation, *Boise Air Terminal Project, Passenger Terminal Building – Schematic Design Manual*, February 15, 1999.

Prepared by: Ricondo & Associates, Inc., May 2008.

4.3 Aviation Tenant Facility Requirements

As described in Section II, aviation tenants include all tenants that engage in flying or aircraft maintenance and have access to the airfield. For this Master Plan Update, facility requirements have been identified for air cargo, GA, military, and other government aviation tenants.

4.3.1 Air Cargo Facility Requirements

Air cargo facilities at the Airport are used by both integrated cargo carriers and passenger airlines. There are six air cargo buildings with a total of 73,690 square feet. To estimate the future building space needs of the various cargo tenants, a utilization factor, represented by the number of tons processed per square foot of cargo building, was applied.

Based on 2007 cargo volumes, the existing utilization rate is 0.64 tons per square foot. This is well below a conservative industry standard rate of 1.5 tons per square foot. The Airport's lower utilization rate may be due to a number of factors, including how the facilities are used. The cargo buildings in use by the passenger airlines may also be used for other functions. For example, the United Airlines cargo facility is shared by FBO fuelers and the Delta Airlines cargo facility is collocated with the in-flight kitchen facility. Additionally, the integrated cargo carriers may process truck-to-truck freight and mail through the cargo building, which would not be recorded as air cargo.

Air cargo building space requirements are presented in **Table IV-16**. The building requirements presented were calculated on both the existing utilization rate of 0.64 tons per square foot and the industry standard rate of 1.5 tons per square foot. Based on the existing utilization rate, additional cargo facilities could be required throughout the planning period. As shown in Table IV-16, an additional 113,610 square feet of cargo building space would be required by 2030.

Air cargo building requirements with the industry utilization rate assume that the cargo carriers increase the amount of cargo processed on a per square foot basis. Based on standard industry utilization rates, the existing cargo building space is sufficient to accommodate the space requirement beyond 2025. As shown, only a modest 5,800-square-foot deficiency would be realized by 2030.

The cargo building requirements presented indicate that there is a possibility for existing facilities to absorb some demand, especially in the near term. However, utilization to the level of 1.5 tons per square foot may not be achievable based on individual operator preferences and secondary uses within the buildings. Therefore, prior to the development of future cargo facilities, it is recommended that a more in-depth analysis of cargo facility space utilization be conducted.

The cargo building requirement provides the template from which the remainder of the cargo facility is planned. At a typical depth of 100 to 150 feet, the cargo building provides an interface between airside and landside. The airside includes the aircraft parking apron, along with space for the movement of service equipment and cargo containers. The landside provides truck docks, employee parking, and connection to the road network. Assuming the depth of future air cargo buildings is 125 feet, an air cargo building length of approximately 900 linear feet will be required under the existing utilization. Using cargo industry utilization standards, only 46 linear feet of additional building would be needed.

Table IV-16

Air Cargo Building Requirements

Year	Air Cargo Forecast (tons)[1/]	Existing Utilization [2/] Cargo Building Requirement (square feet)	Existing Utilization [2/] Cargo Building Surplus or (Deficiency)	Industry Standard Utilization [3/] Cargo Building Requirement (square feet)	Industry Standard Utilization [3/] Cargo Building Surplus or (Deficiency)
2010	58,346	91,600	(17,910)	38,900	34,790
2015	71,290	111,900	(38,210)	47,500	26,190
2020	85,860	134,800	(61,110)	57,200	16,490
2025	101,923	160,000	(86,310)	67,900	5,790
2030	119,279	187,300	(113,610)	79,500	(5,810)

Notes:

1/ Air cargo total equals freight plus mail, converted from pounds to tons.

2/ 0.64 tons per square foot

3/ 1.50 tons per square foot

Source: Ricondo & Associates, Inc., April 2008.
Prepared by: Ricondo & Associates, Inc., May 2008.

4.3.2 General Aviation Facility Requirements

In 2007, GA accounted for approximately 52 percent of total aircraft operations at the Airport.[10] This assessment includes facilities that serve GA aircraft based at the Airport, as well as transient aircraft that require apron parking and/or flight support services. These facilities include aircraft parking aprons and aircraft storage/maintenance hangars. GA facilities are described in detail in Section II. Existing GA facilities consist of approximately 1,880,000 square feet of apron used for transient aircraft parking as well as for tie-down storage for based aircraft, 60 T-hangar units that total approximately 72,900 square feet, and 24 conventional hangars used by 11 FBO or corporate tenants (approximately 460,030 square feet).

4.3.2.1 Itinerant Aircraft Parking Apron Area Requirements

The requirements for GA apron space are driven by the need to accommodate based aircraft parked on the ramp, and by demand for parking area to accommodate transient or itinerant aircraft. Planning standards recommend the use of different area requirements for based aircraft versus transient aircraft. Therefore, for planning purposes, the needs of each were analyzed separately and then combined to provide the overall apron space requirement throughout the planning period.

Itinerant aircraft aprons are intended to accommodate relatively short-term aircraft parking, usually less than 24 hours, and are generally used by transient aircraft. Such aprons should be located to provide easy access to the terminal, fueling, and ground transportation facilities, and configured to allow for safe and efficient taxiing movements between parking positions and the airfield. The requirements for transient aircraft parking were derived by using the guidelines provided in AC 150/5300-13, *Airport Design*. The FAA guidelines, in conjunction with specific local factors, help in determining the number of aircraft parking positions that would be needed to accommodate transient aircraft based on projected demand. Based on these guidelines, the itinerant parking demands for the Airport were calculated, as presented in **Table IV-17**.

[10] 2007 aircraft operation totals do not include any activity associated with the military assault strip.

Table IV-17

Itinerant Aircraft Parking Position Demand

Year	Annual Itinerant General Aviation Operations	Peak Month Operations [1/]	Peak Month Average Day Operations [2/]	Total Required Parking Positions [3/]
2010	68,080	8,374	270	74
2015	81,337	10,004	323	89
2020	90,182	11,092	358	98
2025	99,989	12,299	397	109
2030	115,619	14,221	459	126

Notes:

1/ Peak month represents 12.3% of annual operations (see Section III, Aviation Activity Forecasts).

2/ Peak month operations divided by 31.

3/ Assumes that 50% of transient aircraft require parking positions at any one time plus 10% reserve.

Source: Ricondo & Associates, Inc., April 2008.
Prepared by: Ricondo & Associates, Inc., Mary 2008.

When planning apron area requirements, provision must be made for the aircraft parking area as well as the taxilanes leading to the parking positions. The calculation of the itinerant aircraft parking apron area requirement is calculated by multiplying the number of required parking spaces by the average amount of ramp area needed to accommodate one aircraft, taking into consideration the peak month average day (PMAD) itinerant operations at the Airport. To determine the area required for movement of aircraft between parking positions, half the width of the respective ADG taxilane object-free area (OFA) and a 10-foot clearance between each aircraft parking position was applied.

Using this approach, a ramp area of 3,400 square feet was assumed for each ADG I aircraft (primarily single- and small twin-engine aircraft, and a limited number of small business jets). ADG II aircraft include most small, mid-size, and heavy business jets, with the average ramp area required to accommodate these aircraft estimated to be about 7,500 square feet per aircraft. Finally, ADG III aircraft include large business jets, such as the Gulfstream V or Global Express, which require a minimum ramp area of 20,400 square feet per aircraft.

Table IV-18 reflects the transient aircraft apron required at the Airport. Given the current split of aircraft types in the fleet mix serving the Airport, and taking into consideration the anticipated growth in the proportion of business jets in the general aviation fleet, the transient aircraft fleet mix was estimated. It was assumed that throughout the planning period 70 percent of the transient aircraft would be ADG I, 25 percent would be ADG II, and 5 percent would be ADG III.

Table IV-18

Transient Aircraft Parking Requirements

Year	Apron Requirement by Airplane Design Group[1/] (square feet)			
	ADG I	ADG II	ADG III	Total
2010	176,796	139,283	75,770	391,800
2015	211,223	166,405	90,524	468,200
2020	234,192	184,500	100,368	519,100
2025	259,660	204,564	111,283	575,500
2030	300,249	236,541	128,678	665,500

Notes: ADG = Airplane Design Group
1/ Utilization based on 70% ADG I, 25% ADG II, and 5% ADG III.

Source: Ricondo & Associates, Inc., April 2008.
Prepared by: Ricondo & Associates, Inc., May 2008.

4.3.2.2 Based Aircraft Storage Requirements

As documented in Section II, 315 aircraft are currently based at the Airport. For aircraft storage purposes, there are three general storage categories for these based aircraft:

- **Tie-down spaces** – the most basic type of aircraft storage, located on the apron without shelter from the weather.
- **T-Hangars** – individual enclosed hangar units located on the west side of the Airport and leased to individual aircraft owners.
- **Conventional Hangars** –hangars that are larger in size and can accommodate multiple aircraft for storage and maintenance.

Storage requirements for GA aircraft reflect local weather conditions and the size and technology of the Airport's based aircraft fleet mix. Typically, larger and more expensive aircraft require the protection offered by either a conventional hangar or T-hangar.

The future allocation of based aircraft storage is presented in **Table IV-19**. The majority of single-engine aircraft use tie-downs and T-hangars, with a small percentage being stored in conventional hangars. Conventional hangar use was assumed for 80 percent of the multi-engine and helicopter fleet and 100 percent of the business jets.

The future required tie-down storage area for based aircraft was calculated and is presented in **Table IV-20**. It is estimated that approximately 438,600 square feet of apron will be needed to accommodate the based aircraft forecast in 2030, and 665,500 square feet of apron will be needed for transient operations in 2030. This table also includes the total apron area requirements for based aircraft and transient parking positions at the Airport. As indicated, the Airport currently has ample apron space available for parking based aircraft and accommodating transient operations.

Table IV- 19

Based Aircraft Storage Distribution

Year	Single-engine	Multi-engine	Business Jet	Helicopter	Other
Tie-down					
2010	65%	10%	0%	20%	95%
2015	65%	10%	0%	20%	95%
2020	65%	10%	0%	20%	95%
2025	65%	10%	0%	20%	95%
2030	65%	10%	0%	20%	95%
T-hangar					
2010	30%	10%	0%	0%	5%
2015	30%	10%	0%	0%	5%
2020	30%	10%	0%	0%	5%
2025	30%	10%	0%	0%	5%
2030	30%	10%	0%	0%	5%
Conventional Hangar					
2010	5%	80%	100%	80%	0%
2015	5%	80%	100%	80%	0%
2020	5%	80%	100%	80%	0%
2025	5%	80%	100%	80%	0%
2030	5%	80%	100%	80%	0%

Source: Ricondo & Associates, Inc., April 2008.
Prepared by: Ricondo & Associates, Inc., May 2008.

Table IV- 20

Tie -down and Transient Aircraft Apron Requirements (square footage)

Year	Tie-down Apron Requirement	Transient Apron Requirement	Total Apron Requirement	Total Apron Surplus or (Deficiency)
2010	446,800	391,800	838,600	1,041,400
2015	448,200	468,200	916,400	963,600
2020	442,500	519,100	961,600	918,400
2025	447,100	575,500	1,022,600	857,400
2030	438,600	665,500	1,104,100	775,900

Source: Ricondo & Associates, Inc., April 2008.
Prepared by: Ricondo & Associates, Inc., May 2008.

Based on the storage distribution presented in Table IV-19 and the based aircraft forecast, T-hangar and conventional hangar requirements were calculated. These calculations are based on GA industry standards; however, local variances could require some adjustments to the future aircraft storage requirements. **Table IV- 21** presents these requirements along with the surplus or deficiency as compared to existing facilities. For T-hangars, only a slight increase in required space is anticipated

by 2030. Conventional hangars, however, have capacity to absorb additional demand in the short-term but will require approximately 175,000 square feet of additional space by 2030.

Table IV- 21

T-Hangar and Conventional Hangar Requirements

Year	T-hangar Requirement (square feet)	T-hangar Surplus or (Deficiency)	Conventional Hangar Requirement (square feet)	Conventional Hangar Surplus or (Deficiency)
2010	72,900	0	413,820	46,210
2015	73,900	(1,000)	460,020	10
2020	75,200	(2,300)	512,050	(52,020)
2025	77,200	(4,300)	564,080	(104,050)
2030	79,100	(6,200)	634,590	(174,560)

Note: Conventional hangar requirements include an allowance for lounge and office space.

Source: Ricondo & Associates, Inc., April 2008.
Prepared by: Ricondo & Associates, Inc., May 2008.

FBO and corporate hangars typically have lounge or waiting areas, administrative function space, or parts storage, so an allowance has been included in the conventional hangar requirements for these areas. In addition to the hangar building itself, the sites for conventional hangars will require areas for access and parking and other requirements specific to the individual tenant.

4.3.3 Military Facility Requirements

Gowen Field, located on the south part of the airfield, is an Idaho National Guard base that is home to a number of military detachments, the largest of which is the Idaho Air National Guard (IDANG). Existing and future facility requirements for Gowen Field are addressed in a Master Plan that was prepared and adopted for Gowen Field in October 1997.[11] As mentioned in Section II, the Department of Defense recommended a mission change for IDANG as part of its 2005 Base Realignment and Closure (BRAC) Recommendations. To accommodate the proposed mission change, new facility requirements are currently being developed as part of an update to the Gowen Field Master Plan. One of these includes a new Munitions Storage Area (MSA) planned immediately west of the current location. It is anticipated that other future requirements for IDANG will be accommodated within the currently leased area.

4.3.4 Other Government Aviation Facility Requirements

Other government aviation tenants at the Airport include the National Interagency Fire Center (NIFC), the U.S. Postal Service (USPS), the Idaho Transportation Department (ITD) Division of Aeronautics, and the U.S. Customs and Border Patrol (CBP). A new 5,200-square-foot facility for CBP (for general aviation) is planned east of the east de-icing apron in 2010. Generally speaking, the demand for space/facilities among these tenants is not directly related to the aviation demand forecasts. Any potential need for additional government aviation facilities during the planning period is discussed in the following paragraphs.

[11] National Guard Bureau, *Idaho National Guard Master Plan – Gowen Field/Boise Air Terminal*, October 1997.

4.3.4.1 National Interagency Fire Center

The NIFC occupies approximately 50 acres of space at the Airport, adjacent to the air cargo facilities east of the terminal complex. Existing facilities are considered adequate and include buildings, parking, and an aircraft apron. However, the current location of NIFC facilities limits any future expansion possibilities due to commercial/industrial development to the north and east, air cargo facilities to the west, and GA and airport support facilities to the south. Additionally, the NIFC limits the expansion of any surrounding facilities. For long-term planning purposes, a relocated area should be identified for NIFC facilities.

4.3.4.2 United States Postal Service

A USPS airmail facility is currently located adjacent to air cargo facilities east of the terminal building. The facility sorts mail in conjunction with airline mail-carrying activity. The existing facility is assumed to be adequate and is conveniently located in close proximity to the airline terminal apron.

4.3.4.3 U.S. Customs and Border Patrol

The existing CBP facility is located adjacent to the United Airlines cargo facility east of the passenger terminal building. A new CBP facility has been planned adjacent to existing airport support facilities on the northeast part of the airfield. Once relocation of CBP operations has occurred, it is assumed that the future facilities will be adequate through the planning period.

4.3.4.4 Idaho Transportation Department

ITD Division of Aeronautics facilities include a building and aircraft ramp located in the GA area west of the passenger terminal building. The existing facilities will conflict with the full build-out of Concourse A and will be relocated. Any relocation of the GA area west of the passenger terminal should include the ITD facilities.

4.4 Non-Aviation Tenant Facility Requirements

Facility requirements for non-aviation tenants (industrial park, hotels, and recreational facilities) are not directly linked to the growth in aviation activity at the Airport, and therefore were not forecast as part of this analysis. Facility expansion or contraction for these tenants is typically linked to market demand.

4.5 Support Facility Requirements

As described in Section II, support facilities include aircraft rescue and fire fighting (ARFF) facilities, ATC facilities, airport equipment and snow removal equipment (SRE) facilities, and fueling facilities. Facility requirements associated with support operations are discussed in the following subsections.

4.5.1 Airport Rescue and Fire Fighting Facility Requirements

Each airport with daily scheduled air carrier service is required to provide aircraft rescue and fire fighting (ARFF) services. The equipment required is determined by the standards in FAR Part 139, *Aircraft Rescue and Firefighting: Index Determination*, which are related to the length of the air carrier aircraft (expressed as ARFF Indexes) and the number of average daily departures by the most demanding index of aircraft that serves the Airport. Air carrier aircraft are indexed as follows:

- **Index A** – Aircraft less than 90 feet long (Beech 1900D and CRJ200)
- **Index B** – Aircraft at least 90 feet long, but less than 126 feet long (ERJ145 and B-737-300)
- **Index C** – Aircraft at least 126 feet long, but less than 159 feet long (B-757-200 and MD-88)
- **Index D** – Aircraft at least 159 feet long, but less than 200 feet long (B-757-300 and A330)
- **Index E** – Aircraft at least 200 feet long (A340-600 and B-747-200)

This indexing provides a general assumption of the number of passengers that could be involved in an aircraft incident, resulting in the number of response vehicles and amount of fire fighting agents that would be necessary. FAR Part 139.315 states, "If there are five or more average daily departures of air carrier aircraft in a single Index group serving the airport, the longest Index group with an average of five or more daily departures is the Index required for the airport." At Boise Airport, the largest Index group with five or more daily scheduled departures is Index C. The majority of air carrier operations at the Airport are B-737-300s and -700s, both of which are approximately 110 feet long (Index B). The B-737-800 is 129.8 feet long (Index C), and the MD-80 is also an Index C aircraft.

Based on fleet mix and operations projections presented in Section III, ARFF facilities in compliance with Index C should be adequate through the planning period. However, should an airline begin scheduled service with at least five daily departures using aircraft longer than 159 feet, the Airport's Index would need to be increased to Index D.

The ARFF station is located on the airfield so that under normal conditions ARFF personnel can achieve a response time of three minutes to the mid-point of all air carrier runways. The current airfield configuration enables three-minute response time to each runway. Construction of additional runway could necessitate relocation of the existing ARFF facility and/or construction of additional ARFF facilities.

4.5.2 Air Traffic Control Facility Requirements

Existing ATC facilities at the Airport consist of the ATCT, which facilitates the safe, efficient, and expeditious movement of air traffic on and in the vicinity of the Airport, as well as the Boise Terminal Radar Approach Control (TRACON) facility, which is collocated with the ATCT and is responsible for controlling aircraft transitioning between the arrival/departure and enroute environments.

As discussed in Section II, line-of-sight issues exist on several areas of the airfield, including portions of Taxiway A and the assault strip located south of Gowen Road. Construction of a new ATCT facility on the southern part of the airfield is currently under way and is scheduled to be completed in September 2009, with commissioning scheduled for early 2011. The new ATCT will eliminate the current line-of-sight issues and will allow for positive control of aircraft operating on the assault strip.

Upon completion of the new ATCT, additional ATC facilities are not expected to be required through the planning period.

4.5.3 Airport Equipment and Snow Removal Facility Requirements

The Airport operates a variety of equipment for maintaining the airfield and grounds, including snow plows, runway de-icing trucks, sweepers, mowers, and tractors. Several equipment and SRE storage facilities are located at the Airport. Information on airport maintenance buildings provided in AC 150/5220-15, *Buildings for Storage and Maintenance of Airport Snow Removal and Ice Equipment: A Guide*, indicates that maintenance building needs are related to paved areas, activity levels, and climate. Existing equipment and SRE facilities are considered adequate. However, increases in runway, taxiway, and apron pavement, in addition to increased activity levels, would likely result in the need to provide additional maintenance building space. For planning purposes, a long-term expansion area for SRE facilities should be identified.

4.5.4 Fueling Facility Requirements

Fueling facilities at the Airport are described in Section II. Generally, fueling services are provided by the FBOs that own and operate fuel storage tanks that fulfill the current fueling needs for aircraft activity. As mentioned, existing facilities only provide storage for a one-day supply of jet fuel for commercial aircraft. Typically, maintaining a five-day fuel supply is considered reasonable in facility planning and, therefore, additional fueling facilities/storage tanks should be considered. Expansion of the fuel storage facilities should be included in the Airport's development plans.

4.6 Ground Access Facility Requirements

Ground access facilities include the regional and local access roadways, terminal circulation roads, terminal curbfront, parking facilities, and public transportation. Facility requirements and improvements have been identified, where applicable, for each of these functional areas, and are discussed in the following subsections. Demand for these facilities is driven by passenger demand and the distribution of the various modes of transportation that serve the Airport and local roadway system.

4.6.1 Regional and Local Access Roadways

Access to the Airport is provided by way of Orchard Street, Vista Avenue, Broadway Avenue, and West Gowen Road. Each of these roadways and their intersection with Interstate 84 (I-84) provides a critical link between the Airport and the regional transportation network.

To assess needed improvements to the segment of I-84 in the vicinity of the Airport, a capacity analysis was conducted on all I-84 mainline segments and critical interchanges from west of the Orchard Street interchange to the Eisenman Road interchange. Results of the capacity analysis are documented in the environmental assessment for I-84 improvement between the Orchard interchange and the Gowen interchange,[12] and summarized in Section II.

According to the analysis, several sections of I-84 and associated interchanges that provide access to the Airport already need improvement in order to maintain the desirable level of service for existing traffic conditions. Additionally, the estimated future growth of the region (including the Airport) indicates the need for additional capacity on I-84, and the roadway pavement has experienced significant increases in cracking, roughness, and rutting.

[12] Idaho Transportation Department, *Environmental Assessment: I-84, Orchard Interchange to Gowen Interchange*, June 2007.

Improvements to I-84 mainline segments and associated interchanges in the vicinity of the Airport have been planned and initiated through the Orchard to Isaacs Canyon Corridor project, as detailed in Section II. The goal of the project is to reconstruct existing lanes, add new lanes, and reconstruct interchanges between the west end of the Orchard Street interchange and the east end of the Eisenman Road interchange on I-84. When completed, the I-84 and interchange improvements will provide a desirable level of service through 2035—beyond the planning period for the Airport's Master Plan Update.

4.6.2 Terminal Circulation Roadway Requirements

The existing terminal roadway circulation system was constructed in 2001 as part of the new passenger terminal development project, and is described in Section II. The planning, design, and assessment of the circulation system are documented in a ground transportation master plan completed in 1998.[13] The circulation system currently operates efficiently and was designed to handle forecast traffic through terminal development PAL 3 (6 million annual passengers), which is forecast to occur by 2024. Therefore, no required modification of the circulation roadway is anticipated to be needed through the planning period.

4.6.3 Terminal Curbside Requirements

The terminal curbside was planned and constructed along with the terminal roadway circulation system, as documented in the ground transportation master plan.[14] A two-level curbfront serves the passenger terminal, with departure traffic on the upper level (four lanes) and arrival traffic on the lower level (four lanes). The lower level also provides three commercial vehicle lanes. Each level provides approximately 800 feet of available frontage and is considered adequate for accommodating demand associated with terminal development PAL 3 (6 million annual passengers). No additional curbside facilities should be required through the planning period.

4.6.4 Parking Requirements

Parking facilities at the Airport consist of a four-level parking garage, short-term lot, long-term lot, rental car lot, economy lot, and several employee lots. Existing parking facility information is detailed in Section II. Demand for parking facilities is generally driven by passenger demand. Future requirements for parking facilities at the Airport are documented in a parking master plan, completed in 2007[15] and presented in **Table IV- 22**.

The parking requirements shown in Table IV-22 represent an unconstrained condition where the Airport continues to operate four separate public parking facilities and is able to expand each facility to meet anticipated demand. Although recent expansion of the Economy Lot results in the current supply of overall public parking spaces exceeding demand through at least 2012, projections indicate that approximately 90 percent of the parking demand is for "close-in" parking facilities (parking located within 600 feet of the terminal). Table IV-22 shows that the close-in parking facilities are operating near or above capacity and that additional supply will be necessary to accommodate anticipated demand through the planning period. It will also be necessary to increase the supply of rental car and employee parking facilities.

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[13] CSHQA and HNTB Corporation, *Draft Report: Boise Air Terminal Ground Transportation Master Planning*, September 1998.

[14] Ibid.

[15] Jacobs Consultancy, *Final Report: Parking Master Plan – Boise Airport*, July 2007.

Table IV- 22

Parking Facility Requirements

Parking Facility	Existing Supply (February 2008)	2007 Demand [2/]	Estimated Parking Requirements (spaces) 2012	2017	2022	2027
Public parking [1/]						
Short-term	293	259	340	410	490	580
Garage	1,342	1,346	1,770	2,110	2,530	3,030
Long-term	574	532	700	830	1,000	1,200
Total "close-in" parking	2,209	2,137	2,810	3,350	4,020	4,810
Economy Lot [3/]	1,067	227	300	360	430	510
Total public parking	3,276	2,364	3,110	3,710	4,450	5,320
Rental car parking	296	--	370	445	545	670
Employee parking	653	--	575	670	775	900
Total	4,225	--	4,055	4,825	5,770	6,890

Notes:

1/ Assumes that facility capacities increase to meet demand (existing short- and long-term lots cannot increase).

2/ Based on facility closure reports and Airport staff estimates of midday occupancy during busy days in August and October 2006.

3/ Capacity of the Economy Lot was expanded from 592 spaces to 1,067 spaces in Summer 2007.

Source: City of Boise (existing supply); Jacobs Consultancy, *Final Report: Parking Master Plan – Boise Airport*, July 2007 (future parking requirements).

Prepared by: Ricondo & Associates, Inc., May 2008.

4.7 Summary of Facility Requirements

Based on the facility requirements described in the previous sections, the following improvements are recommended for the Airport over the planning period through 2030:

Airside/Airfield

- Increase runway capacity and/or implement strategies to lower demand in order to avoid significant future delays.
- Increase the length of one air carrier runway to 10,900 feet to provide adequate length for efficient passenger and cargo aircraft operations.
- Construct new Runway 10R taxiway exit to improve runway capacity.
- Maintain current runway pavement strength ratings.
- Ensure land use compatibility within the Runway 10L RPZ when it is enlarged, due to planned implementation of a precision approach to the runway.
- Replace existing VASIs with PAPIs on all runway ends.
- Install touchdown zone lighting and a MALSR approach lighting system on Runway 28R to support the CAT I ILS planned for the runway.
- Add touchdown zone markings to Runway 28R to comply with precision runway marking standards.

Passenger Terminal

- Incrementally expand the terminal building to ultimately accommodate nine additional aircraft gates, as well as needed space enhancements, to meet projected demand through the planning period.

Support Facilities

- Conduct additional space utilization analysis for cargo facilities, and increase cargo building and ramp areas accordingly.
- Provide additional T-hangar and conventional hangar storage for based aircraft. Additional hangar facilities will require areas for automobile access and parking.
- Expand the Airport's fuel storage facilities and increase fuel storage capacity to provide for at least a five-day fuel supply.
- Identify a long-term location for NIFC facilities.
- Identify a long-term expansion area for SRE.

Ground Access

- Increase parking capacity as recommended in the parking master plan.[16]

[16] Jacobs Consultancy, *Final Report: Parking Master Plan – Boise Airport*, July 2007.

V. Concepts Analysis

The primary focus of the Concepts Analysis exercise is to identify and evaluate Airport development concepts that satisfy future aviation-related demand, are responsive to the needs of the communities served by the Airport, and maximize revenue-generating opportunities while effectively managing land uses. To satisfy these goals, numerous development concepts have been identified and evaluated.

The concepts presented in this section are a combination of previously defined concepts and concepts developed during this Master Plan process. Previous updates to the Airport's master plan have identified concepts aimed at satisfying future demand at the Airport, particularly with regard to airfield development.[1] Terminal development concepts were identified in a schematic design manual that was compiled during the planning and design process for the existing terminal building.[2] Parking development concepts were identified in the Airport's current parking master plan.[3] In addition to the previous Master Plan Update and other planning studies, the Airport has identified further development concepts.

For the purpose of this Master Plan Update, concepts were generally considered in five functional areas: airfield, terminal, ground transportation, general aviation (GA) and cargo, and support and other facilities. Concept development was coordinated among the functional areas because resolving issues in one area can impact other areas.

This section discusses in greater detail the identification and evaluation of both existing and previously undefined development concepts, as follows:

- Airfield development concepts
- Passenger terminal development concepts
- Ground transportation development concepts
- Consolidated GA and cargo development concepts
- Support and other facilities development concepts

Concepts were based on the information presented in Sections II, III, and IV, and the previously identified planning studies. These sources were supplemented by the judgment of experienced Airport staff and additional operational and infrastructure data.

5.1 Airfield Development Concepts

Based on analyses presented in Section IV, two primary concerns should be addressed with regard to future airfield development: runway length and airfield capacity. Concepts designed to address runway length and airfield capacity deficiencies are presented and evaluated in the following sections.

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1 Coffman Associates, Inc., *Airport Master Plan, Boise Air Terminal*, March 1993; Coffman Associates, Inc. and WHPacific, *Airport Master Plan, Boise Airport*, February 2001.

2 CSHQA and HNTB Corporation, *Boise Air Terminal Project, Passenger Terminal Building – Schematic Design Manual*, February 15, 1999.

3 Jacobs Consultancy, *Final Report: Parking Master Plan – Boise Airport*, July 2007.

5.1.1 Runway Extension Concepts

The existing runway configuration at the Airport consists of two parallel runways: Runway 10L-28R and Runway 10R-28L. Both runways are oriented northwest-southeast and have a centerline-to-centerline separation of 700 feet. Currently, Runway 10L-28R is 10,000 feet long and Runway 10R-28L is 9,763 feet long. The runway length analysis presented in Section IV shows that additional runway length is needed on at least one of the runways to meet the runway length requirement of 10,900 feet. This is the requirement for an Airbus 300 aircraft operating at 80 percent of its maximum take-off weight.

To obtain the required 10,900 feet of runway length, general options include expanding either Runway 10L-28R or Runway 10R-28L to the northwest or southeast. Concepts based on these options are described and evaluated in the following sections.

5.1.1.1 Northwest Expansion Concepts

Two concepts were considered with respect to expanding Runway 10L-28R or Runway 10R-28L to the northwest:

- Extend Runway 10L-28R to the northwest by 900 feet, to a total length of 10,900 feet.
- Extend Runway 10R-28L to the northwest by 1,137 feet, to a total length of 10,900 feet.

Extend Runway 10L-28R to the Northwest by 900 Feet

As shown on **Exhibit V-1**, under this concept, Runway 10L-28R would be extended to the northwest by 900 feet, to a total length of 10,900 feet. This concept is problematic for the following reasons:

- Taxiway A would have to be extended to provide access to the relocated Runway 10L threshold. Extending Taxiway A would impact the existing alignment of Wright Street.

- The Runway Safety Area (RSA) for the extension would impact the existing location of the New York Canal, and create a non-standard RSA. This canal, which serves as the main source of irrigation water for the areas west of the Airport, could pose an environmental challenge for a runway extension.

- An ILS approach has been installed on Runway 28R; a localizer has been installed approximately 1,010 feet off the end of the Runway 10L threshold along the extended runway centerline. To minimize the potential for signal distortion, AC 150/5300-13, *Airport Design*, specifies dimensions for a localizer critical area, which is to be smoothly graded and remain free of objects. Expansion of Runway 10L-28R, 900 feet to the northwest, would create a non-standard situation with the Airport service road within the RSA and localizer critical area. Realigning the service road would likely require the realignment of Wright Street and the New York Canal. The realignment of these roads would impact current plans to improve the Interstate 84 (I-84)/Orchard Street interchange.

Extend Runway 10R-28L to the Northwest by 1,137 Feet

Under this concept, shown on **Exhibit V-2**, Runway 10R-28L would be extended to the northwest by 1,137 feet, to a total length of 10,900 feet. This concept shares some of the same complications as the extension of Runway 10L-28R to the northwest; construction activities would occur in close proximity to the New York Canal and Orchard Street. Additionally, this concept would create a

Conceptual runway development

Conceptual taxiway development

Localizer critical area

Object Free Area (OFA)

Runway Safety Area (RSA)

Source: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; Ricondo & Associates, Inc., July 2008.
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-1

0 1,000 feet

north

Runway 10L-28R Northwest Extension Concept

Conceptual runway development

Conceptual taxiway development

Object Free Area (OFA)

Runway Safety Area (RSA)

Source: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; Ricondo & Associates, Inc., July 2008.
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-2

0 1,000 feet

north

Runway 10R-28L Northwest Extension Concept

greater offset of thresholds (degrading safety) and require the relocation of existing approach lighting and glideslope and localizer antennas. Construction of new taxiways would also be required to provide access to the relocated Runway 10R threshold.

1.1.1.2 Southeast Expansion Concepts

Three concepts were considered with respect to expanding Runway 10L-28R or Runway 10R-28L to the southeast:

- Extend Runway 10L-28R to the southeast by 900 feet, to a total length of 10,900 feet.
- Extend Runway 10R-28L to the southeast by 1,137 feet, to a total length of 10,900 feet.
- Extend Runway 10R-28L to the southeast by 1,600 feet, to a total length of 11,363 feet.

Extend Runway 10L-28R to the Southeast by 900 Feet

Under this concept, shown on **Exhibit V-3**, Runway 10L-28R would be extended to the southeast by 900 feet, to a total length of 10,900 feet. The previous extension of Runway 10L-28R created a 1,600-foot offset between the thresholds of Runways 28R and 28L. This offset has inadvertently created a safety concern because some pilots have become visually confused as to which runway they are approaching, which has resulted in instances of pilots landing on the wrong runway. Extending Runway 10L-28R to the southeast would increase the offset between the runway thresholds, likely causing further pilot confusion, and would impact the new ILS for Runway 28R. The extension could also reduce approach surface capabilities due to the terrain southeast of the runway. To provide access to the relocated Runway 28R threshold, this concept would require the extension of Taxiway A to the southeast, potentially impacting Airport support and other facilities located in this area.

Extend Runway 10R-28L to the Southeast by 1,137 Feet

As shown on **Exhibit V-4**, under this concept, Runway 10R-28L would be extended to the southeast by 1,137 feet, to a total length of 10,900 feet. The primary benefit of this concept is that it would bring the thresholds for Runway 28L and 28R closer together, thereby improving the visual situation for pilots and reducing the potential for confusion.

This concept would require relocation of the localizer antenna and approach lights used for the ILS approach for Runway 10R, as well as the localizer backcourse approach for Runway 28L. However, no physical impediment would penetrate the localizer critical area or preclude extension of Taxiway B to provide access to the relocated Runway 28L threshold.

This concept also has additional safety and operational benefits stemming from the elimination or improvement of runway crossing operations. Today, during peak departure times, commercial aircraft departing on Runway 28L must cross in front of aircraft departing on Runway 28R. This crossing normally takes place at Taxiway M, which is approximately 1,800 feet from the threshold of Runway 28R. Extending Runway 10R-28L to the southeast and providing a connecting taxiway aligned with the Runway 28R threshold would allow aircraft departing on Runway 28L to cross Runway 28R at the threshold, rather than in front of aircraft departing on Runway 28R. Another added safety benefit would result from the elimination of runway crossings by aircraft based on the south side of the Airport that require runway lengths in excess of the existing 9,763-foot Runway 10R-28L.

Conceptual runway development

Conceptual taxiway development

Source: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; Ricondo & Associates, Inc., July 2008.
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-3

0 1,000 feet north

Runway 10L-28R Southeast Extension Concept

Conceptual runway development

Conceptual taxiway development

Source: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; Ricondo & Associates, Inc., July 2008.
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-4

0 1,000 feet north

Runway 10R-28L Southeast Extension Concept 1

A disadvantage of extending Runway 10R-28L to the southeast by only 1,137 feet is that Taxiway E would be located 300 feet short of the optimum taxiway exit location of 5,700 feet for typical air carrier passenger aircraft arriving on Runway 28L, as calculated using the FAA's Runway Exit Design Interactive Model (REDIM), Version 2.1. Typical air carrier passenger aircraft would have to use additional braking to exit on Taxiway E, or continue down to Taxiway G which is an additional 1,800 feet. Aircraft proceeding to Taxiway G would be increasing their runway occupancy time and decreasing overall airfield capacity.

Extend Runway 10R-28L to the Southeast by 1,600 Feet

As shown on **Exhibit V-5**, under this concept, Runway 10R-28L would be extended to the southeast by 1,600 feet, to a total length of 11,363 feet. This concept shares the same safety and operational benefits as the previous concept with regard to the elimination of runway crossings.

As previously stated, extending Runway 10R-28L to the southeast by 1,137 feet would bring the thresholds for Runways 28L and 28R closer together, thereby reducing confusion associated with properly identifying the runways. However, extending Runway 10R-28L to the southeast by 1,600 feet would completely align the two thresholds, eliminating any pilot confusion due to runway threshold offsets.

An additional benefit of extending Runway 10R-28L 1,600 feet to the southeast is that typical air carrier passenger aircraft landing on Runway 28L could exit the runway at Taxiway E, 5,900 feet from the threshold, which is close to the optimum exit taxiway distance of 5,700 feet as calculated using the FAA's REDIM. Exiting Runway 28L at Taxiway E rather than at Taxiway G improves runway capacity, as described in Section 5.1.2.2.

5.1.1.3 Preferred Runway Extension Concept

After evaluating the possible runway extension concepts for the Airport, the extension of Runway 10R-28L by 1,600 feet to a total length of 11,363 feet is the preferred runway extension concept, as depicted on Exhibit V-5. This concept includes the relocation of approach lights, the localizer antenna, and other applicable runway instrumentation; construction of a blast pad; the extension of Taxiway B to the southeast by 1,600 feet to provide access to the Runway 28L threshold from the south; and the extension of an entrance taxiway to connect the Runway 28R and Runway 28L thresholds.

Extending Runway 10R-28L by 1,600 feet to a total length of 11,363 feet would provide sufficient length for all cargo and air carrier aircraft types anticipated to operate at the Airport through 2030.

5.1.2 Airfield Capacity Enhancing Concepts

Previous updates to the Airport's master plan have recognized the need to develop airfield facilities to accommodate future demand. Demand continues to approach the Airport's annual service volume (ASV). As indicated in Section IV, Facilities Requirements, by 2010, annual demand is projected to reach almost 90 percent of the ASV, indicating that new facilities should be in development to mitigate increasing demands and potential delays. If no action is taken to increase airfield capacity, forecast demand is expected to meet ASV in approximately 2012, at which point the average annual aircraft delay would be estimated at 2.6 minutes per operation. The FAA considers delays of 10 minutes per operation or greater to be severe, a condition that is estimated to occur by approximately 2025 under the existing airfield configuration.

Conceptual runway development

Conceptual taxiway development

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (runway extension concept).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-5

0 1,000 feet north

Runway 10R-28L Southeast Extension Concept 2

Previous updates to the Airport's master plan have identified several airfield concepts aimed at enhancing airfield capacity. Such concepts include both taxiway and runway improvements. Subsequent to the previous Master Plan Update, additional concepts have been studied. The following subsections describe the three preferred concepts for enhancing airfield capacity.

5.1.2.1 New Exit Taxiway for Runway 10R

The operational capacity and efficiency of the airfield can be enhanced through taxiway improvements. Specifically, gains in airfield capacity can be achieved with the proper spacing and geometry of exit taxiways. Properly spaced exit taxiways allow arriving aircraft to exit a runway without delay, allowing the next aircraft to arrive without delay. Poorly spaced exit taxiways cause additional dwell time on the runway for arriving aircraft which requires air traffic controllers to increase spacing between arrivals. Occasionally, the dwell time for a landing aircraft becomes too long, forcing the next arriving aircraft to execute a missed approach. Increased spacing between arriving aircraft and missed approaches reduce airfield capacity and increase delays.

Exit taxiways are available at various intervals along Runways 10L-28R and 10R-28L to allow aircraft to exit the runway and proceed to a parking position. Currently, most air carrier and cargo aircraft landing on Runway 10R typically exit the runway on Taxiway D, which is located approximately 7,300 feet from the landing threshold. Per the FAA's REDIM model, the optimum exit taxiway distance at the Airport is 5,700 feet for the typical air carrier passenger aircraft under normal conditions. Therefore, landing operations on Runway 10R for passenger air carrier aircraft are routinely occupying the runway longer than is necessary because of the location of the taxiway. Additionally, exiting Runway 10R at Taxiway D is problematic because the reverse acute angle requires aircraft to slow down considerably or even stop in order to make the turn onto the taxiway. This routine operation reduces airfield capacity during peak arrival periods because air traffic controllers must increase spacing between arrivals to account for longer aircraft dwell times on the runway. During peak arrival periods, this situation reduces the overall capacity of Runway 10R.

To gain capacity, it is recommended that a new obtuse-angled taxiway (from the perspective of aircraft landing on Runway 10R) be constructed between Taxiways E and D. **Exhibit V-6** identifies a potential location for the exit taxiway, which is approximately 6,500 feet from the runway threshold. Due to the 700-foot spacing between runways, this taxiway would not be a high speed exit. Although this is longer than the optimum distance of 5,700 feet, this location was selected so the new exit taxiway aligns with Taxiway D after crossing Runway 10L-28R. Additional study would be necessary to determine the final exit taxiway configuration.

5.1.2.2 Extension of Runway 10R-28L to the Southeast

The extension of Runway 10R-28L to the southeast by 1,600 feet was previously identified as the preferred runway extension concept, developed to facilitate efficient operation of A300 aircraft currently in service at the Airport (see Exhibit V-5). In addition to the safety benefits resulting from reduced pilot confusion and runway crossings, the concept also offers needed capacity benefits. Therefore, it is also a preferred concept in terms of airfield capacity.

Conceptual taxiway development

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; Ricondo & Associates, Inc., July 2008.
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-6

0 1,000 feet north

New Exit Taxiway Concept

Under the existing airfield configuration, aircraft holding for departure on Runway 28R are often instructed to wait for any commercial aircraft arriving on Runway 28L to land and cross over Runway 28R before beginning their take-off roll. Air carrier aircraft arriving on Runway 28L generally proceed to the terminal via either Taxiway E or Taxiway G, which are separated by approximately 1,800 feet. Because of the distance required for landing and rollout, most air carrier aircraft landing on Runway 28L are unable to exit the runway via Taxiway E. Instead, these aircraft must proceed past Taxiway E an additional 1,800 feet to Taxiway G before exiting the runway. Aircraft exiting Runway 28L via Taxiway G cross Runway 28R approximately 7,800 feet from the threshold of Runway 28R. The additional time required for departing aircraft to hold on Runway 28R while waiting for aircraft landing on Runway 28L to cross on Taxiway G rather than Taxiway E, reduces the overall capacity of Runway 28R.

Extending Runway 28L to the southeast by 1,600 feet would allow aircraft to land on Runway 28L and exit at Taxiway E at approximately 6,000 feet from the thresholds of both runways, which is just 300 feet longer than the optimum exit taxiway distance of 5,700 feet, as calculated by the FAA's REDIM. This would reduce the runway crossing distance by approximately 1,800 feet compared to the existing configuration.

5.1.2.3 Conversion of Assault Strip to Runway 9-27

The first two preferred concepts presented in this section have identified the potential for capacity gains from taxiway and runway improvements to the existing airfield. While additional study is needed to determine the extent of these gains, they are not considered sufficient to meet long-term requirements. As demand approaches the Airport's ASV, it is evident that runway improvements are needed to achieve the additional airfield capacity requirement identified in Section IV.

From an operational perspective, the optimum way to improve airfield capacity is the development of a third parallel runway. From a capacity standpoint, centerline-to-centerline separation of parallel runways is critical. To maximize a parallel runway system, the ideal separation is at least 4,300 feet, which allows for simultaneous approaches in IFR conditions. The existing parallel runways at the Airport are separated by only 700 feet, which allows for simultaneous operations during VFR conditions. However, the parallel runways are still subject to wake turbulence procedures, limiting the capacity of the entire runway system.[4] To achieve maximum capacity benefits, previous updates to the Airport's master plan have recommended a widely-spaced parallel runway with a centerline-to-centerline separation of 5,600 feet from Runway 10R-28L.

Subsequent to the 2001 Master Plan Update, a military assault strip was constructed south of Gowen Road in 2001 for preferential use by the Idaho Air National Guard (IDANG) for C-130 and helicopter training operations. As described in Section II, the assault strip is 5,000 feet long and 90 feet wide, with a centerline-to-centerline separation of approximately 5,450 feet from Runway 10R-28L. With the assault strip in place, planning efforts conducted by the Airport have centered on converting the strip into a third parallel runway (designated Runway 9-27). In exchange for allowing the Department of Defense (DOD) to construct the assault strip on airport property, the Airport granted IDANG preferential use of the assault strip for mission related training for the C-130s until one of the following:

- The long term IDANG real property lease expires.

[4] To mitigate the effects of wake turbulence, for aircraft departing from the same runway or from parallel runways with centerline separations less than 2,500 feet, the FAA requires a two-minute separation from any aircraft departing behind a heavy aircraft.

- Runway 9-27 is no longer needed for IDANG mission related training for C-130s.
- An appropriate and lawful disposition is agreed between parties.

In 2009, the 189th Airlift Squadron ended its mission[5] at Boise Airport and there will no longer be any mission related training on the assault strip. The commanding IDANG General has indicated the preferential use agreement would also expire. Converting the assault strip to Runway 9-27 has been identified as a preferred concept for increasing airfield capacity of the Airport

To date, the limitation of using the assault strip for normal airport operations would have been the line-of-sight issues associated with the current location of the Airport Traffic Control Tower (ATCT). Because air traffic controllers cannot see the assault strip from the existing ATCT, the assault strip cannot be controlled, and therefore cannot be considered an active runway for civilian use. Commissioning of the new Boise ATCT (expected to occur in 2010) south of the existing parallel runways will allow air traffic controllers to see and manage air traffic on the assault strip. Therefore, construction of the new ATCT is a key element in making the development of Runway 9-27 a viable concept to enhance airfield capacity.

A critical aspect of integrating the new runway into the existing airfield system will be the construction of a taxiway system. At a minimum, it is recommended that a full-length taxiway parallel to the new runway be constructed, along with a connecting taxiway to the existing airfield. A connecting taxiway would provide the ATCT more flexibility for aircraft operations, increase the use of Runway 9-27, and increase airfield capacity.

Previous planning studies have recommended construction of a taxiway connecting to the existing airfield at Taxiway M. However, this alignment would conflict with the existing and future munitions storage area. From an operational perspective, the most appropriate connection point to the existing airfield is the point to where Taxiway B is extended to provide access to the threshold for Runway 28R and the extended threshold for Runway 28L (as proposed earlier in this section). The recommended configuration for the connecting taxiway is a single-lane 75-foot-wide taxiway with one or more bypass areas, which could ultimately be developed into a dual-lane taxiway depending on demand and ultimate development of Runway 9-27.

General advantages of converting the assault strip to Runway 9-27 include the following:

Available land area and suitable terrain allow for initial and/or phased development of the runway, including development of instrument approach procedures to both ends of the runway.[6]

- Adequate centerline-to-centerline separation from Runway 10R-28L allows for the possibility of simultaneous IFR approaches, thereby increasing airfield capacity during periods of reduced visibility.
- Increased airfield capacity would be provided by accommodating operations of GA aircraft and helicopters that currently use the existing parallel runways.
- The concept provides adequate space for the development of GA, helicopter, and other facilities, which increases safety by reducing or eliminating mixed-use aircraft operations on the existing airfield (especially for pilot training).

[5] IdahoStatesman.com, http://www.idahostatesman.com/idahoansinaction/story/716978.html (accessed September 10, 2009).

[6] Based on applicable obstacle clearance criteria, airspace and terrain modeling conducted as part of the 2001 Master Plan Update indicates that development of a runway in this area would allow for instrument approaches to be designed for both ends of the runway.

- The concept improves security by increasing the distance between GA and air carrier operations.
- The future consolidated cargo facility will be centrally located, allowing cargo operation to use either Runways 10-28 or 9-27 (when lengthened).

As listed above, one benefit of converting the assault strip to Runway 9-27 is the availability and suitability of land for initial development and future expansion of the runway. This is important, as full realization of some of the benefits listed (such as safety and capacity) depend largely on runway length. As such, converting the assault strip to Runway 9-27 allows for several development options, primarily with regard to runway length. Potential development options, as well as the benefits of each option, are described in the following paragraphs.

Option 1 – Runway Length: 4,500 Feet

The existing length of the assault strip is 5,000 feet. However, line-of-sight requirements based on the location of the new ATCT indicate that the Runway 27 threshold would need to be relocated 500 feet to the west to remain within 10,000 feet of the new ATCT. Therefore, approximately 4,500 feet of assault strip would remain for runway conversion, as shown on **Exhibit V-7**. At a length of 4,500 feet, the runway would primarily support smaller GA aircraft. Because of this limitation, development of facilities and services (i.e., FBOs or air cargo) is more difficult and unlikely under this option. Therefore, it is assumed that the runway would only be used by small GA aircraft conducting touch-and-go operations during daylight hours in VFR weather conditions.

Table V-1 presents the results of a capacity analysis conducted for this option. As shown, development of Runway 9-27 to 4,500 feet increases Airport capacity. However, this apparent gain is diminished by the need to include annual operations already occurring on this runway into Airport-wide totals of operations, which will occur when the new ATCT is commissioned in 2010. As previously stated, if no action is taken to increase airfield capacity, forecast demand is expected to meet ASV in approximately 2012. Under Option 1, demand is expected to meet ASV between 2015 and 2020, at which point delays could increase rapidly if additional capacity is not added.

Table V-1

Comparison of Annual Demand to ASV with Runway 9-27 Development Option 1

Year	Annual Demand [1/]	Runway 9-27 ASV	Adjusted Annual Demand [2/]	Main Airfield ASV	Ratio of Annual Demand to ASV
2005	220,504	49,300	171,204	225,000	0.76
2010	242,562	49,300	193,262	225,000	0.86
2015	268,014	49,300	218,714	224,000	0.98
2020	290,503	49,300	241,203	224,000	1.08
2025	315,592	49,300	266,292	223,000	1.19
2030	352,105	49,300	302,805	223,000	1.36

Notes:

ASV = annual service volume.

1/ 2005 and 2010 annual demand includes 47,450 annual operations already occurring on the assault strip/Runway 9-27, but not included in Airport total demand as discussed in Section III.

2/ The ASV that could potentially be served by this development option is removed from the demand for the main air carrier runways for the purposes of developing an Airport-wide annual demand to ASV ratio.

Source: Ricondo & Associates, Inc., May 2007.
Prepared by: Ricondo & Associates, Inc., July 2008.

Conceptual Runway 10R-28L and Taxiway B extension

Conceptual runway development

Conceptual taxiway development

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (airfield development concept).

Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-7

0 2,000 feet

north

Runway 9-27 Development Option 1
Runway Length: 4,500 Feet

Option 2 – Runway Length: 5,900 Feet

As shown on **Exhibit V-8**, a second option is to develop Runway 9-27 to a length of 5,900 feet. In addition to touch-and-go operations, a runway of this length would allow for normal arrival and departure operations by single-engine and multi-engine aircraft. Development of FBO services could occur under this option. While some small business jets could potentially utilize the runway, larger business jets would likely require additional runway length for routine take-off operations. It is assumed under this option that the runway would be available for VFR daytime and nighttime (lighted) operations. Development of Runway 9-27 at a length of 5,900 feet would also align the northwest end of Runway 9-27 with the new connecting taxiway.

The capacity analysis presented in **Table V-2** shows capacity benefits greater than those calculated under Option 1. The primary reason for the increase is that a touch-and-go operation counts as both an arrival and as a departure with some time dependent overlap. Therefore, the touch-and-go capacity of the runway is lower than the peak hour capacity for normal arrival and departure operations. Under Option 2, demand is expected to meet ASV by approximately 2020.

Table V-2

Comparison of Annual Demand to ASV with Runway 9-27 Development Option 2

Year	Annual Demand [1/]	Runway 9-27 ASV	Adjusted Annual Demand [2/]	Main Airfield ASV	Ratio of Annual Demand to ASV
2005	220,504	66,400	154,104	225,000	0.68
2010	242,562	66,400	176,162	225,000	0.78
2015	268,014	66,400	201,614	224,000	0.90
2020	290,503	66,400	224,103	224,000	1.00
2025	315,592	66,400	249,192	223,000	1.12
2030	352,105	66,400	285,705	223,000	1.28

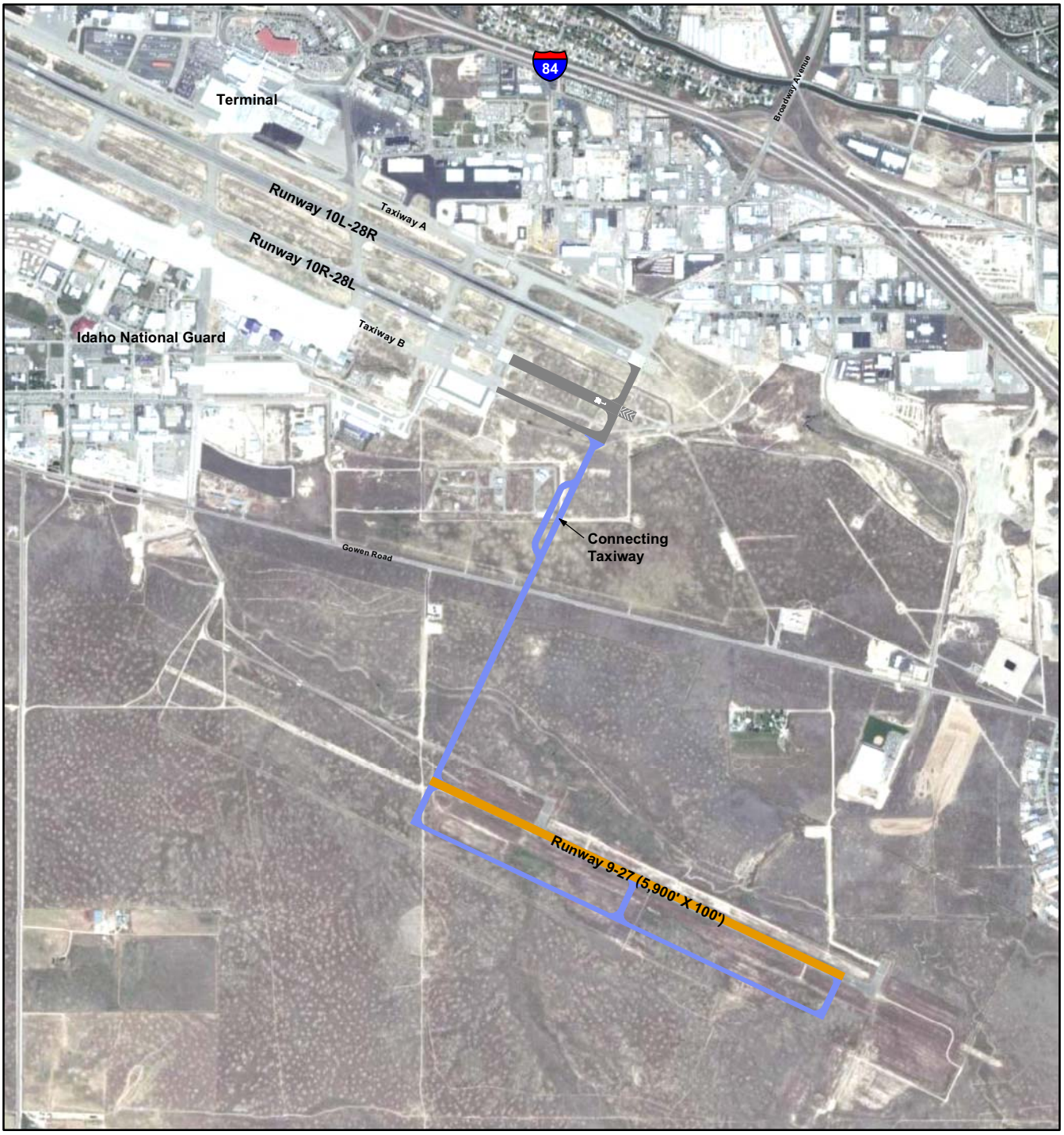
Notes:

ASV = annual service volume.

1/ 2005 and 2010 annual demand includes 47,450 annual operations already occurring on the assault strip/Runway 9-27, but not included in Airport total demand as discussed in Section III.

2/ The ASV that could potentially be served by this development option is removed from the demand for the main air carrier runways for the purposes of developing an Airport-wide annual demand to ASV ratio.

Source: Ricondo & Associates, Inc., May 2007.
Prepared by: Ricondo & Associates, Inc., July 2008.



Conceptual Runway 10R-28L and Taxiway B extension

Conceptual runway development

Conceptual taxiway development

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (airfield development concept).

Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-8

0 2,000 feet

north

Runway 9-27 Development Option 2
Runway Length: 5,900 Feet

Option 3 – Runway Length: 8,000 Feet

Development of Runway 9-27 to a length of 8,000 feet and a width of 150 feet is depicted on **Exhibit V-9**. At this length, it is assumed that all GA aircraft currently using or anticipated to use the Airport through the projection period would be able to conduct arrival and departure operations from the runway. Most air carrier passenger and cargo arrivals, as well as some departures could be supported.

Developing Runway 9-27 into a full GA-capable runway would allow for development of FBO and other support facilities. Such development would increase airfield operational safety and efficiency by allowing for GA consolidation, thereby reducing mixed-use aircraft operations on the existing airfield. Capacity benefits associated with this option would depend on the specific mix of aircraft anticipated to use the runway, the resulting distribution of aircraft types using the existing runways, and whether or not instrument approach procedures would be available for Runway 9-27.

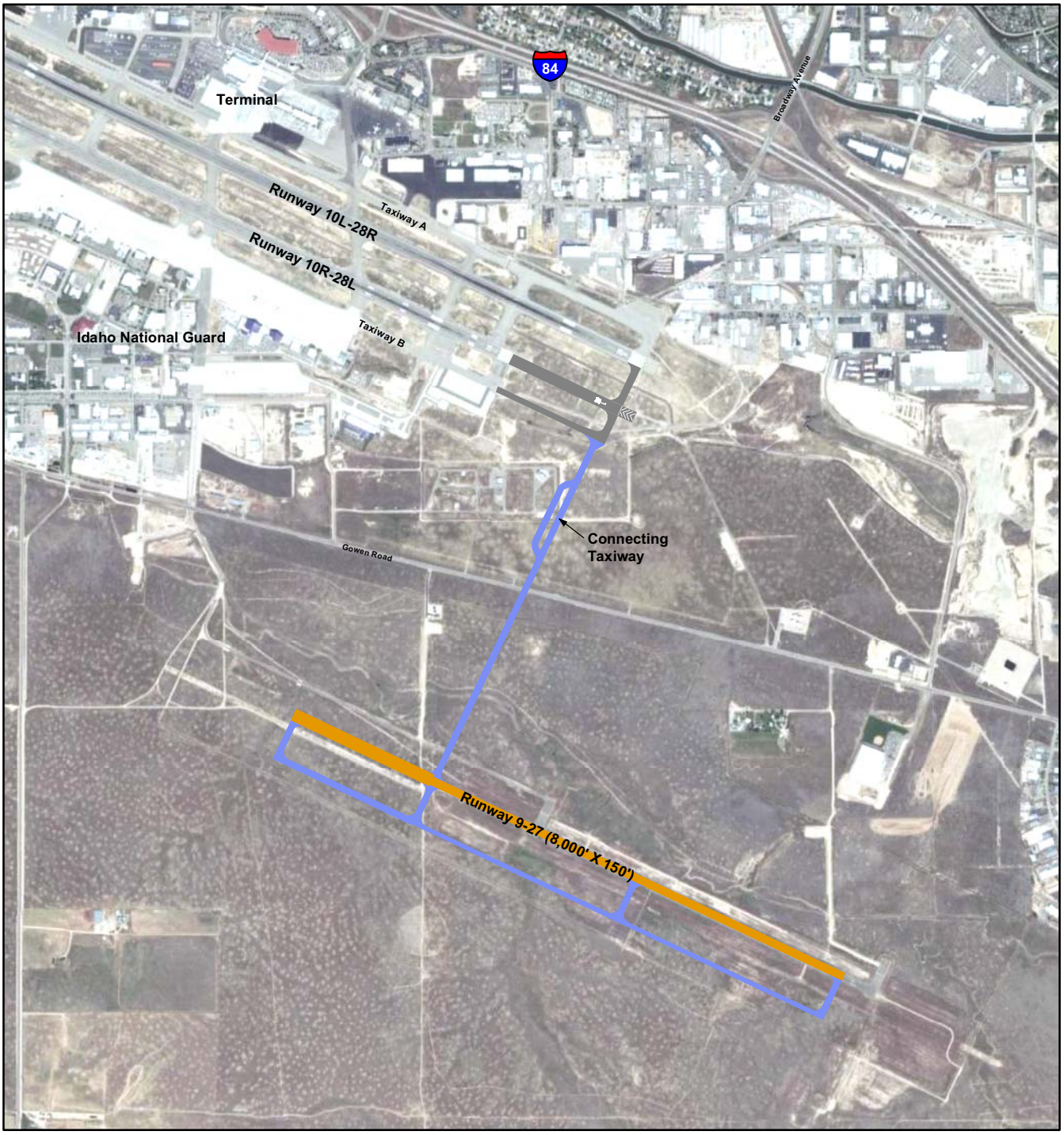
Option 4 – Runway Length: 10,900 Feet

For the purposes of this Master Plan Update, development of Runway 9-27 to a length of 10,900 feet, as shown on **Exhibit V-10**, is considered the full-build option. Depending on stage length and conditions, a length of 10,900 feet would allow normal use of the runway by all aircraft types currently using or forecast to use the Airport through the projection period, including air carrier and air cargo aircraft. It is assumed that one or more instrument approaches would be available for the runway.

Development of Runway 9-27 at a length of 10,900 feet would facilitate possible construction of a taxiway connecting the Runway 9 threshold to the main airfield via access to the IDANG apron.

Any consolidation or relocation of existing or future facilities in the area of this runway would increase safety and efficiency by reducing mixed-use aircraft operations on the main airfield. While the other development options would provide varying levels of capacity increases, development of Runway 9-27 as a full air carrier-capable runway would result in the greatest overall capacity benefits. A capacity analysis assuming development of Runway 9-27 as an air carrier runway was conducted using the same assumptions and methodology used for the main airfield, as documented in Section IV. **Table V-3** shows total ASV and estimated delay for the airfield, both with and without development of Runway 9-27 as an air carrier runway.

As shown and previously stated, if no action is taken to increase airfield capacity, forecast demand is expected to meet ASV in approximately 2012. Under Option 4, demand is expected to meet ASV between 2025 and 2030, resulting in a significant reduction in average delay per operation throughout the planning period.



Conceptual Runway 10R-28L and Taxiway B extension

Conceptual runway development

Conceptual taxiway development

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (airfield development concept).

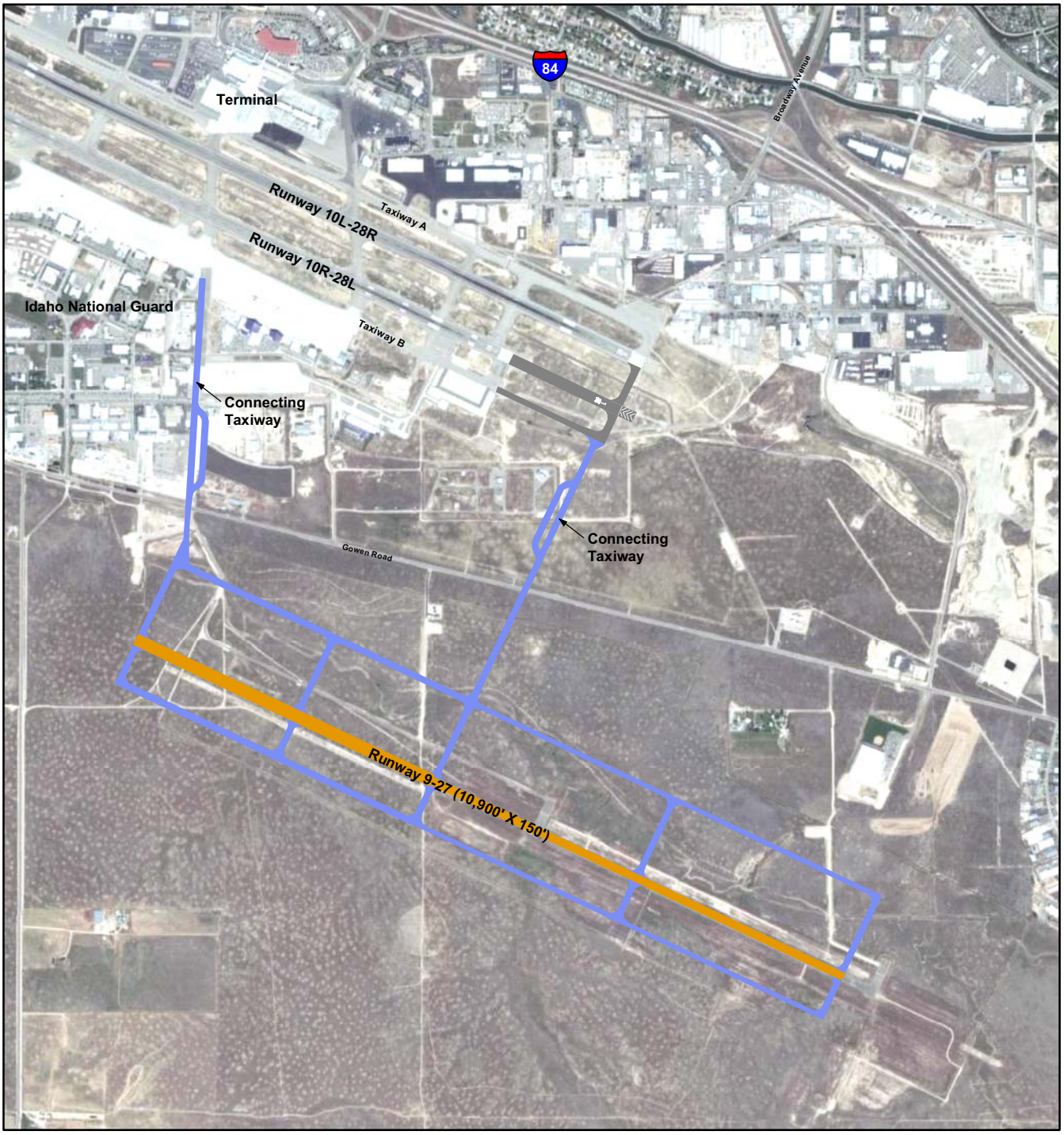
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-9

0 2,000 feet

north

Runway 9-27 Development Option 3
Runway Length: 8,000 Feet



Conceptual Runway 10R-28L and Taxiway B extension

Conceptual runway development

Conceptual taxiway development

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (airfield development concept).

Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-10

0 2,000 feet

north

Runway 9-27 Development Option 4
Runway Length: 10,900 Feet

Table V-3

Annual Demand, Annual Service Volume, and Average Annual Aircraft Delay

Year	Annual Service Volume	Annual Demand	Ratio of Demand to ASV	Projected Average Delay (Minutes per Operation)	Projected Total Annual Delay (Hours)
Existing Airfield					
2005	225,000	173,054	0.77	0.8	2,307
2010	225,000	195,112	0.87	1.3	4,227
2015	224,000	268,014	1.20	4.5	19,919
2020	224,000	290,503	1.30	6.4	31,005
2025	223,000	315,592	1.42	9.8	51,597
2030	223,000	352,105	1.58	17.7	103,868
Airfield with Runway 9-27 as an Air Carrier Runway					
2005	329,000	173,054	0.53	0.4	1,154
2010	328,000	195,112	0.59	0.5	1,626
2015	328,000	268,014	0.82	0.9	4,199
2020	327,000	290,503	0.89	1.4	6,778
2025	326,000	315,592	0.97	2.6	13,676
2030	326,000	352,105	1.08	3.0	17,605

Source: Ricondo & Associates, Inc., May 2007, based on FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*.
Prepared by: Ricondo & Associates, Inc., July 2008.

5.1.3 Long-Range Airfield Development

Assuming continued long-term growth in demand at the Airport, it is anticipated that at some point beyond the planning period discussed in this Master Plan Update, additional airfield facilities will be needed to increase capacity and maintain delays at a reasonable level. The exhibits depicting various Runway 9-27 development options show a parallel taxiway to the north with a centerline-to-centerline distance of 1,150 feet from the runway. This distance allows for potential future development of a fourth parallel runway, which would provide additional long-term airfield capacity.

5.2 Passenger Terminal Development Concepts

The passenger terminal complex is comprised of a main terminal building, one connected concourse (Concourse B), and one integrated ground loading concourse (Concourse C). Phase 1 and Phase 2 construction of the main terminal building and Concourse C were completed in 2003 and 2005, respectively.

Planning and design documents related to the programming, phasing, and construction of the terminal facility were compiled into a schematic design manual.[7] Planning activities associated with the terminal plan included detailed analyses regarding terminal site selection and configuration, footprint/layout, space planning, utility availability and connections, and an evaluation of potential future development options. For the purpose of this Master Plan Update, it is recommended that

[7] CSHQA and HNTB Corporation, *Boise Air Terminal Project, Passenger Terminal Building – Schematic Design Manual*, February 15, 1999.

future development of the terminal complex continue to progress as specified in the overall terminal development plan.

As described in Section IV, planning activity levels (PALs) were developed in the terminal planning process as triggers for future terminal development, based on volumes of annual passengers. Each PAL, along with the year that it is projected to occur, is as follows:[8]

- PAL 1 = 3,000,000 annual passengers – Existing Conditions
- PAL 2 = 4,500,000 annual passengers – 2012 ±
- PAL 3 = 6,000,000 annual passengers – 2023 ±

The preferred terminal development plan is presented at a conceptual level on **Exhibit V-11**. A description of the components associated with each PAL is described in the following sections.

5.2.1 PAL 1 Terminal Development Concept

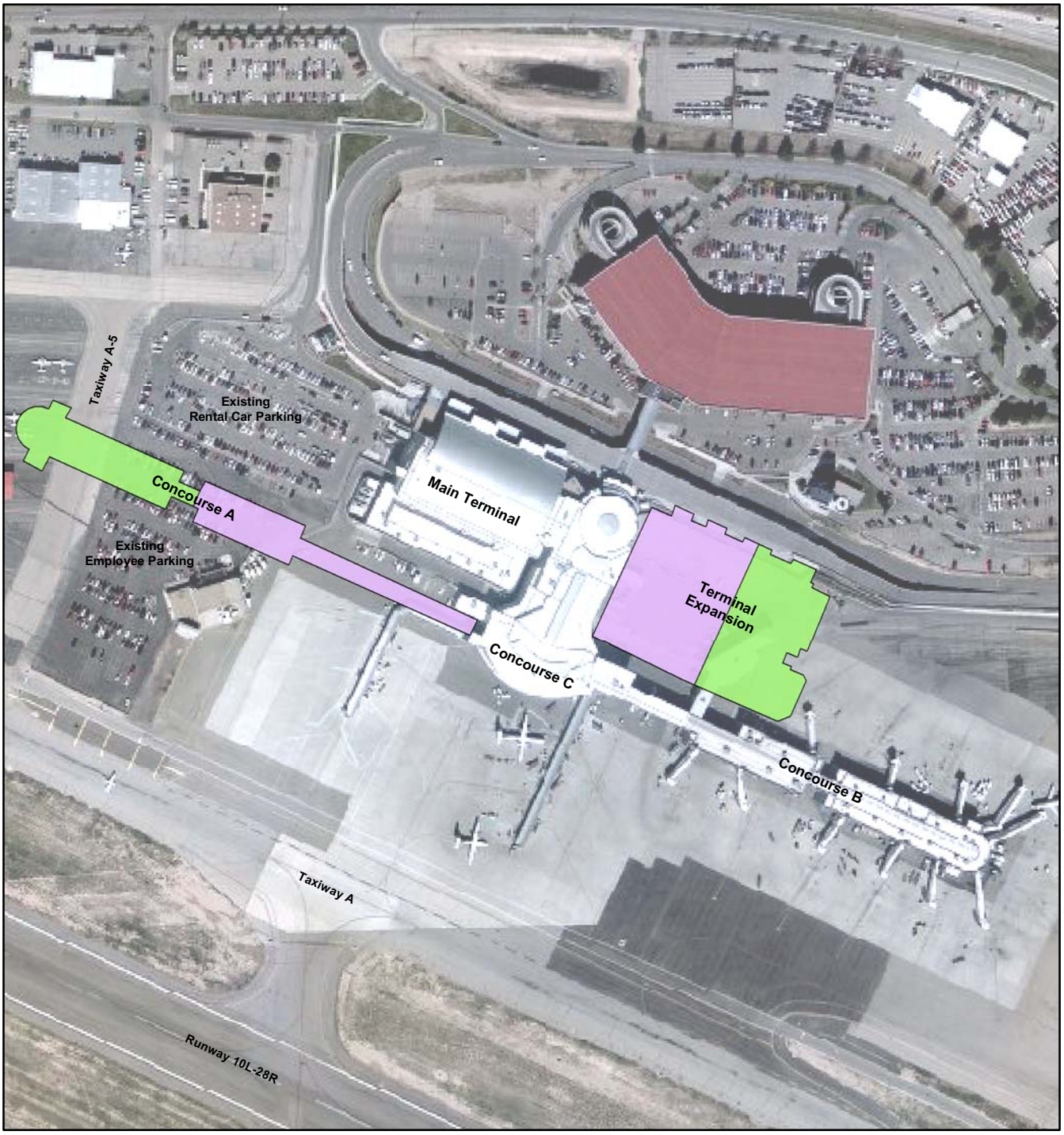
When planning and design of the new terminal project commenced, facility development was programmed for PAL 1 (defined as 3 million annual passengers). When the final phase of the terminal project was completed in 2005, facilities were in place to accommodate PAL 1 demand. No significant terminal construction has occurred since 2005 and, therefore, PAL 1 is assumed to represent existing conditions.

5.2.2 PAL 2 Terminal Development Concept

PAL 2 terminal development includes initial construction of Concourse A and terminal expansion, as follows:

- **Concourse A construction** – As shown on Exhibit V-11, the planning concept for Concourse A calls for development to the west, mirroring Concourse B, which extends to the east. Concourse A would connect to the main terminal structure across from Concourse B at the existing food court (level 2) and Concourse C (level 1). Initial construction of Concourse A would provide airside space for concessions, airline operations, and passenger gate areas. PAL 2 Concourse A development would extend out to an area currently used for employee parking, requiring relocation of those parking facilities. Aircraft parking would occur on the south and west sides of the concourse, delaying impacts to the rental car parking lot.
- **Terminal development** – Under the terminal development plan, expansion of the terminal to the east of the existing terminal (PAL 1) has been programmed to provide additional landside space to accommodate passenger demand at PAL 2. This terminal development concept would include space for ticketing, airline offices, baggage handling and sortation, baggage claim, and concessions. To make efficient use of time and resources, and for ease of future expansion, it is anticipated that during construction of the initial phase of Terminal 2 for PAL 2, the foundation and shell for PAL 3 Terminal 2 development will be constructed.

[8] Timing for each PAL assumes that the number of total passengers is equal to twice the number of enplaned passengers, projected based on the aviation activity forecasts presented in Section III.



Passenger activity level (PAL) 2 development

PAL 3 development

Note: The shell of PAL 3 Terminal 2 expansion would be constructed during PAL 2 for cost efficiencies.

Sources: City of Boise interactive mapping system, July 2007 (aerial photograph), accessed March 2008; CSHQA and HNTB Corporation (concept and phasing).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-11

0 300 feet

north

Preferred Passenger Terminal Development Concept

5.2.3 PAL 3 Terminal Development Concept

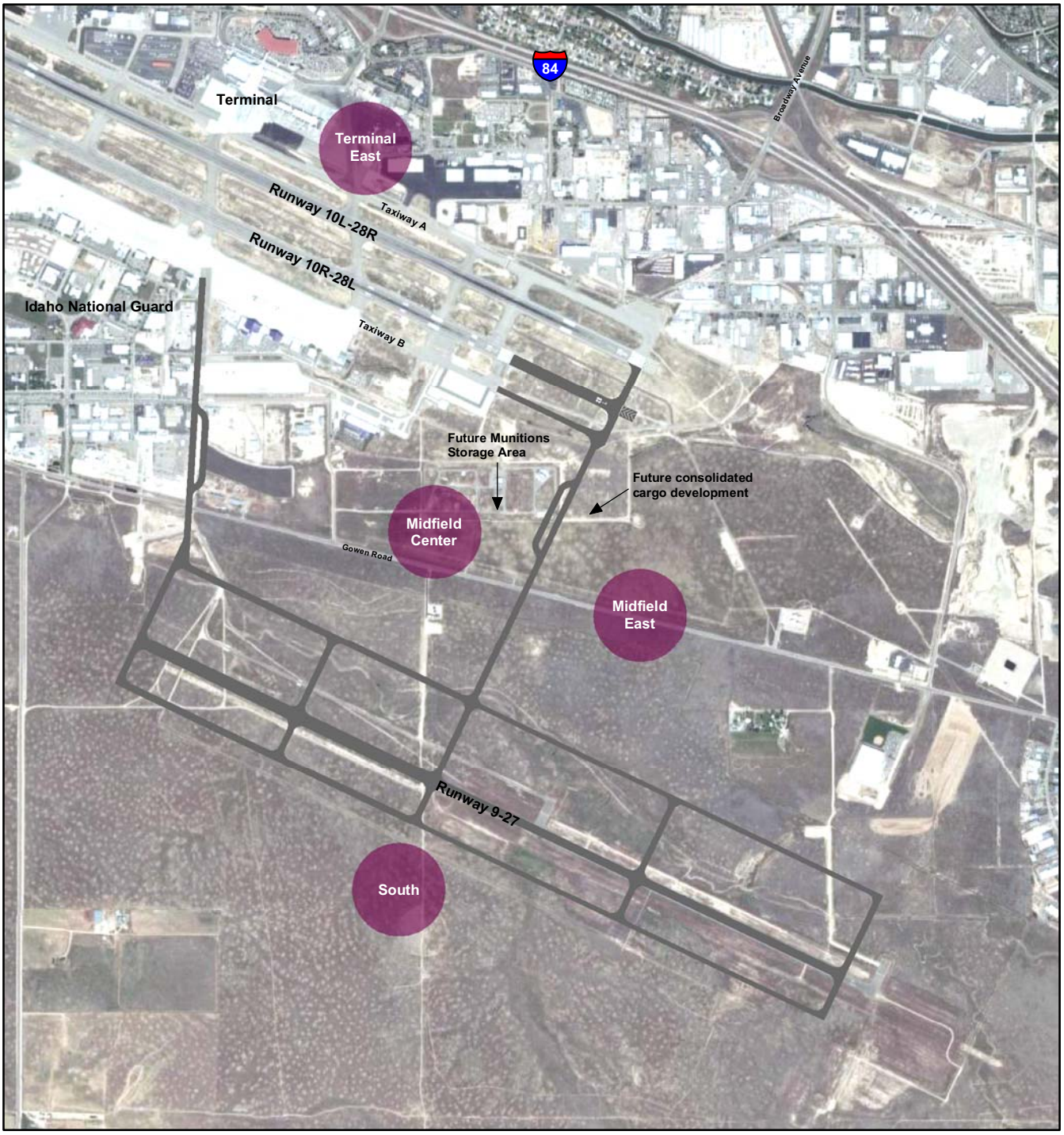
PAL 3 terminal development includes expansion of Concourse A to the west and terminal expansion to the east, as follows:

- **Concourse A expansion** – The programmed development concept for PAL 3 includes the expansion of Concourse A to the west. This expansion would provide additional airside space for concessions, airline operations, and passenger gate areas. At PAL 3, Concourse A would extend across Taxiway A-5 and into an area currently used for GA parking. Due to clearance requirements for the parking and maneuvering of air carrier aircraft around the concourse, GA facilities in this area would have to be relocated.
- **Terminal expansion** – Under PAL 3, the terminal would be expanded to the east to provide additional landside space for ticketing, airline offices, baggage handling and sortation, baggage claim, and concessions.

5.2.4 Long-Range Terminal Development Options

The current terminal development plan describes facility requirements and construction concepts through PAL 3, which, as previously mentioned, is anticipated to occur around 2023. As passenger demand at the Airport grows, so too will the necessity to provide terminal facilities beyond the planning period identified in this Master Plan Update. Although not specifically addressed as part of this master plan, it is prudent to begin considering options for long-range terminal development. Possible locations and options for long-range terminal development are depicted on **Exhibit V-12** and include the following:

- **Terminal East** – Space for long-term terminal development in the vicinity of the existing terminal complex is limited and constrained. Relocation of cargo and National Interagency Fire Center (NIFC) facilities currently located east of the terminal may represent an option for future terminal development in this area. If development of full terminal facilities is not feasible, development of a satellite concourse that shares passenger processing operations with the main terminal complex could be an option. Advantages of terminal development in this area include existing ground access roadways, proximity to I-84, and availability of existing utility infrastructure.
- **Midfield East** – Construction of a taxiway connecting the main airfield to Runway 9-27 would present an opportunity for facility development on either side of the connecting taxiway. Advantages of terminal development in this area include proximity to Runway 9-27 and adequate land area for development. Disadvantages include the need for new ground access roadways, development of utility infrastructure, and the distance from Runways 10L and 10R thresholds (resulting in increased taxi time). Additionally, terminal development in this area conflicts with recommended air cargo consolidation plans (see section 5.4.1).
- **Midfield Center** – This site would place terminal development between the existing airfield and Runway 9-27, allowing more efficient access to all runways. Similar to the midfield east site, terminal development west of the connecting taxiway would require new ground access roadways and the development of utility infrastructure. Another limitation is that this area is controlled by the Idaho National Guard and would conflict with the future munitions storage area.



Conceptual Runway 10R-28L/Taxiway B extension and Runway 9-27 development

Potential long range terminal development options

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (airfield development concepts); Ricondo & Associates, Inc., July 2008 (potential terminal development sites).

Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-12

0 2,000 feet

north

Potential Long Range Terminal Development Options

- **South** – Extension of Runway 9-27 to accommodate air carrier operations could facilitate development of a passenger terminal in this area. The primary advantage of this area is the large amount of space potentially available for terminal construction and expansion. Disadvantages include the need for new ground access and utility infrastructure, as well as distance from the main airfield and increased driving distance for most Airport users.

5.3 Ground Access Development Concepts

Ground access includes local access roadways, terminal circulation roads, terminal curbfront, parking facilities, and public transportation. Ground access facility requirements at the Airport are discussed in Section IV. As stated, the existing terminal circulation roadway and two-level terminal curb are currently operating efficiently and were designed to handle forecast traffic through terminal development PAL 3 (6 million annual passengers). Therefore, no modification of the circulation roadway or curbfront is anticipated to be needed through the planning period.

The primary ground access components that are most in need of development are the local roadways and portions of I-84 that provide access to the Airport and its parking facilities—public parking, employee parking, and rental car parking. To address these needs, several concepts have been proposed and evaluated in separate planning studies conducted by the Airport and other entities.

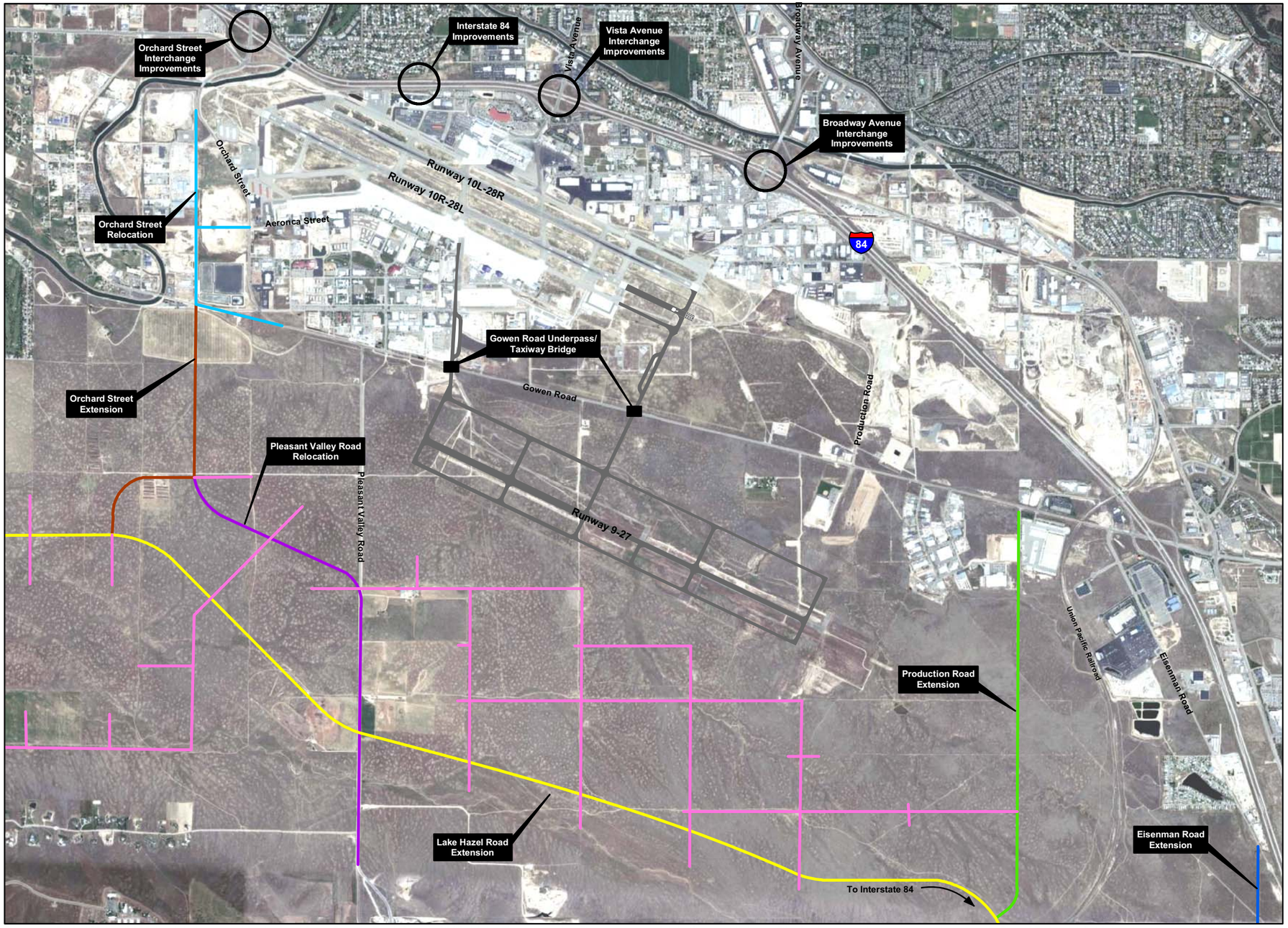
5.3.1 Local Access Roadway Concepts

Sections II and IV describe various deficiencies of the local roadway system serving the Airport, particularly with regard to I-84 and several key interchanges. In addition to improvements to I-84, other local roadway improvement concepts have been proposed to enhance vehicular travel around the Airport and to accommodate future airport development. The preferred concepts are presented on **Exhibit V-13** and described in the following paragraphs.

5.3.1.1 I-84 Improvements

Previous sections have presented the level of service deficiencies and overall disrepair of some segments of I-84 in the vicinity of the Airport. Improvements to I-84 mainline segments and associated interchanges in the vicinity of the Airport have been planned and initiated by the Idaho Transportation Department (ITD) through the Orchard to Isaacs Canyon Corridor project, as detailed in Section II. When completed in 2011, the I-84 and interchange improvements will provide a desirable level of service through 2035—beyond the planning period of this Master Plan Update. The timing for these projects, which are currently funded by ITD through the legislature-approved Garvey Bill, is as follows:

- Orchard Street Interchange – 2009 to 2010
- Vista Avenue Interchange – 2009 to 2011
- Primary lanes of I-84 – 2010 to 2011



Legend

Conceptual Runway 10R-28L/Taxiway B extension and Runway 9-27 development

Idaho Transportation Department Projects

Interstate 84 mainline and/or interchange improvements

City of Boise Projects

Orchard Street relocation (includes extension of Aeronca Street and Gowen Road to the relocated Orchard Street)

Ada County Highway District Projects

- Lake Hazel Road extension
- Pleasant Valley Road relocation
- Orchard Street extension
- Production Road extension
- Eisenman Road extension
- Connector streets

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; Idaho Transportation Department and Ada County Highway District (roadway improvements/concepts); City of Boise (airfield development concept).
Prepared by: Ricondo & Associates, Inc., September 2008.

0 1/2 mile

north

Exhibit V-13

Preferred Roadway Improvement and Alignment Concepts

5.3.1.2 South Orchard Street Relocation

South Orchard Street currently borders the west side of the Airport, running along the boundary of the GA and Idaho National Guard facilities. The preferred concept of relocating the roadway approximately ¼-mile to the west will straighten the roadway and provide space for GA and air cargo (see section 5.4). Included in this concept is the extension of Aeronca Street and Gowen Road to the relocated South Orchard Street.

5.3.1.3 Gowen Road Underpass

To facilitate the use of taxiways connecting Runway 9-27 to the main airfield, previous updates to the Airport's Master Plan have proposed tunneling Gowen Road under the taxiways. As an alternative, the 2001 Master Plan Update presented a concept whereby Gowen Road would be relocated to the south side of Runway 9-27, which would provide roadway access along the entire length of Runway 9-27, and eliminate the need for roadway tunnels and taxiway bridges. After further evaluation of alternative routes, the preferred concept is to tunnel Gowen Road under the connecting taxiways.

5.3.1.4 Pleasant Valley Road Relocation

Pleasant Valley Road currently extends south from Gowen Road. A preferred concept is to relocate the northernmost segment of the roadway to the west to connect to the extended portion of Orchard Street. This relocation will allow for more efficient vehicle travel and will keep vehicle traffic clear of potential Runway 9-27 development.

5.3.1.5 Lake Hazel Road Extension

In February 2008, the Ada County Highway District (ACHD) completed a study to evaluate concepts for extending Lake Hazel Road south of Runway 9-27.[9] Extending Lake Hazel Road south of the Airport has been planned for nearly 10 years to increase connectivity in the southern Ada County region. As part of the relocation/alignment study, concepts were developed for four separate components: the west segment, middle segment, east segment, and connecting roads. Various design constraints were accounted for through the concept identification process, such as the Airport's requirement for a minimum ½-mile separation between the northern boundary of the extension of Lake Hazel Road and the southern boundary of Runway 9-27.

The recommended Lake Hazel Road alignment, as shown on Exhibit V-13, was determined based on projected traffic and transportation needs, stakeholder comments, planned and existing developments, environmental impacts, and site constraints. The alignments selected for the Orchard Street and Production Road connections to Lake Hazel Road were based on stakeholder and public preference, as well as the efficiency of the connection and its potential to minimize impacts. Modifications to the recommended alignments may be considered in the future to maximize the efficiency of the roadway network as future developments are proposed.

5.3.2 Parking Concepts

The primary need for Airport ground access facilities is additional parking area, which includes public parking, employee parking, and rental car parking. As stated in Section IV, recent and planned expansion of the off-airport Economy Lot is expected to provide adequate public parking

[9] Parametrix, *Lake Hazel/Gowen Relocation Alignment Study Report*, February 2008.

capacity through at least 2012. However, projections presented in the Airport's parking master plan indicate that approximately 90 percent of the parking demand is for "close-in" parking spaces (parking located within 600 feet of the terminal).[10] The close-in parking facilities are operating near or above capacity and additional supply will be necessary to accommodate anticipated demand through the planning period. In addition, planned development of the passenger terminal is expected to displace the Airport's rental car ready/return lot and its largest employee lot (see Section 5.2).

To meet the projected demand for close-in parking, the parking master plan identified four potential sites for expansion of the Airport's existing parking garage, as shown on **Exhibit V-14**. Preferred expansion sites were evaluated based on walking distance to the terminal, intuitive wayfinding, operational efficiency, and capacity. Based on the evaluation, it was recommended that as new garage spaces are developed, the sites should be developed in the following order: (1) north of garage/long-term lot, (2) short-term lot, (3) north of West Airport Way.

Based primarily on various funding scenarios, the parking master plan identified three parking development options, each of which is designed to accommodate parking requirements through 2027.

Parking Development Option 1 is shown on **Exhibit V-15** and summarized as follows:

- **Phase 1** - A new 800-space, five-level garage (four levels at or above-grade and one level below-grade) is constructed immediately north of the existing garage.
- **Phase 2** – A four-level garage expansion is constructed on the short-term lot site. A new 600-space, four-level garage is constructed between the existing ATCT and the existing garage. Rental cars would occupy the first level of the existing garage and the first two levels of the new garage north of the existing garage. Short-term parking would be accommodated on the first level of the garage constructed on the existing short-term lot, as well as on adjacent surface parking lots. The surface lot vacated by rental cars could be converted to employee parking upon initiation of terminal expansion.
- **Phase 3** – A new 930-space, four-level garage would be constructed on the long-term lot site and the Economy Lot would be expanded by 300 spaces. A 520-space remote employee lot would be constructed when the existing rental car ready/return area is displaced by terminal development.
- **Phase 4** – The remote employee parking lot would expand to 640 spaces.

Parking Development Option 2 is shown on **Exhibit V-16** and summarized as follows:

- **Phase 1** – A new 800-space, five-level garage (four levels at or above-grade and one level below-grade) would be constructed immediately north of the existing garage. Additional structured public parking spaces, 515 in all, would be constructed on the long-term lot site. Rental cars would occupy the first two levels of the new garage. A 520-space remote employee lot would be constructed when the existing rental car ready/return area is displaced by terminal development.

[10] Jacobs Consultancy, *Final Report: Parking Master Plan – Boise Airport*, July 2007.

Legend

- Existing parking garage
- Potential parking garage expansion site

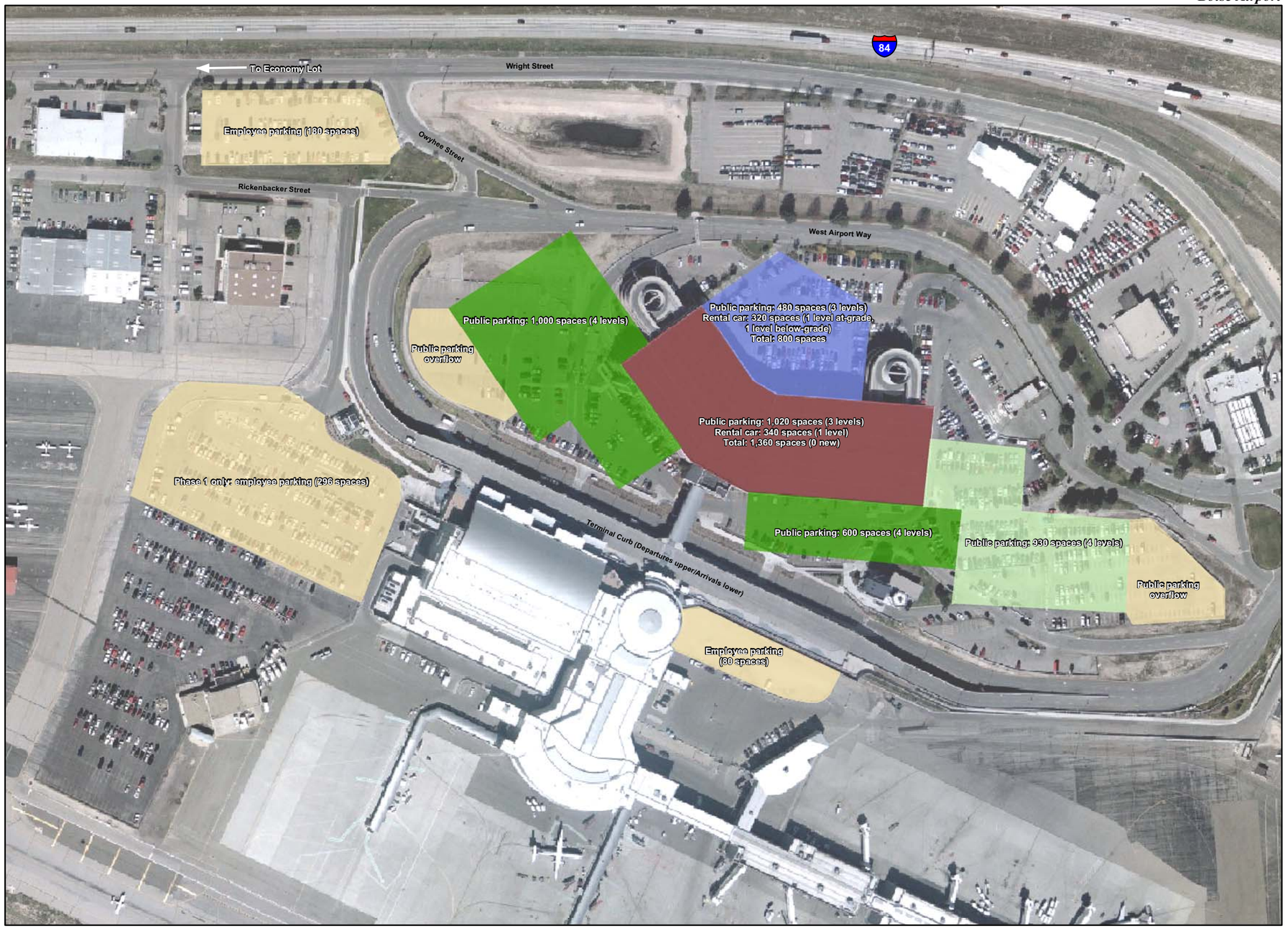
Sources: City of Boise interactive mapping system, July 2007 (aerial photograph); Jacobs Consultancy, Final Report: Parking Master Plan - Boise Airport, July 2007 (potential parking garage expansion sites).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-14

0 200 feet north

Potential Parking Garage Expansion Sites

Economy Lot



Legend

- Existing parking garage
- Existing surface lot

Parking Garage Expansion

- Phase 1
- Phase 2
- Phase 3

Notes: Economy lot expanded by 300 spaces in Phase 3.
520-space remote employee lot constructed in Phase 3.
Remote employee lot expanded to 640 spaces in Phase 4.

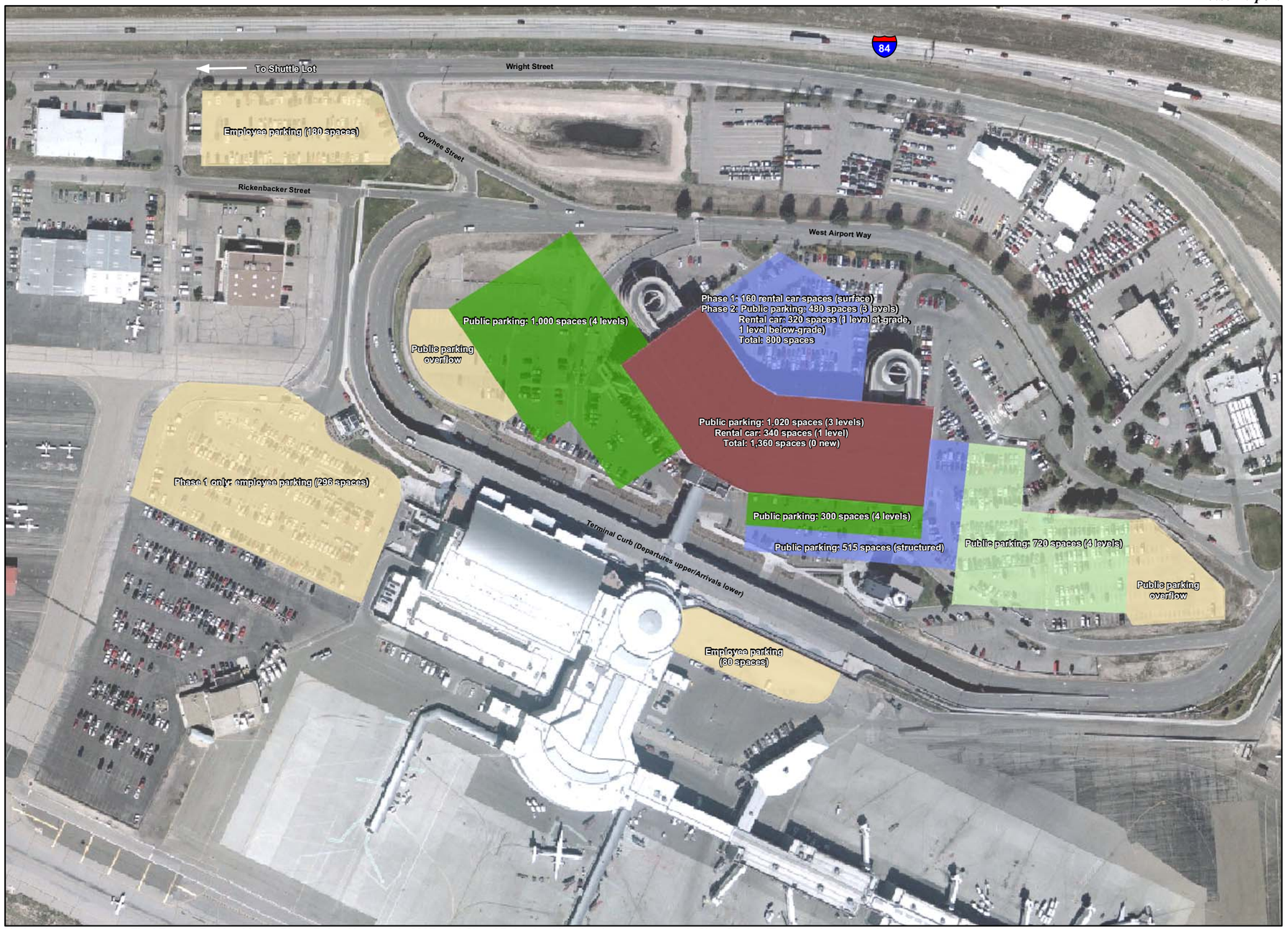
Sources: City of Boise interactive mapping system, July 2007 (aerial photograph); Jacobs Consultancy, Final Report: Parking Master Plan - Boise Airport, July 2007, and City of Boise (parking development concept); City of Boise (Economy Lot expansion area).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-15

0 200 feet north

Parking Development Option 1

Economy Lot



Legend

- Existing parking garage
- Existing surface lot

Parking Garage Expansion

- Phase 1
- Phase 2
- Phase 3

Notes: Economy lot expanded by 275 spaces prior to Phase 3.
520-space remote employee lot constructed in Phase 2.
Remote employee lot expanded to 640 spaces in Phase 3.

Sources: City of Boise interactive mapping system, July 2007 (aerial photograph); Jacobs Consultancy, Final Report: Parking Master Plan - Boise Airport, July 2007, and City of Boise (parking development concept); City of Boise (Economy Lot expansion area).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-16

0 200 feet north

Parking Development Option 2

- **Phase 2** – A new 1,000-space, four-level garage is constructed on the short-term lot site and a new 300-space, four-level garage is constructed between the ATCT and the existing garage. Rental cars would occupy the first level of the existing garage and the adjacent surface lot to the north (currently part of the long-term lot). Short-term parking would be accommodated on the first level of the garage constructed on the short-term lot site as well as on adjacent surface parking lots. The surface lot vacated by rental cars would be converted to employee parking upon initiation of terminal expansion.
- **Phase 3** – An additional 720 spaces would be constructed on the long-term lot site and the remote employee parking lot would be expanded by 640 spaces. Prior to Phase 3, the Economy Lot would be expanded by 275 spaces.

Unlike the other two options, Parking Development Option 3 assumes that rental car facility development occurs away from the terminal area. Should the Airport pursue this option, a site for consolidated rental car facilities has been identified adjacent to the Economy Lot along Victory Road. Option 3 is shown on **Exhibit V-17** and summarized as follows:

- **Phase 1** – A new 800-space, five-level garage (four levels at or above-grade and one level below-grade) would be constructed immediately north of the existing garage. Prior to Phase 1, the Economy Lot would be expanded by 1,000 spaces. When the existing rental car ready/return area is displaced by terminal development, the remaining long-term lot site could be converted to employee parking. In addition, a 165-space remote employee parking lot would be constructed.
- **Phase 2** – A new 1,000-space, four-level garage is constructed on the short-term lot site and a new 300-space, four-level garage is constructed between the ATCT and the existing garage Short-term parking would be accommodated on the first level of the new garage and on adjacent surface parking lots. The surface lot vacated by rental cars would be converted to employee parking upon initiation of terminal expansion.
- **Phase 3** – 2,700 additional spaces would be constructed on the long-term lot site.

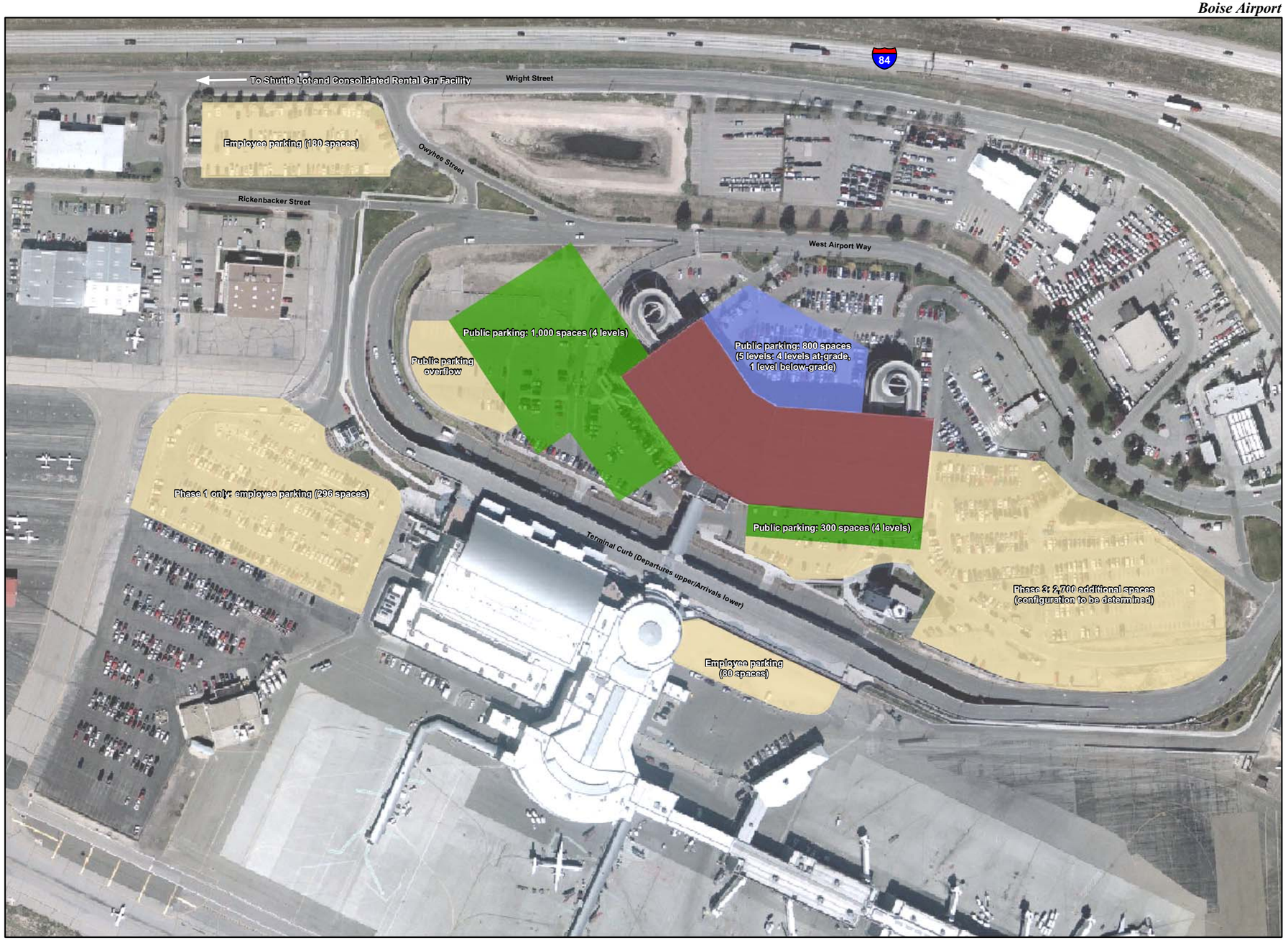
These options, as detailed in the parking master plan, are intended to present the range of potential development scenarios resulting from various financial decisions. The parking master plan does not recommend a specific parking development plan. Likewise, a recommended parking development plan is not presented in this Master Plan Update. The development options summarized in this section correspond to Airport policy decisions regarding funding sources and the location of rental car facilities, as well as the Airport's ability to issue debt to fund expansion of the existing parking garage. It is recognized that ultimate development of Airport parking facilities may be some combination of these options.

5.4 Air Cargo and General Aviation Development Concepts

5.4.1 Air Cargo Development

The future configuration of air cargo facilities at the Airport will be driven primarily by the need to implement new federal cargo screening requirements and to improve the operational efficiencies of cargo facilities and cargo aircraft operations.

Economy Lot and Consolidated Rental Car Facility



Legend

- Existing parking garage
- Existing surface lot

Parking Garage Expansion

- Phase 1
- Phase 2

Notes: Economy lot expanded by 1,000 spaces prior to Phase 1.
165-space remote employee lot constructed in Phase 1.

Sources: City of Boise interactive mapping system, July 2007 (aerial photograph); Jacobs Consultancy, Final Report: Parking Master Plan - Boise Airport, July 2007, and City of Boise (parking development concept); City of Boise (Economy Lot expansion area).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-17

0 200 feet north

Parking Development Option 3

Currently, air cargo facilities at the Airport are located in three separate areas—immediately east and west of the passenger terminal and at the western boundary of the Airport just south of Runway 10R-28L. This current configuration, if maintained, will result in increased costs for the security screening of cargo shipments, require a redundancy of facility operations, and will not reduce runway crossings for air cargo aircraft operations. A solution to improve this situation is to consolidate all cargo facilities to a single area and locate the cargo area south of Runway 10R-28L. Locating all cargo facilities south of Runway 10R-28L would promote the use of Runway 10R-28L for cargo arrivals and departures, thereby eliminating the need to cross Runway 10L-28R except for special circumstances.

5.4.1.1 Consolidated Air Cargo Development Concepts

There are only two development areas that meet the objective of consolidating and locating air cargo facilities at the Airport south of Runway 10R-28L. These areas include the current air cargo site at the Airport's western boundary just south of Runway 10R-28L and a midfield site at the southeast end of Runway 10R-28L. **Exhibit V-18** identifies the Airport's existing cargo areas as well as the two potential development areas for consolidated cargo facilities.

Consolidated West Cargo Complex

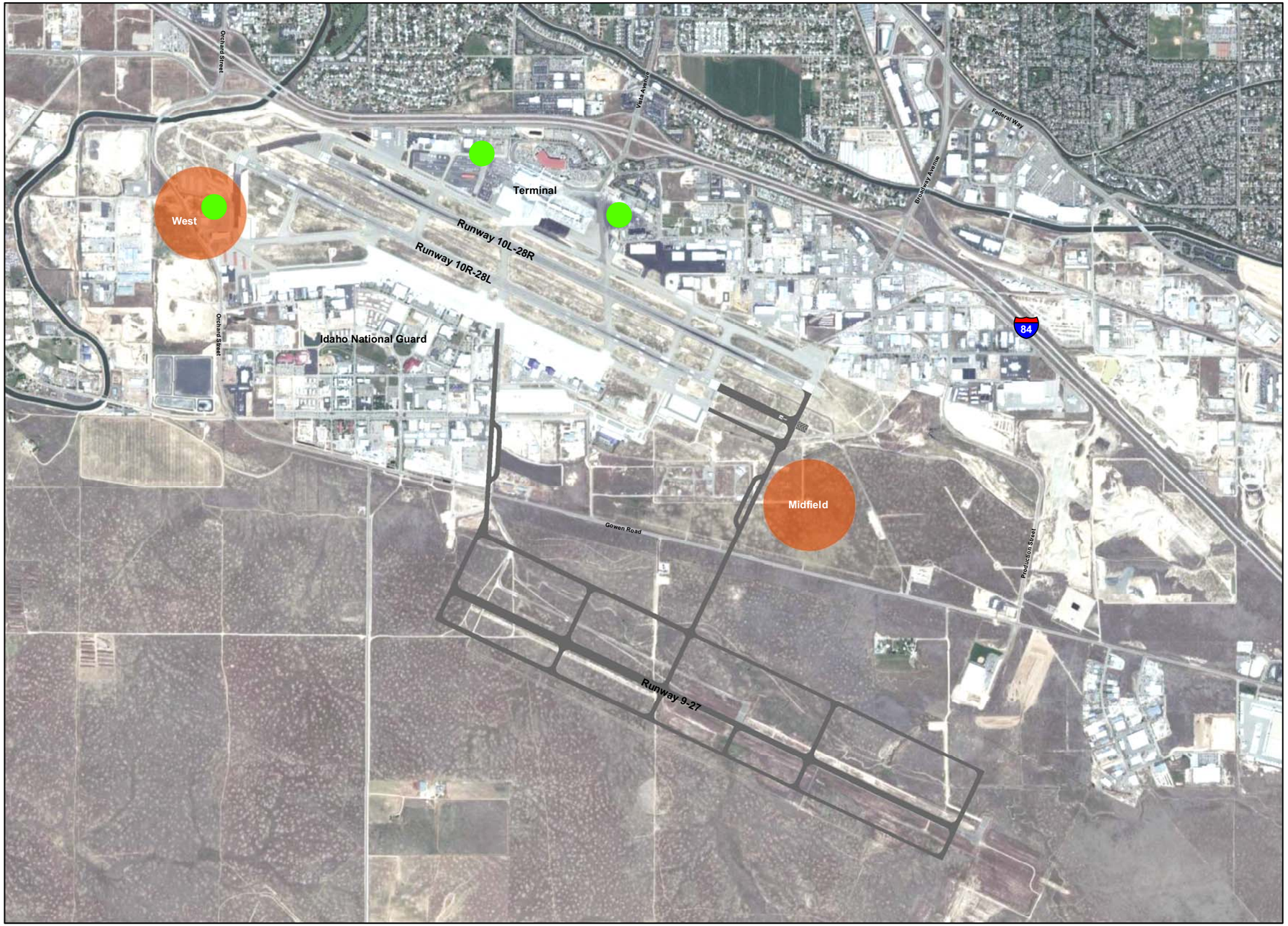
As shown on **Exhibit V-19**, the west cargo complex is the current location for UPS and DHL operations. To consolidate all cargo facilities in this area, additional buildings and apron area would be constructed to the west of existing facilities. The planned relocation of South Orchard Street (shown on Exhibit V-19) will allow for the extension of Taxiway F, construction of additional apron area, and new cargo buildings. To accommodate widebody aircraft (i.e., A300) on the extended Taxiway F, an existing block of T-hangers would need to be relocated. The current clearance for Taxiway F is limited to B-757 aircraft or smaller.

Pros: The advantages of utilizing the existing cargo area for consolidated facilities include the following:

- Use of existing utilities.
- Use of existing cargo buildings and apron area.
- Consolidated federal screening operation.
- Efficiencies of shared facilities (fuel, maintenance, de-icing, etc.).
- Proximity to the Interstate Highway System.
- Elimination of runway crossings (except for special circumstances).

Cons: The disadvantages of expanding the existing cargo area for consolidated facilities include the following:

- Operational mixing of widebody aircraft with a variety of small general aviation aircraft (this is only true if GA facilities remain in their current location).
- Limited ability to expand consolidated cargo facilities (this is only true if the same area is used for expanded GA facilities).
- Increased distance from future expanded Runway 9-27.



Legend

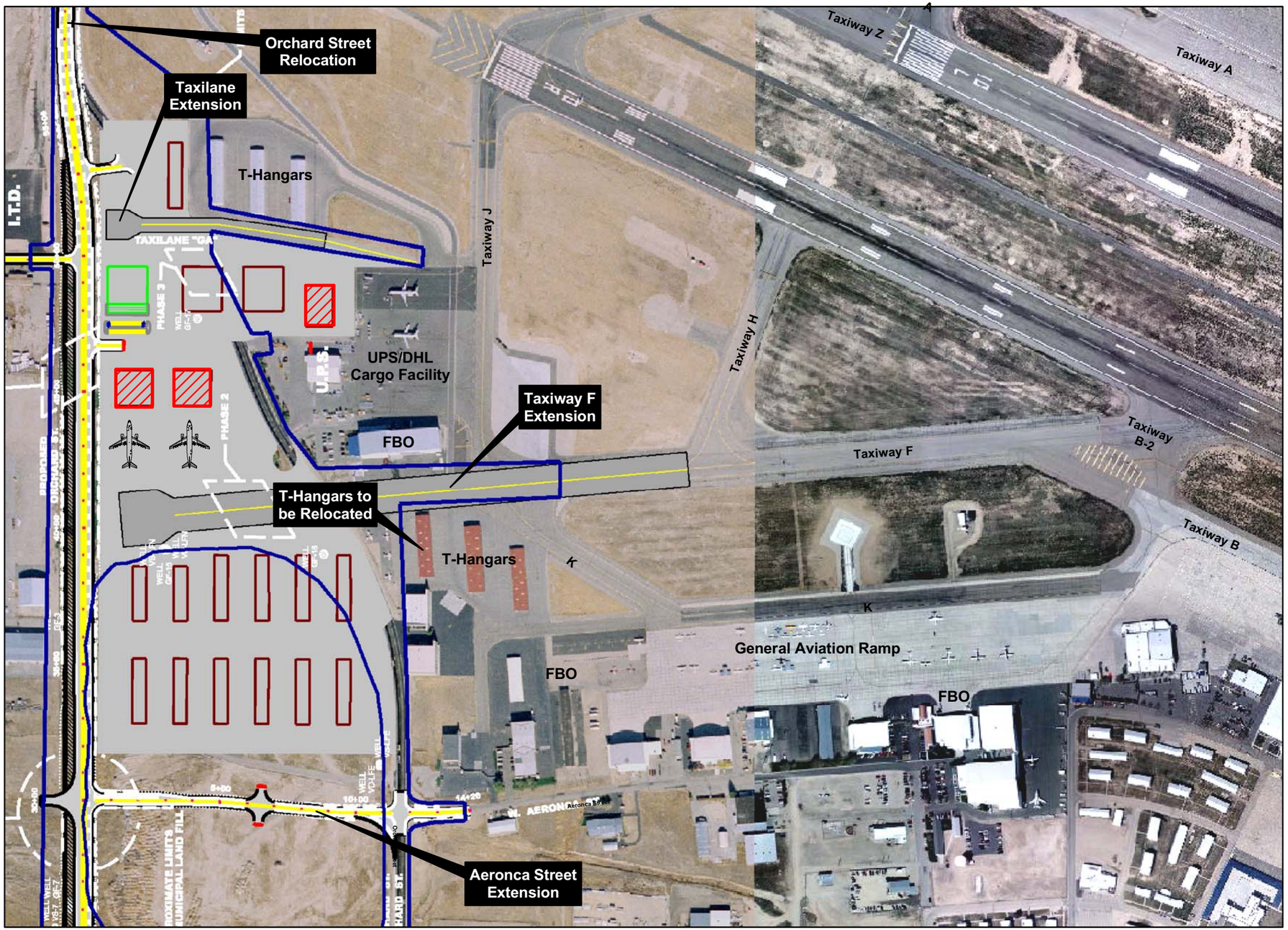
- Conceptual Runway 10R-28L/Taxiway B extension and Runway 9-27 development
- Existing air cargo location
- Potential air cargo consolidation location

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (airfield development concepts and cargo consolidation areas).
Prepared by: Ricondo & Associates, Inc., September 2008.

0 2,000 feet north

Exhibit V-18

Existing and Potential Consolidated Air Cargo Locations



Legend

- Conceptual general aviation hangar/T-hangar development
- Conceptual FBO development
- Conceptual air cargo development
- Conceptual apron expansion

Note: FBO = fixed base operator

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (west cargo complex development concept).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-19

0 400 feet north

West Cargo Complex Option

Consolidated Midfield Cargo Complex

As shown on **Exhibit V-20**, this concept would involve development of a consolidated midfield cargo complex at the southeastern end of Runway 10R-28L. No existing infrastructure is located in this area; therefore, consolidation of all air cargo facilities into this area would require construction of all new facilities.

Pros: The advantages of developing a new midfield consolidated air cargo area include the following:

- Consolidation of federal screening operation.
- Consolidation of security identification area (SIDA) for cargo.
- Efficiencies of shared facilities (fuel, maintenance, de-icing, etc.).
- Expansion potential for consolidated cargo facilities.
- Centrally located between Runway 10L-28R and the future expansion of Runway 9-27 (elimination of the need to cross runways).
- Distinct separation of a widebody cargo aircraft operating area and a general aviation area.
- Area available to expand airside and landside facilities.

Cons: The disadvantages of developing a new midfield consolidated air cargo area include the following:

- Need to develop infrastructure for new site.
- Proximity to interstate system, although this proposed site has good access to two I-84 interchanges.

5.4.2 General Aviation Development

Future development of GA facilities at the Airport will be driven by growth in GA operations, federal GA security requirements, planned expansion of the passenger terminal, air cargo facility development, and the development of Runway 9-27.

As shown on **Exhibit V-21**, existing GA facilities at the Airport are located in two general areas: just west of the passenger terminal, and at the western end of the Airport between the Idaho National Guard installation and Runway 10R-28L. The GA area closest to the passenger terminal has no room for expansion and a significant portion of these facilities will require relocation when Concourse A is constructed. Additionally, the proximity of these facilities to the terminal creates continuous close interaction between air carrier and GA aircraft, requires continuous runway crossings by GA aircraft, and is a security concern for the Transportation Security Administration (TSA). The other GA area, located at the Airport's western boundary, will have significant room for additional facilities once the planned realignment of South Orchard Street is complete. However, this area is also being considered for air cargo development.

Conceptual airside cargo development (ramp/taxiway)

Conceptual cargo building development (sorting building/offices)

Conceptual landside cargo development (truck court/roadways)

Conceptual Runway 10R-28L/Taxiway B extension and Runway 9-27 development

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (airfield development concepts and cargo concept).

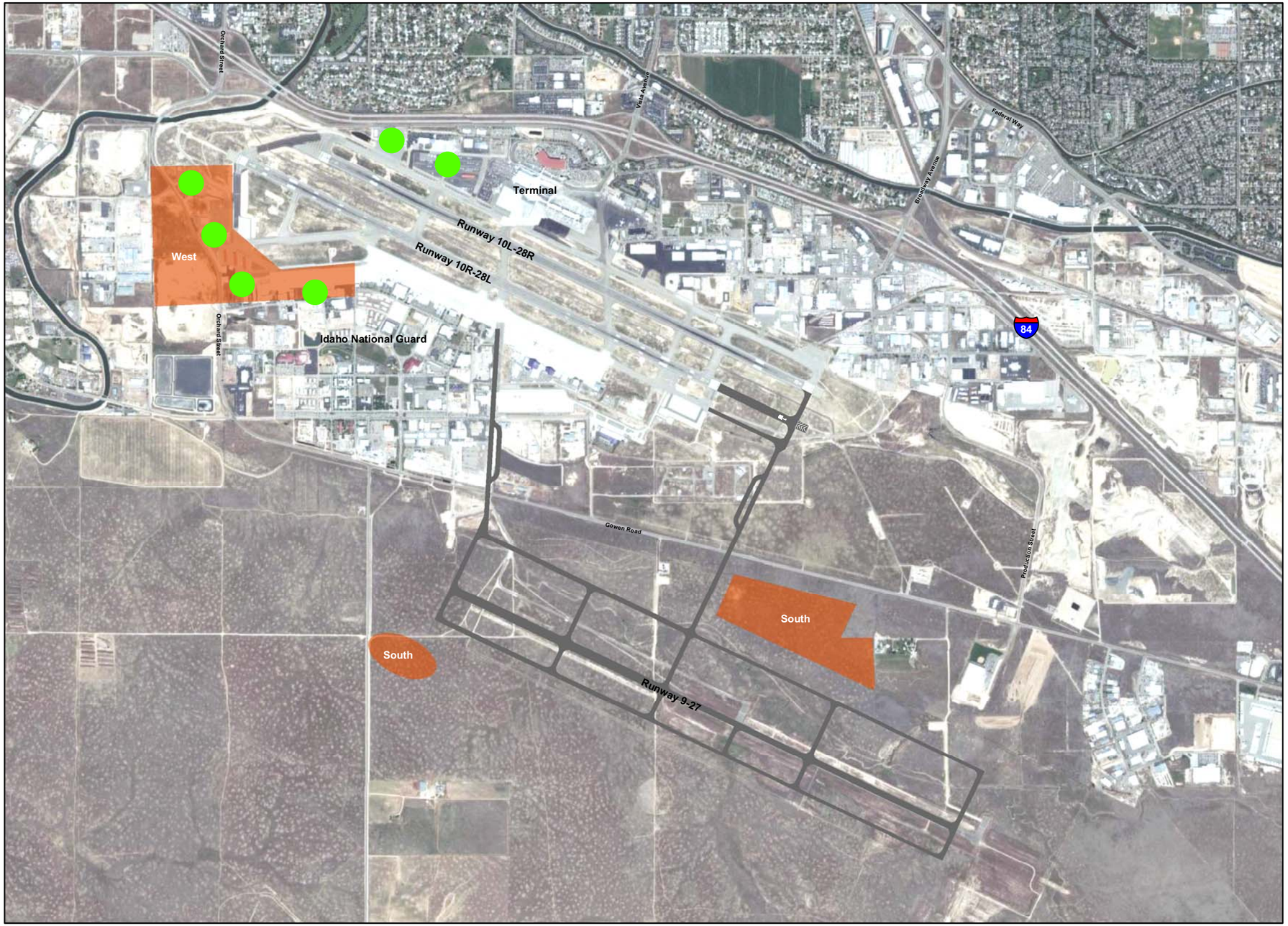
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-20

0 500 feet

north

Consolidated Midfield Cargo Complex



Legend

- Conceptual Runway 10R-28L/Taxiway B extension and Runway 9-27 development
- Existing general aviation location
- Potential general aviation development area

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (airfield development concepts and general aviation development areas).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-21

0 2,000 feet north

Existing and Potential General Aviation Development Areas

5.4.2.1 General Aviation Development Concepts

Three development concepts have been identified for the expansion of GA facilities, as follows:

- Consolidated West General Aviation Area
- West and South General Aviation Areas
- Consolidated South General Aviation Area

The following sections provide a description and assessment of each development concept.

Consolidated West General Aviation Area

As shown on **Exhibit V-22**, the planned relocation of South Orchard Street will provide space for the relocation of GA facilities currently located west of the passenger terminal. However, the ability of this area to accommodate the relocation and future growth of all GA facilities is dependent upon air cargo development being relocated to another area.

Pros: The advantages of utilizing the existing west GA area for consolidated facilities include the following:

- Use of existing utility infrastructure for expansion.
- Efficiencies of shared facilities (fuel, maintenance, ramp areas, etc.).
- Separation of GA operations from passenger terminal area (TSA security issue and potential requirement).
- Elimination of runway crossings (except for special circumstances).
- Reduction in the interaction between GA and air carrier operations.

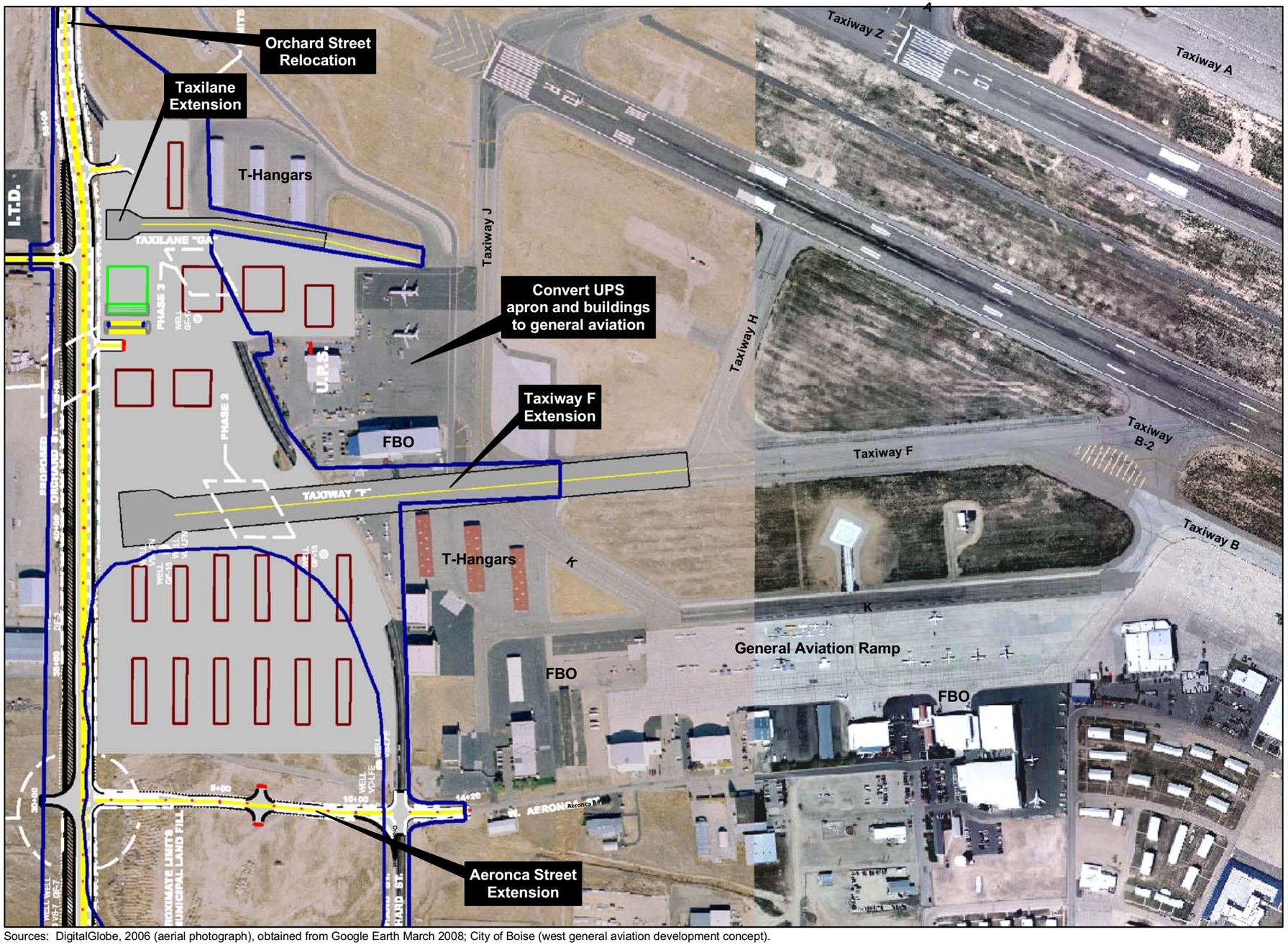
Cons: The disadvantages of expanding the existing west GA area for consolidated facilities include the following:

- Close interaction of ramp operations between GA and air cargo aircraft (if air cargo operations remain in this area).
- Close interaction of ramp operations between GA and air carrier aircraft on Runway 10R-28L (if air cargo operations remain in this area).
- Increased distance from future expanded Runway 9-27 (use of Runway 9-27 allows clear separation of GA and air cargo operations).

West and South General Aviation Areas

As shown on **Exhibit V-23**, this GA development concept consists of maintaining the existing west GA area and the development of a new south GA area. All relocated and new GA facilities would be located at a new south development area along the expanded Runway 9-27. The area made available by the realignment of South Orchard Street could be used for the expansion of air cargo facilities.

Pros: The advantages of maintaining the west GA area and developing a new south GA area include the following:



Legend

- Conceptual general aviation hangar/T-hangar development
- Conceptual FBO development
- Conceptual apron expansion

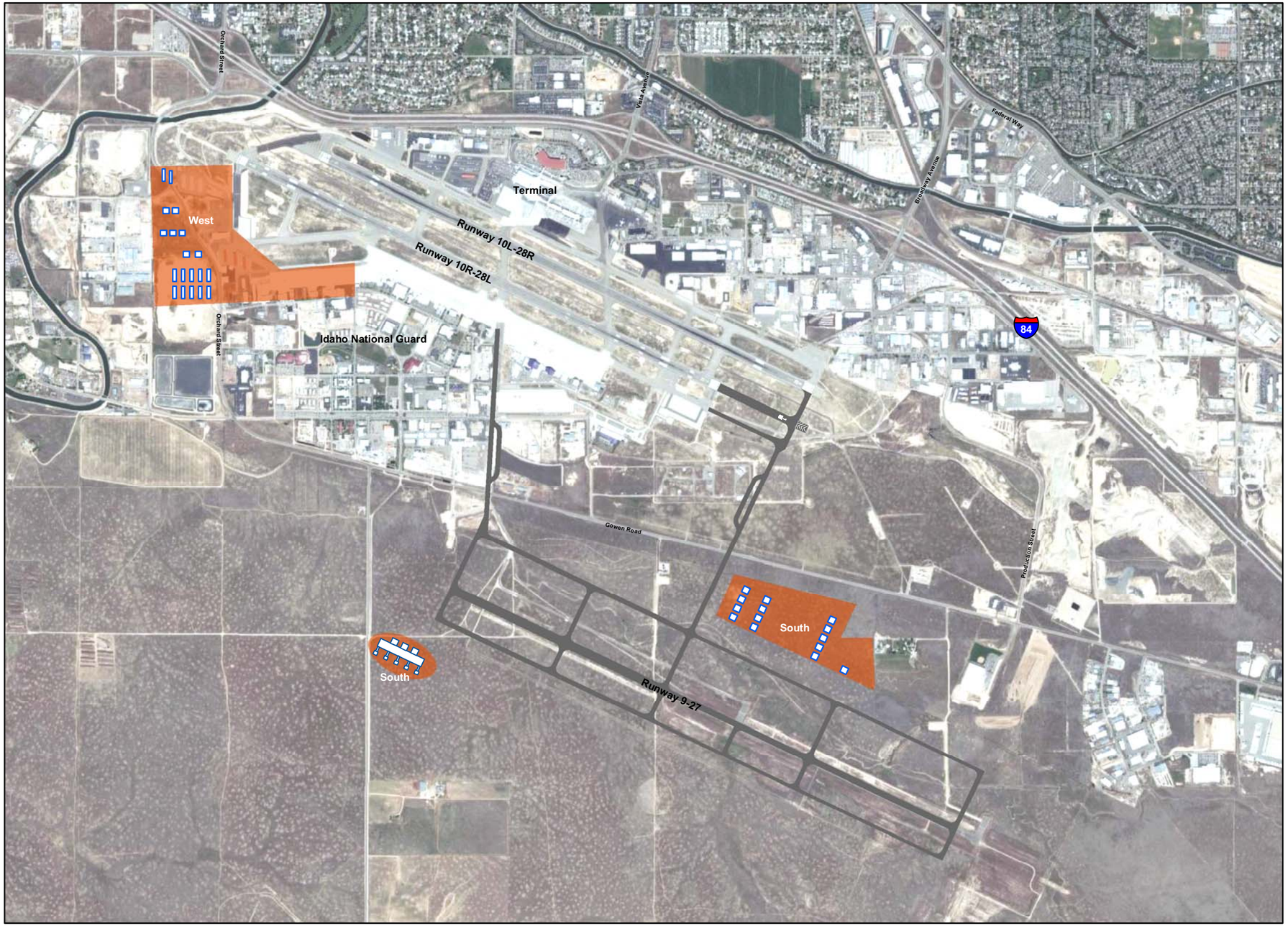
Note: FBO = fixed base operator

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (west general aviation development concept).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-22

0 400 feet north

Consolidated West General Aviation Area



Legend

- Conceptual Runway 10R-28L/Taxiway B extension and Runway 9-27 development
- Potential general aviation development area
- Conceptual general aviation development

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (airfield development concepts and west/south general aviation development concept).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-23

0 2,000 feet north

West and South General Aviation Areas

- Maintains use of existing west GA facilities.
- Significant reduction in the interaction between GA and air carrier operations.
- GA operations separated from passenger terminal area (TSA security issue and potential requirement).
- Elimination of runway crossings (except for special circumstances).
- Promotes non-air carrier development along Runway 9-27 (this allows for greater separation between air carrier and non-air carrier aircraft operations).

Cons: The disadvantages of maintaining the west GA area and developing a new south GA area include the following:

- New infrastructure required for the new south development area (roads, aprons, utilities, etc.).
- No efficiencies gained for consolidating all GA facilities (fuel, maintenance costs, ramp areas, etc.).
- Significant interaction between GA and air carrier operations continues on Runway 10R-28L.
- South development area is dependant upon the development and expansion of Runway 9-27.

Consolidated South General Aviation Area

As shown on **Exhibit V-24**, this concept would involve the relocation of all GA facilities to a new development area along Runway 9-27. The relocation of the GA facilities that are next to the passenger terminal would occur subsequent to or concurrently with the planned construction of Concourse A. The relocation of the western GA facilities would occur over a much longer period of time. The new area would also be sized to accommodate additional growth for GA services. This concept would likely require Runway 9-27 to be improved and extended to a sufficient runway length to accommodate larger corporate aircraft. This concept also opens up the option for a consolidated west air cargo area.

Pros: The advantages of developing a new consolidated south GA area include the following:

- Provides clear separation of GA and air carrier operations (assumes Runway 9-27 is extended to accommodate all GA activity).
- Removes any TSA security concerns involving GA activity in the passenger terminal area.
- Eliminates runway crossings (except for special circumstances).
- Allows for a gradual migration of GA activity from the west GA area.
- Allows for efficiencies resulting from consolidation of all GA facilities (fuel, maintenance costs, ramp areas, etc.).
- Promotes non-air carrier development along Runway 9-27 (this allows for greater separation between air carrier and non-air carrier aircraft operations).

Cons: The disadvantages of developing a new consolidated south GA area include the following:

- Requires new infrastructure for the site (roads, aprons, utilities, etc.).
- Will likely require additional improvements and length for Runway 9-27.

5.4.3 Preferred Air Cargo and General Aviation Development

The preferred concept for air cargo and GA facilities is to develop a new midfield complex for air cargo operations and to develop a new south GA area while maintaining the existing west GA area.

Development of a midfield cargo complex will allow for the consolidation of TSA security screening of air cargo shipments, enhance efficiencies in the use of cargo facilities, and provide ample expansion capabilities for long-term growth.

Conceptual general aviation hangar/T-hangar development

Conceptual FBO development

Conceptual apron development

Conceptual Runway 10R-28L/Taxiway B extension and Runway 9/27 development

Note: FBO = fixed base operator

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (airfield development concept); Ricondo & Associates, Inc., July 2008; and City of Boise (general aviation south development concept).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-24

0 2,000 feet

north

Consolidated South General Aviation Area

Development of the south GA area promotes development of Runway 9-27, maintains the existing west GA area, and provides significant separation of GA and air carrier aircraft operations. This concept also provides the flexibility for the west GA area to expand in the event that Runway 9-27 development is delayed. Additionally, all GA facilities could be relocated to the new south area if long-range development supports a consolidated GA operation.

5.5 Support and Other Facilities Development Concepts

As described in Section II, support facilities include aircraft rescue and fire fighting (ARFF) facilities, ATC facilities, airport equipment and snow removal equipment (SRE) facilities, and fueling facilities. A long-term concept for the National Interagency Fire Center (NIFC) has also been added to this section. The concepts for support and other facilities discussed in this section represent preferred concepts that have been studied and evaluated by the Airport. These concepts were analyzed to determine their overall compatibility with other Master Plan concepts for airfield, terminal area, GA, and air cargo development. The concepts evaluated for this section are presented on **Exhibit V-25** and include the following:

- Identify need for and potential location of supplemental ARFF facility.
- Identify the location of the new ATCT facility.
- Identify a long-term expansion area for Airport storage and SRE.
- Expand the Airport's fuel storage facilities and increase fuel storage capacity to provide for at least a five-day fuel supply.
- Identify a long-term location for NIFC facilities.

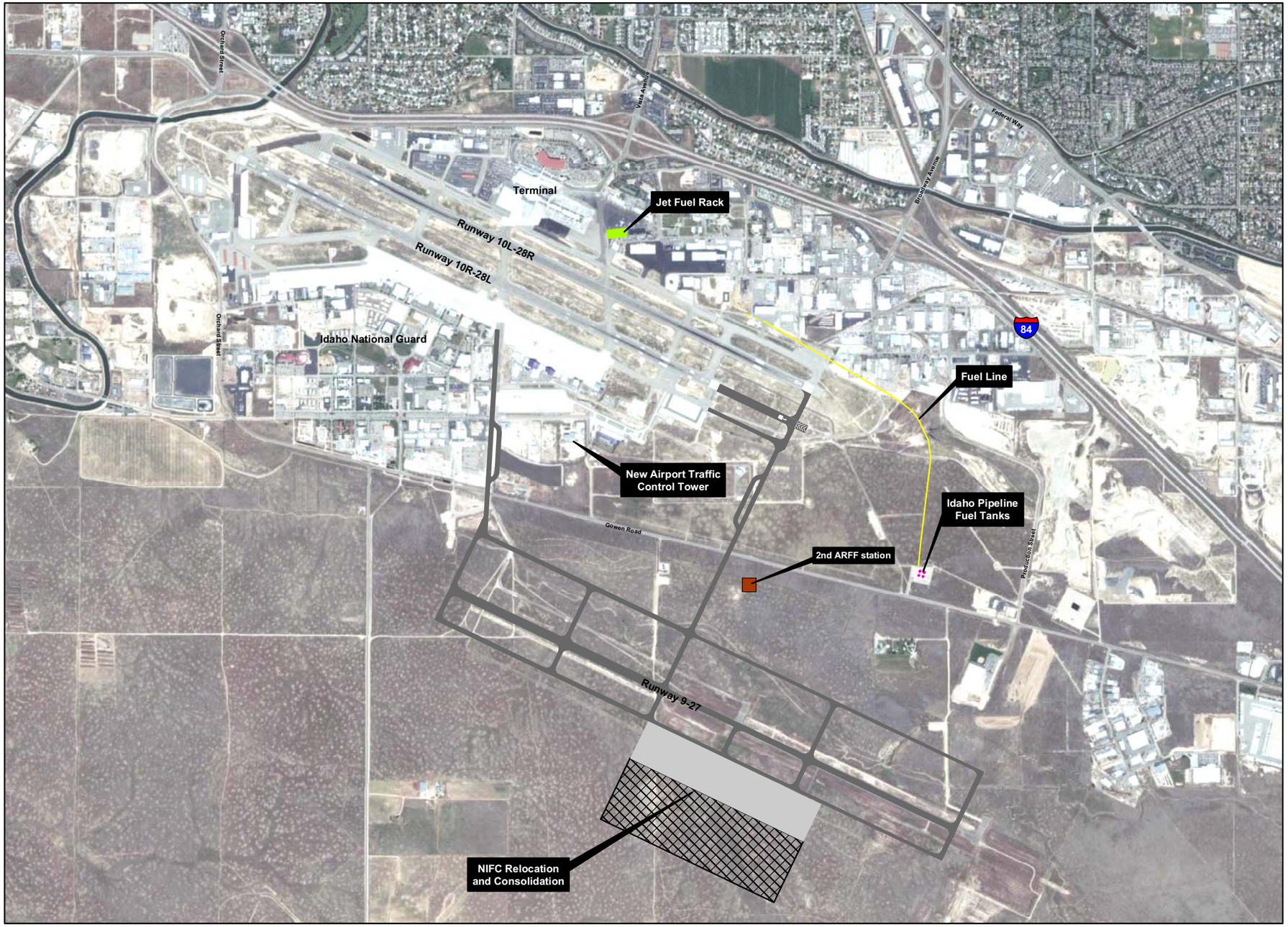
5.5.1 Aircraft Rescue and Fire Fighting Facility Concept

Section IV specifies that while existing ARFF facilities are adequate for the existing airfield configuration and the projected aircraft mix at the Airport, construction of an additional runway could necessitate relocation of the existing ARFF facility and/or construction of additional ARFF facilities. With the proposed development of Runway 9-27, a determination will need to be made as to whether an additional ARFF facility will be needed to satisfy response time requirements.

As mentioned in Section II, IDANG operates an ARFF facility adjacent to the military aircraft apron. Under the joint Fire Protection Agreement between IDANG and the City of Boise Fire Department, the IDANG and Airport ARFF facilities provide mutual aid during aircraft crash and rescue incidents, with overall responsibility delegated based on the type of aircraft involved (civil or military) and the location on or in the vicinity of the Airport. If the IDANG ARFF facility is able to satisfy response time requirements, an additional ARFF facility may not be required. Should development of a satellite ARFF facility be required, it is anticipated that adequate space for the facility would be available in the vicinity of the Runway 9-27 development area.

5.5.2 Air Traffic Control Facility Development Concept

As discussed in Section II, line-of-sight issues exist on several areas of the airfield, including portions of Taxiway A and the assault strip located south of Gowen Road. Simulations were conducted by the FAA to determine the desired location of a new Airport Traffic Control Tower (ATCT). The selected preferred site is at the corner of Ulm and Harvard streets, south of the existing airfield and north of Gowen Road. Construction of a new ATCT facility is currently under way and is slated for completion in September 2009, with commissioning scheduled for early 2011.



Legend

Conceptual Runway 10R-28L/Taxiway B extension and Runway 9-27 development

Conceptual Fuel Capacity Expansion

Fuel line

Idaho Pipeline fuel tanks

Jet fuel rack

Conceptual National Interagency Fire Center (NIFC) Relocation and Consolidation

Aircraft ramp

Landside development (campus consolidation)

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (support/other facility development concepts).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit V-25

0 2,000 feet north

Preferred Support/Other Facility Concepts

The new ATCT will eliminate the current line-of-sight issues and allow for positive control of aircraft operating on the existing assault strip and future Runway 9-27, should that concept be adopted.

5.5.3 Airport Equipment and Snow Removal Equipment Facility Development Concept

Section IV notes that existing equipment and SRE facilities are currently adequate. However, increases in runway, taxiway, and apron pavement, particularly associated with the proposed development of Runway 9-27, in addition to increased activity levels, would likely result in the need to provide additional maintenance building space. As required, long-term expansion of Airport equipment and SRE facilities could be accommodated at its current location.

5.5.4 Fuel Facility Expansion and Capacity Enhancement Concept

Section IV identifies the need to increase the current storage capacity of jet fuel at the Airport from a one-day supply to at least a five-day supply. The preferred concept for achieving the recommended increase in capacity consists of the following components:

- **Storage tanks** – Four fuel storage tanks owned by Idaho Pipeline are located southeast of the airfield along Gowen Road.
- **Jet fuel rack** – A new jet fuel rack would be constructed adjacent to the existing air cargo area southeast of the terminal building.
- **Fuel line** – An underground fuel line would be constructed connecting the Idaho Pipeline fuel tanks to the jet fuel rack.

It is estimated that this fuel storage and delivery concept would provide a seven-day fuel supply for the Airport.

5.5.5 National Interagency Fire Center Facility Relocation/Consolidation Concept

The NIFC currently occupies several buildings and a large apron area north of Runway 10L-28R and adjacent to air cargo facilities located east of the terminal complex. Existing NIFC facilities are spread over a large area. Development of Runway 9-27 would make available a large area south of the runway for facility development. Relocation/consolidation concepts for GA and air cargo facilities favor development north of Runway 9-27, leaving the south side open to other facility development. A long-term preferred concept identified by the Airport is to relocate/consolidate all of the NIFC facilities and operations to the area south of Runway 9-27. Advantages of this concept include the following:

- Consolidation of all NIFC facilities into its own campus, allowing for more secure and efficient operations.
- Adequate apron area for operations and parking of large firefighting tanker aircraft.
- Land that accommodates existing facilities could be used for Airport-related facility development, or for valuable revenue-generating opportunities.
- Provides the possibility of operating the B-747 Supertanker.

VI. Implementation Plan

The Implementation Plan presented in this section outlines a feasible development sequence and schedule for the recommended Airport Development Plan (ADP) based on the type and rates of growth presented in Section III, Aviation Activity Forecasts, through the planning horizon. The development sequence of projects in the Implementation Plan is then assessed in the Financial Plan and presented in Section VII, Financial Analysis. The cost estimates that were developed in support of the Implementation Plan and Financial Analysis are also included in this section.

The timing of project implementation is based on demand. As actual demand may vary from the forecasts, the Implementation Plan includes an overview of factors that are anticipated to trigger a development action. This approach offers the Airport the flexibility to respond effectively to actual demand. Through regular monitoring and data analysis and an understanding of the impacts of various trends, Airport management can respond strategically to meet tenant and user needs by developing demand-driven facilities in a timely manner.

This section includes the following sections:

- **Factors Affecting Implementation and Phasing** – discusses general criteria upon which decisions related to facility development should be based.
- **Expected Deficiencies and Additional Studies** – provides a description of components in the ADP that are known to require further detail or study prior to implementation.
- **Phased Implementation Plan** – includes potential phasing of project development, identifying the individual projects in the ADP, and illustrating the logical progression of those projects to transition the Airport from existing conditions through the ADP, as demand dictates.
- **Implementation Plan Summary** – summarizes the Implementation Plan.

6.1 Factors Affecting Implementation and Phasing

Implementation of the ADP should be phased so that development corresponds with demand, as presented in Section III. Preferably, projects should be implemented in sufficient time to serve the needs of growing demand, but not so early that facilities are underutilized. The ability to stage implementation correctly requires an understanding of the factors that prompt development, and ongoing data monitoring and analysis to identify when action should be taken. It is anticipated that Airport development projects recommended as part of this Master Plan will be implemented as demand warrants.

The Implementation Plan was developed based on the forecasts presented in Section III and the demand/capacity analyses presented in Section IV. The volume and character of Airport activity—factors that were addressed in detail in developing the aviation activity forecasts—determine when development should occur through the planning horizon. Recognizing that growth may not occur as forecast, it is crucial to continuously monitor the overall activity and assess the individual characteristics of that activity. Factors that could influence the volume and type of growth at the Airport are: strength of the economy (which directly influences the number of passengers and volume of cargo), fleet mix changes, change in private vehicle use patterns, and an increase in public transportation.

The health of the economy has a direct impact on the number of airport passengers. A clear example was the increase in passenger levels during the mid to late 1990s when the economy was growing at a fast pace. Then in the late 1990s when the economy began to slow, passenger growth rates started to level off and then plunged following the events of September 11, 2001. By 2004, the economy had started to see strong growth again and passenger activity at airports was increasing. However, the economy began to weaken again in 2006. The recent economic struggles of the nation have also translated to reduced or declining passenger growth rates at many airports. Over the long term, the forecast of enplaned passengers takes into account fluctuations in the economy. Therefore, the question is not whether the facilities identified in this Master Plan will be needed, but rather when they will be needed. The growth of passenger activity must be monitored to ensure proper timing of facility construction.

Unforeseen changes in the Airport's air carrier fleet mix can also impact the timing of new facilities. For example, an increase in the number of regional jet or prop aircraft operations may not require the same improvements necessary to accommodate the same increase in the number of B-737 operations, although the increase in the total number of aircraft operations may be the same. The type of demand on individual Airport components will indicate more about utilization patterns and facility needs than overall activity statistics.

The rapid rise in gasoline prices has resulted in changes in the use patterns for private vehicles. This change could have an impact on Airport facilities if the public reduces its use of private vehicles and increases its use of public transportation, car pooling, shuttle services, etc. This change could impact the long-term demand for public and employee parking lots as well as change the demand for public transportation facilities. The Airport needs to monitor the utilization for these facilities and adjust the facility requirements, if necessary.

6.2 Additional Studies

The ADP includes projects that require additional study prior to design and construction to better understand the actual demand, benefit, and\or impacts. These additional studies are needed for the new consolidated air cargo facilities, airfield expansion, terminal expansion, and new consolidated rental car facilities.

6.2.1 Consolidated Cargo Facilities

As shown in Section IV, the ratio of cargo building space to cargo tonnage is greater at the Airport than what is considered a typical ratio at other airports. This may indicate that the existing air cargo facilities are being underutilized or are being utilized for other non-aviation purposes. Because the Master Plan assessment of existing air cargo facilities was limited, it is recommended that additional study be conducted to better understand current utilization of the facilities. This effort could identify that the future consolidated air cargo facilities could be smaller than current facilities or that additional landside facilities would be needed to better accommodate the current operation. Additionally, the Transportation Security Administration (TSA) is developing new security requirements for air cargo facilities and these space requirements (which were still unknown at the completion of this Master Plan) must be incorporated into the new consolidated air cargo facilities for the Airport.

6.2.2 Airfield Expansion

This Master Plan recommends the construction of an additional runway and taxiway facilities for capacity purposes. However, due to FAA guidelines and limitation of this Master Plan's scope, additional study is needed to better define the capacity benefits of a new runway and taxiways. The FAA typically requires a Benefit-Cost Analysis (BCA) or similar study for a new runway to justify the expenditure of federal funds.

6.2.3 Environmental Studies

The National Environmental Policy Act (NEPA) requires environmental processing for all airport development projects that require a federal (i.e., FAA) action for implementation. The three levels of environmental processing include a categorical exclusion, an environmental assessment, and an environmental impact study. A determination of categorical exclusion has identified that a project or projects would not have an environmental impact. An environmental assessment is needed when it is determined that a project or projects may have an environmental impact. If it is determined that an impact will occur and it can not be mitigated, an environmental impact study is required to make a final determination on the viability of the project.

6.2.4 Terminal Expansion

Passenger processing techniques have improved since the 2005 construction of the new terminal. Advancements in procedures for online check-in, ticketing kiosks, remote check-in, etc., are rapidly changing the space programming model for airport terminals. It is recommended that the Airport monitor these advancements and conduct an updated space requirement analysis prior to the design and construction of Concourse A and/or expansion of the terminal.

6.2.5 Rental Car Facility Expansion

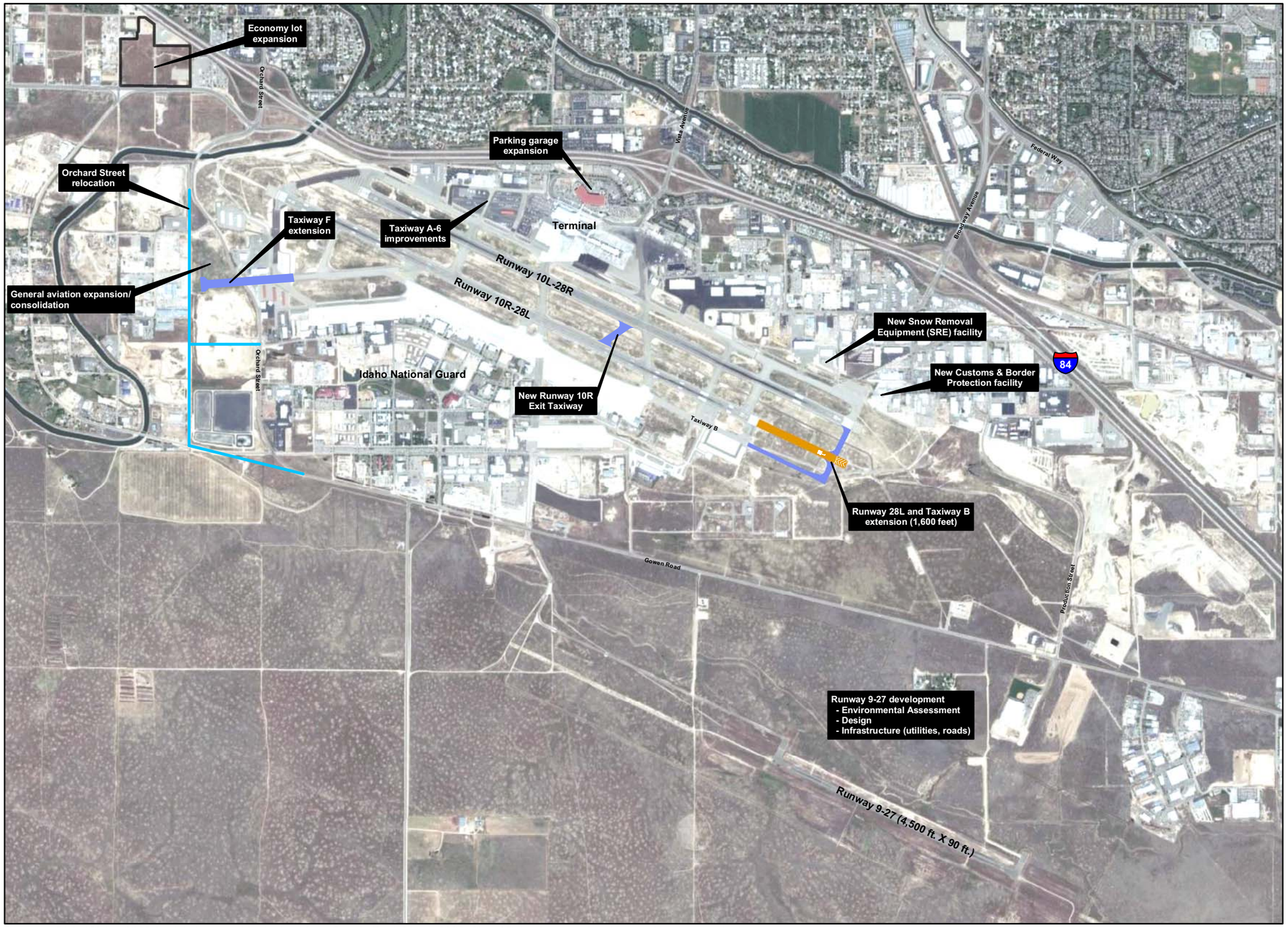
The Master Plan identifies relocation of the rental car operation into the expanded parking garage. The Airport's long-range plans for the rental car operation are to develop a remote consolidated rental car facility. Prior to any design of a consolidated facility, it is recommended that the Airport conduct a financial and programming analysis for the feasibility of this facility. The demand for a consolidated rental car facility is dependant upon many factors including costs, space availability, customer demands, etc., and many of these factors change over time. A future analysis would evaluate all these factors and help in determining the optimum long-range plan for the rental car operation.

6.3 Phased Implementation Plan

ADP project phasing is based on specific demand levels that will trigger implementation of the individual projects. Phasing also involves financial considerations and a logical progression of development that will allow critical projects to be in place to meet demand. The Implementation Plan was divided into four five-year phases. The following subsections include the projects for all four phases of the ADP.

6.3.1 Phase 1 Projects (2008-2012)

Phase 1 projects consist of Airport facilities and infrastructure to be developed in the immediate future (within five years), which were identified to meet requirements over the next five years. Specific Phase 1 projects are described below and illustrated on **Exhibit VI-1**.



Legend

- Runway development
- Taxiway development
- Roadway development

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (proposed projects and implementation).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit VI-1

0 2,000 feet north

Airport Development Plan
Phase 1 (2008-2012)

6.3.1.1 Airfield

- **Environmental Assessment for Runway 9-27 and Heliport Development –** Required by NEPA, an environmental assessment for development of Runway 9-27 and heliport facilities, when completed, would allow the project to proceed on to the design stage.
- **Runway 10R-28L and Taxiway B Extension** – This project extends Runway 10R-28L and Taxiway B to the southeast by 1,600 feet. This extension would bring Runway 10R-28L to an ultimate length of 11,363 feet. This project would also eliminate any offset of the thresholds of Runways 28R and 28L and aligns the threshold with the future connector taxiway to Runway 9-27.
- **Runway 10R Exit Taxiway** – This project constructs a new exit taxiway for aircraft arriving on Runway 10R and would be located between Taxiways E and D, approximately 6,500 feet from the 10R threshold.
- **Utilities and Roads (Runway 9-27 Development)** – This is an enabling project for future development in the Runway 9-27 area. The roads and utilities are the first construction projects toward full development of Runway 9-27.

6.3.1.2 Terminal

- **Taxiway A-6 Improvements –** This project involves the strengthening of Taxiway A-6 on the north side of Concourse A. It is intended to provide sufficient pavement strength for use by air carrier aircraft parking at the future expansion of Concourse A.

6.3.1.3 Ground Access

- **Economy Lot Expansion –** This project involves an expansion of the Economy Parking Lot located just west of Orchard Street. This project will expand the facility by approximately 1,000 stalls and include a new entrance and exit plaza. Construction is scheduled to begin in 2008.
- **Parking Garage Expansion** – As part of the Parking Master Plan, the Airport's parking garage is recommended for expansion to keep up with demand for public parking and to relocate rental car facilities. However, due to financial constraints for issuing debt, the actual size and schedule for this expansion will be determined by the availability of Airport funds.

6.3.1.4 General Aviation (GA)

- **GA Area Expansion** – This project involves the expansion of the GA facilities located along Orchard Street on the Airport's western boundary. Elements of this project include the realignment of Orchard Street to the west, expansion of utilities, expansion of aircraft apron areas, and extension of Taxiway F.

6.3.1.5 Support

- **New Snow Removal Equipment Facility** – This project includes the construction of a new snow removal equipment (SRE) facility for Airport maintenance. The facility will be located close to the eastern end of Runway 10L-28R and will also include a new fueling facility for Airport maintenance.

Separate from the Master Plan ADP, but currently included in the Airport's capital improvement program (CIP) for Phase 1, are the following projects:

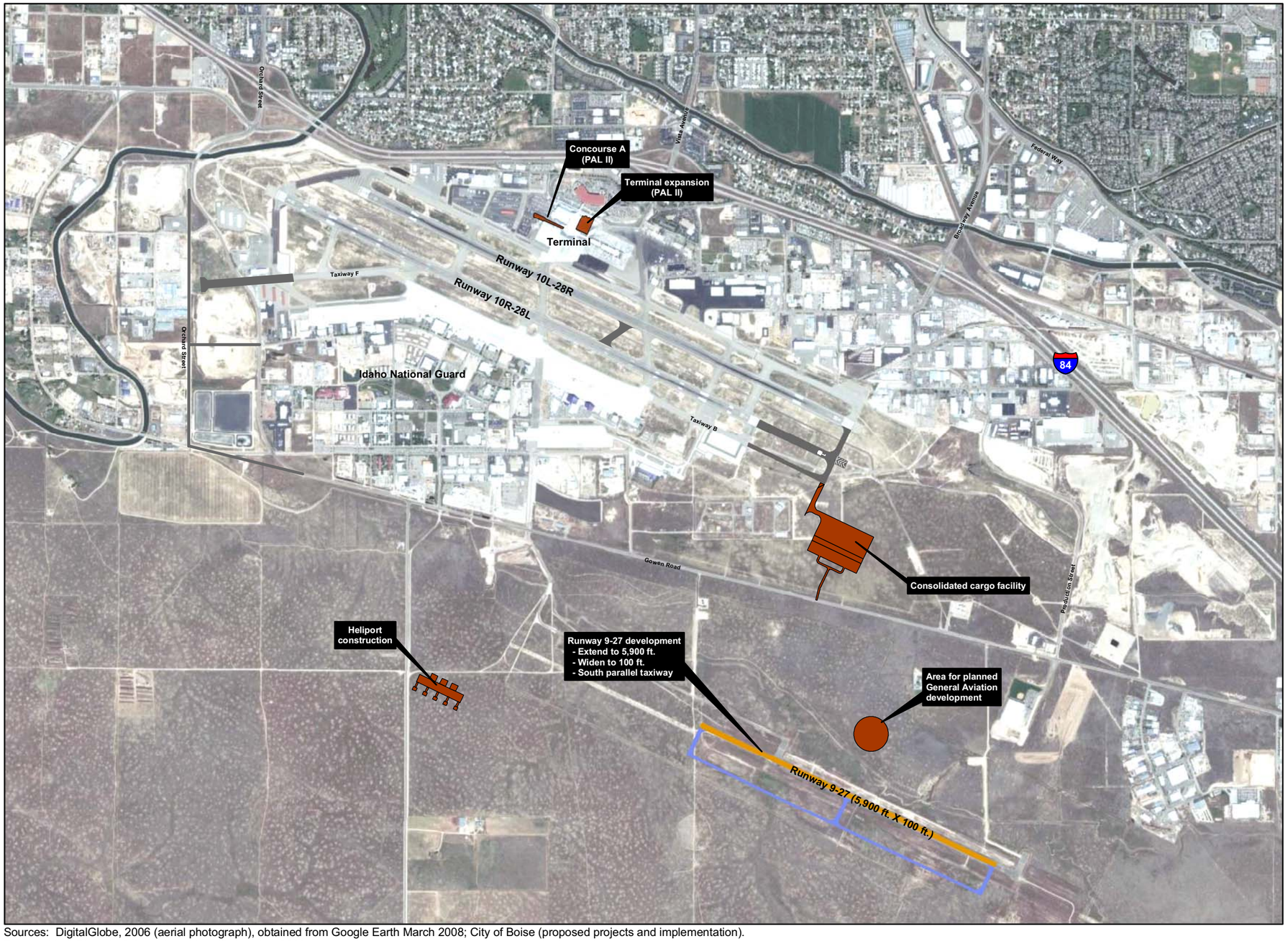
- Airfield
  - Runway 10L-28R Rehabilitation
  - Taxiway Rehabilitation
- Terminal
  - Landscaping
  - Baggage System Upgrades
  - Air Carrier Apron Rehabilitation
  - Security System Upgrades
  - Jet Bridge Improvements
- Ground Access
  - Terminal Roadway Reconstruction
- General Aviation
  - GA Apron Pavement Rehabilitation
- Support
  - U.S. Customs & Boarder Patrol Facility
  - Cargo Hard Stands Positions

6.3.2 Phase 2 Projects (2013-2017)

Phase 2 projects consist of Airport facilities and infrastructure to be developed in the 5 to 10-year timeframe. Specific Phase 2 projects are described below, as well as projects that must take place prior to ultimate development. Specific Phase 2 projects are described below and illustrated on **Exhibit VI-2**.

6.3.2.1 Airfield

- **Runway 9-27 Development (Stage I)** – This first stage of construction for the development of Runway 9-27 involves improvements to the runway to meet FAA guidelines for a public use facility. This will include shortening the 5,000-foot Assault Strip by 500 feet for a total runway length of 4,500 feet. Reducing the runway by 500 feet is necessary to stay within the maximum distance allowable from the Airport Traffic Control Tower (ATCT) cab to the end of a runway. Additionally, a parallel taxiway on the southern side of the runway will be constructed.
- **New Heliport and Helipads** – Also planned for Phase 2 is the development of new heliport facilities. These will be located at the western end of the Runway 9-27 development area and will consolidate much of the helicopter training activities away from the main airfield. This will improve overall operations for the Airport.
- **Runway 9-27 Development (Stage II)** – The next stage of Runway 9-27 development will include a 1,400-foot-long and 100-foot-wide runway extension to the northwest with an associated extension of the parallel taxiway. This extension will bring Runway 9-27 to a total length of 5,900 feet. This will allow the runway to be used by larger aircraft and to align the western end of the runway with the future taxiway that will connect Runway 9-27 with the main airfield. Additionally, Stage II will include widening the original 4,500 feet of runway from 90 to 100 feet and adding a midfield exit taxiway.



Legend

- Development completed in earlier phase
- Runway development
- Taxiway development
- Other facility development
- Roadway development completed in earlier phase

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (proposed projects and implementation).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit VI-2

0 2,000 feet north

Airport Development Plan
Phase 2 (2013-2017)

6.3.2.2 Terminal

- **Concourse A Expansion (PAL II)** – This project involves expanding Concourse A when the annual volume of passengers reaches 4,000,000. Preliminary planning has indicated that the Airport would first utilize the south side of Concourse A to minimize the relocation of the existing rental car operation, GA facilities, and Idaho Transportation Department (ITD) Division of Aeronautics facilities. Passenger levels are forecast to reach 4,000,000 by 2012, but could be delayed or accelerated due to unforeseen events. The actual number of gates to be constructed is yet to be determined.
- **Terminal Expansion (PAL II) –** As part of PAL II expansion requirements, the terminal would be expanded to the east from the central rotunda along the curbfront. This area would provide additional ticketing, baggage, concessions, or other facilities as needed. As mentioned above, additional study would be necessary to determine actual space requirements.

6.3.2.3 Air Cargo

- **New Consolidated Cargo Facility** – This project includes a new consolidated air cargo facility for the Airport. This facility would be located at the eastern end of the Airport between Runways 10R-28L and 9-27 and would include all new airside and landside functions. Ground access to the facility would be off of Gowen Road. Additional study is needed to determine new security screening space requirements which are not yet available from the TSA.

6.3.2.4 General Aviation

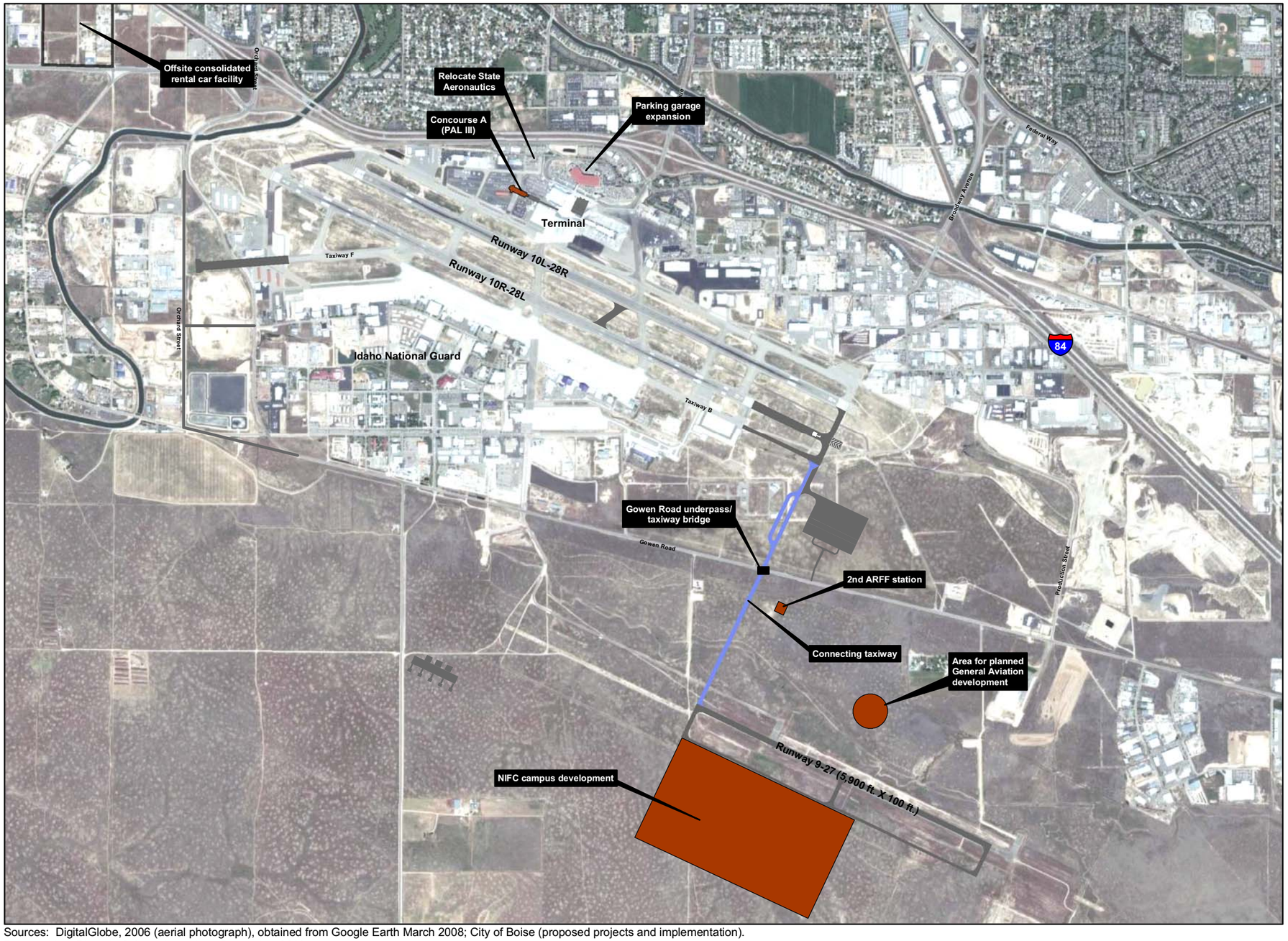
- **GA Facilities along Runway 9-27** – This project is not identified as part of the ADP or as an Airport CIP project, but is included here to note that the Runway 9-27 development area has been prepared for GA facilities and that the Airport expects new GA facilities to be needed and developed with private funding during the Phase 2 timeframe.

Separate from the Master Plan ADP, but currently included in the Airport's CIP for Phase 2, are the following projects:

- Airfield
  - Taxiway Rehabilitation
  - Runway Rehabilitation
  - Airfield Lighting Improvements
- Terminal
  - Air Carrier Apron Rehabilitation
  - Check Point Expansion
  - Security System Improvements
- General Aviation
  - GA Apron Rehabilitation

6.3.3 Phase 3 Projects (2018-2022)

Phase 3 projects consist of Airport facilities and infrastructure which were identified to meet requirements over the next 10 to 15 years. Specific Phase 3 projects are described below and illustrated on **Exhibit VI-3**.



Legend

- Development completed in earlier phase
- Taxiway development
- Other facility development
- Roadway development completed in earlier phase

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (proposed projects and implementation).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit VI-3

0 2,000 feet north

Airport Development Plan
Phase 3 (2018-2022)

6.3.3.1 Airfield

- **Runway 9-27 Development (Stage III) –** In order to fully utilize Runway 9-27, it must be connected to the existing airfield. This connecting taxiway will be begin at the southeast end of Runway 10R-28L and run perpendicular to the northwest end of Runway 9-27. The future consolidated air cargo facility will be constructed along this taxiway. Initially, the connector taxiway will be a single taxiway with a bypass. Long-term plans (beyond the planning horizon of this Master Plan) would consider building a second parallel connector.

6.3.3.2 Terminal

- **Relocation of the ITD Division of Aeronautics Facility –** This is an enabling project for PAL III expansion of Concourse A. This facility would be relocated to a GA location yet to be determined.
- **Concourse A Expansion (PAL III) –** This project is a continuation of the Concourse A expansion in Phase 2. This expansion would be needed to meet PAL III passenger levels of 6,000,000 annual passengers and would be a complete build-out of Concourse A. When completed, this expansion would allow full utilization of the west end and north side of the concourse for aircraft parking. This project would require the relocation of GA facilities to accommodate air carrier operations around the end of the concourse.

6.3.3.3 Ground Access

- **Parking Garage Expansion** – This project is a continuation of the parking garage expansion project in Phase 1 and will be needed, as per the Airport's Parking Master Plan, to maintain sufficient public parking as demand grows. The actual size of this expansion phase is dependant upon the size of the expansion in Phase 1.
- **Consolidated Rental Car Facility (offsite)** – This project is being planned to consolidate all rental car operations to an offsite location. It is recommended that the Airport conduct a financial and programming analysis of the rental car operations to determine the feasibility and required size of a consolidated facility. The consolidated facility is planned to be located just west of the economy parking lot.

6.3.3.4 Support

- **New Airport Rescue and Fire Fighting Facility (ARFF) Station** – In order for the Airport to meet Federal Aviation Regulations (Part 139),[1] a second ARFF station will be needed for Runway 9-27. This facility is planned to be located close to the intersection of Runway 9-27 and the connecting taxiway.
- **New National Interagency Fire Center (NIFC) Campus** – A new NIFC facility is being planned south of Runway 9-27. This new campus would provide a location to consolidate all current NIFC operations. It would also offer expansion possibilities for facilities that currently surround the existing NIFC operation.

[1] Federal Aviation Regulations (FAR) Part 139 is the federal code that identifies the operational and safety standards by which certain commercial airports must comply in order to receive an FAA Airport Operating Certificate. More specifically, FAR Part §139.325 identifies the requirements for an Airport Emergency Plan which contains the guidelines for Airport Rescue and Fire Fighting Facilities.

6.3.4 Phase 4 Projects (2023-2027)

Phase 4 projects consist of Airport facilities and infrastructure to be developed in the 15 to 20-year timeframe. Specific Phase 4 projects are described below and illustrated on **Exhibit VI-4**.

6.3.4.1 Airfield

- **Runway 9-27 Development (Stage IV) –** This is the final Master Plan development stage for Runway 9-27. This expansion would take the runway to a length of 8,000 feet with a width of 150 feet. This would allow Runway 9-27 to routinely accommodate most air carrier operations.

6.3.4.2 Terminal

- **Terminal Expansion (PAL III) –** As with the full build-out of Concourse A, this terminal expansion would be needed to meet PAL III passenger levels of 6,000,000 annual passengers. The expansion would be a continuation of the PAL II terminal expansion and would also constitute a full build-out of the original terminal program. As with the PAL II terminal expansion project, this expansion would provide additional ticketing, baggage, concessions, or other facilities as needed. As mentioned above, additional study would be necessary to determine actual space requirements.

6.3.4.3 Ground Access

- **Economy Lot Expansion** – This project is a continued expansion of the Economy Lot. According to the Airport's Parking Master Plan, it is estimated that this expansion phase would include approximately 350 stalls.

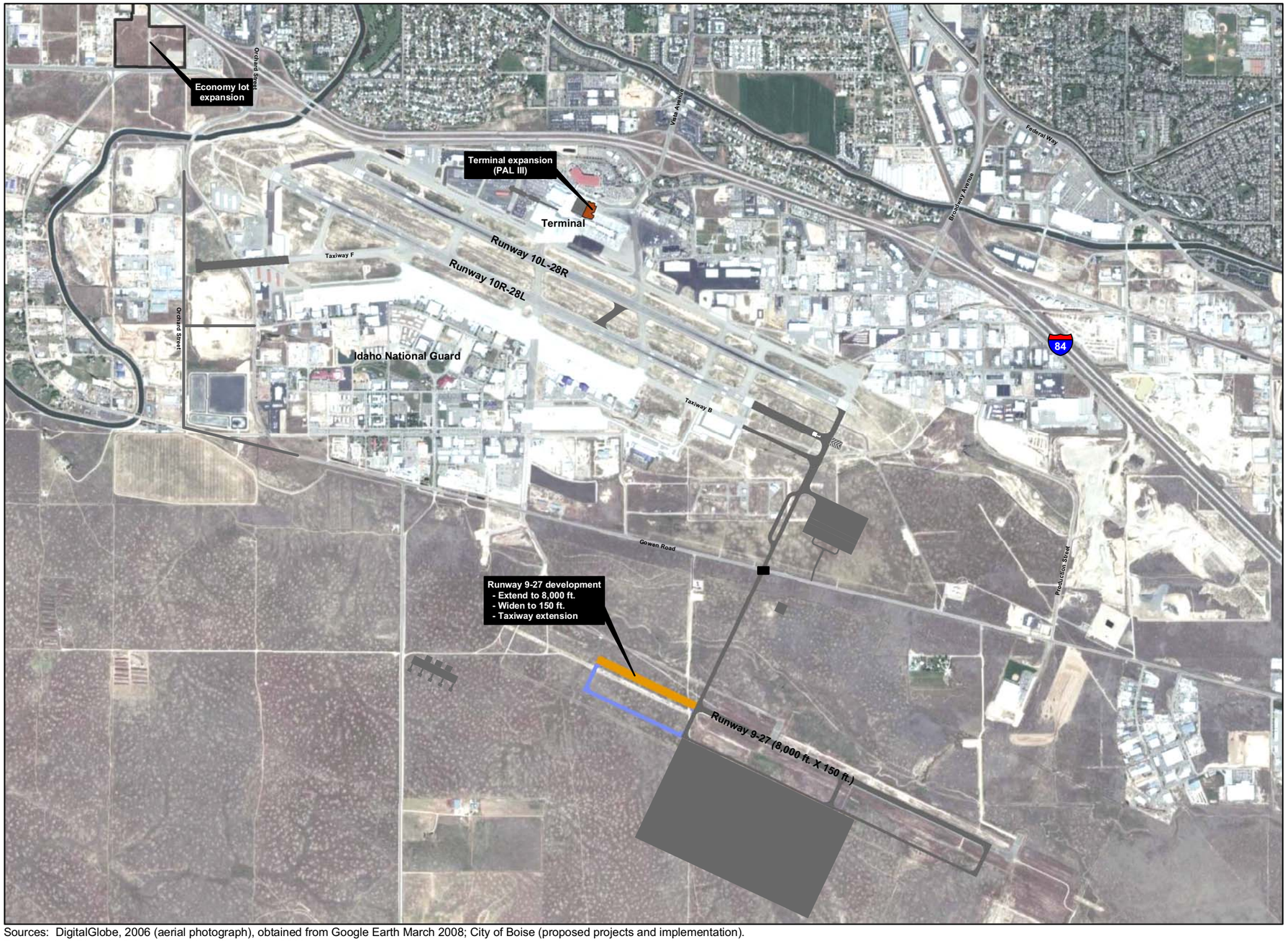
6.4 Implementation Plan Project Cost and Schedule

Table VI-1 identifies the preliminary cost estimates and schedule for all ADP projects. This table breaks down the projects by phase, identifies preliminary project cost estimates, and identifies the projected year(s) of design and construction. The cost estimates are provided in current (2008) dollars.

6.5 Implementation Plan Summary

Airport staff currently monitors a variety of data at the Airport. Data collected includes, but is not limited to, passenger activity levels, aircraft operations data, cargo data, and other statistics, such as parking and rental car data for parking and storage needs. To assess growth on an annual basis, it is recommended that the Airport staff continue to collect this data and compare it to the recommendations in this Master Plan Update.

Implementation of the projects in the ADP is phased so that development corresponds with the demand forecasts presented in Section III. Detailed planning, design, and construction are important factors in the phasing process to minimize impacts to the airfield, terminal, and landside operations during construction. Monitoring and tracking actual activity for comparison to forecast activity is an important part of effective implementation, as actual activity could vary significantly from forecast activity, which would affect project implementation. Changes in activity may change the ADP and the timing of certain projects. Therefore, it is recommended that the ADP and Implementation Plan be reviewed annually.



Legend

- Development completed in earlier phase
- Runway development
- Taxiway development
- Other facility development
- Roadway development completed in earlier phase

Sources: DigitalGlobe, 2006 (aerial photograph), obtained from Google Earth March 2008; City of Boise (proposed projects and implementation).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit VI-4

0 2,000 feet north

Airport Development Plan
Phase 4 (2023-2027)

Table VI-1

Project Cost Estimates and Schedule for Airport Development Plan

Project	Category	Estimated Development Year(s)[1/]	Project Cost Estimate[2/]
Phase 1 - 2008 to 2012			
Environmental Assessment (Runway 9/27 & Heliports)	Airfield	2008-2009	$225,000
Economy Lot Expansion	Ground Access	2008-2009	$3,000,000
New Snow Removal Facility	Support	2008-2009	$1,014,000
Parking Garage Expansion	Ground Access	2008-2010	$16,400,000
Runway 28L & Taxiway B Extension	Airfield	2008-2012	$10,090,000
Runway 10R Exit Taxiway	Airfield	2010	$500,000
Utilities and Roads (Runway 9/27 Development)	Airfield	2010-2012	$600,000
GA Area Expansion	General Aviation	2010-2012	$8,925,000
Taxiway A6 Improvements	Terminal	2012-2013	$902,000
Cost Totals Phase 1			**$41,656,000**
Phase 2 - 2013 to 2017			
Runway 9/27 Development (Stage I)	Airfield	2013-2014	$4,277,000
New Consoldiated Cargo Facility	Cargo	2013-2014	$17,050,000
Heliport and Helipads (Runway 9/27 Development Area)	Airfield	2014	$1,070,000
Concourse A Expansion (PAL II)	Terminal	2014	$13,000,000
Terminal Expansion (PAL II)	Terminal	2014-2015	$27,938,000
Runway 9/27 Development (Stage II)	Airfield	2016	$2,852,000
Cost Totals Phase 2			**$66,187,000**
Phase 3 - 2018 to 2022			
Relocate State Aeronautics	Terminal	2016-2017	$2,600,000
Runway 9/27 Development (State III) Connecting Taxiway	Airfield	2018	$12,000,000
Parking Garage Expansion	Ground Access	2018-2019	$19,200,000
Consolidated Rental Car Facility (offsite)	Ground Access	2018-2019	$16,573,000
New ARFF Station (Runway 9/27 Area)	Support	2019	$1,979,000
New NIFC Campus (Runway 9/27 Area)	Support	2020-2023	$41,000,000
Concourse A Expansion (PAL III)	Terminal	2021-2022	$16,000,000
Cost Totals Phase 3			**$109,352,000**
Phase 4 - 2023 to 2027			
Runway 9/27 Development (Stage IV)	Airfield	2023	$8,555,000
Economy Lot Expansion	Ground Access	2024	$600,000
Terminal Expansion (PAL III)	Terminal	2024-2025	$35,053,000
Cost Totals Phase 4			**$44,208,000**
Grand Total ADP			**$261,403,000**

Notes:

1/ Estimated development years include design and construction.

2/ Cost estimates are in current 2008 dollars.

Source: Cost estimates and project schedule provided by City of Boise, Aviation Department, August 2008.
Prepared by: Ricondo & Associates, Inc., September 2008.

VII. Financial Analysis

This section examines the financial feasibility of implementing the Master Plan recommendations for the Airport. The actual implementation schedule for the various improvements identified in the Master Plan will be defined by development triggers and demand growth rather than specific calendar years, as described in Section VI, Implementation Plan. For purposes of this illustrative financial analysis, a specific implementation schedule was assumed; however, it should be noted that this schedule and the resulting financial analysis are intended only to demonstrate financial feasibility. Actual financing strategies used will be determined as implementation approaches. This section is presented in the following sections:

- Financial Structure of the Airport
- Capital Improvement Program – Projects and Funding Sources
- Debt Service Requirements
- Operations and Maintenance (O&M) Expenses
- Airport Revenues (Nonairline and Airline)
- Cash Flow
- Debt Service Coverage
- Cost per Enplaned Passenger
- Flow of Funds
- Summary

7.1 Financial Structure of the Airport

This section presents a discussion of the Airport's accounting practices, a summary of the Airport-Airline Use and Lease Agreement ("the Airline Agreement") between the City of Boise ("the City") and the airlines that have executed the agreement ("the Signatory Airlines"), and the Lease and Trust Agreement.

7.1.1 Accounting Practices

The Airport operates on a fiscal year basis; the Fiscal Year (FY) for the City ends September 30. Airport-related revenues and expenditures are categorized by type of revenue and expense and allocated to direct and indirect cost centers, as defined in the Airline Agreement.

7.1.1.1 Direct Cost Centers

Direct cost centers are areas or functional activities of the Airport used for accounting of revenues, O&M expenses, and debt service, and are used to assist in determining tenant and user rentals, fees, and charges. The direct cost centers currently used at the Airport are:

- **Airfield** Cost Center – All costs for the operation, repair, and maintenance of the airfield area, aircraft apron, landing area, and ramp area, as well as the Aircraft Rescue and Fire Fighting (ARFF) station. Applicable depreciation as well as revenue bonds and bond coverage related to this cost center, and the pro-rata share of administrative costs, are charged to this cost center. Revenues received from general aviation (GA) fuel sales on the Airport; tie-down, landing, and aircraft parking fees; and military airfield charges are credited to this cost center.
- **Terminal** Cost Center – All costs of normal operation, repair, and maintenance of the terminal building; applicable depreciation and amortization; revenue bonds; bond coverage

related to this cost center; and a pro-rata share of administrative costs and minor building modifications are charged to this cost center. The amount of concession revenue needed to fund the Capital Improvement Fund is dedicated from concession revenues. All other concession revenues, except those generated from the Boise Airport Business Center and the Boise Corporate Sponsorship Program, offset expenses in the Terminal Cost Center.

- **Parking and Airport Roads Cost Center –** All costs of maintenance and repair of the Airport parking areas (both public and employee) and Airport roads area (not a part of the Ada County Highway District system), depreciation, revenue bonds, bond coverage related to this cost center, and a pro-rata share of administrative costs are charged to this cost center. Revenues from the parking lots and limo/courtesy van fees are credited to this cost center. The first $1 million in net income in this cost center is credited to the Airfield Cost Center. Net income in excess of $1 million is split between the Capital Improvement Fund and the Airfield Cost Center.
- **Other Cost Center –** All airport costs and depreciation not charged to another cost center, and a pro-rata share of administrative costs, are charged to this cost center. All airport revenues not credited to another cost center are credited to this cost center.
- **Jetbridge Cost Center –** Costs associated with jetbridge maintenance, repair, and depreciation are balanced against jetbridge revenue. Any surplus or deficit associated with the Jetbridge Cost Center is included in the Terminal Cost Center. Therefore, for the purposes of this financial analysis, financial information for the Jetbridge Cost Center is included in the Terminal Cost Center and not separately identified.

7.1.1.2 Indirect Cost Centers

The City uses certain indirect cost centers for accounting purposes to allocate revenues and expenses to the cost centers defined in the Airline Agreement. Indirect cost centers include Administration, Fire Station, and Security. Revenues and expenses associated with these indirect cost centers are allocated to the cost centers as specified in the Airline Agreement.

7.1.2 Airline Agreement

Each Signatory Airline has executed a separate Airline Agreement with the City. Airline Agreements are currently in effect with all scheduled passenger airlines operating at the Airport, including Delta Air Lines, ExpressJet, Frontier Airlines, Horizon Air, Northwest Airlines, SkyWest Airlines, Southwest Airlines, United Airlines, and U.S. Airways.

Certain all-cargo carriers that lease or sublease space at the Airport are considered to be signatory carriers, although they have not executed similar airline agreements. Cargo carriers that demonstrate that they rent on-Airport land are treated as signatory cargo airlines in determining landing fee rates.

The Airline Agreements terminate on September 30, 2010, or sooner according to the provisions of their Airline Agreement. For the purposes of this financial analysis, it is assumed that future airline agreements will have provisions similar to those in the existing Airline Agreement. The current Airline Agreement includes the following key elements:

- Terminal rental rates are based on a cost center residual methodology for the Terminal Cost Center, with certain allowances for deposits to the Capital Improvement Fund.

- Landing fee rates are based on a cost center residual methodology for the Airfield Cost Center and the Parking and Airport Roads Cost Center, with certain allowances for deposits to the Capital Improvement Fund.
- It is the intent of the City that the combined revenues of the Airfield, Terminal, and Parking and Airport Roads cost centers equal at least the combined costs of the three cost centers. To the extent practicable, the City adjusts fees and space rental charges semi-annually so that the airfield and terminal credited revenues balance costs in the respective centers.
- With certain exceptions, approval by a Majority-in-Interest (MII)[1] of the Signatory Airlines is required for capital expenditures for improvements and developments that are to be included in space rentals and landing fees charged for the use and/or occupancy of terminal and airfield facilities. If an MII disapproves a capital expenditure, the City may proceed with the expenditure as long as the project is deferred for 21 months after the disapproval.

7.1.3 Lease and Trust Agreement[2]

Certain major provisions of the Lease and Trust Agreement ("Lease Agreement") adopted by the City in connection with the issuance of Certificates of Participation to finance Airport improvements are discussed below.

7.1.3.1 Rate Covenant

Under Section 6.14 of the Lease Agreement, the City covenants that it will maintain rates and charges at the Airport as follows:

1. **Rates and Charges** – Rates and charges for services rendered or space used at the City's Airport facilities and properties shall be reasonable and just, taking into account the cost and value of the City's Airport facilities and properties, Operations and Maintenance (O&M) expenses, any possible delinquencies, allowances for depreciation, contingencies, and amounts necessary to retire all obligations payable from net revenues. These rates and charges shall be sufficient to produce net revenues at least equal to 125 percent of the debt service requirements for the applicable fiscal year.

2. **Levy of Rates and Charges** – Prior to the issuance of any additional obligations, the City will establish and levy the required rates and charges and may not reduce these rates and charges unless:

    a. the City has certified its compliance with the Lease Agreement for at least one fiscal year immediately preceding the reduction, and

    b. audits for the full fiscal year immediately preceding the reduction disclose that the estimated net revenues resulting from such a reduction would be sufficient to meet the requirements outlined in the Rates and Charges paragraph above.

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1 A Majority-in-Interest means at least 66 2/3 percent in number of the Signatory Airlines, representing at least 66 2/3 percent of Signatory Airline total landed weight for the most recent 12-month period for which landed weight data is available. A project is considered to be disapproved if 33 1/3 percent of Signatory Airlines submit disapprovals.

2 Information regarding the Lease Agreement from: Leigh Fisher Associates, *Report of the Airport Consultant on the proposed issuance of City of Boise, Idaho Airport Revenue Certificates of Participation, Series 2004*, January 8, 2004.

7.1.3.2 Funds and Accounts

The Lease Agreement establishes certain funds including the Airport Enterprise Fund, Lease Payment Fund, and the Rebate Fund. Descriptions of these funds and the order in which revenues are deposited into the funds are provided in the Lease Agreement.

In addition to the abovementioned funds, the Airline Agreement establishes the Capital Improvement Fund and the Discretionary Fund. Monies in the Capital Improvement Fund are to be used on a priority basis for terminal and airfield capital and equipment projects, but can also be used for parking and environmental projects. Monies in the Discretionary Fund may be used for any lawful purpose and are not subject to Signatory Airline approval.

7.1.3.3 Additional Obligations

Additional debt obligations may be issued subject to certain provisions described in the Lease Agreement.

7.2 Capital Improvement Program – Projects and Funding Sources

Section VI discusses the Master Plan projects that make up the recommended Airport Development Plan (ADP), as well as the phasing schedule for those projects. Separate from the projects included in the ADP, the Airport plans to undertake several additional projects as defined in its Capital Improvement Plan (CIP). For the purposes of this financial analysis, projects included in the ADP were combined with projects included in the existing CIP to develop a total long-term CIP from which to assess the financial viability of the ADP. This section presents a discussion of the Airport's long-term CIP including discussion of major projects and funding sources.

7.2.1 Projects

The estimated capital costs were developed in 2008 dollars and escalated to inflated dollars using an annual growth rate of 3 percent. As shown in **Table VII-1**, the total CIP is estimated to cost $467 million in inflated dollars through FY 2025. Highlights of the CIP are as follows:

- Airfield-related projects in the CIP, including development of Runway 9-27 and extension of Runway 10R-28L, are estimated to total approximately $113.3 million.
- Terminal improvements are estimated to total $160 million and include phased expansion of the main terminal, as well as development and expansion of Concourse A.
- Expansions of the parking garage are planned for FY 2010 and FY 2019 at a total estimated cost of $44 million.
- A consolidated cargo facility is planned for FY 2013/2014 at an estimated cost of $20 million.

7.2.2 Funding Sources

The City intends to finance the recommended CIP through a combination of FAA Airport Improvement Program (AIP) grants (entitlements and discretionary), state grants, passenger facility charge (PFC) revenues, customer facility charge (CFC) revenues, and Airport funds (cash flow). **Table VII-2** presents the CIP for FY 2008 through FY 2027 and funding sources for each project. The following sections briefly describe the anticipated funding sources for these projects.

Table VII-1 (1 of 2)

Capital Improvement Plan

Project	Escalated Cost	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Master Plan Update	$ 259,634	$ 259,634	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Security Fiber Optic Concourse B, construction	200,957	200,957	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New CCTV Digital Storage System, construction	191,480	191,480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Runway 10L-28R Rehab, Phase 1, construction	230,198	230,198	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Runway 10L-28R Rehab, Phase 2, construction	3,313,857	3,313,857	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Economy Lot Expansion, Phase 1, design-1,000 stalls	350,000	350,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Economy Lot Expansion, Phase 1, construction-1,000 stalls	2,729,500	-	2,729,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infrastructure Development/Parking Lot Improvements	548,577	230,214	103,000	106,090	109,273	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parking Signage Project	506,000	300,000	206,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parking Garage Expansion, Planning, and Design	1,960,450	400,000	1,030,000	530,450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Parking Garage Expansion, Construction	15,383,050	-	-	15,383,050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GA Wash Pad	30,889	30,889	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UPS & FedEx Apron Rehab, design	441,000	441,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UPS & FedEx Apron Rehab, construction	1,140,000	1,140,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UPS & FedEx Apron Rehab, match	86,000	86,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARFF Sta 7 Remodel, construction	80,767	80,767	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rickenbacker St. Improvements, construction	750,000	750,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lot E1 Paving, construction	4,770	4,770	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Security Fencing Projects, construction	226,000	226,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Security Fencing Projects, match	11,895	11,895	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aviator Statue	60,000	60,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K9 Facilities Remodel	17,455	17,455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Airport Operations Remodel	48,700	48,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Baggage System Improvements	25,000	25,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CBP Customs Facility, grant eligible	834,300	-	834,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CBP Customs Facility, non-grant eligible	747,780	-	747,780	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CBP Customs Facility, design	241,200	200,000	41,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Airfield Expansion; Phase 1, Orchard St., constn.	3,182,700	-	-	3,182,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Airfield Expansion; Phase 1, Orchard St., ACHD & PW	1,166,990	-	-	1,166,990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Airfield Expansion; Phase 1, Orchard St., design	1,575,900	-	515,000	1,060,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FAA Part 139 Training System	79,236	79,236	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Building Demolition	343,420	70,000	51,500	53,045	54,636	56,275	57,964	-	-	-	-	-	-	-	-	-	-	-	-
EA & Studies for 9-27 Extension & Heliports	229,050	90,000	139,050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SRE facility, construction	880,650	-	880,650	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SRE facility, design and match	50,825	4,475	46,350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Airfield Fuel Facility (SRE)	110,000	110,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concourse B floor tile repairs	606,000	400,000	206,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terminal Landscape and exterior improvements	220,697	117,697	103,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single Mode Fiber Infrastructure (IT)	506,000	300,000	206,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3rd Runway Utilities and Roads	668,844	-	-	106,090	-	562,754	-	-	-	-	-	-	-	-	-	-	-	-	-
Replace HVAC roof top units	366,525	99,568	103,000	53,045	54,636	56,275	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc Paving projects	209,181	50,000	51,500	53,045	54,636	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GA pavement rehab	276,075	52,000	53,560	55,167	56,822	58,526	-	-	-	-	-	-	-	-	-	-	-	-	-
GA pavement rehab	1,051,209	198,000	203,940	210,058	216,360	222,851	-	-	-	-	-	-	-	-	-	-	-	-	-
Baggage system mods/upgrades, Phase I	772,500	-	772,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Construction Management System	417,995	-	-	417,995	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roadway construction	1,502,114	-	515,000	424,360	-	562,754	-	-	-	-	-	-	-	-	-	-	-	-	-
Runway 28L & Taxiway B Extension, design & match	2,167,204	790,000	927,000	-	-	450,204	-	-	-	-	-	-	-	-	-	-	-	-	-
Runway 28L & Taxiway B Extension, construction	9,004,070	-	-	-	-	9,004,070	-	-	-	-	-	-	-	-	-	-	-	-	-
Apron Pavement Rehab, construction	2,837,089	-	-	742,630	-	900,407	-	1,194,052	-	-	-	-	-	-	-	-	-	-	-
Apron Pavement Rehab, design & match	1,067,736	-	154,500	159,135	218,545	225,102	-	310,454	-	-	-	-	-	-	-	-	-	-	-
FAA 1542 Security Discretionary Project, construction	3,024,446	-	978,500	1,007,855	1,038,091	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FAA 1542 Security Discretionary Project, match	159,181	-	51,500	53,045	54,636	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FAA 1542 Security Discretionary Project, design	397,953	-	128,750	132,613	136,591	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aiport/Tenant WiFi Infrastructure (IT)	396,567	-	-	-	-	253,239	46,371	47,762	49,195	-	-	-	-	-	-	-	-	-	-
Taxiway Pavement Rehab, design	1,463,203	-	412,000	-	1,051,203	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxiway Pavement Rehab, construction	5,691,090	-	1,648,000	-	4,043,090	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Airfield Expansion; Phase 2, Taxiway construction	1,420,545	-	-	-	1,420,545	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Airfield Expansion; Phase 2, Taxiway design & match	351,954	-	-	106,090	245,864	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Airfield Expansion; Phase 3, Utilities and aprons	218,545	-	-	-	218,545	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Airfield Expansion; Phase 3, Utilities and aprons	1,688,263	-	-	-	-	1,688,263	-	-	-	-	-	-	-	-	-	-	-	-	-
Concourse B New Power	163,909	-	-	-	163,909	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lighting control panel & Beacon for new ATCT	156,560	-	156,560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lighting control panel & Beacon for new ATCT	8,240	-	8,240	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rental Car Improvements	546,364	-	-	-	546,364	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Relocate Service Road, Design & Match	79,568	-	-	79,568	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Relocate Service Road, Construction	302,357	-	-	302,357	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aircraft AC for Jet Bridges	318,270	-	-	318,270	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Runway 10R new exit taxiway, construction	530,450	-	-	530,450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ATCT remodel (old)	225,102	-	-	-	-	225,102	-	-	-	-	-	-	-	-	-	-	-	-	-
Terminal Access Road Improvements	546,364	-	-	-	546,364	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upgrade VASIs to PAPIs, design & match	58,526	-	-	-	-	58,526	-	-	-	-	-	-	-	-	-	-	-	-	-
Upgrade VASIs to PAPIs, construction	225,102	-	-	-	-	225,102	-	-	-	-	-	-	-	-	-	-	-	-	-
Heliport at West De-Ice Apron	109,273	-	-	-	109,273	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NIFC Relocation Study	112,551	-	-	-	-	112,551	-	-	-	-	-	-	-	-	-	-	-	-	-
Masterplan, ALP, & Exhibit A updates	1,043,347	-	-	-	-	-	1,043,347	-	-	-	-	-	-	-	-	-	-	-	-

Sources: City of Boise (project cost and phasing); Ricondo & Associates, Inc., August 2008 (escalated costs).
Prepared by: Ricondo & Associates, Inc., September 2008.

Table VII-1 (2 of 2)

Capital Improvement Plan

Project	Escalated Cost	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Rehab Runway 10R-28L	$ 3,376,526	$ -	$ -	$ -	$ -	$ 3,376,526	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Rehab Runway 10R-28L	3,376,526	-	-	-	-	3,376,526	-	-	-	-	-	-	-	-	-	-	-	-	-
Rehab Runway 10R-28L	450,204	-	-	-	-	450,204	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxiway A6 improvements, construction	869,456	-	-	-	-	-	869,456	-	-	-	-	-	-	-	-	-	-	-	-
Taxiway A6 improvements, design and match	172,944	-	-	-	-	127,182	45,761	-	-	-	-	-	-	-	-	-	-	-	-
Demo old fire station	57,964	-	-	-	-	-	57,964	-	-	-	-	-	-	-	-	-	-	-	-
New Cargo Landside facility	11,940,523	-	-	-	-	-	-	11,940,523	-	-	-	-	-	-	-	-	-	-	-
New Cargo Landside facility, design	1,176,663	-	-	-	-	-	579,637	597,026	-	-	-	-	-	-	-	-	-	-	-
New Cargo Airside facilities, construction	5,564,516	-	-	-	-	-	5,564,516	-	-	-	-	-	-	-	-	-	-	-	-
New Cargo Airside facilities, design & match	1,449,093	-	-	-	-	-	1,449,093	-	-	-	-	-	-	-	-	-	-	-	-
Install Airfield Scan system, construction	424,360	-	-	424,360	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Install Airfield Scan system, design and match	106,090	-	-	106,090	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3rd Runway Heliport and Helipads, Construction	1,014,944	-	-	-	-	-	-	1,014,944	-	-	-	-	-	-	-	-	-	-	-
3rd Runway Heliport and Helipads, Design & Match	262,692	-	-	-	-	-	-	262,692	-	-	-	-	-	-	-	-	-	-	-
Remodel ARFF Station # 7	597,026	-	-	-	-	-	-	597,026	-	-	-	-	-	-	-	-	-	-	-
Concourse A Phase 1 expansion, construction	15,522,680	-	-	-	-	-	-	15,522,680	-	-	-	-	-	-	-	-	-	-	-
Terminal building Remodel	1,266,770	-	-	-	-	-	-	-	-	1,266,770	-	-	-	-	-	-	-	-	-
Terminal building Remodel	1,266,770	-	-	-	-	-	-	-	-	1,266,770	-	-	-	-	-	-	-	-	-
Terminal building Remodel	658,720	-	-	-	-	-	-	-	-	658,720	-	-	-	-	-	-	-	-	-
PAL II Terminal Expansion	27,857,407	-	-	-	-	-	-	3,582,157	24,275,250	-	-	-	-	-	-	-	-	-	-
PAL II Terminal Expansion	6,395,344	-	-	-	-	-	-	-	6,395,344	-	-	-	-	-	-	-	-	-	-
ARFF Vehicle	2,136,496	-	-	-	-	-	-	1,020,915	-	-	1,115,581	-	-	-	-	-	-	-	-
ARFF Vehicle, match	112,447	-	-	-	-	-	-	53,732	-	-	58,715	-	-	-	-	-	-	-	-
ARFF Vehicle	2,551,088	-	-	-	-	-	-	-	-	-	-	-	-	1,219,026	-	-	1,332,062	-	-
ARFF Vehicle, match	134,268	-	-	-	-	-	-	-	-	-	-	-	-	64,159	-	-	70,109	-	-
FAA 1542 Security Discretionary Project, construction	3,614,502	-	-	-	-	-	-	1,134,350	-	1,203,432	-	1,276,721	-	-	-	-	-	-	-
FAA 1542 Security Discretionary Project, match	190,237	-	-	-	-	-	-	59,703	-	63,339	-	67,196	-	-	-	-	-	-	-
FAA 1542 Security Discretionary Project, design	475,592	-	-	-	-	-	-	149,257	-	158,346	-	167,990	-	-	-	-	-	-	-
Snow Removal Equipment	2,255,782	-	-	-	-	-	-	597,026	614,937	-	1,043,819	-	-	-	-	-	-	-	-
Snow Removal Equipment, match	121,551	-	-	-	-	-	-	32,239	33,207	-	56,105	-	-	-	-	-	-	-	-
Baggage System Expansion, Phase 2	6,456,838	-	-	-	-	-	-	-	122,987	6,333,850	-	-	-	-	-	-	-	-	-
Rehab. Airfield Signs, constn.	601,716	-	-	-	-	-	-	-	-	601,716	-	-	-	-	-	-	-	-	-
Rehab. Airfield Signs, design & match	126,677	-	-	-	-	-	-	-	-	126,677	-	-	-	-	-	-	-	-	-
Relocate State Aeronautics	3,381,009	-	-	-	-	-	-	-	-	380,031	3,000,978	-	-	-	-	-	-	-	-
Roadway Construction	1,230,411	-	-	-	-	-	-	597,026	-	633,385	-	-	-	-	-	-	-	-	-
Taxiway Pavement Rehab	4,936,320	-	-	-	-	-	-	1,134,350	1,844,811	-	1,957,160	-	-	-	-	-	-	-	-
Taxiway Pavement Rehab	1,312,372	-	-	-	-	-	-	298,513	491,950	-	521,909	-	-	-	-	-	-	-	-
Runway 9-27 Phase 1 improvements, construction	4,083,659	-	-	-	-	-	-	4,083,659	-	-	-	-	-	-	-	-	-	-	-
Runway 9-27 Phase 1 improvements, design	1,002,619	-	-	-	-	-	704,106	298,513	-	-	-	-	-	-	-	-	-	-	-
Runway 9-27 Phase 2 improvements	2,888,236	-	-	-	-	-	-	-	-	2,888,236	-	-	-	-	-	-	-	-	-
Runway 9-27 Phase 2 improvements, design	724,059	-	-	-	-	-	-	-	-	724,059	-	-	-	-	-	-	-	-	-
Runway deicing chemical storage bldg., design	61,494	-	-	-	-	-	-	-	61,494	-	-	-	-	-	-	-	-	-	-
Runway deicing chemical storage bldg., construrction	614,937	-	-	-	-	-	-	-	614,937	-	-	-	-	-	-	-	-	-	-
Apron Pavement Rehab	2,687,833	-	-	-	-	-	-	-	-	-	-	2,687,833	-	-	-	-	-	-	-
Apron Pavement Rehab	141,465	-	-	-	-	-	-	-	-	-	-	141,465	-	-	-	-	-	-	-
Concourse B Remodel	2,687,833	-	-	-	-	-	-	-	-	-	-	2,687,833	-	-	-	-	-	-	-
Connecting Taxiway to Runway 9-27	16,126,997	-	-	-	-	-	-	-	-	-	-	16,126,997	-	-	-	-	-	-	-
Replace Jet Bridges	1,957,160	-	-	-	-	-	-	-	-	-	1,957,160	-	-	-	-	-	-	-	-
Replace Jet Bridges	260,955	-	-	-	-	-	-	-	-	-	260,955	-	-	-	-	-	-	-	-
Parking Garage Expansion, Phase 3	26,488,592	-	-	-	-	-	-	-	-	-	-	2,956,616	23,531,976	-	-	-	-	-	-
Offsite Consolidated Rental Car facility	22,880,432	-	-	-	-	-	-	-	-	-	-	2,015,875	20,864,557	-	-	-	-	-	-
Construct 2nd ARFF Station	2,602,913	-	-	-	-	-	-	-	-	-	-	-	2,602,913	-	-	-	-	-	-
Construct 2nd ARFF Station	136,995	-	-	-	-	-	-	-	-	-	-	-	136,995	-	-	-	-	-	-
Snow Removal Equipment	2,053,618	-	-	-	-	-	-	-	-	-	-	-	-	898,229	-	-	-	1,155,389	-
Snow Removal Equipment, match	175,652	-	-	-	-	-	-	-	-	-	-	-	-	47,275	-	-	-	128,377	-
Terminal building Remodel	2,851,522	-	-	-	-	-	-	-	-	-	-	-	-	2,851,522	-	-	-	-	-
Rehab Runway 10L/28R	510,273	-	-	-	-	-	-	-	-	-	-	-	-	510,273	-	-	-	-	-
Rehab Runway 10L/28R	2,851,522	-	-	-	-	-	-	-	-	-	-	-	-	2,851,522	-	-	-	-	-
Develop new NIFC campus south of Runway 9-27	62,396,344	-	-	-	-	-	-	-	-	-	-	-	-	1,425,761	14,685,337	15,125,897	31,159,348	-	-
PAL III Concourse A Expansion	24,113,324	-	-	-	-	-	-	-	-	-	-	-	-	-	2,937,067	21,176,256	-	-	-
Apron Pavement Rehab	7,048,962	-	-	-	-	-	-	-	-	-	-	-	-	-	7,048,962	-	-	-	-
Apron Pavement Rehab	370,999	-	-	-	-	-	-	-	-	-	-	-	-	-	370,999	-	-	-	-
Taxiway Pavement Rehab	4,083,992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,083,992	-	-	-
Taxiway Pavement Rehab	453,777	-	-	-	-	-	-	-	-	-	-	-	-	-	-	453,777	-	-	-
Baggage system Expansion	8,490,922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	467,390	8,023,532	-
FAA 1542 Security Discretionary Project, construction	1,524,471	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,524,471	-
FAA 1542 Security Discretionary Project, match	80,235	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80,235	-
FAA 1542 Security Discretionary Project, design	200,588	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200,588	-
Economy Lot Expansion, Phase 3	962,824	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	962,824	-
Runway 9/27 Phase 4 improvements	10,656,497	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,656,497	-	-
Runway 9/27 Phase 4 improvements, design	2,671,504	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,671,504	-	-
PAL III Terminal Expansion	49,392,864	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,418,826	42,974,038
PAL III Terminal Expansion	7,933,669	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,933,669
PAL III Terminal Expansion	417,562	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	417,562
Total	$ 466,981,019	$ 10,959,792	$ 14,003,880	$ 26,765,446	$ 10,339,383	$ 21,992,442	$ 10,418,213	$ 44,528,598	$ 34,504,111	$ 16,305,331	$ 9,972,381	$ 28,128,523	$ 47,136,441	$ 9,867,767	$ 25,042,365	$ 40,839,923	$ 46,356,911	$ 18,494,242	$ 51,325,269

Sources: City of Boise (project cost and phasing); Ricondo & Associates, Inc., August 2008 (escalated costs).
Prepared by: Ricondo & Associates, Inc., September 2008.

Table VII-2 (1 of 2)

Capital Improvement Program – Funding Sources

Project	Escalated Cost	AIP Discretionary	AIP Entitlements	PFCs	CFCs	State Grant	Airport Funds	Reimbursement 1/	Other Funding 2/
3rd Runway Heliport and Helipads, Construction	$ 1,014,944		1,014,944						
3rd Runway Heliport and Helipads, Design & Match	262,692						262,692		
3rd Runway Utilities and Roads	668,844						668,844		
Aiport/Tenant WiFi Infrastructure (IT)	396,567						396,567		
Aircraft AC for Jet Bridges	318,270			318,270					
Airfield Expansion; Phase 2, Taxiway design & match	351,954						351,954		
Airfield Expansion; Phase 1, Orchard St., ACHD & PW	1,166,990							1,166,990	
Airfield Expansion; Phase 1, Orchard St., design	1,575,900			1,575,900					
Airfield Expansion; Phase 1, Orchard St., constn.	3,182,700		3,182,700						
Airfield Expansion; Phase 2, Taxiway construction	1,420,545		1,420,545						
Airfield Expansion; Phase 3, Utilities and aprons	1,688,263		1,688,263						
Airfield Expansion; Phase 3, Utilities and aprons	218,545						218,545		
Airfield Fuel Facility (SRE)	110,000						110,000		
Airport Operations Remodel	48,700						48,700		
Apron Pavement Rehab	10,249,258		9,736,795				512,463		
Apron Pavement Rehab, construction	2,837,089		2,837,089						
Apron Pavement Rehab, design & match	1,067,736						1,067,736		
ARFF Sta 7 Remodel, construction	80,767						80,767		
ARFF Vehicle	4,687,583	4,687,583							
ARFF Vehicle, match	246,715						246,715		
ATCT remodel (old)	225,102						225,102		
Aviator Statue	60,000						60,000		
Baggage System Expansion	8,490,922			8,490,922					
Baggage System Expansion, Phase 2	6,456,838			6,456,838					
Baggage System Improvements	25,000						25,000		
Baggage System mods/upgrades, Phase 1	772,500			772,500					
Building Demolition	343,420						343,420		
CBP Customs Facility, design	241,200						241,200		
CBP Customs Facility, grant eligible	834,300		834,300						
CBP Customs Facility, non-grant eligible	747,780						747,780		
Concours B Remodel	2,687,833			2,687,833					
Concourse A Phase 1 expansion, construction	15,522,680			15,522,680					
Concourse B floor tile repairs	606,000						606,000		
Concourse B New Power	163,909						163,909		
Construct 2nd ARFF Station	2,739,908		2,602,913				136,995		
Construction Management System	417,995						417,995		
Demo old fire station	57,964						57,964		
Develop new NIFC campus south of Runway 9-27	62,396,344								62,396,344
EA & Studies for Runway 9-27 Extension & Heliports	229,050						229,050		
FAA 1542 Security Discretionary Project, construction	3,024,446	3,024,446							
FAA 1542 Security Discretionary Project, design	397,953						397,953		
FAA 1542 Security Discretionary Project, match	159,181						159,181		
FAA Part 139 Training System	79,236		79,236						
FAA 1542 Security Discretionary Project, construction	5,138,973	5,138,973							
FAA 1542 Security Discretionary Project, design	676,181						676,181		
FAA 1542 Security Discretionary Project, match	270,472						270,472		
GA pavement rehab	1,327,284					276,075	1,051,209		
GA Wash Pad	30,889						30,889		
Heliport at West De-Ice Apron	109,273						109,273		
Infrastructure Development/Parking Lot Improvements	548,577						548,577		
Install Airfield Scan system, construction	424,360		424,360						
Install Airfield Scan system, design and match	106,090						106,090		
K9 Facilities Remodel	17,455						17,455		
Lighting control panel & Beacon for new ATCT	164,800						164,800		
Lot E1 Paving, construction	4,770						4,770		
Master Plan Update	259,634		259,634						
Masterplan, ALP, & Exhibit A updates	1,043,347		1,043,347						
Misc Paving projects	209,181						209,181		
New Cargo Airside facilities, construction	5,564,516		5,564,516						
New Cargo Airside facilities, design & match	1,449,093						1,449,093		
New Cargo Landside facility	11,940,523								11,940,523
New Cargo Landside facility, design	1,176,663						1,176,663		
New CCTV Digital Storage System, construction	191,480	191,480							
NIFC Relocation Study	112,551						112,551		
Offsite Consolidated Rental Car facility	22,880,432				22,880,432				
PAL II Terminal Expansion	34,252,751		6,395,344	27,857,407					
PAL III Concourse A Expansion	24,113,324			24,113,324					
PAL III Terminal Expansion	57,744,095		7,933,669	49,392,864			417,562		
Parking Garage Expansion, construction	15,383,050						15,383,050		
Parking Garage Expansion, Phase 3	26,488,592						26,488,592		
Parking Garage Expansion, Planning, and Design	1,960,450						1,960,450		
Parking Signage Project	506,000						506,000		
Rehab Runway 10L-28R	3,361,794	2,851,522					510,273		
Rehab Runway 10R-28L	7,203,256	3,376,526	3,376,526				450,204		
Rehab. Airfield Signs, constn.	601,716		601,716						
Rehab. Airfield Signs, design & match	126,677						126,677		
Relocate Service Road, Construction	302,357		302,357						
Relocate Service Road, Design & Match	79,568						79,568		
Relocate State Aeronautics	3,381,009						3,381,009		
Remodel ARFF Station # 7	597,026						597,026		

Notes: AIP = Airport Improvement Program; PFC = Passenger Facility Charge; CFC = Customer Facility Charge.

1/ The Ada County Highway District (ACHD) will reimburse a portion of the cost of realigning Orchard Street.

2/ Projects with funding source "Other Funds" means that funding for the project has not been determined and will be deferred indefinitely or alternative financing will be identified.

Sources: City of Boise (project cost and funding sources); Ricondo & Associates, Inc., August 2008 (escalated costs).
Prepared by: Ricondo & Associates, Inc., September 2008.

Table VII-2 (2 of 2)

Capital Improvement Program – Funding Sources

Project	Escalated Cost	AIP Discretionary	AIP Entitlements	PFCs	CFCs	State Grant	Airport Funds	Reimbursement 1/	Other Funding 2/
Rental Car Improvements	546,364				546,364				
Replace HVAC roof top units	366,525						366,525		
Replace Jet Bridges	2,218,114			2,218,114					
Rickenbacker St. Improvements, construction	750,000						750,000		
Roadway construction	2,732,526						2,732,526		
Runway 10L-28R Rehab, Phase 2, construction	3,313,857	3,313,857							
Runway 10L-28R Rehab, Phase 1, construction	230,198		230,198						
Runway 28L & Taxiway B Extension, construction	9,004,070			9,004,070					
Runway 28L & Taxiway B Extension, design & match	2,167,204			2,167,204					
Runway deicing chemical storage bldg., construrction	614,937		614,937						
Runway deicing chemical storage bldg., design	61,494						61,494		
Security Fencing Projects, construction	226,000		226,000						
Security Fencing Projects, match	11,895						11,895		
Security Fiber Optic Concourse B, construction	200,957		200,957						
Economy Lot Expansion, Phase 1, design-1,000 stalls	350,000						350,000		
Economy Lot Expansion, Phase 1, construction-1,000 st	2,729,500						2,729,500		
Economy Lot Expansion, Phase 3	962,824						962,824		
Single Mode Fiber Infrastructure (IT)	506,000						506,000		
Snow Removal Equipment	4,309,400		4,309,400						
Snow Removal Equipment, match	297,203						297,203		
SRE facility, construction	880,650		880,650						
SRE facility, design and match	50,825						50,825		
Taxiway A6 improvements, construction	869,456		869,456						
Taxiway A6 improvements, design and match	172,944						172,944		
Taxiway Pavement Rehab	10,786,461		9,020,313				1,766,149		
Taxiway Pavement Rehab, construction	5,691,090		5,691,090						
Taxiway Pavement Rehab, design	1,463,203						1,463,203		
Terminal Access Road Improvements	546,364			546,364					
Terminal Landscape and exterior improvements	220,697						220,697		
Terminal building Remodel	6,043,782		1,266,770	4,118,292			658,720		
Upgrade VASIs to PAPIs, construction	225,102		225,102						
Upgrade VASIs to PAPIs, design & match	58,526						58,526		
UPS & FedEx Apron Rehab, construction	1,140,000		1,140,000						
UPS & FedEx Apron Rehab, design	441,000						441,000		
UPS & FedEx Apron Rehab, match	86,000						86,000		
Runway 9-27 Phase 1 improvements, construction	4,083,659		4,083,659						
Runway 9-27 Phase 1 improvements, design	1,002,619						1,002,619		
Runway 9-27 Phase 2 improvements	2,888,236		2,888,236						
Runway 9-27 Phase 2 improvements, design	724,059						724,059		
Connecting Taxiway to Runway 9-27	16,126,997		16,126,997						
Runway 9-27 Phase 4 improvements	10,656,497		10,656,497						
Runway 9-27 Phase 4 improvements, design	2,671,504						2,671,504		
Runway 10R new exit taxiway, construction	530,450			530,450					
Total	$ 466,981,019	$ 22,584,387	$ 107,728,513	$ 155,773,032	$ 23,426,795	$ 276,075	$ 81,688,359	$ 1,166,990	$ 74,336,867

Notes: AIP = Airport Improvement Program; PFC = Passenger Facility Charge; CFC = Customer Facility Charge.

1/ The Ada County Highway District (ACHD) will reimburse a portion of the cost of realigning Orchard Street.

2/ Projects with funding source "Other Funds" means that funding for the project has not been determined and will be deferred indefinitely or alternative financing will be identified.

Sources: City of Boise (project cost and funding sources); Ricondo & Associates, Inc., August 2008 (escalated costs).
Prepared by: Ricondo & Associates, Inc., September 2008.

7.2.3 AIP Grants

One of the main sources of funding for airport improvements is the federal AIP. The AIP was initially authorized by the Airport and Airway Improvement Act of 1982 to assist airport sponsors in funding planning, development, and noise compatibility projects at public-use airports nationwide to accommodate projected civil aviation growth. To be eligible for funding assistance, an airport must be included in the National Plan of Integrated Airport Systems (NPIAS).

The AIP is funded through the Aviation Trust Fund, which was established by the Airport and Airway Revenue Act of 1970. Revenues for the Aviation Trust Fund are derived through taxes and fees on aviation fuel and lubricants, airline tickets, international departing passengers, aircraft freight, and other components of the aviation industry. Funds deposited into the Aviation Trust Fund are distributed to eligible airports throughout the United States and its territories through a combination of formula grants (also referred to as apportionments) and discretionary funds. Formula funds are apportioned by formula or percentage and may be used for any eligible airport or planning project. Through the AIP, the FAA apportions formula grants automatically to specific airports or types of

airports under appropriations limits established by the U.S. Congress.

In administering the AIP, the FAA must comply with various statutory provisions, formulas, and set-asides established by law, which specify how AIP grant funds are to be distributed among airports. Each year, the FAA uses the statutory formulas to determine how much in apportionment funds is to be made available to each airport. To receive the funds it is entitled to, an airport has to submit a valid grant application to the FAA. Individual airports do not have to use these funds in the year they are made available. Airports are given up to three years to use their apportionment funds, allowing airports to accumulate a larger amount to pay for more costly projects. Once the apportionments have been determined, the remaining amount of AIP funds is deposited in that program's discretionary fund, which consists of set-asides that are established by statute and other distributions.

AIP funds are usually limited to planning, designing, and constructing projects that improve aircraft operations, such as runways, taxiways, aprons, and land purchases, as well as to purchase security, safety, and emergency equipment. AIP funds are also available to plan for and implement programs to mitigate aircraft noise in the vicinity of airports. However, these grants are generally not eligible for projects related to commercial revenue-generating portions of terminals, such as shop concessions, commercial maintenance hangars, fuel farms, parking garages, and off-airport road construction.

The City expects to use a combination of AIP discretionary and entitlement grants to fund approximately $130.3 million of AIP-eligible projects, including development of Runway 9-27 and associated taxiways, terminal expansion, and various pavement rehabilitation projects.

7.2.4 State Grants

Grants distributed by the Idaho Transportation Department Division of Aeronautics from aviation fuel taxes are expected to fund approximately $276,000 of the CIP projects. No state funding is assumed to be received for road projects, including those maintained by the State.

7.2.5 Passenger Facility Charge Revenues

In accordance with the Aviation Safety and Capacity Expansion Act of 1990, as amended by the Aviation Investment and Reform Act for the 21st Century (AIR-21), the City received approval from the FAA to impose a PFC of $3 per eligible enplaned passenger at the Airport on August 1, 1994. Effective FY 2002, the FAA approved the City's request to increase the PFC per eligible enplaned passenger to $4.50.

The City intends to continue to collect PFCs at a $4.50 level in the future. Although the Airport is currently a small hub, it is anticipated that it could grow to a medium hub. If it does, the city will be required by AIR-21 to demonstrate to the FAA that each proposed PFC-funded project will make a significant contribution to improving air safety and security, increasing competition among air carriers, reducing current or anticipated congestion, or reducing the impact of aviation noise on people living near the Airport. Small hub airports are currently exempt from demonstrating significant contribution for PFCs in excess of $3.00. The finding of significant contribution is in addition to the finding of adequate justification already required for all PFC-eligible projects. In particular, the FAA considers all relevant factors in assessing whether the significant contribution requirement has been met, including, but not limited to:

- **Safety and security projects** – Does the project advance airport safety and/or security? In the case of AIP discretionary funds, highest priority is usually given to those projects that meet regulatory requirements for safety and security under 14 CFR Part 139 and 49 CFR Part 1544, respectively. A similar approach to assessing PFC significance may be appropriate.

- **Congestion (capacity)** – Does the project support or is it part of a capacity project to which the FAA has allocated federal resources or that would qualify for such resources? For example, is the project included in a FAA Letter of Intent (otherwise known as a LOI) or does it satisfy the FAA's benefit-cost criteria for large AIP discretionary investments? Has the project been identified as an important item in an FAA Airport Capacity Enhancement Plan? Does the project alleviate an important constraint on airport growth or service?
- **Noise** – Does the project affect the noise-impacted areas around the airport? Historically, higher priority for AIP discretionary grants has been given to projects in noisier areas over projects in less noisy areas, all other factors being equal. A similar approach to assessing PFC significance may be appropriate.
- **Competition** – Does the project mitigate or remove barriers to increased airline competition at the airport? Has the project been identified as an essential component in the airport's competition plan or other similar documents?

When submitting PFC applications for projects identified as being partially funded with PFC revenues, the City will need to provide sufficient information to support its assertion that a project makes a significant contribution to one or more of the above factors. In the case of a project that would reduce congestion, the information may include a quantified measure of reduced delay per aircraft operation or reference a study that included measures of the expected congestion reduction benefits. Similarly, an assertion that a project enhances competition may be supported by information on the number of new operations that the project would make possible, the number of new entrant airlines it would accommodate, the effect on fares at the airport, and/or other measures of increased competition. In general, because "significant contribution" is a higher standard than "adequate justification," more documentation is required to establish significant contribution than is typically needed for adequate justification.

CIP projects totaling $155.8 million are expected to be funded from PFC revenues on a pay-as-you-go basis. In addition, PFC revenues are pledged toward debt service for the Series 2000 Certificates of Participation in the amount of $76.2 million from FY 2008 through maturity (FY 2031).

The calculation of the percentage of enplaned passengers paying a PFC is based on total enplaned passengers at the Airport, although certain classes of carriers are exempt from collecting a PFC from their passengers. For the purposes of this financial analysis, it was assumed that the City will continue to impose a $4.50 PFC at the Airport through the planning period and that 95 percent of total enplaned passengers using the Airport will pay a PFC. **Table VII-3** presents projections of PFC revenues.

7.2.6 Customer Facility Charge Revenues

Effective July 2003, the City initiated a CFC of $1.20 per rental car per transaction day from rental car passengers. CFC funds must be used for projects that benefit the car rental agencies. CFC revenues are expected to fund approximately $23.4 million in CIP projects, including $22.9 million for an offsite consolidated rental car facility in FY 2019.

Although the City may determine that the amount of CFC revenues required to fund future projects necessitates a higher CFC level, for purposes of this analysis, it was assumed that the City will not increase the CFC during the planning period. Projections of CFC revenues are based on the projected numbers of enplaned passengers and are presented in Table VII-3.

Table VII-3

Passenger Facility Charge and Customer Facility Charge Revenues

									Projected										
	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
Passenger Facility Charge (PFC) Revenues																				
Enplaned Passengers	1,746,281	1,808,775	1,873,636	1,940,958	2,010,840	2,083,387	2,158,701	2,236,897	2,318,087	2,402,393	2,489,944	2,580,868	2,675,304	2,773,391	2,875,279	2,981,125	3,091,088	3,205,336	3,322,093	3,443,103
Passenger Facility Charge	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50
Airline collection fee	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Net Passenger Facility Charge	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39
Percent of passengers paying a PFC	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
PFC Revenues	$ 7,264,159	$ 7,524,121	$ 7,793,929	$ 8,073,974	$ 8,364,668	$ 8,666,448	$ 8,979,739	$ 9,305,018	$ 9,642,751	$ 9,993,446	$ 10,357,639	$ 10,735,864	$ 11,128,698	$ 11,536,719	$ 11,960,551	$ 12,400,848	$ 12,858,271	$ 13,333,519	$ 13,819,203	$ 14,322,579
Interest Earnings	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Net PFC Revenues	7,373,121	7,636,983	7,910,838	8,195,084	8,490,138	8,796,445	9,114,435	9,444,593	9,787,392	10,143,348	10,513,004	10,896,902	11,295,628	11,709,770	12,139,960	12,586,861	13,051,145	13,533,521	14,026,491	14,537,418
Application of PFC Revenues																				
Debt Service for Series 2000 Certificates	$ 2,719,235	$ 2,722,945	$ 2,720,436	$ 2,719,472	$ 2,719,094	$ 2,719,386	$ 2,720,128	$ 2,721,098	$ 2,722,071	$ 2,719,046	$ 2,719,585	$ 2,722,449	$ 2,721,249	$ 2,719,764	$ 2,719,594	$ 2,722,204	$ 2,719,613	$ 2,719,386	$ 2,721,107	$ 2,722,287
Pay-as-you-go Projects or Future Uses	4,653,886	4,914,037	5,190,402	5,475,612	5,771,045	6,077,059	6,394,307	6,723,495	7,065,321	7,424,302	7,793,419	8,174,453	8,574,379	8,990,005	9,420,365	9,864,658	10,331,532	10,814,135	11,305,384	11,815,131
	$ 7,373,121	$ 7,636,983	$ 7,910,838	$ 8,195,084	$ 8,490,138	$ 8,796,445	$ 9,114,435	$ 9,444,593	$ 9,787,392	$ 10,143,348	$ 10,513,004	$ 10,896,902	$ 11,295,628	$ 11,709,770	$ 12,139,960	$ 12,586,861	$ 13,051,145	$ 13,533,521	$ 14,026,491	$ 14,537,418
Customer Facility Charge (CFC) Revenues																				
Enplaned Passengers	1,746,281	1,808,775	1,873,636	1,940,958	2,010,840	2,083,387	2,158,701	2,236,897	2,318,087	2,402,393	2,489,944	2,580,868	2,675,304	2,773,391	2,875,279	2,981,125	3,091,088	3,205,336	3,322,093	3,443,103
Customer Facility Charge	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20	$1.20
Transaction days per enplaned passenger	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
CFC Revenues	$ 838,215	$ 868,212	$ 899,345	$ 931,660	$ 965,203	$ 1,000,026	$ 1,036,176	$ 1,073,711	$ 1,112,682	$ 1,153,149	$ 1,195,173	$ 1,238,817	$ 1,284,146	$ 1,331,228	$ 1,380,134	$ 1,430,940	$ 1,483,722	$ 1,538,561	$ 1,594,605	$ 1,652,689
Interest Earnings	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Net CFC Revenues	$ 850,788	$ 881,235	$ 912,835	$ 945,635	$ 979,681	$ 1,015,026	$ 1,051,719	$ 1,089,816	$ 1,129,372	$ 1,170,446	$ 1,213,101	$ 1,257,399	$ 1,303,408	$ 1,351,196	$ 1,400,836	$ 1,452,404	$ 1,505,978	$ 1,561,640	$ 1,618,524	$ 1,677,480

Source: Ricondo & Associates, Inc., August 2008.
Prepared by: Ricondo & Associates, Inc., September 2008.

7.2.7 General Airport Revenue Bonds (GARBs)

No long-term financing through issuance of GARBs is assumed as a funding source for any projects in the Airport's CIP. As a result of the Idaho Supreme Court ruling in *City of Boise v. Frazier*, the City faces significant limitations on its ability to finance facilities and equipment with long-term debt.

Article VIII, Section 3 of the Idaho Constitution limits the ability of municipal governments and political subdivisions in Idaho to incur indebtedness or liabilities without (1) a vote of two-thirds of the qualified electors, and (2) an annual tax sufficient to pay principal and interest on such debt as it becomes due. A provision included in Article VIII, Section 3 provides an exception for "ordinary and necessary" expenses. The "ordinary and necessary" exception is especially important for municipalities in Idaho because unlike other state Supreme Courts, the Idaho Supreme Court has rejected the "special fund" doctrine, which would allow municipalities to issue revenue bonds (bonds or other indebtedness secured and paid solely by revenue generated by the financed facility) without holding an election and levying a tax to repay the obligations.[3]

The City had initially sought bond financing for the planned expansion(s) of the Airport's parking garage under the "ordinary and necessary" provision contained in Article VIII, Section 3 of the Idaho Constitution. In 2004, the City sought a judicial confirmation that construction of a new parking structure on the site of an existing parking lot at the Airport was an ordinary and necessary expense exempt from the requirements in Article VIII, Section 3. Despite an opposition filed by David Frazier during the City's judicial confirmation proceeding, the District Court granted the City's petition for judicial validation, finding that the expansion of the parking facilities at the Airport was ordinary and necessary. Frazier then filed an appeal of the decision with the Idaho Supreme Court.[4]

In *City of Boise v. Frazier* (2006), the Idaho Supreme Court moved away from the list of factors used in previous court cases to establish whether a project is ordinary and necessary and instead applied definitions of "ordinary and necessary" established around 1900. Applying those standards, the Supreme Court ruled that while expansion of the Airport parking facilities was ordinary, it was not necessary because it was not urgent. The court stated that the project was a planned expense that could have been voted on during a general election, and that an alternative was available (shuttling passengers between the Airport and the existing off-Airport Economy Lot).[5]

The Supreme Court ruling, coupled with the inherent difficulty in achieving a two-thirds majority vote for financing the parking garage with debt, has forced the City to plan on using Airport funds (cash) for the garage expansions. Projects included in the CIP for which funding has not been determined include landside development for the planned consolidated air cargo facility (approximately $12 million) and construction of a consolidated National Interagency Fire Center (NIFC) campus south of Runway 9-27. These projects would normally be candidates for GARB financing, but given the difficulties in issuing GARBs, the Airport would be forced to find alternative funding options or delay the projects indefinitely.

Based on industry experience, it would be reasonable for an airport of similar size to the Boise Airport to issue GARBs for a portion of the airport's CIP. The inability of the City to issue GARBs

[3] Quade, Danielle, "Not To Build: City of Boise V. Frazier Further Restricts Local Governments' Ability to Finance Public Projects," *Idaho Law Review*, Vol. 43 2007, pp. 329-347.

[4] Ibid.

[5] Ibid.

for major capital development projects is a financial constraint for the Airport and potentially limits the ability of the Airport to maximize revenues and compete for aviation-related business on a regional and national level.

7.2.8 Airport Funds

Revenues remaining after the payment of O&M expenses and outstanding debt service are made available for other allowable uses, including funding of capital improvement projects. Airport funds (cash) are assumed to be used to fund projects that are not funded through the other sources described in this section. CIP projects totaling approximately $81.7 million are assumed to be funded with Airport funds through the planning period.

7.3 Debt Service Requirements

The City currently pays debt service on two debt issues, as follows:

- **Airport Terminal Facilities Certificates of Participation ("Certificates"), Series 2000 (New Terminal Facility Project)** – On November 15, 2000, the City issued $52 million in Certificates to fund Airport terminal renovation projects, including demolition of portions of the old terminal building, the addition of approximately 256,000 square feet, a new baggage handling system, improvements to the air carrier ramps and access roads, and improvements required to comply with the Americans with Disabilities Act of 1990. Debt service on the Series 2000 Certificates is payable at 75.6 percent from PFCs and 24.4 percent from general Airport revenues, which is allocated to the Terminal Cost Center. The Certificates will mature on September 1, 2030.
- **City of Boise City, Idaho, Airport Revenue Refunding Bonds, Series 2004-1 (Parking Facilities Project)** – In January 1997, the City issued $14.2 million in Certificates to fund construction of the existing parking garage at the Airport. The final maturity date for the Series 1997 Certificates was to be August 1, 2011. On June 16, 2004, the City issued $9,275,000 in bonds to redeem and refund the City's outstanding Series 1997 Certificates. Debt service on the Series 2004-1 Bonds is payable from general Airport revenues and is allocated to the Parking and Airport Roads Cost Center. The refunding bonds will mature on August 1, 2011.

The annual debt service requirement for the Airport is approximately $5 million from FY 2008 until FY 2011 when the Series 2004-1 Bonds are retired. Annual debt service on the remaining Series 2000 Certificates from FY 2012 through maturity is approximately $3.6 million.

As described previously, no projects included in the CIP are assumed to be funded with future long-term debt.

7.4 Operations and Maintenance Expenses

O&M expenses include personal services, contractual services, supplies, materials, utilities, and depreciation expenses. Depreciation expenses are incurred for capital projects not funded through grants, debt, PFC revenues, or CFC revenues.

O&M expenses related to contractual services, supplies, and materials are forecast to increase 3 percent per year through 2027. Personal services and utilities expenses are forecast to increase 5

percent per year through 2027. O&M expense projects also include additional periodic increases to reflect completion of major Airport facility improvement and expansion projects listed in the CIP.

Table VII-4 presents actual O&M expenses for FY 2007 and projected O&M expenses for FY 2008 through FY 2027. O&M expenses are shown by expense type and by cost center allocation. The allocation of O&M expenses to cost centers shown in Table VII-4 is based on the methodology specified in the Airline Agreement. As shown, O&M expenses are projected to increase from approximately $19 million in FY 2007, to $46.1 million in FY 2027, at a compounded annual growth rate of 4.6 percent.

7.5 Airport Revenues (Nonairline and Airline)

Airport revenues are generated from nonairline sources, such as tenant leases and other miscellaneous agreements, and from airline sources in accordance with the Airline Agreement. Nonairline revenues are categorized by the cost center in which they occur.

7.5.1 Nonairline Revenues

Nonairline revenues for FY 2007 through FY 2027 are presented in **Table VII-5.** As shown, total nonairline revenues are projected to increase from approximately $20.0 million in FY 2007 to approximately $40.6 million in FY 2027, at a compounded annual growth rate of 3.6 percent throughout the projection period.

7.5.1.1 Parking and Airport Roads Revenues

Revenues in the Parking and Airport Roads Cost Center primarily consist of employee and public parking fees as well as rental car fees. These revenues are projected to increase from approximately $8.0 million in FY 2007 to approximately $16.4 million in FY 2027, representing a compounded annual growth rate of 3.6 percent over this period. The projected increase is the result of forecast growth in numbers of enplaned passengers and the effects of inflation during the projection period, as well as assumed periodic increases in public parking rates.

7.5.1.2 Nonairline Terminal Revenues

Nonairline revenues in the Terminal Cost Center primarily consist of rentals and fees from news and gift plus food and beverage concessionaires, advertisers, and miscellaneous concessionaires, as well as nonairline terminal rental revenues. These revenues are projected to increase from approximately $6.5 million in FY 2007, to approximately $13.1 million in FY 2027. This increase represents a compounded annual growth rate of 3.6 percent during this period, and is the result of forecast growth in numbers of enplaned passengers and the effects of inflation during the projection period, as well as increased revenues generated from terminal expansion projects included in the CIP.

7.5.1.3 Nonairline Airfield Revenues

The major sources of nonairline revenues in the Airfield Cost Center are fuel flowage fees and miscellaneous landing fees from cargo and non-signatory air carrier operations. Total Airfield nonairline revenues are projected to increase from approximately $1.2 million in FY 2007 to approximately $2.2 million in FY 2027. This increase represents a compounded annual growth rate of 3 percent during this period, and is the result of forecast growth in aircraft operations and the effects of inflation during the projection period.

Table VII-4

Operations and Maintenance Expenses

	Actual	Projected																				
	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
Parking and Airport Roads																					
Personal Services	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Contractual Servies, Supplies, Materials	1,399,704	1,441,696	1,484,946	1,529,495	1,613,576	1,661,983	1,711,843	1,763,198	1,816,094	1,870,577	1,926,694	1,984,495	2,044,030	2,157,871	2,222,607	2,289,285	2,357,964	2,428,703	2,501,564	2,576,611	2,653,909
Utilities	66,091	69,395	72,865	76,508	82,137	86,244	90,556	95,084	99,838	104,830	110,071	115,575	121,354	129,901	136,396	143,216	150,377	157,896	165,791	174,080	182,784
Depreciation	449,281	449,281	541,281	920,281	1,810,281	1,899,281	2,075,281	2,075,281	2,075,281	2,075,281	2,219,281	2,219,281	2,219,281	3,528,281	3,149,281	3,149,281	3,060,281	2,884,281	2,997,281	2,997,281	2,997,281
TOTAL PARKING AND AIRPORT ROADS O&M EXPENSES	$ 1,915,076	$ 1,960,372	$ 2,099,092	$ 2,526,284	$ 3,505,994	$ 3,647,508	$ 3,877,680	$ 3,933,563	$ 3,991,213	$ 4,050,688	$ 4,256,047	$ 4,319,351	$ 4,384,665	$ 5,816,053	$ 5,508,285	$ 5,581,783	$ 5,568,622	$ 5,470,880	$ 5,664,636	$ 5,747,972	$ 5,833,974
Terminal																					
Personal Services	$ 1,974,362	$ 2,073,080	$ 2,256,734	$ 2,369,571	$ 2,488,049	$ 2,612,452	$ 2,743,074	$ 2,880,228	$ 3,024,240	$ 3,175,452	$ 3,334,224	$ 3,500,935	$ 3,675,982	$ 3,859,781	$ 4,052,770	$ 4,255,409	$ 4,468,179	$ 4,691,588	$ 4,926,168	$ 5,172,476	$ 5,431,100
Contractual Servies, Supplies, Materials	876,067	902,349	929,419	957,302	986,021	1,015,601	1,046,069	1,077,451	1,195,388	1,454,511	1,498,146	1,543,091	1,589,383	1,637,065	1,686,177	1,736,762	1,897,317	1,954,237	2,012,864	2,373,294	2,444,493
Utilities	693,426	728,098	764,503	802,728	842,864	885,007	929,258	975,721	1,103,542	1,368,828	1,437,269	1,509,133	1,584,590	1,663,819	1,747,010	1,834,361	2,042,850	2,144,992	2,252,242	2,707,099	2,842,454
Depreciation	1,631,481	1,631,481	1,633,481	1,699,481	1,699,481	1,710,481	1,741,481	1,741,481	1,741,481	1,741,481	1,796,481	1,796,481	1,796,481	1,796,481	1,796,481	1,796,481	1,796,481	1,796,481	1,794,481	1,771,481	1,771,481
TOTAL TERMINAL O&M EXPENSES	$ 5,175,336	$ 5,335,007	$ 5,584,137	$ 5,829,081	$ 6,016,415	$ 6,223,541	$ 6,459,882	$ 6,674,881	$ 7,064,651	$ 7,740,271	$ 8,066,121	$ 8,349,640	$ 8,646,436	$ 8,957,146	$ 9,282,438	$ 9,623,012	$ 10,204,827	$ 10,587,298	$ 10,985,754	$ 12,024,350	$ 12,489,528
Airfield																					
Personal Services	$ 534,616	$ 561,347	$ 709,414	$ 744,885	$ 782,129	$ 821,236	$ 862,297	$ 905,412	$ 950,683	$ 998,217	$ 1,048,128	$ 1,100,534	$ 1,155,561	$ 1,213,339	$ 1,274,006	$ 1,337,706	$ 1,404,591	$ 1,474,821	$ 1,548,562	$ 1,625,990	$ 1,707,290
Contractual Servies, Supplies, Materials	1,101,958	1,135,017	1,169,067	1,204,139	1,240,263	1,277,471	1,342,427	1,382,700	1,424,181	1,466,906	1,510,913	1,556,241	1,715,477	1,766,942	1,819,950	1,874,548	1,930,785	1,988,708	2,048,369	2,109,821	2,173,115
Utilities	36,861	38,704	40,639	42,671	44,805	47,045	50,397	52,917	55,563	58,341	61,258	64,321	72,279	75,893	79,688	83,672	87,856	92,249	96,861	101,704	106,789
Depreciation	614,519	614,519	680,519	680,519	692,519	916,519	1,177,519	1,197,519	1,420,519	1,420,519	1,484,519	1,638,519	1,655,519	1,589,519	1,649,519	1,680,519	1,548,519	1,467,519	1,447,519	1,291,519	1,291,519
TOTAL AIRFIELD O&M EXPENSES	$ 2,287,954	$ 2,349,587	$ 2,599,640	$ 2,672,214	$ 2,759,716	$ 3,062,271	$ 3,432,640	$ 3,538,548	$ 3,850,945	$ 3,943,983	$ 4,104,818	$ 4,359,615	$ 4,598,836	$ 4,645,693	$ 4,823,162	$ 4,976,446	$ 4,971,751	$ 5,023,297	$ 5,141,312	$ 5,129,034	$ 5,278,713
Other																					
Personal Services	$ 309,344	$ 324,811	$ 341,052	$ 358,104	$ 376,010	$ 394,810	$ 414,551	$ 435,278	$ 457,042	$ 479,894	$ 503,889	$ 529,083	$ 555,537	$ 583,314	$ 612,480	$ 643,104	$ 675,259	$ 709,022	$ 744,473	$ 781,697	$ 820,782
Contractual Servies, Supplies, Materials	725,589	747,357	769,777	792,871	816,657	841,156	866,391	892,383	919,154	946,729	975,131	1,004,385	1,034,516	1,065,552	1,097,518	1,130,444	1,164,357	1,199,288	1,235,267	1,272,325	1,310,494
Utilities	116,029	121,831	127,922	134,318	141,034	148,086	155,490	163,265	171,428	179,999	188,999	198,449	208,372	218,790	229,730	241,216	253,277	265,941	279,238	293,200	307,860
Depreciation	352,989	352,989	366,989	454,989	454,989	454,989	488,989	612,989	691,989	728,989	728,989	969,989	969,989	969,989	971,989	971,989	971,989	945,989	935,989	935,989	935,989
TOTAL OTHER O&M EXPENSES	$ 1,503,951	$ 1,546,987	$ 1,605,740	$ 1,740,282	$ 1,788,689	$ 1,839,041	$ 1,925,421	$ 2,103,914	$ 2,239,613	$ 2,335,611	$ 2,397,008	$ 2,701,906	$ 2,768,414	$ 2,837,645	$ 2,911,717	$ 2,986,753	$ 3,064,882	$ 3,120,240	$ 3,194,967	$ 3,283,210	$ 3,375,125
Administration																					
Personal Services	$ 990,767	$ 1,040,305	$ 1,092,321	$ 1,146,937	$ 1,204,283	$ 1,264,498	$ 1,327,723	$ 1,394,109	$ 1,463,814	$ 1,537,005	$ 1,613,855	$ 1,694,548	$ 1,779,275	$ 1,868,239	$ 1,961,651	$ 2,059,733	$ 2,162,720	$ 2,270,856	$ 2,384,399	$ 2,503,619	$ 2,628,800
Contractual Servies, Supplies, Materials	1,821,217	1,875,853	1,932,129	1,990,093	2,049,796	2,111,290	2,174,628	2,239,867	2,307,063	2,376,275	2,447,563	2,520,990	2,596,620	2,674,518	2,754,754	2,837,397	2,922,518	3,010,194	3,100,500	3,193,515	3,289,320
Utilities	52,226	54,837	57,579	60,458	63,481	66,655	69,988	73,487	77,162	81,020	85,071	89,324	93,791	98,480	103,404	108,574	114,003	119,703	125,688	131,973	138,571
Depreciation	302,879	302,879	308,879	369,879	418,879	418,879	418,879	418,879	418,879	418,879	418,879	418,879	418,879	412,879	385,879	336,879	336,879	336,879	65,750	65,750	65,750
TOTAL ADMINISTRATION O&M EXPENSES	$ 3,167,089	$ 3,273,875	$ 3,390,908	$ 3,567,367	$ 3,736,439	$ 3,861,321	$ 3,991,218	$ 4,126,342	$ 4,266,918	$ 4,413,178	$ 4,565,368	$ 4,723,741	$ 4,888,564	$ 5,054,116	$ 5,205,688	$ 5,342,583	$ 5,536,120	$ 5,737,632	$ 5,676,337	$ 5,894,856	$ 6,122,442
Security																					
Personal Services	$ 2,936,209	$ 3,083,019	$ 3,237,170	$ 3,399,029	$ 3,568,980	$ 3,747,429	$ 3,934,801	$ 4,131,541	$ 4,338,118	$ 4,555,024	$ 4,782,775	$ 5,021,914	$ 5,273,010	$ 5,536,660	$ 5,813,493	$ 6,104,168	$ 6,409,376	$ 6,729,845	$ 7,066,337	$ 7,419,654	$ 7,790,637
Contractual Servies, Supplies, Materials	266,974	274,983	283,233	291,730	300,482	309,496	318,781	328,344	338,195	348,341	358,791	369,554	380,641	392,060	403,822	415,937	428,415	441,267	454,505	468,141	482,185
Utilities	4,200	4,410	4,631	4,862	5,105	5,360	5,628	5,910	6,205	6,516	6,841	7,183	7,543	7,920	8,316	8,731	9,168	9,626	10,108	10,613	11,144
Depreciation	234,297	234,297	235,297	235,297	235,297	301,297	301,297	301,297	301,297	301,297	301,297	301,297	379,297	379,297	379,297	379,297	313,297	313,297	346,297	346,297	346,297
TOTAL SECURITY O&M EXPENSES	$ 3,441,680	$ 3,596,710	$ 3,760,331	$ 3,930,918	$ 4,109,864	$ 4,363,583	$ 4,560,507	$ 4,767,092	$ 4,983,815	$ 5,211,177	$ 5,449,704	$ 5,699,949	$ 6,040,490	$ 6,315,937	$ 6,604,928	$ 6,908,133	$ 7,160,256	$ 7,494,036	$ 7,877,247	$ 8,244,705	$ 8,630,262
Fire Station																					
Personal Services	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Contractual Servies, Supplies, Materials	1,401,755	1,443,807	1,487,122	1,531,735	1,577,687	1,625,018	1,673,768	1,723,981	1,775,701	1,828,972	1,883,841	1,940,356	1,998,567	3,087,786	3,180,420	3,275,832	3,374,107	3,475,330	3,579,590	3,686,978	3,797,587
Utilities	20,774	21,813	22,904	24,049	25,251	26,514	27,840	29,232	30,693	32,228	33,839	35,531	37,308	58,760	61,698	64,782	68,022	71,423	74,994	78,743	82,681
Depreciation	44,831	44,831	53,831	53,831	53,831	53,831	53,831	53,831	123,831	123,831	123,831	136,831	136,831	138,831	138,831	138,831	138,831	154,831	154,831	84,831	84,831
TOTAL FIRE STATION O&M EXPENSES	$ 1,467,360	$ 1,510,451	$ 1,563,856	$ 1,609,615	$ 1,656,770	$ 1,705,363	$ 1,755,439	$ 1,807,044	$ 1,930,225	$ 1,985,031	$ 2,041,511	$ 2,112,718	$ 2,172,706	$ 3,285,377	$ 3,380,948	$ 3,479,446	$ 3,580,960	$ 3,701,584	$ 3,809,415	$ 3,850,552	$ 3,965,099
TOTAL O&M EXPENSES	$ 18,958,446	$ 19,572,989	$ 20,603,703	$ 21,875,761	$ 23,573,888	$ 24,702,629	$ 26,002,787	$ 26,951,385	$ 28,327,380	$ 29,679,940	$ 30,880,577	$ 32,266,920	$ 33,500,111	$ 36,911,967	$ 37,717,166	$ 38,898,155	$ 40,087,419	$ 41,134,967	$ 42,349,668	$ 44,174,680	$ 45,695,143
By Expense Category																					
Personal Services	$ 6,745,298	$ 7,082,563	$ 7,636,691	$ 8,018,526	$ 8,419,452	$ 8,840,424	$ 9,282,446	$ 9,746,568	$ 10,233,896	$ 10,745,591	$ 11,282,871	$ 11,847,014	$ 12,439,365	$ 13,061,333	$ 13,714,400	$ 14,400,120	$ 15,120,126	$ 15,876,132	$ 16,669,939	$ 17,503,436	$ 18,378,608
Contractual Servies, Supplies, Materials	7,593,263	7,821,061	8,055,693	8,297,364	8,584,481	8,842,016	9,133,908	9,407,925	9,775,776	10,292,310	10,601,080	10,919,112	11,359,235	12,781,794	13,165,248	13,560,205	14,075,464	14,497,728	14,932,659	15,680,683	16,151,104
Utilities	989,608	1,039,088	1,091,042	1,145,594	1,204,678	1,264,912	1,329,157	1,395,615	1,544,431	1,831,762	1,923,350	2,019,517	2,125,235	2,253,563	2,366,241	2,484,553	2,725,552	2,861,830	3,004,921	3,497,413	3,672,283
Depreciation	3,630,277	3,630,277	3,820,277	4,414,277	5,365,277	5,755,277	6,257,277	6,401,277	6,773,277	6,810,277	7,073,277	7,481,277	7,576,277	8,815,277	8,471,277	8,453,277	8,166,277	7,899,277	7,742,148	7,493,148	7,493,148
TOTAL O&M EXPENSES	$ 18,958,446	$ 19,572,989	$ 20,603,703	$ 21,875,761	$ 23,573,888	$ 24,702,629	$ 26,002,787	$ 26,951,385	$ 28,327,380	$ 29,679,940	$ 30,880,577	$ 32,266,920	$ 33,500,111	$ 36,911,967	$ 37,717,166	$ 38,898,155	$ 40,087,419	$ 41,134,967	$ 42,349,668	$ 44,174,680	$ 45,695,143
Percent Change		3.2%	5.3%	6.2%	7.8%	4.8%	5.3%	3.6%	5.1%	4.8%	4.0%	4.5%	3.8%	10.2%	2.2%	3.1%	3.1%	2.6%	3.0%	4.3%	3.4%

Sources: Ricondo & Associates, Inc., September 2008, based on information provided by the City of Boise.
Prepared by: Ricondo & Associates, Inc., September 2008.

Table VII-5

Nonairline Revenues

	Actual										Projected										
	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
Parking and Airport Roads																					
Employee Parking	$ 214,106	$ 220,529	$ 227,145	$ 233,959	$ 240,978	$ 248,208	$ 255,654	$ 263,323	$ 271,223	$ 279,360	$ 287,741	$ 296,373	$ 305,264	$ 314,422	$ 323,855	$ 333,570	$ 343,577	$ 353,885	$ 364,501	$ 375,436	$ 386,699
Public Parking	7,633,737	7,798,803	8,335,268	8,484,716	8,637,149	9,232,266	9,398,807	9,568,689	10,229,095	10,414,732	10,604,118	11,337,209	11,544,206	11,755,412	12,569,457	12,800,344	13,035,950	13,940,193	14,197,811	14,456,394	15,455,672
Car Rental	88,150	92,701	97,140	101,796	106,679	111,800	117,170	122,803	128,712	134,909	141,409	148,228	155,382	162,886	170,759	179,018	187,683	196,775	206,315	216,262	226,689
Interest Income	103,354	122,500	59,715	50,273	29,825	19,104	34,503	49,150	60,023	71,303	91,396	114,958	116,742	86,378	85,423	122,575	160,347	189,363	217,281	254,156	293,640
Miscellaneous	4,388	4,520	4,655	4,795	4,939	5,087	5,240	5,397	5,559	5,725	5,897	6,074	6,256	6,444	6,637	6,836	7,041	7,253	7,470	7,694	7,925
TOTAL PARKING AND AIRPORT ROADS REVENUES	$ 8,043,735	$ 8,239,053	$ 8,723,924	$ 8,875,539	$ 9,019,570	$ 9,616,465	$ 9,811,374	$ 10,009,363	$ 10,694,612	$ 10,906,029	$ 11,130,560	$ 11,902,842	$ 12,127,851	$ 12,325,542	$ 13,156,131	$ 13,442,343	$ 13,734,599	$ 14,687,469	$ 14,993,379	$ 15,309,943	$ 16,370,625
Terminal																					
Advertising	$ 415,477	$ 427,941	$ 440,780	$ 454,003	$ 467,623	$ 481,652	$ 496,101	$ 510,984	$ 526,314	$ 542,103	$ 558,366	$ 575,117	$ 592,371	$ 610,142	$ 628,446	$ 647,300	$ 666,719	$ 686,720	$ 707,322	$ 728,541	$ 750,398
Aircraft Cleaning	18,150	18,695	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Car Rental	3,629,827	3,738,722	3,850,883	3,966,410	4,085,402	4,207,964	4,334,203	4,464,229	4,598,156	4,736,101	4,878,184	5,024,529	5,175,265	5,330,523	5,490,439	5,655,152	5,824,807	5,999,551	6,179,537	6,364,924	6,555,871
Car Rental Counter	150,616	155,134	159,789	164,582	169,520	174,605	179,843	185,239	190,796	196,520	202,415	208,488	214,742	221,185	227,820	234,655	241,694	248,945	256,414	264,106	272,029
Concessions-Anton	572,267	601,809	630,632	660,858	692,556	725,800	760,667	797,236	835,593	875,825	918,026	962,294	1,008,733	1,057,450	1,108,559	1,162,179	1,218,435	1,277,460	1,339,392	1,403,968	1,471,657
Concessions-McDonalds	148,970	156,660	164,163	172,032	180,283	188,937	198,013	207,533	217,518	227,991	238,976	250,500	262,589	275,271	288,575	302,533	317,178	332,543	348,664	365,475	383,095
Concessions-Paradies	514,830	541,407	567,337	594,529	623,046	652,954	684,321	717,220	751,726	787,920	825,886	865,711	907,489	951,317	997,296	1,045,534	1,096,144	1,149,245	1,204,960	1,263,055	1,323,950
Concessions-Other	79,586	83,694	87,703	91,906	96,315	100,938	105,787	110,873	116,207	121,802	127,671	133,828	140,286	147,061	154,169	161,626	169,450	177,658	186,271	195,252	204,665
Conference Room Fees	11,160	11,736	12,298	12,888	13,506	14,154	14,834	15,547	16,295	17,080	17,903	18,766	19,672	20,622	21,618	22,664	23,761	24,912	26,120	27,379	28,699
Game Room	63,765	67,057	70,268	73,636	77,168	80,873	84,758	88,832	93,106	97,589	102,291	107,224	112,398	117,827	123,521	129,496	135,764	142,341	149,242	156,437	163,980
Janitorial Charges	38,047	39,188	40,364	41,575	42,822	44,107	45,430	46,793	48,197	49,643	51,132	52,666	54,246	55,873	57,550	59,276	61,054	62,886	64,772	66,716	68,717
Jetway Fees	132,850	136,836	140,941	145,169	149,524	154,010	158,630	163,389	214,188	220,613	227,232	234,049	241,070	248,302	255,751	263,424	348,849	359,314	370,093	381,196	392,632
Paging	65,880	67,856	69,892	71,989	74,149	76,373	78,664	81,024	83,455	85,958	88,537	91,193	93,929	96,747	99,649	102,639	105,718	108,890	112,156	115,521	118,987
Tenant Reimbursements	11,622	11,971	12,330	12,700	13,081	13,473	13,877	14,294	14,722	15,164	15,619	16,088	16,570	17,067	17,579	18,107	18,650	19,209	19,786	20,379	20,991
Terminal Rent - Nonairline	509,611	524,899	540,646	556,866	573,572	590,779	608,502	626,757	688,202	708,848	730,114	752,017	774,578	797,815	821,749	846,402	925,712	953,483	982,088	1,011,550	1,041,897
Interest Income	103,354	122,500	59,715	50,273	29,825	19,104	34,503	49,150	60,023	71,303	91,396	114,958	116,742	86,378	85,423	122,575	160,347	189,363	217,281	254,156	293,640
Miscellaneous	26,108	26,891	27,698	28,529	29,385	30,266	31,174	32,110	33,073	34,065	35,087	36,140	37,224	38,340	39,491	40,675	41,896	43,153	44,447	45,781	47,154
TOTAL TERMINAL NONAIRLINE REVENUES	$ 6,492,120	$ 6,732,998	$ 6,875,439	$ 7,097,944	$ 7,317,777	$ 7,555,989	$ 7,829,309	$ 8,111,210	$ 8,487,571	$ 8,788,526	$ 9,108,835	$ 9,443,568	$ 9,767,905	$ 10,071,921	$ 10,417,637	$ 10,814,236	$ 11,356,177	$ 11,775,673	$ 12,208,546	$ 12,664,436	$ 13,138,362
Airfield																					
Freight/Charter/Other Landing Fees	$ 669,880	$ 836,853	$ 854,986	$ 874,225	$ 889,706	$ 907,304	$ 926,586	$ 947,494	$ 966,103	$ 981,131	$ 1,000,492	$ 1,021,514	$ 1,043,812	$ 1,067,404	$ 1,087,810	$ 1,109,198	$ 1,131,360	$ 1,154,271	$ 1,177,947	$ 1,198,461	$ 1,219,763
Fuel Flowage Fees	178,907	184,274	189,802	195,497	201,361	207,402	213,624	220,033	226,634	233,433	240,436	247,649	255,079	262,731	270,613	278,731	287,093	295,706	304,577	313,715	323,126
Tiedown Fees	29,396	30,278	31,186	32,122	33,085	34,078	35,100	36,153	37,238	38,355	39,506	40,691	41,912	43,169	44,464	45,798	47,172	48,587	50,045	51,546	53,092
Ramp Fees	86,509	89,104	91,777	94,531	97,367	100,288	103,296	106,395	109,587	112,875	116,261	119,749	123,341	127,041	130,853	134,778	138,822	142,986	147,276	151,694	156,245
Lav Cart Fees	30,600	31,518	32,464	33,437	34,441	35,474	36,538	37,634	38,763	39,926	41,124	42,358	43,628	44,937	46,285	47,674	49,104	50,577	52,094	53,657	55,267
National Guard Rent	124,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962	89,962
Interest Income	103,354	122,499	59,714	50,272	29,825	19,104	34,503	49,150	60,023	71,303	91,395	114,957	116,741	86,378	85,423	122,574	160,346	189,361	217,279	254,154	293,637
Miscellaneous	3,991	4,111	4,234	4,361	4,492	4,627	4,765	4,908	5,056	5,207	5,364	5,524	5,690	5,861	6,037	6,218	6,404	6,597	6,794	6,998	7,208
TOTAL AIRFIELD NONAIRLINE REVENUES	$ 1,227,599	$ 1,388,599	$ 1,354,126	$ 1,374,407	$ 1,380,239	$ 1,398,239	$ 1,444,375	$ 1,491,730	$ 1,533,365	$ 1,572,192	$ 1,624,539	$ 1,682,404	$ 1,720,165	$ 1,727,483	$ 1,761,446	$ 1,834,933	$ 1,910,263	$ 1,978,048	$ 2,045,974	$ 2,120,187	$ 2,198,300
Other																					
Taxi/Hotel	$ 154,596	$ 162,577	$ 170,363	$ 178,529	$ 187,092	$ 196,073	$ 205,492	$ 215,371	$ 225,733	$ 236,601	$ 248,002	$ 259,961	$ 272,506	$ 285,667	$ 299,473	$ 313,959	$ 329,156	$ 345,102	$ 361,832	$ 379,277	$ 397,563
Hangar Rent	153,202	157,798	162,532	167,408	172,430	177,603	182,931	188,419	194,072	199,894	205,891	212,067	218,429	224,982	231,732	238,684	245,844	253,220	260,816	268,641	276,700
Industrial Land Rent	1,553,670	1,600,280	1,648,289	1,697,737	1,748,669	1,801,129	1,855,163	1,910,818	1,968,143	2,027,187	2,088,003	2,150,643	2,215,162	2,281,617	2,350,065	2,420,567	2,493,184	2,567,980	2,645,019	2,724,370	2,806,101
Hotel Rent	79,649	83,761	87,772	91,979	96,391	101,018	105,871	110,961	116,299	121,899	127,772	133,934	140,397	147,178	154,291	161,754	169,584	177,799	186,419	195,406	204,827
Chevron	210,246	221,100	231,689	242,794	254,439	266,653	279,463	292,898	306,990	321,770	337,275	353,539	370,600	388,498	407,275	426,974	447,643	469,328	492,081	515,806	540,674
Offsite Car	79,010	83,089	87,068	91,241	95,618	100,208	105,021	110,070	115,366	120,921	126,747	132,859	139,271	145,997	153,053	160,456	168,223	176,372	184,923	193,839	203,184
Concessions - Inflight Kitchen	41,747	26,800	28,084	29,430	30,841	32,322	33,874	35,503	37,211	39,003	40,882	42,853	44,921	47,091	49,367	51,755	54,260	56,888	59,646	62,522	65,536
Corporate Sponsorships	71,053	73,185	24,000	24,720	25,462	26,225	27,012	27,823	28,657	29,517	30,402	31,315	32,254	33,222	34,218	35,245	36,302	37,391	38,513	39,668	40,858
Inflight Food/Svc Sales	522,224	335,000	351,044	367,870	385,515	404,020	423,429	443,785	465,137	487,532	511,023	535,666	561,516	588,635	617,085	646,932	678,248	711,104	745,579	781,525	819,205
Tenant Reimbursements	2,965	3,054	3,146	3,240	3,337	3,437	3,540	3,647	3,756	3,869	3,985	4,104	4,227	4,354	4,485	4,619	4,758	4,901	5,048	5,199	5,355
Interest Inc	622,811	738,180	359,838	302,940	179,726	115,121	207,914	296,177	361,697	429,670	550,745	692,729	703,483	520,511	514,757	738,629	966,244	1,141,091	1,309,323	1,531,530	1,769,455
Miscellaneous	47,463	48,887	50,353	51,864	53,420	55,023	56,673	58,374	60,125	61,928	63,786	65,700	67,671	69,701	71,792	73,946	76,164	78,449	80,803	83,227	85,723
TOTAL OTHER NONAIRLINE REVENUES	$ 3,538,636	$ 3,533,709	$ 3,204,178	$ 3,249,751	$ 3,232,940	$ 3,278,832	$ 3,486,384	$ 3,693,845	$ 3,883,184	$ 4,079,790	$ 4,334,513	$ 4,615,369	$ 4,770,437	$ 4,737,452	$ 4,887,593	$ 5,273,520	$ 5,669,610	$ 6,019,625	$ 6,370,001	$ 6,781,009	$ 7,215,183
Administration Revenues	56,186	58,995	61,945	65,042	68,294	71,709	75,295	79,059	83,012	87,163	91,521	96,097	100,902	105,947	111,244	116,807	122,647	128,779	135,218	141,979	149,078
Security Revenues	634,423	663,606	694,132	726,062	759,461	794,397	830,939	869,162	909,143	950,964	994,708	1,040,465	1,088,326	1,138,389	1,190,755	1,245,530	1,302,824	1,362,754	1,425,441	1,491,011	1,559,598
Fire Station Revenues	3,816	3,930	4,048	4,170	4,295	4,424	4,557	4,693	4,834	4,979	5,128	5,282	5,441	5,604	5,772	5,945	6,124	6,307	6,496	6,691	6,892
TOTAL NONAIRLINE REVENUES	$ 19,996,515	$ 20,620,892	$ 20,917,792	$ 21,392,916	$ 21,782,577	$ 22,720,053	$ 23,482,232	$ 24,259,063	$ 25,595,722	$ 26,389,643	$ 27,289,806	$ 28,786,027	$ 29,581,027	$ 30,112,338	$ 31,530,578	$ 32,733,313	$ 34,102,244	$ 35,958,656	$ 37,185,057	$ 38,515,257	$ 40,638,038
Percent Change		3.1%	1.4%	2.3%	1.8%	4.3%	3.4%	3.3%	5.5%	3.1%	3.4%	5.5%	2.8%	1.8%	4.7%	3.8%	4.2%	5.4%	3.4%	3.6%	5.5%

Sources: Ricondo & Associates, Inc., September 2008, based on information provided by the City of Boise.
Prepared by: Ricondo & Associates, Inc., September 2008.

7.5.1.4 Other Nonairline Revenues

Other nonairline revenues include those revenues contained within the Other, Administration, Security, and Fire Station cost centers. These revenues include items such as industrial land rent, hangar rentals, and inflight food services sales. Total Other nonairline revenues are projected to increase from approximately $4.2 million in FY 2007 to approximately $8.9 million in FY 2027, representing a compounded annual growth rate of 3.8 percent over this period.

7.5.2 Airline Revenues

The remaining revenues generated at the Airport include terminal rentals and landing fees payable by the airlines. In general, the airline rate-base for the terminal rental rate and landing fee calculations consists of the following elements:

- **O&M Expenses –** These expenses are attributed to the various rate-setting areas for the Terminal and Airfield cost centers and the allocated portion of indirect O&M expenses.
- **Debt Service –** Debt service requirements attributable to the rate-setting areas resulting from all outstanding debt.
- **Debt Service Coverage –** The City must maintain rental rates, fees, and charges sufficient to meet the rate covenant in the Lease Agreement.
- **Depreciation –** This amount represents the annual capital expenditures that were initially funded by the City and then amortized through the airline rate-base over the useful life of the project.

7.5.2.1 Landing Fee Revenues

The landing fee rate per 1,000 pounds of landed weight for Signatory Airlines is calculated by dividing (1) the sum of:

- Total direct and indirect O&M expenses to the Airfield Cost Center;
- Total direct personnel and fringe benefits expense allocated to the Airfield Cost Center; and
- Total applicable depreciation of the Airfield Area Cost Center capital assets funded by Airport revenues other than bond proceeds, grants, and contributions;

less, the sum of:

- Total of all fuel flowage fees paid;
- Total of all general aviation tiedown fees;
- Total of airfield charges paid by the National Guard;
- Total of all miscellaneous ramp charges, and landing fees paid by Non-Signatory Airlines, and macerator revenue paid by Signatory Airlines;
- The allocation of one-fourth of all interest income on reserves in excess of interest income earned at the rate of 3 percent APR;
- The total of revenue from the Parking and Airport Roads Cost Center available for allocation to the Airfield Cost Center in accordance with the following calculation: The first $1 million of net parking revenues, calculated by subtracting the total expenses of the Parking and Airport Roads Cost Center from the total revenues of the Parking and Airport Roads Cost

Center, and 50 percent of the net income in excess of $1 million shall offset landing fees; interest earnings allocated to the Parking and Airport Roads Cost Center; one-fourth of interest income on reserves in excess of interest income earned at the rate of 3 percent APR; and

- The amount of net nonairline revenue allocated to the Parking and Airport Roads Cost Center;

by (2) the estimated Signatory Airline landed weight for the following fiscal year.

Table VII-6 presents projected Signatory Airline landing fees for FY 2008 through FY 2027. As shown, the Signatory Airline landing fee rate is projected to range from a low of $0.92 per 1,000 pounds of landed weight to a high of $1.83 per 1,000 pounds of landed weight.

7.5.2.2 Terminal Rental Revenues

The terminal rental rate per square foot per year at the Airport is calculated by dividing (1) the sum of:

- Total direct and indirect O&M expenses allocated to the Terminal Cost Center;
- Total direct personnel and fringe benefits expense allocated to the Terminal Cost Center;
- Total interest, debt service, and coverage due to be paid on bonds and notes allocated to the Terminal Cost Center;
- Total applicable depreciation of the Terminal Cost Center capital assets funded by Airport revenues other than bond proceeds, grants, and contributions; and
- Total costs for maintenance of an insurance deductible reserve fund allocated to the Terminal Cost Center from insurance loss incurred in the previous budget year;

less, the sum of:

- Terminal Building Cost Center concession revenues, including car rental revenues, restaurant and lounge revenues, advertising revenues, game room proceeds, jetway fees, walkway fees, paging revenue, aircraft cleaning revenue, and other terminal revenue, less the revenue allocated to the Capital Improvement Fund and the net nonairline revenue allocated to the Terminal Cost Center;
- The allocation of one-fourth of all interest income on reserves in excess of interest income earned at the rate of 3 percent APR;
- Total revenue bond interest earnings applicable to the Terminal Cost Center;

by (2) the estimated airline rented square footage, including exclusive- and common-use space, in the following Fiscal Year. Any shortfall or surplus in terminal rental revenues is applied against the Terminal Cost Center in the following fiscal year.

Table VII-6 presents the Terminal rental rate for FY 2008 through FY 2027. As shown, the Signatory Airline Terminal rental rate is projected to range from $26.49 per square foot to $59.32 per square foot over the period. It should be noted that while planned terminal expansion projects may increase the airline rented square footage through the planning period, for the purposes of this financial analysis, airline rented space was held constant throughout the planning period.

Table VII-6

Airline Rates and Charges

	Projected																			
	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
Signatory Airline Landing Fee																				
Total Airfield O&M Expenses	$ 2,349,587	$ 2,599,640	$ 2,672,214	$ 2,759,716	$ 3,062,271	$ 3,432,640	$ 3,538,548	$ 3,850,945	$ 3,943,983	$ 4,104,818	$ 4,359,615	$ 4,598,836	$ 4,645,693	$ 4,823,162	$ 4,976,446	$ 4,971,751	$ 5,023,297	$ 5,141,312	$ 5,129,034	$ 5,278,713
Expense Allocations from Other Cost Centers	3,288,638	3,432,271	3,541,147	3,638,312	3,896,575	4,057,766	4,194,954	4,436,376	4,564,616	4,719,881	4,904,908	5,114,572	6,389,272	6,625,624	6,842,457	7,038,477	7,302,727	7,398,347	7,543,272	7,817,384
TOTAL AIRFIELD EXPENSE	$ 5,638,224	$ 6,031,911	$ 6,213,361	$ 6,398,028	$ 6,958,845	$ 7,490,406	$ 7,733,502	$ 8,287,322	$ 8,508,599	$ 8,824,700	$ 9,264,523	$ 9,713,408	$ 11,034,964	$ 11,448,787	$ 11,818,903	$ 12,010,228	$ 12,326,024	$ 12,539,658	$ 12,672,305	$ 13,096,097
LESS: Total Airfield Nonairline Revenue	1,388,599	1,354,126	1,374,407	1,380,239	1,398,239	1,444,375	1,491,730	1,533,365	1,572,192	1,624,539	1,682,404	1,720,165	1,727,483	1,761,446	1,834,933	1,910,263	1,978,048	2,045,974	2,120,187	2,198,300
LESS: Credit from Parking and Airport Roads Net Income	2,101,992	2,252,927	2,028,848	1,513,621	2,709,183	2,659,927	2,706,982	3,002,565	3,057,604	3,029,039	3,358,873	3,400,200	2,676,379	3,237,337	3,311,695	3,439,061	3,933,663	3,988,087	4,065,265	4,506,062
AIRLINE LANDING FEE REQUIREMENT/REVENUE	$ 2,147,634	$ 2,424,859	$ 2,810,107	$ 3,504,168	$ 2,851,424	$ 3,386,103	$ 3,534,790	$ 3,751,392	$ 3,878,804	$ 4,171,121	$ 4,223,246	$ 4,593,044	$ 6,631,103	$ 6,450,004	$ 6,672,275	$ 6,660,903	$ 6,414,313	$ 6,505,597	$ 6,486,853	$ 6,391,734
TOTAL SIGNATORY AIRLINES LANDED WEIGHT (000's)	2,322,070	2,451,422	2,612,482	2,619,114	2,695,938	2,826,050	3,007,049	3,087,885	3,018,428	3,103,137	3,239,125	3,411,336	3,620,274	3,694,146	3,792,261	3,906,390	4,035,260	4,179,228	4,268,785	4,376,754
Signatory Average Landing Fee per 000 Pounds	$0.92	$0.99	$1.08	$1.34	$1.06	$1.20	$1.18	$1.21	$1.29	$1.34	$1.30	$1.35	$1.83	$1.75	$1.76	$1.71	$1.59	$1.56	$1.52	$1.46
Terminal Rental Rate																				
Total Terminal O&M Expenses	$ 5,335,007	$ 5,584,137	$ 5,829,081	$ 6,016,415	$ 6,223,541	$ 6,459,882	$ 6,674,881	$ 7,064,651	$ 7,740,271	$ 8,066,121	$ 8,349,640	$ 8,646,436	$ 8,957,146	$ 9,282,438	$ 9,623,012	$ 10,204,827	$ 10,587,298	$ 10,985,754	$ 12,024,350	$ 12,489,528
Debt Service - Series 2000 Certificates [1/]	1,095,262	1,096,757	1,095,746	1,095,358	1,095,205	1,095,323	1,095,622	1,096,013	1,096,405	1,095,186	1,095,403	1,096,557	1,096,074	1,095,476	1,095,407	1,096,458	1,095,415	1,095,323	1,096,016	1,096,492
Expense Allocations from Other Cost Centers	2,969,624	3,074,279	3,188,429	3,266,497	3,543,269	3,647,005	3,782,081	3,923,831	4,125,381	4,285,094	4,432,866	4,649,447	4,681,184	4,891,249	5,079,573	5,301,794	5,551,793	5,576,187	5,896,037	6,164,597
TOTAL TERMINAL EXPENSE	$ 9,399,894	$ 9,755,173	$ 10,113,256	$ 10,378,270	$ 10,862,016	$ 11,202,210	$ 11,552,585	$ 12,084,494	$ 12,962,057	$ 13,446,402	$ 13,877,909	$ 14,392,440	$ 14,734,404	$ 15,269,163	$ 15,797,993	$ 16,603,079	$ 17,234,506	$ 17,657,265	$ 19,016,404	$ 19,750,616
LESS: Total Terminal Nonairline Revenue	6,732,998	6,875,439	7,097,944	7,317,777	7,555,989	7,829,309	8,111,210	8,487,571	8,788,526	9,108,835	9,443,568	9,767,905	10,071,921	10,417,637	10,814,236	11,356,177	11,775,673	12,208,546	12,664,436	13,138,362
PLUS: Revenue Allocation to Capital Improvement Fund	(239,195)	(152,134)	(446,466)	(1,035,459)	82,649	(47,933)	(86,271)	119,648	80,542	(46,876)	179,162	111,504	(726,752)	(285,951)	(337,757)	(342,864)	12,642	(78,985)	(155,160)	124,615
AIRLINE TERMINAL RENT REQUIREMENT/REVENUE	$ 2,906,091	$ 3,031,868	$ 3,461,779	$ 4,095,952	$ 3,223,378	$ 3,420,834	$ 3,527,646	$ 3,477,275	$ 4,092,989	$ 4,384,442	$ 4,255,179	$ 4,513,032	$ 5,389,235	$ 5,137,476	$ 5,321,514	$ 5,589,766	$ 5,446,191	$ 5,527,704	$ 6,507,128	$ 6,487,639
Total Airline Rented Space	109,701	109,701	109,701	109,701	109,701	109,701	109,701	109,701	109,701	109,701	109,701	109,701	109,701	109,701	109,701	109,701	109,701	109,701	109,701	109,701
Terminal Rent per Square Foot	$26.49	$27.64	$31.56	$37.34	$29.38	$31.18	$32.16	$31.70	$37.31	$39.97	$38.79	$41.14	$49.13	$46.83	$48.51	$50.95	$49.65	$50.39	$59.32	$59.14

Note:

1/ 75.63% of Debt Service on the Series 2000 Certificates is paid with PFC revenues; 24.37% is included in the base rate.

Sources: Ricondo & Associates, Inc., September 2008, based on information provided by the City of Boise.
Prepared by: Ricondo & Associates, Inc., September 2008.

7.5.2.3 Comparison of Airline Rates and Charges

To provide some context for current and projected airline rates and charges at the Airport, a sample of landing fees and terminal rental rates and charges was compiled for airports that approximate the current and projected size of the Airport, with regard to passenger enplanements. A comparison of rates and charges between the Airport and these representative facilities is presented in **Table VII-7**.

The Airport is currently classified as a small-hub facility, meaning that enplanements at the Airport are at least 0.05 percent, but less than 0.25 percent of total nationwide enplanements. Based on projected enplanement growth it is anticipated that the Airport may be reclassified as a medium-hub facility at some point during the planning period. As shown on Table VII-7, the current and projected airline rates and charges for the Airport are within the range of rates and charges currently imposed at similar sized airports. The cost per enplanement at the Airport is the lowest of all the airports presented on the table, primarily due to the low level of debt compared to the other Airports.

7.6 Cash Flow

Table VII-8 shows the funds remaining after O&M expenses and debt service are deducted from total Airport revenues. The funds remaining are available for the calculation of debt service coverage and to fund capital projects. This table also shows the calculation of debt service coverage and cost per enplaned passenger (CPE), as described below.

7.7 Debt Service Coverage

Debt service coverage is calculated by subtracting O&M expenses from total revenues and then dividing the result by debt service for the period. Coverage must be at least 1.25 times debt service as required by the Lease Agreement. As presented in Table VII-8, debt service coverage for the Airport is projected to be higher than the minimum 1.25 times required in every year of the planning period, indicating that the Airport is projected to have adequate resources to meet its debt service obligations throughout the planning period.

7.8 Cost Per Enplaned Passenger

Airline revenues are divided by the number of enplaned passengers to yield the average CPE for passenger airlines operating at the Airport. The number of enplaned passengers is forecast to increase at a compounded annual growth rate of 4.2 percent from FY 2008 through FY 2027. As presented in Table VII-8, the passenger airline CPE is projected to range from $3.21 to $4.81 through this period.

7.9 Flow of Funds

Table VII-9 shows the beginning and ending balances for unrestricted funds, PFCs, and CFCs. The table depicts expenditures drawn from and deposits made to each fund throughout the planning period. As shown, the current funding and implementation strategy for the CIP is expected to result in a positive balance of unrestricted funds for each year. Under the current and assumed future level of $4.50 per eligible enplaned passenger, the PFC fund balance is expected to show losses in several years due to expenditures for terminal expansion projects. Similarly, the CFC fund balance is expected to show losses beginning in FY 2019 when funds are expended for construction of the offsite consolidated rental car facility. It is anticipated that unrestricted funds would be available to cover the balance of these project costs.

Table VII-7

Comparative Airport Summary of Rates and Charges

Airport	Airport Code	2007 Enplanements [1]	Hub Size [2]	Year	Landing Fee [3]		Terminal Rental Rate [5]		Average Cost Per Enplanement	Source
				Budget	Signatory	Non-Signatory [4]	Signatory	Non-Signatory [4]		
Metropolitan Oakland International	OAK	7,334,358	Medium	FY 2008	$1.85		$159.23		$6.25	Port of Oakland
Sacramento International	SMF	5,307,289	Medium	FY 2007	$1.99		$65.52		$5.48	Sacramento County Airport System
William P. Hobby	HOU	4,427,334	Medium	FY 2008	$2.26		$86.07 - $91.45		$8.49	Houston Airport System
Louis Armstrong New Orleans International [6]	MSY	4,100,000	Medium	CY 2008	$1.07	$3.02	$8.00		$9.39	New Orleans Aviation Board
Austin - Bergstrom International	AUS	4,442,696	Medium	FY 2007	$2.86		$74.94		$7.26	The City of Austin Aviation Department
San Antonio International	SAT	3,705,880	Medium	FY 2008	$1.23		76.31 - 77.43		$4.22	San Antonio Airport System
Ontario International	ONT	3,603,575	Medium	FY 2007	$2.05	$2.56	$145.57	$160.12	$9.92	Los Angeles World Airports
Albuquerque International Sunport	ABQ	3,273,382	Medium	FY 2008	$2.14	$2.47	$85.60		$7.52	City of Albuquerque Aviation Department
Jacksonville International	JAX	3,160,829	Medium	FY 2007	$1.47	$1.78	$99.30	$48.39	$5.09	Jacksonville Aviation Authority
Reno/Tahoe International	RNO	2,550,000	Medium	FY 2008	$2.24	$2.74	$65.26		$5.94	Reno - Tahoe Airport Authority
Eppley Airfield [7]	OMA	2,210,166	Medium	FY 2008	$1.73		$51.54 - $64.36		$5.14	Omaha Airport Authority
Tucson International	TUS	2,195,493	Medium	FY 2007	$1.40		$40.46 - $67.44		$6.09	Tucson Airport Authority
Norfolk International	ORF	1,853,620	Small	FY 2008	$1.34	$1.68	$28.78		$4.42	Norfolk Airport Authority
Louisville International - Standiford Field	SDF	1,914,209	Small	FY 2008	$1.40		$45.60 - $52.50		$6.54	Regional Airport Authority of Louisville & Jefferson County
Will Rogers World	OKC	1,859,935	Small	CY 2007	$2.44	$2.92	$7.89 - $64.66	$9.47 - $77.60		Oklahoma City Department of Airports
El Paso International	ELP	1,686,223	Small	FY 2006	$1.50	$1.88	$31.84		$5.33	The City of El Paso
Spokane International	GEG	1,739,883	Small	FY 2006	$1.32	$1.38 - $2.02	$20.55 - $36.35		$7.63	Spokane Airport Board
Boise Airport	BOI	1,679,427	Small	FY 2007	$1.00	$2.07	$27.78		$3.34	City of Boise Department of Aviation & Public Transportation
Tulsa International	TUL	1,608,583	Small	FY 2006	$2.02	$3.03	$14.80 - $44.44	$22.20 - $66.66	$6.50	Tulsa Airport Authority
Birmingham International	BHM	1,611,434	Small	FY 2007	$2.37	$2.84	$40.21		$4.09	Birmingham Airport Authority
Albany International	ALB	1,550,496	Small	FY 2007	$1.82	$2.28	$82.99	$103.74	$7.62	Albany County Airport Authority
Average of Small Hub Airports					$1.69	$2.30	$39.44	$63.90	$5.68	
Average of Medium Hub Airports					$1.86	$2.51	$82.28	$104.26	$6.66	
Average of All Airports					$1.79	$2.38	$63.92	$80.04	$6.25	

Notes:

1/ Based on passenger data provided by each airport's official website.

2/ Based on enplanements provided by the CY 2004 ACAIS.

3/ Per 1,000 pounds of landing weight.

4/ If applicable.

5/ Per square foot.

6/ MSY no longer uses signatory and non-signatory landing fee rates; instead, rates for scheduled and non-scheduled carriers are used. Additionally, in place of a terminal rental rate, an $8.00 per enplanement fee is used across the board for terminal charges.

7/ For landing fees, OMA uses scheduled and non-scheduled carriers instead of signatory and non-signatory.

Source: Ricondo & Associates, Inc., May 2008.
Prepared by: Ricondo & Associates, Inc., September 2008.

Table VII-8

Cash Flow

	Projected																			
	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
Revenues																				
Airline Landing Fees	$ 2,147,634	$ 2,424,859	$ 2,810,107	$ 3,504,168	$ 2,851,424	$ 3,386,103	$ 3,534,790	$ 3,751,392	$ 3,878,804	$ 4,171,121	$ 4,223,246	$ 4,593,044	$ 6,631,103	$ 6,450,004	$ 6,672,275	$ 6,660,903	$ 6,414,313	$ 6,505,597	$ 6,486,853	$ 6,391,734
Airline Terminal Rentals	2,906,091	3,031,868	3,461,779	4,095,952	3,223,378	3,420,834	3,527,646	3,477,275	4,092,989	4,384,442	4,255,179	4,513,032	5,389,235	5,137,476	5,321,514	5,589,766	5,446,191	5,527,704	6,507,128	6,487,639
Nonairline Parking and Airport Road Revenues	8,239,053	8,723,924	8,875,539	9,019,570	9,616,465	9,811,374	10,009,363	10,694,612	10,906,029	11,130,560	11,902,842	12,127,851	12,325,542	13,156,131	13,442,343	13,734,599	14,687,469	14,993,379	15,309,943	16,370,625
Nonairline Terminal Revenues	6,732,998	6,875,439	7,097,944	7,317,777	7,555,989	7,829,309	8,111,210	8,487,571	8,788,526	9,108,835	9,443,568	9,767,905	10,071,921	10,417,637	10,814,236	11,356,177	11,775,673	12,208,546	12,664,436	13,138,362
Nonairline Airfield Revenues	1,388,599	1,354,126	1,374,407	1,380,239	1,398,239	1,444,375	1,491,730	1,533,365	1,572,192	1,624,539	1,682,404	1,720,165	1,727,483	1,761,446	1,834,933	1,910,263	1,978,048	2,045,974	2,120,187	2,198,300
Other Nonairline Revenues	4,260,242	3,964,303	4,045,026	4,064,991	4,149,361	4,397,174	4,646,759	4,880,173	5,122,896	5,425,871	5,757,213	5,965,106	5,987,392	6,195,364	6,641,802	7,101,204	7,517,466	7,937,157	8,420,691	8,930,751
TOTAL REVENUES [A]	$ 25,674,617	$ 26,374,519	$ 27,664,801	$ 29,382,697	$ 28,794,856	$ 30,289,170	$ 31,321,498	$ 32,824,389	$ 34,361,436	$ 35,845,370	$ 37,264,451	$ 38,687,102	$ 42,132,676	$ 43,118,059	$ 44,727,103	$ 46,352,913	$ 47,819,160	$ 49,218,358	$ 51,509,238	$ 53,517,411
Operation and Maintenance Expenses																				
Parking and Airport Roads	1,960,372	2,099,092	2,526,284	3,505,994	3,647,508	3,877,680	3,933,563	3,991,213	4,050,688	4,256,047	4,319,351	4,384,665	5,816,053	5,508,285	5,581,783	5,568,622	5,470,880	5,664,636	5,747,972	5,833,974
Terminal	5,335,007	5,584,137	5,829,081	6,016,415	6,223,541	6,459,882	6,674,881	7,064,651	7,740,271	8,066,121	8,349,640	8,646,436	8,957,146	9,282,438	9,623,012	10,204,827	10,587,298	10,985,754	12,024,350	12,489,528
Airfield	2,349,587	2,599,640	2,672,214	2,759,716	3,062,271	3,432,640	3,538,548	3,850,945	3,943,983	4,104,818	4,359,615	4,598,836	4,645,693	4,823,162	4,976,446	4,971,751	5,023,297	5,141,312	5,129,034	5,278,713
Other O&M Expenses	9,928,023	10,320,835	10,848,181	11,291,762	11,769,308	12,232,584	12,804,392	13,420,571	13,944,997	14,453,591	15,238,314	15,870,174	17,493,075	18,103,281	18,716,915	19,342,218	20,053,492	20,557,966	21,273,324	22,092,927
Total Operation and Maintenance Expenses	$ 19,572,989	$ 20,603,703	$ 21,875,761	$ 23,573,888	$ 24,702,629	$ 26,002,787	$ 26,951,385	$ 28,327,380	$ 29,679,940	$ 30,880,577	$ 32,266,920	$ 33,500,111	$ 36,911,967	$ 37,717,166	$ 38,898,155	$ 40,087,419	$ 41,134,967	$ 42,349,668	$ 44,174,680	$ 45,695,143
LESS: Depreciation (non-cash expense)	$ 3,630,277	$ 3,820,277	$ 4,414,277	$ 5,365,277	$ 5,755,277	$ 6,257,277	$ 6,401,277	$ 6,773,277	$ 6,810,277	$ 7,073,277	$ 7,481,277	$ 7,576,277	$ 8,815,277	$ 8,471,277	$ 8,453,277	$ 8,166,277	$ 7,899,277	$ 7,742,148	$ 7,493,148	$ 7,493,148
TOTAL CASH EXPENSES [B]	$ 15,942,712	$ 16,783,427	$ 17,461,484	$ 18,208,611	$ 18,947,352	$ 19,745,510	$ 20,550,108	$ 21,554,103	$ 22,869,663	$ 23,807,300	$ 24,785,643	$ 25,923,835	$ 28,096,690	$ 29,245,889	$ 30,444,878	$ 31,921,142	$ 33,235,690	$ 34,607,520	$ 36,681,532	$ 38,201,995
Debt Service Requirement																				
Series 2000 Certificates	$ 3,595,445	$ 3,600,351	$ 3,597,033	$ 3,595,758	$ 3,595,258	$ 3,595,645	$ 3,596,626	$ 3,597,908	$ 3,599,195	$ 3,595,195	$ 3,595,908	$ 3,599,695	$ 3,598,108	$ 3,596,145	$ 3,595,920	$ 3,599,370	$ 3,595,945	$ 3,595,645	$ 3,597,920	$ 3,599,480
Series 2004-1 Refunding Bonds	1,351,925	$ 1,350,800	$ 1,398,275	$ 1,407,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
LESS: PFC Revenues Pledged to Debt Service [1/]	2,719,235	$ 2,722,945	$ 2,720,436	$ 2,719,472	$ 2,719,094	$ 2,719,386	$ 2,720,128	$ 2,721,098	$ 2,722,071	$ 2,719,046	$ 2,719,585	$ 2,722,449	$ 2,721,249	$ 2,719,764	$ 2,719,594	$ 2,722,204	$ 2,719,613	$ 2,719,386	$ 2,721,107	$ 2,722,287
TOTAL DEBT SERVICE REQUIREMENT [C]	$ 2,228,135	$ 2,228,206	$ 2,274,872	$ 2,283,886	$ 876,164	$ 876,259	$ 876,498	$ 876,810	$ 877,124	$ 876,149	$ 876,323	$ 877,246	$ 876,859	$ 876,381	$ 876,326	$ 877,166	$ 876,332	$ 876,259	$ 876,813	$ 877,193
NET CASH FLOW FROM OPERATIONS [A-B-C]	$ 7,503,770	$ 7,362,887	$ 7,928,445	$ 8,890,200	$ 8,971,340	$ 9,667,401	$ 9,894,893	$ 10,393,475	$ 10,614,649	$ 11,161,921	$ 11,602,485	$ 11,886,022	$ 13,159,127	$ 12,995,789	$ 13,405,898	$ 13,554,605	$ 13,707,138	$ 13,734,579	$ 13,950,894	$ 14,438,223
Debt Service Coverage																				
Total Revenues	$ 25,674,617	$ 26,374,519	$ 27,664,801	$ 29,382,697	$ 28,794,856	$ 30,289,170	$ 31,321,498	$ 32,824,389	$ 34,361,436	$ 35,845,370	$ 37,264,451	$ 38,687,102	$ 42,132,676	$ 43,118,059	$ 44,727,103	$ 46,352,913	$ 47,819,160	$ 49,218,358	$ 51,509,238	$ 53,517,411
LESS: Total Cash Expenses	15,942,712	16,783,427	17,461,484	18,208,611	18,947,352	19,745,510	20,550,108	21,554,103	22,869,663	23,807,300	24,785,643	25,923,835	28,096,690	29,245,889	30,444,878	31,921,142	33,235,690	34,607,520	36,681,532	38,201,995
NET REVENUES AVAILABLE FOR COVERAGE	$ 9,731,905	$ 9,591,092	$ 10,203,317	$ 11,174,086	$ 9,847,504	$ 10,543,660	$ 10,771,391	$ 11,270,285	$ 11,491,773	$ 12,038,070	$ 12,478,808	$ 12,763,268	$ 14,035,986	$ 13,872,170	$ 14,282,224	$ 14,431,771	$ 14,583,470	$ 14,610,838	$ 14,827,707	$ 15,315,417
Debt Service Requirement (net of PFC revenues)	2,228,135	2,228,206	2,274,872	2,283,886	876,164	876,259	876,498	876,810	877,124	876,149	876,323	877,246	876,859	876,381	876,326	877,166	876,332	876,259	876,813	877,193
Debt Service Coverage	4.37	4.30	4.49	4.89	11.24	12.03	12.29	12.85	13.10	13.74	14.24	14.55	16.01	15.83	16.30	16.45	16.64	16.67	16.91	17.46
Required Coverage	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Passenger Airline Cost Per Enplaned Passenger																				
Total Airline Revenue Requirement	$ 5,602,502	$ 6,021,967	$ 6,854,083	$ 8,199,783	$ 6,692,456	$ 7,443,120	$ 7,717,704	$ 7,949,491	$ 8,714,241	$ 9,320,285	$ 9,266,087	$ 9,917,369	$ 12,855,970	$ 12,448,182	$ 12,880,311	$ 13,241,308	$ 12,880,863	$ 13,084,271	$ 14,076,480	$ 13,994,347
Enplaned Passengers	1,746,281	1,808,775	1,873,636	1,940,958	2,010,840	2,083,387	2,158,701	2,236,897	2,318,087	2,402,393	2,489,944	2,580,868	2,675,304	2,773,391	2,875,279	2,981,125	3,091,088	3,205,336	3,322,093	3,443,103
Average Passenger Airline Cost per Enplanement	$3.21	$3.33	$3.66	$4.22	$3.33	$3.57	$3.58	$3.55	$3.76	$3.88	$3.72	$3.84	$4.81	$4.49	$4.48	$4.44	$4.17	$4.08	$4.24	$4.06

Note:

1/ 75.63% of Debt Service on the Series 2000 Certificates is paid with PFC revenues; 24.37% is included in the base rate.

Sources: Ricondo & Associates, Inc., September 2008, based on information provided by the City of Boise.
Prepared by: Ricondo & Associates, Inc., September 2008.

Table VII-9

Flow of Funds

									Projected										
	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027
Unrestricted Cash Reserve																				
Beginning Unrestricted Cash Reserve [1/]	$ 20,393,901	$ 15,538,202	$ 14,712,294	$ 3,234,529	$ 8,261,026	$ 12,500,521	$ 17,074,694	$ 19,043,019	$ 23,862,277	$ 31,133,187	$ 38,040,242	$ 32,207,047	$ 19,769,355	$ 31,632,390	$ 42,124,471	$ 54,361,137	$ 59,584,104	$ 71,160,192	$ 81,772,869	$ 94,918,512
Expend: Capital Expenditures	4,476,430	7,394,370	17,973,768	2,688,108	2,912,817	2,940,895	3,303,943	635,845	2,744,557	3,637,708	3,333,266	23,668,971	621,707	370,999	453,777	2,741,613	1,372,024	417,562	-	-
Expend: Capital Equipment	376,141	1,940,740	1,432,442	1,090,542	532,366	2,919,357	1,639,434	581,730	599,182	617,158	635,672	654,743	674,385	694,616	715,455	736,919	759,026	781,797	805,251	829,408
Expend: AIP Entitlement Grants	2,136,025	3,362,950	4,652,047	5,463,635	6,190,298	7,477,318	8,024,031	9,470,029	4,756,722	3,000,978	18,814,829	2,602,913	898,229	7,048,962	4,083,992	10,656,497	1,155,389	7,933,669	-	-
Expend: AP Discretionary Grants	3,505,337	978,500	1,007,855	1,038,091	3,376,526	-	2,155,264	-	1,203,432	1,115,581	1,276,721	-	4,070,547	-	-	1,332,062	1,524,471	-	-	-
Expend: Reimbursement	-	-	1,166,990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Expend: State Grants	52,000	53,560	55,167	56,822	58,526	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Deposit: Operating Cash Flow	1,250,628	7,362,887	7,928,445	8,890,200	8,971,340	9,667,401	9,894,893	10,393,475	10,614,649	11,161,921	11,602,485	11,886,022	13,159,127	12,995,789	13,405,898	13,554,605	13,707,138	13,734,579	13,950,894	14,438,223
Deposit: Entitlements Revenue Collections-Capital Projects	882,269	3,160,186	4,652,047	4,838,775	4,903,636	4,970,958	5,040,840	5,113,387	4,756,722	3,000,978	5,348,087	2,602,913	898,229	5,610,868	4,083,992	5,803,391	1,155,389	6,011,125	-	-
Deposit: Entitlements Revenue Collections-Equipment	-	1,258,145	-	539,807	-	2,252,470	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Deposit: Discretionary Revenue Collections	3,505,337	1,069,434	1,007,855	1,038,091	3,376,526	1,020,915	2,155,264	-	1,203,432	1,115,581	1,276,721	-	4,070,547	-	-	1,332,062	1,524,471	-	-	-
Deposit: Reimbursements Revenue	-	-	1,166,990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Deposit: State Grant Revenue	52,000	53,560	55,167	56,822	58,526	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ending Unrestricted Cash Reserve	$ 15,538,202	$ 14,712,294	$ 3,234,529	$ 8,261,026	$ 12,500,521	$ 17,074,694	$ 19,043,019	$ 23,862,277	$ 31,133,187	$ 38,040,242	$ 32,207,047	$ 19,769,355	$ 31,632,390	$ 42,124,471	$ 54,361,137	$ 59,584,104	$ 71,160,192	$ 81,772,869	$ 94,918,512	$ 108,527,327
PFC Fund																				
Beginning PFC Cash Balance [1/]	$ 8,766,131	$ 7,145,367	$ 9,844,904	$ 13,125,686	$ 18,054,934	$ 14,371,705	$ 20,448,764	$ 7,738,234	$ (9,936,509)	$(10,471,809)	$ (5,265,622)	$ (160,036)	$ 8,014,417	$ 13,737,274	$ 19,790,212	$ 8,034,322	$ 17,431,589	$ 13,320,763	$ (18,839,141)	$ (7,533,756)
Expend: PFC Debt Service (Series 2000 Certificates)	1,359,618	2,722,945	2,720,436	2,719,472	2,719,094	2,719,386	2,720,128	2,721,098	2,722,071	2,719,046	2,719,585	2,722,449	2,721,249	2,719,764	2,719,594	2,722,204	2,719,613	2,719,386	2,721,107	2,722,287
Expend: PFC pay-as-you-go Funds	1,490,000	2,214,500	1,909,620	546,364	9,454,274	-	19,104,837	24,398,238	7,600,620	2,218,114	2,687,833	-	2,851,522	2,937,067	21,176,256	467,390	14,442,358	42,974,038	-	-
Deposit: PFC collections	1,228,854	7,636,983	7,910,838	8,195,084	8,490,138	8,796,445	9,114,435	9,444,593	9,787,392	10,143,348	10,513,004	10,896,902	11,295,628	11,709,770	12,139,960	12,586,861	13,051,145	13,533,521	14,026,491	14,537,418
Ending PFC Cash Balance	7,145,367	9,844,904	13,125,686	18,054,934	14,371,705	20,448,764	7,738,234	(9,936,509)	(10,471,809)	(5,265,622)	(160,036)	8,014,417	13,737,274	19,790,212	8,034,322	17,431,589	13,320,763	(18,839,141)	(7,533,756)	4,281,374
CFC Fund																				
Beginning CFC Cash Balance [1/]	$ 2,911,219	$ 3,053,017	$ 3,934,252	$ 4,847,088	$ 5,246,359	$ 6,226,040	$ 7,241,066	$ 8,292,785	$ 9,382,602	$ 10,511,974	$ 11,682,419	$ 10,879,646	$ (8,727,513)	$ (7,424,104)	$ (6,072,908)	$ (4,672,072)	$ (3,219,668)	$ (1,713,690)	$ (152,051)	$ 1,466,473
Expend: CFC Project	-	-	-	546,364	-	-	-	-	-	-	2,015,875	20,864,557	-	-	-	-	-	-	-	-
Deposit: CFC Collections	141,798	881,235	912,835	945,635	979,681	1,015,026	1,051,719	1,089,816	1,129,372	1,170,446	1,213,101	1,257,399	1,303,408	1,351,196	1,400,836	1,452,404	1,505,978	1,561,640	1,618,524	1,677,480
Ending CFC Cash Balance	$ 3,053,017	3,934,252	4,847,088	5,246,359	6,226,040	7,241,066	8,292,785	9,382,602	10,511,974	11,682,419	10,879,646	(8,727,513)	(7,424,104)	(6,072,908)	(4,672,072)	(3,219,668)	(1,713,690)	(152,051)	1,466,473	3,143,953
Total Cash Reserves	$ 25,736,586	$ 28,491,450	$ 21,207,302	$ 31,562,319	$ 33,098,266	$ 44,764,524	$ 35,074,038	$ 23,308,370	$ 31,173,352	$ 44,457,040	$ 42,926,657	$ 19,056,260	$ 37,945,560	$ 55,841,774	$ 57,723,386	$ 73,796,025	$ 82,767,265	$ 62,781,678	$ 88,851,228	$ 115,952,654

Note:

1/ Beginning fund balances provided by the City of Boise as of July 31, 2008.

Sources: Ricondo & Associates, Inc., September 2008, based on information provided by the City of Boise.
Prepared by: Ricondo & Associates, Inc., September 2008.

7.10 Summary

The financial analysis presented in this section has been provided to show the financial feasibility of implementing the recommended ADP for the Airport. For the purposes of this analysis, the implementation of the ADP is shown to be financially feasible. Based on analyses of forecast activity at the Airport, in addition to projected revenues and expenses, and the Airport CIP for FY 2008 through FY 2025, it appears that the City has adequate resources to meet future demand. The City has access to various sources of funding through a mix of FAA funding, State funding, PFC and CFC revenues, and Airport funds. The capital projects recommended in the Master Plan appear to be financially feasible and the City can reasonably expect to implement these projects. The airline rates and overall airline CPE remain reasonable over the planning period and projected Airport funds appear to be adequate to effectively operate the Airport. As required in the Lease Agreement, debt service coverage is projected to be significantly above the minimum 1.25 percent of debt service throughout the planning period, primarily due to the low level of outstanding debt.

As implementation of the CIP progresses, Airport staff should continually assess the financial feasibility of each project included in the CIP. Future considerations regarding the financial feasibility of the CIP include the following:

- **Enplanement/traffic growth** – The financial analysis was conducted using the FAA approved enplanement forecast for the Airport. Actual enplanements from year to year will likely deviate from the forecast. Significant changes in enplanement levels may impact revenues and expenses, as well as PFC and CFC revenues, and AIP grants.
- **Availability of AIP funds** – The current funding strategy proposed for the CIP assumes that the FAA will continue to authorize and appropriate AIP funds for eligible projects on a similar level as experienced in recent years. Because the level of authorized and appropriated AIP funds varies year to year, alternative funding sources may need to be identified if grants cannot be obtained for certain eligible projects.
- **Medium-hub designation** – As previously discussed, it is assumed that the Airport's designation may change from small-hub to medium-hub at some point during the planning period. Assuming the AIP maintains its current structure, when the Airport is designated as a medium-hub, federal AIP funding will only cover 75 percent of the total cost of an eligible project, rather than the 95 percent share currently allocated to the Airport as a small-hub. Additionally, as a medium-hub, the Airport's appropriated AIP grants would be reduced by 50 percent if a $3 PFC is in effect, or by 75 percent if a PFC of greater than $3 is in effect. Furthermore, the City will be required to demonstrate PFC projects provide "substantial contribution" to be eligible for a PFC level greater than $3.
- **Potential increase in maximum PFC level** – Airport industry groups have requested that federal PFC regulations be changed to increase the PFC program's maximum PFC level from its current level of $4.50. As part of its reauthorization proposal for 2008-2010, the FAA proposed that the maximum PFC level be increased to $6. On June 30, 2008, the FAA Extension Act of 2008 (H.R. 6327) was signed into law, extending FAA programs through September 30, 2008, although it did not change the maximum PFC level. As of September of 2008, a Reauthorization Bill that could potentially increase the maximum PFC level had not been adopted by the House and the Senate. The financial projections and the financing plan reflected in this section assume the Airport's current $4.50 PFC level is in place for the entire planning period. If federal PFC regulations are changed and the maximum PFC level is

increased, the Airport may choose to apply to the FAA for authorization to collect the higher PFC level.

- **Ability to issue long-term debt** – As discussed in section 7.2.7, the City is limited in its ability to issue long-term debt, even in the form of revenue bonds. This limitation significantly impacts the ability of the Airport to leverage its financial assets to fund capital development projects. As previously mentioned, funding sources have not been identified for two projects included in the recommended ADP. Without the flexibility to issue long-term debt, alternative funding sources will need to be identified for these projects, or else implementation of the projects would be deferred indefinitely. In addition, without the availability of debt financing, implementation of certain ADP projects may need to be delayed in favor of critical projects that affect Airport safety and operational capability.

VIII. Environmental Overview

This Environmental Overview (EO) was prepared as part of the Master Plan Update to provide a general overview of the potential environmental impacts of the recommended Airport Development Plan (ADP). The EO provides general analysis and identifies areas of potential environmental impacts, but it is by no means inclusive. It can be used by the preparer of formal environmental studies to scope a particular project and draw awareness to the preparer and the sponsor of potential impacts. This overview is intended to provide decision-makers with an understanding of environmental issues that could result from implementation of the projects identified in the Master Plan Update.

The National Environmental Policy Act of 1969 (NEPA), as implemented for airport development by Federal Aviation Administration (FAA) Order 1050.1E, *Policies and Procedures for Considering Environmental Impacts*, and FAA Order 5050.4B, *Airport Environmental Handbook*, requires environmental processing for all airport development projects that require a federal action for implementation. Examples of federal actions that result in the need for environmental processing include the approval of an Airport Layout Plan (ALP) that depicts the project in question, the approval of the use of passenger facility charge (PFC) revenue to fund the project, the granting of funding under the Airport Improvement Program (AIP), and actual construction of the project. In terms of actual environmental processing requirements, proposed airport projects typically fall into one the following categories as outlined in 40 Code of Federal Regulations (CFR) Parts 1500-1508:

- **Categorical Exclusions** – Projects categorically excluded are those actions that have been found under normal circumstances to have no potential for significant environmental impact.
- **Actions Normally Requiring an Environmental Assessment (EA)** – Projects normally requiring an EA are actions that have been found by experience to sometimes have significant environmental impacts.
- **Actions Normally Requiring an Environmental Impact Statement (EIS)** – The purpose of an EA is to determine whether or not a project will have significant impacts. Based on the results reported in an EA, the FAA then prepares either a Finding Of No Significant Impact (FONSI) or an EIS. An EIS further investigates a project's potential environmental impacts.

The major product of the master plan process is the Airport Layout Plan (ALP), which shows an airport's existing and planned development. Federal Aviation Regulations require that an airport operator undertake an environmental analysis for the planned development for FAA review and approval if it plans to apply for federal grants to fund development depicted on the ALP. Due to the limited shelf life of environmental studies,[1] formal EA or categorical exclusion documentation is typically developed at such time to ensure that the environmental work is current within the timeframe during which the actual project would be undertaken.

An overview of environmental conditions related to the Master Plan projects was assessed in relation to the environmental impact categories outlined in FAA Order 1050.1E and typically considered under NEPA. The impact categories include the following:

[1] FAA Order 5050.4B requires that major steps toward implementation of the proposed action must commence within three years from the date of approval or a new evaluation must be performed.

- Noise
- Compatible Land Use
- Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks
- Induced Socioeconomic Impacts
- Air Quality
- Water Quality
- Department of Transportation Act, Section 4(f) Lands
- Historic, Archaeological, and Cultural Resources
- Fish, Wildlife, and Plants
- Wetlands
- Floodplains
- Coastal Zone Management Program
- Wild and Scenic Rivers
- Farmland
- Energy Supply and Natural Resources
- Light Emissions
- Solid Waste and Hazardous Materials
- Construction Impacts

The determination as to the level of significance of each type of potential impact listed above may be made by calculation, measurement, observation, and through correspondence with appropriate federal, state, or local officials. Previous documents and analyses considered during preparation of this EO include, but were not limited to: the 2001 Boise Airport Master Plan Update; the 2007 EA for the Implementation of the Base Realignment and Closure (BRAC); the 2001 EA for Proposed Airfield Improvements at Boise Airport; the 2007 EA for Instrument Landing System and Approach Lighting System Installation, Upgrade, and Operation; and the 2007 EA for I-84, Orchard Interchange to Gowen Interchange.

Based on a review of these documents, the following impact categories do not apply to anticipated development projects at the Airport:

- **Coastal Zone Management Program** – The Airport is not located within a Coastal Zone Management Zone, therefore, implementation of the ADP would not affect compliance with the Coastal Zone Management Act. In addition, no coastal barriers are located at or in the vicinity of the Airport, therefore, implementation of the ADP would not affect compliance with the Coastal Barrier Resources Act.
- **Wild and Scenic Rivers** – No wild or scenic rivers are located in the vicinity of the Airport, therefore, implementation of the ADP would not affect wild and scenic rivers.
- **Farmland** – The Airport property and surrounding area consists of areas rated as either "not prime farmland" or as "prime farmland if irrigated" under the Farmland Protection Policy Act. Since there is no indication of present irrigation or farming or historic irrigation within or adjacent to the Airport property, there would be no significant impacts to farmlands.[2]

For the remaining impact categories, the EO documents existing conditions for each category and identifies, in general terms, the potential impacts that may result from implementation of the ADP.

[2] SAGE Environmental, L.L.C., *Final Environmental Assessment – Instrument Landing System and Approach Lighting System Installation, Upgrade, and Operation*, June 2007.

8.1 Noise

Noise, or unwanted sound, is one of the more intrusive environmental effects associated with airport activity. The effect of aircraft noise on existing and future noise-sensitive land uses is important in relation to the development and growth of the Airport and its environs. Aircraft noise originates from both the engines and the airframe of an aircraft, but the engines are by far the most significant source of aircraft noise. Although noise from propeller-driven aircraft (mostly commuter and general aviation aircraft) can be annoying, jet aircraft are the primary source of disturbing noise from the Airport.

As a result of extensive research into the characteristics of aircraft noise and human response to that noise, the following standard descriptors have been developed:

- **A-Weighted Sound Pressure Level (dBA)** – The decibel (dB) is a unit used to describe sound pressure levels. When written as "dBA", the "A" indicates that the sound has been filtered to reduce the strength of very low and very high frequency sounds, much as the human ear does. Aircraft noise exposure analyses are typically based on this A-weighted scale of sound measurement.
- **Day-Night Average Sound Level (DNL)** – DNL is expressed in dBA and represents the average noise level over a 24-hour period. For each hour during the nighttime period (10:00 p.m. to 6:59 a.m.), the average sound levels are increased by a 10-decibel weighting penalty before the 24-hour average is computed. The weighting penalties account for the more intrusive nature of noise during the nighttime hours. The 10-decibel weighting penalty is equivalent to multiplying the number of noise events during the nighttime hours by a factor of 10. DNL is expressed as an average noise level in terms of average daily aircraft operations over a calendar year and is the noise descriptor required by the FAA for use in aircraft noise exposure analyses and noise compatibility planning.

The FAA's Integrated Noise Model (INM) is the accepted tool for determining the total effect of aircraft noise at and around airports. The INM aircraft database contains representative data for commercial, general aviation, and military aircraft powered by turbojet, turbofan, or propeller-driven engines. For each aircraft type in the database, the following information is provided: (1) a set of departure profiles for each applicable trip length, (2) a set of approach parameters, and (3) sound exposure level (SEL) versus distance curves for several thrust settings. This information is needed to develop noise exposure maps based on the DNL metric. The INM generates a map of contour lines that connect points of equal DNL. The FAA considers aircraft noise of DNL 75+ to be severe noise and DNL 65 to 75 to be significant noise for an airport environs.

8.1.1 Existing Conditions

Noise contours based on 2004 activity and conditions were developed for the Airport as part of an FAA-approved FAR Part 150 Study Update.[3] Using the INM, the noise exposure contours were generated by inputting the following critical data:

- The existing and forecast numbers of aircraft operations by time of day, aircraft type, and stage length (non-stop departure distance from the airport); and

[3] HNTB Corporation, CSHQA, Wyle Laboratories, and Synergy Consulting, *Boise Airport 14 CFR Part 150 Study Update*, July 2004 (approved February 23, 2006).

- Operational information, including use of the runways, the location and use of flight tracks, departure profiles, and existing noise abatement procedures.

The aircraft noise exposure contours for 2004, as published in the approved FAR Part 150 Study Update, are shown on **Exhibit VIII-1**. The exhibit consists of DNL noise contours superimposed on a map of generalized existing land uses, including noise-sensitive areas.

8.1.2 Potential Impacts

Potential aircraft noise exposure impacts due to implementation of the ADP would be addressed through a detailed analysis as part of a NEPA study. For the purpose of this EO, a high-level investigation of potential noise impacts associated with development and expansion of Runway 9-27 was conducted through a review of the 2001 EA for Proposed Airfield Improvements at Boise Airport, which evaluated noise exposure for expanding the existing assault strip into a commercial runway. The 2001 EA noise analysis assumed 2020 forecast activity and presents noise exposure contours for two scenarios: 2020 Without Project (no-action alternative), and 2020 With Project (assuming a third commercial runway with a length of 10,000 feet). The results of this analysis are presented in **Table VIII-1**.

Table VIII-1

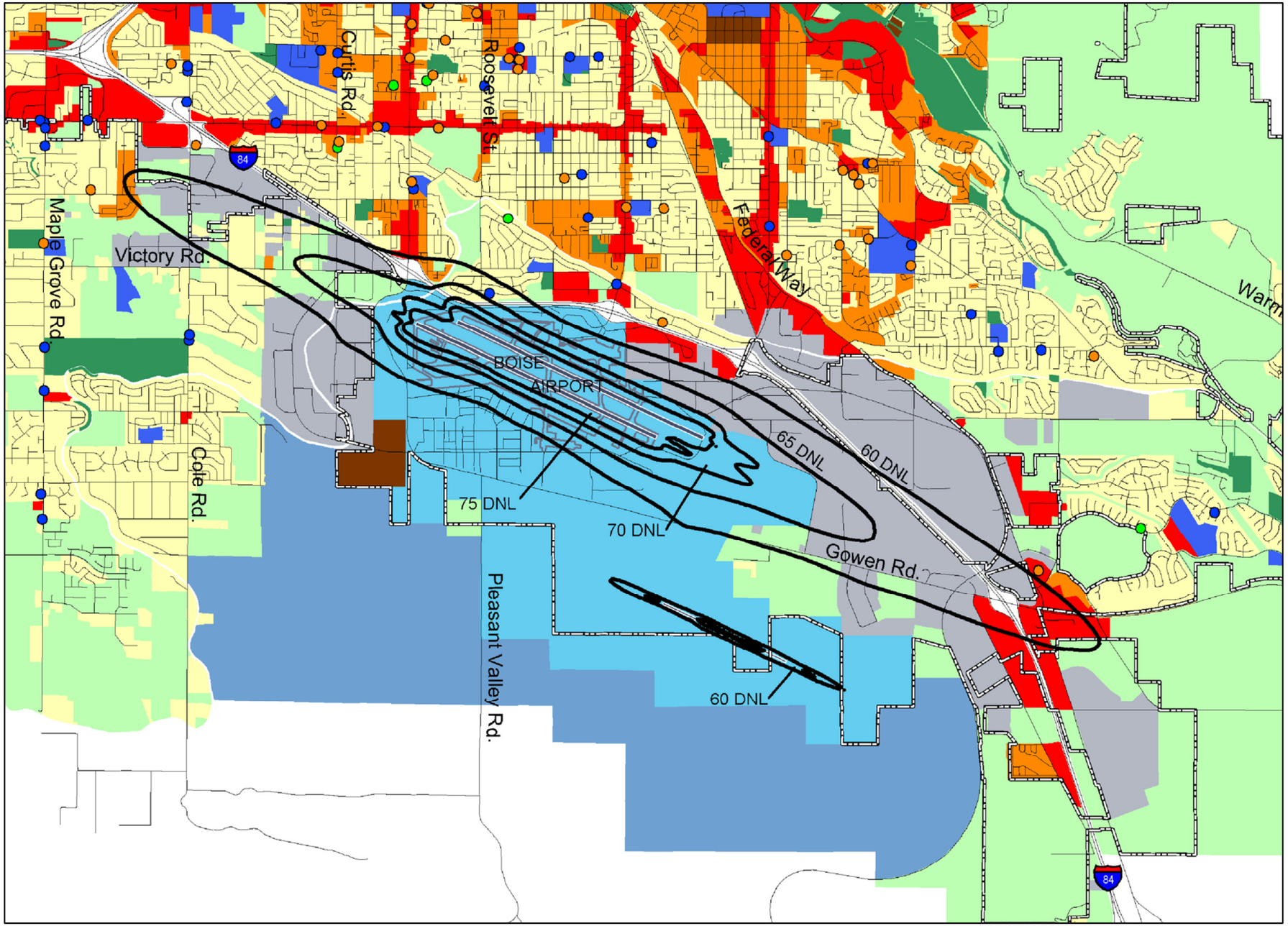
Future Noise Exposure

	Area Affected by Aircraft Noise (square miles)		
Noise Impact	2020 Without Project	2020 With Project	Project Change
60-65 DNL	3.13	3.66	0.53
65-70 DNL	1.36	1.50	0.14
70-75 DNL	0.42	0.52	0.10
75-80 DNL	0.57	0.67	0.10
65 DNL and Greater	2.35	2.69	0.34
60 DNL and Greater	5.47	6.35	0.88

Source: HNTB Corporation, Synergy Consultants, Inc., and Anchor Environmental, L.L.C., *Environmental Assessment of Proposed Airfield Improvements at Boise Airport*, July 2001.
Prepared by: Ricondo & Associates, Inc., September 2008.

As shown, the 2001 EA found that development of a new commercial runway would result in an increased noise exposure area, compared with the no-action alternative, of approximately 0.34 square miles for areas affected by DNL 65 and greater sound levels and 0.88 square miles for areas affected by DNL 60 and greater sound levels.

FAA Order 1050.1E states that an increase in noise is significant when an action, compared to the no-action alternative for the same timeframe, would cause noise-sensitive areas located at or above DNL 65 to experience a noise increase of at least 1.5 dBA. To determine the impact of the new commercial runway on aircraft noise exposure, the 2001 EA documents an analysis of noise levels at various locations. Using the INM, a grid was established with points separated by 1,250 feet. Results of this analysis show that while locations within the DNL 60 noise exposure contour would experience a significant increase in noise due to a new runway (1.5 dBA increase within 65 DNL or 3.0 dBA within 60 DNL), these locations would be within Airport property and no significant increases in noise would occur at off-Airport locations.



Legend

2009 DNL noise exposure contour

DNL = Day-Night Average Sound Level - A metric used to describe the existing and predicted cumulative noise exposure for communities surrounding an airport. DNL is expressed in A-weighted decibels (dBA) and represents the average noise level over a 24-hour period. In calculating DNL, the average sound level for each hour during the nighttime period (10:00 p.m. to 5:59 a.m.) is increased by a 10-decibel weighting penalty.

Generalized existing land uses

- Low density residential
- High/medium density residential
- Commercial
- Industrial
- Mixed use
- Public facility/institutional
- Open space
- Airport property
- Airport conservation
- Park
- School

Noise sensitive facilities

- Pre-school/Kindergarten
- Nursing home
- Hospital
- Place of worship
- Cemetery

Other features

- Street centerline
- Boise city limits

Source: HNTB Corporation, CSHQA, Wyle Laboratories, and Synergy Consulting. Boise Airport 14 CFR Part 150 Study Update. July 2004 (approved February 23, 2006).
Prepared by: Ricondo & Associates, Inc., September 2008.

Exhibit VIII-1

0 4,000 feet north

2009 Noise Exposure Contours over Generalized Existing Land Uses

While the development and expansion of Runway 9-27 as incorporated into the ADP is somewhat different than what was assumed in the 2001 EA, it is possible, based on the results of the noise analysis contained in the EA, that operations on Runway 9-27 would result in an increase in noise over a no-action alternative. However, depending on the specific aircraft mix and operating procedures (flight paths) of those aircraft, it is anticipated that implementation of Runway 9-27 would not result in a significant change in noise exposure.

Changes in aircraft noise exposure resulting from the proposed extension of Runway 10R-28L by 1,600 feet to the southeast are not specifically quantified in this EO. The extended runway would allow air carrier and cargo aircraft to safely carry more weight, thereby potentially affecting the flight profile of departing aircraft. Therefore, the potential exists for changes in noise exposure to occur, although it is anticipated that any significant increases in noise would remain on-Airport.

8.2 Compatible Land Use

Federal agencies have adopted guidelines for compatible land uses and environmental noise levels. Land use is normally determined by property zoning, such as residential, industrial, or commercial. Based on extensive research on the effects of noise on people, noise levels that are incompatible with residential land uses may be compatible with commercial and industrial land uses, including stores and factories.[4] The FAA has developed land use compatibility guidelines relating types of land uses to aircraft noise levels. FAR Part 150, *Airport Noise Compatibility Planning*, sets forth compatibility guidelines for residential, public, commercial, manufacturing, and recreational land uses, as presented in **Table VIII-2**.

8.2.1 Existing Conditions

Existing land use in the vicinity of the Airport was examined in detail in the 2004 FAR Part 150 Study Update and is shown on Exhibit VIII-1. The area north of the Airport is fully developed and contains residential housing and commercial businesses. The area east of the Airport is partially developed and is used primarily for industrial purposes. The area to the south of the Airport is sparsely developed rangeland/agricultural land with some industrial development, and is largely classified for airport conservation. The area west of the Airport is partially developed and includes industrial development and open space.

8.2.2 Potential Impacts

A proposed development is considered to have significant impacts on compatible land use if it causes significant increases in noise exposure over residential or other noise-sensitive land uses, such as schools, parks, and historic buildings, within the existing DNL 65 noise exposure area. Specifically, the minimum threshold is an increase of 1.5 dBA within the area exposed to aircraft noise of DNL 65 and higher. As stated in section 8.1.2, results of the noise analysis conducted as part of the 2001 EA for Proposed Airfield Improvements at Boise Airport suggest that any significant increase in noise exposure resulting from operation of Runway 9-27 would remain on-Airport and would therefore not be expected to impact off-Airport noise-sensitive land uses or facilities.

[4] Federal Aviation Administration, *Aircraft Noise: How We Measure It and Assess Its Impact*, http://aea.faa.gov/aea60/noise/measure.htm (accessed July 20, 2005).

Table VIII-2

Suggested Land Use Compatibility Guidelines in Aircraft Noise Exposure Areas

Land Use	DNL 65 to 70	DNL 70 to 75	DNL 75+
Residential			
Residential other than mobile homes and transient lodgings	NLR required[1/]	NLR required[1/]	Incompatible
Mobile homes	Incompatible	Incompatible	Incompatible
Transient lodgings	NLR required[1/]	NLR required[1/]	Incompatible
Public Use			
Schools, hospitals, and nursing homes	NLR required[1/]	NLR required[1/]	Incompatible
Churches, auditoriums, and concert halls	NLR required[1/]	NLR required[1/]	Incompatible
Governmental services	Compatible	NLR required	NLR required
Transportation	Compatible	Compatible[2/]	Compatible[2/]
Parking	Compatible	Compatible[2/]	Compatible[2/]
Commercial Use			
Offices, business, and professional	NLR required	NLR required	NLR required[2/]
Wholesale and retail – building materials, hardware, and farm equipment	Compatible	Compatible[2/]	Compatible[2/]
Retail trade – general	NLR required	NLR required	NLR required
Utilities	Compatible	Compatible[2/]	Compatible[2/]
Communication	NLR required	NLR required	NLR required
Manufacturing and Production			
Manufacturing – general	Compatible	Compatible[2/]	Compatible[2/]
Photographic and optical	Compatible	NLR required	NLR required
Agriculture (except livestock) and forestry	Compatible	Compatible	Compatible
Livestock farming and breeding	Compatible	Compatible	Incompatible
Mining and fishing resources production and extraction	Compatible	Compatible	Compatible
Recreational			
Outdoor sports arenas and spectator sports	Compatible[3/]	Compatible[3/]	Incompatible
Outdoor music shells, amphitheaters	Incompatible	Incompatible	Incompatible
Nature exhibits and zoos	Compatible	Incompatible	Incompatible
Amusements, parks, resorts, and camps	Compatible	Compatible	Incompatible
Golf courses, riding stables, and water recreation	Compatible	Compatible	Incompatible

DNL = Day-Night Average Sound Level, in A-weighted decibels.

Compatible = Generally, no special noise-attenuating materials are required to achieve an interior noise level of DNL 45 in habitable spaces, or the activity (whether indoors or outdoors) would not be subject to a significant adverse effect by the outdoor noise level.

Incompatible = Generally, the land use, whether in a structure or an outdoor activity, is considered to be incompatible with the outdoor noise level even if special attenuating materials were to be used in the construction of the building.

NLR = Noise Level Reduction. NLR is used to denote the total amount of noise transmission loss in decibels required to reduce an exterior noise level in habitable interior spaces to DNL 45. In most places, typical building construction automatically provides an NLR of 20 decibels. Therefore, if a structure is located in an area exposed to aircraft noise of DNL 65, the interior noise level would be about DNL 45. If the structure is located in an area exposed to aircraft noise of DNL 70, the interior noise level would be about DNL 50, so an additional NLR of 5 decibels would be required if not afforded by the normal construction. This NLR can be achieved through the use of noise-attenuating materials in the construction of the structure.

Notes:

1/ The land use is generally incompatible with aircraft noise and should only be permitted in areas of infill in existing neighborhoods or where the community determines that the use must be allowed.

2/ NLR required in offices or other areas with noise-sensitive activities.

3/ Provided that special sound reinforcement systems are installed.

Source: U.S. Department of Transportation, Federal Aviation Administration, Federal Aviation Regulations Part 150, Airport Noise Compatibility Planning, Code of Federal Regulations, Title 14, Chapter I, Subchapter I, Part 150, Table 1, January 18, 1985, as amended.

Prepared by: Ricondo & Associates, Inc., September 2008.

In addition, the analysis suggests that implementation of Runway 9-27 would result in fewer people and households being affected by DNL 65 and greater sound levels. This reduction reflects that noise levels west of the existing runways would decrease due to quieter aircraft using the existing runways and that some aircraft operations would shift to Runway 9-27 in an undeveloped area.

The City of Boise Comprehensive Plan identifies Airport Influence Areas (AIA) based on noise levels within the respective areas and establishes policies to protect the Airport from encroachment of incompatible uses; requires sound insulation for permitted noise-sensitive uses; and allows compatible uses such as commercial, industrial, office, agriculture, and low-intensity recreational use.[5]

The Ada County Comprehensive Plan has adopted the same AIA and policies as the City of Boise plan and coordinates with the City of Boise ("the City") to ensure consistent city and county development regulations in the AIA.[6] Planned land uses within the AIA are shown on **Exhibit VIII-2**. In addition, the approved FAR Part 150 Study Update recommended measures to ensure long-term compatibility of the Airport with the surrounding area. The City is currently implementing several recommendations of the study.

In summary, implementation of the projects described in this Master Plan is in conformance with local government planning and the facilitation of the Airport improvements is a priority policy for the Airport, the City, and Ada County. Current local government policies regarding land usage at and around the Airport prevent land use which is incompatible with the Airport. Policies have been enacted to protect existing and potential future developments outside of the Airport from excessive noise. Therefore, implementation of the ADP is not expected to result in a significant impact on compatible land use.

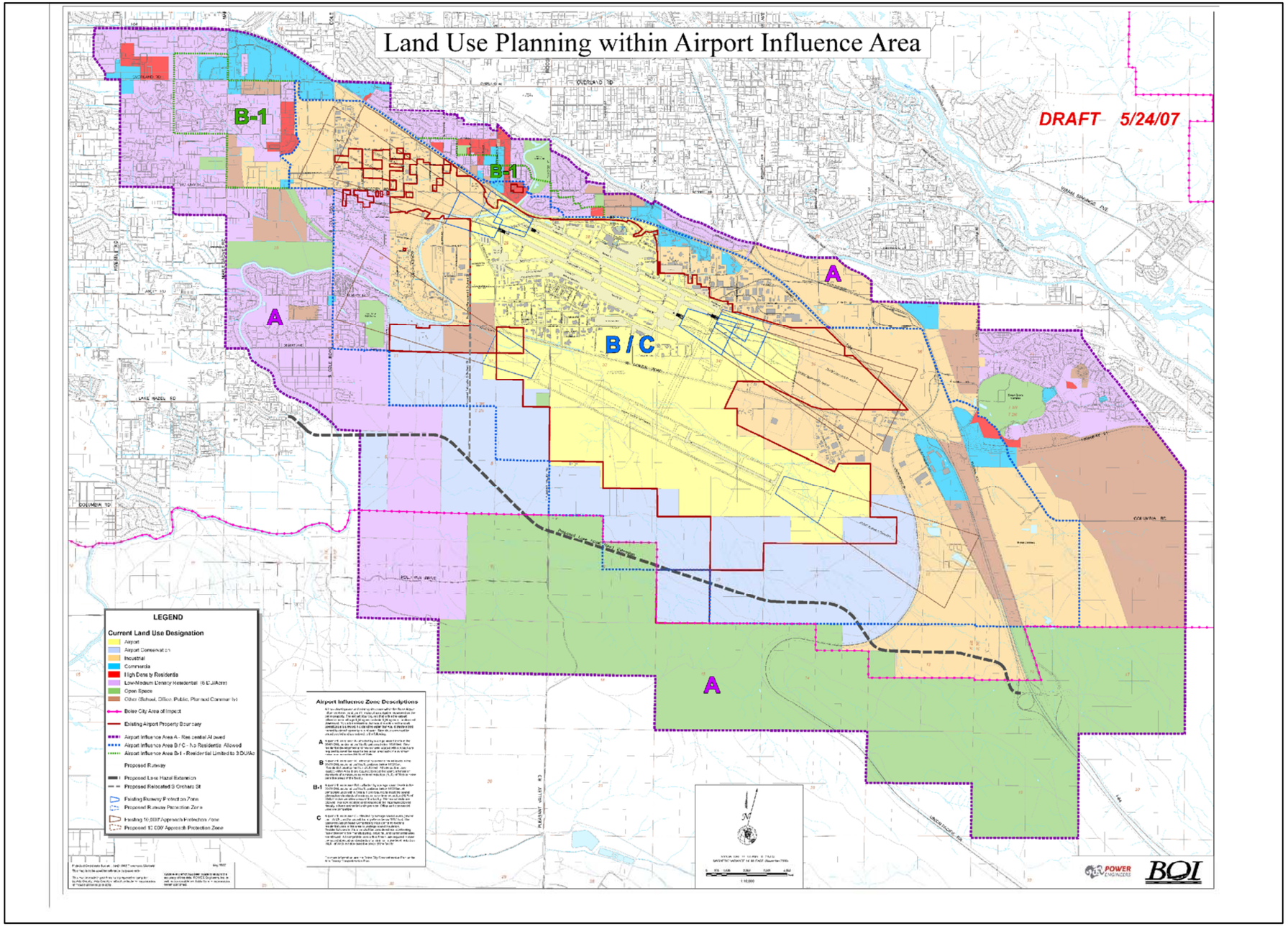
8.3 Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks

According to FAA Orders 1050.1E and 5050.4B, the three primary social impact categories to be considered are: (1) socioeconomic impacts, such as acquisition or displacement of residences and/or businesses; (2) environmental justice, such as disproportionate impacts to minority and low income populations; and (3) children's environmental health and safety risks when a disproportionate share of impacts affect children's health and safety.

The purpose of a social impact analysis is to determine the effects of airport development on the human environment. The types of impacts considered in this resource category that could result from airport development include:

- Relocation of businesses and/or residences
- Disruption of established communities
- Disruption of planned development
- Changes in surface transportation traffic patterns
- Environmental justice and children's environmental health and safety risks

[5] City of Boise, *Boise Comprehensive Plan*. Adopted January 1997. Updated in 2005.
[6] Ada County, *Ada County Comprehensive Plan*. Adopted June 17, 1996. Updated November 2007.



Legend

Current Land Use Designation

- Airport
- Airport Conservation
- Industrial
- Commercial
- High Density Residential
- Low-Medium Density Residential (6 DU/Acre)
- Open Space
- Other (School, Office, Public, Planned Community)
- Boise City Area of Impact
- Existing Airport Property Boundary
- Airport Influence Area A - Residential Allowed
- Airport Influence Area B / C - No Residential Allowed
- Airport Influence Area B-1 - Residential Limited to 3 DU/Ac
- Proposed Runway
- Proposed Lake Hazel Extension
- Proposed Relocated S Orchard St
- Existing Runway Protection Zone
- Proposed Runway Protection Zone
- Existing 10,000' Approach Protection Zone
- Proposed 10,000' Approach Protection Zone

Airport Influence Zone Descriptions

All new development and existing structures within the Boise Airport Influence Areas must grant the airport an avigation easement on the entire property. The airport also requires that within the airport influence area, all sign lighting and exterior lighting must be directed downward. No visible emissions that would interfere with aircraft operations are allowed. No standing water that would create a bird hazard to aircraft operations is allowed. New structures must be soundproofed and are subject to the following:

A Airport influence area A - affected by average sound levels in the 60-65 DNL, and/or aircraft traffic patterns below 1000 feet. New residential development and new schools located within Area A are required to meet the sound attenuation standards of a minimum noise level reduction (NLR) of 25db.

B Airport influence area B - affected by average sound levels in the 65-70 DNL and/or aircraft traffic patterns below 1000 feet. Residential development is not allowed. All compatible uses located within Area B are required to meet the sound attenuation standards of a minimum noise level reduction (NLR) of 30db in noise sensitive areas of the facility.

B-1 Airport influence area B-1 - affected by average sound levels in the 65-70 DNL and/or aircraft traffic patterns below 1000 feet. All compatible uses within Area B-1 are required to meet the sound attenuation standards of a minimum noise level reduction (NLR) of 30db in noise sensitive areas of the facility. No new schools are allowed. For new residential development the maximum allowed density is three residential units per acre. Office and commercial uses are compatible.

C Airport influence area C - affected by average sound levels greater than 70 DNL and/or aircraft traffic patterns below 1000 feet. The approved Airport Noise Compatibility Plan identifies existing residential uses in this area to undergo sound insulation. Residential uses in this area shall be considered non-conforming. Non-noise sensitive manufacturing, industrial, and commercial uses are allowed. All compatible uses within Area C are required to meet the sound attenuation standards of a minimum noise level reduction (NLR) of 30db in noise sensitive areas of the facility.

For more information see the Boise City Comprehensive Plan or the Ada County Comprehensive Plan.

Source: Power Engineers, May 2007.
Prepared by: Ricondo & Associates, Inc., September 2008.

0 Not to scale north

Exhibit VIII-2

Planned Land Uses
Within the Airport Influence Area

8.3.1 Existing Conditions

Boise Airport is located in the City of Boise in northern Ada County, Idaho. Detailed socioeconomic data for Ada County and the entire primary market area of the Airport is presented in Section II. The following summarizes the socioeconomic data for Ada County.

- **Population** – Ada County's population in 2005 was 345,577, with 34.5 percent growth since 1995.
- **Employment** – Total non-agricultural employment in Ada County grew at an annual average rate of 3.4 percent from 1995 to 2005. Services and Wholesale and Retail Trade are the largest employment sectors in the county.
- **Per Capita Personal Income** – Ada County has the highest per capita personal income, which increased from $26,748 in 1995 to $38,955 in 2005. Per capita effective buying income in Ada County increased from $17,036 in 1995 to $19,073 in 2004.

8.3.2 Potential Impacts

8.3.2.1 Relocation of Businesses/Residences

Implementation of the ADP would not involve the acquisition and/or relocation of off-Airport businesses or residences. Construction of the connecting taxiway between Runway 9-27 and the existing airfield would require the relocation of the Idaho National Guard (ING) munitions storage facilities, currently located southeast of the existing airfield. The storage facilities include approximately 15 storage bunkers and several maintenance buildings. Relocation of this facility has been coordinated between the City and the ING. Potential environmental impacts associated with this relocation were discussed in the 2007 EA for the Implementation of the Base Realignment and Closure (BRAC).

8.3.2.2 Disruption of Established Communities

Implementation of the ADP has the potential to slightly alter aircraft noise exposure, as described in section 8.1.2. No other disruptions to local, residential, commercial, or industrial communities are expected.

8.3.2.3 Disruption of Planned Development

Implementation of the ADP is consistent with ongoing Airport planning and development and is not expected to disrupt any planned development in the Airport area.

8.3.2.4 Changes in Surface Transportation

Construction of the connecting taxiway between Runway 9-27 and the existing airfield would necessitate tunneling Gowen Road under the taxiway and constructing a taxiway bridge. During construction, it is anticipated that access through the existing roadway alignment would be maintained. If a closure were to occur, it would be expected to be limited to short durations and traffic would likely be diverted to other area roadways, which have sufficient capacity to accommodate the relocated traffic.

South Orchard Street currently borders the west side of the Airport, running along the boundary of general aviation (GA) and ING facilities. The ADP includes relocating the roadway approximately ¼-mile to the west to straighten the roadway and provide space for GA consolidation and expansion.

Related projects include the extension of Aeronca Street and Gowen Road to the relocated South Orchard Street. It is anticipated that relocating South Orchard Street would involve periodic, but temporary, road closures, which would likely be mitigated by diverting traffic onto other roadways.

Separate from the ground transportation projects included in the ADP, the Idaho Transportation Department has planned and initiated improvements to I-84 and associated interchanges in the vicinity of the Airport. Additionally, the Ada County Highway District has evaluated concepts for extending Lake Hazel Road south of Runway 9-27 to increase connectivity in the southern Ada County region.

8.3.2.5 Environmental Justice and Children's Environmental Health and Safety Risks

Pursuant to Executive Order 12898, the purpose of an environmental justice evaluation is to identify whether adverse human health or environmental effects of a proposed project are likely to fall disproportionately on minority or low-income populations. Similarly, Executive Order 13045 requires an assessment of potential environmental health and safety risks that may disproportionately affect children.

No significant noise impacts are anticipated under the ADP. Previous noise analyses suggest that operation of the new runway may actually reduce the amount of population and housing affected by aircraft noise levels compared with the no-action alternative (see section 8.2.2). Therefore, it is anticipated that implementation of the ADP would not have a disproportionate adverse impact on children or low income or minority populations.

8.3.2.6 Summary

The expansion and development of the Airport through implementation of the ADP has been planned to avoid incompatible land use and noise issues. Future expansion is expected to be in conformance with the City of Boise, Ada County, and Airport planning. Temporary traffic restrictions could temporarily affect access to businesses and industrial facilities around the Airport during construction phases. However, these temporary impacts would not likely be significant. No dislocation of non-Airport related commercial or industrial facilities or residential population is expected due to implementation of the ADP.

8.4 Induced Socioeconomic Impacts

Sometimes called secondary or indirect impacts, induced socioeconomic impacts are directly proportional to the scope of a project. This impact category involves shifts in population, public service demands, or changes in the business and/or economic climate.

8.4.1 Existing Conditions

The Airport is a diverse economic system that influences various sectors of the local and regional economy. These sectors include airline and airport services, freight transportation, passenger ground transportation, contract construction and consulting services, and the visitor/tourism industry.

8.4.2 Potential Impacts

Temporary traffic restrictions resulting from implementation of various ADP projects could temporarily affect access to businesses and industrial facilities around the Airport during construction phases. However, these temporary impacts would not likely be significant. No dislocation of non-airport related commercial or industrial facilities or residential population is expected due to

implementation of the ADP. Construction of various airfield projects would likely require temporary restrictions in the use of the runways, which could temporarily affect airlines and other airport-related businesses. It is anticipated that runway restrictions would be planned to occur at low traffic times to minimize disruptions.

It is expected that the development recommended in the Master Plan Update would positively contribute to the business and overall economic climate of the area. All of the development would occur on existing Airport property; therefore, relocation of businesses and residences would not be required. Improvements to landside and terminal facilities would generate tenant growth and additional jobs. Opportunities also exist for job growth if additional aviation support and GA facilities are developed on land designated for these uses. Combined, these factors would produce an increase in the number of jobs in the area, creating a benefit to the surrounding community.

In summary, no significant secondary or induced impacts are expected through implementation of the ADP.

8.5 Air Quality

The federal Clean Air Act, as amended, requires individual states to identify general geographic areas where the National Ambient Air Quality Standards (NAAQS) are not met for six criteria pollutants.[7,8] The U.S. Environmental Protection Agency (U.S. EPA) has designated such areas as nonattainment areas. A state with a nonattainment area must prepare a State Implementation Plan (SIP) that details the programs and requirements that the State will implement to meet the NAAQS by the deadlines specified in the Clean Air Act Amendments of 1990 (CAAA) and subsequent rules promulgated by the U.S. EPA. Upon achieving attainment, areas are considered to be in maintenance status for a period of 10 or more years.

The CAAA require federal agencies to ensure that their actions conform to the appropriate SIP. Conformity is defined as demonstrating that a project or action conforms to the SIP's purpose of eliminating or reducing the severity and number of violations of the ambient air quality standards and achieving expeditious attainment of such standards. FAA-funded and approved actions or projects are subject to the "General Conformity" regulations of the CAAA (40 CFR Part 93, Subpart B).

Generally, to comply with the requirements of the "General Conformity" regulations, two criteria must be met: (1) it must be shown that total direct and indirect pollutant emissions[9] resulting from a project in a nonattainment area are included in a SIP budget or are below *de minimis*[10] emissions levels established for the nonattainment area, and (2) it must be demonstrated that pollutant emissions from the project would not be regionally significant (i.e., the project would not contribute 10 percent or more of the region's total emissions for a criteria pollutant). If it is determined through an emissions inventory that the direct and indirect pollutant emissions from a project would be below

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7 The criteria pollutants include ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter (fine particles) less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb).

8 The Idaho Department of Environmental Quality (IDEQ) has adopted ambient air quality standards which are the same as the NAAQS.

9 Total direct and indirect emissions are the sum of the emissions increases and decreases associated with a proposed project, or the "net" change in emissions anticipated to occur as a result of the proposed project [40 CFR 93.152].

10 Emissions are so small as to be negligible or insignificant. If a project/action has *de minimis* emissions, a conformity determination/NAAQS assessment pursuant to the CAAA is not required (40 CFR Part 93.153c).

de minimis levels and not "regionally significant", no further air quality analysis is required and the project is presumed to conform with the applicable SIP. If a project's emissions would equal or exceed the annual *de minimis* levels, a conformity determination/NAAQS assessment is required, including requisite pollutant dispersion analyses.

Many projects at airports and air bases are too small to require a detailed NAAQS assessment, and only a few projects are located in nonattainment areas and broad enough in scope to require the full complement of air quality analyses (i.e., an emissions inventory and dispersion analysis). Nevertheless, in the past decade, the number of airport sponsors that have been required to conduct NAAQS assessments has increased substantially, particularly in communities with poor air quality.

8.5.1 Existing Conditions

The Airport is located in Northern Ada County, which is designated as a maintenance area in attainment of the NAAQS for carbon monoxide (CO). This area has not experienced a violation of the CO NAAQS since 1987. The Idaho Department of Environmental Quality (IDEQ) submitted the *Limited Maintenance Plan and Request for Redesignation to Attainment for the Northern Ada County Carbon Monoxide Not-Classified Nonattainment Area* to the U.S. EPA in December 2001. The U.S. EPA approved the Limited Maintenance Plan and subsequently redesignated the area in December 2002. In addition, Northern Ada County is designated as a maintenance area in attainment of the 24-hour PM_{10} standard and an attainment area for the annual PM_{10} standard. No violation of the 24-hour PM_{10} NAAQS has occurred since 1991.

Using the FAA's Emissions and Dispersion Modeling System (EDMS), Version 5.1, a baseline emissions inventory was produced for the Airport, based on activity for the year 2007. Sources of emissions that were calculated by the model include aircraft operations, ground support equipment (GSE), and ground vehicles operating on Airport access roadways and in Airport parking lots. Inventory results and the methodology used to produce the inventory are detailed in the *Boise Airport Master Plan Update Air Quality Screening Analysis Technical Report*.[11]

8.5.2 Potential Impacts

Potential air quality impacts from construction and operation of the projects identified in the ADP would be estimated through one or a combination of several types of air quality assessments. Most of these air quality assessments would be conducted as part of a future EA or EIS, although some may be conducted independently, depending on the actual timing of implementation for each project. The types of air quality assessments which may be required for various projects identified in the ADP include the following:

- **Operational Emissions Inventory** – An operational emissions inventory is conducted to assess air quality impacts caused by changes in airport activity levels. A substantial change in the number, type, or operating patterns of aircraft, GSE, and passenger vehicles caused by an airport improvement project warrants an operational emissions analysis. If, through the operational emissions inventory process, it is determined that project-related emissions (direct and indirect) do not exceed applicable *de minimis* thresholds, no further air quality analysis would be required. If project-related emissions are equal to or greater than the *de minimis* thresholds, an NAAQS assessment may be required (see below). EDMS is approved by the FAA and the U.S. EPA for conducting operational emissions inventories for airports.

[11] Ricondo & Associates, Inc., *Boise Airport Master Plan Update Air Quality Screening Analysis Technical Report*, September 2008.

- **Construction Emissions Inventory** – A construction emissions inventory is conducted to quantify the temporary emissions caused by construction activities. Several projects included in the ADP involve the construction of landside or airside facilities. Typical sources of construction-related emissions include non-road equipment (backhoe, drilling rigs, mixers, etc.), on-road equipment (dump trucks, concrete trucks, etc.), and construction employee vehicle traffic. EDMS is not used to assess construction-related emissions. Methodologies for conducting construction emissions inventories and the emission factors for construction equipment are described in U.S. EPA publications, including the *Compilation of Air Pollutant Emissions Factors, AP-42, Volume II: Mobile Sources, Fifth Edition.*[12] As is the case with the operational emissions inventory, the established protocol for conducting a construction emissions inventory is to compare the direct and indirect emissions associated with the project to *de minimis* thresholds for the applicable nonattainment or maintenance area.[13] Construction-related emissions for most airport projects are below *de minimis* thresholds; however, emissions caused by on-road construction vehicle trips have been the subject of NAAQS assessments, in particular, hot spot analyses.
- **Hot Spot NAAQS Assessment** – If a project has the potential to adversely affect air quality at roadway intersections on the airport or in the airport environs by significantly increasing traffic volumes, it is typical to conduct a hot spot analysis. The purpose of conducting a hot spot analysis is to determine if project-related emissions of carbon monoxide caused by motor vehicles would cause or contribute to an exceedance of the NAAQS. The common protocol for a hot spot analysis is to select the intersections with the highest traffic volumes and the lowest level of service rating for modeling. Hot spot modeling is typically conducted using U.S. EPA models, specifically the MOBILE emissions model and the CAL3QHC dispersion model.
- **General NAAQS Assessment** – If direct and indirect pollutant emissions associated with an airport project are shown to exceed *de minimis* thresholds and pollutant concentrations are likely to cause or contribute to exceedances of the NAAQS (for any of the criteria pollutants), it is typical to conduct a general NAAQS assessment. If a general NAAQS assessment is required, "build" and "no-build" emissions are inventoried for each reasonable alternative. Emissions for the proposed build case are then translated into pollutant concentration estimates using a dispersion model (typically EDMS for airport studies). Once the dispersion modeling has been performed, pollutant concentration estimates from the dispersion model are added to background concentrations and compared to the NAAQS. If concentrations do not exceed the NAAQS, the NAAQS assessment is complete. If pollutant concentrations exceed the NAAQS, emissions must be mitigated or offset, or the project redesigned to reduce air pollutant emissions.

To determine the potential for significant air quality impacts due to implementation of the ADP, a screening analysis was conducted, which compared operational and construction emissions from "With Project" and "Without Project" scenarios during years of significant airport development.[14] The difference in emissions between "With Project" and "Without Project" scenarios were compared

[12] U.S. Environmental Protection Agency, *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume II: Mobile Sources*, Washington, D.C., January 1995.

[13] Under the General Conformity regulations, emissions associated with construction activities must be calculated, added to operational emissions, if appropriate, and the total compared to the annual *de minimis* thresholds for criteria pollutants.

[14] Ricondo & Associates, Inc., *Boise Airport Master Plan Update Air Quality Screening Analysis Technical Report*, September 2008.

against applicable *de minimis* thresholds to determine if implementation of the ADP would be expected to conform to the applicable SIP.

Results of the analysis indicate that operational emissions associated with the "With Project" scenario for each year are less than operational emissions associated with the "Without Project" scenario for the same year. This decrease can be explained by the reduced taxi time/delay experienced by aircraft due to various airfield improvements, such as utilization of Runway 9-27, extension of Runway 10R-28L, a new exit taxiway for aircraft arriving on Runway 10R, and relocation of GA and cargo activity that results in more efficient airfield operations.

Results of the construction emissions analysis indicate that under the assumed implementation plan, CO and PM_{10} emissions generated by construction activities are estimated to be below applicable *de minimis* thresholds. Therefore, implementation of the ADP is not expected to generate increased emissions that would violate the applicable SIP.

It should be noted that the abovementioned screening analysis is not a substitute for a formal General Conformity applicability analysis or any other air quality analysis which may be required under NEPA as part of a future EA or EIS. In addition, the results of the screening analysis may not be considered in lieu of results from future formal air quality analyses when determining significant air quality impacts from specific projects identified in the ADP.

8.6 Water Quality

The federal Water Pollution Control Act, as amended by the Clean Water Act, provides the federal government with the authority to establish water quality standards, control discharges into surface and subsurface waters (i.e., point sources), develop waste treatment management plans, and issue permits for dredge and fill material. Since the initial enactment of these policies, the significance of adverse water quality impacts resulting from non-point sources of pollution has been increasingly recognized. The 1987 Water Quality Act amended the Clean Water Act to specifically address non-point source pollution.

Federal agencies are required to comply with the Clean Water Act in any development that may affect water quality, including the control of any discharge into surface or groundwater. Agencies must also comply with the Fish and Wildlife Coordination Act if planned development diverts, drains, controls, or otherwise modifies the waters of any stream or other water body. Finally, the Safe Drinking Water Act requires consultation with the U.S. EPA if planned development has the potential to contaminate an aquifer designated by the U.S. EPA as a sole or principal source of drinking water for the area.

8.6.1 Existing Conditions

8.6.1.1 Surface Water

The primary surface water features in the vicinity of the Airport include the Boise River and the New York Canal. The Boise River is approximately two to three miles north of the Airport and drainage from the Airport eventually enters the river approximately 25 miles northeast of Boise.[15] The New York Canal parallels the Airport north of Interstate 84, then meanders south and west, crossing Orchard Street at the northwest end of the Airport. The canal begins at the Boise River Diversion

[15] HNTB Corporation, Synergy Consultants, Inc., and Anchor Environmental, L.L.C., *Final Environmental Assessment of Proposed Airfield Improvements at Boise Airport*, July 2001.

Dam, seven miles southeast of Boise, and continues for 40 miles to Deer Flat Reservoir located southwest of Boise. The canal is the main source of irrigation water for the areas west and north of the Airport, which are prime agricultural lands. No drainage from the Airport enters the canal.[16]

Five Mile Creek, a tributary of the Boise River, flows from east to west on the southern part of the Airport (parallel to Gowen Road), in the vicinity of the existing military assault strip (future Runway 9-27). The creek is an intermittent stream fed by heavy rains and snow melt, and typically carries flow only under those conditions.

8.6.1.2 Stormwater Drainage

Stormwater runoff is generated by gradient-induced drainage of paved and impervious surfaces. Activities such as aircraft washing, fueling, de-icing, and minor maintenance on paved surfaces can result in contaminants in stormwater runoff. If not treated, contaminated stormwater will eventually be deposited into nearby tributaries or groundwater reserves.

The Airport has implemented a Storm Water Pollution Prevention Plan (SWPPP) that includes best management practices to prevent and manage water quality impacts associated with airfield runoff and activities. Stormwater runoff is directed to several stormwater retention ponds and a stormwater basin that overflows into Five Mile Creek.

8.6.1.3 Groundwater

Groundwater resources at the Airport include a shallow aquifer at a depth of 150 to 190 feet and a deep aquifer at a depth of 350 feet. The deep aquifer is thought to be recharged by the Boise River, while irrigation activity is thought to be the recharge source for the shallow aquifer. Historically, the New York Canal was considered the recharge source for the shallow aquifer. However, the canal is now lined and is no longer a groundwater source.[17]

8.6.2 Potential Impacts

Airport activities can affect water quality, primarily as a result of stormwater runoff that carries pollutants from paved surfaces. Pollutants typically found in airport runoff include spilled oil and fuel, loose debris, and accidentally discharged chemicals.

Prior development at the Airport has affected Five Mile Creek, which has been partially relocated and channelized. Planned development in accordance with the ADP, particularly development of Runway 9-27, will likely affect Five Mile Creek as well. However, it is anticipated that stormwater pollution prevention practices implemented during construction and stream relocation activities would minimize the potential for exposed soils or other contaminants from construction activities to reach nearby surface waters. Stormwater management infrastructure (i.e., drainage ditches, catch basins, etc.) would also be incorporated into the construction projects, as necessary. In addition, it is anticipated that construction depths would be relatively shallow and would not impact the aquifers or any other groundwater supply. Therefore, no significant impacts to water quality are expected.

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[16] HNTB Corporation, Synergy Consultants, Inc., and Anchor Environmental, L.L.C., *Final Environmental Assessment of Proposed Airfield Improvements at Boise Airport*, July 2001.

[17] National Guard Bureau, *Environmental Assessment for the Implementation of the Base Realignment and Closure (BRAC) – Final Recommendations for the Mission Change and Construction Activities of the 124th Wing*, December 2007.

8.7 Department of Transportation Act, Section 4(f) Lands

Section 4(f) of the U.S. Department of Transportation (DOT) Act (recodified and renumbered as Section 303(c) of 49 U.S.C) states that the DOT Secretary shall not approve any project using publicly-owned land that is considered to be of national, state, or local significance and is included in one or more of the following categories:

- Publicly owned park or recreation area
- Wildlife or waterfowl refuge
- Historic and archaeological resources included on or eligible for listing on the National Register of Historic Places (NRHP)

Section 4(f) lands are evaluated to determine whether or not a project would involve direct (use) or indirect (constructive use) of the land. Direct use of a Section 4(f) land refers to a physical taking or direct control of the land that would change the use of the land from its existing intended use or purpose. A "constructive use" of the land relating to transportation projects occurs when the proximity of a project to the DOT Section 4(f) lands causes impacts to the 4(f) land to the degree that the land is substantially impaired or altered from its original intended use.

8.7.1 Existing Conditions

According to the 2007 EA for Instrument Landing System and Approach Lighting System Installation, Upgrade, and Operation, there is no publicly-owned land used as public parks, recreation areas, wildlife or waterfowl refuges, or historic sites located on the Airport.[18] The closest City of Boise parks to the Airport are Owyhee Park at 3400 W. Elder Street and Shoshone Park at 2800 W. Canal Street, both located approximately one mile north of the Airport. The 2001 EA for Proposed Airfield Improvements at Boise Airport identified three historic districts and three buildings located on Gowen Field that are eligible for listing on the NRHP.[19]

8.7.2 Potential Impacts

Because there are no DOT Act Section 4(f) properties located on or near the area of proposed ADP development, there would be no impact on to these resources. Impacts to the properties or facilities eligible for listing on the NRHP are not expected since they are part of a working National Guard facility and were constructed for the purpose of serving National Guard duties.[20] In addition, implementation of the ADP would not alter the context or community in which these potentially historic structures were built.

8.8 Historic, Archaeological, and Cultural Resources

Historical, architectural, archaeological, and cultural resources are examined pursuant to two main federal acts:

- The **National Historic Preservation Act of 1966**, as amended – This Act requires an initial review to determine whether properties contained within the National Register of Historic Places or properties eligible for inclusion in the Register will be affected by a proposed

[18] SAGE Environmental, L.L.C., *Final Environmental Assessment – Instrument Landing System and Approach Lighting System Installation, Upgrade, and Operation*, June 2007.

[19] HNTB Corporation, Synergy Consultants, Inc., and Anchor Environmental, L.L.C., *Final Environmental Assessment of Proposed Airfield Improvements at Boise Airport*, July 2001.

[20] Ibid.

project. Properties listed in the NRHP must be at least 50 years old unless the property is deemed to be of exceptional historical and/or cultural significance.

- The **Archaeological and Historic Preservation Act of 1974**, as amended – This Act requires a survey, recovery, and preservation of historical and archaeological data that may be destroyed or irreparably lost due to a federal, federally-licensed, or federally-funded action. Certain historical properties are also considered under Section 4(f) of the Department of Transportation Act (see section 8.7).

Impacts to historic, archaeological, and cultural resources can be caused by airport development, and include both direct and indirect impacts. Direct impacts include acquisition or relocation of resources and disruption of a site caused by construction. Indirect impacts include the alteration of surface transportation patterns and environmental impacts such as noise, air pollution, or water pollution that change the use of the site.

8.8.1 Existing Conditions

According to the National Park Service's National Register Information System (NRIS), there are no historic properties listed in the NRHP located on the Airport. The closest registered historical property to the Airport is the Whitney School located at 1609 S. Owyhee Street, approximately two miles north of the Airport. Nine historic preservation districts are located within the City of Boise, although none of them include the Airport. In addition, according to the 2007 EA for Instrument Landing System and Approach Lighting System Installation, Upgrade, and Operation, a search of the Native American Graves Protection and Repatriation Act database found that no federally-recognized Indian Tribes are identified as having interests in Ada County.[21]

A review of previous environmental studies and an archaeological survey were conducted in 1999 as part of the 2001 EA for Proposed Airfield Improvements at Boise Airport. Results of the investigation are presented in **Table VIII-3**.

8.8.2 Potential Impacts

No listed or registered historical, archeological, or cultural resources are known to exist in the area proposed for development under the ADP. The resources discovered in the vicinity of the proposed Runway 9-27 development area during the 1999 survey were either isolated finds or determined to be ineligible for listing on the NRHP. Resources that are eligible for listing on the NRHP are all part of the National Guard installation on Gowen Field and would not be impacted by implementation of the ADP.

If potential historical, archeological, or culturally important materials are discovered during implementation of the ADP, it is anticipated that work would stop, the area would be secured, and the State Historic Preservation Office (SHPO) would be notified of the discovery to determine appropriate actions.

[21] SAGE Environmental, L.L.C., *Final Environmental Assessment – Instrument Landing System and Approach Lighting System Installation, Upgrade, and Operation*, June 2007.

Table VIII-3

Historical, Archaeological, and Cultural Resources in the Vicinity of the Airport

Resource	Location	Type	Status
Isolated artifact	Gowen Field	Archaeological	Isolated find
Isolated artifact #1	Runway 9-27 development area	Archaeological	Isolated find
Isolated artifact #2	Runway 9-27 development area	Archaeological	Isolated find
Five Mile Creek dam and stockpond	Runway 9-27 development area	Historical	Not eligible for listing on the NRHP
Five Mile Creek bunkers	Runway 9-27 development area	Historical	Not eligible for listing on the NRHP
Five Mile Creek dump	Runway 9-27 development area	Historical	Not eligible for listing on the NRHP
World War II Officers' Quarters Historic District	Gowen Field	Architectural	Eligible for listing on the NRHP
World War II Enlisted Men's Barracks Historic District	Gowen Field	Architectural	Eligible for listing on the NRHP
World War II Ordnance Historic District	Gowen Field	Architectural	Eligible for listing on the NRHP
World War II auditorium	Gowen Field	Architectural	Eligible for listing on the NRHP
World War II headquarters	Gowen Field	Architectural	Eligible for listing on the NRHP
World War II warehouse	Gowen Field	Architectural	Eligible for listing on the NRHP

Note: NRHP = National Register of Historic Places.

Sources: Ricondo & Associates, Inc., September 2008, based on information obtained from HNTB Corporation, Synergy Consultants, Inc., and Anchor Environmental, L.L.C., *Final Environmental Assessment of Proposed Airfield Improvements at Boise Airport*, July 2001.
Prepared by: Ricondo & Associates, Inc., September 2008.

8.9 Fish, Wildlife, and Plants

The Endangered Species Act, as amended, protects federally-listed species and the deterioration of critical habitat. Section 7 of the Endangered Species Act mandates all federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) regarding any federal action that may affect a federally-listed species.

The term "endangered species" means any member of the animal kingdom (mammal, fish, bird, etc.) or plant kingdom (seeds, roots, etc.) that is in danger of extinction throughout all or a significant portion of its range. "Threatened species" refers to those members of the animal or plant kingdom that are likely to become endangered within the foreseeable future.

8.9.1 Existing Conditions

The Airport environs consist of areas of urban development, undeveloped disturbed land, and undeveloped vacant land in its native desert state. The semi-arid, variable weather conditions of the local environs, combined with the exposed location of the Airport, support a plant community dominated by sagebrush and bunch grass. Sagebrush-dominated areas are those with Wyoming big sagebrush, cheatgrass, and tumblemustard as the main species. Bunch grass-dominant areas have

cheatgrass, medusahead wildrye, tumblemustard, bur buttercup, rabbit brush, and Great Basin wild rye.[22]

Several animal species are known to use less-developed areas of the Airport property (particularly in the vicinity of the planned Runway 9-27 development), including mice and other small rodents, black-tailed jackrabbits, coyotes, badgers, and mule deer. Birds commonly found in the vicinity of the Airport include the house sparrow, Brewer's blackbird, Common raven, and Western meadowlark, with occasional sightings of raptors, waterfowl, and upland game birds.[23]

No perennial surface waters that support fish populations are located on Airport property. The nearest perennial surface water is the Boise River, located approximately two to three miles north of the Airport. The New York Canal, located at the northwest end of the Airport, conveys water only during the irrigation season, limiting the habitat value of the canal for aquatic species.

The species listed, or that are candidates for listing, by the USFWS under the Endangered Species Act within Ada County are presented in **Table VIII-4**. Recently delisted wildlife species present in Ada County include the bald eagle (*Haliaeetus leucocephalus*) and the Idaho springsnail (*Pyrgulopsis idahoensis*).

Table VIII-4

Federally-Listed and Candidate Fish and Wildlife Species in Ada County

Species	Scientific Name	Federal Status
Gray wolf	*Canis lupus*	Experimental/Non-essential population
Bull trout	*Salvelinus confluentus*	Threatened
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate

Source: U.S. Fish and Wildlife Service Pacific Region, http://www.fws.gov/idaho/agencies/COlists/Ada.pdf (accessed September 8, 2008).
Prepared by: Ricondo & Associates, Inc., September 2008.

Slickspot peppergrass (*Lepidium papilliferum*) has been known to occur on Airport property.[24] Slickspot peppergrass was a candidate species for federal listing as threatened, but that listing was found to be not warranted. However, this species is still considered by the State of Idaho to be of special concern.

Idaho wildlife species of special concern for Ada County for which potential habitat is present on Airport property include the peregrine falcon, the ferruginous hawk, the long-billed curlew, the burrowing owl, and the Piute ground squirrel. Idaho species of special concern for Ada County for which potential habitat is not known to be present on Airport property include the northern leopard frog, Woodhouse's toad, pygmy rabbit, and shining flatsedge.[25]

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22 HNTB Corporation, Synergy Consultants, Inc., and Anchor Environmental, L.L.C., *Final Environmental Assessment of Proposed Airfield Improvements at Boise Airport*, July 2001.

23 Ibid.

24 National Guard Bureau, *Environmental Assessment for the Implementation of the Base Realignment and Closure (BRAC) – Final Recommendations for the Mission Change and Construction Activities of the 124th Wing*, December 2007.

25 SAGE Environmental, L.L.C., *Final Environmental Assessment – Instrument Landing System and Approach Lighting System Installation, Upgrade, and Operation*, June 2007.

8.9.2 Potential Impacts

Implementation of the ADP includes several construction projects, primarily to the south and west of the Airport, some of which could be on undisturbed sagebrush land. No federally-listed species or prime or unique habitat for those species exists in the Airport area. Potential habitat for the gray wolf does not exist due to the Airport's location in urban Boise. Bull trout occur in the Boise River, but only upstream of the Lucky Peak Dam. Since this dam is upstream of the diversion for the New York Canal, bull trout are not expected to be impacted by Airport development. Habitat for yellow-billed cuckoos is also absent due to the lack of any riparian gallery forests.[26] Therefore, significant impacts to these species due to potential construction activities are not expected.

Impacts to slickspot peppergrass (an Idaho plant species of special concern) associated with the construction of the existing assault strip were minimized through implementation of a conservation easement between the City of Boise, the Idaho Air National Guard, and the U.S. Fish and Wildlife Service. Other populations of the species located in the vicinity, but outside of, the conservation easement, could potentially be impacted by construction activities associated with the ADP.[27]

8.10 Wetlands

Wetlands are defined as those areas that are inundated by surface or groundwater with a frequency sufficient to support vegetative or aquatic life that requires saturated or seasonally-saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas, such as sloughs, wet meadows, river overflows, mud flats, and natural ponds. Wetlands also include estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation.

National wetland standards state that if more than five acres are to be filled in or disturbed, an individual U.S. Army Corps of Engineers (USACE) Section 404 permit is required. For impacts less than five acres, a nationwide permit may be obtained if a proposed project and impacts meet nationwide permit conditions; otherwise an individual permit would be required. Obstruction or alteration of navigable waters would require a Section 10 permit.

8.10.1 Existing Conditions

A search for wetlands in the vicinity of the Airport was conducted using the National Wetlands Inventory (NWI) Wetlands Mapper. It revealed no wetlands, other than a riverine water body in the New York Canal. Other potential wetland areas in the Airport vicinity include wastewater treatment ponds southwest of the Airport (these are currently in the process of abandonment by the City of Boise); two intermittent/ephemeral streams, Five Mile Creek and a northern tributary of Five Mile Creek, which cross the southern half of the Airport; and several small freshwater ponds south of Gowen Road. Most of these ponds are labeled as excavated, while another is labeled diked/impounded, indicating that they are the result of human activity. [28]

8.10.2 Potential Impacts

Proposed airfield development at the west end of the Airport would likely affect the wastewater treatment ponds southwest of the Airport, although these ponds are in the process of abandonment by

[26] Ibid.
[27] Ibid.
[28] HNTB Corporation, Synergy Consultants, Inc., and Anchor Environmental, L.L.C., *Final Environmental Assessment of Proposed Airfield Improvements at Boise Airport*, July 2001.

the City of Boise. This development, along with future development/expansion of Runway 9-27, could also impact Five Mile Creek and a northern tributary of Five Mile Creek. However, project planning and construction best management practices would likely prevent or mitigate impacts to any valuable wetland resources.

8.11 Floodplains

As defined in Executive Order 11988, *Floodplain Management*, floodplains are the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands. At a minimum, floodplains include any area subject to a 1 percent or greater chance of a flood in any given year (i.e., the area that would be inundated by a 100-year flood). The Executive Order directs federal agencies to take action to reduce the risk of flood loss; to minimize the impacts of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial value served by floodplains.

8.11.1 Existing Conditions

The Airport lies on a relatively flat terrace which lies approximately 2.5 miles southwest of and 100 feet higher in elevation than the Boise River at its closest point. Five Mile Creek and a northern tributary of Five Mile Creek cross the southern side of the Airport and drain the Airport and surrounding area. The New York Canal, described in section 8.6, is a concrete-lined channel with a capacity of 2,800 cubic feet per second of water at a depth of 8 feet. Flow (and flood control) in the New York Canal is managed by the Boise Project Board of Control.

8.11.2 Potential Impacts

According to the Flood Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM), proposed airfield development at the west end of the Airport, as well as development of Runway 9-27, has the potential to impact the 100-year floodplain of Five Mile Creek. Such an impact would be considered a floodplain encroachment, which would require a No Rise Certification from the Idaho Department of Water Resources to ensure that the development projects would not cause an increase in the depth of expected flood levels. In addition, a Floodplain Development Permit would be required by Ada County.[29]

8.12 Energy Supply and Natural Resources

FAA Orders 1050.1E and 5050.4B, Executive Order 13123, *Greening the Government through Efficient Energy Management*, encourages federal agencies to expand the use of renewable energies and requires the reduction of petroleum use, energy use, and other natural resource consumption in its facilities. Consistent with NEPA and Council on Environmental Quality (CEQ) regulations, the FAA encourages all elements of transportation systems to be developed with respect to their aesthetic effects and conservation of energy supplies and natural resources.

In terms of airport development, there are typically two areas of concern with regard to energy supply and natural resources:

- **Stationary Sources** (terminal building, other facilities, airfield lighting) – Development of new hangars would result in increased energy consumption. Additional runway, taxiway, and approach lighting would also cause an increase in energy consumption.

[29] Washington Group International, *Orchard St. Realignment Environmental Checklist*, May 2007.

- **Mobile Sources** (aircraft and automobiles) – Aircraft are the primary consumer of fuel at the Airport.

8.12.1 Existing Conditions

The two primary forms of energy used at the Airport include energy to power facilities and energy necessary to power aircraft and ground vehicles.

The types of fuel used at the Airport to power aircraft and ground vehicles include avgas, Jet A, gasoline, and diesel. Potable water is supplied to the Airport by United Water. Idaho Power provides electric power to the Airport for buildings and airfield lighting. Natural gas is supplied by Intermountain Gas.

8.12.2 Potential Impacts

Increased levels of activity at the Airport would increase demand for energy regardless of whether the ADP is implemented.

Implementation of the ADP would increase Airport facilities and would likewise increase energy consumption at the Airport. The most notable increases would result from passenger terminal expansion (water, electricity, and natural gas) and airfield expansion (electricity for runway/taxiway lighting). However, compared to the energy consumption of the City of Boise as a whole, the increases in energy consumption and the effect on natural resources and energy supply as a result of the ADP would likely be insignificant.

8.13 Light Emissions

According to FAA Orders 1050.1E and 5050.4B, consideration should be given to potential impacts due to light emissions or visual impacts associated with a federal action: "Light emissions will be considered to the extent to which any lighting associated with an action will create an annoyance among people in the vicinity or interfere with their normal activities." Typical light emissions from airports include navigational aids, parking facilities, and roadway lighting. Visual, or aesthetic, "impacts deal more broadly with the extent that the development contrasts with the existing environment and whether the jurisdictional agency considers this contrast objectionable."

Two potential adverse impacts to human health related to airport light emissions include sleep disturbance and eye damage. Airport-related light emissions are only considered to have a notable impact if intense light is directed toward or is located within a residential area.

8.13.1 Existing Conditions

The Airport is located at the south edge of the City of Boise and is bounded on the north and east sides by I-84, with developed urban residential and commercial areas to the north. The areas to the east, south, and west are primarily developed industrial areas and undeveloped/rangeland. Lighting in the Airport area includes existing airport lights (approach lights, runway/taxiway lights, parking lot lights, etc.), street lighting, lights from local businesses and residential houses, and general ambient light from the Boise urban area north of the Airport.

8.13.2 Potential Impacts

Implementation of the ADP would introduce additional light sources into the area. Extension of Runway 10R-28L to the east, development and extension of Runway 9-27, and related taxiway

construction/improvements, would increase light emissions on the Airport. Generally, airport development would occur in areas that are buffered from residential and commercial properties and would likely not impact those properties significantly. Where necessary, it is anticipated that lights would contain baffles to ensure that light emissions do not adversely impact off-Airport properties.

8.14 Solid Waste and Hazardous Materials

Two distinct elements of hazardous materials and solid waste impacts relate to airport development: the proximity of hazardous waste and waste disposal sites to an airport.

FAA Advisory Circular 150/5200.34A, *Construction or Establishment of Landfills near Public Airports*, provides guidelines concerning the establishment, elimination, or monitoring of landfills, open dumps, waste disposal sites, or similarly titled facilities on or in the vicinity of airports. These types of facilities, used to process, bury, store, or otherwise dispose of waste, trash, and refuse, can attract rodents and birds. As the potential for bird strikes erodes the safety of an airport environment, waste storage facilities are undesirable and potentially hazardous to aviation. FAA Order 150/5200-33A recommends that landfills be located a minimum of 10,000 feet from an airport that serves turbine-powered aircraft. Ideally, however, it is recommended that a landfill be located at least five miles from an active airport.

The U.S. EPA is responsible for establishing federal policy and for establishing hazardous waste regulations and guidelines for the management of hazardous wastes. The enabling legislation for these regulations is the Resource Conservation and Recovery Act (RCRA). Subtitle C of the RCRA regulates hazardous waste generators. The U.S. EPA defines a generator as any person, or site, whose processes and actions create hazardous waste. Generators are divided into three categories—large, small, and conditionally exempt—based upon the quantity of waste produced each month.

The 1986 amendments to RCRA enabled the U.S. EPA to address environmental problems that could result from underground storage tanks (USTs) storing petroleum and other hazardous substances. RCRA focuses only on active and future facilities' USTs containing petroleum products.Hazardous substances included in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) are subject to the requirements of RCRA Subtitle I.

8.14.1 Existing Conditions

Solid waste generated by the Airport (including construction debris) is taken to the Hidden Hollow Landfill operated by the Ada County Solid Waste Management Department. The 40-acre landfill is reaching capacity, although the Ada County Solid Waste Management Department is completing construction on the nearby 22-acre North Ravine Cell. This landfill and other planned landfill cells should provide sufficient disposal capacity for another 100 years.[30]

According to information published by the U.S. EPA, the Airport is listed as a Conditionally Exempt Small Quantity Waste Generator (CESQG), which is defined as a hazardous waste generator that generates less than 100 kg of waste, or less than 1 kg of acutely hazardous waste per month. Hazardous materials located on the Airport include such products as fuel, oil, paint, cleaning supplies, and herbicides/pesticides.

[30] National Guard Bureau, *Environmental Assessment for the Implementation of the Base Realignment and Closure (BRAC) – Final Recommendations for the Mission Change and Construction Activities of the 124th Wing*, December 2007.

The State of Idaho lists 26 UST sites within one mile of the Airport, some of which are associated with the Airport. The State also lists three Leaking Underground Storage Tanks (LUSTs) under investigation or in active or planned remediation within one mile of the Airport. The USTs located on the Airport are used to store products such as jet fuel, gasoline, diesel fuel, and fuel oil.

8.14.2 Potential Impacts

It is anticipated that the types of development projects included in the ADP would not include any direct relationship to solid waste collection, control, or disposal other than that associated with construction itself. Hazardous materials associated with implementation of the ADP would be limited to those required for various construction and installation projects, as well as those required for construction vehicle maintenance and fuel storage.

The Airport contains many aboveground and underground tanks containing fuel and vehicle maintenance fluids, as well as areas where various hazardous materials are handled. Expansion of Airport facilities would likely result in more petroleum products and hazardous materials being handled and increased potential for releases of those materials. However, it is expected that best management practices would allow construction activities to occur without significant impact due to hazardous materials.

8.15 Construction Impacts

Construction activities can create environmental impacts at the construction site and in the surrounding area. These impacts are generally temporary in nature, and subside once construction is completed. Through prudent engineering and construction practices, construction impacts associated with the ADP can be minimized. Typical impacts resulting from construction may include air and noise pollution as well as disruption of surface transportation patterns. Construction impacts considered in this section include Airport operations, surface transportation, noise, air quality, water quality, and solid waste/hazardous materials.

It should be emphasized that construction projects related to implementation of the ADP would be temporary and would not all occur at the same time. Overall, the impacts would be relatively small and would be mitigated by use of best management practices and scheduling and are therefore not considered significant.

8.15.1.1 Airport Operations

During construction, the Airport is expected to remain fully operational. However, minor change in runway use would be expected. Construction of the new exit taxiway for Runway 10R and extension of Runway 10R-28L by 1,600 feet to the southeast would likely restrict aircraft movements on that runway. Construction during non-peak periods may reduce operational impacts.

8.15.1.2 Surface Transportation

During construction, it is expected that construction activity would include the delivery of materials and equipment to the Airport, as well as transportation of construction employees. As a result, short-term construction activity would result in additional surface traffic accessing the Airport. It is anticipated that construction vehicle trips would be minimal on a daily basis and that material excavated during construction would be used on-site within fill areas, thereby minimizing hauling trips. Therefore, any additional surface traffic is not expected to have a significant effect on the surface traffic system.

Construction projects involving the relocation of Orchard Street and construction of the taxiway bridge over Gowen Road would likely result in temporary road closures or times of restricted access to these roads. It is anticipated that traffic affected by these projects would be detoured to nearby roads with adequate capacity.

8.15.1.3 Noise

Noise would be generated during construction by on-site equipment and heavy vehicles entering and leaving the construction site. All construction would remain on Airport property and would not be expected to affect any of the residential areas or other noise-sensitive land uses in the Airport environs.

8.15.1.4 Air Quality

Construction activities can affect air quality in two ways: (1) construction equipment emits relevant criteria pollutants and (2) fugitive dust results from demolition, construction, and material and waste hauling. The general impact of construction activity resulting from implementation of the ADP is quantified in the *Boise Airport Master Plan Update Air Quality Screening Analysis Technical Report*.[31] However, for each construction project associated with the ADP, a formal air quality analysis will be necessary, either as part of an EA, EIS, or as a standalone analysis. Impacts on air quality from construction activity would be temporary and the air quality assessments would determine if an impact to regional air quality would occur with the recommended development.

Fugitive dust emissions may result from construction activity, as well as from wind erosion over freshly-disturbed earth. Dust generation is highly variable. The amount of dust generated on a given day depends on the types and amount of construction activity and on meteorological and soil conditions. Although construction activities may have a discernible effect within a short distance from the development site, the potential for impacts is limited and temporary. The most likely impact of construction would be increased dust immediately downwind of active construction areas. General best management practices to minimize the amount of dust would be followed during construction to reduce any air quality impact in the Airport environs.

8.15.1.5 Water Quality

Construction activities can affect water quality due to erosion or siltation originating from stormwater runoff. A National Pollutant Discharge Elimination System (NPDES) application for permit coverage (Notice of Intent), which is required for all construction areas of five acres or more, would be filed for the construction activities related to the ADP. Along with the Notice of Intent, a construction Storm Water Pollution Prevention Plan would also be required. This plan documents erosion and siltation control measures, including the use of silt screens, hay bales, other sediment control measures, and other "best management practices" that would be taken to protect water quality during the construction period.

8.15.1.6 Solid Waste and Hazardous Materials

Implementation of the ADP may result in the generation of a limited amount of solid waste from the demolition and excavation of materials. This material would be removed from the Airport property and disposed of in an appropriate landfill, or potentially recycled. No portion of the ADP is expected

[31] Ricondo & Associates, Inc., *Boise Airport Master Plan Update Air Quality Screening Analysis Technical Report*, September 2008.

to result in the excavation of any hazardous material. However, prior to the beginning of any construction or excavation activities, an environmental site assessment should be conducted to ensure that any potential hazardous material is identified and properly remediated. Any hazardous material would be disposed of according to applicable local, state, and federal regulations. Certain waste products, particularly petroleum-based products such as asphalt, should be considered for recycling where applicable.

8.16 Summary of Impacts

A summary of potential impacts resulting from implementation of the ADP is presented in **Table VIII-5**.

Table VIII-5

Summary of Potential Impacts

Impact Category	Potential Impact
Air Quality	Temporary construction emissions. No anticipated significant impact.
Coastal Resources	Not applicable.
Compatible Land Use	Adopted policies prevent land use that is incompatible with the Airport. Specific impacts identified through future noise analysis.
Construction Impacts	Construction emissions, road closures/traffic restrictions, runway restrictions.
Department of Transportation Act: Sec. 4(f)	No adverse effect to DOT 4(f) lands.
Farmlands	Airport property rated as either not prime farmland or as "prime farmland if irrigated." No impact due to no evidence of irrigation.
Fish, Wildlife, and Plants	Potential loss of habitat for wildlife and rare plant species.
Floodplains	Potential encroachment of the Five Mile Creek 100-year floodplain.
Hazardous Materials, Pollution Prevention, and Solid Waste	Increased solid waste generation during construction. No capacity issues with existing landfills. Best management practices would reduce the potential for releases of hazardous materials.
Historical, Architectural, Archeological, and Cultural Resources	No properties listed or eligible for National Register of Historic Places located in the Airport area. No anticipated impact.
Light Emissions and Visual Impacts	Runway development would result in additional airfield lighting, primarily in areas that are buffered from residential and commercial properties.
Natural Resources and Energy Supply	Planned development/expansion will increase energy consumption at the Airport, but not significantly compared to the City of Boise as a whole.
Noise	Detailed analysis through future formal environmental document (EA). Previous studies suggest small increase in area affected by DNL 65 contour, but such increase would occur on Airport property. Land use regulations limit potential impact.
Secondary (Induced) Impacts	Temporary traffic restrictions may affect access to businesses, but impacts would be temporary. No dislocation of non-Airport-related businesses expected. Airport expansion would likely increase economic activity around the Airport.
Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks	Airport expansion has been planned to avoid compatible land use and noise issues. Temporary traffic restrictions likely. No non-Airport business relocation anticipated.
Water Quality	Stormwater pollution prevention practices implemented during construction and stream relocation activities would likely prevent significant impacts to surface water quality.
Wetlands	Best management practices would likely prevent or mitigate any valuable wetland resources that may be found.
Wild and Scenic Rivers	No designated or eligible Wild and Scenic Rivers located within or near the Airport.

Source: Ricondo & Associates, Inc., September 2008, based on analyses and sources described in this Section.
Prepared by: Ricondo & Associates, Inc., September 2008.

IX. Airport Layout Plan Narrative

The Airport Layout Plan (ALP) drawing set is a pictorial representation and summarization of the efforts made throughout the master planning process. The previous chapters supply the basis for the Airport's future layout as shown in the drawing set. In order for improvement projects to be eligible for federal Airport Improvement Program (AIP) grants, the projects must appear on a FAA-approved ALP.

Various stakeholders, including the Airport Advisory Board, provided input on the development of the ALP. Key issues addressed by the stakeholders were Airport capacity and air cargo expansion.

Concerns regarding Airport capacity prompted the completion of an existing conditions capacity analysis. The analysis found the percentage of capacity being used by the two main runways was above 80, which is above the action limit to plan capacity improvement projects. As a result, a third parallel runway (Runway 9-27) was assessed as a means to increase overall airport capacity. Utilizing Runway 9-27 for General Aviation (GA) traffic allowed for increased capacity of the main runways by decreasing traffic diversity.

Through the master planning process, it was determined that the existing air cargo area is physically constrained. The area at the east end of Runway 28L was chosen as the most appropriate site for the relocated air cargo area to allow for future expansion.

9.1 Airport Layout Plan Drawing Set

The airport layout plan drawing set consists of the following sheets:

- Cover Sheet and Index of Drawings
- Airport Data
- Airport Layout Plan
- Airport Airspace Plan
- Airport Airspace Plan (Inner Surfaces)
- Runway 10L-28R Approach Surface Profile
- Runway 10R-28L Approach Surface Profile
- Runway 9-27 Approach Surface Profile
- Inner Portion of the Runway 10L-28R Approach Surface
- Inner Portion of the Runway 10R-28L Approach Surface
- Inner Portion of the Runway 9 Approach Surface
- Inner Portion of the Runway 27 Approach Surface
- Runway 28L Departure Surface Plan and Profile
- Runway 10R Departure Surface Plan and Profile
- Runway 28R Departure Surface Plan and Profile
- Runway 10L Departure Surface Plan and Profile
- Terminal Area Plan
- Air Cargo Plan
- General Aviation Plan (North)
- General Aviation Plan (South)
- Land Use Plan
- Exhibit "A" Airport Property Map

Of the sheets listed on the previous page, the Airport Layout Plan sheet is the primary ALP drawing set sheet which, as described below, depicts the current Airport layout and proposed Airport improvements. A scaled-down presentation of this sheet is shown on **Exhibit IX-1**. A full-size print of this sheet, as well as the other sheets comprising the ALP drawing set that were developed as part of the Master Plan Update, are on file with the Airport. The paragraphs to follow describe the specific elements found on each sheet within the ALP drawing set.

Cover Sheet and Index of Drawings

The cover sheet shows a sheet index to the airport layout plan drawing set, and provides both vicinity and location maps that show the Airport in relation to its surrounding geography. Also shown is the FAA grant number and disclaimer statement.

Airport Data

The airport data sheet provides information to be used in conjunction with the ALP. Details on this sheet include wind roses for the Runway 10-28 alignment for all weather and instrument flight rules (IFR) wind data. Information tables for runway data and declared distances are provided for all three runways, as well as a general Airport data table.

Airport Layout Plan

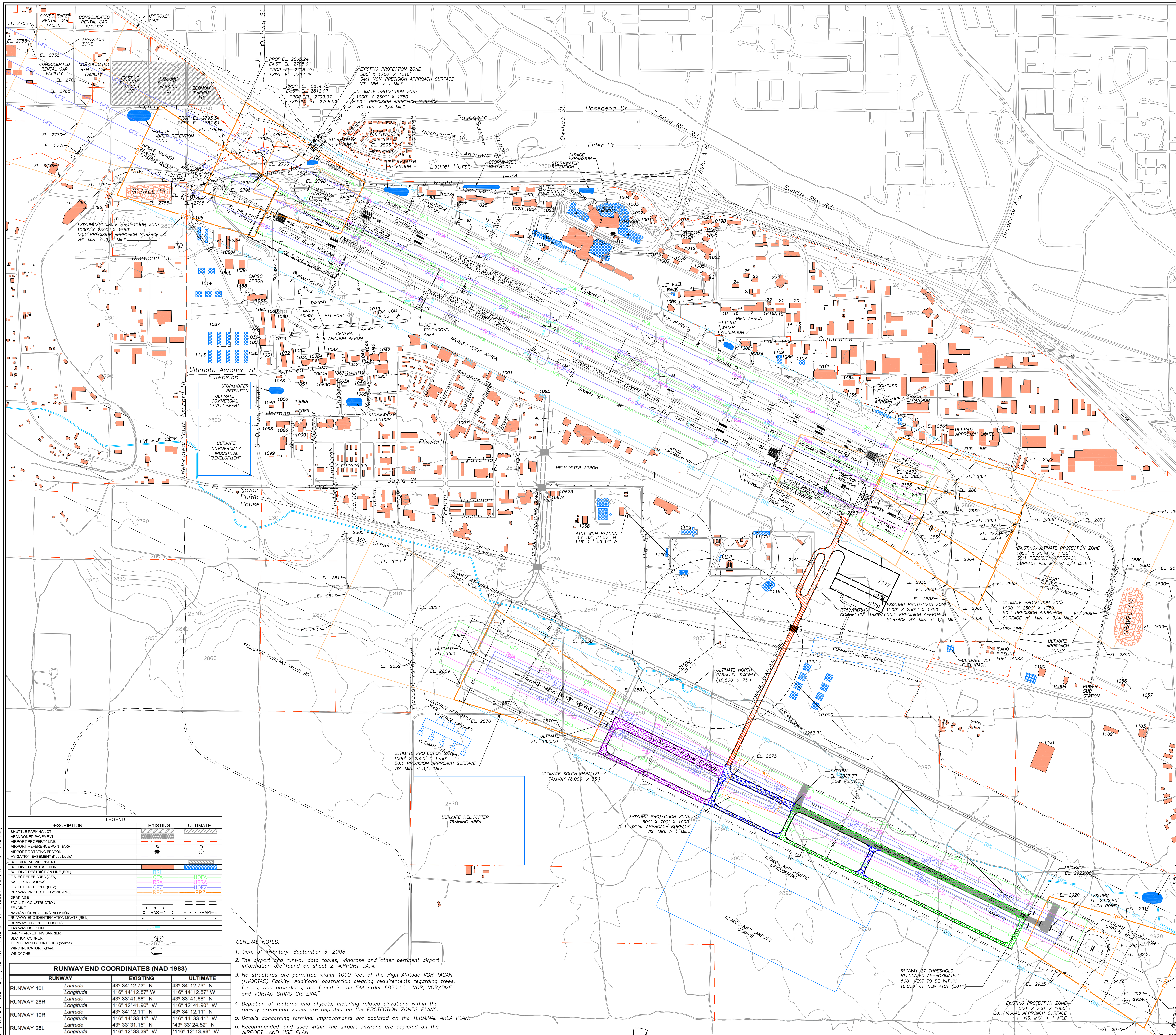
The airport layout plan graphically depicts the current Airport layout and proposed improvements to the Airport for the 20-year planning period and beyond. Descriptions of the improvements and costs over the next 20 years are included in Chapter IV, *Implementation Plan*. The master plan concept, as selected by the City of Boise, was the basis for determining the proposed improvements at the Airport. The ALP is a development guide that can be modified as dictated by demand.

Runway approach visibility minimums, runway protection zones, runway object free areas, runway safety areas, and other standard Airport dimensions are shown in the plan. A buildings/facilities table details on-Airport structures and the structure height (above mean sea level).

Airport Airspace Plan

This drawing shows the Federal Aviation Regulations (FAR) Part 77 Imaginary Surfaces for the future layout of the Airport with a USGS topographic map as the background. FAR Part 77 defines five distinct surfaces, each with a different size and shape. The dimensions of these surfaces are based on the type of runway and the type of approaches ultimately planned for each runway at the Airport. Each imaginary surface and its dimensions as it applies to the Airport are defined below.

- **Primary Surface**. A rectangular surface with a width (centered on the runway centerline) that varies for each runway and a length that extends 200 feet beyond each end of the runway. The elevation of the primary surface corresponds to the elevation of the nearest point of the runway centerline. The width of the primary surface of Runways 10R-28L, 10L-28R, and 9-27 is 1,000 feet.



BUILDINGS/FACILITIES

EXISTING	ULTIMATE	DESCRIPTION	TOP ELEV.
1		TERMINAL BUILDING	2897.00
	2	TERMINAL EXPANSION	FUTURE
3		AIRPORT PARKING GARAGE	2904.00
	4	GARAGE EXPANSION	FUTURE
5		BLM HELITACK & SRE	2896.90
5A		SRE	2889.07
7		BOISE POLICE	2895.42
8		BOI CHEMICAL STORAGE	2894.46
12		U.S. POSTAL SERVICE	2872.22
13		NIFC RETURNS WAREHOUSE	2888.40
14		NIFC RAWS	2886.40
15		NIFC INCIDENT COMM. SUPPORT	2883.70
16		NIFC FS FIRE OPS	2893.81
16A		NIFC FOREST SERVICE HANGARS	2892.40
17		NIFC WAREHOUSE	2890.90
18		NIFC RAMP SERVICE	2885.49
19		NIFC SMOKE JUMPERS LOFT	2923.30
20		NIFC MAINTENANCE EQUIPMENT	2893.30
21		NIFC INFORMATION	2885.20
22		NIFC TOOL SHOP	2881.58
23		NIFC BARRACKS	2886.00
24		NIFC ADMINISTRATION	2900.90
25		NIFC NWS BLDG.	2883.50
26		NIFC TRAINING BLDG.	2880.80
27		NIFC JACK F. WILSON BUILDING	2901.10
41		FEDERAL EXPRESS	2883.40
44		SHADE HANGAR	2860.99
53		FIREHAWK HELICOPTERS	2862.90
53A		FIREHAWK HELICOPTERS	2847.00
54		LINDA LEACH TRUST	2848.49
55		LINDA LEACH TRUST	2848.62
60		NOAA WEATHER STATION	2863.00
1001		AIRPORT CHEVRON GAS STATION	2881.10
1002		HERTZ RAC	2847.57
1003		AVIS RAC	2835.63
1004		NATIONAL RAC	2844.55
1005		HORIZON/SOUTHWEST CARGO	2877.90
1006		DELTA CARGO/INFLIGHT KITCHEN	2894.02
1007		UNITED CARGO	2878.34
1008		IDAHO HELICOPTERS	2888.00
1008A		IDAHO HELICOPTERS	2887.24
1009		ARFF & FED EX RAMP OFFICES	2890.20
1010		U.S. CUSTOMS	2869.25
1011		JB SCOTT	2910.72
1012		SLEEP INN	2888.90
1013		FAA CONTROL TOWER (ATCT) Abandoned	2941.90
1014		FAA CONTROL TOWER (ATCT)	3135.50
1016		OLD FIRE STATION	2873.10
1018		US BANK	2856.52
1019A		AIRPORT BUSINESS PARK	2862.29
1019B		DENNY'S	2862.44
1020		KOPPER KITCHEN	2870.30
1021		BEST WESTERN VISTA INN	2890.30
1022		BEST WESTERN AIRPORT MOTOR INN	2890.29
1023		IDAHO STATE DIVISION OF AERONAUTICS	2872.30
1024		JACKSON JET CENTER	2870.30
1025		JACKSON JET CENTER	2869.10
1026		JACKSON JET CENTER	2876.70
1027		FAA-DUVALL BUILDING	2871.50
1027A		HERTZ RAC	2840.27
1030		ALBERTSONS	2846.32
1030A		J.B. SCOTT	2861.53
1031		CONYAN AVIATION	2843.86
1032		CONYAN AVIATION	2845.70
1033		CONYAN SHADE HANGAR	2829.61
1034		WESTERN AIRCRAFT HANGARS	2828.90
1035		WESTERN AVIATION	2855.80
1035A		WESTERN AVIATION	2836.03
1037		SIMPLOT AVIATION	2859.90
1038		ATWOOD PROPERTIES (AVIATION AIR)	2844.60
1042		WESTERN AIRCRAFT	2862.80
1043		WESTERN AIRCRAFT	2875.50
1044		WESTERN AIRCRAFT	2837.07
1045		WESTERN AIRCRAFT	2844.94
1046		WESTERN AIRCRAFT	2864.60
1047		WESTERN AIRCRAFT	2864.50
1048		CRIPE DISTRIBUTING	2829.61
1049		BUSS AUTOMOTIVE	2832.85
1050		BUSS AUTOMOTIVE	2828.54
1051		PRECISION PROPELLERS	2832.40
1052		ALBERTSONS	2849.30
1053		MRI HANGAR/TURBO AIR	2865.99
1054		S.R.E. BUILDING	2898.90
1055		EQUIPMENT STORAGE BLDG.	2888.10
1056		ARFF TRAINING BUILDING	2937.42
1057		ARFF TRAINING FACILITY	2937.40
1058		UPS CARGO BUILDING	2846.43
1060		T-HANGARS (10 UNITS NESTED)	2831.56
1060A		T-HANGAR	2831.70
			2832.00
			2832.50
1063		CRIPE DISTRIBUTING	2840.94
1063A		CRIPE DISTRIBUTING	2842.32
1063B		CRIPE DISTRIBUTING	2832.14
1063C		CRIPE DISTRIBUTING	2831.17
1064		WESTERN AIRCRAFT	2837.02
1065		MAC TRANSPORTATION (NAYLOR TOWING)	2844.67
1067		BOIX TRUCKING	2856.34
1067A		BOIX TRUCKING	2865.78
1067B		BOIX TRUCKING	2855.83
1068		SYSTEM TECH & SPLAT PAINTBALL	2871.46
	1077	CARGO AREA APRON	FUTURE
	1078	CARGO AREA BUILDINGS	FUTURE
	1079	CARGO AREA	FUTURE
	1081	CARGO/ HANGAR EXPANSION	FUTURE
1083		AIRFIELD LIGHTING & ELECTRICAL BLDG.	2865.50
	1085	HANGAR EXPANSION	FUTURE
1086		CITY VEHICLE SHOP	2884.69
	1087	AVIATION MUSEUM	FUTURE
1089		CONTECH CULVERT	2837.10
1089A		BOISE CITY	2830.54
1090		WESTERN COMMUNICATION	2838.33
1091		WEAPON RELEASE	2872.39
1092		ARFF	2880.55
1093		IDAHO HUMANE SOCIETY	2846.51
1094		APPLETON HANGAR	2853.55
1095		MICRON HANGAR	2859.08
1097		VACANT	2870.68
1098		BOISE CITY FORESTRY	2829.38
1099		VALLEY RIDE	2836.00
1100		NORCO	2942.86
1100A		NORCO	2949.96
1101		POWER SPORTS	2957.58
1102		BOISE SCHOOLS BUS FACILITY	2955.30
1103		FED EX GROUND FACILITY	2958.86
	1104	AVIATION HANGAR	FUTURE
1105		RTR SITE	2886.10
1105A		BOISE CITY	2884.65
	1107	CONCOURSE A EXTENSION	FUTURE
1108		ALSF II BUILDING	2829.32
	1110	HANGAR / CBP FACILITY	FUTURE
1111		WESTERN AIR SHADE HANGAR	2865.40
	1113	GA HANGARS	FUTURE
	1114	AVIATION / MAINTENANCE HANGAR	FUTURE
	1116	ROCKET SHOP	FUTURE
	1117	ADMINISTRATION BUILDING	FUTURE
	1118	IGLOOS	FUTURE
	1119	DOCK FACILITY	FUTURE
	1120	M&I FACILITY	FUTURE
	1121	MULTI CUBE FACILITY	FUTURE
	1122	ARFF FACILITY	FUTURE

LEGEND

DESCRIPTION	EXISTING	ULTIMATE
SHUTTLE PARKING LOT		
ABANDONED PAVEMENT		
AIRPORT PROPERTY LINE		
AIRPORT REFERENCE POINT (ARP)		
AIRPORT ROTATING BEACON		
AVIGATION EASEMENT (if applicable)		
BUILDING ABANDONMENT		
BUILDING CONSTRUCTION		
BUILDING RESTRICTION LINE (BRL)	BRL	
OBJECT FREE AREA (OFA)	OFA	UOFA
SAFETY AREA (RSA)	RSA	URSA
OBJECT FREE ZONE (OFZ)	OFZ	UOFZ
RUNWAY PROTECTION ZONE (RPZ)	RPZ	RPZ
DRAINAGE		
FACILITY CONSTRUCTION		
FENCING		
NAVIGATIONAL AID INSTALLATION	VASI–4	PAPI–4
RUNWAY END IDENTIFICATION LIGHTS (REIL)		
RUNWAY THRESHOLD LIGHTS		
TAXIWAY HOLD LINE		
BAK 14 ARRESTING BARRIER		
SECTION CORNER	34/35 3/2	
TOPOGRAPHIC CONTOURS (source)	2870	
WIND INDICATOR (lighted)		
WINDCONE		

RUNWAY END COORDINATES (NAD 1983)

RUNWAY		EXISTING	ULTIMATE
RUNWAY 10L	Latitude	43° 34' 12.73" N	43° 34' 12.73" N
	Longitude	116° 14' 12.87" W	116° 14' 12.87" W
RUNWAY 28R	Latitude	43° 33' 41.68" N	43° 33' 41.68" N
	Longitude	116° 12' 41.90" W	116° 12' 41.90" W
RUNWAY 10R	Latitude	43° 34' 12.11" N	43° 34' 12.11" N
	Longitude	116° 14' 33.41" W	116° 14' 33.41" W
RUNWAY 28L	Latitude	43° 33' 31.15" N	*43° 33' 24.52" N
	Longitude	116° 12' 33.39" W	*116° 12' 13.98" W
RUNWAY 9	Latitude	43° 32' 31.59" N	*43° 33' 03.96" N
	Longitude	116° 12' 23.13" W	*116° 14' 07.96" W
RUNWAY 27	Latitude	43° 32' 10.60" N	*43° 32' 09.38" N
	Longitude	116° 11' 21.69" W	*116° 11' 28.20" W

* Runway coordinates not determined by survey. These coordinates are for planning purposes only, and should not be used for any other purposes, including construction and/or navigation.

GENERAL NOTES:

1. Date of inventory: September 8, 2008.
2. The airport and runway data tables, windrose and other pertinent airport information are found on sheet 2, AIRPORT DATA.
3. No structures are permitted within 1000 feet of the High Altitude VOR TACAN (HVORTAC) Facility. Additional obstruction clearing requirements regarding trees, fences, and powerlines, are found in the FAA order 6820.10, "VOR, VOR/DME and VORTAC SITING CRITERIA".
4. Depiction of features and objects, including related elevations within the runway protection zones are depicted on the PROTECTION ZONES PLANS.
5. Details concerning terminal improvements are depicted on the TERMINAL AREA PLAN.
6. Recommended land uses within the airport environs are depicted on the AIRPORT LAND USE PLAN.
7. IFR departure may not be conducted on Runway 10R and Runway 28L when aircraft is taxiing to future cargo apron due to obstruction to IFR departure and FAR Part 77 surfaces. Taxiing aircraft will need to be controlled by Air Traffic Control. Hold lines and signs designating "28L APCH" need to be installed.
8. The future CAT III touchdown area for Runway 10R overlaps an airport access road and the New York Canal. These issues will have to be addressed prior to issuance of the CAT III approach.
9. Building Restriction Lines (BRL) are based on a 35-foot tall building located 750 feet from the runway centerline not penetrating the airport's FAR Part 77 surfaces.

ELEVATION DATA REFERENCED TO LOCAL BENCH MARK V86 AT 43° 32' 55" N 116° 10' 10" W ELEVATION 2907.90' (NAVD88).

0 600 1200 1800
SCALE IN FEET

RUNWAY 9/27 STAGE LEGEND

STAGE	DESCRIPTION	TAXIWAY WIDTH	PARALLEL TAXIWAY	RUNWAY LENGTH	COLOR
1	RUNWAY-TAXIWAY IMPROVEMENTS	50'	SOUTH	100' x 4,500'	
2	RUNWAY-TAXIWAY IMPROVEMENTS	50'	SOUTH	100' x 5,900'	
3	CONNECTING TAXIWAY	75'	--	--	
4	RUNWAY-TAXIWAY IMPROVEMENTS	75'	SOUTH	100' x 8,000'	
5	ULTIMATE IMPROVEMENTS (Beyond Master Plan Planning Period)	75'	NORTH	150' x 10,800'	

TOUCHDOWN ZONE ELEVATIONS

RUNWAY 10L	2842.5'
RUNWAY 28R	2859.4'
RUNWAY 10R	2840.2'
RUNWAY 28L	2868.0'

Boise Airport
3201 Airport Way
Boise, Idaho 83705-5097
(208) 383-3110

BOISE AIRPORT
AIRPORT LAYOUT PLANS
AIRPORT LAYOUT PLAN

BOISE IDAHO
SCALE: 1" = 600'
PROJECT NO. 33216
DRAWING FILE NAME: 33216–AIRP–ALP–03

POWER ENGINEERS
RICONDO & ASSOCIATES

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DATE	BY	REV#	REVISION	CK'D	AIRPORT APPROVAL	FAA APPROVAL

DESIGNED BY: JRR
DRAWN BY: JRH
LAST EDIT: 7/16/2010
CHECKED BY: JRR
APPROVED BY: JRR
PLOT DATE: 09/20/10

SHEET 3 21

[Path: P:\City of Boise\033216\Design\Drawings\Civil\OLD_ALP_DWGS\33216–AIRP–ALP–03.dwg] [Layout1]
[Date: 9/20/2010 8:49 AM] [Author: tconklin] [Plotter: CutePDF Writer.pc3] [Style: Full Size.ctb]

- **Approach Surface**. A surface centered on the extended runway centerline, starting at each end of the primary surface (200 feet beyond each end of the runway), at a width equal to that of the primary surface (1,000 feet at the Airport) and an elevation equal to that of the end of the runway. The ultimately planned approach surfaces at the Airport reflect precision instrument approaches to all runway ends. The dimensions of a precision instrument approach surface extend for a horizontal distance of 10,000 feet at a slope of 50:1, then extend an additional 40,000 feet at a slope of 40:1 for a total horizontal distance of 50,000 feet. The outer width of the precision instrument approach surface is 16,000 feet.
- **Transitional Surface**. A sloping 7:1 surface that extends outward and upward at right angles to the runway centerline from the sides of the primary surface and the approach surfaces.
- **Horizontal Surface**. An elliptical surface at an elevation of 150 feet above the established airport elevation created by swinging arcs of a 10,000-foot radius from the center of each end of the primary surface.
- **Conical Surface**. A surface extending outward and upward from the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet.

The Part 77 surfaces are the basis for protecting airspace around an airport; therefore, it is ideal to keep these surfaces clear of obstructions whenever possible. The obstruction data tables on the following approach and departure surface sheets identify each obstruction and its location, along with the disposition to address the described obstruction.

Airport Airspace Plan (Inner Surfaces)

The inner surfaces airspace plan is an enlargement of the inner portions of the previous airport airspace plan. The enlarged inner area allows for closer inspection of the approach surfaces and the identified obstructions. Indicated by number, the obstructions are detailed in the accompanying obstruction data table.

Approach Surface Profiles (three sheets)

Large-scale profiles of each runway and the associated approach surfaces are presented with obstructions identified by number and detailed in obstruction data tables. Separate sheets were prepared for Runways 10R-28L, 10L-28R, and 9-27.

These sheets provide specific data regarding potential obstructions and ground topography. The obstruction data tables identify which surfaces are penetrated by obstructions, the amount of penetration, and the proposed disposition of the obstruction.

Inner Portion of the Runway Approach Surfaces (four sheets)

These drawings provide a plan and profile view of each runway end, the Runway Protection Zones, and the approach surfaces. Obstructions within the approach and transitional surfaces are indicated in the profile view. An aerial base map is presented in the plan view to allow for ease in orientation and obstruction identification.

Departure Surfaces Plan and Profile (four sheets)

For runways supporting air carrier operations, the FAA has identified a one-engine inoperative obstacle identification surface known as a departure surface. The departure surface begins at the departure end of the runway with an inner width of 600 feet, extending horizontally 50,000 feet to an outer width of 12,000 feet, while rising at a 62.5:1 slope. The departure surfaces plan and profile depict the inner portion of the surface and identify potential obstructions.

Terminal Area Plan

This sheet is an enlargement from the ALP that allows for easier reference of the terminal area.

Air Cargo Plan

The air cargo plan is an excerpt from the ALP that allows for closer examination of the air cargo area.

General Aviation Plan (North)

This GA plan is an enlargement from the ALP that allows for easier review of the northern GA area.

General Aviation Plan (South)

This GA plan is an enlargement from the ALP that allows for easier review of the southern GA area.

Land Use Plan

The on-Airport land use plan delineates specific uses of airport property to maximize utilization, while maintaining compatibility with FAA land use standards and the Airport's functional design. It is recommended that land uses shown on this sheet be adopted by the City of Boise and incorporated into their zoning ordinances.

Land uses shown on the plan range from designations such as aviation airfield operations, air cargo, GA, military, etc. These land allocations will assist management in decision-making processes throughout the Airport's development.

Exhibit "A" Property Map (10 sheets)

The Exhibit "A" Property Map has been updated to reflect current airport property interests and future property acquisitions. The Exhibit "A" consists of ten sheets: Airport Property Map, Insets of Airport Property Map, Airport Influence Areas and Aviation Easements, Table of Parcel Information, and six Subdivision Plats.

ACKNOWLEDGEMENTS

CITY GOVERNMENT OFFICIALS

David H. Bieter, *Mayor*

Boise City Council

BOISE AIRPORT COMMISSION

Paul Cunningham, *Chair*

AIRPORT STAFF

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