ARMSTRONG CONSULTANTS, INC.

AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport

Airport Master Plan

Final Report - April 2015

The preparation of this document may have been supported, in part, through the Airport Improvement Program financial assistance from the Federal Aviation Administration (3-04-0020-011-2009) as provided under Title 49 U.S.C., Section 47104. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable or would have justification in accordance with the appropriate public laws.

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Introduction

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport
Airport Master Plan

INTRODUCTION

The City of Holbrook, Arizona, as the Airport Sponsor, is continuing its effort to plan for future development of the Holbrook Municipal Airport. This future development is designed to enhance air and ground operations, improve safety, provide better airport services and stimulate the local economy through business growth potential. The preparation of this master plan is evidence that the City of Holbrook recognizes the significance of air transportation to the community as well as the requirement for a systematic approach to evaluating the airport's unique operating and improvement needs. This Airport Master Plan replaces the 2000 Airport Master Plan and subsequent ALP revisions.

The master plan is intended to be a proactive document which identifies and plans for future facility needs well in advance of the actual need for the facilities. This is done to ensure that the City of Holbrook can coordinate project approvals, design, financing and construction to avoid experiencing unfavorable effects due to inadequate airport facilities. With a sound and realistic master plan Holbrook Municipal Airport can maintain its role as an important link to the national air transportation system for the community.

PURPOSE

The purpose of the Airport Master Plan is to provide a framework to guide future airport development that will cost-effectively satisfy aviation demand, while considering potential environmental and socioeconomic impacts. The Airport Master Plan considers the possible environmental and socioeconomic costs associated with alternative development concepts, as well as, the possible means of avoiding, minimizing, or mitigating impacts to sensitive resources at the appropriate level of detail for facilities planning.

The Airport Master Plan document describes and depicts the overall concept for the long-term development of an airport. It presents the concepts graphically in the Airport Layout Plan (ALP) drawing set and reports the data and logic upon on which the concept is based in the Airport Master Plan (AMP) report.

OBJECTIVES

The primary objectives of the Airport Master Plan are to produce an attainable phased development plan concept that will satisfy the airport needs in a safe, efficient, economical and environmentally sound manner. The plan serves as a guide to decision makers, airport users and the general public for implementing airport development actions while considering both airport and community concerns and objectives. There are a number of objectives the City would like to achieve for the Holbrook Municipal Airport as a result of this master plan.

Objectives of the Airport Master Plan include:

- Document the issues that the proposed development will address.
- Justify the proposed development through the technical, economic and environmental investigation of concepts and alternatives.
- Provide an effective graphic presentation of the development of the airport and anticipated land uses in the vicinity of the airport.
- Establish a realistic schedule for the implementation of the development proposed in the plan, particularly the short-term capital improvement program.
- Propose an achievable financial plan to support the implementation schedule.
- Provide sufficient project definition and detail for subsequent environmental evaluations that may be required before the project is approved.

- Present a plan that adequately addresses the issues and satisfies local, state and Federal regulations.
- Document policies and future aeronautical demand to support municipal or local deliberations on spending, debt, land use controls and other policies necessary to preserve the integrity of the airport and its surroundings.
- Set the stage and establish the framework for a continuing planning process that will monitor key conditions and permit changes in plan recommendations as required.

MASTER PLAN PROCESS

Airport planning takes place at a national, state, regional and local level. These plans are formulated on the basis of overall transportation demands and are coordinated with other transportation planning and comprehensive land use planning. The National Plan of Integrated Airport Systems (NPIAS) is a ten-year plan continually updated and published by the Federal Aviation Administration (FAA). The NPIAS lists developments at public use airports that are considered to be of national interest and thus eligible for financial assistance for airport planning and development under the Airport and Airway Improvement Act of 1982. Statewide Integrated Airport Systems Planning identifies the general location and characteristics of new airports and the general expansion needs of existing airports to meet statewide air transportation goals. This planning is performed by state transportation or aviation planning agencies. Regional Integrated Airport Systems Planning identifies airport needs for a large regional or metropolitan area. Needs are stated in general terms and incorporated into statewide systems plans. Airport Master Plans are prepared by the operators of individual airports and are usually completed with the assistance of consultants.

The City of Holbrook is completing this master plan with the assistance of Armstrong Consultants, Inc. The Airport Master Planning process involves collecting data, forecasting demand, determining facility requirements, studying various alternatives and developing plans and schedules. The flow chart in Figure I-1 depicts the steps in the master planning process. This process will take into consideration the needs and concerns of the airport sponsor, airport tenants and users, as well as the general public.

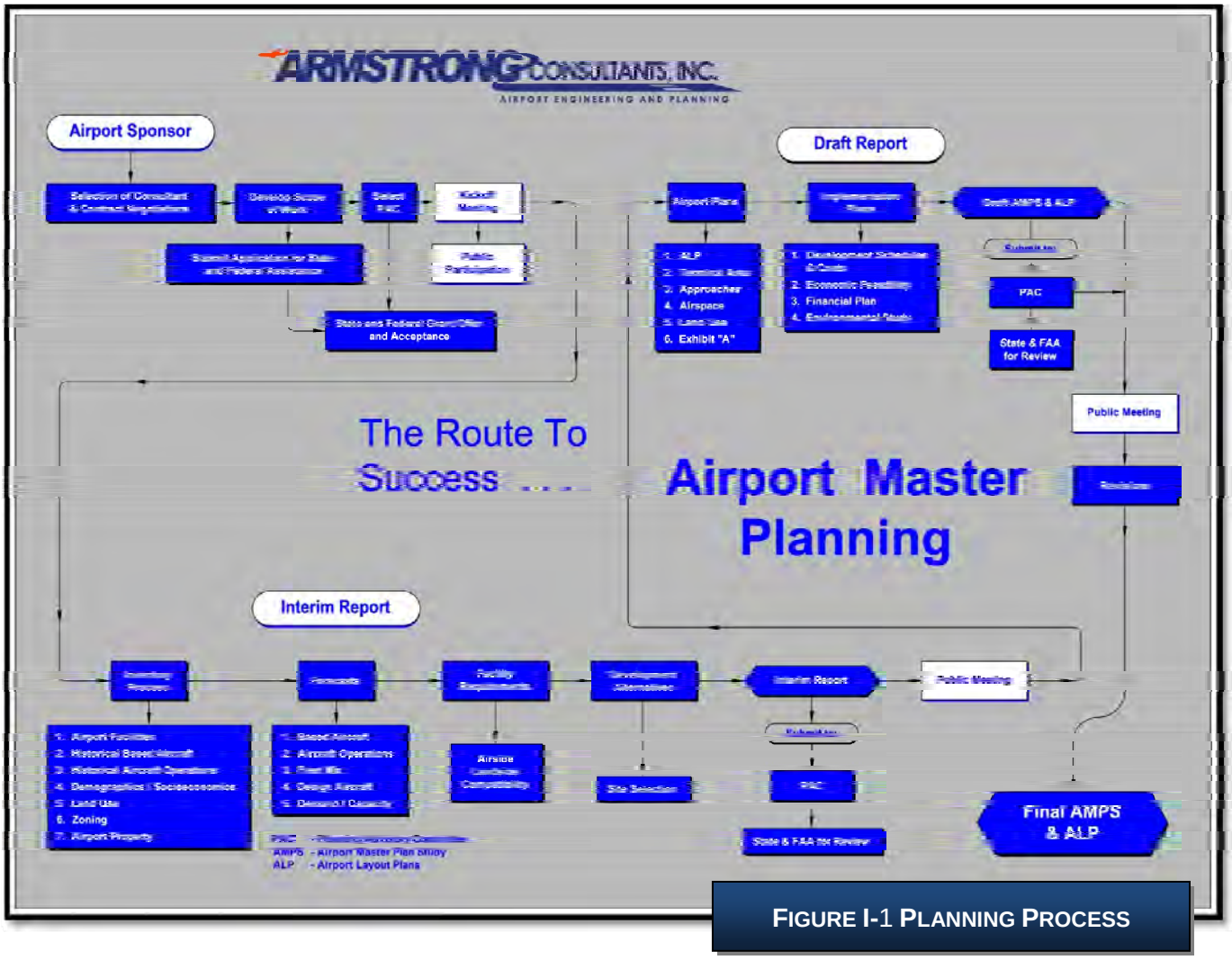


FIGURE I-1 PLANNING PROCESS

PLANNING ADVISORY COMMITTEE

The Holbrook Municipal Airport Planning Advisory Committee (PAC) consists of members representing varied interests in the airport and the community. Their involvement throughout the master planning process will help to keep interested parties informed and will foster consensus for future development actions.

Members of the PAC:

- Ray Alley, City Manager, City of Holbrook
- Tim Kelley, Interim Public Works Director, City of Holbrook
- Darlene Williams, Planner/PFC Specialist, FAA Los Angeles ADO
- Keneth Potts, Airport Projects Planning Manager, ADOT-MPD-Aeronautics Group
- Theresa Coscia, representative of the Holbrook Aircraft Owners and Pilots Association (HAOPA)
- Dan Eldredge, representative of the Holbrook Aircraft Owners and Pilots Association (HAOPA)
- Bill Jeffers, Rancher
- William A. Gillies, U.S. Air Force Liaison

Chapter One
Inventory

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport
Airport Master Plan

1.1 INTRODUCTION AND AIRPORT HISTORY

The preparation and collection of meaningful data on the airport usage and the condition of its components are basic to sound master planning. The development of this master plan requires the collection and evaluation of baseline information relating to the airport's property, facilities, services and local vicinity. The information presented in this chapter will serve as the basis in determining any necessary airport improvements or expansions that are indicated by aviation activity forecasts and the demand/capacity analysis. The information was obtained during visits and interviews with airport management, City staff, airport tenants and users. Airport and other public documents were also examined.

Holbrook Municipal Airport has been in operation as a public airport since the 1920s. It was originally constructed with local funds and has been maintained and improved by the City since then. In 1929, the first scheduled air carrier to land at Holbrook was a Western Air Express F-10 Fokker. During that time the airport also served as an emergency landing facility for air carrier flying from the West Coast. Before World War II, Holbrook Airport was the site of Civilian Pilot Training (CPT). Following World War II and G.I. flight training school was located on the airport.

Today the airport is a valuable asset to the City of Holbrook and serves a variety of general aviation uses including business and recreational flying, flight training, medical evacuation, and air cargo.

1.2 AIRPORT LOCATION

Holbrook Regional Airport is located in Navajo County, Arizona within limits of the City of Holbrook about three miles northeast of the downtown area. Figure 1-1 shows the location of the airport in relation to the County, City and major highways. Holbrook Municipal Airport is located on approximately 458 acres of land owned in fee simple. There are no easements.

The FAA designates the airport with the site number 00710.*A and location identification P14. The Airport Reference Point (ARP) is located at 34˚56'25.9"N and 110˚08'17.6"W at an estimated elevation of 5,262 feet.

1.3 PROJECTS ACCOMPLISHED SINCE 2000 AIRPORT MASTER PLAN

The following projects were accomplished since the 2000 Airport Master Plan see Table 1-1 for the project and grant history:

- Conducted an environmental study.
- Installed AWOS.
- Strengthened Runway 3/21.
- Upgraded wind indicator.
- Acquired land for crosswind Runway 11/29.
- Installed perimeter chain link fence.

The following projects are in process at this time:

- Crack seal, seal coat and remark airfield pavements.
- Upgrade AWOS sensors.
- Install electric gate motor and keypad controller.

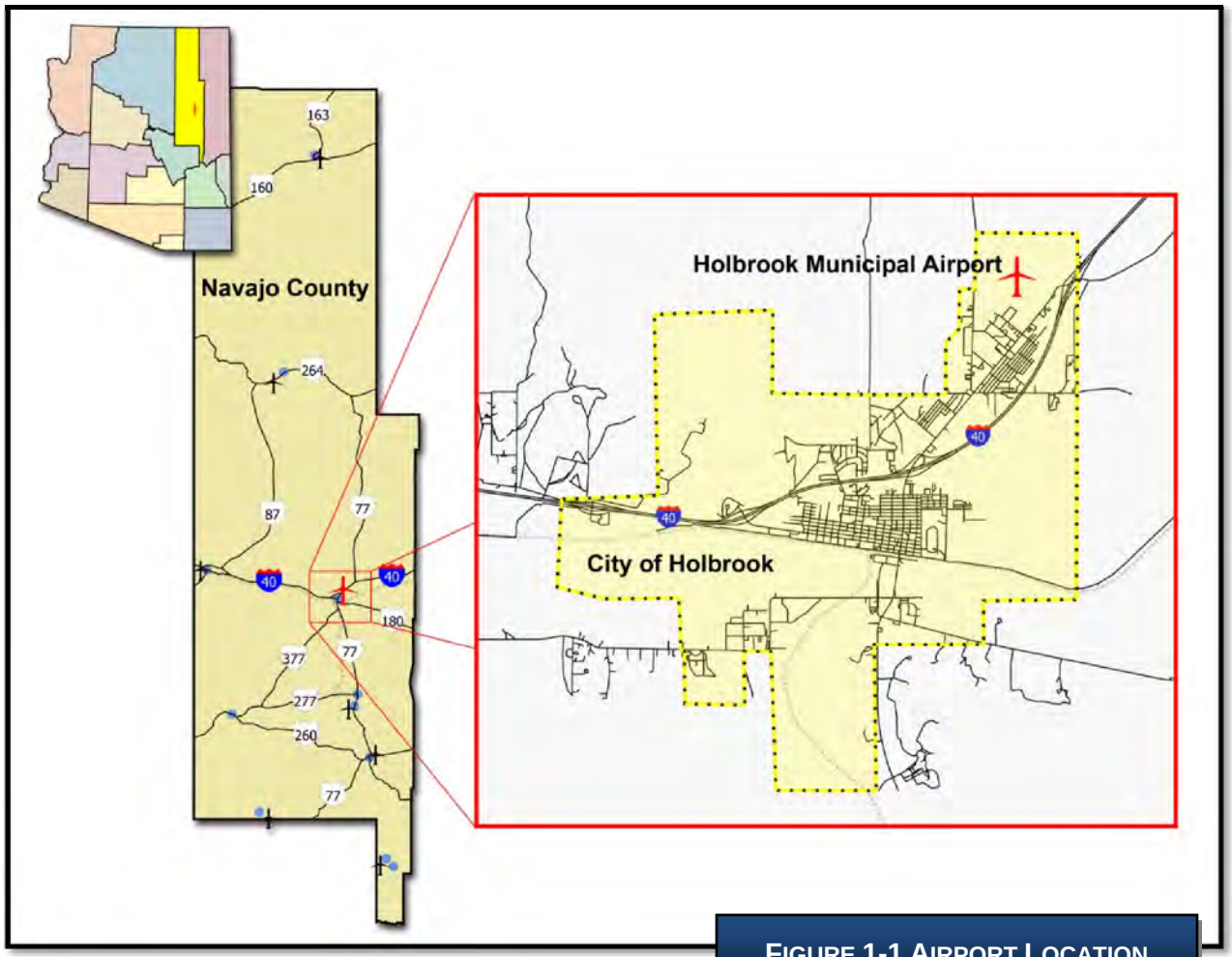


FIGURE 1-1 AIRPORT LOCATION

1.4 AIRPORT OWNERSHIP AND MANAGEMENT

Holbrook Municipal Airport is owned and operated by the City of Holbrook. The operation and maintenance of the airport is the responsibility of the Public Works Department. The City Council is responsible for the administrative and financial oversight of the airport.

1.5 AIRPORT GRANT HISTORY

A federal and state grant history for the capital improvements at Holbrook Municipal Airport is provided in Table 1-1. In Arizona, under the most recent FAA Airport Improvement Program legislation, capital improvement projects are typically funded at 95 percent Federal Aviation Administration (FAA), 2.5 percent State of Arizona and 2.5 percent by the sponsor. State grants are typically funded at 90 percent State of Arizona and five percent by the sponsor.

TABLE 1-1 GRANT HISTORY

FAA GRANT NO.	YEAR	DESCRIPTION OF WORK	FEDERAL AMOUNT
001-1986	1986	Construct Taxiway	$337,818
002-1988	1988	Conduct Airport Master Plan Study	$22,765
003-1989	1989	Install Runway Vertical/Visual Guidance System	$75,445
		Construct Taxiway	$134,555
		TOTAL:	**$210,000**
004-1992	1992	Improve Access Road	$141,143
		Expand Apron	$136,590
		Extend Taxiway	$136,509
		TOTAL:	**$414,242**
005-1994	1994	Rehabilitate Taxiway Lighting	$166,221
		Expand Apron	$115,946
		Install Apron Lighting	$20,395
		Improve Airport Drainage	$18,756
		TOTAL:	**$321,318**
006-2001	2001	Conduct Environmental Study	$77,401
		Install weather Reporting Equipment	$72,599
		TOTAL:	**$150,000**
007-2002	2002	Install Weather Reporting Equipment	$77,413
		Construct Runway	$144,974
		TOTAL:	$222,387
008-2003	2003	Strengthen Runway	$150,000
009-2004	2004	Install Perimeter Fencing	$349,000
		Acquire Land for Approaches	$50,000
		TOTAL:	**$399,000**
010-2005	2005	Rehabilitate Runway	$32,316
011-2009	2009	Update Airport Master Plan Study	$242,488
012-2009	2009	Rehabilitate runway	$245,819
		Install Perimeter Fencing	$50,000
		Install Weather Reporting Equipment	$61,693
		TOTAL:	**$357,512**
		TOTAL FAA AMOUNTS	**$3,082,233**
STATE GRANT NO.	**YEAR**		**STATE AMOUNT**
5F45		Install Airport Perimeter Chain Link Fence	$9,474
5F46		Land Acquisition for Runway 11/29 Extension	$1,027
1111		Wind Indicator Upgrade/Modification	$5,850
2F34		Install weather equipment, automated	$7,363
3F83		Install AWOS – Phase II; Construct Rw	$10,917
3S96B		APPP	$84,602
4S36		Runway 3/21 Safety Area Obstruction	$46,308
6F69		Land Acquisition and Design Crosswind	$0
6F70		Rehabilitate Runway 11/29	$0
7S12		Master Plan Update	$0
9007		Surface Runway (mill 1”-pavement pre	$459,135
9020		Grade, Drain and Surface Apron (helipad)	$68,400
9038		Master Plan Update	$0
E10F30	2009	Master Plan Update	6,382
		TOTAL STATE AMOUNTS	**$699,458**

Source: FAA, ADOT 2009

1.6 AIRPORT CLASSIFICATION

Arizona has a variety of aviation facilities, from small rural unpaved airstrips serving isolated portions of the state to busy rooftop heliports and large long haul commercial service airports. Because of this diversity of facilities with broad ranges of operating parameters and design standards, a means of facility classification is necessary.

The FAA and ADOT use three basic aviation facility classifications. The first is the National Plan of Integrated Airport System (NPIAS). The second is the Airport Reference Code (ARC) which is a coding system used by the FAA to relate airport design criteria to the operational and physical characteristics of the airplanes operating at the airport. The third classification used by ADOT-MPD-Aeronautics Group was based on a review of the previous system plan, and other state aviation and FAA classifications as well as the roles the airports play in Arizona's airport system, five airport roles were developed and include; Commercial Service, Reliever, General Aviation Community, General Aviation Rural and General Aviation Basic

1.6.1 SERVICE LEVEL (NPIAS)

The airport service level reflects the type of public use the airport provides to the community. The service level also reflects the funding categories established by Congress to assist in airport development. The following list identifies the different types of airport service levels:

- **Commercial Service** Airports are public airports that enplane 2,500 or more passengers annually and receive aircraft offering scheduled passenger service. Commercial service airports are either:
    - Primary: an airport that enplanes more than 10,000 passengers annually; or
    - Nonprimary: an airport that enplane at least 2,500 and no more than 10,000 passengers annually.
- **General Aviation Airports**, while not specifically defined, are considered to be airports not classified as commercial service. General aviation airports include:
    - **Reliever airports** designated by the FAA as having the function of relieving congestion at a commercial service airport and providing more general aviation access to the overall community. Privately owned airports may be identified as reliever airports.
    - **Privately owned public-use airports** that enplane 2,500 or more passengers annually and receive scheduled passenger service are also classified as general aviation because they do not meet the criteria for commercial service.
    - **Other General Aviation** are airports that are largely intended to serve the needs of general aviation users (users who conduct non-military operations not involving the carriage of passengers or cargo for hire or compensation.)

Holbrook Municipal Airport is listed in the NPIAS as a general aviation airport. The airport meets all of the NPIAS criteria for a general aviation airport.

1.6.2 AIRPORT REFERENCE CODE (ARC)

The ARC is a coding system used to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at the airport. The ARC has two components relating to the airport design aircraft. The first component, depicted by a letter, is the aircraft approach category and relates to the aircraft approach speed (operational characteristic). The second component depicted by a Roman numeral, is the airplane design group and relates to the airplane wingspan and tail height (physical characteristics).

In general, runway standards are related to aircraft approach speed, airplane wingspan, and designated or planned approach visibility minimums. Taxiway and taxilane standards are related to airplane design group. An upgrade in the first component of the ARC may result in a slight increase in certain design

standards, while an upgrade in the second component of the ARC generally will result in a major increase in airport design standards.

Currently, Runway 3/21 satisfies design standards for ARC B-I and runway 11/29 satisfies design standards for ARC B-I small.

1.6.3 AIRPORT ROLE (ARIZONA STATE SYSTEMS PLAN)

The Arizona State Aviation System Plan divides the airports into five roles. The roles are defined as follows:

- **Commercial Service Airports:** Publicly owned airports which enplane 2,500 or more passengers annually and receive scheduled passenger air service.
- **Reliever Airports:** FAA-designated airports that relieve congestion at commercial service airport.
- **General Aviation Community Airports:** Airports that serve regional economies, connecting to state and national economies and serve all types of general aviation aircraft.
- **General Aviation Rural Airports:** Airports that serve a supplemental role in local economies, primarily serving smaller business, recreational and personal flying.
- **General Aviation Basic:** Airports that serve a limited role in the local economy, primarily serving recreational and personal flying.

Holbrook Municipal Airport is classified as a General Aviation Community Airport based on the 2008 Arizona State Airports System Plan.

1.7 REGIONAL SETTING AND LAND USE

The City of Holbrook is located on the banks of the Little Colorado River and along Interstate 40 in Northeastern Arizona's high plateau country. In 1881-82 railroad tracks were laid and a railroad station was built in the community. The community was then named Holbrook in honor of the first chief engineer of the Atlantic and Pacific Railroad. The railroad is now the Burlington Northern Santa Fe (BNSF) Railway and Holbrook has since been a transportation hub and service center for northeast Arizona. Holbrook is also on Historic Route 66 and is the gateway city to the Petrified Forest National Park. A colorful cowboy history also helps to make Holbrook an interesting tourist community. Holbrook is the county seat of Navajo County.

Zip codes 86025, 86028 and 86029 are used as an approximation for the City of Holbrook, though the zip code area is far more extensive and has a greater population than within the city limits. The 745-square-mile land area of the three zip codes is much larger than the city's 15.5 square miles. The 2000 decennial census count of 7,027 residents in these zip codes was 43 percent greater than the city's population of 4,917. The 2004 population of Holbrook, as defined by these zip codes, is estimated at 7,711.

1.7.1 AIRPORT SERVICE AREA

An airport service area is defined by the communities and surrounding areas served by the airport facility. For example, factors such as the airport's surrounding topographical features (mountains, rivers, etc.), proximity to its users, quality of ground access, required driving time to the airport and the proximity of the facility to other airports that offer the same or similar services can all affect the size of a particular airport's service area. To define the service area for the Holbrook Municipal Airport, the airports in the area and their specific services and facilities were reviewed. Figure 1-2 shows the airport service area and relevant

characteristics of the other airports in the vicinity of Holbrook Municipal Airport. The Primary Service Area includes the area within half the distance of the nearest airport from Holbrook Municipal Airport.

The Secondary Service Area is the area within 20 miles/30-minute drive time of Holbrook Municipal Airport. Users within this area may choose Holbrook over other airports if there are economic or other advantages at Holbrook Municipal Airport such as lower lease rates, less expensive fuel or hangar availability. Table 1-2 shows relevant characteristics of airports surrounding Holbrook Municipal Airport.

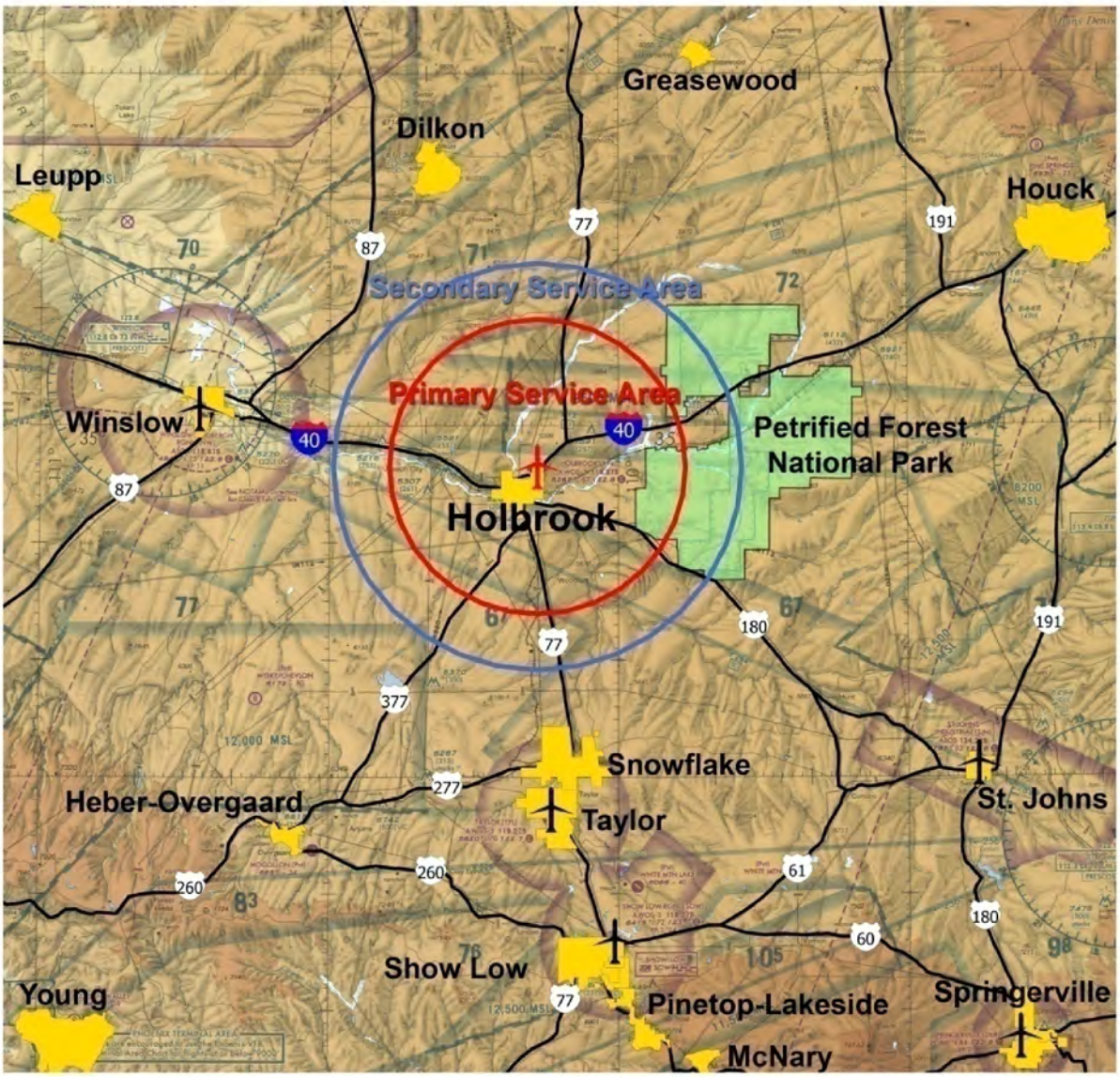


FIGURE 1-2 AIRPORT SERVICE AREA

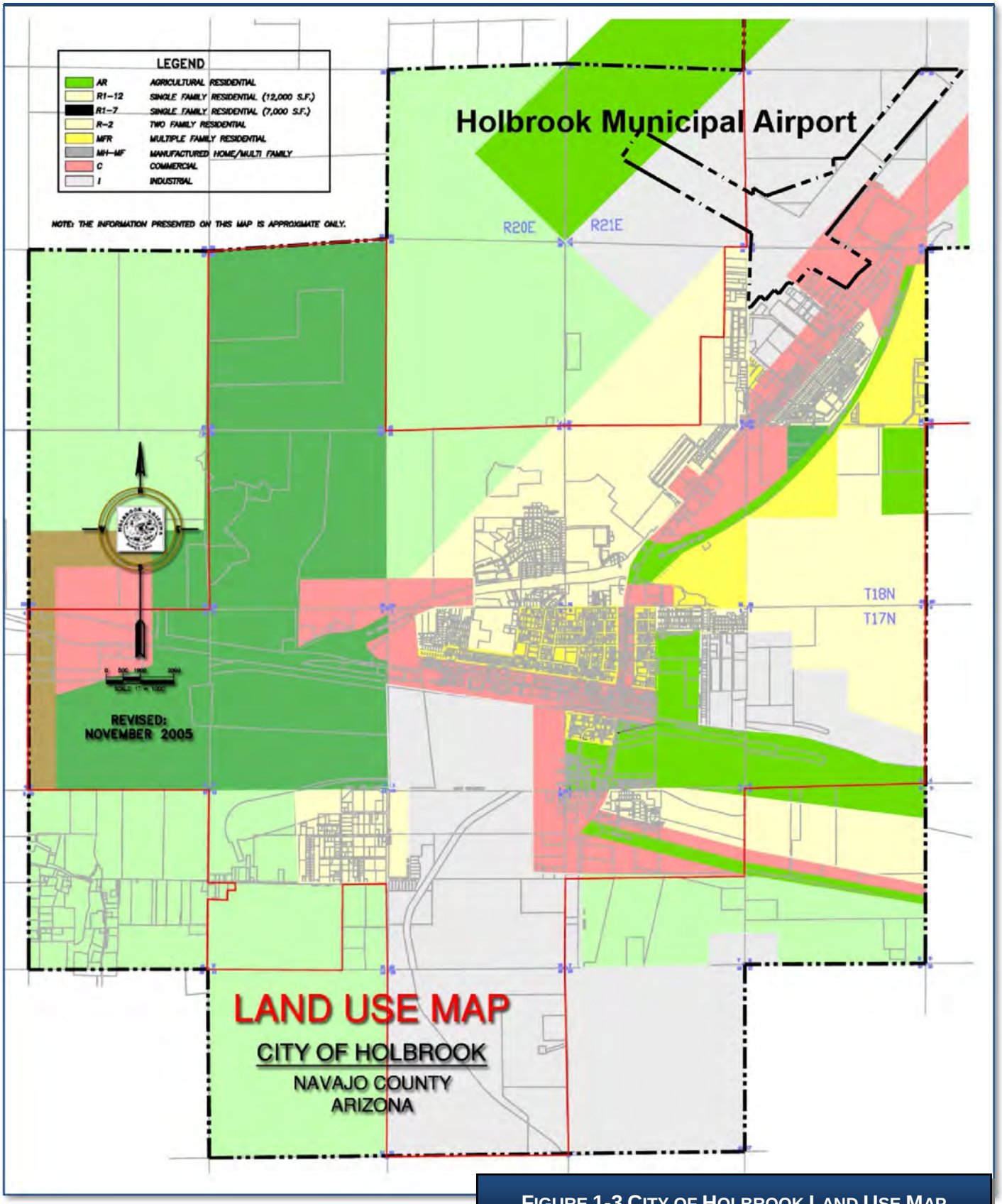
TABLE 1-2 HOLBROOK MUNICIPAL AIRPORT AND SURROUNDING AIRPORTS								
	ID.	DISTANCE (NAUTICAL MILES)	DISTANCE (HIGHWAY MILES)	NPIAS STATUS	RUNWAY LENGTH(S) WIDTH(S)	PAVEMENT TYPE	INSTRUMENT APPROACHES	FUEL
Holbrook Municipal Airport	P14	--	--	GA	6,698x75 ft 3,200x120 ft	Asphalt Dirt	None	100LL
Winslow-Lindbergh Regional Airport	KINW	29 W	37	GA	7,499x150 ft 7,100x150 ft	Asphalt Asphalt	VOR/GPS	100LL Jet-A
Taylor Airport	KTYL	29 S	48	GA	7,000x75 ft	Asphalt	GPS RNAV DP	100LL
Show Low Regional Airport	KSOW	41 S	81	CS	7,200x100 ft 3,937x60 ft	Asphalt Asphalt	RNAV/GPS NDB-A	100LL Jet-A
St. Johns Industrial Airpark	KSJN	45 SE	59	GA	5,322x75 ft 3,400x60 ft	Asphalt Asphalt	RNAV/GPS VOR/DMA-A	100LL Jet-A MOGAS
Polacca Airport	P10	53 NNW	97	GA	4,200x50 ft	Asphalt	None	None
Cibecue Airport	Z95	58 SSW	90	GA	4,200x100 ft	Gravel	None	None
Whiteriver Airport	E24	62 S	87	GA	6,350x75 ft	Asphalt	None	None
Springerville Municipal Airport	D68	64 SE	90	GA	8,422x75 ft 4,603x60 ft	Asphalt Asphalt	GPS	100LL Jet-A

Source: AirNav.com; 2009-2013 NPIAS Report; FAA AF/D.

1.7.2 COMPATIBLE LAND USE PLANNING

The FAA recommends that airport sponsors protect the areas surrounding an airport from incompatible development. Incompatible development includes those land uses which would be sensitive to aircraft noise or over flight, such as residences, schools, churches and hospitals and those uses which could attract wildlife and cause a hazard to aircraft operations such as landfills, ponds and wastewater treatment facilities. A recommended Compatible Land Use and Height Restriction Plan is included as part of this Master Plan. The land uses surrounding the airport include industrial and commercial development.

Figure 1-3 shows the different types of land uses around Holbrook Municipal Airport. The area where the airport is located is designated as Industrial (I) land use. Commercial (C) land uses are located southeast of the airport. Residential land uses located southwest of the airport could become a potential land use incompatibility.



Source: Adapted from the City of Holbrook

FIGURE 1-3 CITY OF HOLBROOK LAND USE MAP

1.8 SOCIOECONOMIC DATA

Examining the specific socioeconomic characteristics of Navajo County, the City of Holbrook and the Airport Service Area will help determine the factors that influence aviation activity and the extent to which aviation facility developments are needed at the Holbrook Airport. Characteristics, such as employment, demographic patterns and income, will help in establishing the potential growth rate of aviation within the city and the county. In other words, by analyzing the information in this Chapter, forecasts of aviation activity can be developed. Those forecasts are provided in Chapter 2.

1.8.1 LOCAL PROFILE

Holbrook is a key trade center for northeastern Arizona. Its location on Historic Route 66 and Interstate 40 at the junction of four major highways, between the Apache Sitgreaves National Forest to the south and the Navajo and Hopi Indian Reservations to the north, makes tourism important to the local economy. Holbrook is also a gateway to the Petrified Forest National Park and the Painted Desert.

A variety of attractions surround Holbrook. To the north is the rugged plateau country with canyons containing prehistoric cliff-dwellings, such as those found in Canyon de Chelly. The Navajo and Hopi Reservations offer many attractions including ceremonial dances, tribal events, and arts and crafts. Holbrook's courthouse, which houses the Museum and Chamber of Commerce Visitor Center, is listed on the National Register of Historic Places.

Holbrook offers a wide range of community facilities including a museum, a community center, a senior center, a library, three parks, one swimming pool, a bowling alley, one golf course, six softball fields and numerous tennis and racquetball courts. There is also a county fairground with a rodeo arena and a track for horse racing. The Winslow Memorial Hospital is a fully staffed hospital with 24-hr emergency room service. Holbrook also offers hotel and lodging facilities with 1,082 rooms and 9 meeting rooms. The largest facility has a capacity of 350 rooms.

1.8.2 POPULATION

As of the 2001 US Census, there were 4,930 people residing in Holbrook. According to population estimates from the Arizona Department of Economic Security and the U.S. Census Bureau, these populations increased moderately from 2001 to 2008. Table 1-3 shows this increased population trend. Projections of population growth are shown on Table 1-4 and Figure 1-4.

TABLE 1-3 HISTORICAL POPULATION DATA

	2001	2002	2003	2004	2005	2006	2007	2008
Arizona	5,319,785	5,470,720	5,642,725	5,845,250	6,077,740	6,305,210	6,500,194	6,629,455
Navajo County	99,840	101,625	103,865	107,170	109,985	113,470	113,796	114,780
Holbrook	**4,930**	**4,930**	**5,310**	**5,415**	**5,425**	**5,455**	**5,599**	**5,611**
Pinetop-Lakeside	3,680	3,750	3,865	4,025	4,165	4,540	4,769	4,765
Show Low	8,085	8,295	8.785	9,345	9,885	10,555	11,473	12,315
Snowflake	4,615	4,725	4,770	4,840	4,935	5,180	5,221	5,565
Taylor	3,400	3,575	3,750	3,970	4,100	4,270	4,325	4,453
Winslow	9,560	9,455	9,480	9,595	9,835	9,945	10,135	10,194
Unincorporated	65,570	66,895	67,905	69,980	71,640	73,525	72,274	71,876

Source: Population Statistics Unit, Research Administration, Department of Economic Security

TABLE 1-4 POPULATION PROJECTIONS

	2010	2015	2020	2025	2030
Arizona	7,056,534	8,040,761	9,024,987	10,009,213	10,993,440
Navajo County	120,969	132,700	144,430	156,160	167,890
Holbrook	5,895	6,404	6,913	7,423	7,932
Pinetop-Lakeside	5,168	6,052	6,936	7,820	8,704
Show Low	13,204	16,261	19,318	22,374	25,431
Snowflake	5,666	6,288	6,911	7,533	8,155
Taylor	4,819	5,582	6,344	7,107	7,869
Winslow	10,395	10,959	11,523	12,087	12,651
Unincorporated	75,822	81,153	86,484	91,814	97,145

Source: Armstrong Consultants, Inc., extrapolated from the Population Statistics Unit, Research Administration, Department of Economic Security data

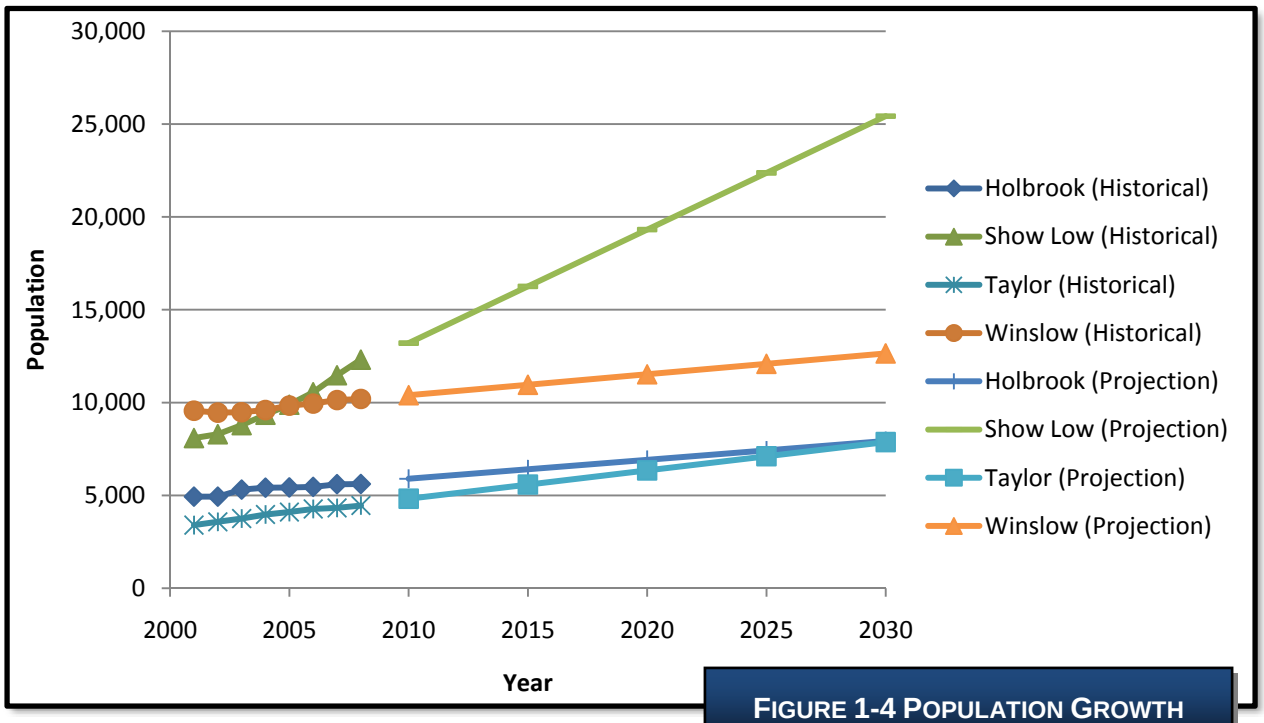


FIGURE 1-4 POPULATION GROWTH

1.8.3 EMPLOYMENT

Tourism, travel, and electrical power generation are the primary drivers of the Holbrook economy. Government provides the most employment of any sector in Holbrook. Table 1-5 and Figure 1-5 show the distribution of employments sectors in the City of Holbrook.

TABLE 1-5 NAVAJO COUNTY EMPLOYMENT DISTRIBUTION

	2007	% OF TOTAL
Government	10,600	35.72%
Trade, Transportation, and Utilities	5,900	19.88%
Professional and Business Services	3,475	11.71%
Educational and Health Services	3,150	10.61%
Mining and Construction	2,825	9.52%
Manufacturing	875	2.95%
Information	800	2.70%
Leisure and Hospitality	725	2.44%
Other Services	725	2.44%
Financial Activities	600	2.02%
Total:	**29,675**	

Source: Arizona Department of Economic Security; Holbrook Community Profile

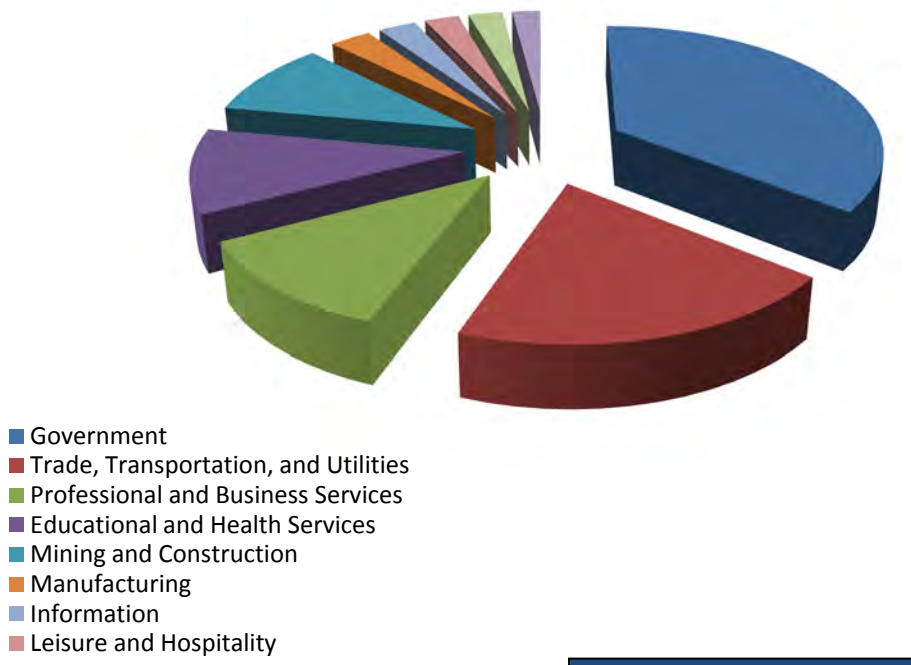


FIGURE 1-5 EMPLOYMENT DISTRIBUTION

1.8.4 INCOME

Historical and projections for per capita personal income (PCPI) are shown on Table 1-6 and Table 1-7. In 2001 PCPI in Navajo County was $15,354 and increased approximately 39 percent from 2001 to 2008. This represents an annual growth of approximately 4.9 percent. It is assumed that PCPI will continue to grow at an annual rate of approximately 3.9 percent.

TABLE 1-6 PER CAPITA INCOME DATA

	2001	2002	2003	2004	2005	2006	2007	2008
Arizona	$26,181	$26,454	$26,959	$28,680	$30,620	$32,285	$32,833	$34,184
Navajo County	$15,354	$15,834	$16,659	$17,580	$18,824	$19,696	$20,369	21,321

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

TABLE 1-7 PER CAPITA INCOME PROJECTIONS

	2010	2015	2020	2025	2030
Arizona	$36,704	$43,004	$49,304	$55,604	$61,904
Navajo County	$23,102	$27,555	$32,007	$36,460	$40,912

Source: Extrapolated from Bureau of Economic Analysis, U.S. Department of Commerce

1.8.5 CERTIFICATED PILOTS AND REGISTERED AIRCRAFT

The FAA databases of certificated airmen and registered aircraft were reviewed to determine the current distribution of pilots and registered aircraft in the area defined the following Zip Codes: 86025, 86028 and 86029. This data indicates that there are 6 certificated pilots and 8 registered aircraft in Holbrook. Aircraft are not always based where they are registered. Table 1-8 shows the number of certificated pilots and registered aircraft in Holbrook and other nearby Cities.

TABLE 1-8 CERTIFICATED PILOTS AND REGISTERED AIRCRAFT NEAR HOLBROOK

	Aircraft Registered	Certificated Pilots
Holbrook	8	6
Winslow	10	15
Taylor	6	6
Show Low	46	45

Source: FAA Aircraft Registry November 2009, Airmen Registration Database December 2009

According to the PAC, inventory and aircraft movement logs there are 12 based aircraft and approximately 4,200 operations at Holbrook Municipal Airport. These totals result in approximately 350 operations per based aircraft (OBPA).

1.9 CLIMATE AND METEOROLOGICAL CONDITIONS

Meteorological conditions play an important role in the planning and development of an airport. Wind direction and speed are essential in determining optimum runway orientation. Temperatures substantially affect aircraft performance and are a major factor in runway length determination. The percentage of time an airport's vicinity experiences low visibility because of meteorological conditions is a key factor in determining the need for instrument approach procedures and the type of procedure and facilities needed.

The type of instrument approach procedure that might be needed, in turn, determines airspace and imaginary surface requirements. The amount and type of precipitation that occurs at an airport affects visibility and runway friction, or runway braking effectiveness. It also affects the type of maintenance equipment required, for example, snow and ice removal equipment.

1.9.1 Local Climatic Data

The monthly average maximum temperature for the hottest month (July) is 93.9 degrees Fahrenheit. August is the month with the largest amount of precipitation (1.37 inches). The total annual average precipitation is 8.37 inches. The average total snow fall is 8.1 inches and there is no snow accumulation during the winter months.

1.9.2 Ceiling and Visibility Conditions

Ceiling and visibility conditions are important considerations since the occurrence of low ceiling and/or poor visibility conditions limit the use of the airport to instrument approach and departure operations until conditions change. Under poor visibility conditions or Instrument Meteorological Conditions (IMC), the pilot must operate under Instrument Flight Rules (IFR), rather than Visual Flight Rules (VFR). Under IFR, the pilot maneuvers the aircraft through sole reference to instruments in the aircraft and navigational aids on the ground. The airport must be closed for use when conditions are worse than the published IFR minimums for that airport. When flight conditions are Visual Meteorological Conditions (VMC), the pilot can maneuver the aircraft by reference to the horizon and objects on the ground. Ceiling and wind conditions for the Holbrook Municipal Airport are shown on Table 1-9. There is currently no existing instrument approach into Holbrook Municipal Airport.

Table 1-9 Ceiling and Visibility Conditions

	Observations
Ceiling ≥ 1,000 feet and visibility ≥ 3 miles	77,693
Ceiling < 1,000 feet and/or visibility < 3 miles but ceiling ≥ 200 feet and visibility ≥ 0.5 miles	584
Ceiling < 200 feet and/or visibility < 0.5 miles	166

Source: National Climatic Data Center. Winslow, AZ station (29 nautical miles west of Holbrook), period of record 1999-2008

1.9.3 Wind Conditions

The FAA recommends that sufficient runway orientation be provided to achieve 95 percent wind coverage using all available runways. Wind coverage is that percent of time when the crosswind component is at an acceptable speed. The crosswind component is defined as the maximum permissible wind velocity occurring at right angles left or right of the heading of a landing or departing aircraft. The allowable crosswind component is expressed in knots and is based on the ARC of the airport and are shown in Table 1-10. Table 1-11 and Table 1-12 summarize the crosswind coverage in all weather conditions and in instrument meteorological conditions.

TABLE 1-10 CROSSWIND COMPONENT	
ALLOWABLE CROSSWIND IN KNOTS	**AIRPORT REFERENCE CODE**
10.5 knots	A-I & B-I
13 knots	A-II & B-II
16 knots	A-III, B-III & C-I through D-III
20 knots	A-IV through D-VI

Source: FAA

When conducting a wind coverage evaluation analysis, the FAA suggests that historical weather information for the last 10 consecutive years. Records of lesser duration may be acceptable on a case-by-case basis. In some instances, it may be desirable to obtain and assemble wind information for periods of particular significance, for example, seasonal variations, instrument weather conditions, daytime versus nighttime and regularly occurring gusts.

Although there is an Automated Weather Observation System (AWOS) at Holbrook Airport, there is no historical data available to conduct a thorough wind analysis. Therefore, the National Climatic Center data at the closest observation station located in Winslow, AZ (29 nautical miles west of Holbrook) for the period 1999-2008 was chosen for a wind analysis. Windroses for all weather and IFR conditions are shown in Figure 1-6 and Figure 1-7.

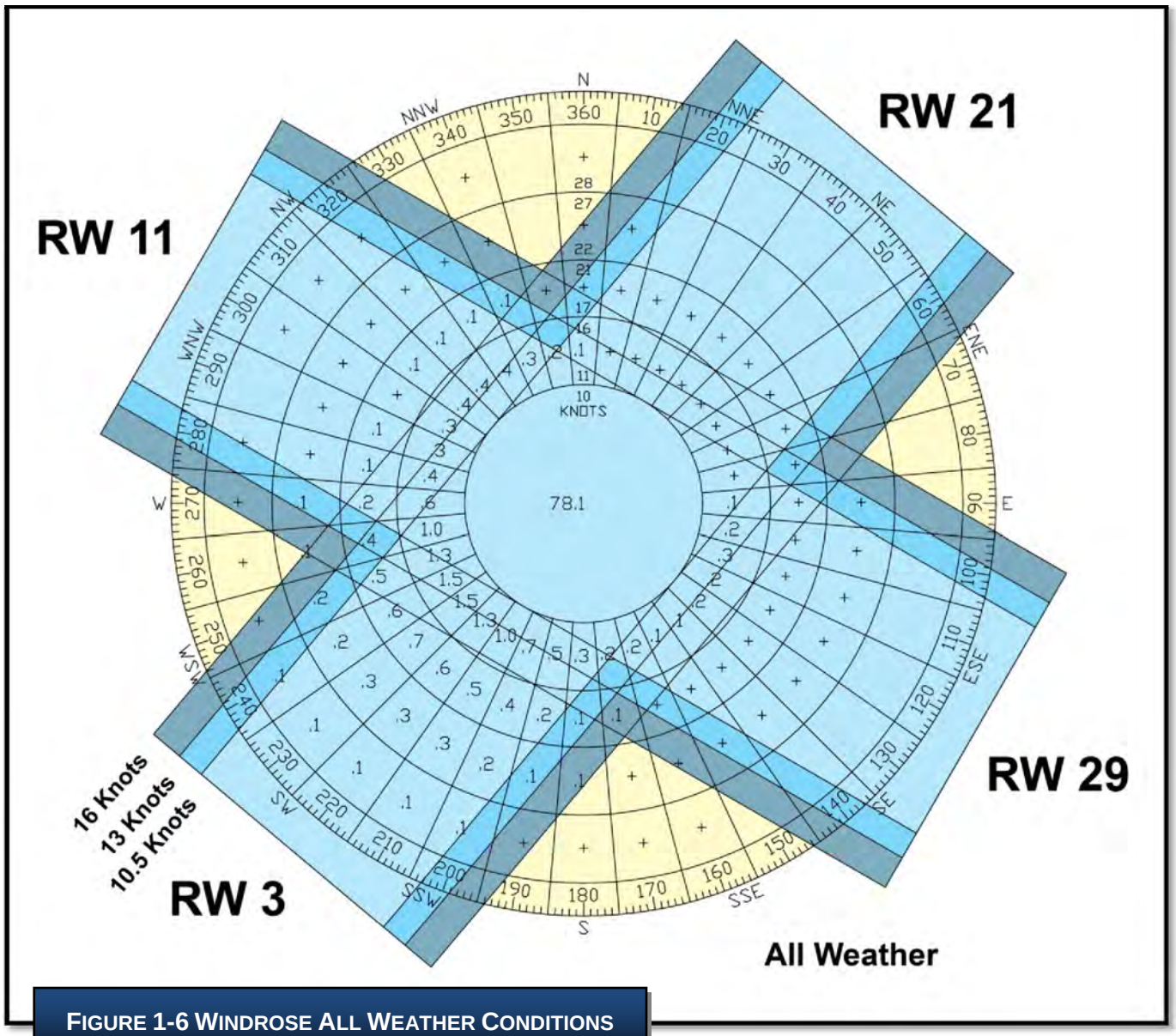


FIGURE 1-6 WINDROSE ALL WEATHER CONDITIONS

TABLE 1-11 CROSSWIND COVERAGE IN ALL WEATHER CONDITIONS

RUNWAY	CROSSWIND		
	10.5 KNOTS	13 KNOTS	16 KNOTS
Runway 3/21	93.34%	96.33%	98.79%
Runway 11/29	85.87%	90.42%	94.80%
Combined	98.04%	99.36%	99.83%
Condition	All Observations, all weather		
Number of Observations	78,533 observations between 1999-2008		

Source: National Climatic Data Center. Winslow, AZ station, period of record 1999-2008

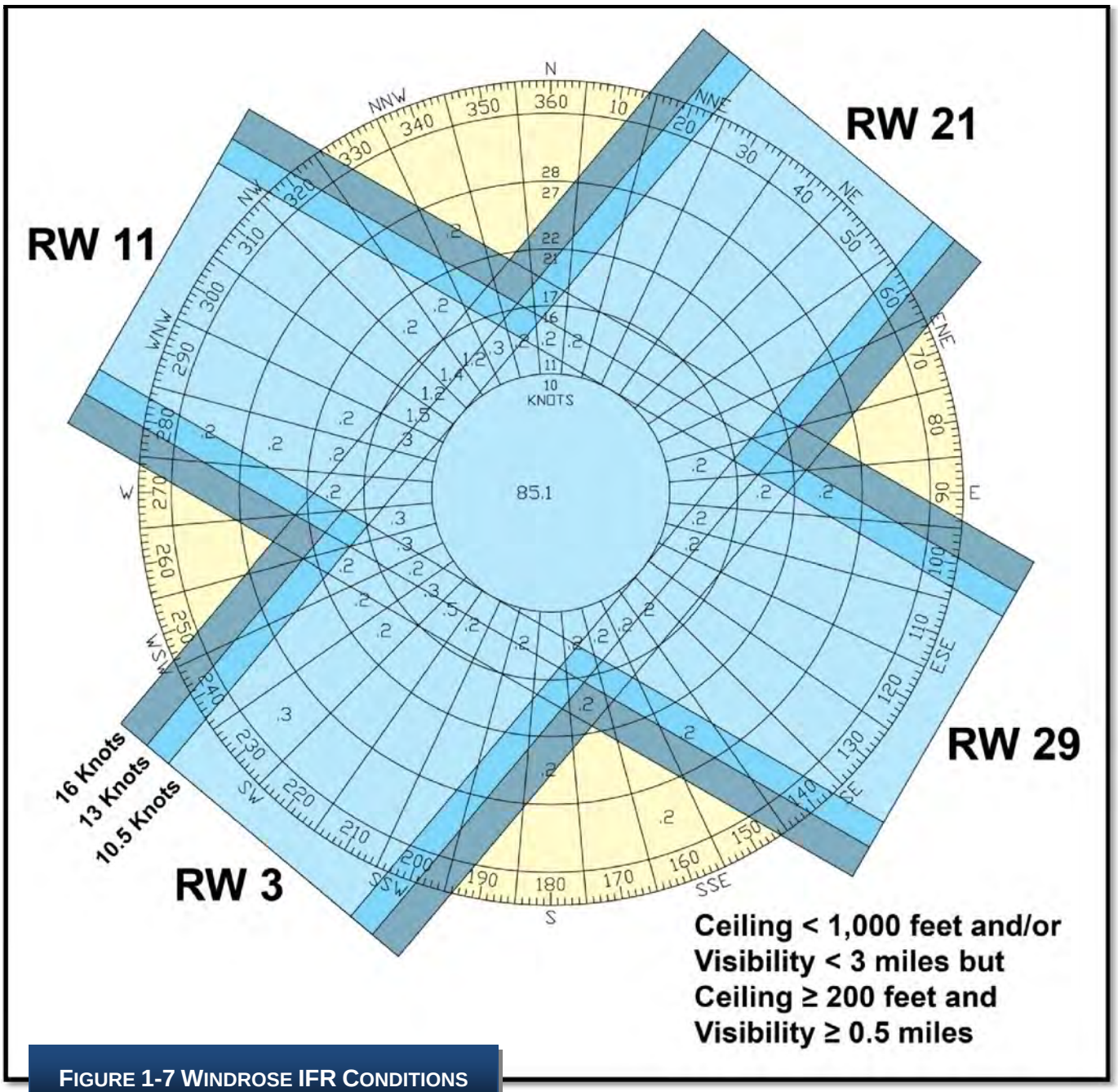


FIGURE 1-7 WINDROSE IFR CONDITIONS

TABLE 1-12 CROSSWIND COVERAGE IN IFR CONDITIONS

RUNWAY	CROSSWIND		
	10.5 Knots	**13 Knots**	**16 Knots**
Runway 3/21	90.30%	93.47%	97.62%
Runway 11/29	94.23%	95.81%	97.17%
Combined	98.14%	98.97%	99.50%
Condition	Ceiling < 1,000 feet and/or visibility < 3 miles but ceiling ≥ 200 feet and visibility ≥ 0.5 miles.		
Number of Observations	585 observations between 1999-2008		

Source: National Climatic Data Center. Winslow, AZ station, period of record 1999-2008

1.10 Existing Based Aircraft, Operations and Fleet Mix Baseline

The number of based aircraft, number of operations and fleet mix baseline was estimated based on the information received from the airport manager and is shown on Table 1-13. This data was for 2008 and 2009 up to March. The information received included counts of flight activities, visitors, courtesy car usage and persons transported.

Table 1-13 Baseline Based Aircraft, Operations, and fleet Mix

Type of Aircraft	2009
Based Aircraft	12
Fixed Wing Single-Engine Aircraft	6
Fixed Wing Multi-Engine Aircraft	0
Rotorcraft	0
Ultralight	0
Weight-shift Control	6
Total Operations Annual Operations	4,200

Source: Airport Management

1.11 Design Standards Inventory

FAA AC 150/5300-13, Airport Design, establishes design standards for airports based on the ARC of the airport. When design standard deficiencies exist, the FAA recommends correction of such deficiencies as soon as practicable. Design standards are based on the ARC and approach visibility minimums of the airport. The ARC is a combination of the wingspan, tail height and approach speed of the critical aircraft operating at the airport. Selected design standard categories are discussed below and Table 1-14 shows the current design standards for Runways 3/21 and 11/29.

1.11.1 Safety Areas

Runway and Taxiway Safety Areas (RSAs and TSAs) are defined surfaces surrounding the runway and taxiway prepared specifically to reduce the risk of damage to aircraft in the event of an undershoot, overshoot or excursion from the runway or taxiway. The Safety Areas must be:

- Cleared and graded and have no potentially hazardous surface variations;
- Drained so as to prevent water accumulation;
- Capable, under dry conditions, of supporting snow removal equipment, ARFF equipment and the occasional passage of aircraft without causing structural damage to the aircraft;
- Free of objects, except for objects that need to be located in the runway or taxiway safety area because of their function.

The runway safety areas off the ends of Runway 3/21 and Runway 11/29 at Holbrook Airport are in good condition and satisfy the requirements defined by the standards.

1.11.2 Obstacle Free Zone (OFZ) and Object Free Area (OFA)

The Obstacle Free Zone (OFZ) is a three dimensional volume of airspace which supports the transition of ground to airborne aircraft operations. The clearing standard precludes taxiing and parked airplanes and object penetrations, except for frangible visual Navigational Aids (NAVAIDs) that need to be located in the OFZ because of their function. The OFZ is similar to the FAR Part 77 Primary Surface insofar that it represents the volume of space longitudinally centered on the runway. It extends 200 feet beyond the end of each runway. The Runway Object Free Area (ROFA) is a two-dimensional ground area surrounding the runway. The ROFA standard precludes parked airplanes, agricultural operations and objects, except for

objects that need to be located in the ROFA for air navigation or aircraft ground maneuvering purposes. Both the OFZ and OFA meet the requirements defined by the standards.

1.11.3 RUNWAY PROTECTION ZONE (RPZ)

The Runway Protection Zone (RPZ) is trapezoidal in shape and centered about the extended runway centerline. The RPZ dimension for a particular runway end is a function of the type of aircraft and approach visibility minimum associated with that runway end.

At both ends of Runway 3/21 the RPZ begins 200 feet from the runway threshold and extends for 1,000 feet. For Runway 3/21 the RPZ is 500 feet wide at the inner end and 700 feet wide at the outer end. For runway 11/29 the RPZ is 250 feet wide at the inner end and 450 feet wide at the outer end.

The land uses not recommended within the RPZ are residences and places of public assembly (churches, schools, hospitals, office buildings, shopping centers and other uses with similar concentrations of persons typify places of public assembly). The FAA recommends the Sponsor control the RPZs through fee simple ownership or avigation easements.

As shown on Figure 1-10, the approach RPZ for Runway 3 begins at 200 feet from the displaced threshold. The departure RPZ for Runway 21 begins at 200 feet from the pavement edge. The approach and departure RPZs shown on Figure 1-10 are not located on airport property. The airport currently does not have any easements or any other land control over these properties. Furthermore, the RPZ encompasses a residential area which is incompatible with FAA recommended standards.

As shown on Figure 1-9, the approach RPZ for Runway 21 and the departure RPZ for Runway 3 are not located on airport property. The airport currently has no easements or other land control over this property.

As shown on Figure 1-9, the approach RPZ for Runway 29 and the departure RPZ for Runway 11 is not located on airport property. Furthermore, a hotel is located within this RPZ which is an incompatible use according to FAA recommended standards.

TABLE 1-14 CURRENT DIMENSIONAL STANDARDS

	Runway 3/21		Runway 11/29	
	CURRENT DIMENSION	CURRENT STANDARD	CURRENT DIMENSION	CURRENT STANDARD
Airport Reference Code (ARC)	--	B-I	--	B-I(small)
Runway length	6,698’	--	3,200	--
Runway width	75’	60’	120’	60’
Runway Safety Area (RSA) width	120’	120’	120	120’
Runway Safety Area (RSA) length beyond runway end	240’	240’	240’	240’
Runway Object Free Area (ROFA) width	400’	400’	250’	250’
Runway Object Free Area (ROFA) length beyond runway end	240’	240’	240’	240’
Runway Obstacle Free Zone (ROFZ) width	400’	400’	250’	250’
Runway Obstacle Free Zone (ROFZ) length beyond runway end	200’	200’	200’	200’
Runway Protection Zone (RPZ) length	1,000’	1,000’	1,000’	1,000’
Runway Protection Zone (RPZ) inner width	500’	500’	250’	250’
Runway Protection Zone (RPZ) outer width	700’	700’	450’	450’
Taxiway Safety Area (TSA) width	49’	49’	--	49’
Taxiway Object Free Area (TOFA) width	89’	89’	--	89’
Taxilane Object Free Area width	79’	79’	--	79’
Runway centerline to hold line	150’	200’	--	125’
Runway centerline to taxiway/taxilane centerline	200’	225’	--	150’
Runway centerline to aircraft parking area	300’	200’	--	125’
Runway centerline to helicopter touchdown pad	367’	--	--	--
Taxiway centerline to parallel taxiway/taxilane centerline	167’	69’	--	69’
Taxiway centerline to fixed or movable object	92’	44.5’	--	44.5’
Taxilane centerline to parallel taxilane centerline	--	64’	--	64’
Taxilane centerline to fixed or movable object	--	39.5’	--	39.5’

1.12 FEDERAL AVIATION REGULATION (FAR) PART 77 IMAGINARY SURFACES

Federal Aviation Regulations (FAR) Part 77 establishes several Imaginary Surfaces that are used as a guide to provide a safe, unobstructed operating environment for aviation. The Primary, Approach, Transitional, Horizontal and Conical Surfaces identified in FAR Part 77 are applied to each runway. For the purpose of this section, a visual/utility runway is a runway that is intended to be used by propeller driven aircraft of 12,500 pound maximum gross weight and less. A non-precision instrument/utility runway is a runway that is intended to be used by aircraft of 12,500 pounds maximum gross weight and less with a straight-in instrument approach procedure and instrument designation indicated on an FAA approved airport layout plan, a military service approved military airport layout plan or by any planning document submitted to the FAA by competent authority. A non-precision instrument/larger-than-utility runway is a runway intended for the operation of aircraft weighing more than 12,500 pounds that also has a straight-in instrument approach procedure.

The Primary Surface is an imaginary surface of specific width longitudinally centered on a runway. Primary Surfaces extend 200 feet beyond each end of the paved surface of runways, but do not extend past the end of non-paved runways. The elevation of any point on the Primary Surface is the same as the elevation of the nearest point on the runway centerline. The width of the Primary Surface varies from 250, 500 or 1,000 feet depending on the type of approach and approach visibility minimums.

The Approach Surface is a surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the Primary Surface. An Approach Surface slope is applied to each end of the runway based upon the type of approach available or planned for that runway, either 20:1, 34:1 or 50:1. The inner edge of the surface is the same width as the Primary Surface. It expands uniformly to a width corresponding to the FAR Part 77 runway classification criteria.

The Transitional Surfaces extend outward and upward at right angles to the runway centerlines from the sides of the Primary and Approach Surfaces at a slope of 7:1 and end at the Horizontal Surface.

The Horizontal Surface is a horizontal plane 150 feet above the established airport elevation. The airport elevation is defined as the highest point of an airport's useable runways, measured in feet above mean sea level. The perimeter is constructed by arcs of specified radius from the center of each end of the Primary Surface of each runway. The radius of each arc is 5,000 feet for runways designated as utility or visual and 10,000 feet for all other runways.

The Conical Surface extends outward and upward from the periphery of the Horizontal Surface at a slope of 20:1 for a horizontal distance of 4,000 feet.

1.12.1 Summary of Part 77 Imaginary Surfaces Dimensional Criteria

Table 1-15 FAR Part 77 Airspace Surfaces for Runway 3/21 and Runway 11/29

	Runway 3/21 Existing	Runway 11/29 Existing
Primary Surface width	500’	250’
Primary Surface length beyond runway ends	200’	0
Approach Surface Dimensions	500’ x 1,500’ x 5,000’	250’ x 1,250’ x 5,000’
Approach Surface slope	20:1	20:1
Transitional Surface slope	7:1	7:1
Horizontal Surface radius from runway	5,000’	5,000’
Conical Surface width	4,000’	4,000’
Conical Surface slope	20:1	20:1

1.13 Threshold Siting Surface

According to FAA AC 150/5300-13, the runway threshold should be located at the beginning of the full-strength runway pavement or runway surface. However, displacement of the threshold may be required when an object obstructs the airspace required for landing airplanes and is beyond the airport owner’s power to remove, relocate or lower. Thresholds may also be displaced for environmental considerations such as noise abatement or to provide the standard RSA and ROFA lengths.

Based on the visual approach and size of aircraft using the Holbrook Municipal Airport, in order to meet FAA design standards, no object should penetrate a surface that starts at the threshold of Runway 3/21and Runway 11/29 at the elevation of the runway centerline at the threshold and slopes upward from the threshold at a slope of 20 feet (horizontal) to 1 foot (vertical). In the plan view, the centerline of this surface extends 2,250 feet along the extended runway centerline. This surface extends laterally 125 feet on each side of the centerline at the threshold and increases in width to 700 feet at a point 2,250 feet from the threshold. Currently there are no objects penetrating this surface.

Based on the available information, there are not obstruction penetrations of the 20:1 obstacle clearance surface (OCS).

1.14 EXISTING AIRSIDE FACILITIES INVENTORY

The “airside” of an airport is that portion of the airport, typically within the public safety and security fenced perimeter, in which aircraft, support vehicles and equipment are located; and in which aviation-specific operational activities take place. This inventory of airside facilities provides the basis for the airfield demand/capacity analysis and the determination of any facility change requirements that might be identified.

1.14.1 RUNWAYS

There are two runways available for use at Holbrook Municipal Airport: Runway 3/21 and Runway 11/29. Runway 3/21 is 6,698 feet long, 75 feet wide, oriented in a northwest-southwest direction and serves as the primary runway. Runway 3/21 is constructed with asphalt. The Runway 3 threshold has been displaced 800 feet to reduce the amount of noise over the residential land located within the RPZ for Runway 3 according to the 2000 Airport Master Plan. This displacement reduces Runway 3 landing distance to 5,898 feet. Figure 1-9 shows the declared distances. Runway 3/21 is in good condition. Runway 11/29 is a dirt runway that serves as crosswind runway. It is 3,200 feet long and 120 feet wide. Runway 11/29 is in fair condition (see Figures 1-8, 1-9 and 1-10).

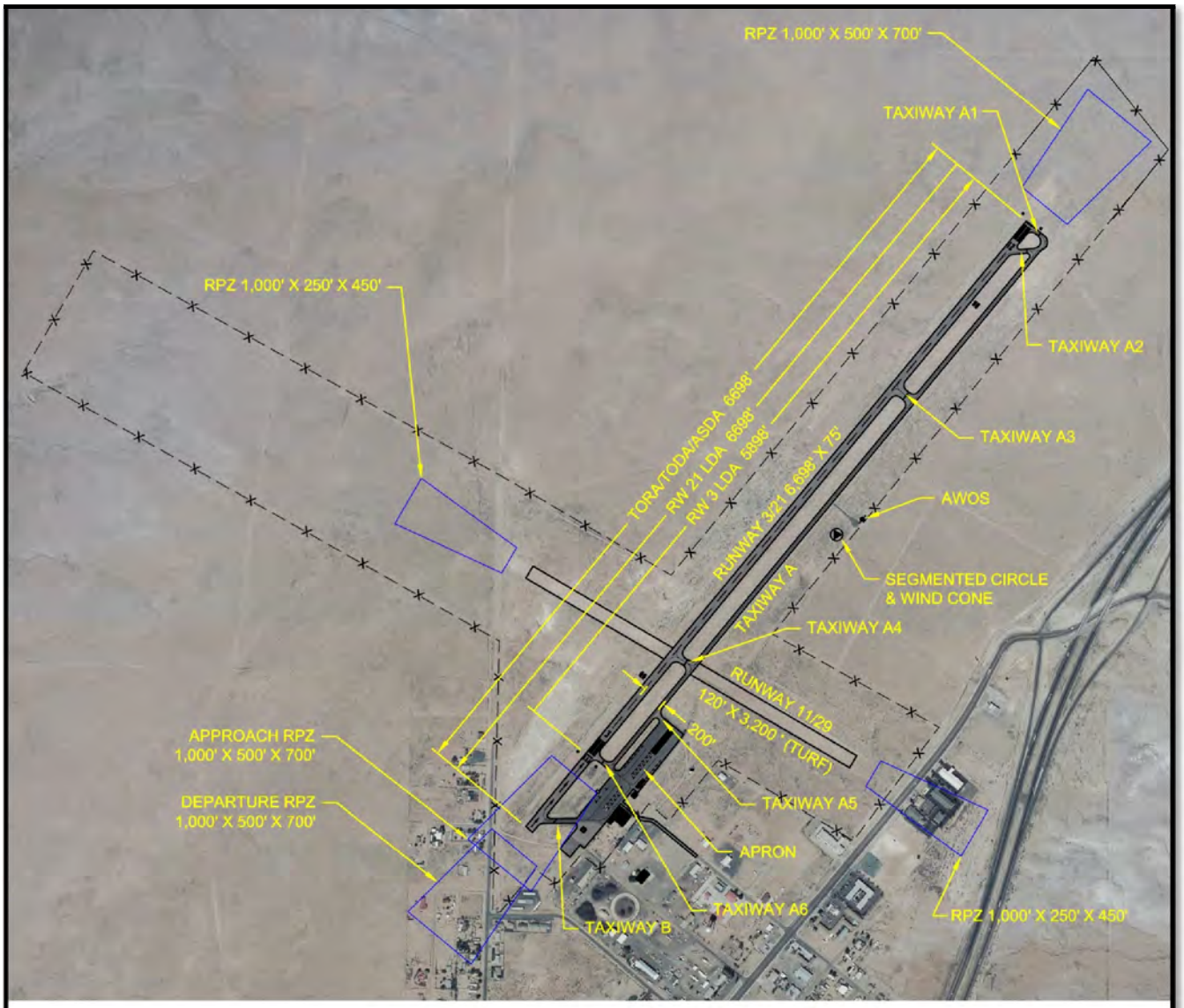
1.14.2 TAXIWAY SYSTEM

Taxiway A is a full length parallel taxiway providing access to both ends of Runway 3/21. Taxiway A is 35 feet wide and located 200 feet east of the Runway 3/21 centerline. Taxiways A1, A2, A3, and A4 serve as runway entrance/exit taxiways and connect Runway 3/21 with Taxiway A. Taxiway A1 is 25 feet wide. Taxiway A2 is 35 feet wide. Taxiway A3 is 80 feet wide while Taxiway A4 is 60 feet wide. Taxiway A5 extends between Taxiway A and the northeast portion of the aircraft parking apron, providing access to the T-hangar area. Taxiway A5 is 35 feet wide. Taxiway A6 extends between the aircraft parking apron and the Runway 3 displaced landing threshold. Taxiway A6 is 40 feet wide. Taxiway B is 40 feet wide and provides access from the aircraft parking apron to the Runway 3 departure threshold.

1.14.3 AIRCRAFT APRON AND HELIPAD

The aircraft apron is constructed of asphalt and encompasses approximately 27,200 square yards, providing 40 tiedown spaces for based and transient aircraft. Five floodlights along the east side of the apron enhance operations and security at night. A helipad is located south of Taxiway B for helicopter arrivals and departures. The helipad is constructed of concrete and measures 60 feet x 60 feet.

FIGURE 1-8 RUNWAY 3/21



DECLARED DISTANCES		
ITEM	RWY 3	RWY 21
TAKEOFF RUN AVAILABLE (TORA)	6,698'	6,698'
TAKEOFF DISTANCE AVAILABLE (TODA)	6,698'	6,698'
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	6,698'	6,698'
LANDING DISTANCE AVAILABLE (LDA)	5,898'	6,698'

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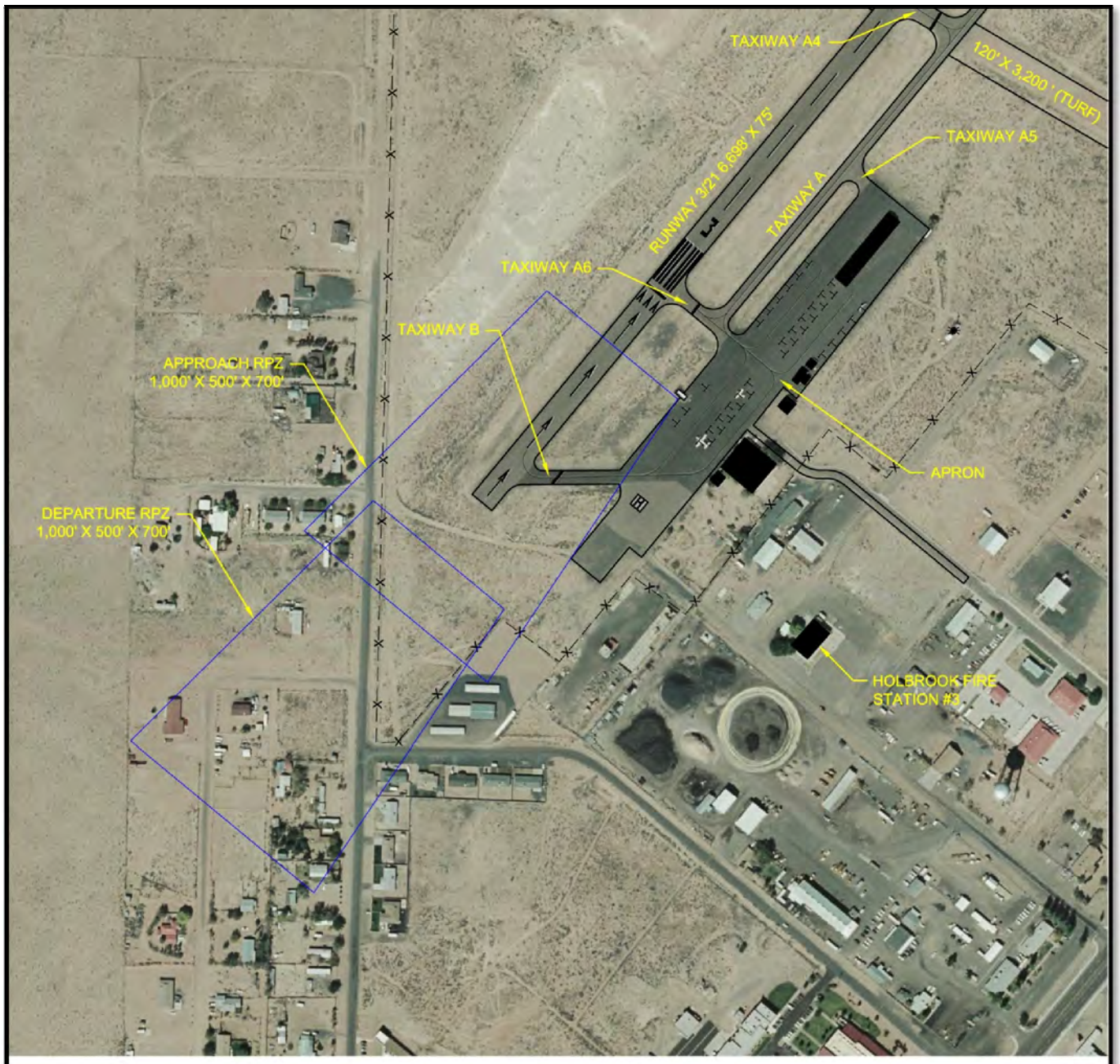
	AIRFIELD DEVELOPMENT (ASPHALT)
	STRUCTURE/FACILITIES (BUILDING)
—— — —x— — —x—	APPROX. AIRPORT FENCE LINE
	RUNWAY PROTECTION ZONE

AIRPORT ELEVATION: 5262'
ARC: B-I, B-I (SMALL)
RUNWAY 3/21: 6,698' X 75'
PAVEMENT STRENGTH: 30,000 lbs.
RUNWAY 11/29: 3,200' X 120' (DIRT)

FIGURE 1-9 AIRSIDE FACILITIES



	AIRFIELD DEVELOPMENT (ASPHALT)
	STRUCTURE/FACILITIES (BUILDING)
—— — —x— — —x—	APPROX. AIRPORT FENCE LINE
	RUNWAY PROTECTION ZONE

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FIGURE 1-10 RUNWAY 3/21 RPZ DETAIL

1.14.4 Pavement Conditions Index (PCI)

The Pavement Condition Index is a numerical index between 0 and 100 and is used to indicate the condition of the pavement. PCI is based on a visual survey of the pavement and a numerical value between 0 and 100 defines the condition with 100 representing an excellent pavement. As shown in Figure 1-11 the last PCI inspection (2006) reported Runway 3/21 and Taxiway A in good condition and the apron in fair condition. A visual inspection of the apron as part of the study indicated that the apron is in poor condition.

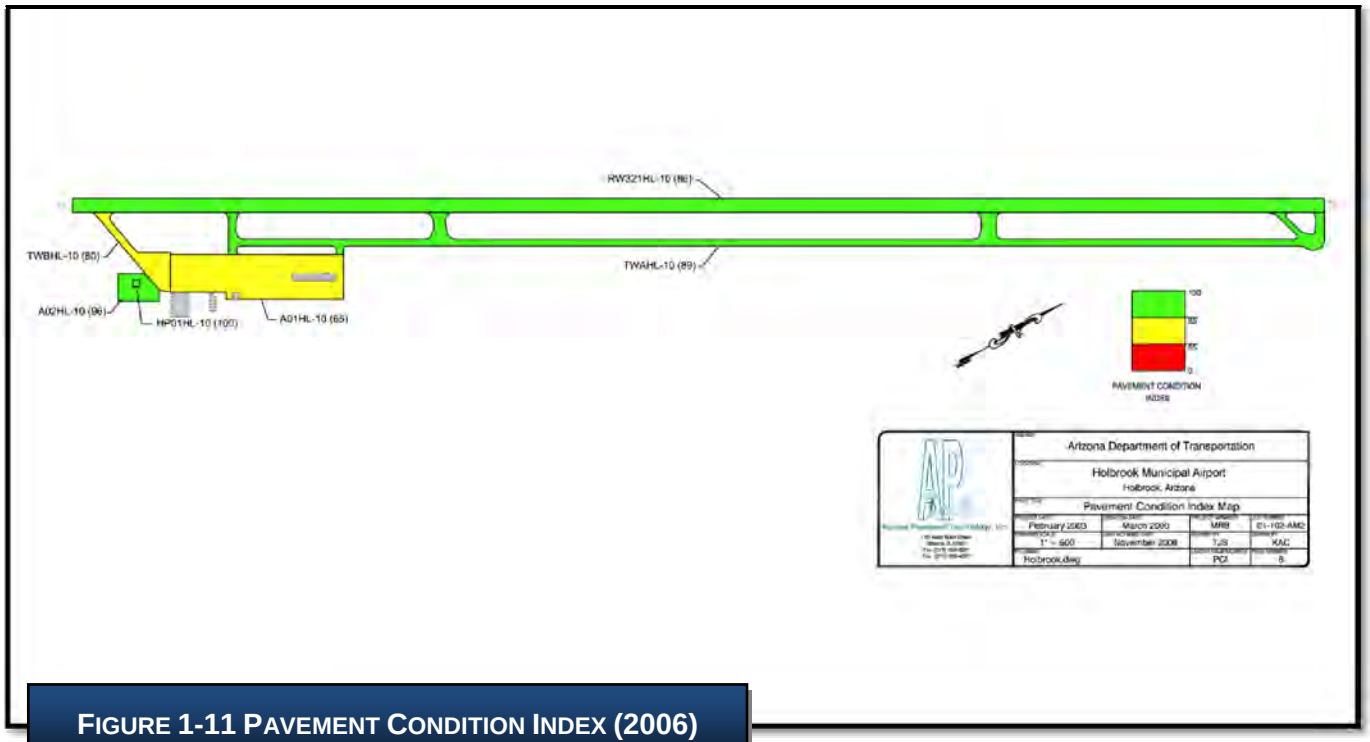


Figure 1-11 Pavement Condition Index (2006)

1.14.5 Airfield Lighting, Signage and Visual Aids

The rotating beacon is located on top of a steel tower on the east side of the airport. Runway 3/21 is equipped with Medium Intensity Runway Lights (MIRL). All taxiways are equipped with Medium Intensity Taxiway Lights (MITL). The runway lighting is pilot controlled. Lighted airfield signs are installed at some of the connector taxiways. A Precision Approach Path Indicator (PAPI) is installed at each end of Runway 3/21. Runway End Identification Lights (REIL) provide rapid and positive identification of the approach end of the runway. REILs are located at both ends on Runway 3/21. The basic markings on Runway 3/21 identify the runway centerline, designation and aircraft holding positions. Taxiway and apron taxilane centerline markings are provided to assist aircraft using these airport surfaces. Pavement markings also identify aircraft parking positions. The existing windsock is in good condition. The segmented circle surrounding the windsock is in poor condition.

1.14.6 Weather Reporting Systems

Automated Weather Observation System (AWOS) uses various sensors, a voice synthesizer and a radio transmitter to provide real-time weather data. There are four types of AWOS. An AWOS-A only reports altimeter setting while an AWOS-1 also measures and reports wind speed, direction, gusts, temperature and dew point. AWOS-2 provides visibility information in addition to everything reported by an AWOS-1. The most capable system, the AWOS-3 also includes cloud and ceiling data. The AWOS transmits over a VHF frequency or the voice portion of a navaid. The transmission can be received within 25 nautical miles

of the site or above 3,000 feet above ground level (AGL). The frequency for the AWOS is published on Aeronautical charts as well as in the airport facilities directory. An AWOS-3 is available at Holbrook Municipal Airport, however the ceiling sensor is inoperative. The AWOS is in process of being upgraded to an AWOS-3/PT with the addition of precipitation and thunderstorm sensors and a replacement ceiling sensor is being installed. The location of the AWOS is shown in Figure 1-12.

FIGURE 1-12 AIRPORT BEACON, WINDSOCK, AWOS

1.14.7 Navigational Aids

A Navigational Aid (NAVAID) is any ground based visual or electronic device used to provide course or altitude information to pilots. NAVAIDs include Very High Omnidirectional Range (VORs), Very High Frequency Omnidirectional Range with Tactical Information (VOR-TACs), Nondirectional Beacons (NDBs) and Tactical Air Navigational Aids (TACANs), as examples. The Winslow VORTAC is located approximately 35 nautical miles northwest of the airport. The Show Low NDB is located at the Show Low Airport approximately 40 miles south. There are no navigational aids located on the airport.

1.15 Existing Landside Facilities

1.15.1 Terminal Building

A 13,200 square foot hangar/terminal building is located along the south side of the aircraft parking apron west of West Vista Road. Built in the 1940's, this building includes approximately 7,500 square feet of hangar space with the remainder of the building providing space for a pilot's lounge, restrooms and airport manager's office. Figure 1-13 shows the terminal building/hangar. The building is in poor condition and needs renovation. An old residence building (approximately 30x30 feet) is located adjacent to the terminal building. This building is currently not in use, and is in good condition and has all the utilities connected except waste water. Figure 1-18 shows the existing landside facilities.

Figure 1-13 Terminal Building

1.15.2 Airport Services/Fixed Base Operator

A Fixed Base Operator (FBO) is usually a private enterprise that leases land from the airport sponsor on which to provide services to based and transient aircraft. The extent of the services provided varies from airport to airport; however, these services frequently include aircraft fueling, minor maintenance and repair, aircraft rental and/or charter services, flight instruction, pilot lounge and flight planning facilities and aircraft tiedown and/or hangar storage. There is currently no FBO present at Holbrook Municipal Airport; however, the following services are provided by the city: weather briefing and flight planning, pilot lounge, restrooms, wireless internet service, phone and courtesy car. These facilities are shown on Figure 1-14 and are in fair condition, but could stand to be updated and/or remodeled.

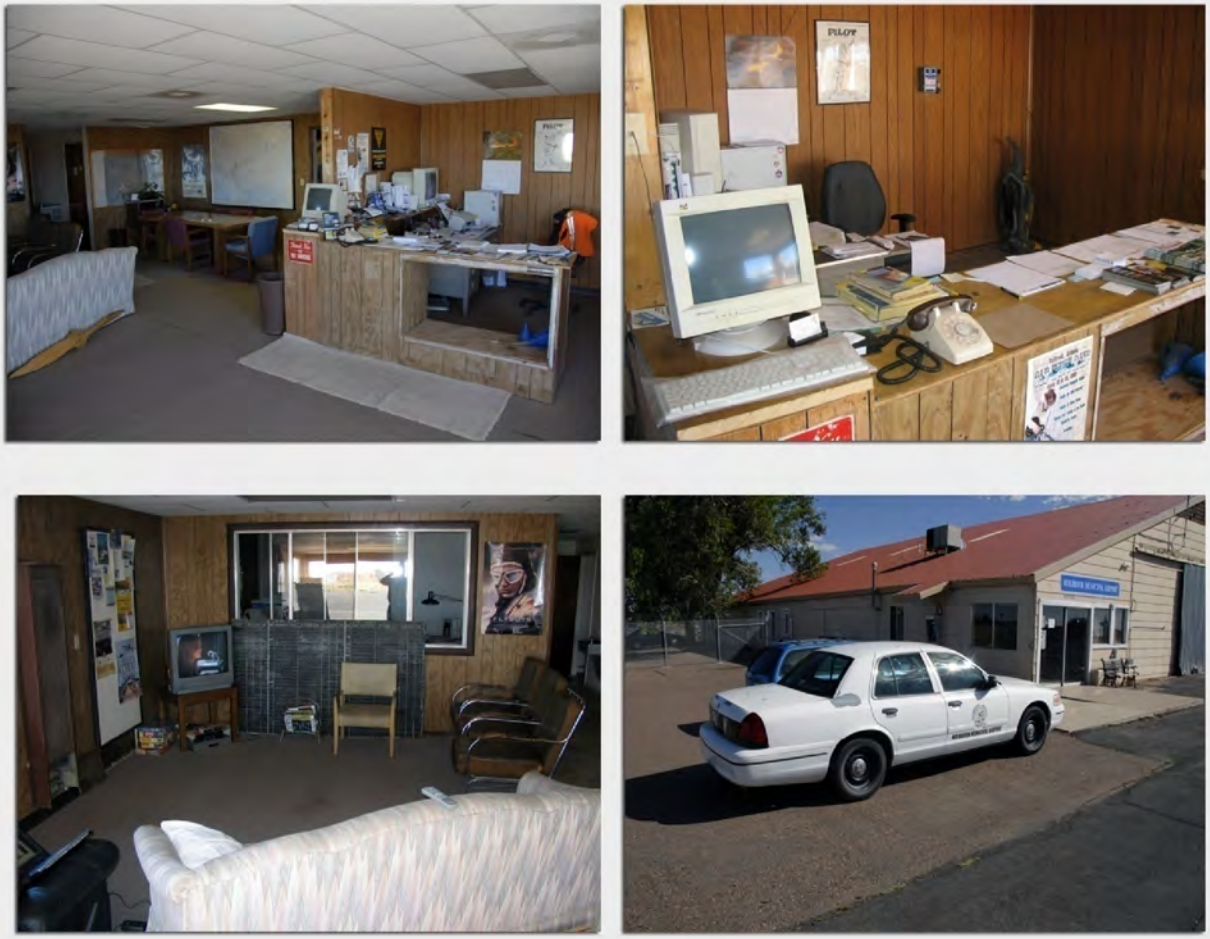


Figure 1-14 Airport Services

1.15.3 Hangars

A 8,200 square foot privately owned 8-unit T-hangar is located on the north end of the aircraft parking apron. A privately owned port-a-port hangar is located in an aircraft tiedown location on the east side of the aircraft parking apron. A storage shed used by the military is located right next to the port-a-port hangar. Figure 1-15 shows all the hangars on the airport.

FIGURE 1-15 HANGARS AND BUILDINGS

1.15.4 ACCESS ROUTES AND SIGNAGE

Holbrook Airport can be accessed from West Vista Drive which intersects with Interstate 40 (Navajo Blvd). There are two standard green and white municipal airport signs along I-40 identifying the turn for the airport.

1.15.5 AUTOMOBILE PARKING

There are four parking spaces located next to the terminal building, one of which is a designated handicapped parking space. An additional unpaved area next to the terminal building provides additional space for approximately 20 parking spaces.

1.15.6 UTILITIES

Electricity, natural gas and water services are available at the airport. Electrical Service is provided by Arizona Public Service (APS). Citizen Utilities Company provides natural gas service. Citizens Telecom provides telephone service. Water service is provided by the City of Holbrook. The terminal building is connected to a septic tank. A sewer line was extended to the airport when West Vista Road was constructed.

1.15.7 Fencing and Security

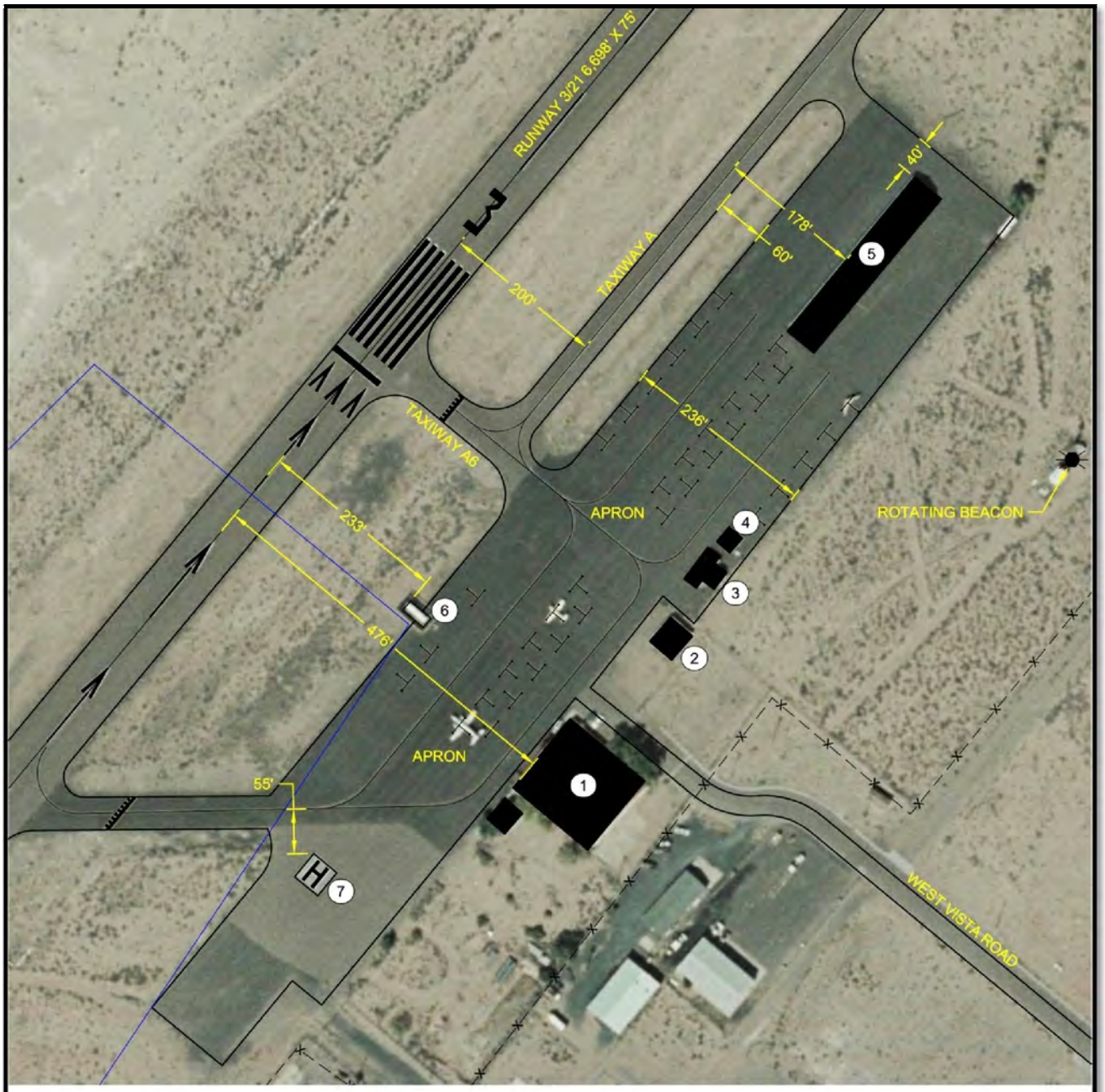
The entire airport perimeter is presently fenced with chain link fencing. A manual gate is located at West Vista Road. The fence was recently installed to include the land acquired for crosswind Runway 11/29. As shown in Figure 1-16 the fence is 6 feet tall with 3-strand barbed wire.

Figure 1-16 Perimeter Fence and Access Gate

1.15.8 Aviation Fuel Facilities

The existing fuel storage facilities are owned by the City of Holbrook and are operated by the airport manager. The fuel tank has a capacity for 11,750 gallons of 100LL AvGas. A self-service system is not available. A fuel truck is not available. Operating hours are generally from 8:00am to 5:00pm. Figure 1-17 shows the existing fuel tank and its location. The fuel tank is located 233 feet from the runway centerline which meets existing ROFA and ROFZ standards but impedes the development of a full length parallel taxiway.

FIGURE 1-17 FUEL TANK



	AIRFIELD DEVELOPMENT (ASPHALT)
	STRUCTURE/FACILITIES (BUILDING)
—x—x—	APPROX. AIRPORT FENCE LINE
	RUNWAY PROTECTION ZONE

1	TERMINAL BUILDING
2	HANGAR
3	PORT-A-PORT HANGAR
4	MILITARY HANGAR
5	8-UNIT T-HANGAR
6	FUEL TANK
7	HELIPORT

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FIGURE 1-18 LANDSIDE FACILITIES

1.15.9 Emergency Services

Emergency response is provided by the Holbrook Volunteer Fire Department. Fire Station 3 is located less than a mile from the airport. It is available for response to aircraft and airport facility emergencies. The closest facility that can provide medical emergency services is Winslow Memorial Hospital, a fully staffed hospital with 24-hour emergency room service and located approximately 30 miles from the airport. Ambulance service provides emergency transportation between Holbrook and the Winslow Memorial Hospital.

Table 1-16 Emergency Services Summary

Fire Station	Holbrook Volunteer Fire Department 100 Airport Rd. Holbrook AZ, 86025
Personnel	30 members, 24 regular, 6 auxiliary
Equipment	5 engine pumpers 1 rescue truck 1 brush seat 1 hose truck equipped with large diameter hose and all appliances for them 1 mobile command center 1 hazardous material response vehicle
Initial response time	Approximately 15 minutes

Source: Holbrook Fire Training Facility Report

1.15.10 Airport Support and Maintenance

The airport support, maintenance and the required equipment is provided by the City of Holbrook. All the equipment is stored off site and operated by the department of public works.

TABLE 1-17 HOLBROOK MUNICIPAL AIRPORT INVENTORY		
Identifier	P14	
FAA Site Number	00710.*A	
NPIAS Number	04-0020	
Airport Reference Code	B-I	
Owner/Sponsor	City of Holbrook	
Airport Elevation	5,262 feet	
Runway 3/21	Length: 6,698 feet Width: 75 feet Surface: Asphalt Marking: Basic visual Runway lighting: MIRL, direct burial	Good condition Non-precision marking in process
Pavement Strength	30,000 lbs	
Navigational Aids	RW 3: PAPI 2L; RW 21: PAPI 2L; REILs	
Approach Minimums	Visual	
Runway 11/29	Length: 3,200 feet Width: 120 feet Surface: Gravel – Dirt Runway lighting: none	
Taxiways	A, A1, A2, A3, A4, A5, A6, B	Good condition
Taxiway Lighting	Medium intensity taxiway lights, can and duct	
Aircraft Apron	27,200 square yards	Fair condition; large block cracks
Tie Downs	40	
Radio Navigation Aids	None	
Airport Beacon	Clear-Green (Civil Airport)	Dusk to dawn
Wind Indicator	Lighted	
Segmented Circle	Yes	Poor condition
Unicom	122.800	
Storage Building	None	
T-Hangars	8 units	
Hangars	One Port-a-Port, one fabric, one military	
Terminal Building	13,200 square feet, includes 7,500 square feet hangar space	
Automobile Parking	Approximately 20 spaces	
Perimeter Fencing	6 foot chain link fence 3 strand barbed wire	
Fuel	One fuel tank 11,750 gallons of 100LL AvGas	
Services	Car rental, taxi Wireless internet	
Weather Equipment	AWOS-3	AWOS-3 P/T in progress
FBO	None	City provides services
Utilities	Electrical, natural gas, and water available	

1.16 AIRSPACE

1.16.1 NATIONAL AIRSPACE SYSTEM

The National Airspace System consists of various classifications of airspace that are regulated by the FAA. Airspace is either controlled or uncontrolled. Pilots flying in controlled airspace are subject to Air Traffic Control (ATC) and must follow either Visual Flight Rule (VFR) or Instrument Flight Rule (IFR) requirements. These requirements include combinations of operating rules, aircraft equipment and pilot certification and vary depending on the Class of airspace and are described in Federal Aviation Regulations (FAR) Part 71, Designation of Class A, Class B, Class C, Class D and Class E Airspace Areas; Airways; Routes; and Reporting Points and FAR Part 91, General Operating and Flight Rules. Figure 1-19 shows the different airspace classes and gives a graphical representation of them.

General definitions of the Classes of airspace are provided below:

- Class A Airspace: Airspace from 18,000 feet Mean Sea Level (MSL) up to and including Flight Level (FL) 600.
- Class B Airspace: Airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of IFR operations or passenger enplanements.
- Class C Airspace: Generally, airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by radar approach control and that have a certain number of IFR operations or passenger enplanements. The airspace usually consists of a 5 nautical mile (nm) radius core surface area that extends from the surface up to 1,200 feet above the airport elevation and a 10 nm radius shelf area that extends from 1,200 feet up to 4,000 feet above the airport elevation.
- Class D Airspace: Airspace from the surface up to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports with an operational control tower.
- Class E Airspace: Generally, controlled airspace that is not Class A, Class B, Class C or Class D.
- Class G Airspace: Generally, uncontrolled airspace that is not designated Class A, Class B, Class C, Class D or Class E.
- Victor Airways: These airways are low altitude flight paths between ground based VHF Omnidirectional Receivers (VORs).

Figure 1-20 shows that the airspace surrounding Holbrook Municipal Airport is class G from the ground to 14,500 feet MSL and class E airspace between 14,500 feet MSL and 18,000 feet MSL.

Holbrook Municipal Airport is located within the jurisdiction of the Albuquerque Air Route Control Center (ARTCC).

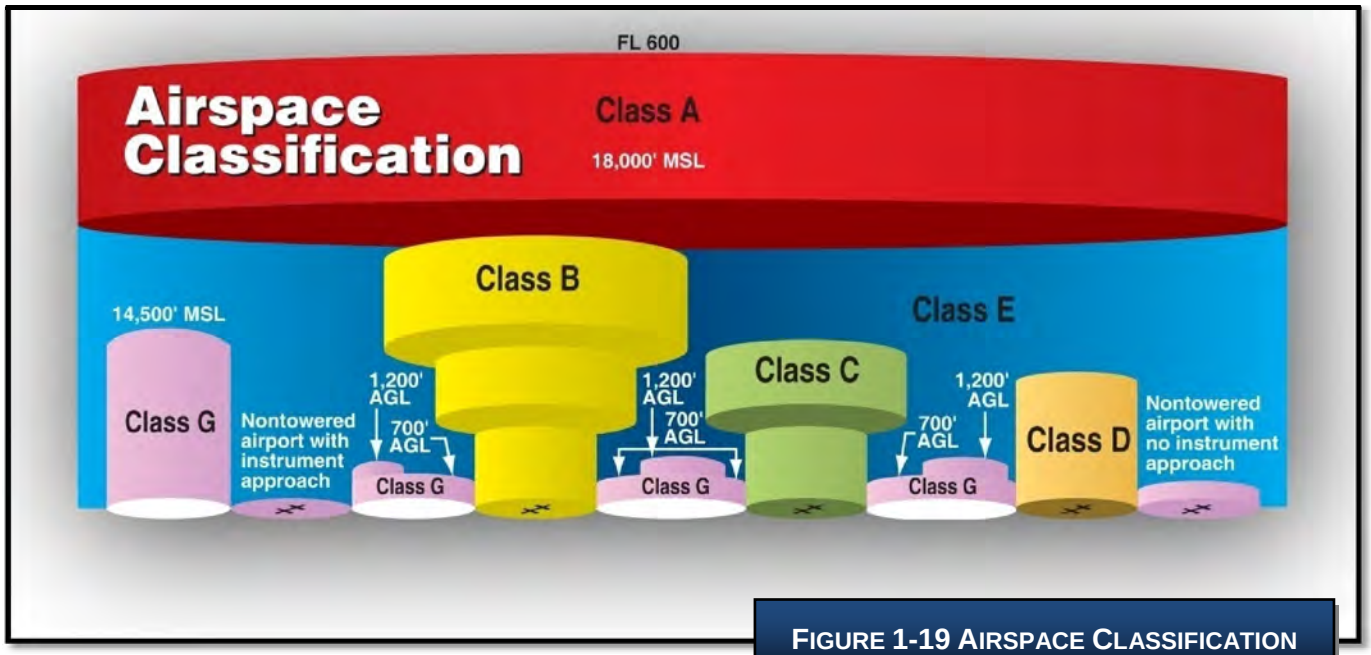


FIGURE 1-19 AIRSPACE CLASSIFICATION

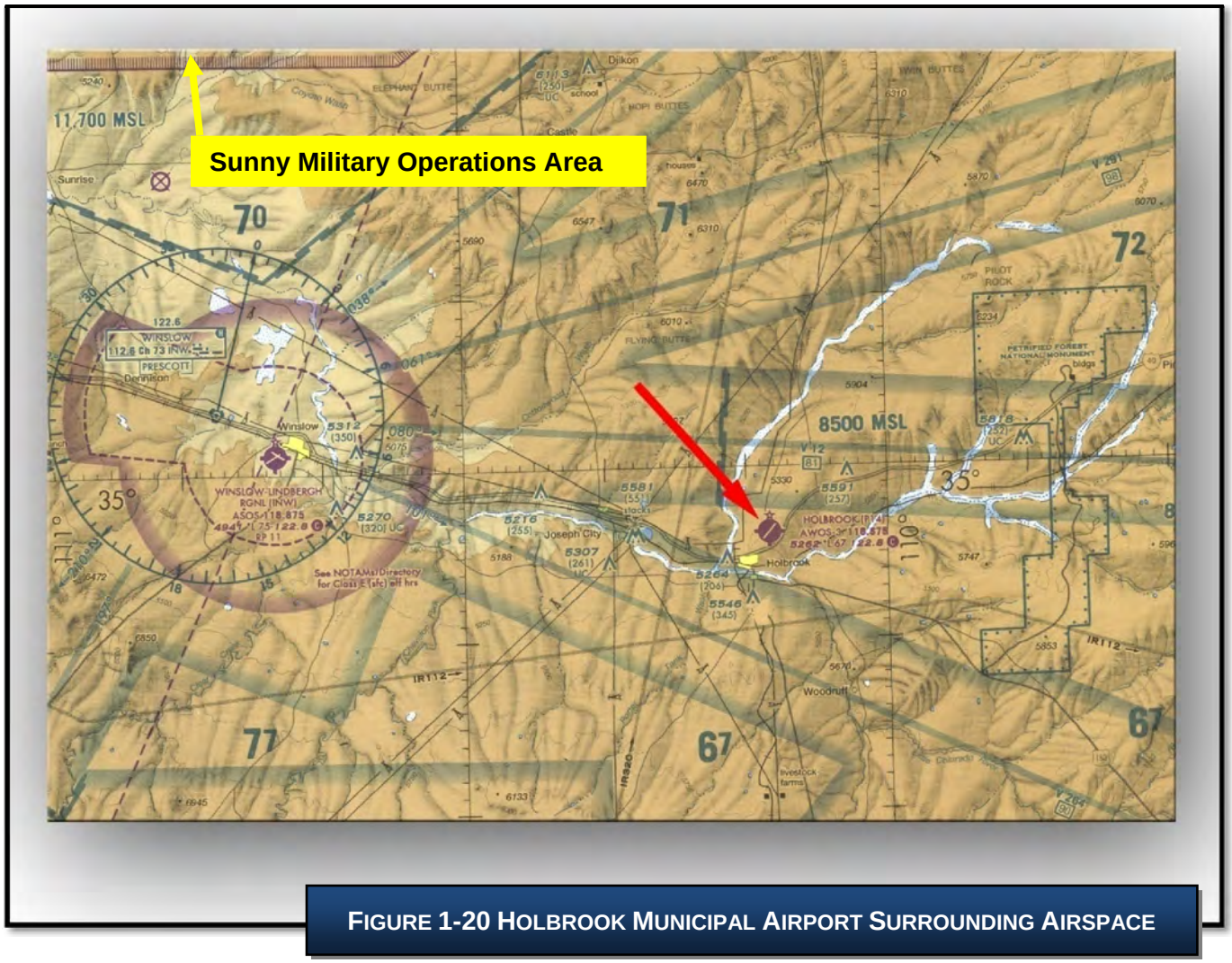


FIGURE 1-20 HOLBROOK MUNICIPAL AIRPORT SURROUNDING AIRSPACE

1.16.2 AIRSPACE RESTRICTIONS

MOAs consist of airspace with defined vertical and lateral limits established for the purpose of separating certain military training activities from IFR traffic. Whenever an MOA is being used, nonparticipating IFR traffic may be cleared through an MOA if IFR separation can be provided by ATC. Otherwise, ATC reroutes or restricts nonparticipating IFR traffic. MOAs are depicted on sectional, VFR terminal area, and en route low altitude charts. The MOA's are also further defined on the back of the sectional charts with times of operation, altitudes affected, and the controlling agency.

Sunny MOA is located approximately 35 nautical miles northwest of Holbrook Municipal Airport. Operations within this airspace are normally conducted between 12,000 feet MSL and 18,000 feet MSL. Times of used are published via Notice to Airmen (NOTAM) 24 hours in advance. Civilian operations are not restricted within a MOA but civilian pilots are cautioned to be alert for military aircraft when operation in the MOA.

Restricted areas denote the existence of unusual, often invisible, hazards to aircraft (e.g., artillery firing, aerial gunnery, or guided missiles). IFR flights may be authorized to transit the airspace and are routed accordingly. Penetration of restricted areas without authorization from the using or controlling agency may be extremely hazardous to the aircraft and its occupants. Restricted Areas may not be entered by civilian aircraft without specific permission from the controlling entity. There are no restricted areas in the vicinity of Holbrook Municipal Airport.

The Petrified Forest National Monument is located approximate 10 nautical miles east from Holbrook Municipal Airport. According to the FAA Aeronautical Information Manual (AIM), pilots are requested to maintain a minimum altitude of 2,000 feet above the surface of the following: National Parks, Monuments, Seashores, Lakeshores, Recreation Areas and Scenic Riverways administered by the National Park Service, National Wildlife Refuges, Big Game Refuges, Game Ranges and Wildlife Ranges administered by the U.S. Fish and Wildlife Service, and Wilderness and Primitive areas administered by the U.S. Forest Service.

1.16.3 LOCAL OPERATING PROCEDURES

The airport is situated at 5,262 feet (MSL). The traffic pattern altitude for all aircraft at the airport is 1,000 feet above the airfield elevation. All runways utilize a left hand traffic pattern. Runway use is dictated by wind conditions. Prevailing wind flow is from the west-southwest leading to a greater use of Runway 21. Certain wind conditions may be too extreme for smaller aircraft to land safely on the primary runway 3/21. In those cases, crosswind Runway 11/29 is used.

1.17 ENVIRONMENTAL INVENTORY

The purpose of the environmental inventory is to identify key environmental resources that maybe affected by potential airport development. The data compiled in this section will be used later in this study.

1.17.1 AIR QUALITY

Air quality attainment maps were obtained from the 2008 Arizona Department of Environmental quality map of nonattainment and attainment areas. The project is located within an attainment area (See Figure 1-21). An attainment area is a zone within which the level of a pollutant is considered to meet National Ambient Air Quality Standards.

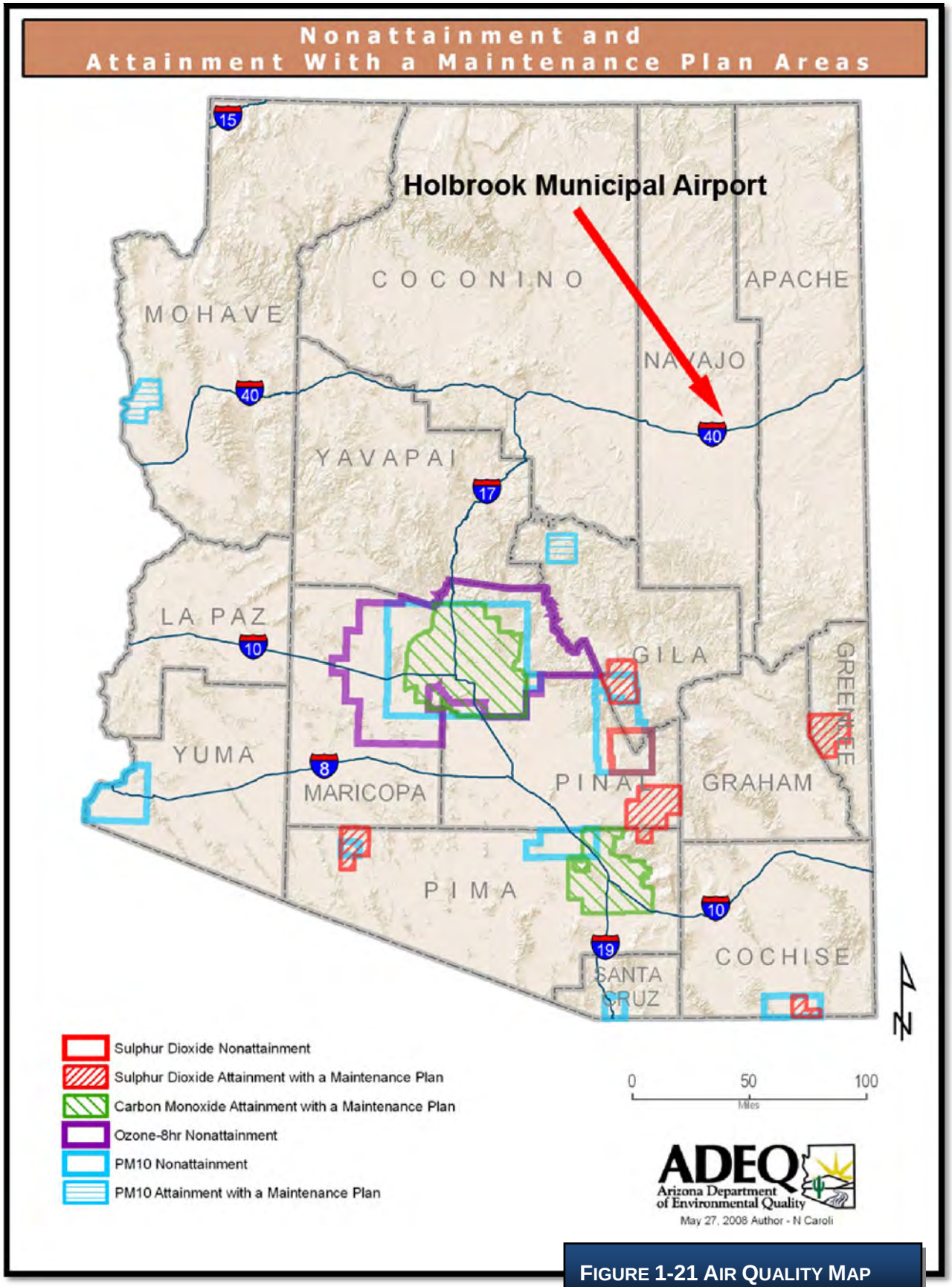


FIGURE 1-21 AIR QUALITY MAP

1.17.2 FLOODPLAINS

Available Federal Emergency Management Agency (FEMA) floodplain maps indicate that the airport property does not encroach upon any 100-year floodplains (see Figure 1-22 and Figure 1-23). There are no current impacts to existing floodplains.

FIGURE 1-22 FLOODPLAIN MAP

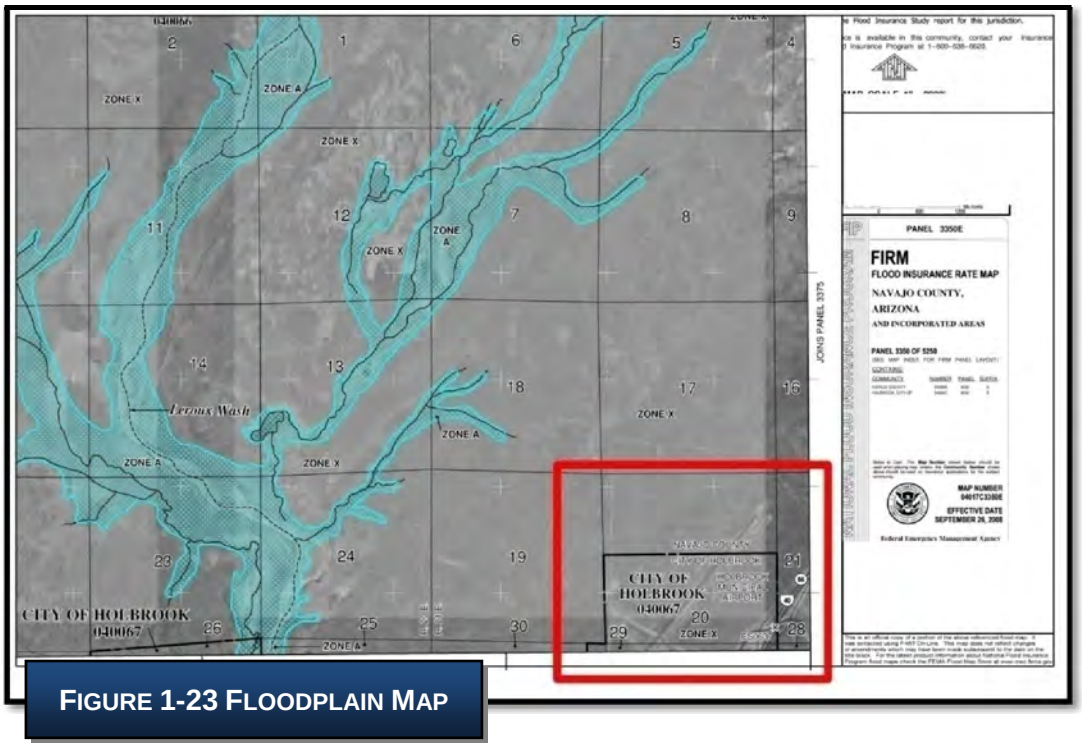


FIGURE 1-23 FLOODPLAIN MAP

1.17.3 Fish, Wildlife and Plants

The U.S. Fish and Wildlife Service website was consulted concerning the possibility of any impacts to any threatened and endangered species and candidate species that may occur within the airport environment. A list of federally threatened or endangered species was obtained for Navajo County. Future development projects should be evaluated to determine if any of the listed species occur or would be impacted.

The species shown on Table 1-18 are currently listed for Navajo County but do not necessarily occur in the vicinity of Holbrook Municipal Airport:

Table 1-18 Endangered and Threatened Species List for Navajo County

Common Name	Scientific Name	Species Group	Status
Apache (Arizona) trout	*Oncorhynchus apache*	Fishes	Threatened
Black-footed ferret	*Mustela nigripes*	Mammals	Endangered
California condor	*Gymnogyps californianus*	Birds	Endangered
Chiricahua leopard frog	*Rana chiricahuensis*	Amphibians	Threatened
Gray wolf	*Canis lupus*	Mammals	Endangered
Little Colorado spinedace	*Lepidomeda vittata*	Fishes	Threatened
Loach minnow	*Tiaroga cobitis*	Fishes	Threatened
Mexican spotted owl	*Strix occidentalis lucida*	Birds	Threatened
Navajo sedge	*Carex specuicola*	Flowering Plants	Threatened
Northern Mexican gartersnake	*Thamnophis eques megalops*	Reptiles	Candidate
Peebles Navajo cactus	*Pediocactus peeblesianus peeblesianus*	Flowering Plants	Endangered
Roundtail chub	*Gila robusta*	Fishes	Candidate
Southwestern willow flycatcher	*Empidonax traillii extimus*	Birds	Endangered
Yellow-billed Cuckoo	*Coccyzus americanus*	Birds	Candidate

Source: U.S. Fish and Wildlife Service, 2009

A biological evaluation was prepared for the Holbrook Municipal Airport as part of the 2002 Environmental Assessment. According to this report there are no endangered or threatened species located on Holbrook Municipal Airport.

1.17.4 Historical, Architectural, Archeological and Cultural Resources

An important component of cultural heritage is cultural resources, which are artifacts and places that have significance to people. Cultural resources include archaeological sites, historic buildings and structures, rock art, shrines, trails, human made artifacts (such as pottery, metal objects, tools, projectile points, and grinding stones), traditional cultural places, and traditional cultural landscapes.

Traditional cultural places and traditional cultural landscapes are places and areas that have significant meaning to one or more cultural group, and often incorporate aspects of the natural and the human-made worlds. For example, a traditional cultural landscape may include a mountain that contains archaeological sites, human burials, herb gathering places and other important cultural resources. Human burials are a special type of cultural resource, which are usually, but certainly not always, found in archaeological sites or graveyards. A cultural resources assessment was conducted as part of the 2002 Environmental Assessment. Based in this report there are no known historical, architectural, archeological or cultural resources on the airport.

1.18 FINANCIAL DATA INVENTORY

Table 1-19 shows a summary of the available historical financial data for Holbrook Municipal Airport.

TABLE 1-19 FINANCIAL DATA

	2007	2008
AIRPORT REVENUE		
Aviation Fuel Sales	$48,642	$76,253
Hangar Rental	$2,190	$2,413
Total Airport Revenue	**$50,832**	**$78,666**
AIRPORT EXPENSES		
Payroll	$6,893	$6,933
Operations and Maintenance	$78,907	$108,178
Total Airport Expenses	**$85,800**	**$115,111**
Net Earnings/Loss	**-$34,968**	**-$36,445**

Source: City of Holbrook, Finance Department

Chapter Two
Forecast

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport
Airport Master Plan

2.1 INTRODUCTION

Forecasts of aviation activity provide the basis of evaluating the adequacy of existing airport facilities and their capability to handle increased traffic levels or different types of traffic. They are the foundation for effective decision making in airport planning, such as if and when improvements are needed, the level of capital improvements and the timing of the necessary investments.

While forecast information is necessary for successful comprehensive airport planning, it is important to recognize that forecasts are only approximations of future activity, based upon historical data and viewed through present situations. They must therefore, be used with careful consideration, as they may lose their validity with the passage of time.

General aviation forecasts are typically based on historical data and broadly accepted industry and governmental estimates of aviation activity, as well as, the primary socio-economic drivers of general aviation activity.

For this reason, an ongoing program of examination of local airport needs and national and regional trends is recommended and encouraged in order to promote the orderly development of aviation facilities at the Holbrook Municipal Airport.

At airports not served by air traffic control towers, estimates of existing aviation activity are necessary in order to form a basis for the development of realistic forecasts. Unlike towered airports, non-towered general aviation airports have historically not tracked or maintained comprehensive logs of aircraft operations. Estimates of existing aviation activity are based upon a review of based aircraft, available historical data, available local information and regional, state and national data that form the baseline to which forecasted aviation activity trends are applied.

Activity projections are made based upon estimated growth rates, area demographics, industry trends and other indicators. Forecasts are prepared for the Initial-Term (0-5 years), the Intermediate-Term (6-10 years) and the Long-Term (11-20 years) time frames. Utilizing forecasts within these time frames will allow the airport improvements to be timed to meet demand, but not so early as to remain idle for an unreasonable length of time.

There are four types of aircraft operations considered in the planning process. These are termed “local, based, itinerant and transient.” They are defined as follows:

1) Local operations are defined as aircraft movements (departures or arrivals) for the purpose of training, pilot currency or pleasure flying within the immediate area of the local airport. These operations typically consist of touch-and-go operations, practice instrument approaches, flights to and within local practice areas and pleasure flights that originate and terminate at the airport under study.

2) Based aircraft operations are defined as the total operations made by aircraft based (stored at the airport on a permanent, seasonal or long-term basis) with no attempt to classify the operations as to purpose.

3) Itinerant operations are defined as arrivals and departures other than local operations and generally originate or terminate at another airport. These types of operations are closely tied to local demographic indicators, such as local industry and business use of aircraft and usage of the facility for recreational purposes.

4) Transient operations are defined as the total operations made by aircraft other than those based at the airport under study. These operations typically consist of business or pleasure flights originating at other airports, with termination or a stopover at the study airport. The terms transient and itinerant are sometimes erroneously used interchangeably. This study will confine analysis to local and itinerant operations.

2.2 NATIONAL AND REGIONAL TRENDS

According to factors such as aircraft production, pilot activity and hours flown, general aviation reached a peak in the late 1970s. This peak was followed by a long downturn that persisted through most of the 1980s and the early 1990s and has been attributed to high manufacturing costs associated with product liability issues as well as other factors. The General Aviation Revitalization Act (GARA) of 1994 was enacted with the goal of revitalizing the industry by limiting product liability costs. The Act established an 18-year statute of repose on liability related to the manufacture of all general aviation aircraft and their components. According to a 2001 report to Congress by the General Accounting Office (GAO), trends in general aviation since GARA was enacted suggest that liability costs have been less burdensome to manufacturers, shipments of new aircraft have increased and technological advances have been made. Indicators of general aviation activity, such as the numbers of hours flown and active pilots, have also increased in the years since GARA, but their growth has not been as substantial as the growth in manufacturing.

The FAA annually convenes expert panels in aviation and develops forecasts for future activity in all areas of aviation, including general aviation. The FAA forecasts the fleet and hours flown for single-engine piston aircraft, multi-engine piston, turboprops, turbojets, rotorcraft (piston, turbine), sport, experiment and other (glider, balloon). The FAA forecasts “active aircraft,” not total aircraft. The FAA uses estimates of fleet size, hours flown, and utilization from the General Aviation and Air Taxi Activity and Avionics Survey (GA Survey) as baseline figures upon which assumed growth rates can be applied.

According to the FAA Aerospace Forecast Fiscal Years 2009-2025 forecast as the demand for business jets has grown over the past several years, the current forecast assumes that business use of general aviation aircraft will expand at a more rapid pace than that for personal/sport use. In addition, corporate safety/security concerns for corporate staff, combined with increasing flight delays at some U.S. airports have made fractional, corporate, and on-demand charter flights practical alternatives to travel on commercial flights.

The active general aviation fleet is projected to increase at an average annual rate of 1.0 percent over the 17-year forecast period, growing from an estimated 234,015 in 2008 to 275,230 aircraft by 2025. The more expensive and sophisticated turbine-powered fleet (including rotorcraft) is projected to grow at an average of 3.2 percent a year over the forecast period with the turbine jet fleet increasing at 4.8 percent a year.

As recently as 2007, industry experts suggested the market for new Very Light Jets (VLJs) could add 500 aircraft a year to the active fleet by 2010. The relatively inexpensive twin-engine VLJs (priced between $1 and $2 million) were believed by many to have the potential to redefine the business jet segment by expanding business jet flying and offering performance that could support a true on-demand air-taxi business service. However, events since that time have dampened expectations for a rapid penetration of VLJs into the market, most notably the bankruptcy of Eclipse and the demise of DayJet. In 2008, VLJ deliveries fell short of our assumption (262 vs. 400). Despite the challenging economy and the uncertainty surrounding the future of Eclipse, the forecast assumes that about 200 VLJs will enter the active fleet in U.S. over the next 2 years and then increase to a rate of 270 to 300 aircraft a year for the balance of the forecast, totaling 4,875 aircraft by 2025.

The number of active piston-powered aircraft (including rotorcraft) is projected to decrease from the 2007 total of 169,675 through 2013 as declines in both single and multi-engine aircraft are forecast. Beyond 2013 active piston-powered aircraft are forecast to increase gradually to 170,475 by 2025. Over the forecast period, the average annual increase in piston-powered aircraft is 0.1 percent. Although piston rotorcraft are projected to increase rapidly (3.9 percent a year) they are a relatively small part of this segment of general aviation aircraft. Single-engine fixed-wing piston aircraft, which are much more numerous, are projected to grow at much slower rates (0.1 percent respectively) while multi-engine fixed wing piston aircraft are projected to decline 1.0 percent a year. In addition, it is assumed that VLJs and new light sport aircraft could erode the replacement market for traditional piston aircraft at the high and low ends of the market respectively.

Starting in 2005, a new category of aircraft (previously not included in the FAA's aircraft registry counts) was created: "light sport" aircraft. At the end of 2007 a total of 6,066 aircraft were estimated to be in this category. The forecast assumes the fleet will increase approximately 930 aircraft per year until 2013 including both newly built aircraft and conversions from ultralight trainers. Thereafter the rate of increase in the fleet tapers considerably to about 300 per year.

By 2025 a total of 15,865 light sport aircraft are projected to be in the fleet. The number of general aviation hours flown is projected to increase by 1.8 percent yearly over the forecast period. Much of the increase reflects increased flying by business and corporate aircraft as well as steady if relatively small annual percentage increases in utilization rates for piston aircraft. Hours flown by turbine aircraft (including rotorcraft) are forecast to increase 3.6 percent yearly over the forecast period, compared with 0.4 percent for piston-powered aircraft. Jet aircraft are forecast to account for most of the increase, with hours flown expanding at an average annual rate of 5.2 percent over the forecast period. The large increases in jet hours result mainly from the increasing size of the business jet fleet, including increases in the fractional ownership fleet and its activity levels. Fractional ownership aircraft fly about 800 hours annually compared to approximately 380 hours for all business jets in all applications.

By 2025 the annual utilization rate for all VLJs is forecast to be 432 hours. Traditional (non-VLJ) turbojets are expected to average approximately 368 hours per year by 2025, as VLJs are expected to have a greater share of their use in on-demand air taxi and shared ownership than the traditional turbojets.

The number of active general aviation pilots (excluding air transport pilots) is projected to be 509,900 in 2025, an increase of almost 42,000 (up 0.5 percent yearly) over the forecast period. Commercial pilots are projected to increase from 124,746 in 2008 to 138,700 in 2025, an average annual increase of 0.6 percent. The number of student pilots is forecast to increase at an average annual rate of 0.4 percent over the forecast period, growing from 80,989 in 2008 to 86,600 in 2025. In addition, FAA is projecting that by the end of the forecast period a total of 20,600 sport pilots will be certified. As of December 31, 2008, the number of sport pilot certificates issued was 2,623 reflecting a growing interest in this new "entry level" pilot certificate that was created in 2005. The number of private pilots is projected to remain steady over the forecast period to total 223,400 in 2025.

Figures 2-1 and 2-2 show current and forecasted the general aviation and on-demand FAR Part 135 fleet mix.

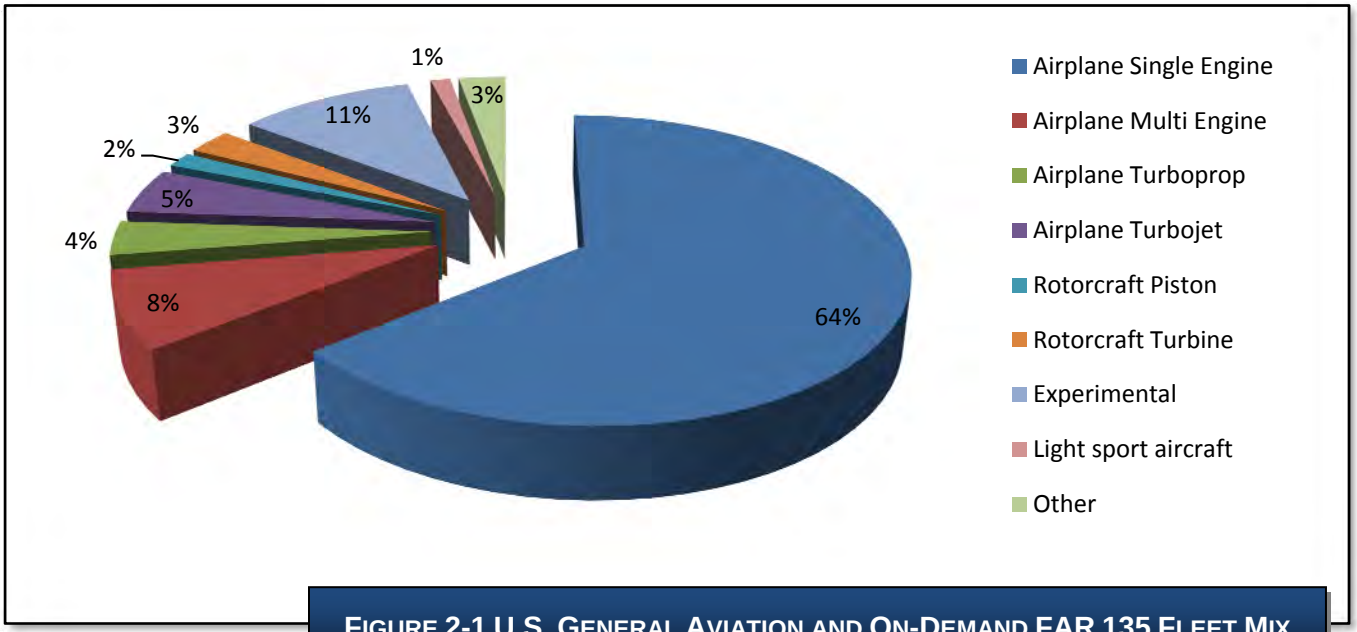


FIGURE 2-1 U.S. GENERAL AVIATION AND ON-DEMAND FAR 135 FLEET MIX

Source: Adapted from the 2008 General Aviation Statistical Databook & Industry Outlook, published by GAMA

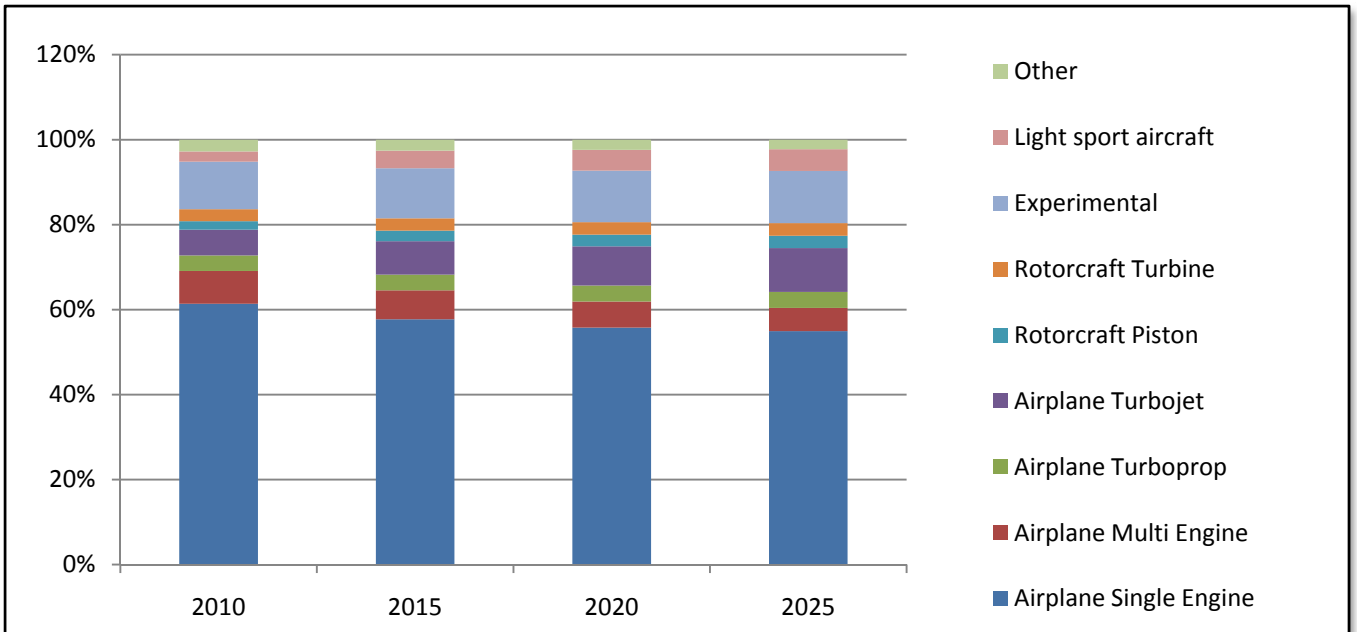


FIGURE 2-2 U.S. GENERAL AVIATION AND ON-DEMAND FAR 135 FLEET MIX FORECAST

Source: Adapted from the 2008 General Aviation Statistical Databook & Industry Outlook, published by GAMA

2.3 FAA Records of Based Aircraft

FAA Form 5010-1, Airport Master Record, is the official record kept by the Federal Aviation Administration to document airport physical conditions and other pertinent information. The record normally includes an annual estimate of aircraft activity as well as the number of based aircraft. This information is normally obtained from the airport sponsor. The accuracy of these documents varies directly with the sponsor's record keeping system. The FAA Form 5010-1 for the Holbrook Municipal Airport indicates 11 based aircraft and 3,630 annual aircraft operations. This form also breaks down the Holbrook Municipal Airport operations to 730 GA Local and 2,900 GA Itinerant operations. Table 2-1 shows a summary of the FAA 2008 Terminal Area Forecast (TAF).

Table 2-1 FAA Terminal Area Forecast (TAF) Detail Report

Year	Based Aircraft	Local Operations			Itinerant Operations				Total Ops.	Instrument Ops.
		Civil	Military	Total	AT&C	Civil	Military	Total		
2007	11	730	0	730	0	2,900	0	2,900	3,630	0
2010	11	730	0	730	0	2,900	0	2,900	3,630	0
2015	11	730	0	730	0	2,900	0	2,900	3,630	0
2020	11	730	0	730	0	2,900	0	2,900	3,630	0
2025	11	730	0	730	0	2,900	0	2,900	3,630	0

Source: FAA TAF 2008
Air Taxi and Commuter (AT&C)

2.4 Existing Aviation Activity

As discussed in section 1.10 and according to the PAC, inventory and aircraft movement logs there are 12 based aircraft and approximately 4,200 annual operations. These totals result in approximately 330 operations per based aircraft (OBPA). This represents the total annual operations divided by the number of based aircraft and includes operations by both based and transient aircraft. It was assumed that itinerant operations represent 80 percent of the total operations and local operations represent 20 percent of the total operations because most of the operations originate or terminate at another airport. This was determined based on a review of the comments in the visitor's log maintained by the airport manager.

The airport serves predominately single engine piston and multi-engine piston aircraft, with some use by light turbojet and turbo prop aircraft. In general, uses include:

Aerial Applications: The area surrounding Holbrook is utilized primarily for agricultural activities and the airport serves as a base for several aerial spraying operators for the local area. The aircraft used for aerial spraying are primarily single-engine piston, single-engine turbine and rotorcraft.

Business Transportation: Business aviation users benefit by being able to travel to or from these business centers to conduct business activities in a single day, without requiring an overnight stay or extensive ground travel time. Local and other small businesses will generally utilize single-engine and multi-engine piston aircraft. Medium sized businesses and larger corporations having a need to travel to the Holbrook area would generally utilize multi-engine piston and turboprop aircraft and light to medium business jets respectively. This user category also includes state and federal agencies and travel by government officials.

Personal Transportation: These users desire the utility and flexibility offered by general aviation aircraft. The types of aircraft utilized for personal transportation vary with individual preference and resources and generally include a mix of single-engine, multi-engine and in some cases turbojet aircraft.

Recreational and Tourism: These users include transient pilots flying into the region to visit recreational and tourist attractions. These users mostly utilize single-engine piston aircraft; however, a small percentage may operate multi-engine piston aircraft. Other types of aircraft in this category include home-built, experimental aircraft, gliders and ultralights.

Flight Training: These users conduct local and itinerant flights in order to meet flight proficiency requirements for obtaining FAA pilot certifications. These flights include touch-and-goes, day and night local and cross-country flights and simulated approaches. Pilot certifications include Sport, Private, Instrument, Commercial, Instructor and Airline Transport ratings. Depending on the level of interest and aircraft availability, a multi-engine rating may or may not be available. A commercial rating may be accomplished with either a single-engine or multi-engine aircraft. Air transport ratings are usually obtained at larger regional FAR Part 141 certificated flight schools.

Specifically, existing airport users include UPS contractor, and the weight-shift control aircraft group.

2.5 AVAILABLE ACTIVITY FORECASTS

The first step in preparing aviation forecasts is to examine historical and existing activity levels and currently available forecasts from other sources. The FAA Terminal Area Forecasts (TAF) 2009 indicates 11 existing based aircraft for Holbrook Municipal Airport and 3,630 existing annual operations. The TAF for Holbrook Municipal Airport shows 11 based aircraft and 3,630 operations over the planning period (see Table 2-1). The TAF for the State of Arizona indicates 7,376 based aircraft and 4,443,432 operations for 2008 and 9,432 based aircraft and 5,268,775 operations in 2025.

2.6 FACTORS INFLUENCING AVIATION DEMAND

Aviation activity at any given airport is dependent upon the economic, demographic and geographic characteristics of the airport service area. Several studies have found that factors such as, population, per capita income, employment, airport prominence, complexity of the airport's based aircraft, presence of a flight school and the region in which the airport is located have a significant correlation with aviation activity.

Demographic characteristics of the population have an influence on the level, composition and growth of aviation demand. Per capita income has demonstrated to be an indicator of general aviation purchase and use. The prominence of an airport can be defined as the proportion of its based aircraft and the total based aircraft in the airport service area, or its attractiveness to pilots due to the services that are offered. A prominent airport usually has adequate facilities and services such as, Fixed Base Operators (FBO), hangars, fuel services, airfield lighting and instrument approach procedures that make the airport more attractive to local and transient users. The complexity of the airport's based aircraft is defined as the ratio of single engine piston based aircraft to all of the based aircraft. Airports with instrument approaches and longer runways tend to attract owners of larger and more complex aircraft, such as high performance multi-engine airplanes. The presence of a pilot training school at an airport, or a nearby airport, is another factor that can significantly increase the number of local operations. Various destination attractions in or near the airport service area are also a factor in forecasting aviation activity.

Airport management records indicate that business, dining, golf and tourism are the primary reasons given by airport visitors for using the airport. The following primary factors influencing aviation activity at Holbrook Airport are local tourist attractions including Petrified Forest National Park, the Wigwam Motel and Route 66, local restaurants, golf courses and air cargo.

2.7 FORECAST METHODOLOGY

The preferred forecast methodology is one that has been used at other airports and which has some intuitive merit. If one knows or assumes no radical change in the aviation environment in the recent past, one can start with the premise that the amount of present aviation activity is proportionally related to the most reliable determinants of GA activity, which is population growth and per capita income. One then calculates the "per capita trend" for each aviation activity of interest using best-estimate or baseline present activity and present population and per capita income data. That trend value is then applied to reliable forecasts of population growth and per capita income to generate forecasts of the selected aviation activities. Finally, professional judgment is applied to make adjustments for any near-term perturbations.

2.8 BASED AIRCRAFT FORECAST

A comparative analysis of based aircraft forecasts was accomplished using three methodologies to derive a preferred forecast. Method 1 (low) is based on the population growth in the City of Holbrook. The results of Method 1 are shown on Table 2-2. Method 2 (high) is based on the per capita income growth in Navajo County and is shown on Table 2-3. Method 3 is the average between the results of Method 1 and Method 2. The results of Method 3 are shown on Table 2-4 and Figure 2-3.

TABLE 2-2 BASED AIRCRAFT FORECAST BASED ON HOLBROOK'S POPULATION GROWTH – METHOD 1

YEAR	HOLBROOK'S POPULATION[1]	BASED AIRCRAFT
2009[2]	5,793	12
2010	5,895	13
2015	6,404	14
2020	6,913	15
2025	7,423	16
2030	7,932	17

[1] Extrapolated from Population Statistics Unit, Arizona Department of Commerce data
[2] Base Year

TABLE 2-3 BASED AIRCRAFT FORECAST BASED ON NAVAJO COUNTY PER-CAPITA INCOME– METHOD 2

YEAR	NAVAJO COUNTY PER CAPITA INCOME[1]	BASED AIRCRAFT
2009[2]	$22,212	12
2010	$23,102	14
2015	$27,555	16
2020	$32,007	19
2025	$36,460	21
2030	$40,912	24

[1] Extrapolated from Bureau of Economic Analysis (BEA) U.S. Department of Commerce data.
[2] Base Year

TABLE 2-4 PREFERRED BASED AIRCRAFT FORECAST – METHOD 3

YEAR	BASED AIRCRAFT
2009[1]	12
2010	14
2015	15
2020	17
2025	19
2030	21

[1] *Base Year*

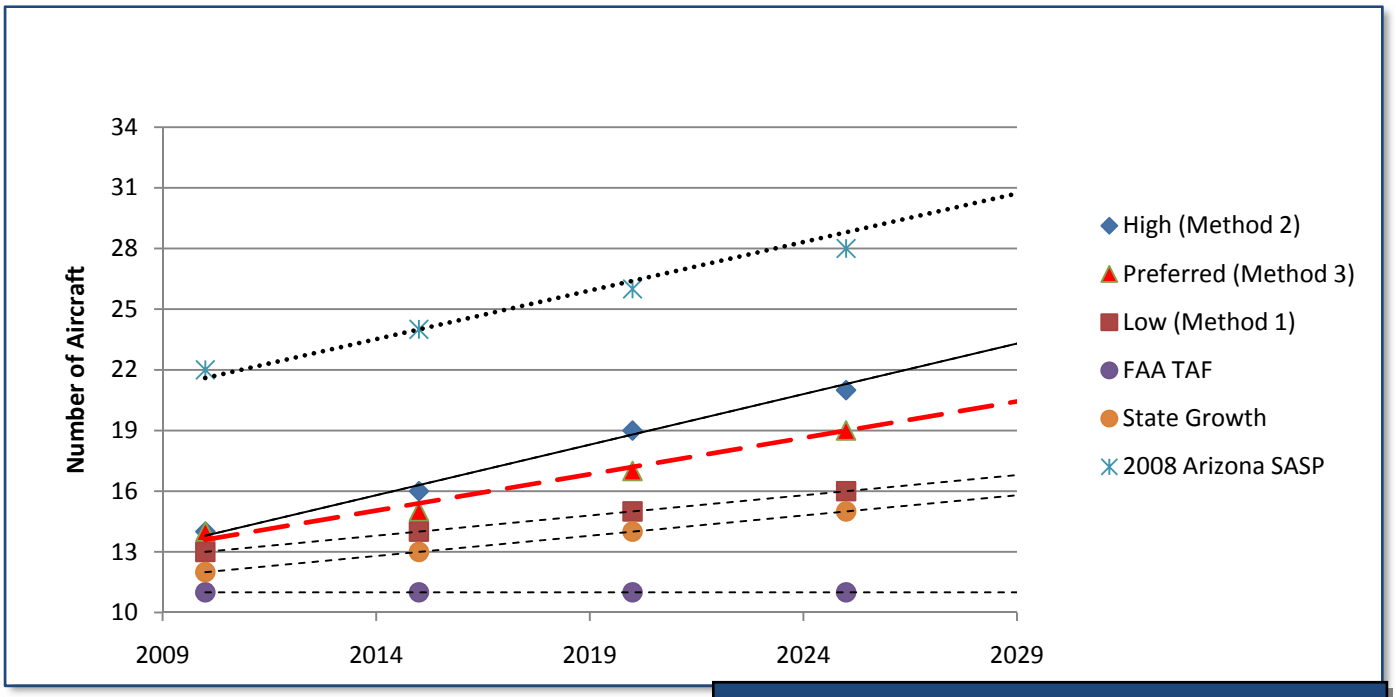


FIGURE 2-3 TOTAL BASED AIRCRAFT FORECAST

2.9 OTHER BASED AIRCRAFT FORECASTS EVALUATED

For comparative purposes, forecasts based on the State wide growth in based aircraft and the 2008 Arizona State Airports Systems Plan (SASP) growth rate were developed and compared to the preferred forecasts and the FAA TAF. The result of this analysis is shown on Table 2-5, Table 2-6 and Figure 2-3.

TABLE 2-5 BASED AIRCRAFT FORECAST BASED ON STATE WIDE BASED AIRCRAFT GROWTH

YEAR	ARIZONA BASED AIRCRAFT[1]	HOLBROOK BASED AIRCRAFT	AVERAGE ANNUAL GROWTH RATE
2009[2]	7,480	12	--
2010	7,580	13	8.3%
2015	8,140	14	1.6%
2020	8,752	15	1.6%
2025	9,432	16	1.6%
2030	9,964	16	--

[1] FAA TAF 2008; [2] Base Year

TABLE 2-6 BASED AIRCRAFT FORECAST FROM THE 2008 ARIZONA STATE AIRPORTS SYSTEMS PLAN (SASP)

YEAR	LOW	MEDIUM	HIGH
2007[2]	20		
2012	21	22	22
2017	22	24	24
2030	25	32	32

Source: 2008 Arizona State Airports Systems

2.10 ANNUAL OPERATIONS FORECAST

A comparative analysis of operations forecasts was accomplished using three methodologies to derive a preferred forecast. Method 1 (low) is based on the population growth in the City of Holbrook. The results of Method 1 are shown on Table 2-7. Method 2 (high) is based on the per capita income growth in the Navajo County and is shown on Table 2-8. Method 3 is the average between the results of Method 1 and Method 2. The results of Method 3 are shown on Table 2-9 and Figure 2-4.

TABLE 2-7 OPERATIONS FORECAST BASED ON HOLBROOK'S POPULATION GROWTH – METHOD 1		
YEAR	HOLBROOK'S POPULATION[1]	OPERATIONS
2009[2]	5,793	4,200
2010	5,895	4,274
2015	6,404	4,644
2020	6,913	5,013
2025	7,423	5,382
2030	7,932	5,752

[1] Extrapolated from Population Statistics Unit, Arizona Department of Commerce data
[2] Base Year

TABLE 2-8 OPERATIONS FORECAST BASED ON NAVAJO COUNTY PER CAPITA INCOME – METHOD 2		
YEAR	PER CAPITA INCOME[1]	HOLBROOK OPERATIONS
2009[2]	$22,212	4,200
2010	$23,102	4,551
2015	$27,555	5,428
2020	$32,007	6,305
2025	$36,460	7,183
2030	$40,912	8,060

[1] Extrapolated from Bureau of Economic Analysis (BEA) U.S. Department of Commerce data; [2] Base Year

TABLE 2-9 PREFERRED OPERATIONS FORECAST – METHOD 3	
YEAR	HOLBROOK OPERATIONS
2009	4,200
2010	4,412
2015	5,036
2020	5,659
2025	6,282
2030	6,906

2.11 OTHER OPERATIONS FORECASTS EVALUATED

For comparative purposes, forecasts based on the State wide aircraft operations growth and the 2008 Arizona State Airports Systems Plan (SASP) growth rate were developed and compared to the preferred forecasts and the FAA TAF. The result of this analysis is shown on Table 2-10, Table 2-11 and Table 2-12.

TABLE 2-10 OPERATIONS FORECAST BASED ON STATE WIDE AIRCRAFT OPERATIONS GROWTH

YEAR	ARIZONA AIRCRAFT OPERATIONS[1]	HOLBROOK OPERATIONS	AVERAGE ANNUAL GROWTH RATE
2009	4,298,179	4,200	--
2010	4,327,058	4,229	0.7%
2015	4,600,810	4,496	1.26%
2020	4,851,885	4,806	1.38%
2025	5,268,775	5,149	1.43%
2030	5,470,537	5,346	0.77%

[1] FAA TAF; [2] Base Year (forecast)

TABLE 2-11 ARIZONA STATE AIRPORTS SYSTEMS PLAN (SASP) 2008 OPERATIONS FORECAST

YEAR	LOW	MEDIUM	HIGH
2007	4,900		
2012	5,400	5,200	5,400
2017	6,000	5,600	5,900
2030	7,800	6,600	7,700

[1] Interpolated from the medium forecast

TABLE 2-12 FAA TERMINAL AREA FORECAST (TAF)

YEAR	HOLBROOK BASED AIRCRAFT	HOLBROOK OPERATIONS
2007[1]	11	3,630
2009	11	3,630
2010	11	3,630
2015	11	3,630
2020	11	3,630
2025	11	3,630

[1] Base Year; [2] Forecast data

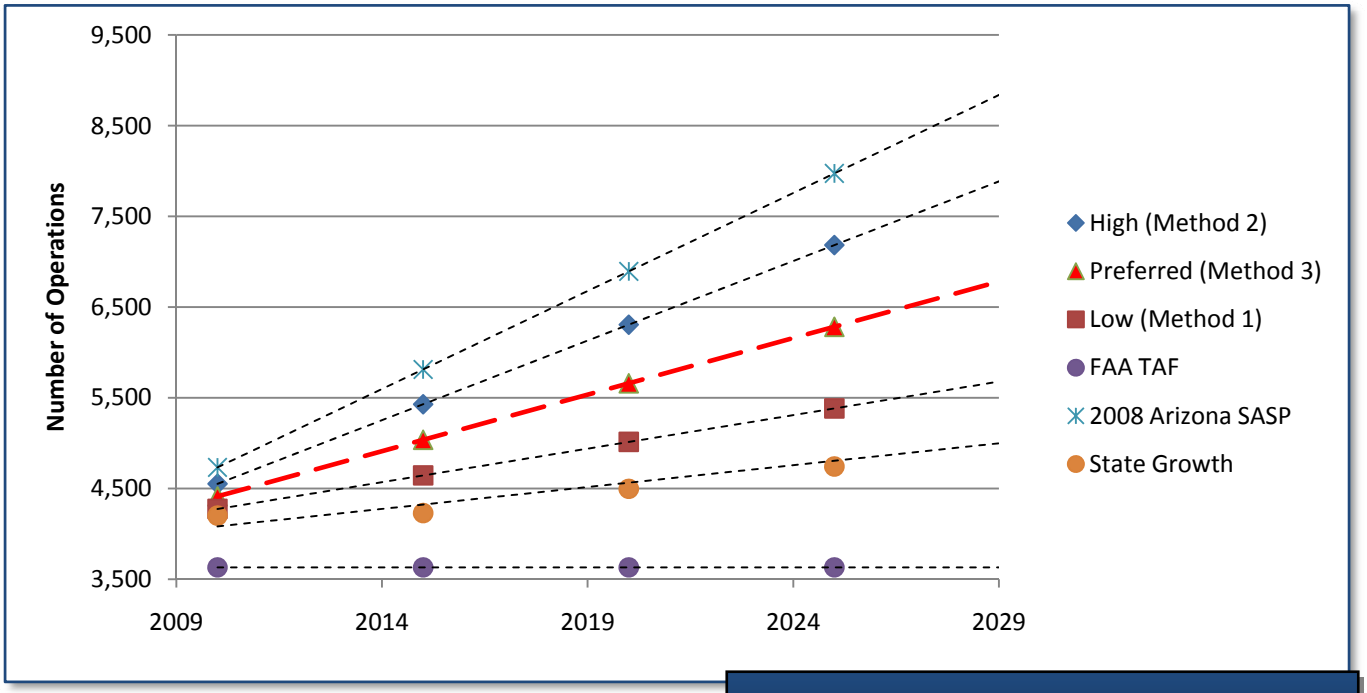


FIGURE 2-4 TOTAL OPERATIONS FORECAST

2.12 PREFERRED FORECAST

All master planning forecasts represent a significant "cone of uncertainty" as the planning horizon lengthens and all forecasts will inevitably be wrong to some degree. It is the planner's responsibility to provide a forecast that is reasonable, that will guide development actions as the needs arises and will not be "so wrong" as to impair the airport's healthy future development. To that end, the preferred forecast model for this master plan is the average of the per capita income growth and the population growth. Table 2-13 shows the preferred forecast for Holbrook Airport.

TABLE 2-13 PREFERRED FORECAST

YEAR	BASED AIRCRAFT[1]	AVERAGE ANNUAL GROWTH RATE	OPERATIONS	AVERAGE ANNUAL GROWTH RATE
2009[1]	12	--	4,200	--
2010	14	16.67%	4,412	5.05%
2015	15	1.43%	5,036	2.83%
2020	17	2.67%	5,659	2.47%
2025	19	2.35%	6,282	2.20%
2030	21	2.11%	6,906	1.99%

[1] *Base year*

2.12.1 Itinerant and Local Operations Forecast

Local operations consist primarily of training and recreational flights in the area. The remaining itinerant flights primarily consist of personal transportation, business transportation and recreational flights to and from other airports. The percentage of local versus itinerant operations is expected to remain fairly constant over the 20 year planning period. Anticipated users whose operations would likely be considered local include ranchers, aerial observation and surveying, recreation, aerial firefighting and flight training. It was assumed that itinerant operations represent 80 percent of the total operations and local operations represent 20 percent of the total operations because most of the operations originate or terminate at another airport. This was determined based on a review of the comments in the visitor's log maintained by the airport manager. The preferred forecast for itinerant and local operations is shown on Table 2-14.

2.12.2 Instrument Operations Forecast

According to the FAA TAF, 21 percent of the total aircraft operations in Arizona are instrument operations. This number is forecast to increase to 24 percent by 2025. Since virtually all commercial and business jet flights and most military aircraft flights are IFR, the number of instrument operations does not reflect the occurrence of instrument weather or the provision of instrument approaches at airports. At most general aviation airports with an instrument approach and no commercial service or military activity, instrument operations will comprise approximately 2.5 percent of total operations. The majority of general aviation operations are under VFR. Business transportation and air medivac/air ambulance are the most likely users of the instrument approaches at Holbrook Municipal Airport. Given most of the traffic at Holbrook Airport consists of light single-engine aircraft, a high volume of instrument operations are not expected. However, an increasing number of single-engine aircraft are being equipped for known-icing conditions and with approach certified GPS receivers; and most turboprops and VLJs are certified for known-icing. A future instrument approach at Holbrook airport would be expected to be used approximately 1.5 percent of the time. Table 2-14 shows the instrument operations forecast for Holbrook; however, given the low relative cost of a GPS approach it could prove beneficial for the air medevac and air freight flights.

Table 2-14 Preferred Forecast of Aviation Activity

Year	Based Aircraft	Local Operations	Itinerant Operations	Total Operations	Instrument Operations
2009[(1)]	12	840	3,360	4,200	--
2010	14	882	3,530	4,412	--
2015	15	1,007	4,029	5,036	76
2020	17	1,132	4,527	5,659	85
2025	18	1,256	5,026	6,282	94
2030	21	1,381	5,525	6,906	104

[(1)] *Base year*

2.12.3 Aviation Activity Forecast by Aircraft Type

The preferred forecast by aircraft type is shown in Table 2-15. Local and itinerant operations are expected to be conducted by predominately single-engine aircraft operations with slightly increasing activity by light twins, turboprops and light jets including VLJs.

TABLE 2-15 DETAILED FORECASTS BY AIRCRAFT TYPE					
	2010	**2015**	**2020**	**2025**	**2030**
Single Engine Aircraft (standard)	7	7	7	8	8
Operations	1,821	2,068	2,305	2,504	2,816
Multi Engine Piston/Turbo-Prop Aircraft	0	0	1	1	2
Operations	730	800	900	1,000	1,000
Turbo Jet Aircraft	0	1	1	1	2
Operations	20	50	100	200	200
Rotorcraft	0	0	1	1	2
Operations	20	50	50	75	75
Experimental & Other	7	7	7	7	7
Operations	1,821	2,068	2,304	2,503	2,815
Total Based	14	15	17	19	21
Annual Operations	4,412	5,036	5,659	6,282	6,906

2.13 AIRPORT SEASONAL USE DETERMINATION

A seasonal fluctuation in aircraft operations may be expected at any airport. This fluctuation is most apparent in regions with severe winter weather patterns and at non-towered general aviation airports. The fluctuation is less pronounced at major airports, with a high percentage of commercial and scheduled airline activity.

Non-towered airports generally experience a substantially higher number of operations in summer months than off-season months. The average seasonal use trend for FAA towered airports from the 1979-1984 records (total aircraft operations handled by tower facilities nationally from FAA Statistical Handbook of Aviation) was used as a baseline for determining seasonal use trends. As discussed above, the seasonal fluctuation is more pronounced at non-towered airports than towered airports. The seasonal use trend for towered airports was adjusted to approximate seasonal use trends at non-towered airports. This is presented in Table 2-16 and in Figure 2-5.

TABLE 2-16 SEASONAL USE TREND		
MONTH	**NON-TOWERED**	**TOWERED**
January	3.5%	7.2%
February	4.0%	8.2%
March	4.8%	8.6%
April	7.5%	9.0%
May	11.3%	9.1%
June	13.5%	9.4%
July	14.8%	9.1%
August	13.0%	8.7%
September	10.0%	8.7%
October	8.0%	7.8%
November	5.8%	7.1%
December	3.8%	7.1%

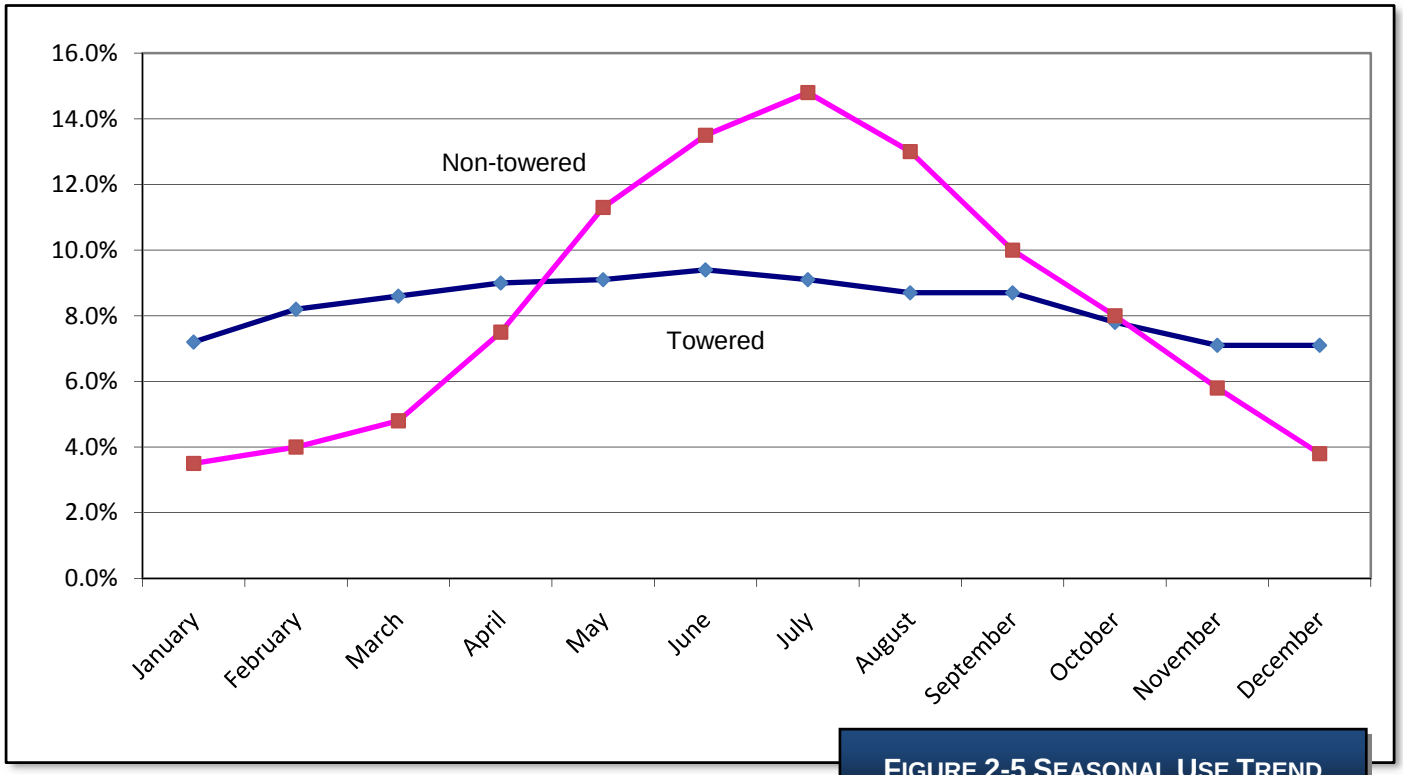


FIGURE 2-5 SEASONAL USE TREND

2.13.1 HOURLY DEMAND AND PEAKING TENDENCIES

In order to arrive at a reasonable estimate of demand at the airport facilities, it was necessary to develop a method to calculate the levels of activity during peak periods. The periods normally used to determine peaking characteristics are defined below:

Peak Month: The calendar month when peak enplanements or operations occur.

Design Day: The average day in the peak month derived by dividing the peak month enplanements or operations by the number of days in the month.

Busy Day: The Busy Day of a typical week in the peak month. In this case, the Busy Day is equal to the Design Day.

Design Hour: The peak hour within the Design Day. This descriptor is used in airfield demand/capacity analysis, as well as in determining terminal building, parking apron and access road requirements.

Busy Hour: The peak hour within the Busy Day. In this case, the Busy Hour is equal to the Design Hour.

The Seasonal Use Trend Curve, as presented in Figure 2-5, was used as a tool to determine the peaking characteristics for the Holbrook Municipal Airport. Using the Seasonal Use information, a formula was derived which will calculate the average daily operations in a given month, based on the percentage of the total annual operations for that month, as determined by the curve. The formula is as follows:

$$M = A (T / 100)$$
$$D = M / (365 / 12)$$

Where T = Monthly percent of use (from curve)

M	=	Average monthly operations
A	=	Total annual operations
D	=	Average Daily Operations in a given month

Approximately 90 percent of total daily operations occur between the hours of 7:00 AM and 7:00 PM (12 hours) at a typical general aviation airport, meaning the maximum peak hourly occurrence may be 50 percent greater than the average of the hourly operations calculated for this time period.

The Estimated Peak Hourly Demand (P) in a given month was, consequently, determined by compressing 90 percent of the Average Daily Operations (D) in a given month into the 12-hour peak use period, reducing that number to an hourly average for the peak use period and increasing the result by 50 percent as follows:

$$P = 1.5 (0.90D / 12)$$

Where	D	=	Average Daily Operations in a given month.
	P	=	Peak Hourly Demand in a given month.

The calculations were made for each month of each phase of the planning period. The results of the calculations are shown in Table 2-17. It is evident that the Design Day and Design Hour peak demand in the planning year occurs under VFR weather conditions in the month of July (highlighted in bold in each table), with 33 daily operations and approximately 3.7 operations per hour in 2030.

TABLE 2-17 ESTIMATED HOURLY DEMAND/MONTH

Planning Year: 2015					Planning Year: 2020				
Operations:	5,036	Operations			Operations:	5,659	Operations		
Month	% Use	Monthly	Daily	Hourly	Month	% Use	Monthly	Daily	Hourly
January	3.5	176	6	0.7	January	3.5	198	7	0.8
February	4.0	201	7	0.8	February	4.0	226	7	0.8
March	4.8	242	8	0.9	March	4.8	272	9	1.0
April	7.5	378	12	1.4	April	7.5	424	14	1.6
May	11.3	569	19	2.1	May	11.3	639	21	2.4
June	13.5	680	22	2.5	June	13.5	764	25	2.8
July	**14.8**	**745**	**24**	**2.7**	**July**	**14.8**	**838**	**28**	**3.2**
August	13.0	655	22	2.5	August	13.0	736	24	2.7
September	10.0	504	17	1.9	September	10.0	566	19	2.1
October	8.0	403	13	1.5	October	8.0	453	15	1.7
November	5.8	292	10	1.1	November	5.8	328	11	1.2
December	3.8	191	6	0.7	December	3.8	215	7	0.8

Planning Year: 2025					Planning Year: 2030				
Operations:	6,282	Operations			Operations:	6,906	Operations		
Month	% Use	Monthly	Daily	Hourly	Month	% Use	Monthly	Daily	Hourly
January	3.5	220	7	0.8	January	3.5	242	8	0.9
February	4.0	251	8	0.9	February	4.0	276	9	1.0
March	4.8	302	10	1.1	March	4.8	331	11	1.2
April	7.5	471	15	1.7	April	7.5	518	17	1.9
May	11.3	710	23	2.6	May	11.3	780	26	2.9
June	13.5	848	28	3.2	June	13.5	932	31	3.5
July	**14.8**	**930**	**31**	**3.5**	**July**	**14.8**	**1,022**	**34**	**3.8**
August	13.0	817	27	3.0	August	13.0	898	30	3.4
September	10.0	628	21	2.4	September	10.0	691	23	2.6
October	8.0	503	17	1.9	October	8.0	552	18	2.0
November	5.8	364	12	1.4	November	5.8	401	13	1.5
December	3.8	239	8	0.9	December	3.8	262	9	1.0

2.14 FORECAST SUMMARY

Multiple forecasts were prepared for the Holbrook Municipal Airport to determine a probable range of future aircraft activity levels. Activity estimates were made for based aircraft operations and the ultimate fleet mix at the airport. A summary of the forecasts of aviation activity are provided in Table 2-18 and are provided in accordance with the FAA forecast format in Appendix B.

A review of the Master Plan forecast and TAF indicates that the Master Plan forecasts exceed the TAF operations by more than 10 percent. The TAF shows no growth for operations and the existing operations numbers shown on the TAF are incorrect due to expired data collected by the FAA. The projected growth of the community explains why the Master Plan preferred forecasts exceed the TAF by more than 10 percent.

TABLE 2-18 FORECAST SUMMARY

	ENPLANEMENTS			ITINERANT OPERATIONS					LOCAL OPERATIONS					
YEAR	**AC**	**COMM**	**TOTAL**	**AC**	**AT & COM**	**GA**	**MIL**	**TOTAL**	**GA**	**MIL**	**TOTAL**	**TOT OPS**	**INST OPS**	**BASED AC**
2009	0	0	0	0	336	2,990	34	3,360	840	0	840	4,200	--	12
2010	0	0	0	0	353	3,142	35	3,530	882	0	882	4,412	--	14
2015	0	0	0	0	403	3,585	41	4,029	1,007	0	1,007	5,036	76	15
2020	0	0	0	0	453	4,029	45	4,527	1,132	0	1,132	5,659	85	17
2025	0	0	0	0	503	4,472	51	5,026	1,256	0	1,256	6,282	94	19
2030	0	0	0	0	553	4,916	56	5,525	1,381	0	1,381	6,906	104	21

Chapter Three
Facility Requirements

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport
Airport Master Plan

3.1 INTRODUCTION

One of the primary objectives of this planning study is to determine the size and configuration of airport facilities needed to accommodate the types and volume of aircraft expected to utilize the airport. Data from Chapter 1 and forecasts from Chapter 2 are coupled with established planning criteria to determine what improvements are necessary to airside and landside areas. Then, having established the facility requirements, alternatives for providing these facilities are provided in Chapter 4 to determine the viability of meeting the facility needs.

The time frame for addressing development needs usually involves short-term (0-5 years), medium-term (6-10 years) and long-term (11-20 year) periods. Long range planning primarily focuses on the ultimate role of the airport and is related to development. Medium-term planning focuses on a more detailed assessment of needs, while the short-term analysis focuses on immediate action items and may include details not geared towards long-term development.

3.2 AIRPORT REFERENCE CODE

The Airport Reference Code (ARC) is a system established by the FAA that is used to relate airport design criteria to the operational and physical characteristics of the aircraft currently operating and/or intended to operate at the airport. The ARC has two components relating to the airport design aircraft. The first component, depicted by a letter, is the Aircraft Approach Category and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the Aircraft Design Group and relates to aircraft wingspan and tail height (physical characteristic). Generally, aircraft approach speed applies to runway dimensional criteria and safety zones prior to and beyond the end of the runway. Aircraft wingspan is primarily associated with separation criteria involving taxiways and taxilanes. Table 3-1 has been included to provide a definition of both Aircraft Approach Categories and Aircraft Design Groups.

TABLE 3-1 AIRPORT REFERENCE CODE

Approach Category	Approach Speed (knots)	
Category A	less than 91	
Category B	91 to 120	
Category C	121 to 140	
Category D	141 to 165	
Category E	166 or more	
Design Group	**Wingspan (ft)**	**Tail Height (ft)**
Group I	less than 49	Less than 20
Group II	49 to 78	20 to 29
Group III	79 to 117	30 to 44
Group IV	118 to 170	45 to 59
Group V	171 to 213	60 to 65
Group VI	214 to 261	66 to 79

FIGURE 3-1 AIRPORT REFERENCE CODE

To ensure that all airport facilities are designed to accommodate the expected air traffic and to meet FAA criteria, the specific ARC for the airport must be determined. In order to designate a specific ARC for an airport, aircraft in that ARC should perform a minimum of 500 annual itinerant operations. The majority of aircraft currently using the Holbrook Airport have an ARC of A-I and B-I. Airport users and fleet mix were discussed in Chapter 2. Examples of aircraft with an ARC of A-I and B-I are listed in Table 3-2. Examples of aircraft with an ARC of A-II and B-II are listed in Table 3-3. Aircraft with an ARC of A-I through B-II are expected to utilize the airport in the short, medium and long-term time frames, with an expectation that B-II operations will continue to increase. It is recommended that all future improvements be planned, designed and constructed to meet an ARC of B-II.

TABLE 3-2 EXAMPLE AIRCRAFT HAVING AN ARC OF A-I OR B-I

Aircraft	Approach Speed (knots)	Wingspan (feet)	Max T.O. Weight (pounds)
Beech Baron 58P	101	37.8	6,200
Beech Bonanza V35B	70	33.5	3,400
Beech King Air B100	111	45.9	11,799
Cessna 150	55	33.3	1,670
Cessna 172	60	36.0	2,200
Cessna 177	64	35.5	2,500
Cessna 182	64	36.0	2,950
Cessna 340	92	38.1	5,990
Cessna 414	94	44.1	6,750
Cessna Citation I	108	47.1	11,850
Gates Learjet 28/29	120	42.2	15,000
Mitsubishi MU-2	119	39.1	10,800
Piper Archer II	86	35.0	2,500
Piper Cheyenne	110	47.6	12,050
Rockwell Sabre 40	120	44.4	18,650
Swearingen Merlin	105	46.3	12,500
Raytheon Beechjet	105	43.5	16,100

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

TABLE 3-3 EXAMPLE AIRCRAFT HAVING AN ARC OF A-II OR B-II

Aircraft	Approach Speed (knots)	Wingspan (feet)	Max T.O. Weight (pounds)
Air Tractor 802F	105	58.0	16,000
Beech King C90-1	100	50.3	9,650
Beech Super King Air B200	103	54.5	12,500
Cessna 441	100	49.3	9,925
Cessna Citation II	108	51.6	13,300
Cessna Citation III	114	50.6	17,000
Dassault Falcon 50	113	61.9	37,480
Dassault Falcon 200	114	53.5	30,650
Dassault Falcon 900	100	63.4	45,500
DHC-6 Twin Otter	75	65.0	12,500
Grumman Gulfstream I	113	78.5	35,100
Pilatus PC-12	85	52.3	9,920

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

3.3 AIRSIDE FACILITY REQUIREMENTS

3.3.1 RUNWAY REQUIREMENTS

Annual Service Volume: The Annual Service Volume (ASV) is a calculated reasonable estimate of an airport's annual capacity; taking into account differences in runway utilization, weather conditions and aircraft mix that would be encountered in one year. When compared to the forecasts or existing operations of an airport, the ASV will give an indication of the adequacy of a facility in relationship to its activity level. The ASV is determined by reference to the charts contained in FAA Advisory Circular (AC) 150/5060-5, Airport Capacity and Delay.

Furthermore, the FAA has developed a computer software program entitled "Airport Design." The program provides the user with recommended runway lengths and other facilities on an airport according to FAA design standards. The FAA Airport Design Program was used to calculate the ASV for a single runway airport with the forecasted operation levels determined in Chapter 2. Annual Service Volume for the runway configuration is 230,000 operations per year. Under these conditions, the existing runway facilities will adequately meet the demand within the time frame of this study.

Runway Length: FAA Advisory Circular 150/5325-4B, Runway Length Requirements for Airport Design, provides guidance for determining runway length requirements. The FAA Airport Design Program was used to calculate recommended runway length requirements, the information required to execute the program for recommended runway lengths, includes airfield elevation, mean maximum temperature of the hottest month and the effective gradient for the runway. The input data for the Holbrook Municipal Airport is listed below:

Field Elevation: 5,262 feet MSL
Mean Maximum Temperature of Hottest Month: 94˚ F
Effective Gradient: 75 feet

(Note: The actual difference in feet from runway end to runway end is required to run the FAA software program and is listed as the effective gradient. However, the effective gradient is usually shown as a percent.)

With this data, the Airport Design program provides several runway length recommendations for both small and large aircraft according to varying percentages of aircraft fleet and associated takeoff weights. A summary of the data provided by the program is listed in Table 3-4. The recommended length for Runway 3/21 is 6,800 feet.

As shown on Figure 3-2, based on the required runways lengths for these categories of aircraft, the current length of Runway 3/21 satisfies the takeoff runway length requirements for most B-I aircraft, as well as some of the commonly used B-II aircraft during high summertime temperatures. The actual runway length may vary depending on several factors including topographical, environmental and financial constraints. The use of the existing runway at any runway length is strictly at the discretion of the aircraft operator/pilot. Increased runway length would enhance safety at the airport by providing increased accelerate stop distance and landing distance. The increased runway length will also increase the utility of the airport by allowing aircraft to operate at increased weight when summertime temperatures increase density altitude.

Runway Strength: the existing pavement strength is 30,000 pounds single wheel gear (SWG) and 30,000 pounds dual wheel gear (DWG). It is recommended to increase the pavement strength to 45,000 pounds SWG and 65,000 DWG to accommodate operations of larger B-II aircraft.

TABLE 3-4 RUNWAY LENGTH ANALYSIS

Airport and Runway Data	
Airport Elevation	5,262 feet
Mean daily maximum temperature of the hottest month	94 ˚F
Maximum difference in runway centerline elevation	75 feet
Length of haul for airplanes of more than 60,000 pounds	500 miles
Runway Lengths Recommended for Airport Design	
Small airplanes with approach speeds of less than 30 knots	460 feet
Small airplanes with approach speeds of less than 50 knots	1,220 feet
Small airplanes with less than 10 passenger seats, < 12,500 pounds	
75 percent of these small airplanes	4,830 feet
95 percent of these small airplanes	6,670 feet
100 percent of these small airplanes	6,760 feet
Small airplanes with 10 or more passenger seats	6,760 feet
Large airplanes of 60,000 pounds or less	
75 percent of these large airplanes at 60 percent useful load	7,710 feet
75 percent of these large airplanes at 90 percent useful load	9,350 feet
100 percent of these large airplanes at 60 percent useful load	11,750 feet
100 percent of these large airplanes at 90 percent useful load	11,750 feet
Airplanes of more than 60,000 pounds	Approximately 6,880 feet

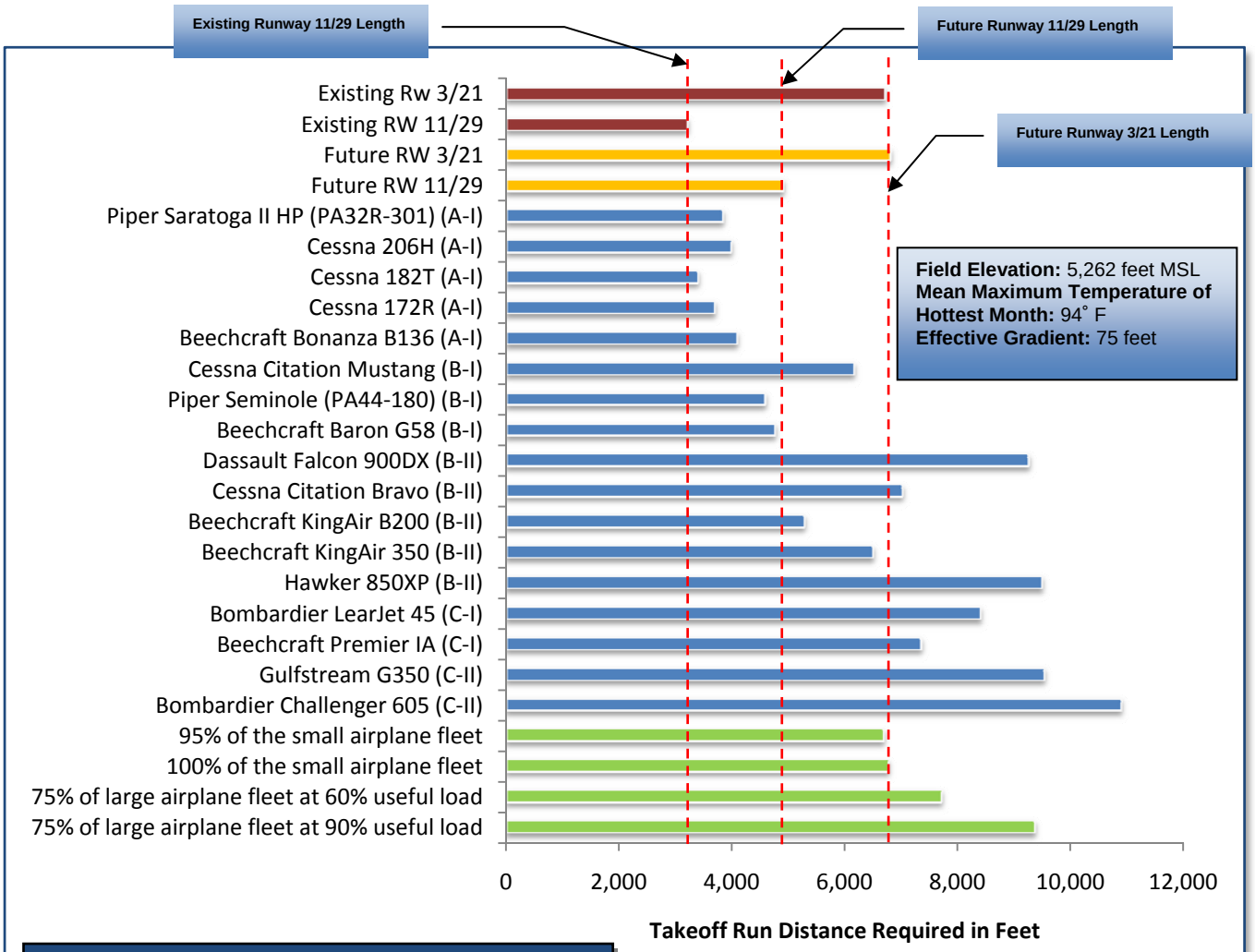


FIGURE 3-2 RUNWAY LENGTH REQUIREMENTS

3.3.2 CROSSWIND RUNWAY REQUIREMENTS

The FAA recommends that a runway's orientation provide at least 95 percent crosswind coverage. If the wind coverage of the runway does not meet this 95 percent minimum for the appropriate ARC, then a crosswind runway should be considered. Crosswind coverage for Runway 3/21 is 93.35 percent for a 10.5 knot crosswind and 96.35 percent for a 13.0 knot crosswind during visual meteorological conditions (VMC) and 90.30 percent for 10.5 knot crosswind and 93.47 percent for a 13.0 knot crosswind in instrument meteorological conditions (IMC). Therefore a crosswind runway is justified for A-I and B-I aircraft operations. Runway 11/29 provides 85.78 percent wind coverage at 10.5 knots and 90.36 percent at 13 knots in VMC; 94.23% percent wind coverage at 10.5 knots and 95.81 percent at 13 knots in IMC . The combined wind coverage in VMC is 98.03 percent at 10.5 knots and 99.36 percent at 13 knots; in IMC the combined wind coverage is 98.14 percent at 10.5 knots and 98.97 percent at 13 knots. If financially and physically feasible a runway length of 4,900 feet and a width of 60 feet is recommended which would accommodate approximately 75 percent of the small aircraft fleet mix.

3.3.3 RUNWAY INCURSIONS

There are currently no runway incursion mitigation measures in place at the Holbrook Municipal Airport. Currently some of the connector taxiways do not have lighted runway holding position signs. It is recommended that the airport install lighted holding position signs at the taxiway connectors that currently do not have holding position sign in order to increase awareness of runways. Installation of electrical motor and keypad controller will enhance safety and security and reduce the potential for vehicle and pedestrian incursions on the main apron area.

3.3.4 TAXIWAY REQUIREMENTS

Length and Width: The primary function of a taxiway system is to provide access between runways and the terminal area. The taxiways should be located so that aircraft exiting the runway will have minimal interference with aircraft entering the runway or remaining in the traffic pattern. Taxiways expedite aircraft departures from the runway and increase operational safety and efficiency.

According to FAA Advisory Circular 150/5300-13, Airport Design, the required runway to taxiway centerline separation for a runway with an ARC of B-II is 240 feet (with as low as 3/4 mile visibility minimums or 300 feet with lower than 3/4 mile visibility minimums) There is currently a full length parallel Taxiway A for Runway 3/21. Taxiway A is currently 35 feet wide and located 200 feet from runway centerline to taxiway centerline. Alternatives for meeting the required runway to taxiway separation will be evaluated in the next Chapter. It is recommended that Taxiway A be relocated to 300 feet to not only meet existing standards but also to provide for future B-II ARC with lower than 3/4 mile visibility minimums.

Strength: The strength of the taxiway should be maintained at a strength equal to that of the associated runway pavement.

3.3.5 AIRCRAFT APRON

The apron space requirements as shown in this planning document were developed according to recommendations given in AC 150/5300-13, Airport Design. Consideration must be made in the overall apron requirements for aircraft parking and tiedown requirements, taxilanes, adjacent taxiways and proximity to all aircraft expected to use the airport.

Apron Requirements: Generally speaking, an apron tiedown area should allow approximately 360 square yards per transient aircraft and 300 square yards per based aircraft. This square yardage per aircraft provides adequate space for tiedowns, circulation and fuel truck movement. Holbrook Municipal Airport should plan for additional apron expansion and taxilane expansion to hangar development areas.

As shown on Figure 3-3 the aircraft apron is in poor condition, large block cracks and longitudinal/transverse cracking. Although a crack seal, seal coat and remarking is in process the apron will need a full rehabilitation/reconstruction in the near future. The existing aircraft parking apron size is considered adequate for the short and medium term. An apron expansion is recommended in the long term to accommodate based and transient aircraft. Options for apron expansion are included in the development alternatives in Chapter 4.

Tiedown Requirements: Aircraft tiedowns should be provided for those small and medium sized aircraft utilizing the airport. These aircraft risk being damaged or may cause damage or injury in sudden wind gusts if not properly secured. A number of tiedowns are required to accommodate the peak daily transient aircraft and overnight transient aircraft, plus based aircraft that are not stored in hangars. The current tiedown layout is based on Group I taxilane OFAs. The future apron layout should be planned to provide an area for Group II taxilane OFAs. Typically large aircraft, including business jets, are not tied down and can usually occupy multiple tiedown spaces.

Future apron square yardage should be planned for both transient and based aircraft. An apron expansion is recommended to accommodate based and transient aircraft including helicopters.

FIGURE 3-3 APRON CURRENT CONDITION

3.3.6 NAVIGATIONAL AIDS

A Navigational Aid (NAVAID) is any ground based visual or electronic device used to provide course or altitude information to pilots. NAVAIDs include Very High Omnidirectional Range (VORs), Very High Frequency Omnidirectional Range with Tactical Information (VOR-TACs), Nondirectional Beacons (NDBs) and Tactical Air Navigational Aids (TACANs), as examples. There are no existing NAVAIDs in working conditions at Holbrook Municipal Airport and no ground based navigational aids are recommended.

3.3.7 APPROACH PROCEDURES

Non-precision Global Positioning System (GPS) approaches do not require ground-based facilities on or near the airport for navigation. The GPS receiver uses satellites for navigation. Therefore, it involves little or no cost for the Airport Sponsor. GPS was developed by the United States Department of Defense for military use and is now available for civilian use. GPS approaches are rapidly being commissioned at airports across the United States, approach minimums as low as 350-foot ceilings and 1-mile visibility are typical for this type of approach. Visibility minimums of 3/4 or 1/2 mile can often be achieved if the airport is in an obstruction free environment. An instrument approach will increase the utility of the airport by providing the capability to operate in inclement weather conditions. This is especially important for air medevac/air ambulance and business flights. It is also useful for conducting training and maintaining instrument currency and proficiency requirements.

A future GPS approach would increase the dimensions of several imaginary surfaces surrounding the airport including Federal Aviation Regulation (FAR) Part 77 Airspace surfaces. A future GPS non-precision instrument approach with 3/4-mile visibility minimums to the Holbrook Municipal Airport is recommended. An obstruction survey is being completed as part of this study and will be used in the request for an instrument approach procedure.

3.3.8 AIRFIELD LIGHTING, SIGNAGE, MARKING AND VISUAL AIDS

Airport lighting enhances safety during periods of inclement weather and nighttime operations by providing visual guidance to pilots in the air and on the ground. Lighting and visual aids can consist of a variety of equipment or a combination thereof as described in Chapter 1. The airport's existing inventory of lighting and visual aids includes a rotating airport beacon, medium intensity runway lights (MIRLs) and medium intensity taxiway lights (MITLs) which are in good condition, visual runway markings and a segmented circle, PAPIs and REILs. Installation of a new segmented circle is recommended. Runway hold position signs are recommended along all connector taxiways.

The runway is in the process of being remodeled with non-precision markings as part of the crack seal, seal coat and remarking project.

3.4 LANDSIDE FACILITY REQUIREMENTS

Landside facilities are another important aspect of the airport. Landside facilities serve as the processing interface between the surrounding community and the airport operating environment. Likewise, it offers the traveler the first impression of the airport and the local area. Landside facilities house the support infrastructure for airside operations and often generate substantial revenues for the airport.

Most the Holbrook Municipal Airport property is undeveloped, a clean-slate with unlimited potential. Recognizing market realities and development costs, an overall master plan can establish a low-risk, step-by-step approach to exploit this resource for beneficial results to the airport and the citizens of Holbrook. It is important that any new development at Holbrook Municipal Airport establish a sense of place, an abstract concept made up of the impressions one gets by the elements that make up the built environment. At the present time, the property is framed with land that has a high potential for light industrial and commercial development.

Within this realm, it is important that any new development establish a positive impression through coordinated planning and design. By doing so, these responsible actions will make the Airport an attractive location for new business and the associated economic investments will be protected. A sense of place with an allure to business will be established by simple actions directed at building design and placement, layout of roads, and landscaping.

3.4.1 TERMINAL BUILDING

A terminal building at any airport offers several amenities to passengers, local and transient pilots and airport management. Terminal buildings (often called pilot lounges at general aviation airports) most often house public restrooms, public telephones, a pilot's lounge and information regarding airport services. The terminal building at Holbrook includes a lobby area, restrooms, telephone, a flight planning room and airport management office. The terminal building is in fair condition and provides adequate space and amenities to accommodate existing demand. The airport sponsor has indicated a desire to expand the terminal to include other services such as a restaurant. The old house could also be converted to use as a restaurant, café or offices. It is also recommended in the future that the terminal building be remodeled to update the interior finishes and restrooms.

3.4.2 HANGAR FACILITIES

Hangars are typically classified as either T-hangars, (small multi-unit storage complexes that usually accommodate one single engine aircraft in each unit) or conventional box hangars, (small to very large units), which accommodate a variety of aircraft types or corporate fleets. The number of aircraft that each conventional hangar can hold varies according to the manufacturer and the specifications of the airport owner or operators.

Based Aircraft Hangar Requirements: The facility requirements for based aircraft typically determine the number of tiedown locations, number of shaded spaces, number of T-hangars and number of conventional type hangars required for the future. Development areas will be identified on the ALP for a mix of T-hangars, box hangars and larger corporate style hangars.

Transient Aircraft Hangar Requirements: Transient single-engine aircraft operators generally do not require aircraft storage facilities unless there is inclement weather expected (such as hail or snow) or if the operator is planning an extended stay. Some higher performance single-engine and multi-engine aircraft operators may desire overnight aircraft storage or a heated hangar in the winter. There is currently no dedicated transient aircraft hangar space at the airport. It is recommended that a future hangar be provided for transient aircraft.

General: The airport sponsor should consider providing long-term land leases to interested parties for the construction of aircraft storage hangars. Allowing the tenant to retain ownership of the hangar while leasing the ground reduces capital outlay requirements for the City of Holbrook. The tenant ownership also enables the City of Holbrook to collect property taxes on the hangar and other improvements. The tenant ownership also provides motivation for the tenant to maintain the hangar in good condition to maximize resale value at the end of the lease period. Previous legislation has made aircraft hangars an eligible cost under the Airport Improvement Program (AIP). While this creates an opportunity for airport sponsors willing to build hangars to meet existing demand, hangars are considered a very low priority by the FAA.

3.4.3 AVIATION FUEL FACILITIES

The current fuel tank should be relocated to satisfy the future runway and taxiway clearance requirements. It is recommended that a self-serve credit card reader fueling system be installed to provide 24-hour fuel access at the airport. For the ultimate development a 10,000 gallon storage tank and a fuel truck for Jet-A is also recommended; thus replacing the tank and pump when it is relocated is recommended.

3.4.4 Airport Access and Vehicle Parking

Currently there are approximately four automobile parking spaces available adjacent to the apron area this is considered adequate for the short-term time frame, approximately 20 automobile parking spaces should be made available for the medium and long-term time frames to accommodate airport users and visitors.

3.4.5 Fencing

A new chain link fence was recently installed surrounding the entire airport property. The existing fencing is considered adequate for the planning period. An electric vehicle access gate with a keypad entry controller is in the process of being installed which will enhance safety and security.

3.4.6 Airport Rescue and Fire Fighting (ARFF) Storage Building

Airport Rescue and Fire Fighting (ARFF) equipment is not required at airports that do not serve scheduled passenger service with aircraft having 10 or more passenger seats. Local municipal or volunteer fire departments typically provide fire protection to general aviation airports in their district. Mutual aid agreements may also be provided for nearby fire departments to assist in emergency situations. In any case, procedures should be in place to ensure emergency response in case of an accident or emergency at the airport. Although statistically very safe, the most likely emergency situations at general aviation airports are an aircraft accident, fuel or aircraft fire or hazardous material (fuel) spill. The level of protection recommended in FAA Advisory Circular 150/5210-6D, Aircraft Fire and Rescue Facilities and Extinguisher Agents, for small general aviation airports is 190 gallons of aqueous film forming foam (AFFF) supplemented with 300 pounds of dry chemical. Proximity suits should be utilized for fire fighter protection. Aviation rated fire extinguishers should be immediately available in the vicinity of the aircraft apron and fueling facilities. Adequate facilities should be provided to store any ARFF vehicle(s) or equipment that is acquired.

3.4.7 Grounds Maintenance Equipment and Storage Building

Holbrook Municipal Airport Management is responsible for grounds maintenance and snow removal at the airport. The airport requires only a minimal amount of snow removal equipment due to the minimal snow conditions at the airport. Multi-function grounds maintenance equipment capable of snow removal, mowing and sweeping is recommended. This type of equipment helps to maintain the safety areas as well as remove objects from the apron, taxiway and runway to minimize foreign object damage (FOD). A storage building to house all the maintenance equipment and its accessories is also recommended.

3.5 Utilities

Available utilities at the airport have been designed and sized to meet the typical needs of a general aviation airport. Power is provided by Arizona Public Service (APS). Telephone is provided by Citizens Telecom. Natural gas is provided by Citizen Utilities Company. Water and sewer is provided by the City of Holbrook. Internet service is provided by Frontier Net. The existing utilities are considered adequate for the planning period; however, services will need to be extended to new development areas.

3.6 Weather Reporting Systems

The automated weather observation system (AWOS-3) is currently being upgraded to an AWOS-3 P/T.

It is recommended that Holbrook Municipal Airport AWOS be connected to the National Airspace Data Interchange Network (NADIN). This will allow national dissemination of the AWOS observations and allow the National Oceanic and Atmospheric Administration (NOAA) to digitally record the hourly observations and disseminate real-time weather information to Flight Service Stations and other sources.

3.7 AIRSPACE REQUIREMENTS

Federal Aviation Regulations (FAR) Part 77 establishes several Imaginary Surfaces that are used as a guide to provide a safe, unobstructed operating environment for aviation. These surfaces, which are typical for civilian airports, are shown in Figure 3-4. The Primary, Approach, Transitional, Horizontal and Conical Surfaces identified in FAR Part 77 are applied to each runway. For the purpose of this section, a visual/utility runway is a runway that is intended to be used by propeller driven aircraft of 12,500 pound maximum gross weight and less. A non-precision instrument/utility runway is a runway that is intended to be used by aircraft of 12,500 pounds maximum gross weight and less with a straight-in instrument approach procedure and instrument designation indicated on an FAA approved airport layout plan, a military service approved military airport layout plan or by any planning document submitted to the FAA by competent authority. A non-precision instrument/larger-than-utility runway is a runway intended for the operation of aircraft weighing more than 12,500 pounds that also has a straight-in instrument approach procedure.

The Primary Surface is an imaginary surface of specific width longitudinally centered on a runway. Primary Surfaces extend 200 feet beyond each end of the paved surface of runways, but do not extend past the end of non-paved runways. The elevation of any point on the Primary Surface is the same as the elevation of the nearest point on the runway centerline. The width of the Primary Surface varies from 250, 500 or 1,000 feet depending on the type of approach and approach visibility minimums.

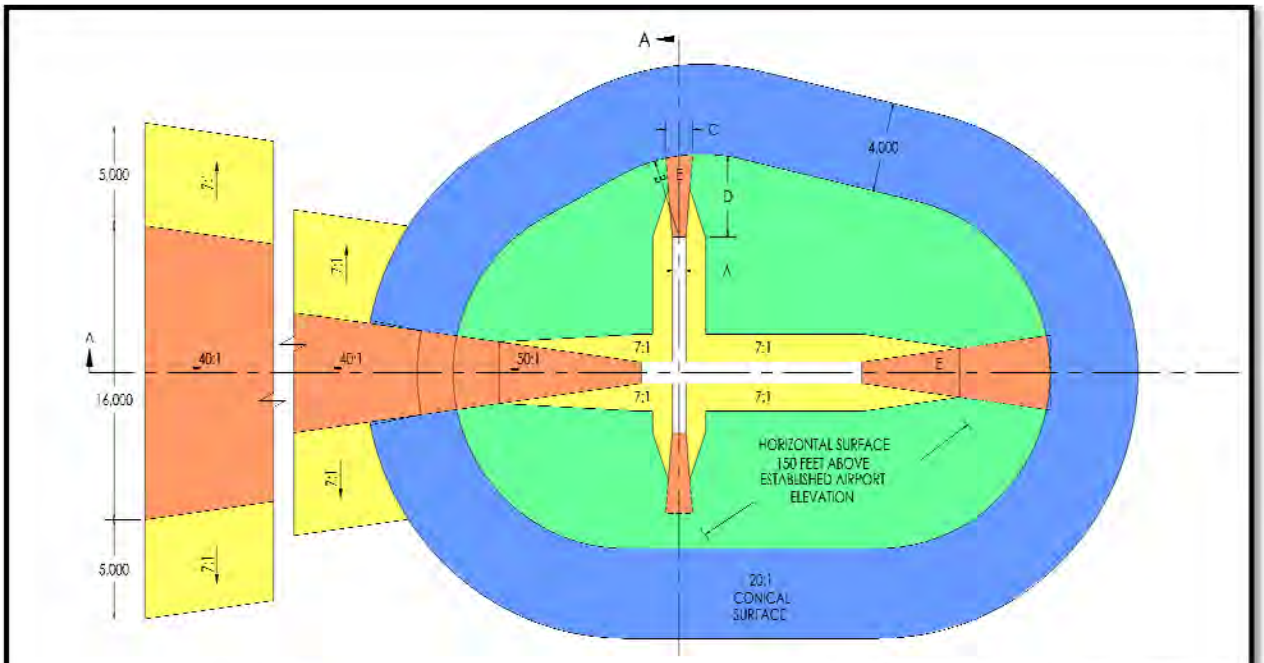
The current Primary Surface width for Runway 3/21 is 500 feet. This would remain 500 feet if the airport develops a non-precision instrument approach of greater than 3/4-mile and will increase to 1,000 feet with operation minimums of 3/4-mile or less. Primary and transitional surface penetrations are often acceptable provided they are marked and lighted and the OFZ remains clear. However, the OFZ would remain clear.

The Approach Surface is a surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the Primary Surface. An Approach Surface slope is applied to each end of the runway based upon the type of approach available or planned for that runway, either 20:1, 34:1 or 50:1. The inner edge of the surface is the same width as the Primary Surface. It expands uniformly to a width corresponding to the FAR Part 77 runway classification criteria.

The Transitional Surfaces extend outward and upward at right angles to the runway centerlines from the sides of the Primary and Approach Surfaces at a slope of 7:1 and end at the Horizontal Surface.

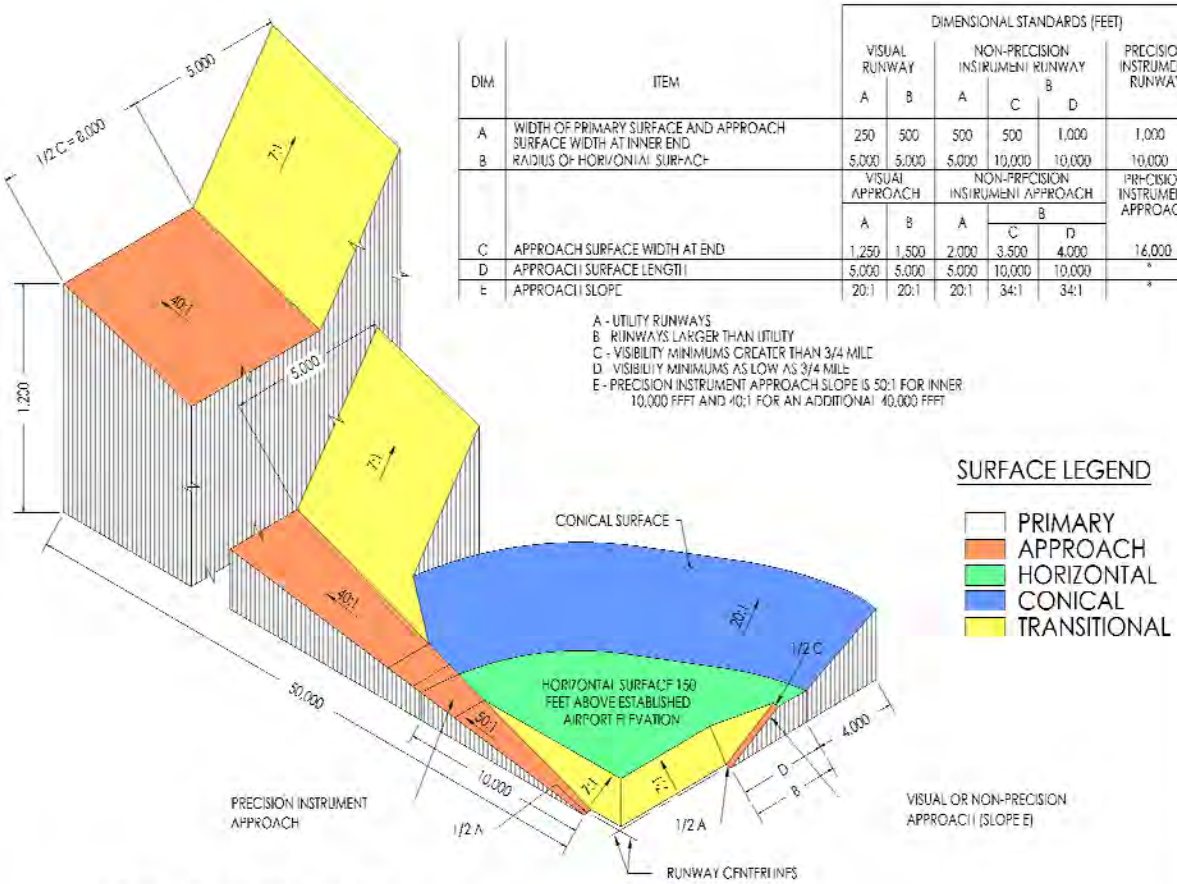
The Horizontal Surface is considered necessary for the safe and efficient operation of aircraft in the vicinity of an airport. As specified in FAR Part 77, the Horizontal Surface is a horizontal plane 150 feet above the established airport elevation. The airport elevation is defined as the highest point of an airport's useable runways, measured in feet above mean sea level. The perimeter is constructed by arcs of specified radius from the center of each end of the Primary Surface of each runway. The radius of each arc is 5,000 feet for runways designated as utility or visual and 10,000 feet for all other runways.

The Conical Surface extends outward and upward from the periphery of the Horizontal Surface at a slope of 20:1 for a horizontal distance of 4,000 feet.



DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B		
					C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
E - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



ISOMETRIC VIEW OF SECTION A-A

FIGURE 3-4 FAR PART 77 IMAGINARY SURFACES

3.8 LAND USE COMPATIBILITY AND CONTROL

3.8.1 AIRPORT PROPERTY

The existing airport property line encompasses approximately 458 acres according to the airport legal description. There are no easements of other land controls over the land located within the Runway Protection Zones. Additional land was recently acquired to accommodate the relocation of the crosswind runway and the shift and extension of Runway 3/21.

3.8.2 HEIGHT RESTRICTION ZONING

Development around airports can pose certain hazards to air navigation if appropriate steps are not taken to ensure that buildings and other structures do not penetrate the FAR Part 77 Airspace Surfaces (described in the following section). The FAA, therefore, recommends that all Airport Sponsors implement height restrictions in the vicinity of the airport to protect these Part 77 Surfaces. The City does not have an existing airport overlay zone for height restrictions surrounding the airport.

3.8.3 COMPATIBLE LAND USE

In addition to ensuring that obstructions to Part 77 Surfaces are avoided or appropriately marked and lighted, it is recommended that the Airport Sponsor make reasonable efforts to prevent incompatible land uses from the immediate area of the airport, including wildlife attractants and noise sensitive land uses such as residential developments, schools, churches and hospitals. For example, the FAA states in FAA Advisory Circular 150/5200-33A, Hazardous Wildlife Attractants On or Near Airports, that landfills and/or transfer stations are incompatible land uses with airports. Therefore, these types of facilities should be located at least 5,000 feet from any point on a runway that serves piston type aircraft and 10,000 feet from any point on a runway that serves turbine type aircraft. Furthermore, any facility which may attract wildlife (especially birds) such as sewage treatment ponds and wastewater treatment plants should also be located this same distance from any point on the runway. Development proposals should also be reviewed to ensure compatibility in the vicinity of the airport.

3.9 SUMMARY OF FACILITY REQUIREMENTS

In summary, the facility requirements for the Holbrook Municipal Airport are based on the types and volume of aircraft expected to use the airport in the short and long-term timeframes. These facilities will enable the airport to serve its users in a safe and efficient manner. The recommended airside and landside facilities are summarized in Table 3-5.

TABLE 3-5 SUMMARY OF AIRPORT FACILITY REQUIREMENTS

FACILITY		EXISTING	FUTURE
RUNWAYS			
3/21	Length and Width in feet	6,698' x 75'	6,800' x 75'
11/29	Length and Width in feet	3,200' x 120'	4,900' x 60'
3/21	Strength (pounds)	12,500 SWG	30,000 SWG
11/29	Strength (pounds)	Dirt	12,500 SWG
Markings	Runway 3/21	Visual	Nonprecision - LPV
	Runway 11/29	None	Visual
TAXIWAY A			
	Parallel	Yes	Yes
	Bypass Taxiways/Turnarounds	Yes	Yes
	Width (feet)	35	35
	Strength (pounds)	30,000 (SWG/DWG)	45,000 (SWG), 65,000 (DWG)
TAXIWAY B			
	Parallel	No	No
	Bypass Taxiways/Turnarounds	No	Yes
	Width (feet)	None	25
	Strength	None	12,500 SWG
APRON			
	Size	Approximately 27,200 square yards	27,200 square yards *
	Tie Downs	40	40*
NAVAIDS			
	Approaches	Visual	NPI (Straight-in) / LPV
	Minimums	N/A	3/4-mile
LIGHTING & VISUAL AIDS			
	Runway 3/21 Edge	MIRL	MIRL
	Runway 11/29 Edge	None	MIRL
	Taxiway A Edge	MITL	MITL
	Taxiway B	None	MITL
	Runway 3/21Threshold Lights	Yes	Yes
	Runway 11/29 Threshold Lights	No	Yes
	REILs Runway 3/21	Yes	Yes
	REILs Runway 11/29	No	Yes
	Approach Slope Indicator Runway 3/21	PAPI-2	PAPI-2
	Approach Slope Indicator Runway 11/29	None	PAPI-2
	Segmented Circle/Wind Cone	Yes	Yes
	Rotating Beacon	Yes	Yes
	Approach Lighting System	No	No
ACCESS & PARKING			
	Automobile	4	20*
HANGAR FACILITIES			
	T-Hangars	One 8-unit	10*
	Conventional-Small	3	5*
	Conventional-Medium/Large	0	5*
FUEL STORAGE			
	100 LL (gallons)	11,750	10,000 Tank
	Jet-A (gallons)	None	10,000 Tank and truck
	Self-Serve	No	Yes
OTHER			
	AWOS	AWOS-3	AWOS-3 P/T
	Unicom	Yes	Yes
	Terminal Building	Yes	Yes

**As required based on demand*

3.9.1 Summary of Design Standards

Table 3-6 and Table 3-7 summarize the FAA design standards (described in Chapter 1) for the recommended airport facilities.

Table 3-6 Summary of Dimensional Criteria Runway 3/21

Design Criteria	Existing	Future
Airport Reference Code Approach Type	B-I Visual > Utility	B-II NPI > Utility 3/4-mile visibility minimums
Design Standards (AC 150/5300-13)		
Runway centerline to parallel taxiway centerline	225’	240’, 300’ recommended
Runway centerline to edge of aircraft parking apron	200’	250’
Runway width	60’	75’
Runway shoulder width	10’	10’
Runway Safety Area width	120’	150’
Runway Safety Area length beyond runway end	240’	300’
Runway Object Free Area width	400’	500’
Runway Object Free Area length beyond runway end	240’	300’
Runway Obstacle Free Zone width	250’	400’
Runway Obstacle Free Zone length beyond runway end	200’	200’
Runway Protection Zone	1,000’ x 500’ x 700’	1,700’ x 1,000’ x 1,510’
Taxiway width	25’	35’
Taxiway Safety Area width	49’	79’
Taxiway Object Free Area width	89’	131’
Taxilane Object Free Area width	79’	115’
Runway centerline to aircraft hold lines	125’	200’
Airspace Surfaces (Part 77)		
Primary Surface width	250’	500’
Primary Surface length beyond runway ends	200’	200’
Approach Surface dimensions RW 3	500’ x 1,500’ x 5,000’	1,000’ x 4,000’ x 10,000’
Approach Surface dimensions RW 21	500’ x 1,500’ x 5,000’	1,000’ x 4,000’ x 10,000’
Approach Surface slope RW 3	20:1	34:1
Approach Surface slope RW 21	20:1	34:1
Transitional Surface slope	7:1	7:1
Horizontal Surface radius from runway	5,000’	10,000’
Conical Surface width	4,000’	4,000’

Source: AC 150/5300-13 Airport Design; FAR Part 77- Objects Affecting Navigable Airspace

TABLE 3-7 SUMMARY OF DIMENSIONAL CRITERIA RUNWAY 11/29

DESIGN CRITERIA	EXISTING	FUTURE
AIRPORT REFERENCE CODE APPROACH TYPE	B-I (SMALL) VISUAL UTILITY	B-I (SMALL) VISUAL UTILITY
DESIGN STANDARDS (AC 150/5300-13)		
RUNWAY CENTERLINE TO PARALLEL TAXIWAY CENTERLINE	150’	150’
RUNWAY CENTERLINE TO EDGE OF AIRCRAFT PARKING APRON	125’	125’
RUNWAY WIDTH	60’ (120’ ACTUAL)	60’
RUNWAY SHOULDER WIDTH	10’	10’
RUNWAY SAFETY AREA WIDTH	120’	120’
RUNWAY SAFETY AREA LENGTH BEYOND RUNWAY END	240’	240’
RUNWAY OBJECT FREE AREA WIDTH	250’	250’
RUNWAY OBJECT FREE AREA LENGTH BEYOND RUNWAY END	240’	240’
RUNWAY OBSTACLE FREE ZONE WIDTH	250’	250’
RUNWAY OBSTACLE FREE ZONE LENGTH BEYOND RUNWAY END	200’	200’
RUNWAY PROTECTION ZONE	1,000’x250’x450’	1,000’x250’x450’
TAXIWAY WIDTH	25’	25’
TAXIWAY SAFETY AREA WIDTH	49’	49’
TAXIWAY OBJECT FREE AREA WIDTH	89’	89’
TAXILANE OBJECT FREE AREA WIDTH	79’	79’
RUNWAY CENTERLINE TO AIRCRAFT HOLD LINES	125’	125’
AIRSPACE SURFACES (PART 77)		
PRIMARY SURFACE WIDTH	250’	250’
PRIMARY SURFACE LENGTH BEYOND RUNWAY ENDS	200’	200’
APPROACH SURFACE DIMENSIONS RW 11	250’x1,250’x5,000’	250’x1,250’x5,000’
APPROACH SURFACE DIMENSIONS RW 29	250’x1,250’x5,000’	250’x1,250’x5,000’
APPROACH SURFACE SLOPE RW 11	20:1	20:1
APPROACH SURFACE SLOPE RW 29	20:1	20:1
TRANSITIONAL SURFACE SLOPE	7:1	7:1
HORIZONTAL SURFACE RADIUS FROM RUNWAY	5,000’	5,000’
CONICAL SURFACE WIDTH	4,000’	4,000’

Source: AC 150/5300-13 Airport Design; FAR Part 77- Objects Affecting Navigable Airspace

Chapter Four
Development Alternatives

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport
Airport Master Plan

4.1 INTRODUCTION

Airports have a wide variety of development options, so an organized approach to identifying and evaluating development alternatives is essential for effective planning. The purpose of this section is to identify and evaluate various alternatives for meeting the needs identified in the facility requirements section for the 20-year planning horizon. While there are theoretically a wide range of options and variations for each aspect of airport development, this study will only address those alternatives that reasonably meet demand and community objectives for airport development at the lowest reasonable financial and environmental costs, while not constraining future development beyond the 20-year planning horizon. Primary consideration will be given to issues of operational safety, airfield standards, efficiency of aeronautical operations and meeting the identified aeronautical demand.

For some airport elements, one alternative may be simply do nothing, while for other elements various alternatives that satisfy the facility requirements may exist. Usually, the selection of a favored project can result from a straightforward and logical evaluation of the options at hand. The discussion of facility requirements presented in this report provides the basis for the airport development concepts described in this section. The improvements evaluated in this master plan are developed from an analysis of projected needs. Though the needs were determined by the best methodology available, it should not be assumed that future trends will not change these needs. The airport master planning process attempts to develop a viable concept for meeting the needs caused by projected demands through the planning period.

4.2 DEVELOPMENT CONCEPT EVALUATION OBJECTIVES

The following objectives discussed in FAA AC 150/5070-6B, generally apply to the evaluation of master plan development alternatives; and serve the planner, airport owner and community well:

- Conforms to best practices for safety and security.
- Conforms to the intent of FAA and other appropriate design standards.
- Satisfies user needs.
- Is technically and financially feasible.
- Allows for forecast growth throughout the planning period.
- Provides for growth beyond the planning horizon.
- Provides for the “highest and best” land use on and off airport.
- Provides balance between development elements.
- Provides flexibility to adjust to unforeseen changes.
- Conforms to the airport owner’s strategic vision.
- Conforms to relevant local, regional and state transportation plans.
- Is socially and politically feasible.

4.3 DEVELOPMENT CONCEPTS

A combination of effective airside and landside planning is essential to the successful development of the airport. Airside facilities are those used during takeoff, landing and ground maneuvering of aircraft. Landside facilities generally support aircraft after they exit the runway and park. They typically consist of a system of hangars, FBO, fuel systems, airport maintenance and support facilities, vehicle parking areas, utility infrastructure and revenue generating areas. Recommended development projects for the Holbrook Municipal Airport are shown in Figure 4-6 and Figure 4-7 at the end of this chapter.

4.3.1 INSTRUMENT APPROACH MINIMUM ALTERNATIVES

Because instrument approach visibility minimums influence the airfield design standards, it is important to first consider the effects of attempting to achieve lower visibility minimums through utilization of the satellite based Global Positioning System (GPS), the Wide Area Augmentation System (WAAS) and the provision of future localizer performance with vertical guidance (LPV) approaches. Two options have been identified for future instrument approach visibility minimums. The first option would be to plan for a future precision instrument approach with approach visibility minimums lower than ¾-mile. This would result in the requirement of a 100 foot wide runway with precision instrument approach surfaces, larger safety areas surrounding the airport and greater runway to taxiway separation requirements. The second option would be to plan for an LPV non-precision instrument approach with visibility minimums of greater or equal to ¾-mile. This would result in non-precision approach surfaces, smaller safety area dimensions and reduced runway to taxiway separation requirements than with lower than ¾-mile minimums. Table 4-1, Summary of Dimensional Criteria, provides an example of the dimensions associated with each design criteria.

TABLE 4-1 SUMMARY OF DIMENSIONAL CRITERIA

DESIGN CRITERIA	EXISTING APPROACH MINIMUMS (ARC B-I)	¾-MILE AND GREATER APPROACH MINIMUMS (ARC B-II)	LOWER THAN ¾-MILE APPROACH MINIMUMS (ARC B-II)
	VISUAL UTILITY	NON-PRECISION INSTRUMENT	PRECISION INSTRUMENT
Runway centerline to parallel taxiway centerline	225’ (200’ existing)	240’ (300’ recommended)	300’
Runway centerline to edge of aircraft parking apron	200’	250’	400’
Runway width	60’ (75’ existing)	75’	100’
Runway shoulder width	10’	10’	10’
Runway shoulder width	120’	150’	300’
Runway Safety Area length beyond runway end	240’	300’	600’
Runway Object Free Area width	400’	500’	800’
Runway Object Free Area length beyond runway end	240’	300’	600’
Runway Obstacle Free Zone width	400’	400’	400’
Runway Obstacle Free Zone length beyond runway end	200’	200’	200’
PART 77 SURFACES			
Primary Surface width	250’	1000’	1,000’
Primary Surface length beyond runway ends	200’	200’	200’
Approach Surface Dimensions	250’x1,250’x5,000’	1,000’x4,000’x10,000’	1,000’x16,000’x50,000’
Radius of the Horizontal Surface	5,000’	10,000’	10,000’
Approach Surface slope	20:1	34:1	50:1*
Transitional Surface slope	7:1	7:1	7:1

*Approach slope is 50:1 for inner 10,000 feet and 40:1 for an additional 40,000 feet.
Source: FAA Advisory Circular 150/5300-13 Change 15

The FAA recommends that an airport protect for future precision instrument approaches with visibility minimums lower than ¾-mile whenever possible. In addition, Table 4-1 shows that future approach visibility minimums of less than ¾-mile for a B-II ARC would require the future parallel taxiway centerline be offset a minimum of 300 feet from the runway centerline and aircraft parking located a minimum of 400 feet from the runway centerline. In contrast, future approach visibility minimums of ¾-mile or greater require a future parallel taxiway centerline be offset a minimum of 240 feet from the runway centerline and aircraft parking located a minimum of 250 feet from the runway centerline.

GPS approach procedures with vertical guidance and visibility minimums of ¾-mile or greater are recommended for Runway 21 and 1-mile or greater for Runway 3; however, it is recommended that when the parallel taxiway is relocated to meet existing design standards that it be relocated to 300 feet rather than 240 feet runway to taxiway separation. This would avoid future impacts to existing and future landside development adjacent to Runway 3/21 and would provide the flexibility to adjust for unforeseen changes in the future. Although not required per the Advisory Circular, the installation of an approach lighting system such as an Omni-Directional Approach Lighting System (ODALS) would be recommended for an instrument approach with visibility minimums of ¾-mile on Runway 21.

Another alternative would be to maintain only visual approach minimums. This alternative has been eliminated from further evaluation for the 20-year planning period, since visual approach minimums would not meet the requirements of existing and future airport users and would constrain the use of the airport during Instrument Meteorological Conditions (IMC).

4.3.2 AIRSIDE DEVELOPMENT CONCEPTS

Airside development is typically the most critical and physically dominant feature of airport development and therefore, the focal point of the airport. The following section evaluates the airside development alternatives and addresses the needs of the existing and future aviation demand identified in the previous Chapter. Chapter Seven, Airport Development and Financial Plan, will provide the recommended phasing of projects for scheduling and budgeting purposes. The recommended airside development is depicted graphically at the end of this chapter in Figure 4-6.

PROJECT 1: RELOCATE RUNWAY 3/21 PARALLEL TAXIWAY A AND CONSTRUCT ASSOCIATED CONNECTOR TAXIWAYS

The existing Runway 3/21 and Taxiway A do not meet the minimum separation standards for ARC B-I. The minimum separation between runway centerline and taxiway centerline for ARC B-I is 225 feet. The minimum runway to taxiway centerline distance for a B-II runway with not lower than ¾-mile visibility approach minimums is 240 feet. The minimum runway to taxiway centerline distance for a B-II runway with lower than ¾-mile approach visibility minimums is 300 feet.

Based on information and recommendations from previous sections of the airport master plan the runway centerline to taxiway centerline separation shall be increased to 300 feet. This would protect for future instrument approach minimums to be lower than ¾-mile with relatively low additional costs during the planning period (i.e. 60 feet of additional pavement on taxiway connectors).

The existing Taxiway A pavement would be removed. Associated connector taxiways would be constructed in order to provide efficient and effective access to the runway in its new configuration. The estimated development costs associated with Taxiway A relocation are shown in Table 4-2.

TABLE 4-2 RELOCATION OF TAXIWAY A COSTS ESTIMATES

PROJECT	TOTAL COST	FAA SHARE (95%)	STATE SHARE (2.5%)	LOCAL SHARE (2.5%)
Relocation of Taxiway A including connectors	$2,245,000	$2,132,750	$56,125	$56,125
Remove Existing Taxiway A Pavement	$202,000	$191,900	$5,050	$5,050
Taxiway Markings	$15,000	$14,250	$375	$375
Taxiway Lights	$149,000	$141,550	$3,725	$3,725
Lighted Signs	$100,000	$95,000	$2,500	$2,500
Total:	$2,711,000	$2,575,450	$67,775	$67,775

Estimated Development Costs are in 2010 dollars

PROJECT 2: SHIFT AND EXTEND RUNWAY 3/21

The primary function of the Runway Protection Zone (RPZ) is to enhance the protection of people and property on the ground. This is achieved through airport owner control over the RPZs. Such control includes clearing RPZ areas and maintaining them clear of incompatible objects and activities. Control is preferably exercised through the acquisition of fee-simple or avigation easement interest in the RPZ.

A portion of the Runway 3 approach RPZ is currently located off of airport property and encompasses a residential area. In order to satisfy the FAA standards, Runway 3 should be shifted approximately 1,200 feet from the existing end of pavement to keep the entire RPZ on existing airport property. The existing pavement should be removed to the future threshold location.

The runway would be shifted approximately 1,200 to the northeast. Runway 3/21 would then be extended to the northeast to a total available length of 6,800 feet in order to satisfy current and future runway length requirements. Table 4-3 shows the estimated shift and extension costs.

TABLE 4-3 RUNWAY 3/21 DEVELOPMENT COST ESTIMATES

PROJECT	TOTAL COST	FAA SHARE (95%)	STATE SHARE (2.5%)	LOCAL SHARE (2.5%)
Runway 3/21 Shift and Extension	$625,000	$593,750	$15,625	$15,625
Removal of Existing Pavement	$69,000	$65,550	$1,725	$1,725
Runway Lighting and Signage	$357,000	$339,150	$8,925	$8,925
Runway Markings	$84,000	$79,800	$2,100	$2,100
PAPIs	$69,000	$65,550	$1,725	$1,725
REILs	$55,000	$52,250	$1,375	$1,375
Total:	$1,259,000	$1,196,050	$31,475	$31,475

Estimated Development Costs are in 2010 dollars

PROJECT 3: SHIFT AND PAVE THE EXISTING CROSSWIND RUNWAY 11/29

Runway 29 approach RPZ is currently located off airport property and it encompasses an area with the potential for high concentrations of persons. In order to satisfy the FAA standards, Runway 29 threshold would be shifted in order to locate RPZ on airport property. Runway 11/29 would be paved to a length of 4,900 feet and a width of 60 feet as shown in Figure 4-1. Runway 11/29 would satisfy the recommended 95% crosswind coverage requirement and facilitate the safe operations of smaller aircraft during high crosswind conditions. An Environmental Assessment for these improvements to the crosswind runway was completed and a Finding of No Significant Impact (FONSI) was issued in 2002, the land was acquired in 2006, and a design completed in 2006; however, the project was not constructed. The project is poised to move forward upon revalidation of the Environmental Assessment and an update of the design plan and specifications. Table 4-4 shows the estimated cost of development of Runway 11/29.

TABLE 4-4 RUNWAY 11/29 DEVELOPMENT COST ESTIMATES				
PROJECT	**TOTAL COST**	**FAA SHARE (95%)**	**STATE SHARE (2.5%)**	**LOCAL SHARE (2.5%)**
Construct Runway 11/29 and Bypass Taxiway	$2,979,000	$2,830,050	$74,475	$74,475
Runway Lighting and Signage	$288,000	$273,600	$7,200	$7,200
Runway Markings	$27,000	$25,650	$675	$675
PAPIs	$69,000	$65,550	$1,725	$1,725
REILs	$55,000	$52,250	$1,375	$1,375
Total:	$3,418,000	$3,247,100	$85,450	$85,450

Estimated Development Costs are in 2010 dollars

FIGURE 4-1 RUNWAY 11/29

4.3.3 LANDSIDE DEVELOPMENT CONCEPTS

Landside facilities are another important aspect of the airport. Landside facilities serve as the processing interface between the surrounding community and the airport operating environment. Likewise, it offers the traveler the first impression of the airport and local area. Landside facilities house the supporting infrastructure for airside operations and often generate substantial revenues for the airport. Chapter Seven, Airport Development and Financial Plan, will provide the recommended phasing of projects for scheduling and budgeting purposes. Recommend landside development is depicted graphically at the end of this chapter in Figure 4-2 and Figure 4-7.

FIGURE 4-2 LANDSIDE DEVELOPMENT CONCEPT

PROJECT 4: DEMAND-BASED CONSTRUCTION OF APRON, HANGARS, AIR FREIGHT FACILITIES AND COMMERCIAL PARCELS

A conceptual demand based development layout plan for apron, hangars, air freight, and commercial parcels is shown in Figure 4-3 and Figure 4-7. This layout provides adequate space for aircraft parking and hangars. The existing fuel tank would be relocated outside of the RPZ. This layout also shows a conceptual layout of the air freight facility which would enhance the current and future air cargo operations at the airport. Aeronautical and non-aeronautical revenue generating parcels have also been included in this layout.

FIGURE 4-3 HANGAR DEVELOPMENT CONCEPT

PROJECT 5: REMODELING OF THE EXISTING TERMINAL BUILDING AND HANGARS

The first and last impression many travelers will have of a community and region will be their arrival and departure airport. Improving the aesthetics of the existing facilities would have a significant impact in generating a positive image of the City of Holbrook. During the kick-off meeting it was discussed that the hangar should be renovated consistent with the historic Route 66 neon signs theme. A conceptual rendering of the terminal building is shown in Figure 4-4 and Figure 4-5.

Similar to commercial service airports, GA airports generally have a building that serves as the airport terminal. The terminal facility provides a “meet and greet” location on the airport site. At Holbrook Municipal Airport a single building is designated as the airport terminal. It houses general FBO services and hangar space as well as space for administrative functions of the airport.

The terminal building should meet the functional needs of the airport users. The level of aircraft operations at the Holbrook Municipal Airport drive the need for amenities provided by the terminal building. The existing terminal building should be remodeled to provide the basics of shelter, restrooms, and telephone communications. Additional services may include food vending machines, as well as flight planning provisions and weather briefings for pilots. American Disability Act (ADA) accessibility requirements should be integrated into the remodeling design plans.

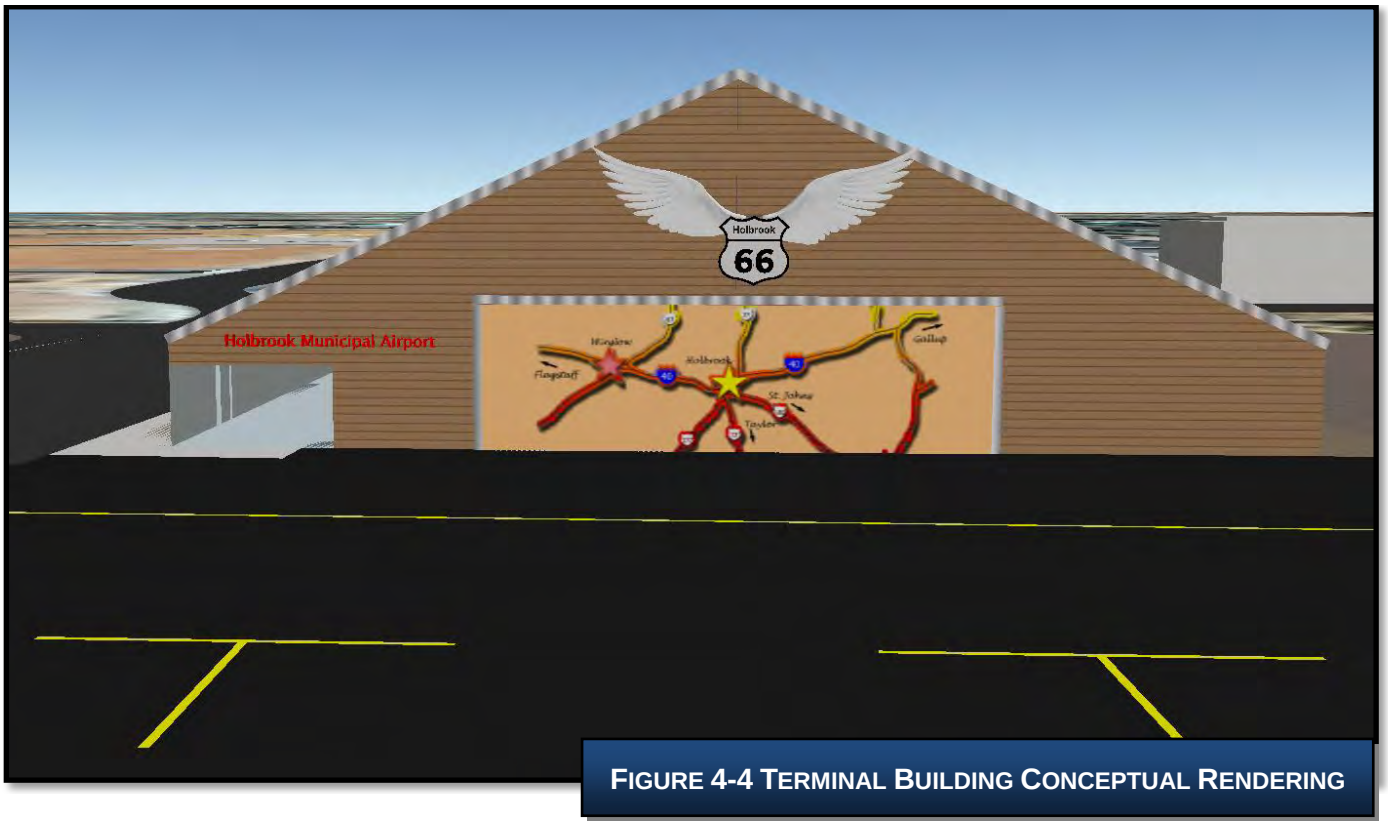


FIGURE 4-4 TERMINAL BUILDING CONCEPTUAL RENDERING

FIGURE 4-5 FUEL AND TERMINAL AREA CONCEPTUAL RENDERING

4.4 OTHER ALTERNATIVES CONSIDERED

4.4.1 DEVELOP NEW AIRPORT SITE

This alternative would include the relocation of the Holbrook Municipal Airport to a new location which would meet FAA standards for aircraft having an ARC of B-II. The existing Holbrook Municipal Airport would be closed and redeveloped to another use if this alternative were chosen. A new airport would require the construction of needed infrastructure such as utility lines and access roads to the selected site. At the minimum, approximately 120 acres would need to be acquired to construct a 7,000 foot runway/taxiway system, aircraft parking apron and terminal facility.

Upon evaluation of this alternative it is not considered to be a viable option. There is very little justification for the movement of the airport other than moving the airport away from the City of Holbrook and allowing new development to take place. The current airport provides users with close convenient access to and from the City of Holbrook.

4.4.2 PROVIDE SERVICE FROM ANOTHER AIRPORT IN THE REGION

The Holbrook Municipal Airport was constructed primarily to serve the general aviation interests, air ambulance and business needs of the City of Holbrook and the surrounding region. The alternative of providing aviation services from another airport is considered impractical due to the lack of another airport close enough to the City of Holbrook to meet the aviation demands of the area. The nearest airport providing facilities to accommodate the aircraft activity that takes place at the Holbrook Municipal Airport is located 37 surface miles to the west. Providing service from another airport would not be economical or feasible. Service from another location would result in increased time, energy and additional travel expense to aviation users that would otherwise be unnecessary. This alternative ignores the existing goal of providing safe and efficient service to the City of Holbrook and the neighboring communities.

4.4.3 NO ACTION ALTERNATIVE

The no action alternative would include leaving the airport in its current condition including the Runway and Apron area. This alternative does not meet the objectives for accommodating future aviation demand or meeting FAA design standards.

4.5 ACCOMMODATION OF AVIATION DEMAND LEVELS

Each development project would meet FAA safety and design standards for an Airport Reference Code of B-II. This will allow the airport to accommodate the current and projected types of aircraft that are expected to use the airport. The planned apron and hangar areas provide sufficient capacity for the ultimate forecasted demand levels and should be developed over time to accommodate actual demand levels.

4.6 AIRSPACE IMPACTS

Development of a nonprecision GPS approach with vertical guidance would enlarge airspace surfaces in accordance with a nonprecision runway designation. This effectively increases the FAR Part 77 Airspace Surfaces. The increased FAR Part 77 airspace dimensions are summarized in Table 4-5 and Table 4-6. An obstruction survey is currently in progress. The result of the survey will determine the lowest potential instrument approach minimums.

TABLE 4-5 PART 77 AIRSPACE SURFACES RUNWAY 3/21

	EXISTING	FUTURE
Approach Visibility Minimum RW 3	Visual, Utility	Visibility minimums as low as ¾-mile
Approach Visibility Minimum RW 21	Visual, Utility	¾-mile and greater, larger than utility
Primary Surface Width	250’	1,000
Primary Surface Length Beyond Runway Ends	200’	200’
Approach Surface Dimension RW 3	500’x1,500’x5,000’	500’x3,500’x10,000’
Approach Surface Dimension RW 21	500’x1,500’x5,000’	1,000’x4,000’x10,000’
Radius of the Horizontal Surface	5,000	10,000
Approach Surface Slope	20:1	34:1
Transitional Surface Slope	7:1	7:1

Utility = a runway designed for use by propeller driven aircraft with a maximum gross weight of 12,500 pounds or less

TABLE 4-6 PART 77 AIRSPACE SURFACES RUNWAY 11/29

	EXISTING	FUTURE
Approach Visibility Minimums	Visual, Utility	Visual, Utility
Primary Surface Width	250’	250’
Primary Surface Length Beyond Runway Ends	200’	200’
Approach Surface Dimensions	250’x1,250’x5,000	250’x1,250’x5,000
Radius of the Horizontal Surface	5,000	5,000
Approach Surface Slope	20:1	20:1
Transitional Surface Slope	7:1	7:1

Utility = a runway designed for use by propeller driven aircraft with a maximum gross weight of 12,500 pounds or less

4.7 ENVIRONMENTAL IMPACTS

The development projects are expected to result in short-term construction impacts, including mitigatable impacts to air quality. No project is expected to cause significant environmental impacts based on the Federal Aviation Administration’s Order 5050.4B, the Airport Environmental Handbook or FAA Order 1050.1E. Environmental impact categories and potential impacts are further evaluated in Chapter 6. An environmental assessment was completed and a finding of no significant impact (FONSI) was issued for the construction of Runway 11/29 in March, 2002. The environmental assessment will need to be revalidated before the project is started.

TABLE 4-7 POTENTIAL ENVIRONMENTAL IMPACTS					
ENVIRONMENTAL CATEGORY	PROJECT 1 TAXIWAY A	PROJECT 2 RUNWAY 3/21	PROJECT 3 RUNWAY 11/29	PROJECT 4 HANGARS AND APRON	PROJECT 5 TERMINAL BUILDING
Air Quality	⦿	⦿	⦿	⦿	⦿
Coastal Resources	○	○	○	○	○
Compatible Land Use	○	⦿	○	○	○
Construction Impacts	⦿	⦿	⦿	⦿	⦿
DOT Act Section 4(F)	○	○	○	○	○
Farmlands	○	○	○	○	○
Fish, Wildlife and Plants	○	○	○	○	○
Floodplains	○	○	○	○	○
Hazardous Materials Pollution Prevention and Solid Waste	○	○	○	○	○
Historical, Architectural, Archaeological and Cultural Resources	○	○	○	○	○
Light Emissions and Visual Impacts	○	○	○	○	○
Natural Resources and Energy Supply	○	○	○	○	○
Noise	○	⦿	⦿	○	○
Secondary (Induced) Impacts	○	○	○	○	○
Socioeconomic Impacts, Environmental Justice and Children's Environmental Health	○	○	○	○	○
Water Quality	○	○	○	○	○
Wetlands	○	○	○	○	○
Wild and Scenic Rivers	○	○	○	○	○

Legend:
○ No Impact
⦿ Minor Impact
● Significant Impact

4.8 CONCLUSIONS AND RECOMMENDATIONS

A planning meeting will be held to discuss the recommended development projects and to solicit input from the PAC, State and FAA.

The projects described in this chapter would accommodate existing and forecast traffic utilizing the airport by providing increased safety, providing adequate landside space and a nonprecision instrument approach into the airport. Each project meets the required criteria for accommodation of existing and forecast aviation demand. An environmental overview of the proposed projects is included in Chapter 6. In addition, no significant impacts are expected with regard to airspace.

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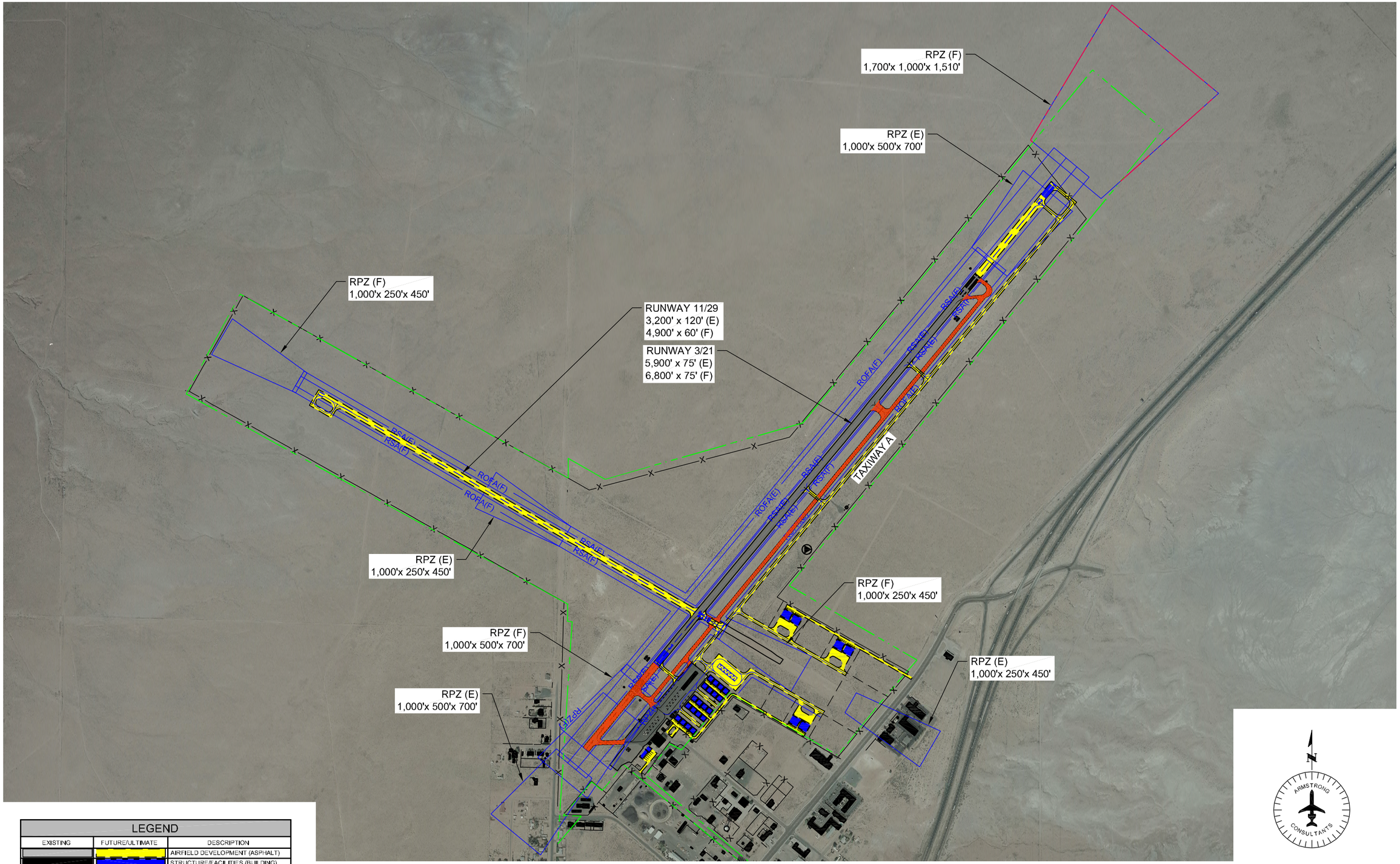
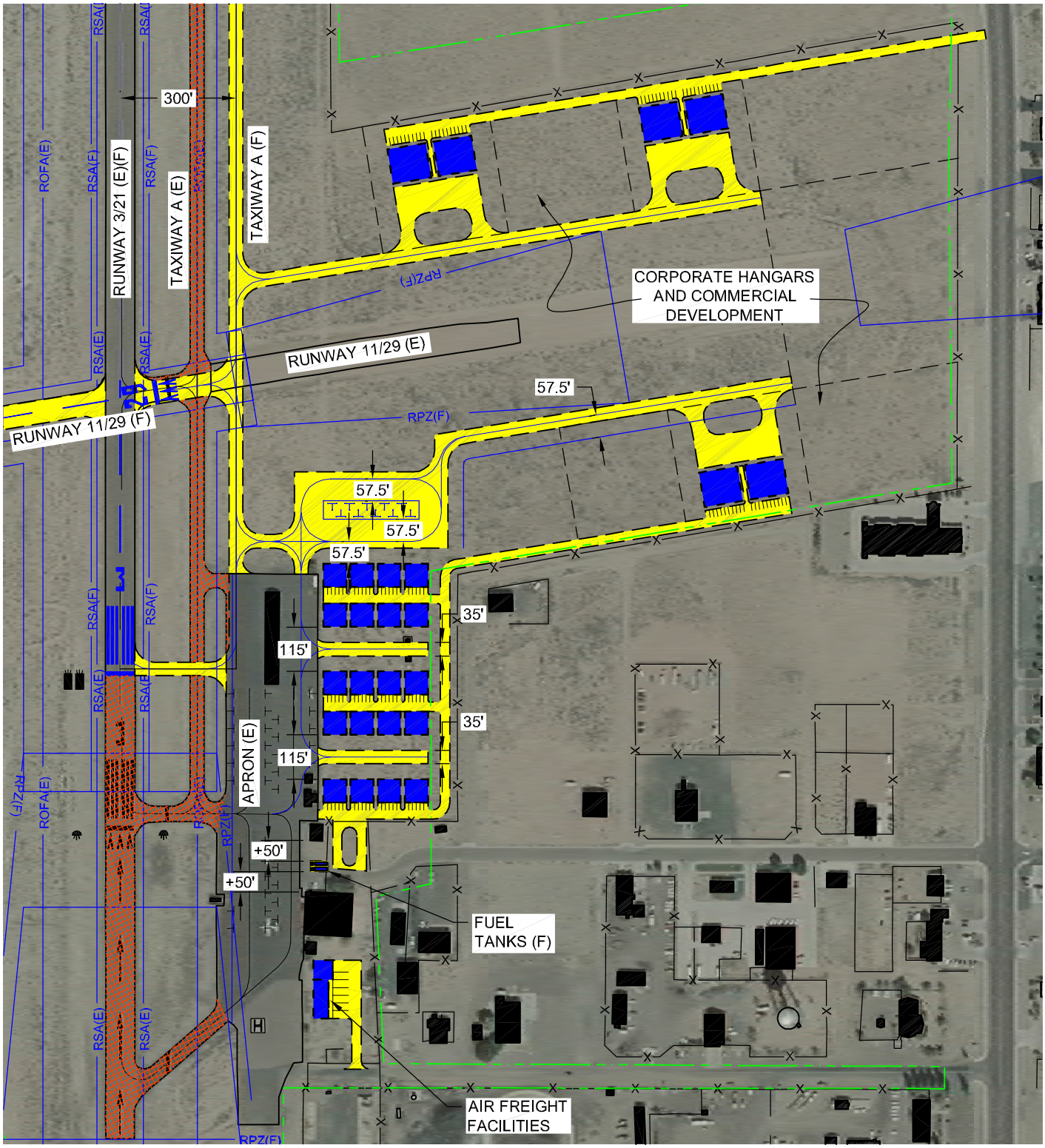


LEGEND		
EXISTING	FUTURE/ULTIMATE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)
		STRUCTURE/FACILITIES (BUILDING)
		REMOVAL AREA
		AIRPORT PROPERTY LINE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)

(E) EXISTING, (F) FUTURE

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

RECOMMENDED
AIRSIDE
FIGURE 4-6



LEGEND		
EXISTING	FUTURE/ULTIMATE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)
		STRUCTURE/FACILITIES (BUILDING)
		REMOVAL AREA
		AIRPORT PROPERTY LINE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)

(E) EXISTING, (F) FUTURE

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

RECOMMENDED
LANDSIDE LAYOUT
FIGURE 4-7

Chapter Five
Airport Layout Plans

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport
Airport Master Plan

HOLBROOK MUNICIPAL AIRPORT

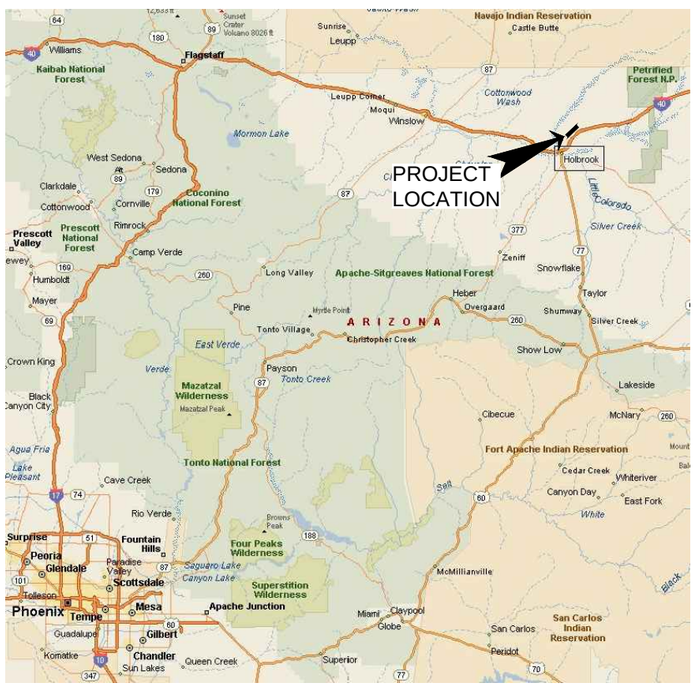
HOLBROOK, ARIZONA

AIRPORT LAYOUT PLANS

PREPARED BY:

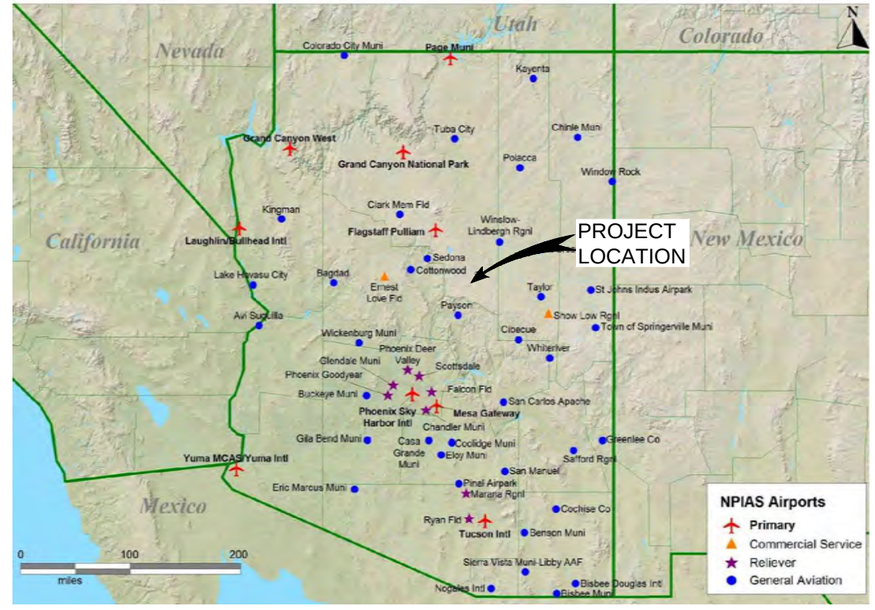
ARMSTRONG CONSULTANTS, INC.

A.I.P. NO. 3-04-0020-011-2009
A.C.I. PROJECT NO. 095910
DATE: APRIL, 2015



VICINITY MAP

Arizona



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(E = EXISTING, F = FUTURE)

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING
861 Rood Avenue
Grand Junction, CO 81501
ph: 970.242.0101 fax: 970.241.1769
www.armstrongconsultants.com

5910501

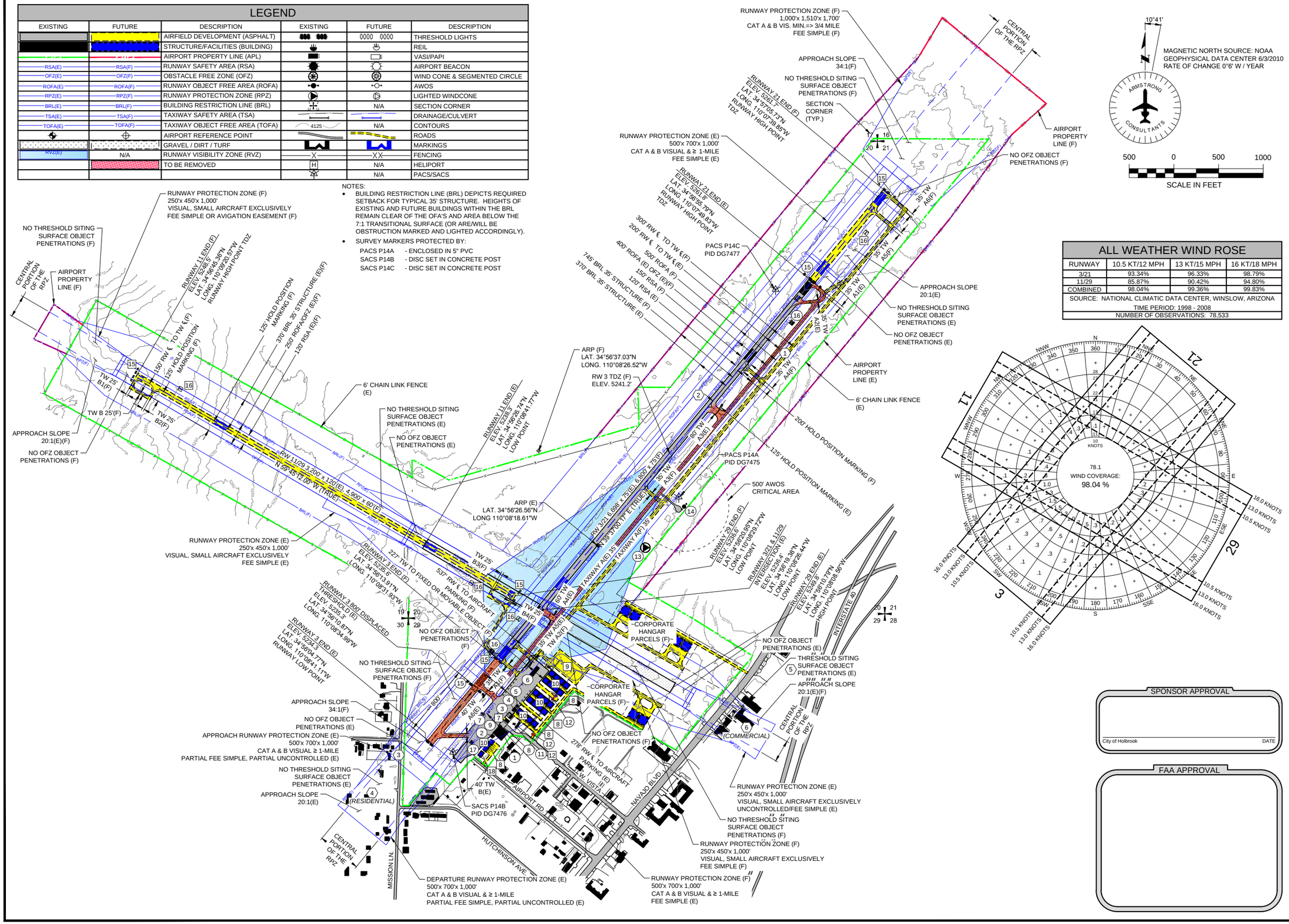
LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)		0000 0000	THRESHOLD LIGHTS
		STRUCTURE/FACILITIES (BUILDING)			REIL
		AIRPORT PROPERTY LINE (APL)			VASI/PAPI
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)			AIRPORT BEACON
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			WIND CONE & SEGMENTED CIRCLE
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			LIGHTED WINDCONE
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)		N/A	SECTION CORNER
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			DRAINAGE/CULVERT
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)	4125	N/A	CONTOURS
		AIRPORT REFERENCE POINT			ROADS
		GRAVEL / DIRT / TURF			MARKINGS
RVZ(E)	N/A	RUNWAY VISIBILITY ZONE (RVZ)			FENCING
		TO BE REMOVED	H	N/A	HELIPORT
				N/A	PACS/SACS

NOTES:

- BUILDING RESTRICTION LINE (BRL) DEPICTS REQUIRED SETBACK FOR TYPICAL 35' STRUCTURE. HEIGHTS OF EXISTING AND FUTURE BUILDINGS WITHIN THE BRL REMAIN CLEAR OF THE OFA'S AND AREA BELOW THE 7:1 TRANSITIONAL SURFACE (OR ARE/WILL BE OBSTRUCTION MARKED AND LIGHTED ACCORDINGLY).
- SURVEY MARKERS PROTECTED BY:

PACS P14A - ENCLOSED IN 5" PVC
SACS P14B - DISC SET IN CONCRETE POST
SACS P14C - DISC SET IN CONCRETE POST



ALL WEATHER WIND ROSE

RUNWAY	10.5 KT/12 MPH	13 KT/15 MPH	16 KT/18 MPH
3/21	93.34%	96.33%	98.79%
11/29	85.87%	90.42%	94.80%
COMBINED	98.04%	99.36%	99.83%

SOURCE: NATIONAL CLIMATIC DATA CENTER, WINSLOW, ARIZONA
TIME PERIOD: 1998 - 2008
NUMBER OF OBSERVATIONS: 78,533

SPONSOR APPROVAL

City of Holbrook DATE

FAA APPROVAL

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING
861 Rood Avenue
Grand Junction, CO 81501
ph: 970.242.0101 fax: 970.241.1769
www.armstrongconsultants.com

HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

AIP No. 3-04-0020-011-2009
AIRPORT LAYOUT PLANS

No.	Project No.	Date	Revision / Description	Drwn.	Chkd.	Apprvd
1	095910	04/2015	ALP/MASTER PLAN UPDATE-ACI	5910502	LKB	HMD	J2P
0		11/21/00	COFFMAN ASSOC.	RAL		SCB

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AIRPORT LAYOUT PLAN

RUNWAY DATA

ITEM		RW 3/21 EXISTING(E)	RW 3/21 FUTURE(F)	RW 11/29 EXISTING(E)	RW 11/29 FUTURE(F)
RUNWAY REFERENCE CODE		B-I	B-II	B-I (SMALL)	B-I (SMALL)
APPROACH MINIMUMS		VISUAL	3/4-MILE	VISUAL	SAME
APPROACH TYPE		VISUAL, UTILITY	NPI > UTILITY	VISUAL, UTILITY	SAME
FAR PART 77 APPROACH SLOPE		20:1	34:1	20:1	SAME
RUNWAY LENGTH		6,698'	6,800'	3,200'	4,900'
RUNWAY WIDTH		75'	75'	60' (120' ACTUAL)	60'
RUNWAY & TAXIWAY PAVEMENT		ASPHALT	SAME	DIRT	ASPHALT
PAVEMENT STRENGTH (LBS)		12,500 SWG	30,000 SWG	NONE	12,500 SWG
RUNWAY LIGHTING		MIRL	SAME	NONE	MIRL
TAXIWAY LIGHTING		MITL	MITL	NONE	MITL
RUNWAY MARKING		NPI	SAME	NONE	VISUAL
% EFFECTIVE GRADIENT		0.41%	0.34%	0.36%	0.24%
% MAXIMUM GRADE		1.22%	SAME	1.84%	SAME
LINE OF SIGHT REQUIREMENTS MET		YES	SAME	YES	SAME
VISUAL APPROACH AIDS		RW 3: PAPI-2, REIL RW 21: PAPI-2, REIL	SAME SAME	RW 11: NONE RW 29: NONE	RW 11: PAPI-2, REIL RW 29: PAPI-2, REIL
INSTRUMENT APPROACH AIDS		NONE	GPS-LPV	NONE	NONE
DESIGN AIRCRAFT	DESIGN AIRCRAFT	CESSNA CITATION I	CESSNA CITATION II	CESSNA 421	SAME
	WINGSPAN	46.8'	53.5'	41.7'	SAME
	APPROACH SPEED	108 KTS	114 KTS	98 KTS	SAME
	MGTOW	10,400 LBS	22,000 LBS	7,450 LBS	SAME
	UNDERCARRIAGE WIDTH	13.0'	9.3'	14.7'	SAME
	TAIL HEIGHT	12.0'	16.8'	11.6'	SAME
RUNWAY SAFETY AREA (RSA)	WIDTH	120'	150'	120'	SAME
	LENGTH BEYOND RW END	240'	300'	240'	SAME
RUNWAY OBJECT FREE AREA (ROFA)	WIDTH	400'	500'	250'	SAME
	LENGTH BEYOND RW END	240' (214' ACTUAL RW 3)	300'	240'	SAME
OBSTACLE FREE ZONE (OFZ) (NO OFZ OBJECT PENETRATIONS)	WIDTH	400'	SAME	250'	SAME
	LENGTH BEYOND RW END	200'	SAME	200'	SAME
RUNWAY END ELEVATIONS (NAVD 88)	RW 3	5234.3'	5235.6'	-	-
	RW 21	5261.8'	5261.7'	-	-
	RW 11	-	-	5238.3'	5248.5'
	RW 29	-	-	5249.8'	5236.6'
TOUCHDOWN ZONE (TDZ)	RW 3	NONE	5241.2'	NONE	SAME
	RW 21	NONE	5261.7'	NONE	SAME
HIGH POINT		5261.8'	5261.7'	5249.8'	5248.5'
LOW POINT		5234.3'	5235.6'	5238.3'	5236.6'
RUNWAY PROTECTION ZONE DIMENSIONS		500' x 700' x 1,000'	RW 3 - 500' x 700' x 1,000' RW 21 - 1,000 x 1,510' x 1,700'	250' x 450' x 1,000'	SAME
RUNWAY CENTERLINE TO HOLD BARS & SIGNS		200' (125' ACTUAL)	200'	NONE	125'
RUNWAY / PARALLEL TAXIWAY C/L SEPARATION		225' (200' ACTUAL)	300'	NONE	150'
TAXIWAY OBJECT FREE AREA WIDTH		89'	131'	NONE	89'
TAXIWAY SAFETY AREA WIDTH		49'	79'	NONE	49'
TAXIWAY WING TIP CLEARANCE		79'	115'	NONE	79'
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT		44.5'	65.5'	NONE	44.5'
TAXIWAY WIDTH		VARIES 35' to 82'	35'	NONE	25'
TAXIWAY SURFACE		ASPHALT	ASPHALT	NONE	ASPHALT
APPROACH SURFACE DIMENSIONS		250' x 1,250' x 5,000'	RW 3 - 500' x 3,500' x 10,000' RW 21 - 1,000' x 4,000' x 10,000'	250' x 1,250' x 5,000'	SAME

AIRPORT DATA

ITEM		EXISTING(E)	FUTURE(F)
AIRPORT ELEVATION (NAVD 88)		5261.5'	5261.7'
AIRPORT REFERENCE POINT (ARP) COORDINATES (NAD 83)	LATITUDE	34°56'26.56" N	34°56'37.03" N
	LONGITUDE	110°08'18.61" W	110°08'26.52" W
MEAN MAXIMUM TEMPERATURE		94°	SAME
HOTTEST MONTH		JULY	SAME
COMBINED WIND COVERAGE	12 MPH / 10.5 kts	98.04%	SAME
	15 MPH / 13 kts	99.36%	SAME
	18 MPH / 16 kts	99.83%	SAME
AIRPORT REFERENCE CODE		B-I	B-II
NPIAS ROLE		GENERAL AVIATION	SAME
MAGNETIC VARIATION, 2010		10°41' E CHANGING BY 0°6' W / YEAR	
NAVAIDS		BEACON	GPS (WAAS), BEACON

NOTE: ALL NAVAIDS AND VISUAL APPROACH AIDS ARE SPONSOR OWNED.

RUNWAY END COORDINATES (NAD 83)

	EXISTING		FUTURE	
	LATITUDE	LONGITUDE	LATITUDE	LONGITUDE
RW 3 END	34°56'04.77" N	110°08'41.11" W	34°56'13.91" N	110°08'31.93" W
RW 3 THRESHOLD	34°56'10.87" N	110°08'34.99" W	N/A	N/A
RW 21 END	34°56'55.79" N	110°07'49.83" W	34°57'05.73" N	110°07'39.85" W
RW 11 END	34°56'26.74" N	110°08'41.77" W	34°56'45.36" N	110°09'20.57" W
RW 29 END	34°56'10.79" N	110°08'08.56" W	34°56'20.95" N	110°08'29.72" W

NOTE: NAD 83 COORDINATES AND NAVD 88 ELEVATIONS BASED ON SURVEY PERFORMED BY WOOLPERT, INC. - 05/2010.

NON-STANDARD CONDITIONS

NUMBER	RW DESIGN CATEGORY	STANDARD	NON-STD CONDITION	PROPOSED ACTION
1	B-I	RUNWAY ℄ TO TAXIWAY ℄ SEPARATION 225'	200'	RELOCATE TAXIWAY TO 300'
2	B-I	HOLD POSITION MARKING 200' TO RW ℄	125'	RELOCATE TO 200'
3	B-I	RUNWAY OFA 240'	214' FENCE PENETRATES RW 3 OFA	RELOCATE RUNWAY 3 END
4	B-I	RPZ - COMPATIBLE USE ONLY	INCOMPATIBLE LAND USES (RESIDENCES) WITHIN RW 21 DEPARTURE RPZ	RELOCATE RW 3 THRESHOLD
5	B-I	THRESHOLD SITING SURFACE CLEAR (TSS)	RW 29 TSS PENETRATION	RELOCATE RW 29 THRESHOLD
6	B-I	RPZ - COMPATIBLE USE ONLY	INCOMPATIBLE LAND USES (COMMERCIAL WITHIN RW 29 DEPARTURE RPZ	RELOCATE RW 29 THRESHOLD

BUILDINGS/FACILITIES

EXISTING	FUTURE	FACILITY DESCRIPTION	HEIGHT (FT.) (ESTIMATED)	TOP ELEVATION (FT-MSL) (ESTIMATED)
1		TERMINAL BUILDING/HANGAR	28	5266 *
2		RESIDENCE (NOT USED)	21	5259 *
3		HANGAR	17	5254 *
4		PORT-A-PORT HANGAR	13	5252 *
5		MILITARY STYLE HANGAR	9	5248 *
6		T-HANGAR	17	5255 *
7	7	FUEL STORAGE (100LL)	10	5244 *
8	8	VEHICLE PARKING	N/A	N/A
9	9	APRON TIE-DOWN	N/A	N/A
	10	BOX HANGAR	21	5257-5259
11		BEACON	45	5282
12	12	ELECTRICAL VAULT & BUILDINGS (TO BE RELOCATED)	15	5252
13		WIND CONE / SEGMENTED CIRCLE	23	5261 *
14		AWOS	30	5273 *
15	15	REIL'S	N/A	N/A
16	16	PAPI'S	N/A	N/A
17		HELIPORT	N/A	N/A
	18	SNOW REMOVAL EQUIPMENT BUILDING	35	5273'

NOTE: * NAVD 88 ELEVATION BASED ON OBSTRUCTION SURVEY PERFORMED BY WOOLPERT, INC. - 05/2010.

DECLARED DISTANCES

ITEM	EXISTING		FUTURE	
	RW 3	RW 21	RW 3	RW 21
RUNWAY 3/21 LENGTH	6,698'	6,698'	NONE	NONE
TAKEOFF DISTANCE AVAILABLE (TODA)	6,698'	6,698'	NONE	NONE
LANDING DISTANCE AVAILABLE (LDA)	5,898'	6,698'	NONE	NONE
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	6,698'	6,698'	NONE	NONE
TAKEOFF RUN AVAILABLE (TORA)	6,698'	6,698'	NONE	NONE

NOTE: DECLARED DISTANCES PROPOSED PENDING FAA APPROVAL.

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING
www.armstrongconsultants.com
861 Rood Avenue
Grand Junction, CO 81501
ph: 970.242.0101 fax: 970.241.1769

HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

AIP No. 3-04-0020-011-2009
AIRPORT LAYOUT PLANS

No.	Project No.	Date	Revision / Description	File	Drwn.	Chkd.	Apprvd
1	095910	04/2015	ALP/MASTER PLAN UPDATE-ACI	5910502	LKB	HMD	JZP
0		11/21/00	COFFMAN ASSOC.		RAL		SCB

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AIRPORT DATA SHEET

BUILDINGS/FACILITIES

EXISTING	FUTURE	FACILITY DESCRIPTION	HEIGHT (FT.) (ESTIMATED)	TOP ELEVATION (FT-MSL) (ESTIMATED)
1		TERMINAL BUILDING/HANGAR	28	5266 *
2		RESIDENCE (NOT USED)	21	5259 *
3		HANGAR	17	5254 *
4		PORT-A-PORT HANGAR	13	5252 *
5		MILITARY STYLE HANGAR	9	5248 *
6		T-HANGAR	17	5255 *
7	7	FUEL STORAGE (100LL)	10	5244 *
8	8	VEHICLE PARKING	N/A	N/A
9	9	APRON TIE-DOWN	N/A	N/A
	10	BOX HANGAR	21	5257-5259
11		BEACON	56	5293 *
12	12	BUILDINGS (TO BE RELOCATED)	15	5252
13		WIND CONE / SEGMENTED CIRCLE	23	5261 *
14		AWOS	30	5273 *
15	15	REIL'S	N/A	N/A
16	16	PAPI'S	N/A	N/A
17		HELIPORT	N/A	N/A
	18	SNOW REMOVAL EQUIPMENT BUILDING	35	5273'

NOTES:

* NAVD 88 ELEVATION BASED ON OBSTRUCTION SURVEY PERFORMED BY WOOLPERT, INC. - 05/2010.

** BUILDING RESTRICTION LINE (BRL) DEPICTS REQUIRED SETBACK FOR TYPICAL 35' STRUCTURE. HEIGHTS OF EXISTING AND FUTURE BUILDINGS WITHIN THE BRL REMAIN CLEAR OF THE OFA'S AND AREA BELOW THE 7:1 TRANSITIONAL SURFACE (OR ARE/WILL BE OBSTRUCTION MARKED AND LIGHTED ACCORDINGLY).

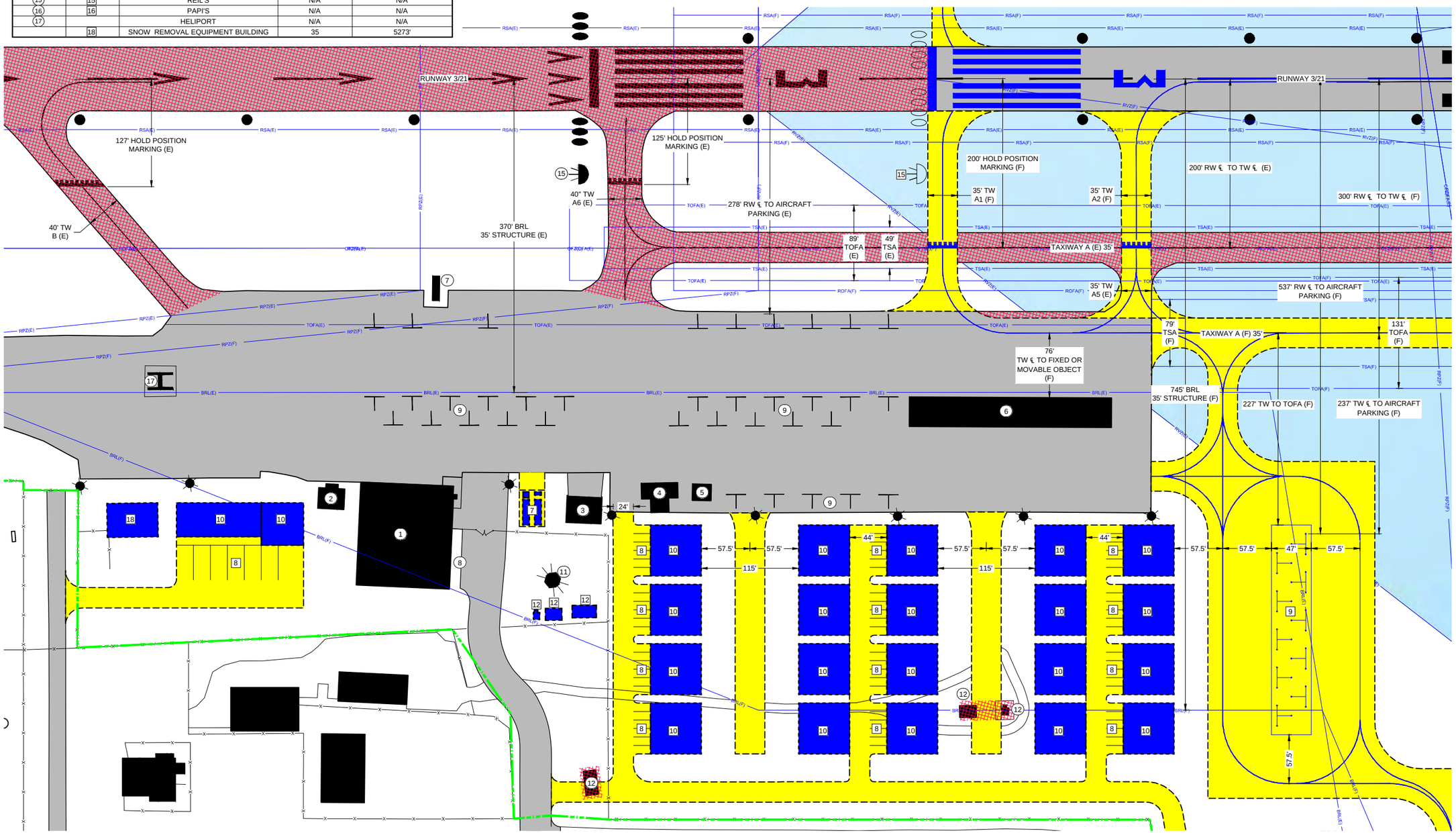
LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)		0000 0000	THRESHOLD LIGHTS
		STRUCTURE/FACILITIES (BUILDING)			REIL
		AIRPORT PROPERTY LINE (APL)			VASI/PAPI
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)			AIRPORT BEACON
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			WIND CONE & SEGMENTED CIRCLE
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			LIGHTED WINDCONE
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)		N/A	SECTION CORNER
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			DRAINAGE/CULVERT
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)	4125	N/A	CONTOURS
		AIRPORT REFERENCE POINT			ROADS
		GRAVEL / DIRT / TURF			MARKINGS
RVZ(E)	N/A	RUNWAY VISIBILITY ZONE (RVZ)			FENCING
		TO BE REMOVED	H	N/A	HELIPORT
				N/A	LIGHT POLE

MAGNETIC NORTH SOURCE: NOAA GEOPHYSICAL DATA CENTER 6/3/2010
RATE OF CHANGE 0°6' W / YEAR

10°41'

60 0 60 120
SCALE IN FEET



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AIRPORT ENGINEERING AND PLANNING
www.armstrongconsultants.com
861 Rood Avenue
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ph: 970.242.0101 fax: 970.241.1769

HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

AIRPORT LAYOUT PLANS

No.	Project No.	Date	Revision / Description	Dwn.	Ck'd.	Apprv'd
1	095910	04/2015	ALP/MASTER PLAN UPDATE-ACI	5910503	LKB	HMD	JZP
0		11/21/00	COFFMAN ASSOC.	RAL		SCB

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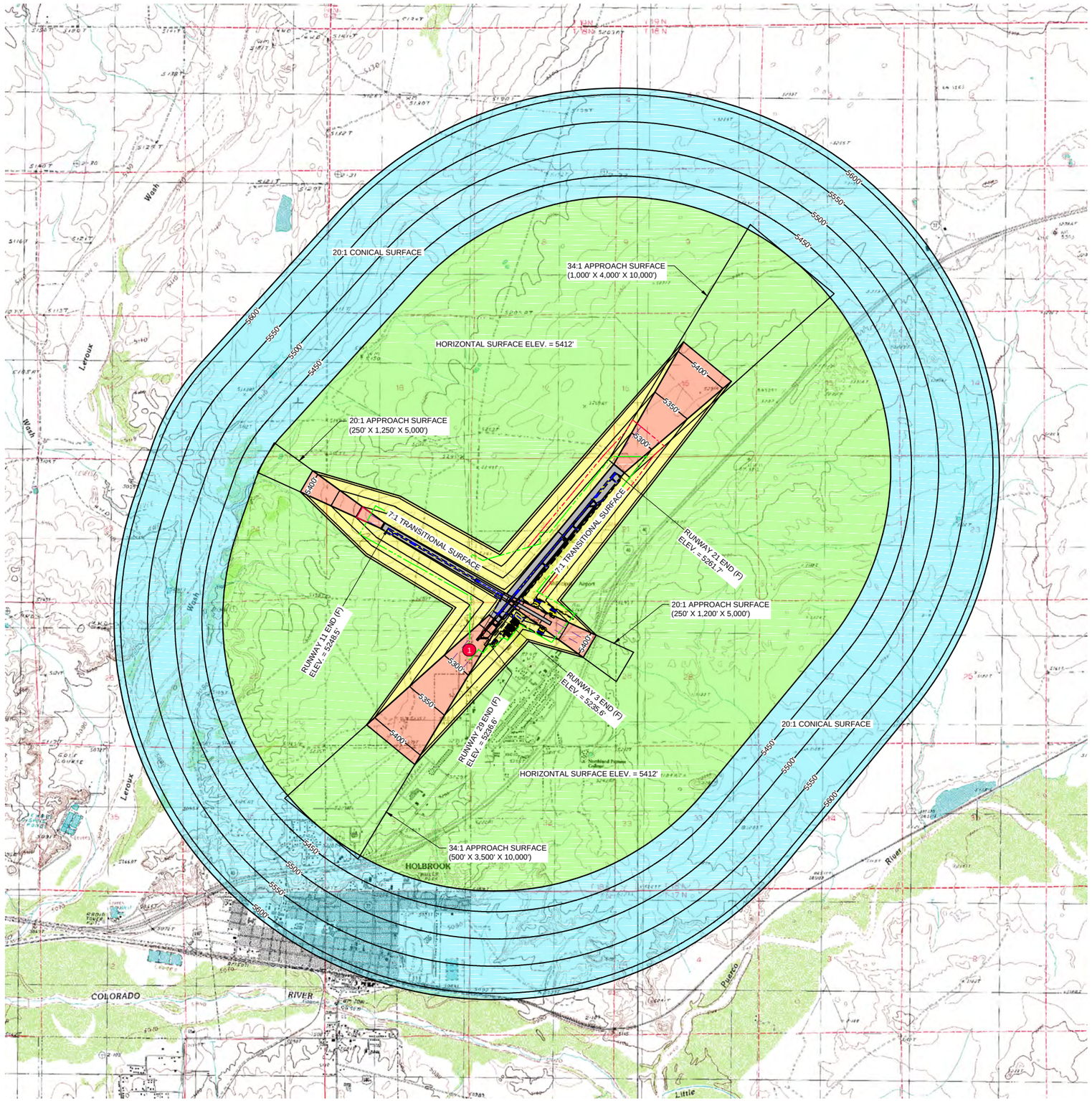
TERMINAL AREA DRAWING

Sheet: 4 of: 20



OBSTRUCTION CHART

SURFACE	DESCRIPTION	TOP ELEVATION	PENETRATION	REMARKS
PRIMARY	NONE	----	----	----
APPROACH	1 SEE NOTE 2	----	----	----
TRANSITIONAL	NONE	----	----	----
CONICAL	NONE	----	----	----
HORIZONTAL	NONE	----	----	----

NOTES

1) NO CURRENT HEIGHT RESTRICTION ZONING IN EFFECT

2) REFER TO "INNER PORTION OF THE APPROACH SURFACE" DRAWING FOR DETAILS ON CLOSE-IN APPROACH OBSTRUCTIONS.

3) APPROACH SURFACES BASED ON ULTIMATE CONDITION

N

ARMSTRONG CONSULTANTS

2000 0 2000 4000

SCALE IN FEET

TRANSITIONAL SURFACE

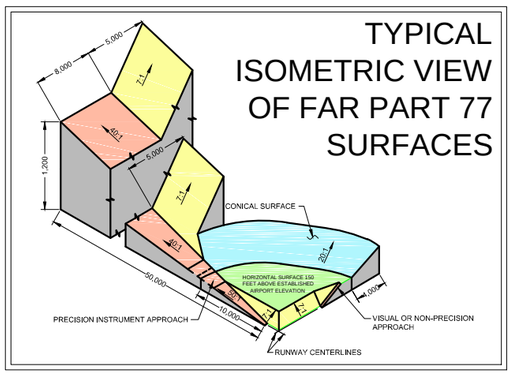
HORIZONTAL SURFACE

APPROACH SURFACE

CONICAL SURFACE

PRIMARY SURFACE

TYPICAL ISOMETRIC VIEW OF FAR PART 77 SURFACES



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AIRPORT LAYOUT PLANS

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			File	Dwn.	Chkd.	Apprvd

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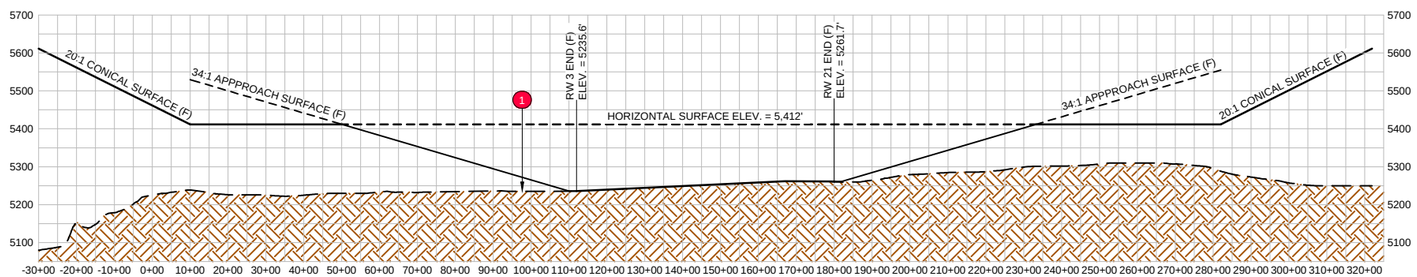
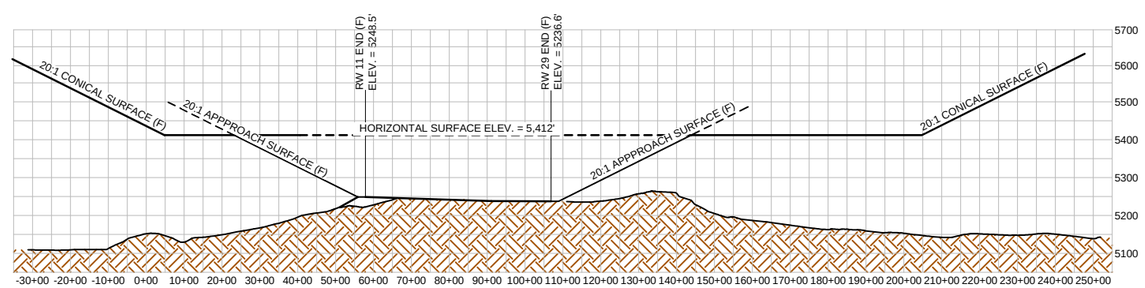
FAR PART "77" DRAWING



RUNWAY 3/21 PROFILE

SCALE: PER GRID

1 SEE INNER PORTION OF APPROACH SURFACE DRAWING FOR DETAILS ON EXISTING CLOSE-IN OBSTRUCTIONS.



RUNWAY 11/29 PROFILE

SCALE: PER GRID

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AIRPORT ENGINEERING AND PLANNING
861 Rood Avenue
Grand Junction, CO 81501
ph: 970.242.0101 fax: 970.241.1769
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AIRPORT LAYOUT PLANS

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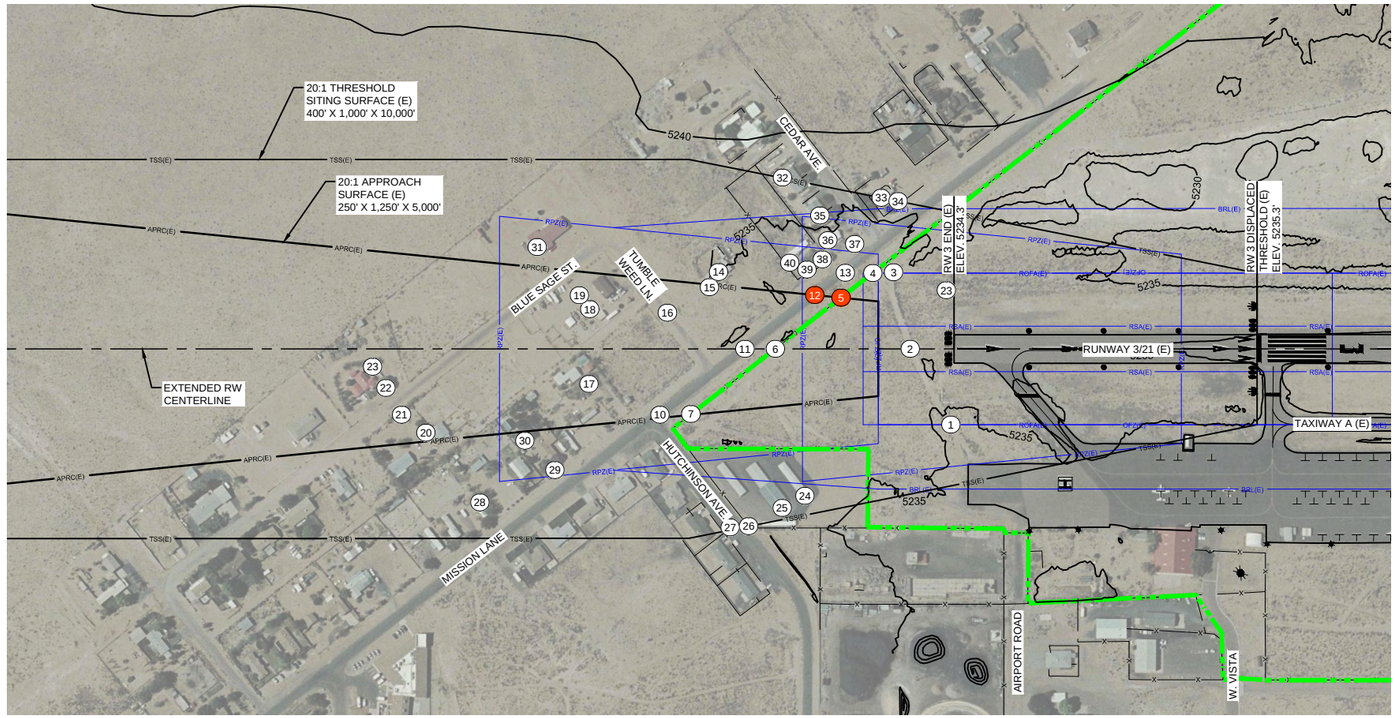
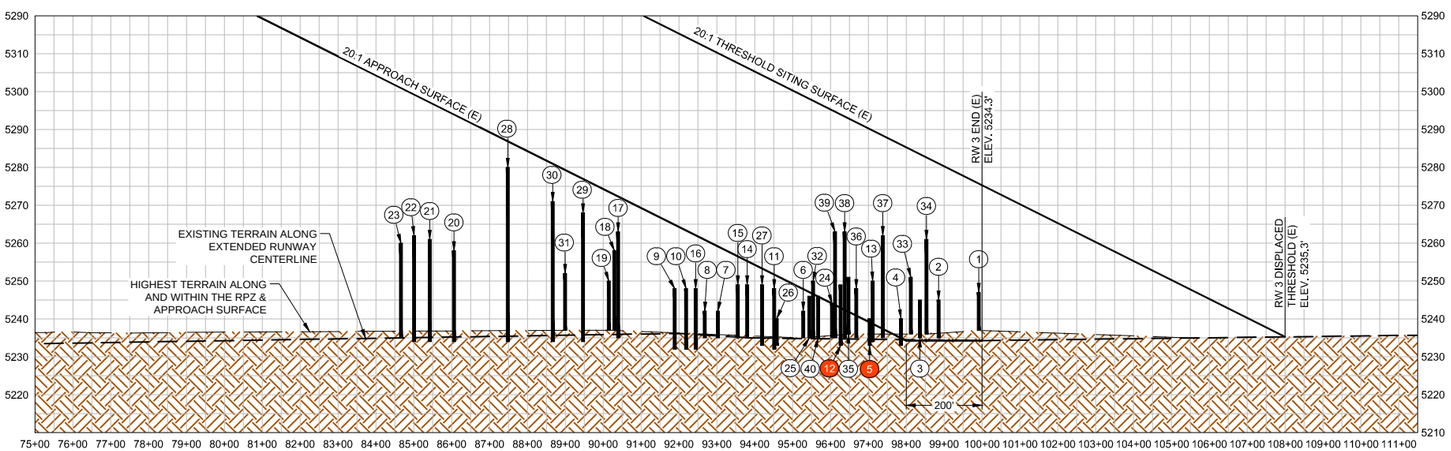
FAR PART "77" PROFILES



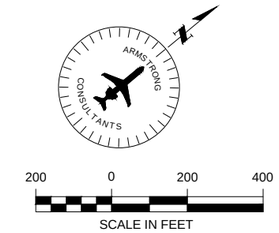
PLAN RW 3 END (E)

SCALE: PER BAR SCALE



PROFILE RW 3 END (E)

SCALE: PER GRID



OBJECTS WITHIN RUNWAY 3 INNER APPROACH SURFACE (APRC) AND THRESHOLD SITING SURFACE (TSS) (E)

No.	OBJECT	GROUND ELEVATION	ESTIMATED OBJECT HT.	TOP ELEVATION (MSL)	20:1 TSS PENETRATION	20:1 APRC SURFACE PENETRATION	PROPOSED ACTION
1	** ROAD	5237'	10'	5252'	NONE	-	N/A
2	** ROAD	5235'	10'	5250'	NONE	-	Z
3	** ROAD	5235'	10'	5250'	NONE	-	N/A
4	** FENCE	5233'	7'	5240'	NONE	-	N/A
5	** FENCE	5233'	7'	5240'	NONE	+1'	O.L.
6	* FENCE	5235'	7'	5242'	NONE	NONE	N/A
7	* FENCE	5235'	7'	5242'	NONE	NONE	N/A
8	* FENCE	5235'	7'	5242'	NONE	-	N/A
9	** ROAD	5232'	16'	5248'	NONE	-	N/A
10	** ROAD	5232'	16'	5248'	NONE	NONE	N/A
11	** ROAD	5232'	16'	5248'	NONE	NONE	N/A
12	** ROAD	5233'	16'	5249'	NONE	+6'	O.L.
13	** ROAD	5234'	16'	5250'	NONE	-	N/A
14	** BUILDING	5235'	14'	5249'	NONE	-	N/A
15	** BUILDING	5235'	14'	5249'	NONE	NONE	N/A
16	** ROAD	5232'	16'	5248'	NONE	NONE	N/A
17	** TREE	5235'	28'	5270'	NONE	NONE	N/A
18	** TREE	5237'	21'	5258'	NONE	NONE	N/A
19	** TREE	5237'	13'	5250'	NONE	NONE	N/A
20	** TREE	5234'	24'	5258'	NONE	NONE	N/A
21	** TREE	5234'	27'	5261'	NONE	NONE	N/A
22	* TREE	5234'	28'	5262'	NONE	NONE	N/A
23	* TREE	5235'	25'	5260'	NONE	NONE	N/A
24	** BUILDING	5235'	9'	5244'	NONE	-	N/A
25	** BUILDING	5235'	11'	5246'	NONE	-	N/A
26	** FENCE	5233'	7'	5240'	NONE	-	N/A
27	** ROAD	5233'	16'	5249'	NONE	-	N/A
28	** TREE	5234'	46'	5280'	NONE	-	N/A
29	** TREE	5234'	34'	5268'	NONE	-	N/A
30	** TREE	5234'	37'	5271'	NONE	-	N/A
31	** BUILDING	5237'	15'	5252'	NONE	-	N/A
32	** BUILDING	5237'	15'	5253'	NONE	-	N/A
33	** BUILDING	5236'	15'	5251'	NONE	-	N/A
34	** TREE	5236'	25'	5261'	NONE	-	N/A
35	** BUILDING	5236'	15'	5251'	NONE	-	N/A
36	** BUILDING	5235'	13'	5248'	NONE	-	N/A
37	** TREE	5235'	27'	5262'	NONE	-	N/A
38	** TREE	5235'	28'	5263'	NONE	-	N/A
39	** TREE	5235'	28'	5263'	NONE	-	N/A
40	** BUILDING	5235'	11'	5246'	NONE	-	N/A

NOTE: OBJECT ELEVATIONS IN FEET MSL (VERTICAL DATUM NAVD88).
* = OBJECT ELEVATIONS ARE ESTIMATED AND NOT BASED ON A SURVEY.
** = OBJECT TOP ELEVATIONS AND LOCATIONS ARE BASED ON A SURVEY BY WOOLPERT, INC. 05/2010.
- = OBJECT IS NOT LOCATED WITHIN THIS SURFACE.
O.L. = OBSTRUCTION LIGHT
= OBJECT PENETRATION LOCATION

NO THRESHOLD SITING SURFACE PENETRATIONS

LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)	APRC(E)	APRC(F)	APPROACH SURFACE
		STRUCTURE/FACILITIES (BUILDING)	DPRT(E)	DPRT(F)	DEPARTURE SURFACE
		AIRPORT PROPERTY LINE (APL)	TSS(E)	TSS(F)	THRESHOLD SITING SURFACE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)		0000 0000	THRESHOLD LIGHTS
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			REIL
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			DRAINAGE/CULVERT
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)	4125	N/A	CONTOURS
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			ROAD
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)			MARKINGS
		GRAVEL / DIRT / TURF	X	XX	FENCE
	N/A	LIGHT POLE	H	N/A	HELIPORT
		TO BE REMOVED			CUT / FILL

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1	095910	04/2015 ALP/MASTER PLAN UPDATE-ACI	5910505	LKB	HMD	JZP
0	11/21/00	COFFMAN ASSOC.		RAL		SCB

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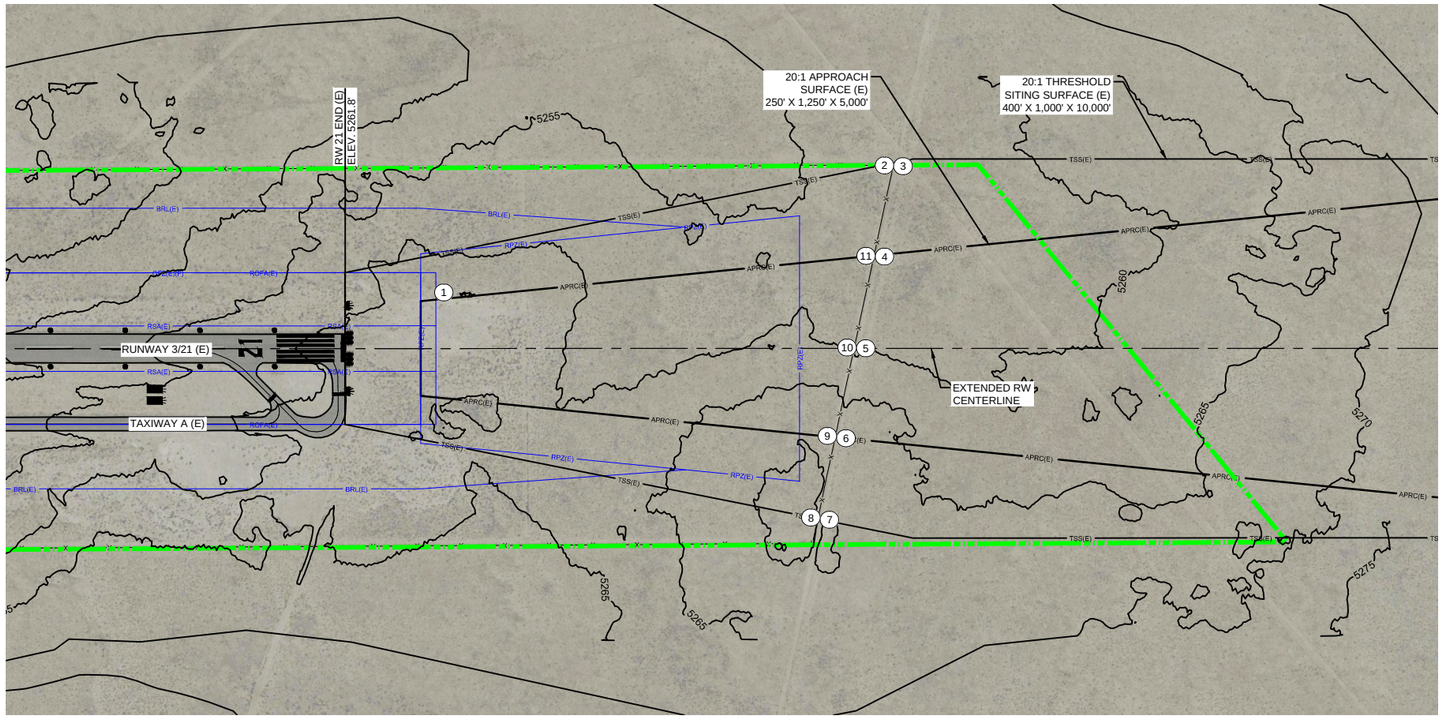
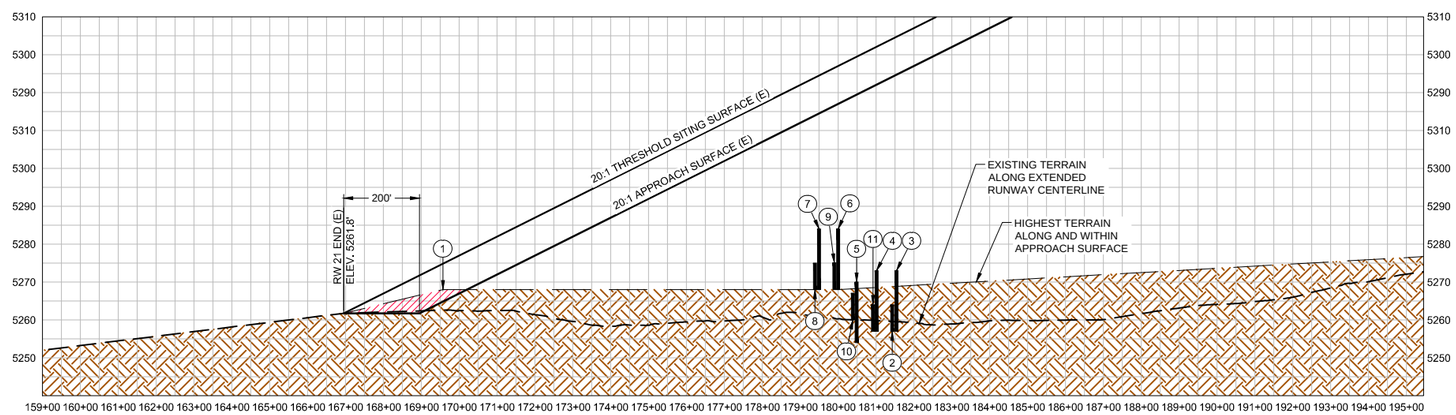
RUNWAY 3 INNER APPROACH (E)



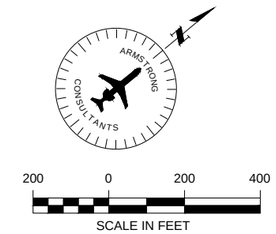
PLAN RW 21 END (E)

SCALE: PER BAR SCALE



PROFILE RW 21 END (E)

SCALE: PER GRID



OBJECTS WITHIN RUNWAY 21 INNER APPROACH SURFACE (APRC) AND THRESHOLD SITING SURFACE (TSS) (E)

No.	OBJECT	GROUND ELEVATION	ESTIMATED OBJECT HT.	TOP ELEVATION (MSL)	20:1 TSS PENETRATION	20:1 APRC SURFACE PENETRATION	PROPOSED ACTION
1	** GROUND	5268'	-	5268'	NONE	NONE	N/A
2	* FENCE	5257'	7'	5264'	NONE	-	N/A
3	* ROAD	5257'	16'	5273'	NONE	-	N/A
4	* ROAD	5257'	16'	5273'	NONE	NONE	N/A
5	* ROAD	5260'	16'	5276'	NONE	NONE	N/A
6	** ROAD	5268'	16'	5284'	NONE	NONE	N/A
7	** ROAD	5268'	16'	5284'	NONE	-	N/A
8	** FENCE	5268'	7'	5275'	NONE	-	N/A
9	** FENCE	5268'	7'	5275'	NONE	NONE	N/A
10	* FENCE	5260'	7'	5267'	NONE	NONE	N/A
11	* FENCE	5257'	7'	5264'	NONE	NONE	N/A

NOTE: OBJECT ELEVATIONS IN FEET MSL (VERTICAL DATUM NAVD88).
* = OBJECT ELEVATIONS ARE ESTIMATED AND NOT BASED ON A SURVEY.
** = OBJECT TOP ELEVATIONS AND LOCATIONS ARE BASED ON A SURVEY BY WOOLPERT, INC. 05/2010.
- = OBJECT IS NOT LOCATED WITHIN THIS SURFACE.
O.L. = OBSTRUCTION LIGHT
● = OBJECT PENETRATION LOCATION

NO THRESHOLD SITING SURFACE PENETRATIONS

LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)	APRC(E)	APRC(F)	APPROACH SURFACE
		STRUCTURE/FACILITIES (BUILDING)	DPRT(E)	DPRT(F)	DEPARTURE SURFACE
		AIRPORT PROPERTY LINE (APL)	TSS(E)	TSS(F)	THRESHOLD SITING SURFACE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)		0000 0000	THRESHOLD LIGHTS
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			REIL
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			DRAINAGE/CULVERT
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)	4125	N/A	CONTOURS
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			ROAD
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)			MARKINGS
		GRAVEL / DIRT / TURF	X	XX	FENCE
	N/A	LIGHT POLE	H	N/A	HELIPORT
		TO BE REMOVED			CUT / FILL

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HOLBROOK, ARIZONA

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1	059910	04/2015	ALP/MASTER PLAN UPDATE-ACI	5910505	LKB	HMD	JZP
0		11/21/00	COFFMAN ASSOC.		RAL		SCB

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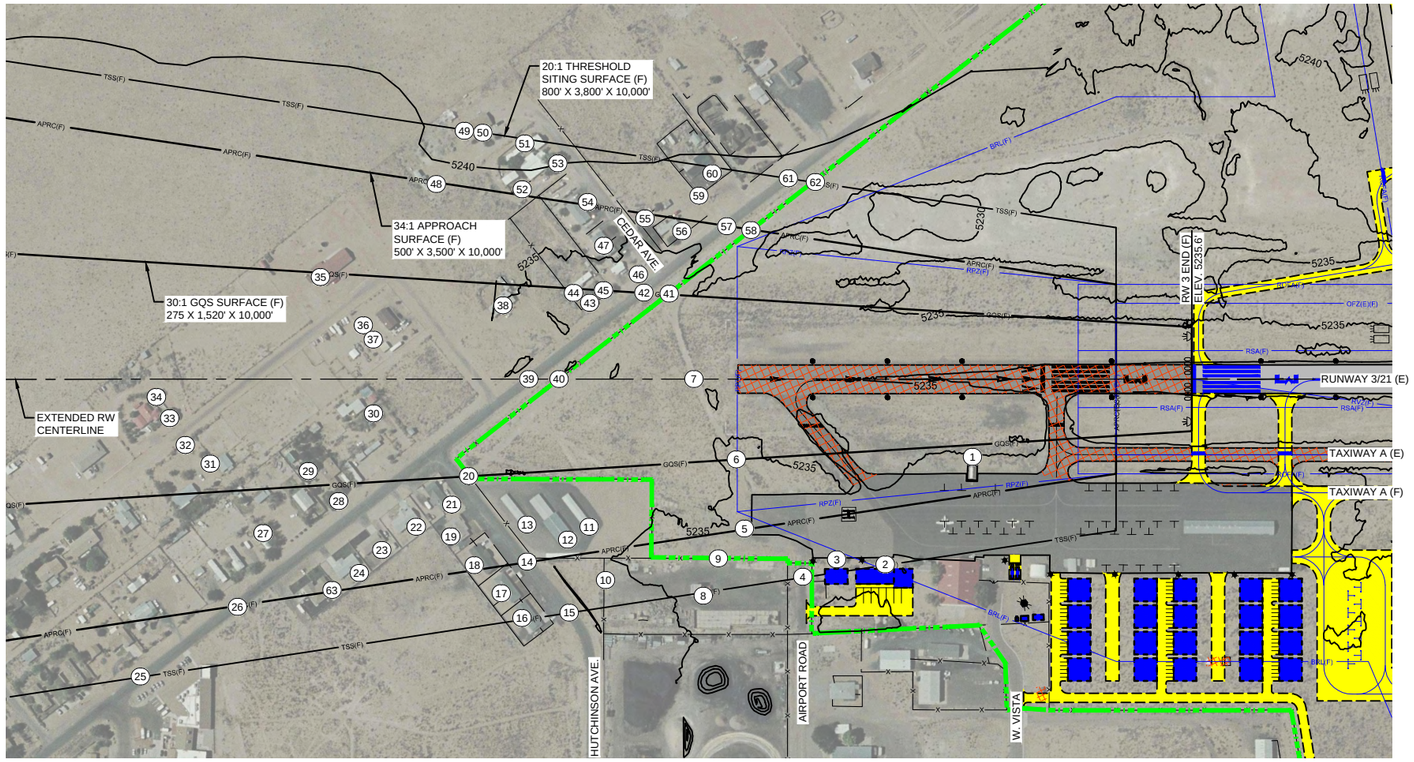
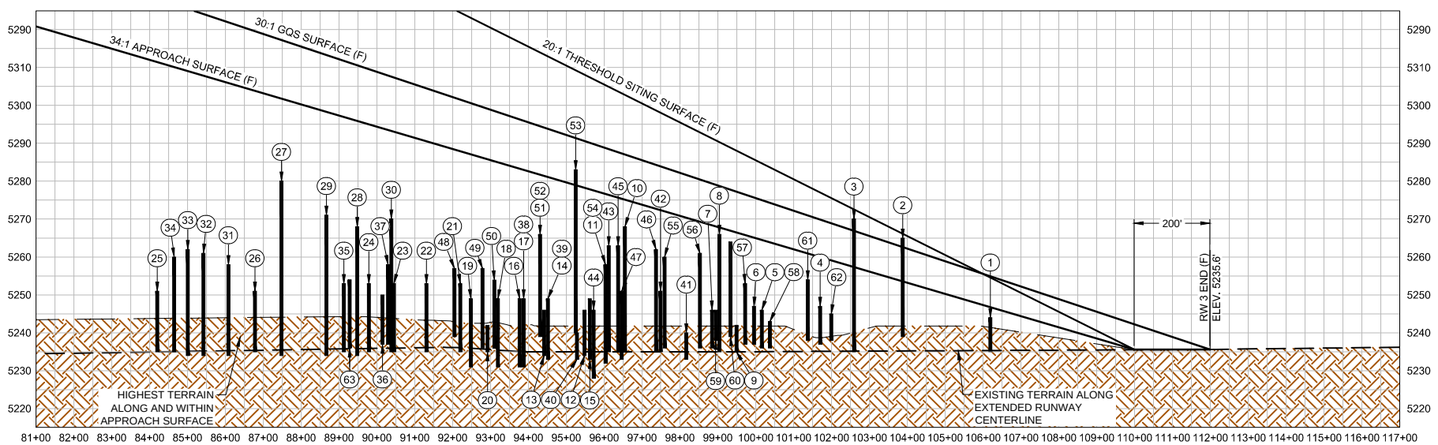
RUNWAY 21 INNER APPROACH (E)



PLAN RW 3 END (F)

SCALE: PER BAR SCALE



PROFILE RW 3 END (F)

SCALE: PER GRID

200 0 200 400

SCALE IN FEET

OBJECTS WITHIN RUNWAY 3 INNER APPROACH SURFACE (APRC), THRESHOLD SITING SURFACE (TSS) AND GQS (F)

No.	OBJECT	GROUND ELEVATION	ESTIMATED OBJECT HT.	TOP ELEVATION (MSL)	20:1 TSS PENETRATION	34:1 APRC SURFACE PENETRATION	30:1 GQS PENETRATION	PROPOSED ACTION
1	** FUEL TANK (E)	5235'	9'	5244'	NONE	NONE	-	RELOCATE
2	* BUILDING (F)	5239'	35'	5274'	NONE	-	-	N/A
3	* SRE (F)	5235'	35'	5270'	NONE	-	-	N/A
4	** ROAD (E)	5237'	10'	5247'	NONE	-	-	N/A
5	* ROAD (E)	5236'	10'	5246'	NONE	NONE	-	N/A
6	** ROAD (E)	5237'	10'	5247'	NONE	NONE	NONE	N/A
7	** ROAD (E)	5236'	10'	5246'	NONE	NONE	NONE	N/A
8	** BUILDING (E)	5235'	31'	5266'	NONE	-	-	N/A
9	** FENCE (E)	5235'	7'	5242'	NONE	-	-	N/A
10	** POLE (E)	5235'	33'	5268'	NONE	-	-	N/A
11	** BUILDING (E)	5232'	9'	5244'	NONE	NONE	-	N/A
12	** BUILDING (E)	5234'	12'	5246'	NONE	NONE	-	N/A
13	* BUILDING (E)	5234'	12'	5246'	NONE	NONE	-	N/A
14	** ROAD (E)	5233'	16'	5249'	NONE	NONE	-	N/A
15	** ROAD (E)	5233'	16'	5249'	NONE	-	-	N/A
16	** BUILDING (E)	5231'	18'	5249'	NONE	-	-	N/A
17	** BUILDING (E)	5231'	18'	5249'	NONE	-	-	N/A
18	* BUILDING (E)	5231'	18'	5249'	NONE	NONE	-	N/A
19	* BUILDING (E)	5231'	18'	5249'	NONE	NONE	-	N/A
20	* FENCE (E)	5235'	7'	5242'	NONE	NONE	NONE	N/A
21	* BUILDING (E)	5235'	18'	5253'	NONE	NONE	-	N/A
22	* BUILDING (E)	5235'	18'	5253'	NONE	NONE	-	N/A
23	* BUILDING (E)	5235'	18'	5253'	NONE	NONE	-	N/A
24	* BUILDING (E)	5235'	18'	5253'	NONE	NONE	-	N/A
25	* ROAD (E)	5235'	16'	5251'	NONE	-	-	N/A
26	* ROAD (E)	5235'	16'	5251'	NONE	NONE	-	N/A
27	** TREE (E)	5234'	46'	5280'	NONE	NONE	-	N/A
28	** TREE (E)	5234'	34'	5268'	NONE	NONE	-	N/A
29	** TREE (E)	5234'	37'	5271'	NONE	NONE	NONE	N/A
30	** TREE (E)	5235'	35'	5270'	NONE	NONE	NONE	N/A
31	** TREE (E)	5234'	24'	5258'	NONE	NONE	NONE	N/A
32	** TREE (E)	5234'	27'	5261'	NONE	NONE	NONE	N/A
33	** TREE (E)	5234'	28'	5262'	NONE	NONE	NONE	N/A
34	** TREE (E)	5235'	25'	5260'	NONE	NONE	NONE	N/A
35	** BUILDING (E)	5234'	18'	5252'	NONE	NONE	NONE	N/A
36	** TREE (E)	5237'	13'	5250'	NONE	NONE	NONE	N/A
37	** TREE (E)	5237'	21'	5258'	NONE	NONE	NONE	N/A
38	** BUILDING (E)	5231'	18'	5249'	NONE	NONE	NONE	N/A
39	** ROAD (E)	5233'	16'	5249'	NONE	NONE	NONE	N/A
40	** FENCE (E)	5233'	7'	5240'	NONE	NONE	NONE	N/A
41	** FENCE (E)	5233'	7'	5240'	NONE	NONE	NONE	N/A
42	** ROAD (E)	5225'	16'	5251'	NONE	NONE	NONE	N/A
43	** TREE (E)	5235'	28'	5263'	NONE	NONE	NONE	N/A
44	** BUILDING (E)	5228'	18'	5246'	NONE	NONE	NONE	N/A
45	** TREE (E)	5235'	28'	5263'	NONE	NONE	NONE	N/A
46	** TREE (E)	5235'	27'	5262'	NONE	NONE	-	N/A
47	** BUILDING (E)	5233'	18'	5251'	NONE	NONE	-	N/A
48	** TREE (E)	5239'	18'	5257'	NONE	NONE	-	N/A
49	** TREE (E)	5236'	21'	5257'	NONE	-	-	N/A
50	** BUILDING (E)	5236'	18'	5254'	NONE	-	-	N/A
51	** TREE (E)	5241'	25'	5266'	NONE	-	-	N/A
52	** TREE (E)	5239'	20'	5259'	NONE	-	-	N/A
53	** TREE (E)	5240'	43'	5283'	NONE	-	-	N/A
54	** TREE (E)	5238'	20'	5258'	NONE	-	-	N/A
55	** TREE (E)	5236'	24'	5260'	NONE	NONE	-	N/A
56	** TREE (E)	5236'	25'	5261'	NONE	NONE	-	N/A
57	** ROAD (E)	5237'	16'	5253'	NONE	NONE	-	N/A
58	* FENCE (E)	5236'	7'	5243'	NONE	NONE	-	N/A
59	** FENCE (E)	5238'	8'	5246'	NONE	-	-	N/A
60	** TELE. POLE (E)	5239'	25'	5264'	NONE	-	-	N/A
61	** ROAD (E)	5238'	16'	5254'	NONE	-	-	N/A
62	* FENCE (E)	5238'	7'	5245'	NONE	-	-	N/A
63	* BUILDING (E)	5236'	18'	5254'	NONE	NONE	-	N/A

NOTE: OBJECT ELEVATIONS IN FEET MSL (VERTICAL DATUM NAVD88).
* = OBJECT ELEVATIONS ARE ESTIMATED AND NOT BASED ON A SURVEY.
** = OBJECT TOP ELEVATIONS AND LOCATIONS ARE BASED ON A SURVEY BY WOOLPERT, INC. 05/2010.
- = OBJECT IS NOT LOCATED WITHIN THIS SURFACE.
O.L. = OBSTRUCTION LIGHT
= OBJECT PENETRATION LOCATION

NO THRESHOLD SITING SURFACE PENETRATIONS

LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)	APRC(E)	APRC(F)	APPROACH SURFACE
		STRUCTURE/FACILITIES (BUILDING)	DPRT(E)	DPRT(F)	DEPARTURE SURFACE
		AIRPORT PROPERTY LINE (APL)	TSS(E)	TSS(F)	THRESHOLD SITING SURFACE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)		0000 0000	THRESHOLD LIGHTS
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			REIL
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			DRAINAGE/CULVERT
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)	4125	N/A	CONTOURS
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			ROAD
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)			MARKINGS
		GRAVEL / DIRT / TURF	X	XX	FENCE
	N/A	LIGHT POLE	H	N/A	HELIPORT
		TO BE REMOVED			CUT / FILL

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING
861 Rood Avenue
Grand Junction, CO 81501
ph: 970.242.0101 fax: 970.241.1769
www.armstrongconsultants.com

HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

AIRPORT LAYOUT PLANS

No.	Date	Revision / Description	File	Drwn.	Chkd.	Apprvd.
1	04/2015	ALP/MASTER PLAN UPDATE-ACI	5910505	LKB	HMD	JZP
0	11/21/00	COFFMAN ASSOC.		RAL		SCB

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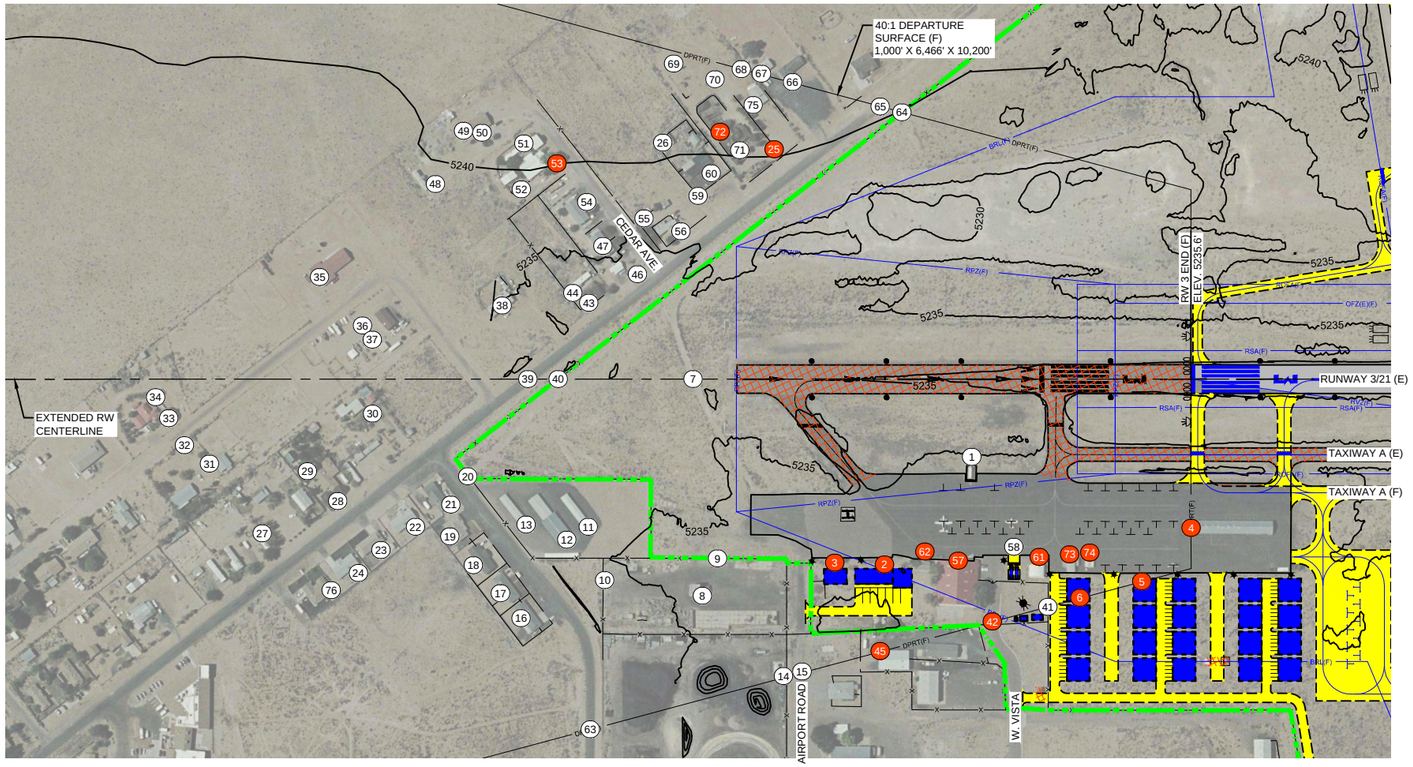
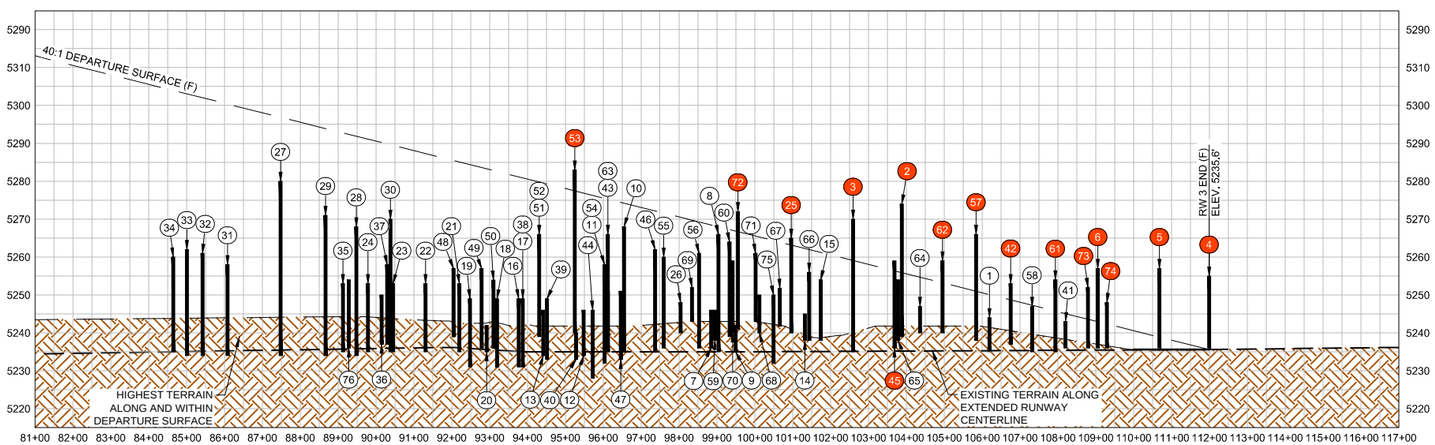
RUNWAY 3
INNER
APPROACH (F)



PLAN RW 3 END (F)

SCALE: PER BAR SCALE



PROFILE RW 3 END (F)

SCALE: PER GRID

SCALE IN FEET: 200 0 200 400

NOTE:
- * = OBJECT ELEVATIONS ARE ESTIMATED AND NOT BASED ON A SURVEY.
- ** = OBJECT TOP ELEVATIONS AND LOCATIONS ARE BASED ON SURVEY BY WOOLPERT, INC. 05/2010.
- \- = OBJECT IS NOT LOCATED WITHIN THIS SURFACE.
- D.P. = FAA DEVELOP OBSTRUCTION CLEARANCE DEPARTURE PROCEDURE.
- O.L. = OBSTRUCTION LIGHT
- ● = OBJECT PENETRATION LOCATION

OBJECTS WITHIN RUNWAY 3 DEPARTURE SURFACE (F)

No.	OBJECT	GROUND ELEVATION	ESTIMATED OBJECT HT.	TOP ELEVATION (MSL)	40:1 DEPARTURE PENETRATION	PROPOSED ACTION
1	** FUEL TANK	5235'	9'	5244'	NONE	RELOCATE
2	* BUILDING (F)	5239'	35'	5274'	+18	O.L.
3	* SRE BUILDING (F)	5235'	35'	5270'	+11	O.L.
4	* HANGAR (E)	5236'	19'	5255'	+19	O.L.
5	* HANGAR (F)	5236'	21'	5257'	+18	O.L.
6	* HANGAR (F)	5236'	21'	5257'	+14	O.L.
7	** ROAD (E)	5236'	10'	5246'	NONE	N/A
8	** BUILDING (E)	5235'	31'	5266'	NONE	N/A
9	** FENCE (E)	5235'	7'	5242''	NONE	N/A
10	** POLE (E)	5235'	33'	5268'	NONE	N/A
11	** BUILDING (E)	5232'	9'	5244'	NONE	N/A
12	** BUILDING (E)	5234'	12'	5246'	NONE	N/A
13	* BUILDING (E)	5234'	12'	5246'	NONE	N/A
14	* FENCE (E)	5238'	7'	5245'	NONE	N/A
15	* ROAD (E)	5238'	16'	5254'	NONE	N/A
16	** BUILDING (E)	5231'	18'	5249'	NONE	N/A
17	** BUILDING	5231'	18'	5249'	NONE	N/A
18	* BUILDING (E)	5231'	18'	5249'	NONE	N/A
19	* BUILDING (E)	5231'	18'	5249'	NONE	N/A
20	* FENCE (E)	5235'	7'	5242'	NONE	N/A
21	* BUILDING (E)	5235'	18'	5253'	NONE	N/A
22	* BUILDING (E)	5235'	18'	5253'	NONE	N/A
23	* BUILDING (E)	5235'	18'	5253'	NONE	N/A
24	* BUILDING (E)	5235'	18'	5253'	NONE	N/A
25	** ** TREE (E)	5240'	25'	5265'	+2	TRIM OR D.P.
26	** TREE (E)	5240'	8'	5248'	NONE	N/A
27	** TREE (E)	5234'	46'	5280'	NONE	N/A
28	** TREE (E)	5234'	34'	5268'	NONE	N/A
29	** TREE (E)	5234'	37'	5271'	NONE	N/A
30	** TREE (E)	5235'	35'	5270'	NONE	N/A
31	** TREE (E)	5234'	24'	5258'	NONE	N/A
32	** TREE (E)	5234'	27'	5261'	NONE	N/A
33	** TREE (E)	5234'	28'	5262'	NONE	N/A
34	** TREE (E)	5235'	25'	5260'	NONE	N/A
35	BUILDING (E)	5234'	18'	5252	NONE	N/A
36	** TREE (E)	5237'	13'	5250'	NONE	N/A
37	** TREE (E)	5237'	21'	5258'	NONE	N/A
38	** BUILDING (E)	5231'	18'	5249'	NONE	N/A
39	** ROAD (E)	5233'	16'	5249'	NONE	N/A
40	** FENCE (E)	5233'	7'	5240'	NONE	N/A
41	* FENCE (E)	5236'	7'	5243'	NONE	N/A
42	** ROAD (E)	5237'	16'	5253'	+5	O.L.
43	** TREE (E)	5235'	28'	5263'	NONE	N/A
44	** BUILDING (E)	5228'	18'	5246'	NONE	N/A
45	** BUILDING (E)	5236'	23'	5259'	+3	O.L.
46	** TREE (E)	5235'	27'	5262'	NONE	N/A
47	** BUILDING (E)	5233'	18'	5251'	NONE	N/A
48	** TREE (E)	5239'	18'	5257'	NONE	N/A
49	** TREE (E)	5236'	21'	5257'	NONE	N/A
50	** BUILDING (E)	5236'	18'	5254'	NONE	N/A
51	** TREE (E)	5241'	25'	5266'	NONE	N/A
52	** TREE (E)	5239'	20'	5259'	NONE	N/A
53	** TREE (E)	5240'	43'	5283'	+6	TRIM OR D.P.
54	** TREE (E)	5238'	20'	5258'	NONE	N/A
55	** TREE (E)	5236'	24'5	260'	NONE	N/A
56	** TREE (E)	5236'	25'	5261'	NONE	N/A
57	** TERMINAL BLDG. (E)	5238'	28'	5266'	+15	O.L.
58	* FUEL TANK (F)	5235'	12'	5247'	NONE	N/A
59	** FENCE (E)	5238'	8'	5246'	NONE	N/A
60	** TELEPHONE POLE	5239'	25'	5264'	NONE	N/A
61	** HANGAR (E)	5235'	19'	5254'	+9	O.L.
62	** BUILDING (E)	5240'	19'	5259'	+6	O.L.
63	** ROAD (E)	5235'	16'	5251'	NONE	N/A
64	* FENCE (E)	5240'	7'	5247'	NONE	N/A
65	** ROAD (E)	5238'	16'	5254'	NONE	N/A
66	** BUILDING (E)	5238'	18'	5256'	NONE	N/A
67	** BUILDING (E)	5242'	16'	5258'	NONE	N/A
68	** BUILDING (E)	5240'	10'	5250'	NONE	N/A
69	** BUILDING (E)	5243'	9'	5252'	NONE	N/A
70	** BUILDING (E)	5242'	19'	5261'	NONE	N/A
71	** BUILDING (E)	5243'	18'	5261'	NONE	N/A
72	** TREE (E)	5241'	31'	5272'	+6	TRIM OR D.P.
73	** HANGAR (E)	5236'	16'	5252'	+9	O.L.
74	** HANGAR (E)	5236'	12'	5248'	+6	O.L.
75	** BUILDING (E)	5232'	18'	5250'	NONE	N/A
76	* BUILDING (E)	5236'	18'	5254'	NONE	N/A

LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)	APRC(E)	APRC(F)	APPROACH SURFACE
		STRUCTURE/FACILITIES (BUILDING)	DPRT(E)	DPRT(F)	DEPARTURE SURFACE
		AIRPORT PROPERTY LINE (APL)	TSS(E)	TSS(F)	THRESHOLD SITING SURFACE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)		0000 0000	THRESHOLD LIGHTS
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			REIL
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			DRAINAGE/CULVERT
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)	4125	N/A	CONTOURS
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			ROAD
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)			MARKINGS
		GRAVEL / DIRT / TURF	X	XX	FENCE
	N/A	LIGHT POLE	H	N/A	HELIPORT
		TO BE REMOVED			CUT / FILL

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING
861 Rood Avenue
Grand Junction, CO 81501
ph: 970.242.0101 fax: 970.241.1769
www.armstrongconsultants.com

HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

AIRPORT LAYOUT PLANS

No.	Date	Revision / Description	Dwn.	Chkd.	Apprvd
1	095910	04/2015 ALP/MASTER PLAN UPDATE-ACI 5910505	LKB	HMD	JZP
0	11/21/00	COFFMAN ASSOC.	RAL		SCB

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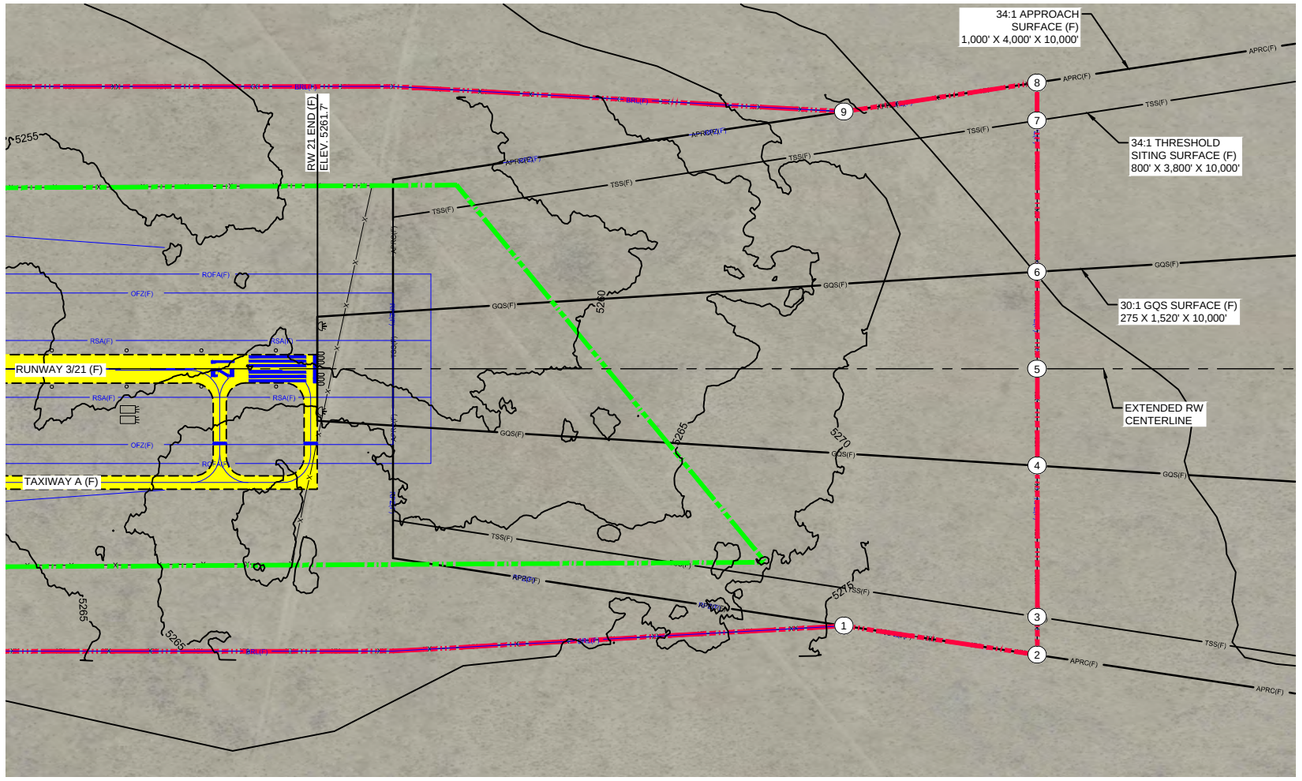
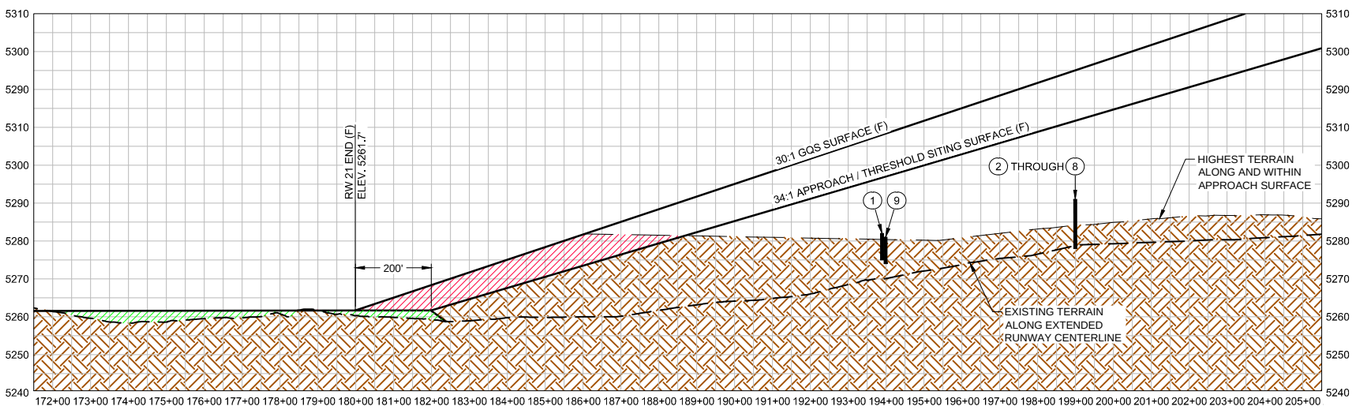
RUNWAY 3 DEPARTURE SURFACE (F)

Sheet: 10 of: 20



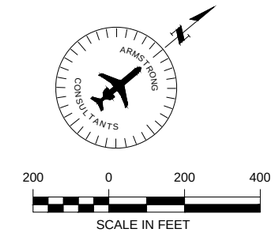
PLAN RW 21 END (F)

SCALE: PER BAR SCALE



PROFILE RW 21 END (F)

SCALE: PER GRID



OBJECTS WITHIN RUNWAY 21 INNER APPROACH SURFACE (APRC), THRESHOLD SITING SURFACE (TSS) AND GQS (F)

No.	OBJECT	GROUND ELEVATION	ESTIMATED OBJECT HT.	TOP ELEVATION (MSL)	34:1 TSS PENETRATION	34:1 APRC SURFACE PENETRATION	30:1 GQS PENETRATION	PROPOSED ACTION
1	* FENCE (F)	5275'	7'	5282'	-	NONE	-	N/A
2	* FENCE (F)	5278'	7'	5285'	-	NONE	-	N/A
3	* FENCE (F)	5278'	7'	5285'	NONE	NONE	-	N/A
4	* FENCE (F)	5278'	7'	5285'	NONE	NONE	NONE	N/A
5	* FENCE (F)	5279'	7'	5286'	NONE	NONE	NONE	N/A
6	* FENCE (F)	5280'	7'	5287'	NONE	NONE	NONE	N/A
7	* FENCE (F)	5283'	7'	5290'	NONE	NONE	-	N/A
8	* FENCE (F)	5284'	7'	5291'	-	NONE	-	N/A
9	* FENCE (F)	5274'	7'	5281'	-	NONE	-	N/A

NOTE: OBJECT ELEVATIONS IN FEET MSL (VERTICAL DATUM NAVD88).
* = OBJECT ELEVATIONS ARE ESTIMATED AND NOT BASED ON A SURVEY.
** = OBJECT TOP ELEVATIONS AND LOCATIONS ARE BASED ON A SURVEY BY WOOLPERT, INC. 05/2010.
\- = OBJECT IS NOT LOCATED WITHIN THIS SURFACE.
O.L. = OBSTRUCTION LIGHT
= OBJECT PENETRATION LOCATION

NO THRESHOLD SITING SURFACE PENETRATIONS

LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)	APRC(E)	APRC(F)	APPROACH SURFACE
		STRUCTURE/FACILITIES (BUILDING)	DPRT(E)	DPRT(F)	DEPARTURE SURFACE
		AIRPORT PROPERTY LINE (APL)	TSS(E)	TSS(F)	THRESHOLD SITING SURFACE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)			THRESHOLD LIGHTS
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			REIL
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			DRAINAGE/CULVERT
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)	4125	N/A	CONTOURS
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			ROAD
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)			MARKINGS
		GRAVEL / DIRT / TURF	X	XX	FENCE
	N/A	LIGHT POLE	H	N/A	HELIPORT
		TO BE REMOVED			CUT / FILL

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AIRPORT ENGINEERING AND PLANNING
861 Rood Avenue
Grand Junction, CO 81501
ph: 970.242.0101 fax: 970.241.1769
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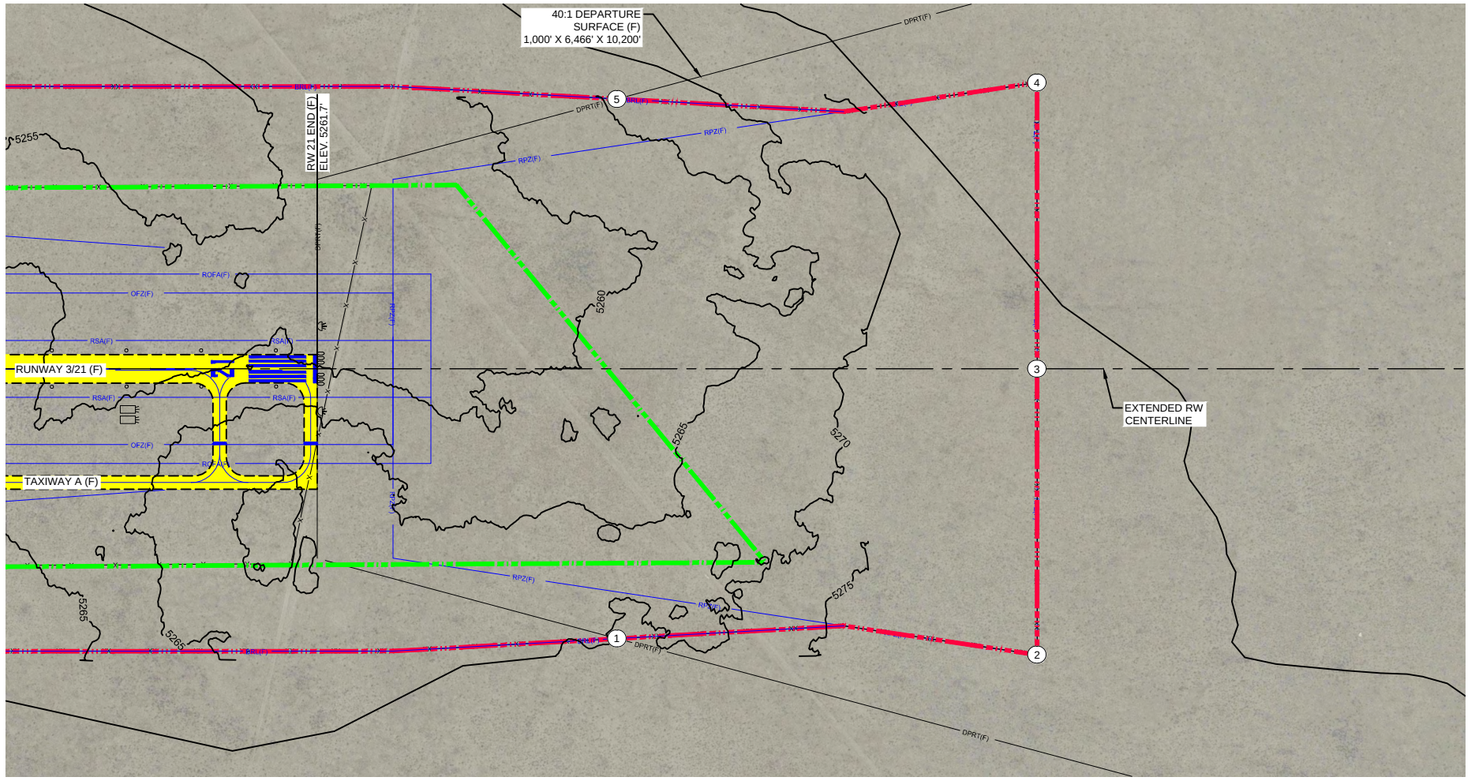
HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

AIRPORT LAYOUT PLANS

No.	Project No.	Date	Revision / Description	File	Drwn.	Chkd.	Apprvd.
1	095910	04/2015	ALP/MASTER PLAN UPDATE-ACI	59105.05	LKB	HMD	JZP
0		11/21/00	COFFMAN ASSOC.		RAL		SCB

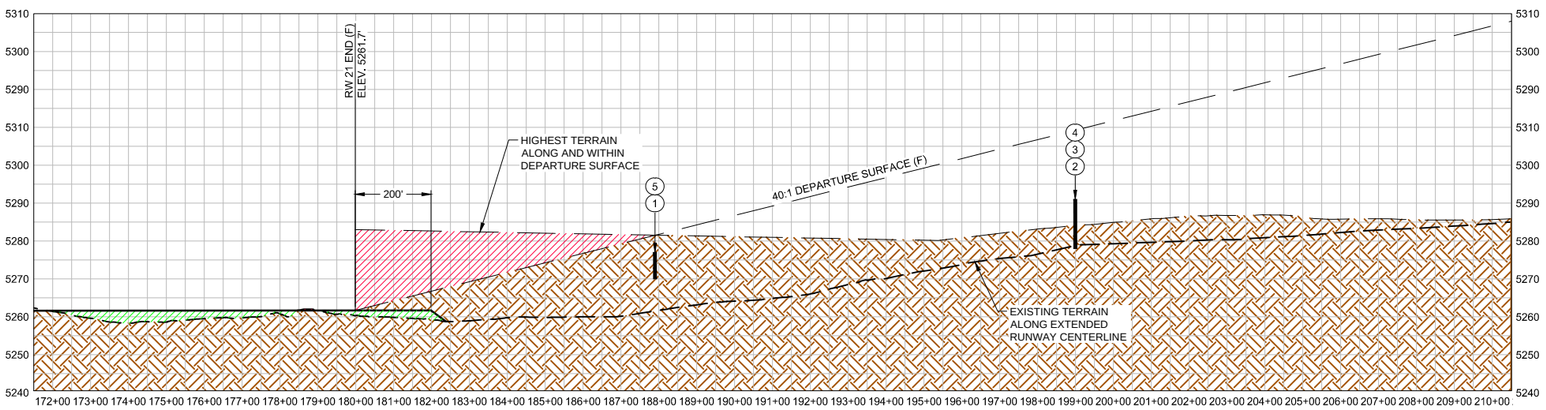
THIS DOCUMENT WAS PREPARED WITH THE CONSULTING ASSISTANCE OF THE FEDERAL AVIATION ADMINISTRATION. ASSISTANCE FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER TITLE 49 UNITED STATES CODE, SECTION 47104. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS PLAN BY THE FAA DOES NOT IMPLY ITS APPROVAL OF THE PROJECTS DESCRIBED OR DEPICTED IN THE PLAN OR ANY FEDERAL FUNDING OF THE DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE OR ELIGIBLE FOR FEDERAL EXPENDITURES ASSOCIATED WITH DEPARTURES FROM STANDARDS.

RUNWAY 21
INNER
APPROACH (F)



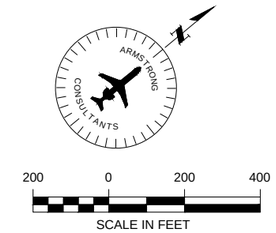
PLAN RW 21 END (F)

SCALE: PER BAR SCALE



PROFILE RW 21 END (F)

SCALE: PER GRID



OBJECTS WITHIN RUNWAY 21 DEPARTURE SURFACE (F)

No.	OBJECT	GROUND ELEVATION	ESTIMATED OBJECT HT.	TOP ELEVATION (MSL)	40:1 DEPARTURE PENETRATION	PROPOSED ACTION
1	* FENCE (F)	5270'	7'	5277'	NONE	N/A
2	* FENCE (F)	5278'	7'	5285'	NONE	N/A
3	* FENCE (F)	5279'	7'	5286'	NONE	N/A
4	* FENCE (F)	5284'	7'	5291'	NONE	N/A
5	* FENCE (F)	5266'	7'	5273'	NONE	N/A

NOTE: OBJECT ELEVATIONS IN FEET MSL (VERTICAL DATUM NAVD88).
* = OBJECT ELEVATIONS ARE ESTIMATED AND NOT BASED ON A SURVEY.
** = OBJECT TOP ELEVATIONS AND LOCATIONS ARE BASED ON A SURVEY BY WOOLPERT, INC. 05/2010.
- = OBJECT IS NOT LOCATED WITHIN THIS SURFACE.
O.L. = OBSTRUCTION LIGHT
= OBJECT PENETRATION LOCATION

LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)	APRC(E)	APRC(F)	APPROACH SURFACE
		STRUCTURE/FACILITIES (BUILDING)	DPRT(E)	DPRT(F)	DEPARTURE SURFACE
		AIRPORT PROPERTY LINE (APL)	TSS(E)	TSS(F)	THRESHOLD SITING SURFACE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)			THRESHOLD LIGHTS
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			REIL
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			DRAINAGE/CULVERT
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)	4125	N/A	CONTOURS
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			ROAD
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)			MARKINGS
		GRAVEL / DIRT / TURF	X	XX	FENCE
	N/A	LIGHT POLE	H	N/A	HELIPORT
		TO BE REMOVED			CUT / FILL

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HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

AIRPORT LAYOUT PLANS

No.	Project No.	Date	Revision / Description	File	Drwn.	Chkd	Apprvd
1	095910	04/2015	ALP/MASTER PLAN UPDATE-ACI	5910505	LKB	HMD	JZP
0		11/21/00	COFFMAN ASSOC.		RAL		SCB

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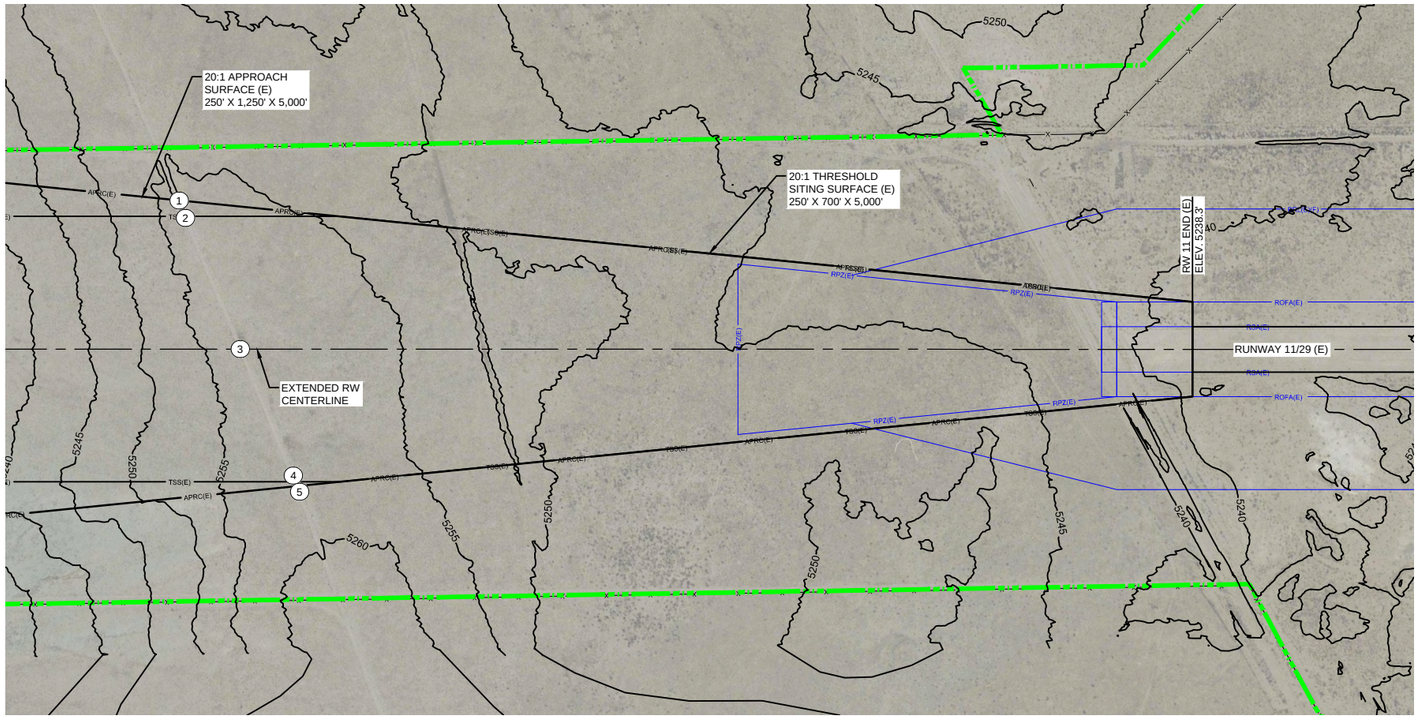
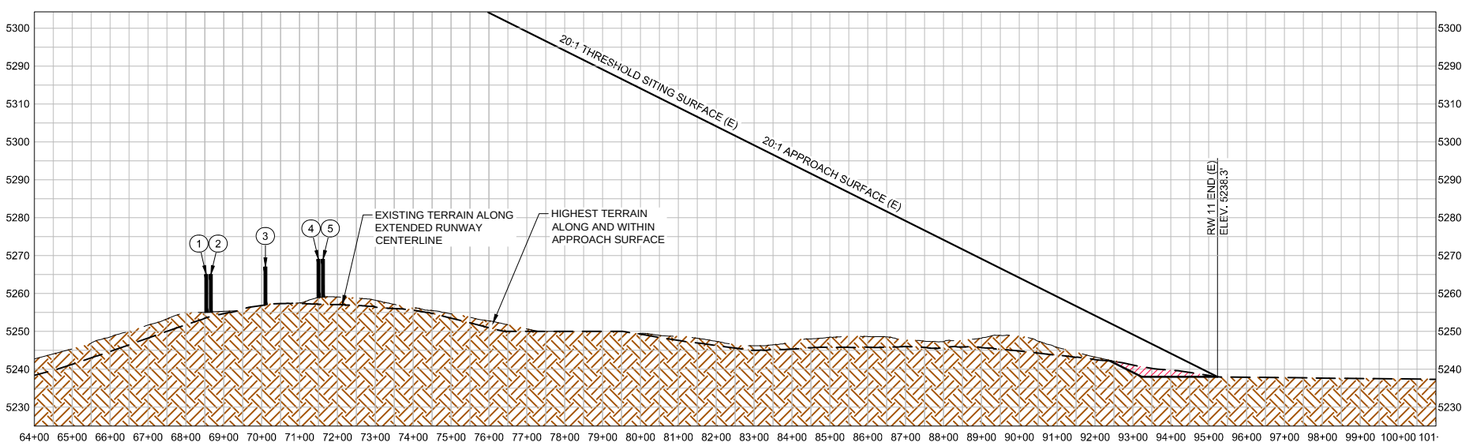
RUNWAY 21
DEPARTURE
SURFACE (F)



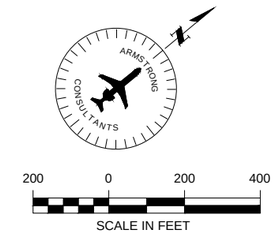
PLAN RW 11 END (E)

SCALE: PER BAR SCALE



PROFILE RW 11 END (E)

SCALE: PER GRID



OBJECTS WITHIN RUNWAY 11 INNER APPROACH SURFACE (APRC) AND THRESHOLD SITING SURFACE (TSS) (E)

No.	OBJECT	GROUND ELEVATION	ESTIMATED OBJECT HT.	TOP ELEVATION (MSL)	20:1 TSS PENETRATION	20:1 APRC SURFACE PENETRATION	PROPOSED ACTION
1	* ROAD	5255'	10'	5265'	-	NONE	N/A
2	* ROAD	5255'	10'	5265'	NONE	NONE	N/A
3	* ROAD	5257'	10'	5267'	NONE	NONE	N/A
4	* ROAD	5259'	10'	5269'	NONE	NONE	N/A
5	* ROAD	5259'	10'	5269'	-	NONE	N/A

NOTE: OBJECT ELEVATIONS IN FEET MSL (VERTICAL DATUM NAVD88).
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- = OBJECT IS NOT LOCATED WITHIN THIS SURFACE.
O.L. = OBSTRUCTION LIGHT
= OBJECT PENETRATION LOCATION

NO THRESHOLD SITING SURFACE PENETRATIONS

LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)	APRC(E)	APRC(F)	APPROACH SURFACE
		STRUCTURE/FACILITIES (BUILDING)	DPRT(E)	DPRT(F)	DEPARTURE SURFACE
		AIRPORT PROPERTY LINE (APL)	TSS(E)	TSS(F)	THRESHOLD SITING SURFACE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)		0000 0000	THRESHOLD LIGHTS
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			REIL
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			DRAINAGE/CULVERT
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)	4125	N/A	CONTOURS
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			ROAD
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)			MARKINGS
		GRAVEL / DIRT / TURF	X	XX	FENCE
	N/A	LIGHT POLE	H	N/A	HELIPORT
		TO BE REMOVED			CUT / FILL

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HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

AIRPORT LAYOUT PLANS

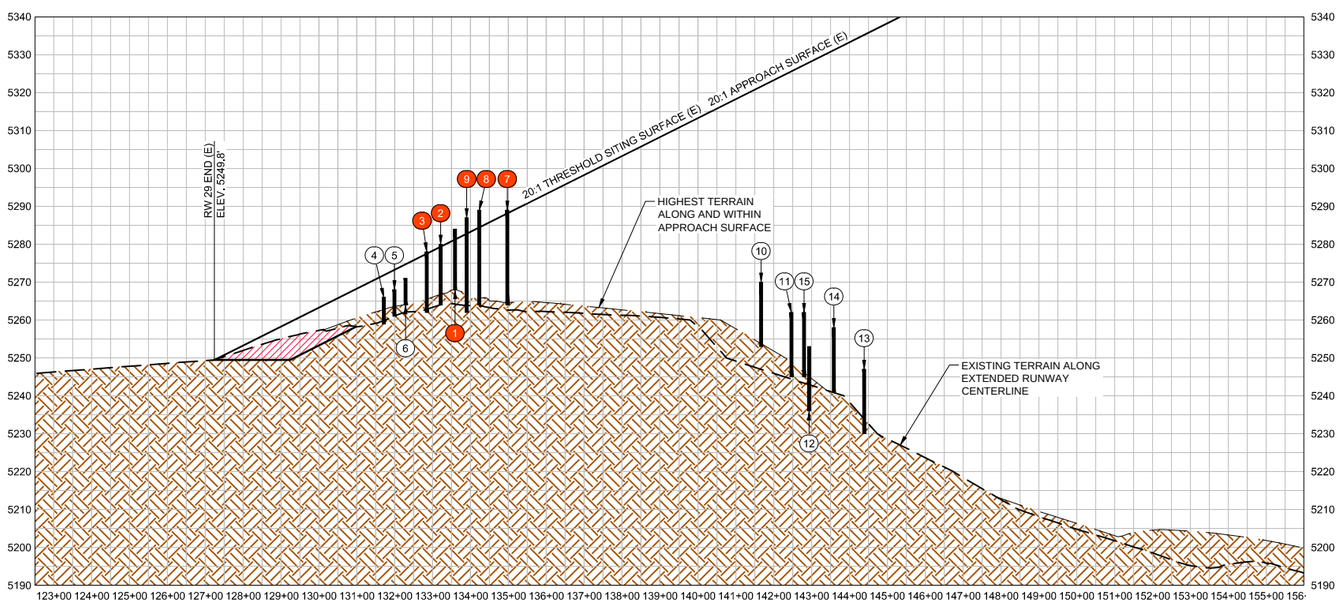
No.	Project No.	Date	Revision / Description	File	Drwn.	Chkd.	Apprvd.
1	095910	04/2015	ALP/MASTER PLAN UPDATE-ACI	5910505	LKB	HMD	JZP
0		11/21/00	COFFMAN ASSOC.		RAL		SCB

THIS PROJECT WAS SUCCESSFUL IN OBTAINING FEDERAL FUNDS UNDER THE AIRPORT IMPROVEMENT PROGRAM. ACCEPTANCE OF THIS PLAN BY THE FAA DOES NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS PLAN BY THE FAA DOES NOT IMPLY THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE OR IS THE BEST POSSIBLE PLAN FOR LOCAL USE. ASSISTANCE FROM THE FEDERAL AVIATION ADMINISTRATION, AS PROVIDED UNDER TITLE 49 UNITED STATES CODE, SECTION 47104. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS PLAN BY THE FAA DOES NOT IMPLY THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE OR IS THE BEST POSSIBLE PLAN FOR LOCAL USE.

RUNWAY 11 INNER APPROACH (E)

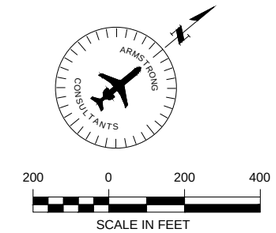
PLAN RW 29 END (E)

SCALE: PER BAR SCALE



PROFILE RW 29 END (E)

SCALE: PER GRID



OBJECTS WITHIN RUNWAY 29 INNER APPROACH SURFACE (APRC) AND THRESHOLD SITING SURFACE (TSS) (E)

No.	OBJECT	GROUND ELEVATION	ESTIMATED OBJECT HT.	TOP ELEVATION (MSL)	20:1 TSS PENETRATION	20:1 APRC SURFACE PENETRATION	PROPOSED ACTION
1	* ROAD	5268'	16'	5284'	+3'	+3'	RELOCATE THRESHOLD
2	* ROAD	5264'	16'	5280'	+1'	+1'	RELOCATE THRESHOLD
3	* ROAD	5262'	16'	5278'	+1'	+1'	RELOCATE THRESHOLD
4	* FENCE	5259'	7'	5266'	NONE	NONE	N/A
5	* FENCE	5261'	7'	5268'	NONE	NONE	N/A
6	* FENCE	5264'	7'	5271'	NONE	NONE	N/A
7	* BUILDING	5264'	25'	5289'	+1'	+1'	RELOCATE THRESHOLD
8	* BUILDING	5264'	25'	5289'	+5'	+5'	RELOCATE THRESHOLD
9	* BUILDING	5262'	30'	5292'	+4'	+4'	RELOCATE THRESHOLD
10	* INTERSTATE	5253'	17'	5270'	NONE	NONE	N/A
11	* INTERSTATE	5245'	17'	5262'	NONE	NONE	N/A
12	* INTERSTATE	5236'	17'	5253'	NONE	NONE	N/A
13	* INTERSTATE	5230'	17'	5247'	NONE	NONE	N/A
14	* INTERTATE	5241'	17'	5258'	NONE	NONE	N/A
15	* INTERSTATE	5245'	17'	5262'	NONE	NONE	N/A

NOTE: OBJECT ELEVATIONS IN FEET MSL (VERTICAL DATUM NAVD88).
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- = OBJECT IS NOT LOCATED WITHIN THIS SURFACE.
O.L. = OBSTRUCTION LIGHT
(1) = OBJECT PENETRATION LOCATION

EXISTING THRESHOLD SITING SURFACE PENETRATIONS

LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)	APRC(E)	APRC(F)	APPROACH SURFACE
		STRUCTURE/FACILITIES (BUILDING)	DPRT(E)	DPRT(F)	DEPARTURE SURFACE
		AIRPORT PROPERTY LINE (APL)	TSS(E)	TSS(F)	THRESHOLD SITING SURFACE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)		0000 0000	THRESHOLD LIGHTS
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			REIL
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			DRAINAGE/CULVERT
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)	4125	N/A	CONTOURS
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			ROAD
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)			MARKINGS
		GRAVEL / DIRT / TURF	X	XX	FENCE
	N/A	LIGHT POLE	H	N/A	HELIPORT
		TO BE REMOVED			CUT / FILL

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HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

AIRPORT LAYOUT PLANS

No.	Date	Revision / Description	File	Drwn.	Chkd	Apprvd
1	04/2015	ALP/MASTER PLAN UPDATE-ACI	5910505	LKB	HMD	JZP
0	11/21/00	COFFMAN ASSOC.		RAL		SCB
	095910					

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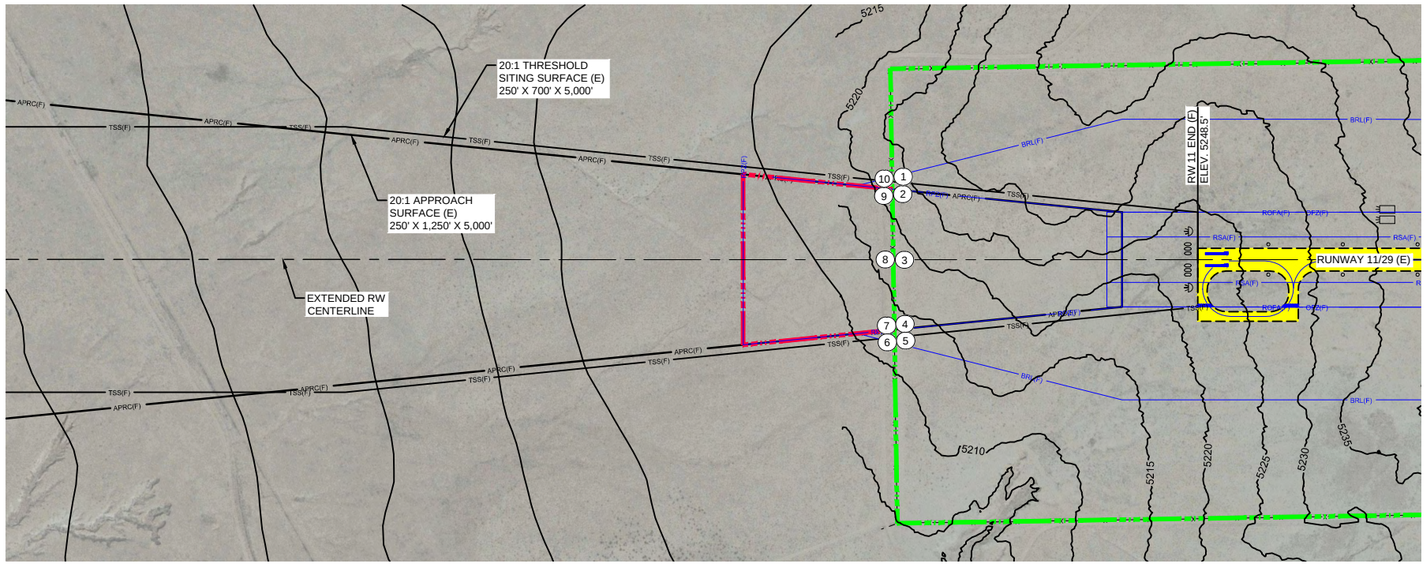
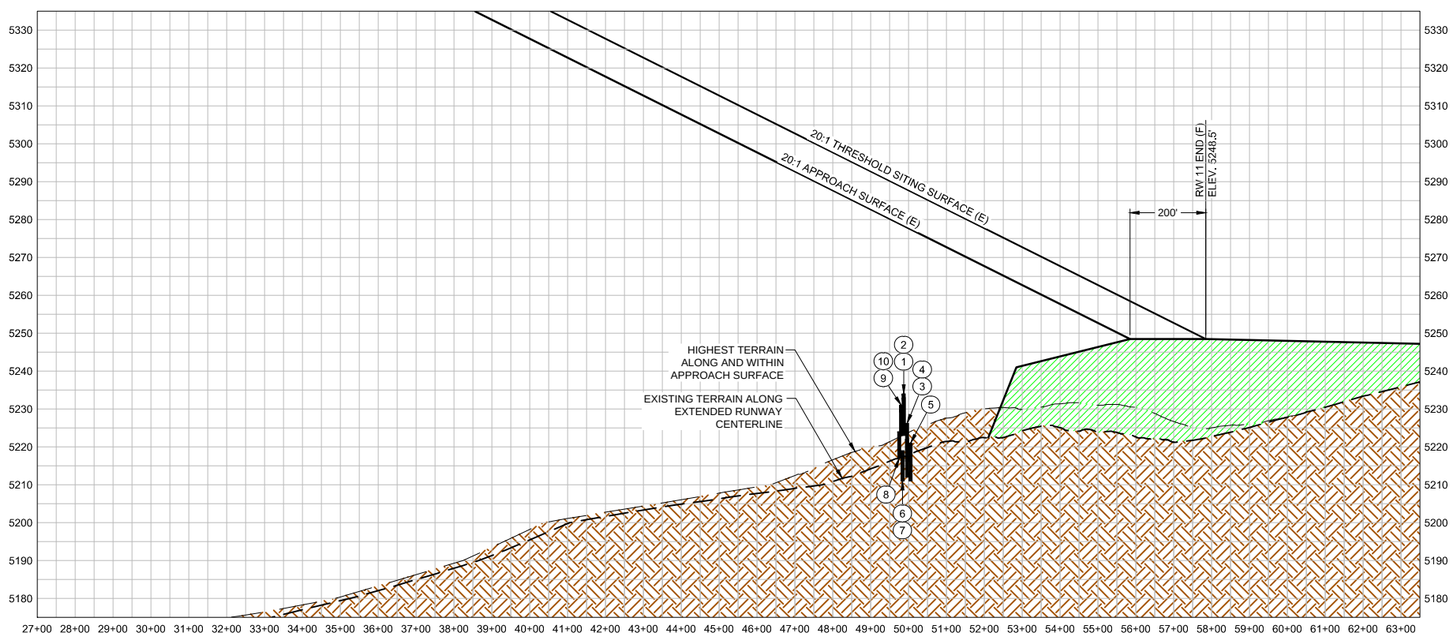
RUNWAY 29 INNER APPROACH (E)



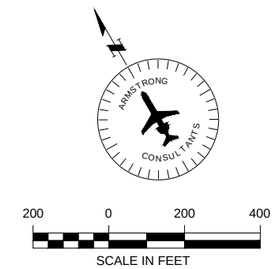
PLAN RW 11 END (F)

SCALE: PER BAR SCALE



PROFILE RW 11 END (F)

SCALE: PER GRID



OBJECTS WITHIN RUNWAY 11 INNER APPROACH SURFACE (APRC) AND THRESHOLD SITING SURFACE (TSS) (F)

No.	OBJECT	GROUND ELEVATION	ESTIMATED OBJECT HT.	TOP ELEVATION (MSL)	20:1 TSS PENETRATION	20:1 APRC SURFACE PENETRATION	PROPOSED ACTION
1	* ROAD (E)	5224'	10'	5234'	NONE	-	N/A
2	* ROAD (E)	5223'	10'	5233'	NONE	NONE	N/A
3	* ROAD (E)	5217'	10'	5227'	NONE	NONE	N/A
4	* ROAD (E)	5212'	10'	5222'	NONE	NONE	N/A
5	* ROAD (E)	5211'	10'	5219'	NONE	-	N/A
6	* FENCE (E)	5211'	7'	5224'	NONE	-	N/A
7	* FENCE (E)	5212'	7'	5230'	NONE	NONE	N/A
8	* FENCE (E)	5217'	7'	5231'	NONE	NONE	N/A
9	* FENCE (E)	5223'	7'	5224'	NONE	NONE	N/A
10	* FENCE (E)	5224'	7'	5230'	NONE	-	N/A

NOTE: OBJECT ELEVATIONS IN FEET MSL (VERTICAL DATUM NAVD88).
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- = OBJECT IS NOT LOCATED WITHIN THIS SURFACE.
O.L. = OBSTRUCTION LIGHT
= OBJECT PENETRATION LOCATION

NO THRESHOLD SITING SURFACE PENETRATIONS

LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)	APRC(E)	APRC(F)	APPROACH SURFACE
		STRUCTURE/FACILITIES (BUILDING)	DPRT(E)	DPRT(F)	DEPARTURE SURFACE
		AIRPORT PROPERTY LINE (APL)	TSS(E)	TSS(F)	THRESHOLD SITING SURFACE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)		0000 0000	THRESHOLD LIGHTS
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			REIL
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			DRAINAGE/CULVERT
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)	4125	N/A	CONTOURS
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			ROAD
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)			MARKINGS
		GRAVEL / DIRT / TURF	X	XX	FENCE
	N/A	LIGHT POLE	H	N/A	HELIPORT
		TO BE REMOVED			CUT / FILL

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HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

AIRPORT LAYOUT PLANS

No.	Date	Revision / Description	File	Drwn.	Chk'd	Apprvd
1	04/2015	ALP/MASTER PLAN UPDATE-ACI	59910505	LKB	HMD	JZP
0	11/21/00	COFFMAN ASSOC.		RAL		SCB

Project No.
095910

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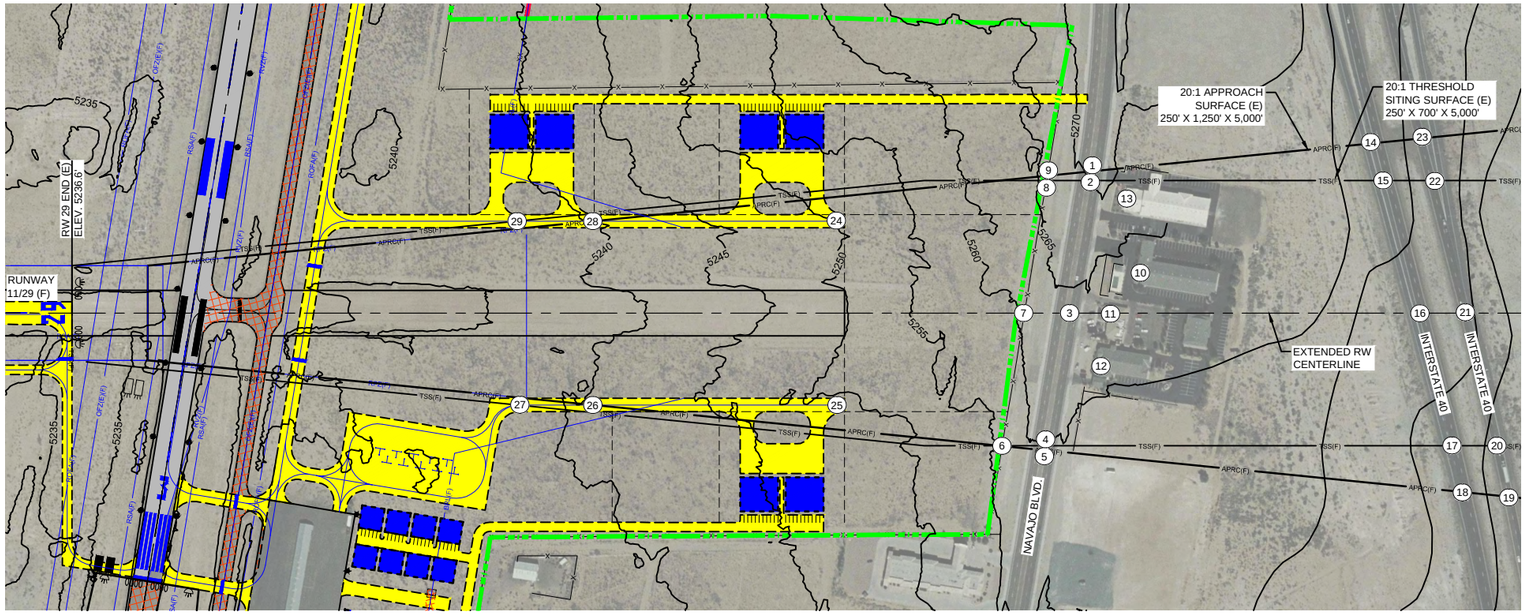
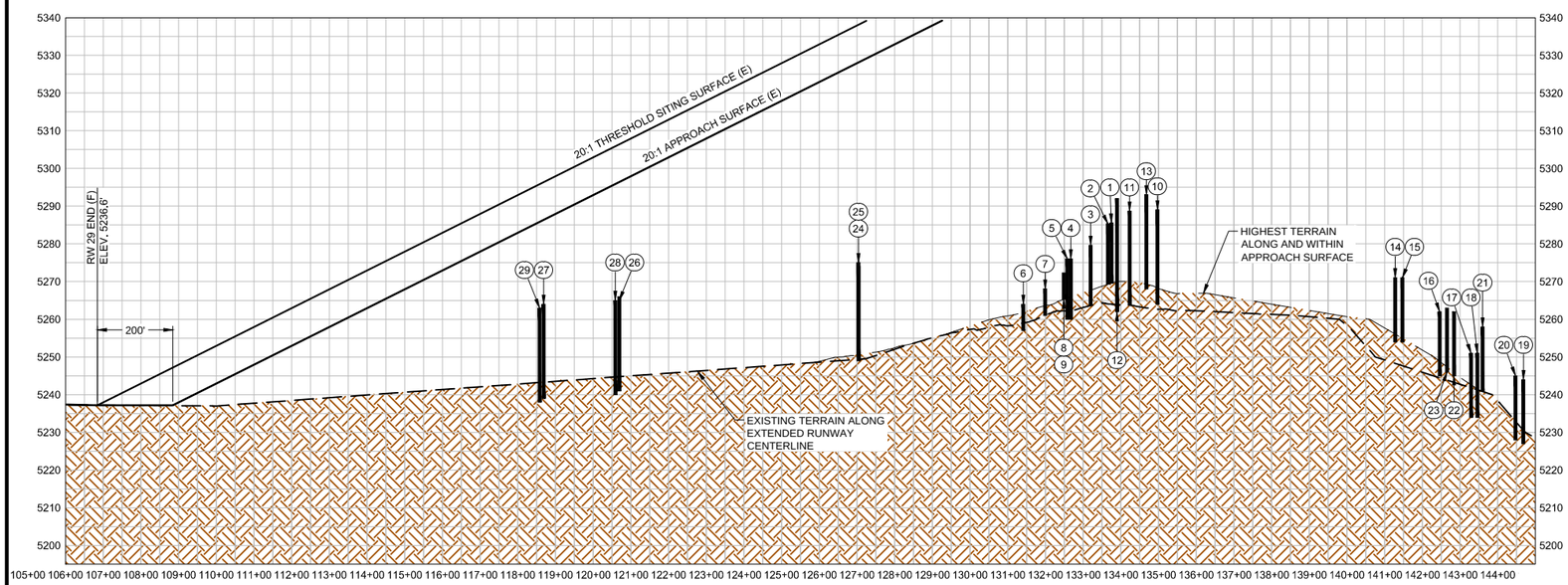
RUNWAY 11 INNER APPROACH (F)



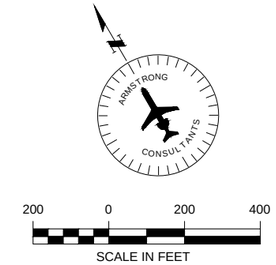
PLAN RW 29 END (F)

SCALE: PER BAR SCALE



PROFILE RW 29 END (F)

SCALE: PER GRID



OBJECTS WITHIN RUNWAY 29 INNER APPROACH SURFACE (APRC) AND THRESHOLD SITING SURFACE (TSS) (F)

No.	OBJECT	GROUND ELEVATION	ESTIMATED OBJECT HT.	TOP ELEVATION (MSL)	20:1 TSS PENETRATION	20:1 APRC SURFACE PENETRATION	PROPOSED ACTION
1	* ROAD (E)	5270'	16'	5286'	-	NONE	N/A
2	* ROAD (E)	5270'	16'	5286'	NONE	NONE	N/A
3	* ROAD (E)	5264'	16'	5280'	NONE	NONE	N/A
4	* ROAD (E)	5260'	16'	5276'	NONE	NONE	N/A
5	* ROAD (E)	5260'	16'	5276'	-	NONE	N/A
6	* FENCE (E)	5257'	7'	5264'	NONE	NONE	N/A
7	* FENCE (E)	5261'	7'	5268'	NONE	NONE	N/A
8	* FENCE (E)	5266'	7'	5273'	NONE	NONE	N/A
9	* FENCE (E)	5266'	7'	5273'	-	NONE	N/A
10	* BUILDING (E)	5264'	25'	5289'	NONE	NONE	N/A
11	* BUILDING (E)	5264'	25'	5289'	NONE	NONE	N/A
12	* BUILDING (E)	5262'	30'	5292'	NONE	NONE	N/A
13	* BUILDING (E)	5268'	25'	5293'	NONE	NONE	N/A
14	* INTERSTATE (E)	5254'	17'	5271'	-	NONE	N/A
15	* INTERSTATE (E)	5254'	17'	5271'	NONE	NONE	N/A
16	* INTERSTATE (E)	5254'	17'	5262'	NONE	NONE	N/A
17	* INTERSTATE (E)	5234'	17'	5251'	NONE	NONE	N/A
18	* INTERSTATE (E)	5234'	17'	5251'	-	NONE	N/A
19	* INTERSTATE (E)	5227'	17'	5244'	-	NONE	N/A
20	* INTERSTATE (E)	5228'	17'	5245'	NONE	NONE	N/A
21	* INTERSTATE (E)	5241'	17'	5258'	NONE	NONE	N/A
22	* INTERSTATE (E)	5245'	17'	5262'	NONE	NONE	N/A
23	* INTERSTATE (E)	5246'	17'	5263'	-	NONE	N/A
24	* TAXILANE (F)	5250'	12'	5262'	NONE	NONE	N/A
25	* TAXILANE (F)	5249'	12'	5261'	NONE	NONE	N/A
26	* TAXILANE (F)	5241'	12'	5253'	NONE	NONE	N/A
27	* TAXILANE (F)	5239'	12'	5251'	NONE	-	N/A
28	* TAXILANE (F)	5240'	12'	5252'	NONE	NONE	N/A
29	* TAXILANE (F)	5238'	12'	5250'	NONE	-	N/A

NOTE: OBJECT ELEVATIONS IN FEET MSL (VERTICAL DATUM NAVD88).
* = OBJECT ELEVATIONS ARE ESTIMATED AND NOT BASED ON A SURVEY.
** = OBJECT TOP ELEVATIONS AND LOCATIONS ARE BASED ON A SURVEY BY WOOLPERT, INC. 05/2010.
- = OBJECT IS NOT LOCATED WITHIN THIS SURFACE.
O.L. = OBSTRUCTION LIGHT
= OBJECT PENETRATION LOCATION

NO THRESHOLD SITING SURFACE PENETRATIONS

LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)	APRC(E)	APRC(F)	APPROACH SURFACE
		STRUCTURE/FACILITIES (BUILDING)	DPRT(E)	DPRT(F)	DEPARTURE SURFACE
		AIRPORT PROPERTY LINE (APL)	TSS(E)	TSS(F)	THRESHOLD SITING SURFACE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)		0000 0000	THRESHOLD LIGHTS
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			REIL
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			DRAINAGE/CULVERT
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)	4125	N/A	CONTOURS
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			ROAD
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)			MARKINGS
		GRAVEL / DIRT / TURF	X	XX	FENCE
	N/A	LIGHT POLE	H	N/A	HELIPORT
		TO BE REMOVED			CUT / FILL

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING
www.armstrongconsultants.com
861 Rood Avenue
Grand Junction, CO 81501
ph: 970.242.0101 fax: 970.241.1769

HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

AIRPORT LAYOUT PLANS

No.	Date	Revision / Description	File	Dwn.	Chk'd.	Apprv'd.
1	09/9/10	ALP/MASTER PLAN UPDATE-ACI	5910505	LKB	HMD	JZP
0	11/21/00	COFFMAN ASSOC.		RAL		SCB

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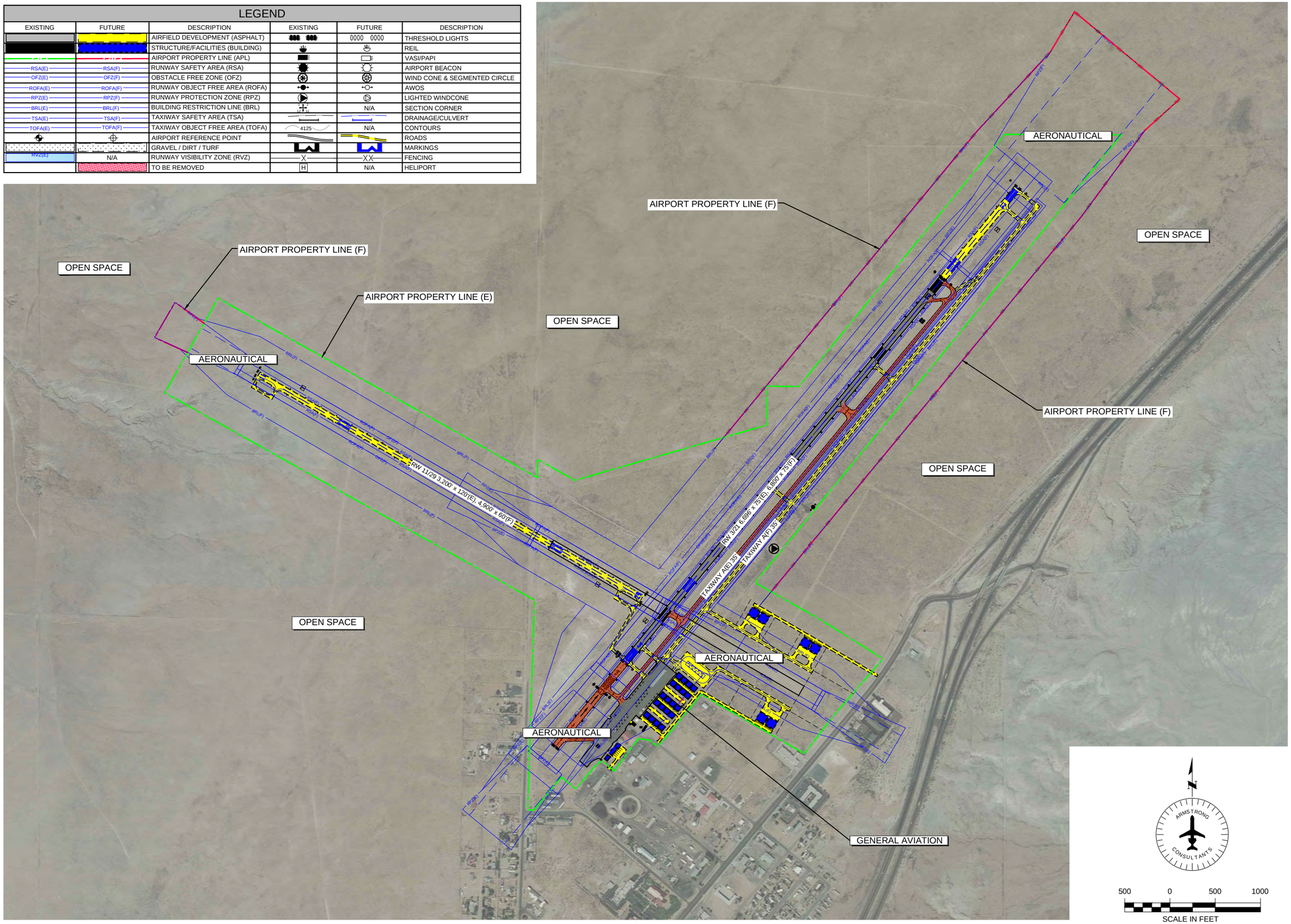
RUNWAY 29
INNER
APPROACH (F)

LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)		0000 0000	THRESHOLD LIGHTS
		STRUCTURE/FACILITIES (BUILDING)			REIL
		AIRPORT PROPERTY LINE (APL)			VASI/PAPI
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)			AIRPORT BEACON
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			WIND CONE & SEGMENTED CIRCLE
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			LIGHTED WINDCONE
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)		N/A	SECTION CORNER
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			DRAINAGE/CULVERT
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)	4125	N/A	CONTOURS
		AIRPORT REFERENCE POINT			ROADS
		GRAVEL / DIRT / TURF			MARKINGS
RVZ(E)	N/A	RUNWAY VISIBILITY ZONE (RVZ)	X	XX	FENCING
		TO BE REMOVED	H	N/A	HELIPORT



ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING
www.armstrongconsultants.com
861 Rood Avenue
Grand Junction, CO 81501
ph: 970.242.0101 fax: 970.241.1769

HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

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1	095910	04/2015	ALP/MASTER PLAN UPDATE-ACI	5910506	LKB	HMD	JZP
0		11/21/00	COFFMAN ASSOC.		RAL		SCB

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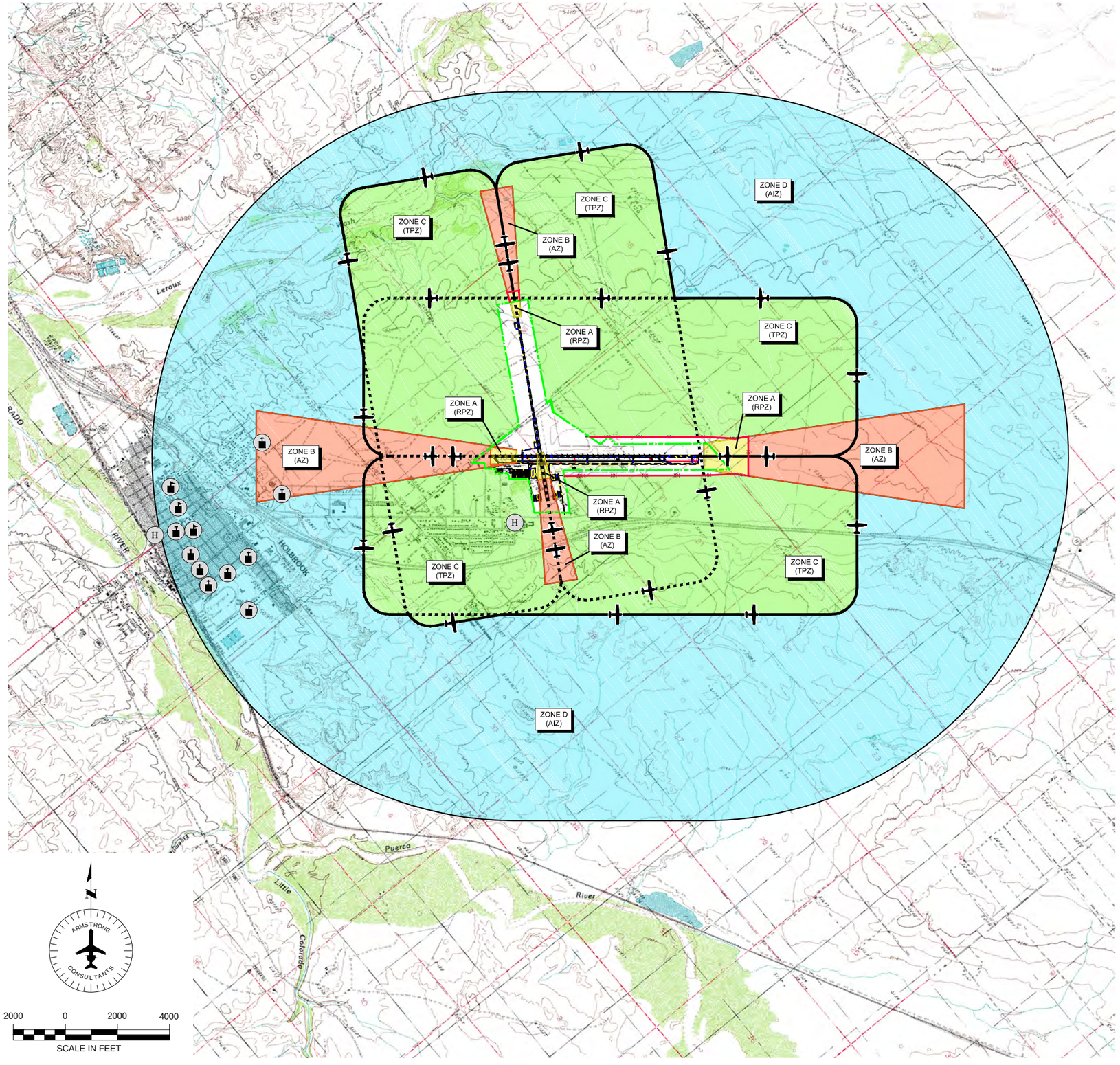
ON AIRPORT LAND USE



LAND USE COMPATIBILITY GUIDELINES

Land Use Category	ZONE D Airport Influence (AIZ)	ZONE C Traffic Pattern (TPZ)	ZONE B Approach (AZ)	ZONE A Runway Protection (RPZ)
Residential				
single-family, nursing homes, mobile homes,	+	o (3)	- (1,3)	- -
multi-family, apartments, condominiums				
transient lodging, hotel, motel	+	o (3)	- (1,3)	- -
Public				
schools, libraries, hospitals	+	o (3)	- (3)	- -
churches, auditoriums, concert halls	+	o (3)	- (3)	- -
transportation, parking, cemeteries	++	++	++	- (2,5)
Commercial and Industrial				
offices, retail trade, service commercial, wholesale trade, warehousing, light industrial, general manufacturing, utilities, extractive industry	++	+	o (3)	- -
Agricultural and Recreational				
cropland	++	++	++	++
livestock breeding	++	++	++	- (2)
parks, playgrounds, zoos, golf courses, riding stables, water recreation	++	++	++	- (2)
outdoor spectator sports	++	+	- (3)	- -
amphitheaters	o	- (4)	- -	- -
open space	++	++	++	++

NOTE: DEVELOPMENT PROJECTS WHICH ARE WILDLIFE ATTRACTANT, INCLUDING SEWERAGE PONDS AND LANDFILLS, WITHIN 10,000 FEET OF THE AIRPORT ARE UNACCEPTABLE. (REF.: FAA AC 150/5200-33)

(1) If allowed, avigation easements and disclosure must be required as a condition of development.
(2) Any structures associated with uses allowed in the RPZ must be located outside the RPZ.
(3) If no reasonable alternative exists, use should be located as far from extended centerline as possible.
(4) If no reasonable alternative exists, use should be located as far from extended runway centerline and traffic patterns as possible.
(5) Transportation facilities in the RPZ (i.e. roads, railroads, waterways) must be configured to comply with Part 77 requirements.

CRITERIA

Land Use Availability	Interpretation/Comments
++ Clearly Acceptable	The activities associated with the specified land use will experience little or no impact due to airport operations. Disclosure of airport proximity should be required as a condition of development.
+ Normally Acceptable	The specified land use is acceptable in this zone or area. Impact may be perceived by some residents. Disclosure of airport proximity should be required as a condition of development. Dedication of avigation easements may also be advisable.
o Conditionally Acceptable	If appropriate disclosure avigation easements and density limitations are put in place, residential uses and uses involving indoor public assemblies are acceptable.
- Normally Unacceptable	Specified use should be allowed only if no reasonable alternative exists. Disclosure of airport proximity and avigation easements must be required as a condition of development.
- - Clearly Unacceptable	Specified use must not be allowed. Potential safety or overflight nuisance impacts are likely in this area.

NOTICE OF PROPOSED CONSTRUCTION

An FAA Form 7460-1, "Notice of Proposed Construction or Alteration" must be submitted for any construction or alteration (including hangars and other on-airport and off-airport structures, towers, etc.) within 20,000 horizontal feet of the airport greater in height than an imaginary surface extending outward and upward from the runway at a slope of 100 to 1 or greater in height than 200 feet above ground level.

LEGEND

- CHURCH
- SCHOOL
- HOSPITAL

TYPICAL TRAFFIC PATTERN DIRECTION AND FLIGHT TRACK AREA.

- RUNWAY PROTECTION ZONE (RPZ) AS DIMENSIONED ON SHEET 2 OF AIRPORT LAYOUT PLAN.
- APPROACH SURFACE AS DESCRIBED ON THE FAR PART 77 DRAWING OF THE AIRPORT LAYOUT PLAN.
- EXISTING AIRPORT PROPERTY LINE
- FUTURE AIRPORT PROPERTY LINE

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING
861 Rood Avenue
Grand Junction, CO 81501
ph: 970.242.0101 fax: 970.241.1769
www.armstrongconsultants.com

HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

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1	095910	04/2015	ALP/MASTER PLAN UPDATE-ACI	5910507	LKB	HMD	JZP
0		11/21/00	COFFMAN ASSOC.		RAL		SCB

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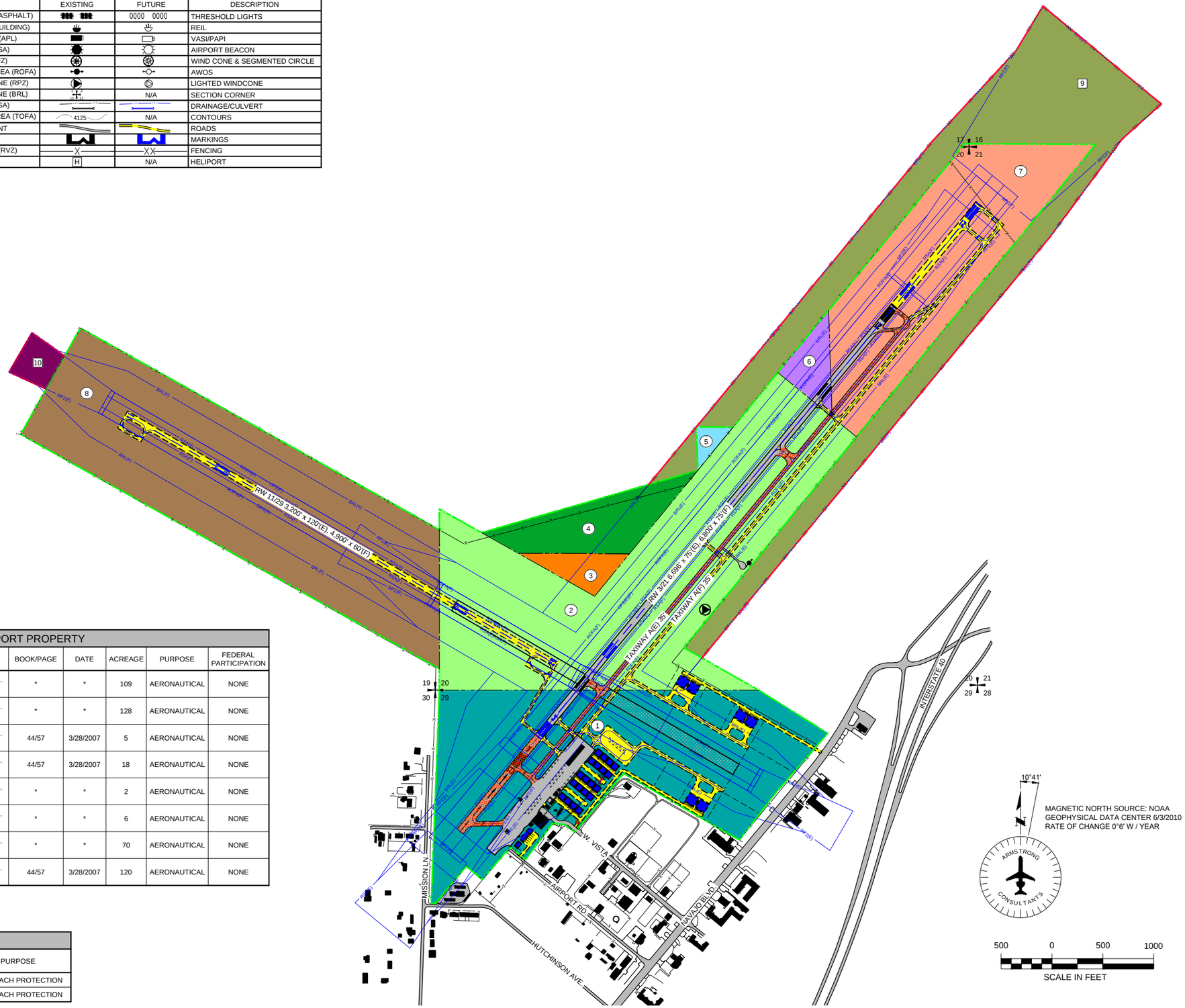
OFF AIRPORT LAND USE

LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)		0000 0000	THRESHOLD LIGHTS
		STRUCTURE/FACILITIES (BUILDING)			REIL
		AIRPORT PROPERTY LINE (APL)			VASI/PAPI
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)			AIRPORT BEACON
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)			WIND CONE & SEGMENTED CIRCLE
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			AWOS
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			LIGHTED WINDCONE
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)		N/A	SECTION CORNER
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			DRAINAGE/CULVERT
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)	4125	N/A	CONTOURS
		AIRPORT REFERENCE POINT			ROADS
		GRAVEL / DIRT / TURF			MARKINGS
RVZ(E)	N/A	RUNWAY VISIBILITY ZONE (RVZ)			FENCING
		TO BE REMOVED	H	N/A	HELIPORT



EXISTING AIRPORT PROPERTY

PARCEL	CURRENT OWNER	GRANTOR	INTEREST	LOCATION	BOOK/PAGE	DATE	ACREAGE	PURPOSE	FEDERAL PARTICIPATION
1	CITY OF HOLBROOK	-	FEE SIMPLE	T. 18 N., R. 21 E. SECTION 29	*	*	109	AERONAUTICAL	NONE
2	CITY OF HOLBROOK	-	FEE SIMPLE	T. 18 N., R. 21 E. SECTION 21	*	*	128	AERONAUTICAL	NONE
3	CITY OF HOLBROOK	JEFFERS CATTLE COMPANY	FEE SIMPLE	T. 18 N., R. 21 E. SECTION 21	44/57	3/28/2007	5	AERONAUTICAL	NONE
4	CITY OF HOLBROOK	JEFFERS CATTLE COMPANY	FEE SIMPLE	T. 18 N., R. 21 E. SECTION 21	44/57	3/28/2007	18	AERONAUTICAL	NONE
5	CITY OF HOLBROOK	-	FEE SIMPLE	T. 18 N., R. 21 E. SECTION 21	*	*	2	AERONAUTICAL	NONE
6	CITY OF HOLBROOK	-	FEE SIMPLE	T. 18 N., R. 21 E. SECTION 21	*	*	6	AERONAUTICAL	NONE
7	CITY OF HOLBROOK	-	FEE SIMPLE	T. 18 N., R. 21 E. SECTION 21	*	*	70	AERONAUTICAL	NONE
8	CITY OF HOLBROOK	JEFFERS CATTLE COMPANY	FEE SIMPLE	T. 18 N., R. 21 E. SECTION 19	44/57	3/28/2007	120	AERONAUTICAL	NONE

* COUNTY ASSESSORS / DATA NOT AVAILABLE.

PROPERTY TO BE ACQUIRED

PARCEL	INTEREST	ACREAGE	PURPOSE
9	FEE SIMPLE OR AVIGATION EASEMENT	85	APPROACH PROTECTION
10	FEE SIMPLE OR AVIGATION EASEMENT	4	APPROACH PROTECTION

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING
www.armstrongconsultants.com
861 Rood Avenue
Grand Junction, CO 81501
ph: 970.242.0101 fax: 970.241.1769

HOLBROOK MUNICIPAL AIRPORT
HOLBROOK, ARIZONA

AIRPORT LAYOUT PLANS

No.	Project No.	Date	Revision / Description	File	Drwn.	Chkd.	Apprvd.
1	059910	04/2015	ALP/MASTER PLAN UPDATE-ACI	59105.08	LKB	HMD	JZP
0		11/21/00	COFFMAN ASSOC.		RAL		SCB

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EXHIBIT "A"
PROPERTY
MAP

500 0 500 1000

SCALE IN FEET

AERIAL PHOTOGRAPH OBTAINED FROM WOOLPERT, INC., - MAY 2010

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

861 Rood Avenue
Grand Junction, CO 81501
ph: 970.242.0101 fax: 970.241.1769

www.armstrongconsultants.com

HOLBROOK MUNICIPAL AIRPORT
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1	095910	04/2015	ALP/MASTER PLAN UPDATE-ACI	5910509	LKB	HMD	JZP
0		11/21/00	COFFMAN ASSOC.	RAL			SCB

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AERIAL PHOTOGRAPH

Chapter Six
Environmental Overview

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport
Airport Master Plan

6.1 INTRODUCTION

This environmental overview examines the potential environmental impacts associated with the proposed airport improvements from the preferred development alternatives selected in Chapter 4 and listed in the Capital Improvement and Financial Plans in the following Chapter. The proposed improvements most likely to result in environmental impacts include the extension of Runway 3/21, the construction of the crosswind Runway 11/29 and the landside development. All other improvements occur on existing airport property and are less likely to impact the natural environment. This Chapter is intended to provide an overview of the potential environmental impacts and identify additional environmental documentation that may be required as a prerequisite to development.

6.2 AIR QUALITY

The Clean Air Act of 1970 was enacted to reduce emissions of specific pollutants via uniform Federal standards. These standards include the National Ambient Air Quality Standards (NAAQS) which set maximum allowable ambient concentrations of ozone (O3), nitrogen dioxide (NO2), sulfur dioxide (SO2), carbon monoxide (CO), lead (Pb) and particulate matter 10 microns or smaller (PM10). Section 176(c) of the Act, in part, states that no Federal agency shall engage in, support in any way or provide financial assistance for, license or permit or approve any activity that does not conform to the State Implementation Plan.

Federal Aviation Administration Orders 5050.4B and 1050.1E require air quality analysis for projects in areas not in compliance with the Environmental Protection Agency (EPA) approved State Implementation Plan (SIP). Because the entire area is considered in attainment with the SIP, no further air quality analysis is required.

Construction emissions, specifically dust, are not a long-term factor. These emissions are described in the "Construction Impacts" section of this Chapter. The necessary permits will be obtained before construction begins and construction projects will conform to FAA Advisory Circular (AC) 150/5370-10E, Standards for Specifying Construction of Airports.

Correspondence was sent to the Arizona Department of Environmental Quality (ADEQ) Office. The ADEQ responded with recommendations to reduce disturbance of particulate matter, including emissions caused by strong winds as well as machinery and trucks tracking soil off the construction site. A copy of the letter can be found in Appendix D.

The following best management practices are recommended to minimize construction emissions:

I. Site Preparation
- A. Minimize land disturbance;
- B. Use watering trucks to minimize dust;
- C. Cover trucks when hauling dirt or debris;
- D. Stabilize the surface of dirt piles and any disturbed areas;
- E. Use windbreaks to prevent any accidental dust pollution; and
- F. Segregate storm water drainage from construction sites and material piles.

II. Construction Phase
- A. Cover trucks when transferring materials; and
- B. Minimize unnecessary vehicular and machinery activities.

III. Completion Phase
- A. Revegetate any disturbed land not used;

B. Remove unused material and dirt piles;

Temporary air pollution may occur as a result of the proposed action. The design and construction of the proposed improvements will incorporate Best Management Practices (BMP) to reduce air quality impacts, including minimizing land disturbance, wetting down, using water trucks, dust suppressant, covering trucks when hauling soil and the use of wind breaks. These practices will be selected based on the site's characteristics. No significant air quality impacts are anticipated as a result of the proposed development.

6.3 COASTAL RESOURCES

There are no coastal zones in the vicinity of the airport or associated with the proposed development. Therefore, compliance with the Coastal Zone Management Act of 1972 and the Coastal Barriers Resources Act of 1982 is not a factor.

6.4 COMPATIBLE LAND USE

Land use compatibility considerations include safety, height hazards and noise exposure. Although extremely rare, most aircraft accidents occur within 5,000 feet of a runway. Therefore, the ability of the pilot to bring the aircraft down in a manner that minimizes the severity of an accident is dependent upon the type of land uses within the vicinity of the airport. Land uses are reviewed in four zones surrounding the airport: the Runway Protection Zone (RPZ), the Approach Zone, the Traffic Pattern Zone and the Airport Influence Zone. The RPZ is a trapezoidal area extending 1,200 feet beyond the ends of the runway and is typically included within the airport property boundary. Residential and other uses that result in congregations of people are not recommended within the runway protection zone. The approach zone generally falls within the FAR Part 77 Approach Surface area. Within the approach zone, public land uses, such as schools, libraries, hospitals and churches should be avoided. New residential developments should include avigation easements and disclosure statements. The Traffic Pattern Zone is generally the area within one mile of the airport. Within the Traffic Pattern Zone, avigation easements should be considered for residential and public uses within this area and disclosure statements should be included. The Airport Influence Zone is the area where aircraft are transitioning to or from enroute altitude or airport over-flight altitude to or from the standard traffic pattern altitude of 800 to 1,000 feet above airport elevation.

There are currently several incompatible land used located within the runway protection zones at Holbrook Municipal Airport. Incompatible land uses include eight single family residences located within the departure runway protection zone to Runway 3 and two hotels and one restaurant in the runway protection zone to Runway 29. The closest populated areas to the Holbrook Municipal Airport are the City of Holbrook located less than one mile to the west the airport. The airport has standard left hand traffic pattern to both ends of Runway 3/21 and 11/29.

Federal Aviation Regulation (FAR) Part 77, Objects Affecting Navigable Airspace, provides imaginary surfaces surrounding an airport that should be protected from penetration by objects. These include the approach surface, horizontal surface and conical surface. These surfaces were described in Chapter 3. Proposed structures in the vicinity of the airport should be reviewed against the Part 77 criteria to ensure hazards to air navigation are not created. There are no penetrations to the approach surface. Objects penetrating these surfaces could result in a hazard to air navigation.

The City of Holbrook has not implemented an Airport Zone surrounding the Holbrook Municipal Airport. An Airport Zone is used as a tool by the planning and zoning department to ensure proposed development surrounding the airport is compatible with the airport. The Airport Zone should be implemented to coincide with the planned airport configuration airspace and design included in this Master Plan and ALP. A copy of a proposed ordinance and zoning maps are included in Appendix H. If adopted and enforced,

this ordinance and drawings would protect the airport from future incompatible land uses and objects that may be considered hazards to air navigation.

6.5 CONSTRUCTION IMPACTS

Local, State and Federal ordinances and regulations address the impacts of construction activities, including dust and noise from heavy equipment traffic, disposal of construction debris and air and water pollution.

Construction operations for the proposed development may cause specific impacts resulting solely from and limited exclusively to the construction project. Construction impacts are distinct in that they are temporary in duration and the degree of adverse impacts decreases as work is concluded. The following construction impacts can be expected:

- A temporary increase in particulate and gaseous air pollution levels as a result of dust generated by construction activity and by vehicle emissions from equipment and worker's automobiles;
- Increases in solid and sanitary wastes from the workers at the site;
- Traffic volumes that would increase in the airport vicinity due to construction activity (workers arriving and departing, delivery of materials, etc.);
- Increase in noise levels at the airport during operation of heavy equipment; and
- Temporary erosion, scarring of land surfaces and loss of vegetation in areas that are excavated or otherwise disturbed to carry out future developments.

Construction projects will comply with guidelines set forth in FAA Advisory Circular 150/5370-10E, Standards for Specifying the Construction of Airports. The contractor will obtain the required construction permits. The contractor will also prepare Storm Water Pollution Prevention and Fugitive Dust Control Plans for construction. These requirements will be specified in the contract documents for the construction of the proposed improvements.

6.6 DOT ACT – SECTION 4(F)

Section 303c of Title 49, U.S.C., formerly Section 4(f) of DOT Act of 1966, provides that the Secretary of Transportation shall not approve any program or project that requires the use of any publicly owned land from a public park, recreation area or wildlife or waterfowl refuge of National, State or Local significance or land from an historic site of National, State or Local significance, as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land and such project includes all possible planning to minimize impacts. The proposed improvements will not require land from any public park, recreation area or wildlife or waterfowl refuge.

There are no public parks, recreation area or wildlife and waterfowl refuges of National, State or local significance surrounding the airport. The nearest recreation area is located over 10 miles from the airport. Pilots are requested to remain at least 2,000 feet Above Ground Level (AGL) over all wilderness areas.

6.7 FARMLANDS

The Farmland Protection Policy Act (FPPA) authorizes the Department of Agriculture to develop criteria for identifying the effects of Federal programs upon the conversion of farmland to uses other than agriculture.

Conversion of "Prime or Unique" farmland may be considered a significant impact. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed or fiber without intolerable soil erosion as determined by the Secretary of Agriculture. Unique farmland is land

other than prime farmland which is used to produce specific high value food and fiber crops, such as citrus, tree nuts, olives, cranberries, fruits and vegetables.

Figure 6-1 shows the land surrounding the Holbrook Municipal Airport in red which indicates that the land is not classified as prime or unique by the U.S. Department of Agriculture (USDA).

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Farmland Classification— Summary by Map Unit — Navajo County Area, Arizona, Central Part

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
3	Badland-Torriorthents association, 1 to 30 percent slopes	Not prime farmland	223.6	6.3%
8	Burnswick-Marcou complex, 1 to 5 percent slopes	Not prime farmland	62.2	1.8%
13	Claysprings clay, 1 to 10 percent slopes	Not prime farmland	213.9	6.1%
20	Grieta sandy loam, 1 to 3 percent slopes	Prime farmland if irrigated	374.3	10.6%
21	Grieta sandy loam, 3 to 10 percent slopes	Not prime farmland	1,095.8	31.1%
46	Penzance-Grieta complex, 0 to 5 percent slopes	Not prime farmland	213.6	6.1%
48	Purgatory fine sandy loam, 1 to 8 percent slopes	Not prime farmland	128.6	3.6%
60	Sheppard-Grieta complex, 1 to 12 percent slopes	Not prime farmland	1,215.6	34.5%
Totals for Area of Interest			3,527.8	100.0%

FIGURE 6-1 FARMLAND MAP

Source: USDA, 2010

6.8 FISH, WILDLIFE AND PLANTS

This category concerns potential impacts to existing wildlife habitat and threatened and endangered species. Examining both the area of land to be altered or removed and its relationship to surrounding habitat quantify the significance of the impacts in this category. For example, removal of a few acres of habitat which represents a small percentage of the area's total similar habitat or which supports a limited variety of common species would not be considered significant. However, removal of a sizeable percentage of the area's similar habitat or habitat which is known to support rare species would be considered a significant impact. The surrounding area offers an abundance of similar habitat and the proposed improvements are not considered to be a significant habitat loss.

Section 7 of the Endangered Species Act, as amended, requires each Federal agency to insure that "any action authorized, funded or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat of such species . . .".

An Endangered Species is defined as any member of the animal or plant kingdoms determined to be in danger of extinction throughout all or a significant portion of its range. A Threatened Species is defined as any member of the plant or animal kingdoms that is likely to become endangered in the foreseeable future.

The Arizona Game and Fish Department conducted a search using its Heritage Data Management System (HDMS) database and identified one listed species (Peebles Navajo Cactus) within 3 miles of the project area. The review also identified the project site as within the 10J area for the California condor. (see letter in Appendix D).

The US Fish and Wildlife Service (USFWS) was contacted requesting information on the potential impact to endangered, threatened, proposed and or candidate species or designated critical habitat from the proposed development at the Holbrook Municipal Airport. No response was received; however, the USFWS typically only responds to a specific determination from the FAA with respect to a specific project.

Table 6-1 lists the species currently listed as threatened, endangered, or candidate for Navajo County. The list provides the biological basis for including or excluding each species from further evaluation of potential impacts from the Holbrook Municipal Airport. None of the species are known to occur within the project area and only the Black-footed ferret has suitable habitat in the area. A Threatened and Endangered Species survey is recommended prior to development in areas that have not been previously disturbed.

TABLE 6-1 ENDANGERED AND THREATENED SPECIES LIST FOR NAVAJO COUNTY

SPECIES[1]	ESA STATUS[1]	HABITAT REQUIREMENTS[1]	HABITAT PRESENT[2]
Apache (Arizona) trout *Oncorhynchus gilae apache*	FT	Streams and rivers generally above 6,000 ft. elevation with adequate stream flow and shading; temperatures below 77 degrees F; and substrate composed of boulders, rocks, gravel and some sand and silt. > 5,000 ft	NP
Black-footed ferret *Mustela nigripes*	FE	Grassland plains generally found in association with prairie dogs. < 10,500	NS
California condor *Gymnogyps californianus*	FE	High desert canyons and plateaus.	NP
Chiricahua leopard frog *Lithobates [Rana] chiricahuensis*	FT	Streams, rivers, backwaters, ponds, and stock tanks that are mostly free from introduced fish, crayfish, and bullfrogs. 3,300-8,900 ft	NP
Little Colorado spinedace *Lepidomeda vittata*	FT	Moderate to small streams; found in pools and riffles with water flowing over fine gravel and silt substrate. 4,000-8,000 ft	NP
Loach minnow *Tiaroga cobitis*	FT	Benthic species of small to large perennial streams with swift shallow water over cobble and gravel. Recurrent flooding and natural hydrograph important. < 8,000 ft	NP
Mexican gray wolf *Canis lupus baileyi*	FE	Chaparral, woodland, and forested areas. May cross desert areas. 4,000-12,000 ft	NP
Mexican spotted owl *Strix occidentalis lucida*	FT	Nests in canyons and dense forests with multi-layered foliage structure. 4,100-9,000 ft	NP
Navajo sedge *Carex specuicola*	FT	Silty soils at shady seeps and springs. 5,700-6,000 ft	NP
Peebles Navajo cactus *Pediocactus peeblesianus var. peeblesianus*	FE	Gravely soils of the Shinarump conglomerate of the Chinle Formation. 5,400-5,600 ft	NP
Southwestern willow flycatcher *Empidonax traillii extimus*	FE	Cottonwood/willow and tamarisk vegetation communities along rivers and streams. < 8,500 ft	NP
Northern Mexican Gartersnake *Thamnophis eques megalops*	FC	Cienegas, stock tanks, large-river riparian woodlands and forests, streamside gallery forests. 130-8,500 ft	NP
Roundtail chub *Gila robusta*	FC	Cool to warm waters of rivers and streams, often occupy the deepest pools and eddies of large streams. 1,000-7,500 ft.	NP
Yellow-billed cuckoo *Coccyzus americanus*	FC	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries). < 6,500 ft	NP

ESA = Endangered Species Act; FE = Federally Endangered; FT = Federally Threatened; FC = Federal Candidate
K = Known, documented observation within the project area.
S = Habitat suitable and species suspected to occur within the project area.
NS = Habitat suitable but species is not suspected to occur within the project area.
NP = Habitat not present and species unlikely to occur within the project area.

[1] *Source: U.S. Fish and Wildlife, 2010*
[2] *Armstrong Consultants, Inc. Analysis*

6.9 FLOODPLAINS

Floodplains are defined by Executive Order 11988, Floodplain Management, as the lowland and relatively flat areas adjoining coastal water . . . including at a minimum, that area subject to a one percent or greater chance of flooding in any given year . . . ", that is, an area which would be inundated by a 100-year flood. If a proposed action involves a 100-year floodplain, mitigating measures must be investigated in order to avoid significant changes to the drainage system.

As described in FAA Order 5050.4B, an airport development project would be a significant impact pursuant to NEPA if it results in notable adverse impacts on natural and beneficial floodplain values. Mitigation measures for base floodplain encroachments may include committing to special flood related design criteria, elevating facilities above base flood level, locating nonconforming structures and facilities out of the floodplain or minimizing fill placed in floodplains.

Based on available Federal Emergency Management Agency (FEMA) floodplain maps the airport is not located within the vicinity of any 100-year floodplains (see Figures 6-2 and 6-3). Therefore, the proposed projects would not result in any impacts on floodplains.

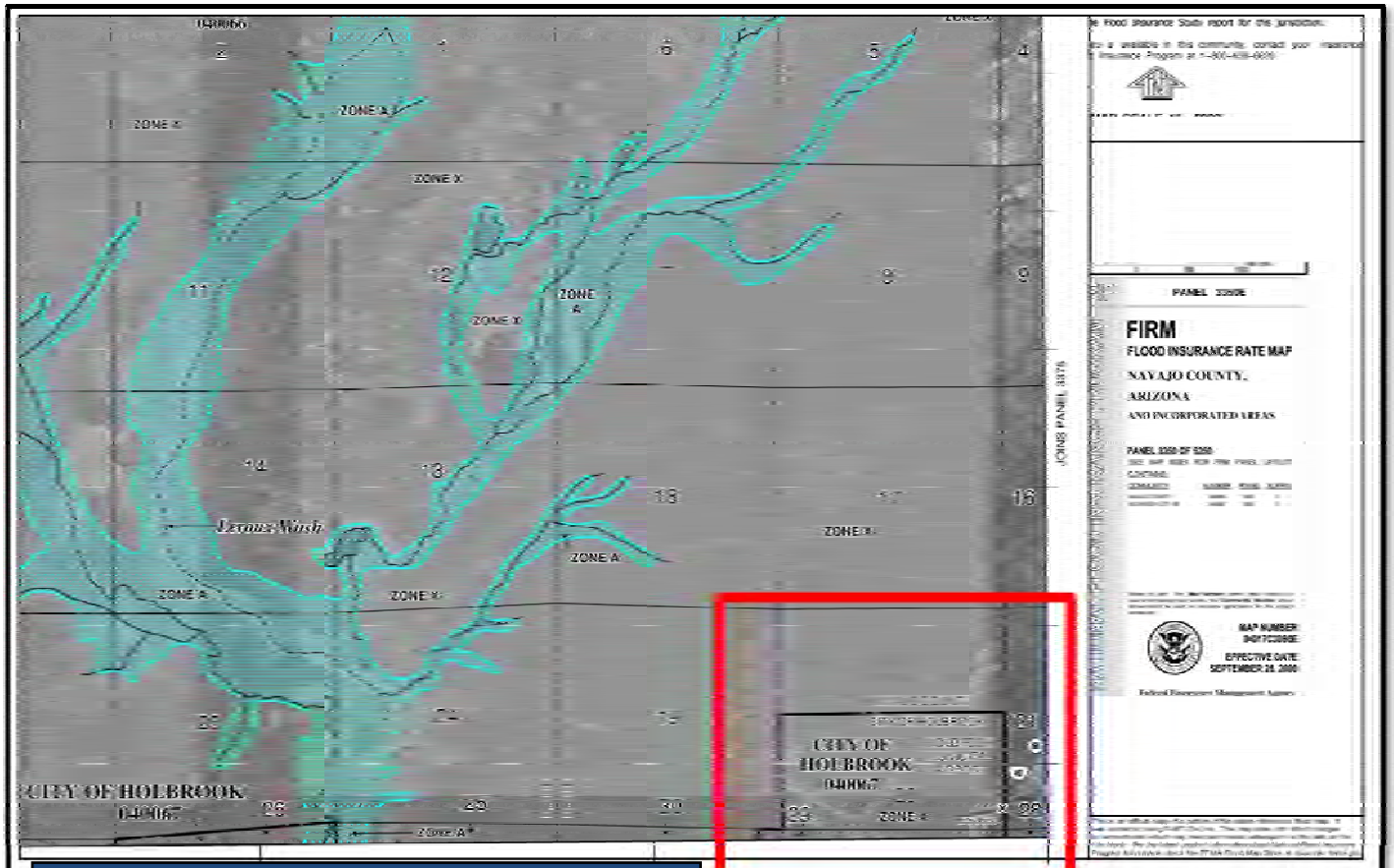


FIGURE 6-2 FLOOD INSURANCE RATE MAP

FIGURE 6-3 FLOOD INSURANCE RATE MAP

6.10 HAZARDOUS MATERIALS, POLLUTION PREVENTION AND SOLID WASTE

Four primary laws have been passed governing the handling and disposal of hazardous materials, chemicals, substances and wastes. The two statutes of most importance to the FAA in proposing actions to construct and operate facilities and navigational aids are the Resource Conservation and Recovery Act (RCRA) (as amended by the Federal Facilities Compliance Act of 1992) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA or Superfund) and the Community Environmental Response Facilitation Act of 1992. RCRA governs the generation, treatment, storage and disposal of hazardous wastes. CERCLA provides for consultation with natural resources trustees and cleanup of any release of a hazardous substance (excluding petroleum) into the environment.

There is no indication of buried storage tanks or land uses that would indicate the presence of hazardous materials. A windshield tour was conducted of the airport property during the inventory of the Holbrook Municipal Airport. The airport does not currently have a Spill Prevention Control and Countermeasure (SPCC) Plan for the existing above ground fuel tanks. When the fuel system is relocated an SPCC Plan is recommended.

Airport development actions that relate only to construction or expansion of runways, taxiways and related facilities do not normally include any direct relationship to solid waste collection, control or disposal other than that associated with the construction itself. The nature of the proposed airport meets these criteria and will not significantly increase net waste output for the City.

Any solid waste disposal facility (i.e. sanitary landfill) which is located within 5,000 feet of all runways planned to be used by piston-powered aircraft or within 10,000 feet of all runways planned to be used by turbine aircraft, is considered by the FAA to be an incompatible land use because of the potential for conflicts between birds and low-flying aircraft. This determination is found in FAA Advisory Circular 150/5200-33, Hazardous Wildlife Attractants On or Near Airports. There are no solid waste disposal facilities within 10,000 feet of the airport.

6.11 HISTORICAL, ARCHITECTURAL, ARCHEOLOGICAL AND CULTURAL RESOURCES

The National Historic Preservation Act of 1966 requires that an initial review be made in order to determine if any properties in or eligible for inclusion in the National Register of Historic Places are within the area of a proposed action's potential environmental impact (the area within which direct and indirect impacts could occur and thus cause a change in historic, architectural, archaeological or cultural properties).

The Archaeological and Historic Preservation Act of 1974 provides for the survey, recovery and preservation of significant scientific, prehistorical, historical, archaeological or paleontological data when such data may be destroyed or irreparably lost due to a federal, federally funded or federally licensed project.

The State Historic Preservation Office (SHPO) indicated that of the Holbrook Municipal Airport has not been assessed for cultural resources. Two prehistoric habitation areas have previously been recorded in close proximity to the project area, one perhaps falling within the airport's property line. The SHPO recommended the airport be inspected for cultural resources by a qualified cultural resources specialist.

6.12 LIGHT EMISSIONS AND VISUAL IMPACTS

Airfield lighting is the main source of light emissions from an airport. Rotating airport beacons are provided so pilots can identify the location of an airport at night or in reduced visibility conditions. Rotating beacons consist of alternating white and green lights rotating at 24-30 flashes per minute. Beacons are typically mounted on a tower or on top of a hangar or other building. Specifications for spotting airport beacons allow the beam to be angled from 2 degrees to 12 degrees above the horizon. The standard setting is 6 degrees. If necessary, the beacon can be shielded to reduce visibility of the beacon from below the horizon line. Medium Intensity Runway Edge Lights (MIRLs) are single white or yellow lights mounted on 14-30 inch posts spaced at 200 foot intervals along both edges of the runway. They define the boundaries of the runway surface usable for takeoff and landing. Precision Approach Path Indicators (PAPIs) are used for visual descent guidance and consist of two or four light units located to the left of the runway and perpendicular to the runway centerline. The lights are directed at a glide path angle of 3 degrees above the runway. If the aircraft is above the glide path, the pilot will see all white lights. If the pilot is on the proper glide path, the light unit closest to the runway will be red and the unit farthest from the runway will be white. When the pilot is below the glide path the light units will be red. PAPIs have an effective visual range from the air of approximately five miles during the day and up to twenty miles at night. These visual aids are extremely useful and enhance safety in situations where there are few visual references surrounding the airport. Runway End Identifier Lights (REILs) are synchronized flashing lights located laterally on each side of the runway threshold. They are angled upward and outward from the runway and provide rapid and positive identification of the threshold of a runway. This is especially useful in metropolitan and densely developed areas where lights in the vicinity of the airport make it difficult to identify the runway.

Proposed improvements will primarily replace existing lighting and will not substantially increase light emission impacts at the Holbrook Municipal Airport. If complaints are received, runway and taxiway lights can be shielded/baffled.

6.13 NATURAL RESOURCES, ENERGY SUPPLY AND SUSTAINABLE DESIGN

Executive Order 13123, Greening the Government Through Efficient Energy Management (64FR 30851, June 8, 1999), encourages each Federal agency to expand the use of renewable energy within its facilities and in its activities. E.O. 13123 also requires each Federal agency to reduce petroleum use, total energy use and associated air emissions and water consumption in its facilities.

It is also the policy of the FAA, consistent with NEPA and the CEQ regulations, to encourage the development of sustainability. All elements of the transportation system should be designed with a view to their aesthetic impact, conservation of resources such as energy, pollution prevention, harmonization with the community environment and sensitivity to the concerns of the traveling public.

Energy requirements associated with airport improvements generally fall into two categories: 1) changed demand for stationary facilities (i.e. airfield lighting and terminal building heating) and 2) those that involve the movement of air and ground vehicles (i.e. fuel consumption). The use of natural resources includes primarily construction materials and water.

Energy requirements are not expected to significantly increase as a result of the proposed improvements. During its reconstruction process, the existing pavement on Taxiway A would be pulverized, recycled and used for the construction of the relocated Taxiway A.

Recycling of asphalt pavement is recommended. Recycling can save money and save energy when recycling is done on site, conserve diminishing resources of aggregates and petroleum products, and help reduce disposal of pavement materials.

Demand for aircraft fuel is expected to increase. Aircraft fuel should be stored in above ground tanks at the airport that conform to EPA and other applicable federal, state and local regulations. Significant increases in ground vehicle fuel consumption are not anticipated.

6.14 NOISE

Noise analysis considerations include whether the Federal thresholds of noise exposure are exceeded, whether the 65 day-night level (DNL) noise contour extends beyond airport property and if there are any residences, churches, schools or hospitals within the 65 DNL noise contour. The basic measure of noise is the sound pressure level that is recorded in decibels (dBA). The important point to understand when considering the impact of noise on communities is that equal levels of sound pressure can be measured for both high and low frequency sounds. Generally, people are less sensitive to sounds of low frequency than they are to high frequencies. An example of this might be the difference between the rumble of automobile traffic on a nearby highway and the high-pitched whine of jet aircraft passing overhead. At any location, over a period of time, sound pressure fluctuates considerably between high and low frequencies. Figure 6-3 depicts a Sound Level Comparison of different noise sources.

The identification of airport generated noise impacts and implementation of noise abatement measures is a joint responsibility of airport operators and users. FAA Order 5050.4B states that “no noise analysis is needed for proposals involving Design Group I and II airplanes operating at airports whose forecast operations in the period covered by the EA do not exceed 90,000 annual adjusted propeller operations or 700 annual adjusted jet operations . . .”. Noise analysis is not required for the Holbrook Municipal Airport since operations are forecasted to be 6,906 in 2030. However, noise contours were generated for the existing and future operations at the airport using the current version of the FAA’s Integrated Noise Model (INM) program, which did not generate a 65 DNL noise contour due to relatively low number of operations by loud aircraft.

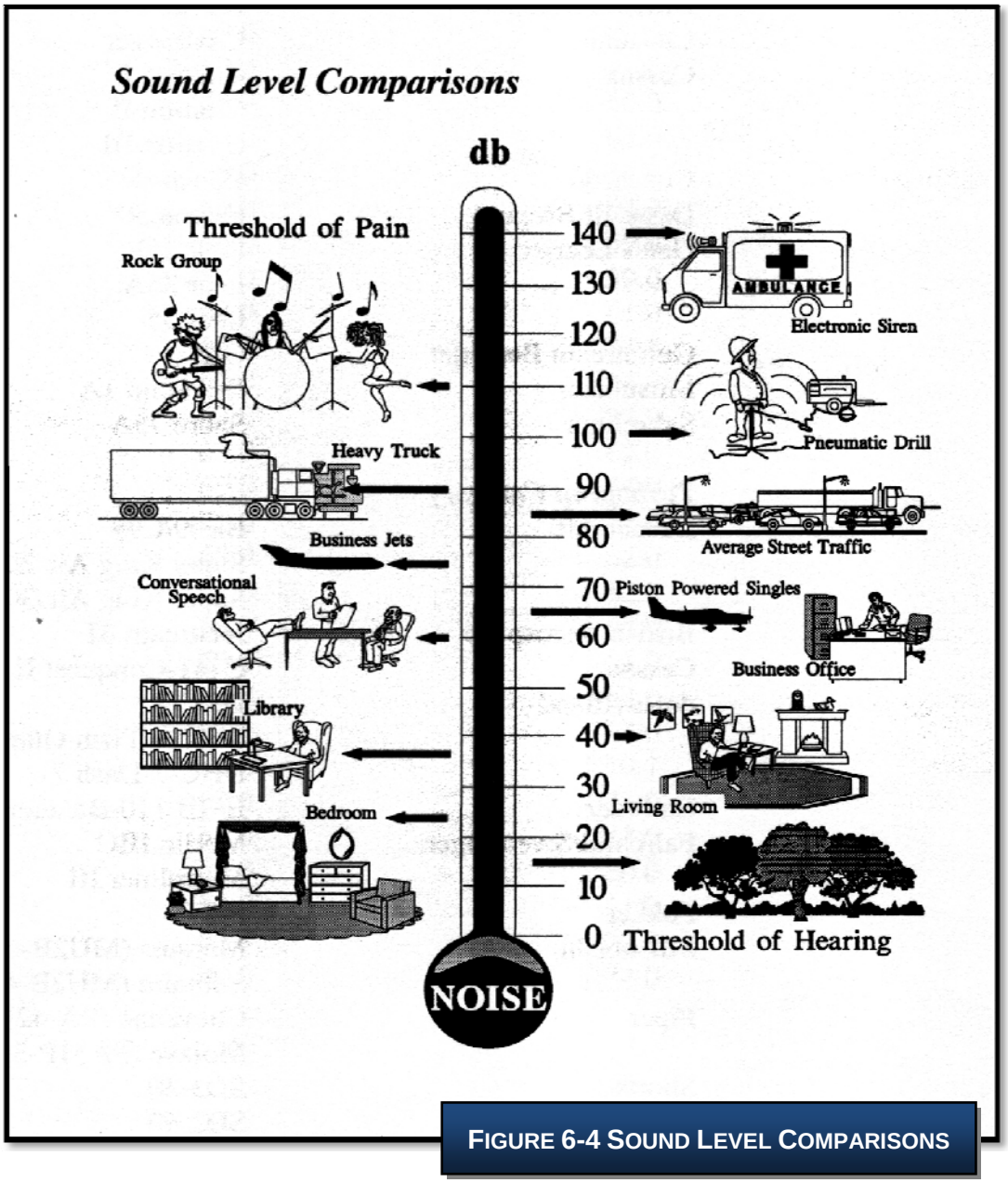


FIGURE 6-4 SOUND LEVEL COMPARISONS

6.15 VOLUNTARY NOISE ABATEMENT PROGRAM

Although the noise exposure levels will not exceed 65 DNL over any noise sensitive area, several voluntary measures can be applied to minimize noise exposure to surrounding areas. Several of these measures are listed below. It is recommended that a voluntary noise abatement program be implemented for the airport and publicized to all based and transient pilots.

Pilots:

- Be aware of noise sensitive areas, particularly residential areas near the airport and avoid low flight.
- Fly traffic patterns tight and high, keeping the aircraft as close to the field as possible.
- In constant-speed-propeller aircraft, do not use high RPM settings in the pattern. Propeller noise from high-performance singles and twins increases drastically at high RPM settings.
- On takeoff, reduce to climb power as soon as safe and practical.

- Climb after liftoff at best-angle-of-climb speed until crossing the airport boundary, then climb at best rate.
- Depart from the start of the runway rather than intersections, for the highest possible altitude when leaving the airport vicinity.
- Avoid prolonged run-ups and do them inside the airport area, rather than at its perimeter.
- Try low-power approaches and always avoid the low, dragged-in approach.

Instructors:

- Teach noise abatement procedures to all students, including pilots you take up for flight reviews.
- Know noise-sensitive areas and point them out to students.
- Assure students fly at or above the recommended pattern altitude.
- Practice maneuvers over unpopulated areas and vary practice areas so that the same locale is not constantly subjected to aircraft operations.
- During practice of ground-reference maneuvers, be particularly aware of houses or businesses in your flight path.
- Stress that high RPM propeller settings are reserved for takeoff and for short final but not for flying in the pattern. Pushing the propeller to high RPM results in significantly higher levels of noise.

Fixed Base Operators (FBOs):

- Identify noise-sensitive areas and work with customers to create voluntary noise abatement procedures.
- Post any noise abatement procedures in a prominently visible area and remind pilots of the importance of adhering to them.
- Call for the use of the least noise sensitive runway whenever wind conditions permit.
- Initiate pilot education programs to teach and explain the rationale for noise abatement procedures and positive community relations.

Airport Owner and Surrounding Jurisdictions:

- Maintain appropriate zoning in the vicinity of the airport and see that noise sensitive land uses are not authorized within pattern, approach and departure paths.
- Disclose the existence of the airport and the airport influence area to real estate purchasers.
- Publish voluntary noise procedures on the Internet.
- Publish voluntary calm runway use procedures.

Source: Aircraft Owners and Pilots Association (AOPA)

6.16 SECONDARY (INDUCED) IMPACTS

These secondary or induced impacts involve major shifts in population, changes in economic climate or shifts in levels of public service demand. The effects are directly proportional to the scope of the project under consideration. Assessment of induced socioeconomic impacts is usually only associated with major development at large air carrier airports, which involve major terminal building development or roadway alignments and similar work. The extent of the indirect socioeconomic impacts of the proposed development is not of the magnitude that would normally be considered significant; however, positive impacts can be expected in the form of direct, indirect and induced economic benefits generated from the airport.

6.17 SOCIOECONOMIC IMPACTS, ENVIRONMENTAL JUSTICE AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, the accompanying Presidential Memorandum and Order DOT 5610.2, Environmental Justice, require the FAA to provide for meaningful public involvement by minority and low-income populations and analysis, including demographic analysis that identifies and addresses potential impacts on these populations that may be disproportionately high and adverse. Included in this process is the disclosure of the effects on subsistence patterns of consumption of fish, vegetation or wildlife and effective public participation and access to this information. The Presidential Memorandum that accompanied E.O. 12898, as well as the CEQ and EPA Guidance, encourage consideration of environmental justice impacts in EA's especially to determine whether a disproportionately high and adverse impact may occur. Environmental Justice is also considered during evaluation of other impact categories, such as noise, air quality, water, hazardous materials and cultural resources.

6.17.1 SOCIOECONOMIC IMPACTS

Induced socioeconomic impacts are usually only associated with major development at large air carrier airports. The socioeconomic impacts produced as a result of the proposed improvements to the Holbrook Municipal Airport are expected to be positive in nature and would include direct, indirect and induced economic benefits to the local area. These airport improvements are expected to attract additional users and in turn to encourage tourism, industry and to enhance the future growth and expansion of the community's economic base.

If acquisition of real property or displacement of persons is involved, 49 CFR Part 24 (implementing the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970), as amended, must be met for Federal projects and projects involving Federal funding. Otherwise, the FAA, to the fullest extent possible, observes all local and State laws, regulations and ordinances concerning zoning, transportation, economic development, housing, etc. when planning, assessing or implementing the proposed action.

6.17.2 ENVIRONMENTAL JUSTICE

The focus of the Environmental Justice evaluation is to determine whether the proposed action results in an inequitable distribution of negative effects to special population groups, as compared to negative effects on other population groups. These special population groups include minority or otherwise special ethnicity or low-income neighborhoods.

The proposed action is not expected to result in any significant negative impacts to any population groups and therefore, would not result in disproportionate negative impacts to any special population group. Socioeconomic and induced economic impacts are expected to be positive in nature and are expected to benefit all population groups in the area.

6.17.3 CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

Pursuant to Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, Federal agencies are directed, as appropriate and consistent with the agency's mission, to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. Agencies are encouraged to participate in implementation of the Order by ensuring that their policies, programs, activities and standards address disproportionate risks to children that result from environmental health risks or safety risks. The proposed improvements are not expected to result in any environmental health risks or safety risks on children.

6.18 WATER QUALITY

Water quality considerations related to airport development often include increased surface runoff and erosion and pollution from fuel, oil, solvents and deicing fluids. Potential pollution could come from petroleum products spilled on the surface and carried through drainage channels off of the airport. State and Federal laws and regulations have been established to safeguard these facilities. These regulations include standards for above ground and underground storage tanks, leak detection and overflow protection. An effective Storm Water Pollution Prevention Plan (SWPPP) identifies storm water discharge points on the airport, describes measures and controls to minimize discharges and details spill prevention and response procedures. In July of 2002, the EPA amended the Oil Pollution Prevention Regulation at Title 40 of the Code of Federal Regulations, Part 112 (40 CFR Part 112). Subparts A through C of this regulation are often referred to as the "SPCC rule" because they describe requirements for certain facilities (including airports) to prepare and implement Spill Prevention Control and Countermeasure (SPCC) Plans.

Before a facility is subjected to the SPCC rule it must meet three criteria: 1) it must be non-transportation related; (non-transportation-related facilities may include the following but are not limited to airports, oil drilling, power generators, oil refineries, marinas, fish canneries, farms, construction sites, oil storage and oil production) 2) it must have an aggregate aboveground storage capacity greater than 1,320 gallons, or a completely buried storage capacity greater than 42,000 gallons; and 3) there must be a reasonable expectation of a discharge into or upon Navigable Waters of the United States. Criteria 1 and 2 are clearly met. Based on the initial analysis, it appears that there is no reasonable expectation of a discharge into or upon any Navigable Waters of the United States. Therefore, an SPCC plan would not be required; however, developing a plan would provide an extra level of pollution prevention and written response procedures in the event of a fuel spill.

In accordance with Section 402(p) of the Clean Water Act, a National Pollution Discharge Elimination System (NPDES) General Permit is required from the Environmental Protection Agency for construction projects that disturb at least one acre of land. Applicable contractors will be required to comply with the requirement and procedures of the NPDES General Permit, including the preparation of a Notice of Intent and a Storm Water Pollution Prevention Plan, prior to the initiation of construction activities.

Recommendations established in FAA Advisory Circular 150/5370-10E, Standards for Specifying Construction of Airports, Item P-156, Temporary Air and Water Pollution, Soil Erosion and Siltation Control, will be incorporated into the project design and specifications. The design and construction of the proposed improvements will incorporate Best Management Practices (BMP) to reduce erosion, minimize sedimentation, control non-storm water discharges and to protect the quality of surface water features potentially affected. These practices will be selected based on the site's characteristics and those factors within the contractor's control and may include: construction scheduling, limiting exposed areas, runoff velocity reduction, sediment trapping and good housekeeping practices.

Future fuel storage and dispensing facilities should be designed, constructed, operated and maintained in accordance with Federal, State and Local regulations. Waste fluids, including oils, coolants, degreasers and aircraft wash facility wastewater will be managed and disposed of in accordance with applicable Federal, State and Local regulations.

Correspondence was sent to the Arizona Department of Environmental Quality (ADEQ) Office. The ADEQ responded with recommendations on several key items including; adherence to water quality standards, project work responsibility, activities on impaired waters, construction general permit, best management practices and hazardous and deleterious materials. A copy of the letter can be found in Appendix D.

6.19 WETLANDS

Wetlands are defined in Executive Order 11990, Protection of Wetlands, as "those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support, a prevalence of vegetation 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, potholes, wet meadows, river overflows and natural ponds. Jurisdictional Waters of the United States may also include drainage channels, washes, ditches, arroyos or other waterways that are tributaries to Navigable Water of the United States or other waters where the degradation or destruction of which could affect interstate or foreign commerce.

Correspondence was sent to the U.S. Army Corps of Engineers. The response from the US Army Corps of Engineers indicated that development of the Holbrook Municipal Airport would require a Department of the Army permit issued under section 404 of the Clean Water Act if there is a discharge of dredged or fill material into the "water of the United States", including adjacent wetlands. A copy of the letter is located in Appendix D; however, no Waters of the U.S. or wetlands have been identified within the project area.

6.20 WILD AND SCENIC RIVERS

The Wild and Scenic Rivers Act (PL 90-542) describes those river areas eligible for protection from development. As a general rule, these rivers possess outstanding scenic, recreational, geological, fish and wildlife, historical, cultural or other similar value.

The Wild and Scenic River list from the National Park Service indicated eight Wild and Scenic Rivers listed in Arizona. The closest Wild and Scenic Rivers are the Verde River and Fossil Creek, which are located approximately 85 miles to the southwest of the project location. Therefore, the proposed improvements would not affect any Wild and Scenic Rivers.

6.21 MEANS TO MITIGATE AND/OR MINIMIZE ADVERSE ENVIRONMENTAL IMPACTS

Where appropriate, the mitigation or minimization of environmental impacts was noted in the discussion of impacts. These actions are summarized below:

- Maintain compatible land uses in the vicinity of the airport;
- Acquire land for the runway extension and landside development in accordance with Federal regulations;
- Utilize pilot controlled lighting on all airfield lighting. Utilize timers or motion sensors for apron and automobile parking area lights;
- Adhere to FAA AC 150/5370-10E, Standards for Specifying the Construction of Airports and best management practices to minimize or eliminate impacts to water quality and air quality during construction;

6.22 SUMMARY AND CONCLUSIONS OF ENVIRONMENTAL IMPACTS

Table 6-2 provides a summary of the analysis ratings for the eighteen environmental impact categories with respect to the proposed airport improvements. While some categories indicate a potential impact, they are all estimated to be below the threshold of significance as described in FAA Order 5050.4B. The selected alternatives for the development, offer the least overall environmental impact of all the potential development alternatives evaluated.

TABLE 6-2 RECOMMENDED DEVELOPMENT POTENTIAL ENVIRONMENTAL IMPACTS

ENVIRONMENTAL CATEGORY	IMPACT LEVEL	DESCRIPTION
Air Quality	⦿	Short-term dust and exhaust
Coastal Resources	○	
Compatible Land Use	○	
Construction Impacts	⦿	Short-term dust and exhaust, erosion
DOT Act Section 4(F)	○	
Farmlands	○	
Fish, Wildlife and Plants	○	
Floodplains	○	
Hazardous Materials Pollution Prevention and Solid Waste	○	Prepare SPCC Plan
Historical, Architectural, Archeological and Cultural Resources	○	Conduct cultural resource survey
Light Emissions and Visual Impacts	○	
Natural Resources and Energy Supply	○	
Noise	○	
Secondary (Induced) Impacts	⦿ Positive	Economic benefit from airport
Socioeconomic Impacts, Environmental Justice and Children's Environmental Health	⦿ Positive	Economic benefit from airport
Water Quality	⦿	Storm water runoff, prepare SPCC plan
Wetlands	○	Avoid Waters of the U.S.
Wild and Scenic Rivers	○	

Legend:
○ No Impact
⦿ Minor Impact
● Significant Impact

Chapter Seven

Airport Development and Financial Plan

ARMSTRONG CONSULTANTS, INC.

AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport
Airport Master Plan

Chapter Seven: Airport Development and Financial Plan

7.1 INTRODUCTION

A program of recommended airport development for the Holbrook Municipal Airport has been formulated to guide the sponsor in the systematic development of the airport and to aid the Federal Aviation Administration, Arizona Department of Transportation Aeronautics Group and the City in allocating funding over the planning period. In Arizona, projects eligible for Airport Improvement Program (AIP) participation are normally funded at 95 percent by the FAA, 2.5 percent by the State and 2.5 percent by the Sponsor. The grant eligible items typically include airfield and aeronautical related facilities such as runways, taxiways, aprons, lighting and visual aids as well as land acquisition and environmental tasks needed to accomplish the improvements. The public use (non-revenue generating) portions of passenger and general aviation terminal building are also grant eligible. In addition, recent AIP legislation has made fuel systems and hangars eligible, however, these items are considered a low priority for FAA funding and require airside development needs to be met first.

7.2 AIRPORT DEVELOPMENT PLAN

Future airport development at the Holbrook Municipal Airport, as included in this study, covers a twenty-year period. Development items are grouped into three phases. Phase I is short-term (1-5 years), Phase II is medium-term (6-10 years) and Phase III is long-term (11-20 years). Estimated development costs are based on the proposed improvements (as shown on the airport layout plan) and are included for each item in the financial development plan. Proposed improvements are based on the recommended facility requirements discussed in Chapter 3 and the selected alternatives in Chapter 4 as shown in Figures 7-1 and 7-2. The phasing of projects assists the airport sponsor in budgetary planning for construction projects. A drawing showing the phasing of each project is included at the end of this Chapter (Figure 7-3). The sequence in which the projects are completed is important as the ultimate configuration of the airport will require numerous projects.

Phase I (1-5 Years)
- Environmental Assessment for Runway 11/29
- Design and Construct Crosswind Runway 11/29
- Install PAPIs and REILs Runway 11/29
- Construct Taxilanes Phase I

Phase II (6-10 Years)
- Environmental Assessment for Runway 3/21 shift, and extension
- Acquire Land for Runway 3/21 Shift, Extension, RPZ and BRL
- Runway 3/21 Shift, Extend and Extend Parallel Taxiway (design and construction)
- Install PAPIs and REILs Runway 3/21
- Relocate Airport Beacon and Buildings
- Construct Taxilanes Phase II
- Pavement Maintenance
- Snow Removal Equipment Building
- ALP Update

Phase III (11-20 Years)
- Design and Relocate Taxiway A
- Environmental Assessment for Apron
- Apron Expansion
- Construct Taxilanes Phase III
- Pavement Maintenance
- Airport Master Plan Update

FIGURE 7-1 RUNWAY 3/21

FIGURE 7-2 RUNWAY 11/29

TABLE 7-1 20-YEAR FINANCIAL DEVELOPMENT PLAN					
PHASE I, SHORT-TERM DEVELOPMENT ITEMS		**TOTAL**	**FAA**	**STATE**	**LOCAL**
A1	Environmental Assessment for Runway 11/29	$150,000	$142,500	$3,750	$3,750
A2	Design and Construct Crosswind Runway 11/29*	$3,294,000	$3,129,300	$82,350	$82,350
A3	Install PAPIs and REILs Runway 11/29	$124,000	$117,800	$3,100	$3,100
A4	Construct Taxilanes Phase I	$150,000	$142,500	$3,750	$3,750
TOTAL SHORT TERM COST		**$3,718,000**	**$3,532,100**	**$92,950**	**$92,950**
PHASE II, MEDIUM-TERM DEVELOPMENT ITEM		**TOTAL**	**FAA**	**STATE**	**LOCAL**
B1	Environmental Assessment for Runway 3/21	$225,000	$213,750	$5,625	$5,625
B2	Acquire Land for Runway 3/21 Shift, Extension, RPZ and BRL	$266,000	$252,700	$6,650	$6,650
B3	Runway 3/21** Shift, Extend and Extend Parallel Taxiway (design and construction)	$1,635,000	$1,553,250	$40,875	$40,875
B4	Install PAPIs and REILs Runway 3/21	$124,000	$117,800	$3,100	$3,100
B5	Relocate Airport Beacon and Buildings	$155,000	$147,250	$3,875	$3,875
B6	Construct Taxilanes Phase II	$150,000	$142,500	$3,750	$3,750
B7	Pavement Maintenance	$150,000	$142,500	$3,750	$3,750
B8	Snow Removal Equipment Building	$400,000	$380,000	$10,000	$10,000
B9	ALP Update	$100,000	$95,000	$2,500	$2,500
TOTAL MEDIUM TERM COST		**$3,205,000**	**$3,044,750**	**$80,125**	**$80,125**
PHASE III, LONG-TERM DEVELOPMENT ITEM		**TOTAL**	**FAA**	**STATE**	**LOCAL**
C1	Design and Relocate Taxiway A**	$2,711,000	$2,575,450	$67,775	$67,775
C2	Environmental Assessment for Apron	$185,000	$175,750	$4,625	$4,625
C3	Apron Expansion	$495,000	$470,250	$12,375	$12,375
C4	Construct Taxilanes Phase III	$536,000	$509,200	$13,400	$13,400
C5	Pavement Maintenance	$150,000	$142,500	$3,750	$3,750
C6	Airport Master Plan Update	$225,000	$213,750	$5,625	$5,625
TOTAL LONG-TERM COST		**$4,302,000**	**$4,086,900**	**$107,550**	**$107,550**
TOTAL		**$11,225,000**	**$10,663,750**	**$280,625**	**$280,625**

Cost estimates in 2010 dollars includes engineering, administration and contingency
**Including lighting, signage and markings*
*** Includes removal of existing pavement, lighting, signage and markings*

7.3 CAPITAL DEVELOPMENT

Federal Grant Assistance: The phasing of projects assists the airport sponsor in budgetary planning for construction improvements that are needed to provide safe and functional facilities for aviation demands. Phased development schedules also assist the airport sponsor in contingencies and construction. Table 7-1 assumes that the Federal Aviation Administration will participate with funding from the Airport Improvement Program (AIP) of 95 percent of eligible items and the Arizona Department of Transportation Aeronautics Group will contribute 2.5 percent towards capital improvements. The City of Holbrook would then be responsible for providing 2.5 percent matching funds for grant eligible projects. The City may meet its local share requirements through cash, in-kind service, force-account, donations or private/third party participation.

The Airport and Airways Act of 1982 created and authorized the Airport Improvement Program (AIP) to assist in the development of a nationwide system of public-use airports adequate to meet the current projected growth of civil aviation. The Act provides funding for airport planning and development projects at airports included in the National Plan of Integrated Airport Systems (NPIAS).

State Assistance: ADOT Aeronautics Group participates in funding airport development and maintenance projects in the State of Arizona. ADOT normally contributes 90 percent to projects without Federal participation and contributes 2.5 percent matching funds to the FAA's 95 percent funding of Federally eligible capital improvement projects. The resulting local share is generally 2.5 percent for FAA and State funded projects and 10 percent for State only funded projects. Due to the current financial situation of the State of Arizona there is a possibility of deferred payments or possible lesser share or no match; however, this condition appears to be improving and the State is now making the deferred grant payments and issuing new matching grants.

Funding The Local Share: The airport sponsor has several methods available for funding the capital required to meet the local share of airport development costs. The most common methods involve cash, debt financing which amortize the debt over the useful life of the project, force accounts, in-kind service, third-party support and donations.

Bank Financing: Some airport sponsors use bank financing as a means of funding airport development. Generally, two conditions are required. First, the sponsor must show the ability to repay the loan plus interest and second, capital improvements must be less than the value of the present facility or some other collateral used to secure the loan. These are standard conditions which are applied to almost all bank loan transactions.

General Obligation Bonds: General Obligation bonds (GO) are a common form of municipal bonds whose payment is secured by the full faith credit and taxing authority of the issuing agency. GO bonds are instruments of credit and because of the community guarantee, reduce the available debt level of the sponsoring community. This type of bond uses tax revenues to retire debt and the key element becomes the approval of the voters to a tax levy to support airport development. If approved, GO bonds are typically issued at a lower interest rate than other types of bonds.

Self-liquidating General Obligation Bonds: As with General Obligation bonds, Self-liquidating General Obligation Bonds are secured by the issuing government agency. They are retired, however, by cash flow from the operation of the facility. Providing the state court determines that the project is self-sustaining, the debt may be legally excluded from the community's debt limit. Since the credit of the local government bears the ultimate risk of default, the bond issue is still considered, for the purpose of financial analysis, as part of the debt burden of the community. Therefore, this method of financing may mean a higher rate of interest on all bonds sold by the community. The amount of increase in the interest rate depends, in part, upon the degree of risk of the bond. Exposure risk occurs when there is insufficient net airport operating income to cover the level of service plus coverage requirements, thus forcing the community to absorb the residual.

Revenue Bonds: Revenue Bonds are payable solely from the revenues of a particular project or from operating income of the borrowing agency, such as an airport commission which lacks taxing power. Generally, they fall outside of constitutional and statutory limitations and in many cases do not require voter approval. Because of the limitations on the other public bonds, airport sponsors are increasingly turning to revenue bonds whenever possible. However, revenue bonds normally carry a higher rate of interest because they lack the guarantees of municipal bonds. It should also be noted that the general public would usually be wary of the risk involved with a revenue bond issue for a general aviation airport. Therefore, the sale of such bonds could be more difficult than other types of bonds.

Combined Revenue/General Obligation Bonds: These bonds, also known as "Double-Barrel Bonds", are secured by a pledge of back-up tax revenues to cover principal and interest payments in cases where airport revenues are insufficient. The combined Revenue/General Obligation Bond interest rates are usually lower than Revenue Bonds, due to their back-up tax provisions.

Force Accounts, In-kind Service, Donations: Depending on the capabilities of the Sponsor, the use of force accounts, in-kind service, or donations may be approved by the FAA and the State for the Sponsor to provide their share of the eligible project costs. An example of force accounts would be the use of heavy machinery and operators for earthmoving and site preparation of runways or taxiways; the installation of fencing; or the construction of improvements to access roads. In-kind service may include surveying, engineering or other services. Donations may include land or materials such as gravel or water needed for the project. The values of these items must be verified and approved by the FAA prior to initiation of the project.

Third-Party Support: Several types of funding fall into this category. For example, individuals or interested organizations may contribute portions of the required development funds (Pilot Associations, Economic Development Associations, Chambers of Commerce, etc.). Although not a common means of airport financing, the role of private financial contributions not only increases the financial support of the project, but also stimulates moral support to airport development from local communities. Because of the potential for hangar development, private developers may be persuaded to invest in hangar development. A suggestion would be that the City authorize long-term leases to individuals interested in constructing a hangar on airport property. This arrangement generates revenue from the airport, stimulates airport activity, and minimizes the sponsor's capital investment requirements. Another method of third-party support involves permitting the fixed base operator (FBO) to construct and monitor facilities on property leased from the airport. Terms of the lease generally include a fixed amount plus a percentage of revenues and a fuel flowage fee. The advantage to this arrangement is that it lowers the sponsor's development costs, a large portion of which is building construction and maintenance.

7.4 FINANCIAL PLAN

The ultimate goal of any airport should be the capability to support its own operation and development through airport generated revenues. Unfortunately, few airports similar in size to the Holbrook Municipal Airport are able to do this. For example, it is difficult to break even when the fees received from hangar rentals and fuel sales will not adequately amortize the cost of construction projects. Yet the effort to become self-sufficient will generate a more positive perception of the airport by the community.

However, while most airports the size of Holbrook Municipal Airport are not able to become self-sustaining, the intrinsic value of such a well-maintained airport for the community or region exceeds the day-to-day operational and maintenance costs of the airport. In other words, the dollars spent in the community or the region by individuals or businesses that use the airport exceeds the expenses that are incurred as a result of operation of the airport. Furthermore, the Holbrook Municipal Airport provides access for valuable services to the City of Holbrook.

7.5 PROJECTED REVENUES AND EXPENDITURES

Expenditures: Airport operating expenditures typically include insurance, utilities, maintenance and management costs. Insurance costs include liability insurance for the airport and property insurance for any real property on the airport owned by the City of Holbrook. Utility expenses primarily consist of power costs to operate airfield lighting and visual aids and water for public use areas. Pavement maintenance consists of crack sealing on an annual basis and seal coating and remarking the pavements every five years. Facility maintenance consists of mowing, snow removal and repair and replacement of parts and equipment such as light bulbs, light fixtures, fences, etc. Management costs may include an airport

manager or contract services provided by a third party or an FBO. Currently the airport manager oversees and administers the day-to-day details for the airport.

Revenues: Airport revenues generally consist of land leases, user fees and property taxes generated from on-airport improvements. Table 7-2 also shows the current rates and charges at the Holbrook Municipal Airport.

Land Leases: Property on the airport that is not devoted to airfield use, vehicle parking or contained within areas required to be cleared of structures may be leased to individual airport users or aviation related businesses. Typically, the individual is provided a long-term lease on which to construct a hangar, business or other facility. At the termination of the lease, the lessee has the option to renew the lease, sell or lease the buildings or to remove the buildings.

Hangar Leases: Hangars on the airport owned by the airport sponsor can be leased to private aircraft operators or businesses. Typically, as with land leases, the individual or business is provided a long-term lease of the hangar. At the termination of the lease, the lessee has the option to renew the lease or cease use of the hangar.

Hangar Rental: The fees are usually established on a nightly rate for transient aircraft or monthly rate for based aircraft.

Tie-Down Fees: A fee is typically established for the use of fixed ramp tiedowns on paved apron areas. The fees are usually established on a monthly or annual basis for based aircraft and on an overnight basis for transient aircraft. There are no existing tiedown fees for the airport.

Through-the-Fence Fees: A fee is typically charged to adjacent landowners who are provided access directly from their private parcel to the public use airport facilities. This fee ensures that the level of rates and charges assessed to on-airport users is equitable to off-airport users and that there is not an unfair economic advantage to operating "through-the-fence". Additionally, through-the-fence operators are required to maintain a secure airport perimeter with fencing and/or gates and to construct paved access taxiways to the airport operating areas. However, the FAA generally discourages through-the-fence operations. Therefore, it is anticipated that all aircraft operations will be conducted from on airport and therefore will not generate through-the-fence fees. In lieu of through-the-fence fees, these aircraft would generate tie-down fees or land lease revenue from hangars. The airport has no existing through-the-fence operations.

Fuel Flowage Fee: This fee is typically imposed on all aircraft fuels delivered to the airport and would include all fuels used by aircraft including AvGas, Jet-A, and MoGas. The fee would apply to fixed base operators, self-fueling (if authorized) and through-the-fence operators who conduct self-fueling.

Airport Usage Fee: This fee is typically imposed on charter aircraft and can be waived if the operator purchases a minimum amount of fuel. The airport has no usage fee.

Commercial Activity Fee: This fee is typically imposed on commercial activities operating "for profit" at the airport. Typical commercial activities may include fixed base operators, maintenance services, air taxi or charter services, automobile rental, restaurants, retail or other goods and services which may be provided at the airport. The Holbrook Municipal Airport has no existing commercial activity fee.

Non-Aeronautical Revenue Generating: This fee is imposed on leases of land that are allocated as airport property but have not access and or use for aeronautical activities and are therefore used for non-aeronautical uses. The fee for these areas must be setup at fair market value and all revenue generated from these leases must remain within the airport fund.

All revenues generated by the airport must be expended by the airport for the capital or operating costs of the airport. No revenue generated on the airport may go into the general fund for the City of Holbrook. Projected revenues and expenses for the planning period are shown in Table 7-3.

TABLE 7-2 EXISTING AIRPORT RATES AND CHARGES

	CURRENT RATES
Hangar Rental Fees[1]	$50 / month
Based Aircraft Tiedown Fees	$30 / month

[1] T-Hangars owned by the City and leased to tenants
Source: Airport Manager, June 2010

TABLE 7-3 ANNUAL AIRPORT REVENUES AND EXPENSES - PROJECTED

	2008*	2010	2015	2020	2025	2030
AIRPORT REVENUE						
Aviation Fuel Sales	$76,253	$78,000	$86,000	$95,000	$105,000	$116,000
Hangar Rental and Tie-Down Fees	$2,413	$3,000	$5,000	$10,000	$16,000	$18,000
Land Leases	--	--	$2,500	$5,000	$8,000	$10,000
Non-aeronautical Revenues	--	--	$5,000	$10,000	$20,000	$25,000
TOTAL AIRPORT REVENUE	**$78,666**	**$81,000**	**$98,500**	**$120,000**	**$149,000**	**$169,000**
AIRPORT EXPENSES						
Payroll	$6,933	$0	$0	$0	$0	$0
Operations and Maintenance	$26,926	$28,500	$28,500	$28,500	$28,500	$28,500
Aviation Fuel Purchase	$81,252	$50,000	$50,000	$50,000	$50,000	$50,000
Capital Improvement Costs	--	--	$18,000	$18,000	$22,000	$22,000
TOTAL AIRPORT EXPENSES	**$115,111**	**$78,500**	**$96,500**	**$96,500**	**$96,500**	**$96,500**
NET EARNINGS/LOSS	**-$36,445**	**$2,500**	**$2,000**	**$23,500**	**$52,500**	**$72,500**

**Base year, source: City of Holbrook, Finance Department*
Projections in 2010 dollars

7.6 RECOMMENDATIONS

A review of airport revenues indicates that the level of rates and charges at the Holbrook Municipal Airport are comparatively low compared with other similar sized airports; however, these low fees provide a competitive advantage and contribute to aviation demand at the airport. Any decision to increase fees should be balanced against the potential opportunity costs of lost based aircraft and/or fuel sales. The most effective means of increasing revenue at the Holbrook Municipal Airport is to accommodate existing unmet demand and to continue to attract new and additional users.

Increasing aircraft storage hangars at the airport would result in not only increased direct revenues generated through land leases, but would also produce indirect revenue through increased use of airport services and facilities, such as increased fuel purchases. Locations for additional nested T-hangars and individual box hangars have been identified on the Terminal Area Drawing (TAD) included in Chapter 5. Business/corporate tenants are typically flight departments for local businesses and provide employment in the local community. They generally operate multi-engine turboprop or business jet aircraft. Their land lease parcels are usually large, the aircraft are typically operated two to three times per week and fuel purchases are typically larger than other general aviation user's (several hundred gallons per fueling).

Whether the improved Holbrook Municipal Airport operates at an annual surplus or subsidy depends greatly on the amount of activity and facilities that are constructed at the airport. Existing demand is currently constrained by the lack of aircraft storage facilities. The most efficient way for the City to accommodate this demand is to construct taxilanes and provide land leases for hangars. If demand for basing aircraft at the Holbrook Municipal Airport continues in the long-term, the City should consider constructing multi-unit T-hangars and/or box hangars.

7.7 COMMUNITY SUPPORT

While it would certainly be advantageous for an airport to support itself, the indirect and intangible benefits of the airport to the community's economy and growth must be considered. People are directly or indirectly employed on the airport by the City, the FBO and individual businesses. As airport activity increases, it is probable that employment on the airport will also grow throughout the planning period. The local construction industry will also benefit directly from implementation of the development programs. Other community benefits involve business growth and development that is enhanced by the availability of air transportation including corporate and private aviation. Clients and suppliers of area businesses will also benefit from the future improvement to the airfield.

The use of corporate and business aircraft is an increasing trend across the US. The movement of American industry from large metropolitan areas to smaller communities that offer lower taxes and labor costs and a better working environment has influenced this trend. Time is money in the business environment and corporate aircraft are answering the need for quick and convenient access to and from these new locations for both executives and management personnel. The ability of a community to provide convenient access to corporate aircraft will be reflected not only in benefits to existing businesses and industries but will be a strong factor in attracting new industry. The events of September 11, 2001, have also resulted in increased corporate and business aviation activity as companies are looking to avoid delays and inconveniences associated with commercial airline travel.

These factors place the Holbrook Municipal Airport in a prime position to capitalize on the trends in the general aviation industry and to maximize the benefits the airport provides to the community. According to the Economic Impact of Airports in Arizona conducted in 2002 it is estimated that 1.7 million dollars in economic activity and 28 jobs were attributable to the Holbrook Municipal Airport.

7.8 CONTINUOUS PLANNING PROCESS

Airport planning is a continuous process that does not end with the completion of a major project. The fundamental issues upon which this master plan are based are expected to remain valid for several years; however, several variables, such as based aircraft, annual aircraft operations, and socioeconomic conditions are likely to change over time. The continuous planning process necessitates that the City of Holbrook consistently monitor the progress of the airport in terms of growth in based aircraft and annual operations, as this growth is critical to the exact timing and need for new airport facilities. The information obtained from this monitoring process will provide the data necessary to determine if the development schedule should be accelerated, decelerated or maintained as scheduled.

Periodic updates of the Airport Layout Plan, Capital Improvement Plan, and Airport Master Plan are recommended to document physical changes to the airport, review changes in aviation activity and to update improvement plans for the airport. The primary goal of this Airport Master Planning effort is to develop a safe and efficient airport that will meet the demands of its aviation users and stimulate economic development for the City of Holbrook. The continuous airport planning process is a valuable tool in achieving that goal.

Appendix A
Design Standards Inventory

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport
Airport Master Plan

Airside Inventory Checklist

Airport	Holbrook Municipal Airport	ARC	B-I
City	City of Holbrook, Arizona	Approach Type	Basic Visual
Contact	Ray Alley	Date Inventoried	
Phone No.	928 524-6225	Inspected By	

Runway 3/21 Inventory	Published	Required B-I/B-II	Actual
Distance To:			
Hold lines from centerline	125'	125'/200'	
Parallel taxiway from centerline	200'	225'/240'	
Aircraft parking from centerline	252.5'/277.5'	200'/250'	
Runway width	75'	60'/75'	
Runway length	6,698'	--	
RSA width	120'	120'	
ROFA width	400'	400'	
Primary/transitional surface penetrations		Clear	
Longitudinal grade - site distance problems	0.41%	2%, RVZ Clear	
OFZ	250'	250'/400'	
Pavement marking type	Basic	Basic	
Pavement marking condition	P	-	
Pavement strength	12(S)	-	
Pavement condition	G	-	
Runway 3 End Inventory			
RSA beyond runway end	240'	240'/300'	
ROFA beyond runway end	240'	240'/300'	
Approach obstructions	--	--	Road, Fence (TSS Clear)
Runway end elevation	--	--	
RPZ	Fee Simple Partial	Owned in Fee	Residences in Departure RPZ
Runway 21 End Inventory			
RSA beyond runway end	240'	240'/300'	
ROFA beyond runway end	240'	240'/300'	
Approach obstructions		-	
Runway end elevation		-	
RPZ	Fee Simple	Owned in Fee	
Runway Lighting Inventory			
Distance from pavement edge		10' Max	
Maximum distance between lights		200' Max	
Type		Optional	
Condition		-	
Color		White	
Runway 3 Threshold			
Distance from pavement edge		10' Max	
Maximum distance between lights		Varies	
Color/Number of Lights		Red/Green/6	
Runway 21 Threshold			
Distance from pavement edge		10' Max	
Maximum distance between lights		Varies	
Color/Number of Lights		Red/Green/6	

COMMENTS Current design aircraft: King Air C-90

Airside Inventory Checklist

Airport	Holbrook Municipal Airport	ARC	B-I[2]
City	City of Holbrook, Arizona	Approach Type	Basic Visual
Contact	Ray Alley	Date Inventoried	
Phone No.	928 524-6225	Inspected By	

Runway 11/29 Inventory	Published	Required B-I[2]/B-II	Actual
Distance To:			
Hold lines from centerline	125'	125'/200'	
Parallel taxiway from centerline	none	150'/225'	
Aircraft parking from centerline		125'/250'	
Runway width	120'	60'/75'	
Runway length	3,200'	-	
RSA width	120'	120'/150'	
ROFA width	400'	250'/500'	
Primary/transitional surface penetration		Clear	
Longitudinal grade - site distance proble	0.44%	2%, RVZ Clear	
OFZ	250'	250'/400'	
Pavement marking type	None	Basic	
Pavement marking condition		-	
Pavement strength		-	
Pavement condition		-	
Runway 11 End Inventory			
RSA beyond runway end	240'	240'/300'	
ROFA beyond runway end	240'	240'/300'	
Approach obstructions		-	
Runway end elevation		-	
RPZ	Fee Simple Partial	Owned in Fee	
Runway 29 End Inventory			
RSA beyond runway end	240'	240'/300'	
ROFA beyond runway end	240'	240'/300'	
Approach obstructions		-	Commercial Buildings
Runway end elevation		-	
RPZ	Fee Simple	Owned in Fee	Commercial Buildings
Runway Lighting Inventory			
Distance from pavement edge		10' Max	
Maximum distance between lights		200' Max	
Type		Optional	
Condition		-	
Color		White	
Runway 11 Threshold			
Distance from pavement edge		10' Max	
Maximum distance between lights		Varies	
Color/Number of Lights		Red/Green/6	
Runway 29 Threshold			
Distance from pavement edge		10' Max	
Maximum distance between lights		Varies	
Color/Number of Lights		Red/Green/6	

COMMENTS

Airside Inventory Checklist

Airport	Holbrook Municipal Airport	ARC	B-I
City	City of Holbrook, Arizona	Approach Type	Basic Visual
Contact	Ray Alley	Date Inventoried	
Phone No.	928 524-6225	Inspected By	

Taxiway A Inventory	Published	Required B-I	Actual
Taixway width	35'	25'/35'	
TSA width	49'	49'/79'	
TOFA width	89'	89'/131'	
Dist. from centerline to fixed or movable obj		44.5/65.5	
Pavement marking type		Centerline	
Pavement marking condition		-	
Pavement strength		-	
Pavement condition		-	
Taxiway Lighting Inventory			
Distance from pavement edge		10'	
Maximum distance between lights		100'	
Type		-	
Condition		-	
Color		Blue	
Miscellaneous			
Type of beacon	Clear-Green	Yes	
Size of beacon		-	
Visual Aids (i.e. PAPI, VASI, REIL, etc.)	P2L	-	
Windcone (condition & compliance)	Yes-L	Yes	
Segmented circle (condition & compliance)	Yes	Yes	Very Poor Condition
Traffic Pattern Indicator		No	
Fencing		Perimeter	
Signs (type, condition, placement)		Yes	

COMMENTS

Landside Inventory Checklist

Airport	Holbrook Municipal Airport	ARC	B-I
City	City of Holbrook, Arizona	Approach Type	Basic Visual
Contact	Ray Alley	Date Inventoried	
Phone No.	928 524-6225	Inspected By	

Facilities	Existing	Notes
Tie-downs	40	
T-hangars	8-unit/3-unit	
Box hangars		
Apron		
Size	27,200 SY	
Pavement strength		
Pavement condition		
Pavement marking		
Pavement marking condition		
Automobile parking	4 parking spaces	
Weather equipment	AWOS	
Fuel storage	11,750 gallons	
Fuel type available	100LL	
FBO/Terminal building	13,200 sf	7,500 sf hangar space
Port-a-port hangar		

COMMENTS

Appendix B
Forecast Summary in FAA Format

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport
Airport Master Plan

	Year	Airport Forecast	TAF	AF/TAF (% Difference)
Passenger Enplanements				
Base yr.	2010	0	0	#DIV/0!
Base yr. + 5yrs.	2015	0	0	#DIV/0!
Base yr. + 10yrs.	2020	0	0	#DIV/0!
Base yr. + 15yrs.	2025	0	0	#DIV/0!
Commercial Operations				
Base yr.	2010	0	0	#DIV/0!
Base yr. + 5yrs.	2015	0	0	#DIV/0!
Base yr. + 10yrs.	2020	0	0	#DIV/0!
Base yr. + 15yrs.	2025	0	0	#DIV/0!
Total Operations				
Base yr.	2010	4,412	3,630	21.5%
Base yr. + 5yrs.	2015	5,036	3,630	38.7%
Base yr. + 10yrs.	2020	5,659	3,630	55.9%
Base yr. + 15yrs.	2025	6,282	3,630	73.1%

NOTES: TAF data is on a U.S. Government fiscal year basis (October through September).
AF/TAF (% Difference) column has embedded formulas.

A. Forecast Levels and Growth Rates

AIRPORT NAME:Holbrook Muncipal Airport **Specify base year:** 2008

	Base Yr. Level	Base Yr. + 1yr.	Base Yr. + 5yrs.	Base Yr. + 10yrs.	Base Yr. + 15yrs.	Average Annual Compound Growth Rates: Base yr. to +1	Base yr. to +5	Base yr. to +10	Base yr. to +15
Passenger Enplanements									
Air Carrier	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Commuter	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
TOTAL	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Operations									
Itinerant									
Air carrier						#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Commuter/air taxi						#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Total Commercial Operations	336	353	403	453	503	5.1%	3.7%	3.0%	2.7%
General aviation	2,990	3,142	3,585	4,029	4,472	5.1%	3.7%	3.0%	2.7%
Military	34	35	41	45	51	2.9%	3.8%	2.8%	2.7%
Local									
General aviation	840	882	1,007	1,132	1,256	5.0%	3.7%	3.0%	2.7%
Military	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
TOTAL OPERATIONS	4,200	4,412	5,036	5,659	6,282	5.0%	3.7%	3.0%	2.7%
Instrument Operations	0	0	76	85	94	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Peak Hour Operations	3	3	3	3	4	0.0%	0.0%	1.7%	1.7%
Cargo/mail (enplaned+deplaned tons)	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Based Aircraft									
Single Engine (Nonjet)	7	7	7	7	8	0.0%	0.0%	0.0%	0.9%
Multi Engine (Nonjet)	0	0	0	1	1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Jet Engine	0	0	1	1	1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Helicopter	0	0	0	1	1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Other	7	7	7	7	7	0.0%	0.0%	0.0%	0.0%
TOTAL	14	14	15	17	18	0.0%	1.4%	2.0%	1.7%

B. Operational Factors

	Base Yr. Level	Base Yr. + 1yr.	Base Yr. + 5yrs.	Base Yr. + 10yrs.	Base Yr. + 15yrs.
Average aircraft size (seats)					
Air carrier	0.0	0.0	0.0	0.0	0.0
Commuter	0.0	0.0	0.0	0.0	0.0
Average enplaning load factor					
Air carrier	0.0%	0.0%	0.0%	0.0%	0.0%
Commuter	0.0%	0.0%	0.0%	0.0%	0.0%
GA operations per based aircraft	274	287	306	304	318

Note: Show base plus one year if forecast was done. If planning effort did not include all forecast years shown interpolate years as needed, using average annual compound growth rates.

NOTE: Right hand side of worksheet has embedded formulas for average annual compound growth rate calculations.

Appendix C
Agency Coordination Letters

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport
Airport Master Plan

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

May 17, 2010

ACI# 095910

Mr. Bret Parke
Arizona Department of Environmental Quality
Administrative Council
1110 West Washington St.
Phoenix, AZ 85007

RE: Holbrook Municipal Airport Master Plan

Dear Mr. Parke:

Armstrong Consultants has been retained to prepare an updated Airport Master Plan for the Holbrook Municipal Airport in Holbrook, AZ. To assist us in preparing this Master Plan and to comply with the requirements of NEPA and the Federal Aviation Administration, we request your comments concerning potential impacts to air quality, water quality and any permitting requirements.

Enclosed for your reference is a drawing of the proposed improvements to the Holbrook Municipal Airport. The Holbrook Municipal Airport is located within Sections 20 and 29, Township 18 North, Range 21 East of the Arizona Meridian. Please forward any comments at your earliest convenience. Please contact me at (970) 242-0101 if you have any questions regarding this project. Thank you for your assistance.

Sincerely,

ARMSTRONG CONSULTANTS, INC.

Hans Dorries
Airport Planner

Enclosures

861 Rood Avenue • Grand Junction, Colorado 81501
www.armstrongconsultants.com
tel 970.242.0101
fax 970.241.1769

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

May 17, 2010

ACI# 095910

State Historic Preservation Office
Arizona State Parks
1300 W. Washington Street
Phoenix, AZ 85007

RE: Holbrook Municipal Airport Master Plan

Attn. Executive:

Armstrong Consultants has been retained to prepare an updated Airport Master Plan for the Holbrook Municipal Airport in Holbrook, AZ. To assist us in preparing this Master Plan and to comply with the requirements of NEPA and the Federal Aviation Administration, we request your comments concerning potential impacts to any historical, cultural and archeological resources.

Enclosed for your reference is a drawing of the proposed improvements to the Holbrook Municipal Airport. The Holbrook Municipal Airport is located within Sections 20 and 29, Township 18 North, Range 21 East of the Arizona Meridian. Please forward any comments at your earliest convenience. Please contact me at (970) 242-0101 if you have any questions regarding this project. Thank you for your assistance.

Sincerely,

ARMSTRONG CONSULTANTS, INC.

Hans L. Dorries

Hans Dorries
Airport Planner

Enclosures

861 Rood Avenue • Grand Junction, Colorado 81501
www.armstrongconsultants.com
tel 970.242.0101
fax 970.241.1769

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

May 17, 2010

ACI# 095910

Ms. Laura Canaca
Project Evaluation Program
Arizona Game & Fish Department
WMHB - Project Evaluation Program
5000 W. Carefree Hwy
Phoenix, AZ 85086-5000

RE: Holbrook Municipal Airport Master Plan

Dear Ms. Canaca

Armstrong Consultants has been retained to prepare an updated Airport Master Plan for the Holbrook Municipal Airport in Holbrook, AZ. To assist us in preparing this Master Plan and to comply with the requirements of NEPA and the Federal Aviation Administration, we request your comments concerning potential impacts to any area threatened or endangered species or state sensitive species.

Enclosed for your reference is a drawing of the proposed improvements to the Holbrook Municipal Airport. The Holbrook Municipal Airport is located within Sections 20 and 29, Township 18 North, Range 21 East of the Arizona Meridian. Please forward any comments at your earliest convenience. Please contact me at (970) 242-0101 if you have any questions regarding this project. Thank you for your assistance.

Sincerely,

ARMSTRONG CONSULTANTS, INC.

Hans Dorries
Airport Planner

Enclosures

861 Rood Avenue • Grand Junction, Colorado 81501
www.armstrongconsultants.com
tel 970.242.0101
fax 970.241.1769

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

May 17, 2010

ACI# 095910

Ms. Sallie McGuire
U.S. Army Corps of Engineers
Arizona Regulatory Office
3636 N. Central Ave. Suite 900
Phoenix, AZ 85012-1939

RE: Holbrook Municipal Airport Master Plan

Dear Ms. McGuire

Armstrong Consultants has been retained to prepare an updated Airport Master Plan for the Holbrook Municipal Airport in Holbrook, AZ. To assist us in preparing this Master Plan and to comply with the requirements of NEPA and the Federal Aviation Administration, we request your comments concerning potential impacts to any wetlands or waters of the U.S.

Enclosed for your reference is a drawing of the proposed improvements to the Holbrook Municipal Airport. The Holbrook Municipal Airport is located within Sections 20 and 29, Township 18 North, Range 21 East of the Arizona Meridian. Please forward any comments at your earliest convenience. Please contact me at (970) 242-0101 if you have any questions regarding this project. Thank you for your assistance.

Sincerely,

ARMSTRONG CONSULTANTS, INC.

Hans L. Dorries

Hans Dorries
Airport Planner

Enclosures

861 Rood Avenue • Grand Junction, Colorado 81501
www.armstrongconsultants.com
tel 970.242.0101
fax 970.241.1769

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

May 17, 2010

ACI# 095910

Mr. John Nystedt
U.S. Fish and Wildlife Service
Fish and Wildlife Biologist
323 N. Leroux Street, Suite 201
Flagstaff, AZ 86001

RE: Holbrook Municipal Airport Master Plan

Dear Mr. Nystedt:

Armstrong Consultants has been retained to prepare an updated Airport Master Plan for the Holbrook Municipal Airport in Holbrook, AZ. To assist us in preparing this Master Plan and to comply with the requirements of NEPA and the Federal Aviation Administration, we request your comments concerning potential impacts to any area threatened or endangered species.

Enclosed for your reference is a drawing of the proposed improvements to the Holbrook Municipal Airport. The Holbrook Municipal Airport is located within Sections 20 and 29, Township 18 North, Range 21 East of the Arizona Meridian. Please forward any comments at your earliest convenience. Please contact me at (970) 242-0101 if you have any questions regarding this project. Thank you for your assistance.

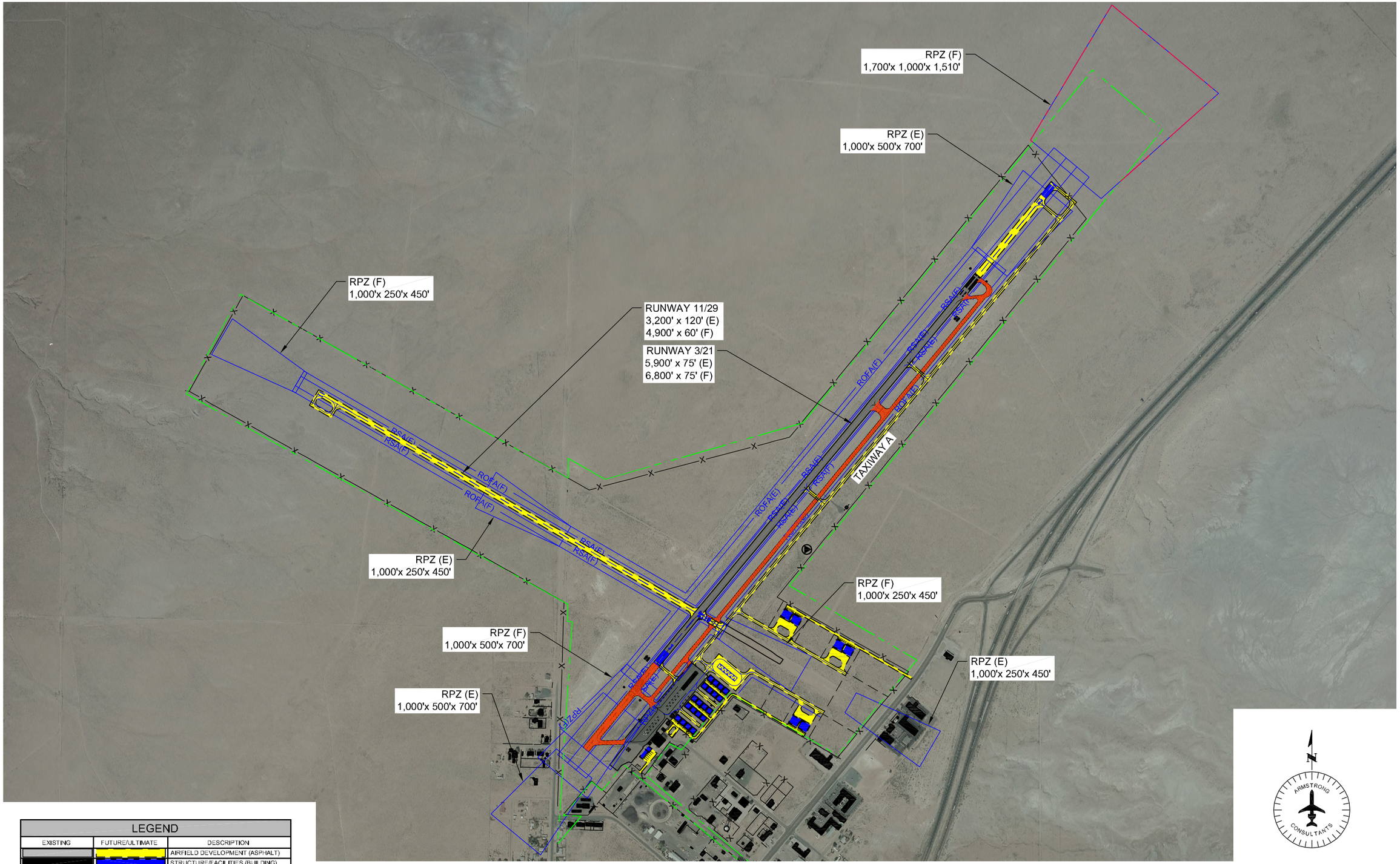
Sincerely,

ARMSTRONG CONSULTANTS, INC.

Hans Dorries
Airport Planner

Enclosures

861 Rood Avenue • Grand Junction, Colorado 81501
www.armstrongconsultants.com
tel 970.242.0101
fax 970.241.1769



LEGEND		
EXISTING	FUTURE/ULTIMATE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)
		STRUCTURE/FACILITIES (BUILDING)
		REMOVAL AREA
		AIRPORT PROPERTY LINE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)

(E) EXISTING, (F) FUTURE

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

RECOMMENDED
AIRSIDE
FIGURE 4-6

Appendix D
Agency Response Letters

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport
Airport Master Plan

RECEIVED JUN 0 1 2010

ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.azdeq.gov

Janice K. Brewer
Governor

Benjamin H. Grumbles
Director

May 27, 2010

Mr. Hans Dorries, Airport Planner
Armstrong Consultants, Inc.
861 Rood Avenue
Grand Junction, CO 81501

Project Location: Scoping Letter: Holbrook Municipal Airport Master Plan Update
Environmental Assessment: ACI# 095910

Dear Mr. Dorries:

On May 24, 2010, the Air Quality Division of the Arizona Department of Environmental Quality received your National Environmental Policy Act (NEPA) Scoping Input request for the proposed Holbrook Municipal Airport Master Plan Update, which includes airfield (both runway and taxiway) development, structural facilities development and removal of some paved areas.

The Air Quality Division reviewed the project described in your letter and is responding by providing information to aid in the reduction of emissions during the construction processes. These emissions could include particulate matter (dust). Both particulate matter 10-microns (PM_{10}) and particulate matter 2.5-microns ($PM_{2.5}$) in size are subject to National Ambient Air Quality Standards (NAAQS). PM_{10} and smaller can penetrate the lungs of human beings and animals, and $PM_{2.5}$ and smaller is difficult for lungs to expel and has been linked to increases in death rates and heart attacks by disturbing heart rhythms and increasing plaque and clotting; respiratory infections, asthma attacks and chronic obstructive pulmonary disease (COPD) aggravation.

To comply with applicable air pollution control requirements and minimize adverse impacts on public health and welfare, the following information is provided:

<u>REDUCE DISTURBANCE of PARTICULATE MATTER during CONSTRUCTION</u>

The following measures are recommended to reduce disturbance of particulate matter, including emissions caused by strong winds as well as machinery and trucks tracking soil off the construction site:

I. Site Preparation and Construction
   A. Minimize land disturbance;

B. Suppress dust on traveled paths which are not paved through wetting, use of watering trucks, chemical dust suppressants, or other reasonable precautions to prevent dust entering ambient air
C. Cover trucks when hauling soil;
D. Minimize soil track-out by washing or cleaning truck wheels before leaving construction site;
E. Stabilize the surface of soil piles; and
F. Create windbreaks

II. Site Restoration
A. Revegetate any disturbed land not used;
B. Remove unused material; and
C. Remove soil piles via covered trucks.

The following rules are applicable to reducing dust during construction, demolition and earth moving activities are enclosed:

- Arizona Administrative Code R18-2-604 through -607
- Arizona Administrative Code R18-2-804

Should you have further questions, please do not hesitate to call A. "Bonnie" Cockrell at (602) 771-2378 or Dave Biddle at (602) 771-2376 of the Planning Section Staff.

Very truly yours,

Diane L. Arnst, Manager
Air Quality Planning Section

Enclosure

cc: Bret H. Parke, EV Administrative Counsel
A. "Bonnie" Cockrell, Environmental Program Specialist, Air Planning
File No. 238087

R18-2-604. Open Areas, Dry Washes, or Riverbeds

A. No person shall cause, suffer, allow, or permit a building or its appurtenances, or a building or subdivision site, or a driveway, or a parking area, or a vacant lot or sales lot, or an urban or suburban open area to be constructed, used, altered, repaired, demolished, cleared, or leveled, or the earth to be moved or excavated, without taking reasonable precautions to limit excessive amounts of particulate matter from becoming airborne. Dust and other types of air contaminants shall be kept to a minimum by good modern practices such as using an approved dust suppressant or adhesive soil stabilizer, paving, covering, landscaping, continuous wetting, detouring, barring access, or other acceptable means.

B. No person shall cause, suffer, allow, or permit a vacant lot, or an urban or suburban open area, to be driven over or used by motor vehicles, trucks, cars, cycles, bikes, or buggies, or by animals such as horses, without taking reasonable precautions to limit excessive amounts of particulates from becoming airborne. Dust shall be kept to a minimum by using an approved dust suppressant, or adhesive soil stabilizer, or by paving, or by barring access to the property, or by other acceptable means.

C. No person shall operate a motor vehicle for recreational purposes in a dry wash, riverbed or open area in such a way as to cause or contribute to visible dust emissions which then cross property lines into a residential, recreational, institutional, educational, retail sales, hotel or business premises. For purposes of this subsection "motor vehicles" shall include, but not be limited to trucks, cars, cycles, bikes, buggies and 3-wheelers. Any person who violates the provisions of this subsection shall be subject to prosecution under A.R.S. § 49-463.

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Former Section R9-3-604 renumbered without change as Section R18-2-604 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-604 renumbered to R18-2-804, new Section R18-2-604 renumbered from R18-2-404 and amended effective November 15, 1993 (Supp. 93-4).

R18-2-605. Roadways and Streets

A. No person shall cause, suffer, allow or permit the use, repair, construction or reconstruction of a roadway or alley without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne. Dust and other particulates shall be kept to a minimum by employing temporary paving, dust suppressants, wetting down, detouring or by other reasonable means.

B. No person shall cause, suffer, allow or permit transportation of materials likely to give rise to airborne dust without taking reasonable precautions, such as wetting, applying dust suppressants, or covering the load, to prevent particulate matter from becoming airborne. Earth or other material that is deposited by trucking or earth moving equipment shall be removed from paved streets by the person responsible for such deposits.

Historical Note

Adopted effective May 14, 1979 (Supp. 79-1). Former Section R9-3-605 renumbered without change as Section R18-2-605 (Supp. 87-3). Amended effective September 26, 1990 (Supp. 90-3). Former Section R18-2-605 renumbered to R18-2-805, new Section R18-2-605 renumbered from R18-2-405 effective November 15, 1993 (Supp. 93-4).

R18-2-606. Material Handling

No person shall cause, suffer, allow or permit crushing, screening, handling, transporting or conveying of materials or other operations likely to result in significant amounts of airborne dust without taking reasonable precautions, such as the use of spray bars, wetting agents, dust suppressants, covering the load, and hoods to prevent excessive amounts of particulate matter from becoming airborne.

Historical Note

Section R18-2-606 renumbered from R18-2-406 effective November 15, 1993 (Supp. 93-4).

R18-2-607. Storage Piles

A. No person shall cause, suffer, allow, or permit organic or inorganic dust producing material to be stacked, piled, or otherwise stored without taking reasonable precautions such as chemical stabilization, wetting, or covering to prevent excessive amounts of particulate matter from becoming airborne.

B. Stacking and reclaiming machinery utilized at storage piles shall be operated at all times with a minimum fall of material and in such manner, or with the use of spray bars and wetting agents, as to prevent excessive amounts of particulate matter from becoming airborne.

Historical Note

Section R18-2-607 renumbered from R18-2-407 effective November 15, 1993 (Supp. 93-4).

R18-2-804. Roadway and Site Cleaning Machinery

A. No person shall cause, allow or permit to be emitted into the atmosphere from any roadway and site cleaning machinery smoke or dust for any period greater than 10 consecutive seconds, the opacity of which exceeds 40%. Visible emissions when starting cold equipment shall be exempt from this requirement for the first 10 minutes.

B. In addition to complying with subsection (A), no person shall cause, allow or permit the cleaning of any site, roadway, or alley without taking reasonable precautions to prevent particulate matter from becoming airborne. Reasonable precautions may include applying dust suppressants. Earth or other material shall be removed from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water or by other means.

Historical Note

Adopted effective February 26, 1988 (Supp. 88-1). Amended effective September 26, 1990 (Supp. 90-3). Amended effective February 3, 1993 (Supp. 93-1). Former Section R18-2-804 renumbered to Section R18-2-904, new Section R18-2-804 renumbered from R18-2-604 effective November 15, 1993 (Supp. 93-4).

RECEIVED JUN 1 4 2010

ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.azdeq.gov

Janice K. Brewer
Governor

Benjamin H. Grumbles
Director

June 8, 2010

Hans Dorries
Armstrong Consultants, Inc.
861 Rood Avenue
Grand Junction, CO 81501

Re: Master Plan for the Holbrook Municipal Airport

Dear Mr. Dorries:

Thank you for the May 17, 2010 letter regarding a NEPA assessment for the Holbrook Municipal Airport's updated Airport Master Plan. From the information submitted, future projects appear to include: asphalt airfield development; constructing buildings; and a removal area. The Arizona Department of Environmental Quality, Water Quality Division (ADEQ) is responsible for ensuring the delivery of safe drinking water to customers of regulated public water systems under the Safe Drinking Water Act, permits for proposed discharges to surface waters of the United States under the federal Clean Water Act (CWA), permits under the state Aquifer Protection Program, and water quality certifications of certain federal licenses and permits. ADEQ would like to make you aware of some water quality issues that may need to be considered.

Stormwater: Stormwater discharges associated with construction activities (clearing, grading, or excavating) that disturb one acre or more must obtain a general permit for coverage of stormwater discharges under the Arizona Pollutant Discharge Elimination System's (AZPDES) Construction General Permit. As part of permit coverage, a Stormwater Pollution Prevention Plan (SWPPP) must be prepared, and implemented during the course of construction. The SWPPP must comply with ADEQ's Construction General Permit's SWPPP requirements, and must identify such elements as the project scope, anticipated acreage of land disturbance, and the best management practices that would be implemented to reduce soil erosion, and contain or minimize the pollutants that might be released to waters of the U.S. In addition to preparing the SWPPP, the project proponent must file for permit coverage before construction. If the Municipal Airport project will disturb the applicable acreage, then Construction General Permit coverage is required. The Construction General Permit, SWPPP checklist, and associated forms are available on ADEQ's website at:
http://www.azdeq.gov/environ/water/permits/stormwater.html#const. For questions, please contact Chris Henninger in our Stormwater and General Permits Unit at (602) 771-4508 or by e-mail at cph@azdeq.gov.

CWA 401 Water Quality Certification: If project activities will occur inside the Ordinary High Water Mark of any water of the U.S., then a CWA section 404 permit (a.k.a. dredge and fill), issued by the U.S. Army Corps of Engineers, may be required. If a 404 permit (or any other federal permit) is required for the project, a state-issued CWA section 401 certification of the permit may be required to ensure that the permitted activities will not result in a violation of Arizona's surface water quality standards. For questions, please contact Bob Scalamera at (602) 771-4502 or by e-mail at rs3@azdeq.gov. The CWA 401 application form can be downloaded from ADEQ's website at: http://www.azdeq.gov/function/forms/appswater.html#dredge.

Multi-Sector General Permit (MSGP): ADEQ is developing an MSGP for stormwater discharges associated with industrial activity, based on the U.S. Environmental Protection Agency version, but tailored to the distinct Arizona environment. Airports and other air transportation facilities that have stormwater discharges are required to obtain MSGP coverage as a Sector S industry. All facilities in Arizona (excluding Indian Country lands) must apply for permit coverage when ADEQ issues its new MSGP. ADEQ anticipates that it will begin the public notice for the MSGP during the summer of 2010. For questions on MSGP coverage, please contact Dennis Turner at (602) 771-4501 or by e-mail at dt1@azdeq.gov.

We appreciate the opportunity to review and provide comments. If you need further information, please contact Wendy LeStarge of my staff at (602) 771-4836 or via e-mail at wl1@azdeq.gov, or myself at (602) 771-4416 or via e-mail at lc1@azdeq.gov.

Sincerely,

Linda Taunt, Deputy Director
Water Quality Division

"Managing and conserving Arizona's natural, cultural and recreational resources"

Arizona State Parks

May 24, 2010

RECEIVED MAY 28 2010

Hans Dorries
Environmental/Airport Planner
Armstrong Consultants, Inc.
861 Rood Avenue
Grand Junction, Colorado 81501

RE: Updated Airport Master Plan
Holbrook Municipal Airport;
SHPO-20106-0728 (85017)

Dear Mr. Dorries:

Thank you for consulting with the State Historic Preservation Office (SHPO) regarding the above project. We appreciate your cooperation with this office in considering the impacts of development on cultural resources situated in Arizona. We have reviewed the submitted materials and offer the following comments.

Your May 17th letter has been interpreted as a NEPA submittal, and does not constitute consultation under Section 106 of the National Historic Preservation Act. Provisions at 36 CFR Part 800.8 must be followed in order for this office to accept NEPA documentation as Section 106 compliance consultation.

A search of our records indicates the area of the Holbrook Municipal Airport has not been assessed for cultural resources. Two prehistoric habitation areas have previously been recorded in close proximity to the project area, one perhaps falling within the airport's property line. We recommend the airport areas be inspected for cultural resources by a qualified cultural resources specialist.

If you have any questions or comments, please contact me at (602) 542-7140 or electronically via djacobs@azstateparks.gov.

Sincerely,

David Jacobs
Compliance Specialist/Archaeologist
State Historic Preservation Office

Janice K. Brewer
Governor

State Parks Board Members

Chair
Reese Woodling
Tucson

Tracey Westerhausen
Phoenix

Larry Landry
Phoenix

Walter D. Armer, Jr.
Vail

Arlan Colton
Tucson

William C. Scalzo
Phoenix

Maria Baier
State Land Commissioner

Renée E. Bahl
Executive Director

Arizona State Parks
1300 W. Washington
Phoenix, AZ 85007

Tel & TTY: 602.542.4174
AZStateParks.com

800.285.3703 from (520 & 928) area codes

General Fax: 602.542.4180

Director's Office Fax: 602.542.4188

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
ARIZONA-NEVADA AREA OFFICE
3636 NORTH CENTRAL AVENUE, SUITE 900
PHOENIX, ARIZONA 85012-1939

RECEIVED JUN 14 2010

REPLY TO
ATTENTION OF:
Office of the Chief
Regulatory Division

June 9, 2010

Town of Holbrook
C/O Hans Dorries
Armstrong Consultants, Inc.
861 Rood Avenue
Grand Junction, Colorado 81501

Subject: Permit Application Request- Holbrook Municipal Airport

Dear Mr. Dorries:

I have received your letter of May 17, 2010 seeking comments in regard to the updated Airport Master Plan that has been prepared for the Holbrook Municipal Airport located at (Sections 20 and 29, T18N, R21E), in the Town of Holbrook, Navajo County, Arizona.

Please be advised that the implementation of the updated Airport Master Plan that is being developed for the Holbrook Municipal Airport may require a Department of the Army permit issued under Section 404 of the Clean Water Act. A Section 404 permit is required for the discharge of dredged or fill material into the "waters of the United States," including adjacent wetlands. Examples of activities requiring a permit are placing bank protection, temporary or permanent stock-piling of excavated material, grading roads, grading (including vegetative clearing operations) that involves the filling of low areas or leveling the land, constructing weirs or diversion dikes, constructing approach fills, and discharging dredged or fill material as part of any other activity.

For your information and use, I am enclosing a permit application form and an informational pamphlet that describes the various regulatory programs that may be applicable to your proposed project.

Thank you for your support and compliance with our regulatory program. If you have questions, please contact me at (602) 640-5385 X226. Please refer to file number SPL-2010-00551-RWF in your reply.

Sincerely,

Ron Fowler
Senior Project Manager,
Arizona Branch, Regulatory Division

Enclosure(s)

RECEIVED MAY 2 4 2010

THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT
5000 W. CAREFREE HIGHWAY
PHOENIX, AZ 85086-5000
(602) 942-3000 • WWW.AZGFD.GOV

GOVERNOR
JANICE K. BREWER
COMMISSIONERS
CHAIR, JENNIFER L. MARTIN, PHOENIX
ROBERT R. WOODHOUSE, ROLL
NORMAN W. FREEMAN, CHINO VALLEY
JACK F. HUSTED, SPRINGERVILLE
J.W. HARRIS, TUCSON
DIRECTOR
LARRY D. VOYLES
DEPUTY DIRECTORS
GARY R. HOVATTER
BOB BROSCHEID

May 19, 2010

Hans Dorries
Armstrong Consultants
861 Rood Avenue
Grand Junction, Colorado 81501

Re: Environmental Review for Holbrook Airport.

Dear Mr. Doories:

The Arizona Game and Fish Department (Department) has reviewed your request, dated May 17, 2010 regarding environmental resources and sensitivities associated with the above-referenced project area. A review of our HDMS data base identified one listed species (Peebles Navajo Cactus) within 3 miles of your project area. The review also identified the project site as within the 10J area for the California condor. The Department has no authority to make determinations regarding these species. The Department recommends you contact the US Fish and Wildlife Service to obtain their determination regarding potential impacts on those species.

The Department has no further comments at this time. If you have any questions regarding this letter, please contact me at (623) 236-7513. General status information, county and watershed distribution lists and abstracts for some special status species are also available on our web site at http://www.azgfd.gov/hdms.

Sincerely,

Daniel E. Nelson
Project Evaluation Specialist
(623) 236-7513

CC: Dave Dorhum, AGFD
M10-05194522

Appendix E
Public Involvement

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Holbrook Municipal Airport
Airport Master Plan

Holbrook Municipal Airport Meeting Summary
October 15, 2009 11:30 AM, Holbrook Municipal Council Chambers

A Planning Advisory Committee (PAC) Kickoff meeting was held on October 15, 2009 to present the Airport Master Planning process to the Holbrook Airport Master Plan Working Group. Attendance at the meeting comprised of seven individuals, including representatives from the City of Holbrook, the Holbrook Aircraft Owners and Pilots Association (HAOPA) and Armstrong Consultants (see attached meeting sign in sheet). The FAA and State Aeronautics, also members of the PAC, could not attend due to limited travel budgets.

The PAC will be included in all aspects of the airport master plan process including the review of working papers, draft reports and drawings. The goals of the airport master plan were presented along with the role of the PAC. The process and schedule for the airport master plan were discussed.

An introduction was given on the status of the airport and the impact the airport has on the local economy. The types and volumes of activity that are currently taking place were discussed which includes business, recreation, air freight, tourism and itinerant general aviation aircraft for fuel. According to the airport manager there are currently six based airplanes and six ultralight trikes at the airport and approximately 4,800 annual operations.

Airport Reference Codes (ARCs) were described including the existing ARC. The design standards were briefly covered and included impacts associated with an ARC upgrade. The need for of implementing a GPS approach was also discussed.

The existing airside and landside layouts were discussed including the constraints of the existing configuration. Members of the PAC expressed the significance of preserving existing facilities as much as possible due to their historical interest. The possibility of developing an airport terminal consistent with the historical Route 66 theme was also discussed. There are several options for the future airside and landside configuration which will be further evaluated during the development alternatives chapter. The need to revalidate the existing engineering design for the crosswind runway was also discussed. The sponsor also expressed the desire to develop the airport with the required facilities to serve the air freight market and to develop airport business parcels on or adjacent to the airport.

The PAC also indicated the necessity of a self-service fuel system which will allow 24 hours of fuel service at the airport, as well as, attract more traffic to the airport and increase the amount of fuel sales

The next step will be to develop Inventory, Forecast and Facility Requirements Chapters. This information will be distributed in a working paper to participating parties for review and comment.

Meeting Sign-In Sheet

Project:	Holbrook Municipal Airport Airport Master Plan – Kickoff Meeting	Meeting Date:	10/15/09

Name	Title	Company	Phone	Fax	E-Mail
Dennis Corsi	Vice President	Armstrong Consultants, Inc.	(970) 242-0101	(970) 241-1769	dennis@armstrongconsultants.com
Hans Dorries	Airport Planner	Armstrong Consultants, Inc.	(970) 242-0101	(970) 241-1769	hans@armstrongconsultants.com
THERESA GOSCIA	HAOPA REP	HAOPA	602 769-0092		perfect-day@cox.net
Dan Eldredge	HAOPA Rep	HAOPA	928-288-3708		dan_idrdge@yahoo.com
Bill Jeffers	Rancher		928-524-2675		wjeffers@frontiernet.net
R. ALAN ROES	AIRPORT MANAGER	CITY OF HOLBROOK	928-241-0082	928-524-9704	aroes@frontiernet.net
Tim Kelley	INTERIM Public Works Director	City of HOLBROOK	524-6725	524-2159	

Holbrook Municipal Airport Meeting Summary
May 12, 2010 11:00 AM, Holbrook Municipal Airport

A Planning Advisory Committee (PAC) development alternatives meeting was held on May 12, 2010 to update the PAC on the status of the Airport Master Planning process and to present the recommended development. Attendance at the meeting comprised of six individuals, including representatives from the City of Holbrook, the Holbrook Aircraft Owners and Pilots Association (HAOPA), aircraft owners and Armstrong Consultants (see attached meeting sign in sheet). The FAA, State Aeronautics, and some members of the PAC, were unable to attend.

The airport master plan schedule was discussed. The Airport Reference Code (ARC) and the associated design standards were reviewed. The airport currently meets the ARC B-I design standards with the exception of the runway centerline to taxiway centerline distance, runway centerline to helicopter touchdown pad distance, apron taxilane centerline to fixed or movable object distance and control of runway protection zone. The forecast of based aircraft and aviation activity was presented.

The existing airside and landside layouts were discussed including the constraints of the existing configuration. The existing incompatible land uses located within the Runway Protection Zones of Runways 3 and 29 were discussed. Recommendations to mitigate the existing land use incompatibilities were provided and discussed.

The following airside and landside recommendations were described. Shift and extend Runway 3/21 to the northeast in order to meet the RPZ land use compatibility standards and accommodate 100 percent of the small aircraft fleet mix. Shift and extend Runway 11/29 to the west to meet RPZ land use compatibility standards and the recommended 95% crosswind coverage. Relocate the parallel Taxiway A to 300 feet runway to taxiway centerline. The existing separation does not meet the existing design standards. Placing Taxiway A at 300 feet would accommodate the future Airport Reference Code and protect the airport for future upgrades beyond the 20-year planning period. Relocate and replace the existing fuel tank outside of the Runway 3 RPZ. A demand based apron and hangar (including commercial and corporate hangars) development layout was discussed.

The PAC indicated their desire to move forward with the recommended development onto the Draft Airport Layout Plan (ALP).

The required environmental documents including the revalidation of the crosswind Runway 11/29 environmental assessment and the fuel tank relocation environmental assessment were discussed. Relevant items of the 5-year Capital Improvement Plan (CIP) were also discussed.

The next steps will be to complete the ALP and complete the final two chapters of the Airport Master Plan including the Environmental Overview and the Financial Plan.

Meeting Sign-In Sheet

Project:	**Holbrook Municipal Airport Airport Master Plan – Development Alternatives Meeting**	**Meeting Date:**	**05/12/10**

Name	Title	Company	Phone	Fax	E-Mail
Justin Pietz	Senior Airport Planner	Armstrong Consultants, Inc.	(970) 242-0101	(970) 241-1769	justin@armstrongconsultants.com
Hans Dorries	Airport Planner	Armstrong Consultants, Inc.	(970) 242-0101	(970) 241-1769	hans@armstrongconsultants.com
Bill Jeffers	Advisory Comm.		928-524-2675	928-524-3619	wjeffers@frontier.net.net
THERESA COSCIA	ADV. COMM		602-769-0092		cmerryteri1@cox.net
RAY ALLEY	CITY MGR	CITY OF HOLBROOK	928-241-8488	928-524-2159	rayalley@ci.holbrook.az.us
DAN CARROLL	AIRCRAFT OWNER	USDA – NRCS	928-699-5933		grookalator13@yahoo.com

Issue 1

October 15, 2009

HOLBROOK MUNICIPAL AIRPORT MASTER PLAN UPDATE

INSIDE THIS ISSUE:

Overview	1
Planning Advisory Committee	2
Public Information Meeting	2
Purpose of the Master Plan	2
Airport Master Plan Process	3
Master Plan Schedule	4

This is the first of four newsletters that will be distributed during the Airport Master Plan Study. An outline of the process is included on page 3 of this publication. The purpose of the newsletters is to provide updates on the progression of the study, announce upcoming meetings, and to ensure the involvement of the community in order that all interested parties are given consideration and that they remain informed about the progress of the Airport Master Plan.

AIRPORT MASTER PLAN STUDY

Holbrook Municipal Airport

Overview

The City of Holbrook has received a grant from the Federal Aviation Administration (FAA) to conduct a Master Plan Update for the Holbrook Municipal Airport in Holbrook, Arizona. Armstrong Consultants, an Airport Planning and Engineering firm from Grand Junction, Colorado has been retained to complete the study. The previous Airport Master Plan for Holbrook Municipal Airport was completed in 2000. The updated Airport Master Plan will update user information provide direction for airport development consistent with the airports role while considering the potential for environmental and socioeconomic impacts. The plan serves as a guide to decision makers, airport users and the general public for implementing airport development actions while considering both airport and community concerns and objectives. Typical components of the Master Plan Process include the following:

- Airport Inventory
- Aviation Forecasts and Facility Requirements
- Development Alternatives
- Environmental Overview
- Financial Analysis and Capital Improvement Program
- Airport Layout Drawings
- Public Involvement

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Planning Advisory Committee

Completion of the Study will require contact with and input from many activities on the airport, community agencies both governmental and non-governmental, airport users, pilots, (passengers, shippers, airlines etc.), residents of the community and others. A Planning Advisory Committee (PAC) has been identified and asked to assist in the ongoing review and participation in the planning process. The PAC will provide input on the recommendations in the study through meetings and review of draft Working Papers, Reports and Drawings. Public meetings will be held throughout the planning process to provide information and to accept oral and written comments on the plan.

Public Information Meetings

Public information meetings will be conducted at key points n the study to discuss the progress, present information and solicit input for the Master Plan. The informational meetings will include a short presentation and then provide interested parties the opportunity to interact with the consultants and airport representatives to ask specific questions and provide input. Representatives from Armstrong Consultants will be available to answer your questions. Public involvement will be an important part of the Airport Master Plan process.

Purpose of the Airport Master Plan

The last Airport Master Plan study was completed in 2000. This Updated Airport Master Plan will provide updated information on the airport and direction for future improvements. There are 12 based aircraft at the airport with a user fleet mix of single engine pistons, multiengine pistons and turbo props. The trend in general aviation is an increase in light jets and fractional business jet ownership as well as experimental and light sport aircraft. An Airport Master Plan study is needed to provide a plan consistent with the types of aircraft currently using and expected to use the airport in the future. The objectives of the Master Plan include:

- Document the issues that the proposed development will address.
- Justify the proposed development through the technical, economic and environmental investigation of concepts and alternatives.
- Provide an effective graphic presentation of the development of the airport and anticipated land uses in the vicinity of the airport.
- Establish a realistic schedule for the implementation of the development proposed in the plan, particularly the short-term capital improvement program.
- Propose an achievable financial plan to support the implementation schedule.
- Provide sufficient project definition and detail for subsequent environmental evaluations that may be required before the project is approved.
- Present a plan that adequately addresses the issues and satisfies local, state and Federal regulations.
- Document future aeronautical demand and airport development needs to support municipal or local deliberations on spending, debt, land use controls and other policies necessary to preserve the integrity of the airport and its surroundings.
- Set the stage and establish the framework for continuing planning process that will monitor key conditions and permit changes in plan recommendations as required.

Holbrook Municipal Airport Terminal Building

Points of Contact

Alan Roes
Airport Manager
P.O. Box 970
Holbrook, AZ 86025
Phone: (928) 524-3267
Fax: (928) 524-9704
aroes@frontiernet.net

Hans Dorries
Airport Planner
Armstrong Consultants, Inc.
861 Rood Avenue
Grand Junction, CO 81501
Phone: (970) 242-0101
Fax: (970) 241-1769
hans@armstrongconsultants.com

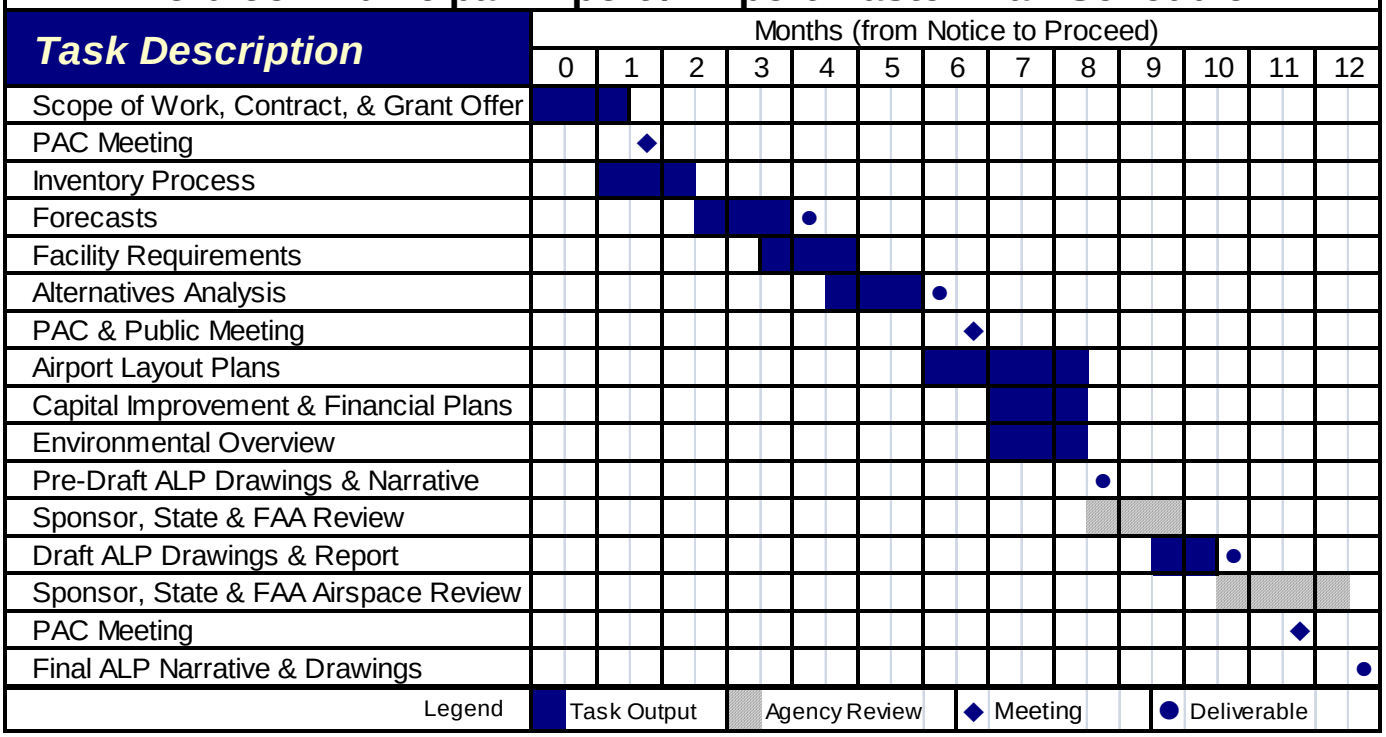
The Airport Master Plan Study Process

The Airport Master Plan process (as shown in the flow chart below) began with the City's application for and acceptance of a Federal grant offer. The next step is to complete Phase I.

Phase I of this process includes an inventory of existing airport facilities, forecasts of aviation activity and a listing of facility requirements at the airport. Phase II includes alternatives for meeting airside and landside development needs. Phase III is the completion of a detailed set of Airport Layout Plan (ALP) drawings, a Capital Improvement Plan (CIP) and implementation plans for the airport.

THE HOLBROOK MUNICIPAL AIRPORT MASTER PLAN SCHEDULE

Holbrook Municipal Airport / Airport Master Plan Schedule



Issue 2

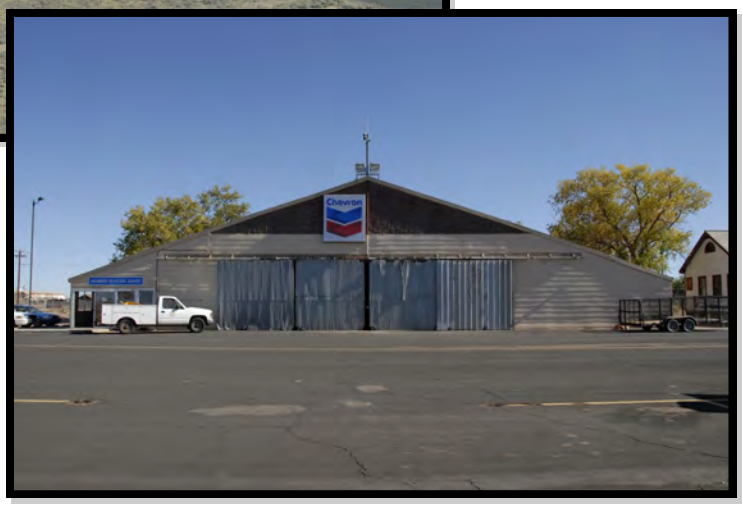
HOLBROOK MUNICIPAL AIRPORT AIRPORT MASTER PLAN UPDATE NEWSLETTER

INSIDE THIS ISSUE:

Overview	*1*
Inventory	*2*
Forecasts	*2*
Facility Requirements	*3*
Upcoming Meeting	*4*

This is the second of four newsletters that will be distributed during the Holbrook Municipal Airport Master Plan Update. The purpose of the newsletters is to provide updates on the progression of the study, announce upcoming meetings and to ensure the involvement of the community. This will allow all interested parties to provide input and remain informed on the progress of the Airport Master Plan.

Inventory, Forecast, Facility Requirements



Holbrook Municipal Airport

Overview

The first Working Paper for the Holbrook Municipal Airport Master Plan has been distributed to the City, Planning Advisory Committee (PAC), the Federal Aviation Administration (FAA) and the Arizona Department of Transportation Aeronautics Group for review and comment. Working Paper 1 includes an inventory of the existing airport facilities, aviation forecasts, and facility requirements.

Baseline information relating to the airport's property, facilities, services and local vicinity were collected during site visits and interviews with airport management, City staff, airport tenants and users. Airport and other public documents were also examined. Forecasts of aviation activity provide the basis for evaluating the adequacy of existing airport facilities and their capacity to handle increased traffic levels or different traffic types. They are the foundation for effective decision making in airport planning, such as if and when improvements are needed, the level of capital improvements and the timing of necessary investments.

One of the primary objectives of this planning study is to determine the size and configuration of airport facilities need to accommodate the types and volume of aircraft expected to utilize the airport. Data from forecasts and facility requirements are coupled with established planning criteria to determine what improvements are necessary to airside and landside areas

INVENTORY

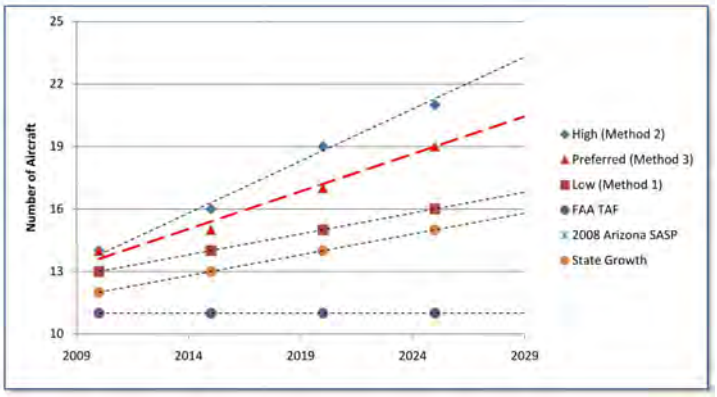
An Inventory of the Holbrook Municipal Airport was conducted and presented in Working Paper 1. The Inventory Chapter provided an overview of the airport development and FAA and State Aeronautics grant histories. The service level of the airport was discussed, including information on the users of the airport. The existing activity levels for the airport from the Terminal Area Forecast (TAF), Airport Master Record Form and airport management records were also presented. According to airport management records there are 12 based aircraft, approximately 4,200 annual operations. The existing Airport Reference Code (ARC) is B-I. Design standards were inventoried and it was determined that separation between Runway 3/21 centerline and Taxiway A centerline does not satisfy the requirements of ARC B-I standards. Furthermore, Runway 3/21 approach RPZ currently encompasses a residential area which is does not satisfy the recommended design standards. The Inventory Chapter also discussed the existing airside and landside facilities including the size and condition of the terminal building, number of hangars, tiedowns and apron space available for airport users.

The Inventory Chapter included an overview of the socioeconomic conditions of Navajo County and the City of Holbrook. Conditions such as population growth, employment and income can affect demand for aviation services in the area and must be taken into consideration when planning for future aviation needs of the area.

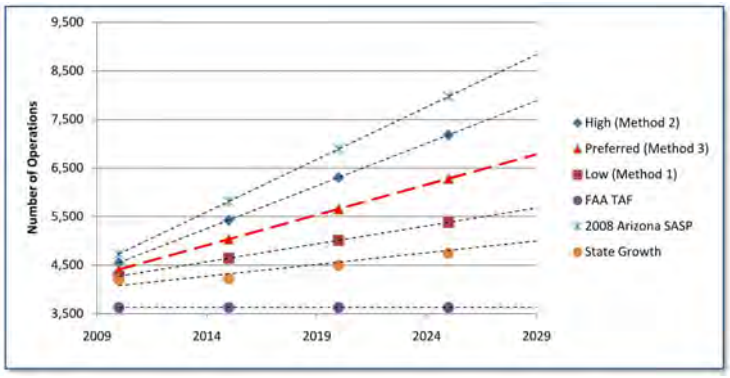
The Inventory Chapter also documented the environmental resources that may be affected by potential airport development. The information that was gathered will be used later in the study in evaluating potential airport development alternatives and to identify environmental related permits that may be required for recommended development projects. Existing financial data was compiled to determine the existing financial condition of the airport. Four years of data was collected showing the financial trends.

FORECASTS

Working Paper 1 also provided forecasts of aviation activity. A comparative analysis of based aircraft forecasts was accomplished using three methodologies to derive a preferred forecast. Method 1 (low) is based on the population growth in the City of Holbrook. Method 2 (high) is based on the per capita income growth in Navajo County. Method 3 is the average between the results of Method 1 and Method 2.



All master planning forecasts represent a significant "cone of uncertainty" as the planning horizon lengthens and all forecasts will inevitably be wrong to some degree. It is the planner's responsibility to provide a forecast that is reasonable, that will guide development actions as the needs arises and will not be "so wrong" as to impair the airport's healthy future development. To that end, the preferred forecast model for based aircraft is the average of the per capita income growth and the population growth (Method 3).



The number of operations at the airport were calculated based on the same three methods previously describe. The preferred forecast model for airport operations is based on the average of the per capita income growth and the population growth (Method 3).

Year	2010	2015	2020	2025	2030
Based Aircraft	14	15	17	19	21
Operations	4,412	5,036	5,659	6,282	6,906

FACILITY REQUIREMENTS

The time frame for addressing development needs usually involves Short-Term (1-5 years), Medium-Term (6-10 years) and Long-Term (11-20 years) periods. Long-term planning primarily focuses on the ultimate role of the airport. Medium-term planning focuses on a more detailed assessment of needs, while the short-term analysis focuses on immediate action items and may include details not geared towards long-term development.

One of the primary objectives of this planning study is to determine the size and configuration of airport facilities needed to accommodate the types and volume of aircraft expected to utilize the airport. Data from Chapter 1 and forecasts from Chapter 2 are coupled with established planning criteria to determine what improvements are necessary to airside and landside areas. Then, having established the facility requirements, alternatives for providing these facilities are provided in Chapter 4 to determine the viability of meeting the facility needs.

Several needs were identified in Working Paper 1 for the Holbrook Municipal Airport including:

- Relocate Runway 3 threshold to satisfy the Runway Protection Zone (RPZ) standards.
- Extend Runway 3/21 to meet the recommended runway length.
- Increase distance between Runway 3/21 centerline to Taxiway A centerline from 200 feet to 300 feet to meet the recommended design standards.
- Remodel the existing terminal building to satisfy user requirements and the historical Route 66 theme.
- Shift and pave Runway 11/29 to satisfy RPZ standards and recommended crosswind coverage.
- Plan for a future air freight facility, aircraft parking space, hangar space, and commercial/corporate hangars.
- Development of a nonprecision GPS approach with vertical guidance. An obstruction survey is currently in progress. The results of the survey will determine the lowest potential instrument approach minimums.

In summary, the facility requirements for Holbrook Municipal Airport are based on the types and volume of aircraft expected to use the airport in the short and long-term timeframes. These facilities will enable the airport to serve its users in a safe and efficient manner.

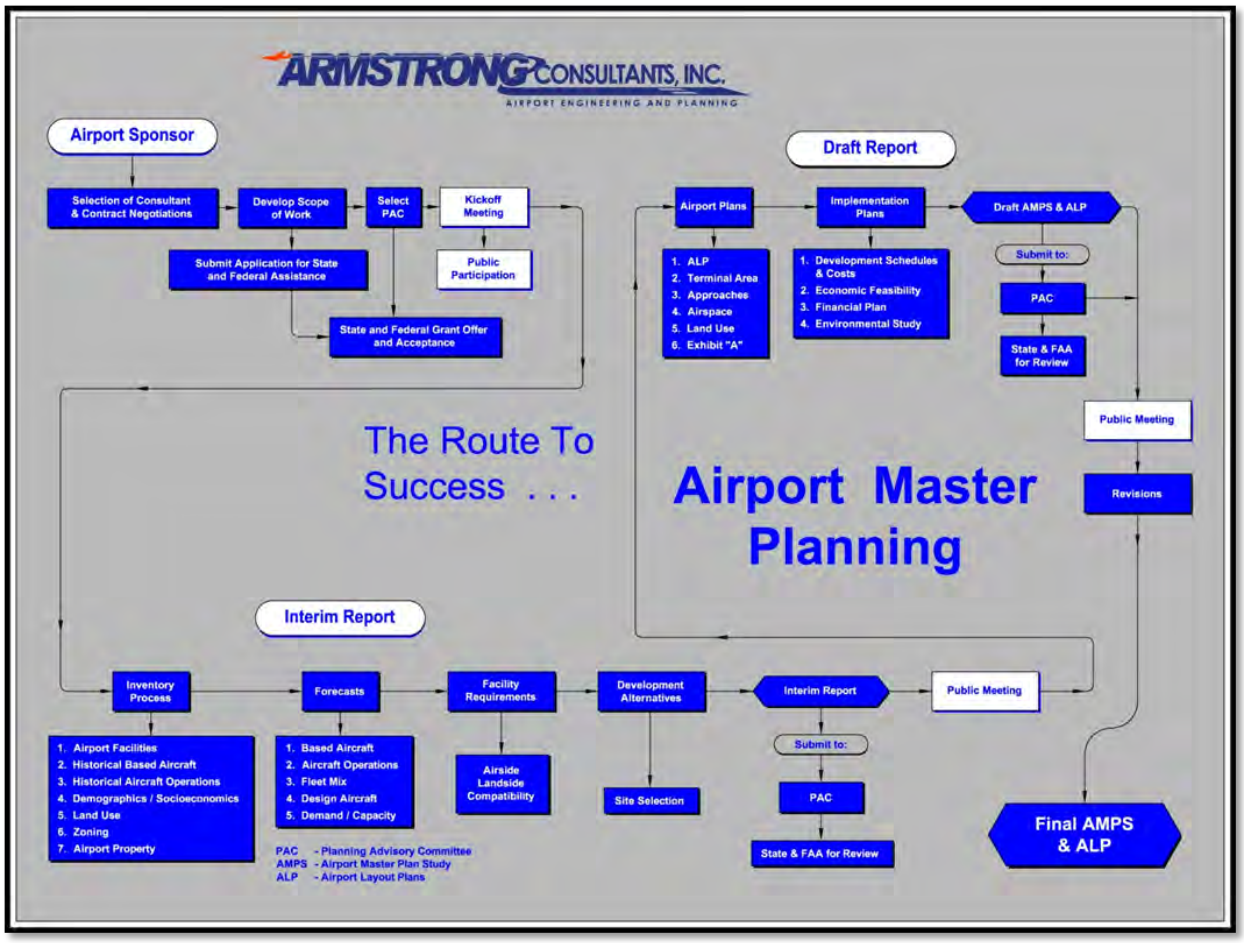
Points of Contact

Ray Alley
City Manager
P.O. Box 970
Holbrook, AZ 86025
Phone: 928-524-6225
rayalley@ci.holbrook.az.us

Hans Dorries
Airport Planner
Armstrong Consultants, Inc.
861 Rood Avenue
Grand Junction, CO 81501
Phone: (970) 242-0101
Fax: (970) 241-1769
hans@armstrongconsultants.com

Public Information Meeting

A meeting will be scheduled to update the Planning Advisory Committee (PAC) on the progress of the study and answer questions about the first four chapters of the study following the completion and distribution of Working Paper # 2.



ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Issue 3

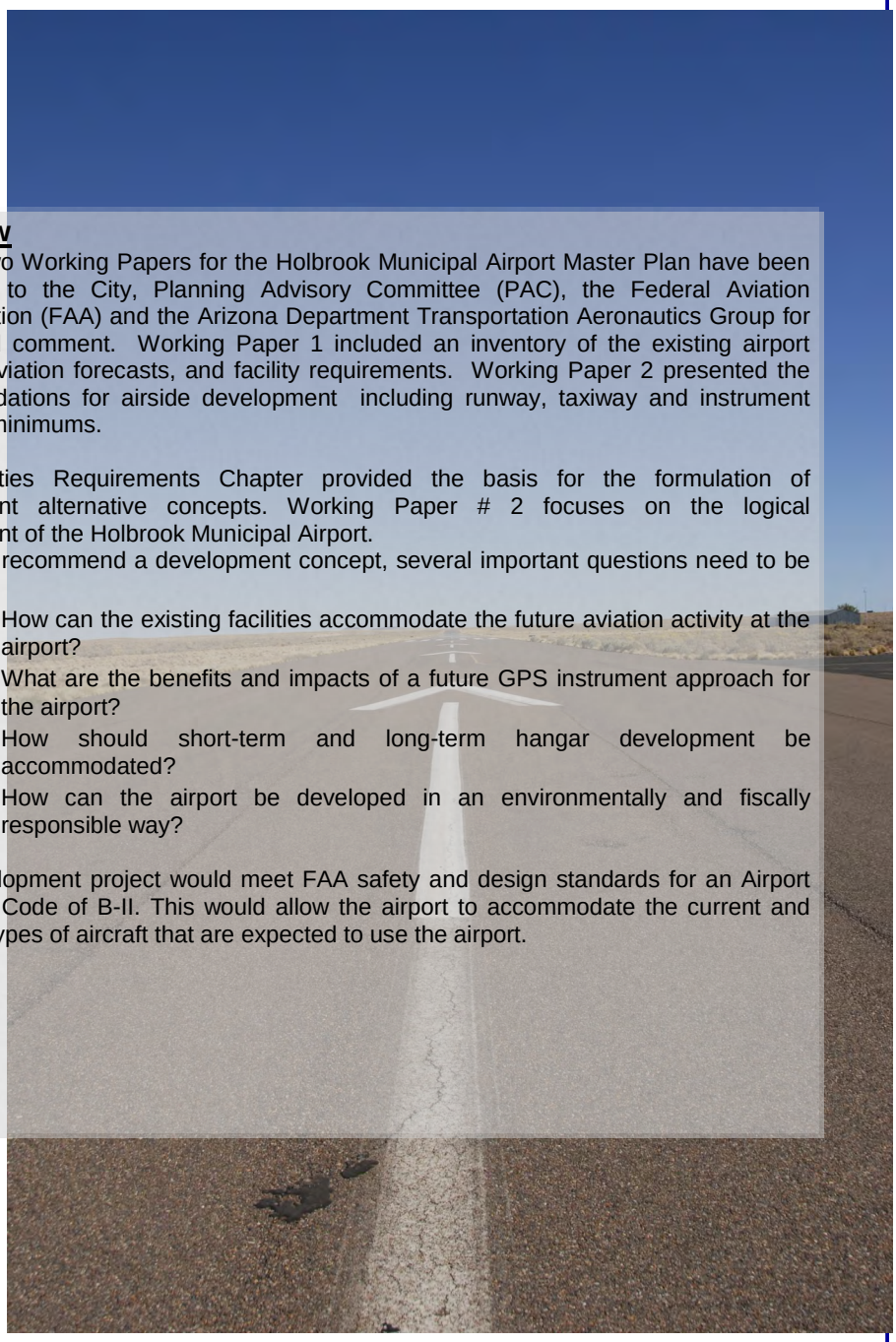
HOLBROOK MUNICIPAL AIRPORT AIRPORT MASTER PLAN UPDATE NEWSLETTER

INSIDE THIS ISSUE:

Overview	*1*
Recommended Development	*2-3*
Upcoming Meeting	*4*

This is the third of four newsletters that will be distributed during the Holbrook Municipal Airport Master Plan Update. The purpose of the newsletters is to provide updates on the progression of the study, announce upcoming meetings and to ensure the involvement of the community. This will allow all interested parties to provide input and remain informed on the progress of the Airport Master Plan.

Recommended Development



Overview

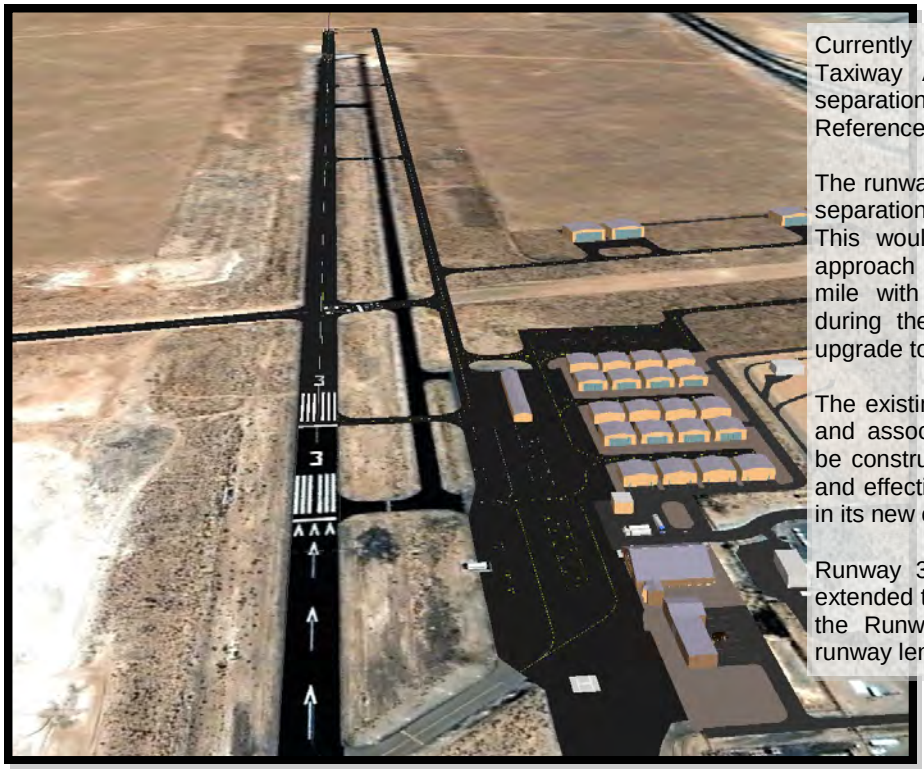
The first two Working Papers for the Holbrook Municipal Airport Master Plan have been distributed to the City, Planning Advisory Committee (PAC), the Federal Aviation Administration (FAA) and the Arizona Department Transportation Aeronautics Group for review and comment. Working Paper 1 included an inventory of the existing airport facilities, aviation forecasts, and facility requirements. Working Paper 2 presented the recommendations for airside development including runway, taxiway and instrument approach minimums.

The Facilities Requirements Chapter provided the basis for the formulation of development alternative concepts. Working Paper # 2 focuses on the logical development of the Holbrook Municipal Airport.
In order to recommend a development concept, several important questions need to be answered:

- How can the existing facilities accommodate the future aviation activity at the airport?
- What are the benefits and impacts of a future GPS instrument approach for the airport?
- How should short-term and long-term hangar development be accommodated?
- How can the airport be developed in an environmentally and fiscally responsible way?

Each development project would meet FAA safety and design standards for an Airport Reference Code of B-II. This would allow the airport to accommodate the current and projected types of aircraft that are expected to use the airport.

RECOMMENDED DEVELOPMENT



Currently the existing Runway 3/21 and Taxiway A do not meet the minimum separation standards for an Airport Reference Code (ARC) B-I.

The runway centerline to taxiway centerline separation should be increased to 300 feet. This would protect for future instrument approach minimums to be lower than 3/4-mile with relatively low additional costs during the planning period and an ARC upgrade to B-II.

The existing Taxiway A would be removed and associated connector taxiways would be constructed in order to provide efficient and effective access to the runway/taxiway in its new configuration.

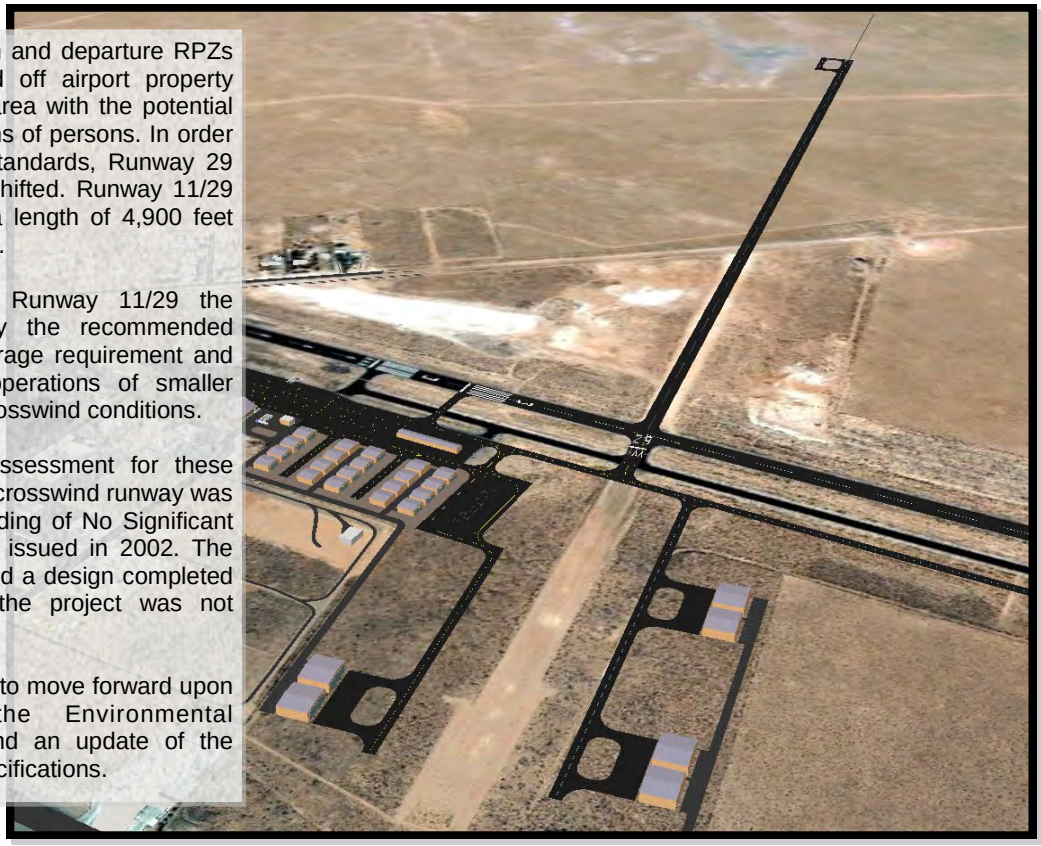
Runway 3/21 would also be shifted and extended to the northeast in order to satisfy the Runway Protection Zone (RPZ) and runway length requirements.

Runway 29 approach and departure RPZs are currently located off airport property and encompass an area with the potential for high concentrations of persons. In order to satisfy the FAA standards, Runway 29 threshold would be shifted. Runway 11/29 would be paved to a length of 4,900 feet and a width of 60 feet.

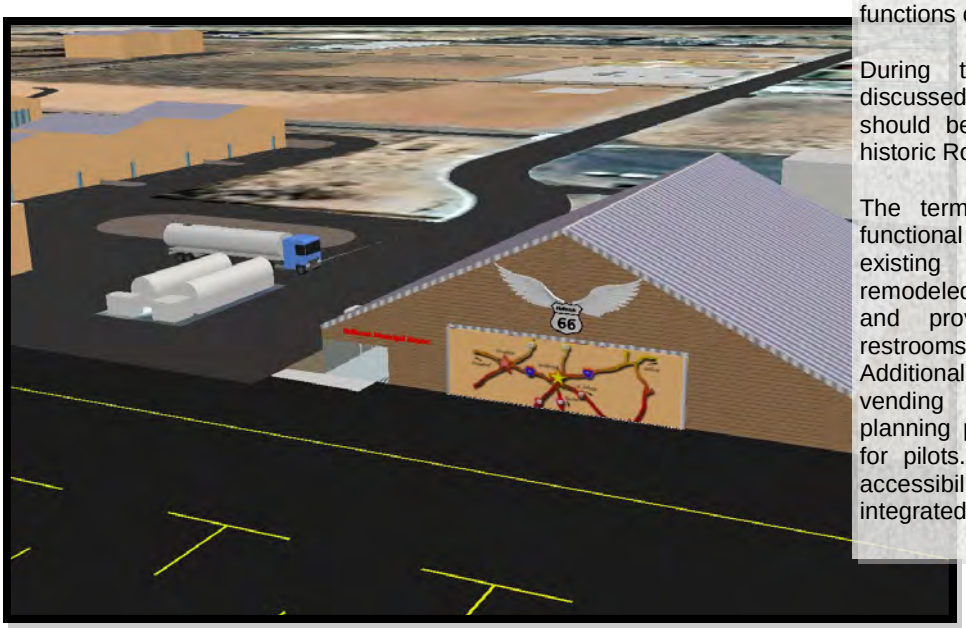
With the improved Runway 11/29 the airport would satisfy the recommended 95% crosswind coverage requirement and facilitate the safe operations of smaller aircraft during high crosswind conditions.

An Environmental Assessment for these improvements to the crosswind runway was completed and a Finding of No Significant Impact (FONSI) was issued in 2002. The land was acquired and a design completed in 2006; however, the project was not constructed.

The project is poised to move forward upon revalidation of the Environmental Assessment (EA) and an update of the design plans and specifications.



RECOMMENDED DEVELOPMENT



Landside facilities are another important aspect of the airport. Landside facilities serve as the processing interface between the surrounding community and the airport operating environment.

Landside facilities house the supporting infrastructure for airside operations and often generate substantial revenues for the airport.

A conceptual demand based layout plan for apron, hangars, air freight, and commercial parcels was designed. The existing fuel tank would be relocated outside of the RPZ.

The first and last impression many air travelers will have of a community and region will be their arrival and departure airport. Improving the aesthetics of the existing facilities would have a significant impact in generating a positive image of the City of Holbrook.

Similar to commercial service airports, general aviation airports generally have a building that serves as the airport terminal. This facility provides a “meet and greet” location on the airport site. At the Holbrook Municipal Airport a single building is designated as the terminal building. It houses general FBO services and hangar space as well as space for administrative functions of the airport.

During the kick-off meeting it was discussed that the existing terminal building should be renovated consistent with the historic Route 66 neon sign theme.

The terminal building should meet the functional needs of the airport users. The existing terminal building should be remodeled to update the interior finishes and provide the basics of shelter, restrooms, and telephone communications. Additional services may include food vending machines, as well as flight planning provisions and weather briefings for pilots. American Disability Act (ADA) accessibility requirements should be integrated into the remodeling design

Points of Contact

Ray Alley
City Manager
P.O. Box 970
Holbrook, AZ 86025
Phone: 928-524-6225
rayalley@ci.holbrook.az.us

Hans Dorries
Airport Planner
Armstrong Consultants, Inc.
861 Rood Avenue
Grand Junction, CO 81501
Phone: (970) 242-0101
Fax: (970) 241-1769
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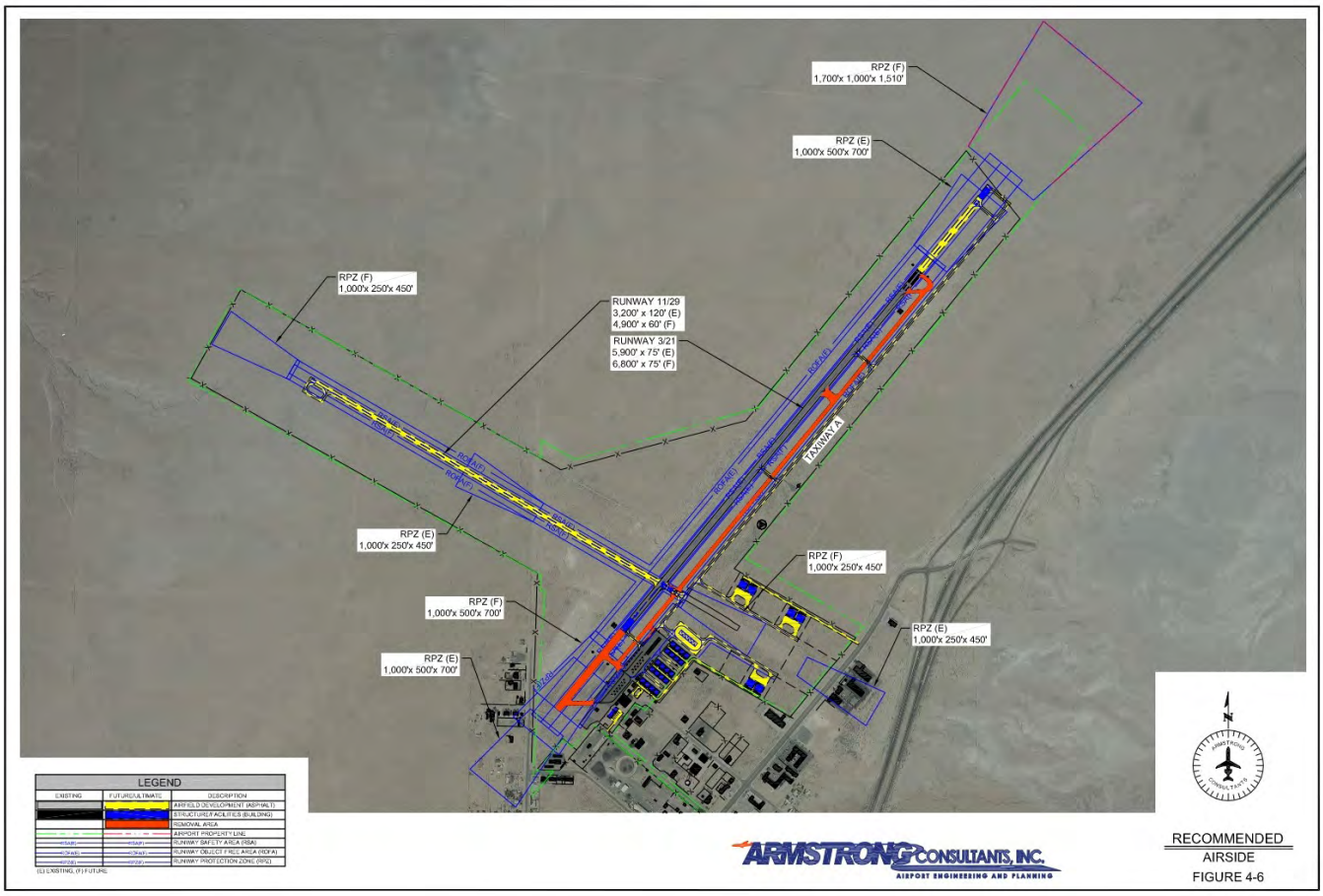
PUBLIC INFORMATION MEETING

A meeting will be scheduled to update the Planning Advisory Committee on the progress of the study and answer questions about the first four chapters of the study.

The informational meeting will include a short presentation and then provide interested parties the opportunity to interact with the consultants and airport representatives to ask specific questions and provide input. Airport Management and Armstrong Consultants will be available to answer any questions.

The date, time and location will be provided in the local media.



RECOMMENDED
AIRSIDE
FIGURE 4-6

ARMSTRONG CONSULTANTS, INC.
AIRPORT ENGINEERING AND PLANNING

Issue 4

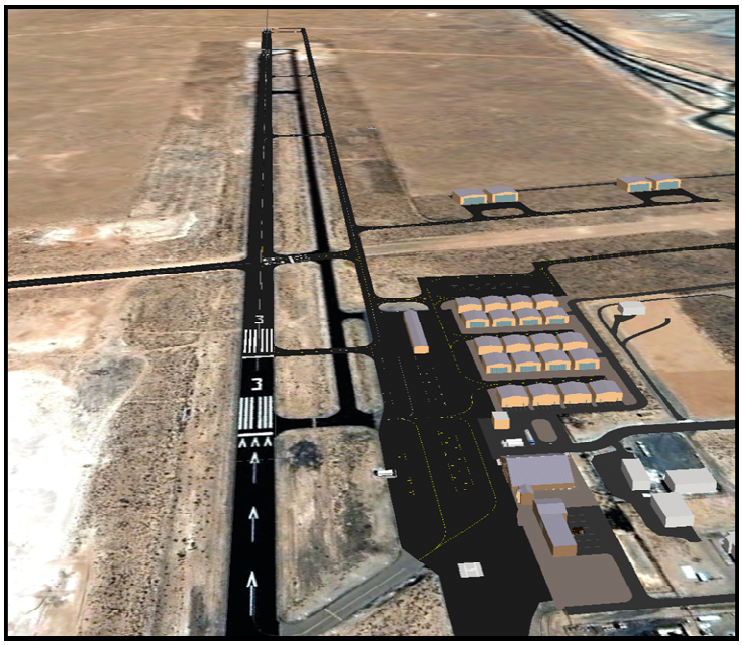
HOLBROOK MUNICIPAL AIRPORT AIRPORT MASTER PLAN UPDATE NEWSLETTER

INSIDE THIS ISSUE:

Overview	*1*
Capital Improvement Program	*2*
Environmental Overview	*2*
Summary	*3*
Upcoming Meeting	*4*

This is the fouth of four newsletters that will be distributed during the Holbrook Municipal Airport Master Plan Update. The purpose of the newsletters is to provide updates on the progression of the study, announce upcoming meetings and to ensure the involvement of the community. This will allow all interested parties to provide input and remain informed on the progress of the Airport Master Plan.

Capital Improvement Program, Environmental Overview, and Financial Analysis



Overview

The Airport Development and Financial Plan includes estimated development costs based on the airport layout plan and are include for each time in the Airport Development Plan.

Recommended development options are based on the facility requirements discussed in Chapter Three of the Master Plan Report and the development projects selected in Chapter Four. The phasing of projects assists the airport sponsor in budgetary planning for construction improvements that are needed to provide safe and functional facilities for aviation demand. Phased development schedules also assist the airport sponsor in contingencies and construction.

The environmental overview examined the potential environmental impacts associated with the proposed improvements listed in the recommended development plan. The environmental overview is intended to provide an overview of the potential impacts and identify additional documentation that may be required as a prerequisite to future development.

AIRPORT DEVELOPMENT AND FINANCIAL PLAN

20-YEAR FINANCIAL DEVELOPMENT PLAN

PHASE I, SHORT-TERM DEVELOPMENT ITEMS		TOTAL	FAA	STATE	LOCAL
A1	Environmental Assessment for Runway 11/29	$150,000	$142,500	$3,750	$3,750
A2	Design and Construct Crosswind Runway 11/29*	$3,294,000	$3,129,300	$82,350	$82,350
A3	Install PAPIs and REILs Runway 11/29	$124,000	$117,800	$3,100	$3,100
A4	Construct Taxilanes Phase I	$150,000	$142,500	$3,750	$3,750
TOTAL SHORT TERM COST		**$3,718,000**	**$3,532,100**	**$92,950**	**$92,950**
PHASE II, MEDIUM-TERM DEVELOPMENT ITEM		**TOTAL**	**FAA**	**STATE**	**LOCAL**
B1	Environmental Assessment for Runway 3/21	$225,000	$213,750	$5,625	$5,625
B2	Acquire Land for Runway 3/21 Shift, Extension, RVZ and BRL	$266,000	$252,700	$6,650	$6,650
B3	Runway 3/21** Shift, Extend and Extend Parallel Taxiway (design and construction)	$1,635,000	$1,553,250	$40,875	$40,875
B4	Install PAPIs and REILs Runway 3/21	$124,000	$117,800	$3,100	$3,100
B5	Relocate Airport Beacon and Buildings	$155,000	$147,250	$3,875	$3,875
B6	Construct Taxilanes Phase II	$150,000	$142,500	$3,750	$3,750
B7	Pavement Maintenance	$150,000	$142,500	$3,750	$3,750
B8	Snow Removal Equipment Building	$400,000	$380,000	$10,000	$10,000
B9	ALP Update	$100,000	$95,000	$2,500	$2,500
TOTAL MEDIUM TERM COST		**$3,205,000**	**$3,044,750**	**$80,125**	**$80,125**
PHASE III, LONG-TERM DEVELOPMENT ITEM		**TOTAL**	**FAA**	**STATE**	**LOCAL**
C1	Design and Relocate Taxiway A**	$2,711,000	$2,575,450	$67,775	$67,775
C2	Environmental Assessment for Apron	$185,000	$175,750	$4,625	$4,625
C3	Apron Expansion	$495,000	$470,250	$12,375	$12,375
C4	Construct Taxilanes Phase III	$536,000	$509,200	$13,400	$13,400
C5	Pavement Maintenance	$150,000	$142,500	$3,750	$3,750
C6	Airport Master Plan Update	$150,000	$142,500	$3,750	$3,750
TOTAL LONG-TERM COST		**$4,227,000**	**$4,015,650**	**$105,675**	**$105,675**
TOTAL		**$11,150,000**	**$10,592,500**	**$278,750**	**$278,750**

Cost estimates in 2010 dollars includes engineering, administration and contingency
**Including lighting, signage and markings*
*** Includes removal of existing pavement, lighting, signage and markings*

Environmental Overview

The potential Environmental Impacts table provides a summary of analysis rating for the eighteen environmental impact categories with respect to the recommended airport improvements. While some categories indicate a potential impact, they are all estimated to be blow the threshold of significance as described in FAA Order 5050.4B.

Recommended Development Potential Environmental Impacts

Environmental Category	Impact Level	Description
Air Quality		Short-term dust and exhaust
Coastal Resources	○	
Compatible Land Use	○	
Construction Impacts	◉	Short-term dust and exhaust, erosion
DOT Act Section 4(F)	○	
Farmlands	○	
Fish, Wildlife and Plants	○	
Floodplains	○	
Hazardous Materials Pollution Prevention and Solid Waste	○	Prepare SPCC Plan
Historical, Architectural, Archeological and Cultural Resources	○	Conduct cultural resource survey
Light Emissions and Visual Impacts	○	
Natural Resources and Energy Supply	○	
Noise	○	
Secondary (Induced) Impacts	⦿ Positive	Economic benefit from airport
Socioeconomic Impacts, Environmental Justice and Children's Environmental Health	⦿ Positive	Economic benefit from airport
Water Quality	⦿	Storm water runoff, prepare SPCC plan
Wetlands	○	Avoid Waters of the U.S.
Wild and Scenic Rivers	○	

Legend:
- ○ No Impact
- ⦿ Minor Impact
- ● Significant Impact

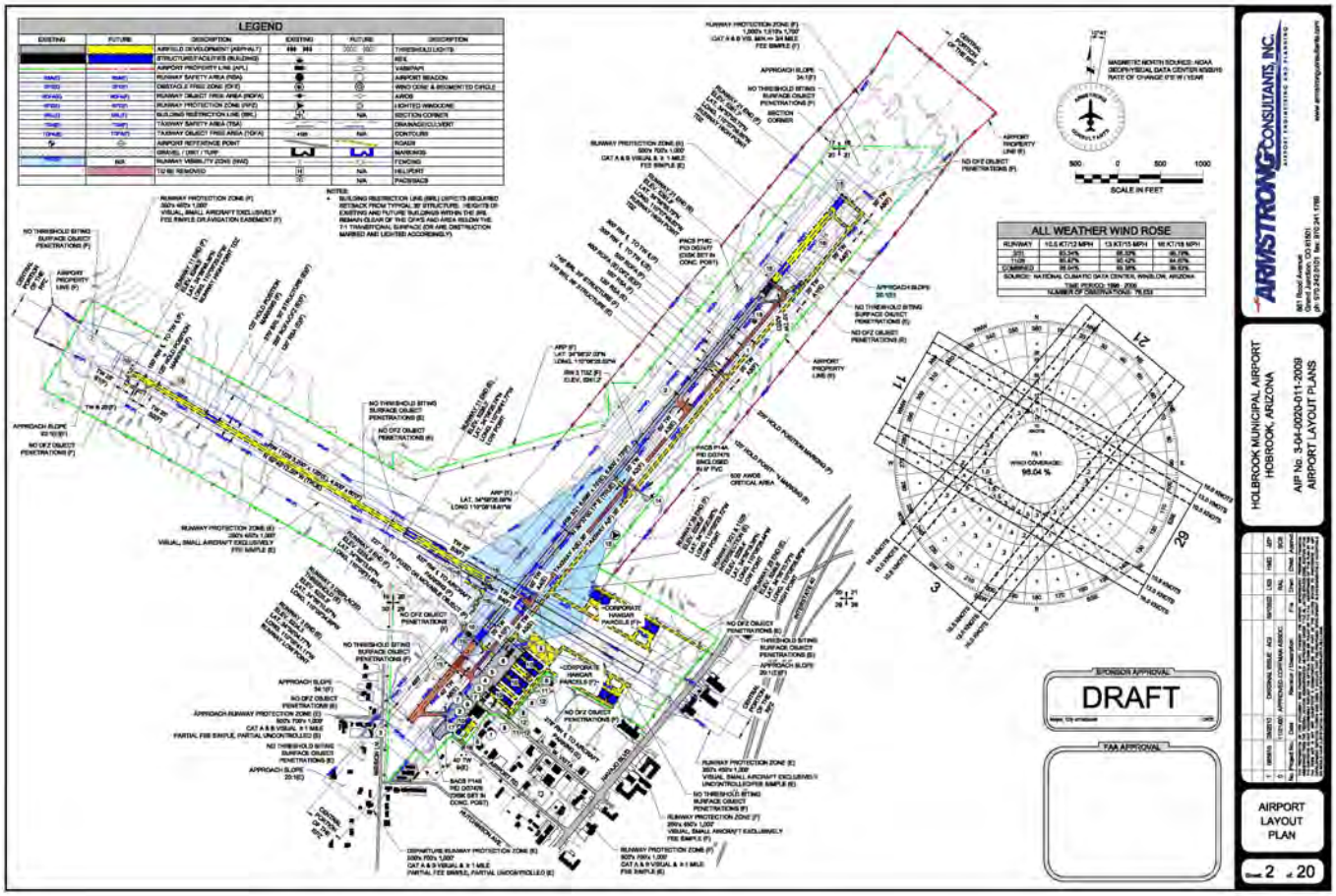
Points of Contact

Ray Alley
City Manager
P.O. Box 970
Holbrook, AZ 86025
Phone: 928-524-6225
rayalley@ci.holbrook.az.us

Justin Pietz
Senior Airport Planner
Armstrong Consultants, Inc.
861 Rood Avenue
Grand Junction, CO 81501
Phone: (970) 242-0101
Fax: (970) 241-1769
justin@armstrongconsultants.com

SUMMARY

A meeting was held on May 12, 2010 to discuss the development alternative with the Planning Advisory Committee (PAC). As a result of the PAC meeting the City elected to move forward with the Recommended development from the development alternatives chapter.



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Appendix F
Acronyms

ARMSTRONG CONSULTANTS, INC.
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Holbrook Municipal Airport
Airport Master Plan

COMMONLY USED ACRONYMS

AC	Advisory Circular
AD	Airport Design
ADG	Airplane Design Group
AGL	Above Ground Level
AIP	Airport Improvement Program
ALP	Airport Layout Plan
ALS	Approach Lighting System
ARC	Airport Reference Code
ARP	Airport Reference Point
ARTCC	Air Route Traffic Control Center
ASDA	Accelerate Stop Distance
ASR	Airport Surveillance Radar
ASV	Annual Service Volume
ATC	Air Traffic Control
ATCT	Airport Traffic Control Tower
AWOS	Automated Weather Observation system
BRL	Building Restriction Line
CAT	Category
CFR	Code of Federal Regulations
CWY	Clearway
CY	Calendar Year
DME	Distance Measuring Equipment
EL	Elevation
EMT	Emergency Medical Technician
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FBO	Fixed Base Operator
FSS	Flight Service System
FY	Fiscal Year
GA	General Aviation
GPS	Global Positioning System
HIRL	High Intensity Runway Lights
IEMT	Intermediate Emergency Medical Technician
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
LDA	Landing Distance Available
LOC	Localizer
MALS	Medium Intensity Approach Lighting System
MALSF	Medium Intensity Approach Lighting System with Sequenced Flashers
MALSR	Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
ME	Multi-Engine
MIRL	Medium Intensity Runway Lights
MITL	Medium Intensity Taxiway Lights
MLS	Microwave Landing System
MOA	Military Operating Area
MSL	Mean Sea Level
NAVAID	Navigational Aid
NDB	Nondirectional Beacon
NM	Nautical Mile
NPIAS	National Plan of Integrated Airport Systems
ODALS	Onmnidirectional Approach Lighting System
OFA	Object Free Area
OFZ	Obstacle Free Zone
PAPI	Precision Approach Path Indicator
PAR	Precision Approach Radar
RAIL	Runway alignment Indicator Lights
REIL	Runway End Identifier Lights
ROFA	Runway Object Free Area
RPZ	Runway Protection Zone
RSA	Runway Safety Area
RVR	Runway Visual Range
RW	Runway
SWY	Stopway
TH	Threshold
TL	Taxilane
TODA	Takeoff Distance Available
TOFA	Taxiway Object Free Area
TORA	Takeoff Run Available
TSA	Taxiway Safety Area
TVOR	Very High Frequency Omni range on an Airport
TW	Taxiway
USGS	United States Geological Society
VASI	Visual Approach Slope Indicator
VFR	Visual Flight Rules
VOR	Very High Frequency Omni range

Appendix G
Glossary of Terms

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Holbrook Municipal Airport
Airport Master Plan

GLOSSARY OF TERMS

Above Ground Level (AGL)	A height above ground as opposed to MSL (height above Mean Sea Level).
Advisory Circular (AC)	Publications issued by the FAA to provide a systematic means of providing non-regulatory guidance and information in a variety of subject areas.
Airport Improvement Program (AIP)	The AIP of the Airport and Airways Improvement Act of 1982 as amended. Under this program, the FAA provide funding assistance for the design and development of airports and airport facilities.
Aircraft Mix	The number of aircraft movements categorized by capacity group or operational group and specified as a percentage of the total aircraft movements.
Aircraft Operation	An aircraft takeoff or landing.
Airport	An area of land or water used or intended to be used for landing and takeoff of aircraft, includes buildings and facilities, if any.
Airport Elevation	The highest point of an airport's useable runways, measured in feet above mean sea level.
Airport Hazard	Any structural or natural object located on or near a public airport, or any use of land near such airport, that obstructs the airspace required for flight of aircraft on approach, landing, takeoff, departure, or taxiing at the airport.
Airport Land Use Regulations	Are designed to preserve existing and/or establish new compatible land uses around airports, to allow land use not associated with high population concentration, to minimize exposure of residential uses to critical aircraft noise areas, to avoid danger from aircraft crashes, to discourage traffic congestion and encourage compatibility with non-motorized traffic from development around airports, to discourage expansion of demand for governmental services beyond reasonable capacity to provide services and regulate the area around the airport to minimize danger to public health, safety, or property from the operation of the airport, to prevent obstruction to air navigation and to aid in realizing the policies of a County Comprehensive Plan and Airport Master Plan.
Airport Layout Plan (ALP)	A graphic presentation, to scale, of existing and proposed airport facilities, their location on the airport and the pertinent applicable standards. To be eligible for AIP funding assistance, an airport must have an FAA-approved ALP.

Airport Master Record, Form 5010	The official FAA document, which lists basic airport data for reference and inspection purposes.
Airport Reference Code (ARC)	The ARC is a coding system used to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at the airport.
Airport Reference Point (ARP)	The latitude and longitude of the approximate center of the airport.
Airspace	Space above the ground in which aircraft travel; divided into corridors, routes and regulated/controlled zones.
Air Traffic	Aircraft operating in the air or on an airport surface, excluding loading ramps and parking areas.
Approach Surface	A surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based upon the type of approach available or planned for that runway end.
Automated Weather Observing System (AWOS)	This equipment automatically gathers weather data from various locations on the airport and transmits the information directly to pilots by means of computer generated voice messages over a discrete frequency.
Based aircraft	An aircraft permanently stationed at an airport.
Building Restriction Line	A line, which identifies suitable building area locations on airports.
Ceiling	The height above the earth's surface of the lowest layer of clouds or other phenomena which obscure vision.
Conical Surfaces	A surface extending outward and upward form the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.
Controlled Airspace	Airspace in which some or all aircraft may be subject to air traffic control to promote safe and expeditious flow of air traffic.
Critical/Design Aircraft	In airport design, the aircraft which controls one or more design items such as runway length, pavement strength, lateral separation, etc., for a particular airport. The same aircraft need not be critical for all design items.

Day Night Level (DNL)	24-hour average sound level, including a 10 decibel penalty for sound occurring between 10:00 PM and 7:00 AM
Decibel	Measuring unit for sound based on the pressure level.
Design Type	The design type classification for an airport refers to the type of runway that the airport has based upon runway dimensions and pavement strength.
Federal Aviation Administration (FAA)	The federal agency responsible for the safety and efficiency of the national airspace and air transportation system.
FAR Part 77	A definition of the protected airspace required for the safe navigation of aircraft.
Fixed Base Operator (FBO)	An individual or company located at an airport and providing commercial general aviation services.
Fuel Flowage Fees	A fee charged by the airport owner based upon the gallons of fuel either delivered to the airport or pump at the airport.
General Aviation (GA)	All aviation activity in the United States, which is neither military nor conducted by major, national or regional airlines.
Glider	A heavier-than-air aircraft that is supported in flight by the dynamic reaction of the air against its lifting surfaces and whose free flight does not depend principally on an engine (FAR Part 1),
Global Positioning System (GPS)	The global positioning system is a space based navigation system, which has the capability to provide highly accurate three-dimensional position, velocity and time to an infinite number of equipped users anywhere on or near the Earth. The typical GPS integrated system will provide: position, velocity, time, altitude, groundspeed and ground track error, heading and variation. The GPS measures distance, which it uses to fix position, by timing a radio signal that starts at the satellite and ends at the GPS receiver. The signal carries with it, data that discloses satellite position and time of transmission and synchronizes the aircraft GPS system with satellite clocks.
Hazard to Air Navigation	An object which, as a result of an aeronautical study, the FAA determines will have a substantial adverse effect upon the safe and efficient use of navigable airspace by aircraft, operation of air navigation facilities or existing or potential airport capacity.
Horizontal Surface	A horizontal plane 150 feet above the established airport elevation, the perimeter which is constructed by swinging arcs of specified radii from the center of each end of the primary surface of each runway and connecting the adjacent arcs by lines tangent to those arcs.

Imaginary Surfaces	Surfaces established in relation to the end of each runway or designated takeoff and landing areas, as defined in paragraphs 77.25, 77.28 and 77.29 of FAR Part 77, *Objects Affecting Navigable Airspace*. Such surfaces include the approach, horizontal, conical, transitional, primary and other surfaces.
Itinerant Operations	All operations at an airport, which are not local operations.
Jet Noise	The noise generated externally to a jet engine in the turbulent jet exhaust.
Knots	Nautical miles per hour, equal 1.15 statute miles per hour.
Large Airplane	An airplane of more than 12,500 pounds maximum certified takeoff weight.
Local Operations	Operations by aircraft flying in the traffic pattern or within sight of the control tower, aircraft known to be arriving or departing from flight in local practice areas, or aircraft executing practice instrument approaches at the airport.
Location Identifier	A three-letter or other code, suggesting where practicable, the location name that it represents.
Maneuvering Area	That part of an airport to be used for the takeoff and landing of aircraft and for the movement of aircraft associated with takeoff and landing, excluding aprons.
Master Plan	A planning document prepared for an airport, which outlines directions and developments in detail for 5 years and less specifically for 20 years. The primary component of which is the Airport Layout Plan.
Mean/Maximum Temperature	The average of all the maximum temperatures usually for a given period of time.
Mean Sea Level (MSL)	Height above sea level.
Medium Intensity Runway Lights (MIRL)	For use on VFR runways or runway showing a nonprecision instrument flight rule (IFR) procedure for either circling or straight-in approach.
Minimum Altitude	That designated altitude below which an IFR pilot is not allowed to fly unless arriving or departing an airport or for specific allowable flight operations.

National Airspace System	The common network of United States airspace, navigation aids, communications facilities and equipment, air traffic control equipment and facilities, aeronautical charts and information, rules, regulations, procedures, technical information and FAA manpower and material.
National Plan of Integrated Airport Systems (NPIAS)	A plan prepared annually by the FAA which identifies, for the public, the composition of a national system of airports together with the airport development necessary to anticipate and meet the present and future needs of civil aeronautics, to meet requirements in support of the national defense and to meet the special needs of the Postal Service. The plan includes both new and qualitative improvements to existing airports to increase their capacity, safety, technological capability, etc.
NAVAID	A ground based visual or electronic device used to provide course or altitude information to pilots.
Noise	Defined subjectively as unwanted sound. The measurement of noise involves understanding three characteristics of sound: intensity, frequency and duration.
Noise Contours	Lines drawn about a noise source indicating constant energy levels of noise exposure. DNL is the measure used to describe community exposure to noise.
Noise Exposure Level	The integrated value, over a given period of time of a number of different events of equal or different noise levels and durations.
Non-Precision Instrument	A runway having an existing instrument approach procedure utilizing air navigation facilities with only horizontal guidance for which a straight-in nonprecision instrument approach procedure has been approved.
Notice to Airmen (NOTAM)	A notice containing information (not known sufficiently in advance to publicize by other means concerning the establishment, condition or change in any component (facility, service, or procedure) of or hazard in the National Airspace System, the timely knowledge of which is essential to personnel concerned with flight operations.
Object	Includes, but is not limited to, above ground structures, NAVAIDs, people, equipment, vehicles, natural growth, terrain and parked aircraft.
Object Free Area (OFA)	A two-dimensional ground area-surrounding runways, taxiways and taxilanes which is clear of objects except for object whose location is fixed by function.

Obstacle Free Zone (OFZ)	The airspace defined by the runway OFZ and, as appropriate, the inner-approach OFZ and the inner-transitional OFZ, which is clear of object penetrations other than frangible NAVAIDs.
Obstruction	An object which penetrates an imaginary surface described in the FAA's Federal Aviation Regulations (FAR), Part 77.
Parking Apron	An apron intended to accommodate parked aircraft.
Pattern	The configuration or form of a flight path flown by an aircraft or prescribed to be flown, as in making an approach to a landing
Precision Approach Path Indicators (PAPI)	The visual approach slope indicator system furnishes the pilot visual slope information to provide safe descent guidance. It provides vertical visual guidance to aircraft during approach and landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that they are "on path" if they see red/white, "above path" if they see white/white and "below path" if they see red/red.
Primary Surface	A surface longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway, but when the runway has no specially prepared hard surface, or planned hard surface, the primary surface ends at each end of that runway.
Rotating Beacon	A visual navaid operated at many airports. At civil airports, alternating white and green flashes indicate the location of the airport.
Runway	A defined rectangular surface on an airport prepared or suitable for the landing or takeoff of airplanes.
Runway End Identifier Lights (REIL)	REILs are flashing strobe lights which aid the pilot in identifying the runway end at night or in bad weather conditions.
Runway Gradient	The average gradient consisting of the difference in elevation of the two ends of the runway divided by the runway length may be used provided that no intervening point on the runway profile lies more than five feet above or below a straight line joining the two ends of the runway. In excess of five feet the runway profile will be segmented and aircraft data will be applied for each segment separately.
Runway Lighting System	A system of lights running the length of a system that may be either high intensity (HIRL), medium intensity (MIRL), or low intensity (LIRL).
Runway Orientation	The magnetic bearing of the centerline of the runway.

Runway Protection Zone (RPZ)	An area off the runway end used to enhance the protection of people and property on the ground.
Runway Safety Area (RSA)	A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion form the runway.
Segmented Circle	A basic marking device used to aid pilots in determining traffic pattern and often contains a windsock or tee.
Small Aircraft	An airplane of 12,500 pounds or less maximum certified takeoff weight.
Taxiway	A defined path established for the taxiing of aircraft to or from the runway or from one part of an airport to another.
Terminal Area	The area used or intended to be used for such facilities as terminal and cargo buildings, gates, hangars, shops and other service buildings, automobile parking, airport motels, restaurants, garages and automobile services and a specific geographical area within which control of air traffic is exercised.
Threshold	The beginning of that portion of the runway available for landing.
Touch and Go Operations	Practice flight performed by a landing touch down and continuous takeoff without stopping.
Traffic Pattern	The traffic flow that is prescribed for aircraft landing at, taxiing on or taking off form an airport. The usual components are the departure, crosswind, downwind, and base legs; and the final approach.
Transitional Surface	These surfaces extend outward and upward at right angles to runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces.
Universal Communications (UNICOM)	A private aeronautical advisory communications facility for purpose other than air traffic control. Only one such station is authorized in any landing area. Service available are advisory in nature primarily concerning the airport services and airport utilization. Locations and frequencies of UNICOMs are listed on aeronautical charts and publications.
Visual Flight Rules (VFR)	Rules that govern flight procedures under visual conditions.
Visual Runway	A runway intended for visual approaches only with no straight-in instrument approach procedure either existing or planned for that runway.

ARMSTRONG CONSULTANTS, INC.

AIRPORT ENGINEERING AND PLANNING

861 Rood Avenue
Grand Junction, CO 81501

Ph (970) 242-0101
Fax (970) 241-1769

www.armstrongconsultants.com