COTTONWOOD
MUNICIPAL AIRPORT

Airport Master Plan

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Cottonwood, Arizona

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INTRODUCTION

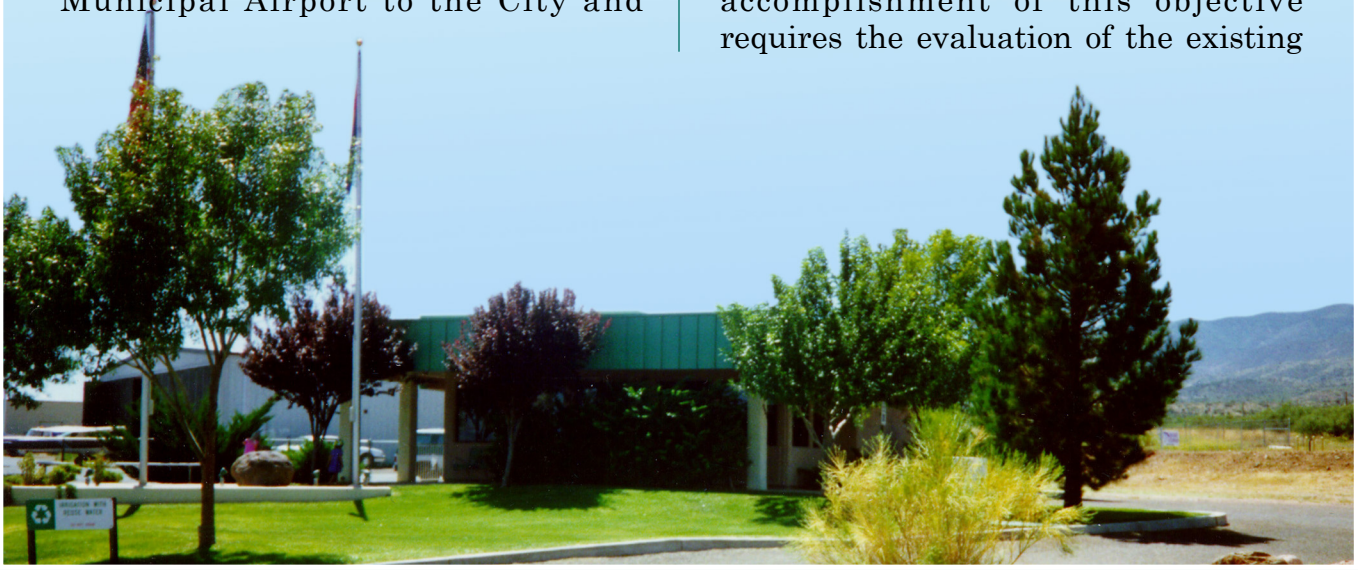
INTRODUCTION

The Cottonwood Municipal Airport Master Plan is a cooperative effort between the City of Cottonwood , the Arizona Department of Transportation, Aeronautics Division (ADOT), and the Federal Aviation Administration (FAA). This Airport Master Plan is a comprehensive analysis of airport needs and alternatives with the purpose of providing direction for the future development of this facility.

This Master Plan replaces the previous master plan which was completed in 1993. Typically, airport sponsors periodically update their master plans to ensure that their airport can continue to adapt and provide the necessary facilities required to meet increasing aviation demand. The commitment to this Master Plan on the part of the City is evidence that they recognize the challenges inherent in accommodating future aviation needs as well as the importance of Cottonwood Municipal Airport to the City and surrounding region. The cost of maintaining a viable airport is an investment which yields significant benefits to a community. By maintaining a sound and flexible Master Plan, Cottonwood Municipal Airport can continue to be a valuable asset and a source of pride to the residents of the community.

MASTER PLAN OBJECTIVES

The primary objective of the Airport Master Plan is to re-examine and update the short, intermediate, and long term development program for the Airport to insure that it will continue to be a safe, efficient, economical, and environmentally acceptable air transportation facility. The accomplishment of this objective requires the evaluation of the existing



actions should be taken to maintain an adequate, safe, and reliable airport facility to meet the needs of the City and surrounding area. The completed Master Plan will provide an outline of the necessary development and give City, Sate, and Federal officials advance notice of future needs to aid in planning, scheduling, and budgeting. In addition, the finalized document includes a set of Airport Layout Plans which depicts the proposed development over the long range planning period.

The Master Plan provides a continuous planning process through a phased outline of the proposed improvements required to meet the ultimate aviation needs of the community. This continuous planning process benefits responsible officials by giving advanced notice of future airport funding needs so that the appropriate steps can be taken to assure that adequate funds are budgeted or planned.

In order to accomplish the objectives set forth in this study, the Airport Master Plan provides the following information:

- **Inventory of Existing Conditions -** Collect, assemble, and organize relevant information and data regarding the Airport, the City of Cottonwood, and the surrounding area.

- **Forecasts -** Develop aviation forecasts, by quantity and type.

- **Facility Requirements** - Determine available capacities of various facilities at the Airport and identify the facilities required to meet projected demand over the 20-year planning horizon.

- **Airport Alternatives** - Develop and evaluate various alternatives for Airport development as determined by current and future facility requirements.

- **Airport Layout Plan** - Refine the recommended Airport development concept into the Airport's final plan for development.

- **Financial Plan** - Prepare the Airport development schedule and cost estimates for the selected Airport development alternative. This plan will ensure that logical staging of improvements are given proper consideration in the development of an overall financial plan and capital improvement program.

- **Environmental Evaluation** - Prepare a preliminary environmental overview to identify potential environmental concerns that will need to be addressed for the various proposed improvements.

In addition to the City of Cottonwood, ADOT, the FAA, and the consultant team, a Planning Advisory Committee was established to review the various aspects of the plan as it was developed. This committee reviewed working papers on the project and provided comments and input throughout the

study to help insure that a realistic, viable plan was developed. A public information workshop also allowed the public to learn about the study and provide input. This final Master Plan technical report incorporated changes as a result of applicable comments gained from this review process.

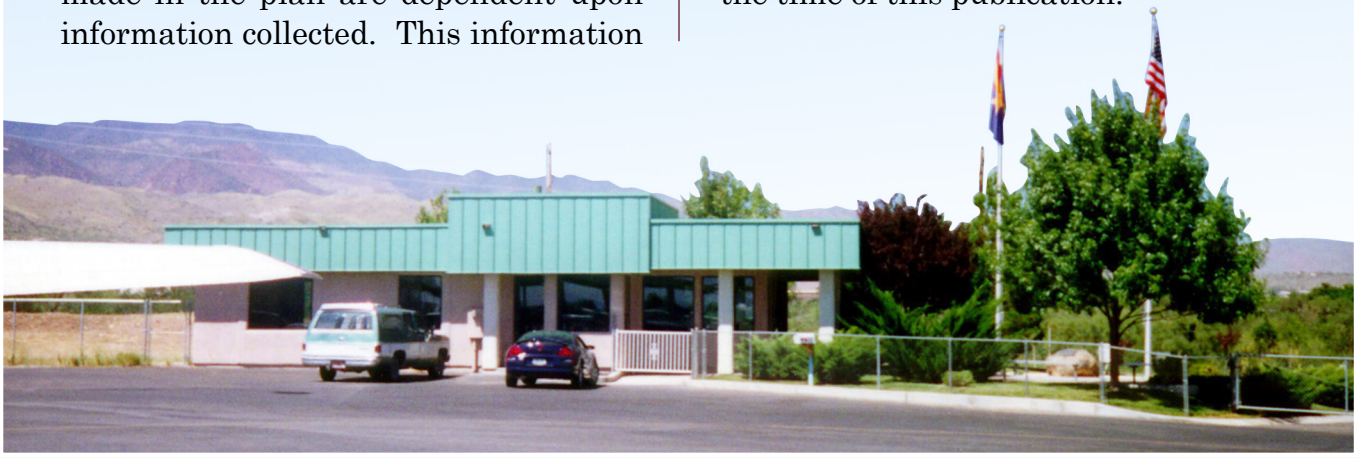
CHAPTER ONE
Inventory

INVENTORY

The first step in the preparation of the Airport Master Plan for Cottonwood Municipal Airport is the collection of information relating to both the Airport and the area that it serves. Information pertaining to existing Airport facilities, regional airspace, and air traffic control is gathered along with pertinent background information regarding the City of Cottonwood and the surrounding region. The data collected and presented in this chapter will be used in subsequent analyses in this study. This includes material relating to the Airfield's role in county, state, and national aviation systems, as well as the area's socioeconomic profile.

The information outlined in this chapter serves as the foundation, or starting point, for all subsequent chapters. An accurate and complete inventory is, therefore, essential to the success of the master plan. This is extremely important since the findings, conclusions and recommendations made in the plan are dependent upon information collected. This information

was gathered during the months of September and October 2001, through on-site investigations of the Airport and interviews with Airport staff, airport users, representatives of various city, state, and federal entities, and regional economic development agencies. Additional information was obtained from documents provided by the Federal Aviation Administration (FAA) and the Arizona Department of Transportation - Aeronautics Division (ADOT). The inventory data and supporting information presented in this chapter are deemed the most current and accurate data available at the time of this publication.



AIRPORT SETTING

Cottonwood Municipal Airport (P52) is located approximately two miles west of State Highway (SR) 260 and one-quarter mile southwest of SR 89A, at 1001 West Mingus Avenue in the City of Cottonwood. The Airport is situated on 210 acres at an elevation of 3,550 feet MSL (above mean sea level). The City of Cottonwood is easily accessed from either Phoenix (approximately 100 miles south) or Flagstaff (approximately 50 miles north) via Interstate 17 and SR 260. The **Location Map**, **Exhibit 1A**, depicts Cottonwood Municipal Airport and it's relationship to the surrounding vicinity.

THE AIRPORT'S SYSTEM ROLE

Airport planning exists at several levels, from local and regional, to state and national. Each level has its own emphasis and purpose. This Airport Master Plan serves as the primary local airport planning document.

At the state level, Cottonwood Municipal Airport is included in the *Arizona State Aviation System Plan (SASP).* The purpose of the *SASP* is to ensure that Arizona has an adequate and efficient airport system that will well serve its aviation needs for many years to come. The *SASP* determines each airport's specific role in the State aviation system and establishes funding requirements. Cottonwood Municipal Airport is classified as a "Primary Airport" under public ownership within the Arizona Airport System. ADOT defines a Primary Airport as *"All public use airports in Arizona categorized as Reliever, Commercial Service, or General Aviation that have 10 or more based aircraft or 2000 annual operations or are projected to meet any of these criteria within the next 10 years."* Through the *State's Continuous Aviation System Planning Process (CASPP),* the *SASP* is updated approximately every five years. The most recently published update is the *1995 Arizona State Aviation Needs Study (SANS);* however, the year *2000 SANS* update is currently in progress and is due for release sometime in the fall or winter of 2001. The mission of the *SANS* is to provide policy guidelines that promote and maintain a safe aviation system in Arizona, assess the State's airports capital improvement needs, and identify resources and strategies to implement the plan. The Arizona *SANS* encompasses all public and private airports and heliports that are open to the public, including Native American and recreational airports.

At the national level, the *National Plan of Integrated Airport Systems (NPIAS) (1998-2002)* identifies more than 3,540 airports (both existing and proposed) that are important to the national air transportation system. These airports are further classified into seven Airport Type categories. To be included in the *NPIAS*, an airport must meet the definition of one these categories. Additionally, an airport must be included in the *NPIAS* to be eligible for federal funding assistance. Cottonwood Municipal Airport is one of 35 general aviation airports in Arizona included in the *NPIAS*. General aviation airports

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Exhibit 1A

are normally included if they account for enough activity (usually 10 based aircraft) and are at least 20 miles from the nearest NPIAS airport. The 2,472 general aviation airports that are currently within the *NPIAS* have an average of 29 based aircraft and account for 37 percent of the nation's general aviation fleet. The remainder of the NPIAS airports account for 55 percent of all GA aircraft, while the remaining eight (8) percent are based at airports or landing sites that are not part of the *NPIAS*. General aviation airports are the most convenient form of air transportation for nearly 19 percent of the population and are of particular importance to rural areas. The *NPIAS* includes total estimates on development needs for the nation's airports that qualify for federal funding assistance.

AIRPORT HISTORY

Cottonwood Municipal Airport, formerly known as Cottonwood/Clemenceau Airport, was originally established in the early 1940s as a military training base for World War II naval cadets. The original dirt runway was 3,600 feet in length, while other airport facilities included a storage and maintenance hangar, along with a group of offices. Yavapai County acquired the Airport upon termination of its military training use. Federal, State and local funding sources were used to construct a 3,600-foot-long paved runway in 1962.

Cottonwood was originally incorporated as a town in 1960, and later became a City in 1987. In 1968, ownership of the Airport property was transferred from the County to the Town. Since 1968, Cottonwood has operated the Airport through either Town/City management or an airport operators lease agreement.

Currently, Aerobear Aviation operates the Airport (per lease agreement) and provides aircraft maintenance, aircraft rentals, fuel dispensing and tiedown rentals. The City receives revenue from the ground leases of the three (3) conventional hangars and the 10 City-owned T-Hangar units which are leased directly to private individuals. In addition, they collect a commission on fuel sales and a portion of the covered tie-down (T-shades) rental fees. The City is responsible for the building and ground maintenance, airport planning and capital improvements to the airport.

Cottonwood Industrial Airpark is a 140-acre, City-owned, planned business/ industrial park surrounding the Airport. Presently, the majority of development is located east of the Airport along Airpark Road, where several businesses currently hold ground leases with the City. Types of businesses located within the Airpark include warehousing/distribution, manufacturing, light assembly, medical transport, high tech, and research and development. Taxiway/taxilane access is being developed at the south end of the east side Airpark. A portion of the planned development on the Airport's west side will also have such access. While several Airpark businesses lease directly from the City, Cottonwood Airpark, Inc., is the main lease holder, subleasing and managing Airport property for the City.

In 1976, using both federal and state grant monies, the City constructed a paved taxiway and aircraft tiedown/ parking apron. Additionally, at that time, Low Intensity Runway Lighting (LIRL) was installed using ADOT and City funding.

The City of Cottonwood funded part of the 600-foot runway extension constructed in 1980. In 1984, Medium Intensity Runway Lighting (MIRL) was installed, along with the completion of security fencing through state and federal grants. The existing access road and parallel taxiway were constructed in the late 1980s. Apron lights were also installed at that time.

In November 2001, a slurry seal was applied to the runway, taxiways, aircraft parking apron, and roadways at the Airport. This project was completed using state and local monies.

Many additional projects have been completed throughout the 1990s, mostly as a result of recommendations from the 1993 Master Plan. Details of these projects are presented in the following section.

PREVIOUS MASTER PLAN

The previous Master Plan was completed in September 1993, and recommended a number of various improvements, both airside and landside. Proposed airside improvements included: the relocation of Taxiway A; the installation of REILS to Runway 14; the replacement of existing visual (basic) runway markings with nonprecision markings; the installation of a non-directional radio beacon (NDB) at the Airport; the relocation of the segmented circle; and the acquisition of land or easements for runway approach and RPZ protection. Of these recommendations, only the acquisition of 6.3 acres northwest of Runway 14 for runway approach/RPZ protection and the installation of REILs to Runway 14 have been completed.

Landside recommendations from the 1993 Master Plan included: the construction of a general aviation terminal building; T-hangar/T-shade construction and/or relocation; conventional hangar construction; apron expansion; removal of the existing fuel facility; aboveground fuel facility installation; the construction of additional auto parking; the construction of a new airport access road; land acquisition (15 acres) west of Runway 32. Improvements completed since 1993 consist of the construction of new T-hangars; a new 3,600 s.f. conventional hangar; apron expansion and additional tiedowns; removal of the underground fuel facility and construction of the new aboveground fuel facility; additional auto parking; and the construction of a gated access road located west of the terminal building. The proposed 15-acre land acquisition west of Runway 32 was abandoned following unsuccessful negotiations with the current land owners.

AIR TRAFFIC ACTIVITY

At general aviation airports, the number of based aircraft and total annual operations (takeoffs and

landings) are the main indicators of aviation activity. These indicators are then used in subsequent analyses later on in the Master Plan process, for projecting future aviation activity as well as for determining future facility requirements.

Historical based aircraft totals for Cottonwood Municipal Airport are shown in **Table 1A**. The latest data is from current Airport management records, while previous years' totals are from historic ADOT and FAA records. Detailed current based aircraft information is presented in **Appendix B**.

TABLE 1A
Historical Based Aircraft

Year	Based Aircraft
2001[1]	40
2000[2]	32
1999[2]	33
1998[2]	32
1997[2]	30
1996[2]	32
1995[2]	29
1993[3]	29
1990[3]	46
1988[3]	37

Source: [1] Cottonwood Municipal Airport Records (October 2001).
[2] ADOT - Aeronautics Division, Historical Aircraft Registration Records, Cottonwood Municipal Airport.
[3] Historical FAA Terminal Area Forecast (TAF) System Records (Query Date: September 2001)

Since Cottonwood Municipal Airport has no airport traffic control tower (ATCT), annual aircraft operations have not been officially recorded. Operations totals for the Airport can only be estimated. The operations estimates for the Airport, summarized in **Table 1B**, were obtained from the Airport's FAA 5010 Form (Airport Master Record), and historical FAA Terminal Area Forecast (TAF) System Records. Estimated operations statistics from other sources will be presented for comparison in Chapter Two, Aviation Demand Forecasts.

TABLE 1B
Aircraft Operations Summary

Year	Air Taxi	GA Local	GA Itinerant	Military	Total
2000[1]	1,000	9,000	9,400	10	19,410
1995[2]	1,000	9,000	9,400	10	19,410
1990[2]	3,000	9,000	9,400	10	21,410
1985[2]	1,000	7,500	3,600	10	12,110
1980[2]	1,000	7,500	3,600	10	12,110

Source: [1] FAA Form 5010, Airport Master Record (Year 2000), Cottonwood Municipal Airport.
[2] Historical FAA Terminal Area Forecast (TAF) System Records (Query Date: September 2001)

AIRPORT FACILITIES

Airport facilities can functionally be divided into two broad categories: airside and landside. The airside category includes those facilities directly affecting take-offs and landings. Landside facilities are those facilities that provide for a safe and efficient transition between ground and air transportation, as well as support facilities necessary for the daily operations of the Airport.

AIRSIDE FACILITIES

Airside facilities include runways, taxiways, airport lighting systems, and navigational aids. The existing airside and landside facilities at Cottonwood Municipal Airport are depicted on **Exhibit 1B.** Airside facilities data is summarized in **Table 1C**.

Runway

Cottonwood Municipal Airport is served by a single asphalt runway, Runway 14-32, which is oriented in a northwest-southeast direction. The runway measures 4,250 in length by 75 feet in width, with 300-foot stopways at each runway end. The FAA Form 5010 (last inspection date 11/24/1999) reports the runway surface condition as being in good condition, with a published pavement strength rating of 4,000 pounds single wheel loading (SWL). However, a pavement strength evaluation conducted by Western Technologies, Inc., in 1992 indicated a runway strength rating of 30,000 pounds DWL. Steps to address this discrepancy between the published runway pavement strength and the "tested" runway pavement strength are outlined in Chapter Three.

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MINGUS AVE
89A
MINGUS INDUSTRIAL PARK
El Rio Del Oro Mobile Home Park
AIRPORT PROPERTY LINE
REIL'S
'E'
PAPI -2
Cottonwood Water Works Well
Runway Protection Zone (RPZ)
1000' x 250' x 450'
20:1 Visual Approach Surface
JENNIFER DR
JUSTIN DR
9
'D'
CULVERT
EXISTING 4250' x 75' RUNWAY
TAXIWAY 'A'
SEGMENTED CIRCLE/ LIGHTED WIND CONE
AIRPARK RD
10
PAPI -2
'C'
Drop Zone
Railroad
Wash
Blowout
REIL'S
'B'
TIEDOWNS
ACCESS RD
Creek
AIRPORT ENTRANCE RD
BEACON
BLACK HILLS DR
S AIRPORT RD
Runway Protection Zone (RPZ)
1000' x 250' x 450'
20:1 Visual Approach Surface
MINGUS AVE
Effluent Holding Pond
AIRPORT PROPERTY LINE
Public Works Department
Fire Training Facilities
Humane Society
Sewage Treatment Plant
Trash Transfer Station

LEGEND:

1. Terminal Building
2. Aerobear Aviation
3. Conventional Hangars
4. T-Hangars (6-Unit)
5. T-Hangars (10-Unit)
6. Shade Hangars
7. Fuel Storage
8. Electric Vault
9. Cottonwood Industrial Airpark
10. Cottonwood Airpark Inc.
11. Sky Dive Cottonwood

Airport Property Line
Fencing

Photo Date: October, 2001

NORTH

0 600 1200
SCALE IN FEET

COTTONWOOD MUNICIPAL AIRPORT

Exhibit 1B
EXISTING FACILITIES

TABLE 1C
Runway Data - Runway 14-32
Cottonwood Municipal Airport

Runway Length (feet) Runway Width (feet)	4,250 75
Runway Surface Material (Condition)	Asphalt (Good)
Runway Pavement Strength (lbs.)	4,000 SWL (FAA 5010 Form) 30,000 DWL (See Note 1)
Runway Effective Gradient	0.97 %
Pavement Edge Lighting Runway Taxiway	 MIRL None
Visual Approach Aids	PAPI-2 (Each Runway End)
Traffic Pattern	Rwy. 14: Left; Rwy. 32: Right
Runway Pavement Markings (Condition)	Rwy. 14: Basic (Good); Rwy. 32: Basic (Good)
Taxiway, Taxilane, and Apron Markings (Condition)	Center striping (Good)
Instrument Approach Procedures	None
Additional Facilities	Airport Beacon, Segmented Circle/Lighted Wind Cone

Source: *FAA 5010 Airport Master Record Form* (Inspection Date: 11-24-1999)

Abbreviations:
SWL - Single Wheel Loading
MIRL - Medium Intensity Runway Lighting
PAPI - Precision Approach Path Indicator

Notes:
1. *Pavement Strength Evaluation, Cottonwood Municipal Airport, Cottonwood, Arizona,* by Western Technologies Inc., dated October 12, 1992.

Taxiways

Taxiways facilitate aircraft movement between the runway and the aircraft parking or storage areas. Taxiway A is a partial length, parallel taxiway which connects to the runway via four exit taxiways designated B, C, D and E. Taxiways B and C connect the runway to Taxiway A and the aircraft parking apron near the Runway 14 end. Taxiways D and E, meanwhile, serve the southeast portion of the runway. These five taxiways are equal in pavement strength load-bearing capacity to the runway and are in good condition.

Navigational Aids

Navigational aids (navaids) are electronic devices that transmit radio frequencies which provide properly equipped aircraft and pilots with in-flight, point-to-point guidance and position data. Located on or near an airport, navigational aids can be classified as either enroute or terminal area navigational aids. Three types of enroute electronic navigational aids typically available in this region of Central Arizona are the very high frequency omnidirectional range (VOR) facility, Loran-C, and global positioning system (GPS).

The most common navaid is the VOR, which transmits azimuth readings via radio signal at every degree, thus providing 360 individual navigational courses. Often, the VOR is combined with Distance Measuring Equipment (DME) which provides both distance and direction information to pilots.

The second type of navaid, the Loran-C, is a ground-based enroute navigational aid which utilizes a system of transmitters located in various locations across the continental United States. Loran-C varies from the VOR as pilots and aircraft are not required to navigate using a specific facility (with the VOR, pilots must navigate to and from a specific VOR facility). With a properly equipped aircraft, pilots using Loran-C can directly navigate to any airport in the United States.

The third type of navaid, GPS, is relatively new to general aviation when compared to the previously discussed navigational systems. GPS was initially developed by the United States Department of Defense for military navigation around the world. Increasingly, over the last several years, GPS has been utilized more in civilian aircraft. GPS uses satellites placed in a fixed orbit around the globe to transmit electronic signals which properly equipped aircraft can use to determine altitude, speed, and navigational information. GPS is similar to Loran-C in that pilots do not have to navigate to or from a specific navigational facility. GPS provides the same precision and safety factors offered by the older, ground-based systems, yet can be instituted and maintained at a far lower cost. The *Navigational Aids and Aviation Services Special Study* (December 1998) completed by ADOT's Aeronautics Division, recommends a future 1-1/2 mile visibility minimum GPS approach be implemented to Runway 32 at Cottonwood Municipal Airport.

Based on *The Federal Radionavigation Plan (FRP)* developed in 1996, the FAA had originally planned to begin phasing out traditional ground-based, enroute navigational aids beginning in 2005, with GPS becoming the sole means of navigation by 2010. The FAA schedule had called for phase-out of established navigational aids, including Loran-C, by the year 2000, and VORs between 2005 and 2010. According to the 1999 FRP, however, the FAA now plans to maintain a backup network of ground systems for pilots flying under very low visibility conditions (Category II and Category III) well beyond 2010. The new FAA plan pushes the final phase-out of the older, conventional navigational systems to 2020.

At present, there are no navaids located at or near Cottonwood Municipal Airport. Two primary navaids located within this region, however, are the Flagstaff (VOR) and the Drake VOR. The Flagstaff VOR is located 31 nautical miles (NM) northeast of Cottonwood Municipal Airport at the Flagstaff-Pulliam Airport. The Drake VOR is located four (4) NM northwest of Prescott's Ernest A. Love Field and 22 miles NM southwest of Cottonwood Municipal Airport. These two navaids service the regional enroute system, as well as perform terminal area navigational functions at each respective airport.

Airfield Lighting and Pavement Markings

Airfield lighting and pavement markings are essential elements to efficient and safe aircraft operations at an airport. Lighting aids enable nighttime, and poor visibility operations at an airport, while pavement markings assist in aircraft ground movement. The lighting systems and pavement markings existing at Cottonwood Municipal Airport are described in the following sections.

Identification Lighting: The location and presence of an airport at night is indicated by the rotating airport beacon. The tower-mounted, rotating beacon at Cottonwood Municipal Airport is located just north of the FBO office on the west side of the runway. This 36-inch diameter beacon is equipped with an optical system that alternately projects two beams of light, one green and one white, 180 degrees apart.

Runway, Taxiway and Apron Area Lighting: Runway 14-32 is equipped with medium intensity runway lighting (MIRL). The MIRLs are a system of runway edge (white) lights which define the lateral limits (width) of the runway for nighttime operation and during periods of low visibility. These lights are essential to safe operations through these periods.

Runway end identification lights (REILs) are provided at each end of Runway 14-32, and are installed in conjunction with runway threshold lights. REILs provide positive and rapid identification of the approach end of the runway, and are typically used where approach lighting is unavailable. The REIL system consists of two synchronized flashing lights that face approaching aircraft.

At present, taxiway edge lighting is not available at the Airport. Area lighting is provided for the terminal building, aircraft parking apron, and hangars.

Visual Approach Lighting: PAPI-2s are available near each end of Runway 14-32. A PAPI is a system of colored lights arranged to provide visual descent guidance information to the pilot during approach to the runway. These light systems are placed on the left side of the runway, perpendicular to the runway centerline. The lights produce a signal presentation that indicates to the pilot whether they are above, below, or on the designed descent path to the runway. The visual glide angles of these lights at Cottonwood Municipal Airport are set at 3 degrees.

Other Lighting: A lighted wind cone with a segmented circle is located atop an elevated berm-like feature near midfield and west of the runway. Pilots use the wind cone to determine surface wind direction and approximate speed prior to takeoffs and landings.

Pavement Markings: Pavement markings, both on the runways and taxiways, assist in aircraft movement at the Airport. The basic (visual) markings of Runway 14-32 indicate runway centerline, runway edge, and designation number. Additionally, chevron-shaped markings identify the runway stopways at each runway end. Taxiway and apron taxilane markings consist of centerline striping only. New pavement markings were applied to the runways, stopways, taxiways, and apron areas following the seal coat project which was completed in November 2001.

LANDSIDE FACILITIES

Landside facilities consist of those entities that are essential to the accommodation of aircraft, pilots and passengers on the airport. Typical landside facilities include terminal buildings/facilities, aircraft parking aprons, aircraft storage hangars, fuel storage/dispensing facilities, auto parking, airport access, firefighting facilities, utilities, fencing, and other ancillary businesses that contribute to an airport's support. The landside facilities available at Cottonwood Municipal Airport are depicted on **Exhibit 1B**, and are further described below.

Terminal Building/Facilities: The airport terminal building is located at the north end of the aircraft parking apron next to Mingus Avenue. The airport's FBO, Aerobear Aviation, operates from the terminal. Some of the services offered by Aerobear Aviation include aircraft fueling and parking, flight school/flight training, aircraft rentals, pilot supplies, car rentals, public telephone, and restrooms. As previously discussed, day-to-day airport management operations are performed by the FBO. The Airport's UNICOM frequency and pilot flight planning facilities are contained within the terminal building.

Aircraft Parking Apron and Tiedowns: The apron area is located west of the Runway 14 end and is accessed from Taxiway A via Taxiways B and C. Located on this asphalt apron are 12 T-shade hangar positions, and 68 aircraft tiedown positions. All 12 T-shade hangar positions are currently leased, while only 18 percent (12 positions) of the tiedowns are occupied.

Aircraft Storage Hangars: Five conventional hangars and two T-hangar structures are located along the apron's western edge. A 2,400-square-foot conventional hangar located nearest the terminal building is leased to Aerobear Aviation for their aircraft maintenance facilities. Four additional conventional hangars are ground leased from the City to private individuals. The largest of these four hangars measures approximately 10,450 square feet and all are located south of the Aerobear Aviation hangar.

Located south of the large conventional hangar is a 6-unit T-hangar facility. The occupants of this structure belong to the Cottonwood Hangar Association and hold ground leases with the City of Cottonwood. The 10-unit T-hangar facility located at the southern end of the apron is owned by the City, which leases the individual units directly to aircraft owners.

Fuel Storage/Dispensing: The fuel facility is located in the hangar development area along the apron's western edge and consists of two 10,000-gallon aboveground tanks. One tank contains 100LL fuel and is owned by the City of Cottonwood. Aerobear Aviation collects fuel fees and uses this tank to supply its 500-gallon-capacity 100LL AvGas fuel truck, which in turn services aircraft.

The second tank contains JetA fuel and is privately owned by an airport tenant, who utilizes this fuel for his own aircraft.

Airport Access: Cottonwood Municipal Airport is accessed via State Route 89A to Mingus Avenue to Airport Entrance Road on the Airport's north side. Airport Entrance Road leads to the apron, just east of Aerobear Aviation. State Route 89A is a four-lane road, while Mingus Avenue and Airport Entrance Road are both two-lane roads. Additional access is provided by the new gated access road west of the terminal building. This road allows access to the hangar development area, as well as the skydiving business located west of the hangars.

Auto Parking: Nine paved parking spaces are provided directly in front of the Aerobear Aviation Building. In addition, unmarked paved parking (approximately 1,600 square feet) is available along the south side of this building. A third parking area (approximately 4,475 square feet), also paved and unmarked, is adjacent to the electrical vault which is located across from the FBO building. Undesignated parking is also available near each hangar facility. In addition, roadside parking (totaling 50 spaces) is available at three separate locations along the new access road west of the hangar development area.

Airport Emergency Response Ability: No dedicated full-time Aircraft Rescue and Fire Fighting (ARFF) facility or personnel is available at Cottonwood Municipal Airport. The Cottonwood Fire Department, which is located approximately 1.5 miles east of the Airport, provides emergency response service to the Airport. Their equipment and training are limited to the more conventional, non-aviation type of emergency response.

Perimeter Fencing: The perimeter fencing at the Airport consists of a chain link fence which varies in height from four to six feet at different locations on the Airport. This fence runs the perimeter of the Airport property, and has warning signs posted at select locations to alert would-be trespassers. The road west of the terminal/FBO building is gated for restricted access.

Utilities: The availability of utilities at an airport is an important factor in determining future airport development. The utility providers to Cottonwood Municipal Airport follow:

- **Water**: City of Cottonwood
- **Sanitary Sewer**: City of Cottonwood
- **Electrical**: Arizona Public Service
- **Telephone**: Qwest Communications, Inc.
- **Natural Gas**: Citizens Gas Company

AIR TRAFFIC CONTROL

As Cottonwood Municipal Airport has no airport traffic control tower, no formal terminal air traffic control services are available. The Airport, however, is attended from 8:00 a.m. to 5:00 p.m. daily. Weather related information and air traffic advisories are provided by the FBO on the Airport's UNICOM frequency (122.7). The UNICOM is also monitored by the Flight Services Station (FSS) located in Prescott. Aircraft operating in the vicinity of the Airport are not required to file any type of flight plan or to contact any air traffic control facility unless they are entering airspace where contact is mandatory. Enroute air traffic control services are provided by the Albuquerque Air Route Traffic Control Center (ARTCC).

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 an airport during low visibility and cloud ceiling conditions. Currently, Cottonwood Municipal Airport has no instrument approach procedures, which means the Airport is essentially closed to all operations when weather conditions deteriorate to a point where visual flight is no longer feasible.

LOCAL OPERATING PROCEDURES

Flights in and out of Cottonwood Municipal Airport are conducted under Visual Flight Rules (VFR) conditions. VFR conditions exist when flight visibility is three miles or greater and cloud ceilings are a minimum of 1,000 feet above ground level (AGL).

Arrival Procedures: Cottonwood Municipal Airport uses the left-hand traffic pattern for Runway 14 and the right-hand traffic pattern for Runway 32. Arriving aircraft must utilize the standard traffic pattern entry procedures for an uncontrolled airport. Traffic pattern altitude (TPA) for single engine aircraft is 4,350 feet MSL; 4,550 feet MSL for multi-engine; turbine (turboprop) is 5,050 feet MSL; and the TPA for helicopters is 4,050 feet MSL.

Departure Procedures: Aircraft departing Runway 14 are requested to maintain runway heading for one (1) mile beyond the runway end and attain 500 feet AGL prior to turning. Runway 32 departing aircraft are requested to maintain runway heading for 0.6 miles beyond the runway end and reach 500 feet AGL before turning. These are not formal noise abatement procedures, however, they were instituted by the former airport manager in response to the increasing encroachment of residential development in the Airport vicinity.

Additional considerations for both arriving/departing aircraft: No multiple takeoff and landing or touch-and-go's are permitted from 30 minutes past sunset until 6:00 a.m. To avoid flyover of Cottonwood, multi-engine aircraft should land on Runway 14 and depart from Runway 32. Runway 32 is the designated calm wind runway.

Downdrafts can occur at the Runway 14 approach end, while midfield air turbulence can be created by a small hill located west of the runway. Pilots are warned to be aware of density altitude (see **Glossary**) which can affect both landing and takeoff distances. In addition, both arriving and departing pilots need be aware of brush and fence at the Runway 14 end. After hours, runway edge lights, precision approach path indicators (PAPIs) and runway end identification lights (REILs) can all be activated via UNICOM (by keying frequency 122.7 - 3, 5 or 7 times).

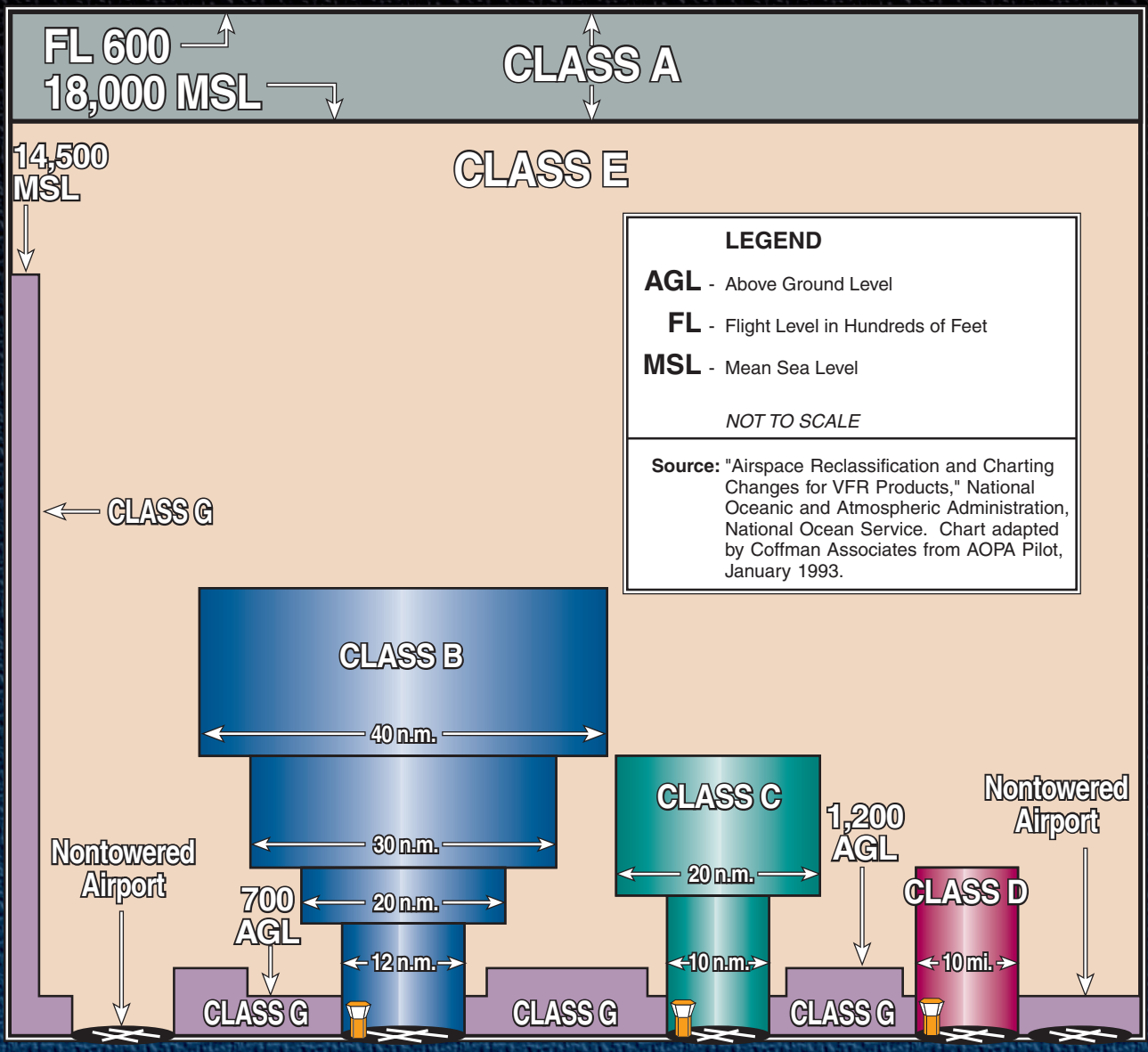
AIRSPACE

The FAA Act 1958 established the FAA as the responsible agency for control and use of navigable airspace within the United States. The FAA has instituted the National Airspace System (NAS) to protect persons and property on the ground and to build a safe and efficient airspace environment for civil, commercial, and military aviation. The NAS is defined as the common network of U.S. airspace, including air navigation facilities; airports and landing areas; aeronautical charts; associated rules, regulations, and procedures; technical information; personnel and material. Those systems shared jointly with the military are included.

AIRSPACE STRUCTURE

The U.S. airspace structure provides for two basic categories of airspace, controlled and uncontrolled, and identifies them as Classes A, B, C, D, E, and G. **Exhibit 1C** further defines airspace classifications.

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 activity commercial service airports (i.e., Phoenix Sky Harbor International Airport). Class C airspace is controlled airspace surrounding lower activity



CLASSIFICATION	DEFINITION
CLASS A	Generally airspace above 18,000 feet MSL up to and including FL 600 .
CLASS B	Generally multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports.
CLASS C	Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.
CLASS D	Generally airspace from the surface to 2,500 feet AGL surrounding towered airports.
CLASS E	Generally controlled airspace that is not Class A, Class B, Class C, or Class D.
CLASS G	Generally uncontrolled airspace that is not Class A, Class B, Class C, Class D, or Class E.

COTTONWOOD MUNICIPAL AIRPORT

commercial service (i.e., Tucson International Airport) and some military airports (i.e., Davis-Monthan Air Force Base). Class D airspace is controlled airspace surrounding airports with an airport traffic control tower (i.e., Phoenix - Deer Valley). All aircraft operating within Class A, B, C, and D airspace must be in contact with the air traffic control facility responsible for the 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. While aircraft conducting visual flights in Class E airspace are not required to be in radio communication with air traffic control facilities, visual flight can only be conducted if minimum visibility and cloud ceilings exist. Class G is uncontrolled airspace that is not Class A, B, C, D, or E controlled airspace. In general, within the United States, Class G Airspace extends up to 14,500 feet above mean sea level (MSL). At and above this altitude, all airspace is within Class E Airspace, excluding the airspace less than 1,500 feet above the terrain and certain special use airspace areas.

VICINITY AIRSPACE

Cottonwood Municipal Airspace lies within Class G Airspace. The nearest controlled airspace is the Class E airspace containing both Sedona Airport and Flagstaff-Pulliam Airport, which begins approximately 2 NM to the north, and the Class E airspace surrounding Prescott's Ernest A. Love Field to the west, located approximately 10 NM to the west. **Exhibit 1D** depicts Cottonwood Municipal Airport and its relationship with the regional airspace.

Airways

Aircraft normally travel between airports on airways. These airways are marked on aeronautical charts with enroute navigational aids that assist pilots in controlling their aircraft along these routes. There are two airway systems: **Victor Airways** and **Jet Airways**. Victor Airways is a system of federal airways established by the FAA, which utilize VOR navigational facilities. These airways are corridors of airspace eight miles wide that extrude upward from 1,200 feet MSL to 18,000 feet MSL and extend between VOR navigational facilities. The Jet Airway System is layered above the Victor Airway System, beginning at 18,000 feet MSL and extending upward to 45,000 feet MSL. The only airway system influencing the area is Victor Airway V12-264, which runs east-west and crosses the Cottonwood Area about four miles north of the Airport. This airway is used to navigate between the Drake VOR and the Winslow VOR.

Other Airspace

A number of wilderness areas are located within 20 nautical miles (NM) of Cottonwood Municipal Airport (See **Exhibit 1D**). These include Woodchute Wilderness Area to the west; Sycamore Canyon Wilderness Area and Red Rock Secret Mountain Wilderness Area to the north; Munds Mountain Wilderness Area to the northeast; Wet Beaver

00MP15-1D-11/28/01

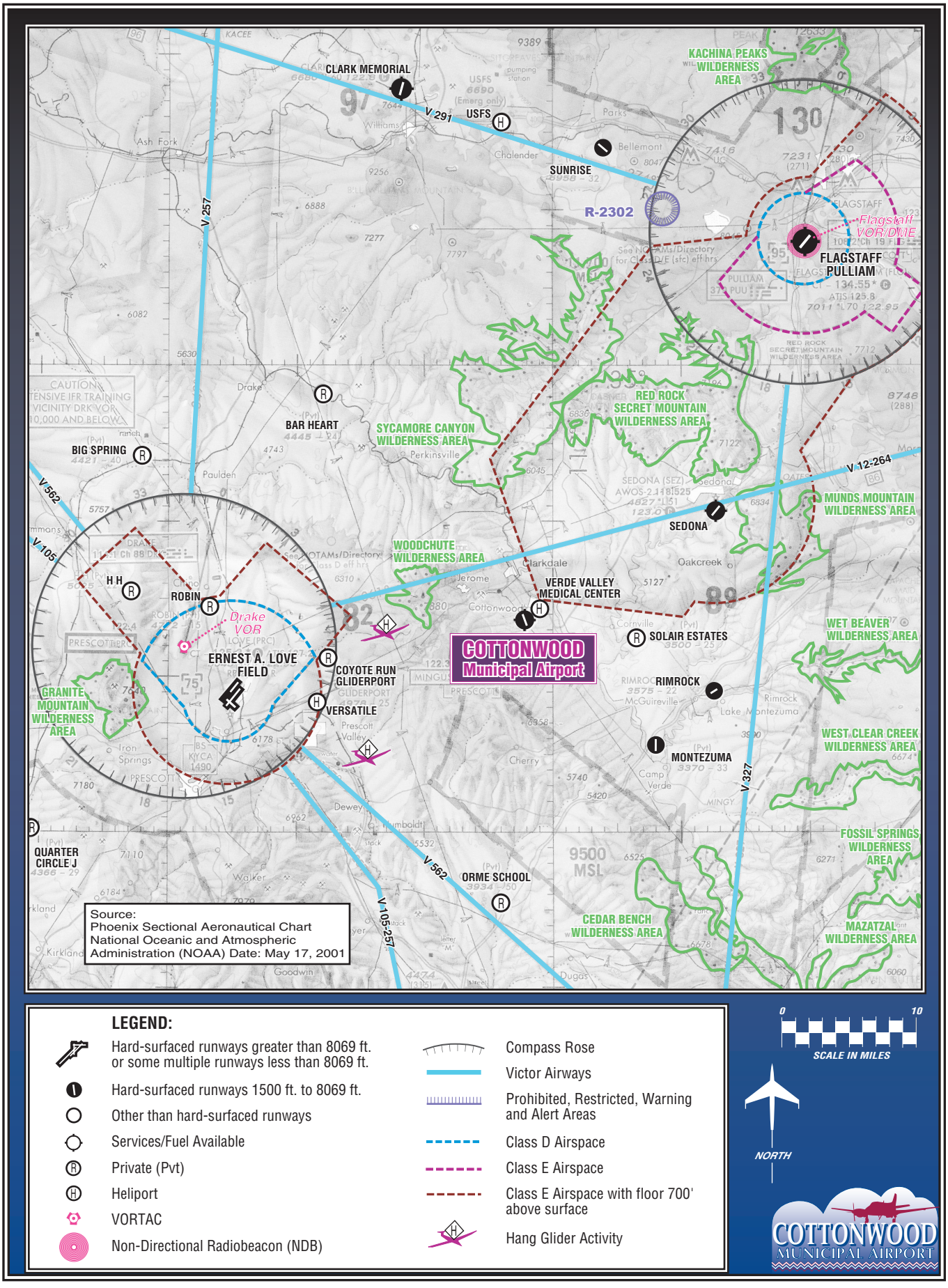


Exhibit 1D

Wilderness Area and West Clear Creek Wilderness Area to the east; and Cedar Branch Wilderness Area to the south. While aircraft operations are not restricted over these areas, aircraft are requested to maintain a minimum altitude of 2,000 feet above ground level.

AREA AIRPORTS

Within a 30 NM radius of Cottonwood Municipal Airport are two public use airports and seven private airports. The two public use airports are Sedona Airport and Prescott's Ernest A. Love Field. These two airports provide hard surface (paved) landing surfaces, while only two of the seven private airports are paved. A brief description of Sedona Airport and Ernest A. Love Field follows.

Sedona Airport (SEZ) is located approximately 14 NM northeast of Cottonwood Municipal Airport. SEZ is served by a single asphalt runway measuring 5,132 feet in length by 75 feet in width. This runway has a pavement strength rating 15,000 single wheel loading (SWL) and 30,000 pounds dual wheel loading (DWL). Sedona Airport's FAA 5010 Airport Master Record (dated July 2001) indicates 98 based aircraft at the airport, with reported operations (takeoff or landing) for the year 2000 totaling 41,500.

Ernest A. Love Field (PRC) is located approximately 20 NM west of Cottonwood Municipal Airport, and is the closest airport providing scheduled commercial service. Three asphalt runways are available at PRC, with Runway 3R-21L serving as the primary runway. Runway 3R-21L is 7,550 feet long by 150 feet wide, with pavement strength ratings (in thousands of pounds) of 63 SWL, 80 DWL, and 100 dual-tandem wheel loading (DTWL). Runway 3L-21R, which parallels the main runway, is 4,846 feet long and 60 feet wide, and is considered the training runway. The third runway, Runway 12-30, is the crosswind runway, and measures 4,408 feet long by 75 feet wide. Both Runway 3L-21R and Runway 12-30 are pavement strength rated at 12,500 pounds SWL. The latest (July 2001) FAA 5010 Airport Master Record for PRC reports 310 based aircraft at the airport, with year 2000 operations totaling 337,132.

Also, located within the vicinity of Cottonwood Municipal Airport are two private heliports; one at the Verde Valley Medical Center (AZ22) which is located ½ NM northeast of the Airport; and the second one, known as Versatile (AZ70), located in Prescott Valley approximately 17 NM west of Cottonwood Municipal Airport. The helicopters from the hospital often refuel at Cottonwood Municipal Airport.

COMMUNITY AND REGIONAL PROFILE

A community and regional profile provides a general look at the socioeconomic make-up of the community that utilizes an airport. It further provides an understanding of the dynamics for growth and the potential changes that may affect aviation demand. Aviation demand

forecasts (see Chapter Two - Forecasts) are usually directly related to the population, economic strength of the region, and the ability of the region to sustain a strong economic base over an extended period of time. This section contains background information on the City of Cottonwood and the surrounding region. Data regarding population, personal income, employment, land uses surrounding the Airport, climate, and the regional surface transportation network are presented in this section.

CITY OF COTTONWOOD

The City of Cottonwood is located in Yavapai County in an area known as the Verde Valley, near the geographic center of Arizona. Cottonwood was founded in 1879 and incorporated in 1960. The community gets its name from a circle of 16 cottonwood trees found near the Verde River which runs through the City. Cottonwood is the main services, retail, employment and economic center for the Verde Valley region. Leading industries in Cottonwood include tourism, professional services, retail services, medical services, senior citizen/ retirement-related services, and manufacturing.

Several natural, historical, and cultural attractions are located within a short drive of the City. The Verde River supports a large riparian habitat. To the north of Cottonwood are the red rocks of Sedona and Oak Creek Canyon; to the west is the Prescott National Forest. The Fort Verde State Historic Park and the ghost mining town of Jerome are within close proximity of Cottonwood. Additionally, the Sinaguan Indian ruins at Tuzigoot National Monument and the cliff dwellings at Montezuma Castle National Monument are also located nearby.

YAVAPAI COUNTY

Yavapai County is one of Arizona's oldest counties. At 8,125 square miles, it is approximately the size of the state of New Jersey. The County's largest community and County seat, Prescott, was twice the territorial capital of Arizona in the 1800s. The U.S. Forest Service owns 38 percent of the land in Yavapai County, including the Prescott, Tonto, and Coconino National Forests. Other substantial government interests include the State, which owns 24.6 percent of the land; the U.S. Bureau of Land Management, 11.6; and the Yavapai Indian Reservation, with 0.5 percent. The County's major industries include tourism and recreation, ranching, manufacturing, and copper mining.

REGIONAL TRANSPORTATION

Cottonwood is located approximately 100 miles north of Phoenix and approximately 50 miles south of Flagstaff. It is easily accessed from Interstate 17 and State Route 260. State Route 89A, off which the Airport is located, connects Cottonwood to Sedona on the north, and to Prescott via Granite Dells and State Route 89 on the south.

Light shuttle bus service is available between the Cottonwood/Sedona/Verde Valley and Phoenix areas. Limited local bus service is provided in Cottonwood. Local taxi service is available in the City. No rail service is available to the community. As Cottonwood is located near major state and interstate trucking routes, several freight companies serve the community.

POPULATION

The size and structure of the surrounding communities, and the airport's service area are crucial factors when considering the planning of future airport facilities. These elements provide a more comprehensive understanding of the economic base required to determine future airport requirements.

Historical population statistics for Cottonwood, Yavapai County, and the state of Arizona are presented in **Table 1D**.

TABLE 1D
Historical Population Statistics

	Cottonwood	Yavapai County	Arizona
1960	1,879	28,912	1,302,161
1970	2,610	37,005	1,775,399
1980	4,550	68,145	2,716,546
1990	5,918	107,714	3,665,339
1995	6,545	129,500	4,228,900
1998	7,775	148,500	4,764,025
2000	9,179	167,517	5,130,632

Sources: Arizona Department of Economic Security, U.S. Census Bureau, and the Arizona Department of Commerce Internet Web Sites, November 2001.

As reflected in the table, the population of Cottonwood grew steadily for the period 1960 through 2000. Cottonwood's population increased from 1,879 in 1960 to 9,179 in 2000, for an annual average growth rate (AGR) of 4.0 percent. This growth rate is below the County's AGR of 4.5 percent, and above the State's (3.5 percent AGR) for the same period.

EMPLOYMENT

Table 1E summarizes Yavapai County employment by sector for the period 1995 to 1999. The services and miscellaneous sector has enjoyed the strongest annual growth rate with 6.61 percent over this period, with the construction sector second at 6.04 percent annual growth rate, followed by the government sector with a 5.03 percent annual growth rate. Two sectors that showed a negative annual growth rate for this five-year period were the agriculture, farming, ranching, forestry, and fishing sector (at minus 4.31 percent), and the transportation, communications, and public utilities category (minus 0.52 percent).

TABLE 1E
Yavapai County Employment by Sector (1995-1999)

	1995	1996	1997	1998	1999	1995-1999 Annual Growth (%)
Agriculture (Farming, Ranching, Forestry, and Fishing)	21,525	19,300	17,275	17,475	18,050	-4.31 %
Manufacturing	3,100	3,225	3,325	3,250	3,250	1.19 %
Mining and Quarrying	775	800	850	850	900	3.81 %
Construction	3,500	3,550	3,825	4,150	4,425	6.04 %
Transportation, Communications, and Public Utilities	1,225	1,250	1,275	1,375	1,200	-0.52 %
Retail/Wholesale Trade	11,075	11,450	12,125	12,300	12,700	3.48 %
Finance, Insurance, and Real Estate	1,550	1,525	1,775	1,950	1,600	0.80 %
Services and Miscellaneous	10,800	11,325	12,500	13,475	13,950	6.61 %
Government	7,500	7,600	8,500	8,875	9,125	5.03 %
Totals	61,050	60,025	61,450	63,700	65,200	1.66 %

Source: Arizona Department of Economic Security, Research Administration

The growth in the services and miscellaneous sector, and the construction sector can be attributed to the growing population. A growing population attracts more service-oriented businesses, and benefits construction through both new business and new home construction. The drop in agricultural-related employment is similar to nationwide statistics, while the slight drop in the transportation, communications, and public utilities sector is not significant.

Unemployment in Yavapai County dropped steadily between 1995 and 1999, from 4.8 percent to 3.4 percent, respectively. In comparison, Arizona's unemployment rate in 1999 was 4.4 percent, while nationally the unemployment rate was 4.2 percent.

INCOME

Table 1F compares the per capita personal income (PCPI) for Yavapai County, the State of Arizona, and the United States, for the years 1995 through 1999.

TABLE 1F
Per Capita Income Comparison

	1995	1996	1997	1998	1999
Yavapai County	$17,995	$16,572	$17,172	$18,639	$18,452
Arizona	$20,634	$21,611	$22,780	$24,133	$25,173
United States	$23,562	$24,651	$25,874	$27,321	$28,546

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

The table shows that the PCPI for the County fell in 1996, then rebounded in 1997 and 1998, before dropping again the following year. Meanwhile, both Arizona and U.S. PCPI rose steadily throughout the five-year period.

AREA LAND USE

Existing Land Uses

Cottonwood Municipal Airport is located within the corporate boundaries of the City of Cottonwood. Land uses within the immediate vicinity of the Airport are shown on **Exhibit 1E, Existing Land Use**. To the west, a small portion of the Airport's boundary borders the Prescott National Forest. The Verde Village residential development (single-family homes) is located south of the Airport, off the Runway 32 end. East of the Runway 32 end is a second, single-family home development known as Tierra Verde. Adjacent to the Airport's eastern boundary, located south of Mingus Avenue and west of State Route 89A, is a commercial/industrial development: Mingus Industrial Park. South along State Route 89A and less than 1/8 mile east of the Airport is the El Rio De Oro Mobile Home Park. The Cottonwood Ranch residential development is located northwest of Runway 14. Further to the northwest is the Black Hills subdivision, which is located within the Town of Clarkdale. The remaining land bordering the Airport is mostly undeveloped open space under the jurisdiction of the City of Cottonwood.

On the Airport are located many commercial/industrial uses known collectively as Cottonwood Industrial Airpark.

Several Public/Semi Public entities are located on Airport property west of the runway and north of Mingus Avenue. Located north of Mingus Avenue is the City of Cottonwood's trash transfer station; public works department; wastewater treatment plant; fire

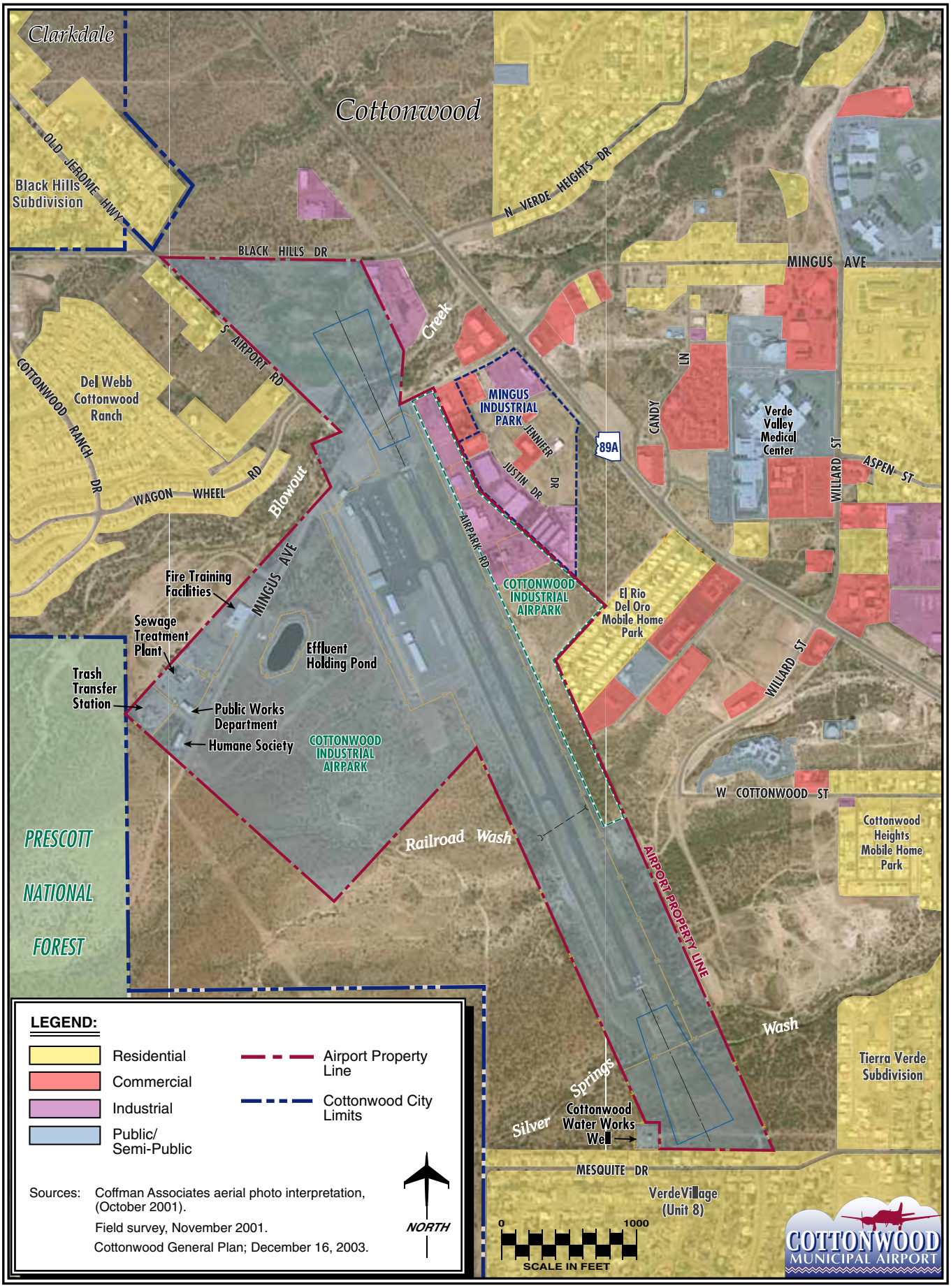


Exhibit 1E
EXISTING LAND USE

training facilities; and the Arizona Humane Society. The effluent holding pond for the City's wastewater treatment facility, however, is located south of Mingus Avenue and west of the hangar development area on Airport property reserved for the future development of Cottonwood Industrial Airpark.

City of Cottonwood General Plan

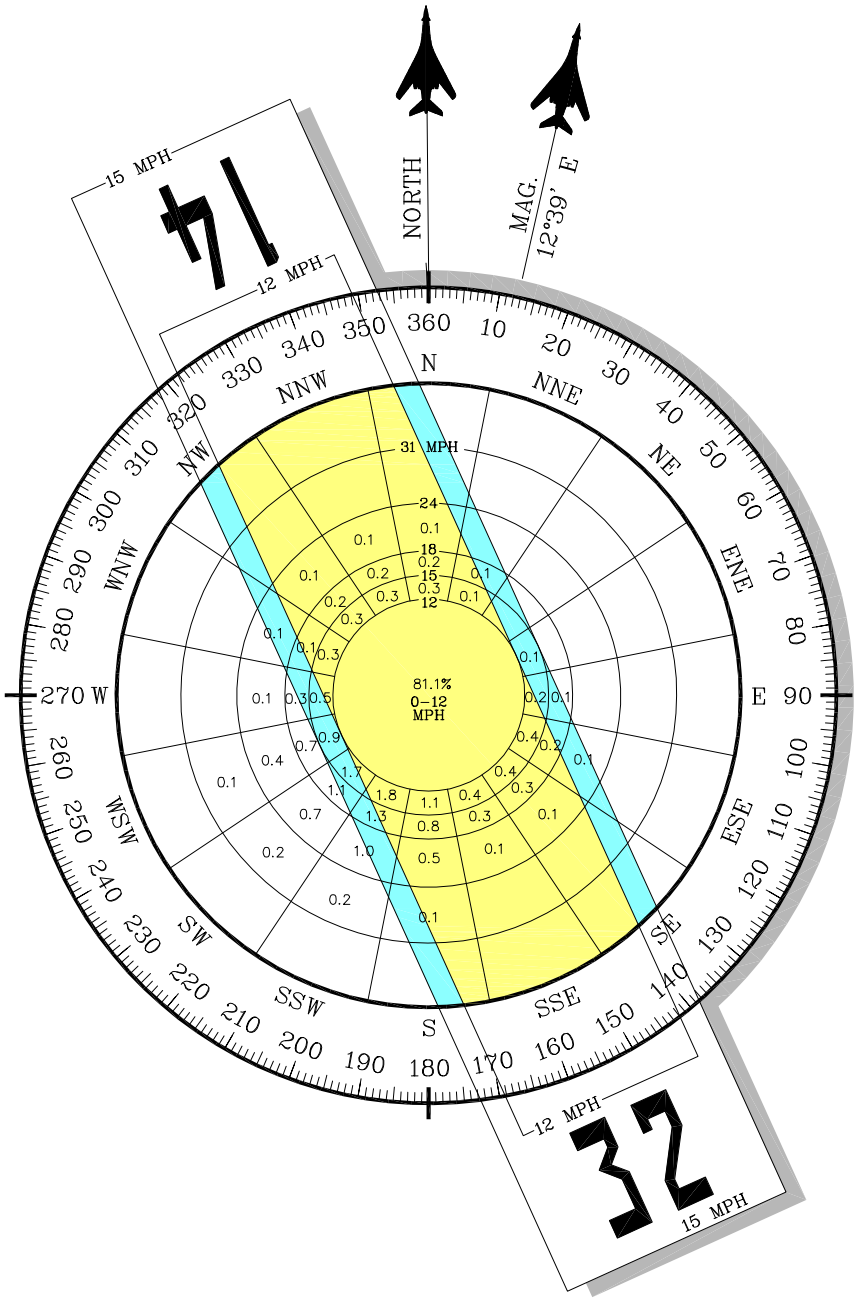
With regard to overall land use, the *City of Cottonwood General Plan (adopted September 19, 1995)* divides the City into six Planning Areas. According to the Plan, the Airport is located in *Planning Area 4 - Airport/Industrial*. This area contains large tracts of public-owned land used primarily as a buffer for the Airport. Most of the land in Area 4 is undeveloped, with a large amount of undeveloped industrial-zoned land which can be compatible with the Airport. Undeveloped land comprises 83 percent of Area 4, while single-family residential land use comprises 1.7 percent, and mobile home land use 2.2 percent. Other Area 4 land uses include: Public/Quasi Public; Commercial, and Roadway/Alley.

Future Area 4 development recommendations of the General Plan call for additional commercial development, expansion of the City wastewater treatment facility located west of the Airport, and some expansion of mobile home and low density single-family residential development.

CLIMATE

Weather conditions play an important role in the operational capabilities and capital development of an airport. Temperature is an important factor in determining runway length required for aircraft operation. Wind speed and direction determine operational flow characteristics. The percentage of time visibility is impaired due to cloud coverage is a major influence in determining the need for instrument approach aids. The moderate climate surrounding Cottonwood Municipal Airport is ideal for aviation. The area records nearly 300 sunny days per year. The hottest month is July, with an average daily maximum temperature of 98.4 degrees Fahrenheit and average daily minimum of 66.0 degrees Fahrenheit. The coolest month is January, with an average daily maximum temperature of 58.2 degrees Fahrenheit and average daily minimum of 28.4 degrees Fahrenheit. The average annual total precipitation is 12.21 inches, with the majority of it coming in the summer monsoon months of July, August, and September.

The prevailing winds at the Airport are out of the southwest. Runway 32 is the designated calm wind runway. **Exhibit 1F, All Weather Wind Rose**, illustrates a more detailed analysis of wind conditions as they pertain to runway orientation. The wind rose was constructed using historical data collected at Prescott's Ernest A. Love Field, which is located 20 NM to the west. This data represents hourly



SOURCE:
U.S. Department of Commerce,
National Oceanic and
Atmospheric Administration

DATA STATION:
National Climate Center
Ashville, North Carolina

OBSERVATIONS:
90,000 Estimated
1948–1978
Ernest A. Love Field
Prescott, Arizona

WIND COVERAGE		
	12 MPH	15 MPH
Runway 14–32	*91.68%*	*96.38%*

COTTONWOOD MUNICIPAL AIRPORT

Exhibit 1F
ALL WEATHER WINDROSE

weather observations covering a 30-year period from 1948 to 1978. At the time of this report, this was the most recent and closest climatic wind data available.

According to this exhibit, Runway 14-32 provides 91.4 percent coverage of the 10.5 knot (12 mph) crosswind component and 95.9 percent of the 13 knot (15 mph) crosswind component. Changing wind patterns and frontal movements over the mountains occasionally disturb the air flow. Wind speeds greater than 43.5 knots (50 mph) are quite common during these short periods.

SUMMARY

The information discussed in this chapter provides a foundation from which the remaining elements of the master plan can be prepared. The inventory information on the current facilities at Cottonwood Municipal Airport will be the basis, along with additional analysis and data collection, for developing forecasts of aviation activity (Chapter Two), and defining future facility requirements (Chapter Three). This chapter also provides the proper perspective from which to develop a feasible master plan that serves the needs of the City of Cottonwood and the surrounding region.

DOCUMENT SOURCES

A variety of documents were referenced in the development of this chapter. The following listing reflects a partial compilation of these sources. The listing does not reflect data provided by City and Airport management, nor drawings which may have been referenced for information. An on-site interview and interviews with City and Airport personnel contributed to the development of the inventory effort.

Airport/Facility Directory, Southwest U.S., U.S. Department of Commerce, National Oceanic and Atmospheric Administration, November 1, 2001.

Phoenix Sectional Aeronautical Chart, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, November 1, 2001.

National Plan of Integrated Airport Systems (NPIAS), U.S. Department of Transportation, Federal Aviation Administration, 1998-2002.

Several Internet sites were also accessed and contributed information to the inventory effort. These include:

Cottonwood Municipal Airport FAA 5010 Form Airport Master Record data
www.airnav.com
www.gcr1.com

City of Cottonwood
www.ci.cottonwood.az.us

Yavapai County
www.co.yavapai.az.us

CHAPTER TWO
Aviation Demand Forecasts

AVIATION DEMAND FORECASTS

Facility planning begins with a definition of the demand that may occur over a specified period of time. In airport master planning, this involves forecasts of aviation activity indicators over a twenty-year planning period. Regarding Cottonwood Municipal Airport, forecasts of based aircraft, based aircraft fleet mix, and annual aircraft operations will serve as the basis for facility planning.

Due to the cyclical nature of the economy, it is virtually impossible to predict, with any reliability, year-to-year fluctuations in aviation activity when looking as far as 20 years down the road. As aviation activity can be affected by many influences at the local, regional, and national level, it is important to remember that forecasts are to serve only as guidelines and planning must remain flexible enough to respond to unforeseen facility needs. The following forecast analysis examines recent developments, historical information, and current aviation trends, to provide an updated set of based aircraft and operational projections. The intent is to permit Cottonwood Municipal Airport to make the planning adjustments necessary to ensure that the facility meets projected demands in an efficient and cost-effective manner.

SEPTEMBER 11, 2001

In light of the tragic events at the World Trade Center and the Pentagon on September 11, 2001, along with the ensuing U.S. military action in Afghanistan, the impact to the nation's

economy and aviation in particular is uncertain at this time. Nearly one month later, on October 17, Federal Reserve Chairman Alan Greenspan, in testimony before Congress's Joint Economic Committee, stated *"As the initial shock began to wear off, economic activity recovered somewhat from the depressed levels that immediately followed the attacks, though the recovery has been uneven. . . ."* Greenspan added *"The pronounced rise in uncertainty also has dampened consumer spending and capital investment; households and businesses, confronted with heightened uncertainty, have pulled back from the marketplace, though that withdrawal has been partial and presumably temporary. . . ."* While Greenspan conceded that it still may be too early to tell, he concluded that *"For the longer term, prospects for ongoing rapid technological advance and associated faster productivity growth are scarcely diminished. . . ."* As far as the economy, therefore, it is important to understand the economic conditions in place at the time of the tragedies and how the economy has responded to past national crisis for similarities and insights. Economic trends already underway before such unprecedented and unforeseen events influence considerably the perceptions of individuals and national responses to such events. For the most part, the U.S. economy had been decelerating since September 2000, as leading economic indicators used to measure the strength of the economy were either stagnant or headed down. Economic conditions on September 11, 2001, are comparable to those existing at both the time of the Oklahoma City bombing (April 1995) and the Iraqi invasion of Kuwait (August 1990). In each instance, the U.S. economy was decelerating. Following the Oklahoma bombing, the economic slowdown ended within eight months. Prior to the Iraqi invasion, however, the U.S. had already entered a full recession (July 1990-March 1991).

For U.S. aviation, the impact of September 11 was felt immediately as U.S. Airspace was quickly closed to all civilian traffic. While the repercussions to the commercial aviation sector received the most coverage, all aspects of the nation's aviation industry were affected. Commercial aviation resumed operations on a reduced basis within a week, while the GA industry remained grounded longer. The layoffs and widely publicized Congressional airline relief bill passed by Congress and signed by the President is well documented. The plight of the GA community such as flight schools, FBOs, aircraft manufacturers, etc., however, received much less attention in the media.

As with the overall economy, the ultimate impact of these events on general aviation is hard to predict. Again, a comparison of the industries response to similar events in the past can be examined for insight. For example, following the Gulf War and the subsequent economic recovery of the early 1990s, general aviation began an unprecedented era of growth that has continued through late 2000 and early 2001. Meanwhile, little or no detectable effect on general aviation followed the April 1995 Oklahoma City bombing.

While the tragedies of September 11, 2001, have affected the U.S. in several ways, they are an anomaly in terms of

long term aviation demand. It is assumed, based on an examination of similar past events and their impacts, that the long term outlook for both the economy and general aviation will remain relatively unchanged from the forecasts presented in this chapter.

NATIONAL AVIATION TRENDS

Each year, the Federal Aviation Administration (FAA) publishes its national aviation forecast. Included in this publication are forecasts for air carriers, regional/commuters, general aviation, military, and FAA workloads. 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. At the time this chapter was prepared, the current edition was *FAA Aviation Forecasts - Fiscal Years 2001-2012.* The forecasts use the economic performance of the United Sates as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets.

According to FAA forecasts, the outlook for the U.S. aviation industry over the next twelve years is for moderate economic growth. Although fuel prices have jumped significantly in the last few years, they are expected to level off through the forecast period. Predictions for the final nine years of the forecast period (2004 to 2012) are for 1.8 percent average annual growth rate. Overall, fuel prices during the 12-year forecast period are expected to decline at an average annual rate of 0.9 percent. By comparison, the predicted consumer price index for this period is 2.5 percent. Based on these assumptions, aviation activity at combined FAA and contract towered airports is forecast to increase from 68.7 million operations in 2000, to 91.5 million operations by 2012, an average annual growth rate of 2.4 percent.

Air route traffic control centers (ARTCC) are expected to handle 61.7 million IFR aircraft by 2012, compared with 46.0 million for the year 2000. This ARTCC workload increase represents an average annual growth rate of 2.5 percent for the 12-year period.

Nationwide, the general aviation active fleet is projected to increase 0.9 percent annually, from 221,213 aircraft in 2000 to 245,965 aircraft in 2010. General aviation hours flown are expected to increase to 41.7 million hours by 2012, an average annual growth rate of 2.2 percent.

GENERAL AVIATION

General aviation describes a diverse range of aviation activities that includes all segments of the aviation industry except commercial air carriers and military. General aviation (GA) is the largest component of the national aviation system and includes the production and sale of aircraft, avionics and other equipment, along with the provision of support services such as flight schools, fixed base operators, finance and insurance. The GA

industry is an important contributor to the nation's economy. It provides "on-the-spot" efficient and direct aviation services that commercial aviation either cannot or will not provide.

Based on most statistical measures, general aviation recorded its sixth consecutive year of growth (1994-1999). This period followed 14 years of annual decline. By all accounts, 2000 was another extremely good year for general aviation. GA aircraft unit shipments were heading toward a sixth consecutive year of increase. General aviation manufacturers' shipments increased by 172 percent, from 928 units in 1994 to 2,525 units in 1999. An additional 2,000 units were reportedly shipped during the first three quarters of 2000. Particularly important is the renewed interest in piston powered aircraft. Shipments of piston powered aircraft more than tripled between 1994 and 1999 (from 499 to 1,747 units), and were up an additional 13.6 percent (1,336 units) following the first nine months of 2000.

Jet aircraft shipments have nearly tripled from 1992 (171 units) to 1999 (514 units). The first three quarters of 2000 promised an eighth consecutive successful year, with shipments up 15.1 percent (352 units) over the same period in 1999. Meanwhile, shipments of turboprop aircraft have not fared as well as the other two aircraft categories, with shipments down 2.6 percent for 1999, however, shipments did total 233 units (up 36 percent) for the first nine months of 2000.

Billings for GA aircraft totaled $7.9 billion in 1999, an all-time high. The industry's year 2000, third quarter, reported billings of $6.3 billion, reflecting an increase of 10.4 percent over the same 1999 period. This relatively smaller increase in the billings-to-shipments ratio reflects the increased shipment of generally lower cost-per-unit priced piston powered aircraft. Additionally, export shipments were up 11.3 percent through the third quarter of 2000. Billings, however, declined 20.7 percent for the same period.

The results of the 1999 General Aviation and Air Taxi Activity and Avionics Survey showed that both the active general aviation fleet and hours flown increased for the fifth consecutive year. Fleet numbers were up 7.2 percent, and hours flown, 13.0 percent respectively. The 1999 survey reported the active general aviation fleet at 219,464 aircraft, and hours flown at 31.8 million.

After eight consecutive years of record increased activity (up 20.3 percent between 1992 and 1999), general aviation activity at FAA enroute centers (ARTCCs) declined by 0.7 percent in 2000. Despite this decline in the number of general aviation aircraft handled, there were some positive trends that reflect the continuing growth in business and corporate flying. Domestic departures at FAA enroute centers were down 1.7 percent for 2000; however, oceanic departures were up 40.3 percent. In addition, both domestic and ocean "overs" showed increased gains in 2000, up 2.5 and 16.2 percent, respectively.

In 2000, the number of active pilots increased for the third straight year to 645,639. The four major pilot categories; student, private, commercial, and airline transport were all estimated to have increased in 2000. In addition, the number of instrument rated pilots also increased for the third consecutive year, rising by 6,000 to 315,000 for 2000.

Other factors influenced general aviation growth over the last several years. The New Piper Aircraft Company has created Piper Financial Services, offering competitive interest rates and/or the leasing of Piper aircraft. Also, a dramatic industry trend is the continued growth of fractional ownership programs. These programs allow an individual or business to purchase an interest in an aircraft and pay only for the time they use that aircraft. These programs allow many individuals and businesses, who were once priced out of the market, to own or use GA aircraft for business or corporate purposes. Aircraft manufacturers Raytheon, Bombardier, and Dassault Falcon Jets have all established their own fractional ownership programs. Industry leader Executive Jet Aviation has expanded their program to include Boeing Business Jets and Gulfstream aircraft.

Of all the encouraging statistics relating to general aviation growth, it is the numbers relating to student pilots that are most important to the general aviation industry. A number of industry-wide programs, such as "BE A PILOT," have been instituted over the last several years, designed to attract new pilots to general aviation. The future direction of general aviation depends, in a large part, on the success of these programs.

Exhibit 2A depicts the FAA forecast for active general aviation aircraft in the United States. The FAA forecasts general aviation active aircraft to increase at an average annual rate of 0.9 percent over the 12-year forecast period, increasing from 221,213 in 2000 to 245,965 in 2012. Over the forecast period, the active fleet is expected to increase by just over 2,000 annually, considering approximately 2,000 annual retirements of older aircraft and new aircraft production of nearly 4,000 annually. Turbine-powered, fixed wing aircraft are projected to grow five times faster than piston aircraft, growing 3.0 percent annually through the year 2012. This includes the number of turboprop aircraft increasing from 5,736 in 2000, to 6,600 in 2012, and the number of turbojet aircraft climbing from 7,440 in 2000, to 12,280 in 2012. Likewise, the turbine-powered rotocraft fleet is expected to equal 5,960 in 2012, an average annual increase of 1.5 percent.

The general aviation piston fleet is projected to increase by 13,217 aircraft (0.6 percent annually) over the forecast period, for a total of 186,000 aircraft in 2012. The number of single engine piston aircraft is expected to rise to 164,800 (0.7 percent annually) while multi-engine piston aircraft is projected at 21,200 (0.02 percent annually) in 2012. The number of piston powered rotocraft is expected to rise to 3,500 by the end of the forecast period, a 2.2 percent annual increase. Amateur-built (experimental) aircraft are projected to

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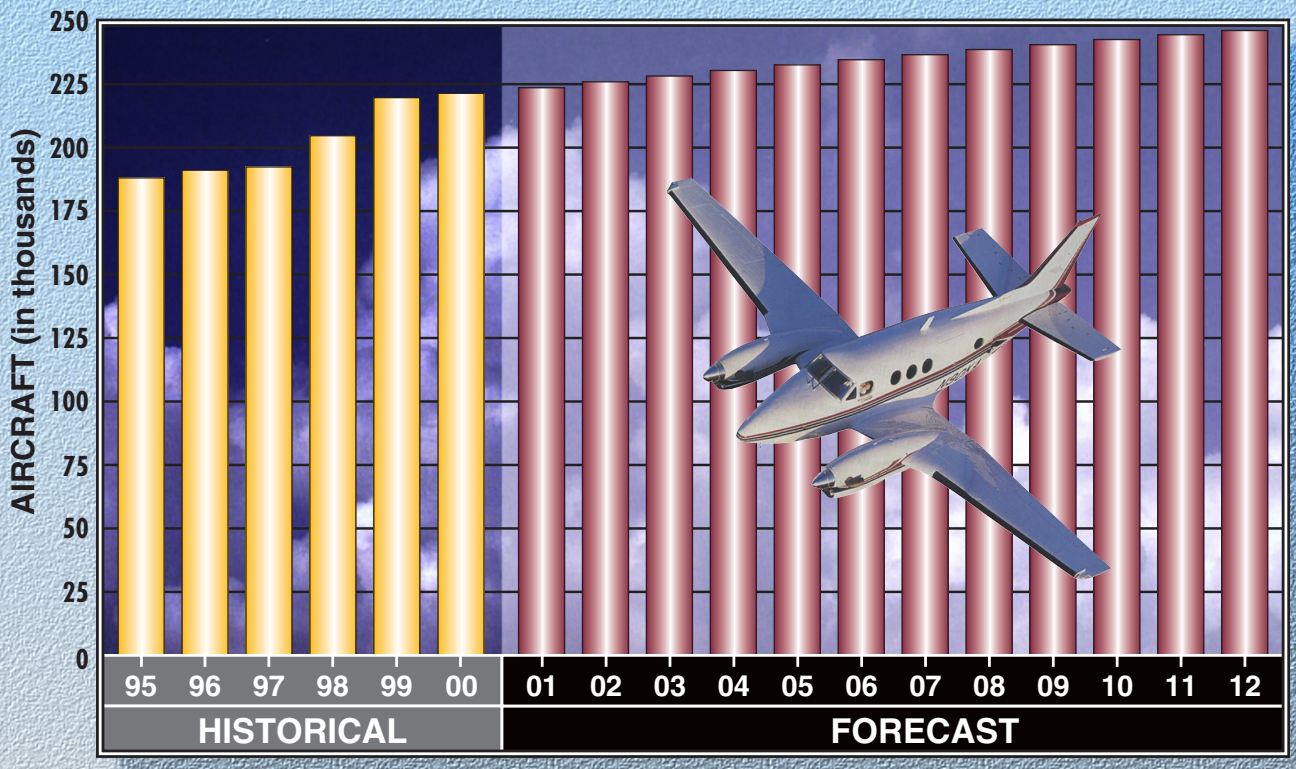
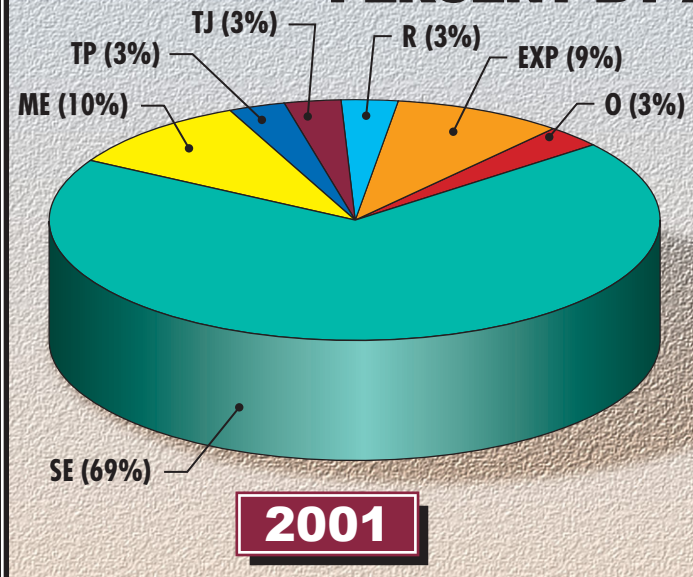
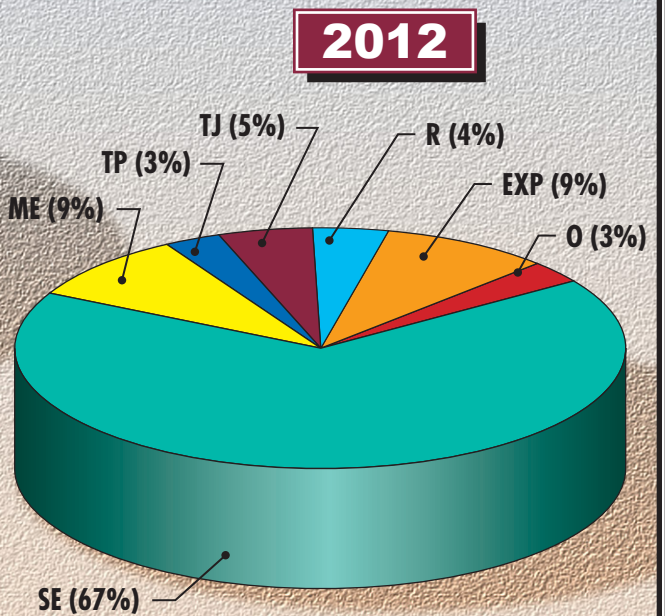
ACTIVE GENERAL AVIATION AIRCRAFT



Source: FAA Aerospace Forecasts, FY 2001-2012

PERCENT BY AIRCRAFT TYPE





SE Single-Engine Piston
ME Multi-Engine Piston
TP Turboprop
TJ Turbojet
R Rotorcraft
EXP Experimental
O Other

COTTONWOOD MUNICIPAL AIRPORT

Exhibit 2A

increase at an average annual rate of 1.2 percent over the next twelve years, from 20,780 in 2000, to 24,080 in 2012.

Throughout the forecast period, general aviation hours flown are expected to increase 2.2 percent annually, for a total of 41.7 million hours in 2012. This larger increase in hours in relation to the number of aircraft reflects expected increases in the utilization of general aviation aircraft, i.e., more hours flown per aircraft. By the year 2012, piston powered aircraft are projected to fly 28.1 million hours (1.5 annual increase), and turbine-powered (including rotocraft) aircraft, 11.7 million hours (up 4.4 percent annually). These large increases are due to the expected increases in both the fractional ownership fleet and its utilization. Fractional ownership business jet usage averages nearly 900 hours annually, while business jets owned by single corporate/business entities average only 325 hours.

The number of pilots is forecast at 827,177 in 2012, an increase of nearly 179,000 or 2.0 percent annually over the forecast period. Student pilots are projected to increase by 40,000 (2.7 percent annually) for a total of 144,200 in 2012. Projected forecast growth among other types of pilot certificates include: private pilots, 309,600 (1.4 percent annually); airline transport pilots, 204,400 (3.2 percent annually); commercial pilots, 148,800 (1.4 percent annually); and helicopter pilots, 9,890 (1.8 percent annually).

Finally, there are two items of note immediately affecting general aviation following the events of September 11, 2001. The first concerns legislation, tentatively named the *General Aviation Small Business Relief Act of 2001*, which was introduced in the House of Representatives on October 3, 2001. This bill is designed to provide relief to those general aviation businesses damaged by the ground stop and airspace restrictions that occurred in the wake of the September 11 attacks. The legislation would require the Small Business Administration to provide grants and loans to small GA businesses that qualify and would defer repayment of loans and interest rates for one year.

Second, according to the Internet aviation magazine *AvWeb* (www.avweb.com), there has been a sharp increase in business-jet travel by means of on-demand jet charter services, as frequent business fliers and other financially able individuals seek a safe and efficient means of travel. While demand has accelerated tremendously since September 11, this trend actually began before then. Executive Jet's NetJets program, which currently operates more than 340 aircraft, announced an order for approximately 600 more jets last May. Executive Jet is the largest provider of fractional ownership of bizjets and is continuing to expand operations throughout the world.

Even commercial airline companies are beginning to explore the possibilities of expanding into this fairly new segment of the general aviation industry. In April 2001, United Airlines confirmed it was considering entering the corporate jet market. In June, United placed orders for 40 Falcon jet aircraft with

options for 60 more, as well as an order for 12 Gulfstreams with options for 23 more. The *Wall Street Journal* reported on Tuesday, October 2, 2001, that UAL Corp. (parent company of United Airlines) had formally announced plans to move ahead next April with a launch of its bizjet subsidiary, to be titled "Avolar.". Avolar is set up to be a wholly-owned but separate subsidiary and will operate the jets through leases with corporate customers via a fractional ownership arrangement. Altogether, Avolar has 225 jets either on order or option. The company expects first deliveries in Spring 2002, and may eventually seek pilots among the 20,000 workers recently laid off from United's 98,000-strong workforce.

Another company, Nimbus Group, is expected to make at least a grab for some of the light-jet-traveler market with the delivery of the first of 1,000 *Eclipse 500* jets that they expect to see sometime in 2004. The Nimbus/Eclipse order announcement is the only one of those mentioned above that was not public until after September 11. Finally, since that date, operational fractionals and charter operators have reported a dramatic increase in interest and demand.

AIRPORT SERVICE AREA

The first step in determining aviation demand for an airport is to define its generalized service area for the various segments of aviation the airport can accommodate. The airport service area is determined primarily by evaluating the location of competing airports, their capabilities and services, and their relative attraction and convenience. With this information, a determination can be made as to how much aviation demand would likely be accommodated by a specific airport. It should be understood that aviation demand does not necessarily conform to political or jurisdictional boundaries.

The airport service area is an area where there is a potential market for airport services. Access to general aviation airports, commercial air service, and transportation networks enter into the equation that determines the size of a service area, as well as the quality of aviation facilities, distance, and other subjective criteria.

In determining the aviation demand for an airport, it is necessary to identify the role of the airport. Cottonwood Municipal Airport is classified by the FAA in the *NPIAS* as a general aviation airport. General aviation includes all components of the aviation field with the exception of the military and commercial air carriers. General Aviation includes all business flying (corporate and executive), all agricultural aviation, personal flying for sport or pleasure, as well as flight schools and flight clubs. Aircraft manufacturers and aircraft maintenance facilities are also a part of general aviation.

Due to the proximity of Sedona Airport (SEZ) and Prescott's Ernest A. Love Field (PRC), as well as the area's seven private airports, the service area for Cottonwood Municipal Airport is primarily limited to the Verde Valley area of eastern Yavapai County. Included within Verde Valley are the communities of Clarkdale, Jerome,

Camp Verde, Cornville, Page Springs, Rimrock, McGuireville, Lake Montezuma, and Verde Village.

PRC is the nearest airport providing scheduled commercial service. Sedona Airport, due to its location atop a high mesa, is used primarily by recreational/ pleasure flyers. The potential for increased aviation demand for Cottonwood Municipal Airport lies in the growing population and promising business growth of the City of Cottonwood and surrounding communities. Ever-growing tourism and recreation industries promise increased private flying activity in the region, while the continued growth in the services and trade sectors offer a potential for increased corporate and business general aviation activity. The forecast analyses conducted in the following sections take into consideration the expected local and regional growth, as well as the nearby airports which influence the Cottonwood Municipal Airport service area.

POPULATION PROJECTIONS

Population growth provides an indication of the potential for sustaining growth in aviation activity over the planning period. A summary of historical and forecast population for the City of Cottonwood, Yavapai County and the State of Arizona is presented in **Table 2A**. As reflected in the table, each of these entities has experienced continued population growth throughout each decade. Cottonwood grew at an average annual rate of 3.57 percent, while the County's growth rate was 4.33 percent over this period, and Arizona experienced a 3.14 percent annual growth rate (AGR) between 1980 and 2000.

Population forecasts through 2020 show an AGR of 2.57 for Cottonwood, 2.61 percent for the County, and 1.83 percent for Arizona. By the year 2020, Cottonwood's population is forecast to reach 15,246, the County's to exceed 280,000 and Arizona's to nearly reach 7.4 million.

ECONOMIC OUTLOOK

ARIZONA

According to the article *The Good News...Bad News* by Marshall J. Vest, in the October 2001 issue of *Arizona's Economy* (published by the Economic and Business Research Program, Eller College of Business, University of Arizona), Arizona economic measures were disappointing for the second quarter of 2001. Both job market statistics (growth and total employment) and personal income showed significant weakness. Despite this, consumer confidence remained relatively optimistic, which benefitted both retailers and the housing market. Mr. Vest predicts Arizona's economic path will remain below its long term potential through the end of this decade, before returning to trend growth. With regard to population and economic growth, however, forecasts are that Arizona will continue to be one of the fastest growing states in the nation over the next 25 years.

TABLE 2A
Historical and Forecast Population Data

	Cottonwood	Yavapai County	Arizona
Historical			
1980	4,550	68,145	2,716,546
1990	5,918	107,714	3,665,339
1995	6,545	129,500	4,228,900
2000	9,179	167,517	5,130,632
(%) Average Annual Increase	3.57%	4.60%	3.23%
Forecast			
2010	10,749	219,910	6,145,108
2020	15,246	280,530	7,363,604
(%) Average Annual Increase	2.57%	2.61%	1.82%

Sources: Arizona Department of Economic Security, U.S. census Bureau, and the Arizona Department of Commerce (November 2001).

COTTONWOOD AND VERDE VALLEY

Historically, Cottonwood and the Verde Valley's economy was centered around agriculture and mining. Today's economic focus, however, is on manufacturing, retail, service, recreation/tourism and the retirement industries.

Highlighting the area's close proximity to interstate trucking routes, available land, affordable labor force and other incentives, Cottonwood's Foundation for Economic Development Council has been actively pursuing general manufacturing to locate to the area.

Tourism and recreation, meanwhile, are becoming an increasingly important part of the economic engine fueling the Cottonwood and Verde Valley area. The region's central location offers close proximity to several of Arizona's historic, cultural and recreational destinations. Three national monuments, four state parks and several Indian ruins are located nearby. Recreational opportunities including fishing, boating, hunting, hiking, etc., are also located within short distances of the area.

Another industry which is seeing promising growth is the retirement industry, as senior citizens are

attracted to the Verde Valley's comfortable and affordable lifestyle. It is estimated that nearly two new jobs are generated for each retiree who moves into the area. As more senior citizens retire to the area they will serve to attract and expand the essential services they require such as real estate, financial, legal and estate planning, and especially health care.

The Verde Valley Medical Center (VVMC), one of the area's largest employers with nearly 560 people, is located in Cottonwood and continues to expand.

Between 1980 and 2000, Cottonwood's labor force nearly doubled from 1,649 to 3,263, for an average annual growth rate of 3.47 percent. This rate was slightly higher than the state's AGR of 3.40 percent, but lower than the County's AGR of 5.48 for the 20-year period. Cottonwood's unemployment during this period remained nearly unchanged, from 4.3 percent in 1980 to 4.4 percent in 2000.

Additional growth indicators for Cottonwood, as reported by the Arizona Department of Commerce, which continue to rise include: taxable sales up 8.5 percent, from $120 million in 1990 to $230 million in 1998; postal receipts, up 7.2 percent, from $1.07 million to $1.85 million for the same period; and new building permits between 1980 and 1999, which increased 28 percent, from 106 to 767. Housing starts continue to be up for the area as several master planned communities are presently under development for Cottonwood and the surrounding area.

All of these indicators would appear to point to continued moderate growth for the Cottonwood area for the foreseeable future.

FORECASTING METHODOLOGY

The development of aviation forecasts is both an analytical and judgmental process. Several mathematical relationships are tested and applied to establish statistical logic and rationale for projected aviation growth. In addition, the forecast analyst must depend upon their own professional experience, aviation industry knowledge, and personal assessment of the service area situation in making the final determination of the preferred forecast.

Reliable aviation demand estimates are best arrived at through the utilization of more than one analytical technique. Methodologies frequently employed include trend line projections, correlation/regression analysis, and market share analysis.

Aviation forecasts which extend beyond five years should not be granted an overly high level of confidence. Due to the fact that it often takes longer than five years to complete a major facility development program, facility and financial planning usually require a minimum ten-year projection. It is important, however, to use forecasts which do not overestimate the Airports revenue-generating capability or underestimate future facility needs which are required to meet aviation activity demands.

Many factors influence the aviation industry, some of which can have significant impact both locally and nationally. Advances in aviation technology have in the past and will in the future continue to affect the growth rate of aviation demand. As these technologies evolve and new ones emerge, it is hard to predict their impact on the aviation industry; simply put, there is no way to mathematically estimate what influence they may have. Therefore, a broad band of local, regional, and national socioeconomic information must be applied in the analysis and development of aviation forecasts. The following forecast analysis examines general aviation demand at Cottonwood Municipal Airport over the next twenty years.

AVIATION ACTIVITY FORECASTS

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. Indicators of general aviation demand usually include:

- Based Aircraft
- Based Aircraft Fleet Mix
- Annual Operations
- Peak Activity

The remainder of this chapter will examine historical trends regarding these areas of general aviation and project future demand for these segments of general aviation activity at Cottonwood Municipal Airport.

BASED AIRCRAFT FORECASTS

At an airport, the number of based aircraft is the primary indicator of general aviation demand. By first developing a forecast of based aircraft, the growth of aviation activities at the airport can be projected. In the preparation of based aircraft forecasts for Cottonwood Municipal Airport, existing and historical based aircraft records maintained by the City, the State and the FAA were obtained and reviewed. According to tiedown and hangar lease records provided by the City of Cottonwood and the FBO, as of October 2001, there were 40 based aircraft at Cottonwood Municipal Airport.

Based aircraft totals for the State are derived from aircraft registrations and are updated as new aircraft are registered. The accuracy of the State data depends upon the registered aircraft owner listing Cottonwood Municipal Airport as the basing location of their aircraft, and not using their home or another address instead. Current (2000-2001) State records indicate 32 based aircraft at Cottonwood Municipal Airport.

Based aircraft totals for the FAA are usually derived from annual inspection of the airport, and are often carried over from year-to-year, depending on the frequency of inspection. The current FAA Form 5010 Airport Master Record for Cottonwood Municipal Airport indicates 30 based aircraft for the Airport in 2000. The latest FAA Terminal Area Forecast records indicate 23 based aircraft for the Airport in

1999, however, this total has not changed in their reporting since 1993.

For purposes of determining future airport facility needs and developing on-airport based aircraft projections, this master plan will utilize current based aircraft totals provided by the City, as they appear to more accurately reflect existing Airport conditions. Detailed current based aircraft information is provided in **Appendix B**.

Table 2B presents historical registered based aircraft for Cottonwood Municipal Airport and offers a future market share analysis based on percentages of Yavapai County registered aircraft.

TABLE 2B
Historical Based Aircraft and Market Share Forecast vs. Yavapai County Registered Aircraft
Cottonwood Municipal Airport

Year	Cottonwood Municipal Airport Based Aircraft	Yavapai County Registered Aircraft	% of County Registered Aircraft at Cottonwood Municipal Airport
HISTORICAL			
1995	29[1]	379[1]	7.65
1996	32[1]	411[1]	7.79
1997	30[1]	427[1]	7.03
1998	32[1]	435[1]	7.36
1999	33[1]	446[1]	7.40
2000	32[1]	461[1]	6.94
2001	40[2]	471[4]	8.49
FORECASTS			
Constant Market Share			
2005	42	491[3]	8.49
2010	47	556[3]	8.49
2015	53	627[3]	8.49
2020	60	708[3]	8.49
2025	68	800[4]	8.49
Increasing Market Share			
2005	44	491[3]	9.00
2010	51	556[3]	9.10
2015	58	627[3]	9.20
2020	66	708[3]	9.30
2025	75	800[4]	9.40

Sources:
[1] ADOT - Aeronautics Division, Historical Aircraft Registration Records.
[2] City of Cottonwood Tiedown and Hangar Lease Records.
[3] ADOT - Aeronautics Division, "Draft" *Arizona State Aviation Needs Study (SANS) 2000*.
[4] Extrapolated by Coffman Associates, Inc.

Future based aircraft demand at Cottonwood Municipal Airport has been analyzed by evaluating the Airport's share of the County's and State aviation markets. According to **Table 2B**, the percent of County registered aircraft currently based at Cottonwood Municipal Airport totals 8.49 percent through the first three quarters of 2001. ADOT's "Draft" *Arizona State Aviation Needs Study (SANS) 2000* projects Yavapai County registered aircraft to grow to 708 by the year 2020, which equates to a 2.2 percent AGR from the 2000 figure of 461. The County's registered aircraft total of 800 for 2025 was extrapolated based on ADOT's 2.2 AGR. The constant market share analysis shown in **Table 2B** assumed that the Airport's share of Yavapai County registered aircraft remains unchanged at 8.49 percent (Year 2001) and would result in 68 based aircraft by 2025. The forecast of continued population growth and increased economic importance of Cottonwood and other nearby communities to the overall economic outlook for Yavapai County should translate to a greater share of County registered aircraft for the Airport. The forecast increasing market share of County registered aircraft yields 75 based aircraft by the end of the planning period.

Additional historical based aircraft and forecast market share comparisons and analysis between Cottonwood Municipal Airport and the State of Arizona are presented in **Table 2C**.

Similar to the previous analysis, a constant share analysis assumes the Airport's current 0.65 percent share of State registered aircraft will not change throughout the planning period. The *2000 SANS* forecasts State registered aircraft to grow by 1.99 percent annually, from 6,006 in 2000 to 8,896 in 2020. The year 2025 State total of 9,565 registered aircraft has again been extrapolated utilizing the projected AGR of 1.99 percent. The constant market share projection, therefore, yields 62 based aircraft for the Airport by 2025. Meanwhile, the increasing market share evaluation (based on the same factors used in the previous analysis) depicted in **Table 2C** results in 91 based aircraft at Cottonwood Municipal Airport by 2025.

A third comparative analysis method is presented in **Table 2D** which utilizes based aircraft per 1,000 Yavapai County residents. It was assumed that the aircraft per 1,000 residents ratio would rise slightly over its current ratio of 0.25, due to such factors as continued moderate population growth and economic development within the Airport's service area. This method results in 78 based aircraft for Cottonwood Municipal Airport by 2025.

A summary of all forecasts (including those from the 1993 Master Plan and ADOT) for based aircraft at Cottonwood Municipal Airport and the selected planning forecast is presented in **Table 2E**, and on **Exhibit 2B**. The planning forecast is a median range projection which reflects the Airport capturing a larger portion of regional and state aviation markets over the planning period. Continued local and regional economic and population growth supports the long-range potential for based aircraft growth at the airport.

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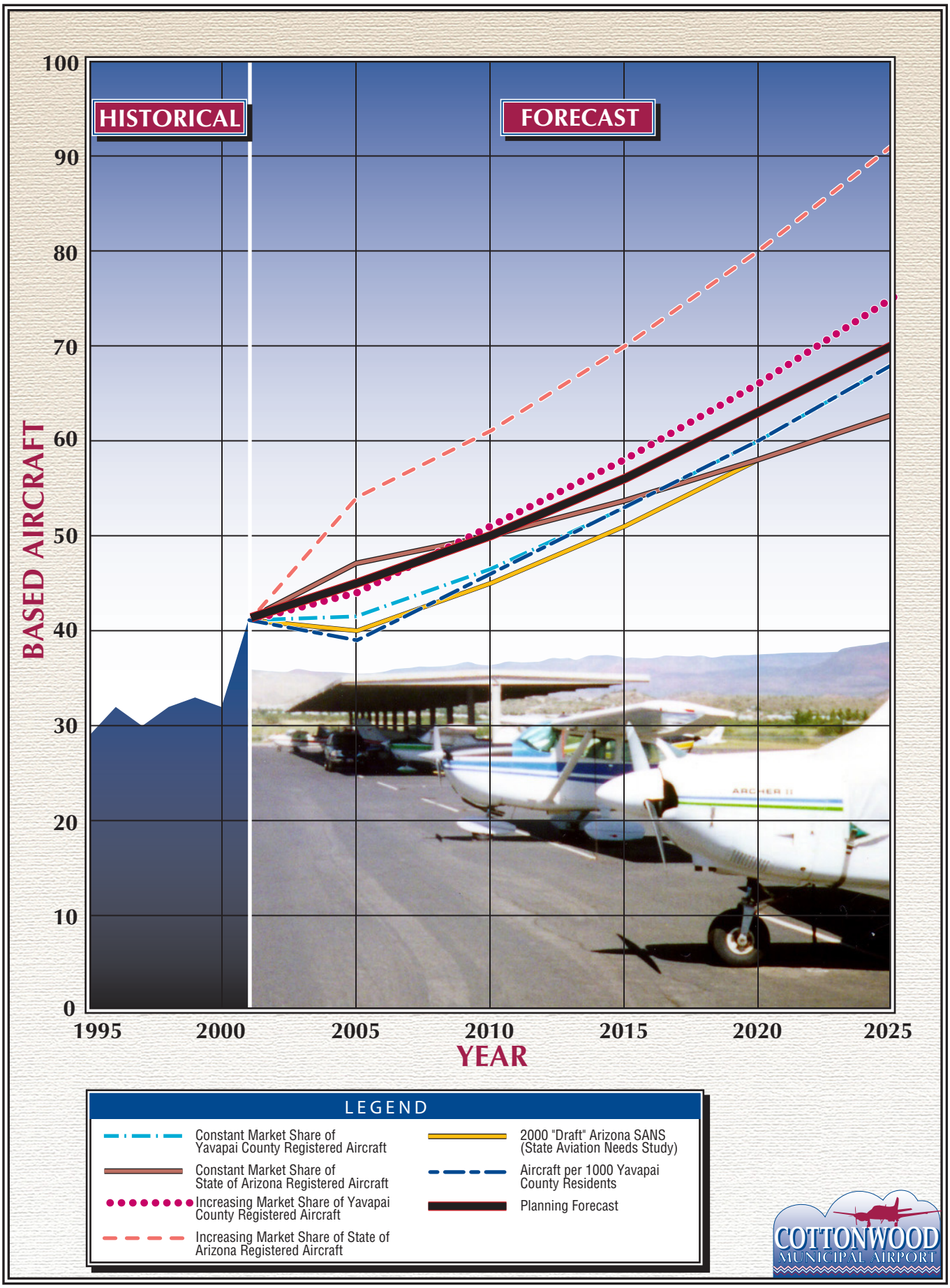

Exhibit 2B

TABLE 2C
Historical and Forecast Based Aircraft vs. Arizona Registered Aircraft
Cottonwood Municipal Airport

Year	Cottonwood Municipal Airport Based Aircraft	State of Arizona Registered Aircraft	% of State Registered Aircraft at Cottonwood Municipal Airport
HISTORICAL			
1995	29[1]	5,076[1]	0.57
1996	32[1]	5,338[1]	0.60
1997	30[1]	5,491[1]	0.55
1998	32[1]	5,717[1]	0.56
1999	33[1]	5,913[1]	0.66
2000	32[1]	6,006[1]	0.53
2001	40[2]	6,126[4]	0.65
FORECASTS			
Constant Market Share			
2005	47	7,156[3]	0.65
2010	50	7,674[3]	0.65
2015	54	8,247[3]	0.65
2020	58	8,896[3]	0.65
2025	62	9,565[4]	0.65
Increasing Market Share			
2005	54	7,156[3]	0.75
2010	61	7,674[3]	0.80
2015	70	8,247[3]	0.85
2020	80	8,896[3]	0.90
2025	91	9,565[4]	0.95

Sources:
[1] ADOT - Aeronautics Division, Historical Aircraft Registration Records.
[2] City of Cottonwood Tiedown and Hangar Lease Records.
[3] ADOT - Aeronautics Division, "Draft" *Arizona State Aviation Needs Study (SANS) 2000*.
[4] Extrapolated by Coffman Associates, Inc.

The planning forecast projects based aircraft at Cottonwood Municipal Airport growing at an average annual rate of 2.5 percent. It is more likely, however, that actual activity will not follow any one of the projections precisely. In all likelihood, based aircraft levels will fluctuate within the range of the projections depicted on **Exhibit 2B**. Thus, these lines serve more as a planning envelope. The planning envelope reflects a reasonable range for based aircraft at the airport. With this in mind, the time-based

projections of anticipated growth should serve only as a guide. At any given time over the planning period, the actual level of based aircraft could fall within the envelope area defined by the lower range forecast numbers and the higher range forecast numbers.

TABLE 2D
Aircraft Per 1,000 Residents (Yavapai County)
Cottonwood Municipal Airport

Year	Based Aircraft[1]	Yavapai County Residents[2]	Aircraft per 1,000 Residents
1995	29[1]	130,300[3]	.22
1996	32[1]	134,600[3]	.24
1997	30[1]	142,075[3]	.21
1998	32[1]	148,500[3]	.22
1999	33[1]	152,957[3]	.22
2000	32[1]	159,080[3]	.20
2001	40[2]	162,272[2]	.25
FORECASTS			
2005	46	175,693[3]	.26
2010	53	198,052[3]	.27
2015	61	219,614[3]	.28
2020	70	240,849[3]	.29
2025	78	260,779[3]	.30

Sources: [1] ADOT - Aeronautics Division, Historical Aircraft Registration Records.
[2] Extrapolated by Coffman Associates, Inc.
[3] Arizona Dept. of Economic Security, Research Administration, Population Statistics Unit.

FLEET MIX

Anticipating the future aircraft fleet mix expected to utilize Cottonwood Municipal Airport is necessary to properly plan the facilities that will best serve not only the level of activity, but also, the type of activities occurring at the Airport. The current total of 40 based aircraft is comprised of 39 single-engine and one twin-piston aircraft. The based aircraft and fleet mix information was provided by the City of Cottonwood and verified through the inventory site visit to Cottonwood Municipal Airport.

The forecast mix of based aircraft for Cottonwood Municipal Airport was determined by examining existing and forecast U.S. general aviation fleet trends. The *FAA Aviation Forecasts - Fiscal Years 2001-2012* was consulted for the U.S. general aviation fleet mix trends and considered in the fleet mix projections. Although the majority of the fleet make-up at Cottonwood Municipal Airport will continue to be single-engine piston aircraft there is expected to be an increasing percentage of multi-engine, turboprop, jet, and helicopters in the future mix, all of

which is consistent with national trends. **Table 2F** summarizes the based aircraft fleet mix projections for the Airport.

TABLE 2E
Based Aircraft Forecast Summary
Cottonwood Municipal Airport

	2005	2010	2015	2020	2025
Constant Market Share of:					
Yavapai County Registered Aircraft	42	47	53	60	68
State of Arizona Registered Aircraft	47	50	54	58	62
Increasing Market Share of:					
Yavapai County Registered Aircraft	44	51	58	66	75
State of Arizona Registered Aircraft	54	61	70	80	91
Other Forecasts:					
1993 Master Plan	44	51	58	N/A	N/A
1995 Arizona SANS (State Aviation Needs Study)	56	64	71	N/A	N/A
2000 "Draft" Arizona SANS (State Aviation Needs Study)	40	45	51	58	N/A
Aircraft per 1,000 Yavapai County Residents	39	46	53	60	68
Planning Forecast	***45***	***50***	***56***	***63***	***70***

TABLE 2F
Projected Based Aircraft Fleet Mix
Cottonwood Municipal Airport

Year	Total Based Aircraft	Single Engine	Multi Engine	Turbo Prop	Jet	Helicopter
Historical						
2001	40	39	1	0	0	0
Forecast						
2005	45	42	1	1	0	1
2010	50	45	2	2	0	1
2015	56	47	3	3	1	2
2020	63	51	4	4	2	2
2025	70	55	5	5	2	3

ANNUAL OPERATIONS

There are two types of general aviation operations at an airport: local and 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. Generally, local operations are characterized by training operations. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. Typically, itinerant operations increase with business and industry use since business aircraft are used primarily to carry people from one location to another.

Cottonwood Municipal Airport has no airport traffic control tower, therefore, aircraft operations have not been regularly counted. Instead, only general estimates of historical and current activity is available. **Table 2G** summarizes historical operational estimates for the airport. The operations data sources for the years depicted in the table are from the FAA Form 5010 for Cottonwood Municipal Airport and FAA Terminal Area Forecast (TAF) System Records. On examination of these records, it would appear that operations estimates have been carried over from year-to-year since 1991, as the totals have remained constant at 19,410 operations. During this time, the itinerant to local operations split is approximately 54 percent to 46 percent, respectively. Military operations between 1980 and 2000 have averaged 10 total operations annually.

TABLE 2G
Historical Operations Summary
Cottonwood Municipal Airport

Year	Based Aircraft	Annual Operations	Operations Per Based Aircraft
1980[2]	30	12,110	404
1985[2]	31	12,110	391
1990[2]	46	21,410	465
1995[2]	29	19,410	669
2000[1]	32	19,410	606
2001[3]	40	19,410	485

Sources:
[1] FAA Form 5010, Airport Master Record (Year 2000), Cottonwood Municipal Airport.
[2] Historical FAA Terminal Area Forecast (TAF) System Records (Query Date: Sept. 2001).
[3] Based Aircraft from City of Cottonwood Tiedown and Hangar Lease Records.

In 1980, according to TAF records, the estimated average number of operations per based aircraft was approximately 404; by 2001, this number rose to 485. While this number of operations per based aircraft is higher than most GA airports, it is reasonable, due to the large number of training operations

(touch-and-go's) conducted at Cottonwood Municipal Airport. Embry-Riddle Aeronautical University (ERAU) located at Prescott's Ernest A. Love Field utilizes Cottonwood Municipal Airport as part of its flight training program. ERAU operations consist entirely of touch-and-go maneuvers. School officials estimate 2,800 operations annually between 1995 and 2000. ERAU voluntarily suspended operations at the Airport for the period of August 1998 to December 1999.

The projections of annual operations at Cottonwood Municipal Airport, which are summarized in **Table 2H**, have been prepared by examining the number of operations per based aircraft. For forecasting purposes, two forecasts of operations per based aircraft have been developed. First, a constant level of 485 operations per based aircraft was applied to forecast based aircraft. This results in an operational level of 33,950 in 2025. The second forecast, utilizes an increasing number of operations per based aircraft. It assumes an annual average increase of 2 percent in operations per aircraft and results in 54,600 total operations by 2025. Both of these operational totals are based on the planning forecast of 70 based aircraft at Cottonwood Municipal Airport.

The third forecast method in the table uses the FAA's Projected 2.3 Percent Annual Increase (total operations) to project 33,500 operations by the year 2025. The 1993 Airport Master Plan estimated 36,800 operations for 2015. Finally, two additional operations forecasts are also shown in the table: the 1995 SANS forecasts annual operations growing to 26,262 by the year 2015, while the 2000 "Draft" SANS projects 32,050 operations in 2020 for Cottonwood Municipal Airport. These additional forecasts, based on different variables, are provided to further define the operational "forecast envelope" of the current planning period.

The planning forecast was arrived at by analyzing and comparing these varied methodologies, and then weighing the results along with several other factors influencing growth both on and around the Airport. Together these forecasts, including the planning forecast, represent the "forecast envelope." **Exhibit 2C** presents the planning forecast and "forecast envelope" for Cottonwood Municipal Airport. For clarity, neither the 1993 Master Plan forecast nor the 1995 SANS forecast is depicted on the exhibit, as they are both undergoing updates.

The expected continuing growth of Cottonwood and the surrounding communities, along with potential new airport tenants and businesses (development of Cottonwood Airpark), and increased business and corporate aircraft activity, has the potential of contributing to additional airfield activity, thus increasing the number of annual operations at the Airport. The planning forecast accounts for this additional activity, as well as subsequent activity resulting from increased numbers of based aircraft at the airport. The planning forecast projects operations to grow at approximately 2.6 percent annually for a total of 36,500 operations at Cottonwood Municipal Airport by the year 2025.

00MP15-2C-12/6/01

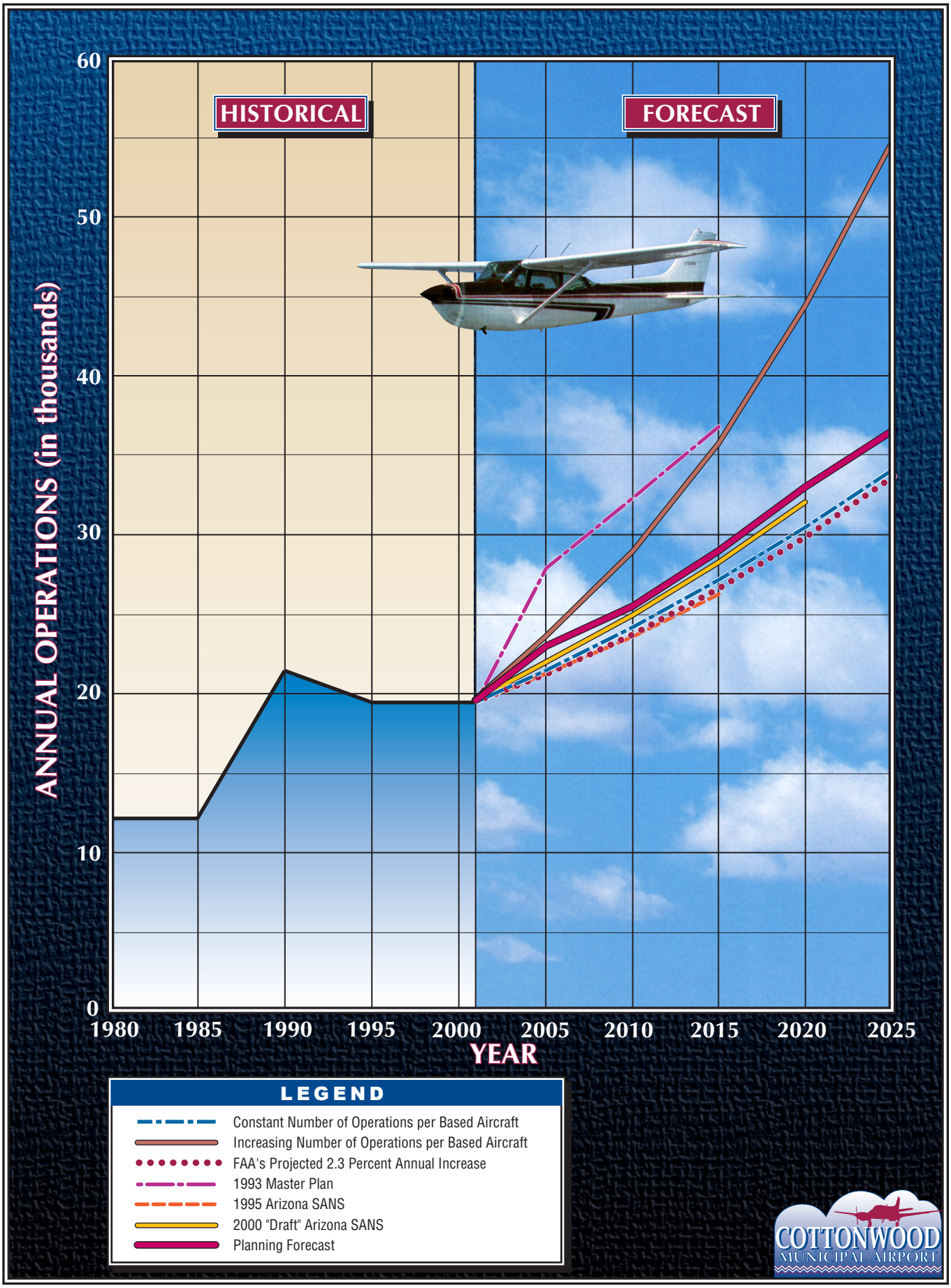

Exhibit 2C

TABLE 2H
Comparative Annual General Aviation Operations Forecast Summary
Cottonwood Municipal Airport

	2005	2010	2015	2020	2025
Constant Number of Operations per Based Aircraft (485 Annually)	21,825	24,250	27,160	30,555	33,950
Increasing Number of Operations per Based Aircraft (+2 percent per year)	23,625	29,000	35,840	44,540	54,600
FAA's Projected 2.3 Percent Annual Increase	21,260	23,820	26,690	29,900	33,500
1993 Master Plan	27,900	32,300	36,800	N/A	N/A
1995 Arizona SANS (State Aviation Needs Study)	21,278	23,578	26,262	N/A	N/A
2000 "Draft" Arizona SANS	22,003	24,942	28,273	32,050	N/A
Planning Forecast	***23,000***	***25,500***	***29,000***	***33,000***	***36,500***

Although business and corporate use of the Airport is expected to increase in the future, it is assumed that the current 55 percent local and 45 percent itinerant split of operations will remain the same throughout the planning period. The projection of local and itinerant operations are summarized in the table at the end of this chapter.

PEAKING CHARACTERISTICS

Many airport facility needs are related to the levels of activity during peak periods. The periods used in developing facility requirements for this study are as follows:

- ***Peak Month*** - The calendar month when peak aircraft operations occur.
- ***Design Day*** - The average day in the peak month. Normally this indicator is easily derived by dividing the peak month operations by the number of days in a month.
- ***Busy Day*** - The busy day of a typical week in the peak month. This descriptor is used primarily to determine apron space requirements.
- ***Design Hour*** - The peak hour within the design day. This descriptor is used primarily in airfield demand/capacity analysis, and in determining terminal building and access road requirements.

Actual operational information is not available to directly determine peak aviation activity at the airport; therefore, peak period forecasts have been determined according to trends experienced at similar airports across the country. Typically, the peak month for activity at general aviation airports approximates 10-12 percent of the

airport's annual operations. Peak month operations have been estimated as 11 percent of annual operations. The forecast of busy day operations at the airport was calculated as 1.25 times design day activity. Design hour operations were calculated as 13.0 percent of design day operations. **Table 2J** summarizes peak activity forecasts for Cottonwood Municipal Airport.

TABLE 2J
Peak Period Forecasts
Cottonwood Municipal Airport

	2005	2010	2015	2020	2025
Annual Operations	23,000	25,500	29,000	33,000	36,500
Peak Month	2,530	2,805	3,190	3,630	4,015
Design Day	84	94	106	121	134
Busy Day	105	118	133	151	168
Design Hour	11	12	14	16	17

COMMERCIAL AIR SERVICE POTENTIAL

Scheduled airline service has never been provided to Cottonwood Municipal Airport. The increasing population along with the expanding economic development of Cottonwood and the surrounding area have the potential to attract air service. Considering Cottonwood's proximity to Phoenix, any potential airline service would likely be commuter/regional type airline service serving Phoenix-Sky Harbor International Airport.

The decision for an airline to enter a market is purely a business decision based on the potential passenger market. As the Airport has no history of air service, estimating the air passenger market in Cottonwood Municipal Airport's service area is difficult. However, an examination of similar airports and communities with existing commercial air service could provide an indication of the potential passenger market in Cottonwood and the surrounding area.

Two communities located near Cottonwood which currently offer scheduled airline service are Prescott and Flagstaff. **Table 2K** compares the population of these communities to the number of annual enplanements (a person boarding a scheduled airline flight) at each airport in 1998, 1999, 2000, to arrive at a ratio of enplanements per 1,000 residents.

According to the table, for both Flagstaff and Prescott, the number of enplanements per 1,000 residents has declined annually since 1998. This can be attributed to a reduction in the number of daily flights offered at each of these airports.

Prescott is included in the Federal Essential Air Service (EAS) program. Under this program, a subsidy is paid to the airline serving Prescott to guarantee regular service and reduce

ticket prices. Considering Prescott's proximity to Phoenix (less than 90 minutes north), the EAS subsidy likely increases the number of annual airline enplanements by ensuring regular airline service. The number of enplanements per 1,000 residents in Prescott, as opposed to Flagstaff, is lower because a large number of airline passengers in Prescott choose to drive to Phoenix instead of using Prescott's airport. In Flagstaff, the number of enplanements is considerably higher due to the extended drive time to Phoenix.

TABLE 2K
Enplanements per 1,000 Residents

City	Year	Enplanements	Population	Enplanements per 1,000 Residents
Flagstaff	1998	38,487	59,945	652
	1999	33,385	60,880	549
	2000	33,978	62,710	542
Prescott	1998	7,844	34,610	227
	1999	5,725	35,785	160
	2000	5,543	36,975	150

The ratio of enplanements per 1,000 residents in Cottonwood Municipal Airport's service area is likely to be lower than in Flagstaff and Prescott, since the communities comprising the service area are closer to Phoenix, plus Prescott is part of the EAS program. The total population of the eleven communities comprising the Airport's service area is approximately 30,700. Assuming a ratio of 100 enplanements per 1,000 residents, equates to an existing air passenger market of approximately 3,070 annual passengers for the Cottonwood Municipal Airport service area. Applying this ratio to forecast population provides an indication of the potential air passengers for the Airport's service area through 2025. Potential air passengers for Cottonwood Municipal Airport are summarized in **Table 2L**.

TABLE 2L
Potential Air Passengers
Cottonwood Municipal Airport Service Area

Year	Forecast Population	Enplanements per 1,000 Residents	Potential Air Passengers
2005	33,383	100	3,338
2010	38,507	100	3,851
2015	43,480	100	4,348
2020	48,305	100	4,831
2025	52,754	100	5,275

The most important factors in creating and sustaining scheduled air service are the frequency of service and air fare prices. Competitive air fares would attract travelers who might otherwise choose to drive to regional airports for frequency of service and efficiency.

The proximity of Cottonwood Municipal Airport to other air carrier airports, along with the existing airport conditions (lack of sufficient runway length, adjacent land uses, no passenger terminal facilities, etc.), are seen as the primary factors limiting the potential for scheduled air service. Although the community might be able to attract air service, it is likely that a large number of potential air passengers would still elect to drive to Phoenix rather than flying directly from Cottonwood Municipal Airport. Jet service, lower fares and the greater numbers of flights offered by Phoenix-Sky Harbor International Airport could be the deciding factors for the potential air traveler.

The *Arizona Rural Air Service Study (August 1999)* by the Arizona Department of Transportation, Aeronautics Division focused on improving air service to 10 Arizona airports with existing scheduled passenger service and three other airports which once supported air service. In this study, Cottonwood Municipal Airport was not considered to receive air service. Instead, the focus was on nearby airports such as Prescott, Flagstaff, and Sedona. As previously discussed, both Prescott and Flagstaff currently provide scheduled passenger service, and Sedona once did.

Attracting scheduled air service would require considerable commitment on the part of the City of Cottonwood. Dependent on the type of air service to be offered, the Airport might need to pursue FAR Part 139 certification from the FAA. Part 139 certification requires Airport Rescue and Firefighting personnel and equipment be available at the Airport. Other necessary airport improvements would include increased runway length, a dedicated passenger terminal facility, terminal apron, and additional auto parking. In addition, the City of Cottonwood would likely need to provide marketing and/or subsidies to attract scheduled air service to the Airport.

FORECAST SUMMARY

This chapter has outlined the various aviation demand levels anticipated over the planning period. The next step in the master plan is to assess the capacity of existing facilities to accommodate forecast demand and determine which facilities will need to be improved to meet these demands. This will be examined in the next chapter -- Chapter Three, Aviation Facility Requirements. **Table 2M** presents a summary of the aviation forecasts developed for Cottonwood Municipal Airport.

TABLE 2M
Aviation Forecast Summary
Cottonwood Municipal Airport

	2005	2010	2015	2020	2025
Annual Operations					
Itinerant Operations	10,350	11,475	13,050	14,850	16,425
Local Operations	12,650	14,025	15,950	18,150	20.075
Total Annual Operations	23,000	25,500	29,000	33,000	36,500
Based Aircraft	45	50	56	63	70

CHAPTER THREE
Facility Requirements

FACILITY REQUIREMENTS

To properly plan for the future of Cottonwood Municipal Airport, it is necessary to translate forecasted aviation use into the specific types and quantities of facilities that can adequately serve this identified demand. This chapter uses the results of the forecasting conducted in **Chapter Two** and establishes 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, fueling, automobile parking and access) facility requirements.

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

Acknowledging that the need to develop facilities is determined by demand, rather than a point in time, the requirements for new facilities have been expressed for the short, intermediate, and long term planning horizons, which roughly correlate to five-year, ten-year, and twenty-year time frames. **Table 3A** summarizes the activity levels that define the planning horizons used in the remainder of this master plan. Future facility needs will be related to these activity levels, rather than a specific year.

TABLE 3A
Planning Horizon Activity Levels
Cottonwood Municipal Airport

	Short Term Planning Horizon	Intermediate Term Planning Horizon	Long Term Planning Horizon
Based Aircraft	45	56	70
Annual Operations	23,000	29,000	36,500

AIRFIELD REQUIREMENTS

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

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

The following sections describe the scope of facilities that would be necessary to accommodate the airport's forecasted role throughout the planning period.

AIRFIELD DESIGN STANDARDS

The selection of the appropriate FAA design standards for the development of the airfield facilities is based primarily upon the characteristics of the aircraft that are expected to use the airport. The most critical characteristics are the **approach speed** and **wingspan** of the **critical design aircraft** anticipated to use the airport now and in the future. The critical design aircraft is defined as the most demanding category of aircraft that conducts 500 or more operations per year. Planning for future aircraft use is of particular importance since design standards are used to plan separation distances between facilities. Appropriately locating these airfield facilities now, reduces/eliminates the need to relocate them in the future, which would be an expensive endeavor.

The FAA has established criteria for use in the sizing and design of airfield facilities. These standards include criteria which relate to aircraft size and performance. According to FAA Advisory Circular (AC) 150/5300-13, *Airport Design*, an aircraft's approach category is based upon 1.3 times its stall speed in landing configuration at the aircraft's maximum certificated weight. The five approach categories used in airport planning are as follows:

Category A: Speeds of less than 91 knots,

Category B: Speeds of 91 knots or more, but less than 121 knots,

Category C: Speeds of 121 knots or more, but less than 141 knots,

Category D: Speeds of 141 knots or more, but less than 166 knots, and

Category E: Speeds of 166 knots or more.

The second basic design criterion relates to aircraft size. The Airplane Design Group (ADG) is based upon wingspan. The six 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, and

Group VI: 214 feet or greater.

Together, approach category and ADG identify a coding system whereby airport design criteria are related to the operational and physical characteristics of the aircraft intended to operate at the airport. This code, the Airport Reference Code (ARC), has two components: the first, depicted by a letter, is the aircraft approach category; the second is the airplane design group. Generally, aircraft approach speed applies to runways and runway-related facilities, while airplane wingspan primarily relates to separation criteria involving taxiways and taxilanes. **Exhibit 3A** provides a depiction of typical aircraft and their associated Airport Reference Codes. In order to determine facility requirements, the ARC of the airport should first be determined, then appropriate airport design criteria can be applied.

The FAA advises designing airfield elements to meet the requirements of the airport's most demanding or critical aircraft. This is the aircraft or group of aircraft expected to perform 500 or more operations per year.

Currently, Cottonwood Municipal Airport's ARC is B-I, as single engine, piston-type aircraft comprise the majority of aircraft utilizing the Airport. ARC B-I does include turboprops such as the Cessna 421 and the Beech King Air F90 and B100. Also within ARC B-I are the Cessna Citation I, CitationJet (CJ), Falcon 10, and Mitsubishi (MU30) business jets.

Based on the based aircraft fleet mix forecast conducted in Chapter Two, however, the Airport will most likely have an ARC B-II classification by the end of the planning horizon. ARC B-II aircraft weighing 12,500 pounds or more would be the most demanding type of aircraft operating at Cottonwood Municipal Airport. The ARC B-II classification includes the twin turboprops Beech King Air (C90, 200, and 300 series) and Cessna 441 Conquest. Business jets in B-II include the Cessna Citation (II, III, and V series) and the Dassault Falcon series of aircraft. These aircraft already use the airport on an infrequent basis.

The Airport's future airside and landside facilities' requirements, as outlined in the following sections, are based on FAA ARC B-II design criteria.

00MP15-3A-11/28/01

A-I

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

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

B-II
less than 12,500 lbs.

Super King Air 200
Cessna 441
DHC Twin Otter

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

A-III, B-III

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

C-I, D-I

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

C-II, D-II

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

C-III, D-III

B 727-200
B 737-200
B 737-300, 400, 500
DC-9
Fokker 70, 100
MD-80
A320

C-IV, D-IV

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

D-V

B-747 Series
B-777

Note: Aircraft pictured is identified in bold type.

COTTONWOOD MUNICIPAL AIRPORT

Exhibit 3A

RUNWAYS

The adequacy of the existing runway system at Cottonwood Municipal Airport has been analyzed from a number of perspectives, including airfield capacity, runway orientation, runway length, and pavement strength. From this information, requirements for runway improvements were determined for the airport.

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. Annual service volume is a reasonable estimate of the maximum level of aircraft operations that can be accommodated in a year with limited levels of delay.

In accordance with FAA guidelines specified in FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, the annual service volume of a single runway configuration comparable to Cottonwood Municipal Airport normally exceeds 230,000 operations. As the forecasts for the Airport indicate that activity through the planning horizon will remain well below 230,000 annual operations, the capacity of the existing airfield (runway) system will not be reached and the existing single runway configuration can meet operational demands. The facility requirements analysis will focus, therefore, on developing those facilities which will improve safety and service concerns, rather than demand/capacity needs.

Runway Orientation

Wind conditions are the principal factor in determining runway orientation. When prevailing winds are consistently from one direction, runways are generally oriented in that direction. In most areas, however, consistency of wind direction is not found. In these circumstances, a multiple runway configuration may be required. The FAA has established guidelines recommending that an airport's runway system should provide 95 percent usability of the airfield. This 95 percent wind coverage is based upon the crosswind not exceeding 10.5 knots (12 mph) for ARC's A-I and B-I; 13 knots (15 mph) for ARC's A-II and B-II; and 16 knots (18 mph) for ARC's C-I through D-II.

Cottonwood Municipal Airport's single runway, Runway 14-32, is oriented in a northwest-southeast direction. As shown on **Exhibit 1F**, in Chapter One, Runway 14-32 provides 91.68 percent wind coverage in the 10.5 knot (12 mph) range and 96.38 percent coverage for the 13 knot (15 mph) category. This does not comply with the FAA recommendations, indicating that a crosswind runway should be considered.

Currently, wind data particular to Cottonwood Municipal Airport is unavailable. For analysis purposes, wind information was obtained from Prescott's Ernest A. Love Field (located approximately 20 nautical miles west of Cottonwood Municipal Airport) and is for the thirty-year period from 1948 to 1978. Due to these time and distance factors, the information used to construct this wind rose may not reflect existing wind conditions at the Airport. Consequently, it is recommended that a one-year wind study be conducted to more accurately analyze ambient wind conditions at the Airport. Any future consideration of the need for a crosswind runway should be delayed until such data is collected and analyzed.

Interviews with the City, FBO staff, and airport users have indicated there is no current demand for a crosswind runway at the Airport.

Runway Length

The determination of runway length requirements for an airport is based upon five primary factors: airport elevation, mean maximum temperature of the hottest month, runway gradient (elevation differences between each runway end), critical aircraft type expected to use the airport, and stage length of the longest nonstop trip destinations. Aircraft performance declines as elevation, temperature, and runway gradient factors increase.

As noted in Chapter One, Cottonwood's average maximum daily temperature of the hottest month (July) is 98.4 degrees (F). The elevation of Cottonwood Municipal Airport is 3,550 feet MSL (above mean sea level), and the runway gradient for Runway 14-32 is 0.97 percent, a difference in elevation of 41 feet between each runway end.

Table 3B summarizes the runway length requirements for various categories of aircraft. These runway lengths were derived from the FAA Airport Design computer program (Version 4.2D). Currently, Runway 14-32's length of 4,250 feet can accommodate 75 percent of small aircraft with less than 10 seats. For the majority of aircraft presently using the Airport, this existing runway length is adequate. In order to accommodate ARC B-II business and corporate type aircraft, future planning should consider extending the runway to the recommended 5,000-foot length shown in the table for 95 percent of small aircraft. Chapter Four, Development Alternatives, further examines the possibility of extending Runway 14-32.

Runway Width

The existing Runway 14-32 width of 75 feet meets FAA design standards for ADG II aircraft. This width is adequate given the forecast level of aviation activity for Cottonwood Municipal Airport.

Runway Strength

Runway 14-32 has a *published* pavement strength rating of 4,000 pounds single wheel loading (SWL). In light of current airport usage, this *published* rating is insufficient. As

noted in Chapter One, however, the previous (1993) Master Plan stated that a 1992 pavement strength analysis reported a runway strength rating of 30,000 pounds DWL. To correct the runway's published pavement strength rating, the City must submit the pavement analysis report, along with a copy of the Airport's FAA 5010 form (highlighting the revision), to the FAA's Western Pacific Region Airports Division Office in Los Angeles, California. FAA publications should reflect this change within six to 12 months of submittal, as the FAA updates their 5010 database approximately twice annually. The 30,000 pounds DWL pavement strength rating for Runway 14-32 is more than adequate for the larger ARC B-II corporate type aircraft projected to use this runway in the future.

TABLE 3B
Runway Length Requirements
Cottonwood Municipal Airport

AIRPORT AND RUNWAY DATA	
Airport elevation	3,550 feet
Mean daily maximum temperature of the hottest month	98.4° F
Maximum difference in runway centerline elevation	41 feet
RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN	
Small airplanes with approach speeds of less than 30 knots	410 feet
Small airplanes with approach speeds of less than 50 knots	1,080 feet
Small airplanes with less than 10 passenger seats	
75 percent of these small planes	**4,000 feet**
95 percent of these small planes	**5,000 feet**
100 percent of these small planes	5,400 feet
Small airplanes with 10 or more passenger seats	5,400 feet
Large airplanes of 60,000 pounds or less	
75 percent of these planes at 60 percent useful load	6,600 feet
100 percent of these planes at 60 percent useful load	9,000 feet

Source: FAA Airport Design computer program Version 4.2A.

TAXIWAYS

Taxiways are primarily constructed to facilitate aircraft movements to and from the runway system. Parallel taxiways, in particular, serve to enhance airfield capacity and are extremely essential to aircraft movement about an airfield. Some taxiways are necessary simply to provide access between the aprons and runways, whereas other taxiways become necessary as activity increases at an airport, in order to provide safe and efficient use of the airfield. Three crucial elements involved in taxiway design are: taxiway width, separation distance between runways and parallel taxiways, and pavement strength rating.

FAA Airport Design standards for taxiway width and separation distances between runways and parallel taxiways are based primarily on the Airplane Design Group (ADG). Design Group II has been designated for future airfield design. ADG II design standards stipulate a taxiway width of 35 feet and runway/parallel taxiway separation distance of 240 feet. All existing taxiways at Cottonwood Municipal Airport are 40 feet in width, exceeding FAA design standards. The existing runway/parallel taxiway separation distance of approximately 150 feet, however, will not meet B-II design standards. Future planning, therefore, should consider relocating parallel Taxiway A to the FAA recommended separation distance of 240 feet. The alternatives analysis will examine the various options available to meet FAA design criteria for runway/parallel taxiway separation distance.

It is further recommended that holding aprons be provided at or near each runway end. These aprons provide aircraft with an area to conduct final checks prior to takeoff. Aircraft which are unable to takeoff due to a malfunction can be bypassed here by other aircraft ready for takeoff. Typically, holding aprons are designed large enough to accommodate from two to four aircraft, which is dependent on the average size of aircraft utilizing the runway in question. Ultimately, all taxiways and holding aprons should be designed to meet any future runway pavement strength improvements.

Additional future taxiway improvements to consider include marking, signage and lighting. These items enhance both the safety and efficient movement of aircraft to and from the runway system. Future planning requirements regarding these items are addressed in the section dealing with runway/taxiway marking and lighting which follows later in this chapter.

NAVIGATIONAL AIDS

Electronic navigational aids are used by aircraft during an approach to an airport. Instrument approach procedures are a series of maneuvers designed by the FAA which utilize navigational aids to assist pilots in locating and landing at an airport and are especially helpful during inclement weather conditions. Additionally, pilots often use instrument approaches during good visibility conditions. Presently, there are no instrument approaches available at Cottonwood Municipal Airport. Having no instrument approaches means that the airport is effectively closed during poor weather situations when visual flight can no longer be attempted. The closest public use airports providing instrument approach capability are Prescott's Ernest A. Love Field (20 nautical miles west) and Flagstaff Pulliam Airport (31 nautical miles northeast).

Throughout the United States, the increased use of general aviation aircraft for business and corporate aircraft has magnified the need for instrument approaches at non-commercial airports. In order to support this growing segment of general aviation, as well as provide convenient local air access to Cottonwood and other surrounding communities, it is vital

that Cottonwood Municipal Airport is accessible in all weather conditions and that weather-related down time (currently estimated at less than 1 percent) at the Airport be eliminated to the greatest extent possible. The advent of Global Positioning System (GPS) technology will ultimately provide the capability of establishing instrument approaches at the Airport. As discussed in Chapter One, the FAA is proceeding with a program to transition from existing, ground-based navigational aids to a satellite-based navigation system utilizing GPS technology.

Currently, GPS is certified for enroute guidance and for use with instrument approach procedures. The initial GPS approaches being developed by the FAA provide only course guidance information. In the near future, it is expected that GPS will also be certified for use in providing descent information for an instrument approach. For now, this capability is only available using an Instrument Landing System (ILS). Presently, there are three categories of GPS approaches, each based upon the desired visibility minimum of the approach. The three categories of GPS approaches are: one-half mile, three-quarter mile, and one mile. To be eligible for a GPS approach, the airport landing surfaces must meet specific standards as outlined in Appendix 16 of the FAA Airport Design Circular. The specific airport landing surface requirements which must be met in order to establish a GPS approach and a comparison of these standards to existing airport facilities is summarized in **Table 3C**.

Table 3C reveals that Runway 14-32 currently meets or exceeds the requirements to support a one-mile-visibility minimum GPS approach.

The *Navigational Aids and Aviation Special Services Study*, released in March 1999 by the Aeronautics Division of ADOT, recommends and supports the establishment of a one and one-half mile GPS approach with 1,310-foot minimum descent altitude (MDA) to Runway 32 at Cottonwood Municipal Airport. Future facility planning at the Airport, therefore, will proceed under the assumption that the proposed GPS approach will be approved and implemented within the short term planning horizon.

While the ADOT-recommended GPS approach to Runway 32 would be implemented within the short term planning period, long term planning should consider a GPS approach to Runway 14 as well. In its report, ADOT notes that a one and one-half mile, 1,570-foot MDA, GPS approach to Runway 14 is feasible. Establishment of these GPS approaches at Cottonwood Municipal Airport can be accomplished at little or no cost to the Airport.

AIRFIELD LIGHTING, PAVEMENT MARKINGS AND WIND INDICATORS

Airfield lighting and pavement markings assist pilots in locating an airport at night and in poor weather conditions, as well as facilitate aircraft movement on the ground. The current

and future requirements for each of these components at Cottonwood Municipal Airport are summarized below.

TABLE 3C
GPS Instrument Approach Requirements

Requirement	One-Half Mile Visibility	3/4-Mile Visibility Greater Than 300-Foot Cloud Ceiling	One-Mile Visibility Greater Than 400-Foot Cloud Ceiling	Runway 14-32 Existing
Minimum Runway Length	4,200 Feet	3,500 Feet	2,400 Feet	4,250 Feet
Runway Markings	Precision	Nonprecision	Visual	Visual
Runway Edge Lighting	Medium Intensity	Medium Intensity	Low Intensity	Medium Intensity
Approach Lighting	MALSR	ODALS Recommended	Not Required	None
Primary Surface	500 feet clearance on each side of runway	500 feet clearance on each side of runway	250 feet clearance on each side of runway	250 feet clearance on each side of runways

Source: Appendix 16, FAA AC 150/5300-13, Airport Design, Change 6
Notes: MALSR - Medium Intensity Approach Lighting System with Runway Alignment Lighting ODALS - Omni-directional Approach Lighting System

Identification Lighting: The Airport is equipped with a rotating beacon which assists pilots in locating the airport at night. As noted in Chapter One, the tower-mounted beacon at Cottonwood Municipal Airport is located north of the FBO office, next to the Airport entrance road. This existing beacon is adequate and should be maintained in the future.

Visual Approach Lighting: Visual approach lighting systems are configurations of lights which are positioned symmetrically along the extended runway centerline and extend toward the approach. Currently, there are no approach lighting systems located at Cottonwood Municipal Airport. An approach lighting system is not required for the implementation of the recommended GPS approaches to Runway 14-32. This condition is adequate regarding the proposed airside improvements presented in this report.

REILs, in conjunction with runway threshold lights, are installed at each end of Runway 14-32. As discussed in Chapter One, REILs provide positive and rapid identification of the approach end of the runway, and are typically

used where approach lighting is unavailable. These existing systems will serve to enhance the recommended GPS approaches at the Airport and should, therefore, be maintained in the future.

Visual Approach Aids: Visual glide slope indicators (VGSI) are a system of lights located at the side of the runway and provide visual descent guidance information to pilots during an approach to the runway. At Cottonwood Municipal Airport, PAPI-2s are provided near each end of Runway 14-32. These light systems will also enhance future GPS approaches at the Airport and should be maintained for the future.

Runway Lighting: The purpose of runway edge lighting at an airport is to provide an outline of the runway, thus enabling both nighttime and low visibility operations. Runway 14-32 is equipped with medium intensity runway lighting (MIRL). These lighting systems are sufficient and should be maintained in the future.

Taxiway Lighting: Taxiway lighting/ illumination at an airport increases the safety and efficiency of aircraft ground movement operations at night. Currently, taxiway lighting is unavailable at the Airport. Medium intensity taxiway lighting (MITL) is recommended for both the existing and any future taxiways at Cottonwood Municipal Airport.

Runway/Taxiway Pavement Markings: The basic (visual) markings of Runway 14-32 denote runway centerline, runway edge, and designation number. Chevron-shaped markings also identify the runway stopways located at each runway end. Taxiway and apron taxilane markings consist of centerline striping only. The existing runway markings are sufficient for the future GPS approaches and should be maintained through the planning period. Any future taxiways at the Airport should be marked to match existing markings at the Airport.

Weather Measurement Equipment: An AWOS (Automated Weather Observing System) is a computerized system that automatically measures one or more weather parameters, analyzes the data, prepares a weather observation that consists of the parameter(s) measured, and broadcasts the observation to the pilot using an integral very high frequency (VHF) radio or an existing navigational aid. The AWOS is a modular system utilizing a central processor which may receive input from several sensors. Basically, there are five standard groups of sensors, however, an AWOS may be certified with any combination of sensors. Dependent upon system design, additional sensors may be certified to any AWOS configuration. At present, there are no weather measurement facilities available at Cottonwood Municipal Airport. For a more detailed description of the standards of AWOS systems and the types of weather sensors available, please reference *FAA Advisory Circular (AC) 150-5220-16C, Automated Weather Observing Systems For Non-federal Applications*, dated December 13, 1999. Additionally, installation criteria are available in *FAA Order 6560.20B, Siting Criteria For Automated Weather*

Observing Systems (AWOS), dated July 20, 1998. An AWOS is recommended for installation at the Airport. The proposed location is near the existing segmented circle.

Wind Indicators: Currently, the airport is equipped with a lighted wind cone/segmented circle near midfield and west of the runway. Wind indicating devices provide pilots with information as to ground-level wind conditions, while segmented circles indicate airport traffic patterns.

Supplemental wind cones are also located near each end of the runway. These facilities are adequate and should be maintained in the future.

CONCLUSIONS

A summary of the airfield facility requirements for Cottonwood Municipal Airport is presented in **Exhibit 3B**. Runway 14-32's current 4,250-foot length can accommodate 75 percent of small aircraft with less than 10 passenger seats. While this is adequate for the bulk of general aviation aircraft presently using the Airport, future planning should examine the possibility of extending the runway to a more usable length of 5,010 feet. This length would accommodate up to 95 percent of small aircraft with less than 10 passenger seats, thus, enabling the Airport to serve a broader range of business and corporate type aircraft. Any extension to the south would appear to be limited by existing residential development located off Runway 32, while to the north, Mingus Avenue, along with the terrain, restricts any Runway 14 extension. Alternatives presented in Chapter Four will explore the possibility of extending Runway 14-32.

Also recommended is the establishment of a one and one-half mile GPS approach to Runway 32. Long term planning should consider the implementation of a similar GPS approach to Runway 14 as well.

Other proposed airside improvements for the Airport include: relocating Taxiway A to the FAA specified runway/taxiway separation distance of 240 feet; the addition of taxiway aircraft holding aprons near each runway end; the addition of medium intensity taxiway lighting (MITL) to all Airport taxiways both existing and new; the installation of an AWOS; and, the designation of a helipad/helicopter landing area for both local and transient helicopters.

LANDSIDE REQUIREMENTS

Landside facilities are those necessary for handling of aircraft and passengers 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. These components include:

- Aircraft Storage Hangars
- Aircraft Parking Apron
- General Aviation Terminal Facilities
- Automobile Parking

00MP15-3B-9/29/03

RUNWAYS AND TAXIWAYS

EXISTING	SHORT TERM (0-5 Years)	INTERMEDIATE (6-10 Years)	LONG TERM (11-20 Years)
Runway 14-32 4,250' x 75' • 12,500 lbs. SWL Partial Length Parallel Taxiway A 4 Entrance/Exit Taxiways (B,C,D,E) 300' Stopways (each end) ARC B-I Standards	**Runway 14-32** 4,250' x 75' 30,000 lbs. DWL ——————— Helipad/Helicopter Landing Area	**Runway 14-32** Holding Aprons (each end) 4,650' x 75' 30,000 lbs. DWL Increase Runway/Taxiway Separation to 240' ARC B-II Standards	**Runway 14-32** 5,000' x 75' 30,000 lbs. DWL ARC B-II Standards

NAVIGATIONAL AIDS AND INSTRUMENT APPROACH PROCEDURES

EXISTING	SHORT TERM (0-5 Years)	INTERMEDIATE (6-10 Years)	LONG TERM (11-20 Years)
None	AWOS	GPS Approach to Runway 32 AWOS	GPS Approach to Runway 14 AWOS

AIRFIELD LIGHTING AND MARKING

EXISTING	SHORT TERM (0-5 Years)	INTERMEDIATE (6-10 Years)	LONG TERM (11-20 Years)
Rotating Beacon Segmented Circle/Lighted Wind Cone	Same Same	Same Same	Same Same
PAPI-2 REIL's MIRL	Same Same Same	Same Same Same Same	Same Same Same Same
Basic Runway Markings Chevron Markings - Stopways	Same Same	Same Same	Same Same

AWOS - Automated Weather Observation Station
GPS - Global Positioning System
MIRL - Medium Intensity Runway Lights
MITL - Medium Intensiy Taxiway Lights
PAPI - Precision Approach Path Indicator
REIL - Runway End Identifier Light

COTTONWOOD MUNICIPAL AIRPORT

Exhibit 3B

- Access
- Fuel Storage
- Airport Support Facilities

AIRCRAFT STORAGE HANGARS

The space required for hangar facilities is dependent upon the number and type of aircraft expected to be based at the airport. Future planning utilizes forecast aviation activity in the determination of estimated future hangar requirements. Based upon the analysis of existing Airport facilities, the current level of storage demand and aviation activity at the Airport, percentages representing hangar requirements for various types of general aviation aircraft have been calculated. Future hangar development, however, should be based on actual demand, as well as financial investment considerations.

Demand for hangar space at an airport is dependent on such factors as local climate, security, and owner preference. Emerging trends in general aviation aircraft are toward more sophisticated, expensive aircraft. In light of this trend, many owners are turning to hangar space, rather than outside tiedowns. Currently, at Cottonwood Municipal Airport, 100 percent of the 12 T-Shade positions and 18 percent (12 positions) of the 68 available outside tiedown positions are occupied. In contrast, all 10 city-owned T-Hangar positions and the six (6) Cottonwood Hangar Association T-Hangar positions are occupied. Additionally, the Airport's three (3) conventional hangars are also occupied. As noted in Chapter One, one of these hangars houses Cottonwood Air Service's aircraft maintenance facilities, while private individuals occupy the other two (2) hangars which are located on ground leases from the City. The demand for enclosed, secure aircraft storage facilities at the Airport is further illustrated by the 20 individuals currently listed on the City's hangar waiting list.

In the future, aircraft storage requirements at the Airport will continue to be met by a combination of hangar types, which is dependent, in large part, upon aircraft owner demand and preferences. Future hangar requirements for Cottonwood Municipal Airport are summarized in **Table 3D**. It is assumed that 80 percent of single-engine aircraft, 90 percent of multi-engine aircraft and 100 percent of turbine and rotocraft will desire hangar space in the future. A planning standard of 1,200 square feet for single-engine aircraft and 2,500 square feet for multi-engine aircraft was used to determine aircraft storage hangar requirements. Conventional hangar area was increased by 15 percent to account for future aircraft maintenance needs. As shown in the table, additional hangar space is expected to be required through the planning period. Dependent on Airport sponsor and aircraft owner preferences and demand, space allocated to future T-Hangar requirements could be shifted to the construction of T-Shades (covered tiedowns) instead. Not only are T-Shades less expensive to construct and maintain, they offer the private aircraft owner a low-cost alternative to enclosed hangar leasing. Alternatives presented in Chapter Four will examine the

options available for future hangar development at the Airport and determine the best location for each type of hangar facility.

TABLE 3D
Aircraft Storage Hangar Requirements
Cottonwood Municipal Airport

		Future Requirements		
	Existing Space Available	Short Term	Intermediate Term	Long Term
Aircraft to be Hangared	32	37	47	59
T-Hangar Positions	16	22	26	32
T-Shade Positions	12	12	12	12
Conventional Hangar Positions	6	3	9	15
T-Hangar/T-Shade Area (s.f.)	32,160	40,800	46,800	52,800
Conventional Hangar Area (s.f.)	16,600	8,625	25,875	43,125
Total Hangar Area (s.f.)	48,760	49,425	72,675	95,925

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. The apron at Cottonwood Municipal Airport is used by single and twin-engine GA aircraft, and is not formally divided into local and transient parking positions. Sixty-eight (68) tiedown positions are located on the aircraft parking apron Seventeen (17) of these tiedowns are currently being leased to private aircraft owners. Based on the Airport's existing hangar to tiedown occupancy rate of 100 percent to 25 percent, it is assumed that the majority of future based aircraft will be stored in an enclosed hangar, although a certain number of based aircraft will still tie-down outside.

Future total apron area requirements were determined by applying a planning criterion of 800 square yards per transient aircraft parking position and 650 square yards for locally-based aircraft parking position (both include a factor for taxilanes). The results of this analysis are presented in **Table 3E**. Based upon the above planning criteria and the number of assumed transient and based aircraft users, the number of existing tiedowns will more than cover future demand throughout the planning period. However, additional apron area may be required as new hangar areas are developed on the Airport which are not contiguous with the existing apron area.

TABLE 3E
Aircraft Parking Apron Requirements

		Future Requirements		
	Existing Space Available	Short Term	Intermediate Term	Long Term
Transient Aircraft Positions	--	8	12	18
Apron Area (s.y.)	--	6,400	9,600	14,400
Local Aircraft Positions	--	8	9	11
Apron Area (s.y.)	--	5,200	5,850	7,150
Total Positions	68	16	21	29
Total Apron Area (s.y.)	±44,180	11,600	15,450	21,550

GENERAL AVIATION TERMINAL FACILITIES

General aviation terminal facilities serve several functions at an airport. These functions can include providing passenger waiting areas, a pilots' lounge and flight planning area, restrooms, food and beverage concessions, administrative and management offices, storage, plus various other needs. The area required for these facilities is not necessarily limited to a single building, but also includes the space used by fixed base operators for similar functions and services.

General aviation terminal facility needs are, for the most part, a function of fixed base operator (FBO) needs. Typically, an FBO which constructs a large aircraft storage and maintenance hangar, will also construct pilot and passenger facilities adjacent to the hangar. This may fulfill some of the Airport's projected terminal requirements, therefore, eliminating the necessity of constructing a single building designed to satisfy general aviation terminal needs.

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. Future space requirements were then based upon providing 75 square feet per design hour itinerant passenger. **Table 3F** outlines these future requirements for general aviation terminal services at Cottonwood Municipal Airport throughout the planning period.

As noted in Chapter One, the offices of Cottonwood Air Service currently

provide these services at the Airport. The existing available space exceeds the long term terminal building requirements as shown in the table.

TABLE 3F
Terminal Building Requirements
Cottonwood Municipal Airport

		Future Requirements		
	Existing Space Available	Short Term	Intermediate Term	Long Term
Design Hour Passengers	--	10	13	15
Building Space (s.f.)	±1,240	750	975	1,125

AVIATION SUPPORT FACILITIES

Certain facilities that do not logically fall under classifications of airfield, terminal building, or general aviation have been identified for inclusion within this Master Plan. Facility requirements, where applicable, have been identified for the following facilities:

- Airport Access and Vehicle Parking
- Fuel Storage
- Aircraft Wash Rack/Maintenance Facility
- Public Utilities
- Other Facilities

AIRPORT ACCESS AND VEHICLE PARKING

As discussed in Chapter One, the main access to Cottonwood Municipal Airport is provided by Mingus Avenue which intersects SR 89A one-quarter mile northeast of the Airport. From Mingus Avenue, Airport Entrance Road leads to both the gated aircraft parking apron and visitor parking located north of the terminal/FBO building. The new gated access road west of the terminal building provides additional access to the hangar development area and, also, the skydiving business located west of the hangars. Airpark Road, which is east of the runway, provides access to Cottonwood Industrial Airpark businesses. Although these businesses are considered on-airport, they have no airside access (i.e., taxiway). These roads are sufficient given the current level of activity and traffic volume at the Airport. Future development of that portion of Cottonwood Industrial Airpark located west of the new access road, however, may require the construction of additional on-airport roadways.

Designated, marked vehicle parking at the Airport consists of nine paved parking spaces located directly north of the Cottonwood Air Service Building. On the building's south side on the apron is an unmarked area which can accommodate approximately seven vehicles. An additional unmarked but

paved parking area for approximately eight to ten vehicles is available adjacent to the electrical vault which is located next to the FBO building within the gated apron area. Vehicles may also park in undesignated areas near the hangars located along the apron's western edge. Roadside parking is also available at three separate locations along the new access road that runs west of the hangar development area.

Automobile parking requirements for future terminal area activities have been determined using a planning standard of 1.8 spaces per design hour passenger and 400 square feet for each parking position. Additionally, general aviation parking requirements are calculated under the assumption that 20 percent of the based aircraft will require automobile parking at any one time. The parking area required per space is the same that is used in terminal area activities parking requirements. Future vehicle parking requirements for Cottonwood Municipal Airport are presented in **Table 3G**.

TABLE 3G
Vehicle Parking Requirements
Cottonwood Municipal Airport

	Existing	Short Term	Intermediate Term	Long Term
Design Hour Passengers	--	10	13	15
Terminal Vehicle Spaces	9	18	23	27
Parking Area (s.f.)	±2,940	7,200	9,200	10,800
General Aviation Spaces	65 to 67	9	11	14
Parking Area (s.f.)	±16,020	3,600	4,400	5,600
Total Airport Parking Spaces	74 to 76	27	34	41
Total Airport Parking Area (s.f.)	±18,960	10,800	13,600	16,400

FUEL STORAGE

Available fuel storage at the Airport consists of two 10,000-gallon aboveground tanks, one for 100LL fuel and the other for Jet-A fuel. The 100LL tank is owned by the City, while the Jet A tank is privately owned. This storage and dispensing facility is located between two hangar facilities along the apron's western edge. As discussed in Chapter One, Cottonwood Air Service collects fuel fees and uses these tanks to supply its two fuel trucks, which in turn services aircraft. An airport's fuel storage requirements can vary based upon individual supplies and distributor policies, therefore, future fuel storage

requirements for Cottonwood Municipal Airport will be dependent upon the independent distributor.

AIRCRAFT WASH RACK/ MAINTENANCE FACILITY

The presence of a designated aircraft wash rack/maintenance facility at an airport offers convenience to the individual aircraft owner and allows the airport sponsor to monitor and maintain their environmental compliance responsibilities. These areas typically provide for the collection of used aircraft oil and other hazardous materials, as well as provide a covered area for aircraft washing and light maintenance. Presently, there is no such designated facility at Cottonwood Municipal Airport. Any future facility should be large enough to accommodate Aircraft Design Group I aircraft (49 foot wingspan). Additionally, an enclosed or covered structure should include a minimum 20-foot tail height clearance. The location of the aircraft wash rack/maintenance facility should be convenient to both aircraft storage and maintenance hangars, as well as the aircraft parking aprons. Furthermore, this facility should comply with all applicable waste water recovery/ disposal, as well as hazardous material collection/disposal practices and procedures.

PUBLIC UTILITIES

Electrical, water, sanitary sewer, phone, and natural gas are all available at the Airport. No utility-related deficiencies are known to exist at the Airport. It is expected, therefore, that the capacity of the existing utilities is sufficient to serve any new or expanded facilities at the Airport. Construction of new facilities such as hangars, etc., however, will likely require new utility extensions to primary service lines and should be included in future design estimates.

OTHER FACILITIES

As it has no immediate future plans for scheduled airline passenger service, Cottonwood Municipal Airport is exempt from Federal Aviation Regulation (FAR) Part 139 Standards and is not required to have aircraft rescue and firefighting (ARFF) equipment on site.

Any new building construction at the Airport, however, whether hangars or conventional structures, must conform to applicable sections of the National Fire Protection Association (NFPA) code, the Uniform Fire Code and the Uniform Building Code, and is subject to inspection and approval of the State Fire Marshall's Office. Specific hangar activities, such as aircraft repair and maintenance, may require the implementation of a fire suppression system in any new hangars. Existing City-owned hangars are equipped with a water-based fire suppression system (sprinklers). City ordinance now requires all buildings, including hangars at the Airport to be fire-sprinkler-equipped.

CONCLUSIONS

Landside facility requirements are illustrated on **Exhibit 3C.** To meet

AIRCRAFT STORAGE HANGARS

	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
Aircraft to be Hangared	32	37	47	59
T-hangar/T-shade Hangar Positions	28	34	38	44
Conventional Hangar Positions	6	3	9	15
T-hangar/T-shade Area (s.f.)	32,160	40,800	46,800	52,800
Conventional Hangar Area (s.f.)	16,600	8,625	25,875	43,125
Total Hangar Area (s.f.)	48,760	49,425	72,675	95,925

APRON AREA

	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
Transient Aircraft Positions	----	8	12	18
Apron Area (s.y.)	----	6,400	9,600	14,400
Local Aircraft Positions	----	8	9	11
Apron Area (s.y.)	----	5,200	5,850	7,150
Total Positions	68	16	21	29
Total Apron Area (s.y)	± 44,180	11,600	15,450	21,550

TERMINAL SERVICES AND VEHICLE PARKING

	AVAILABLE	SHORT TERM NEED	INTERMEDIATE NEED	LONG TERM NEED
Building Space (s.f.)	±1,240	750	975	1,125
Terminal Vehicle Spaces	9	18	23	27
General Aviation Spaces	±50	9	11	14
Total Airport Parking Spaces	74 to 76	27	34	41
Total Airport Parking Area (s.f.)	± 18,960	10,800	13,600	16,400

COTTONWOOD MUNICIPAL AIRPORT

Exhibit 3C

future forecast demand, an increase in available T-hangar/T-Shade space and the development of additional conventional hangar space will be required through the planning period. Dependant on their location, additional apron area may need to be constructed to accommodate the development of these new hangars. Apron expansion to the south of the existing apron is limited due to the drastic rise in elevation. Construction or expansion in this area would require considerable earthwork to maintain necessary grades compatible with taxiing aircraft. However, space is still available for hangar development along the apron's western edge and some T-Hangar/T-Shade development could be accomplished on the existing apron in areas currently occupied by tiedowns. A number of tiedowns could be eliminated or relocated elsewhere on the Airport as the 68 existing tiedowns are more than sufficient given future forecasts. It should be noted, however, that the proposed relocation of Taxiway A to its recommended 240-foot separation distance from Runway 14-32 would considerably limit future hangar development on the existing apron, as well as require the relocation or removal of several existing tiedowns.

While the general aviation terminal facilities' analysis appears to conclude that there is sufficient existing space to satisfy the forecast requirements through the planning period, it is recommended that flexibility with regard to future expansion be maintained. The immediate area surrounding the existing terminal/FBO building should be reserved to insure this expansion capability.

Additional designated terminal area parking will be required through the planning period. General aviation parking needs appear to be sufficient to meet future needs, however, to improve their utilization, it is recommended that the existing areas be marked and designated for this specific purpose.

Given the current level of activity at the Airport, the existing vehicle access off Mingus Avenue is adequate. The westside access road was constructed to facilitate development of the western portion of the airport. Additional on-airport roads may be necessary when this area begins to develop.

Finally, future planning should consider locating an aircraft wash rack/ maintenance facility at the Airport. Such a facility can benefit both the individual aircraft owner and Airport sponsor as well.

SUMMARY

The purpose of this chapter has been to identify the facilities required to meet potential aviation demands projected for Cottonwood Municipal Airport throughout the 20-year planning horizon. The next step is to develop a direction for development that can best meet these projected needs. The remainder of this master plan will focus on outlining this direction, its schedule, and costs.

COTTONWOOD
MUNICIPAL AIRPORT

CHAPTER FOUR
Alternatives

ALTERNATIVES

Prior to defining the development program for Cottonwood Municipal 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 that 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 development scenarios is 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 that 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 and environmental 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 entire planning period.

The number of potential alternatives that can be considered can be endless. Therefore, some judgment must be applied to identify the alternatives that have the greatest potential for implementation. The alternatives presented in this chapter have been identified as such.

The alternatives have been developed to meet the overall program objectives for the airport in a balanced manner. Through coordination with the planning advisory committee (PAC) and the City of Cottonwood, 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.

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, airport development objectives should be considered. As owner and operator, the City of Cottonwood provides the overall guidance for the operation and development of Cottonwood Municipal Airport. It is of primary concern that the airport is marketed, developed, and 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 and maintain a safe, secure, and efficient aviation facility in accordance with applicable federal, state, and local regulations.

2. Identify facilities to efficiently serve the users of Cottonwood Municipal Airport.

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

4. Target local economic development through the development of available property.

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

Exhibit 4A outlines the key considerations for this alternatives analysis. They are summarized by airfield and landside functional use categories. These issues are the result of findings of the forecasts and facility requirements evaluations and consider preliminary input from the City of Cottonwood and the Master Plan PAC.

The airfield system typically requires the greatest commitment of land area and often imparts the greatest influence on the identification and development of other airport facilities. In addition, the FAA has established an array of design standards that must be considered when evaluating potential airfield improvements. These criteria can have a significant impact on the viability of various alternatives designed to meet airfield needs.

00MP15-4A-2/1/07

AIRFIELD CONSIDERATIONS

- PLAN FOR AIRPORT REFERENCE CODE (ARC) B-II
- PROVIDE FOR 5,000' EFFECTIVE RUNWAY LENGTH
- HOLDING APRONS EACH END OF RUNWAY
- STRAIGHT-IN GPS CAPABILITY
- AWOS

LANDSIDE CONSIDERATIONS

- MAINTAIN TRANSIENT PARKING NEAR TERMINAL
- PROVIDE ADDITIONAL T-HANGARS
- PROVIDE FOR ADDITIONAL CONVENTIONAL/ EXECUTIVE HANGARS

COTTONWOOD MUNICIPAL AIRPORT

Exhibit 4A
AIRPORT CONSIDERATIONS

Key considerations for the runway include a potential upgrade to Airport Reference Code (ARC) B-II, as well as an increase in runway length up to 5,000 feet. With the continuing integration of the global positioning system (GPS), the airport will likely have the opportunity to establish straight-in instrument approaches to both runway ends in the future. Each of these improvements will require consideration of safety design standards, including safety areas and runway clearances.

Establishment of an instrument approach, as well as the upgrade to B-II, affects the current runway-taxiway separation. Holding aprons are also a consideration for each end. Another airfield consideration is an automated weather observation system (AWOS). In addition, the airport currently has a drop zone for use by skydivers. The location is such that various development alternatives could affect its future use. Thus, this chapter considers optional sites for relocation.

The landside facilities provide the interface between ground and air transportation. At Cottonwood Municipal Airport, key concerns involve the proper placement of future hangars and parking apron to efficiently serve the users. For example, apron parking for transient aircraft needs to be maintained in reasonable proximity to the terminal building. Additional hangars are anticipated to be needed over the planning period, and consideration needs to be given to functional efficiency, as much as cost.

A final consideration will be maximizing the ability of the airport to be as self-sustaining as possible. Alternatives must be considered that are not only cost-effective, but also can increase revenue potential for the airport, and/or economic enrichment for the community.

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, planning must integrate the individual requirements so that they complement one another.

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. Previous planning efforts, including the 1993 Master Plan, have considered these alternatives. The general conclusion has been to take advantage of the investment in Cottonwood Municipal Airport and its proximity to the city to maintain and develop the airport to meet most of the community's general aviation needs.

No Action Alternative

The "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.

The City of Cottonwood continues to experience socioeconomic growth, doubling its population in the last twenty years. This growth is forecast to continue. While the general aviation industry experienced an extended period of adjustment over the last twenty years, it is now seen as a growth industry once more. The fastest growing segment of general aviation is in the use of business and corporate aircraft.

The Master Plan's forecasts and analysis of facility requirements recognize this potential future need for an upgrade to accommodate a broader range of business class aircraft. This will require improvements in safety design standards and possibly a lengthened runway. Additionally, the facility requirements analysis indicated a need for the establishment of straight-in instrument approach procedures and additional hangar facilities.

In 2002, the City of Cottonwood has been updating its General Plan. Goals outlined for business development in the community included:

- Maintain Cottonwood as the commercial hub of the Verde Valley.
- Diversify local businesses.
- Provide support and assistance to existing businesses.
- Develop the foundations that are needed to support business development.
- Further develop the general manufacturing and retail development target areas.

Essentially, every one of these community goals can be aided by an airport facility that has the capability to provide local businesses direct access to the air transportation system. As a community grows, the airport, like the surface transportation system, must be able to respond to the essential demands. To do nothing with regards to development of the airport could ultimately impair the community in its endeavors to carry out its economic development goals.

Transfer Services To Another Airport

The relocation of services to either another existing airport or a new airport is an alternative that will often be favored by many residing close to the existing airport. The impacts and consequences of relocating services, however, usually have consequences beyond moving the airport "out-of-sight and out-of-mind."

In a sense, the Verde Valley region already relies upon other airports for some forms of air transportation. Local users of commercial airline service generally travel to Prescott, Flagstaff, or Phoenix to catch scheduled flights. This is because the level of local demand for commercial service is not, and will not be, sufficient enough to attract airline service, much less develop an airport capable of accommodating such service.

Similarly, the Cottonwood Municipal Airport is limited to general aviation users that can safely operate within the constraints of the current 4,250 foot-long runway. Essentially, any business or industry utilizing an aircraft that needs more length to operate must use either the Sedona Airport (5,132 feet) or the Earnest A. Love Field in Prescott (7,550 feet). Sedona is the closest, 20 miles away, over mountain roadways. Prescott is 37 miles over similar routes. The airport in Flagstaff is even further away at 68 miles.

These travel distances make it critical for Cottonwood and the Verde Valley region to have their own access to general aviation. The level of the airport's capability should be directed by the level of demand. The ability to accommodate a range of business aircraft will be important to the community's future.

The alternative of developing a new airport has the potential to create a whole new range of issues. Land acquisition, site preparation, and the construction of an entirely new airport can be a difficult and expensive action. In addition, walking away from a functioning airport that can still be utilized and developed further would mean the loss of a substantial investment. In a situation where public funds for airport development are limited, the replacement of an airport facility of this type would represent an unjustifiable loss of a significant public investment.

From social, political, and environmental standpoints, the commitment of a new land area must also be considered. New airports often face significant opposition from landowners and environmental groups. Furthermore, the development of a replacement airport would likely take a minimum of ten 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. In addition, the location of the new site would likely be less convenient than Cottonwood Municipal Airport.

Overall, transferring service to an existing airport or to an entirely new facility are unreasonable alternatives that should not be pursued further at this time. Cottonwood Municipal Airport is capable of accommodating the vast majority of the long range general aviation demands of the area and should be developed in response to those demands. The airport has the potential to continue to develop as a quality general aviation facility that could greatly enhance the economic development of the metropolitan area.

AIRFIELD ALTERNATIVES

The airfield system typically requires the greatest commitment of land area and often imparts the greatest influence on the identification and development of other airport facilities. In addition, the FAA has established an array of design standards that must be considered when evaluating potential airfield improvements. These criteria can have a significant impact on the viability of various alternatives designed to meet airfield needs.

DESIGN STANDARDS

As mentioned in the Facility Requirements, the design of airfield facilities is based, in part, on the physical and operational characteristics of aircraft using the airport. The FAA utilizes the Airport Reference Code (ARC) system to relate airport design requirements to the physical (wingspan) and operational (approach speed) characteristics of the largest and fastest aircraft conducting 500 or more operations annually at the airport. While this can at times be represented by one specific make and model of aircraft, most often the airport's ARC is represented by several different aircraft which collectively conduct more than 500 annual operations at the airport.

The FAA uses the 500 annual operations threshold when evaluating the need to develop and/or upgrade airport facilities to ensure that an airport is cost-effectively constructed to meet the needs of those aircraft that are using, or have the potential to use, the airport on a regular basis. Some aircraft outside the design ARC may occasionally operate at an airport, but are not expected to be enough to meet the 500 annual operations threshold.

At Cottonwood Municipal Airport, based aircraft fall within ARCs A-I and B-I. However, the mix of transient aircraft is more diverse and can include aircraft in ARCs B-I and B-II, as well as an occasional C-I or C-II. Aircraft in ARCs C-I and C-II are the most demanding aircraft to operate at the airport (due to their higher approach speeds); however, these aircraft are not anticipated to conduct more than 500 annual operations at the airport. Therefore, the most demanding approach category for the airport will remain Approach Category B.

A number of business class aircraft in Category B include turboprop and jet aircraft in Airport Design Group (ADG) II. The design standards for the runway and taxiway system vary across these two ARCs. In fact, the standards vary within ARC B-I, as there is a distinction between small (less than 12,500 pounds) and large airplanes. All based aircraft currently fall within Aircraft Design Group (ADG) I and weigh less than 12,500 pounds, so they are considered small aircraft. **Table 4A** compares the design standards for B-I and B-II against the existing conditions at Cottonwood Municipal Airport.

The standards for each ARC are met or exceeded for most of the key design standards at the airport. These include runway width and runway safety area. In fact, all design standards for B-I small aircraft are met. The runway

does not have adequate object free area width for B-II standards. The runway-taxiway separation and hold line positions are inadequate for B-I and B-II standards. **Exhibit 4B** is a photo showing the B-I design deficiencies at the airport.

TABLE 4A
Design Standards
Cottonwood Municipal Airport

	Existing Dimensions (ft.)	B-I Small Aircraft Standards (ft.)	B-I Standards (ft.)	B-II Standards (ft.)
RUNWAY				
Pavement Width	75	60	60	75
Shoulder Width	10	10	10	10
Safety Area				
Width	125	120	120	**150**
Length Beyond Stop End	300	240	240	300
Object Free Area				
Width	385	250	**400**	**500**
Length	300	240	240	300
Centerline to:				
Taxiway Centerline	150	150	**225**	**240**
Hold Position	125	125	**200**	**200**
Building Restriction Line				
20-foot height	370	265**	**390**	**390**
35-foot height	385	370**	**495**	**495**
Protection Zone				
Length	1,000	1,000	1,000	1,000
Inner Width	250	250	500	500
Outer Width	450	450	700	700
TAXIWAY				
Pavement Width	35	25	25	35
Shoulder Width	10	10	10	10
Centerline to Object	50	45	45	55*

Bold indicates B-II standard is not met.
Standards per FAA AC 150/5300-13, Change 6, **Airport Design**.
* Based upon maximum wingspan of 64 feet.
** Circling approach only.

Obstacle clearance at each runway end and laterally along each side of the runway is governed by Federal Aviation Regulations (FAR) Part 77, **Objects Affecting Navigable Airspace**. FAR Part 77 establishes approach surfaces for each runway end based upon the category of aircraft using the runway and the approach visibility minimums. The approach surface begins 200 feet

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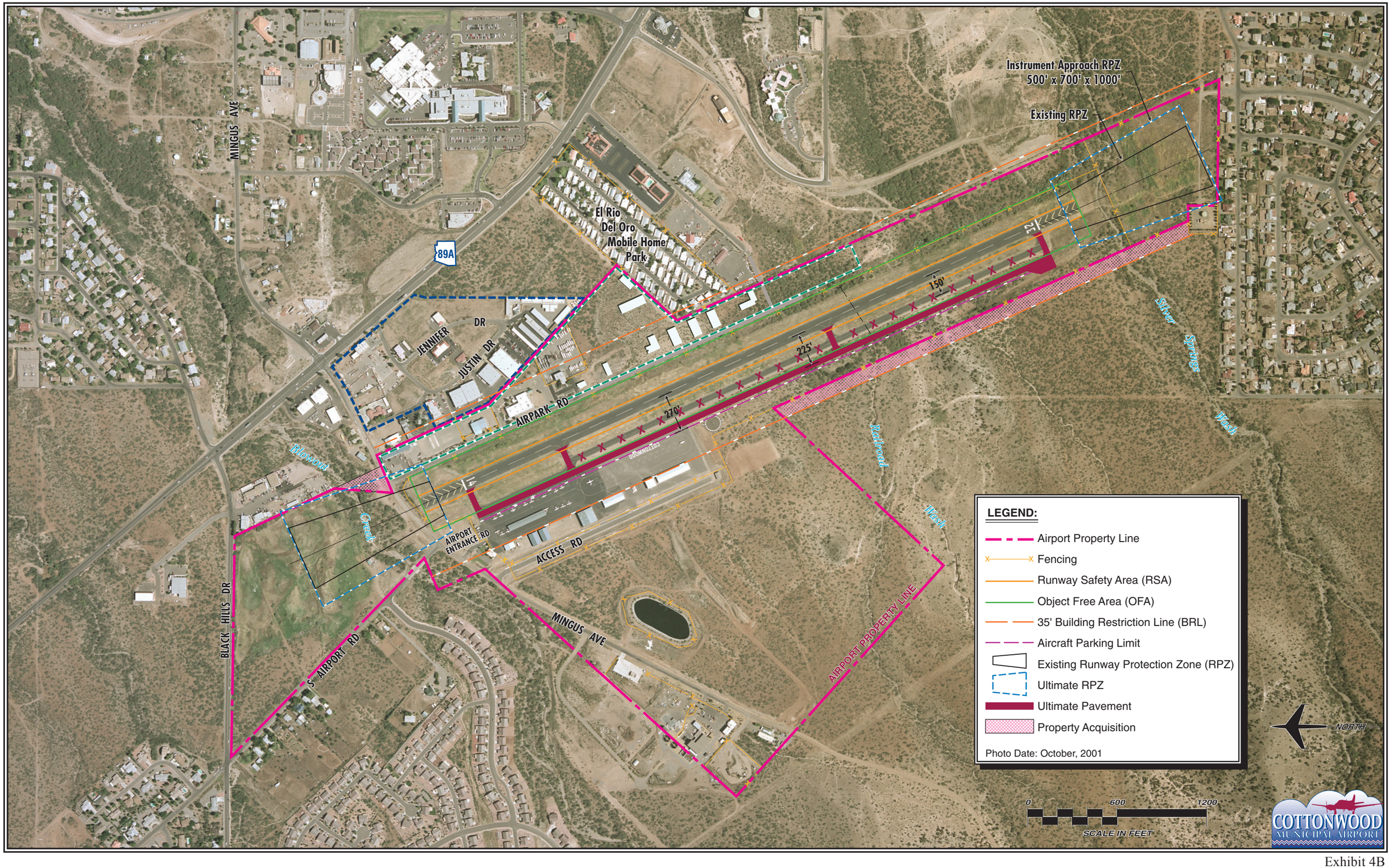

Exhibit 4B
B-I DESIGN STANDARDS

from each runway end. Based on the existing visual approaches, the existing approach slope for each runway is 20:1. Should instrument approach procedures be established for each runway end, the approach slope for Runway 14-32 would remain 20:1 for small aircraft, but increase to 34:1 for aircraft over 12,500 pounds in B-I and B-II. It appears that this lower approach criteria could be met with the existing runway. The subdivision to the south is just outside the runway protection zone (RPZ), but the 34:1 approach slope would still clear the closest home as long as its high point is less than 31 feet above the runway end elevation of 3,558 feet.

Obstacle clearance laterally on each side of the runway follows a 7:1 transitional surface that begins at the edge of the primary surface that surrounds the runway. Under the present visual and circling approach capabilities, the primary surface extends 125 feet from the runway centerline. This would increase to 250 feet for a straight-in instrument approach. To comply with Part 77, building heights should be below the transitional surface. Any object 35 feet high should be at least 495 feet from the runway centerline. Ideally, the airport should have positive control of property to at least this distance. It is common to establish the building restriction line (BRL) at this distance as well. Buildings and structures 20 feet high should be at least 390 feet from the runway centerline. This will normally be sufficient for T-hangars.

If existing structures penetrate the Part 77 surfaces, an aeronautical study will need to be performed by the FAA to ensure that the structure will not be a hazard to air navigation. The existing Airpark is within the 35-foot BRL depicted on **Exhibit 4B**. Subsequently, these buildings will need to be determined to not be a hazard before a straight-in approach could be approved.

Exhibit 4B depicts what would need to be done to meet the B-I requirements for aircraft weighing over 12,500 pounds and a straight-in approach. The following alternatives address the needs to upgrade to B-II, as well as options to provide additional runway length.

ALTERNATIVE A - EXTEND RUNWAY NORTH

The first B-II alternative looks at the options for a 750-foot extension to provide a runway length of 5,000 feet. To be considered is a full extension in either direction or a combination of shorter extensions in both directions. Unless the extension is to be deliberately phased over a period of time, it is generally preferred to place the entire extension on one end, unless development costs or environmental concerns outweigh the efficiencies of maintaining the work on one end.

An extension in either direction will not be simple. To the north, Mingus Avenue and Blowout Creek cross the area where the extension would go. Even a lesser extension would affect Mingus Avenue. The terrain generally falls off so that fill will be required. There is, however, sufficient space to physically accommodate the full runway extension.

An extension to the south, however, would face more severe constraints. As is evident from **Exhibit 4B**, the RPZ already extends to the subdivision immediately abutting the airport. In fact, the larger RPZ that would be required with a straight-in approach would encroach slightly upon one backyard. The RPZ is designed for the protection of people and property on the ground, so residences and congregations of people should be avoided. Any extension of the runway would place the RPZ in the subdivision, thus requiring the acquisition of homes and the relocation of residences. As a result, no extension will be considered that would shift the RPZ any further south.

Exhibit 4C presents the north runway extension. As indicated above, Mingus Avenue would need to be rerouted. This roadway is planned as a minor arterial in the City's General Plan. The intersection of Mingus Avenue with Highway 89 is signalized. The extension is long enough that it would be very difficult to reroute Mingus around the end of the extended runway object free area. The curves would be tight and several businesses would need to be relocated to allow the road to tie back in before the intersection. The exhibit depicts an option where Mingus is rerouted to intersect with Black Hills Drive to the north. Another option would be to simply tie Mingus into South Airport Road. If Black Hills Drive and Mingus Avenue to the east met at Highway 89A, rerouting to Black Hills Drive would be more desirable.

The extension will need to be placed on fill for most, if not all, of its length. The Runway 14 end elevation is 3,517 feet above mean sea level (MSL), and the end of the north overrun is at 3,512 feet MSL. Thus, the existing grade of the overrun is 1.7 percent. While this is within the Category B runway gradient design standard of two percent, the gradient over the length of the existing runway is one percent. Extending the one percent gradient would be better for the higher performance aircraft, as well as all aircraft landing on Runway 14. The terrain also rises to the west, so the higher runway elevation ensures clearance over the surrounding terrain.

A portion of that rising terrain could be utilized to provide the fill for the extension. A preliminary estimate indicates that approximately 110,000 cubic yards of fill will be needed for the runway and parallel taxiway extension. Blowout Creek crosses the proposed extension near the runway end. It would likely be directed through a drainage structure beneath the runway similar to what was done near midfield on Railroad Wash. This will likely require a 404 permit from the Army Corps of Engineers.

As depicted on the exhibit, the runway protection zone would extend across Black Hills Drive, to abut a commercial/industrial building. The area within the RPZ would need to be controlled either by fee simple acquisition or an avigation easement. Approach clearances over the existing building could be a factor as well.

Any extension to the north moves the departure threshold to Runway 14 further from the residential subdivision to the south. This will serve to raise the

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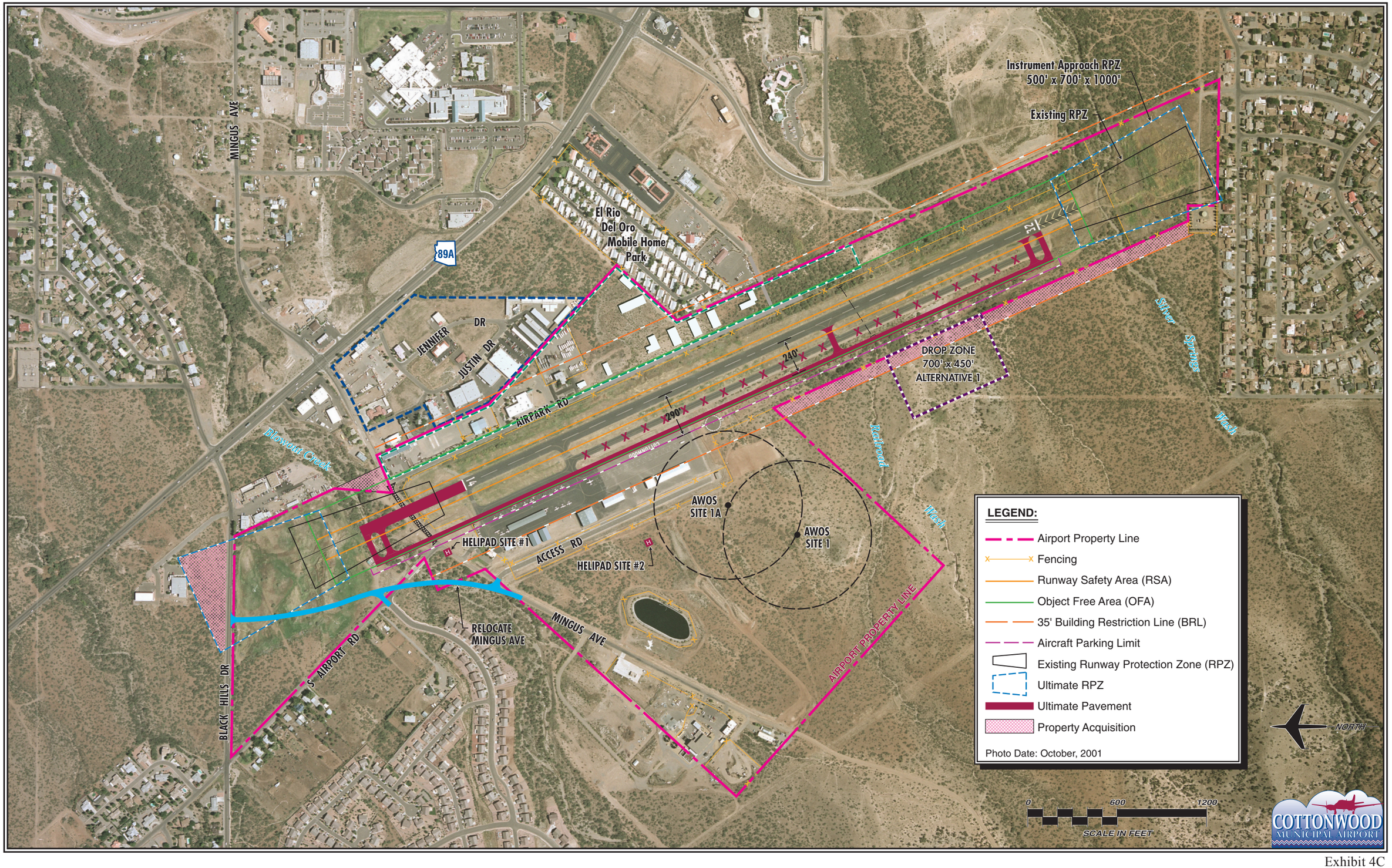

Exhibit 4C
AIRFIELD ALTERNATIVE A
EXTEND RUNWAY 750' NORTH

altitude of departure overflights of this noise-sensitive area.

From an operational standpoint, the extension presented by this alternative would provide the full 5,000 feet for takeoff or landing. As the following alternatives will show, there are options that will have less cost and development impact, but at some expense in effective runway length.

ALTERNATIVE B - CONVERT OVERRUNS TO RUNWAY

Given the constraints already discussed to the south, the only other options to a full extension to the north involve either a lesser extension or the use of a concept known as "declared distances" to comply with object free area (OFA) and runway safety area (RSA) design standards. Declared distances ensure that the full safety areas are provided during critical aircraft operational activities by notifying pilots of the length of runway available for landing or departure. Specifically, declared distances incorporate the following concepts:

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 clearway 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.

The ASDA and the LDA are the most critical declared distances as they take into account the safety areas on approach, rollout, and departure.

The use of declared distances requires specific approval from the FAA Western-Pacific Region. While FAA AC 150/5300-13, *Airport Design*, specifies the use of declared distances for complying with OFA, obstacle free zone (OFZ), and RSA design standard deficiencies, the FAA has limited the implementation of declared distances at general aviation airports. In most cases, the FAA has approved declared distances only at those airports that are constrained in meeting these standards at each runway end.

Exhibit 4D depicts an alternative that attempts to maximize the capability within the existing pavement by utilizing declared distances. Under this alternative, the overruns are converted to pavement to be included in the start of takeoff roll. The landing thresholds would remain in their current locations, and the pavement beyond the threshold at the stop end would be considered runway safety area in declared distance calculations.

As shown on the exhibit, the parallel taxiway would be extended to the new runway end. The south overrun is essentially level with the elevation at the end of the overrun, the same as at

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DECLARED DISTANCES		
	Runway 14	Runway 32
Landing Distance Available (LDA)	4,250'	4,250'
Accelerate-Stop Distance Available (ASDA)	4,550'	4,550'
Takeoff Runway Available (TORA)	4,550'	4,550'
Takeoff distance Available (TODA)	4,850'	4,850'

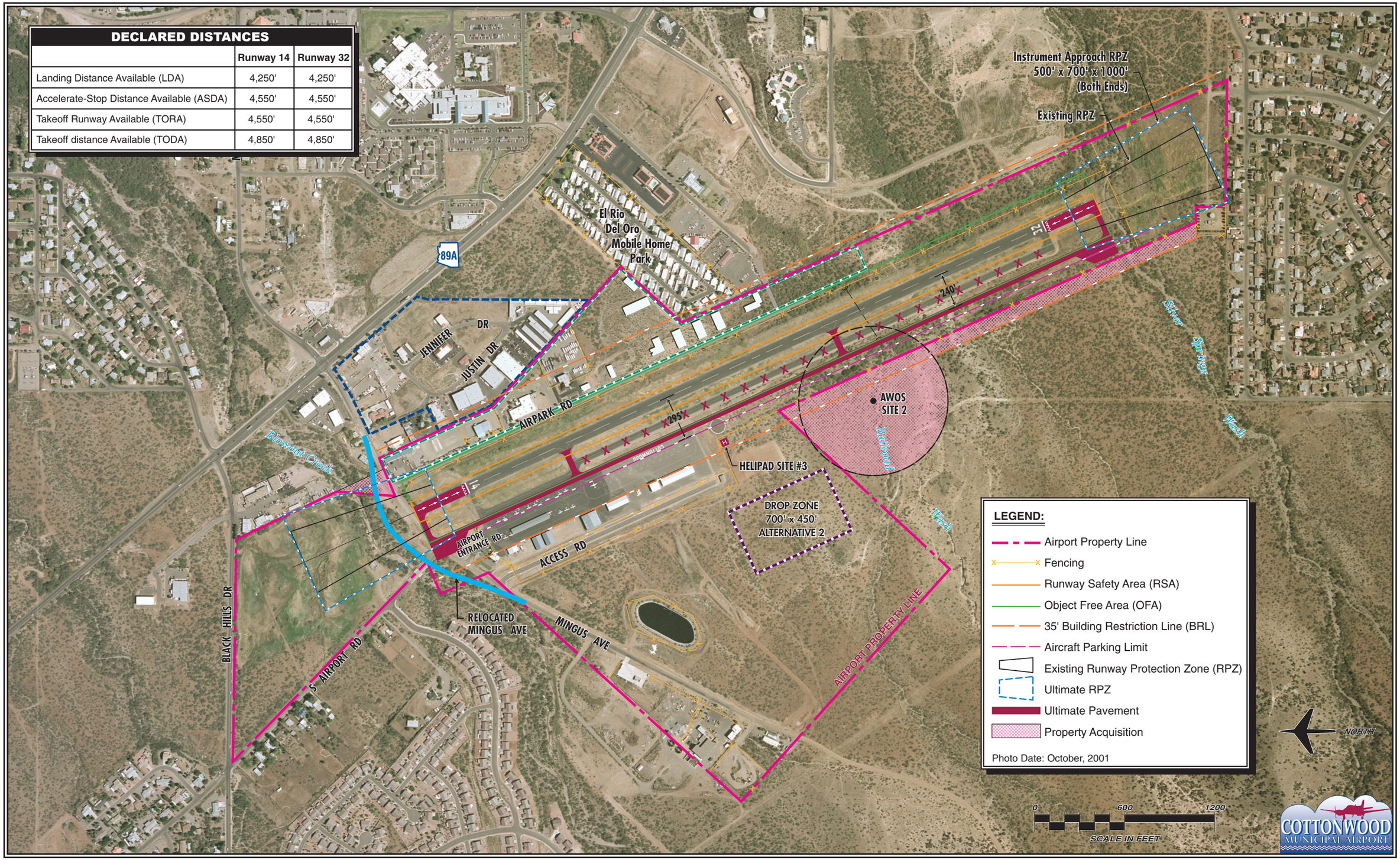

Exhibit 4D
AIRFIELD ALTERNATIVE B
CONVERT OVERRUNS TO RUNWAY

the current threshold to Runway 32. As the terrain rises to the west, the parallel taxiway extension would need to be cut into the surface. The remainder of the conversion would involve strengthening the overrun pavement and, if necessary, remarking as a displaced threshold and adjusting the runway lighting.

The south overrun conversion would not be as simple. The 1.67 percent design slope could reduce the effectiveness of the 300 additional pavement feet for takeoff. Raising the elevation of the north overrun could be necessary, requiring some fill. Raising the runway pavement to a one percent gradient as in Alternative A, the elevation at the end of the pavement would be 3,514 feet MSL. This would place the runway 12 feet above Mingus Avenue. If business jet aircraft are accommodated, a blast fence will be needed because of the proximity of the runway to the road.

To accommodate the extension of the parallel taxiway, however, Mingus Avenue will need to be relocated anyway. **Exhibit 4D** depicts this relocation. The roadway would be able to remain south of the channel to Blowout Creek. None of the businesses along Mingus Avenue would need to be relocated.

The declared distances for this alternative are shown on the exhibit and are the same for each direction of operation. The LDA would remain at the existing length of 4,250 feet. The declared distances related to takeoff would increase. The ASDA and the TORA would increase to 4,550 feet, while the TODA would increase to 4,850 feet.

As with Alternative A, the Runway 14 end is moved further north, away from the subdivision south of the airport. While not as much as Alternative A, it does raise the height of overflights on departure to the south.

This alternative would reduce the cost and impacts associated with a runway extension, but it does fall short of providing the 5,000-foot length identified in the facility requirements.

ALTERNATIVE C - EXTENSION AND CONVERSION

This alternative attempts to utilize declared distances to maximize the effective runway length while reducing the extension to the north. As shown on **Exhibit 4E**, the runway would be extended north 450 feet, while the overrun at the south end would be converted as in Alternative B. The length of the pavement from end to end would be 5,000 feet, but the south extension would be considered as safety area for LDA calculations in both directions and ASDA to the south. This would provide an LDA of 4,700 feet in both directions. The ASDA and TORA to the south would also be 4,700 feet. For takeoffs to the north, however, the ASDA would be the desired 5,000 feet. The TODA would be 5,000 feet in both directions.

While the pavement of this alternative would not extend into Blowout Creek, the runway safety area would. As with

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DECLARED DISTANCES		
	Runway 14	Runway 32
Landing Distance Available (LDA)	4,700'	4,700'
Accelerate-Stop Distance Available (ASDA)	4,700'	5,000'
Takeoff Runway Available (TORA)	4,700'	5,000'
Takeoff distance Available (TODA)	5,000'	5,000'

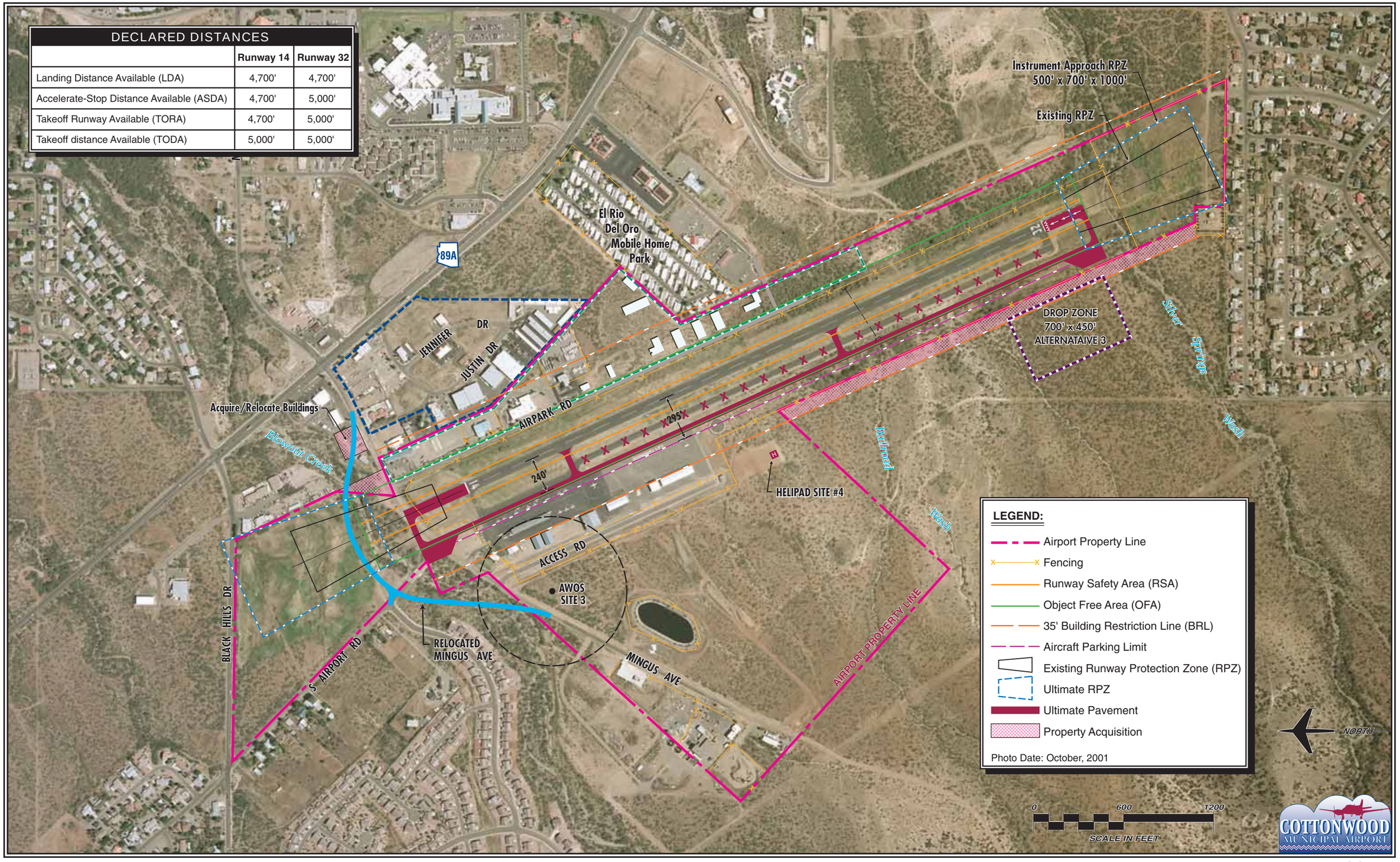

Exhibit 4E
AIRFIELD ALTERNATIVE C
EXTEND RUNWAY 450' NORTH

Alternative A, this would require placing the creek bed in a drainage structure beneath the runway safety area. Fill in the area will likely require a 404 permit from the Corps of Engineers.

As with each of the previous alternatives, Mingus Avenue would need to be relocated around the end of the runway and the extended object free area. As shown on the exhibit, this rerouting can tie back into Mingus Avenue east of the airport, prior to the intersection with Highway 89. Some smaller buildings may need to be relocated on the east side, but the road could remain as a minor arterial street.

As with Alternative A, this shorter extension will still need to be placed on fill for most, if not all of its length. With a one percent slope continued, the elevation at the new runway end would be 3,514 feet MSL.

A portion of that rising terrain on airport property to the west could be utilized to provide the fill for this extension. A preliminary estimate indicates that approximately 80,000 cubic yards of fill will be needed for the runway and parallel taxiway extension. Blowout Creek crosses the proposed extension near the runway end.

The primary advantage to this alternative is that a 5,000-foot ASDA could be achieved while maintaining Mingus Avenue as a through roadway around the runway end. The extension would be used in its entirety for both landing and takeoff, as there would be an extended runway safety area beyond the north end. To attain the 5,000-foot ASDA, however, will require the south overrun be converted to runway for takeoff to the north.

As indicated earlier, the Western Pacific Region of the FAA has preferred to avoid using declared distances on general aviation airports. They have generally approved declared distances only in cases where the extended runway safety area cannot be provided beyond at least one end. Therefore, the FAA's first preference will likely be Alternative A. If the routing of Mingus Avenue north to Black Hills Road is not a feasible solution for the City, a lesser extension, as in Alternative C, may be acceptable. The displaced thresholds will be less desirable to the FAA and may receive approval only as a last resort.

AWOS

The facility requirements analysis determined that an automated weather observation system (AWOS) is needed at Cottonwood Municipal Airport to provide important weather details to pilots, especially transient and charter aircraft operators (charter companies cannot operate to the airport without current weather data). An AWOS includes various sensors for recording cloud height, visibility, wind, temperature, dew point, and precipitation.

FAA Order 6560.20A, *Siting Criteria For Automated Weather Observing Systems* (AWOS) was reviewed for general siting requirements. While each AWOS sensor has specific siting requirements, all AWOS sensors should

be located together and outside the runway and taxiway OFAs. Generally, AWOS sensors are best placed between 1,000 feet and 3,000 feet from the primary runway threshold and between 500 feet and 1,000 feet from the runway centerline. Alternatives for AWOS placement are presented on each of the airfield alternative exhibits.

The siting search was limited to the west side of the airport, as property on the east side has access to the highway and is more likely to be developed for other purposes. The terrain in the area slopes upward to the west, at a gradient of three to four percent. The siting criteria require that the sensor be placed at least 33 feet above the average ground level within the 500-foot radius. While structures can be located within that radius, they must be at least 15 feet beneath the sensors. Objects 500 feet to 1,000 feet from the sensor tower must be cleared by at least 10 feet.

AWOS Alternative #1 meets all the criteria above, but takes up a large portion of the available landside property on the airport, as shown on **Exhibit 4C**. It would not require any land acquisition and remains out of the way of terminal development along the runway. The site is 1,200 feet from the runway centerline, and beyond the preferred location of 500 feet to 1,000 feet. This also makes it slightly more remote to extend power to the site.

With the slope of the terrain, the tower should be at least 50 feet tall in this location. This would allow typical buildings up to 35 feet in height to be placed within the eastern half of the radius. In that case, the tower could be moved closer to the terminal area, as depicted with **AWOS Alternative #1A**. This would also be closer to existing power sources. This location is more accessible from the airport access road and allows for more property to be put into revenue-producing purposes.

AWOS Alternative #2 is located further to the south along the flight line, as depicted on **Exhibit 4D**. The design in this case would place the AWOS outside the potential landside development areas on the airport. As a result, the tower site and much of the radius are outside the existing airport property. As shown on the exhibit, the location would still need to be at least 50 feet high due to the rising terrain, so it would need to be at least 600 feet from the runway centerline. The property within the radius should be acquired fee simple. If this is not possible, an avigation easement restricting the height of development within the radius should be obtained. While the site is somewhat more remote, power could be extended from the lighting along the runway.

AWOS Alternative #3 is located near the entrance to the airport and just west of the terminal area as shown on **Exhibit 4E**. As with the other alternatives, the rising terrain would likely require a 50 foot-plus tower. The 500-foot radius extends beyond the airport boundary to the north, crossing Mingus Avenue. The majority of the radius, however, would remain within the confines of the airport. In addition, the off-airport property within the radius is also owned by the City. As with **Alternative #2**, the off-airport

property would need to be controlled by either fee simple or an avigation easement. While readily accessible and close to power, this alternative would not meet the criteria of being 1,000 feet to 3,000 feet down the runway from its end.

DROP ZONE

The current drop zone for parachutists is located at the south end of the terminal area. Since this is the most logical direction in which to develop additional hangars in the future, it is highly likely the drop zone will need to move. Potential locations were examined and are discussed below.

Drop Zone Alternative #1 is depicted on **Exhibit 4C**. The site is located further south from the present site and off existing airport property. This property would need to be acquired to support the 700-foot by 450-foot drop zone. Access could be extended from the north or south. This location would provide ample room for terminal development.

Drop Zone Alternative #2 is depicted on **Exhibit 4D**. This site would be located just west of the current site. While this site would require minimal change in current skydiving procedures, it is located on property that is currently leased for development as an industrial airpark. Besides the costs involved in buying-out the lease, the drop zone would cut off potential taxiway access to the airpark.

Drop Zone Alternative #3 is depicted on **Exhibit 4E**. This site is located even further south than Alternative #1. Access would likely be developed from the south. This site could operate more independently from future landside development than the other two sites. It is further from the midfield area and closer to the approach.

OTHER AIRSIDE CONSIDERATIONS

The City is examining the possibility of locating a new public cemetery in the northwest corner of airport property. This would be located at the intersection of Black Hills Drive and South Airport Road. The site has been designed to remain outside the north RPZ of all alternatives. A cemetery can be considered compatible with a runway approach in many ways.

If a cemetery were to be put in this location, it will need to be approved by the FAA. The FAA will consider whether this an appropriate use for property on an airport that receives federal funds. If approved, it is likely a lease that would provide market rate revenues to the airport would be required.

LANDSIDE ALTERNATIVES

The orderly development of the terminal area is a critical element of airport capability, but it is typically the most difficult to control. Many general aviation airports have been developed without proper foresight in regard to the functional elements to be served, often taking the least expensive short term solution. A development approach

that picks the path of least resistance can often turn out to be an impediment to the strategic long term growth and viability of the airport. Allowing operators and tenants to develop wherever they please, without regard to a functional plan, can result in a haphazard array of buildings and small ramp areas, which can eventually preclude the most efficient use of valuable space along the flight line.

As indicated earlier, the primary issues in the terminal area are: providing for hangar facilities as needed in the future and maintaining transient parking spaces near the terminal. A wash rack location is also a consideration.

The current layout of the terminal area has the terminal building and the FBO hangar located at the north end of the ramp, near the entrance to the airport. Other hangars are located along the west side of the ramp, adjacent to the access road. Tie-downs are located on the ramp between the hangar row and the parallel taxiway. Twelve (12) tie-downs are covered by a shade hangar. All of these spaces are presently leased to based aircraft owners. The location of the shade hangar affects the number of spaces available for transient parking near the terminal building. Essentially every alternative considers removing or relocating the shade hangar to another location on the airport. Four alternative layouts for the terminal area are presented on **Exhibit 4F**.

ALTERNATIVE A

Alternative A considers a layout that could be implemented if the airport were to remain in ARC B-I. A B-I designation would permit aircraft parking to remain 25 feet closer to the runway than under B-II standards. Still, one row of 12 tie-downs would be lost. Moving the shade hangar to the south end of the ramp would open up more spaces close to the terminal for transient aircraft.

This alternative shows not only the relocated shade hangar, but an additional T-hangar located on the south portion of the ramp. T-hangars are typically 16 to 20 feet in height, and should be kept at least below the 7:1 transitional slope of FAR Part 77. Currently, this slope begins 125 feet from runway centerline. If the runway is commissioned for a straight-in instrument approach, that beginning point will be pushed outward 125 feet.

While the shade hangar is considered as a cover over tie-downs, the T-hangar is not necessarily viewed in the same light. A T-hangar is viewed as a revenue-producing structure, and as such, is not normally allowed to be placed directly over ramp that has been constructed with federal funds.

A second T-hangar is located just off the south end of the ramp. This is acceptable because the ramp is utilized for access to the T-hangar and not as the floor of the hangar. In this alternative, the south side of the T-hangar shares an access taxiway with a series of executive hangar development parcels. Under the B-I design, most of the parcels can be somewhat smaller than for a B-II design because of the shorter wingspans. The segmented circle would need to be moved for this

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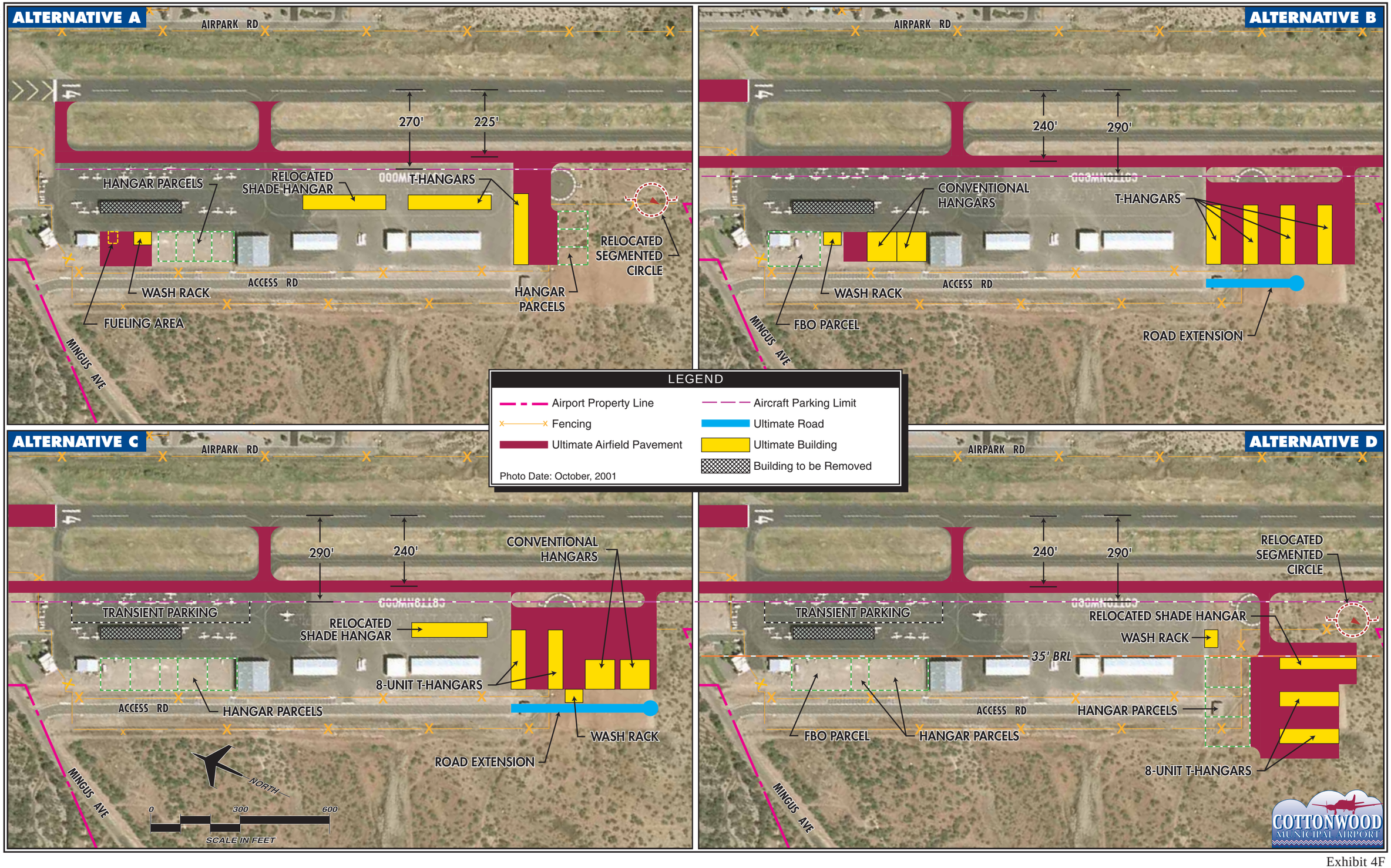

Exhibit 4F
TERMINAL AREA ALTERNATIVES

development. However, its proximity to the relocated parallel taxiway will require that it be relocated on all alternatives anyway.

The remainder of the hangars are located on the west side of the ramp. This includes all the existing hangars, as well as plans for filling in additional hangar parcels. The airport recently leased a 60-foot by 100-foot parcel for a hangar approximately 200 feet south of the FBO hangar. It is also 200 feet north of another private hangar. Alternative A shows three additional parcels 60 feet to 80 feet wide and 100 feet deep between the two leased areas. The area immediately south of the FBO is shown to support a fueling area, as well as a wash rack.

ALTERNATIVE B

Alternative B is the first of three layouts depicting B-II design standards. A large block of 24 tie-downs could be lost with the conversion to B-II. In this alternative, the remaining tie-downs are kept in their current locations. As with all the alternatives, the shade hangar is removed from the tie-downs closest to the terminal to open up the parking area for transient aircraft. It would be replaced at the south end with T-hangars or shades running perpendicular to the runway. This orientation is generally more efficient for putting a series of T-hangars in. It also leaves open the potential to extend the taxiways to the west.

This alternative reserves a large parcel inclusive of the FBO hangar. This would permit the FBO to develop a larger hangar next to, or in place of, the existing hangar. A wash rack is shown immediately south of the FBO parcel. The currently leased 60-foot x 100-foot parcel is next, followed by two new 100-foot x 100-foot parcels. The larger parcels are sized to better accommodate multiple aircraft and/or the wingspans of B-II aircraft.

ALTERNATIVE C

Alternative C shows a different approach to the transient tie-down area that could be created with the relocation of the shade hangar. A large block of transient parking is depicted. This space would primarily be drive-thru, but could accommodate nested positions on very busy days. This layout allows for more taxilane clearance for the circulation of B-II aircraft. It would also allow aircraft to be pulled out of the hangars on the west side of the ramp without blocking the taxilane.

The south end of the ramp would remain for local tie-downs, including the relocated shade hangar. The west ramp south of the FBO is dedicated primarily to 100-foot x 100-foot hangar parcels. Additional T-hangars would be developed off the south end of the ramp. There is also room for additional hangars in that area as well. A wash rack is located at the west end of the new T-hangars.

ALTERNATIVE D

Alternative D maintains the same transient ramp layout as the previous alternative, but does not move the shade hangar to the south portion of the

ramp. Rather, it is located even further south along to a new T-hangar area. The difference in this layout from the previous alternatives is that the T-hangars run parallel to the runway, similar to the existing T-hangars.

A taxiway connects the new hangar area to the parallel taxiway. Three 100-foot x 150-foot hangar parcels are also accessed by the taxiway. The taxiway can also be continued to the west for access to the remainder of the airport's property. Any development in this area for taxiway access would require some earthwork, however, as the grades are rising to the west at three to four percent. A wash rack is shown off the south end of the existing ramp. This becomes feasible if water is extended to the new hangar parcels.

SUMMARY

The process utilized in identifying and evaluating the airfield and landside development alternatives involves consideration of short term and long term needs, as well as future growth potential. Current airport design standards are considered in every scenario. Safety, both air and ground, is given high priority in the analyses.

The recommended development concept for Cottonwood Municipal Airport must represent a means by which the airport can grow in a balanced manner to accommodate the planning horizons. In addition, the plan must provide the flexibility to meet activity growth beyond the long range planning horizon.

Through further meetings and discussions with the Planning Advisory Committee, City staff, and the FAA, a recommended concept has been developed. The plan will represent a means by which the airport can continue to effectively serve general aviation needs within the overall operation and development of the airport. This will further evolve into a plan for maintaining and improving Cottonwood Municipal Airport in the interest of its users and the City.

CHAPTER FIVE
Airport Plans

AIRPORT PLANS

The airport master planning process has evolved through several analytical efforts in the previous chapters, intended to analyze future aviation demand, establish airside and landside facility needs, and evaluate options for the future development of the airside and landside facilities. The planning process included the presentation of Phase Reports of the master plan to the Planning Advisory Committee (PAC). A master plan concept has evolved with their input and the input of the Federal Aviation Administration (FAA).

This concept has been subsequently refined into the final airport layout plan (ALP) set of drawings which represents the extent of planned future improvements at the airport. A full-color, half-sized set of the airport layout plan drawings is included in **Appendix C**. A half-sized copy of the FAA approved and signed ALP plan drawing is included in **Appendix D**, along with the FAA approval letter.

AIRPORT DESIGN STANDARDS

Cottonwood Municipal Airport is utilized by a variety of general aviation aircraft ranging from small single and multi-engine piston aircraft that are included within the airport reference code (ARC) B-I. These aircraft comprise the majority of aircraft operations at the airport. (Refer to Chapter Three for details discussing the airport reference code criterion.)

The airport is also used occasionally today by small turboprop and business jets, generally weighing less than 12,500 pounds. Over the planning period, it is expected that the airport will be used on a more regular basis by

an increasing number of these aircraft. For this reason, it is recommended that the airport be planned and designed to ARC B-II. **Table 5A** summarizes the current FAA planning standards used in the ultimate design and layout of Cottonwood Municipal Airport.

RECOMMENDED MASTER PLAN CONCEPT

The recommended master plan concept provides for anticipated facility needs over the next 20 years, while ensuring a viable aviation facility for the Cottonwood area well beyond this period. The recommended concept is depicted on **Exhibit 5A**. The following paragraphs summarize the airside and landside recommendations.

AIRFIELD RECOMMENDATIONS

The principal airfield recommendations focus first upon safety and security. Of key importance is to ensure that airport design standards are met, particularly in consideration of future development of an instrument approach to the airport. Other recommendations are provided to improve the operational capability for the design aircraft. The following paragraphs discuss the recommendations as they pertain to the runway, the taxiway system, and the airfield support facilities.

Runway 14-32 is currently 4,250 feet in length, with an FAA pavement strength rating of 4,000 pounds single wheel loading (SWL). Pavement analyses in the past have indicated the runway has been designed to handle aircraft up to 30,000 pounds SWL. To accommodate the design aircraft (turboprops and small business jets) in ARC B-II, the runway should be maintained at 12,500 pounds SWL in the future.

The current runway length is sometimes limiting for some of the aircraft that use it. The previous chapter reviewed options for providing additional runway length for takeoff. It was determined that the extension options requiring a major diversion or relocation of Mingus Avenue (Alternatives A and C) would have a significant impact upon the city's roadway and traffic system.

Alternative B proposed converting the current overruns at each end to be part of the runway length and implementing declared distances in accordance with FAA Advisory 150/5300-13 to increase the effective takeoff length to at least 4,550 feet. Upon review, however, the FAA indicated that they would not support this alternative, so the runway length remains unchanged in the final Master Plan concept.

A 60-acre parcel on the west side of the airport is recommended for purchase. This is recommended to provide a midfield location for an airport weather observation station (AWOS) and to allow for the relocation of the segmented circle and the parachute drop zone. This, in turn, will provide space for adding hangars in the terminal area. The property acquisition is based upon the purchase of full properties with sufficient depth back from the runway to provide room for future growth. This will better preserve the long term viability of the airport.

TABLE 5A
Airfield Design Standards by ARC
(dimensions in feet, unless noted)

	Runway 14-32
Airport Reference Code	B-II
Design Pavement Strength (pounds)	12,500
Design Aircraft Wingspan	54.5
Approach Visibility Minimums	Greater than One Mile
Runway	
Width	75
Runway Safety Area (RSA)	
Width	150
Length Beyond Runway End	300
Object Free Area (OFA)	
Width	500
Length Beyond Runway End	300
Obstacle Free Zone (OFZ)	
Width	200
Length Beyond Runway End	250
Runway Centerline To:	
Parallel Taxiway Centerline	240
Edge of Aircraft Parking Apron	250
Runway Protection Zone	
Inner Width	250
Outer Width	450
Length	1000
Obstacle Clearance	20:1
Building Restriction Line	
To On-Airport Buildings	265[1]
To Minimum Property Line	370[2]
Taxiways	
Width	35
Safety Area Width	79
Taxiway Centerline To:	
Parallel Taxiway/Taxilane	76
Fixed or Moveable Object	50
Taxilanes	
Taxilane Centerline To:	
Parallel Taxilane Centerline	70
Fixed or Movable Object	43

Source: FAA Advisory Circular 150/5300-13, *Airport Design*, F.A.R. Part 77, TERPS
[1] 20-foot building height
[2] 35-foot building height

The plan also allows for a connector road along the existing west side of the property. While this will not be eligible as an airport access road, it would provide for improved access on the west side of Cottonwood.

TERMINAL AREA RECOMMENDATIONS

The terminal area development plans include recommendations for landside access and parking, hangars, and parking apron. All of this development is currently at the north end of the west side of the airport. As indicated earlier on **Exhibit 5A**, plans call for reorganization of the ramp, fill-in of hangar parcels, and development of T-hangars beyond the south end of the existing ramp.

The aircraft parking ramp layout is reconfigured to coincide with the parallel taxiway relocation and the ARC B-II design standards. The shade hangar will be relocated from the north ramp to convert it to transient parking. The south ramp would remain in its current tie-down configuration. If desired, the shade hangar could be moved to the south ramp. It would need to be maintained at least 350 feet from the runway centerline.

The current flight line along the west side of the ramp is planned to allow conventional hangar development within the available parcels. The public terminal building will continue to provide areas for airport administration, general aviation services, and for transient facilities such as restrooms and flight planning. An aircraft wash rack is planned adjacent to the fuel storage tanks. The 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.

A T-hangar area is planned to the south of the aircraft ramp. This features up to four eight-unit T-hangars. A taxiway connector running from the parallel taxiway to the airport property west of the future T-hangars is also planned. This will provide access to the industrial airpark planned for this area.

Additional auto parking is planned in the vicinity of the terminal building and the FBO hangar. The access road is planned to be extended south to serve the T-hangars.

The plan for the east side of the airport depicts a proposed development of parcels that would support additional hangar development. This area is planned to be privately developed on property leased from the airport.

Since September 11, 2001, security at airports has increased in importance and awareness. The *Aviation and Transportation Security Act of 2001* established the Transportation Security Administration (TSA) to administer transportation security nationally. While the focus of the TSA has been primarily on commercial airline checked baggage and carry-on baggage screening, improved security at general aviation airports is still part of the plan.

00MP15-5A-10/30/03

DECLARED DISTANCES		
	Runway 14	**Runway 32**
Landing Distance Available (LDA)	4,250'	4,250'
Accelerate-Stop Distance Available (ASDA)	4,550'	4,550'
Takeoff Runway Available (TORA)	4,550'	4,550'
Takeoff distance Available (TODA)	4,850'	4,850'

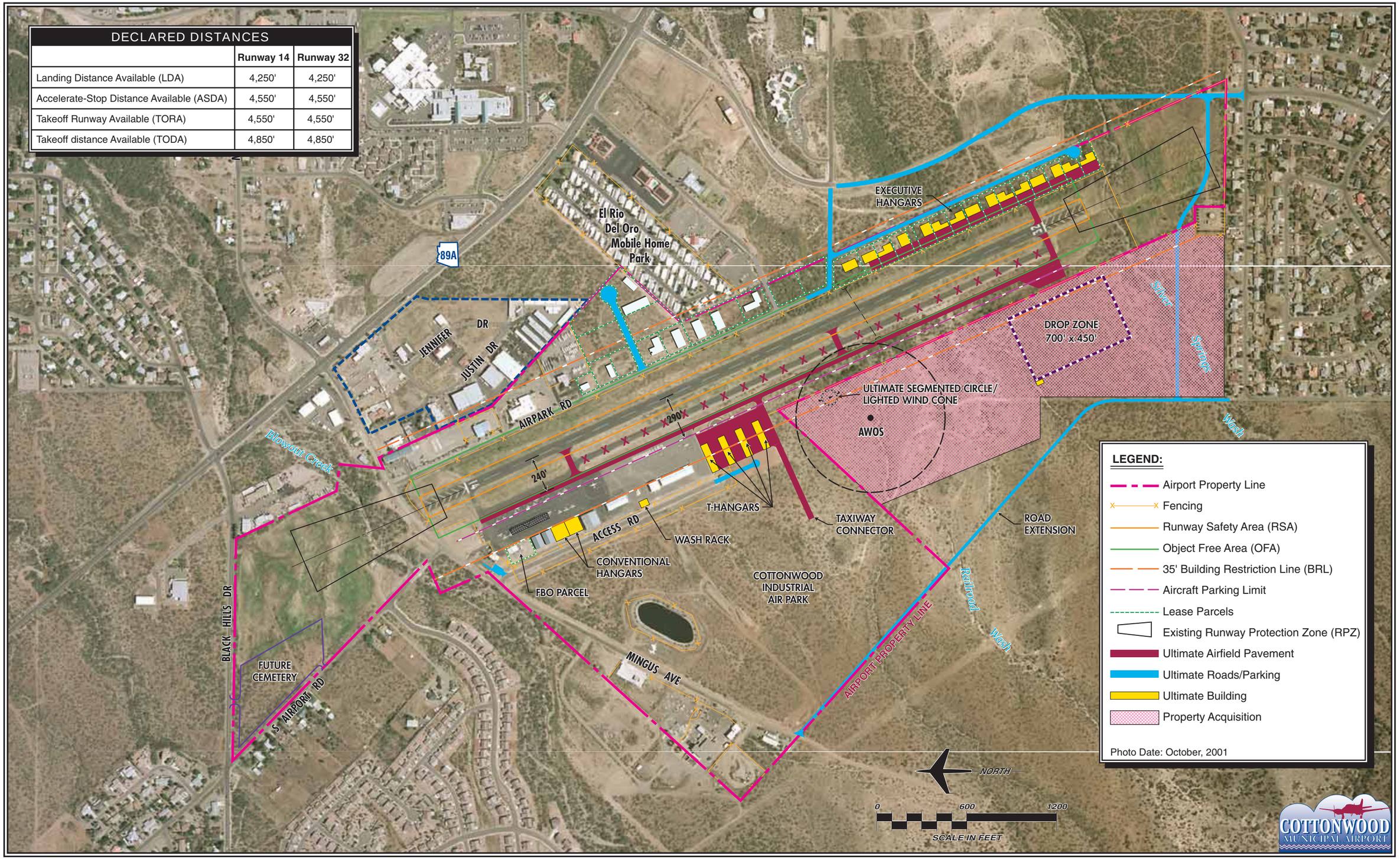

Exhibit 5A
MASTER PLAN DEVELOPMENT CONCEPT

Industry groups had made a series of recommendations to the TSA for general aviation threat assessment and security standards for general aviation airports. This Master Plan has recognized that greater security scrutiny will be placed on general aviation airports in the future. For Cottonwood Municipal Airport, the Master Plan security recommendations focus on limiting vehicle and pedestrian access to the apron areas and aircraft operational areas.

The segregation of vehicle and aircraft operational areas is further supported by new FAA guidance established in June 2002. FAA AC 150/5210-20, *Ground Vehicle Operations on Airports,* states, "The control of vehicular activity on the airside of an airport is of the highest importance." The AC further states, "An airport operator should limit vehicle operations on the movement areas of the airport to only those vehicles necessary to support the operational activity of the airport." The terminal area plan for Cottonwood Municipal Airport has been developed in a manner that reduces the need for vehicles to cross the apron or a taxiway.

Attention has been given to ensure public access routes to the public terminal building and commercial general aviation facilities. Commercial general aviation facilities or fixed base operator (FBO) facilities are focal points for users who are not familiar with aircraft operations (i.e., delivery vehicles, charter passengers, etc.).

The primary emphasis is on maintaining a fenced apron and operations area with gated access. Also important is the provision of ample, convenient, and well-lighted vehicle parking outside the secured area.

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 the proposed development could have on the environment surrounding Cottonwood Municipal 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 Cottonwood Municipal 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 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 assumed implementation of the proposed airfield plan. The input files 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**.

The aircraft noise contours generated using the aforementioned data for Cottonwood Municipal Airport are depicted on **Exhibit 5B**, Existing Noise Exposure and **Exhibit 5C**, Long Term Noise Exposure. As shown on both exhibits, the 65 DNL noise contour is expected to remain almost entirely within the existing airport property when considering both existing and forecast activity at the airport. A small portion of the long term 65 DNL contour extends beyond the northern airport boundary.

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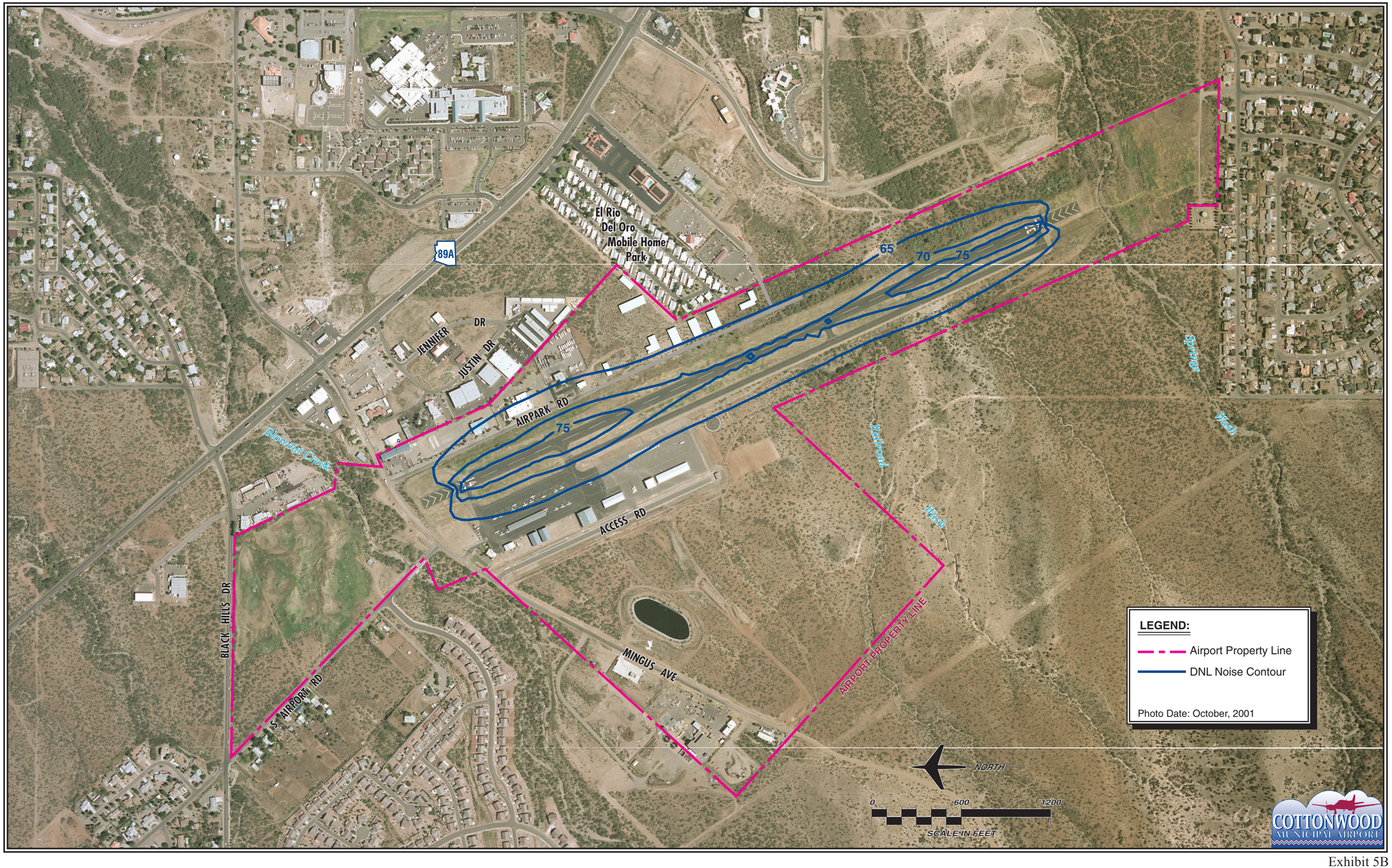

Exhibit 5B
2003 AIRCRAFT NOISE CONTOURS

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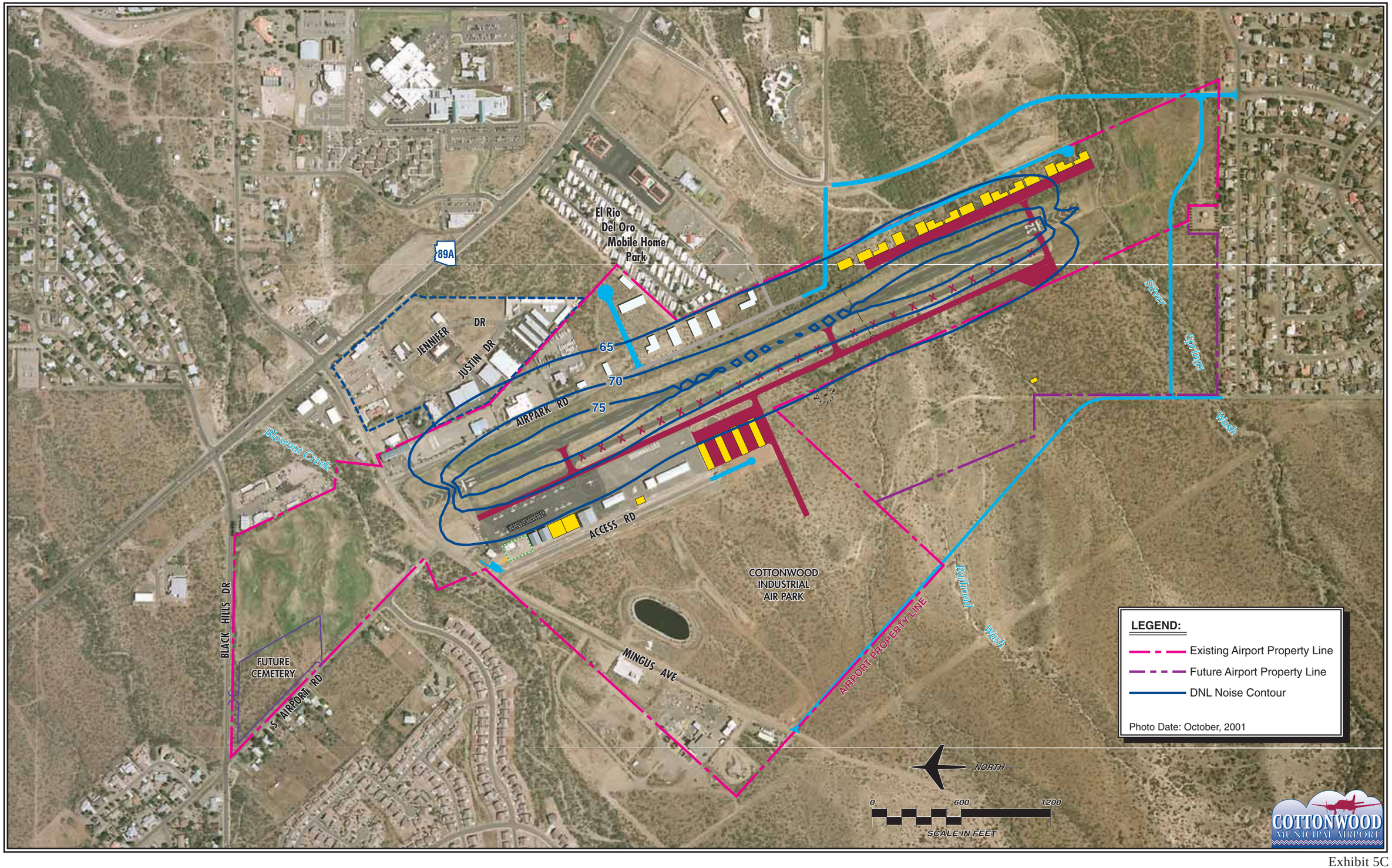

Exhibit 5C
FUTURE AIRCRAFT NOISE CONTOURS

TABLE 5B
Aircraft Forecast Summary

	Annual Operations	
Type of Operation	**Existing**	**Long Term**
Single-Engine Piston	17,500	31,000
Multi-Engine Piston	1,100	2,200
Turboprop	200	1,200
Business Jet	200	1,000
Helicopter	500	1,100
Total Operations	19,500	36,500

ENVIRONMENTAL OVERVIEW

The protection and preservation of the local environment are essential concerns in the master planning process. Now that a program for the use and development of Cottonwood Municipal Airport has been proposed, it is necessary to review environmental issues to ensure that the program can be implemented in compliance with applicable environmental regulations, standards, and guidelines.

All the improvements planned for Cottonwood Municipal Airport, as depicted on the Airport Layout Plan (ALP), will require compliance with the *National Environmental Policy Act (NEPA) of 1969,* as amended. Many of the improvements will be categorically excluded and will not require full NEPA documentation. FAA will determine if projects such as the upgrade to B-II standards or the acquisition of property require full documentation. As detailed in FAA Order 5050.4A, *Airport Environmental Handbook*, compliance with NEPA is generally satisfied with the preparation of an Environmental Assessment (EA). In cases where a categorical exclusion is issued, environmental issues such as wetlands, threatened or endangered species, and cultural resources are further evaluated during the federal, state, and/or local permitting processes.

This section of the Master Plan is not intended to satisfy NEPA requirements; rather, it is intended only to supply a preliminary review of environmental issues that would need to be analyzed in more detail within these or permitting processes. Consequently, this analysis ***does not*** address mitigation or the resolution of environmental issues. The following pages consider the environmental resources as outlined in FAA Order 5050.4A.

Review of Environmental Resources Proposed Facility Improvements	
Environmental Resource	**Anticipated Impacts**
Noise. 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 noise contour as the threshold of incompatibility.	• Noise impacts will primarily remain on airport property as the contours do not extend beyond airport property lines. No noise-sensitive development is anticipated to be impacted by noise in excess of 65 DNL.
Compatible Land Use. The compatibility of existing and planned land uses in the vicinity of an airport is usually associated with the extent of noise impacts related to that airport. In this context, if the noise analysis described above concludes that there is no significant impact, a similar conclusion usually may be drawn with respect to compatible land use. FAA officials shall contact the sponsor and representatives of affected communities to encourage the development of appropriate compatible land use controls early in the project planning stage.	• Noise impacts do not extend onto noise-sensitive development located north and east of the airport. Noise contours are confined to airport property.
Social Impacts. These impacts are often associated with the relocation of residents or businesses or other community disruptions.	• No off-airport business will be affected with implementation of the plan. No off-airport roadways will be relocated.

Review of Environmental Resources (Continued) **Proposed Facility Improvements**	
Environmental Resource	**Anticipated Impacts**
Induced Socioeconomic Impacts. These impacts address those secondary impacts to surrounding communities resulting from the proposed development, including shifts in patterns of population growth, public service demands, and changes in business and economic activity to the extent influenced by the airport development.	• It could be expected that the proposed development would potentially induce positive socioeconomic impacts for the community over a period of years. The airport, with expanded facilities and services, would be expected to attract additional users. It is also expected to encourage tourism, industry, and trade, and to enhance the future growth and expansion of the community's economic base. Future socioeconomic impacts resulting from the proposed development would be primarily positive in nature.
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 (O3), Carbon Monoxide (CO), Sulfur Dioxide (SO2), Nitrogen Oxide (NO), Particulate matter (PM10), and Lead (Pb). Various levels of review apply within both NEPA and permitting requirements.	• Cottonwood Municipal Airport is located in Yavapai County, which is in attainment for all criterial pollutants. • According to FAA Order 5050.4A, during the NEPA process, an emission inventory is not required for airports which are forecasted to handle less than 180,000 general aviation operations per year. However, the Western-Pacific Regional Office has begun requiring an emissions inventory for all projects, subject to the NEPA process, in order to determine conformity with the *Clean Air Act*. Therefore, should a NEPA document be required for any airport improvements, an emissions inventory will likely be required.

Review of Environmental Resources (Continued) **Proposed Facility Improvements**	
Environmental Resource	**Anticipated 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.	• Blowout Creek is located in the northern portions of airport property, Railroad Wash is located in the central portion of airport property, and Silver Springs Wash is located in the southern portion of airport property. Any construction in these areas will require the use of Best Management Practices (BMPs) to reduce or prevent storm water runoff and potential drainage impacts. • The airport will need to comply with current Arizona Pollutant Discharge Elimination System Permits (APDES) 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 APDES General Permit, including the preparation of a *Notice of Intent* and a *Stormwater Pollution Prevention Plan*, prior to the initiation of product construction activities.
Section 4(f) Lands. These include publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or any land from a historic site of national, state, or local significance.	• No impacts anticipated. Proposed airport improvements will occur on existing airport property. Property being proposed for acquisition is currently within the Cottonwood city limits and is planned for industrial and commercial land uses.
Historical and Cultural Resources	• Further coordination with the State Historic Preservation Officer will be required to determine potential impacts to historical or cultural resources. It is anticipated that a cultural resources survey will be required for areas that have not been previously surveyed.

Review of Environmental Resources (Continued) Proposed Facility Improvements	
Environmental Resource	**Anticipated Impacts**
Threatened or Endangered Species and Biological Resources	• A number of protected species are located within Yavapai County. Further coordination with the U.S. Fish and Wildlife Service and the Arizona Department of Fish and Game is required to determine potential impacts to protected species.
Waters of the U.S. Including Wetlands	• A jurisdictional delineation by the U.S. Army Corps of Engineers will be required to determine potential impacts to jurisdictional waters.
Floodplains	• No impacts to any 100-year floodplains.
Wild and Scenic Rivers	• No impacts. The airport is not near any designated wild and scenic rivers.
Farmland	• The proposed development will not affect lands protected by the *Farmland Protection Policy Act* as the area does not contain prime or unique farmland and is already committed to urban development.
Energy Supply and Natural Resources	• The proposed alternative will result in a less-than-significant impact to energy supply and natural resources. Impacts will be a result of increased operations and upgraded facilities.
Light Emissions	• Because of the distance from the airfield to light-sensitive land uses, impacts associated with any new light emissions are expected to be less-than-significant. Any off-site lighting impacts resulting from landside facilities can be addressed on a case-by-case basis through either shielding or redirecting the light source.

Review of Environmental Resources (Continued) Proposed Facility Improvements	
Environmental Resource	**Anticipated Impacts**
Solid Waste	• Based on the forecasts of increased airport activity in the short and long terms, slight increases in the amount of solid waste generated at the airport are expected. These increases are not expected to result in a significant impact in the production of solid waste.

CHAPTER SIX
Capital Improvement Program

Capital Improvement Plan

The implementation of the Cottonwood Municipal Airport Master Plan will require sound judgement on the part of airport management. Among the more important factors influencing decisions to carry out a recommendation is timing and airport activity. Both of these factors should be used as references in plan implementation.

Experience has indicated that major problems can materialize from the standard time-based format of traditional planning documents. The problems typically center around inflexibility and an inability to deal with unforeseen changes that may occur.

While it is necessary for scheduling and budgeting purposes to consider timing of airport development, the actual need for facilities is established by airport activity. Proper master planning implementation suggests the use of airport activity levels, rather than time as guidance for development.

This chapter of the Master Plan is intended to become one of the primary references for decision-makers responsible for implementing master plan recommendations. Consequently, the narrative and graphic presentations must provide understanding of each recommended development item. This understanding will be critical in maintaining a realistic and cost-effective program that provides maximum benefit to the community.

AIRPORT DEVELOPMENT SCHEDULES AND COST SUMMARIES

Once the specific needs and improvements for the airport have been established, the next step is to determine a realistic schedule and costs for implementing the plan. This section examines the overall cost of development and presents a development schedule. The recommended improvements are grouped and divided into three planning horizons of short term, intermediate term, and long range. **Table 6A** summarizes the key activity milestones for each planning horizon.

TABLE 6A
Planning Horizon Summary
Cottonwood Municipal Airport

	Current	Short Term	Intermediate Term	Long Range
General Aviation				
Based Aircraft	40	45	56	70
Annual Operations				
Itinerant	8,300	10,000	13,000	16,500
Local	11,100	13,000	16,000	20,000
Total GA Operations	19,400	23,000	29,000	36,500

The short term planning horizon covers items of highest priority, as well as items that should be developed as the airport approaches the short term activity milestones. Priority items include improvements related to safety. Also included are improvements to facilities that will be inadequate with any growth in demand and property acquisitions. Because of their priority, those items will need to be incorporated into the City's budgeting process, as well as FAA and ADOT programming. To assist in this process, short term projects are scheduled year-by-year over a five-year period.

When short term horizon activity levels are reached, it will be time to program for the intermediate term based upon the next activity milestone. Also, as pavements age, maintenance of these pavements will need to be addressed. Similarly, when the intermediate term milestones are reached, it will be time to program for the long range.

Due to the conceptual nature of a master plan, implementation of capital projects should occur only after further refinement of their design and costs through architectural and engineering analyses. A 15 percent contingency factor was added to the construction

costs. Engineering, architecture, construction administration, and administrative costs were estimated at 24 percent. Capital costs in this chapter should be viewed only as estimates subject to further refinement during design. Nevertheless, these estimates are considered sufficiently accurate for the planning level analyses in this chapter. Cost estimates for each development project listed in **Table 6B** are presented in current (2007) dollars.

TABLE 6B
Capital Improvement Program
Cottonwood Municipal Airport

No.	Project	Total Costs	FAA Eligible	ADOT Match	City
2008					
1	Upgrade Airfield Lighting, Navaids, and Signage	$480,000	$456,000	$12,000	$12,000
2	Environmental Documentation	$300,000	$285,000	$7,500	$7,500
Subtotal 2008		**$780,000**	**$741,000**	**$19,500**	**$19,500**
2009					
1	Acquire Southwest Property (11 acres)	$959,000	$911,050	$23,975	$23,975
2	T-Hangar Area Site Design	$39,000	$37,050	$975	$975
Subtotal 2009		**$998,000**	**$948,100**	**$24,950**	**$24,950**
2010					
1	Site Preparation and Grade T-Hangar Area	$500,000	$475,000	$12,500	$12,500
2	Design Apron Taxiway Extension	$25,000	$23,750	$625	$625
3	Acquire Southwest Property (6.7 acres)	$590,700	$561,165	$14,768	$14,768
4	Design T-Hangar Access Taxiway	$25,000	$23,750	$625	$625
Subtotal 2010		**$1,140,700**	**$1,083,665**	**$28,518**	**$28,518**
2011					
1	Construct Apron Taxiway Extension	$230,000	$218,500	$5,750	$5,750
2	Construct 8-unit T-Hangar	$363,000	$0	$0	$363,000
3	Construct T-Hangar Access Taxiway	$120,000	$114,000	$3,000	$3,000
Subtotal 2011		**$713,000**	**$332,500**	**$8,750**	**$371,750**
2012					
1	Install AWOS	$250,000	$237,500	$6,250	$6,250
Subtotal 2012		**$250,000**	**$237,500**	**$6,250**	**$6,250**
SHORT TERM HORIZON TOTAL		**$3,881,700**	**$3,342,765**	**$87,968**	**$450,968**

TABLE 6B (Continued)
Capital Improvement Program
Cottonwood Municipal Airport

No.	Project	Total Costs	FAA Eligible	ADOT Match	City
INTERMEDIATE HORIZON					
1	Acquire Southwest Property (40 acres)	$3,520,000	$3,344,000	$88,000	$88,000
2	Relocate Southwest Perimeter Fencing	$108,000	$102,600	$2,700	$2,700
3	Relocate Taxiway A	$626,000	$594,700	$15,650	$15,650
4	Light Taxiway A and Exits with MITL	$379,000	$360,050	$9,475	$9,475
5	Overlay South Apron	$420,000	$399,000	$10,500	$10,500
6	Overlay and Re-Mark North Apron	$452,000	$429,400	$11,300	$11,300
7	Construct 8-unit T-Hangar	$363,000	$0	$0	$363,000
8	Construct T-Hangar Access Taxiway	$120,000	$114,000	$3,000	$3,000
INTERMEDIATE HORIZON TOTAL		**$5,988,000**	**$5,343,750**	**$140,625**	**$503,625**
LONG RANGE HORIZON					
1	Extend Airport Access Road South	$64,000	$60,800	$1,600	$1,600
2	Construct T-Hangar Area Auto Parking	$96,000	$91,200	$2,400	$2,400
3	Expand Terminal Auto Parking	$28,000	$26,600	$700	$700
4	Construct Wash Rack	$225,000	$213,750	$5,625	$5,625
5	Construct Two 8-unit T-Hangars	$726,000	$0	$0	$726,000
6	Construct Two T-Hangar Access Taxiways	$240,000	$228,000	$6,000	$6,000
LONG RANGE HORIZON TOTAL		**$1,379,000**	**$620,350**	**$16,325**	**$742,325**
TOTAL PROGRAM COSTS		**$11,248,700**	**$9,306,865**	**$244,918**	**$1,696,918**

SHORT TERM IMPROVEMENTS

As indicated above, the short term planning horizon is the only development stage that is correlated to time. This is because development within this initial period is concentrated first on the most immediate needs of the airfield and landside areas. Therefore, the program is presented year-by-year for the first five years to assist in capital improvement. **Short term improvements presented in Table 6B are estimated at $3.88 million**.

The first year is dedicated to upgrading the runway edge lighting, PAPI, and guidance signs. In addition, an allowance is provided for preparing the environmental documentation that will be necessary before undertaking the proposed property acquisitions on the southwest side of the airport.

The property acquisition is scheduled to begin the following year with 11 acres near the south end of the runway. This property acquisition is necessary to provide space for the parachute drop zone to be relocated, prior to the development of the proposed T-hangar area. The grading and site design for the T-hangar area is included in this year as well. This site design also includes the relocation design for the segmented circle and lighted wind sock.

The third year of the short term planning horizon includes the acquisition of 6.7 acres immediately

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SHORT TERM IMPROVEMENTS

2008

- 8-1 Upgrade Airfield Lighting, Navaids, and Signage
- 8-2 Environmental Documentation

2009

- 9-1 Acquire Southwest Property (11 acres)
- 9-2 T-Hangar Area Site Design

2010

- 10-1 Site Preparation and Grade T-Hangar Area
- 10-2 Design Apron Taxiway Extension
- 10-3 Acquire Southwest Property (6.7 acres)
- 10-4 Design T-Hangar Access Taxiway

2011

- 11-1 Construct Apron Taxiway Extension
- 11-2 Construct 8-unit T-hangar
- 11-3 Construct T-hangar Access Taxiway

2012

- 12-1 Install AWOS

INTERMEDIATE TERM IMPROVEMENTS

- I-1 Acquire Southwest Property (40 acres)
- I-2 Relocate Southwest Perimeter Fencing
- I-3 Relocate Taxiway A
- I-4 Light Taxiway A and Exits with MITL
- I-5 Overlay South Apron
- I-6 Overlay and Re-mark North Apron
- I-7 Construct 8-unit T-hangar
- I-8 Construct T-hangar Access Taxiway

LONG TERM IMPROVEMENTS

- L-1 Extend Airport Access Road
- L-2 Construct T-hangar Area Auto Parking
- L-3 Expand Terminal Auto Parking
- L-4 Construct Wash Rack
- L-5 Construct Two 8-unit T-hangars
- L-6 Construct Two T-hangar Access Taxiways

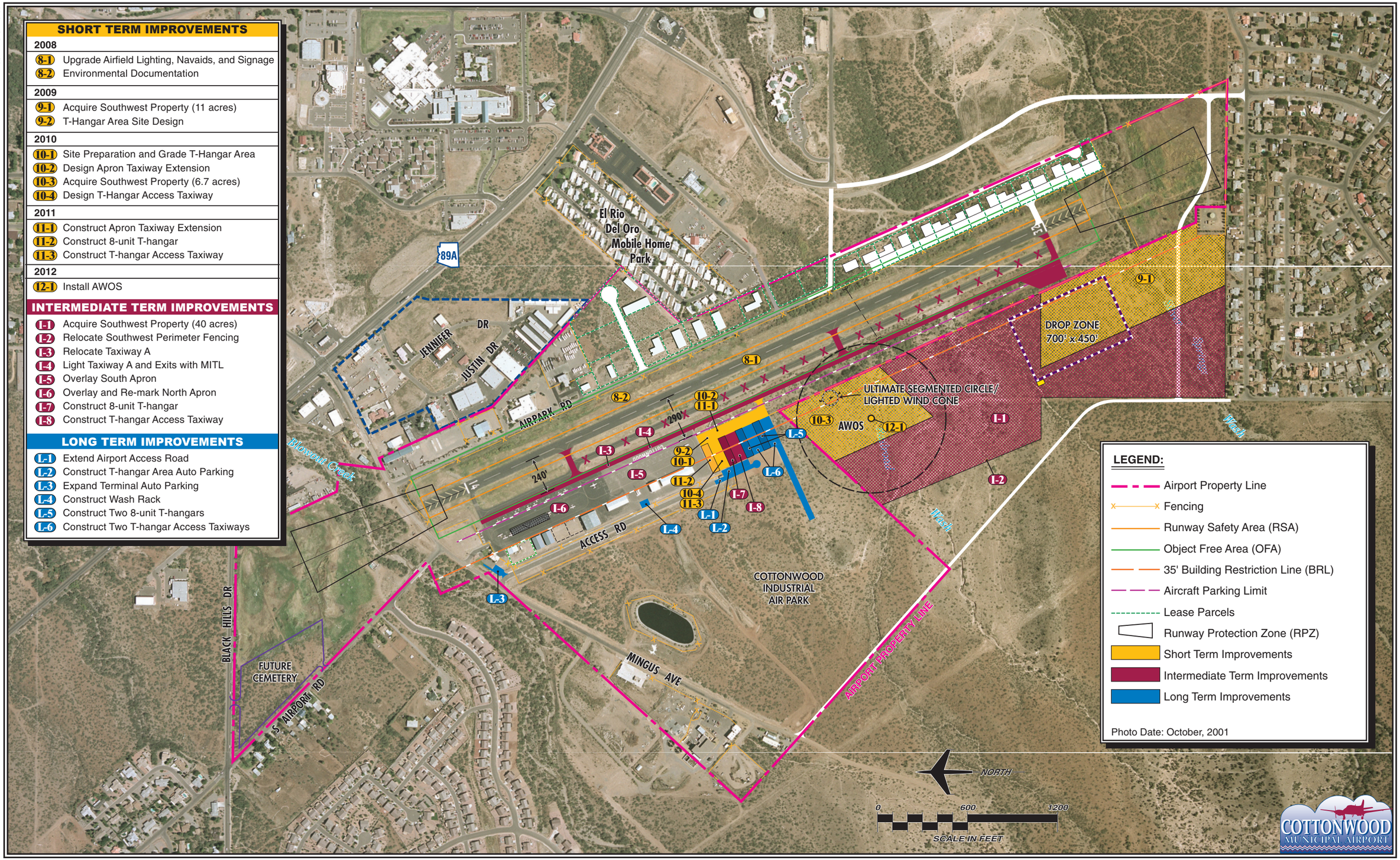


Exhibit 6A
PROPOSED IMPROVEMENT PROJECTS

south of the planned T-hangar area to accommodate the relocation of the segmented circle. The site will also accommodate the future airport weather observation system (AWOS) as well. The site preparation and grading of the T-hangar area will begin as well. The design of the apron taxiway and T-hangar access taxiways are also included in the third year.

Taxiway paving in the T-hangar area is planned for the fourth year of the short term planning horizon. This will include the apron taxiway and the access taxiways for the first T-hangar. This will permit the development of the first T-hangars.

The final year of the short term planning horizon includes the installation of the AWOS.

INTERMEDIATE PLANNING HORIZON

Projects in the intermediate planning horizon are designed to meet changes in demand. As use of the airport by aircraft in ADG II grows to over 500 annual operations, the safety design standards will need to be upgraded. In particular, parallel Taxiway A will need to be relocated to at least 240 feet from the runway centerline. Medium intensity taxiway lighting is scheduled to be installed as well.

The relocation of the parallel taxiway will also require a reconfiguration of the apron area. After the shade hangar is removed from the north ramp, the ramp can be overlaid and remarked for transient parking positions. Additional tie-downs will remain on the south ramp.

Also included in the intermediate term is the acquisition of an additional 40-acres on the southwest side of the airport. This acquisition is recommended to protect the AWOS clearance area and the long term future viability of the airport. **The cost estimates for intermediate term projects are estimated at $5.99 million**.

LONG RANGE PLANNING HORIZON

The long range planning horizon includes projects that will likely be needed by the long range activity milestone, but are not necessarily a priority in the near future. As demand for the third and fourth T-hangars evolves, the airport access road should be extended farther south. At the same time, some additional auto parking close to the T-hangars should be considered.

As use of the airport reaches the long term activity milestones, additional auto parking may be needed near the passenger terminal as well. The other project included in the long term is an aircraft wash rack. While not indicated as a priority at this time, demand could move up the priority, especially if it is developed with private funds.

The cost estimates for the long range projects total $1.38 million.

CAPITAL IMPROVEMENTS FUNDING

Financing capital improvements at the airport will not rely exclusively upon

the financial resources of the City of Cottonwood. Capital improvement funding is available through various grants-in-aid programs at both the federal and state levels. The following discussion outlines the key sources for capital improvement funding.

FEDERAL GRANTS

The United States Congress has long recognized the need to develop and maintain a system of aviation facilities across the nation for the purpose of national defense and promotion of interstate commerce. Various grants-in-aid programs to public airports have been established over the years for this purpose. The most recent legislation is the *Airport Improvement Program* (AIP) of 1982. The AIP has been reauthorized several times, with the most recent legislation enacted in late 2003 and entitled the *Vision 100 – Century of Aviation Reauthorization Act.*

The remaining FAA fiscal years covered by the four-year program are 2006 and 2007. This bill presented similar funding levels to the previous reauthorization – AIR-21. Funding was authorized at $3.6 billion in 2006 and $3.7 billion in 2007.

The source for AIR-21 funds 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 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.

Funds are distributed each year by the FAA from appropriations by Congress. A portion of the annual distribution is to primary commercial service airports based upon enplanement levels. General aviation airports, however, also received entitlements under the last re-authorization. Under the legislation, as long as Congress appropriated the full amounts authorized by AIR-21, eligible general aviation airports received up to $150,000 of funding each year.

After all specific-funding mechanisms are distributed, the remaining AIP funds are disbursed by the FAA, based upon the priority of the project for which they have requested federal assistance through discretionary apportionments. A national priority system is used to evaluate and rank each airport project. Those projects with the highest priority are given preference in funding.

To be eligible for funding, an airport must be included in the *National Plan of Integrated Airport Systems* (NPIAS). Since Cottonwood Municipal Airport is included in the NPIAS, it is eligible for funding. The $150,000 annual entitlement level will not take care of all the airport's funding needs, so eligible Cottonwood Municipal Airport projects will 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, unlike the entitlement funds, most funding for Cottonwood Municipal Airport is not guaranteed.

Under the AIP program, examples of eligible development projects include the airfield, aprons, and access roads.

Non-revenue producing automobile parking at general aviation airports can also be eligible. Improvements such as fueling facilities, utilities (with the exception of water supply for fire prevention), hangar buildings, airline ticketing, and airline operations areas are not typically eligible for AIP funds.

Under Vision 100, Cottonwood Municipal Airport is eligible for 95 percent funding assistance from AIP grants, as opposed to the previous AIR-21 level of 90 percent. The current AIP is set to expire in September 2007. While similar programs have been in place for over 50 years, it will be up to Congress to either extend or draft new legislation authorizing and appropriating future federal funding.

As evident from the airport development schedule and cost summaries, the City could benefit significantly from federal discretionary funding. Federal funding extends the amount of state dollars available for airport funding and guarantees a limited amount of entitlement dollars each year (assuming the current program remains intact through the planning period). The City will need to continue to pursue federal funding.

FAA FACILITIES AND EQUIPMENT PROGRAM

The Airway Facilities Division of the FAA administers the national Facilities and Equipment (F&E) Program. This annual program provides funding for the installation and maintenance of various navigational aids and equipment for the national airspace system and airports. Under the F&E program, funding is provided for FAA airport traffic control towers, en route navigational aids, and on-airport navigational aids such as approach lighting systems. Assuming inclusion in the NPIAS, as activity levels and other development warrant, the airport may be considered by the FAA Airways Facilities Division for the installation and maintenance of navigational aids through the F&E program. With PAPIs and REILs in place at Cottonwood Municipal Airport, this could include future equipment replacements or upgrades.

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 policies for distribution of these state funds.

Under the State of Arizona grant program, an airport can receive funding for one-half (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.

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 five-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 Project funds are provided for airport-related construction projects that are not eligible for funding under another program.

LOCAL FUNDING

The balance of project costs, after consideration has been given to grants, must be funded through local resources. Assuming federal funding, this essentially equates to 2.5 percent of the project costs if all eligible FAA and state funds are available.

According to **Table 6B**, local funding will be needed in each planning horizon. This includes $451,000 in the short term, $504,000 in the intermediate term, and $742,000 in the long range.

There are several alternatives for local finance options for future development at the airport, including airport revenues, direct funding from the City, issuing bonds, and leasehold financing. These strategies could be used to fund the local matching share, or complete the project if grant funding cannot be arranged.

The capital improvement program has assumed that some landside facility development (conventional hangars) would be completed privately, while other developments (namely T-hangars) would be completed by the City.

There are several municipal bonding options available to the City of Cottonwood including general obligation bonds, limited obligation bonds, and revenue bonds. General obligation bonds are a common form of municipal bond which is issued by voter approval and is secured by the full faith and credit of the City. City tax revenues are pledged to retire the debt. As instruments of credit, and because the community secures the bonds, general obligation bonds reduce the available debt level of the community. Due to the community pledge to secure and pay general obligation bonds, they are the most secure type of municipal bond and are generally issued at lower interest rates and carry lower costs of issuance. The primary disadvantage of

general obligation bonds is that they require voter approval and are subject to statutory debt limits. This requires that they be used for projects that have broad support among the voters, and that they be reserved for projects that have highest public priorities.

In contrast to general obligation bonds, limited obligation bonds (sometimes referred to as a Self-Liquidating Bonds) are secured by revenues from a local source. While neither general fund revenues nor the taxing power of the local community is pledged to pay the debt service, these sources may be required to retire the debt if pledged revenues are insufficient to make interest and principal payments on the bonds. These bonds still carry the full faith and credit pledge of the local community and, therefore, are considered, for the purpose of financial analysis, as part of the debt burden of the local community. The overall debt burden of the local community is a factor in determining interest rates on municipal bonds.

There are several types of revenue bonds, but in general they are a form of municipal bond which is payable solely from the revenue derived from the operation of a facility that was constructed or acquired with the proceeds of the bonds. For example, a Lease Revenue Bond is secured with the income from a lease assigned to the repayment of the bonds. Revenue bonds have become a common form of financing airport improvements. Revenue bonds present the opportunity to provide those improvements without direct burden to the taxpayer. Revenue bonds normally carry a higher interest rate because they lack the guarantees of general and limited obligation bonds.

Leasehold financing refers to a developer or tenant financing improvements under a long term ground lease. The obvious advantage of such an arrangement is that it relieves the community of all responsibility for raising the capital funds for improvements. However, the private development of facilities on a ground lease, particularly on property owned by a municipal agency, produces a unique set of problems. In particular, it is more difficult to obtain private financing as only the improvements and the right to continue the lease can be claimed in the event of a default. Ground leases normally provide for the reversion of improvements to the lessor at the end of the lease term, which reduces their potential value to a lender taking possession. Also, companies that want to own their property as a matter of financial policy may not locate where land is only available for lease. The City is using long term lease arrangements for private development of the Industrial Airpark at the airport. Several hangar facilities have been developed with private funds under a long term ground lease with the City.

To ensure that the airport maximizes revenue potential in the future, the City of Cottonwood should also periodically review aviation services rates and charges (i.e., fuel flowage fees, hangar and tiedown rental) at other regional airports to ensure that rates and charges at the airport are competitive and similar to aviation services at other airports. Additionally, all new leases at the airport should have inflation

clauses allowing for periodic rate increases in-line with inflationary factors.

While it is desirable for the airport to directly pay for itself, the indirect and intangible benefits of the airport to the community's economy and growth must be considered in implementing future capital improvements.

PLAN IMPLEMENTATION

The successful implementation of the Cottonwood Municipal Airport Master Plan will require sound judgment on the part of the City of Cottonwood with regard to the implementation of projects to meet future activity demands, while maintaining the existing infrastructure and improving this infrastructure in support of economic development. While the projects included in the capital improvement program have been broken into short, intermediate, and long term planning periods, the City 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 City continually monitor the need for new or rehabilitated facilities, since applications (for eligible projects) must be submitted to the FAA and state each year. The City should continually monitor and communicate with the FAA and state, the projects which are of highest priority.

APPENDIX A
Glossary and Abbreviations

Glossary of Terms

ABOVE GROUND LEVEL: The elevation of a point or surface above the ground.

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

ADVISORY CIRCULAR: External publications issued by the FAA consisting of non-regulatory material providing for the recommendations relative to a policy, guidance and information relative to a specific aviation subject.

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.

AIRCRAFT: A transportation vehicle that is used or intended for use for flight.

AIRCRAFT APPROACH CATEGORY: An alphabetic classification of aircraft based upon 1.3 times the stall speed in a landing configuration at their maximum certified landing weight.

AIRCRAFT OPERATION: The landing, takeoff, or touch-and-go procedure by an aircraft on a runway at an airport.

AIRCRAFT OPERATIONS AREA: A restricted and secure area on the airport property designed to protect all aspects related to aircraft operations.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION: A private organization serving the interests and needs of general aviation pilots and aircraft owners.

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.

AIRCRAFT RESCUE AND FIRE FIGHTING: A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

AIRFIELD: The portion of an airport which contains the facilities necessary for the operation of aircraft.

AIRLINE HUB: An airport at which an airline concentrates a significant portion of its activity and which often has a significant amount of connecting traffic.

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.

AIRPORT AUTHORITY: A quasi-governmental public organization responsible for setting the policies governing the management and operation of an airport or system of airports under its jurisdiction.

AIRPORT BEACON: A navigational aid located at an airport which displays a rotating light beam to identify whether an airport is lighted.

AIRPORT CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

AIRPORT ELEVATION: The highest point on the runway system at an airport 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.

AIRPORT MASTER PLAN: The planner's concept of the long-term development of an airport.

AIRPORT MOVEMENT AREA SAFETY SYSTEM: A system that provides automated alerts and warnings of potential runway incursions or other hazardous aircraft movement events.

AIRPORT OBSTRUCTION CHART: A scaled drawing depicting the Federal Aviation Regulation (FAR) Part 77 surfaces, a representation of objects that penetrate these surfaces, runway, taxiway, and ramp areas, navigational aids, buildings, roads and other detail in the vicinity of an an airport.

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 SPONSOR: The entity that is legally responsible for the management and operation of an airport, including the fulfillment of the requirements of laws and regulations related thereto.

AIRPORT SURFACE DETECTION EQUIPMENT: A radar system that provides air traffic controllers with a visual representation of the movement of aircraft and other vehicles on the ground on the airfield at an airport.

AIRPORT SURVEILLANCE RADAR: The primary radar located at an airport or in an air traffic control terminal area that receives a signal at an antenna and transmits the signal to air traffic control display equipment defining the location of aircraft in the air. The signal provides only the azimuth and range of aircraft from the location of the antenna.

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: A facility which provides enroute air traffic control service to aircraft operating on an IFR flight plan within controlled airspace over a large, multi-state region.

AIRSIDE: The portion of an airport that contains the facilities necessary for the operation of aircraft.

AIRSPACE: The volume of space above the surface of the ground that is provided for the operation of aircraft.

AIR TAXI: An air carrier certificated in accordance with FAR Part 121 and 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.

AIR TRAFFIC CONTROL: A service operated by an appropriate organization for the purpose of providing for the safe, orderly, and expeditious flow of 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.

AIR TRAFFIC HUB: A categorization of commercial service airports or group of commercial service airports in a metropolitan or urban area based upon the proportion of annual national enplanements existing at the airport or airports. The categories are large hub, medium hub, small hub, or non-hub. It forms the basis for the apportionment of entitlement funds.

AIR TRANSPORT ASSOCIATION OF AMERICA: An organization consisting of the principal U.S. airlines that represents the interests of the airline industry on major aviation issues before federal, state, and local government bodies. It promotes air transportation safety by coordinating industry and governmental safety programs and it serves as a focal point for industry efforts to standardize practices and enhance the efficiency of the air transportation system.

ALERT AREA: See special-use airspace.

ALTITUDE: The vertical distance measured in feet above mean sea level.

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.

APPROACH SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 which is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance based upon the type of available or planned approach by aircraft to a runway.

APRON: A specified portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft.

AREA NAVIGATION: The air navigation procedure that provides the capability to establish and maintain a flight path on an arbitrary course that remains within the coverage area of navigational sources being used.

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.

AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS): A reporting system that provides frequent airport ground surface weather observation data through digitized voice broadcasts and printed reports.

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

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

AVIGATION EASEMENT: A contractual right or a property interest in land over which a right of unobstructed flight in the airspace is established.

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."

BASED AIRCRAFT: The general aviation aircraft that use a specific airport as a home base.

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.

BLAST PAD: A prepared surface adjacent to the end of a runway for the purpose of eliminating the erosion of the ground surface by the wind forces produced by airplanes at the initiation of takeoff operations.

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

CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute Airport Improvement Program funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

CARGO SERVICE AIRPORT: An airport served by aircraft providing air transportation of property only, including mail, with an annual aggregate landed weight of at least 100,000,000 pounds.

CATEGORY I: An Instrument Landing System (ILS) that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 100 feet above the horizontal plane containing the runway threshold.

CATEGORY II: An ILS that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 50 feet above the horizontal plane containing the runway threshold.

CATEGORY III: An ILS that provides acceptable guidance information to a pilot from the coverage limits of the ILS with no decision height specified above the horizontal plane containing the runway threshold.

CEILING: The height above the ground surface to the location of the lowest layer of clouds which is reported as either broken or overcast.

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.

COMMERCIAL SERVICE AIRPORT: A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.

COMMON TRAFFIC ADVISORY FREQUENCY: A radio frequency identified in the appropriate aeronautical chart which is designated for the purpose of transmitting airport advisory information and procedures while operating to or from an uncontrolled airport.

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

CONICAL SURFACE: An imaginary obstruction-limiting surface defined in FAR Part 77 that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

CONTROLLED AIRPORT: An airport that has an operating airport traffic control tower.

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.

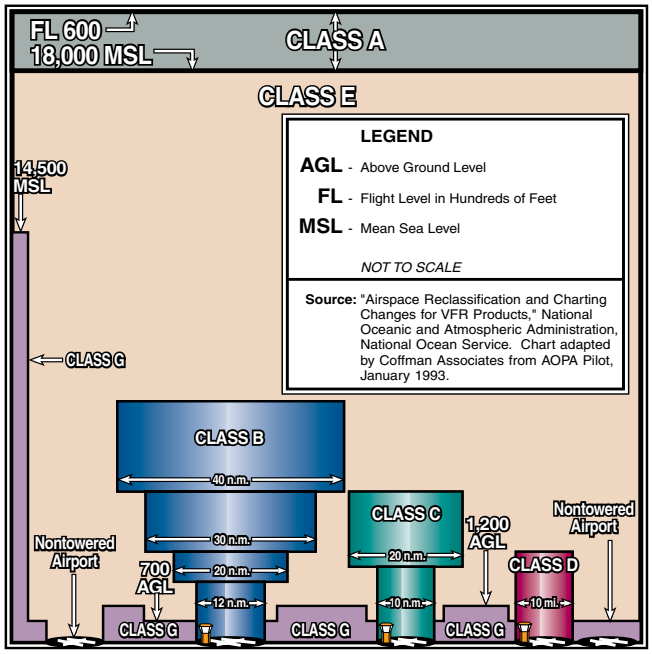
- *CLASS C:* Generally, the airspace from the surface to 4,000 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower and radar approach control and are served by a qualifying number of IFR operations or passenger enplanements. Although individually 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 airspace is individually tailored and configured to encompass published instrument approach proce dures. 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: A wind that is not parallel to a runway centerline or to the intended flight path of an aircraft.

CROSSWIND COMPONENT: The component of wind that is at a right angle to the runway centerline or the intended flight path of an aircraft.

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

DECIBEL: A unit of noise representing a level relative to a reference of a sound pressure 20 micro newtons per square meter.

DECISION HEIGHT: The height above the end of the runway surface at which a decision must be made by a pilot during the ILS or Precision Approach Radar approach to either continue the approach or to execute a missed approach.

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

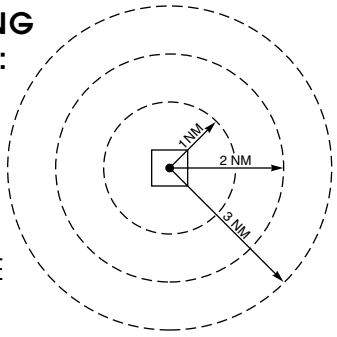
- *LANDING DISTANCE AVAILABLE (LDA):* The runway length declared available and suitable for landing.

DEPARTMENT OF TRANSPORTATION: The cabinet level federal government organization consisting of modal operating agencies, such as the Federal Aviation Administration, which was established to promote the coordination of federal transportation programs and to act as a focal point for research and development efforts in transportation.

DISCRETIONARY FUNDS: Federal grant funds that may be appropriated to an airport based upon designation by the Secretary of Transportation or Congress to meet a specified national priority such as enhancing capacity, safety, and security, or mitigating noise.

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.

ELEVATION: The vertical distance measured in feet above mean sea level.

ENPLANED PASSENGERS: The total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and non-scheduled services.

ENPLANEMENT: The boarding of a passenger, cargo, freight, or mail on an aircraft at an airport.

ENTITLEMENT: Federal funds for which a commercial service airport may be eligible based upon its annual passenger enplanements.

ENVIRONMENTAL ASSESSMENT (EA): An environmental analysis performed pursuant to the National Environmental Policy Act to determine whether an action would significantly affect the environment and thus require a more detailed environmental impact statement.

ENVIRONMENTAL AUDIT: An assessment of the current status of a party's compliance with applicable environmental requirements of a party's environmental compliance policies, practices, and controls.

ENVIRONMENTAL IMPACT STATEMENT (EIS): A document required of federal agencies by the National Environmental Policy Act for major projects ar legislative proposals affecting the environment. It is a tool for decision-making describing the positive and negative effects of a proposed action and citing alternative actions.

ESSENTIAL AIR SERVICE: A federal program which guarantees air carrier service to selected small cities by providing subsidies as needed to prevent these cities from such service.

FEDERAL AVIATION REGULATIONS: The general and permanent rules established by the executive departments and agencies of the Federal Government for aviation, which are published in the Federal Register. These are the aviation subset of the Code of Federal Regulations.

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."

FINDING OF NO SIGNIFICANT IMPACT (FONSI): A public document prepared by a Federal agency that presents the rationale why a proposed action will not have a

significant effect on the environment and for which an environmental impact statement will not be prepared.

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.

FLIGHT LEVEL: A designation for altitude within controlled airspace.

FLIGHT SERVICE STATION: An operations facility in the national flight advisory system which utilizes data interchange facilities for the collection and dissemination of Notices to Airmen, weather, and administrative data and which provides pre-flight and in-flight advisory services to pilots through air and ground based communication facilities.

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 (GPS): A system of 24 satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

GROUND ACCESS: The transportation system on and around the airport that provides access to and from the airport by ground transportation vehicles for passengers, employees, cargo, freight, and airport services.

HELIPAD: A designated area for the takeoff, landing, and parking of helicopters.

HIGH INTENSITY RUNWAY LIGHTS: The highest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

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.

HORIZONTAL SURFACE: An imaginary obstruction-limiting surface defined in FAR Part 77 that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimensions of this surface are a function of the types of approaches existing or planned for the runway.

INSTRUMENT APPROACH PROCEDURE: 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): Procedures for the conduct of flight in weather conditions below Visual Flight Rules weather minimums. The term IFR is often also used to define weather conditions and the type of flight plan under which an aircraft is operating.

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.

INSTRUMENT METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for visual meteorological conditions.

ITINERANT OPERATIONS: Operations by aircraft that are not based at a specified airport.

KNOTS: A unit of speed length used in navigation that is equivalent to the number of nautical miles traveled in one hour.

LANDSIDE: The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.

LANDING DISTANCE AVAILABLE (LDA): See declared distances.

LARGE AIRPLANE: An airplane that has a maximum certified takeoff weight in excess of 12,500 pounds.

LOCAL AREA AUGMENTATION SYSTEM: A differential GPS system that provides localized measurement correction signals to the basic GPS signals to improve navigational accuracy, integrity, continuity, and availability.

LOCAL OPERATIONS: Aircraft operations performed by aircraft that are based at the airport and that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport.

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.

LONG RANGE NAVIGATION SYSTEM (LORAN): Long range navigation is 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.

LOW INTENSITY RUNWAY LIGHTS: The lowest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

MEDIUM INTENSITY RUNWAY LIGHTS: The middle classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

MICROWAVE LANDING SYSTEM (MLS): An instrument approach and landing system that provides precision guidance in azimuth, elevation, and distance measurement.

MILITARY OPERATIONS: Aircraft operations that are performed in military aircraft.

MILITARY OPERATIONS AREA (MOA): See special-use airspace.

MILITARY TRAINING ROUTE: An air route depicted on aeronautical charts for the conduct of military flight training at speeds above 250 knots.

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.

NATIONAL AIRSPACE SYSTEM: The network of air traffic control facilities, air traffic control areas, and navigational facilities through the U.S.

NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS: The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public use airports to meet national air transportation needs.

NATIONAL TRANSPORTATION SAFETY BOARD: A federal government organization established to investigate and determine the probable cause of transportation accidents, to recommend equipment and procedures to enhance transportation safety, and to review on appeal the suspension or revocation of any certificates or licenses issued by the Secretary of Transportation.

NAUTICAL MILE: A unit of length used in navigation which is equivalent to the distance spanned by one minute of arc in latitude, that is, 1,852 meters or 6,076 feet. It is equivalent to approximately 1.15 statute mile.

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.

NON-DIRECTIONAL 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.

NON-PRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

NOTICE TO AIRMEN: A notice containing information concerning the establishment, condition, or change in any component of or hazard in the National Airspace System, the timely knowledge of which is considered essential to personnel concerned with flight operations.

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.

PILOT CONTROLLED LIGHTING: Runway lighting systems at an airport that are controlled by activating the microphone of a pilot on a specified radio frequency.

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 APPROACH RADAR: A radar facility in the terminal air traffic control system used to detect and display with a high degree of accuracy the direction, range, and elevation of an aircraft on the final approach to a runway.

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.

PRIMARY AIRPORT: A commercial service airport that enplanes at least 10,000 annual passengers.

PRIMARY SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are a function of the types of approaches existing or planned for the runway.

PROHIBITED AREA: See special-use airspace.

PVC: Poor visibility and ceiling. Used in determining Annual Sevice Volume. PVC conditions exist when the cloud ceiling is less than 500 feet and visibility is less than one mile.

RADIAL: A navigational signal generated by a Very High Frequency Omni-directional Range or VORTAC station that is measured as an azimuth from the station.

REGRESSION ANALYSIS: A statistical technique that seeks to identify and quantify the relationships between factors associated with a forecast.

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 ALIGNMENT INDICATOR LIGHT: A series of high intensity sequentially flashing lights installed on the extended centerline of the runway usually in conjunction with an approach lighting system.

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 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.

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.

SCOPE: The document that identifies and defines the tasks, emphasis, and level of effort associated with a project or study.

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.

SMALL AIRPLANE: An airplane that has a maximum certified takeoff weight of up to 12,500 pounds.

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.

STOPWAY: An area beyond the end of a takeoff runway that is designed to support an aircraft during an aborted takeoff without causing structural damage to the aircraft. It is not to be used for takeoff, landing, or taxiing by aircraft.

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.

TERMINAL INSTRUMENT PROCEDURES: Published flight procedures for conducting

instrument approaches to runways under instrument meteorological conditions.

TERMINAL RADAR APPROACH CONTROL: An element of the air traffic control system responsible for monitoring the en-route and terminal segment of air traffic in the airspace surrounding airports with moderate to high-levels of air traffic.

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.

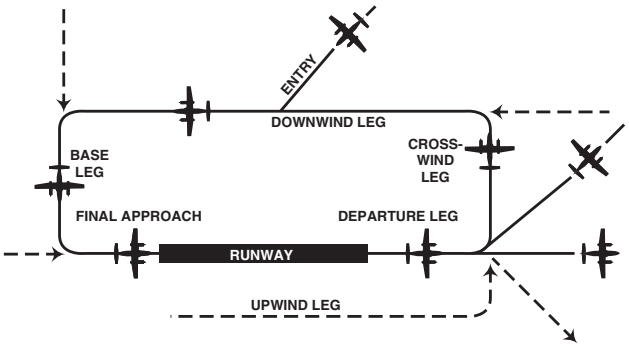
TOUCHDOWN: The point at which a landing aircraft makes contact with the runway surface.

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.

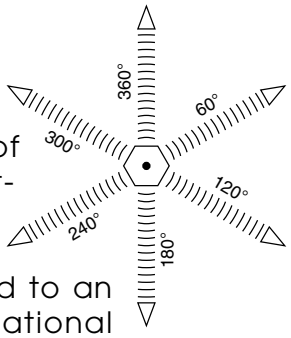


UNCONTROLLED AIRPORT: An airport without an air traffic control tower at which the control of Visual Flight Rules traffic is not exercised.

UNCONTROLLED AIRSPACE: Airspace within which aircraft are not subject to air traffic control.

UNIVERSAL COMMUNICATION (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 OMNI-DIRECTIONAL 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.

VISUAL METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions which are equal to or greater than the threshold values for instrument meteorological conditions.

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.

WIDE AREA AUGMENTATION SYSTEM: An enhancement of the Global Positioning System that includes integrity broadcasts, differential corrections, and additional ranging signals for the purpose of providing the accuracy, integrity, availability, and continuity required to support all phases of flight.

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 lighting 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 fo 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

NPRM: notice of proposed rulemaking

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

PVC: Poor visibility and ceiling.

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 omni-directional range

VORTAC: VOR and TACAN collocated

COTTONWOOD
MUNICIPAL AIRPORT

APPENDIX B
Based Aircraft / Land Lease List

Appendix B
BASED AIRCRAFT/LAND LEASE LIST

SHADED TIE DOWN

NAME/ADDRESS	N#	TYPE
Jess Mulcaire 200 W. Mulcaire Rd. Cornville, AZ 86325	N-7218	Cessna 150
Doug Fowler 4390 N. Montezuma Avenue Rimrock, AZ 86335	N-9227D	Tri-Pacer
Jack Doan 1236 S. Verde Drive Cottonwood, AZ 86326	N-8700	Cessna 150
George Peters 2119 S. Arroyo Vista Drive Cottonwood, AZ 86326	N-8210G	Cardinal RG
Paul Handverger 90 S. Corral Circle Cottonwood, AZ 86326	N-13377	Cessna 172
Adams/Bergen 495 Gloria Avenue Cornville, AZ 86325	N-2133	Cessna 182
Henry Kaldenbaugh, M.D. 214 S. Main Street Cottonwood, AZ 86326	N-92112	Cessna 182
Jack Merritt 1470 W. Wagon Wheel Rd. Cottonwood, AZ 86326	N-89017	Cessna 140

SHADED TIE DOWN (cont.)

NAME/ADDRESS	N#	TYPE
Paul Haynie 2275 W. Roper Lane Cottonwood, AZ 86326	N-2421	Cessna 140
Charles Berres 1792 Gold Rush Rd. Cottonwood, AZ 86326	N-4318	Cessna 172
Howard Becke P.O. Box 897 Clarkdale, AZ 86324	N-3124L	Fly Baby
Don Hanks 2235 W. Rustler Lane Cottonwood, AZ 86326	N-4111K	Navion

OPEN TIE DOWN

Rodney Fielitz 1580 Cholla Lane Clarkdale, AZ 86324	N-9704C	Piper Archer
Ronald Eckert 57 E. Aspen Street Cottonwood, AZ 86326	N-2626W	Mooney
Tom Looper 2972 S. Candler Drive Cornville, AZ 86325	170-N-3166	Cessna 170
George Yeckl 980 Lanny Lane Clarkdale, AZ 86324	N-7556K	Cherokee
Gerald Yaeger P.O. Box 1737 Camp Verde, AZ 86322	N-757W	Cessna 150

OPEN TIE DOWN (cont.)

NAME/ADDRESS	N#	TYPE
Clarence Shaw 240 Cathedral Rock Rd. Sedona, AZ 86351	N-11518	Cessna 150
Ray Morrison 15 Farm Circle Cornville, AZ 86325	N-7057	Cessna 175
Michael Krohasz 2272 E. Arrowhead Lane Cottonwood, AZ 86326	N-435	Navion
Alan MacDonald 128 Koebrick Lane Camp Verde, AZ 86322	N6548X	Cessna 210
Art Tevis P.O. Box 94 Clarkdale, AZ 86324	N-3800Q	Mooney
Ken Roman 655 Mountain Shadow Drive Sedona, AZ 86336	N-216SE	Robin
Craig Dixon P.O. Box 879 Rimrock, AZ 86335	N-19329	Cessna 150

COTTONWOOD HANGAR ASSOCIATION

Nelson J. Shaum, Jr. 1493 S. Sierra Drive Cottonwood, AZ 86326	N-6551V	Bonanza

COTTONWOOD HANGAR ASSOCIATION (cont.)

NAME/ADDRESS	N#	TYPE
Steve Struit 702 E. Highway 89A Cottonwood, AZ 86326	N-8327N	Bonanza
Gary P. Foster 1850 Greendale Drive Anchorage, AK 99504	(Vacant)	
Richard A. Lucas 130 S. Sagebrush Way Cottonwood, AZ 86326	N-56AM	Star Duster
Charles Adams P.O. Box 10068 Sedona, AZ 86339	N-9262L	Piper Arrow
William Hutton 5875 Friars Road #4114 San Diego, CA 92110	N-2905B	Cherokee 6

CITY OF COTTONWOOD T-HANGARS

William C. Wade Unit 1 725 Green River Cottonwood, AZ 86326	N1773W	Beech Bonanza V35B
Neil Heinrich Unit 2 4423 Prairie Lane Cottonwood, AZ 86326	NC9707E	Aeronca 11AC
William T. Brooks Unit 3 P.O. Box 715 Cornville, AZ 86325		Homebuilt-Low Wing

CITY OF COTTONWOOD T-HANGARS (cont.)

NAME/ADDRESS		N#	TYPE
Ronald Burden 245 Bull Dogger Circle Cottonwood, AZ 86326	Unit 4	N8123X	Piper PA-28 Dakota
Charles D. Garrison 1042 N. Main Street Cottonwood, AZ 86326	Unit 5	N8100B	Cessna 172
Thomas R. Welch 143 S. 17th Street Cottonwood, AZ 86326	Unit 6	N73573	Cessna 172
Herman Parish 10560 E. Willow Drive Cornville, AZ 86325	Unit 7	N6384W	Piper PA-28-140
Robert W. Allen ABC Body Shop, Inc. P.O. Box 813 Cottonwood, AZ 86326	Unit 8	N3094Q	Cessna 182
Dan Bacheler Skydive Cottonwood, L.L.C. 3965 E. Valley Lane #7 Rimrock, AZ 86335	Unit 9	N4756F	Cessna 206
Aleck Gradijan, Jr. P.O. Box 277 Cottonwood, AZ 86326	Unit 10	N5895S	Beech S35

CITY OF COTTONWOOD CONVENTIONAL HANGARS

NAME/ADDRESS	N#	TYPE
Larry Green Larry Green Chevrolet 737 South Main Street Cottonwood, AZ 86326		No Permanently Based Aircraft
Arizona Northern Equipment, Inc. Mark Millar, President Arizona Northern Equipment P.O. Box 1950 Cottonwood, AZ 86326	N340MS	Cessna 340

COTTONWOOD
MUNICIPAL AIRPORT

APPENDIX C
Airport Layout Plan

COTTONWOOD
MUNICIPAL AIRPORT

AIRPORT LAYOUT PLAN SET

INDEX OF DRAWINGS

PREPARED FOR
CITY OF COTTONWOOD

Coffman Associates
Airport Consultants

RUNWAY DATA

	RUNWAY 14-32	
	EXISTING	ULTIMATE
RUNWAY CATEGORY/AIRCRAFT DESIGN GROUP	B-II	B-II
APPROACH VISIBILITY MINIMUMS	VISUAL/VISUAL	SAME
CRITICAL DESIGN AIRCRAFT	CITATION I	KING AIR B200
UNDERCARRIAGE WIDTH OF DESIGN AIRCRAFT	17.2'	17.6'
WINGSPAN OF DESIGN AIRCRAFT	46.8'	54.50'
APPROACH SPEED OF DESIGN AIRCRAFT (KNOTS)	72	103
MAXIMUM TAKE OFF WEIGHT (lbs)	11,850	12,500
RUNWAY AZIMUTH	24.11°	SAME
RUNWAY BEARING (TRUE)	N24°25' 01.38"E	SAME
RUNWAY DIMENSIONS	4,250' X 75'	4,250' X 75'
ELEVATION OF RWY TOUCH DOWN ZONE (MSL)	3,545.0' / 3,550.0'	3,545.0' / 3,550.0'
ELEVATION OF RUNWAY HIGH POINT (above MSL)	3,550.0'	3,550.0'
ELEVATION OF RUNWAY LOW POINT (above MSL)	3,512.0'	3,512.0'
WIND COVERAGE IN MPH	12-1 91.68%, 13-36.48%	SAME
FAR PART 77 CATEGORY	VISUAL/VISUAL	SAME
RUNWAY INSTRUMENTATION	VISUAL/VISUAL	SAME
RUNWAY APPROACH SURFACES	20:1/20:1	SAME
RUNWAY THRESHOLD DISPLACEMENT	NONE	NONE
RUNWAY STOPWAY	NONE	NONE
RUNWAY SAFETY AREA WIDTH (RSA)	120'	150'
RSA DISTANCE BEYOND EACH RUNWAY END	240'/240'	300'/300'
RUNWAY OBJECT FREE AREA WIDTH (OFA)	250'	500'
OFA DISTANCE BEYOND EACH RUNWAY END	240'/240'	300'/300'
RUNWAY OBSTACLE FREE ZONE WIDTH (OFZ)	300'	400'
OFZ DISTANCE BEYOND EACH RUNWAY END	200'/200'	200'/200'
LINE OF SITE REQUIREMENT	NO	SAME
RUNWAY PAVEMENT MATERIAL	ASPHALT	SAME
RUNWAY PAVEMENT SURFACE TREATMENT	NONE	SAME
PAVEMENT STRENGTH (in thousand lbs.)	12.5(S)	SAME
RUNWAY EFFECTIVE GRADIENT (in %)	0.57%	0.78%
MAXIMUM GRADIENT (in %)	2%	SAME
RUNWAY LIGHTING	MIRL	SAME
RUNWAY MARKINGS	VISUAL/VISUAL	VISUAL/VISUAL
RUNWAY APPROACH LIGHTING	NONE	NONE
DISTANCE FROM RWY CL TO HOLD BARS	125'/125'	200'/200'
RUNWAY CL TO TAXIWAY CL	150'	240'
TAXIWAY CL TO FIXED OR MOVEABLE OBJECT	109'	SAME
TAXIWAY PAVEMENT MATERIAL	ASPHALT	SAME
TAXIWAY LIGHTING	MITL	SAME
TAXIWAY MARKING	CENTERLINE, HOLDLINES	SAME
VISUAL AIDS	PAPI-2, PAPI-2, REILs	SAME
NAVIGATIONAL AIDES	--	GPS

Pavement strengths are expressed in Single(S), Dual(D), Dual Tandem(DT), and/or Double Dual Tandem(DDT) wheel loading capacities.

AIRPORT DATA

COTTONWOOD MUNICIPAL AIRPORT (P52)

CITY: COTTONWOOD, ARIZONA — COUNTY: YAVAPI, ARIZONA

RANGE: 3 EAST — TOWNSHIP: 15, 16 N — CIVIL TOWNSHIP: N/A

		EXISTING	ULTIMATE
AIRPORT SERVICE LEVEL		GENERAL AVIATION	SAME
AIRPORT REFERENCE CODE		B-II	B-II
AIRPORT ELEVATION ABOVE MSL		3550.00'	3550.00'
MEAN MAXIMUM TEMPERATURE OF HOTTEST MONTH		98.2°F (JULY)	SAME
AIRPORT REFERENCE POINT (ARP) COORDINATES (NAD-83)	Latitude	34°43' 18.01" N	SAME
	Longitude	112°02' 06.563" W	SAME
AIRPORT and TERMINAL NAVIGATIONAL AIDS		ROTATING BEACON	GPS
		SEGMENTED CIRCLE	ROTATING BEACON / SEGMENTED CIRCLE

BUILDINGS/FACILITIES

EXISTING	ULTIMATE	DESCRIPTION	EL.*
1	---	COTTONWOOD AIR SERVICE OFFICE	---
2	---	COTTONWOOD AIR SERVICE HANGAR (FBO)	---
3	3	CONVENTIONAL HANGAR	---
4	---	T-HANGAR (6-unit)	---
5	---	T-HANGAR (10-unit)	---
6	6	SHADE HANGAR	---
7	---	FUEL STORAGE	---
8	---	ELECTRIC VAULT	---
9	9	COTTONWOOD INDUSTRIAL AIRPARK	---
10	---	COTTONWOOD AIRPARK INC	---
11	11	SKY DIVE COTTONWOOD	---
---	12	WASH RACK	---
---	13	T-HANGAR (8-unit)	---
---	14	AVIATION RELATED BUILDINGS	---
---	15	NON-AVIATION RELATED BUILDINGS	---

*NOTE: BUILDING AND FACILITY ELEVATIONS WILL BE ADDED WHEN THEY ARE AVAILABLE

RUNWAY END COORDINATES (NAD 83)

RUNWAY		EXISTING	ULTIMATE
Runway 14	Latitude	34°44' 07.215" N	SAME
	Longitude	112°02' 17.089" W	SAME
Runway 32	Latitude	34°43' 28.933" N	SAME
	Longitude	112°01' 56.042" W	SAME

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
		AVIGATION EASEMENT (if applicable)
		BUILDING CONSTRUCTION
		BUILDING RESTRICTION LINE (30' - BRL)
		OBJECT FREE AREA (OFA)
		RUNWAY SAFETY AREA (RSA)
		OBSTACLE FREE ZONE (OFZ)
		DIRT ROAD
		FACILITY CONSTRUCTION
		FENCING
		NAVIGATIONAL AID INSTALLATION
		RUNWAY END IDENTIFICATION LIGHTS (REIL)
		RUNWAY THRESHOLD LIGHTS
		SECTION CORNER
		SEGMENTED CIRCLE LIGHTED WIND TEE
		TOPOGRAPHIC CONTOURS
		WIND INDICATOR (Lighted)
NA		BUILDING TO BE REMOVED
NA		PAVEMENT TO BE REMOVED
		HOLD LINES

MAG NORTH

MAGNETIC VARIANCE- 12.189°E (2006)
RATE OF CHANGE -0.39283° W

0 300 600 900
SCALE IN FEET

SUBMITTED BY:
Coffman Associates
FOR APPROVAL BY:

APPROVED BY:

Bryan Mickelsen, City Manager
CITY OF COTTONWOOD

FAA APPROVAL STAMP

SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Ernest A Love Field (PRC)
Prescott, Arizona

OBSERVATIONS:
70,631 All Weather Observations
1994-2003

ALL WEATHER WIND COVERAGE

Runway	10.5 Knots / 12 MPH	13 Knots / 15 MPH	18 Knots / 18 MPH	20 Knots / 23 MPH
Runway 14-32	97.98%	95.59%	88.86%	83.71%

VICINITY MAP

DEVIATIONS FROM FAA AIRPORT DESIGN STANDARDS

DEVIATION DESCRIPTION	EFFECTED DESIGN STANDARD	STANDARD	EXISTING	PROPOSED DISPOSITION
FENCE AND ROADWAY IN OBJECT FREE AREA	B-II OBJECT FREE AREA WIDTH	250' FROM RUNWAY CL	200' FROM RUNWAY CL	AT TIME OF UPGRADE TO B-II STANDARDS (PARALLEL TAXIWAY RELOCATION), A MODIFICATION TO STANDARDS WILL BE REQUESTED

PARCELS TO BE RELEASED FOR NON-AERONAUTICAL USES

GENERAL NOTES

1. Depiction of features and use (to, including, airplane movements across the runway protection zones) are provided on the RUNWAY APPROACH/DEPARTURE SURFACE DRAWING.
2. Details concerning terminal improvements are depicted on the TERMINAL AREA PLAN.
3. Recommended land uses within the airport environs are depicted on the AIRPORT LAND USE PLAN.
4. Data concerning airport property are depicted on the AIRPORT PROPERTY MAP.
5. The Building Restriction Lines (BRL) are set for the ultimate runway conditions. The BRLs encompass the runway protection zones, the runway object free area, the runway obstacle free zone, taxiway/taxilane object free areas, and areas required for terminal instrument procedures. The established BRL is an estimate of the minimum depiction to the runway for an object 30 feet or greater in height. Prior to constructing any building or object on the airport, a FAR Part 77 construction analysis should be conducted.
6. Ultimate fence line follows around Existing/Ultimate Property Line except where shown.
7. Base map derived from aerial photo taken 10/01 and USGS maps 0331121 Cottonwood 1973 and 0331131 Clarkdale 1973.
8. Source for runway elevations, Aerial Survey, Airport Facility Directory and calculations using Geodetic Calculator Program using USGS 88s for Vertical Datum and NAD 83 for Horizontal Datum.
9. The airport meets ADOT Aeronautics minimum guidelines for an ARC B-II airport.
10. The airport has not been surveyed in accordance with FAA standard 405.
11. "NO THRESHOLD WITHIN SURFACE OBJECT PENETRATIONS"

No.	REVISIONS	DATE	BY	APP'D.
3	MASTER PLAN UPDATE	11/17/06	CA	FULL
2	ALP REVISIONS (ADDED REIL'S, APRON EXPANSION, FUEL FARM, AND ACCESS ROAD)	05/23/02	Zan	REVAL
1	MASTER PLAN UPDATE (ADOT FUNDED)	10/21/98	CA	FULL

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION, AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREON. NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

COTTONWOOD MUNICIPAL AIRPORT

AIRPORT LAYOUT PLAN

COTTONWOOD, ARIZONA

PLANNED BY: Alvin S. Benson P.E.
DETAILED BY: Maggie Benner
APPROVED BY: James M. Harris P.E.

November 17, 2006 — SHEET 1 OF 7

Coffman Associates
Airport Consultants

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
		AVIGATION EASEMENT (if applicable)
		BUILDING CONSTRUCTION
—20' BRL—	—20' BRL—	BUILDING RESTRICTION LINE (20'-BRL)
		OBJECT FREE AREA (OFA)
		RUNWAY SAFETY AREA (RSA)
		OBSTACLE FREE ZONE (OFZ)
		DIRT ROAD
		FACILITY CONSTRUCTION
		FENCING
PAPI-2	PAPI-2	NAVIGATIONAL AID INSTALLATION
		RUNWAY END IDENTIFICATION LIGHTS (REIL)
		RUNWAY THRESHOLD LIGHTS
		SECTION CORNER
		SEGMENTED CIRCLE/LIGHTED WIND TEE
1000	1000	TOPOGRAPHIC CONTOURS
		WIND INDICATOR (Lighted)
NA		BUILDING TO BE REMOVED
NA		PAVEMENT TO BE REMOVED
		HOLD LINES

Park

EXIST./ULT. ARP
EL. 3550.0'
34°43'48.076"N
112°02'06.566"W

EXISTING 4250' x 75' RUNWAY N24°25'00"W (True)

EXIST. PARALLEL TWY. "A"

EXIST. SEGMENTED CIRCLE/ LIGHTED WIND CONE

ULT. SEGMENTED CIRCLE/ LIGHTED WIND CONE

EXIST. PAPI-2

AIRPARK RD.

20' BRL

"A"

"B"

"C"

"D"

60' (Typ.)

290'

150'

100'

40'

EXIST. DROP ZONE

Future Auto Parking

(11) TO BE REMOVED

Auto Parking

AIRPORT ACCESS ROAD

FBO PARCEL

ROTATING BEACON

Mingus Ave.

RAIL...

MAG NORTH

0 100 200 300
SCALE IN FEET

BUILDINGS/FACILITIES

EXISTING	ULTIMATE	DESCRIPTION	EL.*
(1)	--	COTTONWOOD AIR SERVICE OFFICE	--
(2)	--	COTTONWOOD AIR SERVICE HANGAR (FBO)	--
(3)	(3)	CONVENTIONAL HANGAR	--
(4)	--	T-HANGAR (6-unit)	--
(5)	--	T-HANGAR (10-unit)	--
(6)	(6)	SHADE HANGAR	--
(7)	--	FUEL STORAGE	--
(8)	--	ELECTRIC VAULT	--
(9)	(9)	COTTONWOOD INDUSTRIAL AIRPARK	--
(10)	--	COTTONWOOD AIRPARK INC.	--
(11)	(11)	SKY DIVE COTTONWOOD	--
--	(12)	WASH RACK	--
--	(13)	T-HANGAR (8-unit)	--
--	(14)	AVIATION RELATED BUILDINGS	--
--	(15)	NON-AVIATION RELATED BUILDINGS	--

*NOTE: BUILDING AND FACILITY ELEVATIONS WILL BE ADDED WHEN THEY ARE AVAILABLE.

No.	REVISIONS	DATE	BY	APP'D.
3	MASTER PLAN UPDATE	11/17/06	CA	FULL
2	ALP REVISIONS (ADDED REIL'S, APRON EXPANSION, FUEL FARM, AND ACCESS ROAD)	05/09/00	Z&H	REVAL.
1	MASTER PLAN UPDATE (ADOT FUNDED)	10/21/96	CA	FULL

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COTTONWOOD MUNICIPAL AIRPORT

TERMINAL AREA PLAN

COTTONWOOD, ARIZONA

PLANNED BY: Steven G. Benson P.E.
DETAILED BY: Maggie Beaver
APPROVED BY: James M. Harris P.E.

November 17, 2006 | SHEET 2 OF 7

Coffman Associates
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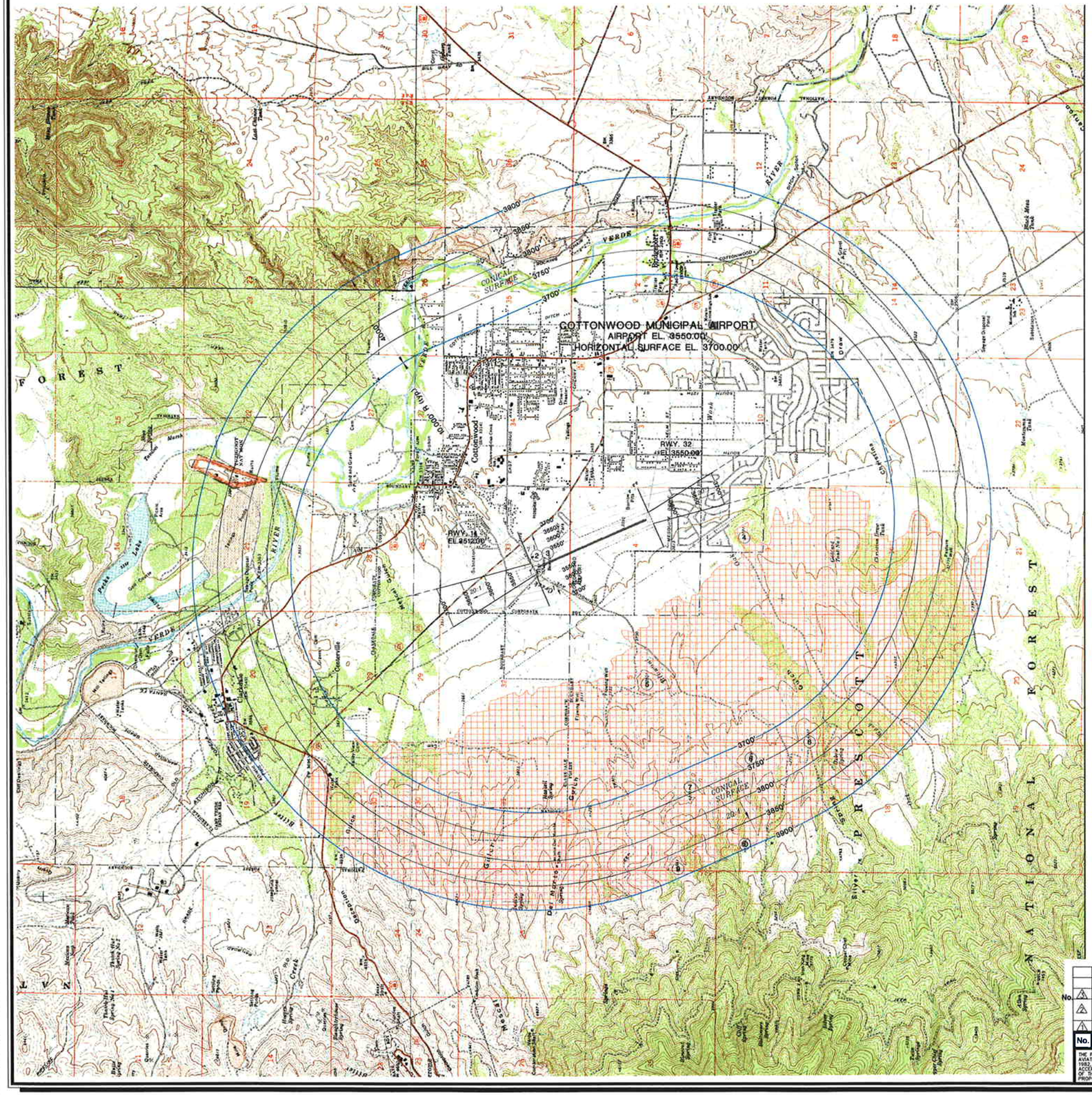
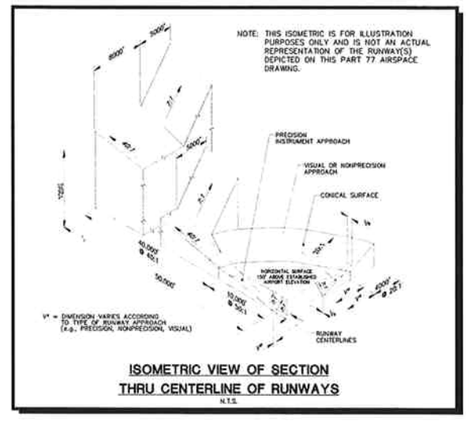


OBSTRUCTION TABLE

Object Description	Object Elevation	Obstructed Part 77 Surface	Surface Elevation	Object Penetration	Proposed Object Disposition
1. MINGUS AVE.	3515'	PRIMARY SURFACE	3527'	3'	NO CHANGE
2. AIRPARK RD.	3520'	PRIMARY SURFACE	3527'	8'	NO CHANGE
3. FENCE	VARIES	PRIMARY SURFACE	3527'	VARIES	NO CHANGE
4. TERRAIN	UP TO 3791'	HORIZONTAL SURFACE	3700'	91'	NO CHANGE
5. TERRAIN	UP TO 3931'	HORIZONTAL SURFACE	3700'	231'	NO CHANGE
6. TERRAIN	UP TO 4391'	CONICAL SURFACE	3743'	648'	NO CHANGE
7. TERRAIN	UP TO 4273'	CONICAL SURFACE	3742'	531'	NO CHANGE
8. TERRAIN	UP TO 4327'	CONICAL SURFACE	3761'	566'	NO CHANGE
9. TERRAIN	UP TO 4541'	CONICAL SURFACE	3884'	657'	NO CHANGE
10. TERRAIN	UP TO 4880'	CONICAL SURFACE	3900'	980'	NO CHANGE



ISOMETRIC VIEW OF SECTION
THRU CENTERLINE OF RUNWAYS
N.T.S.

OBSTRUCTION LEGEND

(1) OBSTRUCTION

(1) 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 outer portion of the approach surfaces, is illustrated on the RUNWAY APPROACH SURFACE PROFILES, sheet 4 of this plan set.
3. Depiction of features and objects within the inner portion of the approach surfaces, is illustrated on the INNER PORTION OF THE RUNWAY 14-32 APPROACH SURFACE DRAWING, sheet 5 of this plan set.
4. Base map derived from USGS maps Cottonwood 1973, Clarkdale1973, Cornville 1968 and Cornville 1968 and Page Springs 1969.

MAG NORTH

MAGNETIC VARIANCE12°25' E
RATE OF CHANGE -3.06' WEST (JULY 2002)

0 2000 4000
SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
1	MASTER PLAN UPDATE	11/17/06	CA	FULL
2	ALP REVISIONS (ADDED REIL'S, APRON EXPANSION, FUEL FARM, AND ACCESS ROAD)	05/09/00	Z&H	REVAL.
1	MASTER PLAN UPDATE (ADOT FUNDED)	10/21/95	CA	FULL

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COTTONWOOD MUNICIPAL AIRPORT

AIRPORT AISPACE DRAWING

COTTONWOOD, ARIZONA

PLANNED BY: Steven G. Benson P.E.
DETAILED BY: Maggie Brewer
APPROVED BY: James M. Harris P.E.
November 17, 2006 SHEET 3 OF 7

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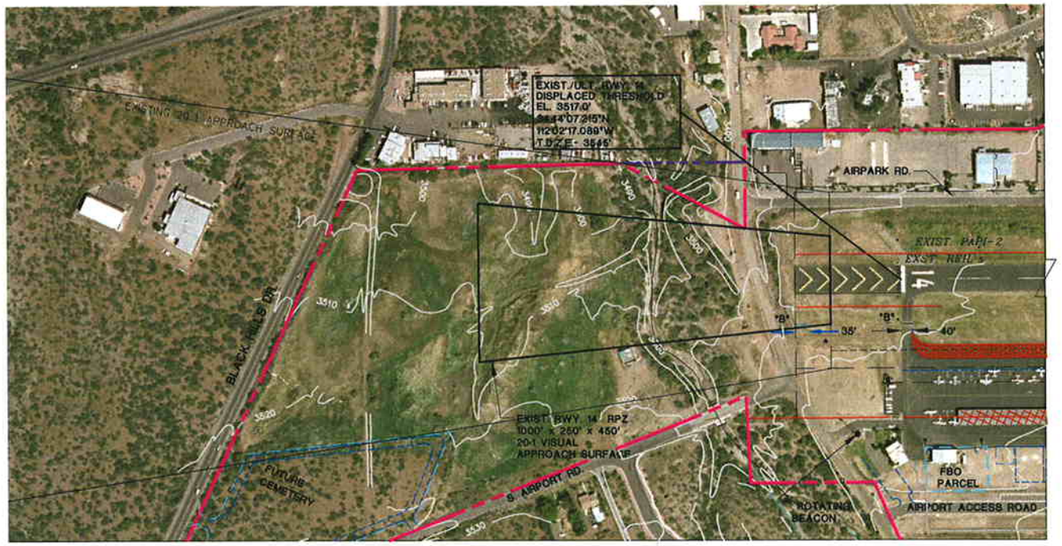
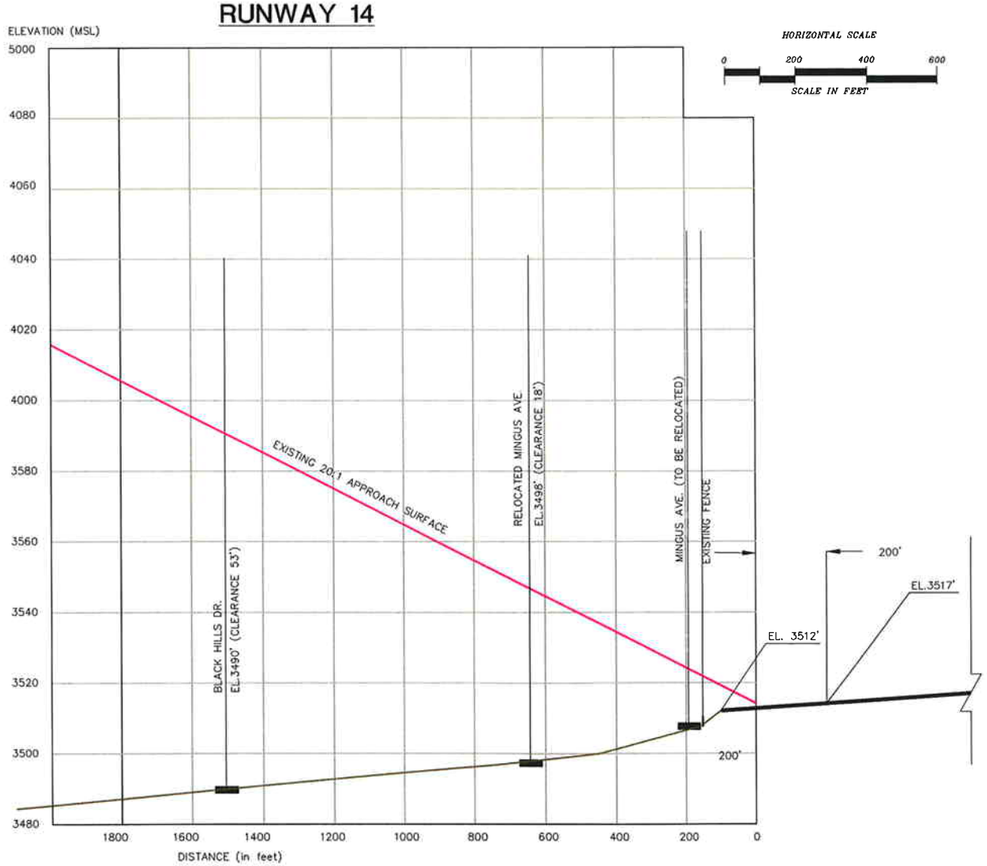
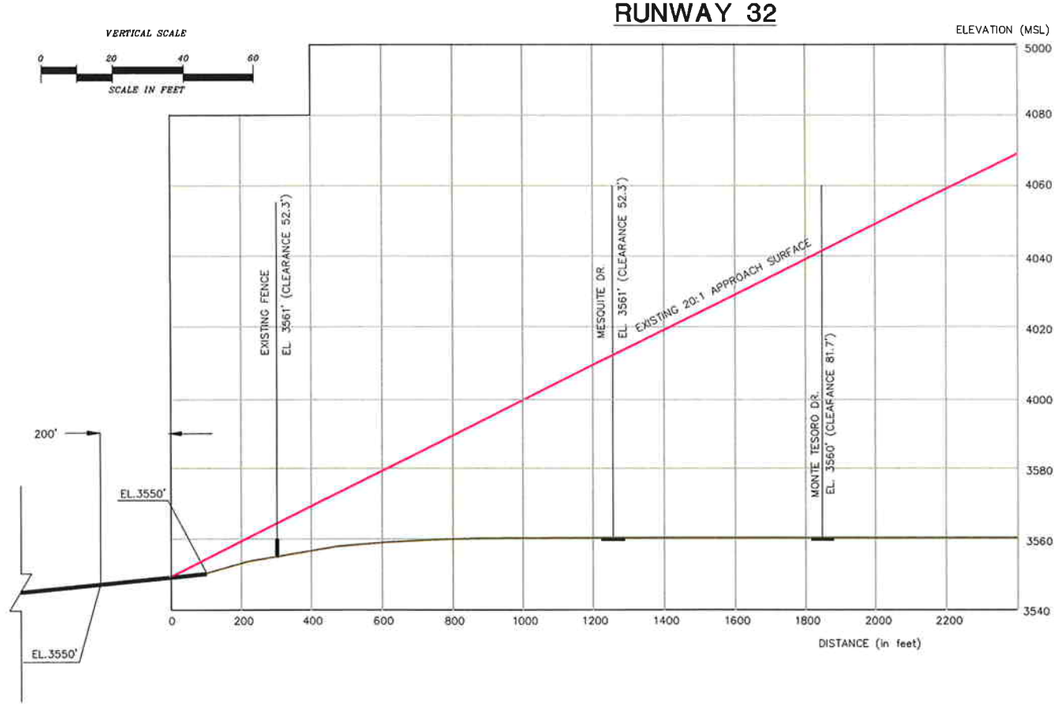


RUNWAY 14



RUNWAY 32



No.	REVISIONS	DATE	BY	APP'D.
3	MASTER PLAN UPDATE	11/17/06	CA	FULL
2	ALP REVISIONS (ADDED REIL'S, APRON EXPANSION, FUEL FARM, AND ACCESS ROAD)	05/09/00	Z&H	REVAL.
1	MASTER PLAN UPDATE (ADOT FUNDED)	10/21/96	CA	FULL

COTTONWOOD MUNICIPAL AIRPORT

INNER PORTION OF THE RUNWAY 14-32 APPROACH SURFACE DRAWING

COTTONWOOD, ARIZONA

PLANNED BY: Steven G. Benson P.E.
DETAILED BY: Maggie Brauer
APPROVED BY: James M. Harris P.E.

November 17, 2006 | SHEET 4 OF 7

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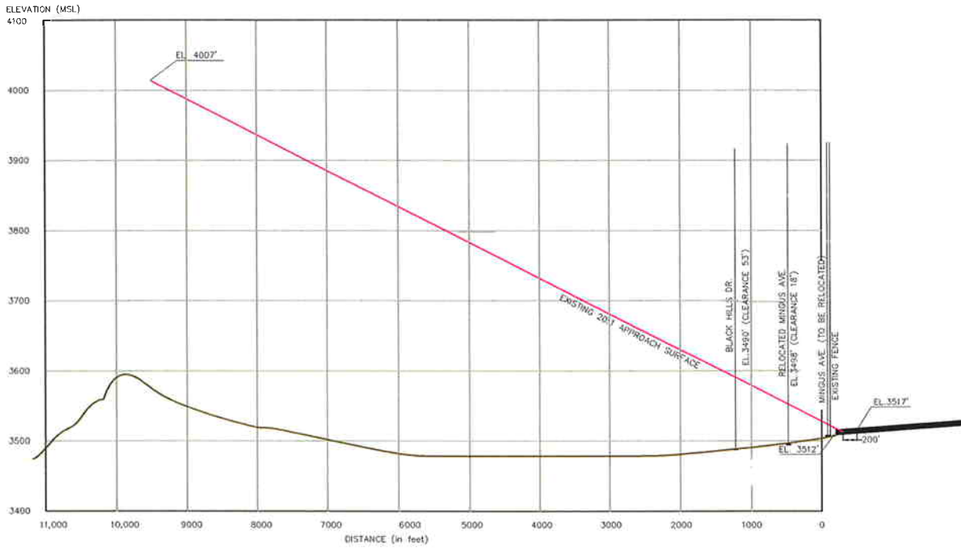
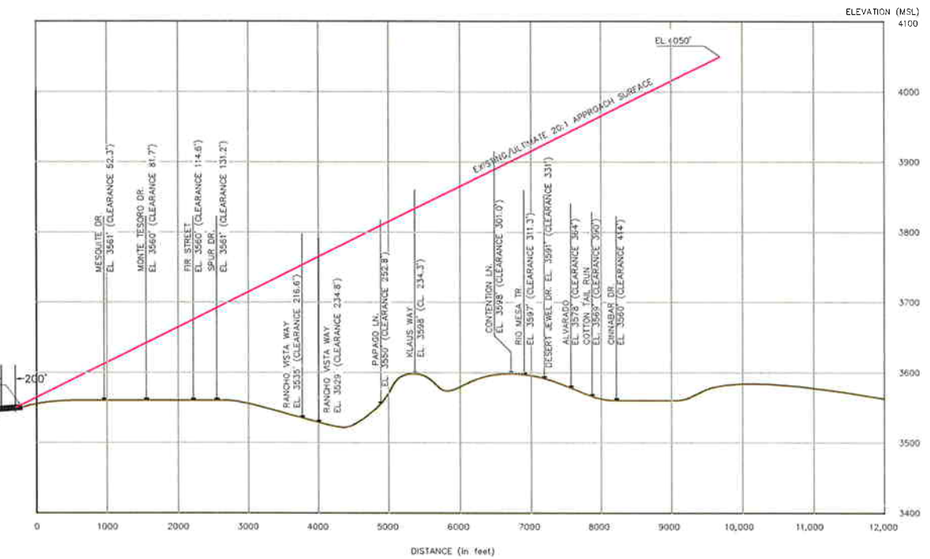
RUNWAY 14



RUNWAY 32



RUNWAY 14-32 APPROACH SURFACE

HORIZONTAL SCALE 0 1000 2000 3000
SCALE IN FEET

VERTICAL SCALE 0 100 200 300
SCALE IN FEET

No.	REVISIONS	DATE	BY	APP'D.
4	MASTER PLAN UPDATE	11/17/06	CA	FULL
3	ALP REVISIONS (ADDED REIL'S, APRON EXPANSION, FUEL FARM, AND ACCESS ROAD)	05/09/00	Z&H	REVAL.
2	MASTER PLAN UPDATE (ADOT FUNDED)	10/21/98	CA	FULL
1				

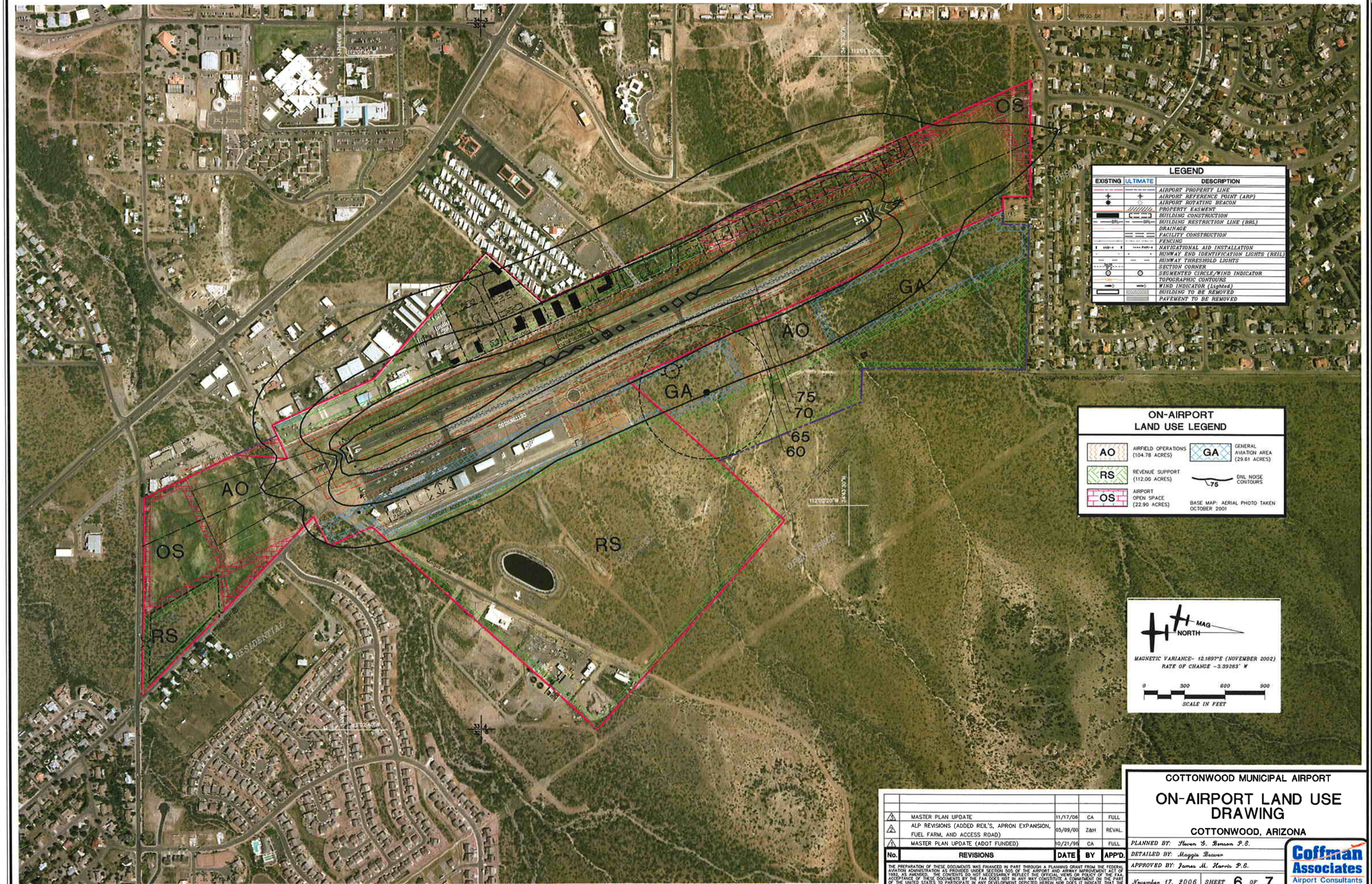
COTTONWOOD MUNICIPAL AIRPORT

RUNWAY 14-32 APPROACH SURFACE PLAN

COTTONWOOD, ARIZONA

PLANNED BY: Steven G. Benson P.E.
DETAILED BY: Maggie Brewer
APPROVED BY: James M. Harris P.E.
November 17, 2006

Coffman Associates
Airport Consultants



No.	REVISIONS	DATE	BY	APP'D
3	MASTER PLAN UPDATE	11/17/06	CA	FULL
2	ALP REVISIONS (ADDED REIL'S, APRON EXPANSION, FUEL FARM, AND ACCESS ROAD)	05/09/00	Z&H	REVAL.
1	MASTER PLAN UPDATE (ADOT FUNDED)	10/21/95	CA	FULL

THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THESE DOCUMENTS BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED HEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

COTTONWOOD MUNICIPAL AIRPORT

ON-AIRPORT LAND USE DRAWING

COTTONWOOD, ARIZONA

PLANNED BY: Steven G. Benson P.E.

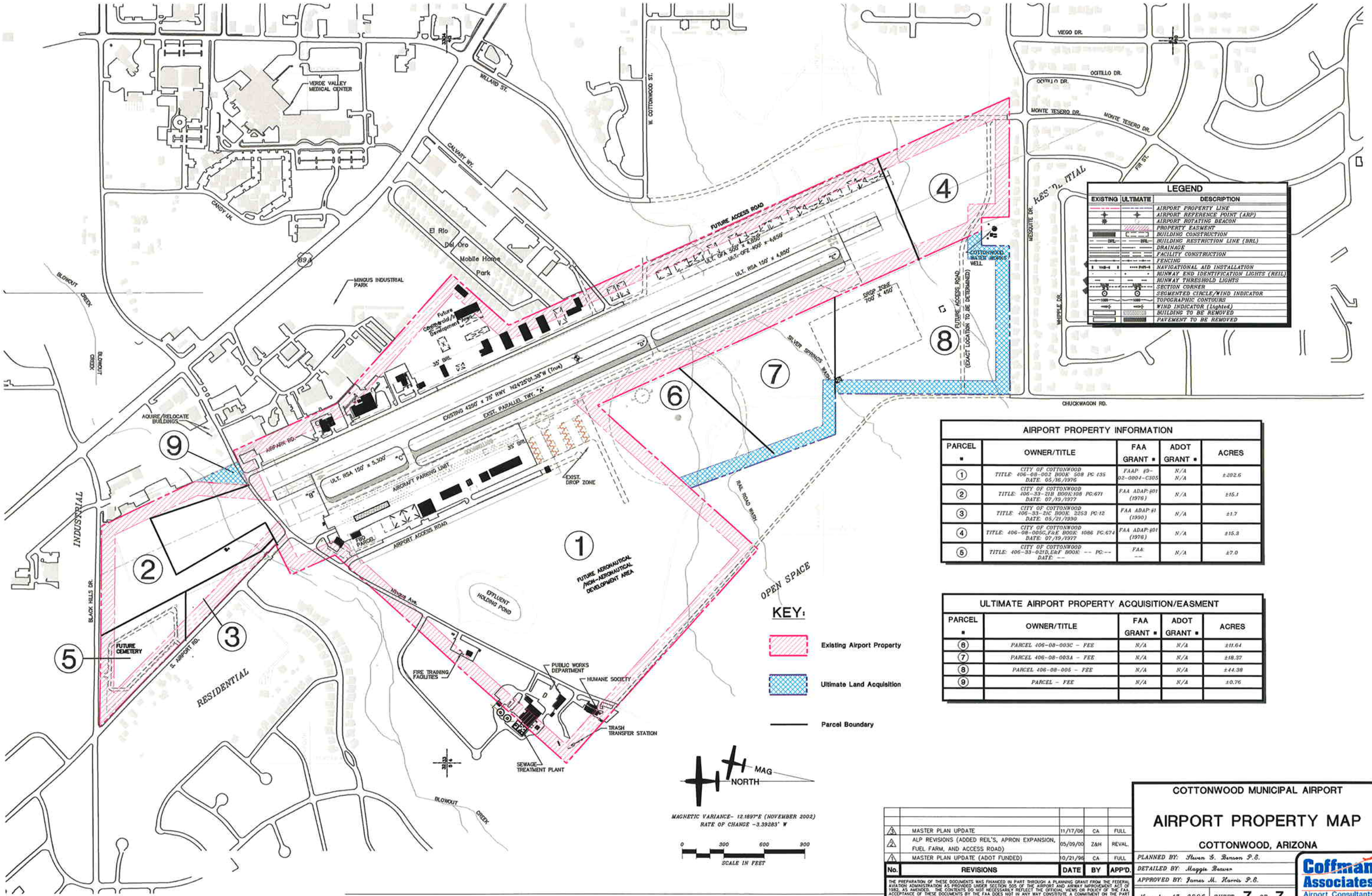
DETAILED BY: Maggie Beaver

APPROVED BY: James M. Harris P.E.

November 17, 2006

Coffman Associates

Airport Consultants



LEGEND		
EXISTING	ULTIMATE	DESCRIPTION
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
		PROPERTY EASEMENT
		BUILDING CONSTRUCTION
BRL	BRL	BUILDING RESTRICTION LINE (BRL)
		DRAINAGE
		FACILITY CONSTRUCTION
		FENCING
		NAVIGATIONAL AID INSTALLATION
		RUNWAY END IDENTIFICATION LIGHTS (REIL)
		RUNWAY THRESHOLD LIGHTS
		SECTION CORNER
		SEGMENTED CIRCLE/WIND INDICATOR
		TOPOGRAPHIC CONTOURS
		WIND INDICATOR (Lighted)
		BUILDING TO BE REMOVED
		PAVEMENT TO BE REMOVED

KEY:

- Existing Airport Property
- Ultimate Land Acquisition
- Parcel Boundary

MAG NORTH

MAGNETIC VARIANCE- 12.1897°E (NOVEMBER 2002)
RATE OF CHANGE -0.39283' W

0 300 600 900
SCALE IN FEET

AIRPORT PROPERTY INFORMATION

PARCEL ▪	OWNER/TITLE	FAA GRANT ▪	ADOT GRANT ▪	ACRES
①	CITY OF COTTONWOOD TITLE: 406-08-002 BOOK: 508 PG:435 DATE: 05/26/1976	FAAP: 9-02-0004-C305	N/A N/A	±202.6
②	CITY OF COTTONWOOD TITLE: 406-33-21B BOOK:108 PG:671 DATE: 07/19/1977	FAA ADAP:#01 (1976)	N/A	±15.1
③	CITY OF COTTONWOOD TITLE: 406-33-21C BOOK: 2353 PG:12 DATE: 05/21/1990	FAA ADAP:#1 (1990)	N/A	±1.7
④	CITY OF COTTONWOOD TITLE: 406-08-005C,F&E BOOK: 1086 PG:674 DATE: 07/19/1977	FAA ADAP:#01 (1976)	N/A	±15.3
⑤	CITY OF COTTONWOOD TITLE: 406-33-021D,E&F BOOK: -- PG:-- DATE: --	FAA: --	N/A	±7.0

ULTIMATE AIRPORT PROPERTY ACQUISITION/EASMENT

PARCEL ▪	OWNER/TITLE	FAA GRANT ▪	ADOT GRANT ▪	ACRES
⑥	PARCEL 406-08-003C – FEE	N/A	N/A	±11.64
⑦	PARCEL 406-08-003A – FEE	N/A	N/A	±18.37
⑧	PARCEL 406-08-005 – FEE	N/A	N/A	±44.38
⑨	PARCEL – FEE	N/A	N/A	±0.76

No.	REVISIONS	DATE	BY	APP'D.
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COTTONWOOD MUNICIPAL AIRPORT

AIRPORT PROPERTY MAP

COTTONWOOD, ARIZONA

PLANNED BY: Steven S. Benson P.E.
DETAILED BY: Maggie Beaver
APPROVED BY: James M. Harris P.E.

November 17, 2006 SHEET 7 OF 7

Coffman Associates Airport Consultants

Coffman Associates ALPPROP.dwg 04/20/2000

COTTONWOOD
MUNICIPAL AIRPORT

APPENDIX D
FAA-Approved Airport Layout Plan

U.S. Department
of Transportation
**Federal Aviation
Administration**

Western-Pacific Region
Los Angeles Airports District Office

P.O. Box 92007
Los Angeles, CA 90009

December 19, 2006

Mr. Tim Costello
Public Works Director
City of Cottonwood
1490 W. Mingus Avenue
Cottonwood, Arizona 86326

Cottonwood Municipal Airport
Airport Master Plan Update Study
Airport Layout Plan - Final Approval

Dear Mr. Costello:

The enclosed Airport Layout Plan for Cottonwood Municipal Airport has been reviewed for revisions requested in our letters of October 25, 2005 and August 21, 2006. The terms specified with the referenced letters have either been met and/or addressed based on conversations between the city (Mr. Tim Costello), Coffman Associates with Mr. Jim Harris and Mr. Steve Benson, Z & H Engineering with Mr. John Berghian and FAA staff (Ms. Margie Drilling and Mr. Eric Vermeeren), therefore, the subject document is hereby conditionally approved. This approval, as indicated by my signature, is given subject to the condition that the proposed airport development listed below, but not limited to, will require an environmental determination and approval by the Federal Aviation Administration (FAA) prior to construction.

- Land Acquisition

The Airport Layout Plan drawing is considered by the FAA as a planning document, **not** an instrument of approval for construction. Therefore, any consideration the city may have of constructing the "future access road" as depicted through the current Runway Protection Zone (RPZ) should be coordinated with FAA prior to initiating any engineering design work for roadway alignment approval. Runway Protection Zones function to enhance the protection of people and property on the ground by keeping the areas free and clear of incompatible objects and activities. In order for the roadway to run through the RPZ, the city would be required to get a release from FAA, prior to construction, to use the property for a non-aviation use. Property releases take upwards to 1-year to complete assuming everything goes as required without any delays. Property is not typically released if it has a high value to the airport, which RPZ land is considered to be.

This approval does not commit this agency to participate in the cost for any development not currently programmed, nor does it negate notification and review requirements imposed by Part 77 and Part 157 of the Federal Aviation Regulations as it pertains to all proposed structures shown on this plan. Further, the Federal Aviation Administration cannot prevent erection of any structure in the vicinity of airports. Airport environs can only be adequately protected through such means as local zoning ordinances.

All future proposed structures shown on the ALP, if not built within six (6) months of the ALP's approval date, shall be filed as separate notice on FAA Form 7460-1 at their time of intended construction. This will enable a current airspace evaluation to be completed with regard to contemporary airspace requirements.

We have returned four (4) copies of the approved plan. Please insure that one (1) approved drawing along with a copy of this approval letter is forwarded to the State of Arizona Department of Transportation (ADOT), Aeronautics Division for their files. The remaining three (3) copies were retained for our files. If we can be of any further assistance please do not hesitate to call.

Sincerely,

Brian Q. Armstrong
Manager, Los Angeles Airports District Office

Enclosures

RUNWAY DATA	RUNWAY 14-32	
	EXISTING	ULTIMATE
RUNWAY CATEGORY/AIRCRAFT DESIGN GROUP	B-I	B-II
APPROACH VISIBILITY MINIMUMS	VISUAL/VISUAL	SAME
CRITICAL DESIGN AIRCRAFT	CITATION I	KING AIR B200
UNDERCARRIAGE WIDTH OF DESIGN AIRCRAFT	17.2'	17.6'
WINGSPAN OF DESIGN AIRCRAFT	46.8'	54.50'
APPROACH SPEED OF DESIGN AIRCRAFT (KNOTS)	72	103
MAXIMUM TAKE OFF WEIGHT (lbs)	11,850	12,500
RUNWAY AZIMUTH	24.417	SAME
RUNWAY BEARING (TRUE)	N24°25'01.38" E	SAME
RUNWAY DIMENSIONS	4,250' X 75'	4,250' X 75'
ELEVATION OF RWY. TOUCH DOWN ZONE (MSL)	3,545.0'/3,550.0'	3,545.0'/3,550.0'
ELEVATION OF RUNWAY HIGH POINT (above MSL)	3,550.0'	3,550.0'
ELEVATION OF RUNWAY LOW POINT (above MSL)	3,517.0'	3,512.0'
WIND COVERAGE IN MPH	12.1-91.88%/15-95.38%	SAME
FAR PART 77 CATEGORY	VISUAL/VISUAL	SAME
RUNWAY INSTRUMENTATION	VISUAL/VISUAL	SAME
RUNWAY APPROACH SURFACES	20:1/20:1	SAME
RUNWAY THRESHOLD DISPLACEMENT	NONE	NONE
RUNWAY STOPWAY	NONE	NONE
RUNWAY SAFETY AREA WIDTH (RSA)	120'	150'
RSA DISTANCE BEYOND EACH RUNWAY END	240'/240'	300'/300'
RUNWAY OBJECT FREE AREA WIDTH (OFA)	250'	500'
OFA DISTANCE BEYOND EACH RUNWAY END	240'/240'	300'/300'
RUNWAY OBSTACLE FREE ZONE WIDTH (OFZ)	300'	400'
OFZ DISTANCE BEYOND EACH RUNWAY END	200'/200'	200'/200'
LINE OF SITE REQUIREMENT	NO	SAME
RUNWAY PAVEMENT MATERIAL	ASPHALT	SAME
RUNWAY PAVEMENT SURFACE TREATMENT	NONE	SAME
PAVEMENT STRENGTH (in thousand lbs.)	12.5(S)	SAME
RUNWAY EFFECTIVE GRADIENT (in %)	0.77%	0.78%
MAXIMUM GRADIENT (in %)	2%	SAME
RUNWAY LIGHTING	MIRL	SAME
RUNWAY MARKINGS	VISUAL/VISUAL	VISUAL/VISUAL
RUNWAY APPROACH LIGHTING	NONE	NONE
DISTANCE FROM RWY. CL TO HOLD BARS	125'/125'	200'/200'
RUNWAY CL TO TAXIWAY CL	150'	240'
TAXIWAY CL TO FIXED OR MOVEBLE OBJECT	100'	SAME
TAXIWAY PAVEMENT MATERIAL	ASPHALT	SAME
TAXIWAY LIGHTING	MITL	SAME
TAXIWAY MARKING	CENTERLINE, HOLDLINES	SAME
VISUAL AIDS	PAPI-2/PAPI-2 REILs	SAME --
NAVIGATIONAL AIDES	-- --	GPS --

Pavement strengths are expressed in Single(S), Dual(D), Dual Tandem(DT), and/or Double Dual Tandem(DDT) wheel loading capacities.

AIRPORT DATA

COTTONWOOD MUNICIPAL AIRPORT (P52)			
CITY: COTTONWOOD, ARIZONA	COUNTY: YAVAPI, ARIZONA		
RANGE: 3 EAST TOWNSHIP: 15, 16 N	CIVIL TOWNSHIP: N/A		
		EXISTING	ULTIMATE
AIRPORT SERVICE LEVEL		GENERAL AVIATION	SAME
AIRPORT REFERENCE CODE		B-I	B-II
AIRPORT ELEVATION ABOVE MSL		3550.00'	3550.00'
MEAN MAXIMUM TEMPERATURE OF HOTTEST MONTH		98.4°F (JULY)	SAME
AIRPORT REFERENCE POINT (ARP) COORDINATES (NAD-83)	Latitude	34°43'48.076" N	SAME
	Longitude	112°02'06.565" W	SAME
AIRPORT and TERMINAL NAVIGATIONAL AIDS		ROTATING BEACON SEGMENTED CIRCLE --	GPS ROTATING BEACON SEGMENTED CIRCLE

BUILDINGS/FACILITIES

EXISTING	ULTIMATE	DESCRIPTION	EL.*
1	--	COTTONWOOD AIR SERVICE OFFICE	--
2	--	COTTONWOOD AIR SERVICE HANGAR (FBO)	--
3	3	CONVENTIONAL HANGAR	--
4	--	T-HANGAR (6-unit)	--
5	--	T-HANGAR (10-unit)	--
6	6	SHADE HANGAR	--
7	--	FUEL STORAGE	--
8	--	ELECTRIC VAULT	--
9	9	COTTONWOOD INDUSTRIAL AIRPARK	--
10	--	COTTONWOOD AIRPARK INC	--
11	11	SKY DIVE COTTONWOOD	--
--	12	WASH RACK	--
--	13	T-HANGAR (8-unit)	--
--	14	AVIATION RELATED BUILDINGS	--
15	15	NON-AVIATION RELATED BUILDINGS	

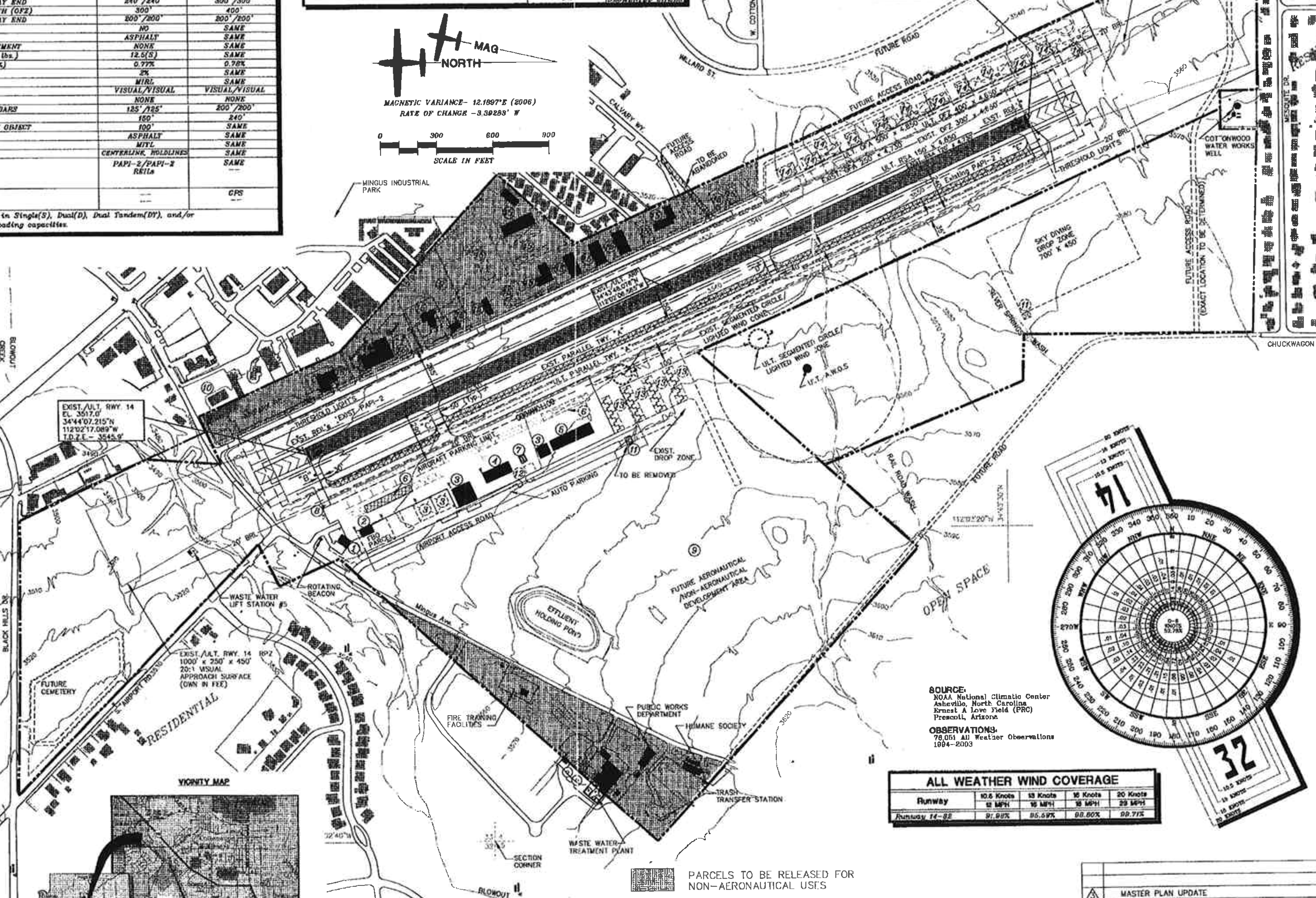
*NOTE: BUILDING AND FACILITY ELEVATIONS WILL BE ADDED WHEN THEY ARE AVAILABLE

RUNWAY END COORDINATES (NAD 83)

RUNWAY		EXISTING	ULTIMATE
Runway 14	Latitude	34°44'07.215" N	SAME
	Longitude	112°02'17.089" W	SAME
Runway 32	Latitude	34°43'28.937" N	SAME
	Longitude	112°01'56.042" W	SAME

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		AIRPORT PROPERTY LINE
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
		AVIGATION EASEMENT (if applicable)
		BUILDING CONSTRUCTION
20' BRL	20' BRL	BUILDING RESTRICTION LINE (20'-BRL)
		OBJECT FREE AREA (OFA)
		RUNWAY SAFETY AREA (RSA)
		OBSTACLE FREE ZONE (OFZ)
		DIRT ROAD
		FACILITY CONSTRUCTION
		FENCING
PAPI-2	PAPI-2	NAVIGATIONAL AID INSTALLATION
		RUNWAY END IDENTIFICATION LIGHTS (REIL)
		RUNWAY THRESHOLD LIGHTS
		SECTION CORNER
		SEGMENTED CIRCLE/LIGHTED WIND TEE
4080	4080	TOPOGRAPHIC CONTOURS
		WIND INDICATOR (Lighted)
N/A		BUILDING TO BE REMOVED
N/A		PAVEMENT TO BE REMOVED
		HOLD LINES



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Ernest A Love Field (PRC)
Prescott, Arizona

OBSERVATIONS:
76,051 All Weather Observations
1994-2003

ALL WEATHER WIND COVERAGE

Runway	10.5 Knots	13 Knots	16 Knots	20 Knots
	12 MPH	15 MPH	18 MPH	23 MPH
Runway 14-32	91.98%	95.59%	98.80%	99.71%

SUBMITTED BY:
Coffman Associates
FOR APPROVAL BY:

APPROVED BY: [signature]
Brian Mickelsen, City Manager
CITY OF COTTONWOOD

FAA APPROVAL STAMP

Approved conditionally DEC 19 2006
Subject to comments contained in our letter dated: DEC 19 2006
FEDERAL AVIATION ADMINISTRATION
Western-Pacific Region
By [signature]
Manager - LAX-ADO

GENERAL NOTES:

1. Depiction of features and objects, including related elevations within the runway protection zones are depicted on the INNER APPROACH SURFACE DRAWING.
2. Details concerning terminal improvements are depicted on the TERMINAL AREA PLAN.
3. Recommended land uses within the airport environs are depicted on the AIRPORT LAND USE PLAN.
4. Detail concerning airport property are depicted on the AIRPORT PROPERTY MAP.
5. The Building Restriction Lines (BRL) are set for the ultimate runway conditions. The BRL's encompass the runway protection zones, the runway object free area, the runway visibility zone, Navaid critical areas and areas required for terminal instrument procedures. The established BRL is an estimate of the minimum distance to the runway for an object for an object 20 feet in height. Prior to constructing any building or object on the airport, a F.A.R. Part 77 obstruction analysis should be conducted.
6. Ultimate fence line extends around Existing/Ultimate Property Line except where shown.
7. Base map derived from aerial photo taken 10/01 and USGS maps 034112F1 Cottonwood 1973 and 034112g1 Clarkdale 1973.
8. Source for runway elevations, Aerial Survey, Airport Facility Directory and calculations using Geodetic Calculator Program using NAVD 88, for Vertical Datum and NAD 83, for Horizontal Datum.
9. The airport meets ADOT Aeronautics minimum guidelines for an ARC B-II airport.
10. The airport has not been surveyed in accordance with FAA standard 405.
11. "NO THRESHOLD SITING SURFACE OBJECT PENETRATIONS"

RECEIVED

DEVIATIONS FROM FAA AIRPORT DESIGN STANDARDS

DEVIATION DESCRIPTION	EFFECTED DESIGN STANDARD	STANDARD	EXISTING	PROPOSED DISPOSITION
FENCE AND ROADWAY IN OBJECT FREE AREA	B-II OBJECT FREE AREA WIDTH	250' FROM RUNWAY CL	200' FROM RUNWAY CL	AT TIME OF UPGRADE TO B-II STANDARDS (PARALLEL TAXIWAY RELOCATION), A MODIFICATION TO STANDARDS WILL BE REQUESTED

No.	REVISIONS	DATE	BY	APP'D.
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COTTONWOOD MUNICIPAL AIRPORT

CITY OF COTTONWOOD
PUBLIC WORKS

AIRPORT LAYOUT PLAN

COTTONWOOD, ARIZONA

PLANNED BY: Steven G. Benson P.E.
DETAILED BY: Maggie Brewer
APPROVED BY: James M. Harris P.E.
November 17, 2006 SHEET 1 OF 7

Coffman Associates
Airport Consultants
www.coffmanassociates.com

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