KINGMAN AIRPORT

AIRPORT MASTER PLAN

KINGMAN AIRPORT
Kingman, Arizona

AIRPORT MASTER PLAN

FINAL TECHNICAL REPORT

Prepared By
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Airport Consultants
And
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As Approved by the Kingman Airport Authority
February 19, 2006

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INTRODUCTION

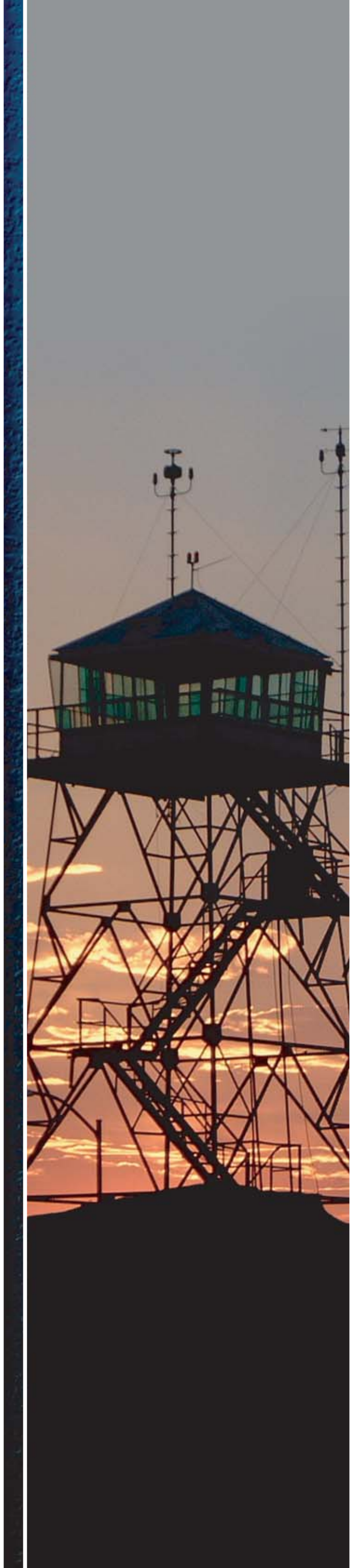
INTRODUCTION

The Kingman Airport Master Plan Update was undertaken to evaluate the airport's capabilities and role, to forecast future aviation demand, and to plan for the timely development of new or expanded facilities that may be required to meet that demand. The ultimate goal of the Master Plan is to provide systematic guidelines for the airport's overall maintenance, development, and operation.

The Master Plan is intended to be a proactive document which identifies and then plans for future facility needs well in advance of the actual need. This is done to ensure that the Kingman Airport Authority (KAA) can coordinate project approvals, design, financing, and construction in a timely manner, prior to experiencing the detrimental effects of inadequate facilities.

An important result of the Master Plan is reserving sufficient areas for future facility needs. This protects development areas and ensures they will be readily available when required to meet future needs. The intended result is a detailed land use concept which outlines specific uses for all areas of airport property.

The preparation of this Master Plan is evidence that the KAA recognizes the importance of air transportation to the community and the associated challenges inherent in providing for its unique operating and improvement needs. The cost of maintaining an airport is an investment which yields impressive benefits to the community. With a sound and realistic Master Plan, Kingman Airport can maintain its role as an important link to the national air transportation system for



the community and maintain the existing public and private investments in its facilities.

MASTER PLAN OBJECTIVES

The primary objective of the Kingman Airport Master Plan is to develop and maintain a financially feasible, long term development program which will satisfy aviation demand and be compatible with community development, other transportation modes, and the environment. The accomplishment of this objective requires the evaluation of the existing airport and a determination of what actions should be taken to maintain an adequate, safe, and reliable airport facility to meet the air transportation needs of the area. The completed Master Plan will provide an outline of the necessary development and give responsible officials advance notice of future needs to aid in planning, scheduling, and budgeting.

Specific objectives of the Kingman Airport Master Plan are:

& **Preserve Public and Private Investments**

The KAA, United States Government (through the Federal Aviation Administration [FAA]), and State of Arizona (through the Department of Transportation – Aeronautics Division [ADOT]) have made considerable investments in the airport's infrastructure. Private individuals and businesses have made investments in buildings and other facilities. The Master Plan will provide for continued maintenance and necessary improvements to the airport's infrastructure to ensure maximum utility of the private facilities at Kingman Airport and ensure the continued use of publicly-funded facilities.

& **Be Reflective of Community Goals and Objectives**

The Kingman Airport is a public facility serving the needs of the local residents and businesses. The Master Plan needs to be reflective of the desires and visions the local communities have for quality of life, business and development, and land use. The Master Plan will consider existing community planning documents for surrounding communities and the County in the ultimate design and use of the airport.

& **Maintain Safety**

Safety is an essential consideration in the planning and development at the airport. The Master Plan will focus on maintaining the highest levels of safety for airport users, visitors, employees, and surrounding communities.

& **Preserve the Environment**

Protection and preservation of the local environment are essential concerns in the Master Plan. Any improvements called for in the Master Plan will be mindful of environmental requirements.

& **Attract Public Participation**

To ensure that the Master Plan reflects the concerns of the public, the local communities, airport tenants, airport users, and businesses throughout the region, the Master Plan process will include an active public outreach program to solicit comments and suggestions and include them in the final Master Plan, to the extent possible.

& **Strengthen the Economy**

In continuing support of the area's strong economy, the Master Plan is aimed at retaining and increasing jobs and revenue for the region and its businesses.

The Master Plan will accomplish these objectives by carrying out the following:

% Determining projected needs of airport users through the year 2023.
% Identifying existing and future facility needs.
% Evaluating future airport facility development alternatives which will optimize airport capacity and aircraft safety.
% Developing a realistic, commonsense plan for the use and/or expansion of the airport.
% Developing land use strategies for the use of airport property.
% Developing compatible land use strategies.
% Establishing a schedule of development priorities and a program for improvements.
% Analyzing the airport's financial requirements for capital improvement needs and grant options.
% Coordinating this Master Plan with local, regional, state, and federal agencies.
% Conducting active and productive public involvement through the planning process.

MASTER PLAN ELEMENTS AND PROCESS

The Kingman Airport Master Plan Update is being prepared in a systematic fashion following FAA guidelines and industry-accepted principles and practices. The Master Plan update for Kingman Airport has six general elements that are intended to assist in the discovery of future facility needs and provide the supporting rationale for their implementation. **Exhibit IA** provides a graphical depiction of the process and elements involved in the Kingman Airport Master Plan Update.

Element One encompasses the inventory efforts. The inventory efforts were focused on collecting and assembling relevant data pertaining to the airport and the area it serves. Information was collected on existing airport facilities and operations. Local economic and demographic data was collected to define the local growth trends. Planning studies which may have relevance to the Master Plan were also collected. Information collected during the inventory efforts are summarized in Chapter One, Inventory.

Element Two examines the potential aviation demand for aviation activity at the airport. This analysis utilizes local socioeconomic information, as well as national air transportation trends to quantify the levels of aviation activity which can reasonably be expected to occur at Kingman Airport though the year 2023. This includes commercial air passengers, general aviation based aircraft, and annual aircraft operations by type. The results of this effort were used to determine the types and sizes of facilities which will be required to meet the projected aviation demands for the airport through the planning period. The results of this analysis are presented in Chapter Two, Aviation Demand Forecasts.

Element Three comprises the facility requirements analysis. The intent of this analysis was to compare the existing facility capacities to forecast aviation demand and determine where deficiencies in capacities (as well as excess capacities) may exist. Where deficiencies were identified, the size and type of new facilities to accommodate the demand are identified. The airfield analysis focused on improvements needed to serve the type of aircraft expected to operate at the airport in the future, as well as navigational aids to increase the safety and efficiency of operations. This element also examined the air carrier terminal, aircraft storage hangars, and apron needs. The findings of this analysis are presented in Chapter Three, Facility Requirements.

Element Four considers a variety of solutions to accommodate the projected facility needs. This element proposes various facility and site plan configurations to efficiently and effectively use the available airport property. A thorough analysis was completed to identify the strengths and weaknesses of each proposed development alternative, with the intention of determining a single direction for development. These results are presented in Chapter Four, Airport Development Alternatives.

Element Five comprises two independent, yet interrelated work efforts: a recommended development plan and an environmental overview. Chapter Five, Airport Plans, presents a graphic and narrative description of the recommended plan for the use, development, and operation of the airport, and a review of federal environmental requirements applicable to Kingman Airport. The official Airport Layout Plan (ALP) drawings used by the FAA and the ADOT in determining grant eligibility and funding are included as Appendix E to the Master Plan.

Element Six focuses on the capital needs program. This program defines the schedules, costs, and funding sources for the recommended development projects. The Capital Improvement Program is included in Chapter Six.

An Economic Benefit Study of Kingman Airport is included as Appendix C to the Master Plan. The Economic Benefit Study details the benefit of the airport to the community in total jobs supported, total payroll, and total revenues. An economic impact study of the Kingman Airport Industrial Park is included in Appendix D.

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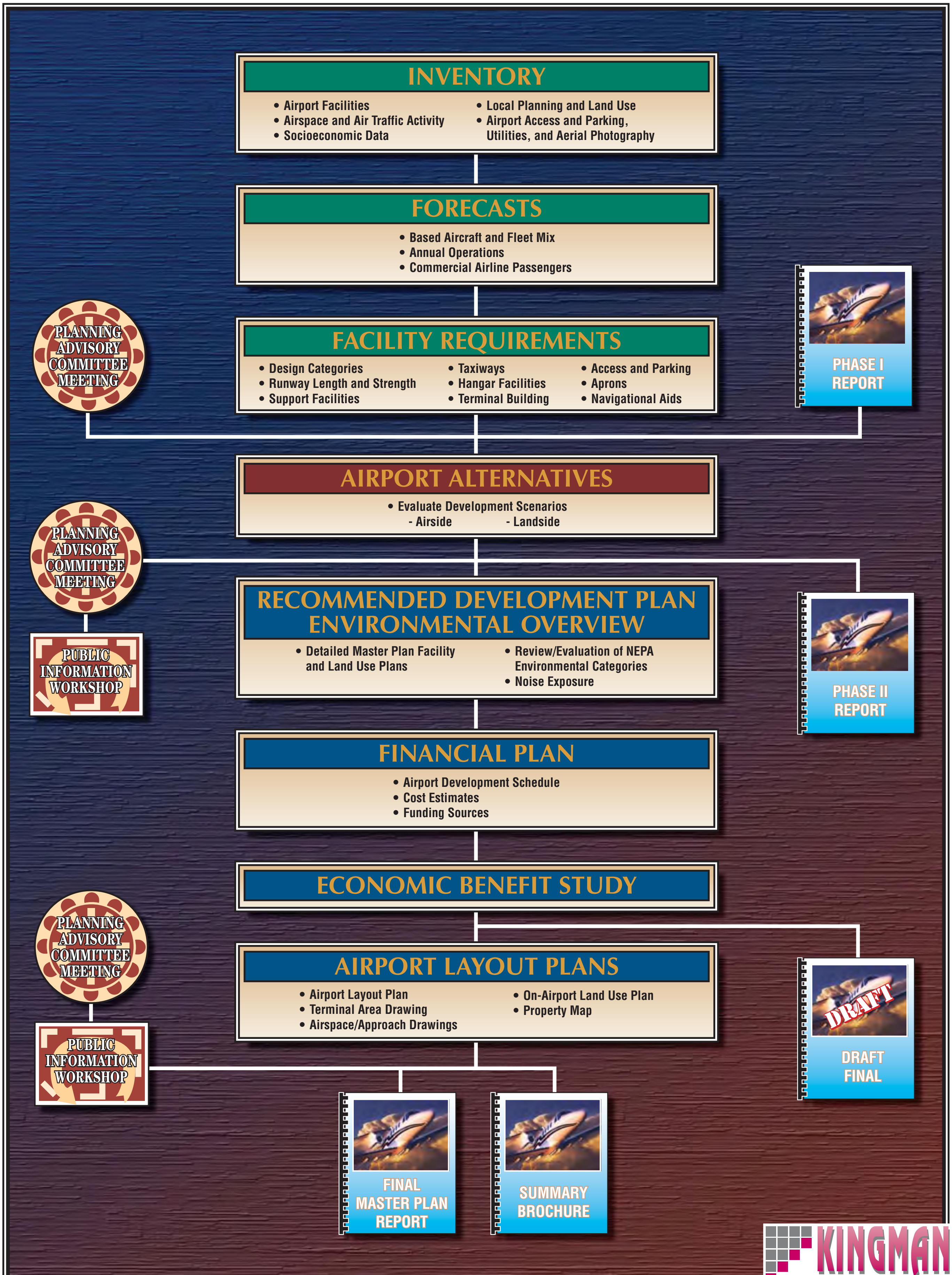

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Exhibit IA
MASTER PLAN PROCESS

COORDINATION

The Kingman Airport Master Plan Update was of interest to many within the local community. This includes local citizens, community organizations, airport users, airport tenants, area-wide planning agencies, and aviation organizations. As an important component of the regional, state, and national aviation systems, the Master Plan Update is of importance to both state and federal agencies responsible for overseeing air transportation.

To assist in the development of the Kingman Airport Master Plan Update, the KAA identified a cross-section of community members and interested persons to act in an advisory role in the development of the Master Plan. As members of the Planning Advisory Committee (PAC), the committee members reviewed phase reports and provided comments throughout the study to help ensure that a realistic, viable plan is developed.

To assist in the review process, draft phase reports were prepared at three milestones in the planning process as shown on **Exhibit IA**. The draft phase report process allowed for input and review during each step of the Master Plan process to ensure that all Master Plan issues are fully addressed as the recommended program was developed.

Two public information workshops were also included as part of the plan coordination. The public information workshops allowed the public to provide input and learn about general information concerning the Master Plan.

Chapter One

INVENTORY

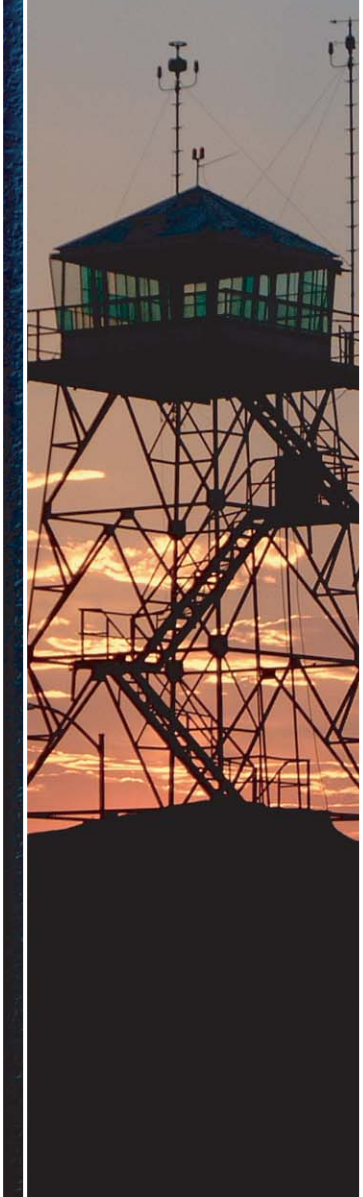
INVENTORY

The initial step in the preparation of the Airport Master Plan Update for Kingman Airport is the collection of information pertaining to the airport and the area it serves. The information collected in this chapter will be used in subsequent analysis in this study. The inventory of existing conditions at Kingman Airport provides an overview of the airport facilities, airspace, and air traffic control. Background information regarding the regional area is also collected and presented. This includes information regarding the airport's role in regional, state, and national aviation systems, surface transportation, and a socioeconomic profile.

The information was obtained from several sources, including on-site inspections, airport records, review of related planning studies, the Federal Aviation Administration (FAA), Arizona Department of Transportation - Aeronautics Division (ADOT), various government agencies, a number of on-line (Internet) sites (which presently summarize much of the statistical information and facts about the airport). Interviews with airport staff, planning associations, and airport tenants also contributed to the data collection.

AIRPORT FACILITIES

Airport facilities can be functionally classified into two broad categories: airside and landside. The airside category includes those facilities directly associated with aircraft operations. The landside category includes those facilities necessary to provide a safe transition from surface to air transportation, and support aircraft



servicing, storage, maintenance, and operational safety.

AIRSIDE FACILITIES

Airside facilities include runways, taxiways, airfield lighting, and navigational aids. Airside facilities are identified on **Exhibit 1A**. **Table 1A** summarizes airside facility data.

TABLE 1A
Airside Facility Data
Kingman Airport

	Runway 3-21	Runway 17-35
Runway Length (feet) Runway Width (feet)	6,831 150	6,725 75
Runway Surface Material Condition	Asphalt Good	Asphalt-Concrete Good
Pavement Markings	Nonprecision	Basic
Runway Load Bearing Strengths (lbs.)		
Single Wheel Loading (SWL)	45,000	22,000
Double Wheel Loading (DWL)	85,000	60,000
Dual Tandem Wheel Loading (DTWL)	125,000	-
Double Dual Tandem Wheel Loading (DDTWL)	265,000	-
Runway Lighting	Medium Intensity Distance Remaining Signs	Medium Intensity
Taxiway Lighting	Medium Intensity [1]	
Approach Lighting	PAPI-4L (3 and 21) REIL (3 and 21)	PAPI-2L (17 and 35)
Instrument Approach Procedures	VOR/DME Runway 21 GPS Runway 3 GPS Runway 21	
Weather or Navigational Aids	Automated Surface Observation System (ASOS) Segmented Circle Lighted Wind Cone; Wind Tee	

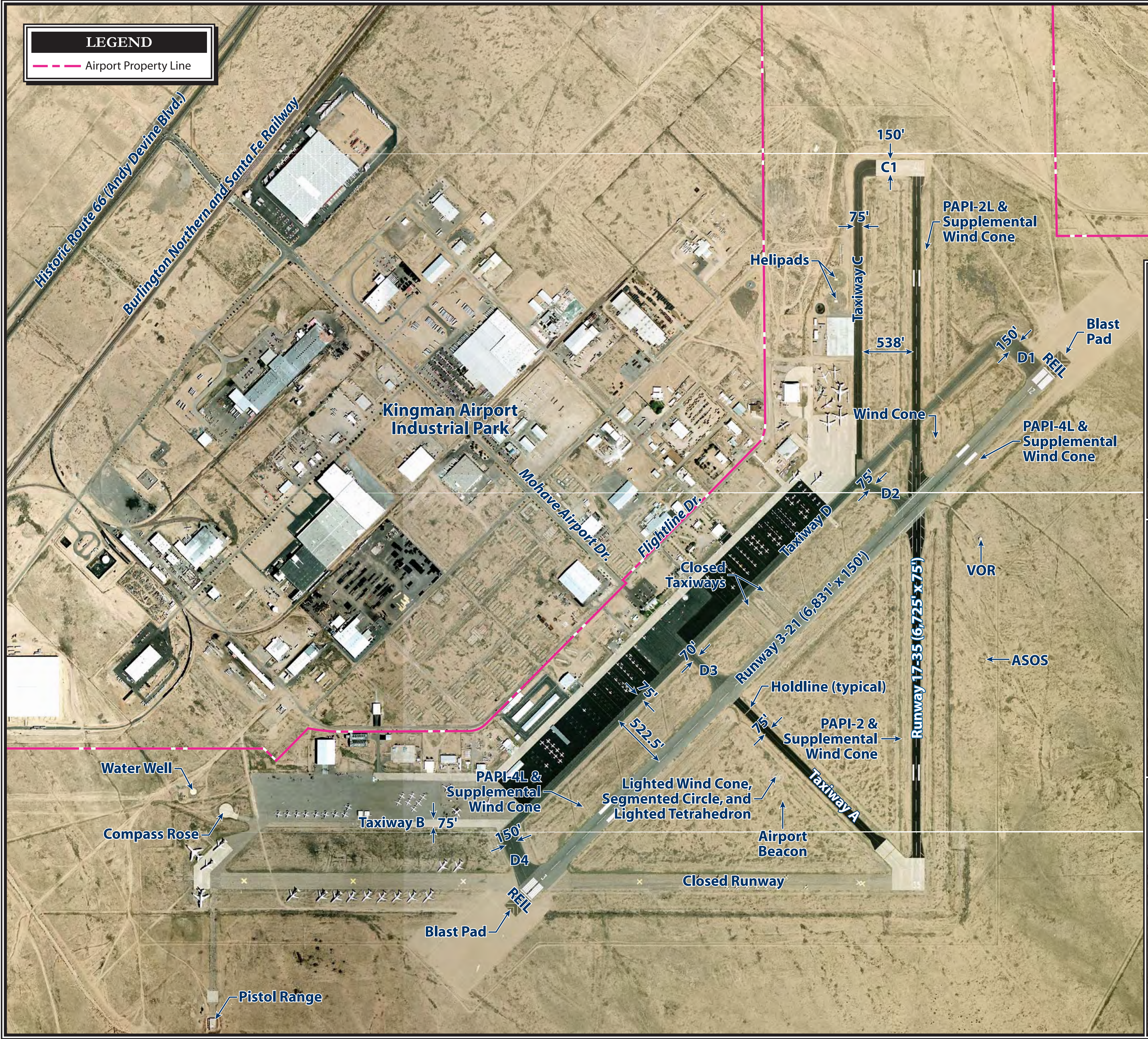
Source: *Airport/Facility Directory, Southwest U.S.* (April 15, 2004); FAA Form 5010-1, Airport Master Record; Kingman Airport Certification Specifications, April 1999

[1] Except Taxiway B

GPS – Global Positioning System
PAPI – Precision Approach Path Indicator
REIL – Runway End Identification Lighting
VOR/DME - Very High Frequency Omnidirectional Range/Distance Measuring Equipment

Runways

The existing runway configuration at Kingman Airport includes two intersecting runways. Runway 3-21, which is oriented in a northeast-southwest direction, serves as the primary runway and is 6,831 feet long and 150 feet wide. Runway 17-35 serves as the crosswind runway and is 6,725 feet long and 75 feet wide. (There was a third runway previously at Kingman Airport. This runway, which has been officially closed since 1984, is oriented in an east-west direction and measures 6,725 feet in length and 150 feet



DISTANCE REMAINING SIGN

AIRPORT BEACON

LIGHTED WIND CONE, SEGMENTED CIRCLE, AND LIGHTED TETRAHEDRON

AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS)

VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE FACILITY (VOR)

DIRECTIONAL SIGNS

RUNWAY

TAXIWAY

PRECISION APPROACH PATH INDICATOR (PAPI)

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Exhibit 1A
EXISTING AIRSIDE FACILITIES

03MP10-1A-4/26/05

in width. This closed runway is now used for the parking and storage of aircraft.)

Both runways are constructed of asphalt. The load bearing strengths of each runway are shown in **Table 1A**. Single wheel loading (SWL) refers to the design of certain aircraft landing gear which has a single wheel on each main landing gear strut. Dual wheel landing (DWL) refers to the design of certain aircraft landing gear which has two wheels on each main landing gear strut. Dual tandem wheel loading (DTWL) refers to the aircraft landing gear struts with a tandem set of dual wheels (four wheels) on each main landing gear strut. Double dual tandem wheel loading refers to aircraft landing gear struts with two tandem wheels on each landing gear strut (eight wheels).

Runway gradient describes the upward or downward slope of a runway. The gradient is determined by dividing the difference in runway end elevations by the runway length. Runway 3-21 slopes upward to the southwest and has a 0.3 percent gradient. Runway 17-35 has a 1.3 percent gradient and slopes upward to the south.

Helipads

Two helipads are available at Kingman Airport. These two helipads are located on the north end of the airfield, west of Taxiway C.

Taxiways

The existing taxiway system at Kingman Airport, as illustrated on **Exhibit 1A**, consists of parallel, connecting, and entrance/exit taxiways. Runway 3-21 is served by a full-length parallel taxiway. Taxiway D is 75 feet wide and located 522 feet from the Runway 3-21 centerline. Taxiway C is a partial parallel taxiway extending between Taxiway D and the Runway 17 end. Taxiway C is 75 feet wide and located 538 feet from the Runway 17-35 centerline. Taxiway B extends to the west along the southern edge of the southwest apron area. Taxiway B is 75 feet wide.

Several entrance/exit taxiways, which are designated as Taxiways C1, D1, D2, D3, and D4, provide connections between the parallel taxiways and runways. These taxiways vary in width from 75 to 150 feet. An additional 75-foot taxiway, designated as Taxiway A, connects the terminal apron with the Runway 35 end. Flightline Drive and Finance Way provide access to the airport for aircraft stored in the industrial park.

Airfield Lighting

Airfield lighting systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of lighting systems are installed at the airport for this purpose. These lighting systems, categorized by function, are summarized as follows:

Identification Lighting: The location of the airport at night is universally identified by a rotating beacon. A rotating beacon projects two beams of light, one white and one green, 180 degrees apart. The rotating beacon at Kingman Airport is located near the center of the runway system, next to the lighted wind cone and segmented circle, south of Taxiway A.

Pavement Edge Lighting: Pavement edge lighting utilizes light fixtures placed near the edge of the pavement to define the lateral limits of the pavement. This lighting is essential for safe operations during night and/or times of low visibility, in order to maintain safe and efficient access to and from the runway and aircraft parking areas. Both runways are equipped with medium intensity runway lighting (MIRL). Taxiways A, C, and D are equipped with medium intensity taxiway lighting (MITL). Taxiway B has no lighting.

Visual Approach Lighting: A precision approach path indicator (PAPI-4L) is installed on both ends of Runway 3-21, while a PAPI-2L is installed on both ends of Runway 17-35. The PAPI consists of a system of lights located at various distances from the runway threshold. When interpreted by the pilot, these lights give the pilot an indication of being above, below, or on the designed descent path to the runway. The PAPI-4 consists of four separate light boxes arranged in a row. The PAPI-2 consists of two separate light boxes arranged in a row.

Runway End Identification Lighting: Runway end identifier lights (REILs) provide rapid and positive identification of the approach end of a runway. REILs are typically used on runways without more sophisticated approach lighting systems. The REIL system consists of two synchronized flashing lights, located laterally on each side of the runway facing the approaching aircraft. REILs are installed on both ends of Runway 3-21.

Pilot-Controlled Lighting: A pilot-controlled lighting system (PCL) allows pilots to activate and/or increase the intensity of the airfield lighting systems from the aircraft, with the use of the aircraft's radio transmitter. At Kingman Airport, the Runway 3-21 MIRLs, Runway 17-35 MITLs, PAPIs, REILs, and taxiway lights are on the PCL system.

There is a diesel-powered 60KW standby electrical generator with adequate capacity to operate the entire airfield lighting system on high-intensity in the event of a commercial power outage. The generator will start automatically for anything over a two-second power interruption.

Airfield Signs: Airfield identification signs assist pilots in identifying their location on the airfield and directing them to their desired location. Lighted signs are installed at all taxiway and runway intersections.

Distance Remaining Signs: Distance remaining signs are installed on Runway 3-21. Distance remaining signs give pilots an indication of the remaining runway length available when landing or departing. The signs are lighted and located at 1,000-foot intervals from the end of the runway.

Runway Threshold Lighting: Runway threshold lights identify the runway end. Runway threshold lights have specially designed lights that are green on one side and red on the other. The green side is oriented towards the landing aircraft. There are eight threshold lights at each runway end.

Pavement Markings

Pavement markings aid in the movement of aircraft along airport surfaces and identify closed or hazardous areas on the airport. The nonprecision markings on Runway 3-21 identify the runway designation, threshold, centerline, and aiming point. The basic markings on Runway 17-35 identify the runway designation, aiming point, and centerline. The closed runway is marked with yellow Xs.

Taxiway and apron centerline markings are provided to assist aircraft using these airport surfaces. Taxiway centerline markings assist pilots in maintaining proper clearance from pavement edges and objects near the taxiway/taxilane edges. Pavement markings also identify aircraft parking and aircraft holding positions.

Weather and Communication Aids

The airport is equipped with an Automated Surface Observing System (ASOS). The ASOS provides automated aviation weather observations 24 hours-a-day. The system updates weather observations every minute, continuously reporting significant weather changes as they occur. The ASOS system reports cloud ceiling, visibility, temperature, dew point, wind direction, wind speed, altimeter setting (barometric pressure), and density altitude (airfield elevation corrected for temperature). The ASOS is located east of Runway 17-35, south of the Runway 21 end.

The airport is also equipped with a lighted wind cone, lighted tetrahedron, and segmented circle. The wind cone provides information on wind direction and velocity. The tetrahedron provides pilots with information about wind direction. The tetrahedron points into the direction of the wind. A segmented circle indicates the traffic pattern location for pilots. The lighted wind cone and segmented circle are located southeast of Taxiway A. Four supplemental wind cones are also located near each runway end, adjacent to the PAPIs.

Compass Rose

A compass rose is located on the south end of the apron and is accessed from Taxiway B. The compass rose is a painted area on the pavement showing the primary magnetic headings. It is used to calibrate the compass in aircraft.

LANDSIDE FACILITIES

Landside facilities are the facilities that support the aircraft and pilot/passenger handling functions. These facilities typically include the terminal building, aircraft storage/maintenance hangars, aircraft parking aprons, and support facilities such as fuel storage, automobile parking, roadway access, and aircraft rescue and firefighting. The landside facilities south of Taxiway D3 are identified on **Exhibit 1B**. The landside facilities north of Taxiway D3 are identified on **Exhibit 1C**.

Passenger Terminal Building

The passenger terminal building is located at the terminus of Mohave Airport Drive, near the center of the aircraft parking apron. Constructed in 1957, the terminal building encompasses 2,640 square feet. The terminal building includes space for airline ticketing, airline operations, rental cars, restrooms, and a restaurant. The secure holdroom and passenger screening functions are handled outside the terminal in a separate building located on the apron. The Transportation Security Administration (TSA) administrative offices are located in a separate modular building located south of the terminal. There are a total of 72 parking spaces west of the terminal building. This includes 18 rental car spaces, 38 long-term parking spaces, 12 short-term parking spaces, and four handicap parking spaces.

Aircraft Hangar Facilities

There are 21 separate hangar facilities totaling approximately 196,800 square feet located at the airport. Hangar space is comprised of conventional hangars, T-hangars, individual T-hangars, and shade hangars. Conventional hangars provide a large enclosed space, typically accommodating more than one aircraft. T-hangars provide for separate, single aircraft storage areas, typically in one large building where as many as 20 T-hangars are located next to each other. One particular T-hangar design provides for separate T-hangar structures that are designed for easy relocation. Shade hangar structures are very similar to T-hangar structures. The shade hangar structure provides individual aircraft locations within a single structure. However, the shade hangar only provides a roof to protect the aircraft from excess sunshine and other weather elements. T-hangars provide totally-enclosed individual hangars within a larger structure; whereas, the shade hangars do not provide enclosed space.

Conventional hangar space at the airport totals approximately 144,500 square feet, in 13 separate structures. There are three T-hangar structures totaling approximately 50,000 square feet. There are three individual T-hangars totaling approximately 2,400 square feet.

Apron

The aircraft parking apron at Kingman Airport totals approximately 260,000 square yards. The portion of apron adjacent to the terminal building is designated for airline operations only. Approximately 166 tiedown positions are available on the apron.

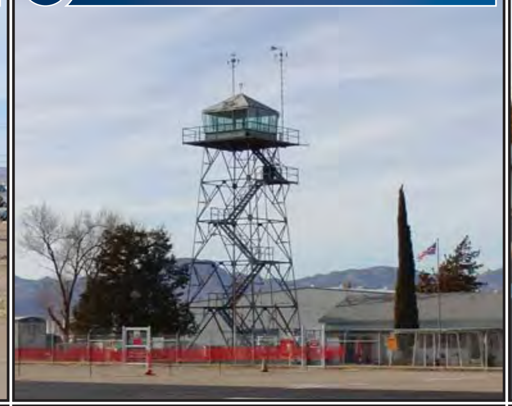
03MP10-1B-4/26/05

Exhibit 1B
SOUTH LANDSIDE FACILITIES

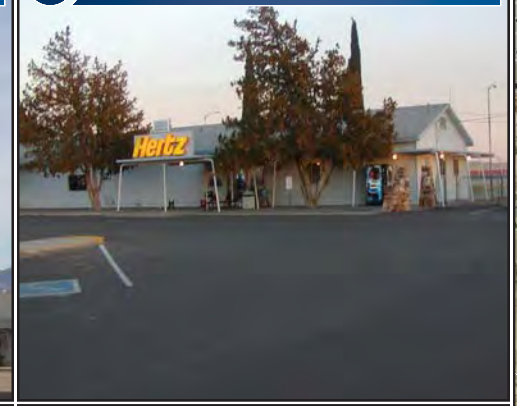
03MP10-1C-6/1/04

C1 TSA ADMINISTRATION

C2 HISTORIC TOWER

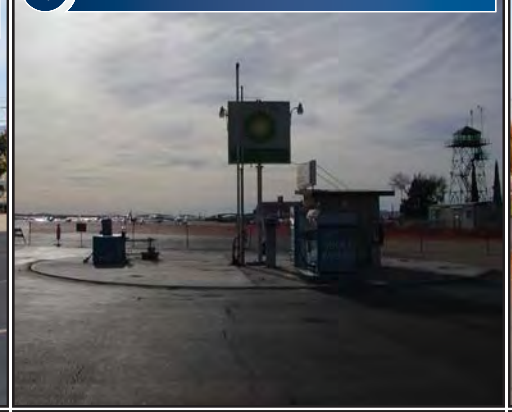


C3 TERMINAL BUILDING

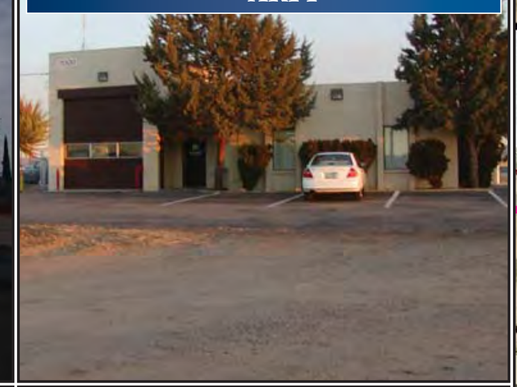


C4 SECURITY SCREENING/ HOLDROOM

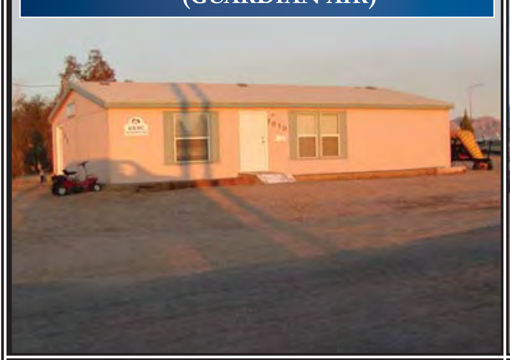
C5 FUEL ISLAND



C6 KAA ADMINISTRATION/ ARFF

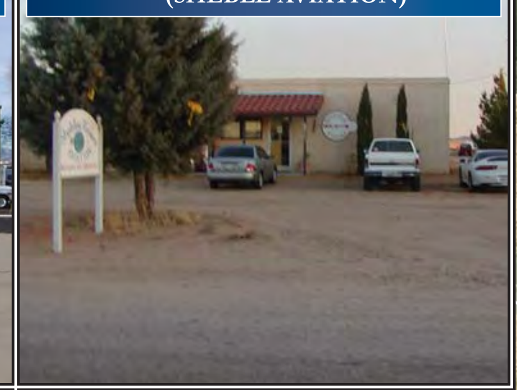


C7 AIR MEDICAL ADMINISTRATION (GUARDIAN AIR)



C8 CONVENTIONAL HANGAR (AIR'ZONA AIRCRAFT SERVICES)

C9 FLIGHT TRAINING (SHEBLE AVIATION)



C10 CONVENTIONAL HANGAR (KINGMAN AIRLINE SERVICES)

C11 CONVENTIONAL HANGAR (KINGMAN AIRLINE SERVICES)

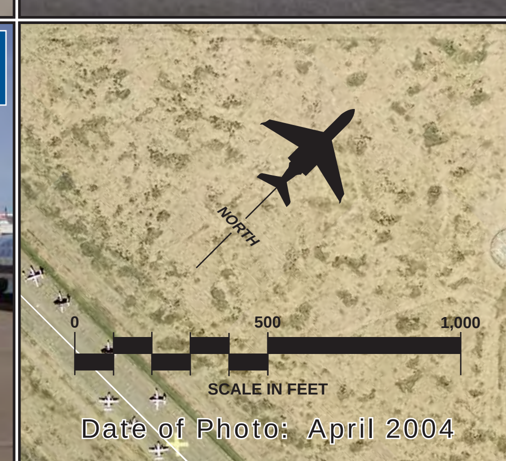


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Exhibit 1C
NORTH LANDSIDE FACILITIES

The abandoned runway is used for aircraft storage. There are approximately 24 aircraft parking pads located on each side of the abandoned runway west of Runway 3-21.

Fuel Storage Facilities

All aircraft fuel storage facilities at the airport are privately-owned and operated. Fuel storage totals 80,000 gallons, with 36,000 gallons of Jet-A storage and 44,000 gallons of 100LL storage capability. Air'zona Aircraft Services operates the self-service fuel island located on the aircraft apron, northeast of the terminal building. Their three underground storage tanks are located adjacent to the fuel island and include two 10,000-gallon tanks for 100LL fuel storage and one 12,000-gallon tank for Jet-A fuel storage. Air'zona Aircraft Services also operates one 700-gallon and one 1,200-gallon mobile fuel truck for 100LL dispensing, and one 2,200-gallon mobile fuel truck for Jet-A fuel dispensing.

Kingman Aero Services dispenses fuel entirely with mobile fuel trucks. Kingman Aero Services maintains one 1,200-gallon mobile truck for 100LL fuel dispensing, and one 1,200-gallon mobile fuel truck and one 5,000-gallon mobile fuel truck for dispensing Jet-A fuel. Their storage facilities are located north of Taxiway B and consist of four 12,000-gallon aboveground tanks, of which two are for 100LL fuel storage and two are for Jet-A fuel storage.

Aviation Services

A full range of aviation services are provided at the airport. Air'zona Aircraft Services provides aircraft fueling (100LL and Jet-A), aircraft maintenance (including avionics and engine maintenance), and aircraft tie-down and hangar space. Kingman Aero Services provides aircraft fueling (100LL and Jet-A), pilot supplies, as well as tie-down space. Sheble Aviation provides flight training and aircraft rental services. Straube Aircraft Services provides aircraft painting services. Kingman Airline Services provides aircraft maintenance and storage services.

Other Tenants

The following businesses and organizations on located on airport property:

- Guardian Air – air medical services
- Bureau of Land Management (BLM)
- Mohave County Sheriff's Department (aviation)
- Transportation Security Administration
- Experimental Aircraft Association (EAA)
- Kingman Airport Café
- Aeroflight – air tanker services
- Kingman Army Airfield Historical Society & Museum – museum
- FedEx – cargo services
- Ameriflight – cargo services for UPS
- Hertz
- Arturo's Aircraft Refurbishing

Aircraft Rescue and Firefighting

The aircraft rescue and firefighting (ARFF) facilities are located in the Kingman Airport Authority (KAA) administration building, north of the terminal building. The airport maintains rescue and firefighting equipment and agents for aircraft less than 90 feet in length, which meets FAA Index A criteria. The airport ARFF vehicle is a three-quarter-ton truck which carries 450 pounds of Purple K dry chemical and 100 gallons of aqueous film forming foam (AFFF). This vehicle is "grandfathered in" under 14 CFR Part 139.37 and is authorized for use until such time as the vehicle is replaced. The ARFF vehicle is operated by the Hualapai Valley Fire Department.

General Aviation Parking

Parking for general aviation activities is located adjacent to individual hangars and buildings. Approximately 112 automobile parking spaces are located on the airport for general aviation activities.

Fencing and Gate Access

The entire airside areas are enclosed with six-foot chain link fencing, with three-strand barbed wire on top. The fencing was installed in 2003. Six automated gates control access to the apron area. The six automated security gates are identified on **Exhibits 1B** and **1C**.

Utilities

Water and sewer services are provided by the City of Kingman. The city has 13 active wells (100-2,300 GPM each) and one reserve well. The city also owns 46 undeveloped well sites in the Sacramento Valley Basin. Electricity, natural gas, and telephone services are provided by Unisource Utilities.

Kingman Airport Industrial Park

The Kingman Airport Industrial Park encompasses approximately 1,100 acres on the western portion of the airport property. The industrial park land was originally part of the airport. The entire airport site was deemed surplus following World War II. The FAA released the industrial park property from grant obligations in 1979, allowing the land to be sold. A condition of the release is that an amount equal to the net proceeds from the sale of property must be reinvested for airport development within five years from the date of the land sale. The industrial park is bounded on the west by the main line of the Burlington Northern and Santa Fe Railway, and several of the parcels have rail access. Several parcels along Flightline Drive and Finance Way have access to the airfield via Flightline Drive.

ENROUTE NAVIGATION AND AIRSPACE

Navigational aids are electronic devices that transmit radio frequencies, which pilots of properly equipped aircraft translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft flying to or from Kingman Airport include the very high frequency omnidirectional range (VOR) facility, Loran-C, and global positioning system (GPS).

The VOR, in general, provides azimuth readings to pilots of properly equipped aircraft by transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility (VOR/DME) to provide distance as well as direction information to the pilot. In addition, the military Tactical Air Navigational Systems (TACANS) and civil VORs are commonly combined to form a VORTAC. A VORTAC provides distance and direction information to civil and military pilots. Pilots flying to or from the airport can utilize the Kingman VOR/DME located at the airport. **Exhibit 1D**, a map of the regional airspace system, depicts the location of the Kingman VOR/DME.

GPS is an additional navigational aid for pilots enroute to the airport. GPS was initially developed by the United States Department of Defense for military navigation around the world. Increasingly, GPS has been utilized more in civilian aircraft. GPS uses satellites placed in orbit around the globe to transmit electronic signals, which properly equipped aircraft use to determine altitude, speed, and position information. GPS allows pilots to navigate directly to any airport in the country. In contrast with the VOR, pilots are not required to navigate from one specific navigational aid to the next. Loran-C uses a system of ground-based transmitters. Similar to GPS, pilots can navigate directly to their destination.

A GPS modernization effort is underway by the FAA and focuses on augmenting the GPS signal to satisfy requirements for accuracy, coverage, availability, and integrity. For civil aviation use, this includes the development of the Wide Area Augmentation System (WAAS), which was launched on July 10, 2003. The WAAS uses a system of reference stations to correct signals from the GPS satellites for improved navigation and approach capabilities. The present GPS provides for enroute navigation and instrument approaches with both course and vertical navigation. The WAAS upgrades are expected to allow for the development of approaches to most airports with cloud ceilings as low as 250 feet above the ground and visibilities restricted to three-quarters mile, after 2015.

INSTRUMENT APPROACH PROCEDURES

Instrument approach procedures are a series of predetermined maneuvers established by the FAA using electronic navigational aids that assist pilots in locating and landing at an airport during low visibility and cloud ceiling conditions. At Kingman Airport, there are three published instrument approaches: (1) VOR/DME Runway 21, (2) GPS Runway 3, and (3) GPS Runway 21. The Kingman Airport instrument approaches are nonprecision instrument approaches. Nonprecision approaches provide only course guidance information to the pilot.

The capability of an instrument approach is defined by the visibility and cloud ceiling minimums associated with the approach. Visibility minimums define the horizontal distance that the pilot must be able to see in order to complete the approach. Cloud ceilings define the lowest level a cloud layer (defined in feet above the ground) can be situated for the pilot to complete the approach. If the observed visibility or cloud ceilings are below the minimums prescribed for the approach, the pilot cannot complete the instrument approach. The different minimum requirements for visibility and cloud ceilings are varied, dependent on the approach speed of the aircraft. A circling approach is when the instrument approach procedure is used to land at another runway end. This maneuver increases the visibility and/or ceiling height minimums. **Table 1B** presents the instrument approach data for Kingman Airport.

TABLE 1B
Instrument Approach Data
Kingman Airport

	WEAHTER MINIMUMS BY AIRCRAFT TYPE					
	Category A/B		**Category C**		**Category D**	
	CH	**VIS**	**CH**	**VIS**	**CH**	**VIS**
VOR/DME Runway 21 Approach						
Straight-In	400	1	400	1	400	1.25
Circling	600	1	600	1.5	700	2.25
GPS Runway 3 Approach						
Straight-In	500	1	500	1.25	500	1.50
Circling	600	1	600	1.50	700	2.25
GPS Runway 21 Approach						
Straight-In	400	1	400	1	400	1.25
Circling	600	1	600	1.50	700	2.25

Source: FAA *Terminal Procedures, Southwest U.S.*, April 15, 2004 Edition.

Aircraft categories are based on 1.3 times the stall speed of the aircraft in landing configuration as follows:
- Category A < 91 knots (Cessna 172)
- Category B 91-120 knots (Beechcraft King Air)
- Category C 121-140 knots (Canadair Challenger)
- Category D 141-165 knots (Gulfstream IV)

CH – Cloud Height (in feet above ground level)
VIS – Visibility (in miles)

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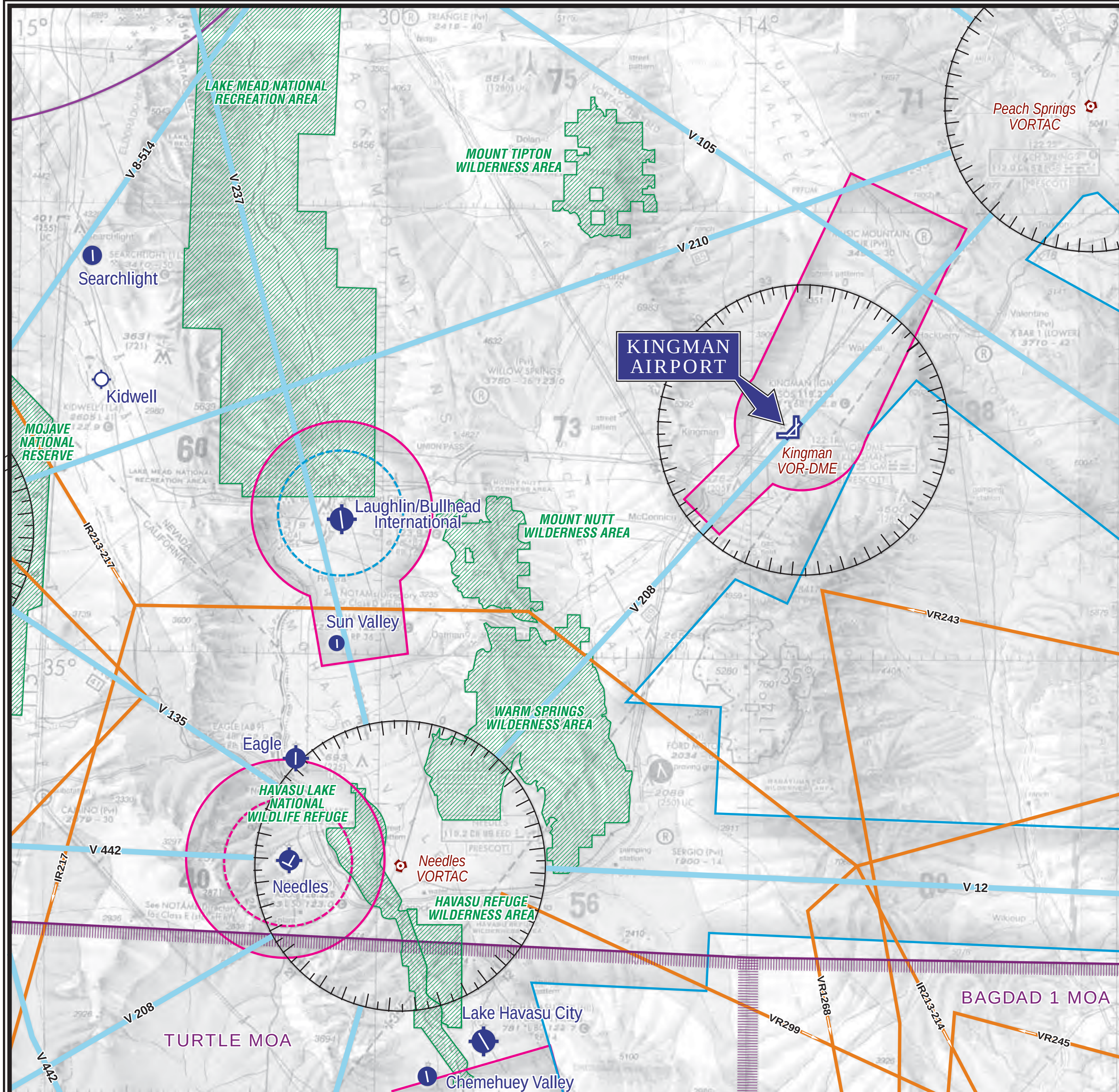

LEGEND

- Airport with other than hard-surfaced runways
- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- Non-Directional Radiobeacon (NDB)
- VORTAC
- VHF Omni Range (VOR)
- VOR-DME
- Compass Rose
- Mode C
- Class D Airspace
- Class E Airspace
- Class E Airspace with floor 700 ft. above surface
- Class E Airspace with floor 1,200 ft. or greater above surface
- Victor Airways
- Military Training Routes
- Wilderness Area
- Military Operations Area - MOA

Source: Phoenix Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration October 30, 2003

NORTH

NOT TO SCALE

KINGMAN AIRPORT

Exhibit 1D
AREA AIRSPACE

VICINITY AIRSPACE

To ensure a safe and efficient airspace environment for all aspects of aviation, the FAA has established an airspace structure that regulates and establishes procedures for aircraft using the National Airspace System. The U.S. airspace structure provides two basic categories of airspace, controlled and uncontrolled, and identifies them as Classes A, B, C, D, E, and G.

Class A airspace is controlled airspace and includes all airspace from 18,000 feet mean sea level (MSL) to Flight Level 600 (approximately 60,000 feet MSL). Class B airspace is controlled airspace surrounding high-capacity commercial service airports (i.e., Phoenix-Sky Harbor International Airport). Class C airspace is controlled airspace surrounding lower activity commercial service airports and some military airports (i.e., Tucson International Airport). Class D airspace is controlled airspace surrounding airports with an airport traffic control tower (i.e., Laughlin/ Bullhead International Airport). All aircraft operating within Classes A, B, C, and D airspace must be in contact with the air traffic control facility responsible for that particular airspace. Class E airspace is controlled airspace that encompasses all instrument approach procedures and low-altitude federal airways. Only aircraft conducting instrument flights are required to be in contact with air traffic control when operating in Class E airspace. Aircraft conducting visual flights in Class E airspace are not required to be in radio communications with air traffic control facilities. Visual flight can only be conducted if minimum visibility and cloud ceilings exist. Class G airspace is uncontrolled airspace that does not require contact with an air traffic control facility.

Airspace in the vicinity of Kingman Airport is depicted on **Exhibit 1D**. The airport is located in Class E airspace, beginning at 700 feet above the surface and extending to 18,000 feet MSL. Class E airspace also encompasses the low-altitude Victor Airways in the vicinity of the airport. Victor Airways are corridors of airspace eight miles wide that extend upward from 1,200 feet AGL to 18,000 feet MSL and extend between VOR navigational facilities. Victor Airways in the area emanate from the Peach Springs VORTAC and the Needles VORTAC.

SPECIAL USE AIRSPACE

Airspace may be reserved for use by a specific agency, primarily the military, within which operations of other aircraft are restricted or prohibited. The special use airspace in the vicinity of Kingman Airport is defined in the following paragraphs and is identified on **Exhibit 1D**.

Located south of the airport are the Turtle and Bagdad 1 Military Operations Areas (MOAs). MOAs define areas of high level military activity and are intended to segregate military and civilian aircraft. While civilian operations are not restricted within the OA, civilian aircraft are cautioned to be alert for military aircraft when operating in the MOA. The Turtle MOA is under control of the Los Angeles Air Route Traffic Control Center (ARTCC) and military operations are authorized from 11,000 feet MSL upward, with no upper limit. Hours of operation are between 6:00 a.m. and 7:00 p.m., Monday through Friday. The Bagdad 1 MOA is under the control of the Albuquerque ARTCC and military operations are authorized from 7,000 feet MSL or 5,000 feet AGL (which ever is higher) upward, with no upper limit. Hours of operation are between 6:00 a.m. and 11:00 a.m., Monday through Friday.

A number of military training routes (MTRs) are located near Kingman Airport. These routes are used by military training aircraft which commonly operate at speeds in excess of 250 knots and at altitudes to 10,000 feet MSL. While general aviation flights are not restricted within this area, pilots are strongly cautioned to be alert for high-speed military jet training aircraft.

Several areas in the vicinity of Kingman Airport are designated as National Recreation and Wilderness Areas. The Lake Mead Recreation Area is located approximately 30 nautical miles west of the airport. The Lake Havasu Wilderness Area is located approximately 40 nautical miles southwest of the airport. As shown on **Exhibit 1D**, several additional wilderness areas are located in the vicinity of Kingman Airport. Aircraft in and over these designated areas are requested to remain above 2,000 feet AGL.

Located northeast of the airport is the SFAR 50-2 Grand Canyon National Park Special Flight Rules Area. Special regulations apply to all aircraft operations in this area below 14,500 feet MSL. Pilots intending to fly within SFAR 50-2 airspace should refer to the Grand Canyon VFR Aeronautical Chart for detailed information.

AIR TRAFFIC CONTROL

Kingman Airport does not currently have an airport traffic control tower (ATCT) to regulate flight operations. Instead, pilots follow general flight procedures for arriving and departing the airport. Pilots announce their position and intentions on the Unicom frequency 122.8.

Enroute air traffic control service to Kingman Airport is provided by the Los Angeles Air Route Traffic Control Center (ARTCC). ARTCCs control aircraft in a large multi-state area. All aircraft in radio communication with the ARTCC are provided with altitude, aircraft separation, and route guidance to and from the airport.

LOCAL OPERATING PROCEDURES

Kingman Airport is situated at 3,446 feet MSL. The traffic pattern altitude at the airport is 1,000 feet above airfield elevation (4,446 feet MSL). Runway 3-21 and Runway 17-35 utilize left-hand traffic patterns. For left-hand traffic patterns, aircraft approach the runway end following a series of left-hand turns.

AREA AIRPORTS

A review of airports within 40 nautical miles of Kingman Airport has been made to identify and distinguish the type of air service provided in the area surrounding the airport. Public-use airports within 40 nautical miles of the airport were previously illustrated on **Exhibit 1D**. Information pertaining to each airport was obtained from FAA master airport records.

Laughlin/Bullhead International Airport, the nearest commercial service airport, is located approximately 31 nautical miles west-southwest of Kingman Airport in Bullhead City, Arizona. A single asphalt runway (7,520 feet in length) serves the airport. The airport is equipped with an airport traffic control tower and there are three published instrument approaches. There are approximately 61 based aircraft at the airport, the majority of which are single-engine. Services available at Laughlin/Bullhead International Airport include fuel sales (100LL and Jet A), aircraft parking (hangars and tie-downs), aircraft maintenance, a passenger terminal and lounge, catering, rental cars, and courtesy transportation.

Sun Valley Airport is located approximately 34 nautical miles west-southwest of Kingman Airport in Bullhead City, Arizona. The airport is served by a single asphalt runway, which is 3,700 feet in length. The airport is not equipped with an airport traffic control tower and there are no published instrument approaches available at the airport. There are 11 based aircraft at Sun Valley Airport, all of which are single-engine. Services available at the airport include 100LL fuel sales, aircraft tie-downs, and minor airframe and powerplant repair.

Eagle Airpark Airport is located approximately 40 nautical miles southwest of Kingman Airport in Bullhead City, Arizona. The airport is served by a single asphalt runway, 4,800 feet in length. The airport is not equipped with an airport traffic control tower and there are no published instrument approaches available at the airport. Approximately 53 aircraft are based at Eagle Airpark Airport, the majority of which are single-engine. Services available at the airport include fuel sales (100LL and Jet A), aircraft parking (hangars and tie-downs), aircraft maintenance, aircraft parts, aviation accessories, and pilot supplies.

REGIONAL SETTING

Kingman Airport and the adjacent Industrial Park are located in an unincorporated portion of Mohave County, northeast of the City of Kingman as shown on **Exhibit 1E**. The City of Kingman is located at the intersection of U.S. Highway 93 (which extends between Wickenburg to the south and Canada to the north) and Interstate 40 (which extends between Barstow, CA, to the west and Wilmington, NC, to the east). Kingman lies on the longest stretch (approximately 158 miles) of Historic Route 66 still intact.

The City of Kingman is located approximately 103 statute miles southeast of Las Vegas, Nevada; 143 statute miles west of Flagstaff, Arizona; 186 statute miles northwest of Phoenix, Arizona; and 324 statute miles east of Los Angeles, California. The location of the airport in its regional and national setting is presented on **Exhibit 1E**.

The city is situated in the Hualapai Valley, between the Cerbat and Hualapai mountain ranges, at an elevation of 3,446 feet. Kingman is a historic city with 62 buildings on the National Register of Historic Buildings. The city was incorporated in 1952 and has served as the county seat of Mohave County since 1887.

Geographically, Mohave County is the second largest county in the state. The Colorado River forms the western boundary of Mohave County and an estimated 1,000 miles of shoreline lie within the county along the Colorado River and Lakes Havasu, Mohave, and Mead. The rivers and lakes offer fishing, along with other forms of recreation, and nearby Hoover Dam offers visitor tours.

GROUND TRANSPORTATION

Both freight and passenger rail lines head into Kingman; the Burlington Northern and Santa Fe Railway provides direct rail connections for Mohave County (includes a railhead to the Kingman Industrial Park), while Amtrak provides daily passenger rail service. In addition, a full-service commercial bus station (Greyhound Bus Lines) provides passenger and parcel connections. Daily parcel and overnight express services have pick-up and delivery routes in Kingman. Local transportation service includes several taxi companies, some of which cater to customers with special needs.

CLIMATE

At an elevation of 3,449 feet, Kingman offers a mild, high-desert climate. The region experiences moderate winters and warm summers. Normally, July is the hottest month, with a mean maximum daily temperature of 97.8º Fahrenheit (F). The average annual high temperature is 77º Fahrenheit, while the average annual low is 47º Fahrenheit. Precipitation in the Kingman area averages 10.37 inches per year, with higher monthly totals in both the winter and late summer months.

Winds in the Kingman area are normally mild to moderate, with periods of higher velocity wind gusts. Seasonal periods with relatively higher wind velocities are more common during the summer monsoon season. Annual snowfall in Kingman averages 2.5 inches, with the majority occurring in January. A climatological summary for the City of Kingman is presented in **Table 1C**.

Since the airport is in the lowest part of the valley, there is normally no snow accumulation and the pavement normally retains enough heat to melt snow. Temperatures do drop below freezing, causing ice to form on pavements if there is any retained water. Kingman has no snow removal equipment; therefore, the airport would normally be closed if dry snow exceeded two inches or slush exceeded one inch.

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KINGMAN AIRPORT

Exhibit 1E
VICINITY MAP

TABLE 1C Climate Summary Kingman, AZ			
Month	**Average Low**	**Average High**	**Average Precipitation (in.)**
January	31°F	56°F	1.11
February	34°F	60°F	1.30
March	37°F	66°F	1.06
April	43°F	74°F	0.66
May	50°F	83°F	0.25
June	58°F	93°F	0.15
July	67°F	98°F	0.91
August	65°F	95°F	1.45
September	58°F	90°F	0.94
October	48°F	79°F	0.65
November	38°F	67°F	0.71
December	32°F	57°F	1.18
Average	47°F	77°F	Annual = 10.37
Source: Western Regional Climate Center			

AIRPORT SYSTEM PLANNING ROLE

Airport planning exists on many levels: local, state, and national. Each level has a different emphasis and purpose. An airport master plan is the primary local airport planning document.

An Airport Master Plan was previously competed for Kingman Airport in 1991. The 1991 Master Plan's principal airside recommendations included preserving an ultimate length of 10,000 feet for Runway 3-21, extending Taxiway C to the Runway 35 end, installing an Automated Surface Observation System (ASOS), installing medium intensity taxiway lighting (MITL) on all existing taxiways and extensions, acquiring land to support the installation of an Instrument Landing System (ILS) to Runway 21 (including a medium intensity approach lighting system with runway alignment indicator lights [MALSR]) and larger runway protection zones (RPZs) on Runways 17 and 21, and the installation of distance remaining signs on Runway 17-35. Principal landside recommendations included the construction of a new terminal building, relocating individual T-hangars and shade hangars, constructing new shade and T-hangars, providing additional general aviation apron area, constructing a new fixed base operator (FBO) facility, and relocating the underground storage tanks to an aboveground storage area.

At the national level, the airport is included in the *National Plan of Integrated Airport Systems* (NPIAS). This plan identifies 3,364 existing airports which are significant to national air transportation, as well as airport development necessary to meet the present and future requirements in support of civil needs. An airport must be included in the NPIAS to be eligible for federal funding assistance. Kingman Airport is classified as a non-primary commercial service airport in the NPIAS.

At the state level, Kingman Airport is included in the *Arizona State Aviation System Plan* (SASP). The purpose of the SASP is to ensure that the state has an adequate and efficient system of airports to serve its aviation needs. The SASP defines the specific role of each airport in the state's aviation system and establishes funding needs. Through the state's continuous aviation system planning process, the SASP is updated every five years. The most recent update to the SASP was in 2000 when the *State Aviation Needs Study* (SANS) was prepared. The SANS provides policy guidelines that promote and maintain a safe aviation system in the state, assess the state's airports' capital improvement needs, and identify resources and strategies to implement the plan. Kingman Airport is one of 112 airports included in the 2000 SANS, which includes all public and private airports and heliports in Arizona that are open to the public, including American Indian and recreational airports.

AIRPORT HISTORY AND ADMINISTRATION

Aviation has been an important part of Kingman's history. The Santa Fe Airway provided an air route from Los Angeles, California, to Amarillo, Texas, and the City of Kingman was the first community to become a "rest and refueling" point on the route.

In the 1930s, scheduled passenger service was brought to the city by Western Air Express and Transcontinental Air Transport (TAT). Both airline companies built their own airfields in Kingman, with Western Air completing their field first and naming it Berry Field. TAT dedicated their field, Port Kingman, to the city on July 4, 1929. Four days later, Charles Lindbergh piloted the first TAT flight into Port Kingman. Both airlines eventually merged to form Trans World Airlines (TWA) and Berry Field was closed.

In 1941, at the beginning of World War II, the United States Army established a gunnery school on the site of the existing airport. Following the war, the military airfield was selected as a military aircraft surplus field. Storing approximately 7,000 aircraft, it became one of the largest military aircraft supply fields in the country.

In 1948, the Army Airfield of Kingman became the property of Mohave County through a government program initiated throughout the country, permitting military airfields to be acquired by each respective city. The old Port Kingman was closed permanently and operations began at the present Kingman Airport.

In 1979, Mohave County obtained a deed release from the FAA allowing a portion of the airport property to be sold and developed as an industrial park. The Mohave County Airport Authority was also established in 1979 as an independent agency to operate the Kingman and Bullhead City airports. Previously named Mohave County Airport, the airport's name was changed to Kingman Airport in 1984.

Kingman Airport is currently owned by the City of Kingman (who is also the grant sponsor) and operated by the Kingman Airport Authority (KAA). The KAA also operates the Kingman Industrial Park. The authority has a 25-year lease expiring in 2028. There is a 25-year option. Day-to-day administration and management of the airport is the responsibility of the airport manager. Seven full-time and one part-time staff positions support administration, operations, and maintenance.

Membership in the KAA is reserved for residents of the City of Kingman, or residents within 20 miles outside the boundaries of the city. Members of the KAA must be elected by a two-thirds majority of the membership. A seven to nine member board of directors manages the KAA. Each member of the board of directors is chosen for a three-year term. Four standing committees focus on the business of the KAA. The airfield committee focuses on the operation of the airport.

The KAA has approved minimum standards for aeronautical activities at the airport, as well as administering defined rules and regulations.

FUTURE LAND USE

The environs in which the airport is located are defined by future land uses surrounding the airport. **Exhibit 1F** depicts the future land use around the City of Kingman as derived from the City of Kingman land use planning and Mohave County planning.

Kingman Airport is located in Mohave County, southeast of State Route 66. The airport is northeast of the City of Kingman, adjacent to City limits. The Kingman Airport Industrial Park is located on the west side of the airport. According to the *Kingman Area General Plan*, this area is designated for heavy manufacturing/industrial land uses. The general plan characterizes this area by industrial business and uses having more intensive types of industrial processes such as mechanical and/or chemical processing, extractive uses, materials transfer, multiple-shift operations, and large structures. Heavy industrial activity has historically been located within Kingman Airport Industrial Park. Southeast and northeast of the airport are small tracts of light industrial land use.

To the south is Vista Bella development. This development consists of The Villas and Valle del Sole subdivisions. Development began in the 1980s, but has been slow in recent times. A new master plan with hard zoning has recently been approved for future development of the area.

West and northwest of the airport, across State Route 66, is Camelback/New Kingman Addition. This area is a mixture of medium, low, and rural density residential with neighborhood and community commercial uses mixed in. The area is characterized as a mixture of older affordable site-built and manufactured homes, with newer developing neighborhoods. Mohave Community College is located in this area.

East of the airport is State Trust and Bureau of Land Management (BLM) lands.

HEIGHT AND HAZARD ZONING

Height and hazard zoning establishes height limits for new construction near the airport and within the runway approaches. It is based upon an approach plan which describes artificial surfaces defining the edges of airspace which are to remain free of obstructions for the purpose of safe air navigation. It requires that anyone who is proposing to construct or alter an object that affects airspace must notify the FAA prior to its construction. Rules and regulations regarding height and hazard zoning are found in the *Mohave County General Plan*, Section 3.

AIRPORT DEVELOPMENT ZONE

The Kingman Airport and Industrial Park both lie within an Airport Development (A-D) Zone. The purpose of an A-D Zone is to provide for manufacturing and warehousing uses in locations which are suitable and appropriate, taking into consideration the land uses and resources in areas near airports. Regulations regarding the A-D Zone are found in the *Mohave County General Plan*, Section 13.1. Any change in the individual use of current A-D zoned property requires approval.

PUBLIC AIRPORT DISCLOSURE MAP

Arizona Revised Statues (ARS) 28-8486, *Public Airport Disclosure,* provides for a public airport owner to publish a map depicting the "territory in the vicinity of the airport." The territory in the vicinity of the airport is defined as the traffic pattern airspace and the property that experiences 60 day-night noise level (DNL) or higher in counties with a population of more than 500,000, and 65 DNL or higher in counties with less than 500,000 residents. The DNL is calculated for the 20-year forecast condition. ARS 28-8486 provides for the State Real Estate Office to prepare a disclosure map in conjunction with the airport owner. The disclosure map is recorded with the County Recorder.

Kingman Airport does not have a public airport disclosure map; however, this Master Plan will prepare a disclosure map based on the ultimate airfield configuration and projected 20-year DNL contours.

SOCIOECONOMIC CHARACTERISTICS

For an airport master plan, socioeconomic characteristics are collected and

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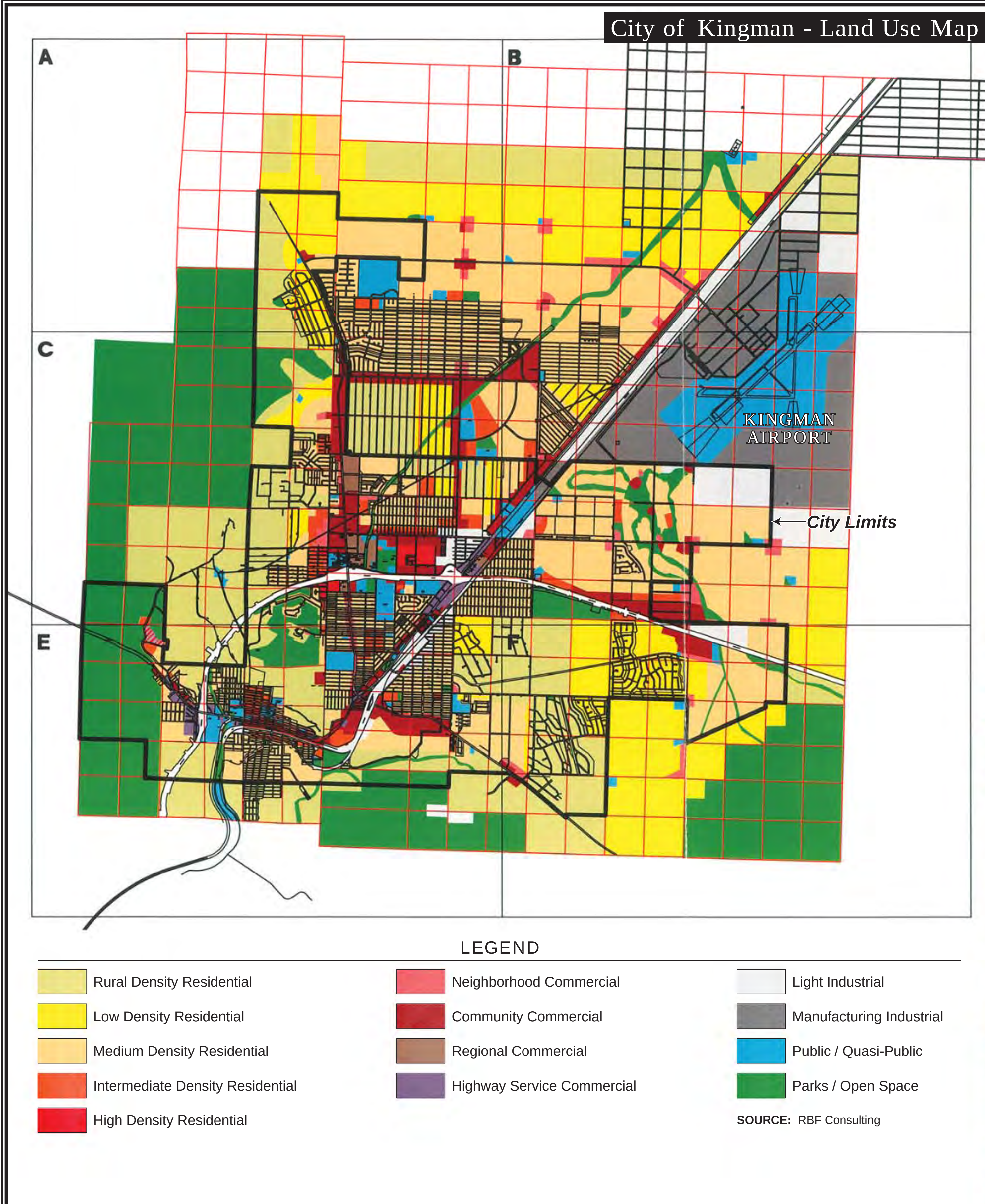
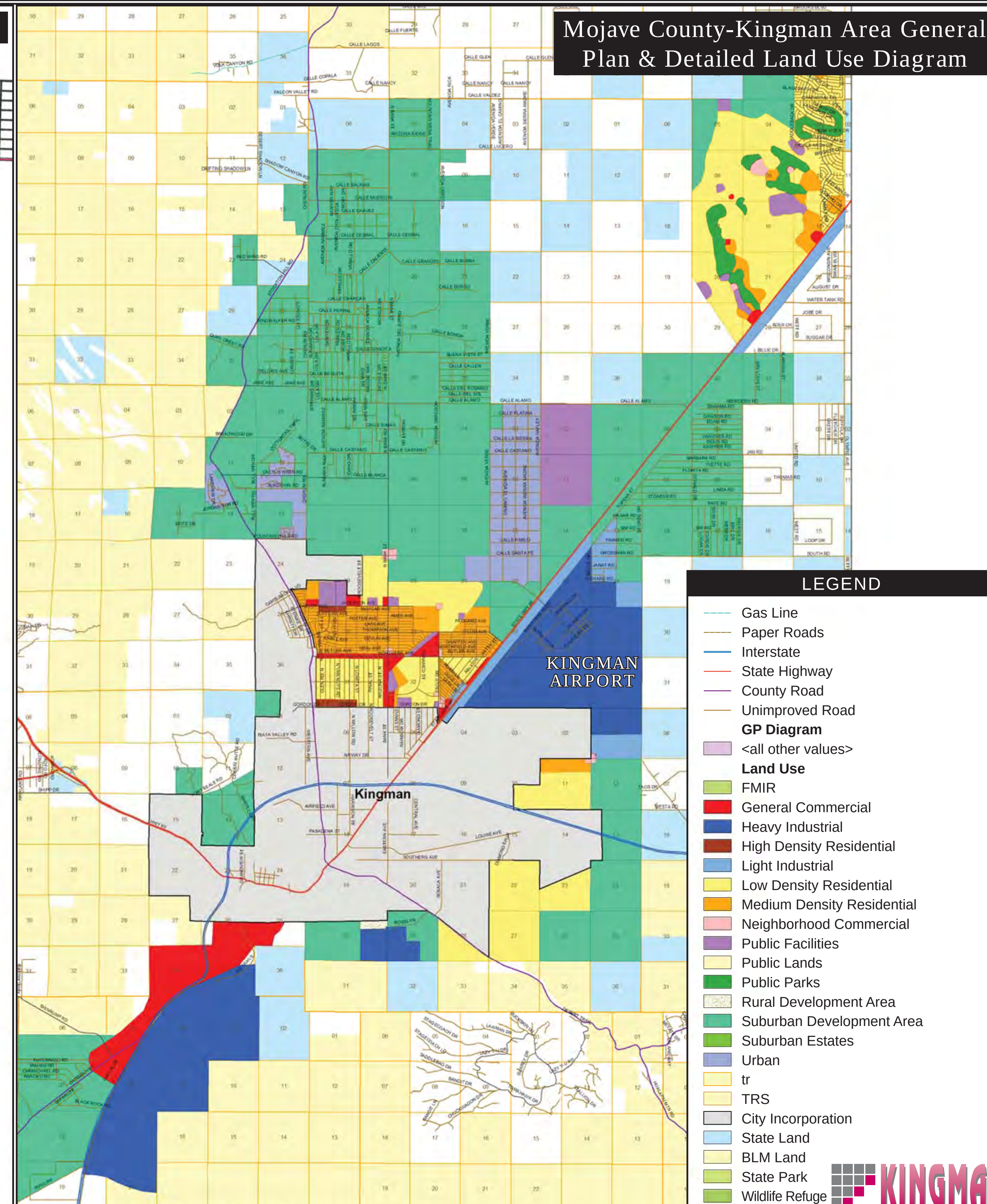




KINGMAN AIRPORT

Exhibit 1F
LAND USE MAP

examined to derive an understanding of the dynamics of growth within the study area. This information is essential in determining aviation service level requirements, as well as forecasting future aviation demand. Aviation forecasts are typically related to the population base, economic strength of the region, and the ability of the region to sustain a strong economic base over an extended period of time.

Population

Historical population totals are presented in **Table 1D**. Historical population totals were obtained from the Arizona Department of Economic Security, Population Statistics Unit. Between 1990 and 2002, Arizona's population grew more than three times as fast as the rest of the nation, becoming home to more than 5.4 million people. This represents an average annual growth rate of 4.9 percent, or a 40 percent increase overall, making it the nation's second fastest growing state during the 90s, behind Nevada's 66 percent increase. Today, Arizona ranks as the 20th largest state.

The historical population of Mohave County and the City of Kingman are also shown in **Table 1D**. Between 1990 and 2002, Mohave County experienced an average annual growth rate of 4.9 percent, adding more than 72,000 residents. During this same time, the city experienced an average annual growth rate of 4.6 percent, resulting in a net increase of more than 9,200 residents.

TABLE 1D
Historical Population

Area	1990	2002	Average Annual Growth Rate 1990-2002
City of Kingman	12,722	22,045	4.6%
Mohave County	93,497	166,465	4.9%
State of Arizona	3,665,228	5,472,750	4.9%

Source: Arizona Department of Economic Security, Population Statistics Unit.

Employment

Analysis of a community's employment base can provide valuable insight into the overall well-being of the community. In most cases, the community make-up and health is significantly impacted by the availability of jobs, variety of employment opportunities, and types of wages provided by local employers.

Employment by economic sector for Mohave County was first examined. The most recent data (2002), which was obtained from the Arizona Department of Economic Security, is presented in **Table 1E**. As shown in the table, the county's main economic sectors include services, trade, and government. The single largest economic sector in the county is trade (wholesale and retail), which employed more than 12,000 people in 2002. The services sector is also a major sector of the economy, employing over 10,000 people in 2002. Many of the jobs in the trade and services sectors are directly related to tourism, which is a major contributor to Mohave County's economy. The government and construction sectors, also very important to the economy, accounted for 7,950 jobs and 4,675 jobs, respectively, in 2002.

TABLE 1E
Employment by Economic Sector
Mohave County

Economic Sector	Mohave County	% of Total Employment
Total Employment	**42,675**	**100.0%**
Mining	75	7.4%
Manufacturing	3,150	0.2%
Construction	4,675	11.0%
Transportation, Comm., & Public Utilities	2,250	5.3%
Trade	12,350	28.9%
Finance, Insurance, & Real Estate	1,500	3.5%
Services	10,725	25.1%
Government	7,950	18.6%

Source: Arizona Department of Economic Security, 2002.

Table 1F presents the major employers in Mohave County. Seven of the top ten are located in the City of Kingman. Of that, four are located at the Kingman Airport Industrial Park. The city is a regional trade, service, and distribution center for northwestern Arizona. Kingman's proximity to major cities such as Los Angeles, Las Vegas, and Phoenix, as well as the Grand Canyon, has made tourism, manufacturing/distribution, and transportation leading industries in the city. Favorable Arizona taxes, Interstate 40, the Burlington Northern and Santa Fe Railway mainline, and the proximity to the California market make Kingman a prime site for industries and distributors.

TABLE 1F
Major Employers in Mohave County

Employer Name	Location (city)	Employment Type
American Woodmark Corp.	Kingman	Manufacturer Kitchen Cabinets
Bullhead Community Hospital	Bullhead City	Hospital/Medical
Cyprus Climax Metals Co.	Kingman	Copper Ore
Ford Proving Grounds	Yucca	Automotive Test Site
General Cable	Kingman	Manufacturer Fabricated Wire Products
Goodyear	Kingman	Manufacturer Aircraft Components
Guardian Fiber Glass	Kingman	Manufacturer Fluorine Products
Havasu Regional Hospital	Lake Havasu City	Hospital/Medical
IWX Motor Freight	Kingman	Trucking/Heavy Hauling
Kingman Regional Medical Center	Kingman	Hospital/Medical

Source: Arizona Department of Commerce.

ENVIRONMENTAL INVENTORY

Available information concerning existing environmental conditions at Kingman Airport has been derived from the 1993 *Environmental Assessment for Proposed Development* at Kingman Airport (EA), as well as from Internet resources, agency maps, and existing literature. The intent of this task is to inventory potential environmental sensitivities that might affect future improvements at the airport.

HISTORIC AND CULTURAL RESOURCES

As part of the 1993 EA, a survey was conducted at the recommendation of the Arizona State Historic Preservation Office (SHPO) to determine the potential for World War II resources which would be eligible for the National Register. This survey resulted in the identification and recording of 24 cultural resource features, of which 17 of these sites are historic archaeological and seven are historic architectural features.

These features were developed during World War II (1942-1945) when the existing airport site served as the Kingman Army Air Field. With the exception of the existing terminal building, all features are considered to be elements of a National Register of Historic Places-eligible historic site. This complex of features, located northwest of the aircraft apron (with the exception of the terminal building), is considered to represent a National Register of Historic Places property.

These features are located in the landside facilities area northeast of Runway 3-21, across from the aircraft apron. The archaeological sites are comprised of concrete building floors, a bunker, L-shaped concrete floors, concrete floor water-use facility, flood pads and associated water/septic tanks, electric manholes, concrete curb, Runway 3, and roads. Architectural sites are the terminal building, control tower, a monument, electrical vault, wood frame hangars, and wood frame building. The terminal building is not considered to be eligible for nomination to the National Register because it is not in its original location and extensive modifications would be difficult and expensive to reverse. The building's architectural integrity has been lost.

Based on the findings, portions of the airport contain elements of a National Register-eligible, World War II-period historic site. It was determined in the 1993 EA that the majority of features could be negatively impacted by future development if proper consideration and mitigation were not considered. The SHPO concurred with the survey and expressed that "National Register quality features be avoided by project activities." If avoidance is not feasible, then a data recovery plan will need to be developed to mitigate adverse impacts to these resources.

WETLANDS

The U.S. Army Corps of Engineers (ACOE) regulates the discharge of dredge and/or fill material into waters of the United States, including adjacent wetlands, under Section 404 of the Clean Water Act.

Wetlands are defined by *Executive Order 11990, Protection of Wetlands,* as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction." Categories of wetlands include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mud flats, natural ponds, estuarine area, tidal overflows, and shallow lakes and ponds with emergent vegetation. Wetlands exhibit three characteristics: hydrology, hydrophytes (plants able to tolerate various degrees of flooding or frequent saturation), and poorly drained soils.

Correspondence included in the 1993 EA from the U.S. Fish and Wildlife Service (USFWS) indicated that no wetlands are present within the project area.

FLOODPLAINS

As defined in the FAA *Order 5050.4A,* floodplains consist of "lowland and relatively flat areas adjoining inland and coastal water including flood prone areas of offshore islands, including at a minimum, that area subject to one percent or greater chance of flooding in any given year." Federal agencies are directed to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health and welfare, and restore and preserve the natural and beneficial values served by floodplains. Floodplains have natural and beneficial values, such as providing ground water recharge, water quality maintenance, fish, wildlife, plants, open space, natural beauty, outdoor recreation, agriculture and forestry. FAA *Order 5050.4A (12) (*c) indicates that "if the proposed action and reasonable alternatives are not within the limits of a base floodplain (100-year flood area)," that it may be assumed that there are no floodplain impacts. The limits of base floodplains are determined by Flood Insurance Rate Maps (FIRM) prepared by the Federal Emergency Management Agency (FEMA). Kingman Airport is not located within the 100-year floodplain.

WATER SUPPLY AND QUALITY

Pursuant to FAA *Order 5050.4A*, the 1982 Airport Act requires that Airport Improvement Program applications for projects involving airport location, runway location, or a major runway extension shall not be approved unless the governor of the state in which the project is located certifies that there is "reasonable assurance" that the project will be located, designed, constructed, and operated in compliance with applicable air and water quality standards.

Water supply and quality concerns related to airport development most often relate to the following:

- Domestic sewage disposal
- Surface runoff and soil erosion
- Storage handling of fuel, petroleum products, solvents, etc.

Domestic Sewage Disposal

Kingman Airport is connected to the Kingman Municipal Sewer System. The City of Kingman operates two separate wastewater treatment plants. The hilltop collection and treatment plant serves most of Kingman, (except downtown) including Kingman Airport. It consists of seven aerated lagoons, a polishing pond with a pump station, seventy-five acres of wetland treatment, and about forty acres of evaporation/percolation basins. The plant treats about 1,300,000 gallons per day. Both treatment plants are permitted by state and federal agencies. Total sewer connections number 5,356. Both systems serve approximately 14,500 people.

Surface Runoff and Soil Erosion

According to a letter received from the Arizona Department of Environmental Quality (ADEQ) as part of the 1993 EA, an extensive dike protects the Kingman Airport and intercepts flows from the East and the South. The dike eliminates the ADEQ's concerns related to watercourse impacts caused by flows through the airport area.

As an industrial facility, Kingman Airport is required to comply with Section 402(p) of the Clean Water Act which includes the National Pollutant Discharge Elimination System (NPDES) General Permit for storm water discharges. Kingman Airport has been included with a number of airports for the preparation of a group NPDES permit.

Storage Handling of Fuel, Petroleum Products, Solvents, Etc.

Spills, leaks, and other releases to the environment of hazardous substances are often a concern at airports due to fuel storage, fueling activities, and maintenance of aircraft. Stormwater flowing over impermeable surfaces may pick up petroleum products residues, and, if not controlled, transport them off-site. Perhaps the most crucial concern would be spills or leaks of substances that could filter through the soil and contaminate groundwater resources. Federal and state laws and regulations have been established to safeguard these facilities and activities. These regulations include standards for underground tank construction materials, the installation of leak or spill detection devices, and regulations for stormwater discharge.

Fuel at the airport is dispensed by Fixed Base Operators (FBOs) who distribute major-brand aviation fuel and products. Jet-A and 100LL fuel is available. Storage tanks and fuel trucks are clearly marked, including specification of specific types of fuel octane designations, and fire extinguishers are in all fuel trucks and fuel dispensing areas. There are two fuel farms on the airport which are maintained and operated by respective operators.

Kingman Airport conducts quarterly inspections of fuel storage facilities, fuel dispensing equipment for items including, but not limited to, fuel leaks, proper signage, storage area free from flammable materials, security of storage facilities, current fire extinguishers, and proper handling.

BIOTIC RESOURCES

Biotic resources refer to those flora and fauna (i.e., vegetation and wildlife) habitats which are present in an area. Impacts to biotic communities are determined based on whether a proposal would cause a minor permanent alteration of existing habitat or whether it would involve the removal of a sizable amount of habitat, habitat which supports a rare species, or a small, sensitive tract.

As part of the previous Master Plan, and outlined in the 1993 EA, the U.S. Fish and Wildlife Service (USFWS), and the Arizona Game and Fish Department (AG&F) were contacted regarding potential impacts relating to biotic resources. The USFWS indicated that "our data indicate no listed or proposed threatened or endangered species in the vicinity of the proposed action alternative. The potential for habitat for the candidate category 2 desert tortoise (Gopherus agasizzii) in the project area should be evaluated." The AF&G indicated that no special status species are present in the project area.

The previous EA concluded that because of the degree of disturbance on the airport property, and the lack of habitat present for the desert tortoise (steep slopes), no significant impacts to biological resources would occur.

AIR QUALITY

The Environmental Protection Agency (EPA) has adopted air quality standards that specify the maximum permissible short-term and long-term concentrations of various air contaminants. The National Ambient Air Quality Standards (NAAQS) consist of primary and secondary standards for six criteria pollutants which include: Ozone (O_3), Carbon Monoxide (CO), Sulfur Dioxide (SO_x), Nitrogen Dioxide (NO_x), Particulate Matter (PM_{10} and PM_{25}), and Lead (Pb).

Primary air quality standards are established at levels to protect the public health and welfare from any known or anticipated adverse effects of a pollutant. All areas of the country are required to demonstrate attainment with NAAQS. Arizona has adopted the federal ambient air quality standards.

Air contaminants increase the aggravation and the production of respiratory and cardiopulmonary diseases.

The standards also establish the level of air quality which is necessary to protect the public health and welfare, including, among other things, affects on crops, vegetation, wildlife, visibility, and climate, as well as affects on materials, economic values, and on personal comfort and well-being.

According to the EPA Greenbook website, Mohave County is in attainment for all criteria pollutants. As outlined within the 1993 EA, a State Air Quality Certification is required previous to construction. This certification comes with standard preventive and mitigative measures to lessen the impacts of fugitive dust in relation to construction activities.

An air quality analysis was not performed for the 1993 EA. Arizona is a state which does not have applicable indirect source review (ISR) requirements. In this case, projected airport activity levels were examined, and Kingman Airport's general aviation activity did not warrant an air quality analysis.

GEOLOGY AND SOILS

In correspondence received as part of the 1993 EA, the Soil Conservation Service expressed that their main concern with proposed development relates to soil erosion and farmland conversion. In the State of Arizona, prime and unique farmland, by definition, includes only those lands which are currently being irrigated. As outlined within the EA, there is no irrigated land that was affected by previous projects.

SOLID WASTE DISPOSAL SITES

Currently, solid waste at the airport is collected by Waste Management Incorporated. The existing sanitary landfill is located approximately 10 miles north of Kingman on U.S. Highway 93.

DEVELOPMENT HISTORY

Table 1G summarizes historical federal and state grants to the KAA for the improvement of Kingman Airport between 2001 and 2005. As shown in the table, over $3.3 million in federal grants and $1.6 million in state grants have been used to improve Kingman Airport in the past five years.

SUMMARY

The information discussed on the previous pages provides a foundation upon which the remaining elements of the planning process will be constructed. Information on current airport facilities and utilization will serve as a basis, with additional analysis, and data collection, for the development of forecasts of aviation activity and facility requirement determinations. The inventory of existing conditions is the first step in the process of determining those factors which will meet projected aviation demand in the community and the region.

TABLE 1G Development History			
Grant Number	**Date**	**Description**	**Amount**
Federal Grants			
3-04-0021-11	7-May-01	Rehabilitate Terminal Apron	499, 009.00
3-04-0021-12	2-Sep-02	Improve Runway Safety Areas Security Enhancements	1,146,927.00
3-04-0021-13	13-Aug-03	Airport Security Enhancements Phase 2 Master Plan Update	350,000.00
3-04-0021-14	13-Jul-04	Rehabilitate Terminal Apron Phase 2	573,432.00
3-04-0021-15	8-Aug-05	Purchase ARFF Vehicle, Construct ARFF Building, Design Terminal Building Phase 1	783,750.00
Total Federal Grants			**$3,353,118.00**
State Grants			
E2F26	15-Apr-02	Rehabilitate Terminal Apron	24,496.00
E3F25	16-Dec-02	Improve Runway Safety Areas	56,301.00
E4F17	15-Dec-03	Master Plan Update	7,363.00
E4F16	15-Dec-03	Airport Security Enhancement Phase 2	9,818.00
E5F20	21-Sep-04	Rehabilitate Terminal Apron Phase 2	15,091.00
E6S10	2-Aug-05	Reconstruct Mohave Airport Drive	1,542,209.00
E6F47	8-Nov-05	Purchase ARFF Vehicle, Construct ARFF Building, Design Terminal Building Phase 1	20,626.00
Total State Grants			**$1,675,904.00**
Source: KAA			

DOCUMENT SOURCES

As mentioned earlier, a variety of different sources were utilized in the inventory process. The following listing reflects a partial compilation of these sources. This does not include data provided by airport management as part of their records, nor does it include airport drawings and photographs which were referenced for information. On-site inventory and interviews with staff tenants also contributed to the inventory effort.

2000 Arizona State Aviation Needs Study (SANS), Arizona Department of Transportation, Aeronautics Division.

Airport/Facility Directory, Southwest U.S., U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, April 15, 2004 Edition.

Kingman Airport Certification Specifications (December 9, 1999), Kingman Airport Authority.

National Plan of Integrated Airport Systems (NPIAS), U.S. Department of Transportation, Federal Aviation Administration, 2001-2005.

U.S. Terminal Procedures, Southwest U.S., U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, April 15, 2004 Edition.

Phoenix Sectional Aeronautical Chart, U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, 70th Edition, October 30, 2003.

1991 Airport Master Plan Update, Coffman Associates, Inc.

A number of Internet sites were also used to collect information for the inventory chapter. These include the following:

FAA 5010 Data
http://www.airnav.com

Arizona Department of Economic Security:
http://www.de.state.az.us

Arizona Department of Transportation, Aeronautics Division:
http://www.dot.state.az.us/Aero/index.htm

Arizona Workforce Informer:
http://www.workforce.az.gov/

Kingman Chamber of Commerce:
http://www.kingmanchamber.org/

U.S. Census Bureau:
http://www.census.gov/

Chapter Two

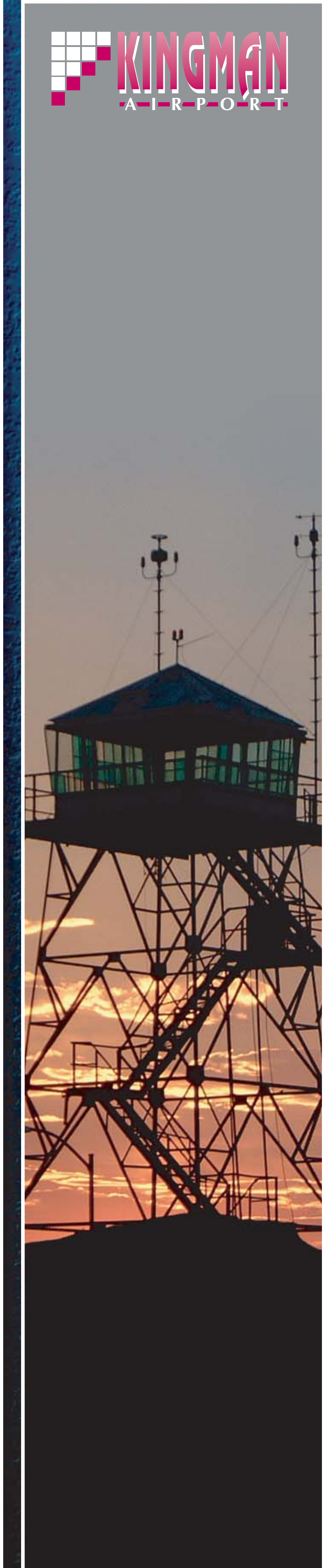
FORECASTS

FORECASTS

Facility planning must begin with a definition of the demand that may reasonably be expected to occur at the facility over a specific period of time. For Kingman Airport, this involves forecasts of aviation activity through the year 2023. In this Master Plan, forecasts of annual enplaned passengers (aircraft boardings), the commercial airline fleet mix, based aircraft, the based aircraft fleet mix, and annual aircraft operations will serve as the basis for facility planning.

Air transportation is a unique industry that has experienced wide fluctuations in growth and recession. For this reason, it is important that from time-to-time an airport re-evaluate its current position and examine future demand trends and potential.

The primary objective of this planning effort is to define the magnitude of change in aviation demand that can be expected over time. Because of the cyclical nature of the economy, it is virtually impossible to predict, with certainty, year-to-year fluctuations in activity when looking 20 years into the future. However, a trend can be established which delineates long-term growth potential. While a single line is often used to express the anticipated growth, it is important to remember that actual growth may fluctuate above and below this line. The point to remember about forecasts is that they serve only as guidelines, and planning must remain flexible to respond to unforeseen facility needs. This is because aviation activity is affected by many external influences, as



well as by the types of aircraft used and the nature of available facilities.

Recognizing this, the Master Plan for Kingman Airport will be demand-based rather than time-based. Demand-based planning relates capital improvements to demand factors, such as based aircraft, instead of points in time. This allows the airport to address capital improvement needs according to the actual demand occurring at the airport. For example, should based aircraft growth slow or dramatically decline, it may not be necessary to implement some improvement projects. However, should the airport experience accelerated growth in based aircraft, the plan will need to be flexible enough to respond accordingly. This dynamic aspect of forecasting aeronautical needs will be further described in subsequent chapters of this Master Plan.

In order to fully assess current and future aviation demand for Kingman Airport, an examination of several key factors is needed. These include: national and regional aviation trends, historical and forecast socioeconomic and demographic information of the area, and historical trends at Kingman Airport.

This is the first planning forecast to be prepared for Kingman Airport subsequent to the events of September 11, 2001. Immediately following the terrorist attacks, the national airspace system was closed and all civilian flights were grounded. Following the resumption of flights, commercial airline traffic declined, which led to schedule reductions and layoffs by many of the commercial airlines to reduce operating losses.

The federal government provided billions of dollars in financial assistance to the commercial airlines, along with loan guarantees. Similar assistance was not provided for the general aviation industry until early 2004. The cumulative impacts of 9/11 may only be determined over time. Prior to updating the airport's forecasts, the following section discusses the trends in aviation at the national level.

NATIONAL AVIATION TRENDS

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for the large air carriers, regional/commuter air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the general public. The current edition when this chapter was prepared was *FAA Aerospace Forecasts-Fiscal Years 2004-2015*, published in March 2004. The forecasts use the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets.

In the seven years prior to the events of 9/11, the U.S. civil aviation industry experienced unprecedented growth in demand and profits. The impacts to the economy and aviation industry from the events of 9/11 were immediate and significant. However, the economic climate and aviation industry have been recovering in the past year. The FAA expects the U.S. economy to recover rapidly over the next two years, growing moderately thereafter. This will positively influence the aviation industry, leading to passenger, air cargo, and general aviation growth throughout the forecast period (assuming that there will not be any new successful terrorists incidents against either U.S. or world aviation). Airline passengers are expected to recover to pre-9/11 levels by 2005, and then grow at 4.2 percent annually through 2015. Large air carriers will grow at 3.8 percent annually, while the regional/commuter airlines are expected to grow at an astonishing pace of 6.4 percent annually. Air cargo revenue-ton-miles (RTMs) are projected to grow at 3.5 percent annually. The number of active general aviation aircraft is expected to grow at 1.3 percent annually.

REGIONAL/COMMUTER AIRLINES

The regional/commuter airline industry consists of 75 airlines providing regularly scheduled passenger service and fleets composed primarily of aircraft having 70 seats or less. This industry segment continues to be the strongest growth sector of the commercial air carrier industry. Dramatic growth in code-sharing agreements with the major carriers, followed by a wave of air carrier acquisitions and purchases of equity interests, has resulted in the transfer of large numbers of short-haul jet routes to their regional partners, fueling the industry's growth. This has allowed the major air carriers to maintain a presence in many markets where they have had to drop service in their efforts to regain profitability and reduce capacity.

There are several important trends for the regional/commuters, brought about by the changes in the major airline industry and introduction of the regional jet. These include: increased capacity, increased passenger trip length, growing load factors, and increased passengers. These will be discussed below.

Regional/commuter passengers continued to grow in 2003, to 108.7 million passengers. This is up from 90.7 million passengers in 2002, an increase of 18.9 percent. Since 2000, regional/commuter enplanements are up 31.3 percent. Despite the events of 9/11, many regionals/commuters were able to maintain their previous flight schedules. In fact, many have even increased their flight schedules in response to the transfer of additional routes from their larger code-sharing partners. Driven by the rapid introduction of new regional jets, regional airline capacity (expressed in available seat miles [ASMs]) was up an additional 24.4 percent in 2003, following a 17.7 percent increase in 2002. The average flight stage and passenger trip length increased 26.0 and 34.4 miles, respectively, in 2003. This reflects the fact that the routes being transferred from the larger network partners are the medium-haul, non-traditional, regional markets which can be more efficiently flown with the regional jet. This fact becomes clearer when it is noted that the number of regional/commuter departures increased by just 3.6 percent in 2003. The regional/commuters also achieved an all-time-high load factor of 64.7 percent in 2003, an increase of 3.4 percent over the previous year.

Industry growth is expected to continue to outpace that of the larger commercial air carriers. The introduction of new state-of-the-art aircraft, especially high-speed turboprops and regional jets with ranges of well over 1,000 miles, is expected to open up new opportunities for growth in non-traditional markets. The regional airline industry will also continue to benefit from integration with the larger air carriers. The further need for larger commercial air carriers to reduce costs and fleet size will insure that these carriers will continue to transfer smaller, marginally profitable routes to the regional air carriers. Since 2000, over 751 regional jets have been put in service. Without the introduction of these aircraft, the industry changes since 9/11 would not have been possible.

Likewise, the increased use of regional jets will continue the trend of the regionals/commuters serving many of the lower density routes of their major network partner. Regional jet aircraft can serve these markets with the speed and comfort of a larger jet, while at the same time providing greater service frequency that is not economically feasible with larger jets. This is expected to contribute to strong growth during the early portion of the planning period, although this phenomenon is expected to diminish during the mid-to-latter portion of the planning period.

The FAA forecasts the regional/commuter capacity to increase by 26.4 percent in 2004, and 16.4 percent in 2005. These large increases result from the projected delivery of nearly 550 regional jets in this two-year period. With 1,192 regional jets in service in 2003, the FAA projects that number will nearly triple to 3,093 by 2015. Capacity growth will slow to 5.7 percent annually after 2005. The average seating capacity is expected to increase from 44.7 seats in 2003, to 53.6 seats in 2015.

Enplanements are expected to grow 18.4 percent in 2004 and 11.6 percent in 2005. Between 2003 and 2015, enplanements will grow by 6.3 percent annually, from 108.7 million in 2003, to 226.2 million in 2015. In 2015, regional/commuters will carry 21.4 percent of all passengers, up from 16.9 percent in 2003. Regional/commuter operations are expected to increase at 5.5 percent through 2005. Thereafter, operations are forecast to grow at 2.3 percent annually. **Exhibit 2A** presents national regional/commuter airline enplanement projections.

The average trip length is projected to grow from 370.2 miles, to 470.2 miles by 2015. Most of this growth is projected to occur between 2004 and 2006 when trip length will increase by a combined 50 miles, or 16.6 miles per year. The large increase between

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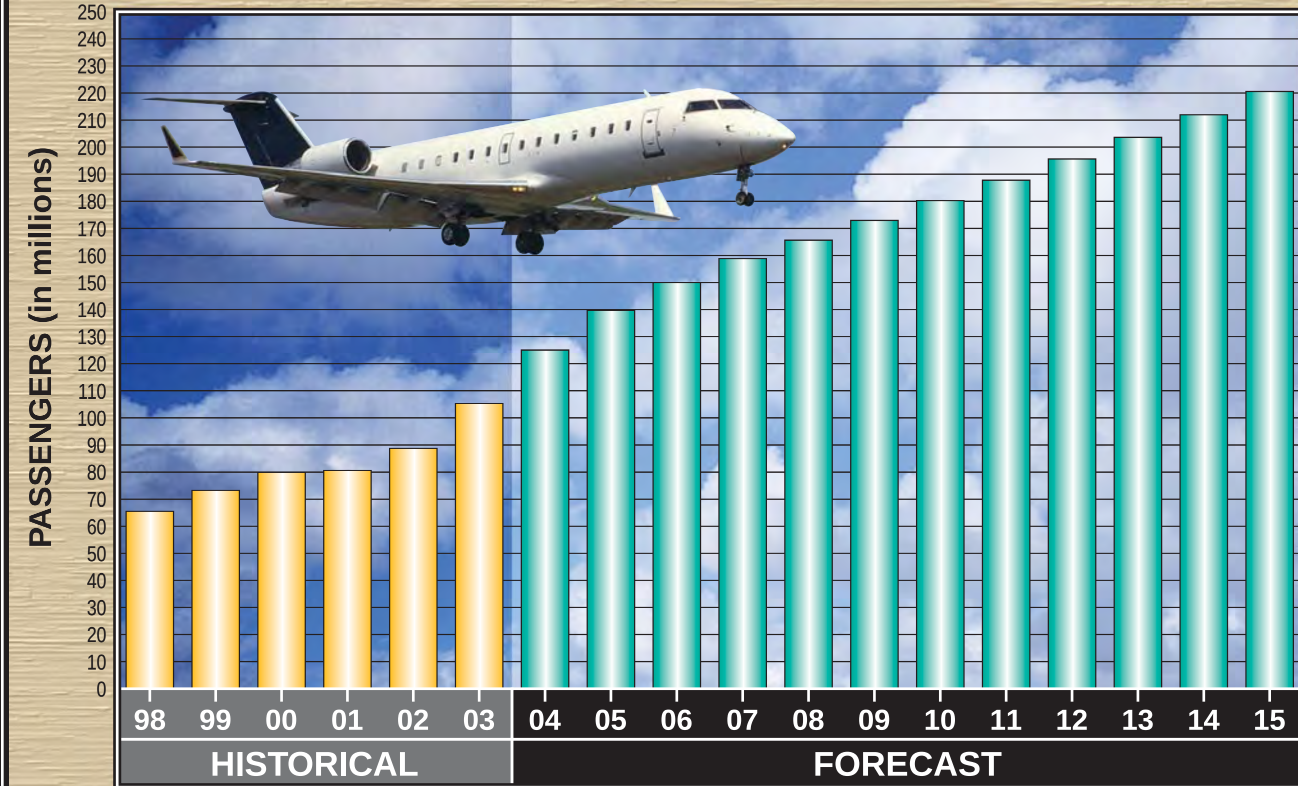
U.S. REGIONAL/COMMUTER SCHEDULED PASSENGER ENPLANEMENTS



Source: FAA Aerospace Forecasts, FY 2004-2015

PERCENT BY AIRCRAFT SEAT SIZE

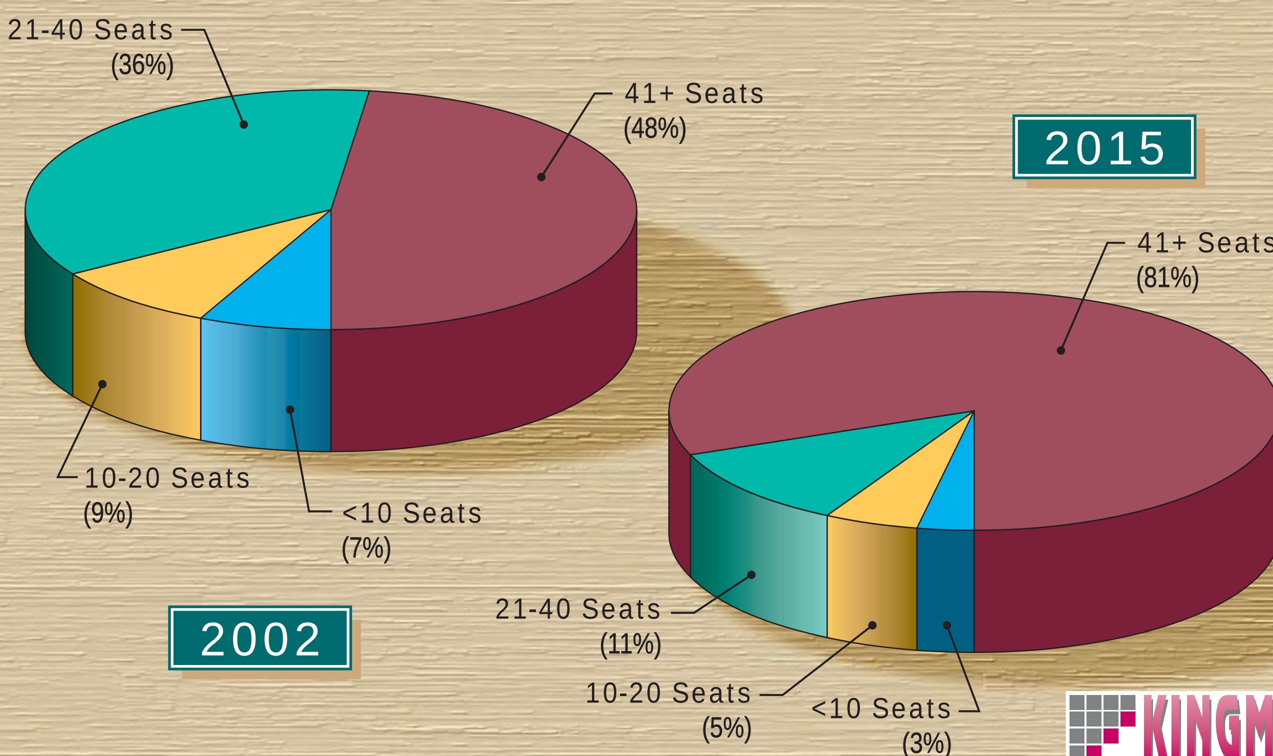


Exhibit 2A
U.S. REGIONAL/COMMUTER FORECASTS

2004 and 2006 is the result of the continued integration of regional jets and transfer of longer stage-length flights from the network partner. After 2005, passenger trip length will increase by 5.7 miles per year.

GENERAL AVIATION

Following more than a decade of decline, the general aviation industry was revitalized with the passage of the *General Aviation Revitalization Act* in 1994, which limited the liability on general aviation aircraft to 18 years from the date of manufacture. This legislation sparked an interest to renew the manufacturing of general aviation aircraft, due to the reduction in product liability, as well as renewed optimism for the industry. The high cost of product liability insurance was a major factor in the decision by many U.S.-based aircraft manufacturers to slow or discontinue the production of general aviation aircraft. The industry responded as expected.

According to the General Aviation Manufacturers Association (GAMA), between 1994 and 2000, general aviation aircraft shipments increased at an average annual rate of more than 20 percent, increasing from 928 shipments in 1994, to 3,140 shipments in 2000. However, the growth in the general aviation industry has slowed considerably since 2000, negatively impacted by the national economic recession and the events surrounding 9/11. In 2001, aircraft shipments were down 4.7 percent to 2,994. The 2002 shipments were down an additional 10.2 percent to 2,687. 2003 aircraft shipments were down less than 1.0 percent from 2002, declining only to 2,686. However, 2003 billings were down 15.5 percent, declining for the third straight year.

Most notable about 2003 shipments was that single-engine piston deliveries were the only category to increase. Single-engine piston deliveries increased to 1,825 from 1,601 or 14.0 percent. This is most likely the result of new product offerings and the age of the single-engine piston aircraft fleet. Turboprop and turbojet deliveries declined. Business jets were down 23.4 percent, the second year of decline. This is the result of slowing demand by fractional jet companies and a large used market for turboprop and turbojet aircraft. **Table 2A** summarizes aircraft shipments and billings since 2000.

TABLE 2A
Annual General Aviation Airplane Shipments
Manufactured Worldwide and Factory Net Billings

Year	Total	SEP	MEP	TP	J	Net Billings ($millions)
2000	3,140	18,962	103	415	760	13,497.0
2001	2,994	1,644	147	421	782	13,866.6
2002	2,687	1,601	130	280	676	11,823.1
2003	2,686	1,825	71	272	518	9,994.8

Source: GAMA
SEP – Single-Engine Piston; MEP – Multi-Engine Piston; TP – Turboprop;
J – Turbofan/Turbojet

The decline in aircraft shipments is not expected to last long. According to the National Business Aviation Association (NBAA), there are more than 2,700 aircraft still on order. NBAA cites a study by Honeywell that aircraft shipments will recover to record levels by 2004, and that 8,400 business aircraft will be delivered over the next 10 years.

On February 5, 2002, the FAA published a notice of proposed rulemaking (NPRM), titled *Certification of Aircraft and Airmen for the Operation of Light-Sport Aircraft*. The rulemaking would establish new light-sport aircraft categories and allow aircraft manufacturers to build and sell completed aircraft without obtaining type and production certificates. Instead, aircraft manufacturers would build to industry consensus standards. This reduces development costs and subsequent aircraft acquisition costs. This new category places specific conditions on the design of the aircraft to limit them to low performance aircraft. New pilot training times are reduced and offer more flexibility in the type of aircraft which the pilot would be allowed to operate. Viewed by many within the general aviation industry as a revolutionary change in the regulation of recreational aircraft, this new rulemaking is anticipated to significantly increase access to general aviation by reducing the time required to earn a pilot's license and the cost of owning and operating an aircraft. These regulations are aimed primarily at the recreational aircraft owner/operator. This new rulemaking is expected to add between 300 and 500 new aircraft each year to the national fleet, beginning in 2006. By 2015, there is expected to be 20,915 of these aircraft in the national fleet (including approximately 15,300 existing aircraft which will now be included in the active fleet beginning in 2004).

At the end of 2003, the total pilot population, including student, private, commercial, and airline transport, was estimated by the FAA to decline to 625,011 from the 625,358 pilots in 2002. However, the total pilot population is expected to grow 1.6 percent annually over the next 12 years. A large portion of this growth is from the expected certification of approximately 16,100 currently unrated pilots, between 2004 and 2005, as sport-rated pilots. Excluding this influx of pilots due to new regulations (many of these are existing ultralight pilots which now are not certificated), the annual growth rate for pilots is 1.4 percent. Student pilots increased 1.5 percent in 2003. The number of student pilots is projected to increase by 1.9 percent annually through 2015.

While impacting aircraft production and delivery, the events of 9/11 and the economic downturn have not had the same negative impact on the business/corporate side of general aviation. The increased security measures placed on commercial flights have increased interest in fractional and corporate aircraft ownership, as well as on-demand charter flights. According to GAMA, the total number of corporate operators increased by 471 operators in 2003. Corporate operators are defined as those companies that have their own flight departments and utilize general aviation airplanes to enhance productivity. **Table 2B** summarizes the number of U.S. companies operating fixed-wing turbine aircraft since 1991.

TABLE 2B U.S. Companies Operating Fixed-Wing Turbine Business Aircraft and Number of Aircraft, 1991-2003		
Year	**Number of Operators**	**Number of Aircraft**
1991	6,584	9,504
1992	6,492	9,504
1993	6,747	9,594
1994	6,869	10,044
1995	7,126	10,321
1996	7,406	11,285
1997	7,805	11,774
1998	8,236	12,425
1999	8,778	13,148
2000	9,317	14,079
2001	9,709	14,837
2002	10,191	15,569
2003	10,661	15,870
Source: GAMA/NBAA		

The growth in corporate operators comes at a time when fractional aircraft programs are experiencing significant growth. Fractional ownership programs sell 1/8 or greater shares in an aircraft at a fixed cost. This cost, plus monthly maintenance fees, allows the shareholder a set number of hours of use per year and provides for the management and pilot services associated with the aircraft's operation. These programs guarantee the aircraft is available at any time, with short notice. Fractional ownership programs offer the shareholder a more efficient use of time (when compared with commercial air service) by providing faster point-to-point travel times and the ability to conduct business confidentially while flying. The lower initial startup costs (when compared with acquiring and establishing a flight department) and easier exiting options are also positive benefits.

Since beginning in 1986, fractional jet programs have flourished. **Table 2C** summarizes the growth in fractional shares since 1986. The number of aircraft in fractional jet programs has grown rapidly. In 2001, there were 696 aircraft in fractional jet programs. This grew to 776 aircraft in fractional jet programs at the end of 2002, and 823 in 2003.

TABLE 2C Fractional Shares 1986-2003	
Year	**Number of Shares**
1986	3
1987	5
1988	26
1989	51
1990	57
1991	71
1992	84
1993	110
1994	158
1995	285
1996	548
1997	957
1998	1,551
1999	2,607
2000	3,834
2001	4,071
2002	4,232
2003	4,515
Source: GAMA/NBAA	

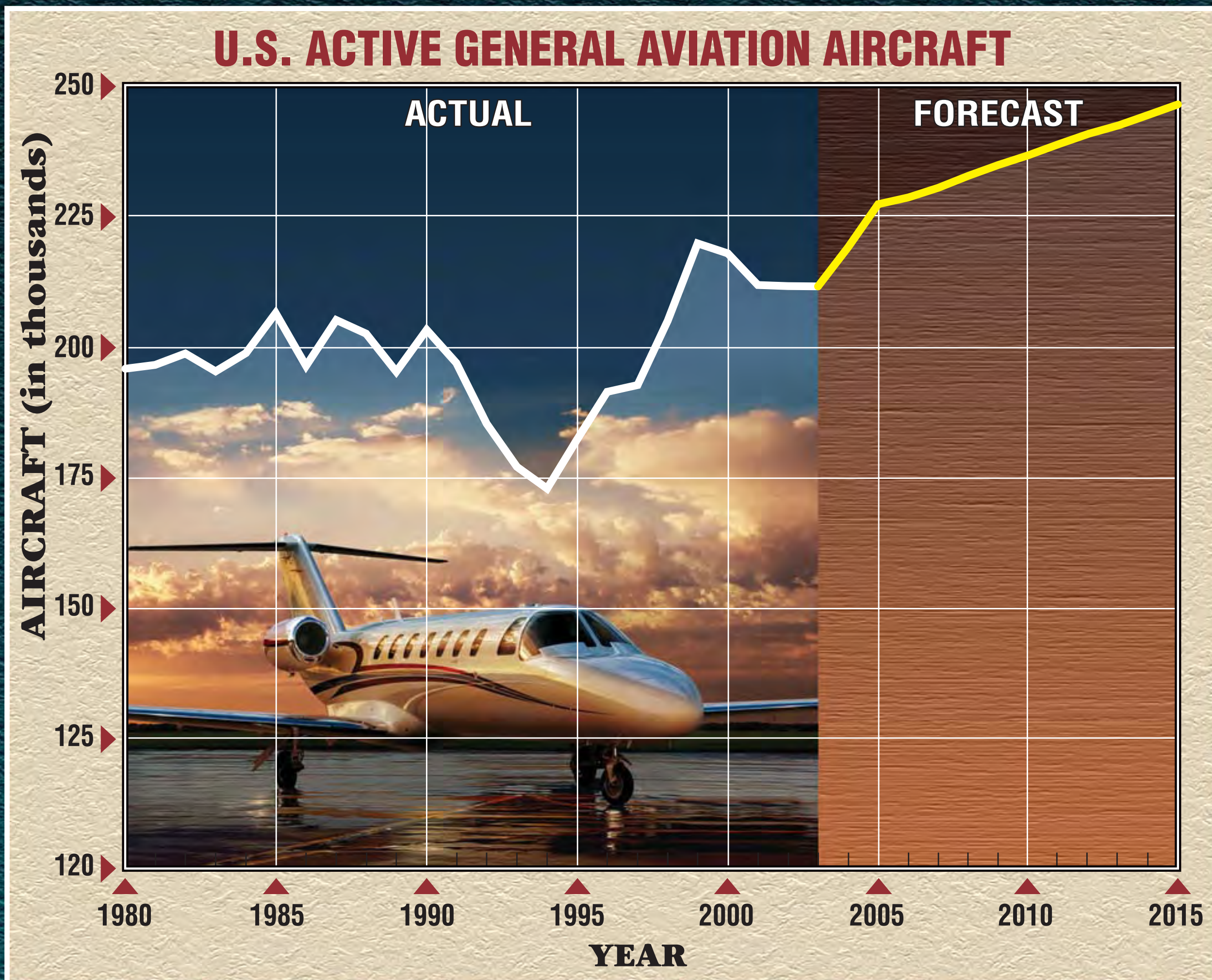
Manufacturer and industry programs and initiatives continue to revitalize the general aviation industry with a variety of programs. For example, Piper Aircraft Company has the Piper Financial Services (PFS) to offer competitive interest rates and/or leasing of Piper aircraft. Manufacturer and industry programs include the "No Plane, No Gain" program promoted jointly by the GAMA and the NBAA. This program was designed to promote the use of general aviation aircraft as an essential, cost-effective tool for businesses. Other programs are intended to promote growth in new pilot starts and to introduce people to general aviation. These include "Project Pilot" sponsored by the Aircraft Owners and Pilots Association (AOPA), "Flying Start" sponsored by the Experimental Aircraft Association (EAA), "Be a Pilot" jointly sponsored and supported by more than 100 industry organizations, and "Av Kids" sponsored by the NBAA. Over the years, programs such as these have played an important role in the success of general aviation and will continue to be vital to its growth in the future.

In 2002, there were an estimated 211,244 active general aviation aircraft, representing a decrease of 203 active aircraft from the previous year and the third straight decline following five years of increases. **Exhibit 2B** depicts the FAA's forecast for active general aviation aircraft in the United States. The FAA predicts the number of active general aviation aircraft to increase at an average annual rate of 1.3 percent over the 12-year forecast period. Piston-powered aircraft are expected to grow at an average annual rate of 0.2 percent. This is due, in part, to declining numbers of multi-engine piston aircraft, while single-engine and rotorcraft increase at rates of 0.3 and 1.0 percent, respectively.

Turbine-powered, fixed-wing aircraft (turboprop and turbojet) are expected to grow at an average annual rate of 3.6 percent over the forecast period. The jet portion of this fleet is expected to grow at an average annual growth rate of 5.1 percent. This growth rate for jet aircraft can be attributed to growth in the fractional-ownership industry, new product offerings (which include new entry-level aircraft and long-range global jets), and a shift away from commercial travel by many travelers and corporations.

Industry estimates for the new microjets suggest that the market could be as high as 5,000 new aircraft by 2010. The microjets are very light jets (less than 12,500 pounds) with low acquisition costs (around $1.0 million) and are believed to have the potential to redefine business jet flying. Their low operating costs (between $0.50 and $1.00 per mile) have the capability to support a true air taxi business service. Current microjet projects include the Eclipse, Cessna Mustang, Raytheon Premier, and Adams A700. The current FAA forecast assumes the entry of a microjet in 2006, reaching 4,600 new aircraft by 2015.

03MP10-2B-4/26/04



U.S. ACTIVE GENERAL AVIATION AIRCRAFT (in thousands)

Year	FIXED WING: PISTON: Single Engine	FIXED WING: PISTON: Multi-Engine	FIXED WING: TURBINE: Turboprop	FIXED WING: TURBINE: Turbojet	ROTORCRAFT: Piston	ROTORCRAFT: Turbine	Experimental	Sport Aircraft	Other	Total
2003 (Est.)	143.4	17.5	6.9	8.5	2.4	4.3	22.0	N/A	6.4	211.2
2005	143.5	17.3	7.0	9.0	2.4	4.3	22.1	15.5	6.4	227.6
2010	146.2	16.9	7.6	12.0	2.6	4.4	22.7	18.1	6.5	236.9
2015	148.5	16.5	8.1	15.5	2.7	4.5	23.1	20.9	6.6	246.4

Source: FAA Aerospace Forecasts, Fiscal Years 2004-2015.

Notes: An active aircraft is one that has a current registration and was flown at least one hour during the calendar year.

KINGMAN AIRPORT

Exhibit 2B
U.S. ACTIVE GENERAL AVIATION
AIRCRAFT FORECASTS

POPULATION PROJECTIONS

Population growth provides an indication of the potential for sustaining growth in aviation activity over the planning period. **Table 2D** summarizes historical and forecast population numbers for the City of Kingman, Mohave County, and the State of Arizona.

Population projections were provided by the Arizona Department of Economic Security, Population Statistics Unit. Projections for the City of Kingman indicate an increase of more than 8,000 new residents by 2023, which equals an average annual growth rate of 1.6 percent. During this same time, the state and the county are expected to experience average annual growth rates of 1.9 percent and 1.7 percent respectively. The population forecasts are presented in **Table 2D**.

TABLE 2D
Population Forecasts

Year	Kingman	Mohave County	State of Arizona
2002	22,045	166,465	5,472,750
2008	24,300	185,400	5,908,600
2013	26,500	207,500	6,503,000
2018	28,500	228,400	7,113,900
2023	30,500	247,800	7,740,900
Average Annual Growth Rate (2002-2023)	1.6%	1.9%	1.7%

Source: Arizona Department of Economic Security, Population Statistics Unit.

AIRPORT SERVICE AREA

The service area of an airport is defined by its proximity to other airports providing similar services. In determining the aviation demand for an airport, it is necessary to identify the role of that airport, as well as the specific areas of aviation demand the airport is intended to serve. The primary role of Kingman Airport is to serve commercial airline and general aviation demand.

As in any business enterprise, the more attractive the facility is in services and capabilities, the more competitive it will be in the market. If an airport's attractiveness increases in relation to nearby airports, so will the size of the service area. If facilities are adequate and rates and fees are competitive at Kingman Airport, some level of aviation activity might be attracted to the airport from surrounding areas.

The nearest commercial service airports in the vicinity of Kingman Airport are listed below, along with their distance from the airport in miles.

- Laughlin-Bullhead Airport – 43 miles west in Bullhead City, Arizona

- Lake Havasu Airport – 69 miles southwest in Lake Havasu, Arizona
- McCarran International Airport – 110 miles northwest in Las Vegas, Nevada
- Ernest A. Love Field Airport – 137 miles southeast in Prescott, Arizona
- Flagstaff Pulliam Airport – 147 miles east in Flagstaff, Arizona
- Phoenix-Sky Harbor International Airport – 187 miles southeast in Phoenix, Arizona

McCarran International Airport offers the greatest competition to Kingman Airport commercial airline service. Located approximately 110 miles (by road) west, McCarran International Airport is served by all major airlines and many regional air carriers. Phoenix-Sky Harbor International Airport is a choice for many air travelers, since it is also served by the major airlines. Lake Havasu Airport and Ernest A. Love Field Airport are not viable choices, as they provide regional service to Phoenix very similar to that provided from Kingman Airport. While Flagstaff Pulliam Airport provides more frequency of service, the service at Flagstaff is not comparable to that of McCarran International Airport or Phoenix-Sky Harbor International Airport.

With scheduled air service available in the other communities in Mohave County, the service area for Kingman Airport is limited. Scheduled service is available in both Lake Havasu and Bullhead City. Since Laughlin-Bullhead Airport currently only provides four scheduled weekly departures to Minneapolis, Minnesota, Kingman Airport may be an alternative to air travelers needing daily departure schedules from Bullhead City. McCarran International Airport and Phoenix-Sky Harbor International Airport also draw air travelers from the southern and western-portions of Mohave County. Considering these factors, the primary catchment area for enplanements at Kingman Airport is limited to the City of Kingman and other communities in central and west-central Mohave County.

From a commercial service perspective, the decision to fly out of Kingman Airport is affected by numerous factors, including the drive times to McCarran International Airport and Phoenix-Sky Harbor International Airport, the availability of flights, aircraft types and airfares offered at McCarran International Airport and Phoenix-Sky Harbor International Airport, and the type of traveler (business vs. pleasure). Business travelers will generally pay higher airfares for the time savings achieved through flying to the local airport, when compared to a recreational traveler.

The primary attraction for air service at Kingman Airport is the ground distance to McCarran International Airport and Phoenix Sky Harbor International Airport and the time savings that can be achieved through flying to/from Kingman Airport. Due to the limited size of the potential passenger market in Kingman, it is unlikely that Kingman Airport could offer similar availability of flights, aircraft, or airfares for air travelers to/from Kingman, as Phoenix Sky Harbor International Airport or McCarran International Airport. Therefore, there will always be air travelers using the hub airports in Las Vegas and Phoenix rather than flying directly from Kingman.

For general aviation, the service area is more closely defined around the airport, since other general aviation airports in the area provide similar services to smaller aircraft. A description of nearby general aviation airports within a 40 nautical-mile radius of Kingman Airport was presented in Chapter One. Due to the comparable levels of facilities and services, it can be expected that the majority of general aviation demand for Kingman Airport will come from within and just outside of the surrounding community. A review of aircraft registrations confirmed that the majority of aircraft owners at Kingman Airport were from the City of Kingman and immediate communities. However, there were some aircraft owners from Bullhead City.

AVIATION ACTIVITY FORECASTS

The following forecast analysis examines each of the aviation-demand categories expected at Kingman Airport over the next 20 years. Each segment will be examined individually, and then collectively, to provide an understanding of the overall aviation activity at the airport through 2023.

The need for airport facilities at Kingman Airport can best be determined by accounting for forecasts of future aviation demand. Therefore, the remainder of this chapter presents the forecasts for airport users, and includes the following:

- COMMERCIAL SERVICE
  - Annual Enplaned Passengers
  - Operations and Fleet Mix
  - Peak Activity
  - Annual Instrument Approaches

- AIR TAXI AND MILITARY
  - Annual Operations

- GENERAL AVIATION
  - Based Aircraft
  - Based Aircraft Fleet Mix
  - Local and Itinerant Operations
  - Peak Activity
  - Annual Instrument Approaches

COMMERCIAL AIRLINE SERVICE

To determine the types and sizes of facilities necessary to properly accommodate present and future airline activity, two elements of commercial service must be forecast: annual enplaned passengers and annual aircraft operations. Of these, the number of annual enplaned passengers is the most basic indicator of demand for commercial service activity. The term "enplanement" refers to a passenger boarding an airline flight. From a forecast of annual enplanements, operations and peak period activity can be projected based on the specific characteristics of passenger demand at the airport.

Kingman Airport Air Service

Kingman Airport has been an essential air service (EAS) route since 1978. The EAS program is administered by the U.S. Department of Transportation to ensure that smaller communities retain access to the national air transportation system. Under the EAS program, the air carrier providing scheduled service to a community is provided a monthly subsidy in return for providing a minimum level of service to a hub airport. Mesa Airlines has held the EAS contract since 1989. Prior to 1989, service was provided by Golden Pacific Airlines, Cochise Airlines, and Republic Airlines. The airport has never been served by more than one airline at a time.

The current EAS program for Kingman Airport includes a service guarantee of two daily flights to Phoenix-Sky Harbor International Airport. Each flight is allowed an intermediate stop. The June 2004 schedule is presented in **Table 2E**. The current schedule includes three daily departures. All flights to and from Kingman stop in Lake Havasu. Mesa Airlines operates the 19-seat Beechcraft 1900, which is a turboprop aircraft.

Kingman Airport is part of the Arizona Rural Consortium of Airports (Consortium). The Consortium is comprised of the communities of Kingman, Prescott, Page, Show Low, and Sierra Vista. In conjunction with the Arizona Department of Transportation (ADOT) Aeronautics Division, the Consortium was granted $1.5 million in 2003, through the Small Community Air Service Development Pilot Program (SCASDPP) to improve air service. The Consortium's plan is to combine the current EAS funding for these communities with the SCASDPP grant and local funds, into one large pool of money. With ADOT acting as the contractor, one single air carrier would be selected to serve all five communities. (Currently, there are three airlines serving these five markets.) The program includes funding for service guarantees, an incentive program to increase enplanement levels at each airport, and the development of a marketing program. As of June 2004, this program was still in development.

TABLE 2E
Mesa Airlines Flight Schedule – June 2004
Kingman Airport

Flight #	Departure	Arrival
Kingman to Phoenix – Monday thru Friday		
6840	6:25 a.m.	8:05 a.m.
6847	11:00 p.m.	12:40 p.m.
6848	3:30 p.m.	5:10 p.m.
Phoenix to Kingman – Monday thru Friday		
6841	8:50 a.m.	10:30 a.m.
6842	1:20 p.m.	3:00 p.m.
6843	7:25 p.m.	9:05 p.m.

Source: America West Airlines

Passenger Enplanements

Historical passenger enplanements and the annual percentage change since 1995 are presented in **Table 2F**. As shown in the table, enplanements at Kingman Airport have fluctuated significantly in the past several years. Enplanements peaked at 3,558 in 1999. The lowest annual level was

1996 with 1,602. The decline in annual enplanements in 1996 and 1997 is the result of schedule changes in those years that included only two daily flights. The decline in 2001 and 2002 is the result of reductions in the schedule as well. In 2003, enplanements were up 15.6 percent from 2002.

TABLE 2F
Historical Passenger Enplanements
Kingman Airport

Year	Total Enplanements	Annual % Change
1995	3,459	-
1996	1,602	-53.7%
1997	1,802	12.5%
1998	2,897	60.8%
1999	3,558	22.8%
2000	3,420	8.3%
2001	3,103	-9.3%
2002	2,001	-35.5%
2003	2,313	15.6%

Source: Airport Records

As in any case where there are differences in levels of service, Kingman Airport must compete with the air service available at McCarran International Airport and Phoenix Sky Harbor International Airport. While 110 miles and 187 miles from Kingman, respectively, each airport provides regular jet service and affordable airfares to all domestic destinations. As a result, many passengers choose to use these airports rather than fly directly to the more convenient Kingman Airport. This is referred to as leakage. The capture of the leakage can lead to growth in enplanements at the airport.

The number of potential enplanements that Kingman Airport may realize depends upon the level of air service at the airport. The full potential for Kingman Airport would only be realized if the airport provided services and air fares similar to McCarran International Airport and/or Phoenix Sky Harbor International Airport. This is not likely, considering the communities that McCarran International Airport and Phoenix Sky Harbor International Airport serve, and the established airline operations at those airports.

The first step in developing forecasts of total annual enplaned passengers involves the use of time-series and regression analyses. Time-series analysis pertains to projecting future activity based on previous trends. Regression analyses measure the statistical relationship between dependent and independent variables, and provide a "correlation coefficient." Due to the fluctuations in enplanement levels since 1992, the time-series and regression analyses yielded correlation coefficients too low to have any predictive reliability. Therefore, none of the time-series or regression analyses were carried forward for the study. Instead, market share comparisons were used to project annual enplanements at Kingman Airport.

The last column on **Table 2G** examines scheduled enplanements at Kingman Airport as a percentage of domestic U.S. regional/commuter airline enplanements since 1995. With growth in U.S. regional/commuter airline enplanements outpacing the growth in annual enplanements at Kingman Airport, the Kingman Airport share of U.S. regional/commuter airline enplanements has declined since 1995, reaching a low of 0.002 percent in 2002 and 2003.

The average market share over the past nine years has been 0.004 percent; however, the annual share has been lower than this average four of the last nine years. Since 2001, the market share has been static at 0.002 percent. Having remained steady at 002 percent in 2002 and 2003, the market may have stabilized with the return of three daily flights to Kingman Airport. A projection which maintains this market share through 2023 is shown in **Table 2G**. This forecast projects enplanement growth at an average annual rate of 5.1 percent through 2023, consistent with national FAA projections for regional/commuter airline enplanement growth.

TABLE 2G
Historical and Forecast Share of
U.S. Regional/Commuter Airline Enplanements
Kingman Airport

Year	Kingman Enplanements	U.S. Regional. Enplanements	Kingman % Share
Historical			
1995	3,459	55,800,000	0.006%
1996	1,602	60,100,000	0.003%
1997	1,802	61,900,000	0.003%
1998	2,897	65,700,000	0.004%
1999	3,558	73,100,000	0.005%
2000	3,420	79,700,000	0.004%
2001	3,103	80,400,000	0.004%
2002	2,001	88,600,000	0.002%
2003	2,313	105,100,000	0.002%
Forecasts			
Constant Share			
2008	3,600	165,300,000	0.002%
2013	4,500	203,200,000	0.002%
2018	5,400	244,800,000	0.002%
2023	6,300	285,500,000	0.002%
Avg. Annual	5.1%	5.1%	
Change	3,987	180,400,000	
Increasing Share			
2008	3,600	165,300,000	0.002%
2013	5,900	203,200,000	0.003%
2018	11,900	244,800,000	0.005%
2023	17,700	285,500,000	0.006%
Avg. Annual	10.7%	5.1%	
Change	15,387	180,400,000	

Note: 2018 & 2023 US Regional Enplanements Extrapolated by Coffman Associates
US Regional Airline Enplanements - FAA Aerospace Forecasts

A second market share examines Kingman Airport recapturing a greater share of the leakage in the market and growing at a faster rate than national regional/commuter airline enplanements. As shown in **Table 2G**, increasing the Kingman Airport share of U.S. regional/commuter airline enplanements to the 1995 level of 0.006 percent, yields an average annual growth rate of 10.7 percent and 17,700 enplanements in 2023.

Table 2H examines enplanements as a ratio of the City of Kingman residents. The City of Kingman represents the primary catchment area for Kingman Airport enplanements. Similar to the Kingman Airport share of U.S. regional/commuter airline enplanements, the ratio of enplanements to residents has declined since 1995, as the City of Kingman population has grown at a faster rate than Kingman Airport enplanements. A forecast assuming the 2003 ratio remains constant through 2023 is presented in **Table 2H**. This projection forecasts annual enplanements growing at 1.5 percent annually through 2023, reaching 3,100. A forecast increasing the ratio of enplanements to residents to the 1995 ratio of 20.6, results in annual enplanements reaching 6,400 by 2023, an average annual growth rate of 5.2 percent.

Enplanement levels and the ratio-to-residents in similarly-sized communities have also been examined to estimate market potential for Kingman Airport. **Table 2J** summarizes communities with population levels near the existing City of Kingman population or within the 20-year forecast population of the City of Kingman. As shown in the table, each of these communities has experienced higher enplanements levels than Kingman Airport, even though the population in these communities is comparable to the City of Kingman.

The higher enplanement levels results in a higher ratio of enplanements to 100 residents than for Kingman Airport. For example, for Fort Dodge, Iowa, the 2000 ratio of enplanements to 100 residents was 46.7. For Kearny, Nebraska, this ratio was 38.1. In Carlsbad, New Mexico, this ratio was 28.7. Prescott, Arizona, had an 18.6 ratio, while North Platte, Nebraska, and Liberal, Kansas, experienced 37.7 and 28.1 ratios, respectively. In 2000, Kingman Airport had a ratio of 16 enplanements per 100 residents.

As shown in **Table 2K**, these ratios have declined since 2002, as enplanement levels at these airports have declined. Similar to Kingman Airport, the declines at these airports were the result of the lower enplanement levels nationwide, brought about by the events of 9/11 and economic recession.

TABLE 2H
Historical and Forecast Enplanements Per Capita
Kingman Airport

Year	Kingman Enplanements	City of Kingman Population	Enplanements Per Residents
Historical			
1995	3,459	16,775	20.6
1996	1,602	17,385	9.2
1997	1,802	18,425	9.8
1998	2,897	19,225	15.1
1999	3,558	20,000	17.8
2000	3,420	20,069	17.0
2001	3,103	21,240	14.6
2002	2,001	22,045	9.1
2003	2,313	22,690	10.2
Forecasts			
Constant Share			
2008	2,500	24,300	10.2
2013	2,700	26,500	10.2
2018	2,900	28,500	10.2
2023	3,100	30,500	10.2
Avg. Annual	1.5%	1.5%	
Change	787	7,810	
Increasing Share			
2008	2,900	24,300	12.00
2013	4,000	26,500	15.00
2018	5,100	28,500	18.00
2023	6,400	30,500	21.00
Avg. Annual	5.2%	1.5%	
Change	4,087	7,810	

Note: 2009, 2025 Population Extrapolated by Coffman Associates
City of Kingman Population –Arizona Department of Economic Security

TABLE 2J Comparable Markets Kingman Airport	2002 Population	2002 Enplane-ments	Ratio To 100 Residents	2000 Population	2000 Enplane-ments	Ratio to Residents
Prescott, AZ	36,300	9,444	26.0	34,007	6,337	18.6
Kearney, NE	27,910	5,184	18.6	27,433	10,463	**38.1**
Carlsbad, NM	25,196	2,616	10.4	25,642	7,355	**28.7**
Fort Dodge, IA	24,897	7,662	30.8	25,136	11,729	**46.7**
North Platte, NE	23,674	5,989	25.3	23,889	9,017	37.7
Liberal, KS	20,082	2,965	14.8	19,666	5,522	28.1
Kingman, AZ	22,092	2,590	11.7	20,905	3,420	16

Source for Historical Population Data: http://eire.census.gov/popest/data/cities/subtab05.php
Source for Historical Enplanements: FAA

Considering the impact that the unusual events of 9/11 and the economic recession have made on the enplanement levels at airports nationwide, market comparison forecasts for Kingman Airport were developed using ratios from these communities for 2000. **Table 2K** summarizes three alternative forecasts which apply the 2000 ratio of enplanements from three communities to the City of Kingman forecast population, to derive an understanding of the market potential at Kingman Airport if it were to experience similar ratios of enplanements to residents. Ratio 1 considers the 2000 Fort Dodge, Iowa ratio of 46.7 enplanements per 100 residents. Ratio 2 considers the 2000 Kearny, Nebraska ratio of 38.1 enplanements per 100 residents, while ratio 3 considers the 2000 Carlsbad, New Mexico ratio of 28.7 enplanements per 100 residents.

Forecasts included in the *2000 Arizona State Aviation Needs Study* (SANS) and the FAA *Terminal Area Forecasts* (TAF) have also been examined for comparative purposes. The 2000 SANS projected enplanements growing from 3,558 in 1999, to 8,426 annual enplanements by the year 2020. This represents a 4.1 percent annual growth rate. The FAA TAF projects enplanements at Kingman Airport to remain constant at 2,066 through the end of the planning period. No explanation is given by the FAA for the TAF enplanement projections. Given that the FAA forecast is lower than the actual 2002 and 2003 enplanement levels, the TAF clearly under-predicts the potential future enplanements for Kingman Airport.

TABLE 2K
Market Comparison Forecasts
Kingman Airport

Year	City of Kingman Population	Ratio 1	Kingman Airport Enplanements	Ratio 2	Kingman Airport Enplanements	Ratio 3	Kingman Airport Enplanements
2008	24,300	46.7	11,300	38.1	9,200	28.7	7,000
2013	26,500	46.7	12,400	38.1	10,000	28.7	7,600
2018	28,500	46.7	13,300	38.1	10,800	28.7	8,200
2023	30,500	46.7	14,200	38.1	11,500	28.7	8,700

Notes: Ratio 1 - Fort Dodge, IA, 2000, Ratio 2 - Kearney, NE, 2000, Ratio 3 - Carlsbad, NM, 2000

Exhibit 2C graphically compares nine annual enplanement projections for Kingman Airport. **Table 2L** summarizes the key milestone levels of each projection. The combination of the forecasts represents a "forecast envelope," or the area in which future enplanements should be found.

TABLE 2L
Summary of Passenger Enplanement Forecasts
Kingman Airport

	2003	2008	2013	2018	2023
Market Share U.S. Domestic Enplanements					
Constant Market Share		3,600	4,500	5,400	6,300
Increasing Market Share		3,600	5,900	11,900	17,700
Enplanements Per Capita (City of Kingman)					
Constant Ratio Projection		2,500	2,700	2,900	3,100
Increasing Ratio Projection		2,900	4,000	5,100	6,000
Market Comparisons					
Ratio 1		11,300	12,400	13,300	14,200
Ratio 2		9,200	10,000	10,800	11,500
Ratio 3		7,000	7,600	8,200	8,700
2000 Arizona State Aviation Needs Study (SANS)		5,800	7,100	8,100	9,000
FAA Terminal Area Forecast (TAF)		2,066	2,066	2,066	N/A
Selected Planning Forecast	**2,313**	**5,400**	**6,800**	**10,100**	**15,000**

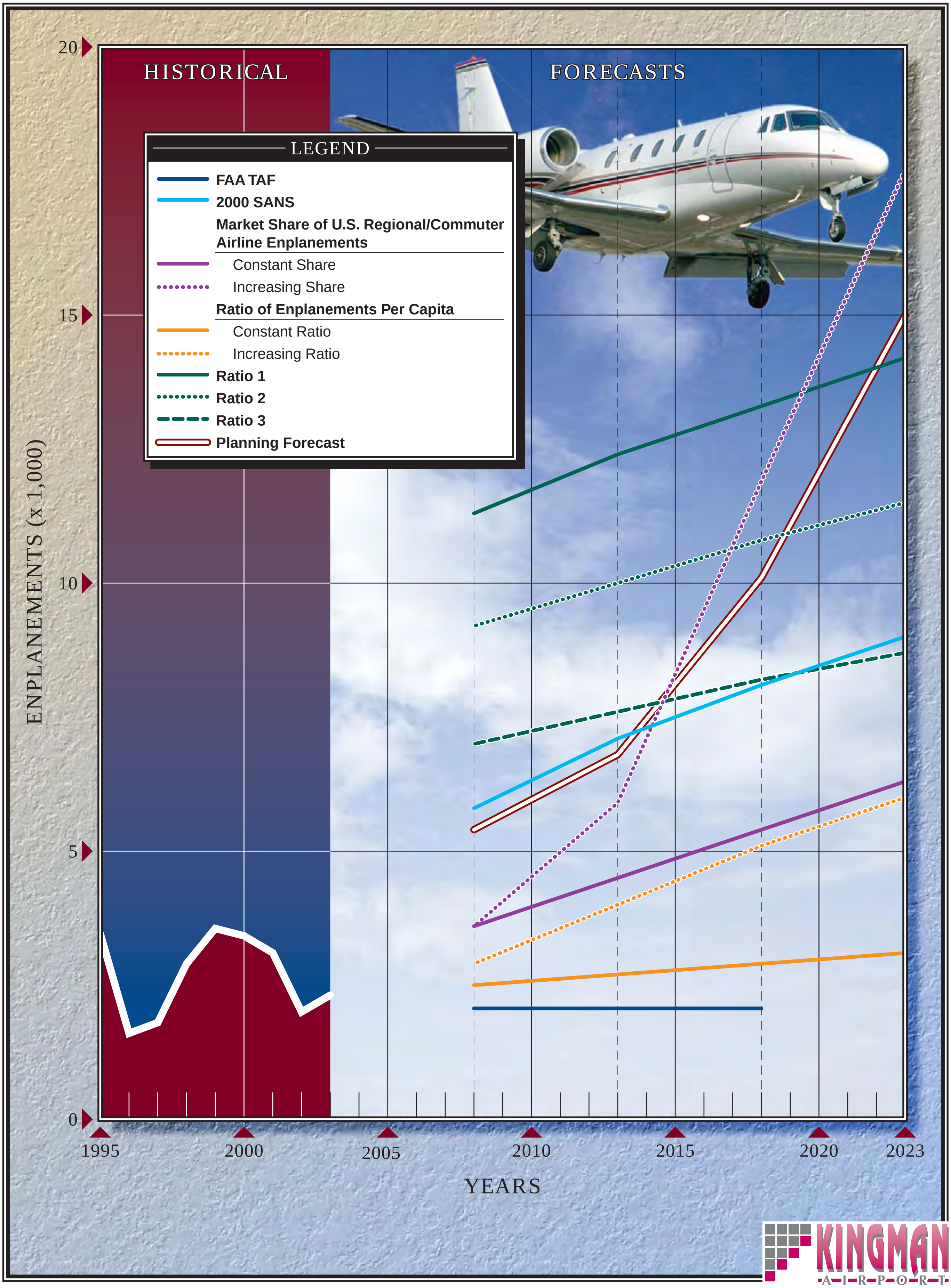


Exhibit 2C
ENPLANEMENT PROJECTIONS

The constant ratio of enplanements per resident forecast represents the low end of the forecast envelope, while the increasing share of U.S. regional/commuter airline enplanement forecast forms the upper end of the forecast envelope. The FAA TAF forecast lies below the forecast envelope.

In examining the forecasts, it would appear that the increasing share of U.S. regional airline enplanements is too aggressive for the airport. This forecast yields a strong annual growth rate that more than likely could not be sustained over the planning period. The constant ratio of enplanements per resident and increasing ratio of enplanements per resident appears to understate growth potential. While the forecasts derived from comparing ratios of enplanements to residents in three comparable communities provide achievable long term growth potential, the short term (2008) levels are aggressive. Therefore, the selected planning forecast must consider the potential growth of the forecasts combined.

There is potential for growth in the Kingman market. The local population and economy is growing, as evidenced previously. The distance between Kingman and Las Vegas and Phoenix areas can attract air travelers who wish to shorten their travel times to and from the area. This is important to business travelers and some visitors. Historically, enplanements have grown during periods of reliable consistent service. Between 1997 and 1999, enplanements nearly doubled when a third flight was added each day. The Kingman Airport market benefits from the assurance of continual service through the EAS program. Service enhancements could also be experienced when the SCASDPP grant program is implemented. The SCASDPP grant program will include incentives to the carrier for reaching certain enplanement milestones in each market. Kingman Airport is served exclusively by regional airlines. This is the fastest-growing segment of the airline industry. Finally, historical enplanement levels in similarly-sized communities have been higher than experienced at Kingman Airport. This indicates that the population of this community can support higher levels of air service and annual enplanement levels.

The selected planning forecast for Kingman Airport allows for growth in the market without overstating the potential. This forecast closely tracks the 2000 SANS through approximately 2015. After this, the selected planning forecast projects the Kingman Airport maturing to levels comparable to similar communities such as Prescott, Arizona, and Fort Dodge, Iowa. The selected forecast equates to a 9.8 percent annual growth rate through 2023.

Fleet Mix and Operations Forecast

The type of aircraft in the commercial airline fleet serving the airport is an important component of airport planning. Not only will the make-up of the commercial airline fleet mix serving the airport be helpful in determining the number of commercial airline operations at the airport, but it is also helpful in defining many of the key parameters used in airport planning - namely, the critical aircraft serving the airport (used for pavement design, ramp geometry, and terminal complex layout). It is expected that air service in the future at Kingman Airport will continue to be provided by regional/ commuter airlines.

As previously mentioned, Air Midwest (a Mesa Airlines subsidiary) provides scheduled air service at Kingman Airport. Service is presently comprised entirely of the 19-seat Beech 1900 aircraft. The Mesa Airlines fleet includes larger DeHavilland Dash-8 aircraft and regional jets. Other regional air carriers in the southwest United States have fleets with 30-seat turboprop aircraft and regional jets as well.

The newest regional aircraft in the national fleet includes faster turboprop aircraft such as the 37-seat DeHavilland Q-100 and smaller regional jets such as the 30-seat Embraer Regional Jet (ERJ-120). With room for additional passengers, these aircraft offer operators a significant reduction in seat-mile operating costs, while offering many of amenities that the flying public has become accustomed to such as a flight attendant and restrooms on board. As enplanements grow, it can be expected that larger aircraft would be used at the airport to serve peak period times.

The potential number of operations is derived from the boarding load factor (BLF). The BLF is determined by dividing the number of enplanements per departure by the average number of departure seats (aircraft seating capacity). The boarding load factor is important to an airline because it is the basis for measuring the ability to profit in a given market. When a load factor is low, an airline will generally cut back the number of seats available by either reducing the size of the aircraft serving the market or reducing the number of flights. Similarly, when the load factor is high, an airline will begin to consider increasing the number of flights or the size of its aircraft.

In 2003, the average number of departure seats was 19, as the airport was consistently served with the Beech 1900 aircraft. The 2003 BLF at Kingman Airport was 15 percent. This BLF is low since Kingman Airport must share an aircraft with another intermediate destination such as Lake Havasu or Prescott. The airline must reserve seats on the departing aircraft from Kingman Airport to have seats available at the intermediate destination.

Similar to the national trend, the boarding load factor for Kingman Airport is expected to increase slightly over the planning period, as enplanement levels grow. The introduction of larger capacity aircraft is anticipated as the aircraft fleet mix changes for the carriers serving the airport and enplanement levels grow. Since service to Kingman has intermediate stops, it is very likely that larger aircraft may be used, particularly if enplanements grow at the intermediate stop. **Table 2M** summarizes the fleet mix and operations forecast for Kingman Airport.

TABLE 2M
Airline Fleet Mix and Operations Forecast
Kingman Airport

		FORECAST			
Fleet Mix Seating Capacity	**2003**	**2008**	**2013**	**2018**	**2023**
< 20 seats (19 average) (Beech 1900)	100%	100%	100%	80%	70%
> 20 seats (30 average) (EMB 120, Q-100)	0%	0%	0%	20%	30%
Totals	100%	100%	100%	100%	100%
Average Seats Per Departure	19	19	19	21	22
Boarding Load Factor	0.15	0.20	0.25	0.30	0.35
Enplanements Per Departure	3	4	5	6	8
Annual Enplanements	2,313	5,400	6,800	10,100	15,000
Annual Departures	791	1,400	1,450	1,600	1,900
Annual Operations	1,582	2,800	2,900	3,200	3,800

Source: Coffman Associates Analysis.

GENERAL AVIATION

General aviation is defined as that portion of civil aviation which encompasses all portions of aviation, except commercial operations. To determine the types and sizes of facilities that should be planned to accommodate general aviation activity, certain elements of this activity must be forecast. These indicators of general aviation demand include: based aircraft, aircraft fleet mix, annual operations, peak activity, and annual instrument approaches.

Based Aircraft

The number of based aircraft is the most basic indicator of general aviation demand. By first developing a forecast of based aircraft, the growth of aviation activities at the airport can be projected.

As mentioned in the previous chapter, a business located on the airport provides maintenance services to the airline and air cargo industry. As part of their services, this company also provides long term aircraft storage services. Based on available records, the number of aircraft stored at Kingman Airport by this business has exceeded 100 annually since 1996. Historically, these aircraft have been included as part of the total based aircraft count at the airport. For planning purposes, the stored aircraft will be separated from the general aviation based aircraft count, since there are different demand considerations and facility planning factors for the stored aircraft and general aviation based aircraft at the airport. The total based aircraft count and number of stored aircraft and general aviation based aircraft since 1996 is presented in **Table 2N**.

TABLE 2N Historical Based Aircraft Kingman Airport			
Year	**Total Based Aircraft**	**Stored Aircraft**	**General Aviation Based Aircraft**
1996	162	117	45
1998	184	124	60
2002	252	167	85
2003	264	152	112

General Aviation Based Aircraft

General aviation based aircraft have grown rapidly at Kingman Airport since 1996. As shown in **Table 2N**, general aviation based aircraft have more than doubled from the 45 based aircraft in 1996 to 112 based aircraft in 2003. Some of this growth is related to new hangar construction at the airport in the past few years. Because of the limited historical data, time-series and regression analyses were not performed, as they would not provide useful projections of based aircraft numbers. Instead, market share forecasts were used to forecast general aviation based aircraft at Kingman Airport.

The first method used to project based aircraft examined the Kingman Airport's share of registered aircraft in Mohave County. As shown in **Table 2P**, the airport captured 11 percent of aircraft registered in the county in 1996. The airport's market share has since increased, capturing 24 percent in 2003.

TABLE 2P General Aviation Based Aircraft Share of Registered Aircraft (Mohave County) Kingman Airport			
Year	**Kingman Airport Based Aircraft**	**Mohave County Registered Aircraft**	**Market Share of Registered Aircraft**
1996	45	399	11%
1998	60	411	15%
2002	85	433	20%
2003	112	466	24%
Constant Market Share			
2008	125	521	24%
2013	138	573	24%
2018	152	635	24%
2023	168	701	24%
Increasing Market Share			
2008	135	521	26%
2013	160	573	28%
2018	191	635	30%
2023	224	701	32%
Source: Historical Based Aircraft – Airport Records; 1996-2003 Registered Aircraft – Aviation Goldmine CD (1994-2000), Avantex Aircraft & Airmen CD (2001-2003). Forecast registered Aircraft – 2000 SANS			

Forecasts for registered aircraft growth in Mohave County were prepared for the 2000 SANS. The 2000 SANS projected Mohave County registered aircraft to grow to 661 by 2020. For purposes of this analysis, the registered aircraft forecast was extrapolated to 2023. Forecasts of based aircraft were developed by projecting the Kingman Airport's share of registered aircraft through 2023. The first forecast assumes the 2003 share will remain constant at 24 percent through the planning. This yields 168 based aircraft by 2023. The second forecast assumes the airport's market share will continue to increase, yielding 224 based aircraft by the year 2023. These market share forecasts are presented in **Table 2P**.

Based aircraft were also examined as a percentage of U.S. active general aviation aircraft. In 1996, based aircraft at Kingman Airport represented 0.02 percent of U.S. active general aviation aircraft. The airport's market share increased slightly over the following years, representing 0.05 percent in 2003. This indicates that based aircraft have been growing at a faster rate than active aircraft, nationally. A constant share projection was first developed. This forecast assumes the airport's share of U.S. active general aviation aircraft will remain constant at 0.05 percent through the planning period, which yields 131 based aircraft by the year 2023. The second forecast assumes the airport's market share will increase, consistent with historical trends. This increasing market share projection yields 236 based aircraft by the year 2023. These market share projections are presented in **Table 2Q**.

TABLE 2Q
General Aviation Based Aircraft
Share of U.S. Active General Aviation (GA) Aircraft
Kingman Airport

Year	Kingman Airport Based Aircraft	U.S. Active GA Aircraft	% of U.S. Active GA Aircraft
1996	45	191,129	0.02%
1998	60	204,710	0.03%
2002	85	211,040	0.04%
2003	112	211,370	0.05%
Constant Market Share			
2008	116	232,725	0.05%
2013	121	242,915	0.05%
2018	126	252,500[1]	0.05%
2023	131	262,300[1]	0.05%
Increasing Market Share			
2008	140	232,725	0.06%
2013	170	242,915	0.07%
2018	202	252,500[1]	0.08%
2023	236	262,300[1]	0.09%

Source: Historical Based Aircraft – Airport Records; Historical and Forecast U.S. Active Aircraft – FAA Aerospace Forecasts, Fiscal Years 2004-2015.
[1] Extrapolated by Coffman Associates.

Finally, based aircraft were examined as a ratio of Mohave County residents. This analysis is summarized in **Table 2R**. Two forecasts have been prepared. The first examines based aircraft potential by applying the 2003 ratio of 0.62 based aircraft per 1,000 residents to forecast Mohave County population. The constant ratio of based aircraft to 1,000 residents projection results in based aircraft growing at the same rate as the local population. This yields 154 based aircraft by 2023. With the expanding population base and economic growth in the area, the potential exists for based aircraft growth at the airport to exceed the projected population growth. This has been the trend in the past, as the ratio of based aircraft to population has been increasing annually. An increasing ratio yields 235 based aircraft in 2023.

TABLE 2R
General Aviation Based Aircraft Per 1,000 Residents (Mohave County)
Kingman Airport

Year	Kingman Airport Based Aircraft	Mohave County Population	Based Aircraft Per 1,000 Residents
1996	45	126,641	0.36
1998	60	140,119	0.43
2002	85	171,532	0.50
2003	112	180,431	0.62
Constant Share Projection			
2008	115	185,400	0.62
2013	129	207,500	0.62
2018	142	228,400	0.62
2023	154	247,800	0.62
Increasing Share Projection			
2008	121	185,400	0.65
2013	156	207,500	0.75
2018	194	228,400	0.85
2023	235	247,800	0.95

Source: Historical Based Aircraft – Airport Records; Historical Population – U.S. Census Bureau; Forecast Population – Arizona Department of Economic Security, Population Statistics Unit.

For comparative purposes, projections for the FAA TAF, 2000 SANS, and previous Kingman Airport Master Plan have also been examined. The FAA TAF used a base year total of 252 based aircraft and projected 416 based aircraft at Kingman Airport by the year 2020. The 2000 Arizona SANS projected based aircraft growing from 180 in 1998, to 221 by 2020. The forecast included in the 1991 Airport Master Plan, projected based aircraft growing from 78 in 1989, to 156 based aircraft by 2010.

The FAA TAF and the 2000 SANS did not separate based aircraft and stored aircraft, as these forecasts have.

Therefore, the based aircraft totals are not comparable; however, the projected growth rates are useful for comparison. The FAA TAF projects based aircraft growing at an average annual growth rate of 2.8 percent. The 2000 SANS projects based aircraft growing at an average annual growth rate of 0.9 percent. The aircraft storage business was not located at Kingman Airport when the 1991 Airport Master Plan was prepared; therefore, it did not consider the potential for stored aircraft. The 1991 Master Plan projected based aircraft growing at an average annual rate of 3.4 percent.

Table 2S and **Exhibit 2D** provide a summary of all general aviation based aircraft forecasts. The Constant Share of Mohave County Registered Aircraft, Constant Share of U.S. Active Aircraft, and Constant Ratio of Aircraft to Residents forecasts appear to understate growth potential, considering the historical growth at the airport. However, the increasing share forecasts may overstate the growth potential in the long term. Therefore, a selected planning forecast was developed that is approximately mid-range in the forecast envelope. The selected planning forecast accounts for the historical growth trend at the airport, but slows this growth over the planning period. The planning forecast projects based aircraft growing at an average annual rate of 2.9 percent, which is comparable to the FAA TAF's projected growth rate of 2.8 percent annually.

TABLE 2S
Summary of General Aviation Based Aircraft Forecasts
Kingman Airport

	2003	2008	2013	2018	2023
Market Share of Registered Aircraft (Mohave Co.)					
Constant Market Share		125	138	152	168
Increasing Market Share		135	160	191	224
Market Share of U.S. Active GA Aircraft					
Constant Market Share		116	121	126	131
Increasing Market Share		140	170	202	236
Aircraft Per 1,000 Residents (Mohave Co.)					
Constant Ratio Projection		115	129	142	154
Increasing Ratio Projection		121	156	194	235
Selected Planning Forecast	**112**	**130**	**150**	**175**	**200**

Based Aircraft Fleet Mix

Knowing the aircraft fleet mix expected to utilize the airport is necessary to properly plan facilities that will best serve the level of activity and the type of activities occurring at the airport. **Table 2T** indicates that the May 2004 based aircraft fleet mix is comprised mainly of single-engine piston aircraft. The based aircraft fleet mix has been examined as a share of total based aircraft.

The fleet mix projection includes a growing percentage of turboprop and turbojet aircraft at the airport, similar to national trends. The FAA expects turbine-powered, fixed-wing aircraft (turboprop and turbojet) to grow at an average annual rate of 3.6 percent through 2015. The jet portion of this fleet is expected to grow at an average annual growth rate of 5.1 percent.

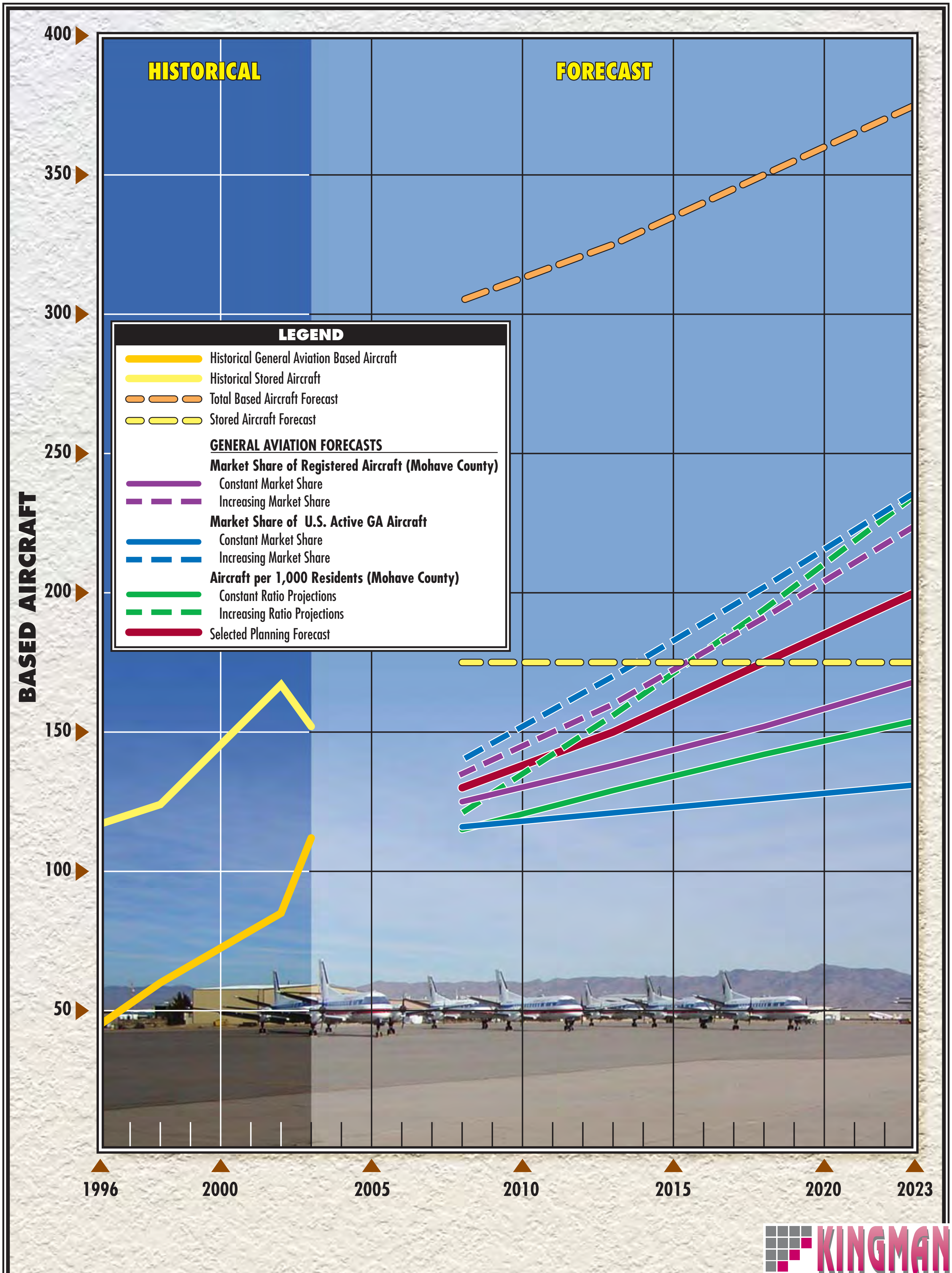
While the single-engine piston category remains static as a percentage of total based aircraft, the total number of single-engine piston aircraft is expected to grow by 77, the highest numerical change of all aircraft categories. Local economic and population growth will add new private aircraft ownership. The new regulations for sport aircraft should increase single-engine based aircraft levels as well. The FAA is finalizing new legislation for sport aircraft. This will create a new category of aircraft and a more simplified approval and manufacturing process. This new rule-making is expected to result in 300 to 500 new aircraft each year, beginning in 2006. By 2015, this results in between 2,700 and 4,500 new single-engine piston aircraft. The traditional single-engine piston fleet is expected to grow by an additional 5,100 aircraft in the next 12 years as well.

TABLE 2T
General Aviation Based Aircraft Fleet Mix

Year	Total	Single-engine Piston	Multi-Engine Piston	Turboprop	Turbojet	Helicopter
2004	103	83	18	0	0	2
Percentage Share						
2004	100.0%	80.6%	17.5%	0.0%	0.0%	1.9%
Forecast						
2008	130	105	20	1	1	3
2013	150	121	22	2	2	3
2018	175	140	24	3	4	4
2023	200	160	26	4	6	4
Percentage Share						
2008	100.0%	80.5%	15.5%	1.0%	1.0%	2.0%
2013	100.0%	80.5%	14.5%	1.5%	1.5%	2.0%
2018	100.0%	81.0%	13.5%	1.5%	2.0%	2.0%
2023	100.0%	80.0%	13.0%	2.0%	3.0%	2.0%
Change	97	77	8	4	6	2

Source for Historical Data: Airport Records

Multi-engine piston aircraft decline as a percentage, adding only eight new aircraft through the planning period. Nationally, the multi-engine piston mix is expected to decline. The cost of a new multi-engine piston aircraft is comparable to many used turboprops, which has led to their decline in use. The operational costs are also too high for widespread recreational aircraft



KINGMAN AIRPORT

Exhibit 2D
BASED AIRCRAFT FORECASTS

ownership and use. For perspective, GAMA reports that only 71 new multi-engine piston aircraft were built and delivered worldwide in 2003. This compares with over 1,800 new single-engine piston aircraft and 500 business jets. Multi-engine piston aircraft will always have a place in new pilot training and some aircraft charter activities.

The helicopter percentage is maintained constant through the planning period. This allows for some growth in this category at the airport. Nationally, the number of helicopters is declining. The FAA projects very little change in the helicopter fleet over the next 12 years. The FAA projects only 300 new piston-engine helicopters and 260 new turbine-powered helicopters by 2015. This indicates that the supply of new helicopters will only barely keep pace with helicopter retirements and that there is not an expected significant expansion of current helicopter activities nationwide.

General Aviation Operations

General aviation operations are classified as either local or itinerant. A local operation is a take-off or landing performed by an aircraft that operates within sight of the airport, or which executes simulated approaches or touch-and-go operations at the airport. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. Generally, local operations are characterized by training operations.

Due to an absence of an airport traffic control tower (ATCT), actual operation counts are not available for Kingman Airport. Instead, only estimates of operations are available. Historical estimates of aircraft operations are summarized in the FAA TAF. **Table 2U** summarizes historical general aviation operational estimates since 1990 for Kingman Airport. As shown in the table, annual general aviation operations have grown since 1990, increasing by 62 percent.

General aviation operations have been examined as a ratio of general aviation based aircraft. As shown in **Table 2U**, the 2002 estimate of 45,320 annual general aviation operations equates to 533 operations per based aircraft. The FAA TAF does not provide an estimate for operations in 2003,which is a forecast year. Assuming that the operations in 2003 were similar to 2002, the operations per based aircraft would fall to approximately 400, as based aircraft increased in 2003. Operations per based aircraft generally range between 250 and 600 at general aviation airports. The higher operations per based aircraft are experienced at airports with higher numbers of local operations than itinerant operations. Kingman Airport has an active flight school which has led to growing numbers of local operations since 1990. In 2002, it was estimated that local operations accounted for approximately 60 percent of total general aviation operations.

TABLE 2U Historical General Aviation Operations			
Year	**Itinerant**	**Local**	**Total**
1990	8,902	19,023	27,925
1995	17,769	4,286	22,055
2000	20,243	10,428	30,671
2001	20,300	10,400	30,700
2002	17,320	28,000	45,320
Source: FAA TAF			

As shown in **Table 2V**, applying the estimated 2003 operations per based aircraft ratio of 400 to forecast based aircraft yields 80,000 annual general aviation operations in 2023. Increasing the operations per based aircraft ratio yields 90,000 annual operations by 2023.

The 2000 SANS and FAA TAF have been examined for comparative purposes. The 2000 SANS projected operations growing from 33,000 in 1998, to 40,563 by 2020. The FAA TAF projects annual operations static at 30,700 through 2020.

TABLE 2V Annual GA Operations Forecasts Kingman Airport							
Year	**Based Aircraft**	**Itinerant Operations**	**% of Total**	**Local Operations**	**% of Total**	**Total Operations**	**Ops Per Based**
2003	112	17,320	38.22%	28,000	61.78%	45,320	404
Constant Ratio Projection							
2008	130	20,800	40.00%	31,200	60.00%	52,000	400
2013	150	27,000	45.00%	33,000	55.00%	60,000	400
2018	175	31,500	45.00%	38,500	55.00%	70,000	400
2023	200	36,000	45.00%	44,000	55.00%	80,000	400
Increasing Ratio Projection							
2008	130	21,300	40.00%	32,000	60.00%	53,300	410
2013	150	28,400	45.00%	34,700	55.00%	63,000	420
2018	175	33,900	45.00%	41,400	55.00%	75,300	430
2023	200	40,500	45.00%	49,500	55.00%	90,000	450
Selected Planning Forecast							
2008	130	21,100	40.00%	31,600	60.00%	52,700	405
2013	150	27,700	45.00%	33,800	55.00%	61,500	410
2018	175	32,700	45.00%	40,000	55.00%	72,700	415
2023	200	38,300	45.00%	46,800	55.00%	85,100	425
Source for historical operations - FAA TAF.							

The FAA projects an increase in aircraft utilization and the number of general aviation hours flown nationally. This trend, along with projected growth in based aircraft, supports future growth in annual operations at Kingman Airport. Considering these factors, the selected planning forecast for the airport projects the number of operations per based aircraft to gradually increase through the planning period. The selected planning forecast is a mid-range forecast, which results in general aviation operations growing to 85,000 by 2023. This is an average annual growth rate of 3.0 percent. Itinerant operations are projected to increase to 45 percent of total general aviation operations as the number of turbine-powered aircraft based at the airport grows. **Exhibit 2E** depicts the general aviation operations forecast.

Total Based Aircraft

As detailed earlier, the total based aircraft at Kingman Airport includes both the general aviation based aircraft and the aircraft stored by one of the tenants at the airport. The demand for stored aircraft will be a factor of the airline industry's business decisions to retire older aircraft and replace them with new, the ability of the local business to attract aircraft for storage, and the status of the used aircraft market. If the used aircraft market is strong, the number of stored aircraft may decline as aircraft are utilized. However, should the airline industry growth slow, the number of stored aircraft could increase. After 9/11, many airlines retired older aircraft or took aircraft out of service while demand was slow. Each of these factors is very difficult to predict. Nationally, there are no firm projections for aircraft retirements or the status of the used aircraft market. Therefore, the number of stored aircraft has been projected to remain static at 175 aircraft through the planning period. This exceeds the highest total at the airport since 1996, and accounts for some growth in this sector. It is expected that the mix of stored aircraft would change over time but include both turboprop and turbojet aircraft. **Table 2W** summarizes total based aircraft projections for Kingman Airport.

TABLE 2W
Total Based Aircraft Forecasts
Kingman Airport

	2003	2008	2013	2018	2023
General Aviation Based Aircraft	112	130	150	175	200
Stored Aircraft	152	175	175	175	175
Selected Planning Forecast	**264**	**305**	**325**	**350**	**375**

MILITARY OPERATIONS

Military activity accounts for the smallest portion of the operational traffic at Kingman Airport. Since 1999, military operations have accounted for less 300 itinerant operations annually. There have been no local military operations. Unless there is an unforeseen mission change in the area, a significant change from these average figures is not anticipated. Therefore, annual military operations have been projected at these annual levels throughout the planning period. This is consistent with typical industry practices for projecting military operations.

PEAKING CHARACTERISTICS

Most facility planning relates to levels of peak activity. The following planning definitions apply to the peak periods:

- Peak Month – The calendar month when peak aircraft operations occur.
- Design Day – The average day in the peak month.
- Busy Day – The busy day of a typical week in the peak month.
- Design Hour – The peak hour within the design day.

It is important to note that only the peak month is an absolute peak within a given year. All other peak periods will be exceeded at various times during the year. However, they do represent reasonable planning standards that can be applied without overbuilding or being too restrictive. The design day is normally derived by dividing the peak month operations or enplanements by the number of days in the month.

Airline Peaks

Historical airport records were examined to determine the peak month for passenger enplanements at Kingman Airport. In 2003, the peak month for enplanements was October, when the airport captured approximately 11.5 percent of total enplanements. This percentage has been applied to the forecast annual enplanements to determine future peak month enplanements levels. The design day enplanements were calculated by dividing the number of enplanements in the peak month by 30 to represent an average month. Design hour enplanements equal the projection of enplanements per departure developed earlier as part of the commercial operations forecast. The enplanements per departure are determined by applying a BLF to the projected number of seats available per departure.

According to airport records, the peak month for airline operations in 2003 was July, when the airport captured approximately 10.0 percent of annual operations. This percentage was applied to forecast operations. In 2003, the airport had three daily departures, or six total operations. This represents the design day. The peak hour had one departure and landing operation, for two total operations. Average day and peak hour operations were projected to increase later in the planning period when additional daily flights might be added. A summary of the forecasts for peak period airline enplanements and operations is presented in **Table 2X**.

General Aviation Peaks

Without an airport traffic control tower, adequate operational information is not available to directly determine peak operational activity at the airport. Therefore, peak period forecasts have been determined according to trends experienced at similar airports and by examining the operational counts completed at the airport in 2002. Typically, the peak month for activity at general aviation airports approximates 10 to 15 percent of the

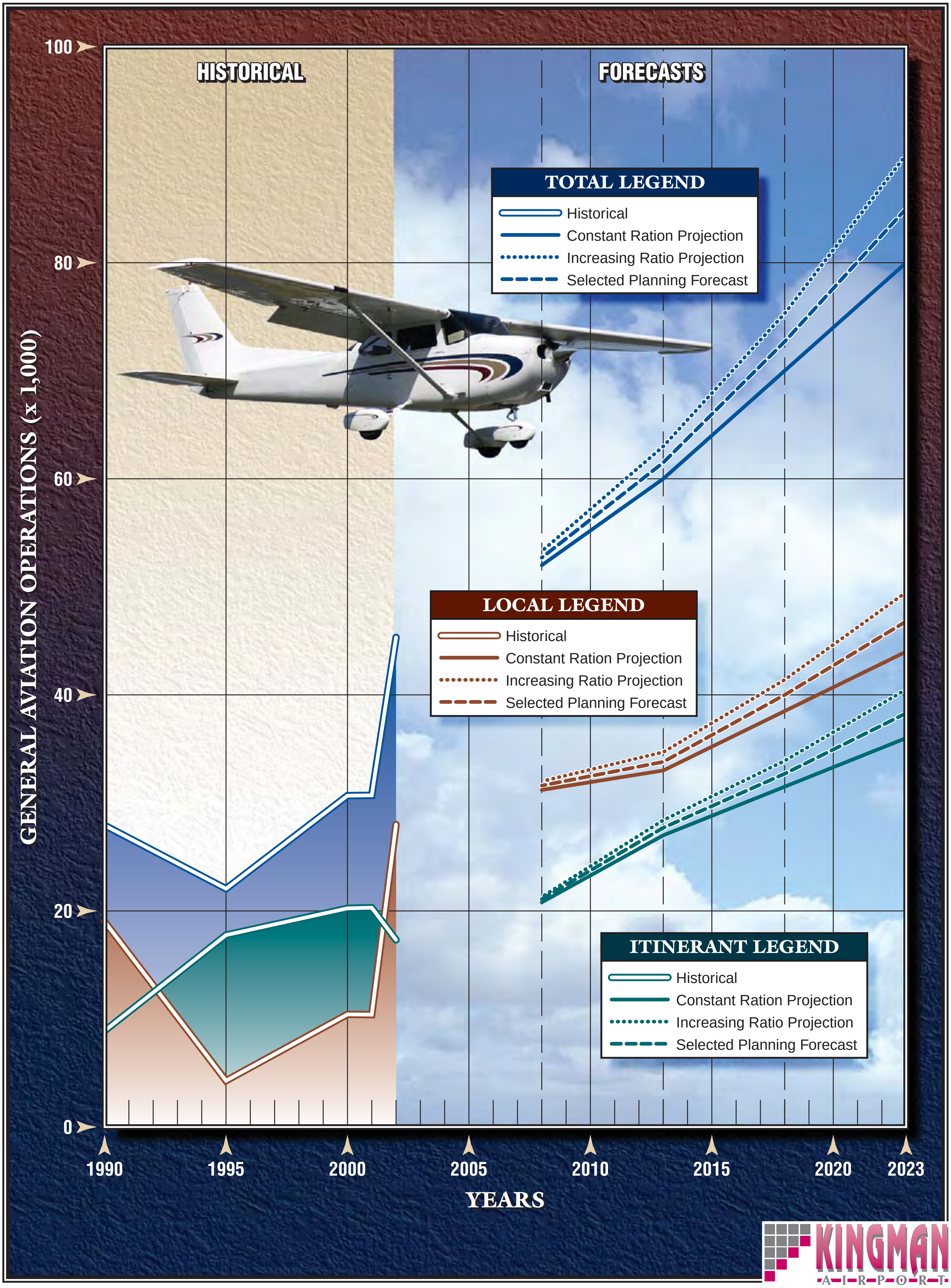


Exhibit 2E
GENERAL AVIATION
OPERATIONS FORECASTS

airport's annual operations. General aviation itinerant operations and total operations were estimated at 12 percent of total annual operations. The forecast of busy day operations was calculated as 1.25 times design day activity. Design hour operations were estimated at 15 percent of design day operations. **Table 2X** summarizes peak operations forecasts for the airport.

TABLE 2X
Peak Period Forecasts
Kingman Airport

	FORECASTS				
	2003	**2008**	**2013**	**2018**	**2023**
Airline Enplanements					
Annual	2,313	5,400	6,800	10,100	15,000
Peak Month	266	621	782	1,162	1,725
Design Day	9	21	26	39	58
Design Hour	3	7	9	13	19
Airline Operations					
Annual	1,582	2,800	2,900	3,200	3,800
Peak Month	158	283	293	323	384
Design Day	6	6	6	8	10
Design Hour	2	2	2	3	3
General Aviation Itinerant Operations					
Annual	17,320	21,100	27,700	32,700	38,300
Peak Month	2,078	2,532	3,324	3,924	4,596
Design Day	67	82	107	127	148
Busy Day	84	102	134	158	185
Design Hour	13	15	20	24	28
All Operations					
Annual	47,980	56,700	65,800	77,400	90,700
Peak Month	5,758	6,804	7,896	9,288	10,884
Design Day	186	219	255	300	351
Busy Day	232	274	318	375	439
Design Hour	35	41	48	56	66

ANNUAL INSTRUMENT APPROACHES

Forecasts of annual instrument approaches (AIAs) provide guidance in determining an airport's requirements for navigational aid facilities. An instrument approach is defined by the FAA as "an approach to an airport with the intent to land by an aircraft in accordance with an instrument flight rule (IFR) plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude."

In 2003, the airport reported 83 AIAs, which accounted for 0.4 percent of total itinerant operations. While AIAs can be partially attributed to weather, they may be expected to increase as transient operations and operations by more sophisticated aircraft increase throughout the planning period.

Therefore, AIAs as a percentage of itinerant operations are expected to increase throughout the planning period. The projections of AIAs for Kingman Airport are summarized in **Table 2Y**.

TABLE 2Y
Annual Instrument Approaches (AIAs)
Kingman Airport

Year	Annual Instrument Approaches	Itinerant Operations	AIAs % of Itinerant Operations
2003	83	19,980	0.4%
FORECAST			
2008	136	25,100	0.5%
2013	192	32,000	0.6%
2018	262	37,400	0.7%
2023	439	43,900	1.0%

Source: Historical AIAs – FAA APO.

SUMMARY

This chapter has provided forecasts for each sector of aviation demand anticipated over the planning period. **Exhibit 2F** presents a summary of the aviation forecasts developed for Kingman Airport. The airport is expected to experience an increase in total based aircraft, annual operations, and annual enplaned passengers throughout the planning period. The next step in this study is to assess the capacity of the existing facilities to accommodate forecast demand and determine what types of facilities will be needed to meet these demands.

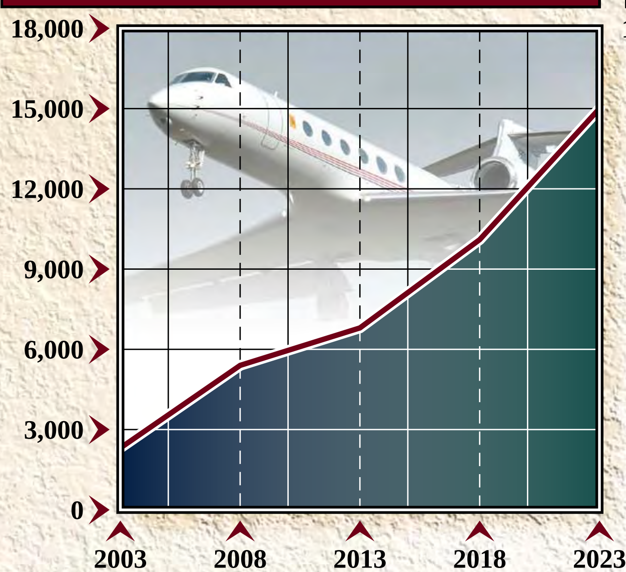
Forecasts for future enplaned air cargo have not been developed. A change in the role of air cargo service at the airport is not expected through the planning period. The airport is expected to continue to be served by feeder aircraft to regional hubs. The integrated air cargo companies are expanding their ground transportation network for cost savings. This is reducing their needs for new airport hub locations. With this understanding, it can be assumed that the airport will be served by both piston-powered and turboprop aircraft in the future. These aircraft can easily be accommodated on existing apron areas.

03MP10-2F-6/4/04

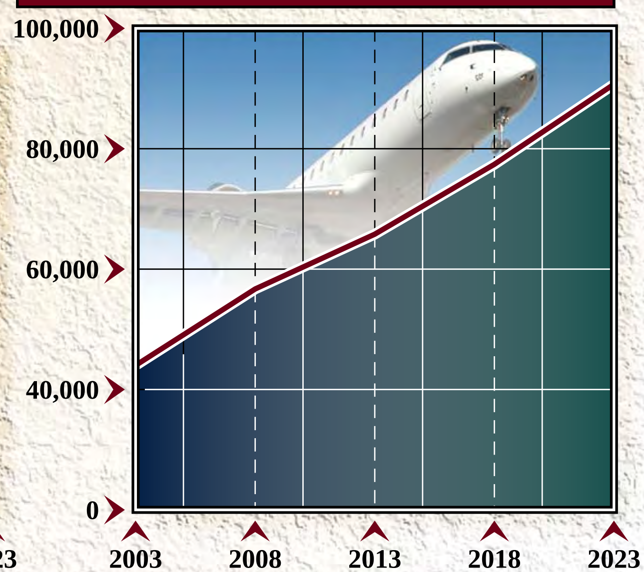
SUMMARY OF AVIATION ACTIVITY FORECASTS

CATEGORY	Historical	Forecasts 2008	2013	2018	2023
ANNUAL ENPLANEMENTS					
Airport Total	**2,313**	**5,400**	**6,800**	**10,100**	**15,000**
ANNUAL OPERATIONS					
Itinerant					
Air Carrier	1,582	2,800	2,900	3,200	3,800
Air Taxi	778	900	1,100	1,200	1,500
General Aviation	17,320	21,100	27,700	32,700	38,300
Military	300	300	300	300	300
Total Itinerant	***19,980***	***25,100***	***32,000***	***37,400***	***43,900***
Local					
General Aviation	28,000	31,600	33,800	40,000	46,800
Total Local	***28,000***	***31,600***	***33,800***	***40,000***	***46,800***
Total Operations	**47,980**	**56,700**	**65,800**	**77,400**	**90,700**
ANNUAL INSTRUMENT APPROACHES (AIAs)					
Airport Total	**83**	**136**	**192**	**262**	**439**
BASED AIRCRAFT					
General Aviation Based Aircraft					
Single-Engine	83	105	121	140	160
Multi-Engine	18	20	22	24	26
Turboprop	0	1	2	3	4
Turbojet	0	1	2	4	6
Helicopters	2	3	3	4	4
Total GA Based Aircraft	***103***	***130***	***150***	***175***	***200***
Stored Aircraft		175	175	175	175
Total Based Aircraft		**305**	**325**	**350**	**375**

ENPLANEMENTS FORECAST



OPERATIONS FORECAST



KINGMAN AIRPORT

Exhibit 2F
FORECAST SUMMARY

Chapter Three

FACILITY REQUIREMENTS

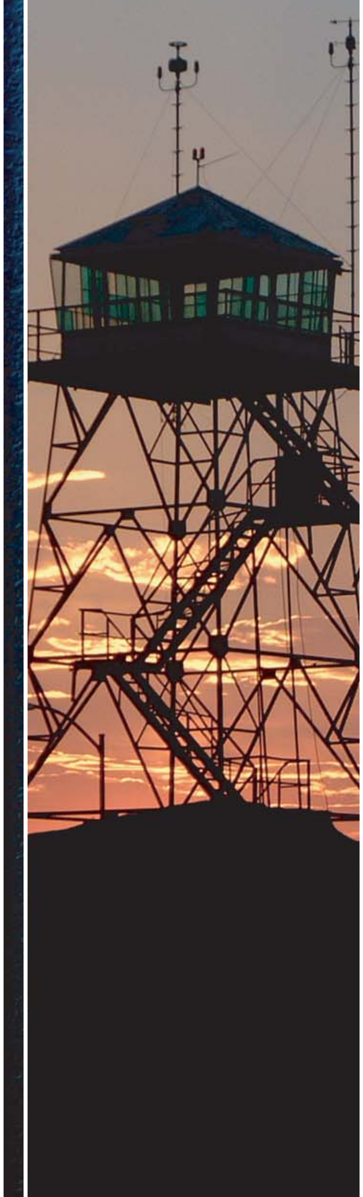
CHAPTER THREE

FACILITY REQUIREMENTS

To properly plan for the future of Kingman Airport, it is necessary to translate forecast aviation demand into the specific types and quantities of facilities that can adequately serve this identified demand. This chapter uses the results of the forecasts conducted in Chapter Two, as well as established planning criteria to determine the airfield (i.e., runways, taxiways, navigational aids, marking and lighting) and landside (i.e., hangars, terminal building, aircraft parking apron) facility requirements.

The objective of this effort is to identify, in general terms, the adequacy of the existing airport facilities, outline what new facilities may be needed, and when these may be needed to accommodate forecast demands. Having established these facility requirements, alternatives for providing these facilities will be evaluated in Chapter Four to determine the most cost-effective and efficient means for implementation.

The cost-effective, efficient, and orderly development of an airport should rely more upon actual demand at an airport than on a time-based forecast figure. In order to develop a Master Plan that is demand-based rather than time-based, a series of planning horizon milestones have been established for Kingman Airport that take into consideration the reasonable range of aviation demand projections prepared in Chapter Two. It is important to consider that the actual activity at the airport may be higher or lower than projected activity levels.



By planning according to activity milestones, the resultant plan can accommodate unexpected shifts or changes in the area's aviation demand.

The most important reason for utilizing milestones is that they allow the airport to develop facilities according to need generated by actual demand levels. The demand-based schedule provides flexibility in development, as development schedules can be slowed or expedited according to actual demand at any given time over the planning period. The resultant plan provides airport officials with a financially responsible and needs-based program. **Table 3A** presents the planning horizon milestones for each activity demand category.

TABLE 3A
Planning Horizon Activity Levels

	Historical	Short Term Planning Horizon	Intermediate Term Planning Horizon	Long Term Planning Horizon
Air Carrier Activity				
Enplaned Passengers	2,313	5,400	6,800	15,000
Annual Operations	1,582	2,800	2,900	3,800
General Aviation Activity				
Based Aircraft	112	130	150	200
Annual Operations	45,320	52,700	61,500	85,000
Air Taxi Operations	5,300	6,000	6,300	7,100
Stored Aircraft	152	175	175	175
Total Annual Operations	47,980	56,700	65,800	90,700

AIRFIELD REQUIREMENTS

Airfield requirements include the need for those facilities related to the arrival and departure of aircraft. These facilities are comprised of the following items:

- Runways
- Taxiways
- Navigational Aids
- Airfield Lighting and Marking

The adequacy of existing airfield facilities at Kingman Airport is analyzed from a number of perspectives within each of these components, including (but not limited to): airfield capacity, runway length, runway pavement strength, Federal Aviation Administration (FAA) design standards, airspace configuration, and air traffic control.

AIRFIELD CAPACITY

A demand/capacity analysis measures the capacity of the airfield facilities (i.e., runways and taxiways) in order to identify a plan for additional development needs. The capacity of the airfield is affected by several factors, including airfield layout, meteorological conditions, aircraft mix, runway use, aircraft arrivals, aircraft touch-and-go activity, and exit taxiway locations. An airport's airfield capacity is expressed in terms of its annual service volume (ASV). Annual service volume is a reasonable estimate of the maximum level of aircraft operations that can be accommodated in a year.

Pursuant to FAA guidelines detailed in the FAA Advisory Circular (AC) 150/5060-5*, Airport Capacity and Delay*, the annual service volume of a two- runway configuration normally exceeds 230,000 operations. Since the forecasts for the airport indicate that activity throughout the planning period will remain below 230,000 annual operations, the capacity of the existing airfield system will not be reached, and the airfield is expected to meet operational demands. Therefore, no additional runways are needed for capacity reasons.

RUNWAY ORIENTATION

For the operational safety and efficiency of an airport, it is desirable for the primary runway of an airport's runway system to be oriented as close as possible to the direction of the prevailing wind. This reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off (defined as a crosswind).

FAA design standards specify that additional runway configurations are needed when the primary runway configuration provides less than 95 percent wind coverage at specific crosswind components. The 95 percent wind coverage is computed on the basis of crosswinds not exceeding 10.5 knots for small aircraft weighing less than 12,500 pounds and from 13 to 16 knots for aircraft weighing over 12,500 pounds.

The airport is presently served by primary Runway 3-21 (oriented in a northeast-southwest direction) and Runway 17-35 (oriented in a north-south direction). **Table 3B** summarizes the wind coverage for the closest reporting station to Kingman Airport. As shown in the table, neither Runway 3-21 nor Runway 17-35 meet or exceed the minimum 95 percent wind coverage established by the FAA for crosswinds of 10.5 knots. Runway 3-21 meets the wind coverage requirements for crosswind components greater than 13 knots. Therefore, two runway orientations are needed at Kingman Airport. The combined wind coverage exceeds 95 percent for all crosswind components. Based on this analysis, the runway system at the airport is properly oriented to prevailing wind flows and aircraft operational safety is maximized. No additional runway orientations are needed at Kingman Airport.

TABLE 3B
Wind Coverage Summary
All-Weather Conditions

	10.5 knots	13 knots	16 knots	20 knots
Runway 3-21	93.26%	96.09%	98.59%	99.58%
Runway 17-35	88.22%	94.33%	98.35%	99.69%
Combined Coverage	97.64%	99.06%	99.71%	99.92%

Source: NOAA National Climatic Center – Asheville, North Carolina.

PHYSICAL PLANNING CRITERIA

The selection of appropriate Federal Aviation Administration (FAA) design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using or are expected to use the airport. Planning for future aircraft use is of particular importance since design standards are used to plan separation distances between facilities. These standards must be determined now since the relocation of these facilities will likely be extremely expensive at a later date.

The FAA has established a coding system to relate airport design criteria to the operational and physical characteristics of aircraft expected to use the airport. This code, the airport reference code (ARC), has two components. The first component, depicted by a letter, is the aircraft approach speed (operational characteristic); the second component, depicted by a Roman numeral, is the airplane design group and relates to aircraft wingspan (physical characteristic). Generally, aircraft approach speed applies to runways and runway-related facilities, while aircraft wingspan primarily relates to separation criteria involving taxiways, taxilanes, and landside facilities.

According to FAA Advisory Circular 150/5300-13, *Airport Design*, an aircraft's approach category is based upon 1.3 times its stall speed in landing configuration at that aircraft's maximum certificated weight. The five approach categories used in airport planning are as follows:

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

The airplane design group (ADG) is based upon the aircraft's wingspan. The six ADGs used in airport planning are as follows:

Group I: Up to but not including 49 feet.
Group II: 49 feet up to but not including 79 feet.

Group III: 79 feet up to but not including 118 feet.
Group IV: 118 feet up to but not including 171 feet.
Group V: 171 feet up to but not including 214 feet.
Group VI: 214 feet or greater.

Exhibit 3A provides a listing of typical aircraft and their associated ARC. The FAA advises designing airfield facilities to meet the requirements of the airport's most demanding aircraft, or critical aircraft. In order to determine facility requirements, an ARC should first be determined, and then appropriate airport design criteria can be applied. This begins with a review of aircraft currently using the airport and those expected to use the airport through the planning period.

Kingman Airport is currently used by a wide variety of aircraft, ranging from aircraft used for scheduled airline service to general aviation recreational aircraft, general aviation business aircraft, and a limited number of helicopters. Helicopters are not included in this determination as they are not assigned an ARC.

Commercial Aircraft

The primary aircraft used for scheduled airline service is the 19-seat Beechcraft 1900 turboprop aircraft. This aircraft falls within ARC B-II. The aviation demand forecasts noted the potential to shift to larger turboprop and regional jet aircraft as the air service market expands. Larger seating capacity turboprops include the DeHavilland Dash-8 (ARC B-III), Bombardier Q series of aircraft (ARC B-III) and Embraer and Canadair regional jets (ARC C-II).

For planning purposes, an increase in the size of air cargo aircraft is anticipated. While a forecast of enplaned air cargo has not been prepared, enplaned air cargo can be expected to grow through the planning period as the local economy grows and new industries are developed in the region. It is expected that air cargo service would continue to be regional in nature, with feeder cargo aircraft continuing to serve nearby hub airports. This would limit the size of aircraft to multi-engine piston and turboprop aircraft. A wide variety of piston engine and turboprop aircraft could be used in air cargo service; however, it is not expected that this would include aircraft larger than ARC B-II.

Taking into consideration the potential changes in scheduled airline and air cargo aircraft, the critical commercial aircraft are expected to fall within ARC C-II. This accounts for the potential introduction of regional jet aircraft in the market.

General Aviation

General aviation aircraft using the airport include small single and multi-engine aircraft, which fall within approach categories A and B and ADG I, and business turboprop and jet aircraft, which fall within approach categories B, C, and D and ADGs I and II. The majority of based aircraft fall within ARC A-I and ARC B-I. Representative based aircraft include the Cessna 210 and Beechcraft Bonanza.

A wide range of transient business jets operate at the airport. These include aircraft within the Cessna Citation family of business jets, Gulfstream business jets, Learjet, and Raytheon jet aircraft. Based upon data available from the FAA, there were an estimated 300 operations by business jet aircraft in 2003.

When compared with the single and multi-engine piston aircraft, and business turboprop aircraft, business jets are the most demanding general aviation aircraft to operate at the airport. This is due to their longer wing span, higher approach speed, and higher landing and takeoff weights. Therefore, business jet aircraft comprise the critical design aircraft for the general aviation segment of activity at the airport. Presently, the critical business jets fall within ARC C-II. The aviation demand forecasts projected business jet activity to increase through the planning period. Therefore, it is expected that activity within Approach Category D would increase in the future.

Stored Aircraft

A business located on the airport provides aircraft maintenance and storage services to the airline and air cargo industry. In 2003, there were approximately 152 aircraft stored at Kingman Airport. This included a wide range of aircraft, from turboprop aircraft within ARC B-II to large transport jet aircraft in ARC C-III, C-IV. It is expected in the future that large transport aircraft would continue to be part of the storage and maintenance mix. For stored aircraft, the critical design aircraft is ARC C-III. This covers the DC-9, MD-80, and 737 series aircraft.

Critical Design Aircraft Conclusion

For planning purposes, stored aircraft up to ARC C-III define the airport's critical aircraft. These are the largest and most demanding aircraft to operate at the airport. While these aircraft conduct only limited operations at the airport, their wingspan and landing gear configurations are vastly different than the remaining segments of activity at the airport. The wingspan and landing gear configurations of the transport aircraft become critical for the proper separation distances between the runway and taxiways, and taxiways and landside facilities. The landing gear configurations and width between landing gear struts contributes to the design width of the runways and taxiways. Business jets share the same approach speeds with the larger transport jets that will use the airport for storage and maintenance activities. Some larger business jets such as the Global Express and Gulfstream V fall within ADG III.

ARC C-III design requirements have been applied to Kingman Airport since the 1991 Master Plan. This review of the critical design aircraft confirms the need to continue to plan airfield facilities to ARC C-III.

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A-I

- Beech Baron 55
- **Beech Bonanza**
- Cessna 150
- Cessna 172
- Piper Archer
- Piper Seneca

C-I, D-I

- **Lear** 25, **35**, 55
- Israeli Westwind
- HS 125

B-I less than 12,500 lbs.

- Beech Baron 58
- Beech King Air 100
- Cessna 402
- **Cessna 421**
- Piper Navajo
- Piper Cheyenne
- Swearingen Metroliner
- Cessna Citation I

C-II, D-II

- **Gulfstream** II, III, **IV**
- Canadair 600
- Canadair Regional Jet
- Lockheed JetStar
- Super King Air 350

B-II less than 12,500 lbs.

- **Super King Air 200**
- Cessna 441
- DHC Twin Otter

C-III, D-III

- Boeing Business Jet
- B 727-200
- **B 737-300 Series**
- MD-80, DC-9
- Fokker 70, 100
- A319, A320
- Gulfstream V
- Global Express

B-I, II over 12,500 lbs.

- Super King Air 300
- Beech 1900
- Jetstream 31
- Falcon 10, 20, 50
- Falcon 200, 900
- **Citation** II, **III**, IV, V
- Saab 340
- Embraer 120

C-IV, D-IV

- **B-757**
- B-767
- DC-8-70
- DC-10
- MD-11
- L1011

A-III, B-III

- DHC Dash 7
- **DHC Dash 8**
- DC-3
- Convair 580
- Fairchild F-27
- ATR 72
- ATP

D-V

- **B-747** Series
- B-777

Note: Aircraft pictured is identified in bold type.

KINGMAN AIRPORT

Exhibit 3A
AIRPORT REFERENCE CODES

Runway 3-21 provides the greatest length at the airport and presently serves as the primary runway for large aircraft. This runway should ultimately consider ARC C-III design requirements. The wind analysis indicated that a crosswind runway was needed for crosswind components to 10.5 knots. This includes aircraft through ARC B-II. Therefore, ARC B-II planning standards should be used in the ultimate design and construction of crosswind Runway 17-35.

The design of taxiway and apron areas should consider the wingspan requirements of the most demanding aircraft to operate within that specific functional area on the airport. The airfield taxiways and main transient apron area should consider ADG III design requirements to accommodate the wingspan requirements of business jet aircraft. Other transient general aviation apron and aircraft maintenance and repair hangar areas should consider ADG II requirements to accommodate larger piston and turboprop aircraft, as well as typical business jet aircraft. T-hangar and small conventional hangar areas should consider ADG I requirements as these commonly serve smaller single and multi-engine piston aircraft.

AIRFIELD SAFETY STANDARDS

The FAA has established several imaginary surfaces to protect aircraft operational areas and keep them free from obstructions that could affect the safe operation of aircraft. These include the object free area (OFA), obstacle free zone (OFZ), runway protection zone (RPZ), and runway safety area (RSA).

The OFA is defined as "a two-dimensional ground area surrounding runways, taxiways, and taxilanes, which is clear of objects except for objects whose location is fixed by function." The RSA is "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 from the runway." The OFZ is a "defined volume of airspace centered above the runway centerline whose elevation is the same as the nearest point on the runway centerline and extends 200 feet beyond each runway end." The RPZ is a two-dimensional trapezoidal-shaped surface located along the extended runway centerline to protect people and property on the ground. The FAA expects these areas to be under the control of the airport and free from obstructions.

The dimensional requirements for ARC-III are summarized on **Table 3C** and **Exhibit 3B**. A cursory review of these design requirements at Kingman Airport indicates that these design requirements are fully met. A project in 2003 improved the Runway 3-21 RSA to meet ARC C-III standards. Design standards will be more fully reviewed within the Alternatives Analysis (Chapter Four).

The current RPZ requirements are met on existing airport property. The alternatives analysis will examine future RPZ land acquisition needs considering the design standard and upgraded instrument approach recommendations of this Master Plan.

TABLE 3C **Airfield Safety Area Dimensional Standards (ft.)**	C-III
Runway Safety Area	
Width	400
Length Beyond Runway End	1,000
Object Free Area	
Width	800
Length Beyond Runway End	1,000
Precision Object Free Area	
Width	800
Length Beyond Runway End	200
Obstacle Free Zone	
Width	400
Length Beyond Runway End	200
Source: FAA Airport Design Software Version 4.2D, Change 7 to AC 150/5300-13	

Runway Length

Runway length requirements are based upon five primary elements: airport elevation, the mean maximum daily temperature of the hottest month, runway gradient, critical aircraft type expected to use the runway, and the stage length of the longest non-stop trip destination.

Aircraft performance declines as elevation, temperature, and runway gradient factors increase. For calculating runway length requirements at Kingman Airport, elevation is 3,446 feet above mean sea level (MSL); the mean maximum daily temperature of the hottest month is 97.1 degrees Fahrenheit. Runway end elevations vary by 17 feet (Runway 3-21) and 89 feet (Runway 17-35).

In examining runway length requirements at the airport, the primary runway should be designed to accommodate the most demanding aircraft currently serving the airport, as well as aircraft expected to serve the airport in the future. Business jets will be the most demanding aircraft for runway length determinations at the airport. These aircraft are most likely desiring to operate at maximum payload to carry both passengers and fuel to their destination. While the stored aircraft are critical for design standard considerations, these aircraft will rarely be operating at maximum takeoff weights, as they will not be carrying passengers or cargo.

Business jets are most affected by the existing runway length, especially during the warm summer months when payload must be reduced to meet takeoff requirements. Business jets may reduce payload at the airport during the warm summer months to be able to depart on the available runway lengths at the airport. Long term facility planning should consider providing additional runway length for longer stage length flights should

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EXISTING	SHORT TERM NEED	LONG TERM NEED
RUNWAYS		
Runway 3-21 ARC C-II • 6,831' x 150' 45,000 SWL • 85,000 DWL 125,000 DTWL • 265,000 DDTWL ***Runway Safety Area*** 200' each side of runway centerline 1,000' beyond each runway end ***Object Free Area*** 400' each side of runway centerline 1,000' beyond each runway end ***Runway Protection Zone Each End*** Inner Width - 500' • Outer Width - 1,010' Length - 1,700'	Runway 3-21 ARC C-III • 6,831' x 150' 45,000 SWL • 85,000 DWL 125,000 DTWL • 265,000 DDTWL ***Runway Safety Area*** 200' each side of runway centerline 1,000' beyond each runway end ***Object Free Area*** 400' each side of runway centerline 1,000' beyond each runway end ***Runway Protection Zone Each End*** Inner Width - 500' • Outer Width - 1,010' Length - 1,700'	Runway 3-21 ARC C-III • 7,000' x 150' 45,000 SWL • 85,000 DWL 125,000 DTWL • 265,000 DDTWL ***Runway Safety Area*** 250' each side of runway centerline 1,000' beyond each runway end ***Object Free Area*** 400' each side of runway centerline 1,000' beyond each runway end ***Precision Object Free Area*** 400' each side of runway centerline 200' beyond each runway end ***Runway Protection Zone Primary End*** Inner Width - 1,000' • Outer Width - 1,750' Length - 2,500' ***Runway Protection Zone Other End*** Inner Width - 500' • Outer Width - 1,010' Length - 1,700'
Runway 17-35 ARC B-II • 6,725' x 75' 22,000 SWL • 60,000 DWL ***Runway Safety Area*** 75' each side of runway centerline 300' beyond each runway end ***Object Free Area*** 250' each side of runway centerline 300' beyond each runway end ***Runway Protection Zone Each End*** Inner Width - 500' • Outer Width - 700' Length - 1,000'	Runway 17-35 ARC B-II • 6,725' x 75' 22,000 SWL • 60,000 DWL ***Runway Safety Area*** 75' each side of runway centerline 300' beyond each runway end ***Object Free Area*** 250' each side of runway centerline 300' beyond each runway end ***Runway Protection Zone Each End*** Inner Width - 500' • Outer Width - 700' Length - 1,000'	Runway 17-35 ARC B-II • 6,725' x 75' 22,000 SWL • 60,000 DWL ***Runway Safety Area*** 75' each side of runway centerline 300' beyond each runway end ***Object Free Area*** 250' each side of runway centerline 300' beyond each runway end ***Runway Protection Zone Each End*** Inner Width - 500' • Outer Width - 700' Length - 1,000'
TAXIWAYS		
Runway 3-21 Full-length Parallel Taxiway A - 75' wide 522.5' from runway centerline Taxiway D1 - 150' wide Taxiway D2 - 75' wide Taxiway D3 - 75' wide Taxiway D4 - 150' wide	Runway 3-21 Full-length Parallel Taxiway A - 75' wide 522.5' from runway centerline Taxiway D1 - 150' wide Taxiway D2 - 75' wide Taxiway D3 - 75' wide Taxiway D4 - 150' wide **Add Exit Taxiways**	Runway 3-21 Full-length Parallel Taxiway A - 75' wide **Relocate to 400' from runway centerline** Taxiway D1 - 150' wide Taxiway D2 - 75' wide Taxiway D3 - 75' wide Taxiway D4 - 150' wide **Reserve for east full-length parallel taxiway**
Runway 17-35 Partial Parallel Taxiway C - 75' wide 522.5' from runway centerline Taxiway C1 - 150' wide Taxiway A - 75' wide Taxiway B - 75' wide	Runway 17-35 Partial Parallel Taxiway C - 75' wide 522.5' from runway centerline Taxiway C1 - 150' wide Taxiway A - 75' wide Taxiway B - 75' wide **Taxiway Access to Industrial Park**	Runway 17-35 Taxiway C - 75' wide **/ Extend to Runway 35 End** **Relocate to 400' from runway centerline** Taxiway C1 - 150' wide **Add Exit Taxiways** **Reserve for east full-length parallel taxiway** Taxiway A - 75' wide Taxiway B - 75' wide **/ Extend to the west** Taxiway Access to Industrial Park
HELICOPTER OPERATIONS		
(2) Helicopter Parking Positions Along Taxiway C	(2) Helicopter Parking Positions Along Taxiway C **Transient Helipad on Main Apron** **Hardstands on Main Apron**	(2) Helicopter Parking Positions Along Taxiway C Transient Helipad on Main Apron Hardstands on Main Apron

KEY

SWL - Single wheel loading
DWL - Dual wheel loading
DTWL - Dual-tandem wheel loading
DDTWL - Double dual-tandem wheel loading

Exhibit 3B
AIRCRAFT OPERATIONAL
AREA REQUIREMENTS

that be needed by specific operators at the airport. The appropriate planning category for ARC C-III is 75 percent of large aircraft at 90 percent useful load. As shown in **Table 3D**, a runway length of 7,000 feet is recommended for this category. Therefore, long term facility planning should consider an ultimate runway length of 7,000 feet for Runway 3-21.

The 1991 Master Plan and current Airport Layout Plan (ALP) depict an ultimate length of 10,000 feet on Runway 3-21. While the entire 10,000 feet cannot be justified at this time based on the existing and projected fleet mix, consideration could be given to reserving airport property to accommodate this length of runway in the future so that this property is not developed for other uses. Reserving property for a 10,000-foot runway provides flexibility in the types of businesses and operators that the airport can market to in the future. Additionally, since the ultimate length of the runway impacts airspace planning as defined in 14 CFR Part 77, and used in local height and hazard zoning, reserving the potential for a 10,000-foot runway can ensure that the surrounding communities do not construct buildings or towers that would obstruct a 10,000-foot runway approach surfaces should the need for this runway length materialize in the future. The alternatives analysis will consider the design requirements for both a 7,000-foot primary runway length, as well as a 10,000-foot ultimate runway length on Runway 3-21.

The appropriate planning category for Runway 17-35 is "Small airplanes with 10 or more passenger seats". Additional runway length is not needed on Runway 17-35 since this runway currently exceeds the minimum 5,300 feet of length recommended by the FAA.

TABLE 3D
Runway Length Requirements

AIRPORT AND RUNWAY DATA	
Airport elevation	3,446 feet
Mean daily maximum temperature of the hottest month	97.1° F
Maximum difference in runway centerline elevation	89 feet
Length of haul for airplanes of more than 60,000 pounds	500 miles
RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN	
Small airplanes with 10 or more passenger seats	5,300 feet
Large airplanes of 60,000 pounds or less	
75 percent of large airplanes at 60 percent useful load	7,000 feet
100 percent of large airplanes at 60 percent useful load	9,200 feet

Reference: FAA's airport design computer software utilizing Chapter Two of AC 150/5325-4A, *Runway Length Requirements for Airport Design*, no changes included.

Runway Width

Runway width is primarily determined by the planning ARC for the particular runway. FAA design standards specify a minimum width of 150 feet for Runway 3-21 (ADG III), while a minimum of 75 feet should be provided for Runway 17-35 (ADG II). Each runway currently meets the standard established by the FAA and should satisfy future needs with normal maintenance.

Pavement Strength

The most important feature of airfield pavement is its ability to withstand repeated use by aircraft of significant weight. The current strength rating on Runway 3-21 is 45,000 pounds single wheel loading (SWL), 85,000 pounds dual wheel loading (DWL), 125,000 pounds dual tandem wheel loading (DTWL), and 265,000 pounds double dual tandem wheel loading (DDTWL). Runway 17-35 has a current strength rating of 22,000 pounds SWL and 60,000 pounds DWL. The current strength ratings on both runways are sufficient for the fleet of aircraft currently serving, and expected to serve the airport in the future.

TAXIWAYS

Taxiways are constructed primarily to facilitate aircraft movements to and from the runway system. Some taxiways are necessary simply to provide access between the aprons and runways, whereas other taxiways become necessary as activity increases at an airport to provide safe and efficient use of the airfield.

Design standards for separation between the runways and parallel taxiways are based upon the wingspan of the critical aircraft using the runway. Since this varies between the two runways, different standards apply. Runway 3-21 is served by full-length parallel Taxiway D. Taxiway D is 75 feet in width, which exceeds the 50 feet required for ARC C-III. The runway/taxiway centerline separation of 522.5 feet exceeds the requirements for ARC C-III. Consideration may be given to relocating Taxiway D to the minimum 400-foot separation distance defined in FAA design standards when a major rehabilitation of this taxiway is needed. This could allow for the development of additional aircraft parking. This will be examined in the alternatives analysis.

While ARC B-II design standards apply to Runway 17-35, aircraft through ADG III may utilize Taxiway C. Therefore, ADG III design standards should be retained for Taxiway C similar to Taxiway D. Taxiway C is currently 75 feet wide and located 538 feet from the Runway 17-35 centerline. Similar to Taxiway D, the existing width and separation distances exceed FAA design standards. Consideration may be given to relocating Taxiway C to the minimum 400-foot separation distance defined in FAA design standards, when a major rehabilitation of this taxiway is needed. This will be examined in the alternatives analysis, as will the extension of Taxiway C to the Runway 35 end.

The type and frequency of runway entrance/exit taxiways can affect the efficiency and capacity of the runway system. Right-angled exits require an aircraft to be nearly stopped before exiting the runway. Acute-angled (high-speed) exits allow aircraft to slow to a safe speed, without stopping, before exiting the runway. Additional connecting taxiways (at a minimum of 50 feet in width) should be considered. This will be examined more closely in the alternatives analysis.

Taxiway B currently extends along the southern edge of the apron. Facility planning should include extending this taxiway to the west to allow airfield access to the western portions of airport property. While not needed for airfield capacity, full-length parallel taxiways should be considered on the southeast and south sides of Runway 3-21 and Runway 17-35, respectively. Future landside development on the east side of the airport may require airfield access. Planning for a parallel taxiway for these runways will ensure that future landside facilities developed in these areas consider the separation distances needed for this taxiway. Consideration for taxiway access to the adjacent industrial park should also be considered.

HELIPADS

The airport does not have a designated helipad on the main apron area. Helicopters utilize the same areas as fixed-wing aircraft. Helicopter and fixed-wing aircraft should be segregated to the extent possible. Facility planning should include establishing a designated transient helipad at the airport. Helipads are available along the Bureau of Land Management (BLM) area. These helipads should be maintained through the planning period.

NAVIGATIONAL AND APPROACH AIDS

Navigational aids are electronic devices that transmit radio frequencies which properly equipped aircraft and pilots translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft flying to or from Kingman Airport include the Kingman very high frequency omnidirectional range (VOR) facility, global positioning system (GPS), and Loran-C. These systems are sufficient for navigation to and from the airport; therefore, no other navigational aids are needed at the airport.

Instrument Approach Procedures

Instrument approach procedures have been established for the airport using the VOR and GPS navigational aids. Instrument approach procedures consist of a series of predetermined maneuvers established by the FAA for navigation during inclement weather conditions. The current instrument approach procedures only provide course guidance information to the pilot.

Appendix 16 of FAA AC 150/5300-13, *Airport Design*, Change 7, details the minimum airport landing surface requirements that must be met prior to the establishment of a new instrument approach procedure. This appendix details the requirements for three types of instrument approach procedures: precision instrument approaches, approach procedures with vertical guidance (APV), and nonprecision approaches. While both the precision instrument and APV will provide descent and course guidance information, the precision approach provides the best approach minimums (visibility less than 3/4 mile and 200-foot cloud ceilings). The APV can provide similar visibility minimums, but cloud ceiling minimums only to 250 feet. The APV is applicable to any approach using GPS. Nonprecision approaches can provide for approaches with visibility minimums less than 3/4 mile and 300-foot cloud ceilings.

Since both course guidance and descent information is desirable for an instrument approach to Kingman Airport and GPS does not require the installation of costly navigation equipment at the airport, both a precision GPS approach and an APV approach should be planned for Kingman Airport. The Arizona Department of Transportation - Aeronautics Division's (ADOT), *Navigational Aids and Aviation Services Special Study*, supported the development of a precision approach to Runway 21 at Kingman Airport. APV approaches should be planned for the remaining runway ends.

A review of Appendix 16 indicates that the existing airport site can support an APV with visibility minimums of one mile and cloud ceilings as low as 300 feet. Lower visibility and cloud ceiling minimums would require an approach lighting system and precision runway markings. These lighting and marking improvements will be detailed later within this chapter.

AIRFIELD MARKING, LIGHTING, AND SIGNAGE

There are a number of lighting and pavement marking aids serving pilots using the Kingman Airport. These lighting and marking aids assist pilots in locating the airport during night or poor weather conditions, as well as assist in the ground movement of aircraft. **Exhibit 3C** summarizes the existing lighting aids and presents future requirements.

Identification Lighting

The location of an airport at night is universally indicated by a rotating beacon. The rotating beacon at the airport is located south of Taxiway A near the center of the runway system. The rotating beacon is sufficient and should be maintained in the future.

Runway and Taxiway Lighting

Both runways are equipped with medium intensity runway lighting (MIRL), which will be adequate through the planning period. Parallel Taxiways A, C, and D are equipped with medium intensity taxiway lighting (MITL). Taxiway B has no light-

EXISTING	SHORT TERM NEED	LONG TERM NEED
INSTRUMENT APPROACH PROCEDURES		
VOR/DME Runway 21 1 mile visibility, 400' cloud ceiling minima Approach Categories A, B, and C 1.25 mile visibility, 400' cloud ceiling minima Approach Category D **GPS Runway 3** 1 mile visibility, 500' cloud ceiling minima Approach Categories A and B 1.25 mile visibility, 500' cloud ceiling minima Approach Category C 1.5 mile visibility, 500' cloud ceiling minima Approach Category D **GPS Runway 21** 1 mile visibility, 400' cloud ceiling minima Approach Categories A, B, and C 1.25 mile visibility, 400' cloud ceiling minima Approach Category D	**No Changes**	**Precision Approach** Runway 21 Approach Categories A, B, C, and D One-Half Mile Visibility Minimum 200' Cloud Ceilings **Straight-in GPS Approach** Runway 17-35 Approach Categories A, B, C, and D 1 mile visibility minimum 400' cloud ceilings
AIRFIELD LIGHTING AND MARKINGS		
Rotating Beacon Pilot Controlled Lighting Runway 3-21 Medium Intensity Runway Edge Lighting Medium Intensity Taxiway Edge Lighting Lighted Runway/Taxiway Directional Signage Precision Approach Path Indicator - 4 Runway 3 and Runway 21 Runway End Identifier Lights Runway 3 and Runway 21 Nonprecision Runway Markings Distance Remaining Signs Runway 17-35 Medium Intensity Runway Edge Lighting Medium Intensity Taxiway Edge Lighting Lighted Runway/Taxiway Directional Signage Precision Approach Path Indicator - 2 Runway 17 and Runway 35 Basic Runway Markings	Rotating Beacon Pilot Controlled Lighting Runway 3-21 Medium Intensity Runway Edge Lighting Medium Intensity Taxiway Edge Lighting Lighted Runway/Taxiway Directional Signage Precision Approach Path Indicator - 4 Runway 3 and Runway 21 Runway End Identifier Lights Runway 3 and Runway 21 Nonprecision Runway Markings Distance Remaining Signs Runway 17-35 Medium Intensity Runway Edge Lighting Medium Intensity Taxiway Edge Lighting Lighted Runway/Taxiway Directional Signage Precision Approach Path Indicator - 2 Runway 17 and Runway 35 **Runway End Identifier Lights** **Runway 17 and Runway 35** Basic Runway Markings	Rotating Beacon Pilot Controlled Lighting Runway 3-21 Medium Intensity Runway Edge Lighting Medium Intensity Taxiway Edge Lighting Lighted Runway/Taxiway Directional Signage Precision Approach Path Indicator - 4 Runway 3 and Runway 21 **MALSR - Runway 21** Runway End Identifier Lights Runway 3 **Precision Runway Markings** Distance Remaining Signs Runway 17-35 Medium Intensity Runway Edge Lighting Medium Intensity Taxiway Edge Lighting Lighted Runway/Taxiway Directional Signage Precision Approach Path Indicator - 2 Runway 17 and Runway 35 Runway End Identifier Lights Runway 17 and Runway 35 **Nonprecision Runway Markings**
OTHER FACILITIES		
Lighted Wind Indicator Segmented Circle Wind Tee Automated Surface Observation System (ASOS) Remote Communications Outlet (RCO)	Lighted Wind Indicator Segmented Circle Wind Tee Automated Surface Observation System (ASOS) Remote Communications Outlet (RCO)	Lighted Wind Indicator Segmented Circle Wind Tee Automated Surface Observation System (ASOS) Remote Communications Outlet (RCO)

KEY

VOR - Very High Frequency Omni-directional Rang Facility
GPS - Global Positioning System
DME - Distance Measuring Equipment
MALSR - Medium Intensity Approach Lighting System with Runway Alignment Indicator Lighting

KINGMAN AIRPORT

Exhibit 3C
AIRFIELD SUPPORT REQUIREMENTS

ing. Future planning should include the addition of MITL on Taxiways B.

Distance Remaining Signs

Runway 3-21 is equipped with lighted distance remaining signs that notify pilots of the available runway length. These are sufficient through the planning period, although they would need to be relocated if the runway is extended.

Airfield Signs

Airfield signage provides another means of notifying pilots as to their location on the airport. A system of signs placed at several airfield intersections on the airport is the best method available to provide this guidance. Signs located at intersections of taxiways provide crucial information to avoid conflicts between moving aircraft. Directional signage instructs pilots as to the location of taxiways and terminal aprons. At Kingman Airport, all signs installed at the taxiway and runway intersections are lit.

Visual Approach Lighting

In most instances, the landing phase of any flight must be conducted in visual conditions. To provide pilots with visual guidance information during landings to the runway, electronic visual approach aids are commonly provided at airports. A four-light precision approach path indicator (PAPI-4L) is installed on the approach ends of Runway 3-21, while a two-light precision approach slope indicator (PAPI-2L) is installed on the approach ends of Runway 17-35. The PAPIs are appropriate for the mix of aircraft operating at the airport and should be maintained through the planning period.

Runway End Identification Lighting

Runway end identifier lights (REILs) are flashing lights that facilitate identification of the runway end. REILs are installed on each end of Runway 3-21. As REILs provide pilots with the ability to identify the runway ends and distinguish the runway end lighting from other lighting on the airport and in the approach areas, REILs should be planned for each end of Runway 17-35.

Approach Lighting

Approach lighting systems provide the basic means to transition from instrument flight to visual flight for landing. No approach lighting system is presently installed at the airport. A future precision approach to Runway 21 would require the installation of a medium intensity approach lighting system with runway alignment lighting (MALSR). This would replace the REILs currently installed at the Runway 21 end.

Pilot-Controlled Lighting

Kingman Airport is equipped with pilot-controlled lighting (PCL). PCL allows pilots to control the intensity of runway lighting using the radio transmitter in the aircraft. PCL also provides for more efficient use of airfield lighting energy. A PCL system turns the airfield lights off or to a lower intensity when not in use. Similar to changing the intensity of the lights, pilots can turn up the lights using the radio transmitter in the aircraft. This system should be maintained through the planning period.

Pavement Markings

In order to facilitate the safe movement of aircraft about the field, airports use pavement markings, lighting, and signage to direct pilots to their destinations. Runway markings are designed according to the type of instrument approach available on the runway. FAA Advisory Circular 150/5340-1H, *Marking of Paved Areas on Airports*, provides the guidance necessary to design airport markings.

Runway 3-21 is marked as a nonprecision runway, while Runway 17-35 has basic/visual markings. If the airport secures a precision instrument landing system (ILS), then precision markings would be required on Runway 3-21. Nonprecision markings will be required on 17-35 should GPS approaches ultimately be established to this runway.

Taxiway and apron areas also require marking. Yellow centerline stripes are currently painted on all taxiway surfaces at the airport to provide this guidance to pilots. The apron areas also have centerline markings to indicate the alignment of taxilanes within these areas. Besides routine maintenance of the taxiway striping, these markings will be sufficient through the planning period.

Aircraft hold positions must all continue to be marked. By June 9, 2007, Kingman Airport will be required to have installed internally-illuminated holding position signs.

WEATHER REPORTING

The airport has a lighted wind cone and wind tee that provide pilots with information about wind conditions. A segmented circle provides traffic pattern information to pilots. These facilities are required when the airport is not served by a 24-hour ATCT. These facilities are sufficient and should be maintained in the future.

The airport is equipped with an Automated Surface Observing System (ASOS), which provides automated aviation weather observations 24 hours per day. The system updates weather observations every minute, continuously reporting significant weather changes as they occur. The ASOS system reports cloud ceiling, visibility, temperature, dew point, wind direction, wind speed, altimeter setting (barometric pressure), and density altitude (airfield elevation corrected for temperature). The ASOS should be maintained through the planning period.

COMMUNICATIONS FACILITIES

Kingman Airport is equipped with a remote communications outlet (RCO) that provides pilots with a direct communication link to the Prescott Flight Service Station. This communication link facilitates the opening and closing of flight plans and should be maintained in the future.

AIR TRAFFIC CONTROL

Kingman Airport does not have an operational airport traffic control tower (ATCT); therefore, no formal terminal air traffic control services are available at the airport.

The establishment of a fully-funded ATCT, staffed and maintained by FAA personnel, follows guidance provided in FAA Handbook 7031.2C, *Airway Planning Standard Number One - Terminal Air Navigation Facilities and Air Traffic Control Services*. To be identified as a possible candidate for an ATCT, the sum of the following formula must be greater than or equal to one. The formula is as follows:

AC +	AT +	GAI +	GAL +	MI +	ML =	X
38,000	90,000	160,000	280,000	48,000	90,000	

Where:

AC	=	Air Carrier Operations
AT	=	Air Taxi Operations
GAI	=	General Aviation Itinerant Operations
GAL	=	General Aviation Local Operations
MI	=	Military Itinerant Operations
ML	=	Military Local Operations

Using current activity levels and those forecast activity levels prepared in Chapter Two, it is expected that Kingman Airport would not qualify as a possible candidate for a fully-funded FAA ATCT due to the levels of air traffic at the airport. At 2003 activity levels, the sum of the formula above is 0.24. At long term planning horizon levels, the sum is 0.44.

Facility planning should include identifying and reserving a location for the future development of a tower, should a tower be required in the future or the community wish to participate in the FAA Contract Tower program.

LANDSIDE REQUIREMENTS

Landside facilities are those necessary for handling aircraft, passengers, and freight while on the ground. These facilities provide the essential interface between the air and ground transportation modes. The capacities of the various components of each area were examined in relation to projected demand to identify future landside facility needs.

TERMINAL AREA REQUIREMENTS

Components of the terminal area complex include the terminal apron, vehicle parking area, and the various functional elements within the terminal building. This section identifies the terminal area facilities required to meet the airport's needs throughout the planning period.

The requirements for the various terminal complex functional areas were determined with the guidance of FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*. The consultant's database for space requirements was also considered.

Facility requirements were developed for the planning period based upon the forecast enplanement levels. It should be noted that actual need for construction of facilities will be based upon enplanement levels rather than a forecast year. It is also important to note the impact that increased security is placing on facility requirements. Future requirements will include increased areas for the queuing of passengers and additional security screening equipment. The various functional areas of the terminal building are summarized as follows:

- **Ticketing -** includes estimates of the space necessary for the queuing of passengers at ticket counters, the linear footage of ticket counters, and the space necessary to accommodate baggage make-up and airline ticket offices.
- **Departure Facilities -** includes estimates of the space necessary for departure holdroom and the number of aircraft gate positions. Holdroom space and gate positions in excess of the requirements presented in the exhibit are frequently necessary to accommodate individual airline demands.
- **Baggage Claim -** includes estimates of the linear footage of baggage claim needed and space for passengers to claim baggage.
- **Rental Cars -** includes estimates of space necessary for the queuing of passengers at rental car counters, the space necessary for rental car offices, and the linear footage for rental car counters.
- **Concessions -** includes estimates of the space necessary to provide adequate concession services such as restaurant and retail facilities.
- **Security Screening -** includes estimates of the amount of space required to accommodate passenger screening devices, the queuing of passengers, and security officers' office area.
- **Public Waiting Lobby -** includes estimates of the amount of space

to accommodate arriving and departing passengers.

- **Terminal Area Automobile Parking -** space required for long-term and short-term public parking, employee parking, and rental car parking.

- **Terminal Curb Frontage** - includes estimates of the linear footage of curb required to accommodate the queuing of enplaning and deplaning passenger vehicles. At Kingman Airport, the length of the terminal curb frontage is a function of the length of the terminal building.

The methodology utilized in the analysis of the passenger terminal building involved the design hour passenger demands and a comparison of these requirements with existing terminal facilities. The evaluation process includes the major terminal building areas that are normally affected by peaking characteristics. **Exhibit 3D** depicts the existing square footage space available in the existing terminal building and compares it to the anticipated needs for each of the planning horizon levels.

As evidenced on the exhibit, a larger terminal building will be needed at the airport should enplanement levels grow. Currently, the existing terminal building is without a dedicated baggage claim and is not sufficiently sized to accommodate the secure hold room. Given the age of the building and the need to considerably increase the square-footage of the building, a replacement building must be considered. The alternatives analysis will examine the optimal location for the terminal building and its configuration.

GENERAL AVIATION REQUIREMENTS

The purpose of this section is to determine the landside space requirements for general aviation hangar and apron parking facilities during the planning period. In addition, the total surface area needed to accommodate general aviation activities throughout the planning period is estimated.

HANGARS

The demand for aircraft storage hangars typically depends upon the number and type of aircraft expected to be based at the airport. For planning purposes, it is necessary to estimate hangar requirements based upon forecast operational activity. However, hangar development should be based on actual demand trends and financial investment conditions.

Utilization of hangar space varies as a function of local climate, security, and owner preferences. The trend in general aviation aircraft, whether single or multi-engine, is in more sophisticated (and, consequently, more expensive) aircraft. Therefore, many hangar owners prefer hangar space to outside tiedowns. The climate of the regional area causes most aircraft owners to prefer inside storage. Presently, the majority of aircraft owners currently keep their aircraft in enclosed hangar space.

Future hangar requirements for the airport are summarized on **Exhibit 3E**. Future hangar requirements were developed with the assumption that a majority of aircraft owners would prefer enclosed storage and that the percentage of aircraft within enclosed hangar facilities would increase through the planning period. T-hangar requirements were determined by providing 1,200 square feet of space for aircraft within each T-hangar space. Conventional hangar space was determined by providing 1,200 square feet for single engine aircraft and 3,000 square feet for multi-engine aircraft. A larger portion of the aircraft projected for enclosed aircraft storage were anticipated to be located within conventional (clearspan) hangars, as is the current trend at the airport. For this analysis, the hangars used for large aircraft maintenance were removed from the analysis since the use of these facilities is not related to general aviation activity.

As indicated on the exhibit, additional hangar space is expected to be required through the planning period. The alternatives analysis will examine options available for hangar development at the airport and determine the best location for each type of hangar facility.

AIRCRAFT PARKING APRON

A parking apron should be provided for at least the number of locally-based aircraft that are not stored in hangars, as well as transient aircraft. There are approximately 166 tiedowns available for both based and transient aircraft at the airport. Although the majority of future based aircraft were assumed to be stored in an enclosed hangar, a number of based aircraft will still tie down outside.

Along with based aircraft parking needs, transient aircraft parking needs must also be considered in determining apron requirements. Kingman Airport accommodates a significant level of transient activity annually.

Total apron area requirements were determined by applying a planning criterion of 800 square yards per transient aircraft parking position and 500 square yards for each locally-based aircraft parking position. Transient business jet positions were determined by applying a planning criterion of 1,600 square yards for each transient business jet position. The results of this analysis are presented on **Exhibit 3E**. Based upon the planning criteria above and assumed transient and based aircraft users, the existing apron areas should be sufficient through the planning period. Additional apron area in excess of these needs may be needed as new hangar areas are developed on the airport which are not contiguous with the existing apron areas.

The tiedown spaces and apron area not used for general aviation activity are currently used for aircraft storage. This is expected to continue through the planning period. Additional heavy aircraft parking areas should be pro-

	EXISTING	ENPLANEMENTS 5,400	6,800	15,000
TICKETING				
Counter Length (l.f.)	6	8	8	10
Counter Area (s.f.)	225	250	250	300
Ticket Lobby (s.f.)	82	200	200	300
Airline Operations/Bag Make-Up (s.f.)	144	200	250	300
DEPARTURE FACILITIES				
Aircraft Gates	1	1	1	1
Security Stations	1	1	1	1
Holdroom Area (s.f.)	---	200	300	450
BAGGAGE CLAIM				
Claim Display (l.f.)	0	5	5	10
Baggage Claim Lobby (s.f.)	0	200	250	350
TERMINAL SERVICES				
Rental Car				
Counter Length (l.f.)	5	5	7	10
Office Area (s.f.)	100	200	300	400
Counter Queue Area (s.f.)	100	100	150	300
Food/Beverage (s.f.)	910	900	1,200	1,500
Retail (s.f.)	0	100	100	200
Restrooms (s.f.)	135	100	150	300
PUBLIC LOBBY				
Seating/Greeting/Farewell Area (s.f.)[1]	443	500	550	600
AIRPORT/ADMINISTRATION/OFFICE SPACE	**0**	**1,200**	**1,500**	**2,000**
SUBTOTAL PROGRAMMED AREA	**2,139**	**4,150**	**5,200**	**7,000**
General Circulation	0	800	900	1,300
Mech./Elec., Maint., & Storage (s.f.)	501	600	700	1,000
TOTAL TERMINAL BUILDING	**2,640**	**5,550**	**6,800**	**9,300**
AUTO PARKING				
Public Parking	54	54	54	74
Rental Car	18	18	18	18
Total Auto Parking	**72**	**72**	**72**	**92**

[1] Included in public lobby space

KINGMAN AIRPORT

Exhibit 3D

PASSENGER TERMINAL BUILDING REQUIREMENTS

03MP10-3E-6/7/04

AIRCRAFT STORAGE HANGARS (General Aviation Aircraft)

	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
Aircraft to be Hangared	73	91	113	160
T-Hangars	48	59	73	104
Conventional Hangars	25	32	39	56
Hangar Area Requirements				
T-Hangar Area (s.f.)	50,000	71,000	87,800	124,800
Conventional Hangar Storage Area (s.f.)	100,912	118,400	120,300	144,000
Total Hangar Area (s.f.)	150,912	189,400	208,100	268,800

AIRCRAFT PARKING APRON (General Aviation Aircraft)

	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
Single, Multi-engine Transient Aircraft Positions	---	22	24	35
Apron Area (s.y.)	---	17,400	19,000	27,800
Transient Business Jet Positions	---	2	4	4
Apron Area (s.y.)	---	3,900	6,700	6,200
Locally-Based Aircraft Positions	---	39	37	40
Apron Area (s.y.)	---	25,400	24,100	26,000
Total Positions	166	63	65	79
Total Apron Area (s.y.)	260,000	46,700	48,700	60,000

	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
General Aviation Terminal Facilities (s.f.)	---5,400	6,300	7,900	
General Aviation Automobile Parking	112	112	112	150
Other Facilities		Aircraft Wash Rack Airport Maintenance Building ARFF Station		Covered Aircraft Owner's Maintenance Facility/Wash Rack

ARFF - Airport Rescue & Firefighting

KINGMAN AIRPORT

Exhibit 3E
LANDSIDE FACILITY REQUIREMENTS

vided along the sides of the closed runway. This involves a technique of soil stabilization that does not require the expense of asphalt or concrete pavement.

GENERAL AVIATION TERMINAL FACILITIES

General aviation terminal facilities have several functions separate from those of the airline terminal building. Space is required for passengers waiting, pilots' lounge and flight planning, concessions, management, storage, and various other needs. This space is not necessarily limited to a single, separate terminal building, but also includes the space offered by fixed base operators for these functions and services.

The methodology used in estimating general aviation terminal facility needs was based on the number of airport users expected to utilize general aviation facilities during the design hour. General aviation space requirements were then based upon providing 120 square feet per design hour itinerant passenger. **Exhibit 3E** outlines the general aviation space requirements for general aviation terminal services at Kingman Airport. There is no dedicated general aviation terminal at Kingman Airport, although this function may be included in the future passenger terminal building configuration.

SUPPORT REQUIREMENTS

Various facilities that do not logically fall within classifications of airfield, terminal building, or general aviation facilities have been identified for inclusion in this Master Plan. Facility requirements have been identified for these remaining facilities:

- Aircraft Wash Facility
- Perimeter Fencing and Access Gates
- Airport Maintenance
- Utilities
- 14 CFR Part 139

Aircraft Wash Facility

Presently, there is not a designated aircraft wash facility on the airport. Consideration should be given to establishing an aircraft wash facility at the airport to collect aircraft cleaning fluids used during the cleaning process.

Other airports have combined an aircraft owner maintenance facility with the wash facility. This typically has involved covering the wash rack area. These areas typically provide for the collection of used aircraft oil and other hazardous materials and provide a covered area for aircraft washing and light maintenance. The development of a similar facility at Kingman Airport could reduce environmental exposure and provide an additional revenue source, which could be used to offset development costs.

Perimeter Fencing and Access Gates

The entire runway and taxiway system, along with the main apron areas, are enclosed with six-foot chain link fencing with three-strand barbed wire on top. This fencing was installed in 2003, along with automated vehicle access gates, which are operated by a keypad. These fencing systems are sufficient through the planning period.

Airport Maintenance Building

Presently, there is not a dedicated airport maintenance facility. Airport maintenance personnel utilize an existing T-hangar for equipment storage. Consideration should be given to developing a maintenance facility for the storage of maintenance equipment and to provide work areas for airport maintenance employees. Grant funding can be obtained for a 1,500 square-foot maintenance building.

Utilities

Electrical, water, natural gas, and sanitary sewer services are available at the airport. No information collected during the inventory effort revealed any deficiencies in providing electrical, water, or sanitary sewer services at the airport. Therefore, it is assumed that all future infrastructure needs for these services will be sufficiently met. Airside fire hydrants are needed for fire protection.

14 CFR Part 139 Certification Requirements

14 CFR Part 139, *Certification and Operations: Land Airports Serving Certain Air Carriers*, as amended, prescribes the rules governing the certification and operation of land airports which serve any scheduled or unscheduled passenger operation of an air carrier that is conducted with an aircraft having a seating capacity of more than 30 passengers. Presently, Kingman Airport is certificated under 14 CFR Part 139. New FAA rulemaking will require changes to the 14 CFR Part 139 program at Kingman Airport.

The new 14 CFR Part 139 regulations are effective June 9, 2004, and extend certification requirements to airports serving scheduled air carrier operations in aircraft with 10-30 seats. Kingman Airport is served by 19-seat air carrier aircraft, which requires compliance with these new rules.

Under the changes to the Part 139 requirements, there would be four classes of airports: Classes I, II, III, and IV. Airports serving all types of scheduled operations of large air carrier aircraft, and any other type of air carrier operations, would be known as Class I airports. Class II airports would be those airports that serve scheduled operations of small air carrier aircraft (10-30 seats) and unscheduled operations of larger air carrier aircraft (more than 30 seats). Class III airports would be those airports that serve only scheduled operations of air carrier aircraft with 10-30 seats. Class IV airports would be those airports serving only unscheduled air carrier operations in aircraft with more than 30 seats. These designations are shown in **Table 3E**. The current air carrier aircraft operating at the airport would require that Kingman Airport comply with Class III of the regulation. Should the air carrier aircraft change to include aircraft with more than 30 passenger seats, the airport would be required to comply with Class I of the regulation.

TABLE 3E
Proposed Part 139 Airport Classifications

	Proposed Airport Class			
Type of air carrier operation	**Class I**	**Class II**	**Class III**	**Class IV**
Scheduled Large Air Carrier Aircraft	X			
Unscheduled Large Air Carrier Aircraft	X	X		X
Scheduled Small Air Carrier Aircraft	X	X	X	

The rulemaking establishes the following dates for compliance:

- June 9, 2005: Class II, III and IV airports must submit Airport Certification Manuals to FAA for approval.
- June 9, 2005: At least one training supervisor with each fueling agent must be trained in fire safety prior to this date.
- June 9, 2006: Class II, III and IV airports must submit an Airport Emergency Plan to FAA.
- June 9, 2007: Class II, III and IV airports must comply with the requirements of 14 CFR 139.319-ARFF Operations.

Because Kingman Airport currently maintains a limited operating certificate under 14 CFR Part 139, it must be capable of providing standby equipment and personnel for aircraft rescue and firefighting to air carrier aircraft for any air carrier operations. Kingman Airport's existing rescue and firefighting capabilities satisfy the requirements of Index A (although the ARFF vehicle has been grandfathered under existing rulemaking until it can be replaced). Future airport plans should maintain Index A requirements and include replacing the existing ARFF vehicle. A new ARFF building should also be planned to allow for expanded equipment storage and personnel quarters as needed.

AIRPORT ACCESS

Primary access to the airport is provided from Historic Route 66 (Andy Devine Avenue) via Mohave Airport Drive. The intersection of Mohave Airport Drive and Andy Devine Boulevard is signalized. Directional signage is available from Interstate 40. Besides routine maintenance and pavement improvements, the existing roadway access to the airport should be capable of supporting aviation-related growth at the airport. Expansion of roadways and new roadway development at the airport will be a function of future development at the airport.

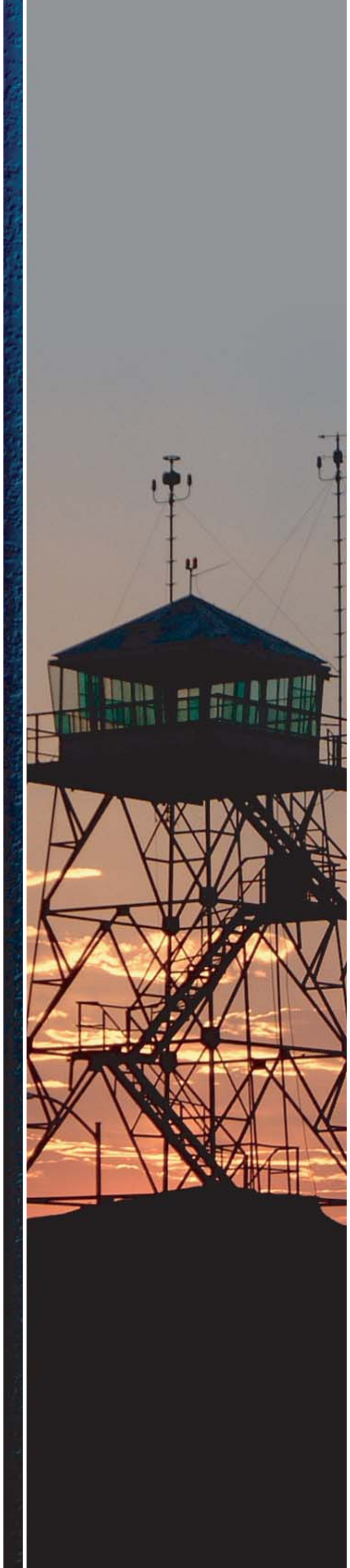
SUMMARY

The intent of this chapter has been to outline the facilities required to meet potential aviation demands projected for the airport through the planning horizon. The next step is to develop a direction for implementation that will best meet these projected needs. The remainder of the master plan will be devoted to outlining this direction, its schedule, and costs.

Chapter Four

AIRPORT DEVELOPMENT ALTERNATIVES

AIRPORT DEVELOPMENT ALTERNATIVES



Prior to defining the development program for Kingman Airport, it is important to consider development potential and constraints at the airport. The purpose of this chapter is to consider the actual physical facilities which are needed to accommodate projected demand and meet the program requirements as defined in Chapter Three, Aviation Facility Requirements.

In this chapter, a series of airport development scenarios are considered for the airport. In each of these scenarios, different physical facility layouts are presented for the purposes of evaluation. The ultimate goal is to develop the underlying rationale which supports the final Master Plan recommendations. Through this process, an evaluation of the highest and best uses of airport property is made while considering local goals, physical constraints, and appropriate federal airport design standards, where appropriate.

Any development proposed by a Master Plan evolves from an analysis of projected needs. Though the needs were determined by the best methodology available, it cannot be assumed that future events will not change these needs. The master planning process attempts to develop a viable concept for meeting the needs caused by projected demands through the planning period.

The alternatives presented in this chapter have been developed to meet the overall program objectives for the airport in a balanced manner. Through coordination with the Planning Advisory Committee (PAC),

the public, and the Kingman Airport Authority (KAA), the alternatives (or combination thereof) will be refined and modified as necessary to develop the recommended development program. Therefore, the alternatives presented in this chapter can be considered a beginning point in the development of the recommended Master Plan development program, and input will be necessary to define the resultant development program.

NON-DEVELOPMENT ALTERNATIVES

Non-development alternatives include the no action or "do nothing" alternative, transferring service to an existing airport, or developing an airport at a new location.

NO ACTION ALTERNATIVE

The no action or "do-nothing" alternative essentially considers keeping the airport in its present condition and not providing for any type of improvement to the existing facilities. The primary result of this alternative would be the inability of the airport to satisfy the projected aviation demands of the airport service area.

Kingman Airport and the adjacent industrial park are an important contributor to the economic development of the regional area. The airport is a transportation link to other regional and national economic centers. Not improving Kingman Airport to meet its commercial and general aviation needs could limit economic growth for the region.

Kingman Airport is a federally designated essential air service market. This allows the air carrier serving the airport to receive an operating subsidy from the federal government in return for guarantees for scheduled service. This is done to ensure the community maintains the important transportation link noted above. Not maintaining the airfield in good working order and improving the safety of the airfield or operations would not be consistent with this federal program or community economic goals.

The general aviation industry has experienced an extended period of adjustment over the last 20 years, but it is now seen as a growth industry once more. While overall, general aviation growth will be slow, the demand for higher performance aircraft is experiencing the strongest rate of growth. With heightened interest in security due to the recent terrorist attacks in the United States, corporate general aviation could expect demand for private executive aircraft to grow even more. Although some restrictions (i.e., Transportation Security Administration [TSA] rulemaking) may work to counter-balance some of this growth, Kingman Airport's role as a strategically located airport requires that it be in a position to respond to anticipated demands for improved facilities for the reasons stated above.

SERVICE FROM ANOTHER EXISTING AIRPORT

Service from another existing airport essentially considers relying on other airports to serve aviation demand for the local area. As detailed in Chapter One, there are only three public use airports within 40 nautical miles of Kingman Airport: Laughlin/Bullhead International Airport, Sun Valley Airport, and Eagle Airpark. Only Laughlin/Bullhead International Airport provides similar aviation capabilities to Kingman Airport. Therefore, while Laughlin/Bullhead International Airport could reasonably be expected to serve the aviation users of Kingman Airport, Laughlin/Bullhead International Airport is located nearly 40 miles west and would not be in a good position to serve the City of Kingman and regional area. Laughlin/Bullhead International Airport is also not considered an essential air service market. This would mean a loss in air service guarantees for the community.

Sun Valley Airport and Eagle Airpark have shorter runways and lower pavement strengths than Kingman Airport. Neither of these airports is capable of serving commercial airline service. Considering the current capability of these regional airports, none of these airports is presently configured to provide the level of service provided at Kingman Airport, without significant investments.

CONSTRUCTING A NEW AIRPORT

Theoretically, another option to be considered is constructing a new airport. This is usually considered when the airport site is constrained by environmental or physical factors. However, Kingman Airport currently encompasses nearly 3,000 acres. The Kingman Airport Industrial Park encompasses nearly 1,000 acres.

From the social, political, and environmental standpoints, the commitment of a new large land area to replace Kingman Airport must also be considered. The development of a new airport similar to Kingman Airport would likely take 10 to 15 years to become a reality. The potential exists for significant environmental impacts associated with disturbing a large land area when developing a new airport site. To develop a new site with the capabilities of Kingman Airport could easily cost over $50 million and would not provide the strategic location that the Kingman Airport does today to the City of Kingman. Furthermore, the Kingman Airport is an integral component and supporting facility for the adjacent Kingman Airport Industrial Park. Replacing the airport could reduce the marketability of this important economic contributor to the local economy and the ability of the industrial park to grow.

Overall, transferring service to an existing airport in the region or to an entirely new facility are unreasonable alternatives that should not be pursued further at this time. Kingman Airport is a valuable asset to the economic dynamics of the regional area. It should be developed to the extent practicable to maintain and promote commerce in the area.

AIRPORT DEVELOPMENT OBJECTIVES

It is the overall objective of this effort to produce a balanced airside and landside complex to serve forecast aviation demands. However, before defining and evaluating specific alternatives, the development objectives of this Master Plan should be considered. The primary goal for the Master Plan is to define a development concept which allows for the airport to be marketed, developed, and safely operated for the betterment of the community and its users. With this in mind, the following development objectives have been defined for this planning effort:

1. Develop a safe, attractive, and efficient aviation facility in accordance with applicable federal, state, and local regulations.

2. Identify facilities to efficiently and securely accommodate commercial airline activity.

3. Identify facilities to efficiently serve general aviation users.

4. Identify the necessary improvements that will provide sufficient airside and landside capacity to accommodate the long term planning horizon level of demand of the area.

5. Target local economic development through the development of available property and support of the adjacent Kingman Airport Industrial Park, including identifying a potential expansion of the industrial park to the south and east.

6. Maintain and operate the airport in compliance with applicable environmental regulations, standards, and guidelines.

The remainder of this chapter will describe various development alternatives for the airside and landside facilities. Within each of these components, specific facilities are required or desired. Although each component is treated separately, the final plan will integrate the individual requirements so that they complement one another.

AIRFIELD ALTERNATIVES

Airfield facilities are, by nature, the focal point of the airport complex. Because of their primary role and the fact that they physically dominate airport land use, airfield facility needs are often the most critical factor in the determination of viable airport development alternatives. In particular, the runway system requires the greatest commitment of land area and often imparts the greatest influence of the identification and development of other airport facilities. Furthermore, aircraft operations dictate the FAA design criteria that must be considered when looking at airfield improvements. These criteria, depending upon the areas around the airport, can often have a significant impact on the viability of various alternatives designed to meet airfield needs.

The issues to be considered in this analysis are summarized on **Exhibit 4A**. The issues are summarized by functional use categories, which include: airfield and landside uses. These issues are the result of the findings of the Aviation Demand Forecasts and Aviation Facility Requirements evaluations, and include input from the PAC and KAA.

Kingman Airport serves each component of the air transportation industry: air carrier, air cargo, general aviation, and military. This requires accommodating a wide range of aircraft, from small single-engine aircraft used for recreational purposes to commercial airline and air cargo turboprops and some business jets. The airport also accommodates large transport aircraft which are stored and maintained at the airport.

Due to the airport's elevation and summertime temperatures, some of the operations of the larger aircraft are limited. The facility requirements analysis indicated a need for up to 7,000 feet of length on Runway 3-21 to serve business aircraft. To ensure that the airport can take advantage of future growth opportunities that may require a longer runway, the Master Plan is considering the potential to provide up to 10,000 feet of length on Runway 3-21.

Improved instrument approach capability is also a need for Kingman Airport, which serves scheduled airline and air cargo activities. The capabilities of the existing instrument approaches at the airport are limited. These most capable approaches (Global Positioning System [GPS] Runway 21 approach and VOR/DME Runway 21 approach) only provide for landings when cloud ceilings are higher than 400 feet above the ground and visibility is greater than one mile for aircraft with approach speeds less than 140 knots. For aircraft with higher approach speeds, visibility minimums are increased by one-quarter mile.

Chapter Three identified that Runway 21 should ultimately have a Category (CAT) I precision approach. A precision instrument approach would increase the amount of time that the airport is accessible as landings could be made when the cloud ceilings are as low as 200 feet above the ground and visibility is restricted to one-half mile. This increases the reliability of the airport, which aids in improving and maintaining commercial airline and air cargo services that need to maintain a schedule regardless of weather conditions. Business and corporate users also desire this type of capability for their travel planning.

The precision approach could be developed with the standard instrument landing system (ILS) equipment or GPS once the Wide Area Augmentation System (WAAS) is fully CAT I capable after 2015. Achieving lower approach minimums will require the installation of an approach lighting system, such as the medium intensity approach lighting system with runway alignment indicator lights (MALSR), precision runway markings, and a larger runway protection zone (RPZ). Straight-in GPS approaches with vertical navigation are planned for Runways 17 and 35.

New exit taxiways are considered for both Runway 3-21 and Runway 17-35 to reduce runway occupancy time after landing. While not needed for capacity, consideration is being given to providing taxiway access to the south and east portions of the airport. This would provide future airfield access from these areas of the airport. Identifying the location of these taxiways now will reserve the area needed for the taxiways and prevent that area from being developed for other reasons, which could cause a costly relocation at a later date.

A consolidation of the existing and future long term aircraft storage needs at the airport is depicted on the airfield alternatives. Presently, there are approximately 150 stored commercial airline aircraft at Kingman Airport located in several areas of the airport. This Master Plan anticipates needing as many as 175 storage positions. Stored aircraft include a range of turboprops and large transport aircraft. The large transport aircraft are stored along the closed runway and near Kingman Airline Services. The turboprop aircraft are stored on the existing apron area. The turboprop aircraft currently utilize portions of the main apron area adjacent to future development parcels. Should these parcels be developed with a user requiring apron area, it may be desirable to relocate and consolidate the stored aircraft in a more remote area of the airport. The configuration that is depicted on the alternatives is in use at other airports with a large number of stored commercial aircraft. In this concept, long taxilanes are developed parallel to each other. The aircraft are placed nose-to-tail along the taxiway. The configuration shown allows for as many as seven large transport category aircraft to be stored along the taxiway.

AIRFIELD ALTERNATIVE A

Airfield Alternative A is presented on **Exhibit 4B**. This alternative extends Runway 3-21 3,169 feet southwest for an ultimate length of 10,000 feet. The extension would cross a major drainage channel on the south side of the airport.

The location and configuration of the MALSR and RPZ needed to accommodate a precision instrument approach to Runway 21 is shown on Airfield Alternative A. The acquisition of approximately 78 acres of land along the northeastern airport boundary is shown to accommodate the MALSR light standards and RPZ.

Two additional exit taxiways for Runway 3-21 are shown as means to re-

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AIRFIELD CONSIDERATIONS

- Provide for Runway 3-21 to ultimately be 10,000 feet long
- Provide for additional exit taxiways on Runway 3-21 and Runway 17-35
- Relocate Taxiway A 400 feet from the Runway 3-21 centerline
- Provide for a taxiway access south of Runway 3-21
- Relocate Taxiway C 400 feet from the Runway 17-35 centerline
- Provide for a taxiway access east of Runway 17-35
- Provide for a precision instrument approach to Runway 21
- Provide for straight-in GPS approaches to Runways 17 and 35

LANDSIDE CONSIDERATIONS

- Identify potential locations for taxiway access to the industrial park
- Identify potential locations for a helipad and helicopter parking positions on the main apron
- Identify potential locations for a new commercial airline passenger terminal building
- Identify potential locations for new hangar development to meet long term needs.
- Identify potential locations for the development of an aircraft wash rack and tenant maintenance shelter.
- Identify potential locations for a dedicated airport maintenance building.
- Identify potential locations for a new Airport Rescue and Firefighting (ARFF) building
- Identify locations for large aircraft storage
- Consider expansion of the Airport Industrial Park on the south and east portions of the airport

KINGMAN AIRPORT

Exhibit 4A
ALTERNATIVE DEVELOPMENT CONSIDERATIONS

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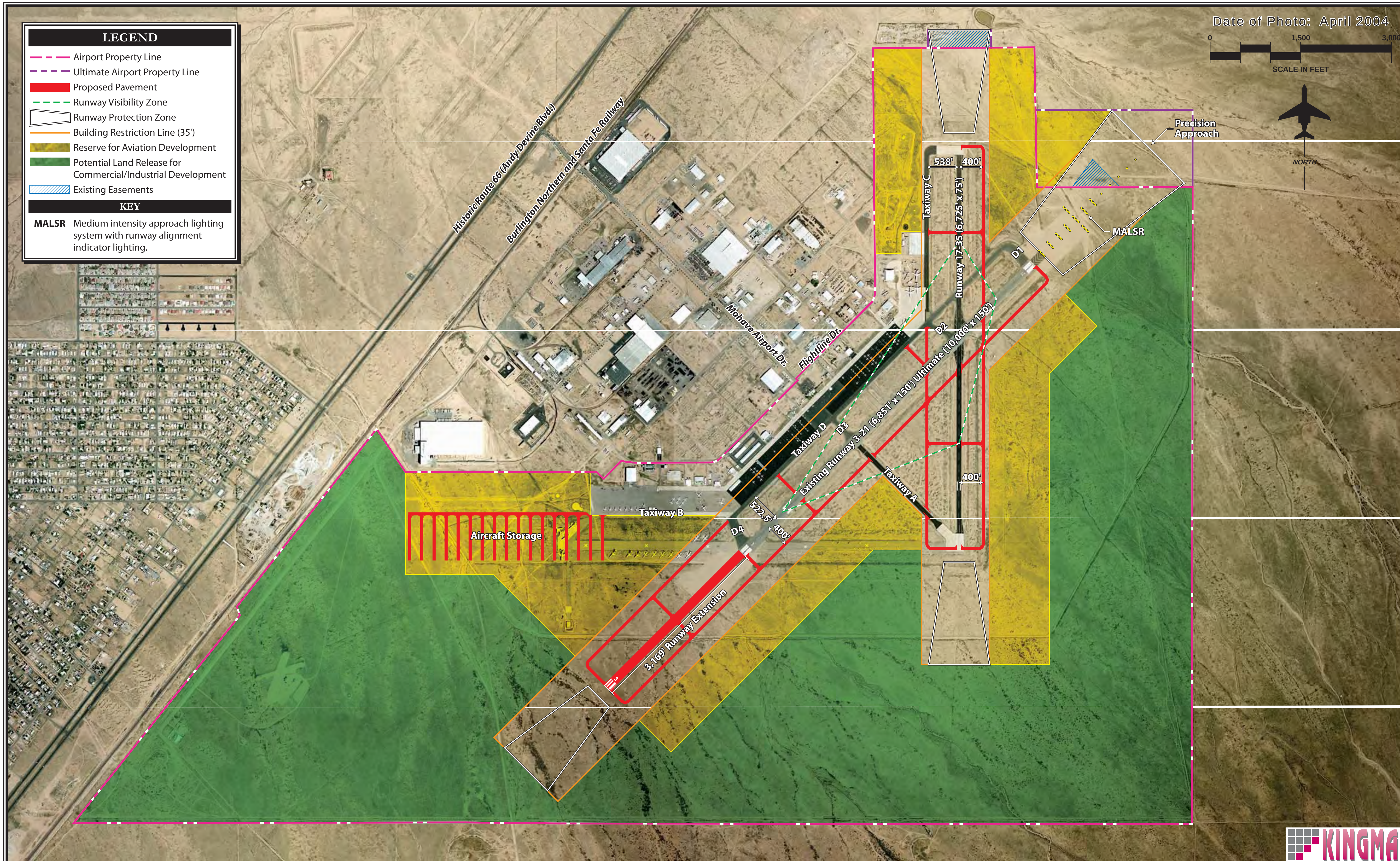

Exhibit 4B
AIRFIELD ALTERNATIVE A

duce runway occupancy time. The first taxiway is planned between Taxiway D3 and Taxiway D4. This taxiway is located approximately 1,400 feet northeast of the existing Runway 3 threshold and 5,500 feet southwest of the Runway 21 threshold. This taxiway is expected to allow 92 percent of aircraft over 12,500 pounds landing Runway 21 to exit before reaching the Runway 3 end. The second exit taxiway is planned approximately 2,500 feet southwest of the Runway 21 end and approximately 4,400 feet northeast of the Runway 3 end. This taxiway will allow 100 percent of single engine aircraft landing Runway 21 to exit before reaching Taxiway D3 and 50 percent of aircraft over 12,500 pounds to exit before reaching the Runway 3 end.

Taxiway C is extended to the Runway 35 end in this alternative. This is an improvement shown in the previous Master Plan to provide direct access to the Runway 35 end. To access the Runway 35 end now, aircraft must use Taxiway D to Taxiway D3 and follow Taxiway A to the Runway 35 end. A full-length parallel taxiway also allows for the development of an exit taxiway between the Runway 35 end and the Runway 3-21/Runway 17-35 intersection. An exit taxiway is needed in this area at the airport as aircraft currently cannot exit until reaching the runway intersection and Taxiway D2. A new exit taxiway midway between the Runway 3-21/Runway 17-35 intersection and the Runway 17 end is also planned to allow more aircraft to exit the runway before reaching the runway end.

While extending Taxiway C to the Runway 35 end would provide a more direct route to this runway end, the ultimate need for direct taxiway access may be determined by the type of landside development north of the existing apron area. It is assumed that most aircraft located on the existing main apron area and along Taxiway B would continue to utilize the combination of Taxiways D, D3, and A to reach the Runway 35 end since a parallel taxiway would not serve these portions of the airport. Therefore, the parallel taxiway would be most beneficial for aircraft located along the existing length of Taxiway C which extends north of Runway 3-21. Considering that the area west of the existing portion of Taxiway C is a former landfill site, future development is limited and may never occur, perhaps limiting the need for a full-length parallel taxiway west of Runway 17-35.

Airfield Alternative A depicts a full-length parallel taxiway southeast of Runway 3-21 and east of Runway 17-35. These taxiways would serve future aviation development south and east of the existing runway system.

Airfield Alternative A proposes the long term aircraft storage area west of Taxiway B. This configuration provides for an extension of Taxiway B to the west with the aircraft storage taxilanes extending to the south. In this configuration, the storage taxilanes could be developed as needed for demand. These taxilanes do not necessarily need to be paved. Other airports with similar storage configurations use various soil stabilization methods that do not require paving. Soil stabilization techniques were used in the past at Kingman Airport to create the existing large aircraft storage pads along the closed runway.

A final consideration is examining the ability to increase the size of the Kingman Airport Industrial Park. The existing industrial park has been developed quite successfully over the past several years. The industrial park has limited multi-acre parcels available for development. Therefore, the expansion of the industrial park may ultimately be warranted. The aviation needs of the region will not require the use of all the existing airport property to the south and east of the runway system. Furthermore, much of this land area is located too far from the runway to allow for airfield access. Therefore, the KAA may consider pursuing a release of this land from federal obligations for expansion of the industrial park in the same manner that the existing industrial park area was released from federal obligations in 1979. The industrial park provides an important economic contribution in terms of employment and tax revenues to the community. The area available for a future land release is illustrated in green shading on the exhibit. This is the area that would be available after reserving 1,500 feet on each side of Runway 3-21 and Runway 17-35 for aviation development. Up to 1,500 feet is typically needed from the runway centerline for apron, hangar, automobile parking, and access road development.

AIRFIELD ALTERNATIVE B

Airfield Alternative B is shown on **Exhibit 4C**. In contrast with Airfield Alternative A, Runway 3-21 is extended 3,169 feet northeast for an ultimate length of 10,000 feet. The extension would cross the Frees Wash to the north, but would move the extension away from a planned residential community along the airport's southern border. The extension requires the acquisition of approximately 180 acres of land. A precision approach (with associated MALSR) is shown to the Runway 21 end to accommodate the extended MALSR lighting standards and precision RPZ.

Presently, Taxiway C and Taxiway D are located 538 feet and 522.5 feet from Runway 17-35 and Runway 3-21 centerlines, respectively. Federal Aviation Administration (FAA) design standards allow for the taxiways to be located as close as 400 feet from the runway centerline. This alternative relocates these taxiways to allow for increased apron area along Taxiway D and additional landside development along Taxiway C. An additional 20,000 square yards of apron is available by relocating Taxiway D. This additional apron is essentially the result of converting portions of existing Taxiway D to apron. Taxiway D currently extends along the eastern edge of the main apron area. An additional 13,800 square yards of area available for apron development is created along the relocated Taxiway C.

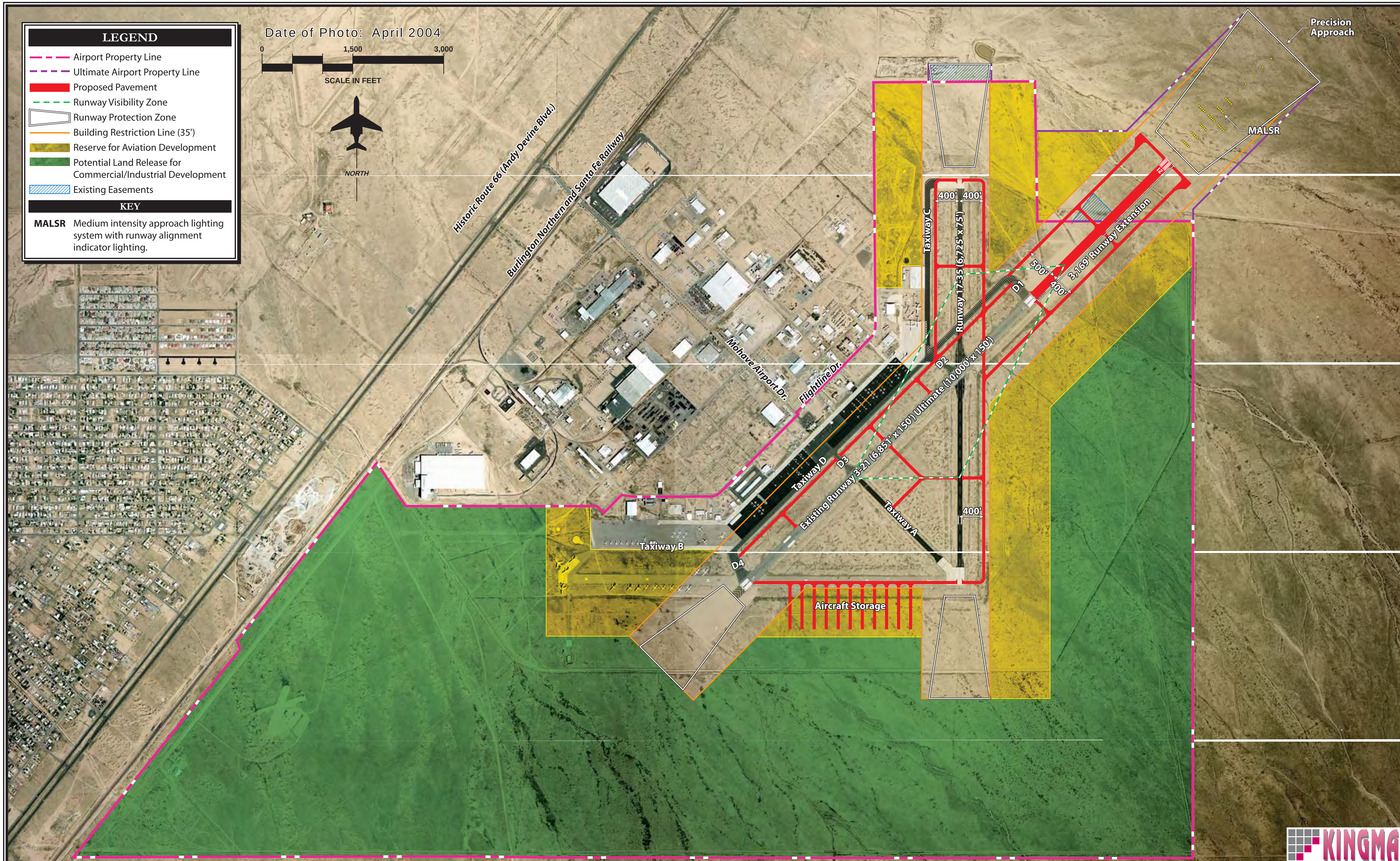

Exhibit 4C
AIRFIELD ALTERNATIVE B

The proposed Runway 3-21 exit taxiway locations in this alternative are the same as in Airfield Alternative A. However, a full-length parallel taxiway southeast of Runway 3-21 is not retained in this alternative. The intent of the full-length parallel taxiway shown in Alternative A was to provide access from the southern portions of the airport to the Runway 17 and Runway 21 ends. However, this taxiway was somewhat redundant to the full-length parallel taxiway east of Runway 17-35 which already provided access to the northern runway ends. Therefore, this alternative creates a series of partial parallel taxiways and new taxiway extensions to allow aircraft from the south and east portions of the airport to access the Runway 17 and 21 ends without the need for a full-length parallel taxiway southeast of Runway 3-21.

In this alternative, a partial parallel taxiway is located southeast of Runway 3-21. This taxiway would extend from the existing closed runway to the Runway 3 end. The portion of the closed taxiway between Runway 3 and Runway 35 would be rebuilt and converted to taxiway. This taxiway would connect the south and east sides of the airport. A full-length parallel taxiway east of Runway 17-35 would provide access for the east side of the airport. A partial parallel taxiway to the Runway 21 end would extend between the Runway 17-35 east parallel taxiway and the Runway 21 end.

Converting the closed runway to a taxiway reduces some potential developable property on the airport. Airfield Alternative A had shown that aviation-related development could extend into the area between Runway 17-35 and Runway 3-21 along Taxiway A. Converting the closed runway to taxiway would eliminate this possibility as the area north of the new taxiway would not have vehicle access.

An exit taxiway between the Runway 35 end and the Runway 3-21/Runway 17-35 intersection is an important improvement. This alternative provides for this taxiway to extend to the west and turn northwest to intersect Taxiway D. A connection to Taxiway A is also planned. This taxiway would allow aircraft to land Runway 35 and taxi directly to the main apron area.

The aircraft storage area is shown to be developed along the new taxiway developed on the closed runway alignment between the Runway 3 end and the Runway 35 end. Potential area for land release and ultimate aviation reserve are also shown on this alternative.

LANDSIDE ALTERNATIVES

The landside alternatives consider a number of facility needs related to commercial airline, general aviation, and support activities at the airport.

PASSENGER TERMINAL BUILDING

A primary finding of this Master Plan is that a new commercial passenger terminal building is needed. This confirms previous planning recommendations which have also held that a new terminal building is needed. The current building is 57 years old and may have reached the end of its useful life. The age, configuration, and construction of the building diminish its ability to be developed to serve long term commercial airline activities.

An airport passenger terminal is similar in many respects to other transportation terminals, but has some distinctly different characteristics. For example, the ground time of an aircraft is minimized; therefore, airport passenger terminals must be able to accommodate condensed peak passengers and baggage situations. In addition, airports place a greater reliance on the use of private automobiles for access to and from the airport, creating a need for adequate roadway and parking facilities.

A terminal building typically provides several separate and distinct functions. These include ticketing, airline office and baggage make-up, departure lounges, bag claim, and terminal services. Ticketing refers not only to airline ticket counters, but also to a ticket lobby for the queuing of passengers. Ticketing counters should be situated near the entrance, clearly visible, and readily accessible from the terminal curb. Airline office and baggage make-up refers to an area for airline personnel to complete administrative tasks, as well as collect outbound baggage. A separate baggage make-up location is important for baggage security, theft prevention, and sorting, and is usually situated directly behind the ticket counters.

The departure lounge or holdroom refers to an area where passengers wait to board an aircraft. Commonly, the departure lounge is secure, separated from other public areas within the terminal. All passengers and carry-on luggage are screened prior to entry. At airports served by large air carrier aircraft, the departure lounge is located on a second level to provide for jet bridge loading. Kingman Airport uses ground level boarding. This is expected to continue as the airport is not expected to be served by large air carrier aircraft.

Baggage claim refers to the portion of the terminal used for the display of baggage to be claimed. The baggage claim lobby includes a bag claim counter and lobby for passengers awaiting baggage. Ideally, the bag claim lobby should be situated convenient to the arriving passenger flow and in proximity to the terminal curb.

Overall, an efficient terminal layout will provide adequate circulation space. The amount of circulation space varies, but at a minimum, circulation space should be provided in the ticketing and bag claim areas to minimize the disruptions of passenger queues at the ticketing and bag claim counters.

The current terminal building is undersized and does not provide all functional elements described above. There is neither a baggage claim area nor a secure departure lounge in the existing terminal building. The secure departure lounge is located in a trailer on the apron away from the terminal building. Passengers must walk outside uncovered to the trailer for security screening and holding prior to boarding a flight. The ticket counter area is limited as well as the queuing area.

Compounding the current limitations, the current terminal building is not properly sized to serve future growth in enplanements. Given the age of the building, this plan considers developing a new terminal building which will provide sufficient area to accommodate the required functional elements described above.

The passenger terminal building is the first impression air travelers have of the community. A functional and attractive terminal facility is needed to secure and build air travelers' favorable opinion of a community, particularly business leaders who may be investing in the community.

New security methods and security equipment improvements may be needed over time at Kingman Airport. Current security equipment would not be able to be accommodated in the current terminal building, further solidifying the need for a new terminal building.

The *Aviation and Transportation Security Act* was written in response to the terrorist acts of September 11, 2001. Major provisions of the law applicable to terminal planning include the federal government taking responsibility of carry-on baggage screening and new requirements for checked baggage screening. The law required security screeners to be employees of the federal government by the end of 2002, and the establishment of a security manager at each airport. The law further requires that all checked baggage be screened by explosive detection systems (EDS) by the end of 2002. Prior to the enactment of this law, the airlines were responsible for passenger and baggage screening.

Current checked baggage screening involves the use of EDS technology. EDS involves the use of computed tomography (CT) imaging technology. The FAA has certified two separate manufacturers' systems. To be effective, the EDS must be integrated with the baggage check-in and baggage make-up areas to efficiently direct checked baggage for screening. Presently, there is not an EDS system at the airport, nor is there is a baggage conveyor system at the airport. The current EDS imaging modules span as much as seven feet without conveyor systems and are as much as eight feet wide. An area for the operator work station and maintenance must also be considered. The current terminal building does not provide sufficient area for this equipment should it be required in the future. The current Transportation Security Administration (TSA) administrative offices are located in a temporary facility south of the existing terminal due to the space limitations of the existing facility.

Electronic trace detection systems are also used in place of EDS modules at some airports. This could be an alternative to the full EDS system. Trace detection devices test for explosive residue on baggage and have been used at many locations where there is low traffic volumes or the EDS has not been installed. These machines require less space within the terminal. Final decisions with regard to EDS will need to be coordinated with the TSA. The rules, regulations, costs, and procedures for these new requirements will need to be continually monitored.

Passenger Terminal Building Location Alternatives

FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*, identifies a number of basic considerations that affect the location of a terminal building. The primary considerations include the following:

1. **Runway configuration**: The terminal should be located to minimize aircraft taxiing distances and times and the number of runway crossings.

2. **Access to transportation network**: The terminal should be located to provide the most direct/shortest routing to the regional roadway network.

3. **Expansion potential**: The long term viability of the terminal is dependent upon the ability of the site to accommodate expansion of the terminal beyond forecast requirements.

4. **FAA Geometric Design Standards**: The terminal location needs to assure adequate distance from present and future aircraft operational areas.

A review of each of these factors is listed below.

Runway configuration: The terminal is situated near the center of the main apron which is west of primary Runway 3-21. Taxiway D serves the main apron and located west of Runway 3-21. In this location, aircraft does not need to cross Runway 3-21 to access a runway end. The Runway 17 end can also be accessed without crossing an active runway.

Access to transportation network: The existing terminal building is located at the terminus of Mohave Airport Drive. Mohave Airport Drive connects directly with Andy Devine Boulevard (Historic Route 66) west of the terminal building. This intersection is signalized with dedicated turn lanes. Andy Devine Boulevard connects directly with Interstate Highway 40, and also extends directly to the City of Kingman central business district.

Expansion potential: There are only two permanent structures near the existing terminal – the KAA administration offices, located approximately 300 feet north and the historic airport traffic control located immediately adjacent to the terminal. The historic ATCT is an identifying feature of the airport and cannot be removed. This may limit some development potential to the south. However, sufficient area is available to the north for development. Additionally, considerable area is available between the terminal and Flightline Drive for parking and support facilities.

FAA Geometric Design Standards: The exiting terminal is located more than 1,000 feet west of the Runway 3-21 centerline. This is well outside any area obstruction clearance area and does not impact any design standards.

As shown, the existing terminal site meets the general recommendations of the FAA utilizing this criterion. Therefore, the terminal building should ultimately be redeveloped in its existing location. This also preserves the existing investments in the automobile parking and access already provided at the existing terminal building site.

Having established that the terminal should be located in the same general area, two potential development scenarios have been identified for the ultimate terminal location. The first option is shown on **Exhibit 4D**. In this option, the existing terminal is razed and replaced by the new terminal building. This locates the terminal at the center of the existing parking lot and replaces the aging building. However, this option requires the demolition of the existing building prior to constructing the new building. While terminal functions could be accommodated in a temporary structure, the continued operation of the restaurant would be more problematic. This option reserves all area to the north of the existing parking lot to the existing KAA administration building for public, employee, and rental car parking expansion and support functions such as rental car maintenance and storage. Additional support functional area is reserved south of the existing parking lot as well.

The second option is shown on **Exhibit 4E**. In this alternative, the new terminal is constructed immediately adjacent to the north side of the existing terminal building. This allows for the construction of the new building while allowing the continued operation of the new terminal including the restaurant. An advantage is that the existing terminal, and most importantly, the restaurant could be retained and integrated into the new terminal building. This would reduce development costs of the new terminal as the restaurant is retained. This option reserves all area to the north of the existing parking lot to the existing KAA administration building for public, employee, and rental car parking expansion. In this configuration, some support functions may need to be conducted off-site or in a more remote location of the airport.

General Aviation and Support Alternatives

The primary planning considerations for this analysis is the development of additional general aviation storage hangars to accommodate forecast demand, identification of commercial general aviation parcels, the development of a helipad, and the development of a designated aircraft wash facility.

An airport maintenance facility and larger airport rescue and firefighting (ARFF) facility are also considered. There is currently no dedicated airport maintenance building. Some airport maintenance functions are accommodated in a T-hangar facility. The airport maintenance facility can be located off the main flightline as this activity does not require direct airfield access; although the facility should be located near a gated entrance point if not located within the fence line. If possible, the airport maintenance facility should be located in close proximity to the KAA administrative offices.

The existing KAA administration building provides a single bay for the storage of the single ARFF vehicle at the airport. A larger facility may ultimately be needed when new equipment is added at the airport. This may ultimately require a new facility to be constructed in the future.

Several factors must be considered when determining the best location for an ARFF facility. This not only includes the location and development costs of needed infrastructure items such as roads and utilities, but also includes ARFF operational response requirements. An ARFF facility location should allow for: 1) immediate, direct, and safe access to airside facilities; 2) unimpeded access routes with a minimum of turns to runways, taxiways, and aircraft parking aprons; 3) direct access to terminal aprons; 4) maximum surveillance of the air operations area; 5) shortest response time to the most probable aircraft accident areas; and 6) the minimum of obstructions or interferences from existing facilities such as access roads, fueling areas, and aircraft taxiing or parking areas. 14 CFR Part 139.319(i), *Aircraft Rescue and Firefighting: Operational Requirements*, requires that "within 3 minutes from the time of the alarm, at least one required aircraft rescue and firefighting vehicle shall reach the midpoint of the farthest runway serving air carrier aircraft from its assigned post, or reach any other specified point of comparable distance on the movement area that is available to air carriers, and begin application of extinguishing agent."

The existing ARFF building is located near the center of the main apron. Direct access to the midpoint of Runway 3-21 is available via Taxiway D3. The midpoint of Runway 3-21 is approximately 1,500 feet from the current site. The midpoint of Runway 17-35 can be accessed via Taxiway D to Taxiway D2 or Taxiway D3 to Runway 3-21 to Runway 17-35. In both cases, the midpoint of Runway 17-35 is no more than 3,100 feet from the existing ARFF facility. Considering the availability of existing utility infrastructure and roadways, it does not appear that a new location is warranted, as it is not expected that a more suitable location could be found without limiting a future development parcel or increasing development costs. This alternatives analysis will consider a future ARFF facility remaining near its existing location.

The facility requirements analysis indicated the need for additional aircraft storage facilities. This could include the development of T-hangar units and clearspan hangars. Consideration will be given to providing areas for corporate/executive hangar development as well.

Consideration may be given to developing an aircraft wash facility to provide a suitable area for the washing of

KINGMAN AIRPORT

Exhibit 4D
MAIN APRON AREA ALTERNATIVE A

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KINGMAN AIRPORT

Exhibit 4E
MAIN APRON AREA ALTERNATIVE B

aircraft. This provides for the proper disposal of aircraft cleaning fluids.

A helipad and helicopter parking area should also be considered. There is currently no designated helipad and helicopters must use apron areas for fixed-wing aircraft. Fixed-wing aircraft and rotary aircraft should be segregated to the extent practical. The best possible location for the helipad is along the main apron, just north of Taxiway D and south of the terminal building. This area is segregated from aircraft tiedown locations. This area currently accommodates most helicopter activity.

To a certain extent, landside uses should be grouped with similar uses or uses that are compatible. Other functions should be separated, or at least have well-defined boundaries for reasons of safety, security, and efficient operation. Finally, each landside use must be planned in conjunction with the airfield, as well as ground access that is suitable to the function.

Runway frontage should be reserved for those uses with a high level of airfield interface, or need for exposure. Other uses with lower levels of aircraft movements, or little need for runway exposure, can be placed in more isolated locations.

Typically, airports face development constraints of one degree or another because of their basic function, causing the alternatives analysis to focus upon specific layouts of landside facilities. However, only a portion of the available land area at Kingman Airport is presently developed.

Developable parcels are available along the west side of the main apron and along the southern apron and Taxiway B. The interrelationship of the landside functions discussed above is important to defining a long term landside layout for the airport. Therefore, these requirements have been combined in a series of development alternatives. Since the available area in the existing terminal area is expected to serve projected demand through the planning period, the analysis of development opportunities will be limited to this area. The area north of the Bureau of Land Management lease site along Taxiway C has not been considered for development as this area includes a former landfill site that would need to be mitigated prior to development. The ultimate land use plan will reserve this area for future aviation related development should the landfill be mitigated.

For clarity, the landside alternatives have been presented separately for the main apron area and the southwest apron area along Taxiway B.

Main Apron Alternative A

Main Apron Alternative A is shown on **Exhibit 4D**. This alternative provides for the logical completion of the T-hangar area developed over the past few years. This includes expanding the center row of T-hangars by 10-units. An additional six 50-foot by 50-foot clearspan hangars can be developed along the western edge of this hangar area. An additional four 50-foot by 50-foot clearspan hangars can be developed along the southern edge of this area. The wash rack is developed south of the aircraft storage area.

The area between Kingman Aero Services and Straube Aircraft Services is developed with two 10-unit T-hangars and 16 50-foot by 50-foot clearspan hangars. This closely resembles the existing aircraft storage hangar area described above. The airport maintenance facility is developed along Flightline Drive near the existing KAA administration building. The area between Kingman Airline Services and Air'zona Aircraft Services is reserved for Fixed Based Operator (FBO) development. FBOs provide a wide variety of general aviation services such as maintenance, charter, and flight training activities. FBOs generally require a large apron for circulation and tiedown and good visibility from the runway system. This location meets these needs. Much of the apron adjacent to these parcels is presently used for long term aircraft storage. The relocation of these aircraft may be required to fully utilize these parcels.

Main Apron Alternative B

Main Apron Alternative B is shown on **Exhibit 4E**. Similar to Main Apron Alternative A, this alternative retains the completion of the existing aircraft storage area. In contrast with Main Apron Alternative A, two FBO parcels are proposed for the area between Kingman Aero Services and Straube Aircraft Services. The apron adjacent to these parcels is not presently dedicated to aircraft storage. Therefore, unlike Main Apron Alternative A, this alternative would not require the relocation of stored aircraft.

A third FBO parcel is shown between the existing terminal parking lot and Kingman Aero Services. The primary disadvantage of providing for FBO development in this area is that it limits the passenger terminal building expansion to the south.

In this alternative, the area between Kingman Airline Services and Air'zona Aircraft Services is developed for a series of independent corporate/executive clearspan hangars. These hangars provide 6,400 square feet of space with adjacent automobile parking and access. A similar development is in place at Glendale Municipal Airport. A wash rack is developed along the main apron in lieu of one of the hangar positions.

Southwest Alternative A

Southwest Alternative A is shown on **Exhibit 4F**. This alternative extends taxiway access into the Kingman Airport Industrial Park across Flightline Drive utilizing an undeveloped parcel north of the Experimental Aircraft Association (EAA) hangar. This taxiway extends to 12 development parcels ranging from approximately 0.5 acres to 2.3 acres in size. Vehicle access to the southern parcels would be via Flightline Drive. Vehicle access to the northern parcels would be via an existing road in the industrial park. It is expected that Flightline Drive would be closed where the proposed taxiway crosses flightline drive. These parcels are designed to accommodate aircraft

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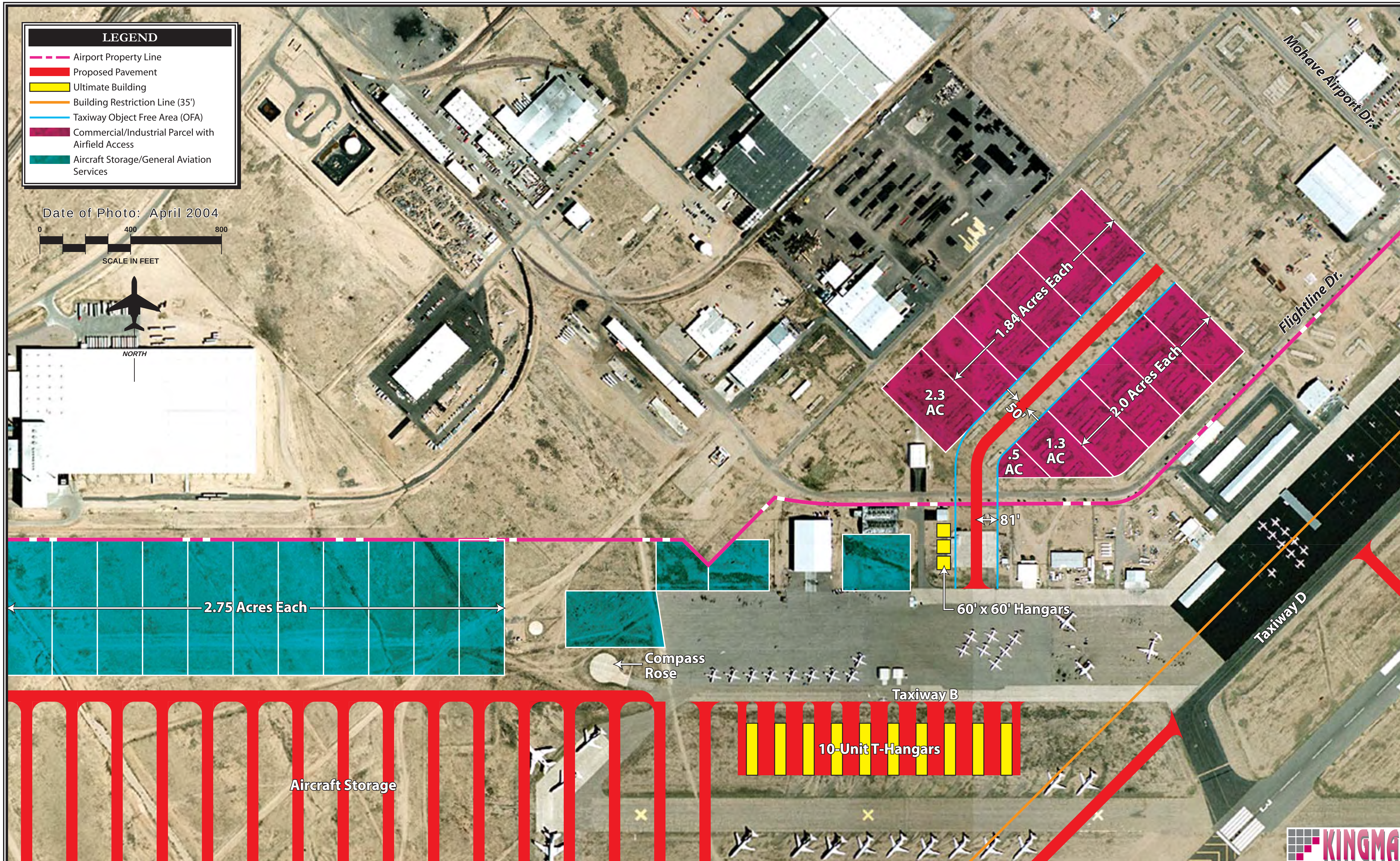


Exhibit 4F
SOUTHWEST ALTERNATIVE A

through Airplane Design Group III (wingspans to 118 feet).

T-hangar development is proposed along the southern edge of Taxiway B. A total of 100 T-hangars are shown in this area. The development potential of this area greatly exceeds the projected long term need. Should this development option be pursued, further T-hangar development along the main apron area would not be needed. Therefore, all the undeveloped parcels along the main apron could be reserved for FBO development. A series of development parcels are shown along the apron and along the extended Taxiway B. Three clearspan hangars similar in size to the existing EAA hangar could be developed along the taxiway alignment in that area.

Southwest Alternative B

Southwest Alternative A is shown on **Exhibit 4G**. Similar to Southwest Alternative A, taxiway access to the Kingman Airport Industrial Park is provided in this alternative. This alternative utilizes the existing taxiway located between the EAA hangar and Kingman Army Airfield (KAAF) Museum for airfield access. This location has an existing automated gate. This taxiway would provide access to 16 parcels ranging size from less than one acre to two acres. Vehicle access is from Flightline Drive and existing industrial park roads.

In contrast with Southwest Alternative A, the area north of the EAA hangar would be developed with a series of 9,600 square-foot hangars. Two 12-unit T-hangars would be developed in the area south of the KAAF museum. An additional 52 T-hangar units are proposed on the west end of the apron. Similar to Southwest Alternative A, these proposed T-hangar developments exceed the projected need. Therefore, there would not be a need to develop further T-hangars along the main apron in excess of the logical completion of the existing aircraft storage area. A number of development parcels are reserved south of Taxiway B.

SUMMARY

The process utilized in assessing the airside and landside development alternatives involved a detailed analysis of short and long-term requirements, as well as future growth potential. Current airport design standards were considered at each stage of development.

Upon review of this report by the KAA, the public, and the PAC, a final Master Plan concept can be formed. The resultant plan will represent an airside facility that fulfills safety and design standards and a landside complex that can be developed as demand dictates.

The proposed development plan for the airport must represent a means by which the airport can grow in a balanced manner, both on the airside as well as the landside, to accommodate forecast demand. In addition, it must provide (as all good development plans should) for flexibility in the plan to meet activity growth beyond the 20-year planning period.

The remaining chapters will be dedicated to refining the basic concept into a final plan with recommendations to ensure proper implementation and timing for a demand-based program.

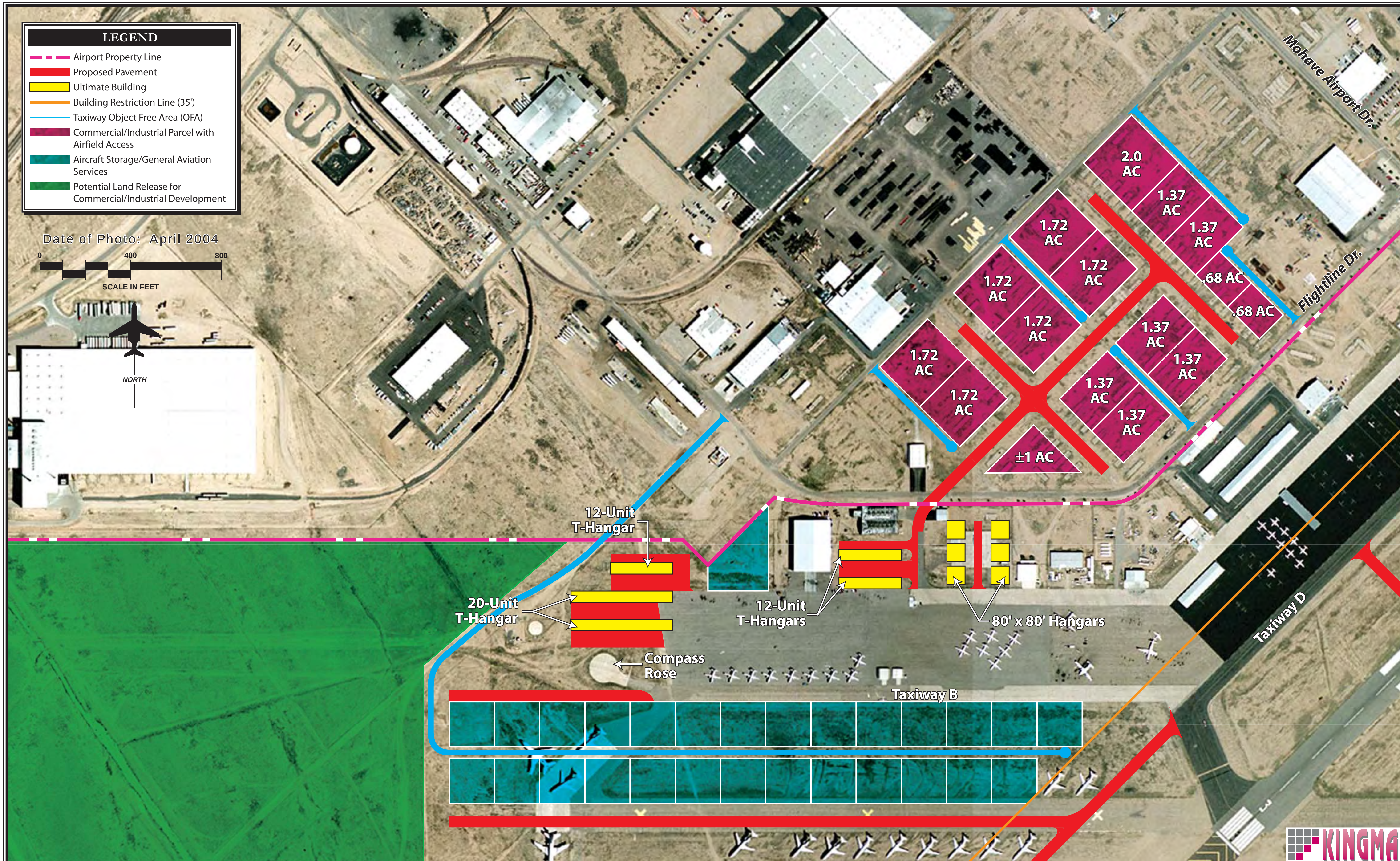


Exhibit 4G
SOUTHWEST ALTERNATIVE B

Chapter Five

AIRPORT PLANS

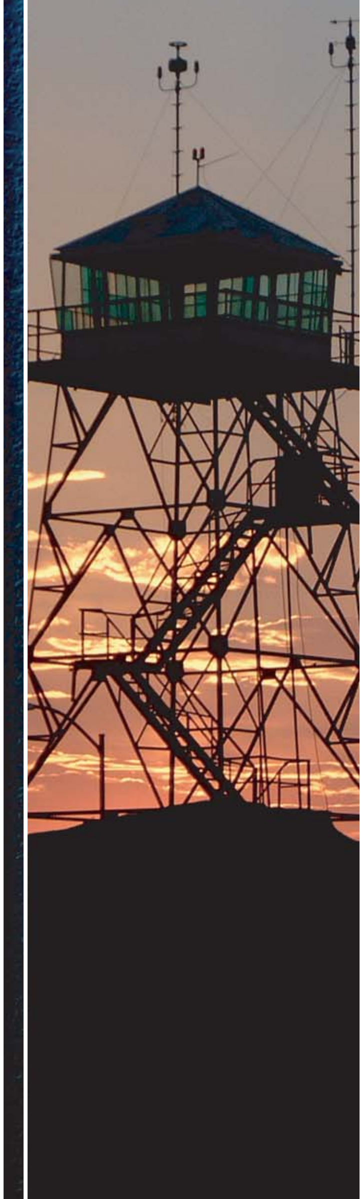
AIRPORT PLANS

The planning process for the Kingman Airport Master Plan has included several analytic efforts in the previous chapters, intended to project potential aviation demand, establish airside and landside facility needs, and evaluate options for improving the airport to meet those airside and landside facility needs. The planning process, thus far, has included the presentation of two draft phase reports (representing the first four chapters of the Master Plan) to the Planning Advisory Committee (PAC) and Kingman Airport Authority (KAA). A plan for the use of Kingman Airport has evolved considering their input. The purpose of this chapter is to describe, in narrative and graphic form, the plan for the future use of Kingman Airport.

AIRFIELD PLAN

The airfield plan for Kingman Airport focuses on meeting Federal Aviation Administration (FAA) design and safety standards, lengthening Runway 3-21 to the northeast, constructing new parallel taxiway access on the east side of the airfield, constructing glider aircraft staging areas, and constructing additional exit taxiways for Runways 3-21 and 17-35. **Exhibit 5A** graphically depicts the proposed airfield improvements. The following text summarizes the elements of the airfield plan.

The FAA has established a variety of design criterion to define the physical dimensions of runways and taxiways,



and the surrounding imaginary surfaces that protect the safe operation of aircraft at the airport. FAA design standards also define the separation criteria for the placement of landside facilities. As discussed previously in Chapter Three, FAA design criteria are a function of the critical design aircraft's (the most demanding aircraft or "family" of aircraft which will conduct 500 or more operations (take-offs and landings) per year at the airport) wingspan and approach speed, and in some cases, the runway approach visibility minimums. The Federal Aviation Administration (FAA) has established the Airport Reference Code (ARC) to relate these factors to airfield design standards.

Kingman Airport is currently used by a wide range of general aviation piston powered and turbine powered aircraft. These aircraft range from ARC A-I to ARC D-I and D-II on occasion. A wide range of transient business aircraft operate at the airport. A review of instrument flight plan data suggests that these business aircraft generally fall within ARC C-II.

The primary aircraft used for commercial service operations at Kingman Airport is the Beechcraft 1900 turboprop aircraft. This aircraft falls within ARC B-II. The stored aircraft at Kingman Airport are the most demanding aircraft to operate at the airport due to their larger wingspans and higher approach speeds, when compared with the remaining types of aircraft operating at the airport. They consist of smaller turboprop aircraft to large transport jet aircraft. These aircraft range from ARC B-II to C-IV.

For the Master Plan, stored aircraft within Approach Category C and ADG III are expected to comprise the critical design aircraft through the planning period. Assigning ARC C-III to the ultimate design of airfield facilities at Kingman Airport provides for the operation of all corporate aircraft up to the Bombardier Global Express and the Boeing Business Jet. The type of aircraft expected to be used in commercial air service is not expected to be larger than ARC B-II. This comprises the 19-seat Beechcraft 1900, which currently operates at the airport.

As the primary runway, Runway 3-21 and its associated taxiways will be designed to ARC C-III. To meet FAA minimum wind coverage requirements, ARC B-II design standards will be applied to the design and construction of Runway 17-35. **Table 5A** summarizes the ultimate ARC C-III and B-II airfield safety and facility dimensions for Kingman Airport.

The airfield plan preserves the ability to extend Runway 3-21 3,169 feet, from 6,851 feet to 10,000 feet. If constructed, the entire extension would be placed behind the Runway 21 end. The previous Master Plan recommended a similar extension be placed behind the Runway 3 end. Members of the PAC, expressed concern over a southwesterly extension, as a southwesterly extension would be directly towards new residential development that is planned along the airport's southern border. While the full 3,169-foot extension could be accommodated on existing airport property to the southwest, extending Runway 3-21 to

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Exhibit 5A
RECOMMENDED AIRFIELD DEVELOPMENT CONCEPT

the northeast requires the acquisition of approximately 180 acres of land. Some of this land is currently publically-owned (Arizona State Land Trust). This extension would require crossing the Frees Wash located along the northern airport border.

TABLE 5A
Planned Airfield Safety and Facility Dimensions (in feet)
Kingman Airport

	Runway 3-21		**Runway 17-35**
Airport Reference Code (ARC)	**C-III**		**B-II**
Runway	150		75
Width	10,000		6,725
Length			
Runway Safety Area (RSA)	500		150
Width	1,000		300
Length Beyond Runway End			
Object Free Area (OFA)	800		500
Width	1,000		300
Length Beyond Runway End			
Obstacle Free Zone (OFZ)	400		400
Width	200		200
Length Beyond Runway End			
Runway Centerline To:	250		200
Hold Line	400		240
Parallel Taxiway Centerline	500		250
Edge of Aircraft Parking			
	Runway 3	**Runway 21**	**Each End**
Approach Visibility Minimums	One-Mile	½ Mile	One-Mile
Runway Protection Zone (RPZ)			5
Inner Width	1,000	1,000	00
Outer Width	1,510	1,750	700
Length	1,700	2,500	1,000
Approach Obstacle Clearance	34:1	50:1	20:1
Precision Obstacle Free Zone (POFZ)			
Width	N/A	800	N/A
Length Beyond Runway End	N/A	200	N/A
Taxiways			
Width	50		35
Safety Area Width	118		79
Object Free Area Width	186		131
Taxiway Centerline To:			
Parallel Taxiway/Taxilane	152		105
Fixed or Moveable Object	93		65.5
Taxilanes			
Taxilane Centerline To:			
Parallel Taxilane Centerline	140		97
Fixed or Moveable Object	81		57.5
Taxilane Object Free Area	162		115

Source: FAA Advisory Circular 150/5300-13, *Airport Design,* Change 9, 14 CFR Part 77, *Objects Affecting Navigable Airspace*, FAA Advisory Circular 150/5340-1h, *Marking Of Paved Areas On Airports*

It should be noted that this extension is included in the Master Plan for planning purposes only. This is to aid in local land use planning to ensure that appropriate land use measures are put into place to allow for this extension in the future if it is needed. By planning for a 10,000-foot runway, the City and County can take appropriate measures to ensure that there are not hazards or obstacle penetrations to the 14 Code of Federal Regulations (CFR) Part 77 airspace, and compatible land use is planned in the extended runway approach/departure area. The Airport Disclosure Map as also be developed around this ultimate condition to ensure adequate notification of the potential for this extension at the airport in the future.

As noted in Chapter Three, the mix of aircraft currently using, or expected to use the airport in the future may only require a 7,000-foot long runway. Changes in the type of commercial airline service, cargo services, or new aviation maintenance and repair businesses are examples of the type of activity changes that may require a longer runway that cannot be adequately determined at this time. Changes in the tenants of the adjacent Kingman Airport Industrial Park may also impact the type of aircraft using the airport and could require a longer runway. Extending the runway beyond 7,000 feet would require separate justification that is not included in this Master Plan.

Several taxiway improvements are included in the airfield plan. A new exit taxiway is planned between Taxiway D3 and D4 along Runway 3-21. This taxiway would allow aircraft landing Runway 21 to exit the runway before reaching the runway end should they not be able to exit at Taxiway D3. This taxiway benefits larger business aircraft.

Two new exit taxiways are planned for Runway 17-35. The first is planned midway between the Runway 17 end and the Runway 17-35/Runway 3-21 intersection. Presently, aircraft landing Runway 17 cannot exit the runway until reaching the runway intersection via Taxiway D2. This new exit taxiway would extend directly to the main apron area. A second exit taxiway is planned midway between the Runway 17-35/Ruwnay 3-21 and Runway 35 end. This taxiway would allow aircraft landing Runway 17 to exit the runway before reaching the runway intersection should they not be able to exit at Taxiway D2.

Parallel taxiway access is planned on the east side of the runways to support future aviation-related development on the east side of the airport. This includes a full-length parallel taxiway 400 feet east of the Runway 17-35 centerline. A partial parallel taxiway extending between the Runway 17-35 easterly parallel taxiway and the extended Runway 21 end would provide access to the primary runway from the east side of the airport.

While the alternatives analysis considered extending Taxiway C to the Runway 17 end, it was determined that there is not a significant number of aircraft that would use this taxiway as landside development is limited near the Runway 35 end and all existing tenants primarily use Taxiway D. The alternatives analysis also considered relocating Taxiways C and D closer to the Runway 17-35 and Runway 3-21 centerlines at the minimum distance provided by FAA standards. These alternatives were eliminated as the gain in developable property did not equal the potential reconstruction costs of the taxiways and lighting infrastructure.

A new taxiway is planned on the southern end of the runways to connect the Runway 3 and Runway 17 ends with the southern apron area. This taxiway would be constructed along the former runway alignment. This taxiway could be extended to the west to support future landside development needs.

An aircraft storage area is planned south Taxiway E west of the Runway 3 end. This storage area is planned to consolidate the long term storage of aircraft in a single area of the airport, away from the main apron areas which may ultimately be needed to support future landside development such as commercial general aviation operations, based aircraft, or transient aircraft needs. The configuration as shown on **Exhibit 5A** is in use at other airports with a large number of stored aircraft. In this concept, the aircraft are parked nose-to-tail along the taxiways. Depending upon aircraft size, 175 or more aircraft could be stored along these taxiways. These taxiways do not necessarily need to be paved with asphalt or concrete. Engineering solutions are available which can stabilize the soil sufficiently to support a parked aircraft.

Airfield lighting plans include adding medium intensity taxiway lights (MITL) to Taxiway B and all new taxiways. Runway end identifier lights (REILs) are planned for each end of Runway 17-35. REILS provide pilots the ability to identify the runway ends and distinguish the runway end lighting from other lighting on the airport.

A precision instrument approach with Category I (CAT I) minimums (one-half-mile visibility and 200-foot cloud ceiling minimum) is planned for Runway 21. The capability is currently only provided with an instrument landing system (ILS). While the FAA is implementing the Wide Area Augmentation System (WAAS) to enhance the standard GPS signal for both vertical and lateral navigational approach capabilities, the current capabilities of the WAAS do not allow for CAT I approach minimums. GPS approaches with CAT I standards are not envisioned until after 2015. The installation of a medium intensity approach lighting system with runway alignment indicator lights (MALSR) will be required to achieve CAT I standards. A MALSR is located at the Runway 21 end. Precision markings are planned for Runway 21, to support the precision approach.

Runways 3, 17, and 35 are planned for approach procedures with vertical guidance (APV). The APV provides both vertical descent and course guidance information, with capabilities for approach minimums as low as one-mile visibility and cloud ceilings of 250 feet above the ground. To support an APV, the Runway 17 and 35 markings are planned to be upgraded to nonprecision markings.

Areas for glider operations have been planned along Runway 3-21. Gliders have special ground handling requirements. Before departure, the glider needs to be attached to the tow plane. After landing, the glider needs to be attached to a tow vehicle which will take the glider to the apron area. A taxiway is planned at the Runway 3 end to allow the staging of the glider and tow aircraft prior to departure. A taxiway is planned northeast of Taxiway D3 to accommodate the removal of the glider from the airfield. Both of these taxiways allow for this handling off the taxiway, which improves capacity and safety.

A perimeter service road is planned. This road will allow airport maintenance vehicles and security patrols to easily move around the airfield without needing to cross any runways or taxiways. This reduces the potential for runway incursions.

Shown in green shading on **Exhibit 5A** are areas of airport property that are in excess of the aviation needs of the airport over the next 20 years. Furthermore, much of the land is located too far from the runway to allow for airfield access. Consideration may be given to incorporating these portions of the airport into the existing Kingman Airport Industrial Park. The existing industrial park has been developed quite successfully over the past several years. The industrial park has limited multi-acre parcels available for development. Therefore, the expansion of the industrial park may ultimately be warranted.

To use the portions of the airport shown in green for nonaviation uses, the KAA would need to pursue the release of this land from federal obligations. This would be similar to the release of federal obligations that was granted by the FAA in 1979 to allow for the development of the existing Kingman Airport Industrial Park.

Areas along each runway are reserved for future aviation-related development. Aviation-related development is designated for the area up to 1,500 feet on each side of Runway 3-21 and Runway 17-35. Up to 1,500 feet is typically needed from the runway centerline for apron, hangar, automobile parking, and access road development.

LANDSIDE PLAN

The landside plan for Kingman Airport has been devised to safely, securely, and efficiently accommodate potential aviation demand. Landside improvements are shown in detail on **Exhibit 5B**.

A replacement commercial airline terminal building is planned. The current terminal building is undersized and does not provide all the necessary functional elements for airline service in the same building. There is neither a baggage claim area nor a secure departure lounge in the existing terminal building. The secure departure lounge is located in a trailer on the apron away from the terminal building. Passengers must walk outside uncovered to the trailer for security screening and holding prior to boarding a flight. The ticket counter area is limited as well as the queuing area. Compounding the current limitations, the current terminal building is not

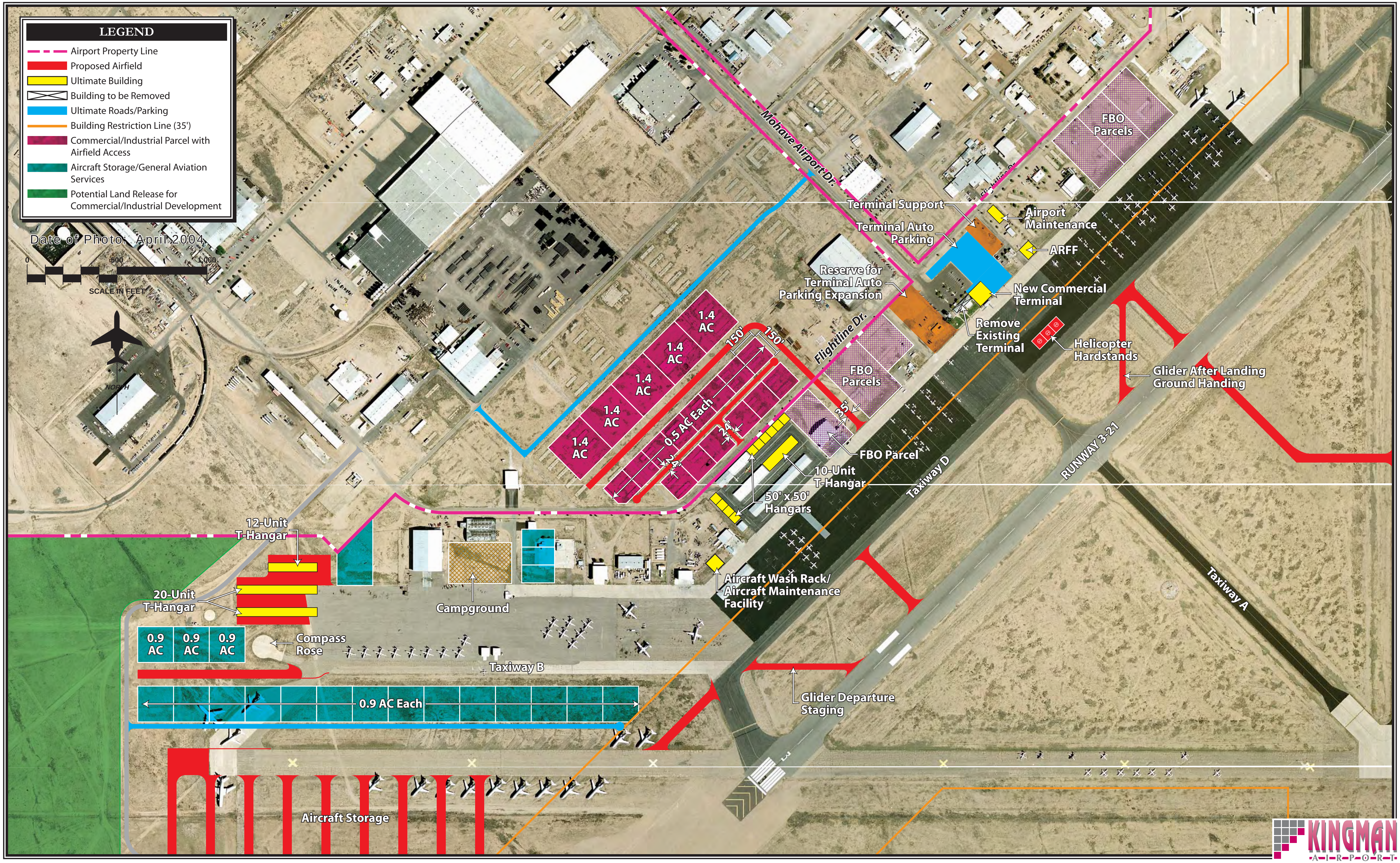

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Exhibit 5B
RECOMMENDED LANDSIDE DEVELOPMENT CONCEPT

properly sized to serve future growth in enplanements. Given the age of the building, this plan considers developing a new terminal building which will provide sufficient area to accommodate the required functional elements described above.

The alternatives analysis concluded that the terminal building should initially remain near its existing location. This is the ideal location for public vehicle access to Andy Devine Boulevard, and access to the primary runway for aircraft. This area also provides the existing paved automobile parking area.

To ensure an operational terminal while the replacement terminal is being constructed, the existing terminal should remain in place until the replacement terminal is constructed. This also provides the opportunity to integrate the existing terminal building into the new terminal structure after completion. Retaining the existing terminal structure would avoid the costs of replacing the existing restaurant facilities.

Ultimately, the replacement terminal building could be constructed on either the north or south side of the existing terminal building. **Exhibit 5B** depicts the terminal being located on the north side of the building, as this area is readily available for development and would not require the relocation of the historic airport traffic control tower (ATCT) located on the south side of the terminal building. An ultimate terminal location is reserved along Taxiway E between the Runway 3 and Runway 17 ends. This location would provide a segregated, secure location. This location would be needed if enplanements grow more than projected in this Master Plan.

The landside plan depicts the development of an airport rescue and firefighting (ARFF) facility northeast of the new commercial terminal, near the existing KAA administration building. This location is ideally suited to meet minimum 14 CFR Part 139 response times to the primary runway.

An airport maintenance facility is planned along Flightline Drive north of the new commercial terminal building. An airport maintenance structure can be constructed off the apron area, as direct access to the apron is not needed. Airport maintenance vehicles only need paved roadway access through a secure gate, which is available east of the proposed airport maintenance building site along the main apron.

Three helicopter hardstands are planned on the main apron near Taxiway D. There is presently no dedicated helicopter parking positions on the main apron. These hardstands will replace the existing asphalt pavement which has been damaged by the helicopter skids. This area is segregated from fixed wing aircraft tiedown locations.

A series of parcels for the development of fixed base operator (FBO) facilities has been reserved along the western edge of main apron area. These parcels could be used for providing a wide variety of commercial aviation services such as aircraft maintenance, flight training, or aircraft charter. The area designated for these parcels is presently undeveloped and is located along the primary apron area. A large apron area with good visibility and access to the primary runway is typically needed to support many types of FBO activities.

The local completion of the aircraft storage hangar area south of the terminal building is included in the landside plan. This area can accommodate an additional 10 T-hangar units and 10 2,500-square-foot conventional hangars.

An aircraft wash rack is planned for the southwest corner of the main apron. An aircraft wash rack would provide an area for aircraft cleaning, and the proper collection of the aircraft cleaning solvents and contaminants removed from the aircraft hull during cleaning.

Long term T-hangar development is planned at the southern edge of the southwest apron area. A total of 52 T-hangar units are planned to meet projected long term storage needs.

The southwest apron development concept plans for several parcels of land that would be used for aircraft storage or general aviation services. The majority of these parcels are located south of Taxiway B. A taxiway would be constructed where the closed runway is currently located to allow these parcels to have airport access. Taxiway B would also be extended to the west for the same purpose. Automobile access to these parcels would be via a new access road branching off of Flightline Drive. Four more aircraft storage/general aviation parcels would be located at the north end of the southwest apron.

A campground is designated for an undeveloped area near the Kingman Army Airfield Museum. This campground would be for the exclusive use of aircraft owners.

Access to the adjacent Kingman Airport Industrial Park is included in the landside plan. This includes the development of a taxiway extending west across Flightline Drive from the main apron, as shown on **Exhibit 5B**. A variety of parcel sizes are shown to accommodate different market conditions, although it is likely that the size and configuration of the parcels could change in the future as demand dictates. The taxiway is designed for Airplane Design Group II aircraft (aircraft with wingspans less than 79 feet). This is to serve the smaller parcels located along Flightline Drive. The width of the taxiway is restricted by existing leaseholds and building locations. Flightline Drive is currently designated to allow for taxiway access to the Kingman Airport. Several businesses that are currently located in the industrial park, taxi to the runways via Flightline Drive.

NOISE EXPOSURE ANALYSIS

Aircraft sound emissions are often the most noticeable environmental effect an airport will produce on the surrounding community. If the sound is sufficiently loud or frequent in occurrence, it may interfere with various activities or otherwise be considered objectionable.

To determine the noise-related impacts that the proposed development could have on the environment surrounding Kingman Airport, noise exposure patterns were analyzed for both existing airport activity conditions and projected long term activity conditions.

The basic methodology employed to define aircraft noise levels involves the use of a mathematical model for aircraft noise predication. The Yearly Day Night Average Sound Level (DNL) is used in this study to assess aircraft noise. DNL is the metric currently accepted by the FAA, Environmental Protection Agency (EPA), and Department of Housing and Urban Development (HUD) as an appropriate measure of cumulative noise exposure. These three federal agencies have each identified the 65 DNL noise contour as the threshold of incompatibility, meaning that noise levels below 65 DNL are considered compatible with underlying land uses. Most federally-funded airport noise studies use DNL as the primary metric for evaluating noise.

DNL is defined as the average A-weighted sound level as measured in decibels (dB), during a 24-hour period. A 10-dB penalty applies to noise events occurring at night (10:00 p.m. to 7:00 a.m.). DNL is a summation metric which allows objective analysis and can describe noise exposure comprehensively over a large area. The 65 DNL contour has been established as the threshold of incompatibility, meaning that noise levels below 65 DNL are considered compatible with underlying land uses.

Since noise decreases at a constant rate in all directions from a source, points of equal DNL noise levels are routinely indicated by means of a contour line. The various contour lines are then superimposed on a map of the airport and its environs. It is important to recognize that a line drawn on a map does not imply that a particular noise condition exists on one side of the line and not on the other. DNL calculations do not precisely define noise impacts. Nevertheless, DNL contours can be used to: (1) highlight existing or potential incompatibilities between an airport and any surrounding development; (2) assess relative exposure levels; (3) assist in the preparation of airport environs land use plans; and (4) provide guidance in the development of land use control devices, such as zoning ordinances, subdivision regulations and building codes.

The noise contours for Kingman Airport have been developed from the Integrated Noise Model (INM), Version 6.1. The INM was developed by the Transportation Systems Center of the U.S. Department of Transportation at Cambridge, Massachusetts, and has been specified by the FAA as one of the two models acceptable for federally-funded noise analysis.

The INM is a computer model which accounts for each aircraft along flight tracks during an average 24-hour period. These flight tracks are coupled with separate tables contained in the database of the INM, which relate to noise, distances, and engine thrust for each make and model of aircraft type selected.

Computer input files for the noise analysis contain operational data, runway utilization, aircraft flight tracks, and fleet mix as projected in the plan. The operational data and aircraft fleet mix are summarized in **Table 5B**. These estimates were derived after review of instrument flight plans maintained by the FAA and existing airport records.

TABLE 5B
Noise Model Input: Aircraft Operations
Kingman Airport

Operations By Type	Single Engine	Multi-Engine	Turboprop	Turbojet	Helicopter	Totals
Existing Conditions						
Local	24,061	3,721	0	0	0	27,782
Itinerant	14,739	2,279	1,800	300	1,000	20,118
Total	38,800	6,000	1,800	300	1,000	47,900
Long Term						
Local	38,627	4,909	0	0	0	43,536
Itinerant	32,973	4,191	5,400	2,700	1,800	47,064
Total	71,600	9,100	5,400	2,700	1,800	90,600

Source: Coffman Associates Analysis

The runway use percentages are summarized in **Table 5C**.

TABLE 5C
Noise Model Input: Runway Use Percentages
Kingman Airport

Aircraft	3	21	17	35
Existing				
Single Engine Piston	25%	65%	2%	8%
Multi-Engine Piston	25%	65%	2%	8%
Turboprop	25%	65%	2%	8%
Business Aircraft	25%	65%	2%	8%

Source: Coffman Associates analysis

The aircraft noise contours generated using the aforementioned data for Kingman Airport are depicted on **Exhibit 5C**. For both the existing and projected activity levels, the 65 DNL

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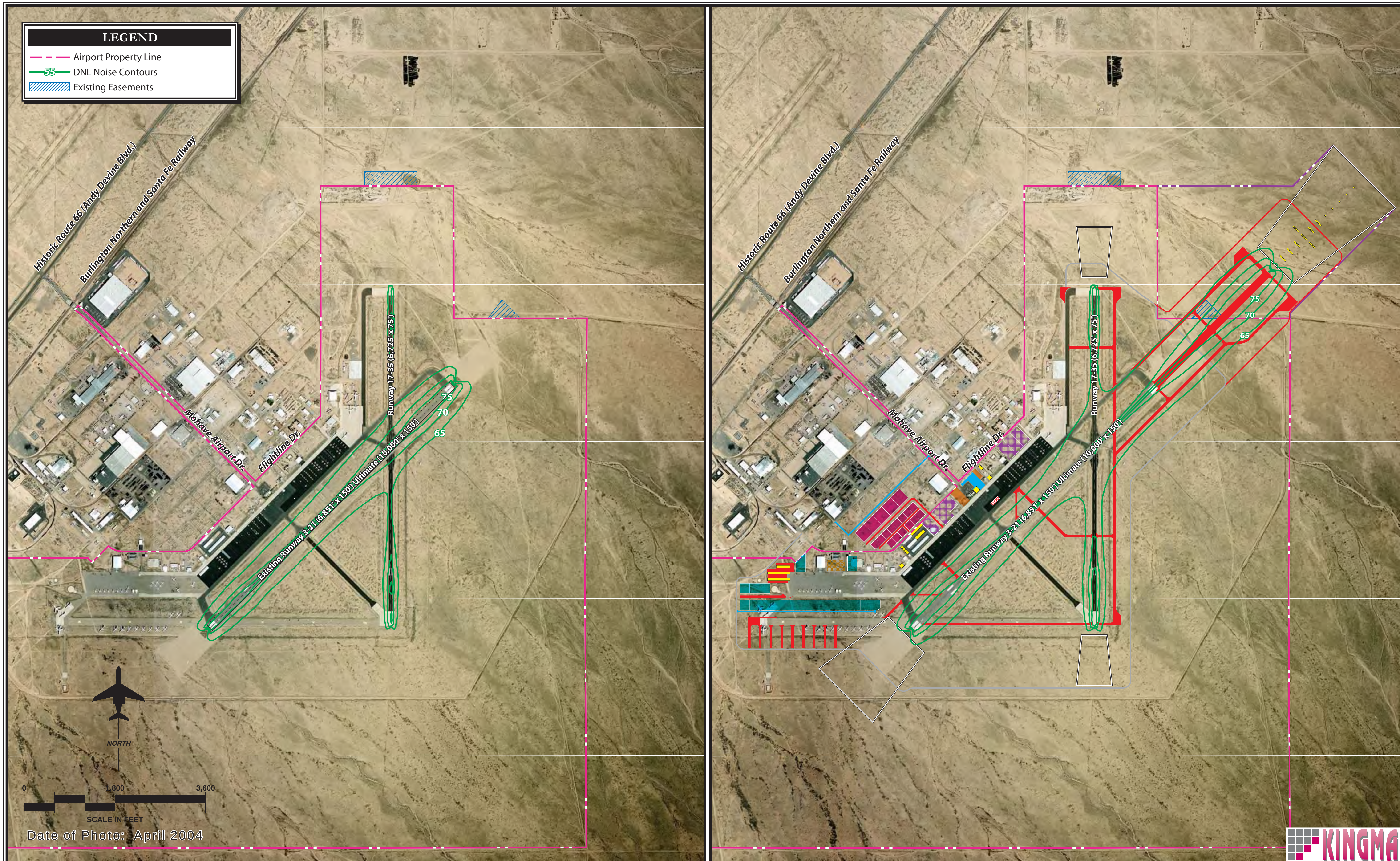


Exhibit 5C
EXISTING AND PROJECTED LONG TERM
NOISE EXPOSURE CONTOURS

noise contour remains entirely within the existing airport property line.

ENVIRONMENTAL EVALUATION

A review of the potential environmental impacts associated with proposed airport improvements is an important consideration in the Airport Master Plan process. Prior to the FAA's approval of development projects at an airport, some form of environmental review must be undertaken. The *National Environmental Policy Act (NEPA) of 1969*, as amended, outlines the general format of this review. The FAA has established airport-specific NEPA environmental review processes which are detailed in FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*. The NEPA process for a project typically takes one of three forms. The simplest and least time-consuming form of review is the categorical exclusion, often referred to as a Cat-Ex. Historically, the FAA has completed many of the Cat-Ex documents internally; however, as the number of Cat-Ex documentation requirements has increased, the FAA is now requesting project sponsors complete the needed documentation and then submit it to the FAA for review. A detailed list of projects which can often be categorically excluded, pending no extraordinary circumstances, is found in paragraphs 307 through 312 of FAA Order 1050.1E. Extraordinary circumstances exist if the project could have an adverse effect within any of the resource categories discussed in the following sections of this evaluation (i.e., cultural or biological resources, wetlands, or floodplains).

The second level of NEPA documentation is an Environmental Assessment (EA). Environmental assessments are typically prepared when a project is not categorically excluded; is normally categorically excluded but, in this instance, involves at least one extraordinary circumstance that may significantly affect the human environment; or, when the action is not one known to require a higher level of environmental review. Actions which typically require an EA are listed in paragraph 401 of FAA Order 1050.1E and include projects such as the acquisition of more than three acres of property, runway extensions, new runways, and runway strengthening projects which have the potential to increase off-airport noise by 1.5 decibels within the 65 DNL noise contour.

The third level of NEPA documentation is an Environmental Impact Statement (EIS). This form of documentation is fairly rare when compared to the number of categorical exclusion and EA documents which are prepared. EISs are required when the impacts of the proposed action are significant, even with the incorporation of mitigation.

The purpose of this environmental evaluation is to provide a preliminary review of environmental issues that would need to be analyzed in further detail during the NEPA process. As a result, this analysis does not address mitigation or resolution of any identified environmental impacts.

EVALUATION OF POTENTIAL IMPACTS

A brief description of the existing environmental condition surrounding Kingman Airport was provided within Chapter One of the Master Plan. This evaluation will identify potential impacts to these resources identified in Chapter One. Guidance contained within Appendix A of FAA Order 1050.1E, as well as FAA Order 5050.4A, *Airport Environmental Handbook,* was utilized for the preparation of this evaluation. Discussion regarding each of the 18 impact categories contained within the FAA guidance is provided.

Noise/Compatible Land Use

The Yearly Day-Night Average Sound Level (DNL) is used in this study to assess aircraft noise. DNL is the metric currently accepted by the Federal Aviation Administration (FAA), Environmental Protection Agency (EPA), and Department of Housing and Urban Development (HUD) as an appropriate measure of cumulative noise exposure. These three agencies have each identified the 65 DNL noise contour as the threshold of incompatibility.

The compatibility of existing and planned land uses in the vicinity of an airport is usually associated with the extent of the airport's noise impacts. Typically, significant impacts will occur over noise-sensitive areas within the 65 DNL noise contour.

Land use within the airport environs primarily consists of industrial and commercial to the northwest. The remaining land surrounding the airport is undeveloped. As depicted in **Exhibit 5C**, the existing and project long-term 65 DNL noise contours remain on airport property. Therefore, no significant noise impacts are anticipated in the future.

Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks

Socioeconomic impacts known to result from airport improvements are often associated with relocation activities or other community disruptions, including alterations to surface transportation patterns, division or disruption of existing communities, interferences with orderly planned development, or an appreciable change in employment related to the project. Social impacts are generally evaluated based on areas of acquisition and/or areas of significant project impact, such as areas encompassed by noise levels in excess of 65 DNL.

As part of the planned airport development, land to the northeast of the airport will be acquired for the runway extension and associated runway protection zone. Presently, this land is undeveloped. According to the *Mohave County General Plan*, this area is planned for light-industrial land uses. It is not anticipated that off-airport businesses will need to be relocated.

Executive Order (EO) 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations,* and the accompanying Presidential Memorandum, and Department of Transportation (DOT) Order 5610.2, *Environmental Justice*, require the FAA to provide meaningful public involvement by minority and low-income populations, as well as analysis that identifies and addresses potential impacts on these populations that may be disproportionately high and adverse.

Regarding EO 12898, Kingman Airport is not located in an area which exhibits a higher than average percentage of minorities or low-income persons when compared with county and state levels.

Pursuant to Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, federal agencies are directed to identify and assess environmental health and safety risks that may disproportionately affect children. These risks include those that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they may be exposed to.

It is not anticipated that the proposed airport projects will pose health and safety risks to children, as the airport will continue to operate in the same manner as it does today. The acquisition of the runway protection zones will further increase the safety of area residents, including children.

Secondary (Induced) Impacts

Secondary impacts are those that include shifts in patterns of population growth, public service demands, and changes in business and economic activity to the extent influenced by airport development.

Significant shifts in patterns of population movement or growth, or an increase in public service demands are not anticipated as a result of the proposed development. The proposed development is being undertaken to meet the needs of existing and anticipated future users, as well as to gain control of the safety areas.

Air Quality

The U.S. Environmental Protection Agency (EPA) has adopted air quality standards that specify the maximum permissible short-term and long-term concentrations of various air contaminants. The National Ambient Air Quality Standards (NAAQS) consist of primary and secondary standards for six criteria pollutants which include: Ozone (O_3), Carbon Monoxide (CO), Sulfur Dioxide (SO_2), Nitrogen Oxides (NO_x), Particulate Matter (PM10 and PM 2.5), and Lead (Pb). Potentially significant air quality impacts, associated with an FAA project or action, would be demonstrated by the project or action exceeding one or more of the NAAQS for any of the time periods analyzed.

As discussed in Chapter One, Kingman Airport is located in Mohave County, which is in attainment for all pollutants. As the projects are proposed for development, thereby requiring FAA environmental approval, air quality analyses will be required. It is not anticipated that any of the proposed development projects would result in significant air quality impacts.

Water Quality

Water quality concerns associated with airport expansion most often relate to domestic sewage disposal, increased surface runoff and soil erosion, and the storage and handling of fuel, petroleum, solvents, etc. Chapter One outlines the existing water supply and drainage patterns for the airport and its environs.

Construction of the taxiway improvements, runway extension, and landside development will result in a slight increase of impermeable surfaces and, thereby, result in an increase in surface runoff. Additionally, during the construction phase of the proposed projects, short-term impacts on water quality may be experienced; however, temporary measures to control water pollution, soil erosion, and siltation through the use of best management practices should minimize these impacts.

Wetlands and Waters of the U.S.

Wetlands are defined by Executive Order 11990, *Protection of Wetlands*, as those areas that are inundated by surface or groundwater with a frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetation or aquatic life that requires saturated or seasonally-saturated soil conditions for growth and reproduction.

Coordination undertaken during previous NEPA analyses indicates that wetlands are not present on airport property; however, due to the lapse in time since this determination, a wetlands delineation should be performed prior to runway and taxiway projects.

Specifically, the proposed runway extension to the north would require a wetlands delineation to determine the presence of wetlands in that area and the extent of the impacts that may occur as a result of the proposed development. Analysis of USGS maps indicates that the proposed runway extension would involve filling two intermittent streams (Frees Wash) located north of the airport. Section 404 of the *Clean Water Act* requires a permit when jurisdictional waters are dredged or filled. Coordination with the U.S. Army Corps of Engineers should be undertaken prior to runway development to determine permitting requirements.

Floodplains

Significant impacts to floodplains occur when the proposed actions increase the risk of flood loss, increasing the impact of flooding on human safety, health and welfare. Additionally, impacts can occur if the proposed action destroys the natural and beneficial values that are inherent in floodplain areas. As indicated in Chapter One, Kingman Airport is not located in a 100-year floodplain.

Historical, Architectural, Archaeological and Cultural Resources

Determination of a project's environmental impact to historic and cultural resources is made under guidance in the *National Historic Preservation Act (NHPA) of 1966*, as amended, the *Archaeological and Historic Preservation Act (AHPA) of 1974*, the *Archaeological Resources Protection Act (ARPA)*, and the *Native American Graves Protection and Repatriation Act (NAGPRA) of 1990*. In addition, the *Antiquities Act of 1906*, the *Historic Sites Act of 1935*, and the *American Indian Religious Freedom Act of 1978* also protect historical, architectural, archaeological, and cultural resources.

As discussed in Chapter One, a survey was conducted as part of the 1993 Environmental Assessment. It was determined that 24 cultural resource features exist at the airport. All these features are considered to be part of a National Register of Historic Places eligible historic site. Prior to development, additional coordination with the Arizona State Historic Preservation Office may be required to determine the possible impacts.

Department of Transportation Act: Section 4(f)

Section 4(f) of the DOT Act, which was re-codified as section 303(c) of 49 USC, provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly-owned land from a historic site, public parks, recreation areas, or waterfowl and wildlife refuges of national, state, regional, or local importance, unless there is no feasible and prudent alternative to the use of such land, and the project includes all possible planning to minimize harm resulting from the use.

If the National Register of Historic Places eligible features discussed in the previous section are disturbed or removed, Section 4(f) impacts will likely result. Coordination with the Arizona State Historic Preservation Office may be required.

Fish, Wildlife, and Plants

Section 7 of the Endangered Species Act (ESA), as amended, applies to federal agency actions and sets forth requirements for consultation to determine if the proposed action "may affect" a federally-endangered or threatened species. If an agency determines that an action "may affect" a federally-protected species, then Section 7(a)(2) requires each agency to consult with the U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS), as appropriate, to ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of any federally-listed endangered or threatened species, or result in the destruction or adverse modification of critical habitat. If a species has been listed as a candidate species, Sec. 7 (a)(4) states that each agency must confer with the FWS and/or NMFS.

The existing biotic environment was discussed in Chapter One. The U.S. Fish and Wildlife Service lists 17 endangered or threatened species in Mohave County. A field survey would be required to determine the presence of these species within the project area. Additionally, the endangered species list is constantly being updated and would need to be consulted prior to any development projects.

Coastal Resources

Federal activities involving or affecting coastal resources are governed by the *Coastal Barriers Resource Act (CBRA)*, the *Coastal Zone Management Act (CZMA)*, and EO 13089, *Coral Reef Protection*. The airport is not located near any coastal resources.

Wild and Scenic Rivers

Wild and scenic rivers (WSR) are designated by the Wild and Scenic Rivers Act. A National Rivers Inventory (NRI) is maintained to identify those river segments which are protected under this Act. There are no designated wild or scenic rivers within the immediate vicinity of the airport.

Farmland

Under the *Farmland Protection Policy Act* (FPPA), federal agencies are directed to identify and take into account the adverse effects of federal programs on the preservation of farmland, to consider appropriate alternative actions which could lessen adverse effects, and to assure that such federal programs are, to the extent practicable, compatible with state or local government programs and policies to protect farmland. The FPPA guidelines apply to farmland classified as prime or unique, or of state or local importance as determined by the appropriate government agency, with concurrence by the Secretary of Agriculture.

Generally, lands that are used as irrigated farmland are considered prime or unique within the State of Arizona. The lands proposed for acquisition are not used as irrigated farmland; therefore, no impacts are anticipated.

Natural Resources and Energy Supply

Energy requirements associated with the proposed action alternative generally fall into two categories: (1) those which relate to changed demands for stationary facilities (i.e., airfield lighting and terminal building heating); and (2) those which involve the movement of air and ground vehicles (i.e., fuel consumption). In addition to fuel, the use of natural resources includes construction materials, water, and manpower.

The implementation of the proposed alternative will not likely increase significantly the consumption of natural resources and energy at the airport. Any impacts would be the result of increased operations and upgraded facilities.

Light Emissions and Visual Impacts

Light emission impacts occur when lighting associated with an action will create an annoyance among people in the vicinity or interfere with their normal activities. Aesthetic impacts relate to the extent that the development contrasts with the existing environment and whether this contrast is objectionable.

It is unlikely that the proposed alternative will result in less-than-significant lighting or visual impacts to the area surrounding the airport. The proposed development does include the extension of runway lighting; however, no residential land uses are located in close proximity to the airport. The proposed development projects will be consistent with the existing features on the property; therefore, it is anticipated that they will blend-in with the existing facilities.

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 Recovery Act (RCRA)* (as amended by the *Federal Facilities Compliance Act of 1992*) and the *Comprehensive Environmental Response, Compensation, Liability Act (CERCLA)*, as amended (also known as Superfund). RCRA governs the generation, treatment, storage, and disposal of hazardous wastes. CERCLA provides for cleanup of any release of a hazardous substance (excluding petroleum) into the environment.

Consideration should be given regarding the hazardous nature of any materials or wastes to be used, generated, or disturbed by the proposed action, as well as the control measures to be taken.

As mentioned previously in this section, the airport will need to continue to comply with current NPDES operations permit requirements. With regard to construction activities, the airport and all applicable contractors will need to obtain and comply with the requirements and procedures of the construction-related NPDES General Permit, including the preparation of a *Notice of Intent* and a *Stormwater Pollution Prevention Plan*, prior to the initiation of project construction activities.

Construction Impacts

Construction impacts typically relate to the effects on specific impact categories, such as air quality or noise, during construction. To minimize construction-related impacts, the use of best management practices is recommended. All applicable permits and certifications will need to be obtained prior to any construction.

PUBLIC AIRPORT DISCLOSURE MAP

Arizona Revised Statues (ARS) 28-8486, *Public Airport Disclosure,* provides for a public airport owner to publish a map depicting the "territory in the vicinity of the airport." The territory in the vicinity of the airport is defined as the traffic pattern airspace and the property that experiences 60 DNL or higher in counties with a population of more than 500,000, and 65 DNL or higher in counties with less than 500,000 residents. The DNL is calculated for the 20-year forecast condition. ARS 28-8486 provides for the State Real Estate Office to prepare a disclosure map in conjunction with the airport owner. The Disclosure Map is recorded with the County Recorder.

Exhibit 5D depicts the recommended Disclosure Map for Kingman Airport, considering the requirements of the statute above. Traffic pattern airspace is defined in FAA Order 7400.2D, *Procedures for Handling Airspace Matters.* Traffic pattern airspace is a function of the approach category for the runway. Approach category C is planned for Runway 6-24, while approach category B is planned for Runway 18-36.

According to FAA Order 7400.2D, the traffic pattern airspace for approach category C extends 2.25 miles beyond each runway end, 2.25 miles laterally from the runway centerline to encompass the traffic pattern. For approach category B, the traffic pattern airspace extends 1.5 miles beyond each runway end, 1.5 miles laterally from the runway centerline to encompass the traffic pattern, and 0.25 miles on the side opposite the traffic pattern when the traffic pattern is maintained on one side of the runway.

The Disclosure Map for Kingman Airport has been developed assuming left traffic for all runways. The 65 DNL contour is shown as required by the statute.

SUMMARY

The Master Plan for Kingman Airport has been developed in cooperation with the PAC, interested citizens, and KAA. It is designed to assist the KAA in making decisions relative to the future use of Kingman Airport as it is maintained to meet the air transportation needs for the region.

Flexibility will be a key to the plan, since activity may not occur exactly as forecast. The Master Plan provides the KAA with options to pursue in marketing the assets of the airport for community development. Following the general recommendations of the plan, the airport can maintain its viability and continue to provide air transportation services to the region.

03MP10-5D-5/4/05

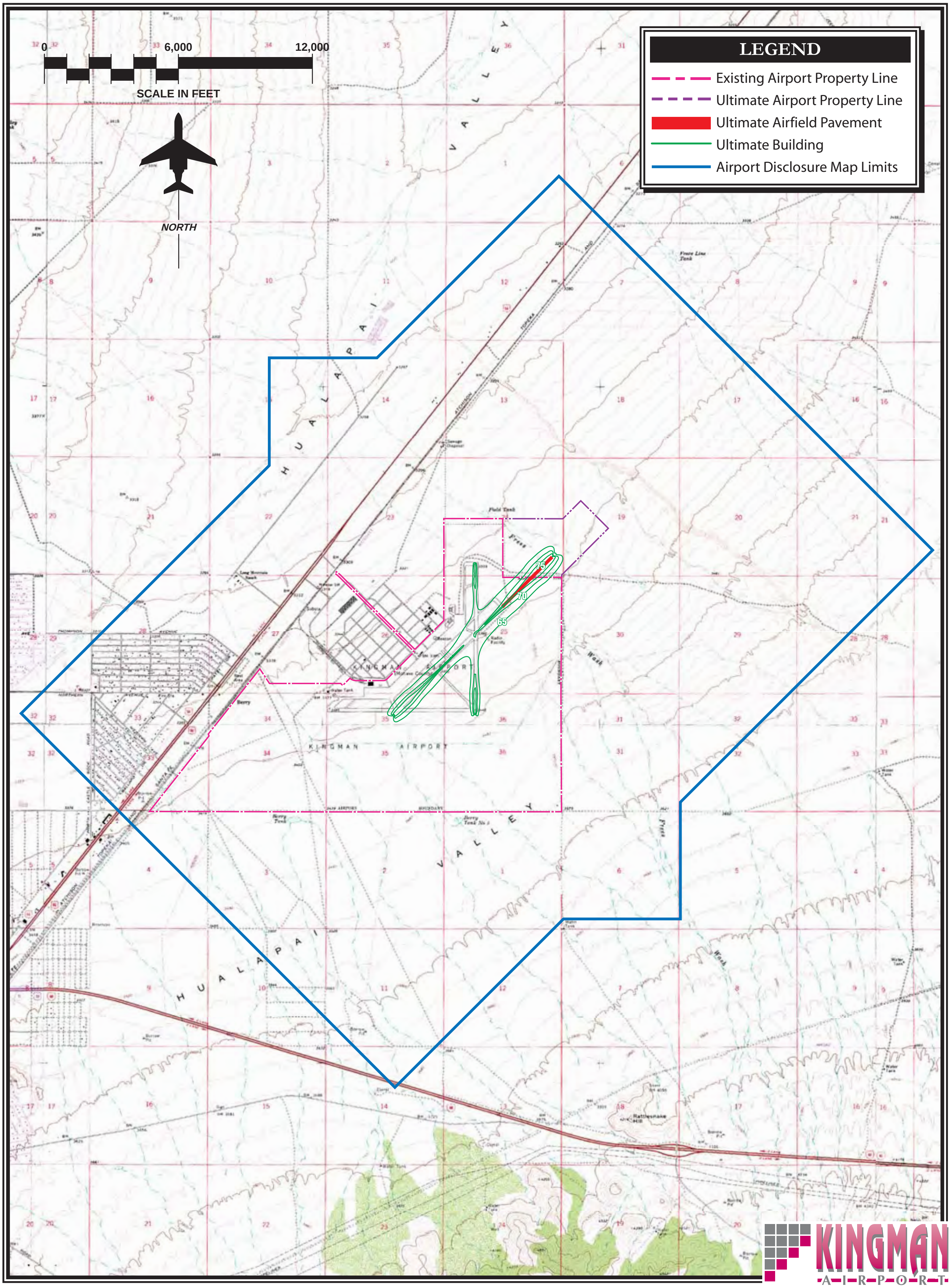


Exhibit 5D
AIRPORT DISCLOSURE MAP

Chapter Six

CAPITAL IMPROVEMENT PROGRAM

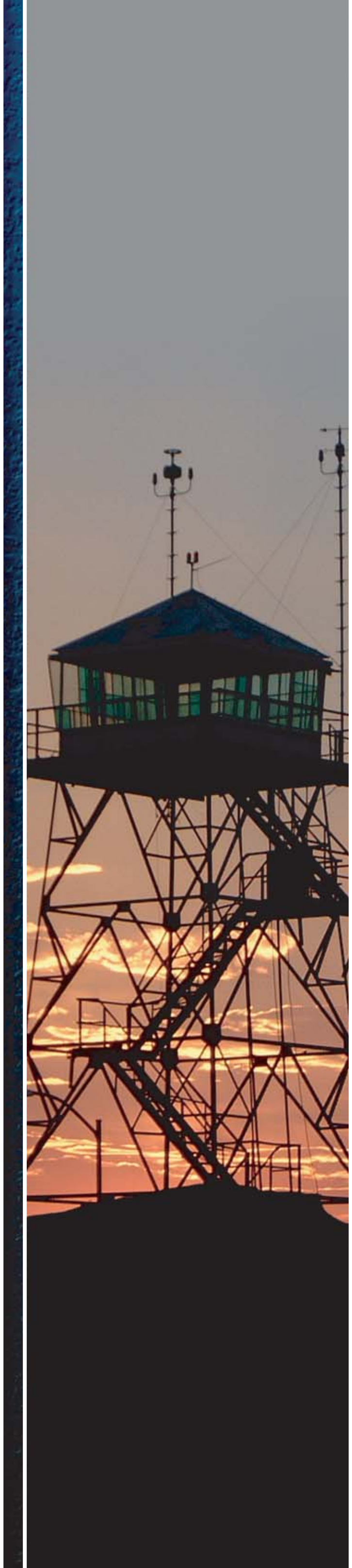
CAPITAL IMPROVEMENT PROGRAM

The analyses conducted in the previous chapters evaluated airport development needs based upon safety, security, potential aviation activity, and operational efficiency. Through these analyses, a plan for the use and development of the airport was defined. The purpose of this chapter is to identify the projects to implement the proposed plan for the use and development of Kingman Airport, and those capital needs required to operate and maintain the airport in a safe and environmentally acceptable manner.

The presentation of the financial plan and its feasibility has been organized into two sections. First, funding sources on the federal and local levels are identified and discussed. Second, the airport's capital needs, costs, and funding eligibility are presented in narrative and tabulated form.

CAPITAL IMPROVEMENTS FUNDING

Financing capital improvements at the airport will not rely exclusively upon the financial resources of the Kingman Airport Authority (KAA). Capital improvement funding is available at the federal level and state level for many airport projects. The following discussion outlines the key sources for capital improvement funding.



FEDERAL GRANTS

Through federal legislation over the years, various grants-in-aid programs have been established to develop and maintain a system of public airports throughout the United States. The purpose of this system and its federally-based funding is to maintain national defense and promote interstate commerce. The most recent legislation, *Vision 100 – Century of Aviation Reauthorization Act* (Vision 100), was signed into law on December 13, 2003.

Vision 100 is a four-year bill covering federal fiscal years 2004, 2005, 2006, and 2007. Vision 100 provides national funding levels to the Federal Aviation Administration (FAA) of $3.4 billion in 2004, increasing $100 million annually, until reaching $3.7 billion in 2007.

The source for federal funding of airports is the Aviation Trust Fund. The Aviation Trust Fund was established in 1970 to provide funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Aviation Trust Fund also finances the operation of the FAA. It is funded by user fees, taxes on airline tickets, aviation fuel, and various aircraft parts.

Proceeds from the Aviation Trust Fund are distributed each year by the FAA from appropriations by Congress. A portion of the annual distribution is to primary commercial service airports (e.g., Phoenix Sky Harbor International Airport), based upon enplanement levels. Commercial service airports enplaning more than 10,000 passengers annually are provided a minimum $1,000,000 annual entitlement. For eligible non-primary commercial services airports, Vision 100 provides up to $150,000 of funding each year. As a non-primary commercial service airport, Kingman Airport does not qualify for the commercial service entitlement; however, it does qualify for the annual $150,000 entitlement. An airport can consolidate four years of entitlement funding for a total of $600,000. However, these annual entitlement levels can be reduced if Congress does not appropriate the full funding levels specified above.

After meeting entitlement obligations, the remaining Airport Improvement Program (AIP) funds are distributed by the FAA, based upon the priority of the project for which airport sponsors have requested federal assistance through discretionary apportionments. A national priority ranking system is used to evaluate and rank each project for which an airport sponsor seeks federal assistance. Those projects with the highest priority are given preference in funding. Each project for Kingman Airport is required to follow this procedure and compete with other airport projects in the state for AIP state apportionment dollars, and across the country for other federal AIP funds. An important point to consider is that most funding for Kingman Airport is not guaranteed, as the airport is currently only eligible for the $150,000 annual entitlement. Therefore, the KAA must rely on federal discretionary funding. However, should the airport be able to grow to 10,000 passenger enplanements annually, the airport would qualify for the $1,000,000 annual primary commercial service entitlement. If commercial airline activity occurs as forecast, the airport could pass this level after 2015.

Airport development that meets the FAA's eligibility requirements can receive 95 percent of the total project cost from the FAA. This is a five percent increase from past funding, which only provided 90 percent funding for eligible projects. The 95 percent funding level is currently only provided by law until 2007. After 2007, the funding level would revert back to 90 percent (the federal share for the past two decades), unless extended by Congress. Funding at 95 percent for AIP-eligible projects has been assumed to extend through the planning period, as it is expected that subsequent legislation would make permanent the 95 percent funding level. Property acquisition, airfield improvements, aprons, perimeter service roads, and access road improvements are examples of eligible items.

Vision 100 does provide for the Secretary of Transportation to fund revenue-generating developments such as hangars and fuel facilities, which have historically not been eligible for federal funding. Vision 100 limits this funding eligibility to non-primary airports such as Kingman Airport, and the airports must use their annual entitlement dollars. Vision 100 also requires that all airside needs at the airport are met prior to an airport receiving funding for revenue-generating development.

STATE AID TO AIRPORTS

In support of the state airport system, the State of Arizona also participates in airport improvement projects. The source for state airport improvement funds is the Arizona Aviation Fund. Taxes levied by the state on aviation fuel, flight property, aircraft registration tax, and registration fees (as well as interest on these funds) are deposited in the Arizona Aviation Fund. The Transportation Board establishes the policies for distribution of these state funds.

Under the State of Arizona grant program, an airport can receive funding for one-half (currently 2.5 percent) of the local share of projects receiving federal AIP funding. The state also provides 90 percent funding for projects which are typically not eligible for federal AIP funding or have not received federal funding.

State Airport Loan Program

The Arizona Department of Transportation-Aeronautics Division (ADOT) Airport Loan Program was established to enhance the utilization of state funds and provide a flexible funding mechanism to assist airports in funding improvement projects. Eligible projects include runway, taxiway, and apron improvements; land acquisition, planning studies, and the preparation of plans and specifications for airport construction projects; as well as revenue-generating improvements such as hangars and fuel storage facilities. Projects which are not currently eligible for the State Airport Loan Program are considered if the project would enhance the airport's ability to be financially self-sufficient.

There are three ways in which the loan funds can be used: Grant Advance, Matching Funds, or Revenue-Generating Projects. The Grant Advance loan funds are provided when the airport can demonstrate the ability to accelerate the development and construction of a multi-phase project. The project(s) must be compatible with the Airport Master Plan and be included in the ADOT 5-year Airport Development Program. The Matching Funds are provided to meet the local matching fund requirement for securing federal airport improvement grants or other federal or state grants. The Revenue-Generating funds are provided for airport-related construction projects that are not eligible for funding under another program.

Pavement Maintenance Program

The airport system in Arizona is a multi-million dollar investment of public and private funds that must be protected and preserved. State aviation fund dollars are limited and the State Transportation Board recognizes the need to protect and extend to the maximum amount the useful life of the airport system's pavement. This program, Arizona Pavement Preservation Program (APPP), is established to assist in the preservation of the Arizona airport system infrastructure. Kingman Airport participates in this program.

Public Law 103-305 requires that airports requesting Federal AIP funding for pavement rehabilitation or reconstruction have an effective pavement maintenance management system. To this end, ADOT-Aeronautics has completed and is maintaining an Airport Pavement Management System (APMS) which, coupled with monthly pavement evaluations by the airport sponsors, fulfills this requirement.

The Arizona Airport Pavement Management System uses the Army Corps of Engineers' "Micropaver" program as a basis for generating a Five-Year Airport Pavement Preservation Program (APPP). The APMS consists of visual inspections of all airport pavements. Evaluations are made of the types and severities observed and entered into a computer program database. Pavement Condition Index (PCI) values are determined through the visual assessment of pavement condition in accordance with the most recent FAA Advisory Circular 150/5380-6 and range from 0 (failed) to 100 (excellent). Every three years, a complete database update with new visual observations is conducted. Individual airport reports from the update are shared with all participating system airports. The Aeronautics Division ensures that that the APMS database is kept current, in compliance with FAA requirements.

Every year, the Aeronautics Division, utilizing the APMS, will identify airport pavement maintenance projects eligible for funding for the upcoming five years. These projects will appear in the State's Five-Year Airport Development Program. Once a project has been identified and approved for funding by the State Transportation Board, the airport sponsor may elect to accept a state grant for the project and not participate in the Airport Pavement Preservation Program (APPP), or the airport sponsor may sign an Inter-Government agreement (IGA) with the Aeronautics Division to participate in the APPP.

LOCAL FUNDING

The balance of project costs, after consideration has been given to federal grants, must be funded through local resources. There are several alternatives for local finance options for future development at the airport. The KAA could choose to fund the local share, after FAA grants, through airport operating revenues and/or bonds. Some improvements may require private funding mechanisms (hangars), such as bank loans or private capital investments. These decisions are made at project implementation, based on KAA financial resources at that time.

The development of general aviation facilities at Kingman Airport has relied on a combination of public and private investments in the past. The KAA has funded many of the grant-eligible items for general aviation at the airport including the taxiways, apron, access roads, land acquisition, and automobile parking. Private individuals or businesses have financed the construction of hangar facilities.

A continuation of public and private investments may be necessary to implement the proposed plan. The capital improvement program, shown on **Exhibit 6A,** includes the KAA fully pursuing all the grant-eligible improvements to accommodate general aviation growth in the future. This primarily includes apron development and hangar access taxiways.

The T-hangar, FBO hangar, and corporate hangars are assumed to be developed by private developers through long-term ground leases. The obvious advantage of such an arrangement is that it relieves the KAA of all responsibility for raising the capital funds for these improvements, considering the remaining capital needs at the airport. These improvements are demand-based; therefore, these projects should only be pursued when the need for these facilities can be determined. Furthermore, these facilities should only be constructed when it is found that the development costs can be fully recovered through lease and rental fees.

DEMAND-BASED PLAN

The Master Plan for Kingman Airport has been developed according to a demand-based schedule. Demand-based planning refers to the intention to develop planning guidelines for the airport based upon airport activity levels, instead of guidelines based on points in time. By doing so, the levels of activity derived from the demand forecasts can be related to the actual capital investments needed to safely and efficiently accommodate the level of demand being experienced at the airport. More specifically, the intention of this Master Plan is that the facility improvements needed to serve new levels of demand should only be implemented when the levels of demand experienced at the airport justify their implementation.

For example, the aviation demand forecasts projected that based aircraft could be expected to grow through the year 2025. This forecast was supported by the local community's growing economy and population, and historical trends which yielded a growing number of based aircraft levels at the airport.

Future based aircraft levels will be dependent upon a number of economic factors. These factors could slow or accelerate based aircraft levels differently than projected in the aviation demand forecasts. Since changes in these factors cannot be realistically predicted for the entire forecast period, it is difficult to predict, with the level of accuracy needed to justify a capital investment, exactly when an improvement will be needed to satisfy demand level.

For these reasons, the Kingman Airport Master Plan has been developed as a demand-based plan. The Master Plan projects various activity levels for short, intermediate, and long term planning horizons. When activity levels begin to reach or exceed the level of one of the planning horizons, the Master Plan suggests the KAA begin to consider the development necessary to support the projected demand in the next planning horizon. This provides a level of flexibility in the Master Plan, as the development program can be accelerated or slowed to meet demand. This can extend the time between Master Plan updates.

A demand-based Master Plan does not specifically require implementation of any of the demand-based improvements. Instead, it is envisioned that implementation of any Master Plan improvement would be examined against demand levels prior to implementation.

In many ways, this Master Plan is similar to a community's comprehensive plan. The Master Plan establishes a plan for the use of the airport facilities, consistent with potential aviation needs and the capital needs required to support that use. However, individual projects in the plan are not implemented until the need is demonstrated and the project is approved by the KAA. **Table 6A** summarizes the key activity milestones for each planning horizon.

CAPITAL NEEDS AND COST SUMMARIES

Once the specific needs for the airport have been established, the next step is to determine a realistic schedule and costs for implementing each project. The capital needs presented in this chapter outline the costs and timing for implementation. The program outlined on the following pages has been evaluated from a variety of perspectives and represents the culmination of a comparative analysis of basic budget factors, demand, and priority assignments by the Consultants.

03MP10-6A-4/13/06

	Total Cost	Federally Eligible	ADOT Eligible	Local Share
Short Term Planning Horizon (First Five Years)				
2006				
1. Land Acquisition Appraisal (Safety/Standards)	$ 35,000	$ 33,250	$ 875	$ 875
2. Install Lighted Hold Markings (Safety/Standards)	150,000	142,500	3,750	3,750
3. Construct Terminal Building (Capacity)	1,700,000	850,000	425,000	425,000
4. Prepare Master Airport Drainage Study (Environmental)	100,000	95,000	2,500	2,500
5. Design Taxiway B Reconstruction (Safety/Standards)	88,000	83,600	2,200	2,200
6. Design/Construct Hangars (Demand)	480,000	0	0	480,000
7. Reconstruct Mohave Airport Drive (Maintenance)	1,500,000	-	1,350,000	150,000
Subtotal 2006	**$ 4,053,000**	**$ 1,204,350**	**$ 1,784,325**	**$ 1,064,325**
2007				
1. Land Acquisition - 80 Acres (Safety/Standards)	$ 2,400,000	$ 2,280,000	$ 60,000	$ 60,000
2. Construct Perimeter Service Road (Security)	325,000	308,750	8,125	8,125
3. Reconstruct Taxiway B (Safety/Standards)	645,000	612,750	16,125	16,125
4. Design Kingman Industrial Park Access Taxiway (Demand)	75,000	-	0	75,000
5. Install Integrated Security Access Control System (Security)	490,000	465,500	12,250	12,250
6. Design Taxiway E - Phase I (Capacity)	80,000	-	72,000	8,000
Subtotal 2007	**$ 4,015,000**	**$ 3,667,000**	**$ 168,500**	**$ 179,500**
2008				
1. Install Apron Lighting (Security)	$ 150,000	$ 142,500	$ 3,750	$ 3,750
2. Taxiway E Construction - Phase I (Demand)	950,000	902,500	23,750	23,750
3. Design Taxiway E - Phase II (Demand)	80,000	76,000	2,000	2,000
4. Construct Kingman Industrial Park Access Taxiway - Phase I (Demand)	556,000	-	0	556,000
5. Design Taxiway C Reconstruction (Safety/Standards)	140,000	133,000	3,500	3,500
Subtotal 2008	**$ 1,876,000**	**$ 1,254,000**	**$ 33,000**	**$ 589,000**
2009				
1. Design and Construct Maintenance Building (Maintenance)	$ 400,000	$ 380,000	$ 10,000	$ 10,000
2. Construct Aircraft Wash Rack (Environmental)	150,000	142,500	3,750	3,750
3. Reconstruct Taxiway C (Safety/Standards)	1,100,000	1,045,000	27,500	27,500
4. Construct Taxiway E - Phase II (Demand)	950,000	902,500	23,750	23,750
Subtotal 2009	**$ 2,600,000**	**$ 2,470,000**	**$ 65,000**	**$ 65,000**
2010				
1. Perimeter Lighting and Security Upgrade (Security)	$ 1,500,000	$ 1,425,000	$ 37,500	$ 37,500
2. Construct Helicopter Hardstands (Maintenance)	59,000	56,050	1,475	1,475
Subtotal 2010	**$ 1,559,000**	**$ 1,481,050**	**$ 38,975**	**$ 38,975**
Subtotal Short Term Planning Horizon	**$ 14,103,000**	**$ 10,076,400**	**$ 2,089,800**	**$ 1,936,800**
Intermediate Term Planning Horizon (6-10 years)				
1. Install REILs Runway 17-35 (Safety/Standards)	$ 40,000	$ 38,000	$ 1,000	$ 1,000
2. Construct T-Hangar Taxilanes - Phase I (Demand)	222,000	210,900	5,550	5,550
3. Construct 22 T-Hangars (Demand)	587,000	0	0	587,000
4. Construct North Exit Taxiway Runway 17-35 (Capacity)	183,000	173,850	4,575	4,575
5. Construct Exit Taxiways Runway 3-21 (Capacity)	214,500	203,775	5,363	5,363
6. Construct Taxiway from Runway 17-35 to Main Apron (Capacity)	937,000	890,150	23,425	23,425
7. Construct Glider Taxiways (Capacity)	361,800	343,710	9,045	9,045
8. Install MITL Taxiway B (Safety/Standards)	460,000	437,000	11,500	11,500
9. Construct Terminal Building Automobile Parking (Demand)	345,000	327,750	8,625	8,625
10. Extend Runway 3-21 and Taxiway D to 7,000 Feet (Demand)	423,000	401,850	10,575	10,575
11. Install Instrument Landing System (ILS) Runway 21 (Capacity)	1,500,000	1,425,000	37,500	37,500
12. Install MALSR Runway 21 (Capacity)	350,000	332,500	8,750	8,750
13. Construct General Aviation Parcels Access Road - Phase I (Demand)	945,000	897,750	23,625	23,625
14. Construct Kingman Airport Industrial Park Taxilane - Phase II (Demand)	1,134,000	-	0	1,134,000
15. Construct Industrial Park Access Cul-De-Sacs (Demand)	267,000	-	0	267,000
16. Construct Industrial Park Access Road (Mohave Dr. to Factory Way)	439,000	-	0	439,000
17. Pavement Preservation (Maintenance)	1,000,000	950,000	25,000	25,000
Subtotal Intermediate Term Planning Horizon	**$ 9,408,300**	**$ 6,632,235**	**$ 174,533**	**$ 2,601,533**
Long Term Planning Horizon (11-20 years)				
1. Construct Runway 17-35 Parallel Taxiway (Demand)	$ 2,741,000	$ 2,603,950	$ 68,525	$ 68,525
2. Construct Partial Parallel Taxiway to Runway 21 (Demand)	973,000	924,350	24,325	24,325
3. Taxiway B Extension (Demand)	367,000	348,650	9,175	9,175
4. Construct T-Hangar Taxilanes - Phase II (Demand)	143,400	136,230	3,585	3,585
5. Construct 32 T-Hangars (Demand)	853,000	0	0	853,000
6. Pavement Preservation (Maintenance)	2,000,000	1,900,000	50,000	50,000
Subtotal Long Term Planning Horizon	**$ 7,077,400**	**$ 5,913,180**	**$ 155,610**	**$ 1,008,610**
Total All Development	**$ 30,588,700**	**$ 22,621,815**	**$ 2,419,943**	**$ 5,546,943**

KEY
ILS - Instrument Landing System
MALSR - Medium Intensity Approach Lighting System with Runway Alignment Indicator Lighting
REIL - Runway End Identifier Lighting
MITL - Medium Intensity Taxiway Lighting

KINGMAN AIRPORT

Exhibit 6A
CAPITAL IMPROVEMENT PLAN

TABLE 6A Planning Horizon Activity Levels	2003	Short Term Planning Horizon	Intermediate Term Planning Horizon	Long Term Planning Horizon
Air Carrier Activity				
Enplaned Passengers	2,313	5,400	6,800	15,000
Annual Operations	1,582	2,800	2,900	3,800
General Aviation Activity				
Based Aircraft	103	130	150	200
Annual Operations	45,320	52,700	61,500	85,100
Air Taxi Operations	778	900	1,100	1,500
Military Operations	300	300	300	300
Total Annual Operations	47,980	56,700	65,800	90,700

Exhibit 6A summarizes capital needs for Kingman Airport through the planning period of this Master Plan. Individual project cost estimates account for engineering, survey, and other contingencies that may be experienced during implementation of the project, and are in current (2005) dollars. Due to the conceptual nature of a Master Plan, implementation of capital improvement projects should occur only after further refinement of their design and costs through engineering and/or architectural analyses. Capital costs in this chapter should be viewed only as estimates subject to further refinement during design. Nevertheless, these estimates are considered sufficient for performing the feasibility analyses in this chapter.

It is important to recognize that while many of the projects shown below are grant-eligible, their funding is uncertain. Kingman Airport is only entitled to $150,000 annually from the FAA, which needs to be directed towards all capital improvement needs at the airport; most importantly, airfield safety and maintenance. **Exhibit 6A** depicts funding eligibility only, and not the actual level of federal or KAA funds available for the project. The FAA makes funding decisions on an annual basis and funding is not guaranteed. Based on national priorities and the national AIP funding provided by Congress, the FAA will decide the level of funds available each year to the KAA for improvements at Kingman Airport. This can include the entire amount of funding eligibility shown in each year, or a reduced level. Should the FAA provide a reduced level of funding, the KAA would need to decide whether to delay project implementation or fund the project with KAA funds entirely.

The capital needs for the airport can be categorized as follows:

1) **Maintenance -** Maintaining the existing infrastructure is a priority. The capital needs program provides for the continued maintenance and rehabilitation of the airport's pavement areas.

2) **Safety/Standards -** Of utmost importance with any transportation facility is safety. All projects in the plan are designed according to FAA design standards. This is carried throughout the other areas of focus. The safety needs in the capital needs program are considered necessary for the operational safety and protection of aircraft and/or people and property on the ground near the airport.

3) **Security –** Kingman Airport accommodates scheduled commercial airline service. The security of these operations is a primary concern of the Transportation Security Administration (TSA). The security of general aviation aircraft and operations is also important. Capital needs in this program are intended to improve the overall security posture of the airport.

4) **Environmental** – These are necessary to conform to legal environmental requirements on the state and federal levels.

5) **Capacity** – These are projects which improve the capacity or use of the airport in an effort to reduce delay. Examples include taxiway improvements.

6) **Demand** - The Master Plan has established future activity levels for the airport. Should these activity levels be reached, it may be necessary to improve existing facilities to safely, efficiently, and securely accommodate the new activity levels. Therefore, the capital needs program includes provisions to accommodate levels of aviation demand. The implementation of these projects should only occur when demand for these needs are verified.

Each capital need is categorized using one of these five categories. These are listed in parentheses by the project description on **Exhibit 6A**.

Table 6B summarizes capital improvement costs by category and planning term. As shown in the table, collectively over the planning period of the Master Plan, demand improvements represent over 40 percent of the programmed development costs. As discussed earlier, these improvements will only be completed should the actual need for these facilities be demonstrated by new levels of based aircraft or increases in operations.

TABLE 6B
Capital Projects by Type

	Short Term Planning Horizon	Intermediate Term Planning Horizon	Long Term Planning Horizon	Totals	Percent of Total
Safety/Standards	$4,558,000	$500,000	-	$5,058,000	17%
Maintenance	1,959,000	1,000,000	$2,000,000	4,959,000	16%
Security	2,465,000	--	--	2,465,000	8%
Environmental	250,000	-	-	250,000	1%
Capacity	1,780,000	3,546,300	-	5,326,300	17%
Demand	3,091,000	4,362,000	5,077,400	12,530,400	41%
Totals	**$14,103,000**	**$9,408,300**	**$7,077,400**	**$30,588,700**	**100%**

Capacity improvements represent 17 percent of total development costs. These improvements are primarily related to reducing runway occupancy time by adding exit taxiways. Improved instrument approach capability also increases capacity during inclement weather conditions. Some taxiway improvements are demand-based; in particular, the east side taxiways. The need for these taxiways will be dependent on the type of landside development on the east side of the airfield.

Safety/standards improvements include compliance with federal design standards and Part 139 certification. This is the third largest category for improvements over the planning period.

Maintenance projects represent the next largest category. Maintenance projects include crack filling and pavement surface seals, and pavement overlays at regular schedules, in accordance with the Airport's Pavement Management Plan. A regular pavement maintenance program is a condition of the airport receiving federal funding.

Due to the role of the FAA in the planning process, compliance with the federal National Environmental Protection Act (NEPA) is necessary. Environmental compliance will be a component of each project improvement. This can include local, state, and federal permits for improvements. These costs are anticipated in each specific development item.

SHORT TERM CAPITAL NEEDS

The Short Term Planning Horizon covers fiscal years 2006 through 2010, and includes $14.1 million in capital needs. Since these projects represent the most immediate needs for the airport, it is important that a year-by-year implementation program be developed so that the KAA, FAA, and state can arrange funding. The Short Term Planning Horizon is the only planning horizon organized by years, as the actual sequencing of projects needs to be more fully examined closer to implementation.

Maintenance projects in the Short Term Planning Horizon include the reconstruction of Mohave Airport Drive and construction of helicopter hardstands. The hardstands are needed as the helicopter skids have deteriorated the apron pavement.

Safety/standards projects include the acquisition of the Runway 21 runway protection zone (RPZ) and installation of lighted hold signs. The lighted hold signs are a requirement of the airport's 14 CFR Part 139 certification. FAA standards recommend the fee simple acquisition of the RPZ to ensure that it is not developed with incompatible uses. This also includes the reconstruction of Taxiways B and C for 14 CFR Part 139 compliance.

Security projects include apron lighting and the perimeter service road. The perimeter service road allows perimeter security checks during heightened alert periods. Additionally, the perimeter service road allows airport maintenance vehicles to move around the airfield without having to cross a runway or taxiway. This reduces the potential for runway incursions. An integrated security access system is planned to control and log access at all automated security gates on the airport.

Demand projects include the construction of a 10-unit T-hangar and eight conventional hangars in the existing aircraft storage area to meet demand. Coordination with the FAA will be necessary to determine if grant funding would be available for the construction of these hangars. As discussed above, hangar construction is now eligible at non-primary commercial service airports but the airport is limited to using their annual entitlement dollars.

The reconstruction of Taxiway E is also included in the Short Term Planning Horizon. This taxiway would be constructed along the closed runway alignment at the south end of the airport. This area would provide access to the aircraft storage area.

The construction of a new passenger terminal is also included in the Short Term Planning Horizon. The terminal would replace the existing building which is more than 50 years old and does not accommodate all the necessary functional elements of commercial airline service.

A master drainage study is planned along with the construction of an airport maintenance building and an aircraft wash rack. First phase taxiway access to the Kingman Airport Industrial Park is also programmed.

INTERMEDIATE TERM CAPITAL NEEDS

Intermediate Term Planning Horizon development needs support projected aviation demand, continued pavement maintenance, and the addition of taxiways for capacity and efficiency. Intermediate Term Planning Horizon improvements are estimated at $9.4 million.

This includes the addition of two exit taxiways along Runway 17-35 and one exit along Runway 3-21. Two taxiways to support the ground handling of gliders before departure and after landing are also included in this planning horizon. Runway 3-21 is programmed to be extended to 7,000 feet with an instrument landing system (ILS) and medium intensity approach lighting system with runway alignment indicator lights (MALSR) installed for a Category I (1/2-mile visibility and 200-foot cloud ceiling minimum) precision approach. Runway end identifier lights (REILs) are programmed for each end of Runway 17-35. This lighting assists pilots in locating the runway ends at night and during inclement weather conditions.

Taxiway B is programmed for medium intensity taxiway lighting (MITL). Development along the southwest apron will be supported by a vehicle access road located north of Taxiway E. Provision for expanded automobile parking near the terminal building is included in this planning horizon as well as the construction of 20 T-hangars and associated taxilanes. Phase II taxiway development and vehicle access roads for aviation-related development in the adjacent Kingman Airport Industrial Park is also programmed.

A total of $200,000 annually is included in the Intermediate Term Planning Horizon for pavement preservation activities. Pavement preservation activities typically include applying a slurry seal to rejuvenate and protect the pavement surface, crack sealing, and/or small pavement repairs.

LONG TERM CAPITAL NEEDS

Long Term Planning Horizon development needs support projected aviation demand and continue pavement maintenance. Long Term Planning Horizon improvements are estimated at $7.0 million.

Demand projects include the construction of 32 T-hangars and associated taxiways to meet projected demand. The construction of the Runway 17-35 easterly parallel taxiway and Runway 3-21 southern partial parallel taxiway is also programmed. These taxiways may be needed to support future aviation-related development on the east side of the airport. Taxiway B is also planned to be extended to the west.

A total of $200,000 annually is included in the Long Term Planning Horizon for pavement preservation activities. Pavement preservation activities typically include applying a slurry seal to rejuvenate and protect the pavement surface, crack sealing, and/or small pavement repairs. **Exhibits 6B** and **6C** depict development staging.

PLAN IMPLEMENTATION

The successful implementation of the Kingman Airport Master Plan will require sound judgment on the part of the KAA to meet future activity demands, while maintaining the existing infrastructure and improving this infrastructure to support new development. While the projects included in the capital improvement program have been broken into short, intermediate, and long term planning periods, the KAA will need to consider the scheduling of projects in a flexible manner and add new projects from time-to-time to satisfy safety or design standards, or newly created demands. In summary, the planning process requires that the KAA continually monitor the need for new or rehabilitated facilities, since applications (for eligible projects) must be submitted to the FAA each year.

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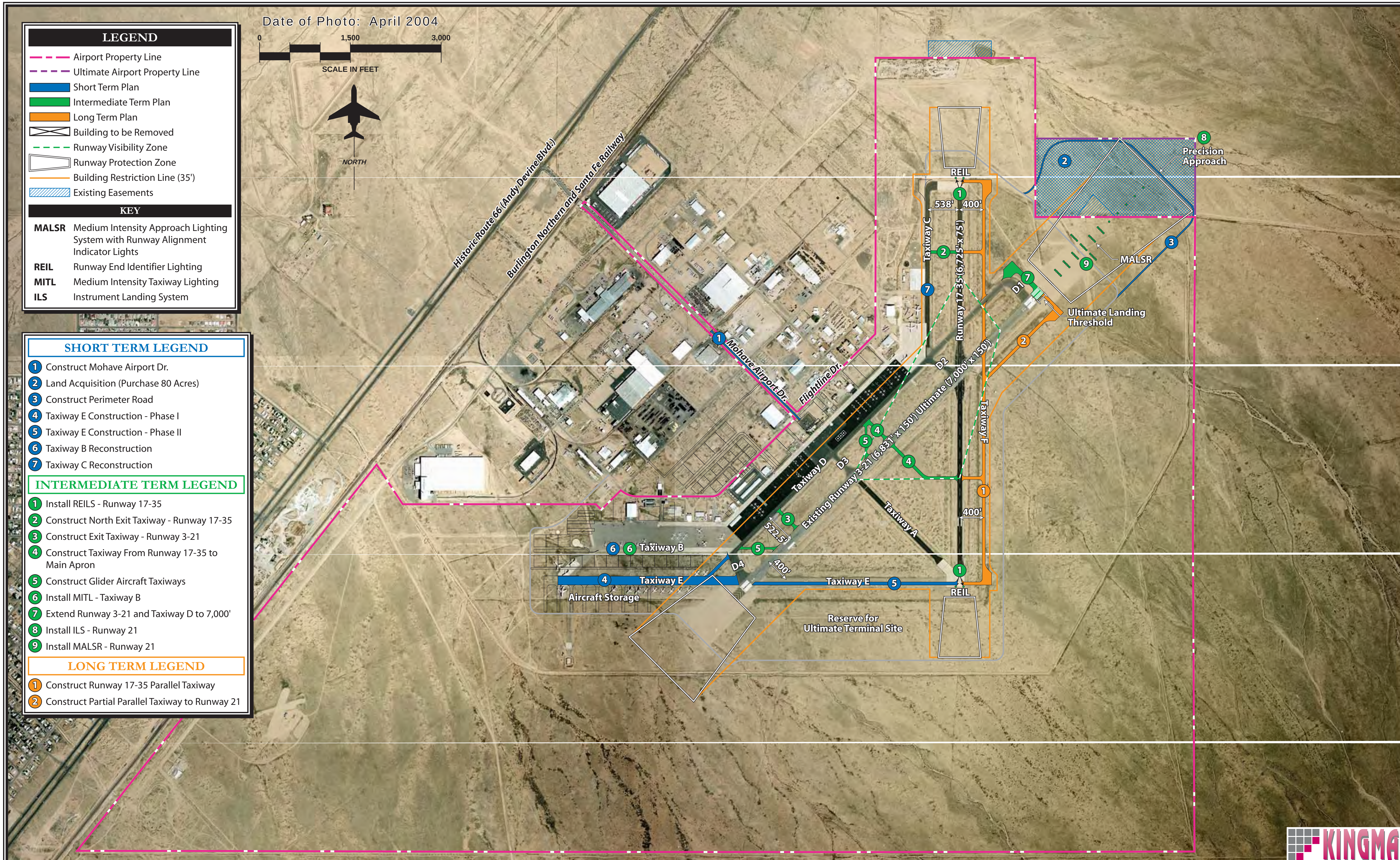

Exhibit 6B
AIRFIELD DEVELOPMENT STAGING

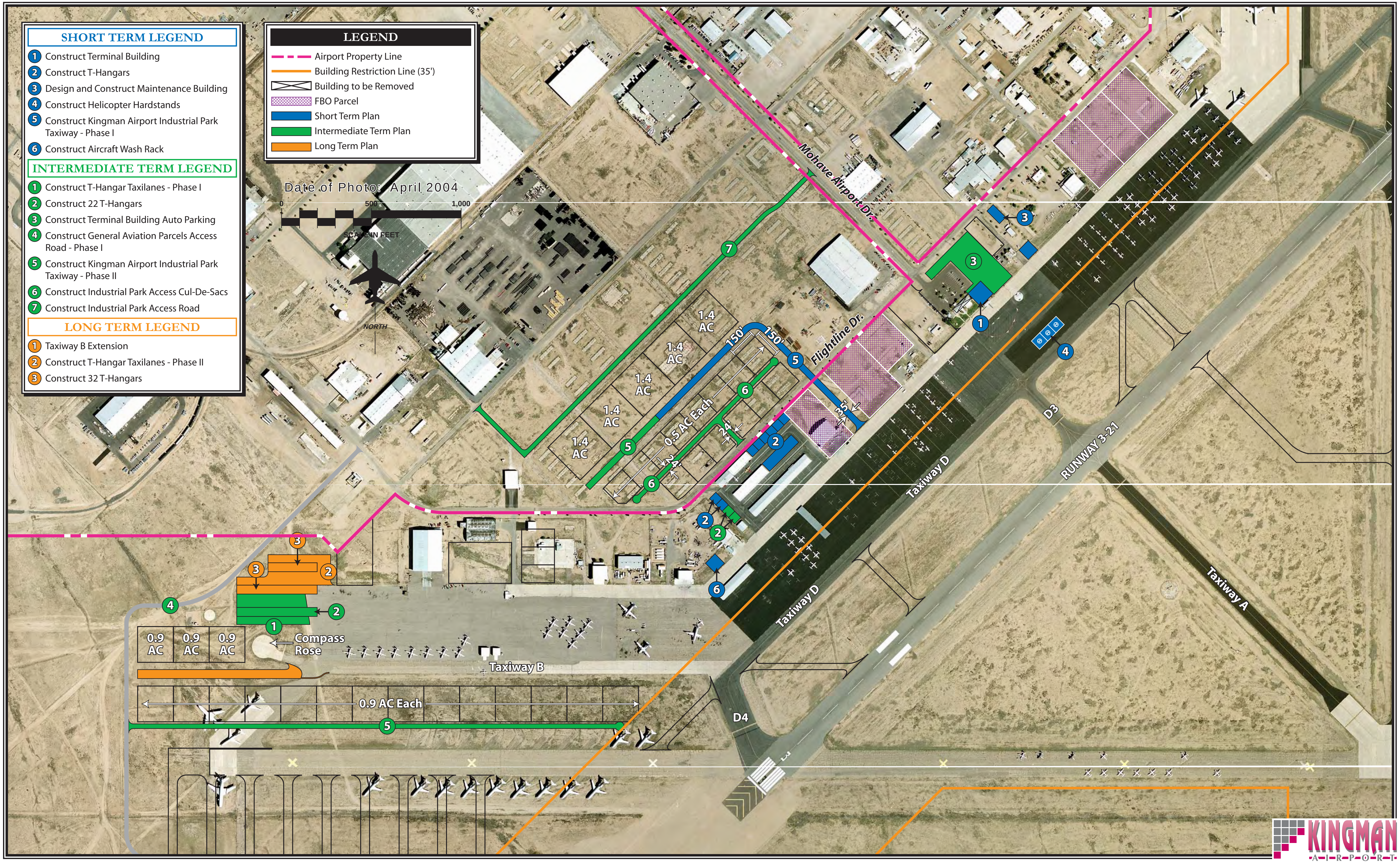

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Exhibit 6C
LANDSIDE DEVELOPMENT STAGING

KINGMAN AIRPORT

Appendix A

GLOSSARY & ABBREVIATIONS

ACCELERATE-STOP DISTANCE AVAILABLE (ASDA): see declared distances.

AIR CARRIER: an operator which: (1) performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week, and places between which such flights are performed; or (2) transport mail by air pursuant to a current contract with the U.S. Postal Service. Certified in accordance with Federal Aviation Regulation (FAR) Parts 121 and 127.

AIRPORT REFERENCE CODE (ARC): a coding system used to relate airport design criteria to the operational (Aircraft Approach Category) to the physical characteristics (Airplane Design Group) of the airplanes intended to operate at the airport.

AIRPORT REFERENCE POINT (ARP): The latitude and longitude of the approximate center of the airport.

AIRPORT ELEVATION: The highest point on an airport's usable runway expressed in feet above mean sea level (MSL).

AIRPORT LAYOUT DRAWING (ALD): The drawing of the airport showing the layout of existing and proposed airport facilities.

AIRCRAFT APPROACH CATEGORY: a grouping of aircraft based on 1.3 times the stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

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

AIRPLANE DESIGN GROUP (ADG): a grouping of aircraft based upon wingspan. The groups are as follows:

- *Group I:* Up to but not including 49 feet.
- *Group II:* 49 feet up to but not including 79 feet.
- *Group III:* 79 feet up to but not including 118 feet.
- *Group IV:* 118 feet up to but not including 171 feet.
- *Group V:* 171 feet up to but not including 214 feet.
- *Group VI:* 214 feet or greater.

AIR TAXI: An air carrier certificated in accordance with FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.

AIRPORT TRAFFIC CONTROL TOWER (ATCT): a central operations facility in the terminal air traffic control system, consisting of a tower, including an associated instrument flight rule (IFR) room if radar equipped, using air/ground communications and/or radar, visual signaling, and other devices to provide safe and expeditious movement of terminal air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC): a facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the enroute phase of flight.

ALERT AREA: see special-use airspace.

ANNUAL INSTRUMENT APPROACH (AIA): an approach to an airport with the intent to land by an aircraft in accordance with an IFR flight plan when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.

APPROACH LIGHTING SYSTEM (ALS): an airport lighting facility which provides visual guidance to landing aircraft by radiating light beams by which the pilot aligns the aircraft with the extended centerline of the runway on his final approach and landing.

APPROACH MINIMUMS: the altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.

AUTOMATIC DIRECTION FINDER (ADF): an aircraft radio navigation system which senses and indicates the direction to a non-directional radio beacon (NDB) ground transmitter.

AUTOMATED WEATHER OBSERVATION STATION (AWOS): equipment used to automatically record weather conditions (i.e. cloud height, visibility, wind speed and direction, temperature, dewpoint, etc...)

AUTOMATED TERMINAL INFORMATION SERVICE (ATIS): the continuous broadcast of recorded non-control information at towered airports. Information typically includes wind speed, direction, and runway in use.

AZIMUTH: Horizontal direction expressed as the angular distance between true north and the direction of a fixed point (as the observer's heading).

BASE LEG: A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline. See "traffic pattern."

BEARING: the horizontal direction to or from any point, usually measured clockwise from true north or magnetic north.

BLAST FENCE: a barrier used to divert or dissipate jet blast or propeller wash.

BUILDING RESTRICTION LINE (BRL): A line which identifies suitable building area locations on the airport.

CIRCLING APPROACH: a maneuver initiated by the pilot to align the aircraft with the runway for landing when flying a predetermined circling instrument approach under IFR.

CLASS A AIRSPACE: see Controlled Airspace.

CLASS B AIRSPACE: see Controlled Airspace.

CLASS C AIRSPACE: see Controlled Airspace.

CLASS D AIRSPACE: see Controlled Airspace.

CLASS E AIRSPACE: see Controlled Airspace.

CLASS G AIRSPACE: see Controlled Airspace.

CLEAR ZONE: see Runway Protection Zone.

CROSSWIND: wind flow that is not parallel to the runway of the flight path of an aircraft.

COMPASS LOCATOR (LOM): a low power, low/medium frequency radiobeacon installed in conjunction with the instrument landing system at one or two of the marker sites.

CONTROLLED AIRSPACE: airspace of defined dimensions within which air traffic control services are provided to instrument flight rules (IFR) and visual flight rules (VFR) flights in accordance with the airspace classification. Controlled airspace in the United States is designated as follows:

- *CLASS A:* generally, the airspace from 18,000 feet mean sea level (MSL) up to but not including flight level FL600. All persons must operate their aircraft under IFR.

- *CLASS B:* generally, the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. The configuration of Class B airspace is unique to each airport, but typically consists of two or more layers of air space and is designed to contain all published instrument approach procedures to the airport. An air traffic control clearance is required for all aircraft to operate in the area.

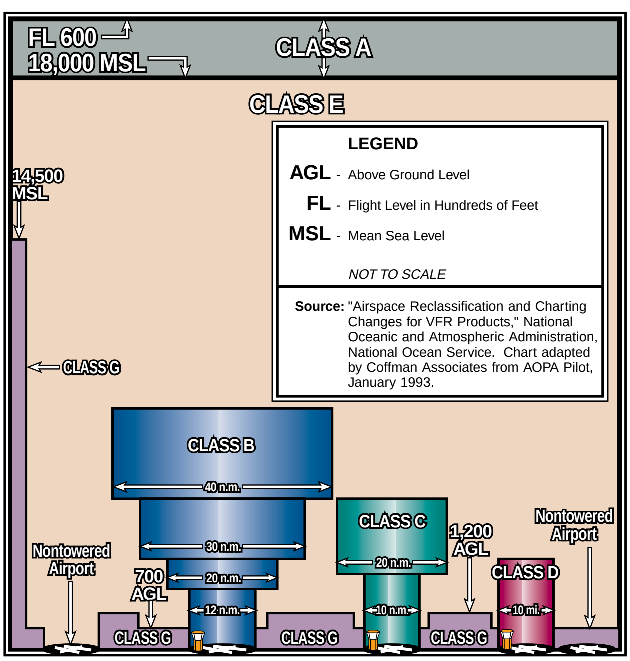
- *CLASS C:* generally, the airspace from the surface to 4,000 feet above the air port elevation (charted as MSL) surrounding those airports that have an operational control tower and radar approach control and are served by a qualifying number of IFR operations or passenger enplanements. Although individually tailored for each airport, Class C airspace typically consists of a surface area with a five nautical mile (nm) radius and an outer area with a 10 nautical mile radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Two-way radio communication is required for all aircraft.

- *CLASS D:* generally, that airspace from the surface to 2,500 feet above the air port elevation (charted as MSL) surrounding those airport that have an operational control tower. Class D air space is individually tailored and configured to encompass published instrument approach procedures.
  Unless otherwise authorized, all

persons must establish two-way radio communication.

- *CLASS E:* generally, controlled airspace that is not classified as Class A, B, C, or D. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Class E airspace encompasses all Victor Airways. Only aircraft following instrument flight rules are required to establish two-way radio communication with air traffic control.

- *CLASS G:* generally, that airspace not classified as Class A, B, C, D, or E. Class G airspace is uncontrolled for all aircraft. Class G airspace extends from the surface to the overlying Class E airspace.



CONTROLLED FIRING AREA: see special-use airspace.

CROSSWIND LEG: A flight path at right angles to the landing runway off its upwind end. See "traffic pattern."

DECLARED DISTANCES: The distances declared available for the airplane's takeoff runway, takeoff distance, accelerate-stop distance, and landing distance requirements. The distances are:

- *TAKEOFF RUNWAY AVAILABLE (TORA):* The runway length declared available and suitable for the ground run of an airplane taking off;

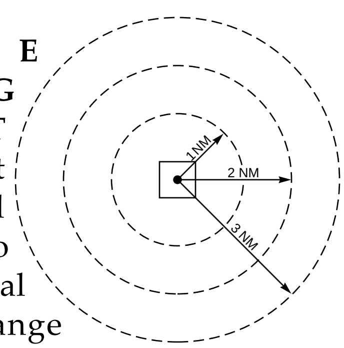
- *TAKEOFF DISTANCE AVAILABLE (TODA):* The TORA plus the length of any remaining runway and/or clear way beyond the far end of the TORA;

- *ACCELERATE-STOP DISTANCE AVAILABLE (ASDA):* The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff; and

- *LANDING DISTANCE AVAILABLE (LDA):* The runway length declared available and suitable for landing.

DISPLACED THRESHOLD: a threshold that is located at a point on the runway other than the designated beginning of the runway.

DISTANCE MEASURING EQUIPMENT (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range



distance of an aircraft from the DME navigational aid.

DNL: The 24-hour average sound level, in A-weighted decibels, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m. as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.

DOWNWIND LEG: A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg. Also see "traffic pattern."

EASEMENT: The legal right of one party to use a portion of the total rights in real estate owned by another party. This may include the right of passage over, on, or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity, as well as any other legal rights in the property that may be specified in the easement document.

ENPLANED PASSENGERS: the total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and non-scheduled services.

FINAL APPROACH: A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. See "traffic pattern."

FIXED BASE OPERATOR (FBO): A provider of services to users of an airport. Such services include, but are not limited to, hangaring, fueling, flight training, repair, and maintenance.

FRANGIBLE NAVAID: a navigational aid which retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft.

GENERAL AVIATION: that portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of convenience and necessity, and large aircraft commercial operators.

GLIDESLOPE (GS): Provides vertical guidance for aircraft during approach and landing. The glideslope consists of the following:

1. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS; or

2. Visual ground aids, such as VASI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

GLOBAL POSITIONING SYSTEM: See "GPS."

GPS - GLOBAL POSITIONING SYSTEM: A system of 24 satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

HELIPAD: a designated area for the takeoff, landing, and parking of helicopters.

HIGH-SPEED EXIT TAXIWAY: a long radius taxiway designed to expedite aircraft turning off the runway after landing (at speeds to 60 knots), thus reducing runway occupancy time.

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

INSTRUMENT FLIGHT RULES (IFR): Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.

INSTRUMENT LANDING SYSTEM (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer.
2. Glide Slope.
3. Outer Marker.
4. Middle Marker.
5. Approach Lights.

LANDING DISTANCE AVAILABLE (LDA): see declared distances.

LOCAL TRAFFIC: aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from the local practice areas, or aircraft executing practice instrument approach procedures. Typically, this includes touch-and-go training operations.

LOCALIZER: The component of an ILS which provides course guidance to the runway.

LOCALIZER TYPE DIRECTIONAL AID (LDA): a facility of comparable utility and accuracy to a localizer, but is not part of a complete ILS and is not aligned with the runway.

LORAN: long range navigation, an electronic navigational aid which determines aircraft position and speed by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters. Loran is used for enroute navigation.

MICROWAVE LANDING SYSTEM (MLS): an instrument approach and landing system that provides precision guidance in azimuth, elevation, and distance measurement.

MILITARY OPERATIONS AREA (MOA): see special-use airspace.

MISSED APPROACH COURSE (MAC): The flight route to be followed if, after an instrument approach, a landing is not affected, and occurring normally:

1. When the aircraft has descended to the decision height and has not established visual contact; or

2. When directed by air traffic control to pull up or to go around again.

MOVEMENT AREA: the runways, taxiways, and other areas of an airport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, air traffic control clearance is required for entry onto the movement area.

NAVAID: a term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e. PAPI, VASI, ILS, etc..)

NOISE CONTOUR: A continuous line on a map of the airport vicinity connecting all points of the same noise exposure level.

NONDIRECTIONAL BEACON (NDB): A beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his or her bearing to and from the radio beacon and home on, or track to, the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.

NONPRECISION APPROACH PROCEDURE: a standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

OBJECT FREE AREA (OFA): an area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

OBSTACLE FREE ZONE (OFZ): the airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be kept clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance for aircraft landing or taking off from the runway, and for missed approaches.

OPERATION: a take-off or a landing.

OUTER MARKER (OM): an ILS navigation facility in the terminal area navigation system located four to seven miles from the runway edge on the extended centerline indicating to the pilot, that he/she is passing over the facility and can begin final approach.

PRECISION APPROACH: a standard instrument approach procedure which provides runway alignment and glide slope (descent) information. It is categorized as follows:

- *CATEGORY I (CAT I):* a precision approach which provides for approaches with a decision height of not less than 200 feet and visibility not less than 1/2 mile or Runway Visual Range (RVR) 2400 (RVR 1800) with operative touchdown zone and runway centerline lights.

- *CATEGORY II (CAT II):* a precision approach which provides for approaches with a decision height of not less than 100 feet and visibility not less than 1200 feet RVR.

- *CATEGORY III (CAT III):* a precision approach which provides for approaches with minima less than Category II.

PRECISION APPROACH PATH INDICATOR (PAPI): A lighting system providing visual approach slope guidance to aircraft during a landing approach. It is similar to a VASI but provides a sharper transition between the colored indicator lights.

PRECISION OBJECT FREE AREA (POFA): an area centered on the extended runway centerline, beginning at the runway threshold and extending behind the runway threshold that is 200 feet long by 800 feet wide. The POFA is a clearing standard which requires the POFA to be kept clear of above ground objects protruding above the runway safety area edge elevation (except for frangible NAVAIDS). The POFA applies to all new authorized instrument approach procedures with less than 3/4 mile visibility.

PROHIBITED AREA: see special-use airspace.

REMOTE COMMUNICATIONS OUTLET (RCO): an unstaffed transmitter receiver/facility remotely controlled by air traffic personnel. RCOs serve flight service stations (FSSs). RCOs were established to provide ground-to-ground communications between air traffic control specialists and pilots at satellite airports for delivering enroute clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times.

REMOTE TRANSMITTER/RECEIVER (RTR): see remote communications outlet. RTRs serve ARTCCs.

RELIEVER AIRPORT: an airport to serve general aviation aircraft which might otherwise use a congested air-carrier served airport.

RESTRICTED AREA: see special-use airspace.

RNAV: area navigation - airborne equipment which permits flights over determined tracks within prescribed accuracy tolerances without the need to overfly ground-based navigation facilities. Used enroute and for approaches to an airport.

RUNWAY: a defined rectangular area on an airport prepared for aircraft landing and takeoff. Runways are normally numbered in relation to their magnetic direction, rounded off to the nearest 10 degrees. For example, a runway with a magnetic heading of 180 would be designated Runway 18. The runway heading on the opposite end of the runway is 180 degrees from that runway end. For example, the opposite runway heading for Runway 18 would be Runway 36 (magnetic heading of 360). Aircraft can takeoff or land from either end of a runway, depending upon wind direction.

RUNWAY BLAST PAD: a surface adjacent to the ends of runways provided to reduce the erosive effect of jet blast and propeller wash.

RUNWAY END IDENTIFIER LIGHTS (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

RUNWAY GRADIENT: the average slope, measured in percent, between the two ends of a runway.

RUNWAY PROTECTION ZONE (RPZ): An area off the runway end to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape. Its dimensions are determined by the aircraft approach speed and runway approach type and minima.

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 from the runway.

RUNWAY VISUAL RANGE (RVR): an instrumentally derived value, in feet, representing the horizontal distance a pilot can see down the runway from the runway end.

RUNWAY VISIBILITY ZONE (RVZ): an area on the airport to be kept clear of permanent objects so that there is an unobstructed line-of-site from any point five feet above the runway centerline to any point five feet above an intersecting runway centerline.

SEGMENTED CIRCLE: a system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

SHOULDER: an area adjacent to the edge of paved runways, taxiways or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection. The shoulder does not necessarily need to be paved.

SLANT-RANGE DISTANCE: The straight line distance between an aircraft and a point on the ground.

SPECIAL-USE AIRSPACE: airspace of defined dimensions identified by a surface area wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Special-use airspace classifications include:

- *ALERT AREA:* airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.

- *CONTROLLED FIRING AREA:* airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons or property on the ground.

- *MILITARY OPERATIONS AREA (MOA):* designated airspace with defined vertical and lateral dimensions established outside Class A airspace to separate/segregate certain military activities from instrument flight rule (IFR) traffic and to identify for visual flight rule (VFR) traffic where these activities are conducted.

- *PROHIBITED AREA:* designated airspace within which the flight of aircraft is prohibited.

- *RESTRICTED AREA:* airspace designated under Federal Aviation Regulation (FAR) 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use. When not in use by the using agency, IFR/VFR operations can be authorized by the controlling air traffic control facility.

- *WARNING AREA:* airspace which may contain hazards to nonparticipating aircraft.

STANDARD INSTRUMENT DEPARTURE (SID): a preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual form only.

STANDARD TERMINAL ARRIVAL (STAR): a preplanned coded air traffic control IFR arrival routing, preprinted for pilot use in graphic and textual or textual form only.

STOP-AND-GO: a procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point. A stop-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

STRAIGHT-IN LANDING/APPROACH: a landing made on a runway aligned within 30 degrees of the final approach course following completion of an instrument approach.

TACTICAL AIR NAVIGATION (TACAN): An ultra-high frequency electronic air navigation system which provides suitably-equipped aircraft a continuous indication of bearing and distance to the TACAN station.

TAKEOFF RUNWAY AVAILABLE (TORA): see declared distances.

TAKEOFF DISTANCE AVAILABLE (TODA): see declared distances.

TAXILANE: the portion of the aircraft parking area used for access between taxiways and aircraft parking positions.

TAXIWAY: a defined path established for the taxiing of aircraft from one part of an airport to another.

TAXIWAY SAFETY AREA (TSA): a defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

TETRAHEDRON: a device used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.

THRESHOLD: the beginning of that portion of the runway available for landing. In some instances the landing threshold may be displaced.

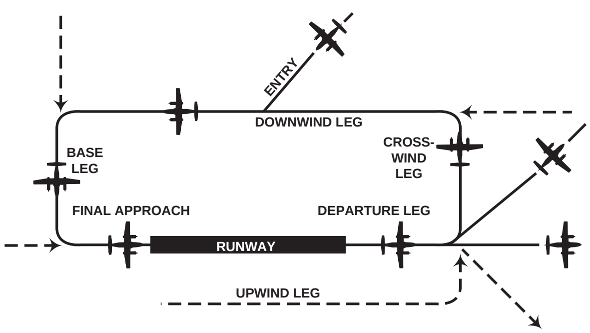
TOUCH-AND-GO: an operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

TOUCHDOWN ZONE (TDZ): The first 3,000 feet of the runway beginning at the threshold.

TOUCHDOWN ZONE ELEVATION (TDZE): The highest elevation in the touchdown zone.

TOUCHDOWN ZONE (TDZ) LIGHTING: Two rows of transverse light bars located symmetrically about the runway centerline normally at 100-foot intervals. The basic system extends 3,000 feet along the runway.

TRAFFIC PATTERN: The traffic flow that is prescribed for aircraft landing at or taking off from an airport. The components of a typical traffic pattern are the upwind leg, crosswind leg, downwind leg, base leg, and final approach.

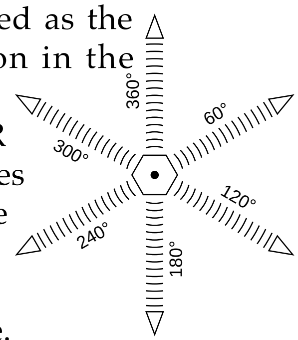


UNICOM: A nongovernment communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOM's are shown on aeronautical charts and publications.

UPWIND LEG: A flight path parallel to the landing runway in the direction of landing. See "traffic pattern."

VECTOR: A heading issued to an aircraft to provide navigational guidance by radar.

VERY HIGH FREQUENCY/ OMNIDIRECTIONAL RANGE STATION (VOR): A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the national airspace system. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature.



VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE STATION/ TACTICAL AIR NAVIGATION (VORTAC): A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment (DME) at one site.

VICTOR AIRWAY: A control area or portion thereof established in the form of a corridor, the centerline of which is defined by radio navigational aids.

VISUAL APPROACH: An approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.

VISUAL APPROACH SLOPE INDICATOR (VASI): An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he is on path if he sees red/white, above path if white/white, and below path if red/red. Some airports serving large aircraft have three-bar VASI's which provide two visual guide paths to the same runway.

VISUAL FLIGHT RULES (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

VOR: See "Very High Frequency Omnidirectional Range Station."

VORTAC: See "Very High Frequency Omnidirectional Range Station/Tactical Air Navigation."

WARNING AREA: see special-use airspace.

ABBREVIATIONS

AC: advisory circular

ADF: automatic direction finder

ADG: airplane design group

AFSS: automated flight service station

AGL: above ground level

AIA: annual instrument approach

AIP: Airport Improvement Program

AIR-21: Wendell H. Ford Aviation Investment and Reform Act for the 21st Century

ALS: approach lighting system

ALSF-1: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT I configuration)

ALSF-2: standard 2,400-foot high intensity approach light ing system with sequenced flashers (CAT II configuration)

APV: instrument approach procedure with vertical guidance

ARC: airport reference code

ARFF: aircraft rescue and firefighting

ARP: airport reference point

ARTCC: air route traffic control center

ASDA: accelerate-stop distance available

ASR: airport surveillance radar

ASOS: automated surface observation station

ATCT: airport traffic control tower

ATIS: automated terminal information service

AVGAS: aviation gasoline - typically 100 low lead (100LL)

AWOS: automated weather observation station

BRL: building restriction line

CFR: Code of Federal Regulations

CIP: capital improvement program

DME: distance measuring equipment

DNL: day-night noise level

DWL:	runway weight bearing capacity for aircraft with dual-wheel type landing gear
DTWL:	runway weight bearing capacity for aircraft with dual-tandem type landing gear
FAA:	Federal Aviation Administration
FAR:	Federal Aviation Regulation
FBO:	fixed base operator
FY:	fiscal year
GPS:	global positioning system
GS:	glide slope
HIRL:	high intensity runway edge lighting
IFR:	instrument flight rules (FAR Part 91)
ILS:	instrument landing system
IM:	inner marker
LDA:	localizer type directional aid
LDA:	landing distance available
LIRL:	low intensity runway edge lighting
LMM:	compass locator at middle marker
LOC:	ILS localizer
LOM:	compass locator at ILS outer marker
LORAN:	long range navigation
MALS:	medium intensity approach lighting system
MALSR:	medium intensity approach lighting system with runway alignment indicator lights
MIRL:	medium intensity runway edge lighting
MITL:	medium intensity taxiway edge lighting
MLS:	microwave landing system
MM:	middle marker
MOA:	military operations area
MSL:	mean sea level
NAVAID:	navigational aid
NDB:	nondirectional radio beacon
NM:	nautical mile (6,076 .1 feet)
NPES:	National Pollutant Discharge Elimination System
NPIAS:	National Plan of Integrated Airport Systems

Coffman Associates
Airport Consultants
www.coffmanassociates.com

NPRM: notice of proposed rule-making

ODALS: omnidirectional approach lighting system

OFA: object free area

OFZ: obstacle free zone

OM: outer marker

PAC: planning advisory committee

PAPI: precision approach path indicator

PFC: porous friction course

PFC: passenger facility charge

PCL: pilot-controlled lighting

PIW: public information workshop

PLASI: pulsating visual approach slope indicator

POFA: precision object free area

PVASI: pulsating/steady visual approach slope indicator

RCO: remote communications outlet

REIL: runway end identifier lighting

RNAV: area navigation

RPZ: runway protection zone

RSA: Runway Safety Area

RTR: remote transmitter/receiver

RVR: runway visibility range

RVZ: runway visibility zone

SALS: short approach lighting system

SASP: state aviation system plan

SEL: sound exposure level

SID: standard instrument departure

SM: statute mile (5,280 feet)

SRE: snow removal equipment

SSALF: simplified short approach lighting system with sequenced flashers

SSALR: simplified short approach lighting system with runway alignment indicator lights

STAR: standard terminal arrival route

SWL: runway weight bearing capacity for aircraft with single-wheel type landing gear

STWL: runway weight bearing capacity for aircraft with single-wheel tandem type landing gear

TACAN: tactical air navigational aid

TDZ: touchdown zone

TDZE: touchdown zone elevation

TAF: Federal Aviation Administration (FAA) Terminal Area Forecast

TODA: takeoff distance available

TORA: takeoff runway available

TRACON: terminal radar approach control

VASI: visual approach slope indicator

VFR: visual flight rules (FAR Part 91)

VHF: very high frequency

VOR: very high frequency omnidirectional range

VORTAC: VOR and TACAN collocated

Appendix B

BASED AIRCRAFT

BASED AIRCRAFT LISTING

KINGMAN AIRPORT
June, 2004

N-Number	Type	Make/Model
122PW	SE	Cessna 172
2042C	ME	Beech 95
73830	SE	Cessna 172
874R	SE	Beech 35-33
3989Q	SE	Cessna 172
13533	SE	Cessna 172
6979H	SE	Cessna 172
5401H	SE	Cessna 172
2712Y	ME	Beech 95
128W	ME	Beech 95
9844G	SE	Cessna 172
6430X	SE	Cessna 180
4241N	ME	Piper PA-E23-250
2024C	ME	Beech 95
2096C	ME	Beech 95
9143H	SE	Cessna 172
5268U	SE	Cessna 172
9022N	SE	North American T-28C
378J	SE	Beech V35
6140R	SE	Cessna 172
32LB	SE	Lake LA-4-200
227D	SE	Cessna 210
173VA	SE	Cessna 172
546S	ME	Fairchild C-123K
51802	ME	Douglas C-54G
142F	ME	Beech 95-C55
32425	SE	Piper PA-28-151
6151P	SE	Piper PA-24-250
8421Z	SE	Cessna 210
8438P	SE	Piper PA-24-400
1616T	ME	Cessna 414
92375	SE	North American AT6-C
1215D	SE	Cessna 170
6365R	SE	Piper PA-28-140
8890K	SE	Piper PA-28-140
3985Q	SE	Cessna 172

34476	SE	Cessna 177
2152T	SE	Cessna 172
3490A	SE	Piper PA-22-135
9473Z	SE	Cessna 182
6933M	SE	Stinson 108-3
898BH	SE	Cessna 210
8175X	SE	Cessna 172
301CA	SE	Piper PA-32-30
6488Q	SE	Mooney M20
6962A	SE	Cessna 172
8577M	ME	Beech 95-A55
7725	SE	Sportavia-Putzer Fournier
3322F	SE	Cessna 182
14872	SE	Cessna 206
9391G	SE	Cessna 182
62663	SE	Boeing IB75A
49MD	ME	Beech 95-C55
3652K	SE	Piper PA-28-140
58442	SE	Cessna 182
3360M	SE	Piper PA-28-161
7067A	SE	Cessna 172
63453	SE	Cessna 150
5217F	SE	Cessna 172
7783U	SE	Cessna 172
9878T	SE	Piper PA-38-112
3758F	SE	Cessna 172
734XH	SE	Cessna 172
68874	SE	Helio HT-295
6423L	SE	American Aviation AA-1A
4241N	ME	Piper PA-E23-250
6644T	SE	Cessna 150
1815J	SE	Piper PA-28-140
267SD	Rotorcraft	Bell OH-58A
3089V	SE	Beech 35
711RH	SE	Cessna 172
4990W	SE	Rockwell International 114
289GR	ME	Aero Commander 500
19686	SE	Cessna 172
28974	SE	Bellanca 14-12F-3
737XU	SE	Cessna 172
134VP	SE	Piper PA-128-140
58571	SE	Stinson V77
2029	SE	Sinclair-Robert PL-1
2629W	SE	Mooney M20

8477F	SE	Piper PA-28-140
2120Q	SE	Maxwell Richard RV-6A
8366K	SE	Stinson 108-1
8883J	SE	Piper PA-28-180
87346	SE	Ercoupe 415-E
296MH	SE	Hart Malcom Steele Cozy III
6617S	SE	Cessna 150
8091X	SE	Piper PA-28-140
23127	SE	Cessna 150
8673A	SE	Beech A35
3322F	SE	Cessna 182
6850F	SE	Cessna 150
5505P	SE	Piper PA-24-250
49MD	ME	Beech 95-C55
2403D	SE	Piper PA-38-112
90483	Rotorcraft	Hiller UH-12L4
9795W	SE	Piper PA-28-140
22716	SE	Cessna 150
90203	ME	Douglas C-54G
96358	ME	Douglas C-54E-DC
3054V	ME	Douglas C-54-DC
4054F	SE	Cessna 172
701PG	SE	George Paul Zenith 701

Appendix C

AIRPORT ECONOMIC BENEFIT ANALYSIS

EXECUTIVE SUMMARY

This report presents an analysis of the economic benefits of Kingman Airport for the economy of the airport service area, Mohave County in Arizona, the City of Kingman, and nearby communities.

This economic benefit study is based on interviews, surveys and data collected relating to the year 2004. At mid-year 2004 there were 103 based aircraft on the airport, including 83 single engine planes, 18 multi-engine aircraft, and 2 helicopters. In addition, there were some 150 stored aircraft.

In 2004, Kingman Airport recorded 2,585 commercial airline passenger enplanements. More than one half of these travelers (55%) were visitors to the region.

Total Economic Benefits

Economic benefits (revenues, employment and earnings) are created when economic activity takes place both on and off the airport. The economic benefits of Kingman Airport for 2004 are shown in Table C1.

The total benefits of the airport, the sum of the direct benefits and the indirect benefits, which result as dollars re-circulated in the regional economy, were calculated to be:

- **$33.0 Million Revenues**
- **$11.5 Million Earnings**
- **466 Total Employment**

Measuring Economic Benefits

Kingman Airport serves as a gateway that welcomes commerce and visitors into the region and provides access for the citizens and businesses of the Kingman area to travel outward to the economy at large.

Commercial airline travelers from Kingman can make connections for national and global flights. General aviation allows business travelers to reach destinations without the delays and uncertainty of today's airline flights and provides access to more than 5,300 airports in the nation, compared to approximately 565 served by scheduled airlines.

The presence of an airport creates benefits for a community in other ways. Airports bring essential services, including enhanced medical care (such as air ambulance service), support for law enforcement and fire control, and courier delivery of mail and high value parcels. These services raise the quality of life for residents and maintain a competitive environment for economic development.

Although qualitative advantages created by the presence of an airport are important, they are also difficult to measure. In studying airport benefits, regional analysts have emphasized indicators of economic activity for airports that can be quantified, such as dollar value of output, number of jobs created, and earnings of workers and proprietors of businesses.

Economic benefit studies differ from cost-benefit analyses, which are often called for to

TABLE C1
Summary of Economic Benefits: 2004
Kingman Airport

	BENEFIT MEASURES		
Source	**Revenues**	**Earnings**	**Employment**
On-Airport Aviation Employers	**$15,000,000**	**$5,200,000**	**149**
Capital Projects	**1,700,000**	**800,000**	**21**
All On-Airport Economic Benefits	**16,700,000**	**6,000,000**	**170**
Off-Airport Air Visitor Spending	**1,000,000**	**400,000**	**25**
Direct Benefits: Sum of On-Airport & Off-Airport Benefits	**17,700,000**	**6,400,000**	**195**
Indirect Benefits (Multiplier Effects of Secondary Spending)	***15,300,000***	***5,100,000***	***271***
TOTAL BENEFITS	**$33,000,000**	**$11,500,000**	**466**

support decision-making, typically for public sector capital projects. Study of economic benefit is synonymous with measurement of economic performance. The methodology was standardized in the publication by the Federal Aviation Administration, *Estimating the Regional Economic Significance of Airports*, Washington DC, 1992.

Following the FAA methodology, this study views Kingman Airport as a source of measurable economic output (the production of aviation services) that creates revenues for firms, and employment and earnings for workers on and off the airport.

Business spending on the airport injects revenues into the community when firms buy products from suppliers and again when employees of the airport spend for household goods and services. In addition, spending by air visitors produces revenues for firms in the hospitality sector as well as employment and earnings for workers.

Benefit Measures

The quantitative measures of economic benefits of the Kingman Airport are each described below.

Revenue is the value in dollars of the output of goods and services produced by businesses. For government units, the budget is used as the value of output.

Output is equivalent to revenue or spending or sales. From the perspective of the business that is the supplier of goods and services, the dollar value of output is equal to the revenues received by that producer. From the viewpoint of the consumer, the dollar value of the output is equal to the amount that the consumer spent to purchase those goods and services from the business.

Earnings are a second benefit measure, made up of employee compensation (the dollar value of payments received by workers as wages and benefits) and proprietor's income of business owners.

Employment is the third benefit measure, the number of jobs supported by the revenues created by the airport.

To measure the economic benefits of the airport, information on revenues, employment and earnings was obtained directly from suppliers and users of aviation services including private sector firms on the airport, government agencies, airport staff, air travelers, and based aircraft owners.

On-Airport Direct Benefits

Operations on Kingman Airport supported a total of 19 private and public employers including passenger services such as airline ticketing and auto rental; FBO services, maintenance, and aircraft storage; express delivery services and medical transport; national forest fire fighting; as well as government agencies including the Transportation Security Administration, Bureau of Land Management, sheriff, and airport administration. In addition, on-going airport capital improvement projects created benefits on the airport during the year.

Including the revenues and employment created by outlays for airport capital projects, these economic units were responsible for on-airport benefits of:

- **$16.7 Million Revenues**
- **$6.0 Million Earnings**
- **170 On-Airport Jobs**

Off-Airport Visitor Benefits

An important source of aviation-related spending comes from visitors to the area that arrive at Kingman Airport. When air travelers make off-airport expenditures these outlays create revenues (sales) for firms that supply goods and services to visitors. During a typical year, there are more than 6,500 air visitors that arrive at the airport by commercial, private, or chartered aircraft.

Visitors traveling for business or personal reasons spend for lodging, food and drink, entertainment, retail goods and services, and ground transportation including auto rental and taxis, creating annual airport service area output, employment and earnings of:

- **$1.0 Million Revenues**
- **$400 Thousand Earnings**
- **25 Off-Airport Jobs**

Direct Benefits

Direct benefits represent the sum of on-airport and off-airport revenues, earnings and employment due to the presence of the airport. Direct benefits are the "first round" impacts and do not include any multiplier effects of secondary spending. The direct benefits of on-airport and off-airport economic activity related to Kingman Airport were:

- **$17.7 Million Revenues**
- **$6.4 Million Earnings**
- **195 Jobs**

Indirect Benefits (Multiplier Effects)

Indirect benefits (multiplier effects) are created when the initial spending by airport employers or visitors circulates and recycles through the economy. In contrast to initial or direct benefits, the indirect benefits measure the magnitude of successive rounds of re-spending as those who work for or sell products to airport employers or the hospitality sector spend dollars.

For example, when an aircraft mechanic's wages are spent to purchase food, housing, clothing, and medical services, these dollars create more jobs and income in the general economy of the region through multiplier effects of re-spending.

The initial direct revenue stream in the service area of $17.7 million created by the presence of Kingman Airport was estimated to stimulate indirect benefits from multiplier effects within the airport service area of:

- **$15.3 Million Revenues**
- **$5.1 Million Earnings**
- **271 Jobs**

Value of Based Aircraft Travel

The general aviation aircraft based at the airport flew more than 5,000 business and 7,800 personal hours in 2004 according to survey results of based aircraft owners. The Charter Equivalent Value of this travel was computed as $7.3 million, or more than $72,000 of economic value of travel per aircraft per year.

ON-AIRPORT BENEFITS

This section provides more detail on the economic benefits associated with activity on site at Kingman Airport.

Table C2 illustrates the annualized employment, earnings and value of output (revenues) produced by airport tenants in 2004. Values shown for revenues, employment and earnings are the direct benefits and do not include multiplier effects of indirect benefits.

On-Airport Output

On-airport economic activity created annual output of $16.7 million, including $1.7 million budgeted for capital projects. Private sector aviation revenues were $13.6 million and governmental budgets were $1.4 million.

Businesses at Kingman Airport offer passenger services including airline ticketing, auto rental and parking. Based on figures from the U. S. Department of Transportation, the dollar value of outbound airline travel from Kingman Airport was over $350,00 in 2004.

Full FBO services available for the aviation community include aircraft rental, maintenance, avionics, storage, and fueling for various categories of aircraft including piston, turboprop, and business jets.

Aviation activities on the airport include corporate hangars for private aircraft and services to the public such as flight training for those interested in learning to fly and sales, leasing and exchange of aircraft, as well as pilot supplies.

Air cargo and expedited delivery services are available for consumers, business, and medical users requiring secure and speedy transport of packages and products.

The airport is an important center for aerial fire fighting and during the fire season the number of fire fighting personnel can increase to 40 or more. The airport is the locus of specialized wildland fire fighting expertise and equipment both public and private that serve not only Arizona, but the entire Western region and, as needed, national sites as well. The low humidity of Mohave County has made Kingman Airport a competitive site for storage of large aircraft. Specialized services are available on the airport to provide maintenance and refurbishing.

There are several government agencies supporting aviation, including the Kingman Airport staff from the City of Kingman Airports Division, police and the Transportation Security Administration (TSA).

Capital Projects

Capital projects are vital for airports to maintain safety and provide for growth. Capital spending for airport improvements also creates jobs and injects dollars into the local economy. Spending for improvements for FY 2004 were budgeted at $1.7 million.

Employment and Earnings

There were 15 private sector aviation employers on the airport in 2004, and 4 government units. Surveys of on-airport employers provided a tally of 170 jobs on the airport (including 21 workers for capital projects). These employees brought home annual earnings of $6.0 million.

TABLE C2
On-Airport Benefits: Revenues, Earnings and Employment
Kingman Airport

	BENEFIT MEASURES		
Sources of On-Airport Benefits	**Revenues**	**Earnings**	**Employment**
Private Aviation Employers Commercial Airlines Auto Rental & Food Service FBO Services, Fueling & Parts Ariel Firefighting & Medical Transport Aircraft Maintenance & Storage Food Services	$13,600,000	$4,600,000	130
Capital Projects	1,700,000	800,000	21
Government Agencies/Services Kingman Airports Division Law Enforcement Bureau of Land Management Transportation Security Admin.	1,400,000	600,000	19
ON-AIRPORT BENEFITS	$16,700,000	$6,000,000	170

Source: Survey of Employers, Kingman Airport

AIR VISITOR BENEFITS

Kingman Airport attracts commercial airline and general aviation visitors from throughout the region and the nation who come to the area for business, recreational and personal travel.

This section provides detail on economic benefits from commercial and general aviation air travelers who use the airport. Values shown for spending (revenues), employment and earnings are direct benefits of initial visitor outlays and do not include multiplier effects of indirect benefits.

Commercial Airline Visitors

During 2004 there were 2,585 airline enplanements at Kingman Airport. According to an analysis of the air traveler origin and destination data bank of the U. S. Department of Transportation, 55 percent or 1,422 enplaning passengers were visitors to the area (Table C3).

Based on figures provided by the Arizona Department of Tourism, the average length of stay for travel parties in 2004 was 4.1 days.

Travel party information on Mohave County air visitor spending for lodging, food, retail goods and services and ground transportation also was obtained through the cooperation of the Arizona Department of Tourism.

The average spending per visitor per trip was $163 (figures are rounded to the nearest dollar to simplify tables).

Multiplication of $163 by 1,422 annual airline passenger visitors, times length of stay, yields off airport visitor spending of $630,000 for the year after deducting $320,000 for previously accounted on airport ground transportation spending.

Airline travelers contributed 5,830 visitor days in 2004. On a typical day, there were 16 airline visitor travelers in the Kingman area spending an average of $163 per person per day, creating revenues of $2,608 each day.

TABLE C3
Commercial Carrier Visitors: 2004
Kingman Airport

Category	Value
Enplanements	2,585
Percent Visitors	55%
Number of Visitors	1,422
Length of Stay (Days)	4.1
Avg. Spending per Visitor per Day	$163
Visitor Spending	$950,000

Source: Passenger Data, Arizona Department of Tourism. $950,000 includes expenditures on the airport for auto rental.

The figures for spending per person per trip can be used to derive the economic value of a typical passenger aircraft arriving at Kingman Airport (Table C4).

Based on recent characteristics of passenger aircraft, the number of visitors per aircraft is 2, who will spend $1,336 while in the Kingman area. This $1,336 is the economic value of each arriving air carrier aircraft.

TABLE C4 Economic Value of Arriving Airliner Kingman Airport	
Category	**Value**
Passengers Per Aircraft	4
Percent Visitors	55%
Visitors Per Aircraft	2
Trip Expenditures/Person	$668
Value of Arriving Airliner	$1,336

Source: US Dept. Transportation and Arizona Department of Tourism

Off-airport air carrier visitor spending accounts for $630,000 injected into the local economy. Spending by category and resulting economic benefits from all airline visitors to these two counties are shown in Table C5. The largest spending category is lodging ($60 per person per day), which is the source of the greatest annual revenues (at $350,000), earnings ($140,000) and employment (9 workers.

The 630,000 of off-airport visitor spending by airline travelers created a total of 16 off-airport direct jobs in the service area, with earnings to workers and proprietors of $245,000.

TABLE C5
Economic Benefits from Commercial Airline Visitors: Revenues, Earnings and Employment - Kingman Airport

Category	Spending Per Day	Revenues	Earnings	Jobs
Lodging	$60	$350,000	$140,000	9
Food/Drink	28	163,000	58,500	4
Retail Sales	12	71,000	33,500	2
Entertainment	8	46,000	14,000	1
Ground Trans	55	$320,000 Included in On Airport Table C2		
TOTAL	$163	$630,000	$245,000	16

Note: Earnings and employment figures were derived from the IMPLAN input-output model based on data for Mohave County and the United States Bureau of Economic Analysis. Employment is not necessarily full time equivalents; includes full and some part time workers, figures rounded to head counts. Transportation benefits were previously captured in terms of output, earnings and jobs on-airport.

General Aviation Visitors

In order to analyze general aviation traffic patterns at the airport, a database of 1,200 2004 general aviation flight plans involving Kingman Airport as either destination or origin for travel was obtained from the FAA.

TABLE C6
GA Aircraft Origination
Kingman Airport

Rank and Origin	State
1. Montgomery Field	CA
2. Ernest A. Love Field	AZ
3. McCarran International	NV
4. Phoenix Sky Harbor System	AZ
5. Flagstaff Pulliam	AZ
6. North Las Vegas	NV
7. Yuma	AZ
8. Scottsdale	AZ
9. Falcon Field	AZ
10. Wiley Post Airfield	OK

Source: FAA Flight Plan Data Base and Kingman Airport

The most frequent source of itinerant flights arriving at Kingman Airport was San Diego's Montgomery Airfield. Second in importance was Ernest A. Love Field in Prescott, followed by McCarran International, the Sky Harbor Airport System and Flagstaff, rounding out the top five (Table C6).

Overall, general aviation aircraft arriving at IGM during the study period originated at more than 100 airports around the nation.

Past years have often seen more than 18,000 itinerant general aviation operations annually at Kingman Airport. Operations involve both arrivals and departures. It is necessary to differentiate between itinerant operations by based and transient aircraft. An itinerant operation typically involves an origination or destination airport other than Kingman Airport. However, both based and non-based aircraft contribute to itinerant activity in any given day.

When a based aircraft returns to Kingman Airport after travel to Yuma, for example, that is an itinerant operation. When an aircraft based at an airport other than Kingman arrives at Kingman Airport that aircraft is classified as a transient itinerant.

According to analysis of flight records, there were 9,990 itinerant arrivals with 4,066 transient aircraft arrivals at Kingman Airport in 2004. Of these, 435 brought overnight visitors and 3,631 were one-day visitors (Table C7).

Separate analyses were conducted for those GA visitors with an overnight stay and those whose visit was one day or less in duration. To compute economic benefits based on visitor spending, one day aircraft were further partitioned into those staying less than 2 hours and 2 hours or more. Visitor spending estimates were computed only for those aircraft staying 2 hours or longer at Kingman Airport, reflecting the fact that many aircraft stop only for fuel and travelers do not spend for food, retail shopping, or ground transportation off the airport.

There were 1,414 general aviation aircraft that stayed on the ground 2 hours or more during the year. (See below, Table C10).

TABLE C7 General Aviation Transient Aircraft Kingman Airport	
Item	**Annual Value**
Itinerant AC Arrivals	9,990
Transient AC Arrivals	4,066
Overnight Transient AC	435
One Day Transient AC	3,631
Source: Derived from FAA Flight Plan Data Base and Kingman Airport Records	

Overnight GA Visitors

Information on visiting general aviation aircraft was obtained from a mail survey of visiting aircraft owners and pilots. Visitors were asked about the purpose of their trip, the size of the travel party, length of stay, type of lodging, and outlays by category.

The travel patterns underlying the calculation of overnight GA visitor economic benefits are shown in Table C8, for the 435 transient overnight aircraft arrivals during the year.

The average party size was 2 persons and the average overnight travel party stayed in the area for 3.8 days.

There were 896 overnight visitors for the year, including crew, with a combined total of 3,405 visitor days.

Spending per travel party per aircraft averaged $690. Total spending by all GA overnight visitors summed to $300,000.

Table C9 shows the percentage distribution of outlays reported by overnight travel parties at Kingman Airport. Lodging accounts for 32 percent of visitor spending, averaging $222 per aircraft travel party per trip.

TABLE C8 General Aviation Overnight Visitors Kingman Airport	
Item	**Annual Value**
Transient AC Arrivals	4,066
Overnight Transient AC	435
Avg. Party Size	2
Number of Visitors	896
Length of Stay (Days)	3.8
Visitor Days	3,405
Spending per Aircraft	$690
Total Expenditures	$300,000
Source: Derived from FAA Flight Plan Data Base and GA Visitor Survey. The number of visitors includes crew for some aircraft.	

Food and drink, at $200 per overnight aircraft, made up 29 percent. Ground transportation (auto rental, taxi or car service) at $123 and 18 percent was next in importance, followed by entertainment spending per aircraft at $76, and11 percent and finally retail spending at $68 and 10 percent for the average travel party.

TABLE C9 Spending Per Overnight GA Aircraft Kingman Airport		
Category	**Spending**	**Percent**
Lodging	**$222**	**32**
Food/Drink	**200**	**29**
Retail	**68**	**10**
Entertainment	**76**	**11**
Transportation	**123**	**18**
TOTAL	**$690**	**100**
Source: GA Visitor Survey		

Day GA Visitors

According to flight operations records, 36 percent of itinerant general aviation arrivals were transients that stayed on the airport for one day or less. Expressed differently, 90 percent of transient general aviation aircraft arriving at Kingman Airport visited the airport for one day or less.

During the year, there were 3,631 aircraft that stopped at the airport for one day. Some were only on the ground for a few minutes while others were parked several hours when the travel party had their aircraft serviced, pursued a personal activity or conducted business.

The economic benefits from arriving aircraft travel parties are of two types. Those pilots or aircraft owners that buy fuel or have their aircraft serviced on the airport are making purchases which contribute to the revenue stream received by aviation businesses on the airport. That type of spending creates output, employment, and earning on the airport. Those economic benefits are shown in Table C2 as on-airport benefits.

TABLE C10 General Aviation Day Visitors Kingman Airport	
Item	**Annual Value**
Transient Aircraft	**4,046**
One Day Transient AC	**3,631**
Stay >/= 2 Hours	**1,414**
Average Stay (Hours)	**6**
Avg. Party Size	**3**
Number of GA Visitors	**4,242**
Spending per Aircraft	**$109**
Total Expenditures	**$154,000**
Source: Source: Derived from FAA Flight Plan Data Base and GA Visitor Survey	

However, if the aircraft travel party leaves the airport to visit a corporate site, conduct a business meeting, or attend a sporting or cultural event, these off-airport activities may generate off-airport spending that create jobs and earnings in the local community. For the purposes of this study, those travel parties that arrived and departed within two hours were assumed to have not left the airport and not contributed any significant spending off the airport.

Of the 4,066 transient aircraft that stopped at Kingman Airport during the past year, there were 1,414 that were parked for more than two hours but not overnight (Table C10). The average stay in the area for those travel parties was 6 hours, according to arrival and departure records, with a range of 2 to 12 hours.

TABLE C11
Spending Per Day Visitor Aircraft
Kingman Airport

Category	Spending	Percent
Lodging	$ 0	0
Food/Drink	56	52
Retail	32	30
Entertainment	3	3
Transportation	18	15
TOTAL	$109	100

Source: GA Visitor Survey

Day trip aircraft brought 2,162 visitors and crew to the Kingman area during the year. The average spending per one-day aircraft averaged $109. The total economic benefits created by off-airport spending by one-day general aviation visitors tallied to $154,000.

The largest expenditure category for one-day visiting travel parties was food and drink, which averaged $56 per aircraft travel party for the day and accounted for 52 percent of outlays (Table C11). Spending for retail was the second largest category, at $32 per aircraft, or 30 percent of outlays.

Combined GA Visitor Spending

Table C12 shows the economic benefits resulting from spending in the region by combined overnight and day general aviation visitors arriving at Kingman Airport.

To recap, there were 4,066 transient general aviation aircraft that brought visitors to the airport during the year. Of these, 435 were arriving overnight general aviation aircraft and 1,414 were one day visiting aircraft that were parked more than 2 hours, long enough to make off-airport expenditures.

Each overnight travel party spent an average of $690 during their trip to the airport service area and travelers on each day visitor aircraft reported expenditures of $109 per trip.

Multiplying the expenditures for each category of spending by the number of aircraft yields the total outlays for lodging, food and drink, entertainment, and retail spending due to GA visitors during the year. This spending summed to $380,000 in revenues.

There were 7,647 visitor days attributable to general aviation travelers during the year. Forty five percent of visitor days (3,405) were due to overnight GA travelers and fifty five percent (4,242) were from one-day visitors.

On an average day, there were 21 visitors in the service area that had arrived by general aviation aircraft. Average daily spending by all GA air travelers was $1,041 within the airport service area.

The average economic impact of any arriving GA transient aircraft (combined overnight and day visitors staying more than 2 hours) was $205.

The largest spending category by general aviation visitors was expenditures for food and beverage, with outlays of $130,000 or 34.2 percent of the total. Spending for lodging accounted for 26 percent of GA visitor spending and was the second largest category, with outlays of $99,000 for the year.

Taken together, these two categories accounted for 60.2 percent of the economic benefits from GA visitors to Kingman Airport.

Of total spending of $380,000 created by GA visitors, an average of 40 cents of each dollar was used within the service area by employers as earnings paid out to workers.

Wages taken home by tourism/visitor sector workers for spending in their own community summed to $153,500 during the year. Earnings in the lodging industry accounted for nearly 26 percent of total earnings from visitor spending.

Expenditures by GA visitors created 9 direct jobs in the tourist sector in the Kingman Airport service area. Food and beverage spending created the greatest number of jobs, 4, followed by the lodging and retail industries with 2 workers each.

TABLE C12
Economic Benefits from GA Visitors - Revenues, Earnings and Employment
Kingman Airport

Category	Spending per AC		Revenues	Earnings	Employment
	Overnight	Day			
Lodging	$222		$99,000	$40,000	2
Food/Drink	200	$56	130,000	46,500	4
Retail Sales	68	32	100,000	52,000	2
Entertainment	76	3	50,000	15,000	1
Ground Trans.	123	18	Included in On Airport Table C2		
TOTAL	$690	$109	380,000	$153,500	9

Note: Earnings and employment figures were derived from the IMPLAN input-output model based on data for Mohave County and the United States Bureau of Economic Analysis. Employment is not necessarily full time equivalents; includes full and some part time workers, figures rounded to head counts. Transportation benefits reflect "off airport" spending as "on airport" transportation benefits are previously captured in terms of output, earnings and jobs.

Combined Airline and GA Visitors

There were 13,477 visitor days attributable to commercial and general aviation travelers during the year. Forty three percent of visitor days (5,830) were due to commercial air travelers and fifty seven percent (7,647) were from general aviation visitors.

On an average day, there were 37 air visitors in the service area. Average daily spending by all air travelers was $2,740 within the airport service area.

Table C13 shows that the largest spending category by aviation visitors was expenditures for lodging, with outlays of $449,000 or 45 percent of the total. Spending on food and beverages accounted for 33 percent of visitor spending and was the second largest category, with outlays of $330,000 for the year.

Airline and general aviation visitors combined to spend $1.0 million in the service area during the year, creating 25 jobs with earnings to workers of $400,000.

TABLE C13
Economic Benefits from Airline and GA Visitors: Revenues, Earnings and Employment
Kingman Airport

Category	Revenues	Earnings	Employment
Lodging	$449,000	$180,000	11
Food/Drink	330,000	104,500	8
Retail Sales	145,000	85,500	4
Entertainment	84,000	29,500	2
Ground Transport	Included in On Airport Table C2		
TOTAL	$1,000,000	$400,000	25

Note: Earnings and employment figures were derived from the IMPLAN input-output model based on data for Mohave County and the United States Bureau of Economic Analysis. Employment is not necessarily full time equivalents; includes full and some part time workers, figures rounded to head counts. Transportation benefits reflect "off airport" spending as "on airport" transportation benefits are previously captured in terms of output, earnings and jobs.

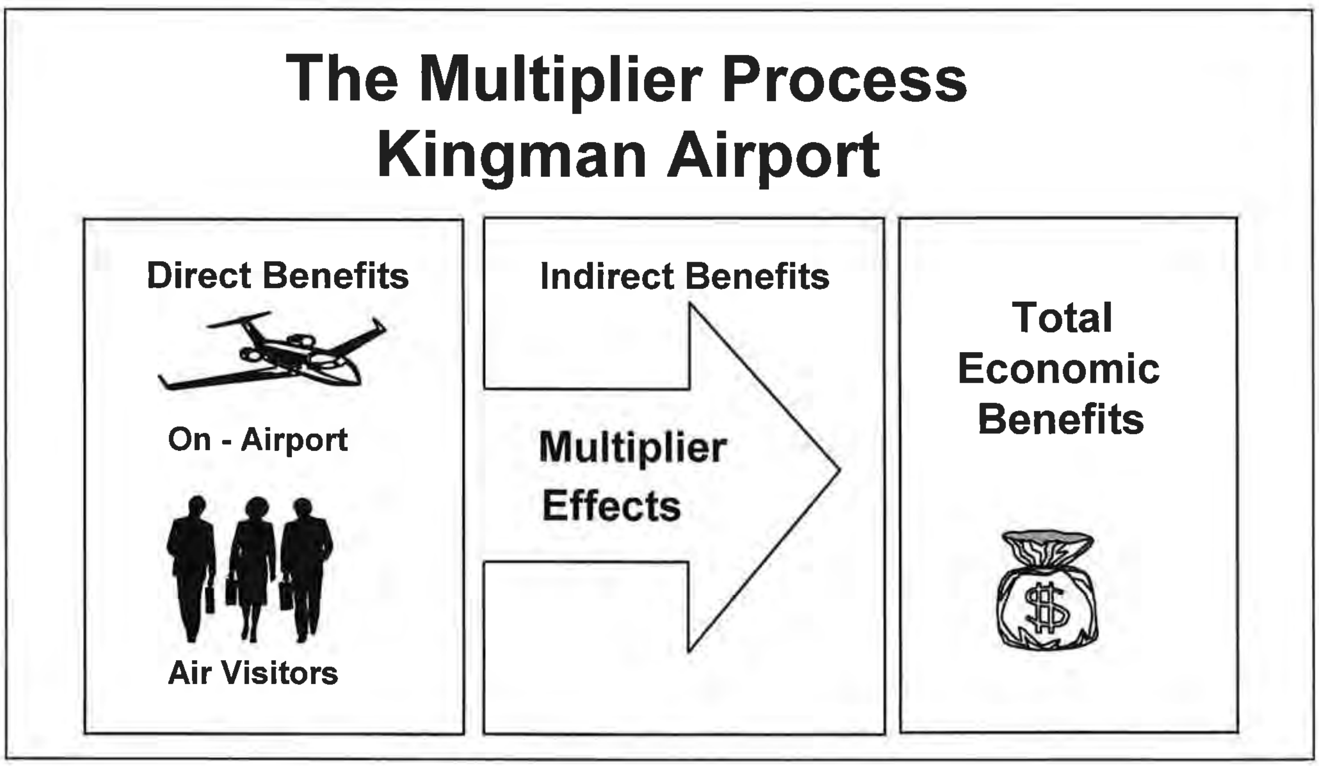
INDIRECT BENEFITS: MULTIPLIER EFFECTS

The output, employment, and earnings from on-airport activity and off-airport visitor spending represent the computed direct benefits from the presence of Kingman Airport. For the service area, these direct benefits summed to $17.7 million of output (measured as revenues to firms and budgets of administrative units), 195 jobs, and earnings to workers and proprietors of $6.4 million. These figures for initial economic activity created by the presence of the airport do not include the "multiplier effects" that result from additional spending induced in the economy to produce the initial goods and services.

Production of aviation output requires inputs in the form of supplies and labor. Purchase of inputs by aviation firms has the effect of creating secondary or indirect revenues and employment that should be included in total benefits of the airport. Airport benefit studies rely on multiplier factors from input-output models to estimate the impact of secondary spending on output, earnings and employment to determine indirect and total benefits, as illustrated in the figure below.

The multipliers used for this study were from the IMPLAN input-output model based on data for Mohave County, from Arizona state labor force sources, and the U. S. Bureau of Economic Analysis. To demonstrate the methodology, average county multipliers are shown in Table C14.

The multipliers represent weighted averages for combined industries in each category. For example, the visitor spending multipliers



shown combine lodging, food services, retailing, auto rental, and entertainment multipliers used in the analysis.

The multipliers in this table illustrate the process for calculating the indirect and total impacts on all industries of the regional economy resulting from the direct impact of each aviation related industry. The multipliers for output show the average dollar change in revenues for all firms in the service area due to a one-dollar increase in revenues either on the airport or through visitor spending.

For example, each dollar of new output (revenue) created by on-airport employers circulates through the economy until it has stimulated total output in all industries in the service area of $1.8623 or, put differently, the revenue multiplier of 1.8623 for on-airport activity shows that for each dollar spent on the airport there is additional spending created of $0.8623 or 86.23 cents of indirect or multiplier spending.

Direct revenues from all sources associated with the presence of Kingman Airport were $17.7 million for the year. After accounting for the multiplier effect, total revenues created within the service area were $33.0 million. Indirect or secondary revenues were $15.3 million, the difference between total and direct revenues.

The multiplier for earnings shows the dollar change in earnings for the service area economy due to a one-dollar increase in earnings either on the airport or in the visitor sector. The earnings multipliers determine how wages paid to workers on or off the airport stay within the economy and create additional spending and earnings for workers in non-aviation industries. For example, each dollar of wages paid for workers on the airport stimulates an additional 80 cents of earnings in the total economy.

The initial direct wages of $6.0 million for aviation workers and proprietors on the airport were spent for consumer goods and services that in turn created additional earnings of $4.8 million for workers and proprietors in the general economy.

The total earnings benefit of the airport was $11.5 million, consisting of $6.4 million of direct benefits and $5.1 million of indirect benefits. The economic interpretation is that the presence of the airport provided employment and earnings for workers, who then re-spent these dollars in the service area.

The multipliers for employment show the total change in jobs for the service area economy due to an increase of one job on or off the airport. Each job on the airport is associated with 1.5294 additional jobs in the rest of the airport service area economy. Similarly, each job of the airport related to air visitor or student spending is associated with 0.44 additional jobs in the general economy.

The overall result is that the 195 direct jobs created by the airport supported an additional 271 jobs in the service area as indirect employment. The sum of the direct aviation related jobs and indirect jobs created in the general economy is the total employment of 466 workers that can be attributed to the presence of the airport.

The information above is intended for illustration only. In the full analysis separate multipliers were used for on-airport aviation employers and visitor spending categories (lodging, eating places, retail, entertainment, and ground transportation).

TABLE C14
Average Multipliers and Indirect Benefits Within the Airport Service Area
Kingman Airport

Revenue Source	Direct Revenues	Average Output Multipliers	Indirect Revenues	Total Revenues
On-Airport Benefits	$16,700,000	1.8623	$14,400,000	$31,100,000
Off-Airport Benefits	1,000,000	1.9000	900,000	1,900,000
Revenues	*$17,700,000*		*15,300,000*	*$33,000,000*
Earnings Source	**Direct Earnings**	**Average Earnings Multipliers**	**Indirect Earnings**	**Total Earnings**
On-Airport Benefits	$6,000,000	1.8000	$4,800,000	$10,800,000
Off-Airport Benefits	400,000	1.7500	300,000	700,000
Earnings	*$6,400,000*		*$5,100,000*	*$11,500,000*
Employment Source	**Direct Employment**	**Average Employment Multipliers**	**Indirect Employment**	**Total Employment**
On-Airport Benefits	170	2.5294	260	430
Off-Airport Benefits	25	1.4400	11	36
Employment	*195*		*271*	*466*

Notes: Multipliers above are weighted averages intended to illustrate how indirect and total benefits were calculated for Kingman Airport. In the full analysis, separate multipliers were used for on-airport employers (airlines, FBO, other aviation businesses), and visitor spending (lodging, eating places, retailing, entertainment, and ground transportation). Multipliers are for Kingman Airport service area as produced by the IMPLAN input-output model based on data from Arizona Department of Economic Security and U. S. Bureau of Economic Analysis.

BASED AIRCRAFT BENEFITS

There were 103 based aircraft at Kingman Airport in 2004 (Table C15). Of these, 83 were single engine, 18 were multi-engine aircraft, and 2 were helicopters.

A survey of owners of aircraft based at Kingman Airport was conducted to compile information on private aircraft usage patterns, including number of trips per year, purpose of travel, average party size, and average hours and miles flown per trip. Questions were also posed concerning the importance of the airport for residential location and businesses of flyers.

TABLE C15
Based Aircraft Profile
Kingman Airport

Type	Number
Total Based Aircraft	**103**
Single Engine Piston	**83**
Twin Engine Piston	**18**
Turboprop	**0**
Jet	**0**
Helicopter	**2**

Source: Kingman Airport and Coffman Associates, 2004

The presence of the airport as a factor affecting the personal quality of life and business success of aircraft owners was measured by survey questions asking respondents to rate the airport as "very important, important, slightly important, or not important" to their residential location decision and their business.

The survey results show that Kingman Airport is a significant factor in influencing the success of business and professional activity of aircraft owners.

- Seven out of ten of all responding based aircraft owners (69.2%) said that the airport is "very important" or "important" to the success of their business location.

- Further, seven out of ten aircraft owners (70.4%) stated that the airport is "very important" or "important" to their residential location decision.

Those who reported the airport as important to their business were also asked for information about their business.

- Firms represented by users of based aircraft for business purposes accounted for 885 employees in the county and surrounding area, and the businesses of the combined respondents accounted for a reported $51.9 million of annual sales.

Drawing from these results, it is evident that Kingman Airport plays a key role in the overall quality of life and level of economic activity in the Mohave County area.

TABLE C16
Based Aircraft Characteristics And Business Activity
Kingman Airport

Category	All Based Aircraft
Average Aircraft Value	**$90,400**
Maintenance Outlays per Year	**$7,900**
Business Hours per Year per AC	**54**
Business Trips – Party Size	**2.2**
Airport "Very Important or "Important" to Business	**69.2%**
Employees of Owners of Based Aircraft	**885**
Annual Sales of Firms with Aircraft	**$51,900,000**

Source: Based Aircraft Owner Survey, Kingman Airport

Characteristics of based aircraft at Kingman Airport are set out in Table C16. The table illustrates that the average value for an individual aircraft was $90,400 and annual outlays were $7,900 for maintenance, upkeep, storage, and other expenses such as insurance.

Multiplying the average expenditures per aircraft of $7,900 times 103 aircraft gives total outlays by aircraft owners of more than $800,000 injected into the economy, much of it going to the immediate airport service area.

The aircraft based at Kingman Airport represent assets to their owners with estimated total value of $9.3 million. Many based aircraft are viewed as investments by their owners that provide returns through enhanced revenues and timesavings when compared to scheduled airline travel.

The table illustrates the relation between private aircraft ownership and business activity in the area served by the airport.

Aircraft owners contribute to the economy when they use their aircraft for business purposes. Faster travel and more responsive businesses make the entire region more competitive. According to the aircraft owner survey, the average aircraft is used for business 54 hours per year, or 4.5 hours per month.

Based aircraft owners at Kingman Airport reported flying an average of 132 non-training hours per year (Table C17), or 2.5 hours per week. The range of annual hours reported by aircraft owners included some who used one plane for up to 375 hours per year.

TABLE C17
Based Aircraft Use Patterns
Kingman Airport

Usage Measure	Annual Hours
Avg. Number of Hours	132
Avg. Business Hours	54
Avg. Personal Hours	78
Percent Business Hours	41%
Percent Personal Hours	59%

Source: Based Aircraft Owner Survey

The average aircraft based at Kingman Airport was flown 78 hours on personal trips per year. The typical round trip for pleasure, recreation or other personal reasons had 2 persons in the travel party (Table C18).

There were an estimated 15,756 passenger hours flown for personal reasons that originated at Kingman Airport during the year.

The typical business trip for a general aviation aircraft included 2 persons in the travel party (Table C19). Kingman Airport based aircraft flew 5,454 business hours for the year and 10,908 business passenger hours.

(Note: Passenger hours flown on business or personal use were computed from multiplying average party size by hours flown, to obtain total passenger hours.)

TABLE C18
Based Aircraft - Personal Use
Kingman Airport

Usage Measure	Annual Value
Avg. Party Size	2
Avg. Round Trip Hours/Year	78
AC Personal Hours	7,878
Passenger Hours	15,756

Source: Based Aircraft Owner Survey, does not include helicopters.

TABLE C19
Based Aircraft - Business Use
Kingman Airport

Item	Annual Value
Avg. Party Size	2
Avg. Round Trip Hours/Year	54
AC Business Hours	5,454
Passenger Hours	10,908

Source: Based Aircraft Owner Survey, does not include helicopters

An estimate of the value of travel on based aircraft may be obtained by computing the cost of making these same trips on a chartered flight.

This is one approach approved by the Internal Revenue Service for valuation of aircraft travel use by corporate executives.

The average round trip hours for based aircraft trips from the survey was 2 hours per trip. The cost of charter flights varies by distance and type of aircraft. Table C20 shows charter rates for round trips of 2 hours from Kingman Airport at mid-year 2004.

A weighted average charter cost was determined by assigning a cost equivalent to the number of each aircraft type based at the airport, excluding helicopters. For example, since 82% of the 101 aircraft are single engine, the cost of a single engine charter had a weight of .82 in the overall charter cost.

The 101 based aircraft flew a total of 13,332 hours during the year. Assigning an average charter value of $550 per hour, the "charter equivalent value" of general aviation travel originating at Kingman Airport for the year totaled $7.3 million.

This value of travel estimate, while very large, does not accurately measure all the associated economic gains and benefits that very often can result from GA trips, which may be substantial. A single air trip can result in additional profits to a business firm. Trips for medical reasons often have high economic value as well. Further, the flexibility compared to scheduled airline travel and the time saved by general aviation travel compared to automobile use is not calculated here, but certainly has economic significance.

TABLE C20
Charter Equivalent Value of General Aviation Travel
Kingman Airport

Aircraft Type	Number	Weights	Hourly Charter Cost	Weighted Cost
Single Engine	83	0.82	$497	$407
Twin Engine	18	0.18	$795	$143
TOTAL	101	1.00		$550

Charter Equivalent Value Based On Above Cost Per Flight

Hours	Avg. Trip Cost	Total Value
13,332	$550	$7,300,000

Note: Charter costs by aircraft type for 2 hour round trip, average of various charter firms, 2004. Does not include standby time, landing fees, other charges. Distance range of 568 miles.

SUMMARY & FUTURE BENEFITS

Airports are available to serve the flying public and support the regional economy every day of the year. On a typical day at Kingman Airport, there are more than 130 operations by aircraft involved in local or itinerant activity including flight training, cargo and courier service, corporate travel, or commercial aircraft bringing passengers visiting the area for personal travel or on business.

During each day of the year, Kingman Airport generates $90,000 of revenues within its service area (see box). Revenues and production support jobs, not only for the suppliers and users of aviation services, but throughout the economy.

Each day Kingman Airport provides 170 jobs directly on the airport and in total supports 466 local jobs in the airport service area. Airport and service area workers bring home daily earnings of $31,500 for spending in their home communities.

On an average day during the year, there are 37 visitors in the area who arrived at Kingman Airport. Some will stay in the Kingman area for only a few hours while they conduct their business, and others will stay overnight. The average spending by these visitors on a typical day injects $2,740 into the local economy.

Table C21 shows a summary of current economic benefits associated with the airport. Direct benefits to the service area, without multiplier effects, include revenues of $17.7 million, 195 jobs and earnings to workers and proprietors of $6.4 million.

Kingman Airport
Daily Economic Benefits

- **$90,000 Revenue**
- **466 Local Jobs Supported**
- **$2,740 Visitor Spending**
- **37 Air Visitors**

TABLE C21
Summary of Economic Benefits: 2004
Kingman Airport

	Revenues	Earnings	Employment
On-Airport Activity	**$16,700,000**	**$6,000,000**	**195**
Off-Airport Visitor Spending	**1,000,000**	**400,000**	**25**
Direct Benefits	**17,700,000**	**6,400,000**	**195**
Indirect Benefits	**15,300,000**	**5,100,000**	**271**
Total Benefits	**$33,000,000**	**$9,300,000**	**466**

Note: Revenues, earnings and employment benefits reflect activity associated with 47,980 operations in FY 2004 and capital improvement budget of $1.7 million.

Including indirect or multiplier effects, total benefits to the service area are $33.0 million in revenues, 466 jobs and earnings of $11.5 million.

Kingman Airport is the origin of thousands of air traveler trips per year. Commercial airlines take passengers to connecting and destination airports, while the availability of the airport allows visitors, customers and employees to come to the Kingman area. Corporate and other private aircraft are used to visit other parts of the nation and the globe. The estimated cost of chartering aircraft to serve the same needs of GA travelers was estimated to be $7.3 million.

It is important for citizens and policy makers to be aware that there are unmeasured but qualitative benefits from aviation that represent significant social and economic value created by airports for the regions that they serve. In addition to exerting a positive influence on economic development in general, aviation often reduces costs and increases efficiency in individual firms.

Annual studies by the National Business Aviation Association show that those firms with business aircraft have sales 4 to 5 times larger than those that do not operate aircraft. In 2003, the net income of aircraft operating companies was 6 times larger than non-operators. Two thirds of the *Fortune* 500 firms operate aircraft and 88 percent of the top100 have business aircraft (see National Business Aviation Association, *Fact Book*, 2004).

As aviation activity increases in the airport service area, the economic benefits of the airport to the regional economy can be expected to increase (forecasts below do not include capital projects pending approval).

The short term planning horizon for the airport is associated with an increase in operations to an annual level of 56,700. Not including outlays for capital projects, on-airport revenues will be $18.0 million, employment on the airport will be 176 workers and jobs related to air visitors will increase to 40 (Table C22). Visitor spending will reach $2.0 million (measured in 2004 dollars) and the revenue benefits due to the presence of the airport will rise to $36.4 million, including all multiplier effects.

The intermediate term planning horizon is based on 65,800 operations (Table C23). Employment on the airport will rise to 204 jobs and the total employment impact on and off the airport after all multiplier effects is 570 jobs, with earnings rising to $14.4 million. Revenues will increase to $43.0 million (2004 dollars) in the intermediate term.

The long term is defined as an airport activity level of 90,700 operations per year. The long-term projections imply on-airport employment of 282 workers. Accounting for all multiplier effects, jobs supported in the airport service area under the long-term assumptions total 786. Revenues will be $57.0 million, and earnings will be $19.0 million, measured in 2004 dollars (see table C24).

TABLE C22
Summary of Economic Benefits: Short Term
Kingman Airport

	Revenues	Earnings	Employment
On-Airport Activity	**$18,000,000**	**$6,200,000**	**176**
Off-Airport Visitor Spending	**2,000,000**	**700,000**	**40**
Direct Benefits	**20,000,000**	**6,900,000**	**216**
Indirect Benefits	**16,400,000**	**5,600,000**	**299**
Total Benefits	**$36,400,000**	**$12,500,000**	**515**

Note: Revenues, earnings and employment for short-term forecast period reflect activity associated with 56,700 operations per year (FY 2003-2008) and 5,400 enplanements. Table does not include capital improvement budget. Figures are in 2004 dollars.

TABLE C23
Summary of Economic Benefits: Intermediate Term
Kingman Airport

	Revenues	Earnings	Employment
On-Airport Activity	$20,700,000	$7,000,000	204
Off-Airport Visitor Spending	2,400,000	900,000	44
Direct Benefits	23,100,000	7,900,000	248
Indirect Benefits	19,900,000	6,500,000	322
Total Benefits	$43,000,000	$14,400,000	570

Note: Revenues, earnings and employment for intermediate term forecast period reflect activity associated with 65,800 operations per year (2008-2013) and 6,800 enplanements. Table does not include capital improvement budget. Figures are in 2004 dollars.

TABLE C24
Summary of Economic Benefits: Long Term
Kingman Airport

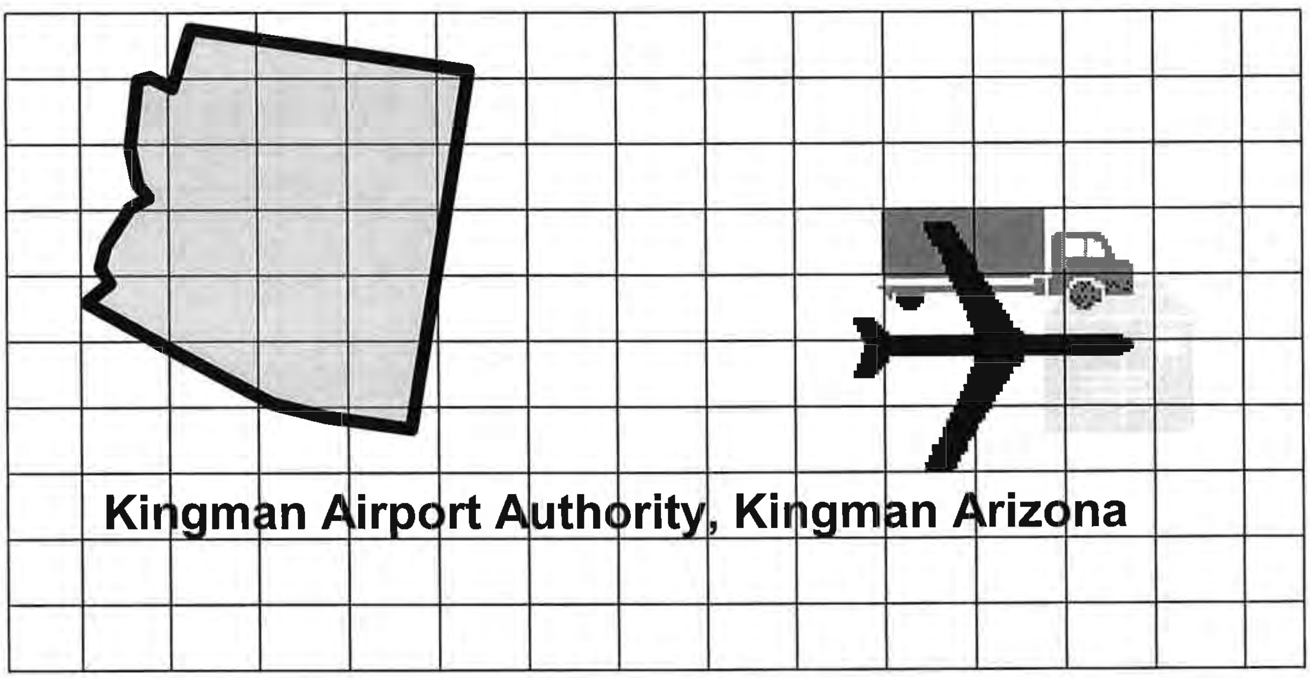
	Revenues	Earnings	Employment
On-Airport Activity	$28,000,000	$10,000,000	282
Off-Airport Visitor Spending	4,900,000	1,700,000	88
Direct Benefits	32,900,000	11,700,000	254
Indirect Benefits	24,100,000	7,300,000	53 2
Total Benefits	$57,000,000	$19,000,000	786

Note: Revenues, earnings and employment for long-term forecast period reflect activity associated with 90,700 operations per year (2035-2023) and 15,000 enplanements. Table does not include capital improvement budget. Figures are in 2004 dollars.

Appendix D

ECONOMIC IMPACT OF THE KINGMAN AIRPORT INDUSTRIAL PARK

Economic Impact
of the
Kingman Airport Industrial Park



Prepared by

Coffman Associates &
W.P. Carey School of Business
Arizona State University

September 2005

Contents

HIGHLIGHTS

- *The Kingman Airport Industrial Park, over 1,000 acres in size, is located along historic Route 66, five miles from Interstate 43 in Mohave County, Arizona. The Industrial Park is home to more than 50 businesses. Major employers include manufacturers (such as wood products, plastics and wire); distributors of goods, energy and materials; and service firms (including engineering and scientific companies). The Kingman Airport Industrial Park is one of the largest single sites for employment and economic activity in Mohave County (see table, pg 2).*

- *The value of direct output (measured as dollars of revenue) produced by Industrial Park tenants was $357 million in 2004. Combined firms at the Industrial Park employed 2,058 Arizona workers with a payroll of $95.4 million.*

- *When direct expenditures by Industrial Park tenants enter the general economy, each dollar is available for additional spending, creating a "multiplier effect" that increases employment, income, and total economic activity in the region. The total economic impact of the Kingman Airport Industrial Park, incorporating multiplier effects estimated from an input-output model, was $619.7 million in 2004.*

Kingman Airport Industrial Park Economic Impact

$357 Million Direct Output

$95.4 Million Payroll

2,058 Workers on Site

$619.7 Million Total Output
(Including All Multiplier Effects)

Kingman Airport Industrial Park

(Non-Aviation Tenants: 2004)

Acton Welding
Allied Signal/Honeywell
Allstate Electric Motors
American Woodmark
Aquarium Décor
B & J Engineering
Bob's Barricades
Carl Hays Enterprises
Carris Reels
Cascades Tissue Group
Custom Aluminum Radiators
DATS Trucking
Farner/Orr Partnership
Fed Ex
Fed Ex Freight West
Ferrellgas
Goodyear
Grif-Fab
Guardian Fiberglass
Henry Products
Hertz Rent-A-Car
Honeywell Aircraft Landing Systems
I-Corp Arizona
Import Corner
Interstate Group
Ivy Products
Jeld-Wen
J-M Manufacturing
JPL Fastfreight
Laidlaw Corporation
Laminaids, Inc.
Laron Engineering
Lomanco West
Luseaux Laboratories
Martin Swanty Rent-A-Car
McAtlin Electrical
Mohave Warehousing
Musket Corporation
Northern Energy
Pepsi-Cola Company
Potters Industries
RLS Transport
Schwan Enterprises
Shutters & More
Solution Dispersions
Southwest Alarm
Southwire Corp.
Spectrum One
Sunstate Components
Tru*Serv
Ultimate Systems LTD
UPS
West Coast Netting

Source: Kingman Airport Authority, Inc.

MEASURING ECONOMIC IMPACTS

Economic impact analysis measures the contributions of economic units and agencies to the creation of output, earnings and employment within a region. For the purposes of this study, the economic units were tenants of the Kingman Airport Industrial Park. The region of analysis is Mohave County, including the greater Kingman area.

The *direct economic impact* of a group of firms equals the value of the output (measured here as revenues), employment, and earnings created by their annual operations. *Indirect impacts* result when (a) firms at the Industrial Park buy goods, services, supplies and materials from regional suppliers and (b) when employees of the Industrial Park make purchases of consumer goods and services. These indirect impacts create additional revenues, jobs and earnings as spending circulates through the regional economy. The *total economic impact* is the sum of the combined direct and indirect impacts.

Kingman Airport Industrial Park
Summary of Economic Impacts: 2004

	IMPACT MEASURES		
Source	**Revenues**	**Earnings**	**Employment**
Industrial Park Direct Impacts	**$357,000,000**	**$95,400,000**	**2,058**
Indirect Impacts (Multiplier Effects of Secondary Spending)	***262,700,000***	***77,900,000***	***3,336***
TOTAL IMPACT	**$619,700,000**	**$173,300,000**	**5,394**

DIRECT IMPACTS

Direct impacts represent the sum of Industrial Park revenues, earnings and employment due to the presence of the park. Direct impacts are the "first round" impacts and do not include any multiplier effects of secondary spending.

The $357 million direct economic output (revenues) from Kingman Airport Industrial Park firms created 2,058 jobs at the Industrial Park with an annual payroll of $95.4 million. Twenty-seven percent of revenues were allocated to employee compensation, including wages and proprietor's income. Earnings per worker were calculated as $46,335.

These direct impacts reveal the importance of the Kingman Airport Industrial Park to Mohave County and the Kingman area. According to the Arizona Department of Economic Security, as of the fourth quarter of 2004, Mohave County employment was 49,206 workers. The Industrial Park accounted for 4.1 percent of the employment in the County. Moreover, the Arizona Department of Commerce reports 2004 employment in Kingman as 10,949. The 2,058 workers at the Industrial Park account for nearly one job out of five in Kingman.

DIRECT IMPACTS BY INDUSTRIAL GROUPS

The Industrial Park economic activity created an annual output of $357.0 million that can be allocated across three broad industrial groups: distribution, manufacturing and services. The table on the next page illustrates the annualized employment, earnings and value of output (revenues) produced by the industrial park tenants in 2004 for each group. Values shown for revenues, employment and earnings are direct impacts and do not include multiplier effects of indirect impacts.

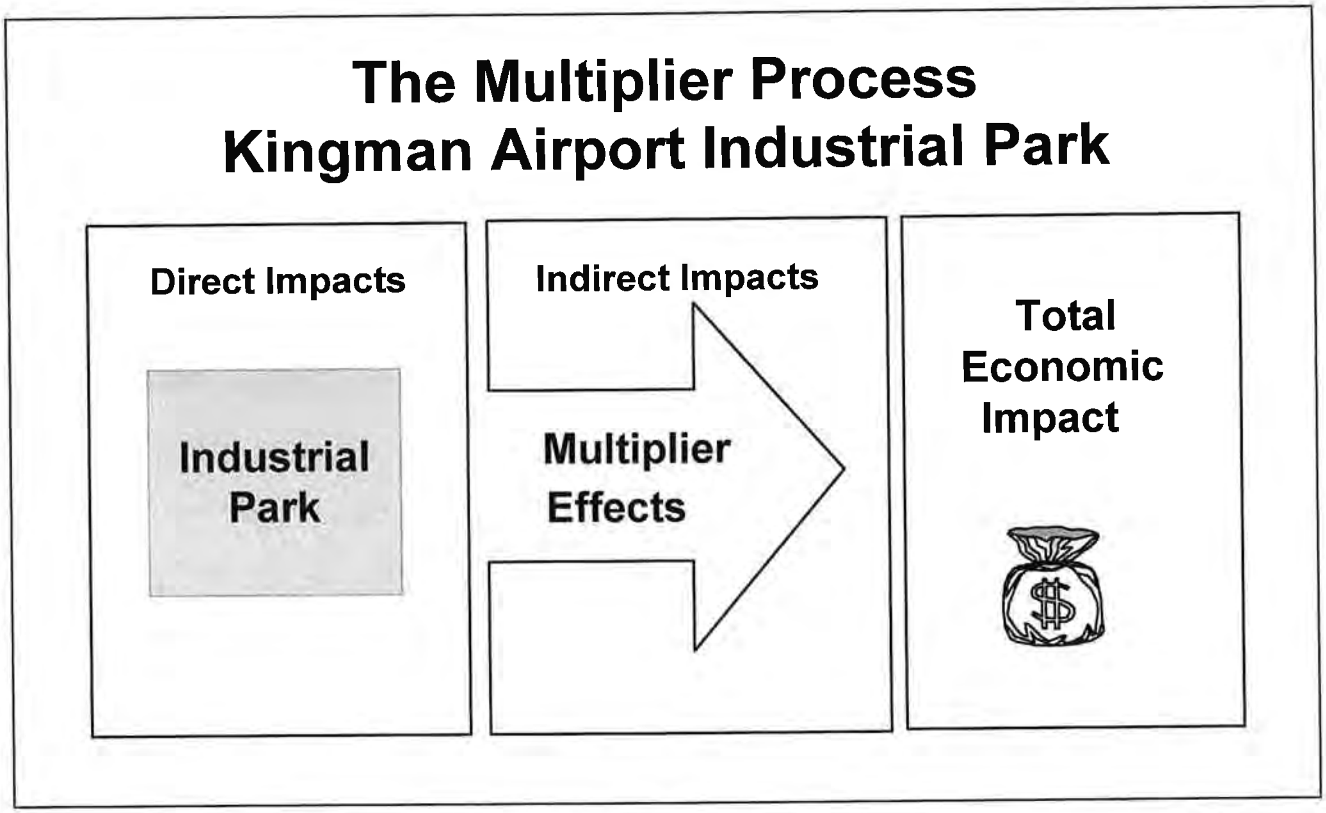
Business activities in the distribution category include air and ground courier services, energy distribution, freight and food distribution. The manufacturing category includes such business as cable and wire, wood products, fiberglass products, aviation related goods and sporting equipment. In the services sector, businesses include engineering, machine shops, aviation services and general consumer services and retailing suppliers. Several of these Industrial Park employers qualify to be on the list of the largest employers in both Mohave County and the greater Kingman area.

Kingman Airport Industrial Park Industry Group Revenues, Earnings and Employment			
	IMPACT MEASURES		
Industry Groups	**Revenues**	**Earnings**	**Employment**
Distribution	**$36,000,000**	**$4,800,000**	**124**
Manufacturing	**239,400,000**	**68,000,000**	**1,502**
Services	**81,600,000**	**22,600,000**	**432**
DIRECT IMPACTS	**$357,000,000**	**$95,400,000**	**2,058**
Source: Kingman Airport Industrial Park, Dun & Bradstreet Company Profile Reports, Mohave County Economic Data.			

The largest industrial group by any measure (revenue, employment or earnings) is manufacturing. In contrast to a national trend, manufacturing employment in Mohave County has seen increases in recent years. The Kingman Airport Industrial Park is the site of 1,502 manufacturing jobs with earnings of $68 million and $239 million of output per year.

INDIRECT IMPACTS

Indirect impacts result when business at the Industrial Park purchase from other businesses in the region and when employees buy consumer goods and services. In contrast to initial or direct impacts, the indirect impacts measure the magnitude of successive rounds of re-spending. For example, when a worker from an Industrial Park firm spends for food, clothing, and medical services, the wages paid at the Industrial Park support additional jobs and spending in the general economy. This process is illustrated by the figure on the following page.



The initial direct revenue stream in the county area of $353.0 million created by the presence of Kingman Airport Authority Industrial Park was estimated to stimulate indirect impacts from multiplier effects within the county of $262.7 million in additional revenues and 3,336 additional jobs with earnings of $77.9 million.

Note that indirect earnings per job created are $23,351, a substantially lower figure than for the Industrial Park itself. This lower level of employee compensation is because the indirect jobs are in industries that serve consumers, such as retailing and the service sector. Many of these jobs are lower-paying or part time.

The indirect economic impacts for a region may be estimated by use of an input-output model. The methodology is well-established and has been in wide use since the development of the theoretical framework, for which Wassily Leotieff won the Nobel Prize in Economics (1973).

The coefficients used for this study were from the IMPLAN input-output model based on data for Mohave County from Arizona DES sources, and the U. S. Bureau of Economic Analysis. IMPLAN data and accounts are derived following the original methodology developed and popularized by the Bureau of Economic Analysis and published in 1980 as "The Input-Output Study of the US Economy."

TOTAL ECONOMIC IMPACT

The sum of direct and indirect impacts is the *total economic impact* of the Kingman Airport Industrial Park. The total economic impact of the Industrial Park, accounting for all multiplier effects of secondary spending, was $619.7 million of revenue created within the region during the year. Total employment was 5,394 jobs, with earnings to workers and proprietors of $173.3 million.

Incorporated within the total economic impact are payments by businesses and workers to government agencies at the federal, state and local level. These calculations are made through the input-output model using ratios of taxes to income and output for Mohave County. Federal tax collections due to the presence of the Industrial Park were $46.9 million, with social security taxes as the largest single component. State and local tax revenues were $34. 3 million.

The total economic impact of the Kingman Airport Industrial Park including all multiplier effects is shown in the table on the following page.

Kingman Airport Industrial Park
Government Revenues By Source

Federal Taxes	**FY 2004**
Corporate Profits Tax	$4,500,000
Excise Taxes	2,400,000
Personal Income Tax	18,700,000
Social Insurance Tax	21,300,000
Subtotal	$46,900,000
State & Local Taxes	**FY 2004**
Corporate Profits Tax	$900,000
Property Tax	10,200,000
Sales Taxes	14,700,000
Personal Income Tax	2,400,000
All Other State & Local Taxes & Fees	6,100,000
Subtotal	$34,300,000
GRAND TOTAL	**$81,200,000**

KINGMAN AIRPORT INDUSTRIAL PARK TOTAL ECONOMIC IMPACT

5,394 MOHAVE CO. JOBS

$619.7 MILLION ECONOMIC OUTPUT

$173.3 MILLION EARNINGS

Arizona Government Taxes and Fees: $34.3 Million

Federal Government Taxes and Fees: $46.9 Million

(Note: Figures above include all multiplier effects.)

KINGMAN
AIRPORT

Appendix E

AIRPORT LAYOUT PLAN DRAWING SET

AIRPORT LAYOUT PLANS

FOR

KINGMAN AIRPORT

Prepared for the

Kingman Airport Authority, Inc.

INDEX OF DRAWINGS

1. AIRPORT LAYOUT DRAWING
2. PART 77 AIRSPACE DRAWING
3. AIRPORT AIRSPACE DRAWING
CONICAL SURFACE
4. AIRPORT AIRSPACE DRAWING
RUNWAY 21 APPROACH FAN
5. APPROACH ZONE PROFILES
RUNWAY 3-21/RUNWAY PROFILE
6. APPROACH ZONE PROFILES
RUNWAY 17-35/RUNWAY PROFILE
7. INNER PORTION OF RUNWAY 21
APPROACH SURFACE DRAWING
8. INNER PORTION OF RUNWAY 21
APPROACH SURFACE DRAWING
9. INNER PORTION OF RUNWAYS 17-35
APPROACH SURFACE DRAWING
10. TERMINAL AREA DRAWING
11. AIRPORT LAND USE PLAN
12. AIRPORT PROPERTY MAP

Coffman Associates Airport Consultants

DEVIATIONS FROM FAA AIRPORT DESIGN STANDARDS

DEVIATION DESCRIPTION	EFFECTED DESIGN STANDARD	STANDARD	EXISTING	PROPOSED DISPOSITION
NONE				

RUNWAY DATA

RUNWAY DATA	RUNWAY 3-21				RUNWAY 17-35			
	EXISTING		ULTIMATE		EXISTING		ULTIMATE	
	3	21	3	21	17	35	17	35
AIRCRAFT APPROACH CATEGORY-DESIGN GROUP	C-III		C-III		B-II		B-II	
APPROACH VISIBILITY MINIMUMS (LOWEST)	>1 MILE	>3/4 MILE	>1 MILE	<3/4 MILE	>1 MILE	>1 MILE	>1 MILE	>1 MILE
F.A.R. PART 77 CATEGORY	C	C	C	PIR	AV	AV	AV	AV
PERCENTAGE OF WIND COVERAGE (ALL WEATHER IN MPH)	[illegible]		[illegible]		[illegible]		[illegible]	
MAXIMUN CERTIFIED TAKEOFF WEIGHT (in LBS) OF DESIGN AIRCRAFT	124,500		124,500		12,500		12,500	
LINE OF SIGHT REQUIREMENT MET	YES		YES		YES		YES	
MAXIMUM ELEVATION (ABOVE MSL)	3411.2		3411.2		3448.8		3448.8	
LOWEST ELEVATION (ABOVE MSL)	3394.3		3390.0		3360.0		3360.0	
RUNWAY DIMENSIONS	6,831' x 150'		10,000' x 150'		6,725' x 75'		6,725' x 75'	
RUNWAY BEARING (TRUE BEARING - DECIMAL DEGREES)	45.0076	225.0213	45.0076	225.0213	0.0286	180.0283	0.0283	180.0283
RUNWAY APPROACH SURFACES (F.A.R. PART 77)	34:1	34:1	34:1	50:1	20:1	20:1	34:1	34:1
RUNWAY END ELEVATION	3411.2	3394.3	3411.2	3390.0	3360.0	3448.8	3360.0	3448.8
RUNWAY THRESHOLD DISPLACEMENT	0'	0'	0'	0'	0'	0'	0'	0'
RUNWAY THRESHOLD SITING REQUIREMENTS (APPENDIX 2, CATEGORY)	F	F	F	G	B	B	B	B
RUNWAY STOPWAY	0'	0'	0'	0'	0'	0'	0'	0'
RUNWAY SAFETY AREA (RSA)	8,831' x 500'		12,000' x 500'		7,325' x 150'		7,325' x 150'	
RUNWAY SAFETY AREA (RSA) BEYOND RUNWAY STOP END	1,000'	1,000'	1,000'	1,000'	300'	300'	300'	300'
RUNWAY OBSTACLE FREE ZONE (OFZ)	7,231' x 400'		10,400' x 400'		7,125' x 400'		7,125' x 400'	
RUNWAY OBSTACLE FREE ZONE (OFZ) BEYOND RUNWAY STOP END	200'	200'	200'	200'	200'	200'	200'	200'
RUNWAY OBJECT FREE AREA (OFA)	8,831' x 800'		12,000' x 800'		7,325' x 500'		7,325' x 500'	
RUNWAY OBJECT FREE AREA (OFA) BEYOND RUNWAY STOP END	1,000'	1,000'	1,000'	1,000'	300'	300'	300'	300'
RUNWAY PAVEMENT SURFACE MATERIAL	ASPHALT		ASPHALT		ASPHALT/CONCRETE		ASPHALT/CONCRETE	
RUNWAY PAVEMENT STRENGTH (IN THOUSAND LBS.)[1]	45(S)/85(D)/125(DT)/265(DDT)		45(S)/85(D)/125(DT)/265(DDT)		22(S)/60(D)		22(S)/60(D)	
RUNWAY EFFECTIVE GRADIENT	0.25%		0.25%		1.32%		1.32%	
RUNWAY MAXIMUM GRADIENT	0.30%		0.30%		1.49%		1.49%	
RUNWAY TOUCHDOWN ZONE ELEVATION (ABOVE MSL)	3411.2	3403.1	3411.2	3403.1	3395.8	3448.8	3395.8	3448.8
RUNWAY MARKING	NONPRECISION	NONPRECISION	NONPRECISION	PRECISION	BASIC	BASIC	BASIC	BASIC
RUNWAY LIGHTING	MIRL		MIRL		MIRL		MIRL	
RUNWAY APPROACH LIGHTING	NONE	NONE	NONE	MALSR	NONE	NONE	NONE	NONE
RUNWAY TO TAXIWAY SEPARATION (FROM CENTERLINE TO CENTERLINE)	400'		400'		240'		240'	
RUNWAY HOLD LINE POSITION (FROM RUNWAY CENTERLINE)	250'		250'		200'		200'	
TAXIWAY TO TAXILANE SEPARATION (FROM CENTERLINE TO CENTERLINE)	152'		152'		105'		105'	
TAXIWAY LIGHTING	MITL		MITL		MITL		MITL	
TAXIWAY MARKING	CENTERLINE		CENTERLINE		CENTERLINE		CENTERLINE	
TAXIWAY SURFACE MATERIAL	ASPHALT		ASPHALT		ASPHALT		ASPHALT	
TAXIWAY WINGTIP CLEARANCE	34'		34'		26'		26'	
TAXIWAY WIDTH	VARIES (75' TO 150')		VARIES (60' TO 150')		VARIES (70' TO 150')		VARIES (60' TO 150')	
TAXIWAY SAFETY AREA WIDTH	118'		118'		79'		79'	
TAXIWAY OBJECT FREE AREA WIDTH	186'		186'		131'		131'	
RUNWAY VISUAL NAVIGATIONAL AIDS	PAPI-4 L REIL	PAPI-4 L REIL	PAPI-4 L REIL	PAPI-4 L REIL	PAPI-2 L	PAPI-2 L	PAPI-2 L	PAPI-2 L
RUNWAY ELECTRONIC NAVIGATIONAL AIDS	GPS	GPS VOR/DME	GPS	ILS GPS VOR/DME				

[1]Pavement strengths are expressed in Single(S), Dual(D), Dual Tandem(DT) and Double Dual Tandem(DDT) wheel loading capacities.

AIRPORT DATA

KINGMAN AIRPORT (IGM)

CITY: KINGMAN, ARIZONA | COUNTY: MOHAVE, ARIZONA | RANGE: 16W | TOWNSHIP: 22N

		EXISTING	ULTIMATE
AIRPORT SERVICE LEVEL		COMMERCIAL-NONPRIMARY	COMMERCIAL-NONPRIMARY
AIRPORT REFERENCE CODE		C-III	C-III
DESIGN AIRCRAFT		B737-300	B737-300
AIRPORT ELEVATION		3448.8 MSL	3448.8 MSL
MEAN MAXIMUM TEMPERATURE OF HOTTEST MONTH		98° F (JULY)	98° F (JULY)
AIRPORT REFERENCE POINT (ARP)	LATITUDE	35° 15' 34.100" N	35° 15' 39.818" N
COORDINATES (NAD 83)	LONGITUDE	113° 56' 17.000" W	113° 56' 10.245" W
AIRPORT AND TERMINAL NAVIGATIONAL AIDS		VOR/DME (21) PAPI-4 (3/21) PAPI-2 (17/35)	ILS (21) VOR/DME (21) PAPI-4 (3/21) PAPI-2 (17/35)
GPS APPROACH		3/21	3/21

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
		AVIGATION EASEMENT (if applicable)
		BUILDING REMOVAL
		BUILDING CONSTRUCTION
	BRL	BUILDING RESTRICTION LINE (BRL)
		FACILITY (PAVEMENT) CONSTRUCTION
		FENCING
		INDUSTRIAL PARK BOUNDARY
VAS-4	VAS-4	NAVIGATIONAL AID INSTALLATION
PAPI-4	PAPI-4	PRECISION APPROACH PATH INDICATOR
		PRIMARY/SECONDARY AIRPORT CONTROL STATION
		RUNWAY OBJECT FREE AREA
		RUNWAY OBSTACLE FREE ZONE
		RUNWAY SAFETY AREA
		RUNWAY END IDENTIFICATION LIGHTS (REIL)
		RUNWAY THRESHOLD LIGHTS
		RUNWAY VISIBILITY ZONE
		SECTION CORNER
		SEGMENTED CIRCLE/WIND INDICATOR
		TAXIWAY DESIGNATION
		TOPOGRAPHY
		WIND INDICATOR (Lighted)

EXISTING BUILDINGS/FACILITIES

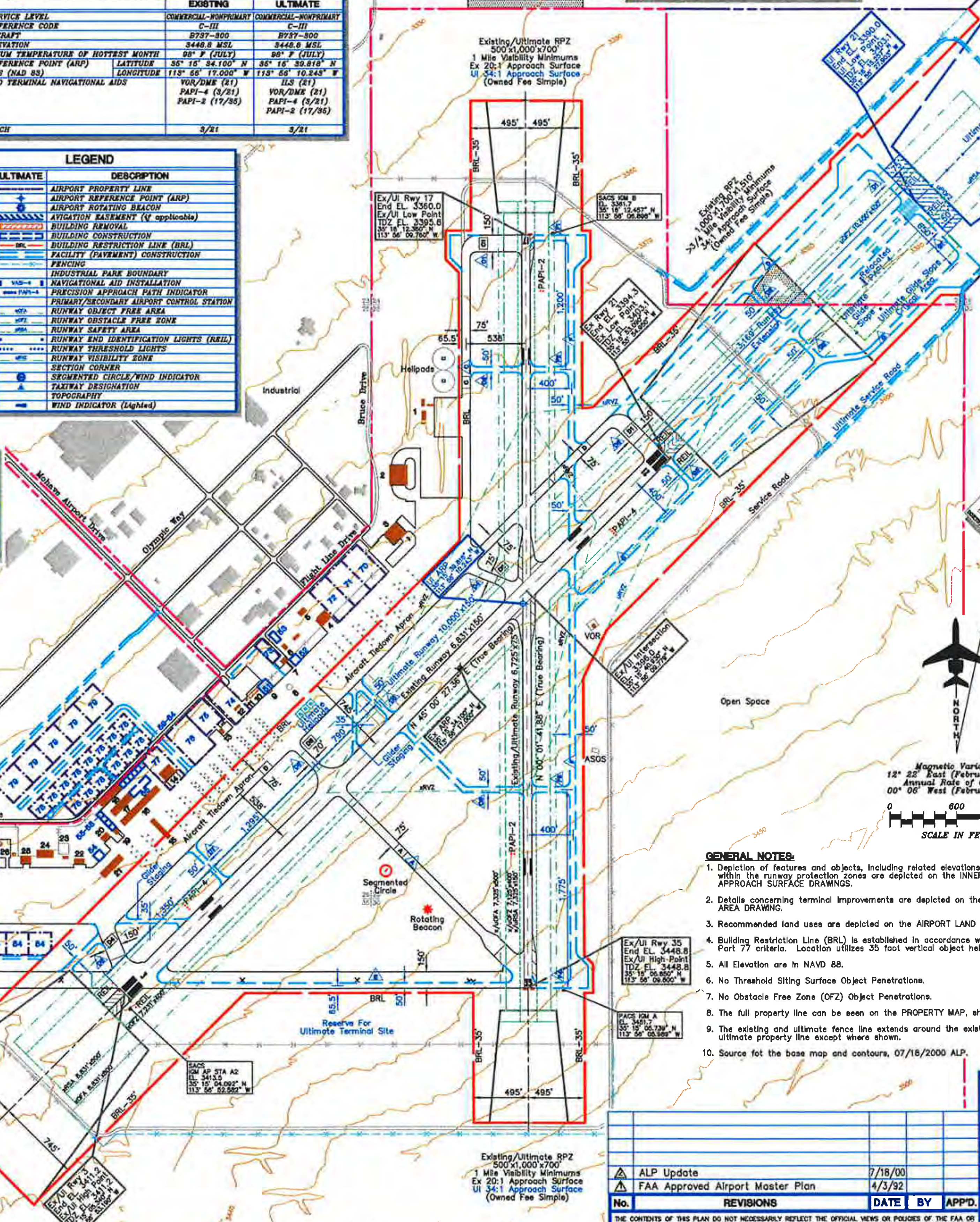
NO.	DESCRIPTION
1	BUREAU OF LAND MANAGEMENT
2	CONVENTIONAL HANGAR
3	CONVENTIONAL HANGAR
4	CONVENTIONAL HANGAR
5	OFFICE
6	AIR MEDICAL ADMINISTRATION
7	KINGMAN AIRPORT AUTHORITY ADMINISTRATIONS/ARFF
8	FUEL ISLAND
9	SECURITY SCREENING/HOLDROOM BUILDING
10	TERMINAL BUILDING
11	HISTORIC TOWER
12	TRANSPORTATION SECURITY ADMINISTRATION BUILDING
13	FIXED BASE OPERATIONS
14	CONVENTIONAL HANGAR
15	SHADE HANGAR
16	T-HANGARS
17	T-HANGARS
18	CONVENTIONAL HANGARS
19	CONVENTIONAL HANGAR
20	CONVENTIONAL HANGAR
21	T-HANGAR
22	CONVENTIONAL HANGAR
23	FUEL FACILITY
24	CONVENTIONAL HANGAR
25	CONVENTIONAL HANGAR
26	T-HANGAR
27	T-HANGAR
28	CONVENTIONAL HANGAR
29	CONVENTIONAL HANGAR
30	CONVENTIONAL HANGAR
31	T-HANGAR
32	CONVENTIONAL HANGAR
33	CONVENTIONAL HANGAR

ULTIMATE BUILDINGS/FACILITIES

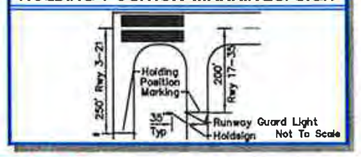
NO.	DESCRIPTION
51	COMMERCIAL TERMINAL
52	AIRPORT RESCUE/FIREFIGHTING (ARFF)
53	AIRPORT MAINTENANCE
54	AIRCRAFT WASH RACK
55	CONVENTIONAL HANGAR
56	CONVENTIONAL HANGAR
57	CONVENTIONAL HANGAR
58	CONVENTIONAL HANGAR
59	CONVENTIONAL HANGAR
60	CONVENTIONAL HANGAR
61	CONVENTIONAL HANGAR
62	CONVENTIONAL HANGAR
63	CONVENTIONAL HANGAR
64	CONVENTIONAL HANGAR
65	T-HANGAR (10 Units)
66	CAMPGROUND
67	T-HANGAR (12 Units)
68	T-HANGAR (10 Units)
69	T-HANGAR (20 Units)
70	PARCEL (Fixed Based Operation)
71	PARCEL (Fixed Based Operation)
72	PARCEL (Fixed Based Operation)
73	PARCEL (Terminal Support)
74	PARCEL (Terminal Support)
75	PARCEL (Aviation Related)
76	PARCEL (Aviation Related)
77	PARCEL (Aviation Related)
78	PARCEL (160' x 160')
79	PARCEL (250' x 250')
80	PARCEL (Aviation Related)
81	PARCEL (Aviation Related)
82	PARCEL (Aviation Related)
83	PARCEL (Aviation Related)
84	PARCEL (200' x 200')

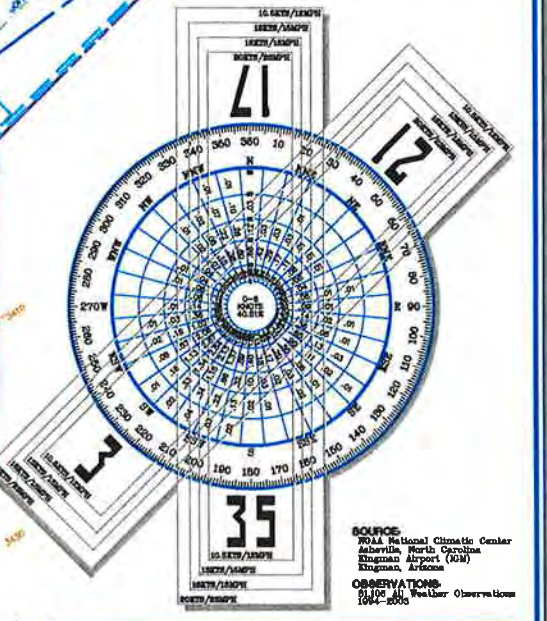
RUNWAY END COORDINATES (NAD 83)

RUNWAY		EXISTING	ULTIMATE
Runway 3	Latitude	35° 15' 05.340" N	35° 15' 05.340" N
	Longitude	113° 56' 53.190" W	113° 56' 53.190" W
Runway 21	Latitude	35° 15' 53.090" N	35° 16' 16.257" N
	Longitude	113° 55' 54.950" W	113° 55' 27.903" W
Runway 17	Latitude	35° 16' 12.350" N	35° 16' 12.350" N
	Longitude	113° 56' 09.760" W	113° 56' 09.760" W
Runway 35	Latitude	35° 15' 05.850" N	35° 15' 05.850" N
	Longitude	113° 56' 09.800" W	113° 56' 09.800" W



HOLDING POSITION MARKINGS/SIGN





ALL WEATHER WIND COVERAGE

Runways	10.5kts/12mph	13kts/15mph	16kts/18mph	20kts/23mph
Runway 3-21	93.26%	96.09%	98.59%	99.59%
Runway 17-35	88.22%	94.33%	98.35%	99.69%
Combined	97.64%	99.06%	99.71%	99.92%

Magnetic Variance 12° 22' East (February 2006) Annual Rate of Change 00° 06' West (February 2006)

0 600 1,200 SCALE IN FEET

FOR APPROVAL BY:

Kingman Airport Authority, Inc.

APPROVED BY: ON THE DATE OF:

Ms. Brenda Chastain
Director, Corporate Administration

FAA APPROVAL STAMP

GENERAL NOTES:

1. Depiction of features and objects, including related elevations and clearances, within the runway protection zones are depicted on the INNER PORTION APPROACH SURFACE DRAWINGS.
2. Details concerning terminal improvements are depicted on the TERMINAL AREA DRAWING.
3. Recommended land uses are depicted on the AIRPORT LAND USE DRAWING.
4. Building Restriction Line (BRL) is established in accordance with F.A.R. Part 77 criteria. Location utilizes 35 foot vertical object height.
5. All Elevation are in NAVD 88.
6. No Threshold Siting Surface Object Penetrations.
7. No Obstacle Free Zone (OFZ) Object Penetrations.
8. The full property line can be seen on the PROPERTY MAP, sheet 12 of 12.
9. The existing and ultimate fence line extends around the existing and ultimate property line except where shown.
10. Source fot the base map and contours, 07/18/2000 ALP.

VICINITY MAP

LOCATION MAP

No.	REVISIONS	DATE	BY	APP'D.
2	ALP Update	7/18/00		
1	FAA Approved Airport Master Plan	4/3/92		

THE CONTENTS OF THIS PLAN DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICIES OF THE FAA OR ADOT AERONAUTICS. ACCEPTANCE OF THESE DOCUMENTS BY ADOT AERONAUTICS DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE STATE OF ARIZONA TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC OR STATE LAWS.

KINGMAN AIRPORT

AIRPORT LAYOUT DRAWING

KINGMAN, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Richard A. Lolly
APPROVED BY: Chris M. Hugunin

February 16, 2006 | SHEET 1 OF 12

Coffman Associates Airport Consultants

OBSTRUCTION TABLE

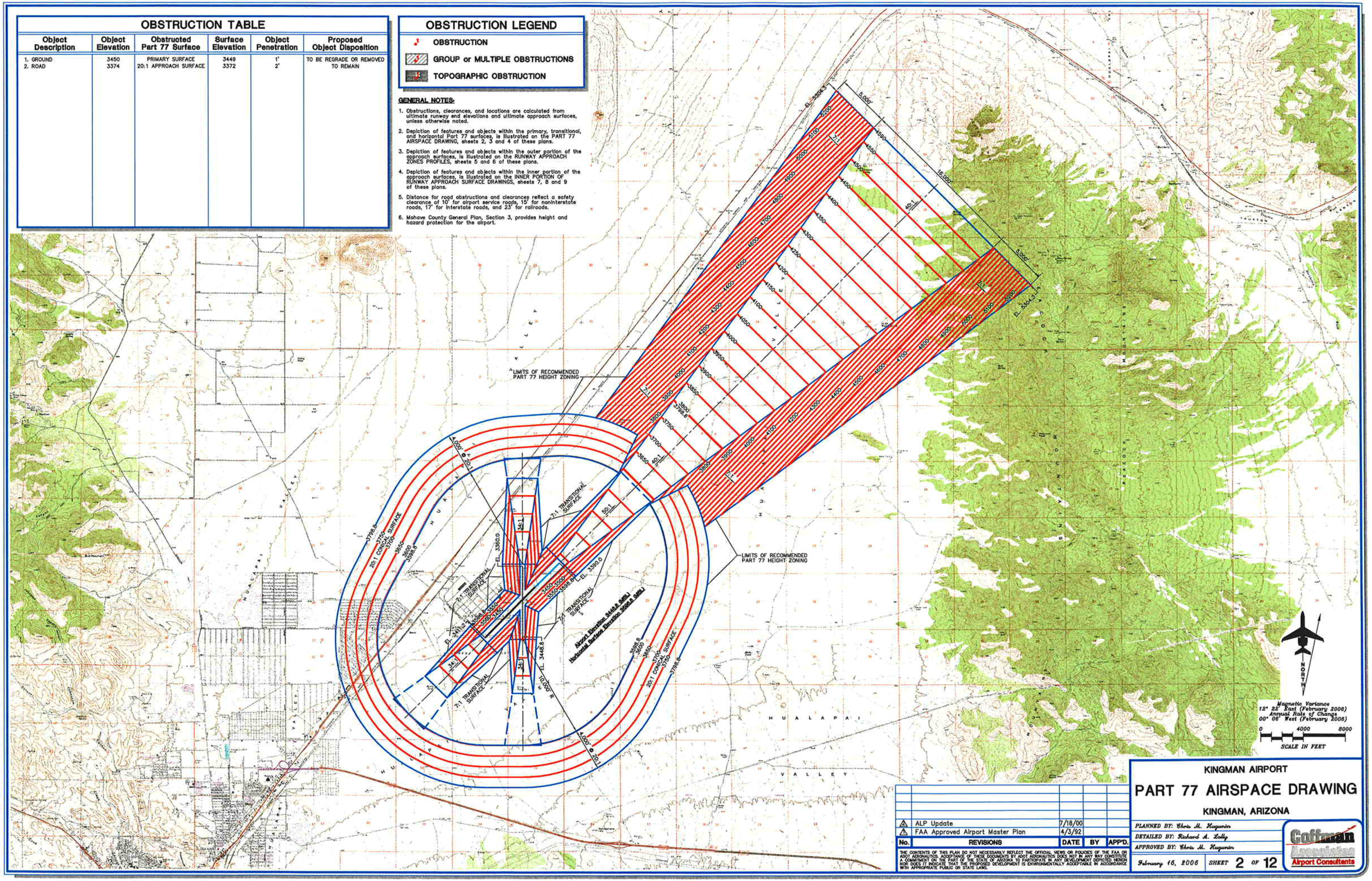
Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
1. GROUND	3450	PRIMARY SURFACE	3449	1'	TO BE REGRADE OR REMOVED
2. ROAD	3374	20:1 APPROACH SURFACE	3372	2'	TO REMAIN

OBSTRUCTION LEGEND

- OBSTRUCTION
- GROUP or MULTIPLE OBSTRUCTIONS
- TOPOGRAPHIC OBSTRUCTION

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
2. Depiction of features and objects within the primary, transitional, and horizontal Part 77 surfaces, is illustrated on the PART 77 AIRSPACE DRAWING, sheets 2, 3 and 4 of these plans.
3. Depiction of features and objects within the outer portion of the approach surfaces, is illustrated on the RUNWAY APPROACH ZONES PROFILES, sheets 5 and 6 of these plans.
4. Depiction of features and objects within the inner portion of the approach surfaces, is illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS, sheets 7, 8 and 9 of these plans.
5. Distance for road obstructions and clearances reflect a safety clearance of 10' for airport service roads, 15' for noninterstate roads, 17' for interstate roads, and 23' for railroads.
6. Mohave County General Plan, Section 3, provides height and hazard protection for the airport.



No.	REVISIONS	DATE	BY	APP'D.
2	ALP Update	7/18/00		
1	FAA Approved Airport Master Plan	4/3/92		

KINGMAN AIRPORT

PART 77 AIRSPACE DRAWING

KINGMAN, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Richard A. Lolly
APPROVED BY: Chris M. Hugunin

February 16, 2006 — SHEET 2 OF 12

Coffman Associates Airport Consultants

OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
1. GROUND	3450	PRIMARY SURFACE	3449	1'	TO BE REGRADE OR REMOVED
2. ROAD	3374	20:1 APPROACH SURFACE	3372	2'	TO REMAIN

OBSTRUCTION LEGEND

- OBSTRUCTION
- GROUP or MULTIPLE OBSTRUCTIONS
- TOPOGRAPHIC OBSTRUCTION

GENERAL NOTES:

1. Obstructions, clearances, and locations are calculated from ultimate runway end elevations and ultimate approach surfaces, unless otherwise noted.
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4. Depiction of features and objects within the inner portion of the approach surfaces, is illustrated on the INNER PORTION OF RUNWAY APPROACH SURFACE DRAWINGS, sheets 7, 8 and 9 of these plans.
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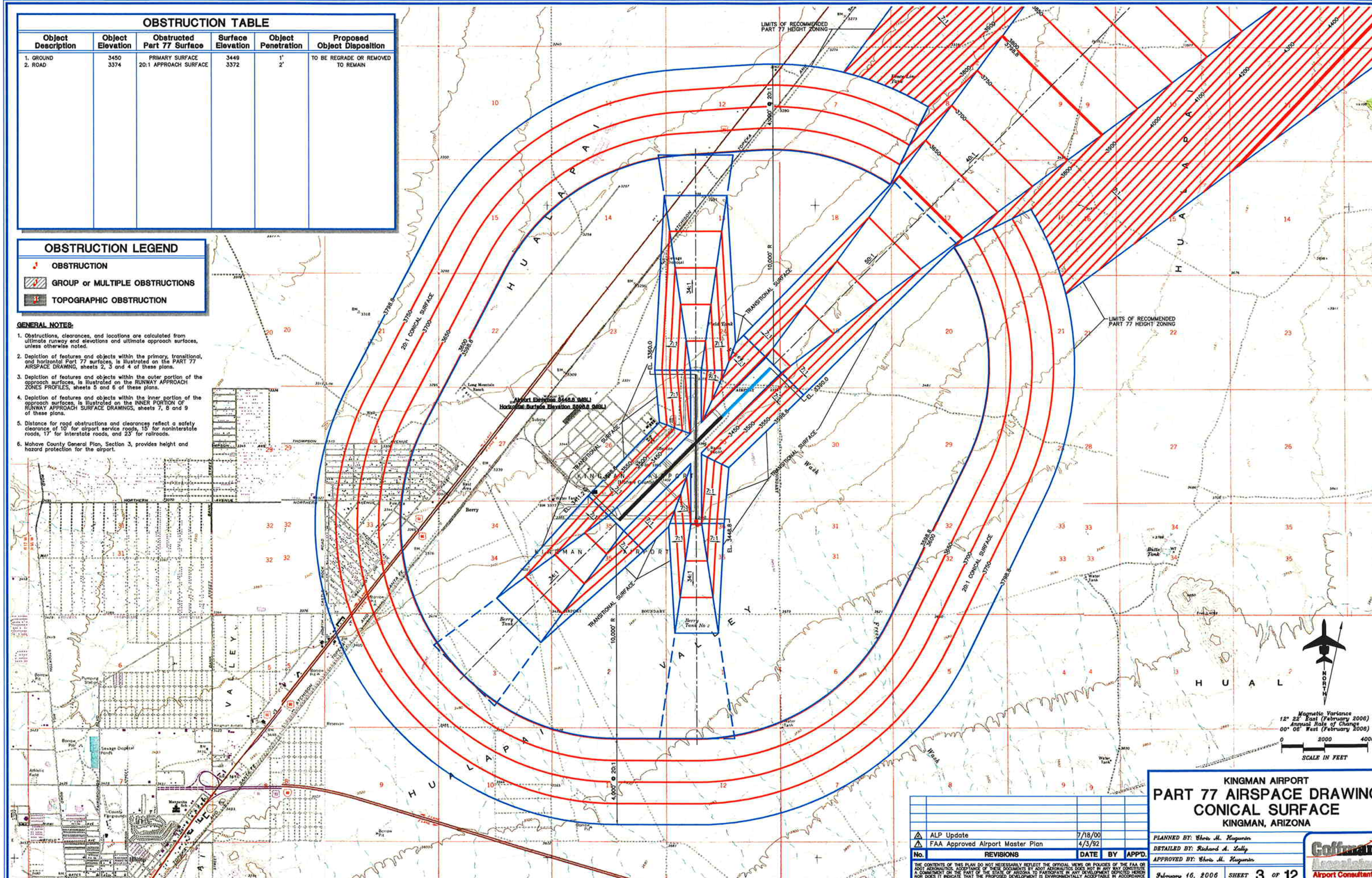

No.	REVISIONS	DATE	BY	APP'D.
2	ALP Update	7/18/00		
1	FAA Approved Airport Master Plan	4/3/92		

KINGMAN AIRPORT
PART 77 AIRSPACE DRAWING CONICAL SURFACE
KINGMAN, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Richard A. Lally
APPROVED BY: Chris M. Hugunin

February 16, 2006 SHEET 3 OF 12

Coffman Associates
Airport Consultants

OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
NONE					

OBSTRUCTION LEGEND

- OBSTRUCTION
- GROUP or MULTIPLE OBSTRUCTIONS
- TOPOGRAPHIC OBSTRUCTION

GENERAL NOTES:

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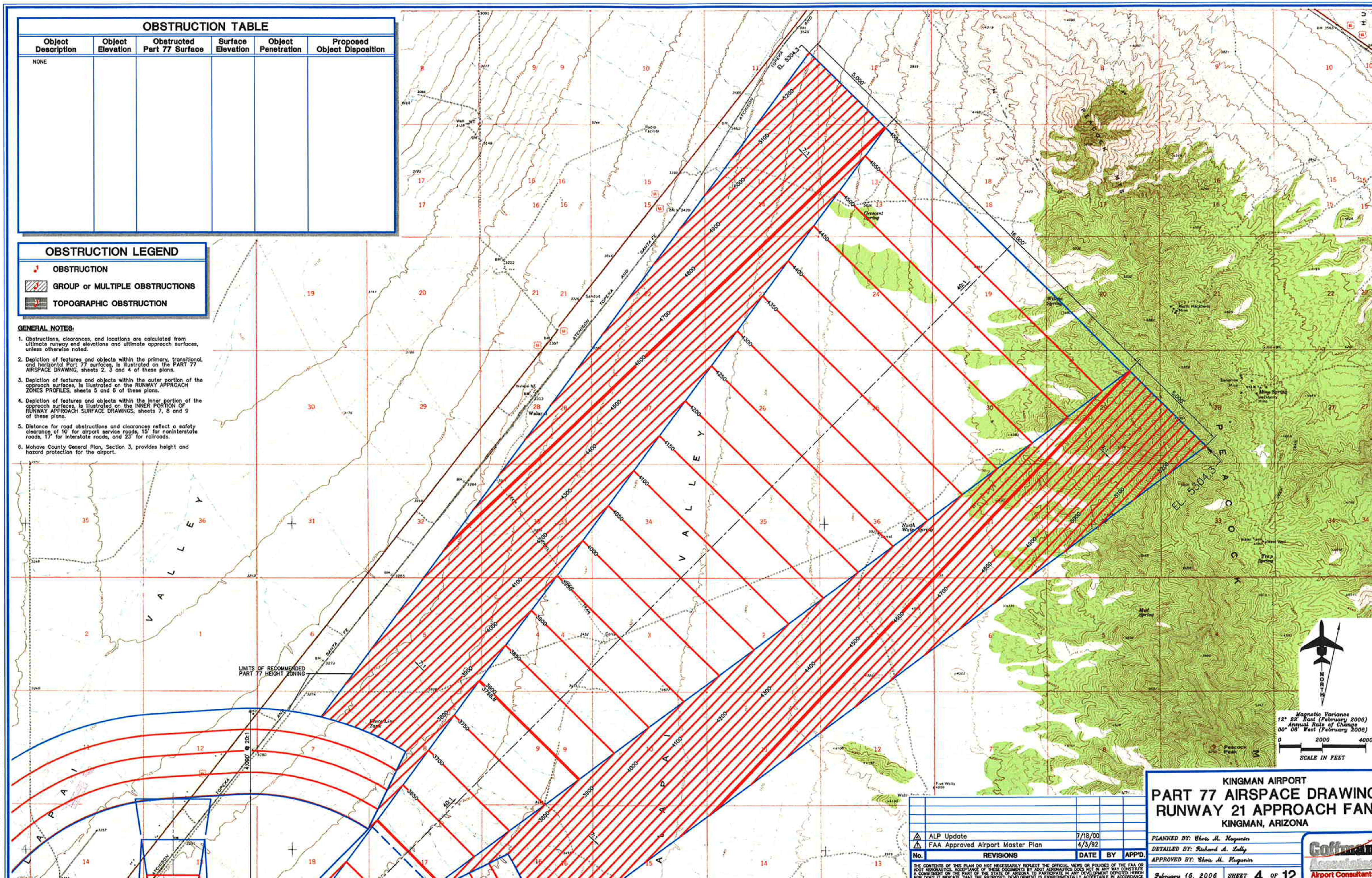

No.	REVISIONS	DATE	BY	APP'D.
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1	FAA Approved Airport Master Plan	4/3/92		

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KINGMAN AIRPORT

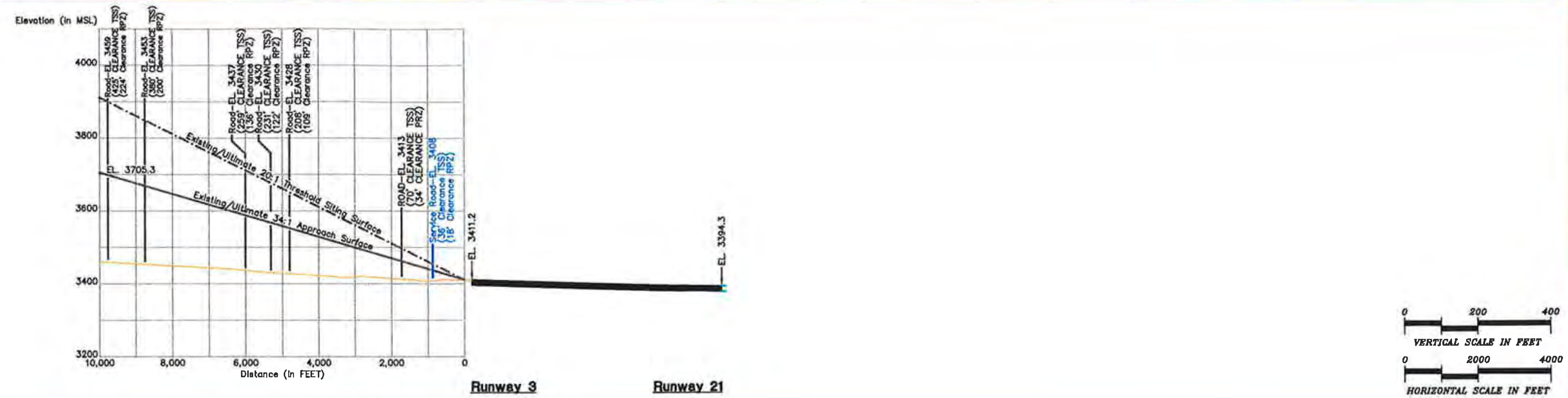
PART 77 AIRSPACE DRAWING RUNWAY 21 APPROACH FAN

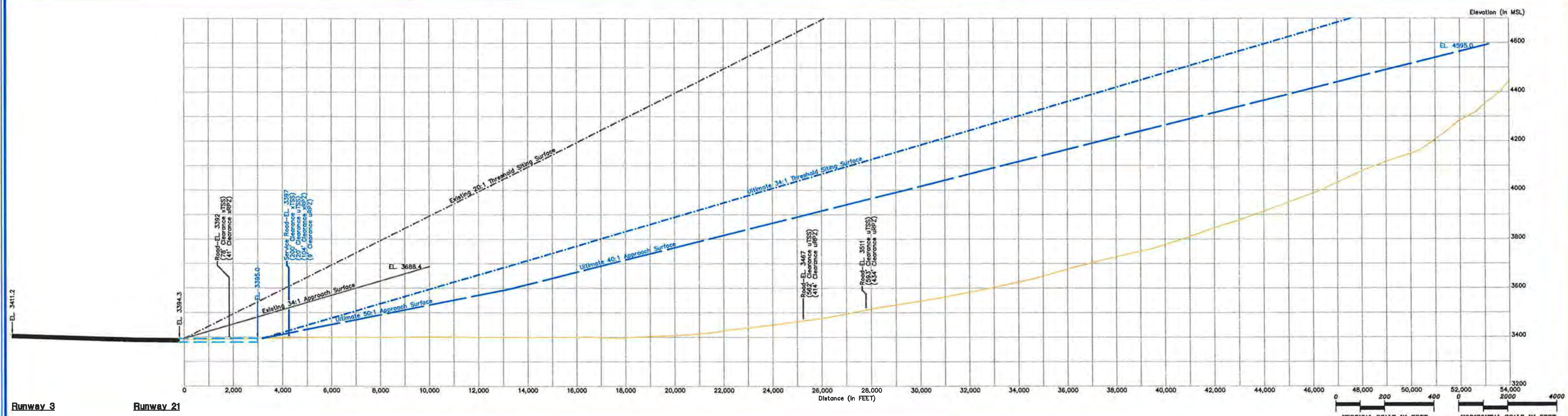
KINGMAN, ARIZONA

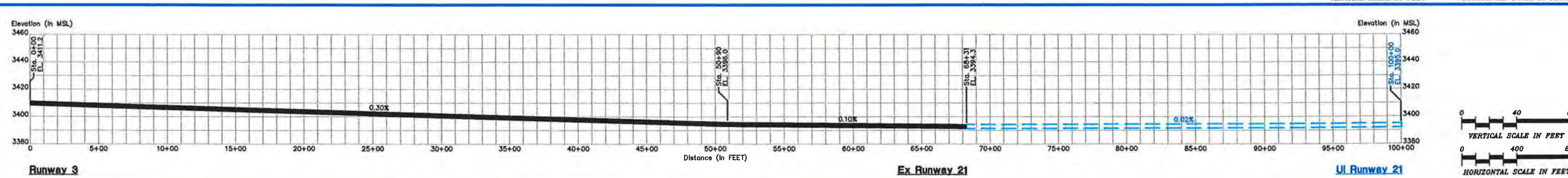
PLANNED BY: Chris M. Hugunin
DETAILED BY: Richard A. Lolly
APPROVED BY: Chris M. Hugunin

February 16, 2006 — SHEET 4 OF 12

Coffman Associates Airport Consultants







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5. Distance for road obstructions and clearances reflect a safety clearance of 10' for airport service roads, 15' for noninterstate roads, 17' for interstate roads, and 23' for railroads.
6. Exising and future height and hazard ordinances are to be amended and/or referenced upon approval of updated PART 77 AIRSPACE DRAWING.

No.	REVISIONS	DATE	BY	APP'D.
2	ALP Update	7/18/00		
1	FAA Approved Airport Master Plan	4/3/92		

KINGMAN AIRPORT

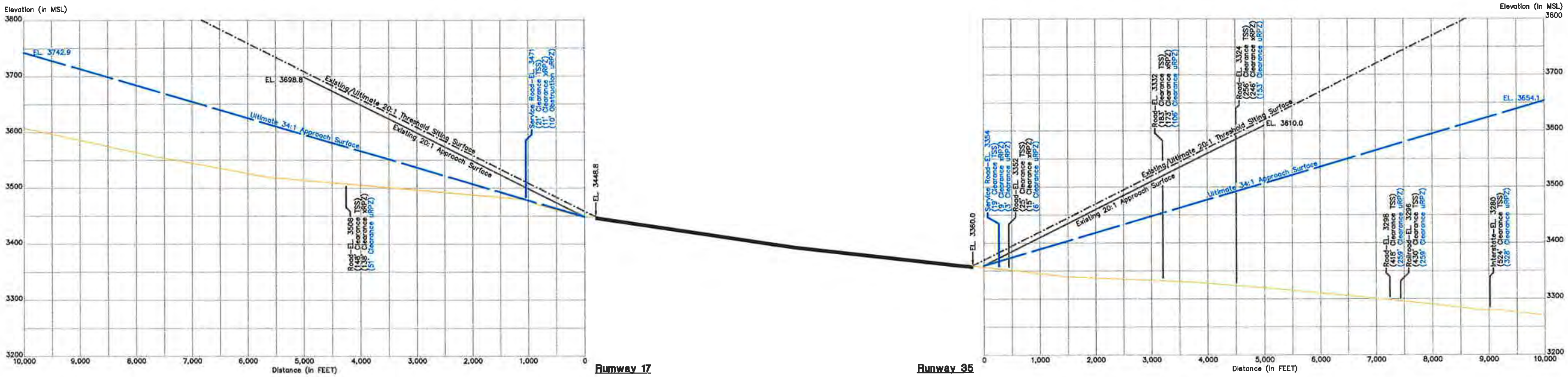
APPROACH ZONE PROFILES
RUNWAY 3-21/RUNWAY PROFILE

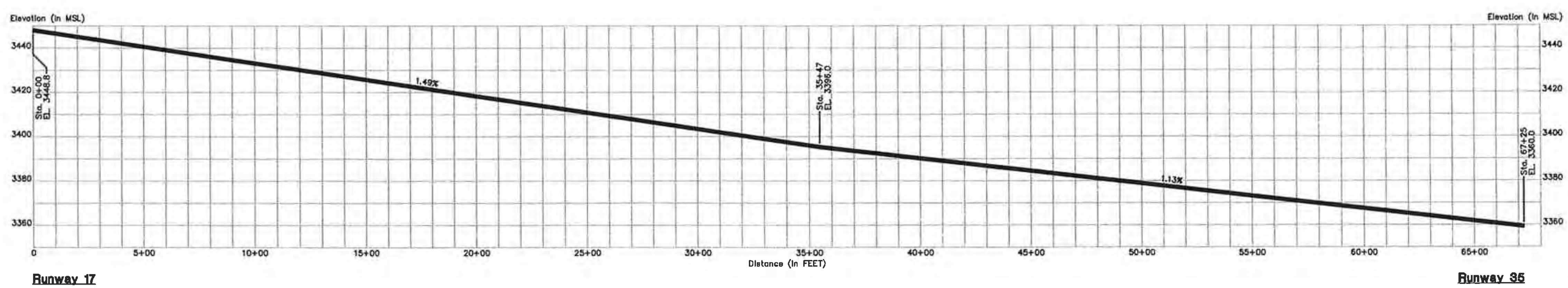
KINGMAN, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Richard A. Lolly
APPROVED BY: Chris M. Hugunin

February 16, 2006 — SHEET 5 OF 12

Coffman Associates
Airport Consultants





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1	FAA Approved Airport Master Plan	4/3/92		

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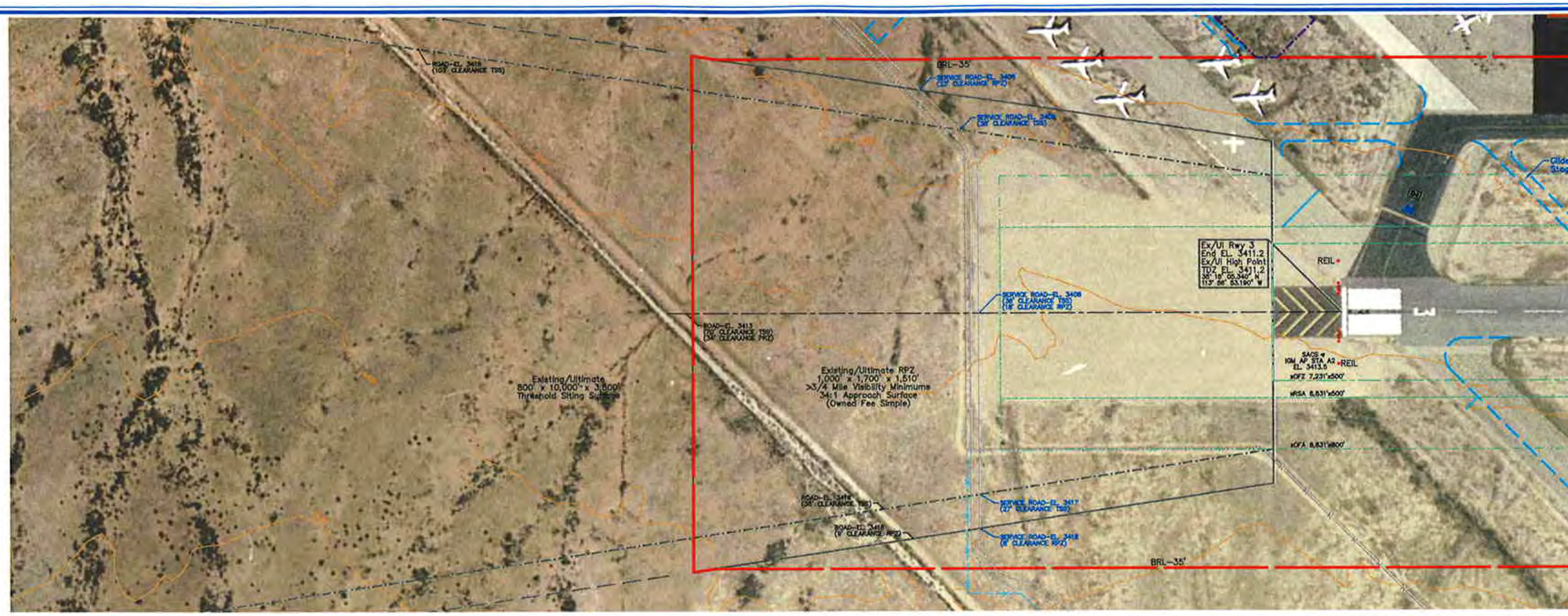
KINGMAN AIRPORT
APPROACH ZONE PROFILES RUNWAY 17-35/RUNWAY PROFILE
KINGMAN, ARIZONA

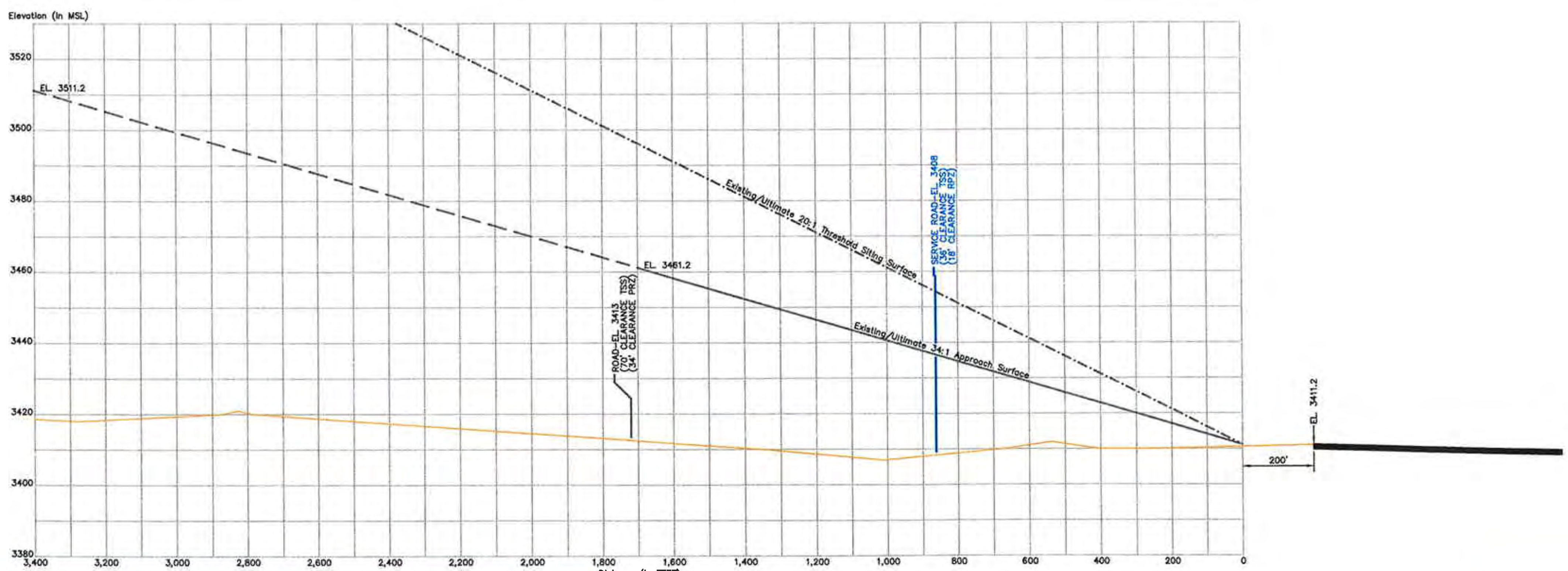
PLANNED BY: Chris M. Huguenin
DETAILED BY: Richard A. Lolly
APPROVED BY: Chris M. Huguenin

February 16, 2006 | SHEET 6 OF 12

Coffman Associates
Airport Consultants

Magnetic Variance
12° 22' East (February 2006)
Annual Rate of Change
00° 06' West (February 2006)





VERTICAL SCALE IN FEET (0, 20, 40)

HORIZONTAL SCALE IN FEET (0, 200, 400)

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OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
NONE					

No.	REVISIONS	DATE	BY	APP'D.
△	ALP Update	7/18/00		
△	FAA Approved Airport Master Plan	4/3/92		

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KINGMAN AIRPORT

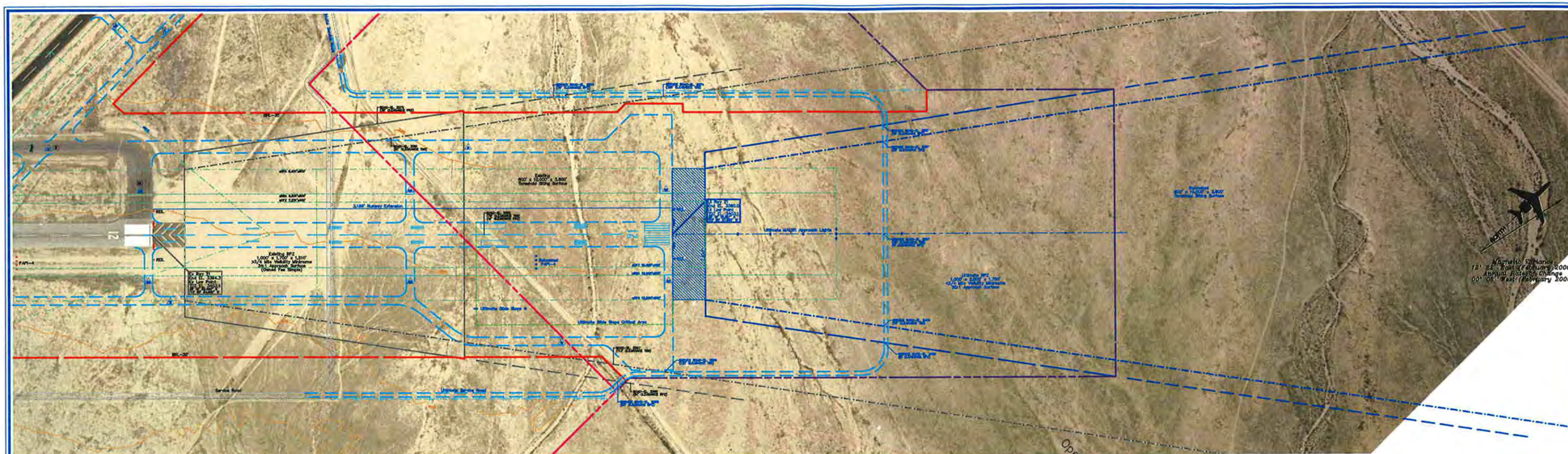
INNER PORTION OF RUNWAY 3 APPROACH SURFACE DRAWING

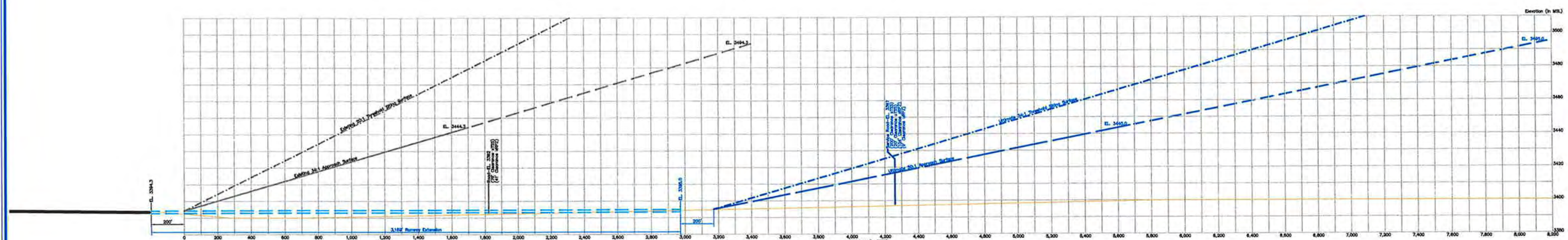
KINGMAN, ARIZONA

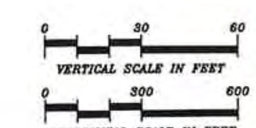
PLANNED BY: Chris M. Hugunin
DETAILED BY: Richard A. Lolly
APPROVED BY: Chris M. Hugunin

February 16, 2006 | SHEET 7 OF 12

Coffman Associates Airport Consultants







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6. Exising and future height and hazard ordinances are to be amended and/or referenced upon approval of updated PART 77 AIRSPACE DRAWING.

OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
NONE					

No.	REVISIONS	DATE	BY	APP'D.
△	ALP Update	7/18/00		
△	FAA Approved Airport Master Plan	4/3/92		

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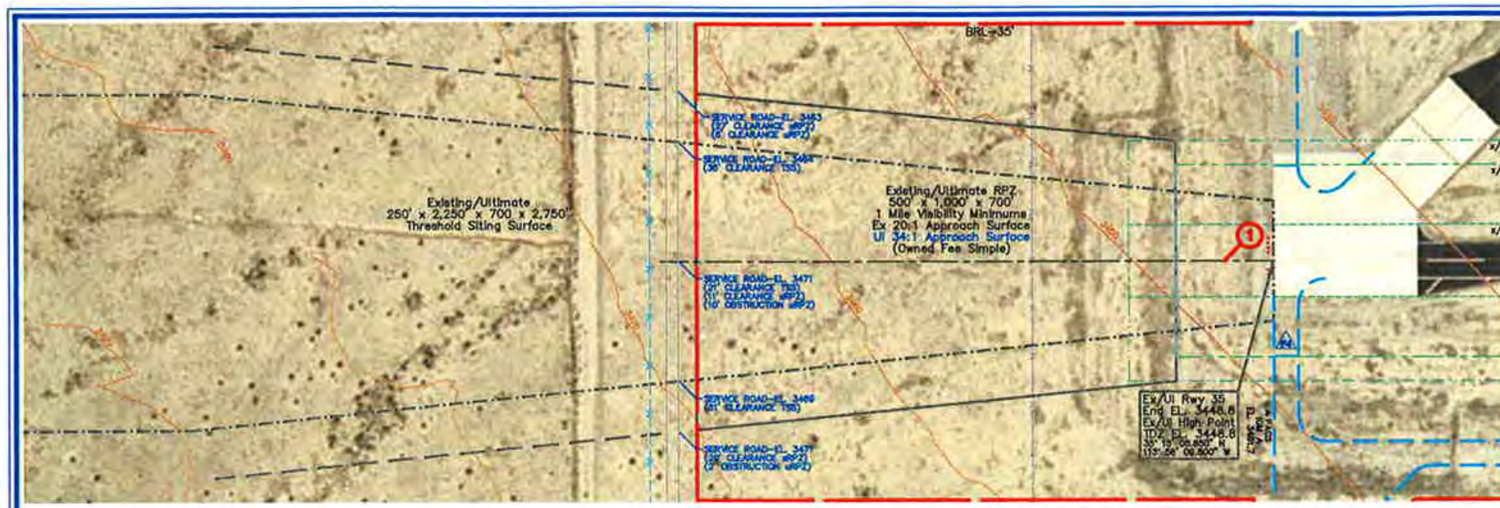
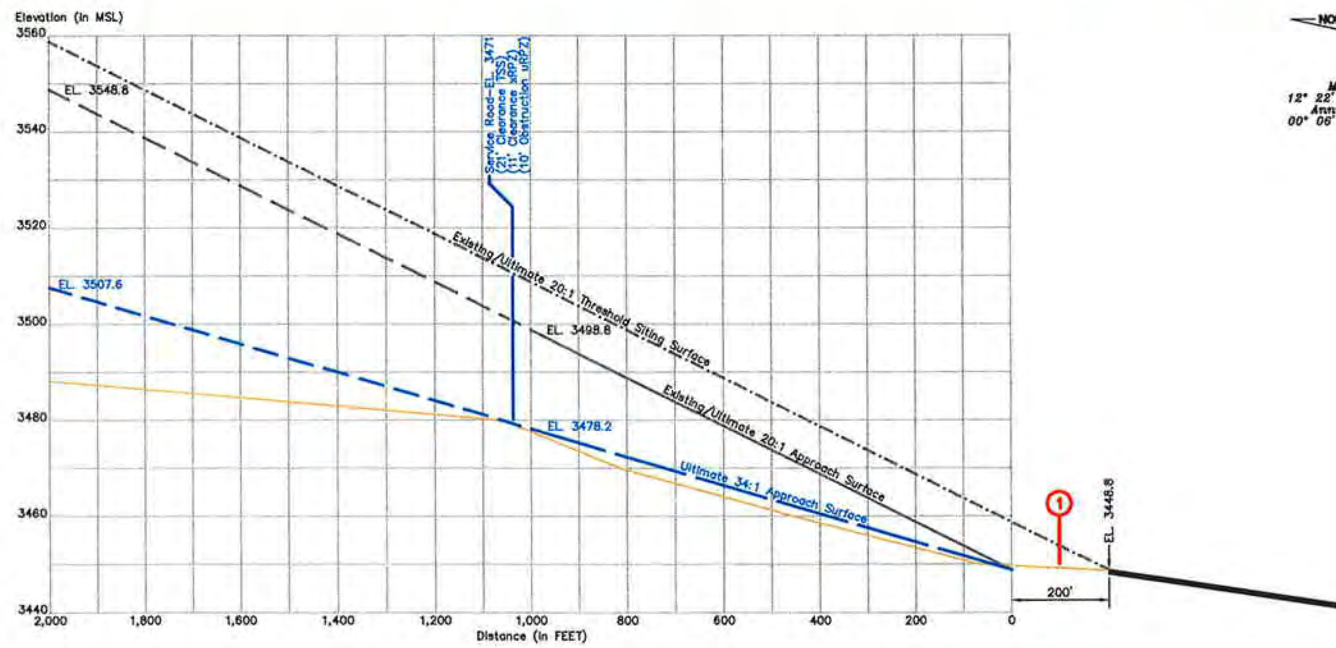
KINGMAN AIRPORT
INNER PORTION OF RUNWAY 21 APPROACH SURFACE DRAWING
KINGMAN, ARIZONA

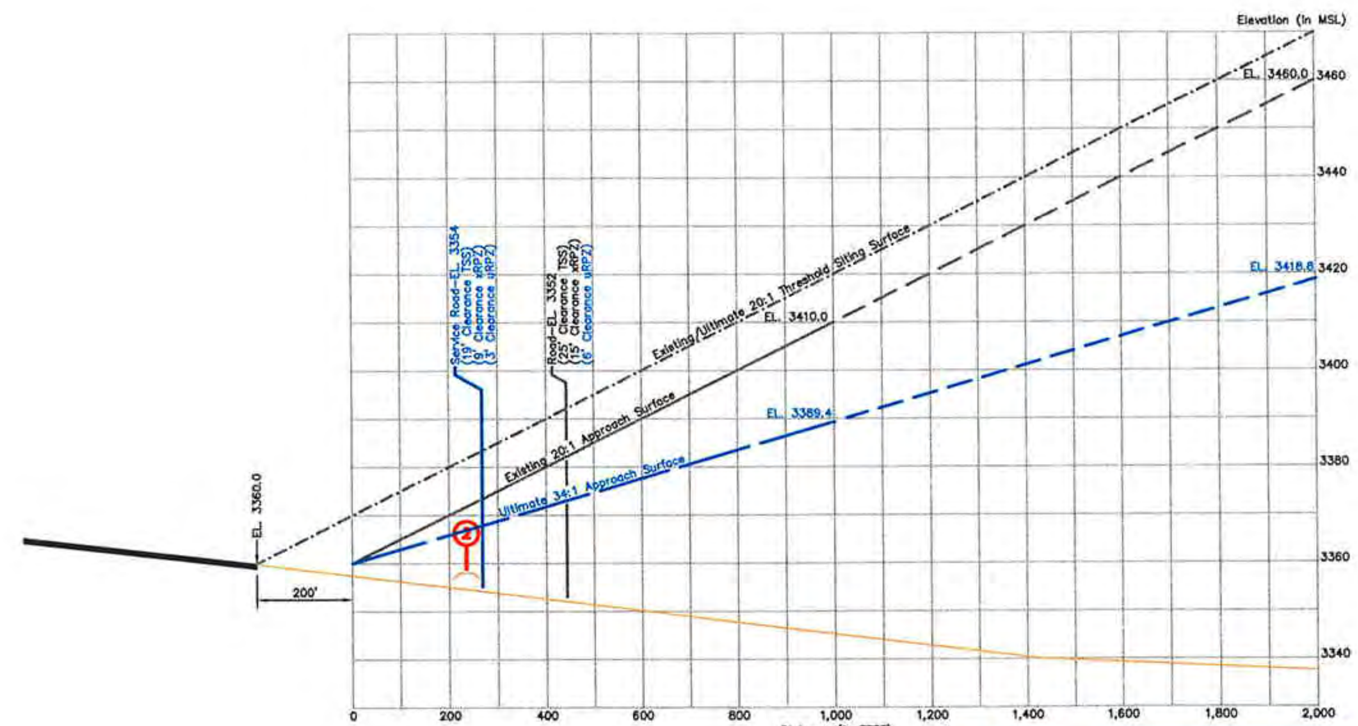
PLANNED BY: Chris M. Hugunin
DETAILED BY: Richard A. Lolly
APPROVED BY: Chris M. Hugunin

February 16, 2006 | SHEET 8 OF 12

Coffman Associates Airport Consultants







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OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
1. GROUND	3450	PRIMARY SURFACE	3449	1'	TO BE REGRADE OR REMOVED
2. ROAD	3374	20:1 APPROACH SURFACE	3372	2'	TO REMAIN

VERTICAL SCALE IN FEET: 0 20 40

HORIZONTAL SCALE IN FEET: 0 200 400

No.	REVISIONS	DATE	BY	APP'D.
2	ALP Update	7/18/00		
1	FAA Approved Airport Master Plan	4/3/92		

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KINGMAN AIRPORT

INNER PORTION OF RUNWAYS 17-35 APPROACH SURFACES DRAWING

KINGMAN, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Richard A. Lolly
APPROVED BY: Chris M. Hugunin

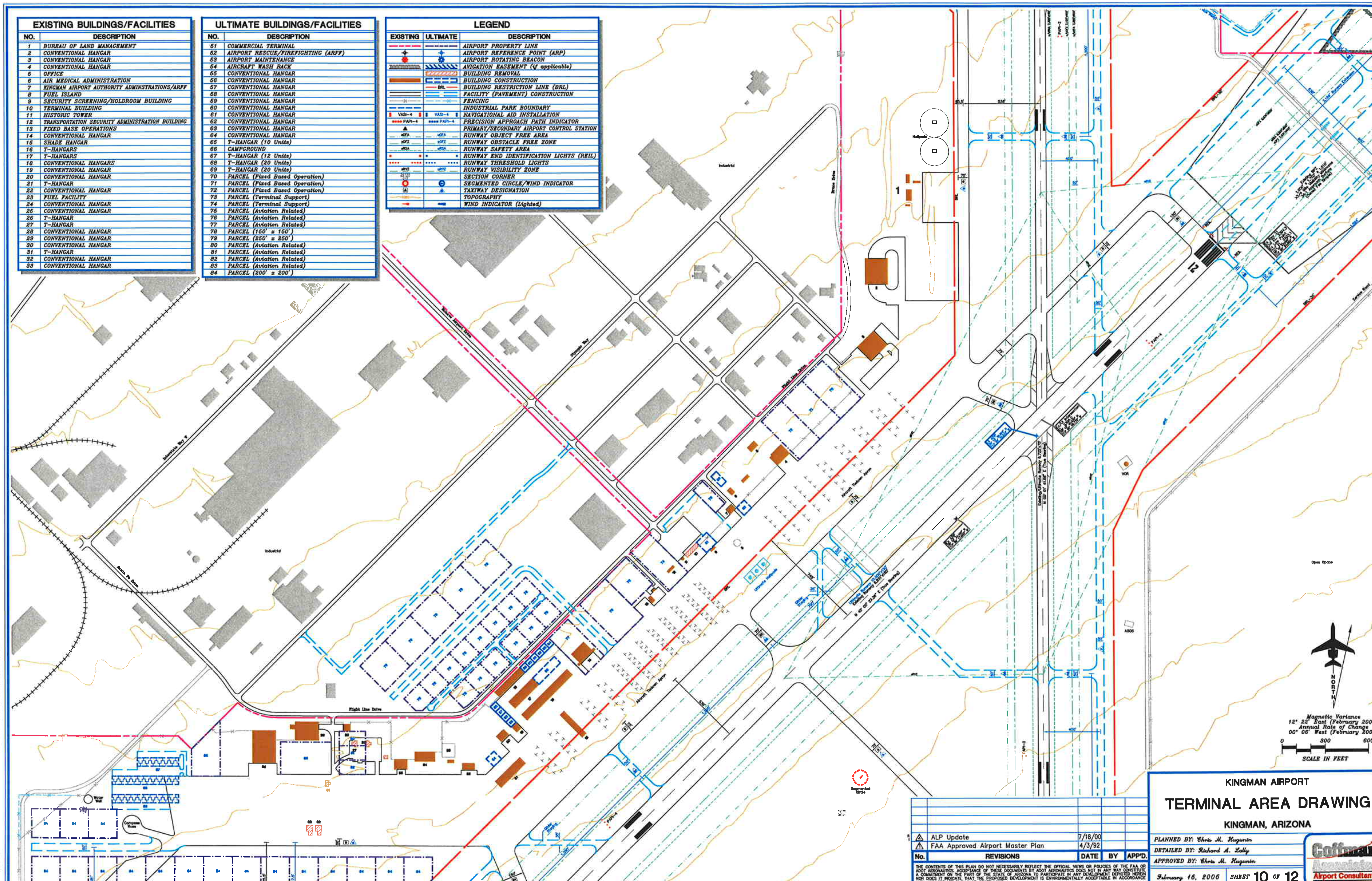
February 16, 2006 | SHEET 9 OF 12

Coffman Associates Airport Consultants

EXISTING BUILDINGS/FACILITIES	
NO.	DESCRIPTION
1	BUREAU OF LAND MANAGEMENT
2	CONVENTIONAL HANGAR
3	CONVENTIONAL HANGAR
4	CONVENTIONAL HANGAR
5	OFFICE
6	AIR MEDICAL ADMINISTRATION
7	KINGMAN AIRPORT AUTHORITY ADMINSTRATIONS/ARFF
8	FUEL ISLAND
9	SECURITY SCREENING/HOLDROOM BUILDING
10	TERMINAL BUILDING
11	HISTORIC TOWER
12	TRANSPORTATION SECURITY ADMINISTRATION BUILDING
13	FIXED BASE OPERATIONS
14	CONVENTIONAL HANGAR
15	SHADE HANGAR
16	T-HANGARS
17	T-HANGARS
18	CONVENTIONAL HANGARS
19	CONVENTIONAL HANGAR
20	CONVENTIONAL HANGAR
21	T-HANGAR
22	CONVENTIONAL HANGAR
23	FUEL FACILITY
24	CONVENTIONAL HANGAR
25	CONVENTIONAL HANGAR
26	T-HANGAR
27	T-HANGAR
28	CONVENTIONAL HANGAR
29	CONVENTIONAL HANGAR
30	CONVENTIONAL HANGAR
31	T-HANGAR
32	CONVENTIONAL HANGAR
33	CONVENTIONAL HANGAR

ULTIMATE BUILDINGS/FACILITIES	
NO.	DESCRIPTION
51	COMMERCIAL TERMINAL
52	AIRPORT RESCUE/FIREFIGHTING (ARFF)
53	AIRPORT MAINTENANCE
54	AIRCRAFT WASH RACK
55	CONVENTIONAL HANGAR
56	CONVENTIONAL HANGAR
57	CONVENTIONAL HANGAR
58	CONVENTIONAL HANGAR
59	CONVENTIONAL HANGAR
60	CONVENTIONAL HANGAR
61	CONVENTIONAL HANGAR
62	CONVENTIONAL HANGAR
63	CONVENTIONAL HANGAR
64	CONVENTIONAL HANGAR
65	T-HANGAR (10 Units)
66	CAMPGROUND
67	T-HANGAR (12 Units)
68	T-HANGAR (20 Units)
69	T-HANGAR (20 Units)
70	PARCEL (Fixed Based Operation)
71	PARCEL (Fixed Based Operation)
72	PARCEL (Fixed Based Operation)
73	PARCEL (Terminal Support)
74	PARCEL (Terminal Support)
75	PARCEL (Aviation Related)
76	PARCEL (Aviation Related)
77	PARCEL (Aviation Related)
78	PARCEL (150' x 150')
79	PARCEL (250' x 250')
80	PARCEL (Aviation Related)
81	PARCEL (Aviation Related)
82	PARCEL (Aviation Related)
83	PARCEL (Aviation Related)
84	PARCEL (200' x 200')

LEGEND		
EXISTING	ULTIMATE	DESCRIPTION
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
		AVIGATION EASEMENT (if applicable)
		BUILDING REMOVAL
		BUILDING CONSTRUCTION
	BRL	BUILDING RESTRICTION LINE (BRL)
		FACILITY (PAVEMENT) CONSTRUCTION
		FENCING
		INDUSTRIAL PARK BOUNDARY
VASI-4	VASI-4	NAVIGATIONAL AID INSTALLATION
PAPI-4	PAPI-4	PRECISION APPROACH PATH INDICATOR
		PRIMARY/SECONDARY AIRPORT CONTROL STATION
eOFA	uOFA	RUNWAY OBJECT FREE AREA
eOFZ	uOFZ	RUNWAY OBSTACLE FREE ZONE
eRSA	uRSA	RUNWAY SAFETY AREA
		RUNWAY END IDENTIFICATION LIGHTS (REIL)
		RUNWAY THRESHOLD LIGHTS
eRVZ	uRVZ	RUNWAY VISIBILITY ZONE
		SECTION CORNER
		SEGMENTED CIRCLE/WIND INDICATOR
A	A	TAXIWAY DESIGNATION
		TOPOGRAPHY
		WIND INDICATOR (Lighted)



No.	REVISIONS	DATE	BY	APP'D.
1	ALP Update	7/18/00		
	FAA Approved Airport Master Plan	4/3/92		

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KINGMAN AIRPORT

TERMINAL AREA DRAWING

KINGMAN, ARIZONA

PLANNED BY: Chris M. Huguenin
DETAILED BY: Richard A. Lolly
APPROVED BY: Chris M. Huguenin

February 16, 2006 — SHEET 10 OF 12

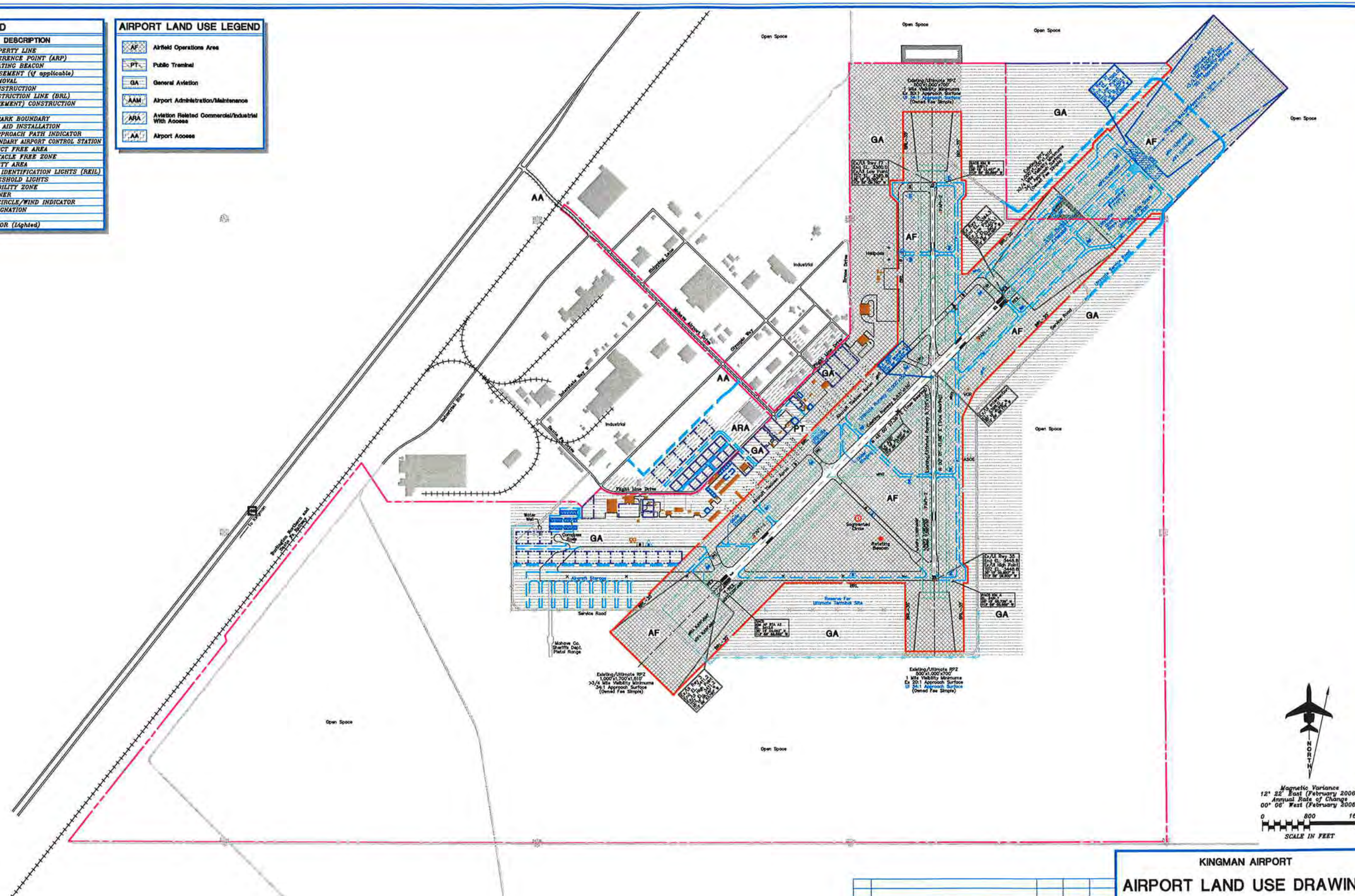
Coffman Associates
Airport Consultants

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
		AVIGATION EASEMENT (if applicable)
		BUILDING REMOVAL
		BUILDING CONSTRUCTION
	BRL	BUILDING RESTRICTION LINE (BRL)
		FACILITY (PAVEMENT) CONSTRUCTION
		FENCING
		INDUSTRIAL PARK BOUNDARY
VASI-4	VASI-4	NAVIGATIONAL AID INSTALLATION
PAPI-4	PAPI-4	PRECISION APPROACH PATH INDICATOR
		PRIMARY/SECONDARY AIRPORT CONTROL STATION
ROFA	ROFA	RUNWAY OBJECT FREE AREA
ROFZ	ROFZ	RUNWAY OBSTACLE FREE ZONE
RSA	RSA	RUNWAY SAFETY AREA
		RUNWAY END IDENTIFICATION LIGHTS (REIL)
		RUNWAY THRESHOLD LIGHTS
RVZ	RVZ	RUNWAY VISIBILITY ZONE
		SECTION CORNER
		SEGMENTED CIRCLE/WIND INDICATOR
A	A	TAXIWAY DESIGNATION
		TOPOGRAPHY
		WIND INDICATOR (Lighted)

AIRPORT LAND USE LEGEND

AF	Airfield Operations Area
PT	Public Terminal
GA	General Aviation
AAM	Airport Administration/Maintenance
ARA	Aviation Related Commercial/Industrial With Access
AA	Airport Access



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KINGMAN AIRPORT

AIRPORT LAND USE DRAWING

KINGMAN, ARIZONA

PLANNED BY: Chris M. Hugunin
DETAILED BY: Richard A. Lolly
APPROVED BY: Chris M. Hugunin

February 16, 2006 | SHEET 11 OF 12

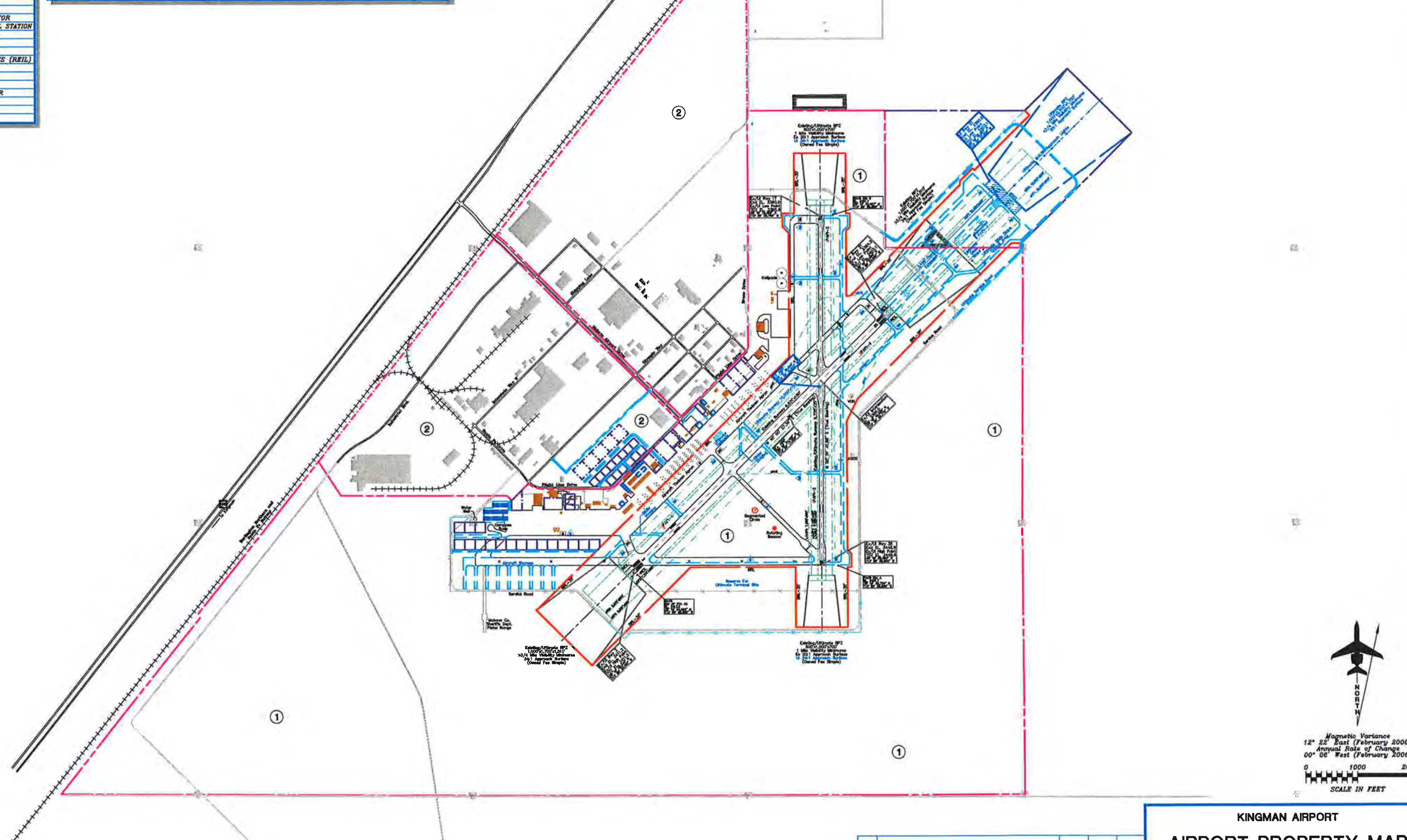
Coffman Associates Airport Consultants

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
		AVIGATION EASEMENT (if applicable)
		BUILDING REMOVAL
		BUILDING CONSTRUCTION
	BRL	BUILDING RESTRICTION LINE (BRL)
		FACILITY (PAVEMENT) CONSTRUCTION
		FENCING
		INDUSTRIAL PARK BOUNDARY
VASI-4	VASI-4	NAVIGATIONAL AID INSTALLATION
PAPI-4	PAPI-4	PRECISION APPROACH PATH INDICATOR
		PRIMARY/SECONDARY AIRPORT CONTROL STATION
ROFA	ROFA	RUNWAY OBJECT FREE AREA
ROFZ	ROFZ	RUNWAY OBSTACLE FREE ZONE
RSA	RSA	RUNWAY SAFETY AREA
		RUNWAY END IDENTIFICATION LIGHTS (REIL)
		RUNWAY THRESHOLD LIGHTS
RVZ	RVZ	RUNWAY VISIBILITY ZONE
		SECTION CORNER
		SEGMENTED CIRCLE/WIND INDICATOR
(A)		TAXIWAY DESIGNATION
		TOPOGRAPHY
		WIND INDICATOR (Lighted)

DEED RECORDING INFORMATION (COUNTY ASSESSOR-MOHAVE COUNTY, ARIZONA)

PARCEL	OWNER AND PARCEL DESCRIPTION	ACREAGE	DATE RECORDED	RECORDING INFORMATION	GRANTOR/ DEED TYPE
1	CITY OF KINGMAN KINGMAN AIRPORT REMNANT PARCEL	2989.38±	12-20-1988	BOOK: 1496 PAGE: 799 TO 802	STATE OF ARIZONA/ MOHAVE COUNTY QUIT-CLAIM
2	CITY OF KINGMAN KINGMAN AIRPORT INDUSTRIAL PARK REMNANT PARCEL	1019.57±	12-20-1988	BOOK: 1496 PAGE: 803	STATE OF ARIZONA/ MOHAVE COUNTY QUIT-CLAIM
	TOTAL ACREAGE	4008.95±	SEE NOTE 1		



No.	REVISIONS	DATE	BY	APP'D.
△	ALP Update	7/18/00		
△	FAA Approved Airport Master Plan	4/3/92		

THE CONTENTS OF THIS PLAN DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICIES OF THE FAA OR ADOT AERONAUTICS. ACCEPTANCE OF THESE DOCUMENTS BY ADOT AERONAUTICS DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE STATE OF ARIZONA TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREON NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC OR STATE LAWS.

KINGMAN AIRPORT

AIRPORT PROPERTY MAP

KINGMAN, ARIZONA

PLANNED BY: Chris M. Hugunin

DETAILED BY: Richard A. Lally

APPROVED BY: Chris M. Hugunin

February 16, 2006

Airport Consultants

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