CITY OF MARICOPA

PROUD HISTORY • PROSPEROUS FUTURE

AIRPORT FEASIBILITY STUDY

AIRPORT FEASIBILITY AND SITE SELECTION STUDY

MARICOPA, ARIZONA

Prepared for the

CITY OF MARICOPA

By

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Introduction and Background Data Base

Chapter One

Introduction and Background Data Base

The City of Maricopa, in cooperation with the Arizona Department of Transportation, commissioned this Airport Feasibility Study to provide a preliminary market analysis of the potential for a general aviation airport in the city. This study is considered as an initial or Phase I examination of the potential development of an airport. The Feasibility Study will be a tool to assist the City of Maricopa in determining whether to proceed into Phase II with an Airport Site Selection Study.

If a site is selected for development consideration, then Phase III, an Airport Master Plan and Environmental Assessment, would be undertaken. The completion of each phase will be a decision point for the City of Maricopa on whether to proceed further.

The specific objectives of this Phase I Airport Feasibility Study include:

- Review area socioeconomic characteristics, local and regional community planning, area physical and environmental characteristics, and weather data as they may relate to airport development potential.
- Review physical and operational characteristics and constraints at other area airports.
- Determine current and projected aviation activity that a new airport could reasonably expect.
- Conduct research of other airports and identify possible market niches for a new airport.

- Establish the general airport requirements for a new airport.

- Perform a preliminary cost/benefit analysis on a potential airport.

The purpose of this first chapter is to examine the existing conditions within the Maricopa area. This will begin with an examination of the socioeconomic characteristics of the region. General land use and environmental and physical features will also be examined in the airport siting area. Finally, this chapter will examine the existing airport and airspace system serving the southwest sector to the Phoenix metropolitan area, as well as the level of aircraft ownership in the area.

GENERAL SETTING

The City of Maricopa is located in central Arizona approximately 35 miles south of Phoenix and about 20 miles northwest of Casa Grande. Maricopa was incorporated on October 15, 2003, becoming the 88th incorporated city in Arizona. **Exhibit 1A** depicts the city in its regional locale.

The first known historical reference to Maricopa is a 1694 journal entry by Father Euseblo Francisco Kino, which describes an area that would become Maricopa Wells. He noted an agricultural community populated by friendly Native Americans who were established traders.

In the mid-1800s, when everything south of the Gila River was still a part of Mexico, Maricopa Wells was a dependable source of water along the Gila Trail. It became an important and famous stage stop for the Butterfield Overland Mail Line that stretched from St. Louis to San Francisco. The 1870s brought the railroad south of the wells.

Maricopa settled into a slower pace as rail traffic north was halted in 1935. Agricultural production had been consistent through time, but it became a catalyst when the rail service was cut. The increased mechanization of agriculture slowed the flow of people, but it created a healthy farm economy that thrives today. Cotton, grains, fruit, vegetables, and beef thrive in the arid desert, making Maricopa one of the most productive farm communities in the state.

Fueled by explosive growth, the population of Maricopa is expected to increase at a rate greater than 50 percent per year for at least the next five years, exceeding 100,000 residents by 2010. This growth brings tremendous opportunities for business and commerce in terms of the population to be served. The City of Maricopa is in partnership with the private business sector and is actively engaged in recruiting universities, colleges, hospitals, and employers to the community. The importance of bringing business and employment growth into the city is of prime significance to the City Council.

The Estrella Mountains offer desert picnic and rock-hounding areas and petroglyphs. The Estrella Sailport offers glider pilot training and aerobatic glider flights. North of Maricopa is

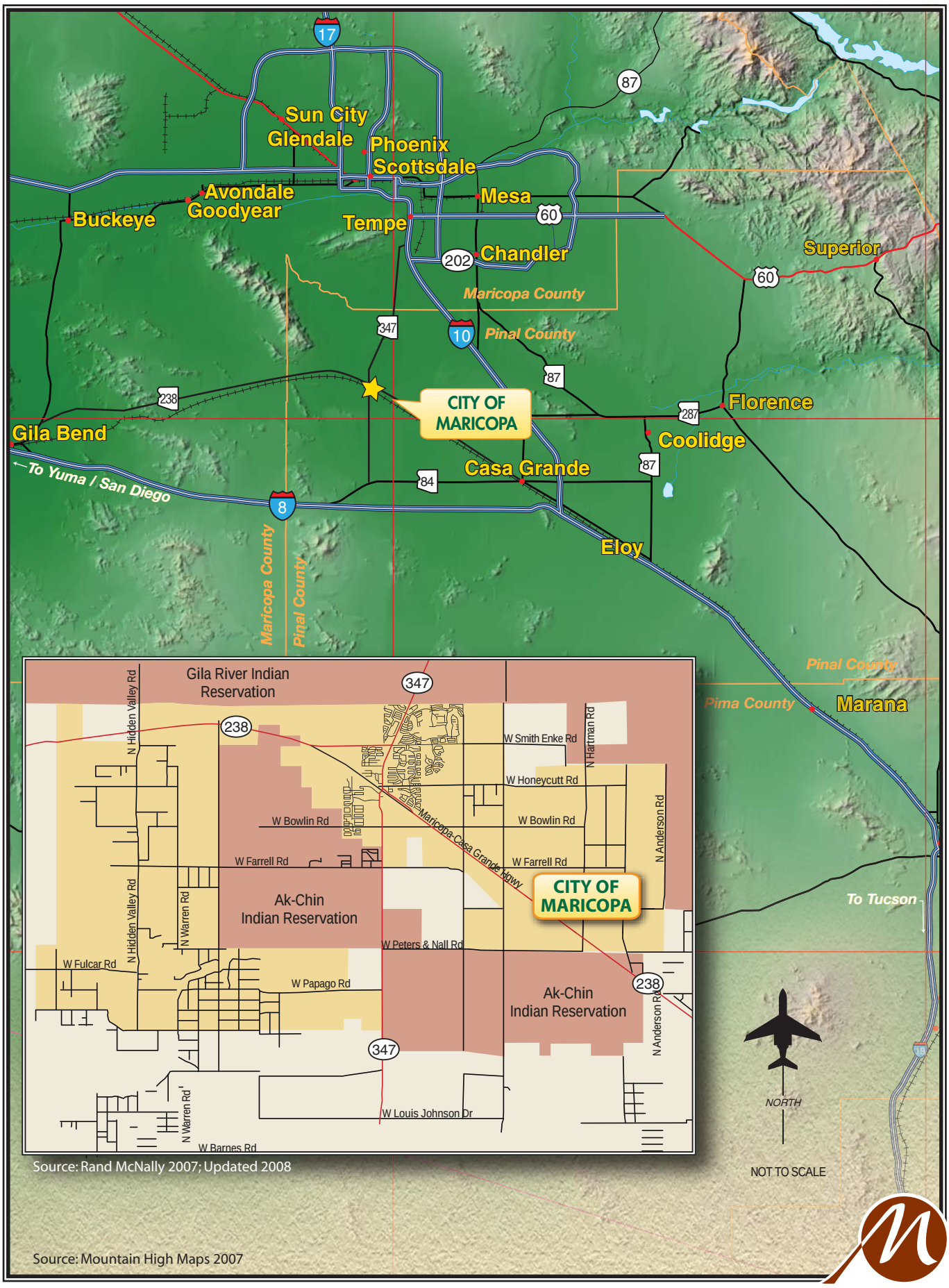

Exhibit 1A
LOCATION MAP

Firebird International Raceway, featuring three road racing courses, a drag strip, and a 120-acre private water sport lake where major spectator motor sports are held.

The Him-Dak Museum, located in the Ak-Chin Indian Community, features Native American artifacts. Nearby Francisco Grande Resort has an 18-hole golf course. Other activities include horseback riding, quail/dove hunting, clogging, and cotton gin tours. Annual events include an antique car show, Stanfield Friendship Days Parade, Maricopa Stagecoach Days and Parade, fireworks, a watermelon bust, and the Maricopa Agricultural Center Bar-B-Que and Air Show.

REGIONAL SURFACE TRANSPORTATION

The primary roadway within Maricopa is State Route (SR) 347 (also known as Maricopa Road and John Wayne Parkway). This is a four-lane highway which traverses the community in a north-south alignment. It serves as the primary link between Maricopa and the Phoenix metropolitan area. As a result, it is the key route for commuters living in the Maricopa area. In addition, the highway is often used by east metro area residents as a cut-off between Interstate 10 to the north and west-bound Interstate 8 south of Maricopa.

The other major highway passing directly through Maricopa is SR 238, commonly known as the Maricopa-Casa Grande Highway. SR 238 parallels the Union Pacific Railroad in a northwest-southeast alignment through the city. As suggested by its name, the Maricopa-Casa Grande Highway connects the two western Pinal County cities. It extends southeast of Casa Grande to SR 87 east of Eloy. To the west, the highway extends to Gila Bend and Interstate 8.

While not running through the corporate limits of the City of Maricopa, there are two other highways that traverse the southern portions of the Maricopa planning area. SR 84 extends from SR 87 south of Coolidge, westward through Casa Grande. It intersects SR 347 approximately 12 miles south of Maricopa. At that point, SR 84 turns to the southwest to terminate at Interstate 8. Interstate 8 runs through the southern portion of the Maricopa planning area, beginning at Interstate 10 south of Casa Grande. Interstate 10 provides the Phoenix area highway links to the major cities of Los Angeles, Las Vegas, Tucson, and El Paso. Interstate 8 provides freeway access to San Diego and Southern California.

The Union Pacific Railroad (UPRR) parallels the Maricopa-Casa Grande Highway and SR 238 from Casa Grande to Gila Bend. Currently, between 45 and 55 different freight trains operate daily through Maricopa. Union Pacific expects the number of daily trains to reach 70 within the next few years and 80 by 2013. Amtrak's Orlando-Los Angeles Sunset Limited has a scheduled stop in Maricopa. The Amtrak station is located just east of the SR 347 crossing of the UPRR tracks.

No local or regional bus lines operate within Maricopa city limits. The closest Greyhound bus station is in Casa Grande, and the closest taxicab companies serve Maricopa from Chandler or Casa Grande. One shuttle service operates on an on-call basis from the Maricopa Amtrak station to the metropolitan Phoenix area.

CLIMATE

Weather conditions are important to the planning and development of an airport. Temperature is an important factor in determining runway length requirements, while wind direction and speed are used to determine optimum runway orientation. The need for navigational aids and lighting is determined by the percentage of time that visibility is impaired due to cloud coverage or other conditions. **Table 1A** summarizes monthly climatic data for the City of Maricopa, including temperatures and precipitation. Low temperatures in December average 34°F, while the high temperatures in July average 107°F. Annual precipitation is less than eight inches.

TABLE 1A
Climate Summary
Maricopa, AZ

Month	Avg. Low Temperature	Avg. High Temperature	Precipitation (inches)
January	35°F	66°F	0.7
February	38°F	71°F	0.8
March	43°F	77°F	0.9
April	49°F	86°F	0.3
May	57°F	95°F	0.1
June	67°F	105°F	0.2
July	76°F°	107°F	0.8
August	75°F	105°F	1.0
September	67°F	100°F	0.7
October	53°F	89°F	0.6
November	41°F	75°F	0.6
December	34°F	66°F	1.0
Yearly Avg.	53°F	87°F	7.6

Source: Western Regional Climate Center (Period of Record 1960-2004).

SOCIOECONOMIC PROFILE

A socioeconomic profile provides a general look at the demographic and economic make-up of the community that would utilize an airport. It also provides a background for understanding the dynamics of growth and the potential changes that could affect future aviation demand. Aviation demand can normally be linked to the population base, economic strength of the region, and the ability to maintain a strong economic base over an extended period of time. Demographic and economic information cited here

was collected from several local, state, and federal sources.

POPULATION

Population is one of the most basic elements to consider when planning airport needs. An examination of population statistics should concentrate on areas of influence within the study area. For this study, historical and forecasted population was examined for the City of Maricopa, Pinal County, and Maricopa County. Historical population statistics for these areas are presented in **Table 1B**.

As shown in the table, Pinal County experienced a 5.8 percent annual growth rate from 1990 to 2006. This is greater than the growth rate of Maricopa County, of 3.7 percent during this same time. Because the City of Maricopa was not incorporated until 2003, limited historical data is available. Between 2000 and 2006, the City experienced phenomenal population growth, increasing from approximately 1,040 residents in 2000 to over 24,000 in 2006. This represents an average annual growth rate of nearly 70.0 percent.

TABLE 1B
Historical Population
Maricopa Airport Feasibility Study

Year	City of Maricopa	Pinal County	Maricopa County
1990	N/A	116,379	2,122,101
2000	1,040	179,727	3,072,149
2006	24,600[1]	286,800[1]	3,806,800[1]
Annual Growth Rate	69.5% (2000-2006)	5.8% (1990-2006)	3.7% (1990-2006)

Source: U.S. Census Bureau.
[1]Estimated on July 1, 2006.

Locally referred to as "hyper-growth," projections for the City of Maricopa are staggering. Fueled by this explosive growth, the population of Maricopa is expected to increase at a rate greater than 50 percent per year for at least the next five years. **Table 1C** presents population projections for the City of Maricopa as put forward in the *Maricopa General Plan.* These projections are based on a continuation of existing growth rates for five years, and a moderation in growth over the following ten years, along with modest annexation of developable properties. As shown in the table, the City's population by 2020 is projected to reach 190,000.

TABLE 1C
Population Projections
City of Maricopa

Year	City of Maricopa
2010	106,000
2015	148,000
2020	190,000

Source: The Maricopa General Plan.

In the summer of 2005, the City of Maricopa calculated that three new residents per hour were moving into the City. While growth has stabilized somewhat, Maricopa is still seeing up to 30 new residents per day. As of 2007, the city continued to issue an average of 270 new residential building permits per month. While much of the new residential development within the city has emerged east of John Wayne Parkway, significant development is also occurring west of John Wayne Parkway and south of the Union Pacific Railroad.

Table 1D presents growth assumptions for the Maricopa Planning Area through 2025. These projections are based on the continuance of current growth patterns, which are driven by the housing market in the city and county, reasonable access by John Wayne Parkway, land availability, and other factors. Population projections utilize 2.8 persons per dwelling unit and sustained rapid growth to reach an estimated population of 350,000 by 2025 for the Maricopa Planning Area.

TABLE 1D
Growth Assumption
Maricopa Planning Area

	2005	2025
Population	14,000	350,000
Dwelling Units	5,000	130,000
Employment	2,400	189,400
Commercial (s.f.)	300,000	12,350,000

Source: The Maricopa General Plan.

Table 1E presents population projections for Pinal County. The County's population is expected to grow at an average annual rate of 10.9 percent over the next twenty years, reaching a total population of nearly two million by 2025. According to the *Pinal County Small Area Transportation Study (SATS)*, the areas projected to experience substantial growth include Eloy, Maricopa, Casa Grande, Coolidge, and Florence.

Exhibit 1B was derived from a graphic prepared by the Maricopa Association of Governments (MAG). The exhibit shows the anticipated growth of population centers in Maricopa, Pinal, and Pima Counties between 2000 and 2050. It becomes quite evident from this depiction that Pinal County is developing into a metropolitan center between the Phoenix and Tucson metropolitan areas.

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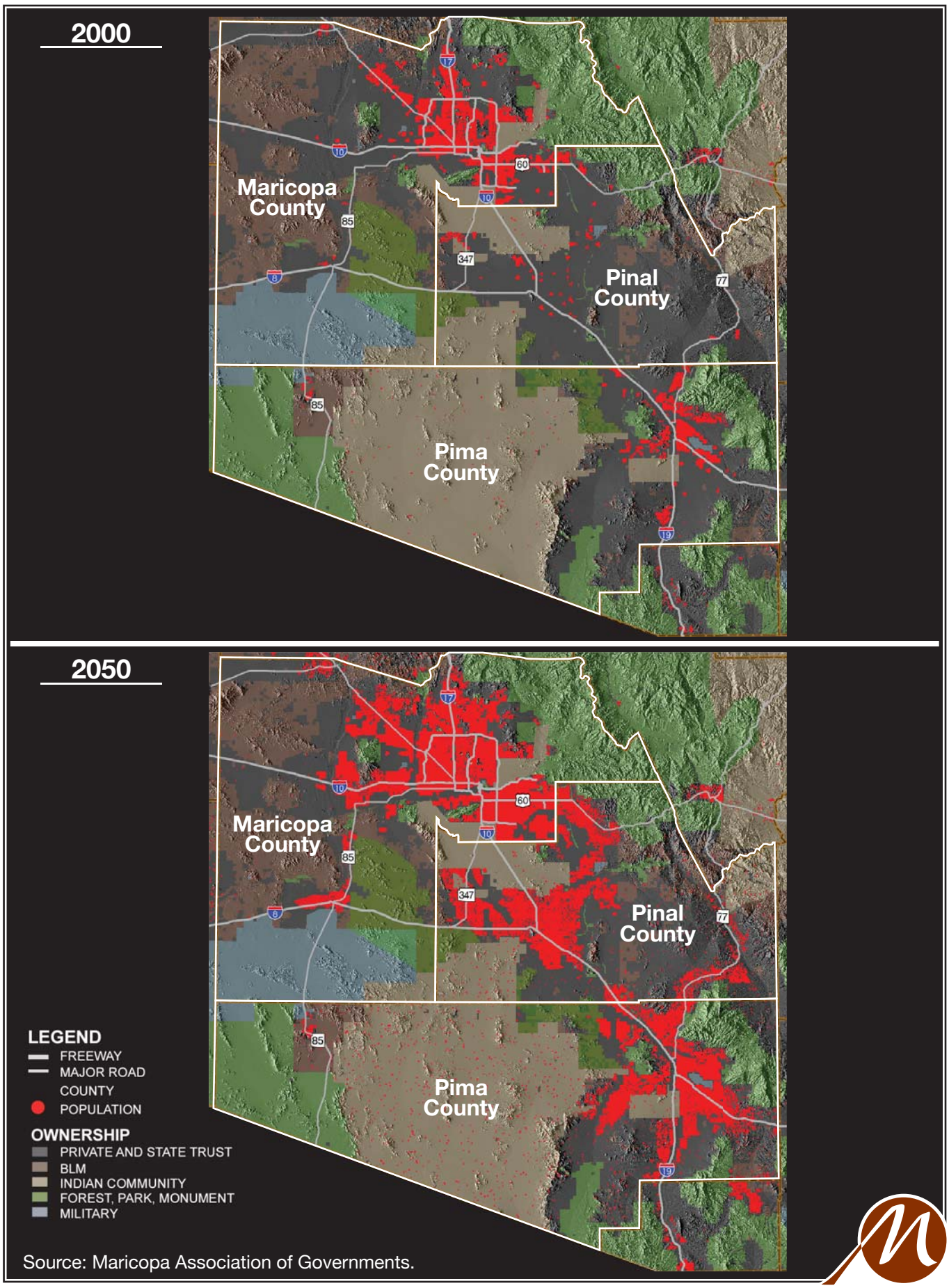

Source: Maricopa Association of Governments.

Exhibit 1B
POPULATION GROWTH
SOUTH CENTRAL ARIZONA

TABLE 1E
Population Projections
Pinal County

Study Area	2005 Population	2025 Population	Population Increase	Average Annual Growth
Western	94,000	789,700	695,700	11.2%
North Central	121,900	884,200	762,300	10.4%
Eastern	32,200	280,100	247,800	11.4%
County Total	248,100	1,954,000	1,705,800	10.9%

Source: Pinal County Small Area Transportation Study (August 2006).

EMPLOYMENT

Analysis of a community's employment profile can be valuable in determining the overall well-being of that community. In most cases, the community makeup and health are significantly impacted by the availability of jobs, variety of employment opportunities, and types of wages provided by local employers. Employment forecasts for Pinal County and its three regions were prepared as part of the county's SATS study in 2006. As presented in **Table 1F**, employment is projected to grow at an even faster rate than population. These forecasts were based upon an expectation that the growth of the Phoenix metropolitan area to the north and the Tucson metropolitan area to the south will continue to extend into Pinal County. While growing essentially as a suburban community (home prices in Pinal County remain approximately 80 percent of those in Maricopa County), the goods and services required by the residents would create jobs and expand the economy within Pinal County.

TABLE 1F
Employment Projections
Pinal County

Study Area	2005 Employment	2025 Employment	Population Increase	Average Annual Growth
Western	21,977	259,706	237,729	13.1%
North Central	18,149	216,346	198,197	13.2%
Eastern	2,851	43,722	40,871	14.6%
County Total	42,977	519,774	476,797	13.3%

Source: Pinal County Small Area Transportation Study (August 2006).

At the local level, Maricopa's businesses and industries have traditionally been geared toward farming and ranching. However, its economic base has been diversifying through companies such as Volkswagen and Nissan,

both of which have proving grounds in the area. Harrah's Ak-Chin Casino also contributes to the growing economy. The largest industries are agriculture, retail, and manufacturing.

Exhibit 1C depicts future employment centers in the Maricopa Planning Area. This information was obtained from the 2005 *Maricopa General Plan*.

INCOME

Table 1G summarizes historical and forecast per capita personal income (PCPI), adjusted for 2006 dollars, for Pinal County, Maricopa County, the State of Arizona, and the United States. This data was obtained from the 2006 *Complete Economic and Demographic Data Source* (CEDDS), Woods and Poole Economics, Inc. As shown in the table, Pinal County's PCPI has remained the lowest of the four compared areas and is estimated to be $17,700 currently. This is $10,000 less than Maricopa County and nearly $12,000 less than the United States.

Projections of PCPI indicate an annual growth rate of 1.5 percent for Pinal County through 2030. This is a higher growth rate than projected for Maricopa County or the state and nation.

TABLE 1G
Per Capita Personal Income (2006$)

Year	Pinal County	Maricopa County	State of Arizona	United States
1990	$14,200	$22,100	$19,800	$22,600
2000	$16,500	$27,100	$24,000	$27,900
2007	$17,700	$27,900	$25,100	$29,100
Annual Growth Rate (1990-2007)	1.3%	1.4%	1.4%	1.5%
FORECASTS				
2010	$18,500	$28,800	$26,000	$30,100
2020	$21,400	$32,100	$29,200	$33,700
2030	$24,900	$36,000	$32,900	$37,800
Annual Growth Rate (2007-2030)	1.5%	1.1%	1.2%	1.1%

Source: *Complete Economic and Demographic Data Source* (CEDDS), Woods & Poole, Inc. (2006).

ENVIRONMENTAL INVENTORY

Available information regarding the existing environmental conditions in Maricopa and northwest Pinal County, Arizona has been derived from internet resources, agency maps, and existing literature. The intent of this section is to inventory potential land use environmental sensitivities that might affect construction and planning of the future airport. These resources are discussed further within the following

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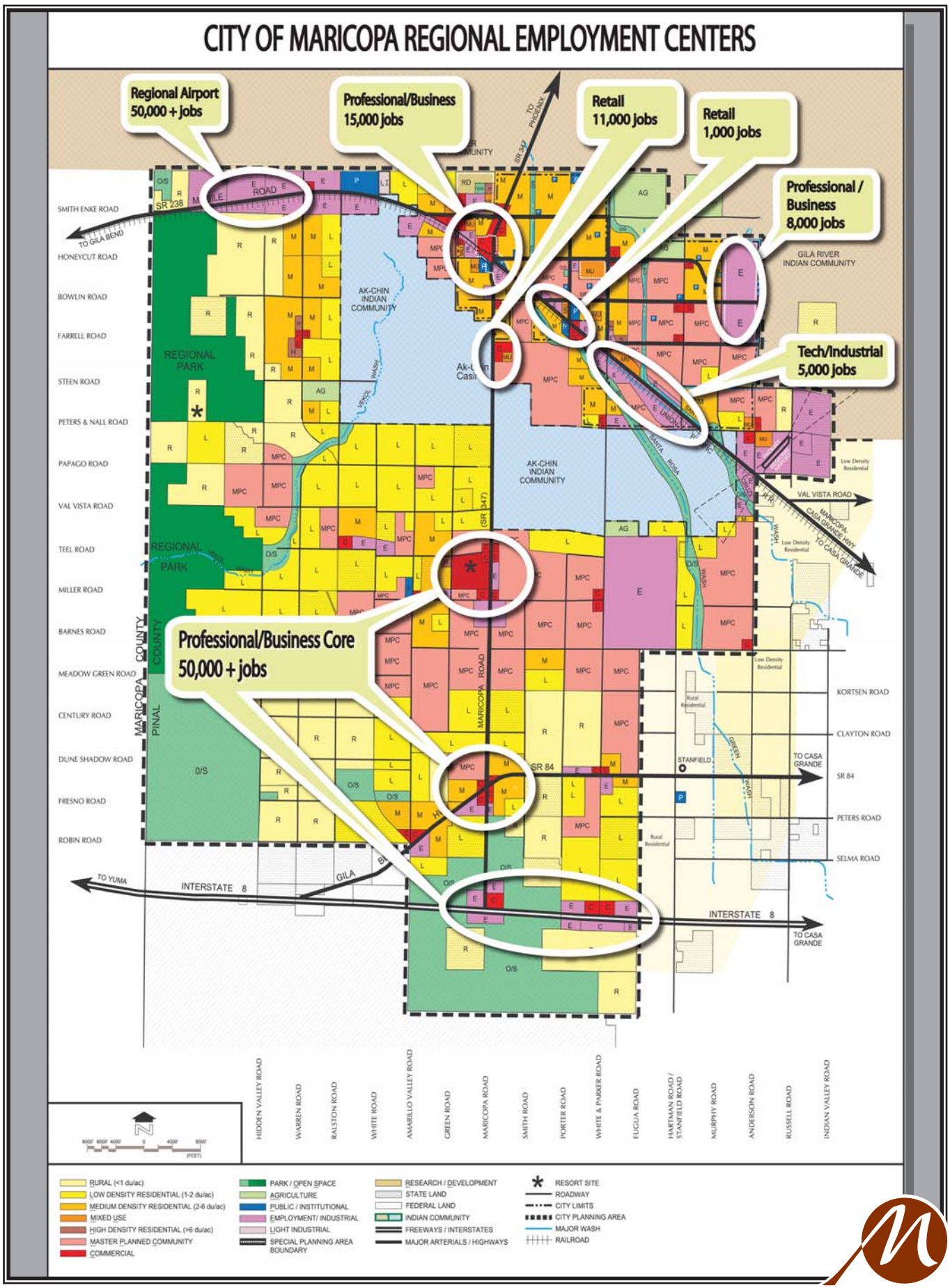

Exhibit 1C
FUTURE EMPLOYMENT CENTERS

subsections and are depicted on **Exhibit 1D**.

EXISTING LAND USE

Land use is an important consideration when determining the needs of an existing airport or the construction of a new airport. By understanding the land use issues, more appropriate recommendations can be made for the future.

Pinal County was formed from portions of Maricopa and Pima Counties and encompasses 5,374 square miles, of which 4.5 square miles are water. In both economy and geography, Pinal County has two distinct regions. The eastern portion is characterized by mountains with elevations to 6,000 feet above mean sea level (MSL) and copper mining. The western area is primarily low desert valleys and irrigated agriculture.

The State of Arizona is the County's largest landowner with 35 percent, followed by Native American lands with 23 percent. Private individuals and corporations own 22 percent, the U.S. Forest Service and Bureau of Land Management control 14 percent, and the remaining six percent is other publicly owned lands.

As in the rest of the County, much of the land within the airport study area is currently owned and/or managed by Native American Communities, the Bureau of Land Management (BLM), or the Arizona State Land Trust.

The Ak Chin Indian Community is located on 22,000 acres within the study area. The community consists of both Tohono O'odham (Papago) and Pima Indians. The Santa Cruz Wash (to the east) and the Vekol Wash (to the west) traverse the community from north to south. The land is primarily used for agriculture with 15,000 acres currently irrigated.

The Gila River Indian Community is located just north and east of the study area on 372,000 acres. This community traces its roots to the Hohokam, prehistoric Indians who lived and farmed along the Gila River Basin centuries ago. The community is composed of two tribes, the Pima and Maricopa. This area is rich in agriculture with 37,000 acres currently utilized as community and private agriculture activities.

BLM lands are located in the western boundary of the study area. Table Top Wilderness Area is located southwest of the study area and consists of 34,400 acres. Table Top Mountain, at 4,373 feet, is the highest peak in the area and its flat-topped summit is a familiar landmark. Steeply rising flat-top mesas, ridges, lava flows, wide canyons and mesquite and ironwood-lined washes surround Table Top Peak. The Sierra Estrella Wilderness Area is located on 14,400 acres northwest of the study area. It is bordered to the north and east by the Gila River Indian Community.

Arizona State Trust lands are dispersed throughout the study area.

The largest beneficiary to these trust lands is the common schools (K-12) owning approximately 87 percent of these trust lands.

The current boundaries of the City of Maricopa within the study area are also depicted on **Exhibit 1D**. As evident by the growing population, residential is rapidly developing and is expected to soon overtake agriculture as the predominant land use within the City.

The highly developable nature of the area has drawn a significant amount of interest both within the city as well as the rest of the study area. There are a number of plats and proposals throughout the area.

Exhibit 1E depicts future land uses in the Maricopa Planning Area in the area as outlined in the 2005 *Maricopa General Plan*. As evidenced from this exhibit as well as **Exhibit 1C**, employment land uses are planned to grow along the Maricopa-Casa Grande Highway/Union Pacific corridor and the SR 347 corridor. Of the 172,000 acres in the planning area, 97,000 acres are planned for residential uses.

PHYSICAL CHARACTERISTICS

Geology

Topography is comprised of mountainous areas along the western boundary of the study area and lowland valleys in the central and eastern portions. The Palo Verde Mountains, located in the northwest corner of the study area, reach an elevation of 2,117 feet. The Haley Hills are located south of these mountains and have an elevation of approximately 500 feet. Hidden Valley is located between these two features. Just east of the study area, within the Gila River Indian Community, are the Sacaton Mountains with an elevation of 2,235 feet.

Much of the land in the central portions of the study area is irrigated for agricultural purposes. Any land in Arizona which is currently under irrigation is considered to be prime farmland.

According to the *Pinal County Open Space and Trails Master Plan*, the majority of the area has slopes from 0-3 percent. Slopes in this range can be easily developed with minimal impact on the environment. Within the mountainous regions to the west along the county line, slopes greater than 20 percent can be found. Slopes in this range are not conducive to development.

An additional consideration for the airport site is the potential for earth fissures. According to the Arizona Geological Survey's Earth Fissure Center website (www.azgs.az.gov/efc.html), "Earth fissures are associated with basin subsidence that accompanies extensive ground water mining." Fissures can be more than a mile in length, up to 15 feet wide, and hundreds of feet deep. Fissures typically develop during torrential rains, opening crevices in the earth's surface.

The Arizona Geological Survey has the responsibility to map known or reported earth fissures. The City of Ma-

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GILA RIVER

AK CHIN

AK CHIN

RESERVATION

238

Juan Bautista de Anza

Santa Cruz Wash

Santa Rosa Wash

Vekol Wash

347

NORTH

LEGEND

- City of Maricopa
- State Land Trust
- Bureau of Land Mangement
- Landfill
- Tribal Lands
- 100 Year Floodplain*
- Urban Areas
- Highway
- Union Pacific Railroad
- Underground Gas Pipe Line
- Cultural Resources
- Subsidence Potential
- Known or Reported Fissures

* In populated areas, much of the 100-year floodplain is contained with channels and culverts to protect areas from flooding

Source:

- City of Maricopa 2025 General Plan
- Federal Emergency Management Agency Federal Insurance Rate Map
- Arizona Land Resource Information System
- Pinal County Open Space & Trails Master Plan

Areas where subsidence and/or Earth fissures may occure.

PHOENIX

Maricopa

Pinal

CASA GRANDE

TUCSON

Pima

Santa Cruz

- Area in detail

Exhibit 1D
ENVIRONMENTAL CHARACTERISTICS

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FUTURE LAND USE

MARICOPA GENERAL PLAN

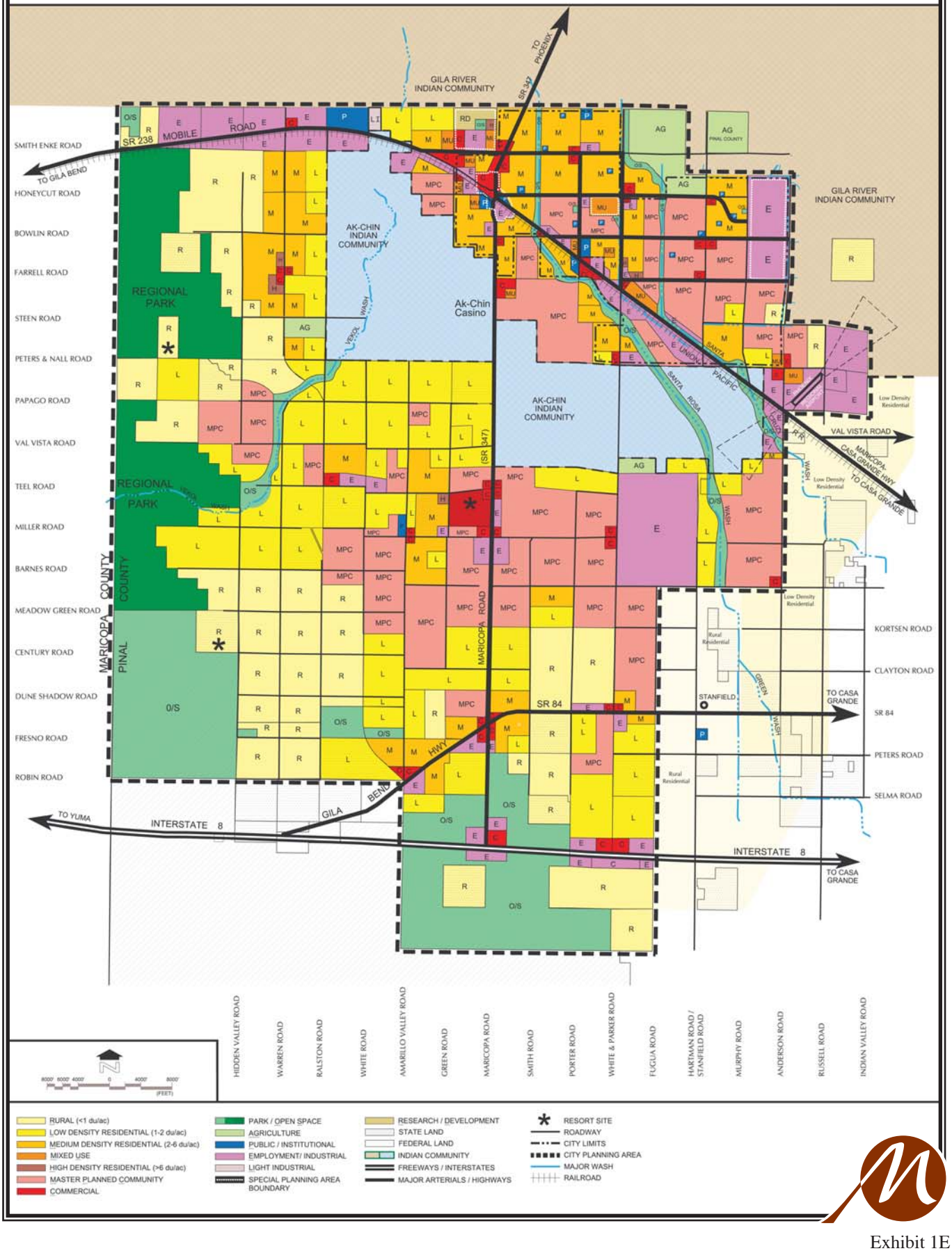


Exhibit 1E
FUTURE LAND USE

ricopa and much of the surrounding area falls within an area known to have earth fissure issues. Within this area some actual fissures have been identified. The potential for earth fissures should also be further analyzed during the NEPA process.

Man-Made Features

A transcontinental line for the Union Pacific Railroad (UPRR) bisects the study area from the northwest to southeast and runs parallel to State Road 238/Maricopa Road through the Town of Maricopa. UPRR plans to add an additional track, or double-track, to allow for increased railroad traffic in both directions. This will increase traffic to 80 trains per day by 2013. The need for infrastructure improvements at railroad crossings has been identified by the City of Maricopa. These will be crucial as population and traffic increases.

An underground gas pipeline crosses the study area entering Pinal County near Steen Road and extends diagonally across the study area to the southeast.

According to the *City of Maricopa General Plan 2025*, a landfill is located just north of State Road 238 and south of the Gila River Indian Community, east of N. Warren Road. The recycling Association of Maricopa is located just west of the city along McDavid Road.

NATURAL CHARACTERISTICS

Air Quality

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

Primary air quality standards are established at levels to protect the public health and welfare from any known or anticipated adverse effects of a pollutant. The EPA has classified the study area as non-attainment for 8-hour ozone, Particulate Matter (PM_{10} and $PM_{2.5}$), and Sulfur Oxides (SO_2). A nonattainment classification indicates that the area has pollution levels which consistently exceed the NAAQS.

Hydrology

As defined in FAA Order 1050.1E, floodplains consist of "lowland and relatively flat areas adjoining inland and coastal water including flood prone areas of offshore islands, including at a minimum, that area subject to one percent or greater chance of flood-

ing in any given year." Federal agencies are directed to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health and welfare, and restore and preserve the natural and beneficial values served by floodplains.

Floodplains have natural and beneficial values, such as providing ground water recharge, water quality maintenance, fish, wildlife, plants, open space, natural beauty, outdoor recreation, agriculture, and forestry. FAA Order 1050.1E (12) (c) indicates that "if the proposed action and reasonable alternatives are not within the limits of a base floodplain (100-year flood area)," that it may be assumed that there are no floodplain impacts. The limits of base floodplains are determined by Flood Insurance Rate Maps (FIRM) prepared by the Federal emergency Management Agency (FEMA).

The Gila River is located approximately 10 miles north of the study area. Numerous washes extend from this river south throughout the area. Of these washes, the most prominent is the Santa Cruz Wash. This wash extends from the Gila River through the Gila River Indian Community where it divides to create the Vekol Wash. The Vekol Wash extends along the eastern portions of the Ak Chin Indian Community to the southwest where it enters Maricopa County. The Santa Cruz Wash has two distinct arms after it divides within the Gila River Indian Community. This wash is a prominent feature as it extends from the north along the eastern portions of the study area. The Vekol and Santa Cruz Wash both have 100-year floodplains associated with them.

Biological Resources

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

According to the Arizona Electronic Atlas mapping tool, native vegetation classification for the area is identified as Lower Colorado Sonoran Desert Scrub along the central and eastern portions of the study area and Great Basin Conifer Woodlands along the western portion of the study area. Habitat in the study area consists of riparian areas with Cottonwoods, Willows, and Sycamore trees. The upper elevations and mesa tops are desert grasslands consisting of mesquite and native perennial grasses. The lower elevations and hillsides are Sonoran desert scrub with Saguaro and Paloverde being the dominant species.
According to the Arizona Electronic Atlas mapping tool, habitat potential for reptile species is greatest along the eastern portions of the study area in areas with a higher elevation. Habitat for mammal species is greatest along the valley floor within the washes that are present in this area.

Numerous threatened, endangered, and candidate species have suitable habitat in the study area. These species and their habitat are identified in **Table 1H**.

TABLE 1H
Threatened, Endangered, and Candidate Species in Pinal County

COMMON NAME	SCIENTIFIC NAME	HABITAT	STATUS
Arizona hedgehog	Echinocereus triglochidiatus var. arizonicus	Ecotone between interior chapparal and madrean evergreen woodland.	Endangered
Bald eagle	Haliaeetus leucocephalus	Large trees or cliffs near water with abundant prey.	Threatened
California Brown pelican	Pelecanus occidentalis californicus	Coastal land and islands; species found around many Arizona lakes and rivers.	Endangered
Desert pupfish	Cyprinodon macularius	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	Endangered
Gila chub	Gila intermedia	Pools, springs, cienegas, and streams.	Endangered
Gila topminnow	Poeciliopsis occidentalis occidentalis	Small streams, springs, and cienegas vegetated shallows.	Endangered
Lesser long-nosed bat	Leptonycteris curasoae yerbabuenae	Desert scrub habitat with agave and columnar cacti present as food plants.	Endangered
Loach minnow	Tiaroga cobitis	Small to large perennial streams with swift shallow water over cobble and gravel.	Threatened
Mexican spotted owl	Strix occidentalis lucida	Nests in canyons and dense forests with multi-layered foliage structure.	Threatened
Nichol Turk's head cactus	Echinocactus horizonthalonius var. nicholii	Sonoran desertscrub.	Endangered
Razorback sucker	Xyrauchen texanus	Riverine and lacustrine areas, generally not in fast moving water and may use backwaters.	Endangered
Southwestern willow flycatcher	Empidonax traillii extimus	Cottonwood/willow and tasmarisk vegetation communities along rivers and streams.	Endangered
Spikedance	Meda fulgida	Moderate to large perennial streams with gravel substrates and moderate to swift velocities over sand and gravel substitutes.	Threatened
Yuma clapper rail	Rallus longirostris yumanensis	Fresh water and brackish marshes	Endangered
Acuna cactus	Echinomastus erectocentrus var. acunensis	Well drained knolls and gravel ridges in Sonoran desertscrub.	Candidate
Yellow-billed cuckoo	Coccyzus americanus	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries).	Candidate

Source: U.S. Fish and Wildlife Service, Pinal County Species List, May 2006

Parks and Recreation

Regional parks, outlined within the *City of Maricopa General Plan 2025*, are planned along the western boundary of the study area and within the Vekol and Santa Cruz Washes. In addition, many of the roadways and highways have path or trail connections which make a collective trail system.

Hohokam Pima National Monument is located north of the study area within the Gila River Indian Community. This site was inhabited from 300 BC to around 1200 AD and may have had up to 2,000 inhabitants. The monument is under tribal ownership and is not open to the public. Casa Grande Ruins National Monument, located east of the study area, preserves an ancient Hohokam farming community

and "Great House." Created as the nation's first archaeological reserve in 1892, the site was declared a National Monument in 1918.

According to the United States Forest Service website, no national forests or grasslands are located within the study area. Bureau of Land Management wilderness areas are located along the western boundary of the study area.

Cultural Characteristics

Due to the proximity of the Salt and Gila Rivers, the Santa Cruz Valley is an area rich in history and prehistory dating back over 12,000 years. Numerous native peoples farmed this valley dating back to the prehistoric Paleo inhabitants circa 10000 BC, the Cochise people circa 2000 BC, to the Hohokam people in 300 BC. As discussed previously, the area is home to the Ak Chin and the Gila River Indian Communities today. Numerous historic and cultural sites are located throughout the area. Development of an airport on undisturbed land will require cultural/historic surveys.

The Juan Bautisa de Anza National Historic Trail follows the existing State Road 238. The trail goes north from Nogales, Arizona to San Francisco, California.

AREA AVIATION

Typically, general aviation airports which could have any significant influence on the proposed airport are within a 15-mile range. **Table 1J** presents a basic inventory of the airports in the vicinity of the City of Maricopa.

As evident from the table, there are several airports of various sizes, capablities, and functions within 17 miles of the City of Maricopa. In fact, there are currently 18 airfields with Maricopa or Stanfield addresses. Most of these are privately owned for private use and require prior permission to land. Many are affiliated with farms or ranches, and some are bases for aerial agricultural applicators. Public owners of restricted use airports in the area include the Ak Chin Indian Community and the University of Arizona Maricopa Agriculture Center.

The Mobile Airport located to the northwest in Maricopa County is a private restricted use airport that is used exclusively by the Airline Training Center of Arizona (ATCA) for pilot training. The airport features a paved 4,500-foot runway with a full-length parallel taxiway and high intensity runway lighting.

Two of the airports in the immediate area, Estrella Sailport and Phoenix Regional Airport, are also privately owned but available for public use. These two airports, as well as four other public use airports, are discussed below.

ESTRELLA SAILPORT

Estrella Sailport is a private airport located six miles west of the City of Maricopa on the north side of SR 238. The airport is operated by Arizona

Soaring, Inc., who offers a full range of glider or sailplane training as well as sailplane rides. They operate the facility from 11:00 a.m. to dusk on weekdays and from 9:00 a.m. to dusk on weekends.

The airport has a single asphalt runway 2,520 feet long by 30 feet wide, as well as three dirt runways in support of the sailplane operations. A segmented circle and wind indicator are located on the airfield. The runway is not lighted and there are no published instrument approaches. Other facilities available include hangars and tiedowns.

According to the FAA Form 5010, there are currently two single engine piston aircraft and 40 gliders based at the airport. Annual operations are estimated at 20,000. Information for the airport is summarized on **Exhibit 1F**.

TABLE 1J
Maricopa Area Airports

Airport	Distance (miles)	Owner	NPIAS Role	Runway		Based Aircraft	Annual Operations
				Length (ft)	Paved		
Public Use Airports							
Estrella Sailport	6 W	Private	None	2,520 3,740	Yes No	42/40	20,000
Phoenix Regional	8 ESE	Private	None	5,000	Yes	12/10	NR
Gila River Memorial*	13 NNE	Private	None	8,560 5,200	Yes Yes	61/0	25,500
Casa Grande	15 ESE	Public	GA	5,200	Yes	101/10	98,500
Stellar Airpark	15 NE	Private	None	3,913	Yes	152/1	39,000
Chandler Municipal	17 NE	Public	RL	4,870 4,401	Yes Yes	449/0	269,072
Restricted use Airports							
Ak Chin Community	4 S	Public	None	2,950	Yes	3/0	4,300
Donnelly Residence	10 SSE	Private	None	1,650	No	NR	NR
Flying Bucket Ranch	15 SW	Private	None	2,900	No	5/0	NR
G.M. Ranch	12 SW	Private	None	2,640	No	1/0	NR
Mel's Ranch	17 W	Private	None	2,000	No	1/0	NR
Millar	6 W	Private	None	2,300	No	1/0	NR
Mobile	12 WNW	Private	None	4,500	Yes	NR	NR
Potters Field	10 SE	Private	None	2,400	No	10/0	NR
Schu Ranch	12 W	Private	None	2,000	No	12/6	NR
Serene Field	14 SW	Private	None	3,960	No	3/1	NR
U of A Maricopa Ag Center	4 NE	Public	None	5,300	No	NR	NR
Walter Ranch	13 SW	Private	None	2,600	No	2/0	NR

* Airport is currently restricted use but Master Plan calls for future public use
NPIAS Roles: GA – General Aviation; RL – Reliever; None – Not included in the NPIAS
Based Aircraft: Total aircraft based/based ultralights or gliders
NR: Not Reported

PHOENIX REGIONAL AIRPORT

Phoenix Regional Airport is located eight miles east-southeast of the City of Maricopa. It is a privately owned, public use airport with a single asphalt runway 5,000 feet long by 50 feet wide. The runway is not lighted and there are no published instrument approaches. A wind indicator is located on the airfield.

FAA records indicate there are two single engine piston and 10 ultralight aircraft based at the airport. Annual operations at the airport were not reported. Information for the airport is summarized on **Exhibit 1G**.

GILA RIVER MEMORIAL AIRPORT

Gila River Memorial Airport is a private airport located 13 miles north-northeast of the City of Maricopa. It is located within the Gila River Indian Community. The airport is attended on weekdays from 8:00 a.m. to 5:00 p.m. Prior permission is required for landing, but an airport master plan has been prepared for the airport that suggests that it could be open to public use in the future.

The airport has two asphalt runways, the longest one measuring 8,560 feet long by 75 feet wide. The shorter runway is 5,200 feet by 200 feet, but is in poor condition. A segmented circle and wind indicator are located on the airfield. The runways are not lighted and there are no published instrument approaches.

There are currently 61 based aircraft at the airport, and annual operations are estimated at 25,500. Services available at Gila River Memorial Airport include aircraft tie-downs and minor airframe and powerplant services. Information for the airport is depicted on **Exhibit 1H**.

CASA GRANDE MUNICIPAL AIRPORT

Casa Grande Municipal Airport is located 15 miles east-southeast of the City of Maricopa. It is owned and operated by the City of Casa Grande and is as classified as a general aviation (GA) airport in the FAA's National Plan of Integrated Airport Systems (NPIAS).

The airport has a single asphalt runway 5,200 feet long by 100 feet wide with medium intensity runway lights. A segmented circle and lighted wind indicator are located on the airfield. There are currently 101 based aircraft at the airport, two of which are multi-engine piston aircraft, four helicopters, and ten ultralights. The remaining 85 aircraft are single engine. Annual operations at the airport are estimated at 98,500.

There are four published instrument approaches available at the airport. The lowest minimums are provided by the instrument landing system (ILS) Runway 5 approach that is popular for instrument pilot training. The cloud ceilings are 300 feet above ground level (AGL) and the visibility is a half-mile.

07SP04-1F-8/06/07

Airport Name: Estrella Sailport (E68)

Airport Sponsor: Private (Arizona Soaring Inc.)

Distance from City of Maricopa: 6 nm W

Airport Reference Code: N/A

FAA Classification: N/A

Acreage: 640

Runways:

7-25 3,740' x 20' Dirt
6R-24L 2,520' x 30' Asphalt
6C-24C 1,995' x 25' Dirt
6L-24R 1,910 x 25' Dirt

Primary Runway Strength Rating:
N/A

Lighting: None

Closest Navigational Aids/Distance:
Stanfield VORTAC: 17nm
Chandler NDB: 21 nm

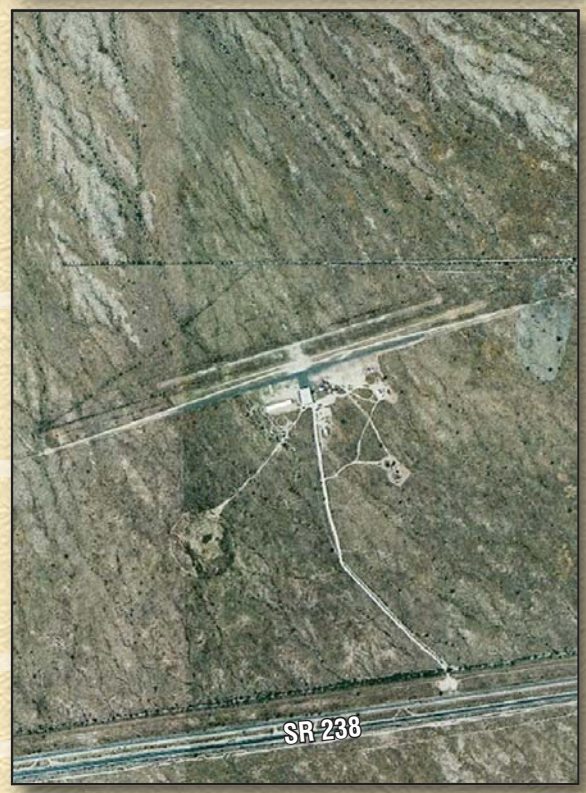
Tower: No

Activity:

Based Aircraft	Annual Operations
42 (includes 40 sailplanes)	20,075 (est.)

Instrument Approaches:
None Published

Five-Year Airport Development Program (2007-2011):
N/A



Source: FAA Form 5010 Airport Master Record

Exhibit 1F
ESTRELLA SAILPORT

07SP04-1G-8/06/07

Airport Name: Phoenix Regional Airport (A39)

Airport Sponsor: Private (Grande Valley Development Corporation)

Distance from City of Maricopa: 8 nm ESE

Airport Reference Code: B-II

FAA Classification: General Aviation

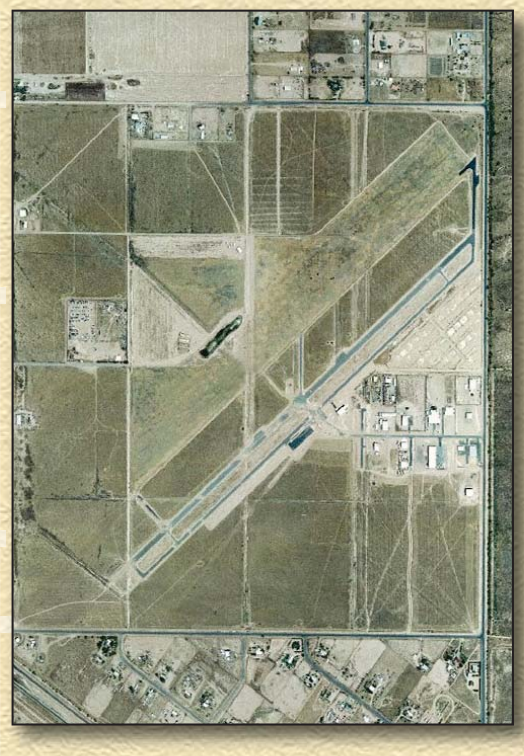
Acreage: 170

Runways:

3-21 5,000' x 50' Asphalt

Primary Runway Strength Rating:

N/A



Lighting:

None

Closest Navigational Aids/Distance:

Stanfield VORTAC: 6 nm

Chandler NDB: 17 nm

Tower: No

Activity:

Based Aircraft	Annual Operations
12 (includes 10 ultralights)	N/A

Instrument Approaches:

None Published

Five-Year Airport Development Program (2007-2011):

N/A

Source: FAA Form 5010 Airport Master Record

Exhibit 1G
PHOENIX REGIONAL AIRPORT

07SP04-1J-7/27/07

Airport Name: Gila River Memorial (34AZ)

Airport Sponsor: Private (Memorial Airfield Corporation)

Distance from City of Maricopa: 13 nm NNE

Airport Reference Code: N/A

FAA Classification: N/A

Acreage: 1,345

Runways:

12-30	8,560' x 75'	Asphalt
3-21	5,200' x 200'	Asphalt

Primary Runway Strength Rating:
N/A

Lighting:
None

Closest Navigational Aids/Distance:
Phoenix VORTAC; 12 nm
Chandler NDB: 6 nm

Tower: No

Activity:

Based Aircraft	Annual Operations
61	25,550 (est.)

Instrument Approaches:
None Published

Five-Year Airport Development Program (2007-2011):
N/A

Source: FAA Form 5010 Airport Master Record

Exhibit 1H
GILA RIVER
MEMORIAL AIRPORT

The airport is attended daily by city staff from 7:30 a.m. to 5:30 p.m. Services provided at Casa Grande Airport include aircraft maintenance, fuel sales (Jet A and 100LL), and aircraft tie-downs. Self-serve 100 LL is also available. The fuel concession is operated by city staff. Information on the airport is summarized on **Exhibit 1J**.

STELLAR AIRPARK

Stellar Airpark is located 15 miles northeast of Maricopa in Chandler. The airport is privately owned and operated but is open for public use.

The airport has a single asphalt runway 3,913 feet long by 60 feet wide with medium intensity runway lights. There are full-length parallel taxiways on both sides of the runway. There is a wind indicator on the field, but no segmented circle.

The airport has a VOR or GPS-A circling approach with minimums of 500 feet cloud ceilings and one mile visibility.

The airport is listed as unattended, but a fixed base operator has 100 LL fuel available. Other services include ramp and tie-down parking, aircraft maintenance, and pilot supplies. Information on the airport is summarized on **Exhibit 1K**.

CHANDLER MUNICIPAL AIRPORT

Chandler Municipal Airport is located 17 miles northeast of the City of Maricopa. It is a reliever airport as classified in the NPIAS.

The airport offers two asphalt runways. Runway 4R-22L is 4,870 feet long and 75 feet wide. Runway 4L-22R is 4,401 long and 75 feet wide. Both are equipped with medium intensity runway lights. A segmented circle and lighted wind indicator are located on the airfield. Chandler Municipal Airport also has an air traffic control tower (ATCT), which is in operation daily from 6:00am to 9:00pm.

There are currently 449 based aircraft at the airport, the majority of which are single engine. There are no jets based at the airfield. Annual operations, as counted by the ATCT, totaled 269,072 in 2006. Services provided at Chandler Municipal Airport include aircraft maintenance, fuel sales (Jet A and 100LL), and aircraft tie-downs.

Three published instrument approaches are available at the airport. The lowest minimums are provided by the GPS Runway 4 approach. The cloud ceilings are 500 feet above ground level (AGL) and the visibility is one mile. Information for the airport is depicted on **Exhibit 1L**.

AREA AIRSPACE

To ensure a safe and efficient airspace environment for all aspects of aviation, the FAA has established an airspace structure that regulates and establishes procedures for aircraft using the National Airspace System. The U.S. airspace structure provides two basic categories of airspace, controlled

and uncontrolled, and identifies them as Classes A, B, C, D, E, and G. These are depicted on **Exhibit 1M** and described below.

Class A airspace is controlled airspace that includes all airspace from 18,000 feet MSL to Flight Level 600 (approximately 60,000 feet MSL). Class B airspace is controlled airspace surrounding high-capacity commercial service airports (i.e., Phoenix Sky Harbor International Airport). Class C airspace is controlled airspace surrounding lower activity commercial service airports and some military airports. Class D airspace is controlled airspace surrounding airports with an airport traffic control tower.

All aircraft operating within Classes A, B, C, and D airspace must be in contact with the air traffic control facility responsible for that particular airspace. Class E airspace is controlled airspace that encompasses all instrument approach procedures and low-altitude federal airways. Only aircraft conducting instrument flights are required to be in contact with air traffic control when operating in Class E airspace. Aircraft conducting visual flights in Class E airspace are not required to be in radio communications with air traffic control facilities. Visual flight can only be conducted if minimum visibility and cloud ceilings exist. Class G airspace is uncontrolled airspace that does not require contact with an air traffic control facility. The airspace in the vicinity of Maricopa is depicted on **Exhibit 1N**.

Most of the Phoenix metropolitan area is located under the Class B airspace of Phoenix Sky Harbor International Airport. In fact, Class B airspace extends over nearly all the publicly owned airports in Maricopa County, with the exception of Buckeye Municipal Airport and Gila Bend Airport.

Class B airspace provides for controlled airspace along primary arrival routes to Sky Harbor. The boundaries of Class B airspace vary to provide for operations to the surrounding airports. Class B airspace extends from the surface to 9,000 feet above the airport. The floor of Class B airspace gradually increases outward from Sky Harbor to allow for aircraft operations beneath Class B.

The Maricopa area is currently outside of Class B airspace as are Estrella Sailport, Millar Airport, Mobile Airport, Phoenix Regional Airport and Casa Grande Municipal Airport.

Class D airspace surrounds the other metropolitan airports with airport traffic control towers, including Chandler Municipal Airport. None of the airports in Pinal County currently have control towers, so none are located within Class D airspace.

Exhibit 1N also depicts the Mode C veil around the metropolitan area. All aircraft operating inside the Mode C perimeter are required to have a transponder. With the exception of Casa Grande Municipal Airport, all area airports within 15 miles of Maricopa, lie within the Mode C veil.

For aircraft arriving or departing the regional area, a system of Federal Airways, referred to as Victor Air-

07SP04-1J-8/06/07

Airport Name: Casa Grande Municipal Airport (CGZ)

Airport Sponsor: City of Casa Grande

Distance from City of Maricopa: 15 nm ESE

Airport Reference Code: B-I

FAA Classification: General Aviation

Acreage: 640

Runways:

5-23 5,200' x 100' Asphalt

Primary Runway Strength Rating:

SWL: 18,500 lbs.
DWL: 65,000 lbs.

Lighting:

MALSR (5)
VASI-2L (5-23)

Closest Navigational Aids/Distance:

Stanfield VORTAC: 8 nm
Chandler NDB: 19 nm

Tower: No

Activity:

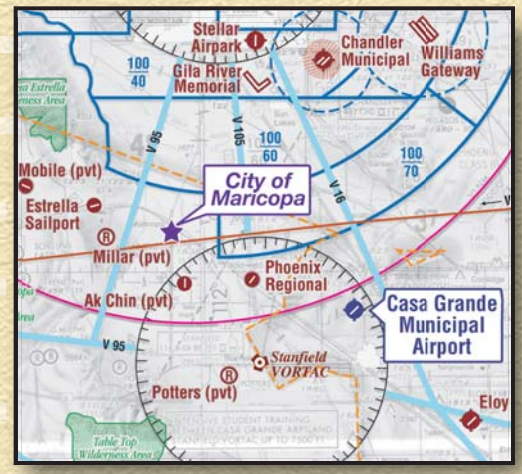
Based Aircraft	Annual Operations
101(incl. 10 ultralights)	98,550 (est.)

Instrument Approaches:

ILS Runway 5	GPS Runway 23
GPS Runway 5	VOR Runway 5

Five-Year Airport Development Program (2007-2011):

- Apron for East and South Terminal Area
- Parking lot for South Terminal Area
- Runway Extension
- North Area Access Road
- Relocate Drainage Ditch



Source: FAA Form 5010 Airport Master Record

Exhibit 1J
CASA GRANDE
MUNICIPAL AIRPORT

07SP04-1H-7/26/07

Airport Name: Stellar Airpark (P19)

Airport Sponsor: Stellar Runway Utilizers Association, Inc.

Distance from City of Maricopa: 5 nm NE

Airport Reference Code: N/A

FAA Classification: N/A

Acreage: 200

Runways:

17-35 3913' x 60' Asphalt

Primary Runway Strength Rating:

N/A

Lighting:

Beacon
MIRL
VASI (4L-17)

Closest Navigational Aids/Distance:

Phoenix VORTAC: 8.5 nm
Willie VORTAC: 13.2 nm
Stanfield VORTAC: 24.5

Tower: No

Activity:

Based Aircraft	Annual Operations
152	39,000

Instrument Approaches:

VOR/GPS-A Circling

Five-Year Airport Development Program (2007-2011):

N/A

Source: FAA Form 5010 Airport Master Record

Exhibit 1K
STELLAR AIRPARK

07SP04-1L–8/06/07

Airport Name: Chandler Municipal Airport (CHD)

Airport Sponsor: City of Chandler

Distance from City of Maricopa: 17 nm NE

Airport Reference Code: B-II

FAA Classification: Reliever

Acreage: 550

Runways:

4R-22L 4,870' x 75' Asphalt
4L-22R 4,401' x 75' Asphalt

Primary Runway Strength Rating:

SWL: 30,000 lbs.

Lighting:

Beacon
MIRL
PAPIs (4R-22L/4L-22R)
REILS (4R-22L)

Closest Navigational Aids/Distance:

Willie VORTAC: 8 nm
Chandler NDB: At Field

Tower: Yes (6:00am - 9:00pm)

Activity:

Based Aircraft	Annual Operations
449	269,072

Instrument Approaches:

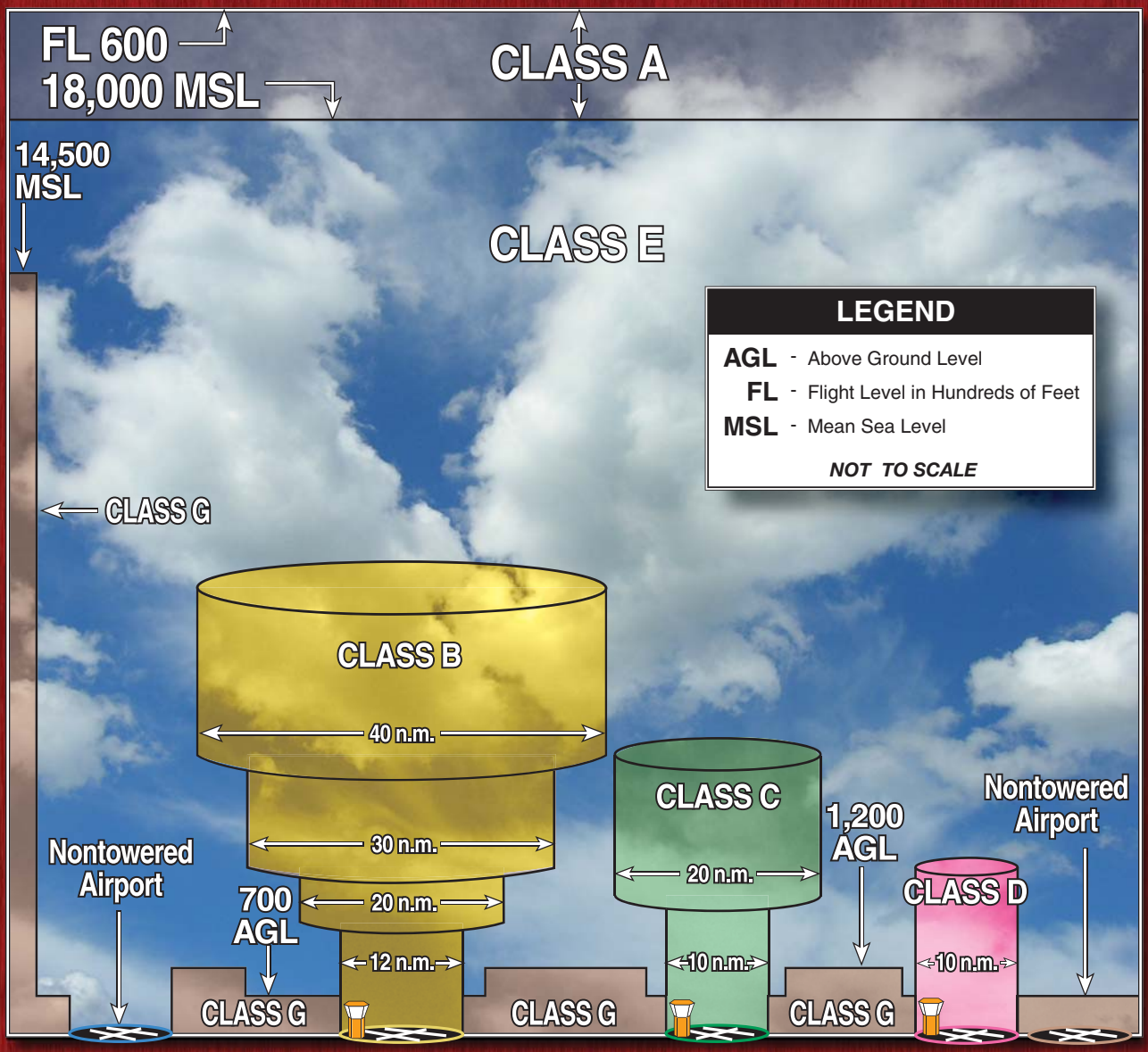
GPS Runway 4R
VOR Runway 4R
NDB Runway 4R

Five-Year Airport Development Program (2007-2011):

- Construct Perimeter Access Service Road
- Construct Terminal Area Apron Improvement
- Taxiway B Extension

Source: FAA Form 5010 Airport Master Record

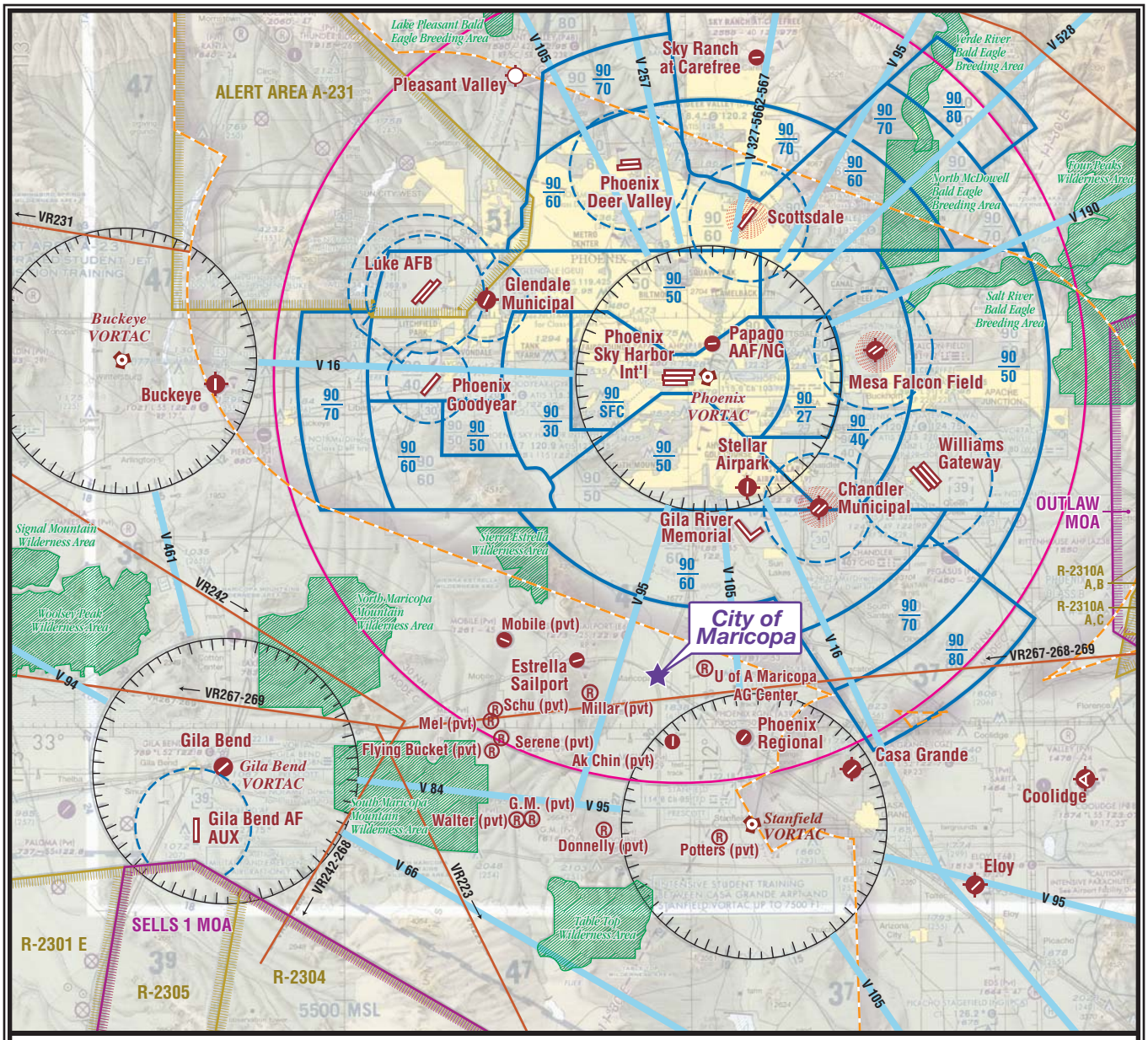
Exhibit 1L
CHANDLER MUNICIPAL AIRPORT



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.

Source: "Airspace Reclassification and Charting Changes for VFR Products," National Oceanic and Atmospheric Administration, National Ocean Service. Chart adapted by Coffman Associates from AOPA Pilot, January 1993.

Exhibit 1M
AIRSPACE CLASSIFICATION



LEGEND

- Airport with other than hard-surfaced runways
- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- VORTAC
- Non-Directional Radiobeacon (NDB)
- Compass Rose
- Military Operations Area (MOA)
- Prohibited, Restricted, Warning and Alert Areas
- Wilderness Areas
- Mode C
- Military Training Routes
- Victor Airways
- Class B Airspace
- Class D Airspace
- Class E Airspace with floor 700' above surface

NORTH

NOT TO SCALE

Source: Phoenix Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration, July 03, 2008

Exhibit 1N
AREA AIRSPACE

ways, has been established. Victor Airways are corridors of airspace eight miles wide that extend upward from 1,200 feet AGL to 18,000 feet MSL and extend between VOR navigational facilities. As shown on **Exhibit 1N**, Victor Airways in the Maricopa area emanate from the Stanfield, Phoenix, and Gila Bend VORTACs.

There are several areas of special-use airspace in the vicinity. This include Military Operations Areas (MOAs), Restricted Areas, and Warning Areas.

Military aircraft training is a major part of the Department of Defense presence and mission in Arizona. Located southwest of Maricopa is the Sells 1 MOA, and located to the northeast is the Outlaw MOA. Located to the southwest are Restricted Areas R-2301E, R-2305, and R-2304. Located to the northwest of the airport is Alert Area A-231, which is used extensively by Luke Air Force Base.

Civil aircraft operations within these areas are specifically restricted at various times and altitudes. The hours that these areas are in use and the altitudes that are restricted vary. This information can be found on the Phoenix Sectional Chart.

A number of military training routes (MTRs) are also located in the vicinity of Maricopa. VR267-268-269 runs in an east-west direction just south of Maricopa. These routes are used by military aircraft for training and commonly operate at speeds in excess of 250 knots and at altitudes to 10,000 feet MSL. While general aviation flights are not restricted within these areas, pilots are strongly cautioned to be alert for high speed military jet training aircraft.

As depicted on **Exhibit 1N**, several Wilderness Areas are located in the vicinity of Maricopa. Aircraft flying over designated Wilderness Areas are requested to remain above 2,000 feet AGL. The names of each Wilderness Area and its distance from Maricopa are as follows:

- Sierra Estrella Wilderness Area – 10 nm northwest
- North Maricopa Mountain Wilderness Area – 17 nm west
- South Maricopa Mountain Wilderness Area – 15 nm southwest
- Table Top Wilderness Area – 18 nm south

AIRCRAFT REGISTRATIONS

Aircraft registrations provide information on basic general aviation demand in an area in terms of local aircraft ownership. Historic information of registered aircraft is readily available on a county-wide basis. Current registrations were searched by zip code to determine the number and location of aircraft owners in the Maricopa area.

Table 1K presents a history of registered aircraft in Pinal County. In 1997 there were 276 aircraft registered to owners in Pinal County. Over the past ten years, county registrations have increased to 356. This is an addition of 80 registered aircraft in the County representing an average annual growth rate of 2.6 percent.

TABLE 1K
Historical Aircraft Registrations
Pinal County

Year	Registered Aircraft	Annual Growth Rate
1997	276	-
1998	267	-3.3%
1999	292	9.4%
2000	305	4.5%
2001	305	0.0%
2002	307	0.7%
2003	305	-0.7%
2004	327	7.2%
2005	335	2.4%
2006	356	6.3%

Source: Aviation Goldmine CD (1997-2000); Avantex Aircraft & Airmen CD (2001-2006).

A search of aircraft currently registered to owners in the Maricopa area was also performed. **Exhibit 1P** maps the location of current aircraft registrations by zip code, and **Table 1L** organizes the zip codes by city address. The area depicted on the exhibit includes 834 aircraft registrations. As could be expected, there are larger concentrations of aircraft registered to the communities in Maricopa County to the north.

As shown in the table, there are 51 aircraft registered to Maricopa addresses. There are also 12 aircraft registered to Stanfield addresses.

SUMMARY

This first chapter examined the existing conditions within the Maricopa area, including the socioeconomic characteristics of the region, general land use, environmental factors, and physical features. This chapter also examined the existing airport and airspace system serving the southwest sector to the Phoenix metropolitan area, as well as the level of aircraft ownership in the area. The following chapter will identify possible market niches for the proposed airport. Potential airport activity and market forecasts will also be developed in order to establish the general requirements necessary to meet projected demand.

TABLE 1L
Aircraft Registration by Zip Code
Maricopa Feasibility Study

City	Registered Aircraft
Buckeye Address	
85326	53
Casa Grande Address	
85222	67
Chandler Address	
85224	87
85225	53
85226	138
85248	78
85249	84
Chandler Total	440
Eloy Address	
85231	38
Gilbert Address	
85233	35
85296	55
Gilbert Total	90
Laveen Address	
85339	22
Maricopa Address	
85239	51
Phoenix Address	
85044	54
85045	7
Phoenix Total	61
Stanfield Address	
85272	12
Total Registered Aircraft	**834**

Source: Avatex Aircraft & Airmen CD (2006).

07SP04-1P-08/06/07

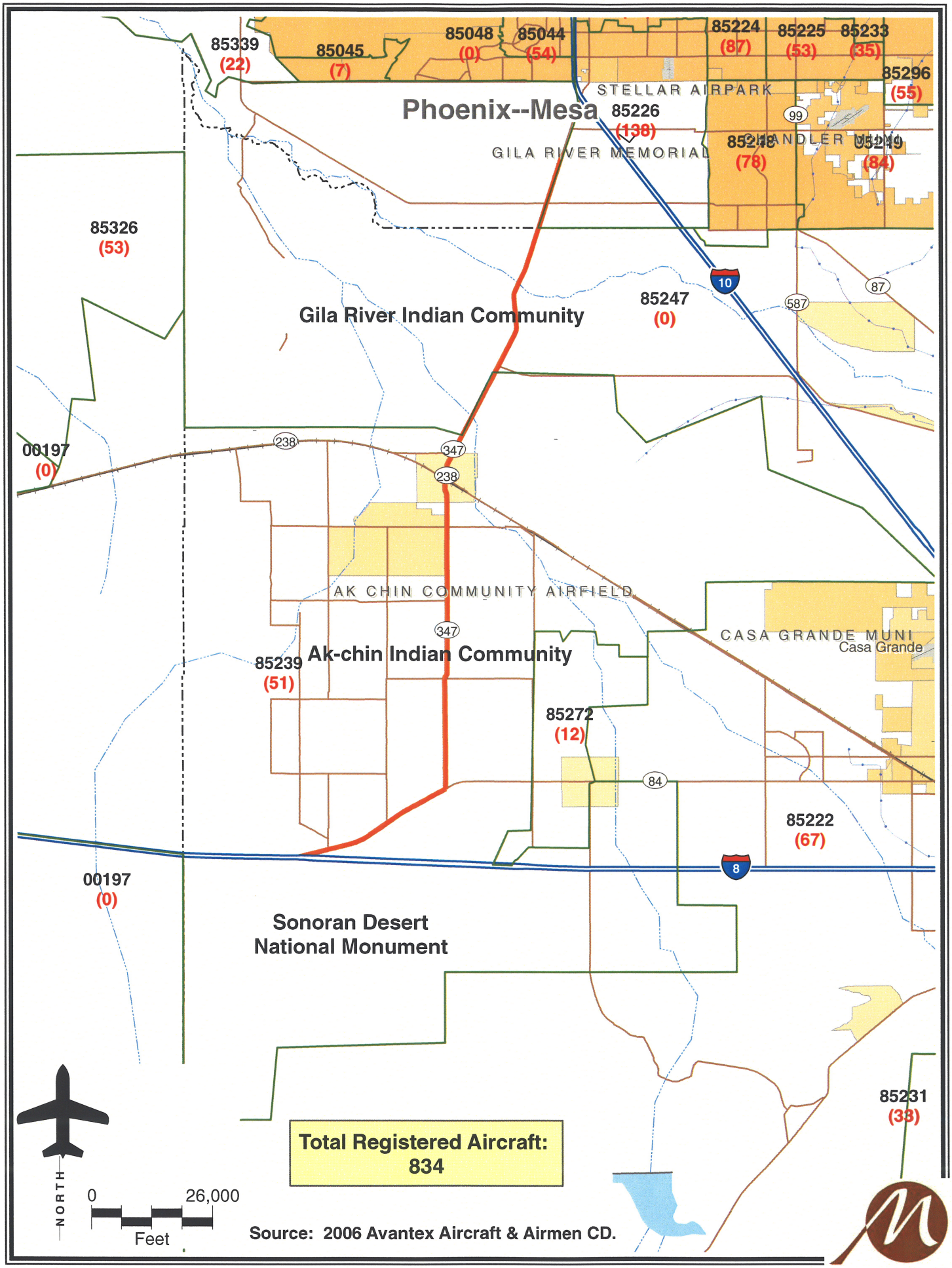


Exhibit 1P
AIRCRAFT REGISTERED BY ZIP CODE

Chapter Two

Airport Market Analysis

Chapter Two

Airport Market Analysis

The previous chapter provided basic background information pertaining to existing airport facilities, the metropolitan airport system, local aircraft ownership, regional and local socioeconomic indicators, and general characteristics of the potential airport siting area. The next step is to examine the market potential for an airport in the Maricopa area.

This chapter examines this potential by first reviewing the markets of other general aviation airports in the metropolitan area with regards to operations and mission, services and products, business use, as well as constraints to operations. The analysis will then turn specifically to the Maricopa market to consider local market constraints, opportunities, and potential niches. A forecast of potential aviation activity is included that will be used to estimate the type of airport facilities that would be necessary. The facility requirements will then be used to provide a preliminary estimate of the cost of a facility which can then be compared to the revenues that can be generated for consideration of economic feasibility.

EXISTING MARKET DESCRIPTIONS

The airports currently located within a 17-mile radius of Maricopa were generally described in the previous chapter. As indicated in the previous chapter, the majority of the local airfields are generally restricted from public use. They include farm and

ranch airstrips, as well as other airfields used primarily in support of agricultural operations. One airport is used exclusively for pilot training. This chapter looks further into the public use airports in the area to examine their markets and the niches they serve.

ESTRELLA SAILPORT

Estrella Sailport is the closest public use airport to Maricopa. It is located immediately north of SR 238, six miles west of the intersection of SR 238 and SR 347 in Maricopa. The facility is located on land leased from the Arizona State Land Department, and is owned and operated by Arizona Soaring, Inc.

As the name suggests, the airport is dedicated almost exclusively to aerial soaring. Arizona Soaring, Inc. offers pilot training from Federal Aviation Administration (FAA) certified glide instructors for Private to Advanced Aerobatics ratings. The company also offers sailplane rides to the general public. They maintain a fleet of seven single-place gliders, eight two-place gliders, and three tow-planes. The airport also has tie-down and hangar storage available for sailplane owners.

Estrella Sailport is an internationally recognized gliderport that takes advantage of its location and weather in serving the recreational soaring market. The airport is located close to the Phoenix metropolitan area, but is outside of Class B airspace. The sunny and warm Arizona weather maximizes the conditions conducive to soaring. The location at the foot of the Estrella Mountains provides excellent opportunities for ridge and wave flying nearby.

PHOENIX REGIONAL AIRPORT

Phoenix Regional Airport was privately developed as part of a 2,000 acre master planned community. The original vision for the airport was to combine the market nuances of Scottsdale Airport and Stellar Airpark at one location with both residential and industrial access to the airfield.

The current facility does have a small industrial park with airfield access, but the residential airpark has yet to evolve. The airport has recently been sold to the Ak Chin Indian Community. The future of the facility is unknown as indications are that leases are not currently being renewed.

GILA RIVER MEMORIAL

Gila River Memorial Airport is an airport facility located approximately four miles southwest of downtown Chandler. The facility was constructed in 1942 by the Department of Defense, but is now owned by the Gila River Indian Community. Due to the poor condition of the airfield, Memorial Airport has been closed to public operations; however, several users still exist. According to the most recent 5010 Airport Master Record for Memorial Airport, the airport has 61 based aircraft, including 31 single engine aircraft and 30 multi-engine aircraft. This number may be exagge-

rated as the most recent airport master plan inventoried based aircraft at 17 in 2003.

The airport's 8,560-foot runway is sufficient for jet aircraft, but would first need to be rehabilitated. The airport has seven enclosed executive hangars used for based aircraft storage and two large conventional hangars used for maintenance operations. Each of these hangars is privately owned. The current occupancy rate is estimated at 100 percent. The airport's 80,000 square yard apron is heavily deteriorated and has no tie-down facilities. Several aircraft are parked on the apron permanently. There are no public fueling services at the airport. Individual operators provide their own fuel for their operations.

There is currently a single aviation business located on the airport. Biegert Aviation utilizes DHC-7 aircraft for air cargo and air charter activities, and operates out of a large conventional hangar. International Air Services used to operate C-130 aircraft for aerial firefighting operations at Memorial Airport but have recently relocated their operations to another airport due to the poor airfield conditions.

Unless major rehabilitation projects are undertaken in the short-term that allow the airport to be re-open to public-use, it will be difficult for Memorial Airport to attract aircraft to the airport. Competing airports in the region include Sky Harbor International Airport, Mesa Falcon Field, Williams Gateway, Stellar Airpark, Chandler Municipal Airport, and Casa Grande. Each of these facilities is presently better equipped to accommodate aircraft operations into the future.

The most recent master plan was prepared in 2003 and recommended abandoning the existing runway and constructing a new primary Runway 13-31. A shorter parallel runway was also planned to accommodate potential small general aviation aircraft training operations. Landside recommendations included a terminal facility, as well as several hangar facilities. Large areas for potential commercial and industrial development were also reserved. At this point in time, none of the recommendations from the master plan have been implemented.

Due to its close location near Interstate 10, Memorial Airport could readily serve as a general aviation reliever to Sky Harbor International Airport; however, facilities would need to be refurbished and improved to accomplish this. The primary constraint facing Memorial Airport is its complicated property ownership and management issues. Until these issues can be resolved, little investment in the airport can be expected.

CASA GRANDE MUNICIPAL AIRPORT

The Casa Grande Municipal Airport is located approximately four miles north of downtown Casa Grande. The *National Plan of Integrated Airport Systems* (NPIAS) classifies Casa Grande Municipal Airport as a public-use general aviation airport.

Casa Grande is equipped with a single runway measuring 5,200 feet in length and 100 feet in width. According to the most current 5010 Airport Master Record, Casa Grande has 101 total based aircraft, including ten ultralights. Operations are estimated at 98,000 annually. The vast majority of these operations are local general aviation operations. Due to the fact that Casa Grande is equipped with a precision instrument landing system (ILS) approach combined with its location outside of the Class B airspace around Phoenix, many training operations are performed here on a daily basis.

The airport currently rents out 52 T-hangars, 18 shade hangars, 50 tie-down spaces, a commercial hangar, and a flight school building. Four conventional hangars have also been privately developed on leased land. There is currently a waiting list for those wishing to rent a hangar facility at Casa Grande. The airport's terminal building was built in 2001 and provides office space, restrooms and showers, flight planning area, conference room, and a fuel service desk. Fueling services are provided by the City.

There is an industrial park located adjacent to the airport that was originally developed with taxiway access. However, the park was released from the airport and parcels are now sold rather than leased. Any airport access from the park would now require a "through-the-fence" agreement that would have to be approved by the FAA.

The Casa Grande Municipal Airport should continue to experience growth in based aircraft and general aviation operations due to the population growth in the Casa Grande area. While the airport is preparing to update its master plan, the current plans include extending the runway to an ultimate length of 8,540 feet. A 2002 economic impact study indicated that the Casa Grande Municipal Airport employed 28 people with a payroll of 1.1 million dollars and a total sales activity of 2.5 million dollars.

STELLAR AIRPARK

Stellar Airpark is a privately owned and operated airport located in Chandler that has successfully developed both residential and industrial airpark. The residential airpark is located on the west side of the airport, and includes gated taxiways into a series of residential lots complete with adjacent or attached aircraft "garages." The east side of the runway also includes taxiway access in an aviation business park setting.

The airport is also open to public use with a fixed base operator (FBO), Stellar Air, providing fuel and aircraft maintenance. The runway length of 3,913 feet is not conducive to significant corporate aircraft activity, but sufficient for the private aircraft and small aviation businesses that thrive there. The airport has 152 based aircraft with an estimated 39,000 annual operations. Local operations are estimated at nearly 80 percent of the traffic.

CHANDLER MUNICIPAL AIRPORT

Chandler Municipal Airport is located approximately three miles southeast of downtown Chandler. The airport has been owned and operated by the City of Chandler since its acquisition in 1948. Chandler Municipal Airport is currently classified as a reliever airport in the NPIAS.

Chandler Municipal Airport is equipped with a parallel runway system. The longest runway is currently 4,870 feet in length and 75 feet in width. This is capable of handling most small general aviation aircraft and limited business jet aircraft.

According to the current 5010 Airport Master Record, there are 449 based aircraft at Chandler Municipal Airport. Airport traffic control tower (ATCT) records indicate the airport experienced 269,072 operations in 2006. Over 67 percent of these operations were local general aviation operations. This high percentage of local operations can be attributed to the four flight training operators at the airport who provide fixed-wing aircraft flight instruction as well as helicopter flight training.

The airport has four FBO tenants. Chandler Air Service provides a wide array of services, including aircraft fuel, flight training, aircraft rental, maintenance, and aircraft sales. Chandler Aviation conducts aircraft maintenance and repair services. A sub-tenant of Chandler Aviation is Sunbird Flight School, who provides flight training services. Venture Aviation provides flight training and aircraft maintenance services. Quantum Helicopters' main service is flight training; however, they also conduct charter and aerial photography operations.

Landside facilities at Chandler Municipal Airport include approximately 116 T-hangars, approximately 10 conventional hangars, and 20-shade hangars. The 90,500 square-yard apron is equipped with 122 aircraft tie-down spaces. A terminal building provides areas for flight planning, restrooms, passenger waiting, office space, and administration facilities.

Chandler Municipal Airport drives economic activity for the City of Chandler. Employment at the airport was estimated at 160 people in 2002 with over six million dollars in payroll and almost 14.1 million in sales. Chandler Airpark is planned adjacent to the airport and could potentially boost local economic activity. This airpark provides areas for all kinds of business development in an enterprise zone, which allows for tax incentives.

The recent master plan recommends extending the primary runway to a length of 5,700 feet. Development encroachment limits the ability to extend the runway any further. This length would allow the airport to accommodate some additional business jet activity and create more economic potential for the airport and the community.

POTENTIAL MARKET NICHES

Based upon the market description of the other public use airports in the area, as well as the assets and constraints of the Maricopa area, several opportunities or niches can be identified. These include:

- Pilot Training – This is a significant business in the Phoenix metropolitan area, taking advantage of the high percentage of visual weather the area experiences.

- Recreational Aviation – This is a niche already being served locally by the Estrella Sailport.

- Industrial Airpark – Stellar Airpark and Phoenix Regional Airport were privately developed to be both residential and industrial airparks. Casa Grande Municipal and Chandler Municipal Airports have business parks developing adjacent to them.

- Corporate Aviation – To date, other than Williams Gateway Airport, no airport on the south side of the Phoenix metropolitan area has developed a true niche of serving corporate clientele on a level comparable to Scottsdale Municipal Airport.

The four niches described above each take advantage of assets available in the Maricopa area. There are numerous flight school companies throughout the Valley offering not only private pilot rating, but commercial ratings as well. Some schools have contracts with foreign airlines and countries for the initial flight training of their future pilots. The Maricopa area's location outside of the Phoenix Class B airspace would be attractive for pilot training as already evidenced by the training activity at Casa Grande Municipal Airport and at Mobile Airport. One potential concern with an extensive flight training program would be the military training route that crosses almost directly over Maricopa.

A recreational airport would tend to cater to the smaller general aviation users as well as the glider activity now being served by Estrella Sailport. A strictly recreational airport, while valuable in attracting visitors to the area, would be limited on its ability to attract business and industry to the community. Depending upon the site location, however, this is a use that might need to be incorporated into the future airport.

An industrial airpark would provide an attraction for business use as well as an employment center. In its planning to date, the City of Maricopa has viewed the area around the Estrella Sailport as a potential employment center.

Ideally, an industrial airpark would be planned with taxiway access to available sites. Private airports such as Stellar Airpark and Phoenix Regional Airport have an advantage in this area because they can subdivide and sell lots with airport access. At federally obligated public airports, direct airfield access from privately owned property is considered "through-the-fence" and discouraged by the FAA.

The demand for industrial lots on leased property is generally lower.

As indicated above, corporate aviation is a niche that has presently not been truly developed on the south central side of the Phoenix metropolitan area. With the exception of Gila River Memorial Airport, which is presently not open for public use, the longest runway among the area public use airports is 5,200 feet at Casa Grande Municipal Airport. The closest runways currently capable of accommodating a full range of corporate jet traffic on a regular basis are at Sky Harbor International Airport, Williams Gateway Airport, and Phoenix Goodyear Airport. Chandler Municipal Airport has plans to extend its runway to a maximum length of 5,700 feet, but this will still serve only limited corporate jet activity. Casa Grande Municipal Airport's current approved airport layout plan does include a runway extension of 3,000 feet.

As a growing community, Maricopa's airport development interests should focus first on facilities that can grow with the community. This should include serving local aircraft that will grow with population, as well as corporate aircraft that serve the diversification of the area as an employment base. The ability to develop a business or industrial park either on or adjacent to the airport would be a plus.

If necessary, the airport should also consider the existing recreational uses in the area. This could result in an ultimate design that has a primary runway designed for corporate aircraft use. A second parallel runway could be developed for flight training with an adjacent dirt strip for use by glider aircraft. Flight patterns would be maintained on opposite sides of the airfield as would corporate and recreational landside activities.

AVIATION FORECASTS

With an indication of the market potentials, the next step is to quantify the potential demand for the airport use in the form of aviation activity. The primary indicators of general aviation demand include:

- Based aircraft
- Annual operations
- Fleet mix

The following subsections examine the activity that a new general aviation airport in the Maricopa area could expect to attract based upon today's aviation community and future growth potential. The analysis begins with an examination of the outlook for the general aviation industry on a national level.

NATIONAL GENERAL AVIATION TRENDS

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for the large air carriers, regional/ commuter air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet budget and planning needs of the constituent units of the FAA and to provide information that can be used by

state and local authorities, the aviation industry, and the general public.

The current edition when this chapter was prepared was FAA *Aerospace Forecasts - Fiscal Years 2007-2020*, published in March 2007. The forecasts use the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets.

In the seven years prior to the events of September 11, 2001, the U.S. civil aviation industry experienced unprecedented growth in demand and profits. The impacts to the economy and aviation industry from the events of 9/11 were immediate and significant. The economic climate and aviation industry, however, has been on the recovery.

The Office of Management and Budget (OMB) expects the U.S. economy to continue to grow in terms of Gross Domestic Product (GDP) at an average annual rate of 2.9 percent through 2020. The world GDP is forecast to grow at an even faster rate of 3.1 percent over the same period. This will positively influence the aviation industry, leading to passenger, air cargo, and general aviation growth throughout the forecast period (assuming there will be no new successful terrorist incidents against either U.S. or world aviation).

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

The sustained growth in the general aviation industry slowed considerably in 2001, negatively impacted by the events of September 11. Thousands of general aviation aircraft were grounded for weeks due to no-fly zone restrictions imposed on operations of aircraft in security-sensitive areas. This, in addition to the economic recession that began in early 2001, had a negative impact on the general aviation industry. General aviation shipments by U.S. manufacturers declined for three straight years from 2001 through 2003.

Stimulated by an expanding U.S. economy as well as accelerated depreciation allowances for operators of new aircraft, general aviation staged a relatively strong recovery with over ten percent growth in each of the last three years.

Resilience being demonstrated in the piston aircraft market offers hope that the new aircraft models are attracting interest in the low-end market of general aviation. The introduction of new, light sport aircraft is expected to provide further stimulation in the coming years.

New models of business jets are also stimulating interest for the high-end of the market. The FAA still expects the business segment to expand at a faster rate than personal/sport flying. Safety and security concerns combined with increased processing time at commercial terminals make business/corporate flying an attractive alternative. In addition, the bonus depreciation provision of the President's economic stimulation package began to help business jet sales late in 2004.

In 2006, there were an estimated 226,422 active general aviation aircraft in the United States. **Exhibit 2A** depicts the FAA forecast for active general aviation aircraft. The FAA projects an average annual increase of 1.4 percent through 2020, resulting in 274,914 active aircraft. Piston-powered aircraft are expected to grow at an average annual rate of 0.4 percent. This is driven primarily by a 5.7 percent annual increase in piston-powered rotorcraft and growth in experimental and sport aircraft, as single engine fixed wing piston are projected to increase at just 0.3 percent annually, and multi-engine fixed wing piston aircraft are projected to decrease by 0.2 percent per year. This is due, in part, to declining numbers of multi-engine piston aircraft, and the attrition of approximately 1,500 older piston aircraft annually. In addition, it is expected that the new, light sport aircraft and the relatively inexpensive microjets will dilute or weaken the replacement market for piston aircraft.

Owners of ultralight aircraft could begin registering their aircraft as "light sport" aircraft in 2005. The FAA estimates there will be a registration of 5,600 aircraft by 2010, and then grow to 13,200 aircraft by 2020.

Turbine-powered aircraft (turboprop and jet) are expected to grow at an average annual rate of 3.6 percent over the forecast period. Even more significantly, the jet portion of this fleet is expected to double in size in 12 years, with an average annual growth rate of 6.0 percent. The total number of jets in the general aviation fleet is projected to grow from 10,032 in 2006, to 22,797 by 2020.

At the October 2006 workshop sponsored by the FAA and the Transportation Research Board, industry experts suggested that the market for the new, very light jet (VLJ), or microjets, could add 500 more aircraft a year to the fleet by 2010. These twin-engine jets are expected to be priced between $1 million and $2 million, and are believed to have the potential to redefine business jet flying with the capability to support a true on-demand air taxi business service. The FAA forecast assumes that microjets will begin to enter the active fleet in 2007, with 350 new aircraft. After this year's introduction, they are forecast to grow by 400 to 500 aircraft per year, contributing a total of 6,300 aircraft to the jet forecast by 2020.

AIRPORT SERVICE AREA

The initial 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 compet-

ing 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 recognized that aviation demand does not necessarily conform to political or geographical boundaries.

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

An inventory of nearby general aviation airports was previously outlined in Chapter One, including 18 restricted use airports and public use airports such as Estrella Sailport, Phoenix Regional, Gila River Memorial, Casa Grande Municipal, Stellar Airpark, and Chandler Municipal. The primary service area for the proposed airport will be generally defined by the proximity to the other general aviation public use airports.

As mentioned previously, the airport siting area is located mainly to the west and south of the City of Maricopa. **Exhibit 2B** depicts the primary service area. It is defined to the north and northeast by the Gila River Indian Community, and the service areas of Chandler Municipal Airport and Stellar Airpark to the east and southeast by Casa Grande Municipal Airport; to the northwest by Phoenix Goodyear Airport; and to the south and west by the Sonoran National Monument.

AIRCRAFT REGISTRATIONS

The number of aircraft based at an airport is, to some degree, dependent upon the nature and magnitude of aircraft ownership in the local service area. In addition, a new Maricopa airport would be one of several airports serving the general aviation needs in Pinal and Maricopa Counties. Therefore, the process of determining based aircraft potential begins with a review of historical and forecast aircraft registrations in the area.

Table 1G in the previous chapter outlined the historic registered aircraft in Pinal County since 1997. This information was obtained from records of the FAA's Aircraft Registry. There were a reported 276 aircraft registered in Pinal County in 1997. This number has since increased, with 356 registered aircraft reported in the County in 2006, which represents an annual average growth rate of 2.6 percent. This is more than double the national average of 1.2 percent growth for U.S. active aircraft during the same period. National growth coincides not only with the improved general economic conditions of the period, but also the enactment of the *General Aviation Revitalization Act*, which was approved by Congress in 1994 and sparked new aircraft manufacturing. There are no

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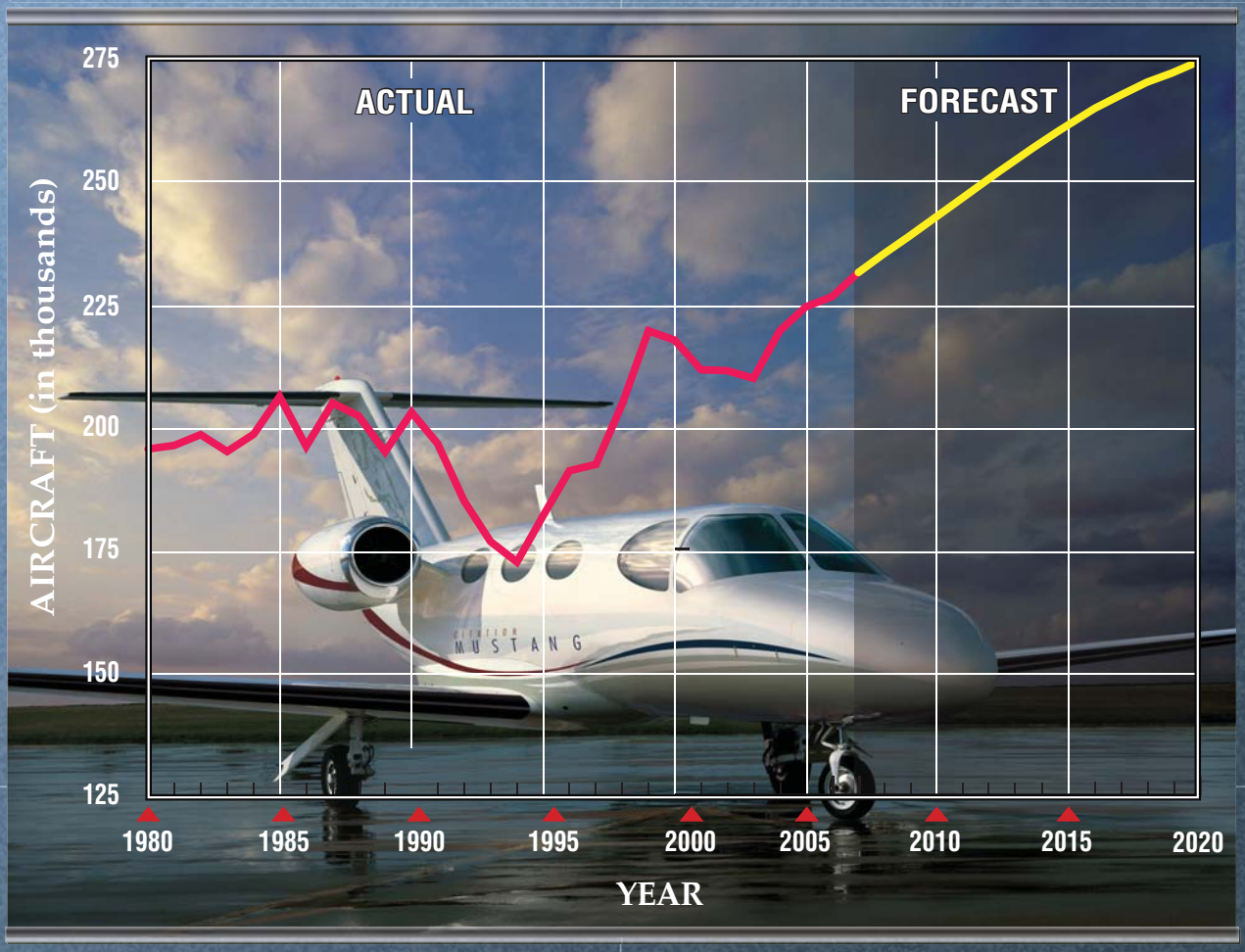
U.S. ACTIVE GENERAL AVIATION AIRCRAFT



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

Year	FIXED WING				ROTORCRAFT		Experimental	Sport Aircraft	Other	Total
	PISTON		TURBINE							
	Single Engine	Multi-Engine	Turboprop	Turbojet	Piston	Turbine				
2006 (Est.)	148.2	19.4	8.0	10.0	3.4	5.9	24.5	0.4	6.6	226.4
2010	150.4	19.2	8.2	13.4	4.8	6.5	27.7	5.6	6.8	242.8
2015	154.0	19.0	8.5	18.0	6.3	7.2	31.1	10.5	6.7	261.4
2020	155.6	18.8	8.8	22.8	7.4	7.9	33.9	13.2	6.6	274.9

Source: FAA Aerospace Forecasts, Fiscal Years 2007-2020.

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

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

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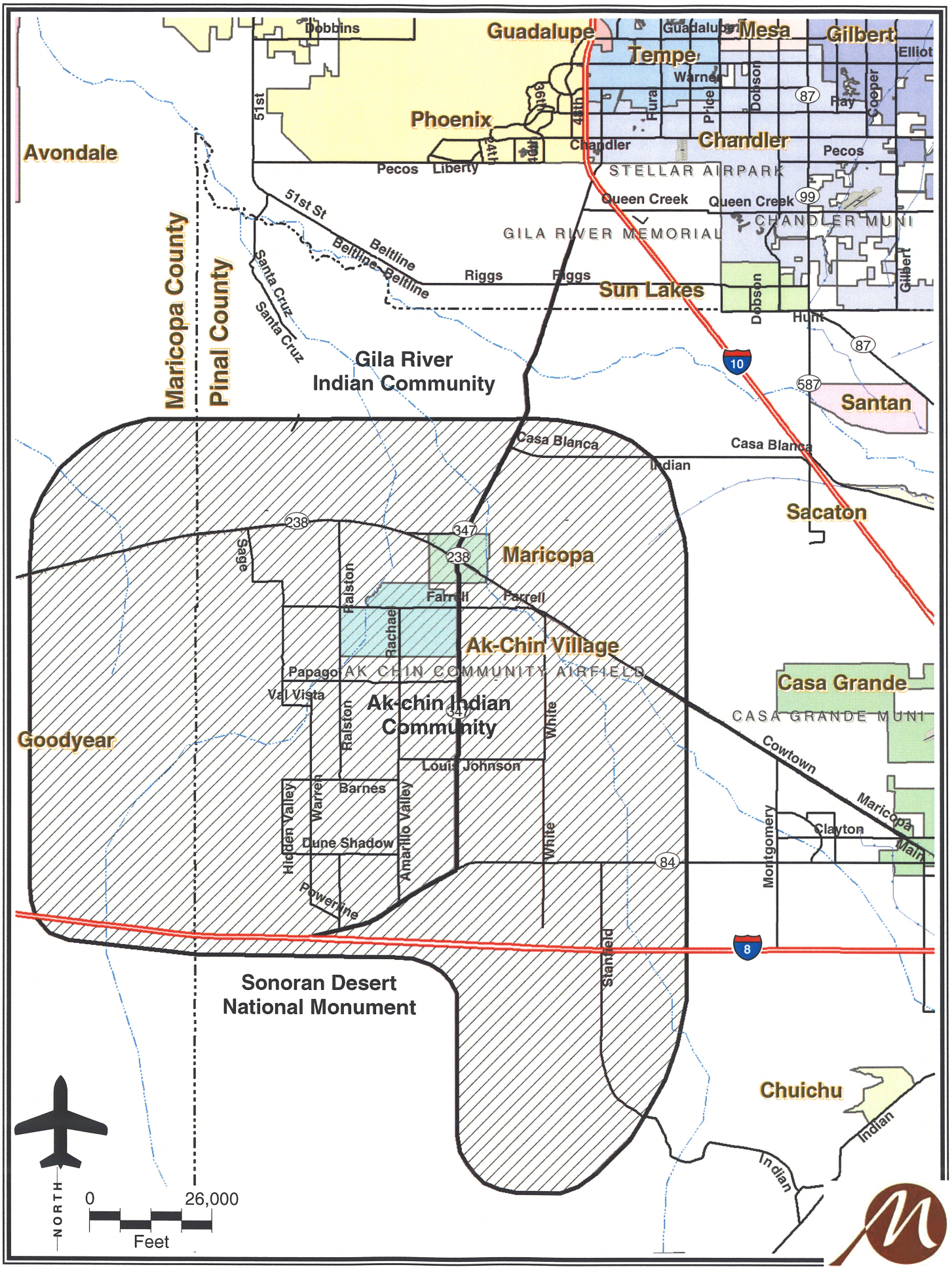

Exhibit 2B
GENERAL SERVICE AREA

other recently prepared forecasts of registered aircraft to examine and compare. As a result, a projection of county registrations was developed for this study.

Several analytical techniques were examined for their applicability to projecting registered aircraft in Pinal County. These included time-series extrapolation, regression analyses, and market share analyses.

A time-series analysis of registered aircraft in the County was prepared based upon the historic data gathered between 1997 and 2006. A regression analysis was also performed to compare the relationship of registered aircraft to population. Both of these resulted in a correlation coefficient (r^2) of less than 0.90. The correlation coefficient (Pearson's "r") measures the association between changes in the dependent variable (enplanements) and the independent variable(s) (calendar years). An r^2 greater than 0.90 indicates good predictive reliability. A value below 0.90 may be used with the understanding that the predictive reliability is lower. Being below the 0.90 threshold, neither the time-series analysis or regression analysis was considered reliable enough to define long-term registered aircraft in Pinal County. Therefore, other methods were used to develop projections of registered aircraft.

Table 2A outlines the history of registered aircraft in Pinal County in relation to the total active general aviation aircraft in the United States. While the County's market share decreased initially in 1998, it has increased since 2000 and was at 0.164 percent in 2006. A constant market share was applied to the projections of U.S active general aviation aircraft and yields 450 registered aircraft in Pinal County by 2025.

The population of Pinal County was also used as a comparison with registered aircraft in the County. The forecast examines the history of registered aircraft as a ratio of residents in Pinal County. As shown in **Table 2A**, the 2006 estimated population for the County was 286,795, resulting in a ratio of 1.24 registered aircraft per 1,000 residents. Maintaining the current ratio would yield a projection of 2,430 registered aircraft in Pinal County by 2025.

However, the ratio has been declining since 1997, when there were 1.75 registered aircraft per 1,000 residents in the County. Because of this declining ratio in Pinal County over the past ten years, the ratio of registered aircraft to population was also examined in the adjacent larger metropolitan counties of Maricopa and Pima. As shown in **Table 2B**, both counties have a higher ratio than Pinal County, but also experienced a decline in the ratio between 1995 and 2006.

This suggests that a larger population has a higher propensity for registered aircraft. Population growth rates in the three-county area, however, will remain stronger than aircraft demand. Thus, the aircraft ownership per capita will still decline over time.

The selected forecast for registered aircraft in Pinal County is based upon

a slowly decreasing ratio of registrations per 1,000 residents. The selected forecast yields 500 registered aircraft by 2010, 790 registered aircraft by 2015, and 1,950 registered aircraft by 2025. This represents a 9.4 percent average annual growth rate. **Table 2A** summarizes the registered aircraft forecasts developed for Pinal County, as well as the selected forecast.

TABLE 2A
Registered Aircraft Projections
Pinal County

Year	Pinal Co. Registered Aircraft	U.S. Active GA Aircraft	% of U.S. Active GA Aircraft	Pinal Co. Population	AC Per 1,000 Residents
1997	276	192,414	0.143%	157,758	1.75
1998	267	204,711	0.130%	164,765	1.62
1999	292	219,464	0.133%	172,083	1.70
2000	305	217,533	0.140%	179,727	1.70
2001	305	211,447	0.144%	194,285	1.57
2002	307	211,244	0.145%	210,022	1.46
2003	305	209,606	0.146%	227,034	1.34
2004	327	212,390	0.154%	245,425	1.33
2005	335	214,591	0.156%	265,304	1.26
2006	356	216,835	0.164%	286,795	1.24
Constant Market Share of U.S. Active GA Aircraft					
2010	385	234,000	0.164%	415,600[2]	0.92
2015	410	248,100	0.164%	696,300[2]	0.58
2025	450	274,500[1]	0.164%	1,954,000	0.23
Constant Registrations Per Capita					
2010	515	234,000	0.220%	415,600[2]	1.24
2015	865	248,100	0.348%	696,300[2]	1.24
2025	2,430	274,500[1]	0.884%	1,954,000	1.24
Decreasing Registrations Per Capita (Selected Forecast)					
2010	500	234,000	0.213%	415,600[2]	1.20
2015	790	248,100	0.317%	696,300[2]	1.13
2025	1,950	274,500[1]	0.712%	1,954,000	1.00

Source: Historical Registered Aircraft - Aviation Goldmine CD (1997-2000); Avantex Aircraft & Airmen CD (2001-2006); Historical & Forecast U.S. Active GA Aircraft – FAA Aerospace Forecasts, 2006-2017. Historical Population – U.S. Census Bureau; Forecast Population - Pinal County Small Area Transportation Study (August 2006).
[1] Extrapolated
[2] Interpolated

TABLE 2B Registered Aircraft Per Capita	1995	2000	2006
Pinal County			
Registered Aircraft	304	305	356
Population	144,627	194,285	286,795
Registered AC Per 1,000 Residents	2.10	1.57	1.24
Maricopa County			
Registered Aircraft	4,050	4,632	5,299
Population	2,551,765	3,072,149	3,764,446
Registered AC Per 1,000 Residents	1.59	1.51	1.41
Pima County			
Registered Aircraft	1,135	1,247	1,341
Population	776,172	843,746	980,977
Registered AC Per 1,000 Residents	1.46	1.48	1.37

The distribution of registered aircraft in the Maricopa area was also examined in Chapter One. Exhibit 1P and Table 1L depicted this distribution by community and zip code. Distribution of aircraft to the new Maricopa airport was made based upon proximity to the Maricopa planning area. **Exhibit 2B** depicts the general service area for the new Maricopa airport. In zip codes that are located within the primary service area, two of three registered aircraft were assigned to the new airport. In zip codes on the fringe of the primary service area, ten percent of the registered aircraft were assigned to the new airport. The result was a potential for an initial basing of 54 aircraft at a new airport were it to open today.

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

This baseline number of 54 based aircraft at the new Maricopa airport represents 15.2 percent of the total aircraft registered in Pinal County in 2006. An increasing market share forecast was developed and is presented in **Table 2C**. This increasing market share forecast assumes that with the projected boom in the population, the airport will begin capturing a greater share of registered aircraft in the County. This increasing market share projection yields a selected forecast of 350 based aircraft by the end of the planning period.

Since the process of development of a new airport can typically take from three to ten years to complete, it is difficult to rely on forecasts based upon time. For example, the longer it takes to establish the airport, realization of the demand projections could be delayed. Therefore, the airport demand timeframe will be related to the initial opening of the airport rather than a particular calendar year. A new air-

port is not likely to be open until after 2010. Therefore, the initial planning period will represent the five-year horizon, the intermediate term period will reflect a ten-year horizon, and the long range period will reflect a twenty-year planning horizon. **Exhibit 2C** reflects the based aircraft by planning horizon.

TABLE 2C
Market Share of Registered Aircraft (Pinal County)
New Maricopa Airport

Year	New Maricopa Based Aircraft	Pinal County Registered Aircraft	Market Share of Based Aircraft
2006	54	356	15.2%
Increasing Market Share			
2010	80	500	16.5%
2015	140	790	17.5%
2025	350	1,950	18.0%

Source: Historical Registered Aircraft - Avantex Aircraft & Airmen CD; Forecast Registered Aircraft – Analysis By Coffman Associates.

BASED AIRCRAFT FLEET MIX

Knowing the aircraft fleet mix expected to utilize the airport is necessary to properly plan facilities that will best serve the level of activity and type of activities occurring at the airport. The based aircraft fleet mix at other airports in the vicinity of Maricopa is comprised primarily of single-engine piston aircraft. Multi-engine piston and turbine aircraft comprise less than 10 percent of the totals, with business jet aircraft totaling less than one percent. Nationally, the general aviation fleet mix is around 80 percent single-engine aircraft.

As indicated earlier, none of the public use airports in the area currently have runways longer than 5,200 feet. This limits the current demand for business jet aircraft. Population and employment growth can be expected to generate demand for business jets basing at the new airport. The fleet projections were prepared assuming that the new airport would be developed to attract corporate activity. Any glider or ultralight activity that would be based at the facility would be in addition to the forecasts depicted here.

Table 2D outlines the projected fleet mix. The national trend is towards a larger percentage of sophisticated aircraft and helicopters in the fleet mix. Growth within each category at the airport has been determined by comparison with national projections, which reflect current aircraft in production.

ANNUAL OPERATIONS

Aircraft operations are classified by air traffic control towers as either local or itinerant. A local operation is a take-off or landing performed by an aircraft that operates within sight of the airport, or which executes simulated approaches or touch-and-go operations at the airport. Itinerant op-

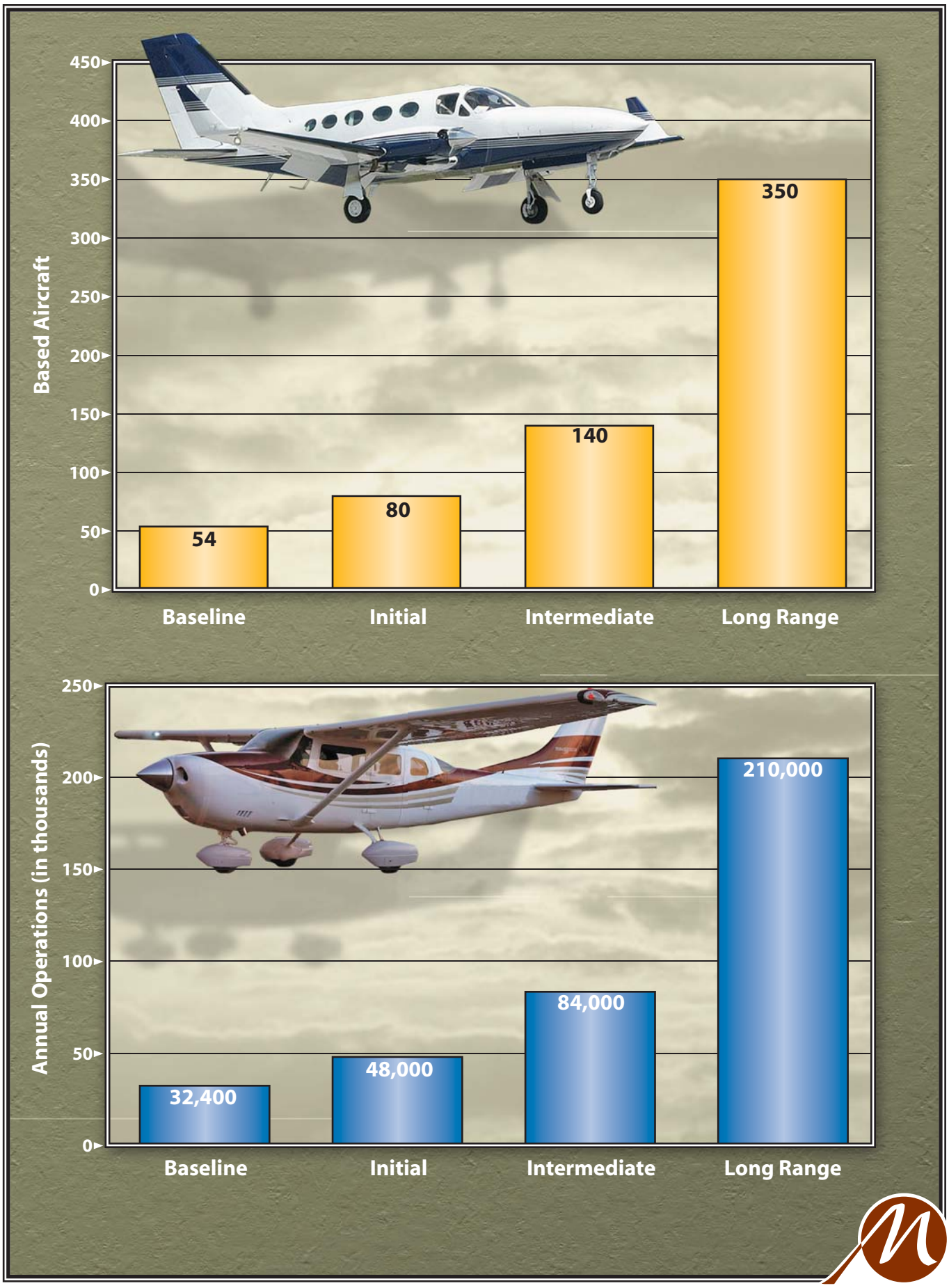

Exhibit 2C
POTENTIAL AIRPORT DEMAND

erations are those performed by aircraft with a specific origin or destination away from the airport. Generally, local operations are characterized by training operations. Typically, itinerant operations increase with business and industrial use since business aircraft are used primarily to carry people from one location to another.

TABLE 2D
Based Aircraft Fleet Mix
New Maricopa Airport

Year	Total	Single Engine	Multi-Engine	Turbo-prop	Jet	Rotor-craft
Baseline	54	46	5	1	0	2
Percentage Share						
Baseline	100.0%	85.2%	9.3%	1.9%	0.0%	3.7%
FORECAST						
Initial	80	66	7	2	2	3
Intermediate	140	111	10	5	8	6
Long Range	350	270	22	12	30	16
Percentage Share						
Initial	100.0%	82.5%	8.8%	2.5%	2.5%	3.8%
Intermediate	100.0%	79.3%	7.1%	3.6%	5.7%	4.3%
Long Range	100.0%	77.1%	6.3%	3.4%	8.6%	4.6%

Potential operations at a new airport can be estimated based on activity relationships at existing airports. This is done by examining ratios of annual operations per based at towered airports in the area. In the Phoenix area, these ratios were found to fluctuate between 300 and 1,000 operations per based aircraft with the higher ratios at locations with high levels of training activity. For planning purposes, operations at the potential new Maricopa airport were estimated at 600 annual operations per based aircraft. An examination of airports in the area revealed approximately 40 percent of total operations are itinerant. It is estimated that itinerant operations at a new Maricopa airport would initially be 35 percent. As the airport matures with more business-related traffic, the ratio of itinerant operations is expected to gradually increase to 40 percent. **Table 2E** and **Exhibit 2C** present the forecast of annual operations.

TABLE 2E
General Aviation Operations Forecast
New Maricopa Airport

Year	Based Aircraft	Itinerant Ops	Local Ops	Total Ops	Ops Per Based AC
Baseline	54	11,300	21,100	32,400	600
Constant Ratio Projection					
Initial	80	17,000	31,000	48,000	600
Intermediate	140	31,000	53,000	84,000	600
Long Range	350	84,000	126,000	210,000	600

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. 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.

- **Design Hour** - The peak hour within the design day.

It is important to note that only the peak month is an absolute peak within a given year. All other peak periods will be exceeded at various times during the year. However, they do represent reasonable planning standards that can be applied without overbuilding or being too restrictive.

Peak period data from other general aviation airports in the metropolitan area was reviewed to develop estimates for the potential new airport. Typically, the peak month for general aviation operations represents 10-12 percent of the airport's annual operations. For this analysis, 12 percent was used. Design day operations were calculated by dividing the peak month by 31. Daily peak periods are important factors for the provision of adequate aircraft parking apron area on the airport. Typically, busy days account for 1.25 times the design day activity. Design hour operations were estimated at 15 percent of the design day operations, but declining to 12 percent over the planning horizons. **Table 2F** summarizes the general aviation peak activity forecasts. It also includes separate peaks for itinerant general aviation operations.

TABLE 2F
Peaking Period Activity
New Maricopa Airport

	Baseline	Initial	Intermediate	Long Range
Annual Operations	32,400	48,000	84,000	210,000
Peak Month	3,890	5,760	10,080	25,200
Design Day	130	192	336	840
Busy Day	162	240	420	1,050
Design Hour	19	29	54	101
Itinerant Operations	11,300	17,000	31,000	84,000
Peak Month	1,360	2,040	3,720	10,080
Design Day	45	68	124	336
Busy Day	57	85	155	420
Design Hour	7	10	17	40

FACILITY REQUIREMENTS

To properly examine the feasibility of a new airport, it is necessary to translate projected aviation demand into the specific types and quantities of facilities that can adequately serve this expected demand. The objective of this effort is to identify, in general terms, what new facilities may be needed, and when these may be needed to accommodate forecast demands. Having established these facility requirements, general estimates of development costs can be estimated for considering the financial feasibility of the airport facility.

The requirements for new facilities have been expressed for the initial airport as well as the short, intermediate, and long range planning horizons, which roughly correlate to five-year, ten-year, and twenty-year time frames.

AIRFIELD DESIGN STANDARDS

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

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

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

Category A: Speed less than 91 knots.

Category B: Speed 91 knots or more, but less than 121 knots.

Category C: Speed 121 knots or more, but less than 141 knots.

Category D: Speed 141 knots or more, but less than 166 knots.

Category E: Speed greater than 166 knots.

The airplane design group (ADG) is based upon the aircraft's wingspan

and tail height. The six ADGs used in airport planning are as follows:

Group I: Up to but not including 49 feet wingspan or tail height up to but not including 20 feet.

Group II: 49 feet up to but not including 79 feet wingspan or tail height from 20 up to but not including 30 feet.

Group III: 79 feet up to but not including 118 feet wingspan or tail height from 30 up to but not including 45 feet.

Group IV: 118 feet up to but not including 171 feet wingspan or tail height from 45 up to but not including 60 feet.

Group V: 171 feet up to but not including 214 feet wingspan or tail height from 60 up to but not including 66 feet.

Group VI: 214 feet up to but not including 262 feet wingspan or tail height from 66 up to but not including 80 feet.

In order to determine facility requirements, an ARC should first be determined, and then appropriate airport design criteria can be applied. This begins with a review of the type of aircraft using and expected to the airport. **Exhibit 2D** provides a listing of typical aircraft and their associated ARC.

The FAA recommends designing airport functional elements to meet the requirements of the most demanding ARC for that airport (minimum of 500 annual operations). In order to determine the airport's facility requirements, the ARC of the critical aircraft should first be determined. The most demanding aircraft at the proposed airport will be corporate aircraft comprised of business jets and turboprops. Initially, the airport should be capable of at least accommodating aircraft in ARC C-II. This will provide a facility designed to handle the majority of business jets. For the long term, a new Maricopa airport should ultimately be capable of accommodating a full range of business jets up to ARC D-III. This would include aircraft such as the Gulfstream V and the Global Express.

AIRFIELD REQUIREMENTS

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

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

A single runway should be capable of handling the initial activity at the proposed airport, unless it is to be co-located with recreational aviation facilities. In that case, a parallel dirt runway should be included to accommodate the gliders, tail draggers, and other slow-moving recreational aircraft.

07SP04-2D-7/19/07

A-I

- Beech Baron 55
- Beech Bonanza
- Cessna 150
- Cessna 172
- Cessna Citation Mustang
- **Eclipse 500**
- 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, B-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

- Beech 400
- **Lear** 25, 31, **35**, 45, 55, 60
- Israeli Westwind
- HS 125-400, 700

C-II, D-II

- Cessna Citation III, VI, VIII, X
- **Gulfstream** II, III, **IV**
- Canadair 600
- ERJ-135, 140, 145
- CRJ-200, 700, 900
- Embraer Regional Jet
- Lockheed JetStar
- Super King Air 350

C-III, D-III

- ERJ-170, 190
- Boeing Business Jet
- B 727-200
- **B 737-300 Series**
- MD-80, DC-9
- Fokker 70, 100
- A319, A320
- Gulfstream V
- Global Express

C-IV, D-IV

- **B-757**
- B-767
- C-130
- DC-8-70
- DC-10
- MD-11
- L1011

D-V

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

Note: Aircraft pictured is identified in bold type.

Exhibit 2D
AIRPORT REFERENCE CODES

In the long range, the forecast traffic will warrant the development of a parallel runway. The separation between the centerlines of the two paved runways should be at least 700 feet. The parallel runway should be of sufficient design to accommodate on the order of 90 percent of the aircraft types using the airport. As a result, it should ultimately be planned to ARC B-II.

Based upon wind analysis from Casa Grande and other airports in the metropolitan area, a single runway orientation should achieve significantly higher than 95 percent wind coverage for all types of aircraft. Thus, a crosswind runway should not be required.

Runway length requirements specific to conditions in Maricopa for the various classifications of general aviation aircraft that may operate at the airport were examined using the FAA Airport Design Computer Software, Version 4.2D. The program groups general aviation aircraft into several categories, reflecting the percentage of the fleet within each category. **Table 2G** summarizes FAA's generalized recommended runway lengths for a new Maricopa airport.

TABLE 2G
Runway Length Requirements
New Maricopa Airport

AIRPORT AND RUNWAY DATA	
Airport elevation	1,190 feet
Mean daily maximum temperature of the hottest month	107.0° F
Maximum difference in runway centerline elevation	25 feet
Length of haul for airplanes of more than 60,000 pounds	2,000 miles
RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN	
Small airplanes with less than 10 passenger seats	
75 percent of these small airplanes	3,100 feet
95 percent of these small airplanes	3,700 feet
100 percent of these small airplanes	4,400 feet
Small airplanes with 10 or more passengers seats	4,800 feet
Large airplanes of 60,000 pounds or less	
75 percent of large airplanes at 60 percent useful load	5,500 feet
75 percent of large airplanes at 90 percent useful load	8,500 feet
100 percent of large airplanes at 60 percent useful load	7,300 feet
100 percent of large airplanes at 90 percent useful load	11,300 feet
Airplanes of more than 60,000 pounds	8,300 feet

Reference: FAA's Airport Design Computer Software, Version 4.2D.

The table also outlines the runway length requirements for the business jet aircraft weighing 60,000 pounds or less. A runway length of 5,500 feet would be needed to adequately accommodate 75 percent of the business jet fleet at a useful load of 60 percent. This should be adequate for the initial

development of the airport. To accommodate a full range of business jet activity at 60 percent useful load, however, a runway length of 7,300 feet will be needed. This may need to be considered by the intermediate planning horizon.

Growing use of aircraft such as the Gulfstream IV and V and the Global Express could eventually make the larger-than-60,000 pound aircraft the most demanding family of aircraft. The table indicates that these aircraft could operate on at least a 2,000-mile trip length (equivalent of Phoenix to Boston) with a runway length of 8,300 feet. Based upon the future critical aircraft and the desired haul lengths, the primary runway length at the new airport should ultimately be planned to 8,300 feet. The ultimate parallel runway should be constructed at a length of 4,400 feet, which will accommodate 100 percent of small airplanes.

Additional airfield requirements are summarized on **Table 2H**. These include a full length parallel taxiway for both paved runways, as well as the construction of a dirt runway. A summary of the required navigational aids, lighting, and marking are also presented in the table.

TERMINAL AREA REQUIREMENTS

Terminal area facilities are those necessary for handling of aircraft, passengers, and cargo while on the ground. These facilities provide the essential interface between 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 during the planning period for the following types of facilities normally associated with general aviation terminal areas:

- Hangars
- Aircraft Parking Apron
- General Aviation Terminal
- Access and Vehicle Parking

Hangars

The demand for hangar facilities typically depends on the number and type of aircraft expected to be based at the airport. Hangar facilities are generally classified as shade hangars, T-hangars, or conventional hangars. Conventional hangars can include individual hangars or multi-aircraft hangars. These different types of hangars offer varying levels of privacy, security, and protection from the elements.

Typical utilization of hangar space varies across the country as a function of local climate conditions, airport security, and owner preferences. The intense summer weather conditions in Phoenix places a premium on sheltered parking. Weather is not the only factor that influences the demand for hangar storage. The larger, more sophisticated, and more expensive aircraft tend to be stored in hangars. Owners of these types of aircraft normally desire hangar space to protect their investment. The cost and availability of hangar storage does affect

the percentage of aircraft stored in hangars. For planning purposes, it was estimated that 75 percent of piston aircraft would initially be hangared, with that percentage gradually increasing to 85 percent over the planning period.

TABLE 2H
Airfield Facility Requirements
New Maricopa Airport

	Initial	Intermediate	Long Range
Airport Reference Code	C-II	D-II	D-III
Primary Runway Length (ft.) Width (ft.) Strength (lbs.)	 5,500 100 30,000 SWL	 7,300 100 30,000 SWL	 8,300 100 75,000 DWL
Secondary Runway ARC Length (ft.) Width (ft.)	NA NA NA	NA NA NA	B-II 4,400 75
Dirt Runway (if required) Length (ft.) Width (ft.)	A-I 3,700 120	A-I 3,700 120	A-I 4,400 120
Taxiway Width (ft.)	Parallel 35	Parallel 35	Parallel 50
Navigational Aids	PAPI-4 GPS	PAPI-4 GPS	PAPI-4 GPS ATCT
Lighting	MIRL REILs Beacon	MIRL REILs Beacon	MALSR MIRL REILs Beacon
Marking	Nonprecision Segmented Circle Wind Cone	Nonprecision Segmented Circle Wind Cone	Precision Segmented Circle Wind Cone

Approximately 73 percent of hangared aircraft at a new Maricopa airport would initially be stored in T-hangars, with this percentage declining throughout the planning period. A planning standard of 1,200 square feet per based aircraft has been used to determine future T-hangar requirements.

The remaining 27 percent of hangared aircraft would be stored in executive/conventional hangars, with this percentage increasing throughout the planning period. These types of hangars are designed for multiple aircraft storage. As the trend towards more sophisticated aircraft continues throughout the planning period, it is

important to determine the need for more executive/conventional hangars. A planning standard of 1,200 square feet was used for single engine aircraft, while a planning standard of 3,000 square feet was used for multi-engine aircraft, jets, and helicopters.

Since portions of conventional hangars are also used for aircraft maintenance and servicing, requirements for maintenance/service hangar area were estimated using a planning standard of approximately 15 percent of the total hangar space needs. Future hangar requirements for a new Maricopa airport are summarized in **Table 2J**.

TABLE 2J
Terminal Area Requirements
New Maricopa Airport

	Initial	Intermediate	Long Term
Based Aircraft	80	140	350
Annual Operations	48,000	84,000	210,000
Aircraft to be Hangared			
Piston	62	103	248
Turbine	4	13	42
Helicopter	3	6	16
Total	69	122	306
Hangar Positions			
Shade or T-Hangars	56	93	223
Conventional Hangars	13	29	83
Hangar Storage Area (s.f.)			
Shade or T-Hangars	67,200	111,600	267,600
Conventional Hangars	22,400	57,400	171,800
Maintenance Hangar Area (s.f.)	14,000	24,500	61,250
Aircraft Parking			
Positions			
Local Tiedowns	11	18	44
Apron Area (s.y.)	3,900	6,300	15,400
Transient Ramp			
Positions	21	39	105
Apron Area (s.y.)	14,300	27,200	74,300
Terminal Building (s.f.)	2,000	3,700	10,200
Auto Parking			
Spaces	68	124	326
Area (s.f.)	23,800	43,400	114,100

Aircraft Parking Apron

A parking apron should provide for the number of locally based aircraft that are not stored in hangars, as well as transient aircraft. For planning purposes, 15 percent of the based piston aircraft total was used to estimate the apron tie-down requirements for based aircraft. A planning criterion of 350 square yards per aircraft was used to

determine the apron requirements for local aircraft.

FAA Advisory Circular 150/5300-13 suggests a methodology by which transient apron requirements can be estimated from busy day operations. The number of transient spaces necessary was estimated to be approximately 25 percent of the busy day itinerant operations. Planning criterion of 600 square yards was used per transient for piston aircraft and 1,000 square yards for transient turbine and rotorcraft. Total aircraft parking apron requirements are presented in **Table 2J**.

General Aviation Terminal

A general aviation terminal can serve several functions including providing space for passenger waiting, pilot's lounge and flight planning, concessions, line service and airport management offices, storage, and various other needs. At most general aviation airports, these functions may not necessarily be limited to a single, separate terminal building, but can also be included in the space offered by fixed base operators for these functions and services. For purposes of this analysis, the space requirements will reflect that of a single, public terminal building. Space provided by airport operators, while decreasing the space requirements of a public terminal, will generally increase the overall square footage requirements because of some duplication of function.

The methodology used in estimating general aviation terminal facility needs was based on the number of itinerant passengers expected to utilize terminal facilities during the design hour and FAA guidelines. A planning average of 2.2 passengers per itinerant flight increasing to 2.8 passengers per itinerant flight by the end of the planning period was multiplied by the number of design hour itinerant operations to determine design hour itinerant passengers. Space requirements were then based upon providing 90 square feet per design hour itinerant passenger. **Table 2J** outlines the general space requirements for a general aviation terminal.

Vehicle Access and Parking

Using trip generation estimates from the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 5th Edition*, the airport is estimated to generate 2.6 daily vehicle trips per aircraft operation. Based upon this ratio, design day trips can be expected to grow from 400 initially to 1,800 over the long range. This traffic level is not significant enough to require additional roadway capacity; however, the development of an adjacent business park could increase traffic to ultimately justify four-lane access in the vicinity of the airport.

Vehicle parking requirements were determined based on industry standards. General aviation spaces were calculated by multiplying design hour itinerant passengers by an industry standard of 1.8. Parking for based aircraft owners was estimated at 35 percent of the total based aircraft. Au-

to parking requirements are also summarized in **Table 2J**.

PROTOTYPE AIRPORT

When planning a new airport, or improvements to an existing airport, the appropriate Federal Aviation Administration (FAA) design standards based on the airport reference code (ARC) should be employed. For an airport intended to serve a wide variety of activities from gliders to large business jets, it is advisable to apply design standards to those areas of the airport where each aircraft type is planned to operate. For example, the ultimate primary runway should be designed to accommodate large business jets up to ARC D-III. A potential future parallel runway need only be designed to accommodate up to ARC B-II. Due to the potential for co-location with the glider activity in the area, this airport may also need to provide an unpaved landing area.

Exhibit 2E presents a prototype airport for the City of Maricopa. The primary runway would be initially constructed to a length of 5,500 feet and a width of 100 feet. A parallel taxiway is planned at a separation distance from the runway, centerline to centerline, of 400 feet. This 400-foot separation is the standard for Group III wingspans. It is also the standard for any airport providing a Category I (CAT-I) approach with visibility minimums down to one-half mile and cloud ceiling heights down to 200 feet.

The runway protection zones (RPZ) are trapezoidal areas located off the ends of each runway that are to be clear of incompatible objects and activities. The dimensions of the RPZ are a function of the type of aircraft using the runway and the approach visibility minimums associated with each runway end.

The runway end serving the prevailing aircraft flow direction is ultimately planned for a CAT-I approach. The RPZ on this runway end is 2,500 feet long, with a 1,000-foot inner width and a 1,750-foot outer width. The opposite runway end is planned for an approach with not lower than one mile visibility minimums. The RPZ on this runway end is 1,700 feet long, with a 500-foot inner width and a 1,010-foot outer width.

The parallel taxiway centerline to aircraft parking areas (the beginning of apron area) should be a minimum of 100 feet, which is depicted on the exhibit. A central aircraft parking apron is planned to a width of 400 feet and a length of 2,000 feet (approximately 90,000 square yards). Several large conventional hangars measuring up to 150 feet by 200 feet along the apron are intended to be occupied by fixed base operators (FBO) and multi-hangar storage. These large hangars are set to either side of an airport terminal building.

Strategies for locating landside facilities such as hangars follow a philosophy of separating activity levels. High activity areas such as FBO facilities

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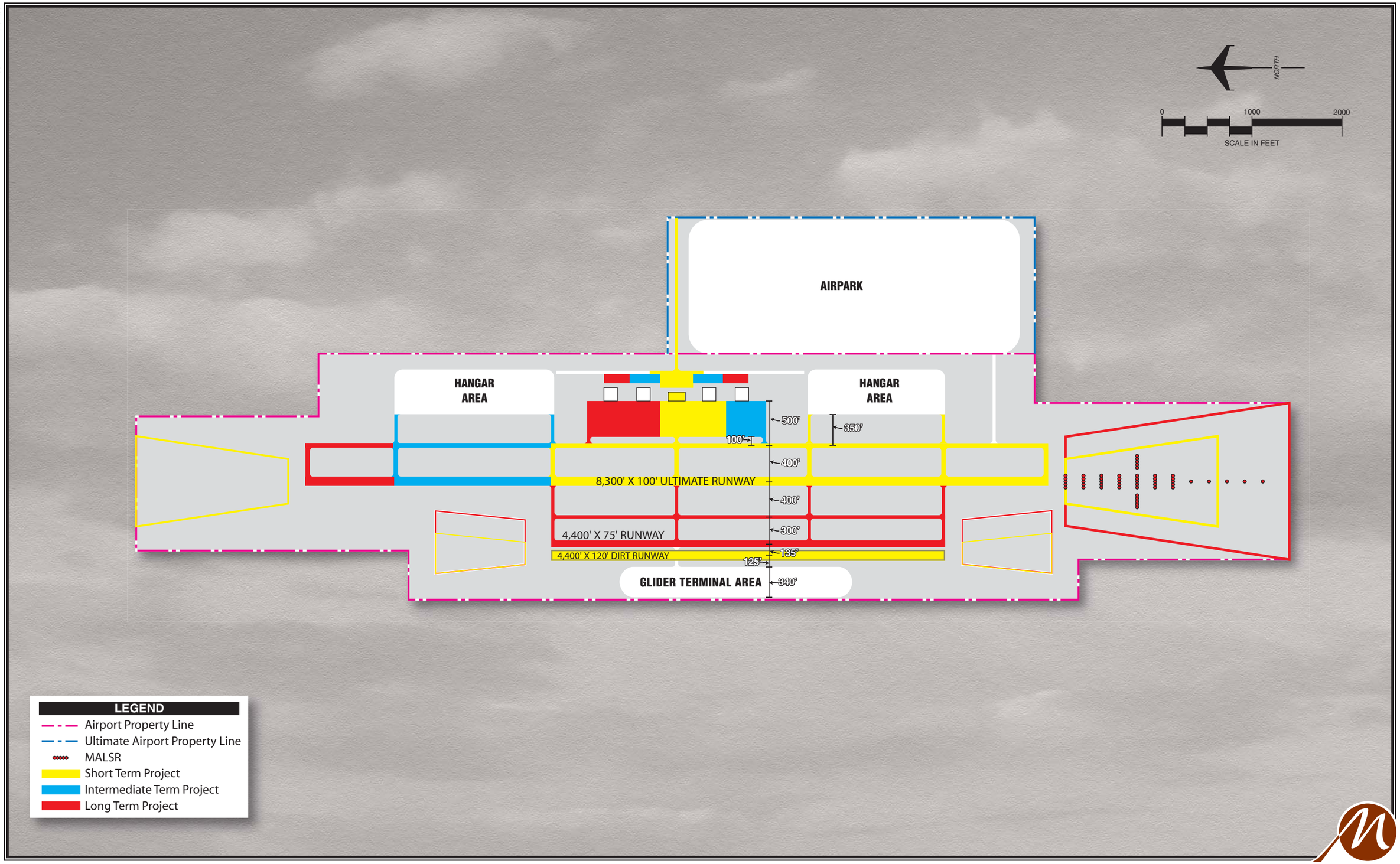

Exhibit 2E
PROTOTYPE AIRPORT LAYOUT

and the terminal building should be located central to the runway system. This allows for maximum efficiency of movement and limited taxi times. Medium activity levels would include corporate aviation departments or other airport aviation businesses. These users will typically occupy a medium-sized hangar. These structures should be located to the sides of the high activity level areas and have direct access to the runway system. Low activity levels would include individual aircraft owner hangars such as a T-hangar. These facilities should be located further to the sides of the medium and high activity areas or perhaps set back from the flight line.

The location of any of these facilities needs to consider FAA airspace restrictions. The transition surface is one of several imaginary surfaces that surround the runway. This surface rises at a 7:1 ratio beginning 500 feet from the runway centerline and should not be penetrated by structures. Therefore, larger conventional hangars are planned to begin no closer than 800 feet from the runway centerline and smaller T-hangars 750 feet from the runway centerline.

Those areas parallel to the runway, or the flightline, should be reserved for aviation uses. At the very least, all land out to a distance of 500 feet should be owned by the airport if no facilities are planned. An additional 900 feet should be planned if aviation-related facilities are planned. Therefore, it is advisable for the airport to own at least 1,400 feet of property from the runway centerline. Any additional land outside this initial 1,400-foot buffer can be planned for either aviation or non-aviation uses.

The history of aviation activity in the Phoenix metropolitan area has shown that facilities grow rather quickly in terms of activity and capacity becomes an issue. The prototype airport anticipates the need for a parallel runway to primarily accommodate local training activity. As mentioned, a parallel runway can be designed to accommodate smaller aircraft. The parallel runway is planned to a length of 4,400 feet and a width of 75 feet. ARC B-II design standards are applied for the various FAA design standards.

The RPZs serving this runway will be much smaller as there will not be a need for the sophisticated CAT-I type approach. The RPZs serving this runway will be 1,000 feet long, 500 feet wide on the inner width and 700 feet on the outer width. These RPZs can provide for instrument approaches with visibility minimums not lower than one mile.

The parallel runway should be located no closer than 700 feet from the primary runway, centerline to centerline. This distance will allow for simultaneous visual approaches to both runways.

There may be a need to support glider activity at the planned airport. For this purpose, a graded dirt landing strip is located parallel to the training runway. The dirt runway is planned to the same length as the training runway (4,400 feet) and is 120 feet wide. The dirt runway is 135 feet, centerline to centerline, from the

training runway. This distance allows for the runway safety area (RSA) surrounding the training runway to be clear. From the centerline of the dirt runway to the glider terminal area should be at least 125 feet. An additional 340 feet should also be under airport ownership to allow for any future development on this side of the airport.

The total area of this prototype airport is approximately 650 acres. This is the minimum that the City of Maricopa should consider when acquiring property for airport use. Only those portions of the property necessary for the basic airport and support facilities would need to be developed at the outset.

FEASIBILITY ANALYSIS

The analysis conducted thus far in this study has been to determine the potential market for a general aviation airport to primarily serve the Maricopa and western Pinal County. This airport may also serve some of the aviation needs of the Goodyear area in southern Maricopa County. The basic facilities required for such an airport have been established and a prototype airport identified. This section will examine the development costs of a general aviation facility, the potential funding for those costs, preliminary revenue and operating cost forecasts, and the potential economic benefits to the community.

DEVELOPMENT COST ESTIMATES

Three stages have been selected to illustrate the basic capital project costs associated with developing a new airport. The initial phase includes those airport elements necessary to support a basic general aviation airport capable of serving 75 percent of the general aviation fleet at 60 percent useful load. This standard includes all single and multi-engine aircraft as well as a majority of business jets in the national fleet. The remaining business jets could still operate at the airport, but would likely be weight-restricted. Ultimately, the runway is planned to be extended from 5,500 feet to 8,300 feet. This length would accommodate the full range of business jets on a regular basis.

Initial Construction

Once a site is selected for the new airport, appropriate master planning and environmental documentation will be necessary. To be eligible for federal and state funding, the airport will require an airport layout plan (ALP) approved by the FAA. As part of this approval process, FAA will require environmental approval. Typically, this will include an Environmental Assessment (EA) which adheres to the standards set forth in the *National Environmental Policy Act* (NEPA). Once the site has been assessed from an environmental impact perspective, and the ALP approved, the airport property can be acquired. It is estimated that the ultimate airport would encompass approximately 650 acres.

Acquisition of this entire tract is considered in the short term planning horizon. Experience has shown that waiting to purchase land necessary for future development can often lead to land being unavailable, developed, or much more expensive. This entire tract should be fenced with six-to eight-foot high chain-link fence with barbed wire on top.

It is anticipated that the site selected will not require extensive earthwork to accommodate the airport. Therefore, an estimate for site preparation costs assumes a basic grading program with minimal fill and removal of soil. Nonetheless, site preparation for an initial 300-acre development tract is estimated at $8.7 million dollars.

The airport will require the extension of utilities. As a placeholder, utility extension to the airport is estimated at 1,000 feet plus the width of the runway. Depending on the site selected, this figure could go up or down. The access road to the airport also assumes a 1,000-foot runway at a 40-foot width.

In the short term, the runway is planned to a length of 5,500 feet and a width of 100 feet. A parallel taxiway is planned which would be 35 feet wide. This initial runway would provide five entrance and exit taxiways. Taxilanes would be provided to the hangar development area. These taxilanes would be 35 feet wide and have a strength rating for 12,500 pounds. The taxilanes do not need to be constructed to the same standard as the parallel taxiway, which would be wider and stronger.

Both the runway and taxiways would be outfitted with edge lighting. Edge lighting is important to define the lateral extent available for aircraft movements. The runway would need runway end identification lights (REILs). These strobe lights are set to the side of the runway ends and help pilots positively locate the runway ends during day and night operations. Precision approach path indicators (PAPIs) lights provide a visual indication to pilots of the appropriate approach slope to the runway touchdown point. These visual aids are provided on both ends of the runway.

Weather aids planned for the airport include an automated weather observation system (AWOS). Pilots are able to obtain airport-specific weather conditions, such as wind speed and direction, from the AWOS. Three lighted wind cones provide wind speed and directional information and a segmented circle is planned to provide traffic pattern information.

The initial airport construction is planned to include a centrally located aircraft parking apron. This first phase of the apron is planned to encompass 18,000 square yards of pavement. A 2,000-square-foot terminal building is also planned initially. This facility should include space for a pilot briefing room, weather monitoring equipment, lounge, and manager's office. An initial automobile parking lot of 24,000 square feet is planned.

It is estimated that the total initial investment necessary for the new airport is $44.6 million dollars. **Table 2K** presents the cost estimates for the

airport development. Also included is a breakdown of what portions of the projects would be eligible for either Federal FAA and/or State of Arizona funding. A description of these funding mechanisms is presented in the section to follow.

TABLE 2K
Potential Airport Development Costs
New Maricopa Airport

	Total	FAA Eligible	ADOT Eligible	Local Share
Initial Construction				
Environmental/Planning Documentation	$800,000	$760,000	$20,000	$20,000
Property Acquisition (650 acres)	$21,450,000	$20,377,500	$536,250	$536,250
Site Preparation (300 acres)	$9,801,000	$9,310,950	$245,025	$245,025
Airport Utilities	$1,755,000	$1,667,250	$43,875	$43,875
Primary Runway (5,500' x 100')	$4,125,000	$3,918,750	$103,125	$103,125
Taxiway Paving (parallel and 5 entrances)	$2,813,000	$2,672,350	$70,325	$70,325
Taxilanes to Hangars (2)	$110,000	$104,500	$2,750	$2,750
Aircraft Apron	$1,215,000	$1,154,250	$30,375	$30,375
Dirt Runway Construction	$238,000	$226,100	$5,950	$5,950
Airfield Lighting and Marking	$614,000	$583,300	$15,350	$15,350
REILs	$68,000	$64,600	$1,700	$1,700
PAPIs	$108,000	$102,600	$2,700	$2,700
Fencing	$740,000	$703,000	$18,500	$18,500
Airport Access Roads	$180,000	$171,000	$4,500	$4,500
Auto Parking	$89,000	$0	$80,100	$8,900
Terminal Building	$270,000	$0	$243,000	$27,000
Weather Aids	$203,000	$192,850	$5,075	$5,075
Initial Construction Totals	**$44,579,000**	**$42,009,000**	**$1,428,600**	**$1,141,400**
Intermediate Term Construction				
Environmental/Planning Documentation	$500,000	$475,000	$12,500	$12,500
Site Preparation (100 acres)	$3,267,000	$3,103,650	$81,675	$81,675
Primary Runway Extension (1,800' x 100')	$1,350,000	$1,282,500	$33,750	$33,750
Taxiway Extension (parallel and entrance)	$825,000	$783,750	$20,625	$20,625
Airfield Lighting and Marking	$208,000	$197,600	$5,200	$5,200
Taxilanes to Hangars (2)	$110,000	$104,500	$2,750	$2,750
Aircraft Apron	$790,000	$750,500	$19,750	$19,750
Auto Parking	$74,000	$0	$66,600	$7,400
Terminal Building Expansion	$270,000	$0	$243,000	$27,000
Intermediate Construction Costs	**$7,394,000**	**$6,697,500**	**$485,850**	**$210,650**
Long Term Construction				
Environmental/Planning Documentation	$500,000	$475,000	$12,500	$12,500
Site Preparation (150 acres)	$4,901,000	$4,655,950	$122,525	$122,525
Primary Runway Extension (1,000' x 100')	$750,000	$712,500	$18,750	$18,750
Taxiway Extension (parallel and entrance)	$525,000	$498,750	$13,125	$13,125
Parallel Runway (4,400' x 75')	$1,485,000	$1,410,750	$37,125	$37,125
Parallel Taxiway (35' wide)	$1,134,000	$1,077,300	$28,350	$28,350
Parallel Lighting and Marking	$477,000	$453,150	$11,925	$11,925
REILs	$68,000	$64,600	$1,700	$1,700
PAPIs	$108,000	$102,600	$2,700	$2,700
MALSR	$1,215,000	$1,154,250	$30,375	$30,375
Aircraft Apron	$3,814,000	$3,623,300	$95,350	$95,350
Auto Parking	$265,000	$0	$238,500	$26,500
Terminal Building Expansion	$837,000	$0	$753,300	$83,700
Airport Traffic Control Tower	$4,050,000	$3,847,500	$101,250	$101,250
Long Term Construction Costs	**$20,129,000**	**$18,075,650**	**$1,467,475**	**$585,875**
Total Development Costs	**$72,102,000**	**$66,782,150**	**$3,381,925**	**$1,937,925**

Intermediate Term Projects

All intermediate term projects should be based on demand. The airport sponsor should not consider these projects unless the demand indicators, such as based aircraft and operations, are being reached. Assuming that the demand indicators are being met, several intermediate term projects will require further environmental and planning study.

Approximately 100 acres of airport property that was not previously prepared will now need to be graded to allow for development. The primary runway is planned for a 1,800-foot extension, which would bring the total length to 7,300 feet. The parallel taxiway would then be extended to the runway ends as well. Taxiway and runway lighting would be continued. Two taxilanes to a new hangar development area are also planned in this timeframe.

The main aircraft apron is planned to be expanded by approximately 15,000 square yards. The terminal building would be doubled in size. Automobile parking serving the terminal area is also expanded. Intermediate term construction costs are estimated at $7.4 million.

Long Term Projects

Continued airport development will require further environmental and planning study. A placeholder of $500,000 has been added to address these needs in the long term.

Assuming that demand indicators are continuing to be met, the airport would be in need of a parallel runway in order to add airfield capacity and allow for continued growth. The remaining 150 acres of airport property is planned for site preparation. A portion of this area would be planned for the parallel runway.

The parallel runway would be intended to accommodate primarily local training operations. This runway is planned to a length of 4,400 feet and a width of 75 feet. These dimensions will accommodate all smaller piston-powered general aviation aircraft. Appropriate edge lighting for the runway and taxiway is also necessary. This runway would be outfitted with REILs and PAPIs.

The primary runway is planned for a 1,000-foot extension, bringing the total runway length up to 8,300 feet. Taxiway extension and lighting is also planned. The opposite end of the primary runway is then planned for the installation of a sophisticated approach lighting system. This medium intensity approach lighting system with runway alignment indicator lights (MALSR) will allow the airport to remain open into periods of poor visibility conditions. It is assumed that the MALSR will be utilized in conjunction with the global positioning system (GPS) to provide the necessary approach visibility minimums.

The last project of the long term planning period is the construction of an airport traffic control tower (ATCT).

The terminal as well as automobile and aircraft apron areas are also expanded as demand warrants in the long term. Long term projects are estimated to total $20.1 million.

POTENTIAL FUNDING SOURCES

Construction of a general aviation airport in the vicinity of the City of Maricopa will not rely exclusively upon the airport sponsor for funding. Capital funding is available through various grant-in-aid programs on both the state and federal levels. The following discussion outlines key sources of funding potentially available for the development of a new airport. **Table 2K** presents the project costs as well as a breakdown of what portions of those costs are eligible for grant funding.

Federal Grants

Through federal legislation over the years, various grant-in-aid programs have been established to develop and maintain a system of public airports across the United States. The purpose of this system and its federally based funding is to maintain national defense and to promote interstate commerce. The most recent legislation affecting federal funding was enacted in late 2003 and is entitled, *Century of Aviation Reauthorization Act,* or *Vision 100.*

The four-year bill covers FAA fiscal years 2004, 2005, 2006, and 2007. This bill presented similar funding levels to the previous bill - *Air 21.* Airport Improvement Program (AIP) funding was authorized at $3.4 billion in 2004, $3.5 billion in 2005, $3.6 billion in 2006, and $3.7 billion in 2007. The current bill provides the FAA and local airport sponsors the opportunity to plan for longer term projects versus simple one-year reauthorizations.

The source for *Vision 100* 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 Aviation Trust Fund also finances the operation of the FAA. It is funded by user fees, taxes on airline tickets, aviation fuel, and various aircraft parts.

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. If Congress appropriates the full amounts authorized by *Vision 100*, eligible general aviation airports could receive up to $150,000 of additional funding each year in Non-Primary Entitlement (NPE) funds (*National Plan of Integrated Airport Systems* [NPIAS] inclusion is required for general aviation entitlement funding).

The remaining AIP funds are distributed by the FAA based upon the priority of the project for which they have requested federal assistance through discretionary apportionments. A National Priority Ranking System is used to evaluate and rank each airport project. The airport sponsor would have to compete with all airports nationally for FAA discretionary funding.

Therefore, discretionary funds are not assured. If the necessary funding for the development of a new airport is not forthcoming in the form of AIP grants, then projects would either be delayed or require funding from other sources. One other federal source would be a direct Congressional allocation, or earmark.

Both the four-year aviation financing bill and the Aviation Trust Fund, from which the FAA allots grant monies, are up for reauthorization by the end of fiscal 2007. As of August 2007, neither program has been reauthorized. Without legislative authorization in place, funding availability can be jeopardized.

In Arizona, general aviation airport development projects that met FAA's eligibility requirements can receive 95 percent funding. Property acquisition, navigational aids, airfield pavement, and access roads, are examples of eligible airport development elements. General aviation terminal buildings, hangars, and other revenue-producing elements are not eligible for federal grant assistance. Under rare circumstances, some hangars and fuel farm facilities may be eligible.

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 air traffic control towers, enroute navigational aids such as the VORs, and on-airport navigational aids such as PAPIs and approach lighting systems.

As activity levels and other development warrant, the airport may be considered by the FAA for installation and maintenance of navigational aids. Navigational aids such as the MALSR, PAPIs, and REILs may be eligible for funding through this division of the FAA. Should the FAA install these navigational aids, they would operate and maintain them at no cost to the airport. It should be noted that this division of the FAA is currently primarily focused on maintaining existing navigational aids and has limited funding for new equipment. Today, most airports in need of these navigational aids will not rely on F&E.

State Funding

In support of the state aviation 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.

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

State Airport Loan Program

The Arizona Department of Transportation (ADOT) - Aeronautics Division's 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. Unlike the federal AIP funding mechanism, revenue-generating improvements, such as hangars and fuel storage facilities, are eligible under the State Airport Loan Program. 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 funds are provided for airport-related construction projects that are not eligible for funding under another program.

Pavement Maintenance Program

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

Public Law 103-305 requires that airports requesting federal AIP funding for pavement rehabilitation or reconstruction have an effective pavement maintenance management system. To this end, ADOT-Aeronautics maintains an Airport Pavement Management System (APMS). This system requires monthly airport inspections which are conducted by airport management and supplied to ADOT.

The Arizona Airport Pavement Management System uses the Army Corps of Engineers' "Micropaver" program as a basis for generating a Five-Year Airport Pavement Preservation Program (APPP). The APMS consists of visual inspections of all airport pavements. Evaluations are made of the types and severities observed, and entered into a computer program database. Pavement Condition Index (PCI) values are determined through the visual assessment of pavement conditions in accordance with the most

recent FAA Advisory Circular 150/5380-7, *Pavement Management System*, and range from 0 (failed) to 100 (excellent). Every three years, a complete database update with new visual observations is conducted. Individual airport reports from the update are shared with all participating system airports. The Aeronautics Division ensures that the APMS database is kept current, in compliance with FAA requirements.

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

Innovative Funding Sources

As a result of scarcities in traditional federal, state, and local funding sources, consideration might be given to various non-traditional sources of funds available from other federal government departments. These funds are typically used to leverage existing local funds in support of the project. Strong community support and political experience are necessary for these sources to come to fruition. Examples of federal programs that have been successfully used to provide non-traditional funding for airport development projects include:

- Community Development Block grants and loans through the U.S. Department of Housing and Urban Development (HUD)

- Economic Development Assistance (EDA) grants and loans through the U.S. Department of Commerce, Economic Development Administration

- Rural Economic Development grants and loans through the U.S. Department of Agriculture (USDA)

In addition to these federal programs, there may be other state and local programs that should be examined as potential avenues for project funding. While estimating funding from innovative funding sources is not quantified in this analysis, successfully acquiring funding from these sources and leveraging local or private funding against those grants or loans could significantly reduce the funding burden of both local and private funding sources.

One additional funding source is available but requires significant action by political representatives. On occasion, airport development projects have been included as a line item in the federal budget. It would require the support of the U.S. congressional representative for the Maricopa area and both U.S. Senators from Arizona. It should be noted, however, that this option can be problematic. In most

cases, the addition to the AIP bill does not carry with it a national discretionary funding allotment. In the past, the regional FAA offices have been unable to provide ADOT additional discretionary funds as other regional airports have utilized all available. If the City were to pursue this option, an attempt should be made to have FAA provide the grants from national discretionary funds, not regional discretionary funds. All other resources should be explored and exhausted prior to pursuing this option.

Local Funding

Table 2K summarized the eligibility of the airport development for state and federal funds. The balance of project costs, after consideration has been given to grants, must be funded through local resources. The goal for the operation of any airport is to generate ample revenues to cover all operating and maintenance costs, as well as the local matching share of capital expenditures. On a national level, most general aviation airports do not fully meet this goal. Due to higher levels of activity, general aviation airports in the greater Phoenix metropolitan area tend to have a better opportunity for reaching self-sufficiency at least from an operating perspective.

There are several alternatives for local financing 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.

Local funding options may also include the solicitation of private developers to construct and manage hangar facilities. Outsourcing hangar development can benefit the airport sponsor by generating land lease revenue and relieving the sponsor of operations and maintenance costs. Private hangar development should be allowed only within the definition of the airport master plan in order to maintain an efficient airport facility layout.

Ideally, a financing package is established and airport operating income after operating expenses is utilized to retire the debt service. This section will analyze the potential for the airport to finance itself based upon a reasonable rates and charges schedule.

Table 2L provides an overview of operating revenues and expenses of other area general aviation airports for fiscal year 2005-06. These range from Buckeye Municipal Airport with 61 based aircraft to Phoenix Deer Valley Airport, the busiest general aviation airport in the country with over 1,200 based aircraft. Debt service, depreciation, and capital outlays are not included. The information was gathered from publicly published budget and financial statements of each airport sponsor.

TABLE 2L
Area Airport Operating Statistics
Fiscal Year 2005-06

	Buckeye Municipal	Casa Grande Municipal	Chandler Municipal	Glendale Municipal	Phoenix Goodyear	Phoenix Deer Valley
Airport Statistics						
Based Aircraft	61	91	449	378	198	1,250
Annual Operations (2006)	40,314	98,630	269,072	150,772	159,266	406,507
Runway Lengths (ft.)	5,500	5,200	4,840 4,401	7,150	8,500	8,208 4,500
Operating Cash Flow Fiscal Year 2006						
Operating Revenues	$295,215	$737,517	NA	$408,093	$1,725,300	$2,772,799
Operating Expenses	344,715	365,765	$955,991	552,867	1,119,900	1,726,390
Net Operating Income/Loss	($49,500)	$371,752	NA	($144,774)	$605,400	$1,046,409

Note: Operating revenues and expenses only. Does not include debt service, capital improvements, or depreciation.
Source: City Sponsor Budget and Financial Statements.

- OPERATING REVENUES

Airport operating revenues will be generated from fees and lease agreements with users of the airport and/or the airport property. Several methods are available for an airport to generate income from its use. At a general aviation airport such as considered for Maricopa, this would include fuel flowage fees, tie-down fees, land rentals, and building rentals.

Fuel flowage fees are typically charged per gallon of fuel sold by the FBOs on the airport. Typical fees range from four to 12 cents per gallon. For this analysis, a fee of 10 cents per gallon was utilized. Fuel sales were estimated to average six gallons per annual operation initially, growing to 12 gallons per operation with increasing jet traffic.

Tie-down fees are charged to based and transient aircraft using the airport's parking apron. Based aircraft are charged on a monthly basis, while transient aircraft pay an overnight parking fee. A rate of $30 per month was used for based aircraft. Overnight fees can vary depending upon the size of the aircraft, but will generally be 15 to 20 percent of the monthly fee.

Terminal building space rental is charged for office or concession space in the terminal building. A rate of $18 per square foot was assumed for leased space. It was further assumed that less than 40 percent of the space could be leased in the public terminal.

Land rentals would include both rentals for hangar development as well as in the corporate airpark. Space for T-hangar and shade hangar development was estimated at $0.15 per square foot. Space with full utilities for individual and FBO hangars was estimated up to $0.30 per square foot. Depending upon the location of the airport, there is a potential to lease

unused areas for agricultural use or other temporary uses to enhance revenue. No estimates of this type of use were utilized in this analysis. **Table 2M** summarizes the projected revenues for each of the planning horizons.

TABLE 2M
Financial Analysis
New Airport Development (2007) Dollars

	Initial Development	Intermediate Development	Long Range Development
Operating Revenues			
Fuel Flowage	$28,800	$75,600	$252,000
Tie-down Fees	11,520	16,920	45,720
Land Rentals	128,141	198,074	371,564
Terminal Rentals	14,400	26,640	73,440
Total Operating Revenues	**$182,861**	**$317,234**	**$742,724**
Operating Expenses			
Personnel Services	$100,000	$130,000	$200,000
Maintenance and Supplies	120,000	150,000	220,000
Miscellaneous	20,000	30,000	60,000
Total Operating Expenses	**$240,000**	**$310,000**	**$480,000**
Operating Income/Loss	**($57,139)**	**$7,234**	**$262,724**
Capital Improvement Financing			
Total CIP	$44,579,000	$7,394,000	$20,129,000
Federal and State Funding	43,437,600	7,183,350	19,543,125
Remaining Local Share	**$1,141,400**	**$210,650**	**$585,875**
Debt Service 20 years @ 6%			
New Debt Service	$117,067	$21,605	$60,090
Carry-over Debt Service	---	117,067	138,673
Total Debt Service	**$117,067**	**$138,673**	**$198,763**
Net Cash Flow	**($174,207)**	**($131,438)**	**$63,962**

Operating Expenses

To determine the net operating income that will be available to amortize capital improvements, operating expenses must also be considered. When added to annual capital-related costs, an estimate of the total annual airport cash requirement can be determined. In general, these expenses include items such as salaries and wages, employee benefits, utilities, maintenance, supplies, and administrative expenses.

Forecasts of operating expenditures were based upon past experience at other general aviation airports in and around the Phoenix metropolitan area. Adjustments were made based upon the size and operational levels of the proposed facility. **Table 2M** estimates airport operating expenses for each of the planning horizons.

FINANCIAL FEASIBILITY

In reviewing the operating revenues and expenses of other general aviation airports in the metropolitan area, it is evident there is a mix of operating incomes and losses. Buckeye Municipal Airport is at the lower scale of activity and currently has an operating loss.

The newest publicly owned airport in the Phoenix metropolitan area, Glendale Municipal Airport, has had a net operating loss since it opened. The deficit is continuing to decrease, however, as activity increases and space is leased.

While operating revenues were not available for Chandler Municipal Airport, the other three airports listed in **Table 2L** showed a positive operating income for FY 2006. At Casa Grande Municipal Airport, the city's operation of the fuel concession contributes to the positive operating income.

At Phoenix Goodyear Airport, the Phoenix Aviation Department also runs the fuel concession. There are also significant land and building leases with a flight training school and with a large aircraft modification company. At Phoenix Deer Valley Airport, there are two major flight schools, leases with two major FBOs, as well as revenue generated from hangars and other land leases generated by over 1,200 based aircraft.

While operating revenues increase with activity, so do expenses, albeit not proportionally. Subsequently, the ability to become a self-sustaining airport over time improves.

Table 2M presents a generalized cash flow analysis for the potential airport. The analysis determines the net operating income that would be available to assist in funding capital improvements at each horizon level. As indicated on the table, the airport is not likely to show a net operating income through its early years. Not until at least the intermediate planning horizon should operating revenues be expected to meet operating costs. Over the long range, activity should become sufficient to permit the airport to have adequate operating income to assist in funding capital improvements.

Thus, the airport sponsor will need to be prepared to subsidize the initial development and operation of the airport. Over the long term, however, the investment should begin to pay its own way and continue to provide other economic benefits to the community.

ECONOMIC BENEFITS

Revenues generated from operations at general aviation airports often do not meet the required annual expenditures to operate, maintain, and improve the facility without additional funding from the governing entity. As such, general aviation airports are often criticized for not operating at a profit, and causing a drain on local taxpayers.

When airports are perceived in this limited way, their role in attracting business and facilitating spending in the community is overlooked. It is true that a goal of an airport should be to strive for self-sufficiency; however, there are limits to the amount of revenue that can be obtained from airport users in meeting operating expenses and necessary capital costs for airport improvements. An analysis of direct and indirect impacts of airport development provides some insights into the amount of economic activity generated by the presence of an airport.

The economics of an airport reach beyond a simple balance sheet of revenues and expenditures. Since businesses often choose to locate near transportation centers, the presence of an airport can provide a substantial benefit to the community it serves. Similar to the locational advantages of waterways and railroads of the past, airports now are considered attractors of economic development opportunities.

In 2002, the Aeronautics Division of Arizona Department of Transportation (ADOT) commissioned a study of the statewide economic impact of aviation. *The Economic Impact of Aviation in Arizona* not only studies the statewide impact but also the impact of each individual airport in the state. **Table 2N** presents the results for several area airports including Phoenix Regional Airport and the Estrella Sailport, the two public use airports in the vicinity of Maricopa. Phoenix Regional Airport was found to have a $1.4 million economic impact on the economy in 2002, while Estrella Sailport's impact was $2.9 million. The economic impact of neighboring Casa Grande Municipal Airport was $23.9 million. The combined economic impact of the nine existing public use airports in Pinal County totaled $65.4 million in 2002.

TABLE 2N
Economic Impacts of Area Public Use Airports - 2002

	Estrella Sailport	Phoenix Regional	Casa Grande Municipal	Buckeye Municipal	Glendale Municipal	Chandler Municipal
On-Airport Direct Impact						
Employment	19	4	28	35	124	160
Payroll	$720,242	$145,894	$1,074,316	$1,904,671	$4,843,339	$6,164,148
Sales	$1,619,846	$310,481	$2,535,337	$5,784,819	$11,023,290	$14,163,853
Visitor Spending						
Employment	2	6	228	68	116	203
Payroll	$33,036	$127,793	$4,523,841	$1,354,176	$2,311,021	$4,038,123
Sales	$81,235	$314,243	$11,124,120	$3,329,918	$5,682,797	$9,929,740
Total Primary Impacts						
Employment	21	10	256	103	240	363
Payroll	$753,274	$273,687	$5,598,157	$3,258,847	$7,154,360	$10,202,271
Sales	$1,701,081	$624,724	$13,659,457	$9,114,737	$16,706,087	$24,093,593
Total Impacts with Multiplier						
Employment	38	23	399	236	516	778
Payroll	$1,281,918	$601,032	$9,915,806	$7,204,437	$15,452,764	$22,445,580
Sales	$2,901,494	$1,397,500	$23,934,485	$19,283,702	$36,717,702	$53,877,443

Source: Arizona Department of Transportation

Although Buckeye Municipal and Glendale Municipal Airports have registered operating losses, the 2002 study determined their annual economic contribution to be $19.2 million and $36.7 million dollars, respectively. The projected basing potential of a new airport to serve the Maricopa airport falls within the range of these two airports. The long term operations level projected for the Maricopa airport would be comparable to that of Chandler Municipal Airport, which had an economic impact of $53.9 million in 2002.

The airport also improves the essential services of the community, including enhanced medical care (such as air ambulance services), support for law enforcement, pest and fire control, and courier delivery of freight and mail. These services raise the quality of life for residences and maintain a competitive environment for economic development.

Studies of factors influencing the economic development consistently show that the presence of a modern airport facility has a positive impact on the pace and quality of economic growth. An efficient airport can provide a competitive edge for communities seeking corporate relocations or expansions.

Two out of every three Fortune 500 companies use private aircraft in their businesses to transport goods, materials, and personnel. The remainder often charter, lease, or employ other ownership options. Therefore, adequate general aviation facilities, properly promoted and funded, are necessary to ensure that a community fully participates in today's economy.

SUMMARY AND CONCLUSIONS

Based upon the analysis in this chapter, an airport in Maricopa appears to be feasible of further consideration. The community can expect strong population growth and the per capita income of the area is growing along with the population. These factors indicate a propensity to support general aviation ownership.

The City's growth to date has primarily been in residential and supporting commercial development with lower levels of business/industrial development. This is typical of suburban bedroom community growth. An airport can serve as a catalyst to enhance the growth of area employment to better diversify the tax base.

Based upon this analysis, an airport geared to corporate use is recommended. The airport should be planned to ultimately accommodate the full range of business jets. The location outside Class B airspace suggests that the airport will be popular for pilot training as well. Depending upon the location of the airport, facilities to support the types of recreational flying that are already present in the Maricopa area may be needed.

While much of the Maricopa area is presently undeveloped, land available for development is expected to be rapidly absorbed. If an airport is to become a reality, property on the order of 600 to 700 acres must be reserved within the next few years. There are environmental concerns in the area including floodplains, archaeological and biological resources, and public lands. These concerns, however, do not appear to be insurmountable with proper planning.

As with most general aviation airports, an airport in Maricopa cannot be expected to be self-sufficient financially for at least the first five to ten years. As shown by other general aviation airports in and around the Phoenix metropolitan area, increased levels of activity can provide the op-

portunity to grow revenues to ultimately become self-sufficient.

While it would be ideal for the airport to pay for itself from the start, the indirect and intangible benefits of the facility to the community must be considered. Based upon the studies at other airports, an airport in Maricopa could expect to have an annual economic impact of over $20 million initially, growing to over $50 million in the long term. This figure does not include the impact that an airport's assistance attracting new business to the community can mean.

Chapter Three

Site Analysis

Chapter Three

Site Analysis

In Phase I of the planning process, the feasibility of developing a new airport to serve the City of Maricopa and western Pinal County was established. The forecasting element indicated that the area's population and corresponding income growth are substantial, often leading the country in statistical growth measures. This type of growth is projected to be able to support a fully functional general aviation airport designed to initially accommodate all small general aviation aircraft and small- to medium-sized business jets (ARC C-II). Ultimately, the airport should be planned to accommodate large business jets (ARC D-III). This site selection chapter will present an evaluation of several candidate sites which could be suitable for locating the City's airport.

In Phase I, the analysis considered the basic parameters for potential demand and airport facilities, as well as a generic airport development template for an airport layout. The next step is to identify and evaluate potential airport sites. The site selection process utilized in identifying a preferred site for the new general aviation airport will encompass the following:

- Refinement of the airport search area
- Identification of candidate sites
- Evaluation of candidate sites
- Selection of preferred site

Before starting this analysis, it is important to review the basic facility to be accommodated.

AIRPORT SEARCH AREA

A generalized service area for the planned Maricopa airport was previously presented on **Exhibit 2B.** The service area was primarily defined by the proximity of other regional general aviation airports. This area extended to the

north into the Gila River Indian Community, South to Interstate 8, with a southeast portion extending approximately 10 miles further south. The western extent included a portion of Maricopa County and the southern portion of the City of Goodyear planning area. The eastern extent was limited by the proximity of the City of Casa Grande and the Casa Grande Municipal Airport.

The first task, when identifying potential sites for the location of the Maricopa airport, is to narrow the search extent to an area that is more ideal. If no suitable sites can be found in this search area, then reverting to a wider search area is appropriate. As previously determined, the airport will primarily serve the City of Maricopa; thus, the airport should be within a reasonable distance to the central business district (CBD) as well as the residents of the community. When other factors are generally equal, the proximity of an airport to a primary residence or business is the main reason for an aircraft owner to base at or utilize a general aviation airport.

The potential airport to serve the City of Maricopa will also need to serve the overall Arizona aviation system by being located a sufficient distance from other general aviation airports or fill a service level void. It is preferable that the site selected for further study be located in such a manner as to fit within the overall system network of general aviation airports, while still primarily serving the City of Maricopa.

The potential Maricopa airport should be located within the current planning area for the City of Maricopa as previously depicted on Exhibit 1E. By utilizing this previously defined planning area, more detailed analysis of any suitable airport sites can be conducted as pertinent information is already available from other studies, including the General Plan.

The airport service area as defined by the Maricopa Planning Area provides a wide area for potential airport sites and it reflects several natural or man-made barriers. To the west is an expanse of Bureau of Land Management (BLM) property and mountains. To the south is Interstate 8, to the north is the Gila River Indian Community, and to the east is the growing City of Casa Grande.

This defined service area also maintains the potential airport sites within Pinal County, where the City of Maricopa is located. While it is not unheard of for an airport to be located in an adjacent county, it is not ideal as an additional level of governmental concern must be addressed. Therefore, potential airport sites should first be identified in Pinal County and if none are found to be feasible, then the search area could expand to include a portion of southern Maricopa County.

With the establishment of an airport study area, additional geographic data was compiled using a geographic information system (GIS). A GIS is a sophisticated software platform that combines visual geographic data with associated

database information. For example, this technology makes it possible not only to see where a communication tower is located, but also to analyze its potential impact on an airport site. Utilizing GIS, the study area was topically examined to determine areas which should be explored further.

Given that a relatively large study area is available for examination, the first inputs into the GIS were features considered exclusionary for an airport location. These are the shaded-out features presented on **Exhibit 3A**. One exclusion feature is the 100-year floodplain of the Vekol and Santa Cruz Washes. The Federal Emergency Management Agency (FEMA) is continually updating floodplain information, primarily for flood insurance rate determination.

This information is subsequently utilized by many other agencies and jurisdictions, including the Environmental Protection Agency (EPA), to identify potentially environmentally sensitive areas. Executive Order11988, *Floodplain Management*, directs federal agencies to take action to reduce the risk of flood loss, and to minimize the impact of floods on human safety, health, and welfare. Since the proposed airport is anticipated to require both federal and state development assistance, floodplains were excluded from initial consideration.

Features such as interstate highways, railroads, pipelines, and high voltage power lines were also criteria in the initial analysis. A protective buffer was applied to each of these features. The relocation of some minor or even arterial roads is typically possible, but the cost associated with the relocation of highways and freeways is often prohibitive. Therefore, **Exhibit 3A** excludes Interstate 8, State Route-238 (SR-238), and planned arterial streets as exclusionary features. Power lines are initially excluded in this study; however, they can be relocated should that become necessary. Railroads can be difficult and expensive to relocate because of limits on grading and curvatures as well as the large amounts of land needed to be acquired in order to reroute the line.

The airspace around an airport must be clear of obstructions in order to protect the operation of aircraft, as well as people and property on the ground. To this end, communication towers within the study area have been identified. As presented on the exhibit, the area within a 5,000-foot radius of a tower was considered exclusionary. If a site near a tower proves to be the most appropriate location, relocating the tower can be undertaken, but can significantly add to the overall development costs.

Several different types of towers in the study area have been identified. Those labeled as FAA towers are those that are over 200 feet tall and have been logged by the FAA. All other towers are sourced from the Federal Communications Commission (FCC) and are at least 30 feet tall.

In western Pinal County, consideration must be given to the natural terrain. There are several hills/mountains rising several hundred feet from the base elevation that can have an impact on air-

craft operations. All mountainous areas and other areas with gradients consistently higher than two percent are excluded.

Urbanized areas are also considered exclusionary for obvious reasons. Urbanized areas are considered the CBD or the "downtown" areas of any community. The excluded urbanized areas include the City of Maricopa.

The final exclusionary criterion included on **Exhibit 3A** is the existing land uses. Any tribal or federal lands have been excluded. Although none are located in the immediate airport study area, park land, military property, and national parks have been excluded.

IDENTIFICATION OF CANDIDATE SITES

With the study area narrowed and initial exclusionary features identified, the next step is to identify potential locations for the proposed Maricopa airport. The location must be able to accommodate the prototype airport presented previously on Exhibit 2E. This airport includes an ultimate runway length of 8,300 feet, a shorter parallel runway, and possibly a dirt runway to accommodate the glider activity in the area.

The ideal orientation of the runway is based on the prevailing wind direction. Both the FAA and ADOT desire that a single or parallel runway system accommodate 10.5 knot crosswinds or less at least 95 percent of the time. With some possible exception in or around mountainous areas, any orientation typically will meet this standard in central Arizona.

Initial office review identified a total of 14 potential sites. Three of these sites would involve the expansion and improvement of existing airports while the remaining 11 sites were identified as meeting the initial screening criteria. One of the sites is located within the current city limits, while five sites are located within the proposed annexation area for the city. All 14 sites are within the Maricopa Planning Area. The 14 sites identified for initial consideration are presented on **Exhibit 3B**.

SITE 1 – This site is the current location of the Estrella Sailport (E68) immediately north of SR-238, approximately six miles to the west of the Maricopa CBD. Site 1 is located primarily on land owned by the Arizona State Land Department (ASLD).

SITE 2 – Site 2 is located to the west of the Maricopa CBD approximately 6 miles. It is south of SR-238 and west of Hidden Valley Road. This site is located on privately owned property.

SITE 3 – A portion of this site is currently operated as a private airport called Millar (2AZ4). This airport currently supports a 2,300-foot long dirt runway. The site is located immediately east of Site 2 and is bounded by SR-238 to the north, Warren to the east, Farrell to the south, and Hidden Valley to the west.

SITE 4 – Site 4 is located to the east of Site 3 and is approximately five miles from the Maricopa CBD. This site is

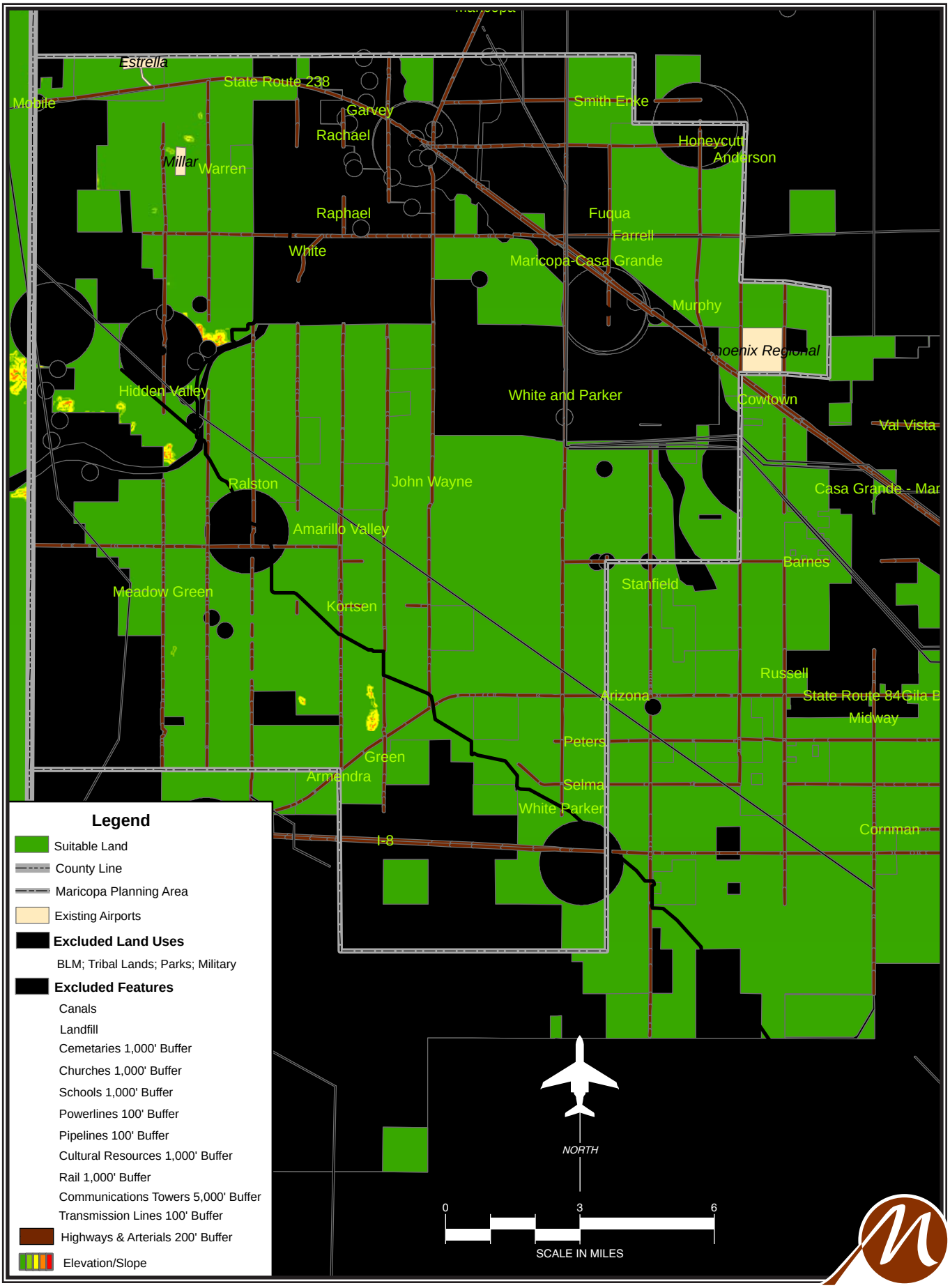

Exhibit 3A
EXCLUSION AREAS

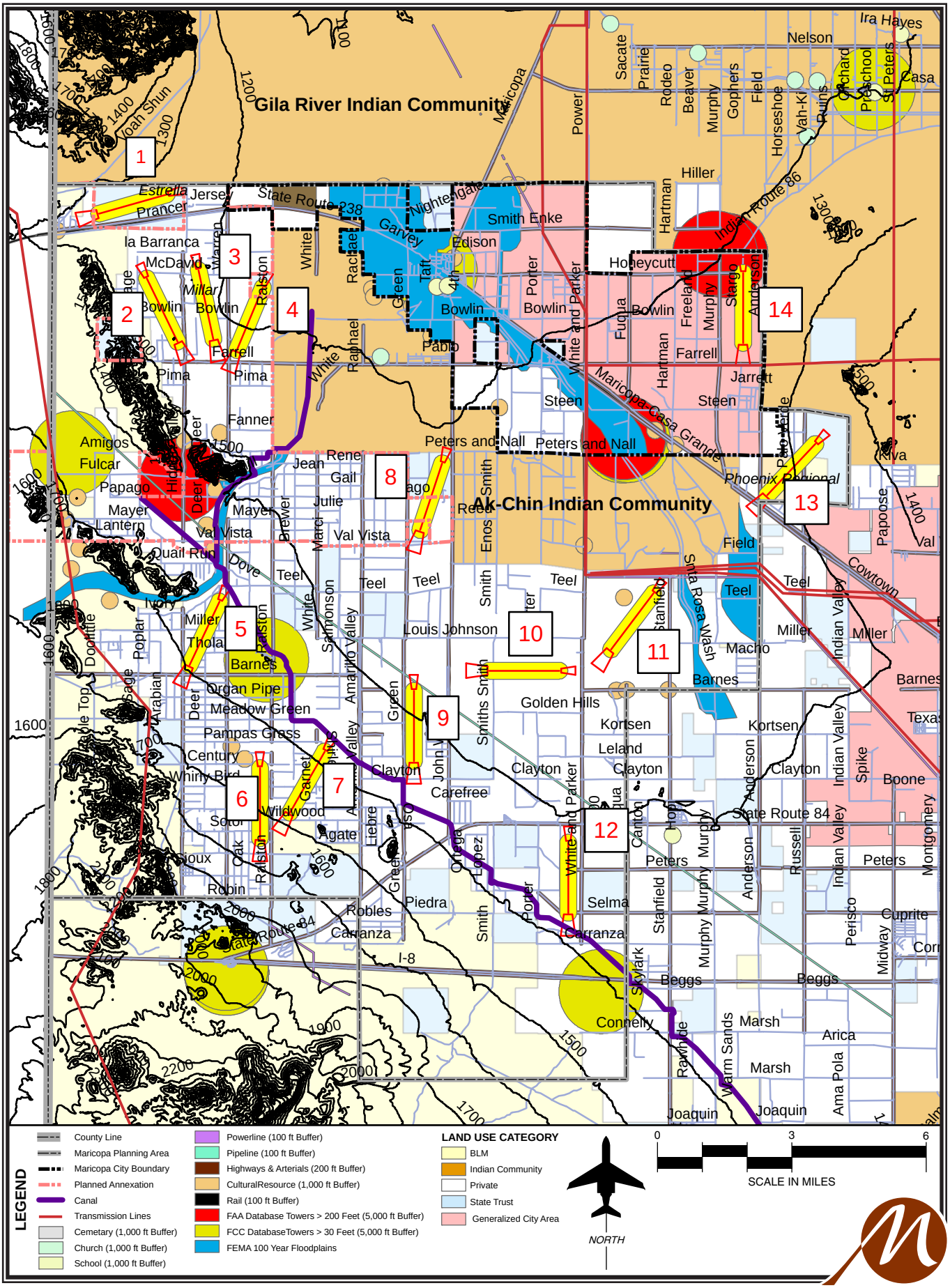

Exhibit 3B
INITIAL SITE CONSIDERATION

located on both private land and ASLD property. The airport site is bounded by SR-238 to the north, Ralston and the Ak-Chin Indian Community to the east, Farrell Road to the South, and Warren Road to the west.

SITE 5 – Site 5 is approximately 10 miles from the Maricopa Central Business District CBD. This site is located to the immediate south of the Vekol Wash. It is bounded to the east by Warren Road, to the south by Barnes Road to the south, and Hidden Valley Road to the west. This property is privately owned.

SITE 6 – Site 6 is one of the most distant sites from the Maricopa CBD, approximately 13 miles. This site is approximately 3 miles from Interstate 8 to the south and State Route 84 (SR-84) to the east. The potential airport site is bounded by Century Road to the north, Ralston to the east, Fresno Road to the south, and Warren Road to the west.

SITE 7 – Site 7 is approximately one mile to the east of Site 6. This site is comprised of privately owned land. The planned arterial roads in the vicinity are Ralston Road to the west and Amarillo Valley to the east.

SITE 8 – Site 8 is the closest potential airport site to the Maricopa CBD at four miles. This site is located directly south of the CBD with primary access to John Wayne Road. To the north and east is Ak-Chin Indian Community lands, to south is Val Vista Road, and to the west is Green Road. This potential site would include two parcels that are currently owned by the ASLD with the remaining property privately owned.

SITE 9 – This site is located approximately five miles to the south of Site 8 and 9 miles to the south of the Maricopa CBD. It is bounded on the north by Louis Johnson Road, to the east by John Wayne Road, to the south by Clayton Road, and to the west by Green Road. This site is located entirely on private property. Site 9 is approximately five miles north of Interstate 8.

SITE 10 – This site is located approximately two miles to the east of Site 9 and nine miles south of the Maricopa CBD. It is bounded on the north by Louis Johnson Road, on the east by White and Parker Road, to the south by Golden Hills Road, and to the west by Smith Road. John Wayne Road is approximately one mile to the west. This site is entirely privately owned.

SITE 11 – Site 11 is one mile east of Site 10. This site is currently utilized as an automobile test grounds. To the north is the Ak-Chin Indian Community, to the east is Stanfield Road, to the south is Barnes Road, and to the west is White and Parker Road. This property is currently privately owned. This site is approximately nine miles from the Maricopa CBD.

SITE 12 – Site 12 is the most distant from the Maricopa CBD at 14 miles. This site is situated between SR-84 to the north and Interstate 8 to the south. White and Parker road is to the east and Porter Road is to the west. This site is located on privately owned property.

SITE 13 – The final site considered in this initial airport site screening is the Phoenix Regional Airport (A39). This airport is privately owned and provides a 5,000-foot long paved runway. This site is approximately eight miles from the Maricopa CBD. It is located adjacent to SR-238. The extended runway would traverse a portion of ASLD property. Some Bureau of Land Management (BLM) property is to the immediate east of the site.

SITE 14 – This site is currently occupied by the Volkswagen test track facilities. It is located approximately five miles to the east of the city center. It is bounded on the west by Murphy Road and the Anderson Road alignment to the east. To the south is Farrell Road and to the north is the Gila River Indian Community.

POTENTIAL SITES REMOVED FROM FURTHER CONSIDERATION

During the week of November 5, 2007, the consultant met with City staff and made field visits to further assess the viability of each of the 14 candidate sites. Through this work, the list of potential sites retained for further consideration was reduced to a total of five (5). The next subsection will discuss the analysis considered when eliminating nine sites from further consideration. This section will be followed by the application of a rating system to identify the sites with the greatest potential to support a new airport.

Based on the initial comments of City staff, the results of field visits, and further GIS analysis, a total of nine sites were removed from further consideration. Sites 5, 6, 7, and 9 were removed because of the long distance from the city center, their location in an area which is prone to sheet flow drainage problems, and the potential obstruction from the mountains to the west.

Sites 2 and 4 were removed because these were the least desirable of the three sites (including Site 3) in this area. Site 2 is too close to the mountains to the west and Site 4 would lead to over-flights of the Ak-Chin Indian Community. Just north end of Site 4 is a major feed lot, which is undesirable as this can be a bird attractant. Both also have concentrations of residential development in their approaches.

Site 8 was also removed from consideration because its location would lead to direct over-flights of the CBD and the Ak-Chin Indian Community. Site 12 was removed due to its distance from the city center.

The last site eliminated at this stage is the current location of the Phoenix Regional Airport. This site is limited in its expansion capability by the mountains to the northeast, and is surrounded by arterial roads on four sides. This airport has also recently been purchased by the Ak-Chin Indian Community. Acquisition of tribal lands can be difficult and time-consuming and should be avoided if other sites can satisfy the needs of the city.

The five remaining sites are Sites 1, 3, 10, 11, and 14. Site 1 is the current location of the Estrella Sailport. Site 3 is the current location of the Millar Airfield, a private unpaved runway. Site 10 is currently agricultural lands to the south of the city. Site 11 is the current location of the Nissan test track to the south of the city. Site 14 is the current location of the Volkswagen test track facility to the east of the city.

SITE SELECTION CRITERIA

In order to determine the most desirable site for an airport, a variety of factors must be taken under consideration. The following have been developed as criteria upon which to judge the advantages and disadvantages of each site. In this manner, a process of elimination can be used to select the most advantageous site for the airport.

ENGINEERING FACTORS

Engineering factors are those which relate directly to the construction, operation, and maintenance of the airport. The categories considered under engineering factors include:

Proximity and Access

To provide maximum service to an area, an airport should be located in reasonable proximity to the population center it is to serve. The location in relation to business and industry should also receive attention. The airport should be located so that it is provided with good access from a major roadway or, preferably, a major highway. Future access and visibility should also be considered, based upon plans for the growth of the surrounding area.

Planning for compatible land uses adjacent to an airport site is a prudent consideration. Warehousing, industrial, and commercial employment centers are compatible with airport activity. Factors to be weighed include available land, proximity to major thoroughfares, location to supporting industry networks, and availability or proximity to existing utility infrastructure.

Site Layout and Design

Each potential site must be evaluated on its ability to physically accommodate the airport. This includes consideration of runway orientation for wind coverage, site limitations that could constrain development including the surrounding terrain, functional efficiency, safety, utility services, and terminal facility layout. Other factors to be considered are the level of infrastructure relocations (roads, power lines, irrigation canals, etc.) and development (roads, utilities, etc.).

Consideration will also be given to the ability of each site to accommodate glider activity in addition to regular fixed-wing activity. The site layout will also consider the possibility of locating an industrial park adjacent to the airport site.

Property Acquisition

This factor examines the magnitude of property to be acquired for each candidate site. The airfield layout, the size and shape of existing parcel ownership, and other impacts to neighboring parcels can affect the amount of property necessary to be acquired. Also included for consideration under this category will be the need for any residential acquisition and relocation.

As described in the feasibility study, the ultimate development plan will require up to 650 acres of land. In many cases, however, additional land may need to be acquired, as landowners cannot be left with an uneconomic remnant. An uneconomic remnant is property that no longer has road access, for example, and, therefore, does not have the same viability as the property previously had as a whole. Some landowners may desire that their entire parcel be acquired rather than selling just a portion. In this phase of the site selection process, the template airport encompassing approximately 650 acres will be shown on each site with the areas recommended for additional acquisition.

Earthworks and Drainage

This factor involves a preliminary evaluation of each site as it relates to site preparation, earthwork, grading, and drainage. The site topography will dictate the amount of earthwork required. As it is not desirable to construct an airport on a site that would require major cut and fill, site ratings will reflect the level of earthwork and drainage required for development of each site.

Airspace, Obstructions, and Navigational Conditions

An analysis of the relationship with the airspace requirements of the existing airport system is essential. It is also necessary to review the envelope area of each site for the presence or absence of potential obstructions to aircraft activity. Certain obstructions may be considered immovable or too expensive to move when other options are available (e.g., large land forms, tall communication towers, major power lines, water towers, etc.). Others, such as smaller power lines, trees, buildings, and roads, impose a cost of removal or relocation that must be considered.

The airport should be capable of providing a precision instrument approach, likely from the south; thus, an examination of potential obstructions must consider providing a cleared approach for this type of approach. It is also important to consider obstructions to the north, as the plan will also include a nonprecision approach from the north.

ENVIRONMENTAL FACTORS

Factors considered as environmentally related are those that affect the area surrounding the airport site, thus having an impact on the existing conditions within the community. At this time, only topical environmental information is available. After one or several sites

are selected for further study, letters of inquiry will be sent to appropriate agencies requesting site-specific environmental determination. This information will be used to confirm and add to the research already conducted and to update the environmental evaluation, if necessary. Criteria to be considered under the environmental analysis include the following categories:

Social Resources

Each site must be evaluated for its potential impact upon social factors within the community. This includes the potential relocation of residents and/or businesses necessary for the development of the airport site. Each site must also be evaluated for how it might influence area development plans in the future. Included within this factor is the relocation or closing of roads and similar disruptions that might be unique to any site.

Physical Resources

This category evaluates potential physical impacts related to physical factors of construction of the airport. Included in this evaluation are impacts such as flood hazards, earth fissures, light emissions, air quality, water quality, and the airport's affect on energy supply or other natural resources.

Ecological Resources

This category evaluates the potential impacts on the natural and historic environment. Biotic communities and endangered species and their habitat areas are included under this category.

Farmland Resources

The Natural Resource Conservation Service, in cooperation with other federal, state, and local government organizations, has inventoried land that can be used for the production of the nation's food supply. Prime Farmland, as defined by the U.S. Department of Agriculture (USDA), is land that has the best combination of physical and chemical characteristics for producing food. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. In Arizona, any land that is irrigated is considered prime farmland. Some irrigated farmland in Arizona is further classified as Unique Farmland which can be used for the production of high-value crops such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables.

Land with these designations will require additional environmental evaluation prior to approval for development. As a general rule of thumb, the closer to existing or planned urban development that prime or unique farmland is located, the lower the impact development will cause.

Historical and Cultural Resources

This category evaluates the potential impacts to historical or cultural resources and DOT Section 4(f) resources

(park lands) that may be of a national, state, or local significance.

EVALUATION OF CANDIDATE SITES

Five potential airport sites have been identified for further analysis, environmental review, and rating. Site 1 is the current location of the Estrella Sailport. Site 3 is the current location of the Millar private airfield. Sites 10 and 11, located to the south of the Ak-Chin Indian Community, are also retained. The final site for consideration (Site 14) is the Volkswagen test facility, located within the City boundaries to the east of the CBD. Airport layouts for the five sites to be further evaluated are each presented on **Exhibits 3C, 3D, 3E, 3F, and 3G**.

Utilizing the engineering and environmental criteria previously identified, each site has been evaluated and ranked. The combination of this ranking, consultation with City staff, and consultant experience and expertise, will lead to a preferred alternative for the proposed airport development site.

The rating values outlined below were developed so that some penalty would be given to sites that do not entirely meet criteria, with a greater penalty given to sites that are totally unsatisfactory. If applicable, sites that met or enhanced the criteria were given a bonus, while sites that substantially exceeded the criteria were given an additional bonus. Five rating values were assigned as described below:

0 - UNACCEPTABLE: The site fails to meet the criteria, or would require major changes to achieve acceptable conditions.

2 - INADEQUATE: The site includes factors that do not meet the criteria as well as some other sites, or will require some changes to achieve acceptable conditions.

5 - ACCEPTABLE: The site satisfactorily meets the criteria.

8 - ADEQUATE: The site is fully sufficient to properly meet the criteria, and includes some advantages in meeting the criteria.

10 - SUPERIOR: The site best meets the criteria and includes major advantages.

The following sections will discuss the rating analysis for each site, first based upon the engineering criteria, then based upon the environmental criteria.

ENGINEERING FACTORS

This section will evaluate the candidate sites using an engineering site rating analysis to determine which site has the best overall potential. The engineering factors were used to give each site a single number rating indicating the degree to which the site was capable of meeting the criteria discussed in the preceding section.

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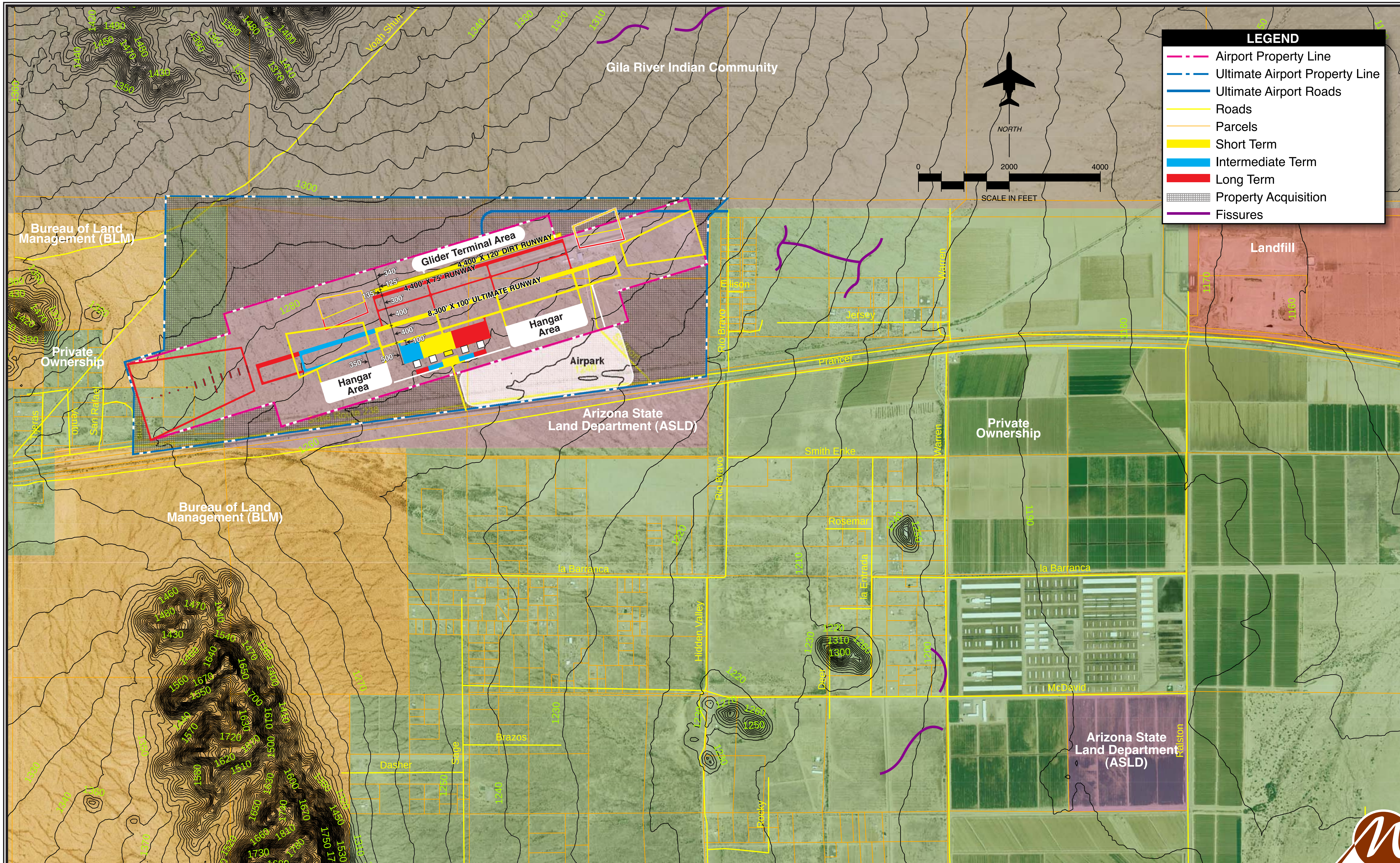

Exhibit 3C
CANDIDATE SITE 1

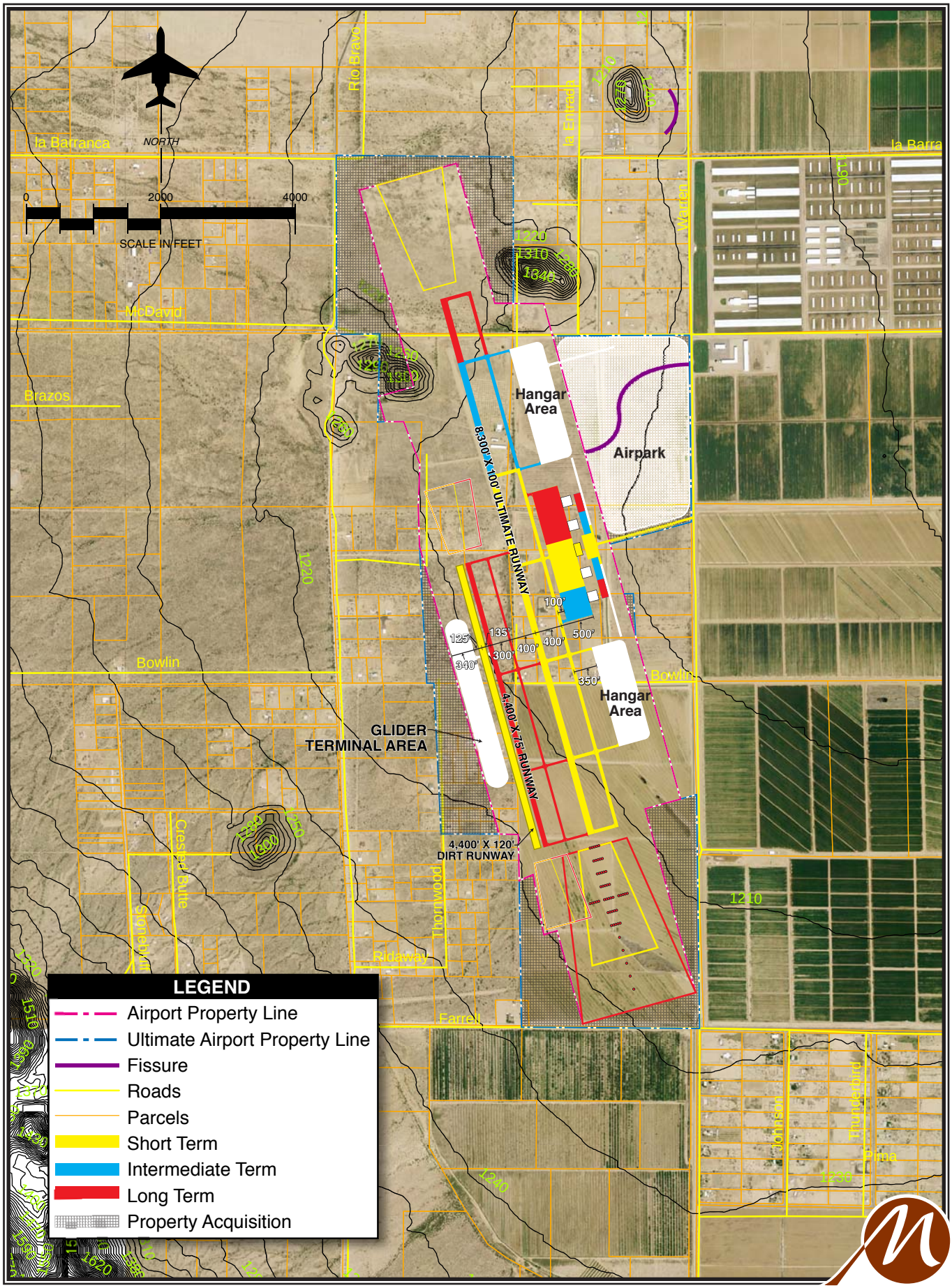

Exhibit 3D
CANDIDATE SITE 3

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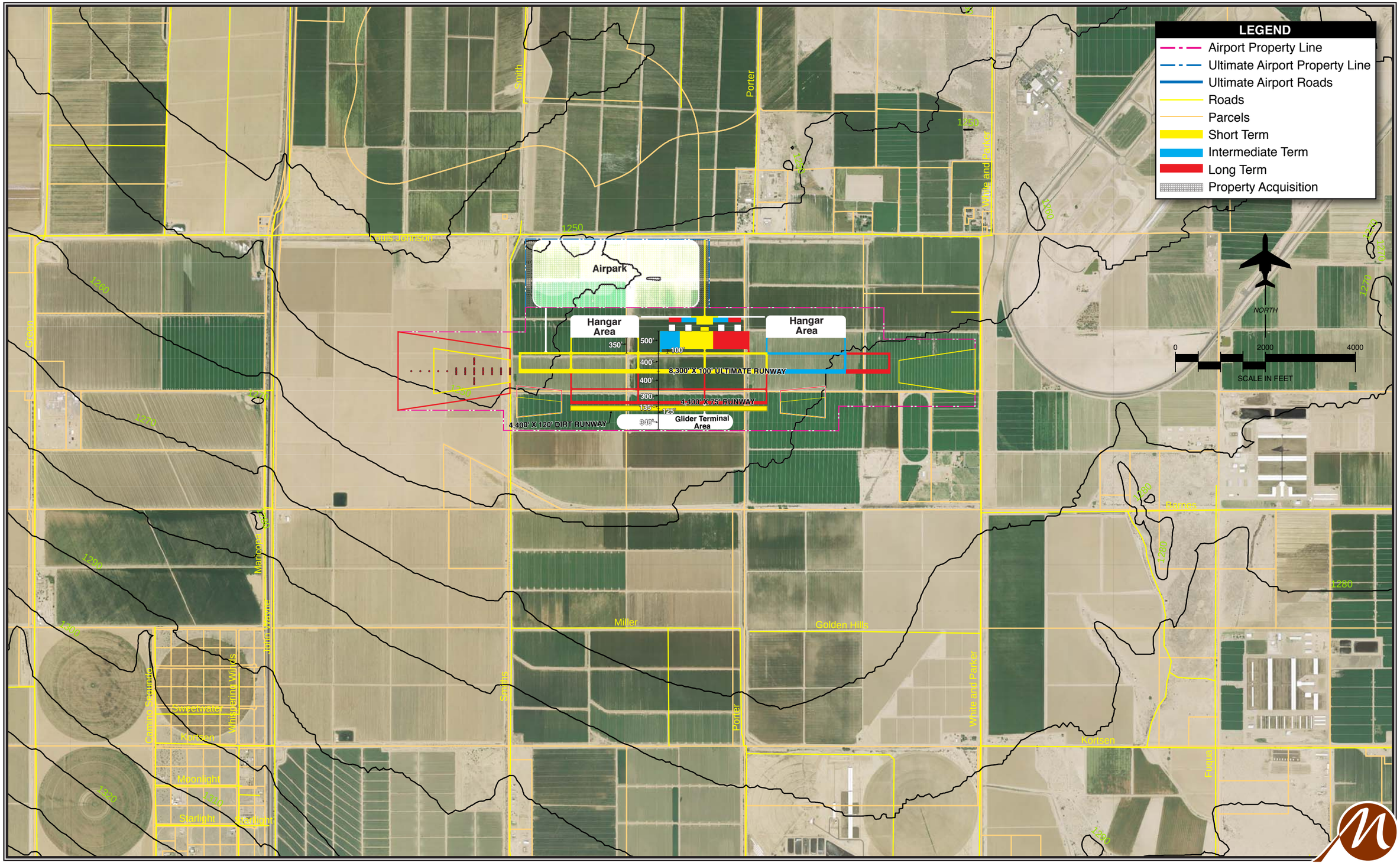

Exhibit 3E
CANDIDATE SITE 10

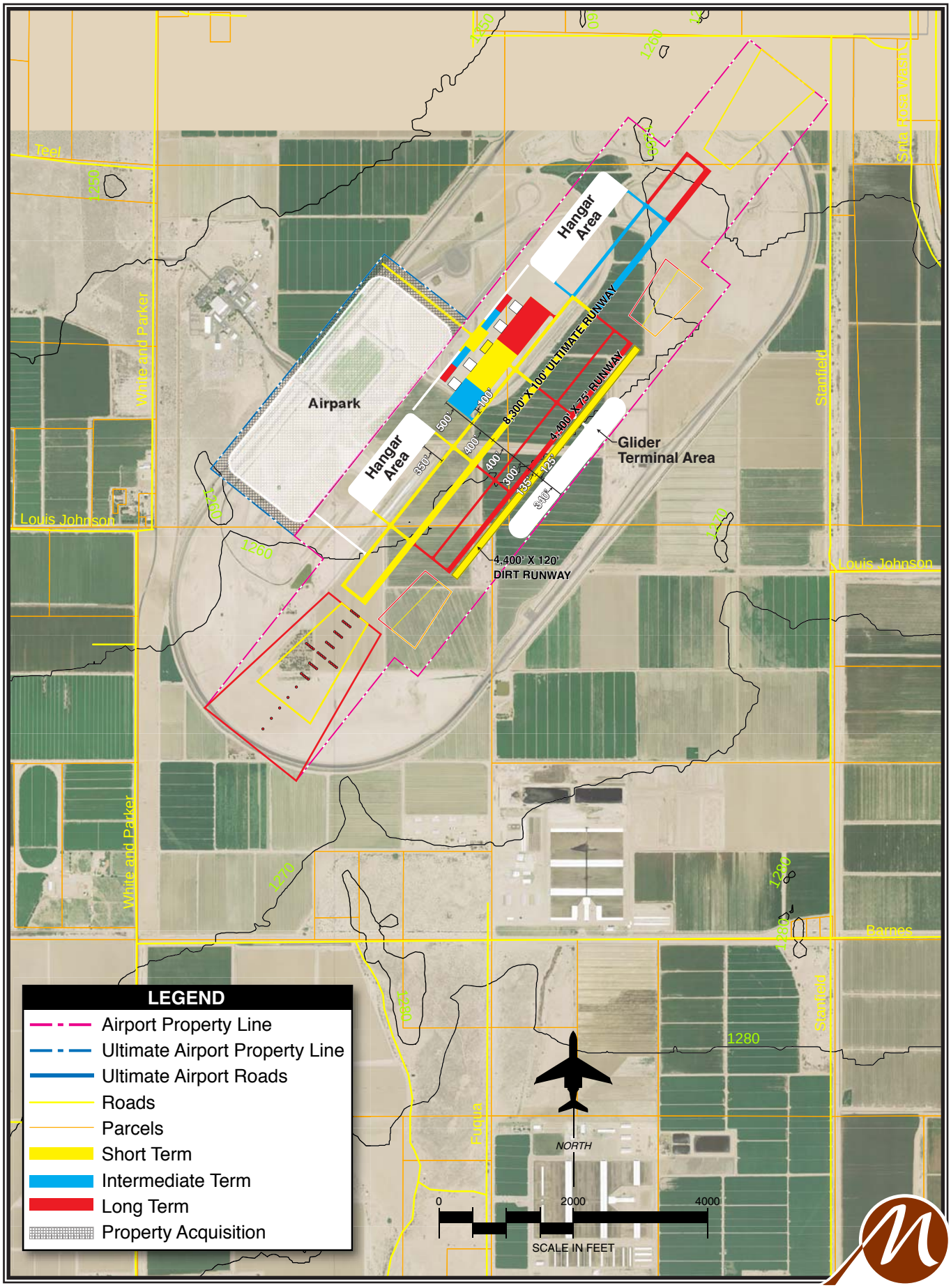

Exhibit 3F
CANDIDATE SITE 11

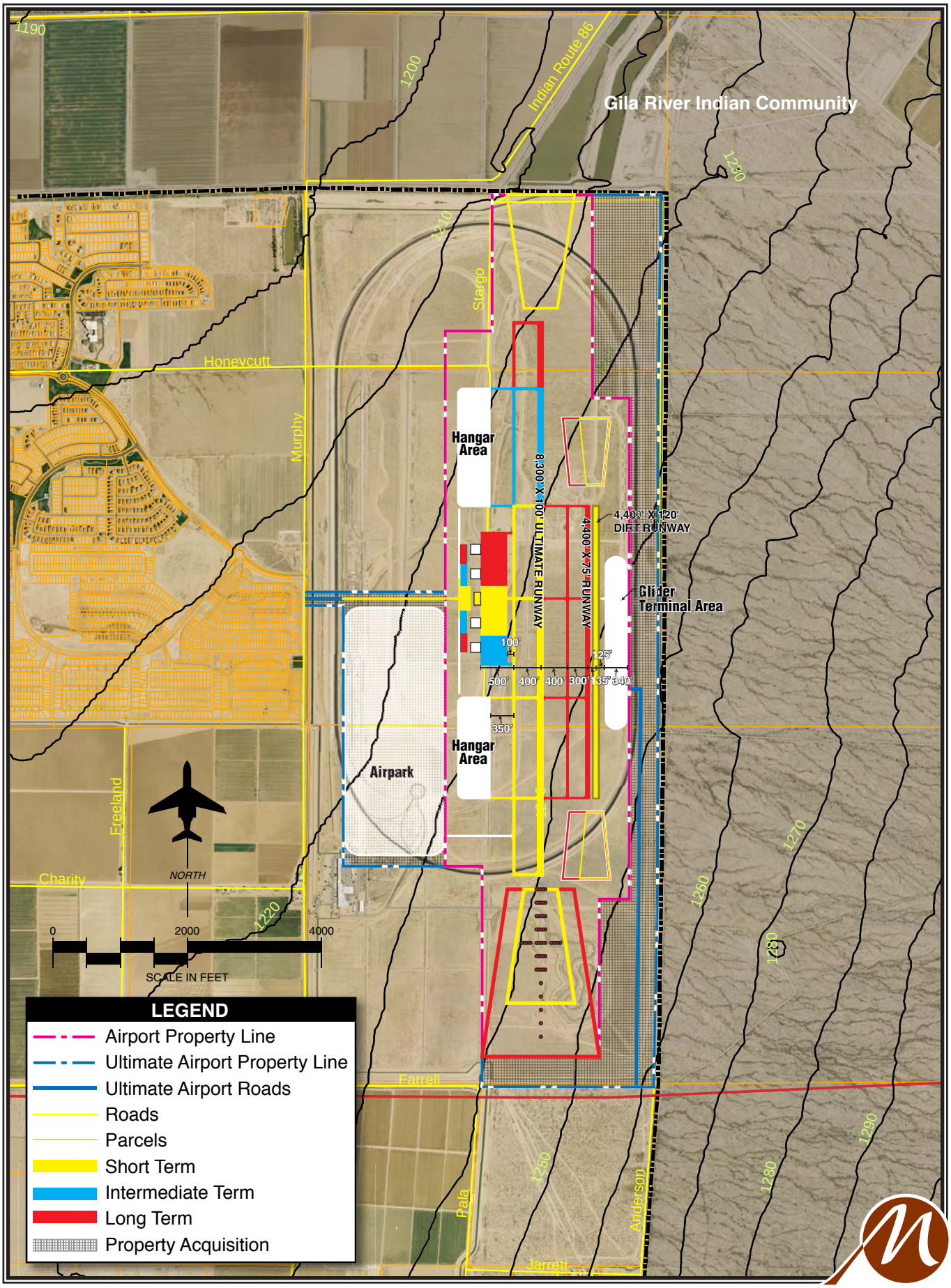

Exhibit 3G
CANDIDATE SITE 14

LOCATION AND ACCESS

Site 1 has the best visibility and access to a major highway. The site is immediately north of SR-238 and approximately six miles to the west of the CBD. This location is advantageous if an adjacent industrial park is developed. As with all the sites, a primary access road would need to be constructed. For Site 1, a secondary road would be necessary to access the glider facilities on the north side of the runways. An additional benefit is that its location is north of the highway while the railroad tracks are south, thus eliminating potentially long waits for trains to pass. Because of the proximity to SR-238, Site 1 was given the highest rating of 10.

The Millar airfield site, Site 3, is located approximately two miles to the south of SR-238 and approximately six miles to the east of the CBD. While the proximity of this site to the city is advantageous, visibility from SR-238 is limited. The two potential access roads, Warren and Hidden Valley, are unpaved and would need improvement in order to support activity generated by the airport. An adjacent industrial park may be less compatible in this location because of the higher density of residential development in the area. Vehicles would be required to cross the railroad tracks in order to access SR-238 which could lead to potentially long wait times. This site was given a rating of 2.

Sites 10 and 11 were both rated with a 5 for location and access. Both sites are adjacent to paved arterial roads. Site 10 is adjacent to John Wayne and White and Parker Roads, while Site 11 is adjacent to White and Parker Road. These two sites have a potential advantage in that they are located equidistant to the major highways serving the area. To the north is SR-238 and to the south is SR-84 and Interstate-8. Visibility from the arterial roads would be excellent but visibility to the highway system (SR-238 and SR-84) would not be available. In general, the distance from these sites to the CBD is a disadvantage.

Site 14 appears to be the closest site to the city center at only five miles, but the driving route is somewhat circuitous. The drive to the CBD would be four miles to the south via Murphy Road, then eight miles to the northwest via SR-238. This site is rated higher than Site 3 because the road system is already paved. Site 14 received a rating of 5.

Site Ratings: Site 1 – 10; Site 3 – 2; Site 10 – 5; Site 11 – 5; Site 14 - 5

SITE LAYOUT AND DESIGN

The prototype airport includes a parallel runway system and a third runway intended to accommodate the glider activity in the region. Sites 1 and 3 would have to accommodate the glider component of the Estrella Sailport. Sites 10, 11, and 14 could be developed for fixed-wing and helicopter activity, while the Estrella Sailport could remain in its current location to serve glider activity. This analysis of the site layout considers a baseline condition for accommodating the prototype airport that in-

cludes replacement glider facilities at each site.

The airfield system for Site 1 is oriented from the southwest to the northeast. This orientation is primarily intended to avoid the hills located to the west of the airport. Approximately 5,500 feet to the west of the initial runway end is a power line corridor. These power lines are approximately 50 feet above ground level. The power line corridor would be approximately 2,500 feet from the ultimate runway end. Neither of these site issues is anticipated to prevent development of the airport but approach minimums could be affected.

The availability of water and sanitary sewer is also an important site design and layout consideration. Both services are provided by private companies. Global Water has the greatest coverage outside the Maricopa city limits. Maps representing the extent of water and sewer lines were analyzed to determine the approximate distance each potential airport site is from these lines. The further from these utility lines a site is located, the more expensive it would be to extend the lines, thus a lower rating for that site. **Table 3A** presents this analysis for each of the five sites.

TABLE 3A
Distance to Water and Sewer
Maricopa Airport Site Selection

Potential Airport Site	Distance to Water	Distance to Sewer
Site 1 - Estrella Sailport	4 miles	4 miles
Site 3 - Millar Airfield	8 miles	8 miles
Site 10 - John Wayne Road	6 miles	6 miles
Site 11 - Nissan Test Track	7 miles	7 miles
Site 14 - Volkswagen Test Track	Immediate Proximity	Immediate Proximity

Source: Global Water

Site 1 is approximately four miles from the water and sewer lines serving the city. When factoring in the availability of utilities, Site 1 receives a rating of 8.

Site 3 represents an expansion of the private Millar Airfield. The orientation of this runway system is from the north-northwest to the south-southeast. This orientation would represent a designation of 16-34. This is approximately the same orientation as the existing unpaved runway which splits two hills to the sides of the north end of the runway. The hill to the immediate west of the airport should be removed to allow for future airport growth. The hill to the east could remain in the short term but would likely need to be removed to allow for future extension of the airport. The mountains located approximately two miles to the west and northwest would likely impact the potential approach visibility minimums available at the airport.

Portions of the property considered for Site 3 have above ground irrigation channels. These channels are concrete to a depth of approximately two feet and a width of four feet. The potential airport would disrupt this system and

consideration will need to be given to rerouting these channels.

This site is the greatest distance to both water and sewer when calculating toward the CBD. There is limited water and sewer service to the south of the Ak-Chin Indian Community currently. This distance is approximately six miles and may be able to supply the area as well.

Site 3 would require the closure of several roads including McDavid between Rio Bravo (Hidden Valley) and Warren. Bowlin Road, extending from Warren to the west, would also need to be closed. Site 3 receives a rating of 5.

Site 10 is nearly flat with elevations ranging from 1,250 to 1,260 feet. There are no obvious terrain issues. Smiths Road, a dirt road to the west of the site, would need to be closed or relocated. Site 10 is irrigated farmland and would require rerouting of portions of the irrigation system. Water and sewer lines are approximately six miles to the site. This site receives a site rating of 8.

Site 11, the current location of the Nissan test tack facility, has relatively few issues with the development of an airport. The site is very flat and would require minimal site preparation. Both the initial and ultimate runway could easily be situated within the existing test track circle. There may be additional grading necessary to remove the elevated banks of the test track on the ends.

Site 11 would require no changes to the existing road network. No roads would need to be closed or rerouted. The existing buildings could be incorporated into the airport layout and design or included as part of an industrial park. Water and sewer lines are approximately seven miles from the site. This site receives a rating of 8.

Site 14 is the Volkswagen test track facility. This site has a range in elevation from 1,210 feet on the north end to 1,250 feet on the south end. This slope is well within the FAA acceptable range. This site would not require significant earthwork. There are some major transmission lines to the south of the airport, parallel to Farrell Road, which may need to be relocated or buried. The residential communities to the immediate west of the site are served by water and sewer, and they run along Murphy Road. The availability of these utilities is an advantage for this site. Overall, this site received a rating of 5.

Site Ratings: Site 1 – 8; Site 3 – 5; Site 10 – 8; Site 11 – 8; Site 14 - 5

PROPERTY ACQUISITION

The acquisition of property for the location of a new airport is an important consideration. Typically, it is less expensive to acquire property that is undeveloped. Acquisition of property that is occupied by residences or businesses can be expensive. To acquire homes or businesses can also be time-consuming as it requires appropriate notice and relocation funding. Any acquisition by condemnation can also be politically challenging.

The first consideration for the airport property is the footprint of the prototype airport. The prototype occupies approximately 650 acres with an additional 120 acres identified for development of

an airport industrial park. For each site, where necessary, the prototype footprint has been adjusted to impact the fewest parcels while not having an impact on airport operations. In addition, any parcels that would potentially be left economically damaged, meaning they no longer have road access or are landlocked, have been considered for acquisition.

Therefore, sites that have the fewest landowners, homes, or affected parcels will rate well. **Table 3B** presents a summary of affected property for each of the five sites.

TABLE 3B
Property Acquisition
City of Maricopa Potential Airport Sites

	Site 1	Site 3	Site 10	Site 11	Site 14
Airport Footprint (acres)	650	640	650	650	650
Adjacent Remnant Property (acres)	653	295	0	0	200
Airpark (acres)	95	125	120	120	120
Home Relocations (Approx.)	0	33	0	0	0
Impacted Parcels	14 (6 are ASLD; 8 are private)	62 (privately owned)	10 (privately owned)	5 (1 Owner)	3 (1 Owner)

Source: Pinal County Parcel Data (November 2007)

Site 1 is located on property currently owned by the Arizona State Land Department (ASLD) and is identified as State Trust Land. A portion of this property is currently leased to the operators of the Estrella Sailport. Nearly the entire 650-acre airport footprint is able to remain on the ASLD parcels except for approximately 100 acres that extends to the west.

In an effort to not leave uneconomic remnant property, an additional 653 acres are considered for acquisition. It should be noted that this property does not need to be under the airport ownership like the airport footprint does.

A potential advantage of Site 1 is that most of the property is owned by a single land owner (the ASLD). Only 100 acres to the west of the airport is privately owned and there are currently no dwellings on the parcels. While it is recommended that the initial land purchase for the new airport include the ultimate property line, any delays realized in purchasing the private property would not hinder initial development of the airport.

Site 1 may require the acquisition of the largest amount of land but most of the property is currently owned by a single landowner, the ASLD. Except for the existing Estrella Sailport, the property is currently undeveloped. Site 1 receives a rating of 8 for this category.

Site 3 presents a more complex property acquisition scenario. While the site involves the expansion of a private existing airstrip, the current facility is small compared to the intended use of the new airport. In an effort to minimize the number of parcels impacted, the prototype airport footprint has been adjusted to encompass approximately 640 acres. Additional property suggested for acquisition encompasses 295 acres.

The acquisition of the recommended property would impact 62 parcels and would require the relocation of 33 dwellings. For these reasons, Site 3 is given a rating of 2.

Site 10 would impact a portion of 10 large parcels. None of the remaining parcel lands would be economically damaged; therefore, the airport footprint of 650 acres is all that would need to be purchased. Site 10 receives a rating of 8.

Site 11 would impact five parcels, each of which belongs to the owner of the Nissan test track facility. No homes would be impacted. Site 11 includes the 120-acre prototype industrial park. Much more land may be available for this purpose if so desired. This site receives a rating of 2 for property acquisition because the current land use would affect acquisition of this property.

Site 14 is the Volkswagen test track facility. This site consists of only three parcels which have a single owner. No homes would be directly impacted. Approximately 120 acres of property may need to be acquired in addition to the 650-acre airport footprint. Residential property at the western border and the current land use as a test track facility could make land values highest of all the sites. A site rating of 2 is applied.

Site Ratings: Site 1 – 8; Site 3 – 2; Site 10 – 8; Site 11 – 2; Site 14 - 2

EARTHWORK AND DRAINAGE

Each of the five sites could accommodate the full prototype airport. Each site is relatively flat and would require minimal earthwork. The footprint of an airport requires large impervious surfaces be constructed including the runways and aprons. During rain events, this water needs to safely run off in a controlled manner. As a result, each of the sites considers the impact of drainage as well.

Site 1 receives a high rating in this category. The site is already an airport; therefore, some of the earthwork is completed and some drainage issues have been addressed. An expanded airport would increase the need for more earthwork and drainage capability moderately. Site 1 receives a rating of 8.

Site 3 would require the removal of a small hill to the immediate northwest of the airport. In the long term, a second hill, which currently has a large private residence on it, may also need to be removed. Drainage would also be an issue as the current runway is unpaved, and the location has many residential buildings. Drainage would need to be addressed in such a manner so as not to

divert run-off toward the houses. Site 3 receives a rating of 2.

Site 10 is also considered for a high rating in this category. The site is currently farmland and is relatively flat. There is ample surrounding space for drainage. Site 10 receives a rating of 8.

Sites 11 and 14 both receive ratings of 5. The fact that both of these sites are on vehicle test track facilities may lead to more earthwork, particularly where the track banks.

Site Ratings: Site 1 – 8; Site 3 – 2; Site 10 – 8; Site 11 – 5; Site 14 - 5

OBSTRUCTIONS AND AIRSPACE

Preliminary analysis of area airspace was conducted to determine if there are any potential obstructions to federally defined imaginary surfaces surrounding the airport sites. Guidance is provided in Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace*.

Exhibit 3H presents the principal FAR Part 77 imaginary surfaces surrounding each airport site. The FAR Part 77 surfaces include the primary surface, the transitional surface, the horizontal surface, the conical surface, and the approach surface.

While there are several other, more restrictive, imaginary surfaces which help to determine obstructions that are a hazard to flight safety, including the Threshold Siting Surface and, in some cases, the Glidepath Qualification Surface, it is the FAR Part 77 surfaces that serve as the first filter. When siting a new airport, it would be desirable to have these imaginary surfaces clear of penetrations, but it is not required. The type and depth of penetration would have to be weighed with other factors to determine if the potential site is still viable.

The primary surface is an area surrounding the runway that must be clear of all object penetrations except those necessary for air navigation, such as light stands, which must be on frangible bases. The elevation of the primary surface is the elevation of the highest point on the runway.

From the edges of the primary surface emanates the transitional surface up and out from the runway at a 7:1 ratio to an elevation of 150 feet. The horizontal surface begins at this elevation and surrounds the runway to a distance of 10,000 feet. From the edge of the horizontal surface emanates the conical surface up and away at a 20:1 ratio to a distance of 4,000 feet.

The approach surface will vary greatly depending on the approved or planned instrument approaches to the airport. The approach surface depicted on the exhibit is for a Category I (CAT-I) approach with one-half mile visibility and 200-foot cloud ceiling minimums. The approach surface for the other end of the runway would not extend beyond the horizontal surface and is, therefore, not depicted.

Sites 1 and 3 have no penetrations to the primary or transitional surfaces. The approach slopes to Site 1 would be

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Site 1
1,260' MSL

Site 3
1,210' MSL

Site 14
1,230' MSL

Site 10
1,260' MSL

Site 11
1,260' MSL

314' AGL
Penetration

260' AGL
Penetration

76' AGL
No Penetration

91' AGL
No Penetration

30.5' AGL
No Penetration

Legend

- Maricopa Planning Area
- Maricopa City Limits
- County Line
- Planned Annexation
- Transmission Lines
- Rail
- FAA Database Towers > 200'
- FCC Database Towers > 30'
- Primary Surface
- Horizontal Surface (150' AGL)
- Conical (20:1)
- Approach Surface (50:1)

NORTH

0 3 6

SCALE IN MILES

Exhibit 3H
OBSTRUCTION CONSIDERATION
CANDIDATE SITES

clear of obstruction. Site 3 would have a terrain penetration to CAT I approach slope from the south. This would potentially raise the instrument approach minimums for the airport.

Both sites have penetrations to the horizontal and conical surface. The mountains to the north of Site 1 are on the Gila River Indian Community lands, the mountains to the west and south of Site 3 are primarily on Bureau of Land Management (BLM) land. It is highly unlikely that either of these could be altered to accommodate the FAR Part 77 surfaces. The principal consequence to these penetrations could be a potential increase to the instrument approach minimums.

Site 3 also has additional long term considerations. While the initial airport development would only have the mountain penetrations several miles from the airport, the ultimate development with extension of the runway to the northwest would introduce penetrations to the primary and transitional surface. There are two hills to either side of the ultimate runway length that pose these obstructions. It is likely that, with initial construction, the west hill would have to come down to grade while long term development may require the east hill to come down to grade as well.

Site 14 has no primary or transitional surface penetrations. There are several communication towers to the northwest of the airport site. Two types of towers are identified. The first type is from a database that the FAA maintains to track all towers greater than 200 feet in height. All these towers must have obstruction lighting. Two of these towers penetrate the horizontal surface surrounding Site 14. The other towers identified are from the Federal Communications Commission (FCC) database and show all towers greater than 30 feet in height. While there are two FCC identified towers in the vicinity of the airport, neither are Part 77 penetrations.

Historically, the FAA has required that any penetrations to Part 77 airspace presented by towers either be removed or relocated. For a new airport, this would almost certainly be the case. Coordination with the cell tower owner and each company that leases space on the tower would be required.

Also considered under the airspace category is the potential impact to the regional airspace system and to the airspace of other airports. **Exhibit 3J** presents the aeronautical airspace impacts when considering the new airport with an airport traffic control tower. While operation of a tower is not considered necessary in the initial construction phase of the airport, ultimately the airport may have enough activity to justify a tower. This exhibit includes the most recent changes to the area aeronautical chart which, in October 2007, lowered the Class B airspace ceiling from 10,000 feet to 9,000 feet surrounding Phoenix Sky Harbor International Airport (PHX).

A tower at the airport would introduce Class D airspace. Class D airspace would require pilots to be in contact with the local tower from ground level

to an elevation of 2,500 feet. All sites would fall beneath the Mode C ring around PHX, which requires aircraft to have a transponder radio.

The Class D ring serving Site 1 would envelop the private Millar Airfield. The Class D ring surrounding Sites 10 and 11 would impact the Ak-Chin Airport and Site 11 Class D airspace would come close to Phoenix Regional Airport. The Class D airspace serving Site 14 would envelop the University of Arizona Maricopa Agriculture Center Airport. The planned CAT I instrument approaches to Sites 11 and 14 may have airspace conflicts with the instrument approaches to Casa Grande Municipal Airport.

Military Training Route (MTR) 267-269 traverses the study area. MTRs provide training space for high performance military aircraft. MTR 267-269 allows for speeds in excess of 250 knots at elevations in excess of 3,000 feet above mean sea level (MSL). The MTR in the area will impact all sites, but particularly sites with approaches that may conflict with the elevation of this MTR. Sites 3 and 14 would fall below the MTR and may be impacted less than the other sites.

The combination of airspace and obstruction factors leads to the following site ratings:

Site Ratings: Site 1 – 5; Site 3 – 2; Site 10 – 8; Site 11 – 5; Site 14 - 2

ENVIRONMENTAL FACTORS

The next step is to evaluate the candidate sites using an environmental site rating analysis to determine which site has the best overall potential. The environmental factors were used to give each site a single number rating indicating the degree to which the site was capable of meeting the criteria discussed in the preceding chapter.

A number of resources, including existing literature, studies, and reports were consulted to assess the preliminary environmental impacts of the development of an airport at each of the five sites under consideration. Once the five candidate sites have been narrowed to one or two sites, scoping letters will be sent to a number of federal, state, and local agencies to obtain specialized input regarding sensitive resources located in the vicinity of the sites. A copy of the agency contact list and letters received will be contained in the final site selection document.

SOCIAL IMPACTS

The primary social impacts in the area are related to potential road relocations, residential relocations, and noise and land use compatibility impacts. Consideration of future land use is also important as it would be more ideal to locate an airport on a planned land use that is compatible with an airport such as employment or industrial. **Exhibit 3K** presents the five candidate sites

04MP14-3J-7/14/04

LEGEND

- Airport with other than hard-surfaced runways
- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- VORTAC
- Non-Directional Radiobeacon (NDB)
- Compass Rose
- Wilderness Areas
- Mode C
- Military Training Routes
- Victor Airways
- Class B Airspace
- Class D Airspace
- Class E Airspace with floor 700' above surface

North Maricopa Mountain Wilderness Area

Mobile (pvt)

Estrella Sailport

Site 1

Site 3

Millar (pvt)

Schu (pvt)

Mel (pvt)

Serene (pvt)

Flying Bucket (pvt)

VR242-268

South Maricopa Mountain Wilderness Area

V 95

G.M. (pvt)

Walter (pvt)

Donnelly (pvt)

V 66

VR223

Table Top Wilderness Area

V 95

City of Maricopa

U of A Maricopa AG Center

Site 14

90/60

Gila River Memorial

V 105

Chandler Municipal

90/70

V 16

90/80

VR267-268-269

Ak Chin (pvt)

Site 11

Site 10

Phoenix Regional

Casa Grande

Stanfield VORTAC

Potters (pvt)

V 95

NORTH

0 3 6

SCALE IN NAUTICAL MILES

Source: Phoenix Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration, February 15, 2007

Exhibit 3J
CANDIDATE AIRSPACE SITES

04MP14-3K-7/14/04

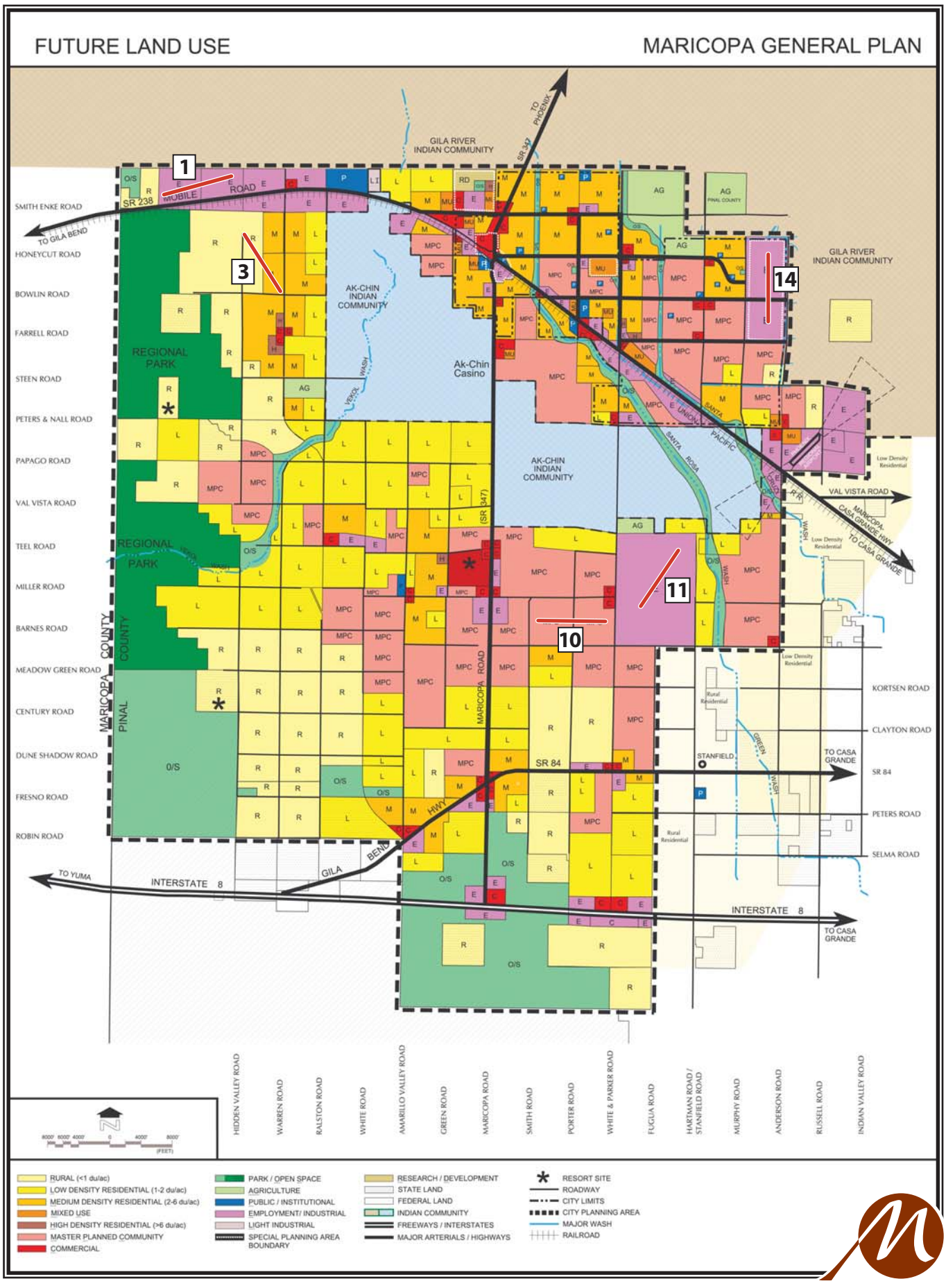


Exhibit 3K
FUTURE LAND USE
CANDIDATE SITES

overlaid on the future land map from the *Maricopa General Plan 2025* for the study area.

Site 1 would have minor social impacts. A new access road would have to be added to allow direct access to the north side glider area. The access road is planned to extend from the existing Rio Bravo Road. This may increase vehicles utilizing this portion of road to access the airport. Although no residential relocation would be necessary for Site 1, there is a collection of approximately 20 residences located approximately 4,000 feet from the ultimate runway end and 7,000 feet from the initial runway end. These residences would experience over-flights, as they do now with the existing airport. There are also some homes along Rio Bravo Road that could experience over-flights and potential noise impacts.

From a compatibility standpoint, Site 1 is appropriate. There is currently an airport on this location. This site is immediately north of a major state highway, which typically will support surrounding commercial or industrial land uses. The future land use plan from the general plan calls for this area to be an employment center. To the north is the Gila River Indian Community, which would provide a buffer and to the west and southwest is BLM land, which would also provide a buffer. Site 1 receives a rating of 5 for social impacts.

Site 3 would potentially have major social impacts. From a road infrastructure perspective, several dead-end roads would have to be truncated and one planned arterial road, McDavid Road, would have to be closed between Hidden Valley and Warren.

This airport site would impact 62 parcels and 33 homes. In addition, there are more residences beyond both ends of the runway. Much of this area has been developed in a rural residential fashion; therefore, light and visual impacts would occur. A significant general aviation airport and potential industrial park is not compatible with the land uses currently in place. This entire area is planned for rural and medium density residential development. For these reasons, Site 3 receives a rating of 0 and would be considered unacceptable from a social impact perspective.

Sites 10 and 11 would have no roadway impacts. No homes or occupants would need to be relocated. This area of the county currently supports large scale agricultural operations and would, thus, be compatible with industrial type uses. Site 11 would be more compatible as the Maricopa General Plan identifies the site for continued employment uses, while Site 10 is identified for residential development.

Also considered a social impact is the potential need to relocate businesses. This would be a significant impact for Site 11, where the Nissan test track facility is located. Site 10 receives a rating of 5 while Site 11 receives an 8.

The Volkswagen site, Site 14, has some social impacts. The roadway system would not be altered but a new access road would be necessary to access the east side glider area. There are no homes on the site so there would be no relocation issues. The social issue of

most significance is the compatibility of an airport with its residential neighbors to the immediate west. To the north, south, and east, there is no residential development. Overall, a rating of 5 was applied to Site 14.

Site Ratings: Site 1 – 5; Site 3 – 0; Site 10 – 5; Site 11 – 8; Site 14 - 5

PHYSICAL IMPACTS

None of the sites will encroach upon the 100-year floodplain. All drainage washes have also been avoided, thus preserving these critical run-off flow channels. Proximity to populated areas is a key factor in many of the other potential physical impacts. Sites 3 and 14 are located in close proximity to existing residential development, increasing the likelihood of impacts from light and noise. A few residences are located near Site 1 as well.

None of the proposed sites are located over an existing energy supply facility. Power lines are located west of Site 1 but will not be directly impacted. Power lines to the immediate south of Site 14 could impact this site. Power lines are also located to the immediate north of Site 11.

Each of the sites has the potential for the presence of earth fissures. Only Site 3 has the presence of known or reported fissures. This fissure is located in an area that is shown on the exhibit as an airport business park. Fissures have been identified to the east, north and southeast of Site 1 but no fissures have been identified on what would be airport property. The fissure to the east is approximately 1.1 miles from the airport. None of the other sites have known fissures in the immediate area surrounding the site.

Site Ratings: Site 1 – 5; Site 3 – 2; Site 10 – 5; Site 11 – 8; Site 14 - 5

ECOLOGICAL IMPACTS

This category evaluates the potential impacts on the ecological environment including biotic communities and endangered species and their habitats. Environmental data from various government and non-government sources was collected from the University of Arizona through the Arizona Electronic Atlas. The native vegetation of the study area is generally identified as Lower Sonoran Desert Scrub and Great Basin Conifer Woodlands.

Sites 1 and 3 are both located in areas that are currently utilized as airports. Expansion of these facilities would require further evaluation to determine the presence of listed species or sensitive habitats. However, as both of these sites have been previously disturbed, the likelihood of native habitat is small. There are no known wetlands located at either site nor are there any 100-year floodplains. Site 1 is not utilized for agricultural purposes. The southern portion of Site 3 is irrigated and used for agricultural purposes.

Site 10 is located in an area which is currently utilized for agricultural uses. Construction of an airport at this site would impact hundreds of acres of prime farmland. As the area is farmed, the presence of native habitat is less likely. However, expansion of this site

would require further evaluation to determine the presence of listed species or sensitive habitats. No wetlands or 100-year floodplains are located on this site.

Sites 11 and 14 are currently utilized as vehicle test tracks with the center of the track being utilized for agricultural use. Due to the disturbed nature of these sites, the presence of native habitat is not likely. However, expansion of either site would require further evaluation to determine the presence of listed species or sensitive habitats. No wetlands or 100-year floodplains are within either site. However, the Santa Cruz wash is located within close proximity to both.

Site Ratings: Site 1 – 8; Site 3 – 8; Site 10 – 8; Site 11 – 8; Site 14 - 8

FARMLAND IMPACTS

The Natural Resource Conservation Service, in cooperation with other federal, state, and local government organizations, has inventoried land that can be used for the production of the nation's food supply. Prime Farmland, as defined by the U.S. Department of Agriculture (USDA), is land that has the best combination of physical and chemical characteristics for producing food. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. In Arizona, any land that is irrigated is considered prime farmland. Some irrigated farmland in Arizona is further classified as Unique Farmland, which can be used for the production of high-value crops such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables.

Site 1 is designated as non-farmland but the eastern portion of the site could be prime farmland if it were irrigated. Approximately half of Site 3 is irrigated and would be considered prime farmland. The remaining half could be prime farmland if irrigated and the soil composition was improved. The hills on the site are non-farmland. Site 10 is prime farmland with a small portion considered unique farmland. Portions of Site 11 are irrigated and are, thus, prime farmland. Small areas of unique farmland are identified on the western edge of the site near White and Parker Road. The southern 40 percent of Site 14 is non-prime farmland unless irrigated. The northern 60 percent is considered unique farmland.

Land with these designations will require additional environmental evaluation prior to approval for development. As a general rule of thumb, the closer to existing or planned urban development that prime or unique farmland is located, the lower the impact that development will cause.

Site Ratings: Site 1 – 10; Site 3 – 8; Site 10 – 2; Site 11 – 5; Site 14 - 8

HISTORICAL AND CULTURAL IMPACTS

The entire study area is rich in history and pre-history dating back over 12,000 years. Numerous artifacts have been discovered in the regional area and several cultural studies have been conducted. Exhibit 1D previously depicted general areas where cultural resources are known to exist. One of these is within Site 11.

Since site specific surveys were not undertaken to identify historical resources, other criteria were used to determine the potential historical or cultural significance of a site. These criteria include:

- Determining if any of the properties or structures proposed for acquisition are more than 50 years old. Generally, properties or structures are eligible for listing as a historic place if they are at least 50 years old.

- Identifying if any significant development is planned within a 100-year floodplain. Cultural or archaeological resources are often encountered within floodplain areas, particularly if there is a lack of existing development within the area. Past settlements have often been placed near a community's water source. These settlements may be buried under layers of mud and silt during flooding events.

- Determining if the area has been heavily disturbed. The likelihood of uncovering artifacts is much less in areas which have already been disturbed for the construction of major highways, developments, etc.

The rating of the sites indicates the relative likelihood of the presence of historical or cultural resources on-site. Sites with a lower rating would represent undisturbed land or land relatively close to a water source where discovery of artifacts would be more likely than land that has already been developed to some extent. The determination is relatively subjective and should be used for comparative purposes only. Once site specific information is received from the various federal, state, and local agencies, any new impacts will be considered.

Site Ratings: Site 1 – 8; Site 3 – 8; Site 10 – 8; Site 11 – 8; Site 14 - 8

SITE ANALYSIS SUMMARY

In this phase of the airport site selection study for the City of Maricopa, the search area was narrowed to include the Maricopa Planning Area as defined in the *Maricopa General Plan 2025*. Within this search area, 14 sites were identified that could support a new general aviation airport. These 14 sites were reduced to five sites that were identified for further analysis.

Table 3C summarizes the results of the preliminary site rating analysis. To avoid the potential for bias in the rating analysis, there was no special weighting applied to any of the factors. With a maximum score of 100, a total score of less than 60 would suggest there are several problems with the site that may be difficult to overcome. A rating of 60 to 69 would suggest that the site has better potential to be acceptable for airport development. A score of 70 to 79 or above would indicate that the site has a number of distinct advantages and would be an excellent location for development of an airport. Scores above 80 are not typical, as there will always be impacts when considering development of any kind but especially an airport because of the large land area required.

TABLE 3C
Rating of Candidate Sites
City of Maricopa Airport Site Selection

EVALUATION CRITERIA	POTENTIAL AIRPORT SITE				
	Site 1 (Estrella Sailport)	Site 3 (Millar Airfield)	Site 10 (John Wayne Road)	Site 11 (Nissan Test Track)	Site 14 (Volkswagen Test Track)
ENGINEERING FACTORS					
Location and Access	10	2	5	5	5
Site Layout and Design	8	5	8	8	5
Property Acquisition	8	2	8	2	2
Earthworks and Drainage	8	2	8	5	5
Airspace and Obstructions	5	2	8	5	2
Engineering Subtotal	**39**	**13**	**37**	**25**	**19**
ENVIRONMENTAL FACTORS					
Social Impacts	5	0	5	8	5
Physical Impacts	5	2	5	8	5
Ecological Impacts	8	8	8	8	8
Farmland Impacts	10	8	2	5	8
Historical & Cultural Impacts	8	8	8	8	8
Environmental Subtotal	**36**	**26**	**28**	**37**	**34**
GRAND TOTAL	**75**	**39**	**65**	**62**	**53**

Three sites (Sites 1, 10, and 11) scored above 60, indicating them as sites acceptable for airport development. Site 3 was by far the lowest scoring site with a 39. Site 14 scored 53, falling below the threshold for a site to be considered further. The following summarizes the preliminary analysis for each of the five sites considered.

Site 1 – Estrella Sailport: The Estrella Sailport had the highest rating and is considered a viable site for a general aviation airport. This site offers several advantages including the fact that the site is currently an airport. Access to the airport would be relatively direct from SR-238, which is the main highway leading to the City of Maricopa from the west. Site 1 is only six miles from the CBD, thus providing convenience to the city center. The ease of access and visibility also benefits potential industrial park occupants.

The general plan for the City of Maricopa calls for this site and several adjacent parcels to be used for employment opportunities. An airport and adjacent business park are compatible with that designation. The fact that the site is located primarily on state land may be a benefit. Negotiating a purchase can be simplified when fewer land owners are involved.

The principal disadvantage to this site is the mountains to the northwest and southwest. These mountains could affect visibility minimums for instrument approaches. There is a landfill located approximately two miles to the east of

the airport. This landfill is not currently active, but has the potential to reopen at sometime in the future.

Site 3 – Millar Airfield: The Millar Airfield is a private airport with an unpaved runway surface. This site returned a very low rating of 39. The principal advantage of this site is that it is currently operated as an airport. The disadvantages are numerous. Access to the airport would require dirt roads to be paved. The visibility from the main highway is minimal due to the presence of two hills and the distance to the highway. The area is currently planned for rural and medium density residential land uses. More than 33 homes and 62 privately owned parcels would be impacted. The two hills nearest the north end of the runway are potential obstructions and may have to be lowered or removed. For these many reasons, this site is considered problematic.

Site 10 – John Wayne Road: This site returned the second highest rating. The location of this site would have ready access to the main north and south arterials of John Wayne Road and White and Parker Road. This site is then equidistant to SR-238 and SR-84 and provides opportunities for access to the airport or to an associated business park from both the north and south. This site is relatively flat as it currently supports agricultural operations and is compromised primarily of large parcels. No homes would be impacted and no businesses would have to be relocated. The airspace around this site would present no obstructions. The primary drawback to this site is that the future land use plan calls for this area to be master planned residential communities. While this is a challenge, this site is immediately adjacent to an area designated as an employment center, so the potential for incompatibility would be reduced. This site is also prime farmland as it is irrigated. This would require coordination with the United States Department of Agriculture.

Site 11 – Nissan Test Track: This site had nearly the same rating as Site 10 which is immediately to the west. White and Parker Road would be the primary north/south road and would connect to SR-238 and SR-84. The site is currently owned by a single property owner and there are no homes on the site. The site is located in an area identified for employment in the *Maricopa General Plan 2025*. This site poses no airspace obstructions. One significant drawback is that the site is currently used as the Nissan test track and the availability of the property is unknown.

Site 14 – Volkswagen Test Track: Site 14 had the second lowest rating with 53. While there are advantages to this site including a single land owner; direct access to SR-238 via Murphy Road; and the general plan identifies this parcel for an employment center, the disadvantages are significant. The property is currently operated as the Volkswagen test track facility; therefore, the availability of the property is unknown. Immediately adjacent to the site is new residential development.

This site also presents airspace issues as the communication towers and, potentially, the hills to the northeast would penetrate the FAR Part 77 surfaces. In addition, a CAT I approach from the south may conflict with current approaches to Casa Grande Municipal Airport. For these reasons, this site should not be considered further unless a fatal flaw is discovered regarding the top three sites.

CONCLUSION

The site analysis indicates that Sites 1, 10, and 11 are the most suitable locations for an airport to serve the City of Maricopa. The three sites appear to have distinct advantages over the other two candidate sites.

The greatest advantages for Site 1 are its location adjacent to the state highway, it is an existing airport site, and most of it currently belongs to a single landowner, the Arizona State Land Department. In addition, the City has already considered Site 1 as a potential airport site in its community planning to date.

Site 10's location on level agricultural property is an advantage from a development standpoint. Its location is not as ideal as Site 1, and community planning for the area calls primarily for residential development in the future.

Site 11 has strong potential for accommodating the physical airport site, but has potential for airspace conflicts with two nearby private airports. Perhaps the most serious drawback to implementation, however, is its current use as a test track. Unless, this use is nearing the end of its useful life for its owner, the cost of acquisition and redevelopment as an airport could be prohibitive if even possible.

Therefore, it appears that the most effective means for serving the existing and future aviation needs of the City of Maricopa and the surrounding area is to acquire and re-develop the existing Estrella Sailport, identified as Site 1. This would provide an immediate airport tenant (Arizona Soaring, Inc.) and allow the existing activity to continue to thrive and grow. At the same time, the facility can evolve into an airport capable of providing the general aviation services that will support the long term growth plans for the City of Maricopa.

These sites are still subject to review by the planning advisory committee and the City of Maricopa. In addition, the final candidate sites are being submitted for FAA airspace review, and environmental agency comment. A final site recommendation will be made following these reviews.

Chapter Four

Financial Analysis & Operating Scenario

Chapter Four

Financial Analysis and Operating Scenario

On February 19, 2008, the aviation consultant for the City of Maricopa presented the study progress to date to the Maricopa City Council. This presentation included the preferred site for the new Maricopa Airport as the current location of the Estrella Sailport. By a vote of 7-0, the City Council approved the recommended site and authorized the study consultant to proceed to the final phase of the study.

This chapter, along with Appendix B, represents the final phase of the Maricopa Airport Feasibility Study. This chapter will include an updated airport layout diagram, site-specific development cost estimates for construction of the airport, several options for management of the airport, and a cash flow analysis for operation of the airport.

The completed draft of the study is planned to be presented to the Planning Advisory Committee for this study, the City Planning and Zoning Commission, and the City Council. With Council approval of the final study report, the next planning steps can proceed. The next steps include an airport master plan and environmental assessment.

AIRPORT LAYOUT

Now that a specific site has been selected, the airport facility layout and runway environment must be revisited in order to optimize the space. This is particularly important for the selected site because there is an existing airport in this location.

The Estrella Sailport is a privately operated public-use airport that specializes in glider activity. There are over 40 based gliders at the airport and several single engine tow aircraft. The FAA estimates 20,000 yearly operations.

The Sailport has developed an international reputation for glider activities. Several national and international glider pilot champions call Estrella home. The meteorological conditions in the region provide for nearly ideal year-round flying. This business provides the Maricopa area with a unique economic stimulus that draws airport users and tourists from around the world. Therefore, if possible, it is important to allow the glider activities to continue while the new airport is being constructed.

In order to do so, the new general aviation runway is located parallel and 700 feet south of the paved glider runway. Being separated by 700 feet, simultaneous operations to both runways can take place under visual conditions (1,000-foot cloud ceiling and three mile visibility). When the new runway opens, the glider runway can continue to operate. Many of the existing hangar facilities will also be able to remain in place as they would be located outside the runway object free area surrounding the new runway.

The planned airport layout for the Estrella Sailport site is presented on **Exhibit 4A**. While the layout is similar to the prototype airport previously presented on Exhibit 3C, some adjustments were made in order to optimize the selected site. The taxiway system was redesigned in order to provide maximum efficiency of movement between the runway and hangar areas. In addition, a taxiway leading to the north side glider area is planned with the initial construction. This taxiway will allow better integration of the glider activities with the rest of the airport.

The long term parallel runway has been shifted slightly to the southwest in order to align the runway threshold and crossing taxiway. The intermediate and long term runway extensions remain the same.

On the landside, more detail on the hangar needs for each planning horizon is provided. Initial development should include a centrally located aircraft apron and FBO hangar complex. The initial apron encompasses 26,666 square yards of pavement. At least two T-hangar structures, each able to accommodate 20 storage units, are also planned. As demand warrants, more T-hangars can be added to the east and larger conventional hangars can be located to the west.

PROPERTY ACQUISITION

If possible, the entirety of the land needed for aviation purposes, now and in the future, should be acquired at the outset. As presented on **Exhibit 4B**, the airport footprint encompasses approximately 746 acres. This airport footprint includes 685 acres of land currently owned by the Arizona State Land Department and 61 acres that are currently privately owned.

The City of Maricopa should be aware of the opportunity that may exist to purchase the entire Arizona State Land Department (ASLD) property north of

06MP12-4A-04/09/08

Gila River Indian Community

NORTH

0 1000 2000

SCALE IN FEET

1300

Hiller Road Easment

Bureau of Land Management (BLM)

Private Ownership

Potential Industrial / Commercial

Glider Terminal Area

340'

125'

135'

4,400' X 120' DIRT RUNWAY

4,400' X 75' RUNWAY

300'

400'

5,500' X 100' RUNWAY

Hangar Area

400'

100'

1,800'

1,000'

500'

Hangar Area Reserve

Potential Industrial / Commercial

Ellison

1280

San Rafael

Prancer

1260

Arizona State Land Department (ASLD)

Rio Bravo

1220

Bureau of Land Management (BLM)

Private Ownership

LEGEND

- Airport Property Line
- Easement
- Roads
- Parcels
- Short Term
- Intermediate Term
- Long Term

Exhibit 4A
DEVELOPMENT SCHEDULE

06MP12-4B-04/24/08

Gila River Indian Community

NORTH

0 1000 2000

SCALE IN FEET

1300

Hiller Road Easment

Bureau of Land Management (BLM)

Private Ownership

218.02 Acres

1280

684.81 Acres

Ellison

1240

6.56 Acres

61.25 Acres

106.95 Acres

22.29 Acres

San Rafael

Prancer

Arizona State Land Department (ASLD)

Rio Bravo

1260

1220

3.08 Acres

Bureau of Land Management (BLM)

Private Ownership

LEGEND

- Airport Property Line
- Roads
- Parcels

Exhibit 4B
PROPERTY ACQUISITION

Highway 238. This includes an additional 218 acres to the northwest of the runways and 129 acres to the south west. This additional property may not be eligible for FAA funding as it is not necessary to accommodate forecast aviation activity.

If the City were to purchase the extra ASLD property, it could either be included as part of the airport or it could be excluded from the airport. If it is included as part of the airport, then all revenues generated by the land would be dedicated to the airport exclusively, per FAA grant obligations.

To acquire the proposed airport property the City of Maricopa will need to make application to the ASLD. In this application, the City must demonstrate that the proposed land use will enhance the value of the land and optimize the economic return for the citizens of the State of Arizona here today and for generations to come. If the ASLD makes an initial positive determination, the City can proceed to the next stage in the acquisition process. The next stage in the process includes:

- Application to purchase
- Surveys (e.g soil, archeological, terrain, etc…)
- Appraisal
- Publication of intent to sell (approximately four months)
- Public auction

The entire process to acquire ASLD property can take from between 18 months to three years.

Approximately 61 acres of privately owned property to the west of the airport are identified for acquisition. Public records collected from the Pinal County Assessors office indicate that seven individual landowners may be impacted.

To acquire private property for airport use the City of Maricopa must conform with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646). This law, as amended, requires the airport sponsor to offer fair market value, as defined as a transaction between a willing buyer and seller, for the property. If, after appraisal, the parties are unable to come to agreement on the purchase price, the airport sponsor can utilize eminent domain to acquire the private property for public use.

Property owners displaced by airport sponsor acquisition of their property are eligible for relocation assistance. Costs to cover moving and related expenses and costs related to assistance in obtaining a replacement dwelling are eligible. The airport sponsor cannot require a property owner to move unless comparable replacement housing is available or is made available.

It should be noted that the actual aviation requirement for these properties would not occur until the runway is extended beyond the initial 5,500 feet to the ultimate length of 8,300 feet and a CAT-I instrument approach is instituted. Both of these actions are planned for the long term planning period, 10 years or more from the time of initial construction.

In the long term development configuration, the CAT-I runway protection zone would extend over 61 privately owned acres, as well as over 6.6 acres of federal land and 3.0 acres of roadway easement. If possible, the federal (Bureau of Land Management) land should be acquired. If not, then avigation easements should be acquired for both areas in order to prevent incompatible land uses.

DEVELOPMENT COST ESTIMATES

In Chapter Two, cost estimates were developed for a prototype airport. It was estimated that the total cost including engineering design, construction, and contingencies for the initial airport development would be approximately $45 million. The ultimate build-out of the airport was estimated at an additional $27 million. These estimates will be further refined during preliminary engineering.

Now that a specific site has been selected, site-specific cost estimates can be provided. **Exhibit 4A** shows the development phasing in graphic form. All elements shaded in yellow are considered for the initial construction of the airport. Those elements shaded in blue are considered for the intermediate timeframe (approximately 6-10 years) and those elements in red are considered long term projects.

The most significant fiscal change from the preliminary estimate is the cost of property acquisition. The total area recommended for the airport increased from 650 acres to 746 acres. The estimated cost per acre includes all ancillary items related to the purchase including legal fees and appraisals.

The short term development items are considered to be required for the initial construction of the airport. Items in the intermediate and long term planning horizon will be justified based upon actual demand. For example, the extension of the runway will only be justified by a critical aircraft (500 or more annual operations) requiring additional length. Expanded aircraft apron will be justified by growth in based and transient aircraft activity. Construction of the parallel runway system will be justified by the operational activity approaching the capacity of the single runway, particularly local operations.

Exhibit 4C presents the cost estimates for development of the proposed Maricopa Airport to be located at the current Estrella Sailport site.

The exhibit specifically shows that most of the projects associated with constructing a new airport are eligible for both federal and state funding. While these projects are eligible, receiving this level of funding is not guaranteed. The City of Maricopa will be competing with airports across the state and country for funding. As a result the scope and timing of projects could be affected.

INITIAL DEVELOPMENT

Even before design and construction begin, two planning documents must be completed: an airport master plan and appropriate environmental documentation. Often these documents can be un-

06MP12-4C-04/30/08

	Total	FAA Eligible	ADOT Eligible	Local Share
Initial Construction				
Environmental/Planning Documentation	$800,000	$760,000	$20,000	$20,000
Property Acquisition - Airport (746 acres)	$37,300,000	$35,435,000	$932,500	$932,500
Site Preparation	$5,467,000	$5,193,650	$136,675	$136,675
Airport Utilities	$630,000	$598,500	$15,750	$15,750
Primary Runway (5,500' x 100')	$4,706,000	$4,470,700	$117,650	$117,650
Taxiway Paving (parallel and 6 entrances)	$3,482,000	$3,307,900	$87,050	$87,050
Taxilanes for T-hangars	$933,000	$886,350	$23,325	$23,325
Airfield Lighting and Marking	$1,128,000	$1,071,600	$28,200	$28,200
REILs	$70,000	$66,500	$1,750	$1,750
PAPIs	$112,000	$106,400	$2,800	$2,800
Aircraft Parking Ramp	$2,053,000	$1,950,350	$51,325	$51,325
Airport Beacon	$80,000	$76,000	$2,000	$2,000
Perimeter Fencing	$1,103,000	$1,047,850	$27,575	$27,575
Airport Access Road to North Side (un-paved)	$93,000	$88,350	$2,325	$2,325
Airport Access Road to South Side	$360,000	$342,000	$9,000	$9,000
Auto Parking	$350,000	$332,500	$8,750	$8,750
Weather Aids	$256,000	$243,200	$6,400	$6,400
Initial Construction Totals	**$58,923,000**	**$55,976,850**	**$1,473,075**	**$1,473,075**
Intermediate Term Construction				
Environmental/Planning Documentation	$900,000	$855,000	$22,500	$22,500
Terminal Building	$1,120,000	$450,000	$603,000	$67,000
Site Preparation	$2,229,000	$2,117,550	$55,725	$55,725
Primary Runway Extension (1,800' x100')	$1,540,000	$1,463,000	$38,500	$38,500
Taxiway Extension (parallel and entrance)	$941,000	$893,950	$23,525	$23,525
Airfield Lighting and Marking	$636,000	$604,200	$15,900	$15,900
Navigational Aid Relocation	$56,000	$53,200	$1,400	$1,400
Taxilanes for T-Hangars	$1,434,000	$1,362,300	$35,850	$35,850
Aircraft Parking Apron	$1,711,000	$1,625,450	$42,775	$42,775
Auto Parking	$292,000	$277,400	$7,300	$7,300
Intermediate Construction Costs	**$10,859,000**	**$9,702,050**	**$846,475**	**$310,475**
Long Term Construction				
Environmental/Planning Documentation	$900,000	$855,000	$22,500	$22,500
Site Preparation	$2,776,000	$2,637,200	$69,400	$69,400
Primary Runway Extension (1,000' x 100')	$856,000	$813,200	$21,400	$21,400
Taxiway Extension (parallel and entrance)	$599,000	$569,050	$14,975	$14,975
Airfield Lighting and Marking	$435,000	$413,250	$10,875	$10,875
Navigational Aid Relocation	$56,000	$53,200	$1,400	$1,400
Taxilanes for T-hangars	$1,655,000	$1,572,250	$41,375	$41,375
Aircraft Parking Apron	$4,107,000	$3,901,650	$102,675	$102,675
Auto Parking	$700,000	$665,000	$17,500	$17,500
Site Prep (north side - 100 acres)	$4,206,000	$3,995,700	$105,150	$105,150
Airport Utilities (north side)	$630,000	$598,500	$15,750	$15,750
Parallel Runway (4,400' x 75')	$2,823,000	$2,681,850	$70,575	$70,575
Parallel Taxiway (35' wide)	$1,961,000	$1,862,950	$49,025	$49,025
Airfield Lighting and Marking (parallel system)	$1,169,000	$1,110,550	$29,225	$29,225
REILs (parallel)	$70,000	$66,500	$1,750	$1,750
PAPIs (parallel)	$112,000	$106,400	$2,800	$2,800
MALSR (south side)	$2,100,000	$1,995,000	$52,500	$52,500
North Side Access Road (paved)	$863,000	$819,850	$21,575	$21,575
Airport Traffic Control Tower	$4,900,000	$4,655,000	$122,500	$122,500
Long Term Construction Costs	**$30,918,000**	**$29,372,100**	**$772,950**	**$772,950**
TOTAL DEVELOPMENT COSTS	**$100,700,000**	**$95,051,100**	**$3,092,500**	**$2,556,500**

KEY

FAA: Federal Aviation Administration
ADOT: Arizona Department of Transportation - Aeronautics Division
REIL: Runway End Identification Lights
PAPI: Precision Approach Path Indicators
MALSR: Medium Intensity Approach Lighting System With Runway Alignment Indicator Lights

Exhibit 4C
ESTIMATED AIRPORT
DEVELOPMENT COSTS

dertaken concurrently. The master plan will include the development of the official airport layout plan (ALP) which is used by the FAA when considering grant funding requests. The environmental documentation will detail any environmental concerns for the airport site and outline any necessary mitigation needs.

The required environmental documentation must comply with the *National Environmental Policy Act* (NEPA) *of 1969*, as amended. For projects not categorically excluded under FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, compliance with NEPA is generally satisfied through the preparation of an Environmental Assessment (EA). In instances in which significant environmental impacts are expected, an Environmental Impact Statement (EIS) may be required. An EA can generally be completed within 12 months, while an EIS may require two years or more.

As part of the NEPA process, several alternatives will be considered including a "no-build" alternative. Therefore, none of the other potential airport sites previously considered are officially excluded until the NEPA process is concluded.

In addition to the master plan and the environmental documentation, the FAA will conduct a benefit-cost-analysis (BCA) regarding the new airport. The BCA is necessary in order to provide justification for the project. This would likely be undertaken concurrently with or immediately after the environmental documentation.

Once property has been acquired and funding appropriated, construction of the planned Maricopa Airport can begin. Much of the planning and engineering design work will have to precede the commencement of construction by at least a year. Construction estimates include 25 percent for design and construction administration and 15 percent for contingencies.

The site preparation cost includes such elements as clearing, grubbing, earthworks, and drainage. Approximately 130 acres of land will need to be prepared and graded for the initial airport development. This includes the runway and taxiway footprint, the runway safety area, the access roads and the terminal area.

Utilities will need to be extended to the airport. The estimate assumes that utilities will be located along Highway 238 at the time of construction. Some further detail may be needed to determine what costs, if any, will be incurred to extend utilities including water, electricity (capacity as needed), sewer, and data lines from the city area, if necessary. Recent City annexation of property in the area of the airport site may lead to the extension of utilities to the area. Without direct utility access, rural elements such as a package waste water treatment facility may be necessary in the interim.

The initial runway construction will provide for a runway that measures 5,500 feet long by 100 feet wide. The planned pavement strength rating is 30,000 pounds single-wheel loading (SWL) and 75,000 pounds dual-wheel loading (DWL).

A full length parallel taxiway is planned. The initial taxiway system will include five taxiway exits leading to the parallel taxiway and a sixth taxiway leading to the existing paved glider runway. This taxiway will allow for integration of the existing glider services with the rest of the airport. The taxiways serving the new runway are planned at a width of 50 feet, while the taxiway leading to the glider area is planned at a width of 35 feet. Ultimately, the taxiway leading to the glider area will become the threshold taxiway to the planned future parallel runway.

An initial construction of T-hangars is planned. T-hangars are intended to house light single and multi-engine aircraft; therefore, the pavement does not need to be to the strength of the primary runway and taxiway surfaces. The footprint of the T-hangar structures is not included in this figure but is included in the site preparation calculations.

Airfield lighting includes runway, taxiway, terminal ramp lighting, and airfield signage such as taxiway designation signs. The markings for the runway should be non-precision which include runway designation, threshold bar, and runway centerline. Taxiway centerline markings and terminal area apron centerlines should also be marked. It should be noted that taxiway lighting is typically approved for airports serving at least 100 based aircraft. While the short term forecast estimated 80 based aircraft, the intermediate term forecast estimates 140 based aircraft. In an effort to save on development costs, the taxiway lighting should be included in the initial airport construction.

The runway should be outfitted with runway end identification lights (REILs) and precision approach path indicator lights (PAPIs). The REIL consists of two strobe lights, one set to either side of the runway threshold. These lights provide visual confirmation, during both the daytime and nighttime, of the runway end. The PAPIs provide visual approach path information for pilots. These units are located to the left side of the runway approximately 1,000 feet from the landing threshold. Pilots can interpret a series of red and white lights to determine if they are on the correct glide path for landing.

The initial terminal area ramp encompasses approximately 26,000 square yards of pavement. This ramp would have space for tie-down aircraft parking and transient aircraft parking. In addition, the airport FBO operators could locate their facilities facing this ramp.

An airport beacon is required and several weather aids should be planned including an automated weather observation system (AWOS-III), a segmented circle, and at least three windsocks. Full perimeter fencing should also be planned.

Two access roads should be planned with the initial airport construction. The first is the main entrance road from Highway 238. This road should be a paved two-lane road leading to the terminal area. A second road is planned from Rio Bravo Road to provide access

from the east to the existing glider terminal area.

Improvements to Rio Bravo from Highway 238 onto the airport and extending to the glider terminal area will need to meet city street design standards. The portion of the road from Rio Bravo to the glider terminal area may be able to be initially constructed of an asphalt rock dust palliative (ARDP) compound. Ultimately it should be paved as any other city street.

One element that is generally a low priority for FAA grant funding is airport parking lots. A parking lot near the terminal area is planned with the initial construction. Parking lots are eligible for ADOT funding.

The total initial acquisition and development cost is estimated at $58.9 million. Of this total, approximately 97.5 percent is eligible for FAA and ADOT grant funding. The remaining $1.5 million would be the responsibility of the City of Maricopa.

INTERMEDIATE TERM DEVELOPMENT

As traffic grows, further development of the runway system and the hangar areas will be justified. The intermediate and long term projects correlate to these triggers being reached in these timeframes. It should be noted that aviation activity can experience unpredictable highs or lows. Rarely do the forecasts follow straight line growth curves. Therefore, the City of Maricopa should be prepared to accelerate development with demand, or delay a project, as necessary, when growth slows.

Planning is a critical element to the successful growth and operation of an airport. After the short term period, the local and national aviation conditions should be reassessed with an update to the master plan. Environmental documentation will also be necessary in order to proceed with the intermediate term projects. Both of these planning documents are included in the intermediate planning horizon.

An early project considered in the intermediate planning horizon is the construction of a general aviation terminal building. It is common for busy general aviation airports to provide facilities that include a common area, a pilot lounge, flight planning facilities, weather station, snack bar or restaurant, and pilot shop. Often the airport management offices will also be located in the terminal building.

The terminal building at an airport is the gateway to the community. When designed, it should be aesthetically pleasing and representative of a community entrance. General aviation terminal buildings are eligible for FAA grant funding in the form of non-primary entitlements (NPE) only. Currently, the maximum potentially available from the FAA would be three years of NPE funds or $450,000. ADOT has actively participated in general aviation terminal buildings.

The first intermediate term project after planning is the design and engineering of the runway extension. Once again,

the 1,800-foot planned runway extension will be justified and, therefore, eligible for FAA and ADOT grant funding, when the critical aircraft for the airport transitions from smaller business jets to larger business jets.

Site preparation for the extension and landside facilities includes approximately 53 acres. Site preparation includes clearing, grubbing, drainage, and earthworks (addition and removal of dirt) for grading purposes.

The runway extension is planned at 1,800 feet. Factors such as elevation (1,270 feet MSL) and average high month temperature (108 degrees Fahrenheit for July) and the critical aircraft (500 or more annual operations) are considered when planning the runway extension. The parallel taxiway is also extended with a new threshold taxiway planned. The medium intensity runway and taxiway lighting are also extended. The REILs and PAPIs will need to be relocated as well.

The terminal area ramp is also planned to be expanded at this time to accommodate a forecast growth in the number of based aircraft and transient operations. The auto parking serving the terminal area is also planned for expansion. The taxilanes to the T-hangar areas are extended providing access for approximately 100 new aircraft storage units.

Intermediate term projects are estimated at $10.9 million. Of this total approximately $9.7 million is eligible for FAA grant funding. An additional $846,000 is eligible for ADOT funding. The remaining portion, approximately $310,000, would be the responsibility of the City of Maricopa.

LONG TERM DEVELOPMENT

Along with continued landside hangar development, two major projects are planned for the long term. The first is a 1,000-foot extension of the primary runway, which would bring the total length to 8,300 feet. The second is the construction of a parallel runway measuring 4,400 feet long by 75 feet wide.

Prior to design of these two projects, appropriate planning documentation will need to be assembled. The master plan should be updated along with the ALP and appropriate environmental documentation should be undertaken as is relates to any expansion of the facilities.

When the airport makes a further transition in critical aircraft from airport reference code (ARC) C-II to ARC D-III, an additional 1,000 feet of runway length may be justified. This extension would be intended to fully accommodate a critical aircraft represented by large business jets up to 100,000 pounds such as the Gulfstream V.

The runway and parallel taxiway are both extended 1,000 feet and a new threshold taxiway is planned. The runway and taxiway lighting will need to be extended. The runway marking will then need to be upgraded to precision markings which will additionally include markings for the down zone, the aiming point, and the edges.

The PAPIs will need to be relocated to provide the correct approach slope. The

REILs may need to be relocated but a medium intensity approach lighting system with runway alignment indicator lights (MALSR) is planned for the west runway end at this time. When an approach lighting system is installed, there is no longer a need for the REILs on that runway end. Therefore, the REILs could be reserved for use on the parallel runway.

On the landside, taxilanes sufficient to support T-hangar expansion are planned. The terminal area ramp is expanded and additional auto parking is also planned to support both the T-hangar area and the terminal area.

The second major project in the long term planning period is the construction of a parallel runway system. During the previously planned master plan updates, it will become apparent if a parallel runway is justified. Actual annual operations will be the trigger for a parallel runway. According to FAA design standards, planning for a parallel runway should begin when operations reach 60 percent of capacity and construction should begin before 80 percent of capacity is exceeded. A single runway system can theoretically accommodate 230,000 annual operations. The long term forecast (20-year) for the new Maricopa Airport, is to reach 210,000 annual operations.

The estimated area for site preparation and drainage improvements for the parallel runway system is 100 acres. While this side of the airfield will have supported glider activities for a number of years by this point, utility upgrades are planned to be extended to the area.

The parallel runway is planned at 4,400 feet in length and 75 feet in width. The runway is intended to relieve the main runway of local training traffic. Mostly small single and multi-engine aircraft would utilize this runway, thus the dimensions do not need to be the same as the primary runway which can accommodate all general aviation aircraft at this point. The parallel runway would be designed to ARC B-II standards.

The parallel runway is located 700 feet, centerline-to-centerline, from the primary runway in order to allow simultaneous visual operations to both runways. A parallel taxiway is also planned between the two runways for circulation. There are six entrance taxiways planned to the new runway. The east side threshold taxiway was previously planned with the initial runway construction to provide access to the glider area. The three taxiways would extend from the new parallel runway, intersect with the parallel taxiway, and continue until reaching the primary runway.

Airfield lighting, marking, and signage are necessary for the parallel system. The parallel runway is planned with non-precision runway markings. The runway pavement strength rating is planned for 15,000 pounds SWL. The taxiways would have centerline markings. The taxiways would be 35 feet wide as opposed to the 50-foot width provided on those taxiways serving the primary runway. REILs and PAPIs are also planned for the parallel runway.

In anticipation of the continued growth in glider activity in this area, a dirt

runway is also planned adjacent to the parallel runway. The dirt runway is located 135 feet, centerline-to-centerline, north of the parallel runway. It is planned to a width of 120 feet. Because gliders will come to a complete stop upon landing and must be towed to the terminal area, a separate glider runway is planned.

The access road to the north side terminal area will need to be altered once the parallel runway goes into place. It is planned as a paved two-lane road running parallel to the north property line before turning south to the north side terminal area.

The final project considered in the long term planning horizon is the construction of an airport traffic control tower (ATCT). While a tower would almost certainly be necessary in the long term (10-20 year time frame), it is difficult to determine precisely when it would be necessary. Typically, when annual operations reach the 100,000 to 150,000 level, a tower can be justified through a cost-benefit analysis.

Airport projects in the long term are estimated at approximately $30.9 million. Approximately 97.5 percent of the total is eligible for FAA and ADOT grant funding.

LANDSIDE CONSTRUCTION

The development costs have excluded costs associated with hangar development. Hangar space construction can be undertaken by the airport sponsor or by a private developer. When the airport sponsor constructs facilities, they retain ownership of the structure and act as the leasing agent. Private developers can lease land from the airport and construct hangars for their own use or for lease.

On **Exhibit 4A**, the area to the west of the terminal area is identified as "Hangar Area Reserve." All flight-line property must be reserved for direct aviation activity. In this study, approximately the first 1,000 feet from the parallel taxiway is reserved for these purposes. If aviation activity grows exponentially at this airport, this space is available for additional development of hangar facilities.

AIRPORT OWNERSHIP AND MANAGEMENT

The airport owner is responsible for the direction and management of one or more airports. An airport owner typically sees aviation as a powerful and positive economic force and believes that linking its community to the nation's aviation system will contribute to a community's growing economy.

The ownership of airports can take several different forms. Airports can be for public or private use. Public use airports can be under public or private ownership.

Most of the public general aviation airports in the country are owned by a local governmental entity (city or county) because airports are often viewed in much the same light as other services provided by governments such as parks or public transportation. Airports have an added benefit in that they have the

potential to produce revenue through building and ground leases, fuel sales, or other revenue avenues.

Most of the public general aviation airports in the central Arizona region are owned by the local governmental entity. For example, Casa Grande Municipal, Chandler Municipal, and Mesa Falcon Field are all owned by the local jurisdiction (City).

In some cases, airports are owned by the state. In Arizona, the Grand Canyon National Park Airport is owned by the state and operated by the Department of Aeronautics.

Airports that are owned by municipalities, counties, or states, are typically run as a department within that governmental body. Policy direction comes from the city council, county board of supervisors, or in the case of Grand Canyon, directly from the State Transportation Board. Airports owned and operated by governmental entities often have access to the full bonding and taxing power of those entities for capital projects.

Some airports are owned and operated by a quasi-governmental body called an airport authority. These authorities are independent entities charged with the operation and oversight of an airport or a group of airports. Authorities are often governed by a board of directors who are appointed to lead the authority by a government official. Authorities are usually created to own and manage larger commercial service airports, but there are some small general aviation airports operating under an authority. In Arizona, airport authorities must be not-for-profit organizations.

In the central Arizona region, Phoenix-Mesa Gateway Airport is owned and operated by the Williams Gateway Airport Authority. The authority is a Joint Powers Airport Authority comprised of the Cities of Mesa and Phoenix, the Towns of Queen Creek and Gilbert, and the Gila River Indian Community. In southern Arizona, the Tucson Airport Authority operates Tucson International Airport and the general aviation airport, Ryan Field.

The management of an airport can take many forms. The most common form for general aviation airports is that the local governmental sponsor employs an airport manager and operates the airport much like any other city department. The sponsor is responsible for development of all airport priorities and for financial grant application from the FAA.

Some general aviation airport owners will enter into a lease management arrangement with a private company to manage the daily operations. This private company could be a professional airport operations company or simply the local airport fixed base operator (FBO). This arrangement benefits the airport owner because they don't have to employ dedicated airport management.

In this management arrangement, the airport owner will be responsible for all airport development and grant matching funds. This includes determining project priorities, applying for financial

grants from the FAA, and providing matching funding.

An example of this management arrangement is Addison Airport in the Dallas, Texas area. The Town contracts with a professional airport operator who manages daily activity including building and land leasing for the Town. This is a for-profit company that benefits from efficient management of the airport.

Another form of airport management is a master lease arrangement. In this scenario, the airport sponsor (city or county) will contract with a separate entity, often a private company or a separate airport authority, for operation of the airport. The leasing organization is responsible for all airport operations including leasing, capital project priority development, and grant matching. Grant applications are made through the airport sponsor.

Examples of this airport management arrangement include Laughlin/Bullhead International Airport in Bullhead City, Arizona, and Kingman Airport in Kingman, Arizona. Both of these airports are owned (sponsored) by their respective cities and counties but are operated under an airport authority with full responsibility for the airport, including project prioritization and grant matching.

Some public use general aviation airports are owned and operated by private companies. Stellar Airport in Chandler, Arizona is a local example. There is no government involvement in the ownership or operation of this airport. To date, this airport has not accepted any federal grants.

Public-use private airports can be eligible for federal grant funding. When any public-use airport, whether publically or privately owned, accepts federal capital improvement grants, that airport is obligated to maintain the useful life of that project, typically 20 years. Pearland Airport, outside Houston, Texas, is an example of a privately owned, public-use airport that receives federal grant funding.

CASH FLOW ANALYSIS

With the presentation of the site specific capital program, more detailed analysis can now be presented on the potential revenues and expenses associated with constructing and operating the airport. This cash flow analysis assumes that the City of Maricopa will operate the airport as a department within the City.

A preliminary cash flow scenario was developed in Chapter Two – Airport Market Analysis. Detailed revenues and expenses from several area general aviation airports were presented and utilized for comparison. In addition, Table 2M presented the cash flow for the prototype airport. In that cash flow analysis, it was shown that through responsible fiscal management, the airport can achieve a net positive cash flow within the long range planning period. This is still the case with the revised cash flow. **Table 4A** presents the update to the financial analysis based on site-specific criteria and recently obtained cost estimates.

OPERATING REVENUE

Airport revenues for general aviation airports are derived from leases and fees collected from users of the airport. The primary revenue sources are fuel flowage fees, aircraft tie-down fees, land rentals, and building space rentals. Some airports will also generate revenue from aircraft hangar rentals, provided the airport owns the hangar. As previously discussed in the capital program, all new hangar development is assumed to be undertaken by private developers.

The most significant revenue source for most general aviation airports is the sale of aviation fuel. There are two approaches to managing fuel sales at an airport. The first is for the airport sponsor to allow airport businesses, such as an FBO, to sell fuel directly to the customer. In exchange for the right to sell fuel on the airport, the FBO operator pays a per-gallon fuel flowage fee to the airport.

TABLE 4A
Financial Analysis ($2008)
Maricopa Airport Feasibility

	Initial Development	Intermediate Development	Long Range Development
Operating Revenues			
Fuel Flowage	$65,763	$223,281	$380,800
Tie-down Fees	11,520	16,920	45,720
Land Rentals	128,141	198,074	371,564
Terminal Rentals	N/A	28,800	73,440
Total Operating Revenues	**$205,424**	**$467,075**	**$871,524**
Operating Expenses			
Personal Services	$110,000	$130,000	$210,000
Maintenance and Supplies	130,000	160,000	250,000
Miscellaneous	25,000	35,000	60,000
Total Operating Expenses	**$265,000**	**$325,000**	**$520,000**
Operating Income/Loss	**$(59,576)**	**$142,075**	**$351,524**
Capital Improvement Financing			
Total CIP	$58,923,000	$10,859,000	$30,918,000
Federal and State Funding	$57,449,925	$10,548,525	$30,145,050
Remaining Local Share	**$1,499,325**	**$310,475**	**$772,950**
Debt Service 20 yrs. @ 6%			
New Debt Service	$151,086	$31,844	$79,277
Carry-over Debt Service	N/A	$151,086	$182,929
Total Debt Service	**$151,086**	**$182,929**	**$262,207**
Net Cash Flow	**$(210,662)**	**$(40,854)**	**$89,318**

NOTE: All costs are average annual estimates.
Source: Coffman Associates analysis

The second method is for the airport to sell fuel directly. In this analysis, it is assumed that the airport sponsor will encourage an FBO to invest in fuel sto-

rage capacity, delivery vehicles, and personnel to accomplish the fuel delivery functions.

Typical fuel flowage fees range from 4 to 12 cents per gallon. For this analysis, a fee of 10 cents per gallon was utilized. Once the airport sponsor begins to solicit FBO operators, this fee structure should be reconfirmed in comparison to other area general aviation airports.

The calculation of estimated annual fuel consumption has been updated based on recent interviews with area FBO operators. For AvGas (100 low-lead), a figure of 1,000 gallons per based piston aircraft was used. For transient piston operators, 20 gallons per visit was utilized. Jet A fuel sales were calculated as 50,000 annual gallons per based turbine aircraft and 300 gallons per transient turbine aircraft.

The ramp area that is centrally located to the runway system is a public aviation access space. This space is owned and maintained by the airport as it is planned to be constructed with federal grants. This ramp should provide not only access to the airport business, but also provide aircraft tie-down positions. The annual revenue for tie-downs is estimated at $360 per position.

Land is the greatest asset that an airport has. Airport property is unique in that it can provide access to the national air transportation system. Therefore, all property potentially providing that immediate access (i.e., flight-line property) must be reserved for direct aviation-related purposes. The airport sponsor can market that property to aviation-related businesses for a land lease fee. Land lease terms are typically 20 years plus extension options. This allows the developer time to recover their capital investment before the facilities revert to airport ownership. The airport operator can then design and build their own hangar facilities for their business or for lease. Any development on-airport should follow the master plan concept and the airport rules and regulations. It should be noted that airport property needed for aviation-related purposes now or in the future cannot be sold.

Land lease rates will vary on the airport depending on location and proposed use. For example, centrally located parcels intended for FBO use will generate a higher lease rate than parcels intended for T-hangars. Space for FBO hangars was estimated at $0.30 per square foot, while space for T-hangars was estimated at $0.15 per square foot.

When a terminal building is constructed, a portion of the space may be leased. The prevailing rate is estimated at $18 per square foot. It was further estimated that no more than 40 percent of the terminal building would be available for commercial lease.

OPERATING EXPENSES

Operating expenses include salaries and wages, employee benefits, utilities, maintenance, supplies, and administration expenses. The expenses presented are derived from analyst experience and comparisons to general aviation airports of similar size at each planning horizon.

In the initial development phase, approximately $110,000 is estimated for personnel services. This would be salary and benefits for an airport manager and a maintenance worker. Over time, both the salaries and the number of employees increase. By the long term, a common airport management arrangement would include a manager, a secretary, and two or three maintenance/operations positions.

Other significant costs are incurred by various maintenance tasks and supplies. A separate category for miscellaneous expenses is included.

NET OPERATING INCOME/LOSS

As presented in the table, in the initial development term (years 0-5), it is estimated that the airport would experience a net annual operating loss. This is not unusual for most general aviation airports. This certainly could be expected for a new airport, just as it is common for a new business to have an operating loss for a period of time after start-up. In growing and busy aviation activity areas of the country, such as Arizona, general aviation airports are much more likely to have a net positive operating situation once the airport is established.

In the intermediate planning period, approximately 10 years, the airport could be expected to show a substantial net positive cash flow of $142,000 from an operating perspective. By the long term (approximately 20 years), the airport more than doubles its net positive cash flow to $351,000 annually.

CAPITAL FUNDING AND NET CASH FLOW

It should always be a goal of the airport to be able to generate enough revenue to not only break even from an operating perspective but also to fund matching grants for major capital improvements. The bottom half of **Table 4A** presents the financial impact of the airport construction and subsequent capital improvements.

In the initial development phase, approximately $58.9 million is needed to construct the airport. Approximately $1.5 million of the total would be the responsibility of the City as a matching grant. In the table, it is assumed that the local share would be financed in full. Assuming a 20-year amortization schedule at a six percent annual interest rate, the airport would assume an annual debt service of $151,086.

In the intermediate term, approximately $10.9 million in capital improvements is planned. Of this total, approximately $310,000 would be the responsibility of the City. Were the City to finance this portion, approximately $32,000 would be added to the amortization schedule.

In the long term, approximately $31 million in capital projects is planned with the City responsible for approximately $773,000. This would add approximately $79,000 to the debt service.

Over time, the debt service will be reduced as the airport or City pays down the financing. In the short term, the City is forecast to realize a net negative cash flow when considering capital expenditures. By the intermediate planning term, the airport nearly breaks

even and by the long term, the airport is fully self-sustaining with the ability to fund all airport operations and capital improvements directly from revenues generated on the airport.

SUMMARY

In this final phase of the Maricopa Airport Feasibility Study, the planned airport layout has been optimized to the selected site. As a result of this optimization, the Estrella Sailport, currently situated on the selected site, will be able to remain operational both during and after construction of the new airport. The existing Estrella Sailport runways and facilities will not be disrupted until such time as a second parallel runway is needed for the airport. This is forecast in the long term planning period or approximately 20 years after construction.

A development schedule and cost has been presented in this chapter. The initial construction of the airport is estimated to cost approximately $58.9 million. Of this total, the airport sponsor, the City of Maricopa, would be responsible for approximately $1.5 million. The intermediate planning term, years 6 through 10 after construction, estimates $10.9 million in capital needs, based on the airport achieving certain demand triggers such as growth in based aircraft and operations. Of this total, the City would be responsible for approximately $310,000. By the long term planning period (20 years), approximately $30.9 million in capital improvements may be justified. The City would be responsible for approximately $800,000 of this total.

While much of the initial airport development and subsequent capital projects are eligible for grant funding, realistically not all will be funded. Airport capital projects will be prioritized and funded as it is available. The figures shown in the development costs therefore represent the baseline starting point for funding eligibility.

Several airport management scenarios were discussed. The most common management system for a general aviation airport is for the airport to operate as a department of the City. Other forms include contracting out daily operations of the airport to a private company or leasing the entire airport to a private company. This study has assumed that the airport would be operated by the City of Maricopa.

The final section of this chapter presented a cash flow analysis. It was shown that through reasonable management of the airport and the use of standard accounting principles, the airport can become profitable from an operating perspective by the intermediate planning period (years 5-10). When including matching grant funds for federal grants for capital improvements, the airport can become entirely self-sustaining within 20 years. Active management of the airport finances by a dedicated airport manager is recommended in order to achieve these goals.

Now that the Maricopa Airport Feasibility Study is complete, it will be presented to the City Council for approval. The next step in the planning process is the development of an airport master plan, airport layout plan, and environmental assessment.

Appendix A

Glossary of Terms

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) transports 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.

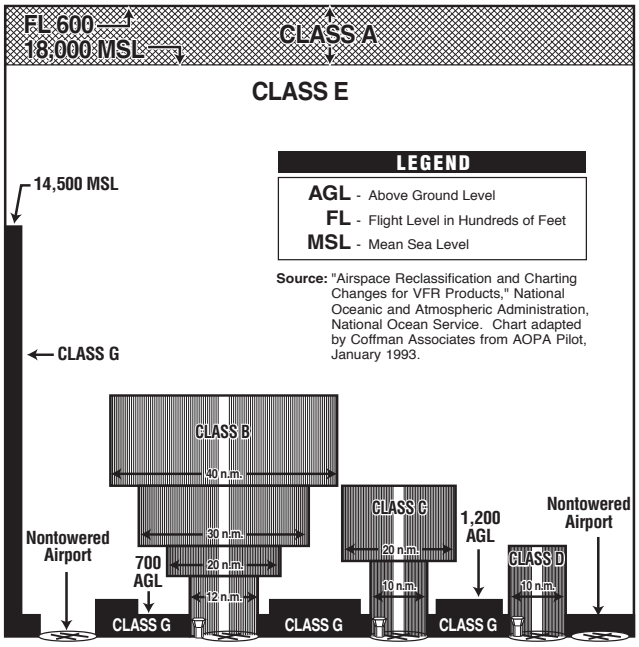
- *CLASS C:* Generally, the airspace from the surface to 4,000 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower and radar approach control and are served by a qualifying number of IFR operations or passenger enplanements. Although individually 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 airports 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

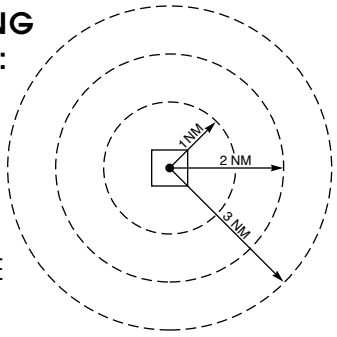
- *LANDING DISTANCE AVAILABLE (LDA):* The runway length declared available and suitable for landing.

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.

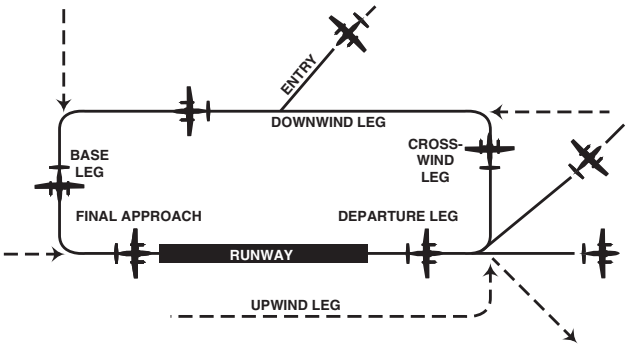
TOUCHDOWN: The point at which a landing aircraft makes contact with the runway surface.

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.

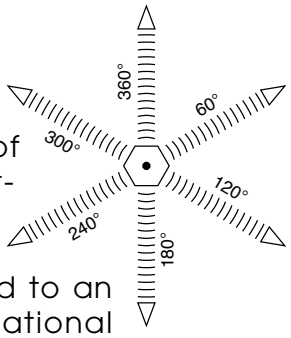


UNCONTROLLED AIRPORT: An airport without an air traffic control tower at which the control of Visual Flight Rules traffic is not exercised.

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

Appendix B

Noise Evaluation & Agency Coordination

Appendix B
NOISE EVALUATION AND AGENCY COORDINATION

Environmental considerations are important when developing the feasibility of and siting a new airport. One of the most noticeable environmental concerns surrounding an airport is the impact of noise now and into the future. In an effort to quantify the potential noise impacts of a new general aviation airport located on the current site of the Estrella Sailport, noise contours were developed. This analysis is presented below.

In addition, numerous federal, state, and local agencies with environmental jurisdiction were contacted regarding the selected airport site. Each was supplied a graphic layout of the airport site and asked to provide any environmental concerns with the site. Their responses are provided below.

NOISE EXPOSURE ANALYSIS

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

To determine the noise-related impacts that the proposed Maricopa Airport site could have on the surrounding environment, noise exposure patterns were analyzed for the projected long term activity.

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 Federal Aviation Administration (FAA), the Environmental Protection Agency (EPA), and the 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.

DNL is defined as the average A-weighted sound level as measured in decibels (dB) during a 24-hour period. A 10dB 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. Most federally funded airport noise studies use DNL as the primary metric for evaluating noise.

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 Maricopa Airport have been developed from the Integrated Noise Model (INM), Version 7.0. The INM was developed by the Transportation Systems Center of the U.S. Department of Transportation at Cambridge, Massachusetts, and has been specified by the FAA as one of the two models acceptable for federally funded noise analysis.

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

Computer input files for the noise analysis contain operational data, runway utilization, aircraft flight tracks, and fleet mix as projected in the plan. The operational

data and aircraft fleet mix are summarized in **Table B1**. These estimates correspond to the aviation activity forecasts presented in Chapter Two of this document.

TABLE B1
Noise Model Input: Aircraft Operations
Proposed Maricopa Airport

Aircraft Type	INM Descriptor	Baseline	20-year Long Range
ITINERANT OPERATIONS			
Turbojet			
Business Jet	LEAR35	200	2,700
Business Jet	CNA500	200	2,700
Business Jet	MU3001	0	300
Business Jet	CNA55B	50	1,300
Business Jet	CL600	0	1,300
Business Jet	GIV	0	600
Business Jet	LEAR25	50	100
Subtotal		500	9,000
Piston/Turboprop/Helicopter			
Single Engine Variable	GASEPV	4,400	29,250
Single Engine Fixed	GASEPF	4,400	29,250
Multi-engine	BEC58P	500	5,000
Turboprop	DHC6	500	5,000
Helicopter	H500D	1,000	6,500
Subtotal		10,800	75,000
TOTAL ITINERANT		**11,300**	**84,000**
LOCAL OPERATIONS			
Piston/Turboprop/Helicopter			
Single Engine Fixed	GASEPV	9,500	56,000
Single Engine Variable	GASEPF	9,500	56,000
Multi-Engine Fixed	BEC58P	1,000	7,000
Helicopter	H500D	1,100	7,000
Subtotal		21,100	126,000
TOTAL LOCAL		**21,100**	**126,000**
TOTAL ACTIVITY		**32,400**	**210,000**

Source: Coffman Associates analysis utilizing Integrated Noise Model (INM) v.7.0

The runway use percentages are summarized in **Table B2**. In the long term planning period at full airport build-out, three runways are proposed. The primary runway, at a length of 8,300 feet, is assigned all large aircraft, particularly business jets. This runway is also assigned 50 percent of total activity. The shorter parallel runway is assigned single and multi-engine aircraft only, as this is primarily a training runway. Forty percent of all operations are placed on this runway. In the long term, a dirt runway is also planned. This runway is intended for glider activity and, therefore, would only support single engine tow aircraft and approximately 10 percent of total operations.

TABLE B2
Long Term Runway Use
Proposed Maricopa Airport

Runway	Length	Surface	Runway Use Percentage	Assignment Notes
Runway 6R-24L	8,300	Paved	50%	All Jets
Runway 6C-24C	4,400	Paved	40%	Single and Multi-Engine
Runway 6L-24R	4,400	Dirt	10%	Single Engine

Source: Coffman Associates Analysis

The long term aircraft noise contours generated using the aforementioned data for the planned Maricopa Airport are depicted on **Exhibit B1**. The 75 and 70 DNL contours remain on airport property. The 65 DNL extends off airport property slightly to the north but remains on the Arizona State Land Department (ASLD) parcel.

As a point of reference, the 60 and 55 DNL contours are also depicted on the exhibit. While there is no federal mandate to mitigate noise impacts to the underlying land uses, consideration should be given to limiting residential land uses in these areas, particularly on approaches to the runways. Some states have taken to developing sophisticated land use measures that extend out from the airport to distances of up to 14,000 feet. These measures place greater limits on residential density the closer one gets to the airport. The states with the most extensive airport compatible land use guidance are California, Florida, Oregon, Washington, and Wisconsin.

COMPATIBLE LAND USE

Title 14 of the Code of Federal Regulations (14 CFR), Part 150 recommends guidelines for planning land use compatibility within various levels of aircraft noise. As the name indicates, these are guidelines only; Part 150 explicitly states that determinations of noise compatibility and regulation of land use are purely local responsibilities.

Based upon the results of the noise modeling efforts, the future 65 DNL will extend slightly off airport property to the north. The airport should make every effort to positively control those areas that fall within the 65 DNL. Appropriate zoning and other land use measures can provide the necessary land use controls that fee-simple acquisition can provide.

This area is currently zoned as an employment center which is compatible with the 65 DNL provided the ultimate land use is industrial or commercial in nature. **Exhibit B2** presents a matrix of compatible land uses surrounding airport.

06MP12-B1-5/6/08

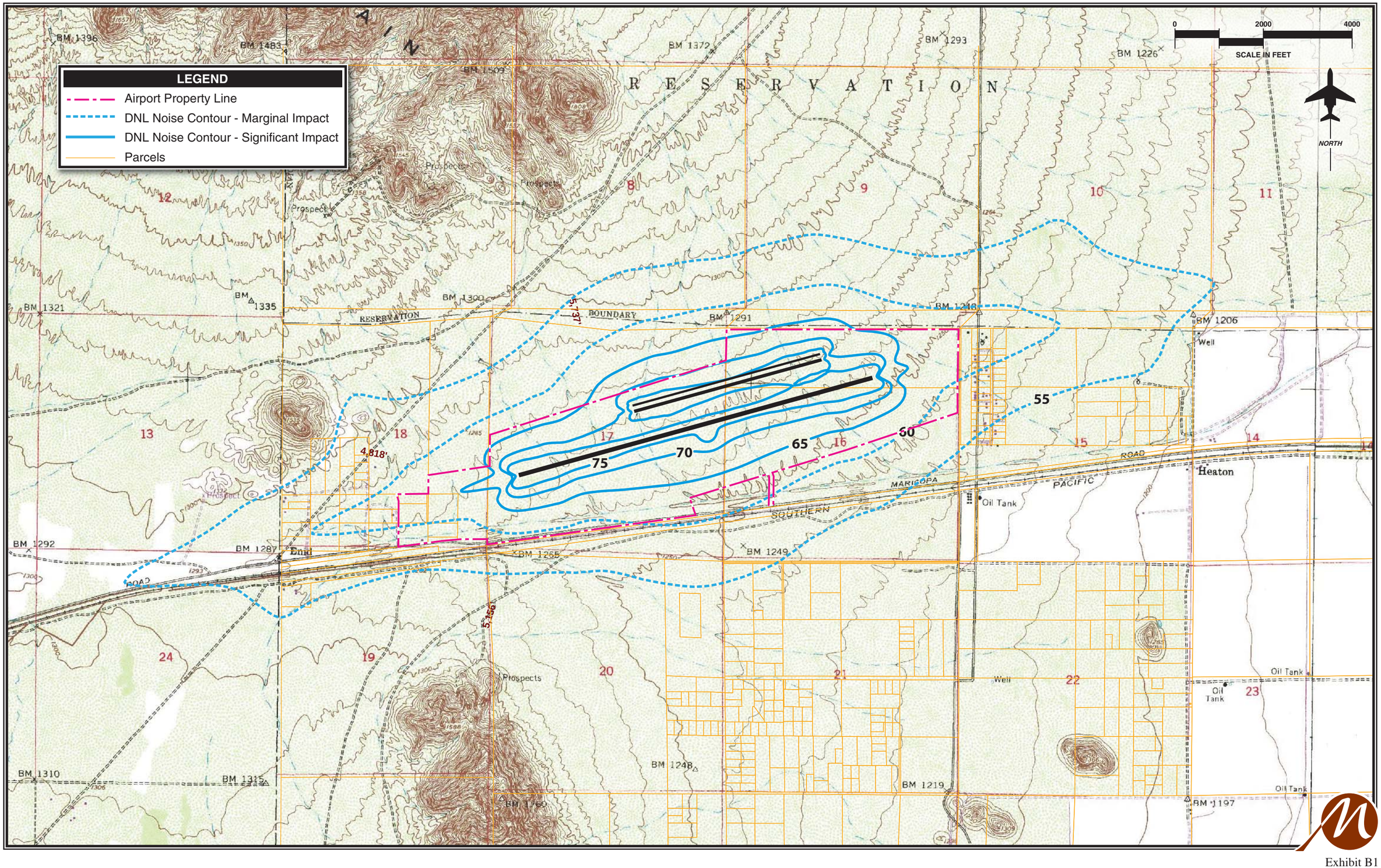


Exhibit B1
BASELINE +20 YEARS
NOISE EXPOSURE CONTOURS

07SP04-B2-5/7/08

LAND USE	Yearly Day-Night Average Sound Level (DNL) in Decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
RESIDENTIAL						
Residential, other than mobile homes and transient lodgings	Y	N[1]	N[1]	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
PUBLIC USE						
Schools	Y	N[1]	N[1]	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[2]	Y[3]	Y[4]	Y[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
COMMERCIAL USE						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail-building materials, hardware and farm equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail trade-general	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Communication	Y	Y	25	30	N	N
MANUFACTURING AND PRODUCTION						
Manufacturing, general	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock farming and breeding	Y	Y[6]	Y[7]	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
RECREATIONAL						
Outdoor sports arenas and spectator sports	Y	Y[5]	Y[5]	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally-determined land uses for those determined to be appropriate by local authorities in response to locally-determined needs and values in achieving noise compatible land uses.

See other side for notes and key to table.

Exhibit B2
LAND USE COMPATIBILITY GUIDELINES

KEY

Y (Yes)	Land Use and related structures compatible without restrictions.
N (No)	Land Use and related structures are not compatible and should be prohibited.
NLR	Noise Level Reduction (outdoor-to-indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, 35	Land Use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

NOTES

1 Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB, respectively, should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB; thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

2 Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

3 Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

4 Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

5 Land use compatible provided special sound reinforcement systems are installed.

6 Residential buildings require a NLR of 25.

7 Residential buildings require a NLR of 30.

8 Residential buildings not permitted.

Source: ***14 CFR Part 150***, Appendix A, Table 1.

Many land uses such as parking lots, roadways, commercial, manufacturing, and industrial development are permissible in the 65 DNL. A residential land use would be non-compatible and is strongly discouraged within the 65 DNL. Often, mixed land uses can include some residential development. This circumstance should be avoided either through zoning or airport acquisition.

The primary goal of compatible land use planning is to achieve and maintain compatibility between the airport and its surrounding community. Inherent in this goal is the assurance that the airport can maintain or expand its size and level of operations to satisfy existing and future aviation demand. The protection of the investment in a facility such as an airport is of great importance. At the same time, a person who lives, works, or owns property near an airport should be able to enjoy the location without infringement by noise or other adverse impacts of the airport.

As the airport grows in the overall number of operations and as the fleet mix changes to include more operations by larger general aviation aircraft, such as turboprops and business jets, the extent of noise impacts can be expected to grow accordingly. Advancements in aircraft engine technology are progressing rapidly and the noise generated by today's sophisticated jet aircraft is far less than that generated just ten years ago. Further noise reduction technology can be expected to be applied in the future to aircraft.

The visual impact of aircraft in the air would likely increase through the planning period although the air traffic pattern, as managed by the ATCT, would not expand significantly. In the future, the number of aircraft in the pattern may increase due to the increase in operations, but the extent of the pattern is not expected to change.

AGENCY COORDINATION

As part of the environmental evaluation, various federal, state, and local agencies with environmental jurisdiction were contacted. Each of these agencies was provided with a letter describing the selected airport site and a graphic showing the runway superimposed onto an aerial photograph. Letters were sent to the following agencies in February 2008, and replies were received from those agencies in **bold**:

National Park Service, Intermountain Region
Arizona Department of Environmental Quality – Water Quality Division
Arizona Department of Environmental Quality – Waste Programs Division
Arizona Department of Environmental Quality – Air Quality Division
State Historic Preservation Office (Arizona)
State of Arizona Game and Fish
Pinal County Public Works Department
City of Maricopa –
Planning and Economic Development (Comments received at PAC)

U.S. Department of Interior - Fish and Wildlife Service
U.S. Army Corps of Engineers
Arizona State Land Department
Pinal County Division of Environment and Health
Pinal County Planning and Development Services
Gila River Indian Community – Planning and Development

The following pages provide a copy of the environmental scoping letter sent to the agencies and the responses received.

Coffman Associates
Airport Consultants

February 20, 2008

Dear :

The City of Maricopa, in cooperation with the Arizona Department of Transportation, has commissioned our firm to prepare an Airport Feasibility Study to provide a preliminary market analysis of the potential for a new general aviation airport to serve the City of Maricopa and western Pinal County.

The current phase of the study is to evaluate potential airport sites. The initial process of identifying candidate sites included the review of 14 potential sites. In order to determine the most desirable site for an airport, a variety of engineering factors (such as proximity and access, site layout and design, earthwork and drainage, airspace, obstructions, and navigational conditions) as well as environmental factors (such as property acquisition, physical resources, ecological resources, farmland resources, and historical and cultural resources) were analyzed.

Our initial screening study resulted in the selection of the existing Estrella Sailport as the most feasible site. The greatest advantages for this site are its location adjacent to the state highway, it is an existing (private) airport site, and most of it currently belongs to a single land owner, the Arizona State Land Department. In addition, the city has already considered this site as a potential airport site in its community planning.

The purpose of this correspondence is to solicit your comments regarding environmental resources and sensitivities potentially associated with, or affected by, the candidate site depicted on the enclosed exhibit. The candidate site is located on the United States Geologic Survey (USGS) Enid quadrangle topographic map within Township 4S and Range 2E. Your review and comment will be used to document resources which could affect the viability of this site.

Please forward any written comments to me by March 28, 2008, at the address on the letterhead. As another option, you may fax or e-mail your comments to me at:

FAX: (816) 524-2575
E-mail: asteele@coffmanassociates.com

Kansas City • Phoenix
237 N.W. Blue Parkway, Suite 100, Lee's Summit, MO 64063 • Phone: 816.524.3500 • FAX: 816.524.2575

If you have any questions or need additional information, you may contact me by e-mail or at (816) 524-3500. Thank you for your consideration and timely response.

Sincerely,

Angela Steele
Airport/Environmental Planner

Enclosures

C: Patrick Taylor, Coffman Associates

Janet Napolitano
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

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

Stephen A. Owens
Director

March 10, 2008

Ms. Angela Steele, Airport/Environmental Planner
Coffman Associates
237 N.W. Blue Parkway, Suite 100
Lee's Summit, MO 64063

Location: Pinal County/City of Maricopa: Airport Feasibility Study – Estrella Sailport

Dear Ms. Steele:

The Air Quality Division has reviewed the proposed project, as described in your letter, dated February 20, 2008, that was submitted for a General Conformity Determination with the Arizona State Implementation Plan in accordance with Clean Air Act Section 176(c)(1); 58 Federal Register 63214-63259; Title 40 Code of Federal Regulations Part 51, Subpart W §§ 51.850-51.860; Title 40 Code of Federal Regulations Part 93, Subpart B §§ 93.150-160; and Arizona Administrative Code R18-2-348 (approved into the Arizona State Implementation Plan April 23, 1999; effective June 22, 1999). The Air Quality Division has concluded that a General Conformity Determination is not required for the following reason(s):

☒ Not in a Nonattainment or Maintenance area

While the Estrella Sailport area is in an attainment area, it is near areas that have experienced PM10, 8-hour ozone and carbon monoxide problems in both Maricopa and Pinal counties, which may be affected by prevailing winds during the development, completion and operation of the proposed airport facility. It is important to consider that the general area is experiencing, and will continue to experience rapid population expansion for years to come and refer you to Executive Order 2007-03, Improving Air Quality, paragraph 6 (enclosed). To comply with other applicable air pollution control requirements and minimize adverse impacts on public health and welfare, the following additional information is provided:

REDUCE DISTURBANCE of PARTICULATE MATTER during CONSTRUCTION

This action, plan or activity may temporarily increase ambient particulate matter (dust) levels. Particulate matter 10 microns in size and smaller can penetrate the lungs of human beings and animals and is subject to a National Ambient Air Quality Standard (NAAQS) to protect public health and welfare. Particulate matter 2.5 microns in size and smaller is difficult for lungs to expel and has been linked to increases in death rates; heart attacks by disturbing heart rhythms and increasing plaque and clotting; respiratory infections; asthma attacks and cardiopulmonary obstructive disease (COPD) aggravation. It is also subject to a NAAQS.

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

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

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

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

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

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

Very truly yours,

Diane L. Arnst, Manager
Air Quality Planning Section

Enclosures

cc: Henry R. Darwin, EV Administrative Counsel
David A. Biddle, Environmental Program Specialist
File No. 176763

Janet Napolitano
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

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

Stephen A. Owens
Director

March 7, 2008

Ms. Angela Steele
Coffman Associates
237 N.W. Blue Parkway, Suite 100
Lee's Summit, MO 64063

Re: Environmental Screening for Preferred Airport Site, Maricopa, AZ

Dear Ms. Steele:

The Arizona Department of Environmental Quality (ADEQ) received your letter concerning environmental resources associated with or that may be affected by the selection of Estrella Sailport as a new general aviation airport to serve the City of Maricopa and western Pinal County. While it is somewhat difficult to comment on the proposal as little to no information has been provided about potential improvements at the Sailport, we offer the following general comments with respect to water quality and water resources.

ADEQ's Water Quality Division is responsible for permitting and certification decisions for proposed discharges to surface waters of the United States, under the federal Clean Water Act and to groundwater under the State aquifer protection program. A review of the site finds no perennial or intermittent surface waters in the immediate vicinity and no waters listed as impaired.

Should Estrella Sailport be selected as the general aviation airport, any additions or expansions to the airport that resulted in a discharge to waters of the U.S., would need to be permitted under the Arizona Pollutant Discharge Elimination System (AZPDES) program. Discharges that may be anticipated during the course of this project include stormwater runoff from disturbed areas during runway construction or the erection of buildings, hangars or equipment.

> Stormwater discharges associated with construction activities (clearing, grading, or excavating) which disturb one acre or more must obtain coverage under the AZPDES Construction Stormwater General Permit (AZG2003-001) which also requires development of a Stormwater Pollution Prevention Plan (SWPPP). Refer to the enclosed "Steps to Obtain Coverage" document for directions on how to file for permit coverage. The Construction Stormwater Permit, SWPPP checklist, and associated forms are available on ADEQ's website at: http://www.azdeq.gov/environ/water/permits/ stormwater.html#const. For questions on the Construction Stormwater program and permit coverage, please contact Shirley Conard at 602-771-4632 or by e-mail at sc4@azdeq.gov

There is no discussion of how wastewater will be handled. If an on-site wastewater treatment system (e.g., septic tank) will be installed, permits will likely be obtained from Pinal County Environmental Services Department, which has been delegated the review and issuance of certain general permits by ADEQ. If a wastewater treatment facility is anticipated, there would be additional permits and approvals needed including an individual Aquifer Protection Permit and a permit for the collection system. Once the details for treatment and disposal of wastewater have been further defined, please contact David Burchard at 602-771-4298 or by email at db2@azdeq.gov for further guidance.

Construction related to the project may require a CWA Section 404 Permit. If an individual 404 permit is required, the State will be asked to provide a CWA Section 401 water quality certification for the project. These conditions will be incorporated into the Section 404 permit to ensure that the permitted activities will not result in a violation of the State's surface water quality standards. For questions relating to CWA 401/404 please contact Bob Scalamera at 602-771-4502 or by e-mail at rs3@azdeq.gov.

Lastly, as the current Sailport borders the Gila River Indian Community, we would suggest you contact the tribe to solicit any questions or concerns they may have with the proposed project. Two possible contacts for the tribe are: Denzil Jones, Director of Public Works at Denzil.Jones@gric.sns.us or Glen Stark, Manager, Water Quality Program at stark@gilanet.net.

ADEQ appreciates the opportunity to provide these comments and we look forward to receiving notice of availability of the environmental assessment. Please contact the staff members noted above for the specific program or contact me directly at 602-771-4416 for further assistance.

Sincerely,

Linda Taunt, Deputy Director
Water Quality Division

Coffman Associates
Airport Consultants

February 20, 2008

Ms. Roxanne Runkel
Planning Technician
National Park Service, Intermountain Region
12795 West Alameda Parkway
P.O. Box 25287
Denver, CO 80225-0287

Dear Ms. Runkel:

The City of Maricopa, in cooperation with the Arizona Department of Transportation, has commissioned our firm to prepare an Airport Feasibility Study to provide a preliminary market analysis of the potential for a new general aviation airport to serve the City of Maricopa and western Pinal County.

The current phase of the study is to evaluate potential airport sites. The initial process of identifying candidate sites included the review of 14 potential sites. In order to determine the most desirable site for an airport, a variety of engineering factors (such as proximity and access, site layout and design, earthwork and drainage, airspace, obstructions, and navigational conditions) as well as environmental factors (such as property acquisition, physical resources, ecological resources, farmland resources, and historical and cultural resources) were analyzed.

Our initial screening study resulted in the selection of the existing Estrella Sailport as the most feasible site. The greatest advantages for this site are its location adjacent to the state highway, it is an existing (private) airport site, and most of it currently belongs to a single land owner, the Arizona State Land Department. In addition, the city has already considered this site as a potential airport site in its community planning.

The purpose of this correspondence is to solicit your comments regarding environmental resources and sensitivities potentially associated with, or affected by, the candidate site depicted on the enclosed exhibit. The candidate site is located on the United States Geologic Survey (USGS) Enid quadrangle topographic map within Township 4S and Range 2E. Your review and comment will be used to document resources which could affect the viability of this site.

Please forward any written comments to me by March 28, 2008, at the address on the letterhead. As another option, you may fax or e-mail your comments to me at:

FAX: (816) 524-2575
E-mail: asteele@coffmanassociates.com

If you have any questions or need additional information, you may contact me by e-mail or at (816) 524-3500. Thank you for your consideration and timely response.

Sincerely,

Angela Steele
Airport/Environmental Planner

Enclosures

C: Patrick Taylor, Coffman Associates

The National Park Service reviewed this project, and determined that no parks will be affected; therefore, we have no comments.

Signed: _____ Date: 3/19/08

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

February 26, 2008

Angela Steele
Coffman Associates
237 N. Blue Parkway, Suite 100
Lee's Summit, MO 64063

Re: Maricopa candidate airport site.

Dear Ms Steele:

The Arizona Game and Fish Department (Department) has reviewed your request, dated February 20, 2008, regarding environemental resources and sentivities associated with the above-referenced project area. The Department's Arizona On-Line Environmental Review Tool (Tool) has been accessed and current records indicate the presence of no special status species in the project vicinity (3-mile radius). There are, however, two Indian reservation within 3 miles of the site that may present cultural issues.

This information can now be provided to you almost instantaneously and is designed to replace the need for requests via writing by fax, mail, or email for most projects. The information is generated utilizing an interactive on-line tool, which can be accessed via the Internet at http://www.azgfd.gov/hgis/. The Tool allows you to submit land and water projects on-line by following a few simple steps.

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

Sincerely,

Daniel E. Nelson
Project Evaluation Program Specialist

Attachment

cc. Russ Haughey, Region 6

Angela M. Steele

From: djacobs@azstateparks.gov

Sent: Wednesday, March 19, 2008 7:14 PM

To: Angela M. Steele

Subject: airport feasibility study-Maricopa, Arizona

Angela-
The location of the existing Estrella Sailport has **not** been assessed for cultural resources. Its location on the landscape suggests it certainly should contain some archaeological sites; we do not have any tribal records for the tribal land, so all of the information about the land on the GRIC is tribal information and GRIC should be contacted. The archaeological surveys for Maricopa Road [for ADOT] and also the pipelines to the northwest of the proposed airport did not identify anything close to the proposed airport location. Of course, ASLD as a land owner will request a cultural resources assessment.
David Jacobs, Arizona State Historic Preservation Office

Angela M. Steele

From: AJ Blaha [AJ.Blaha@co.pinal.az.us]
Sent: Monday, March 03, 2008 6:03 PM
To: Angela M. Steele
Cc: Gregory Stanley; Jim Petty
Subject: City of Maricopa Airport Feasibility Study

Attachments: Pinalcounty2007v2.pdf

Pinalcounty2007v2.pdf (8 MB)

Ms. Steele,

Our director, Greg Stanley, sent me you letter requesting comments on the environmental resources and sensitivities potenially associated with the City of Maricopa's proposed airport location at the Estrella Sailport.

First, from a pilot's standpoint the site has several hazards to pilots in the form of three, large hill masses to the southwest, west, and northwest of the Runway 06 approach. These hills are approximately 5,000 feet to 6,000 feet MSL and from 0.5 to 1.0 miles from the end of the runway. They would pose a threat as they are well within the General Aviation pattern distance (0.5 to 1.0 miles) and above pattern altitude (2,300 feet MSL). The nearest hill mass to the west would restrict instrument approach minimums to Runway 06. There is another smaller hill mass to the southeast of similar height that could pose a problem although it is approximately 1.5 miles from the runway. However, this would be within jet pattern distances. The hill masses would also create irregular, swirling wind patterns in addition to up and down drafts (which is the reason for the choice of this location for a sailplane field).

In addition to these hazards to avigation, the area has mapped earth fissures as depicted on the attached Arizona Geological Survey map (Heaton area). These will create unstable soil conditions for the proposed airport. The nearby Casa Grande Municipal Airport is experiencing large cracks in the taxiways which continue to widened, and for which the asphalt pavement experts have been unable to determine the cause.

If we can be of any additional service please let us know.

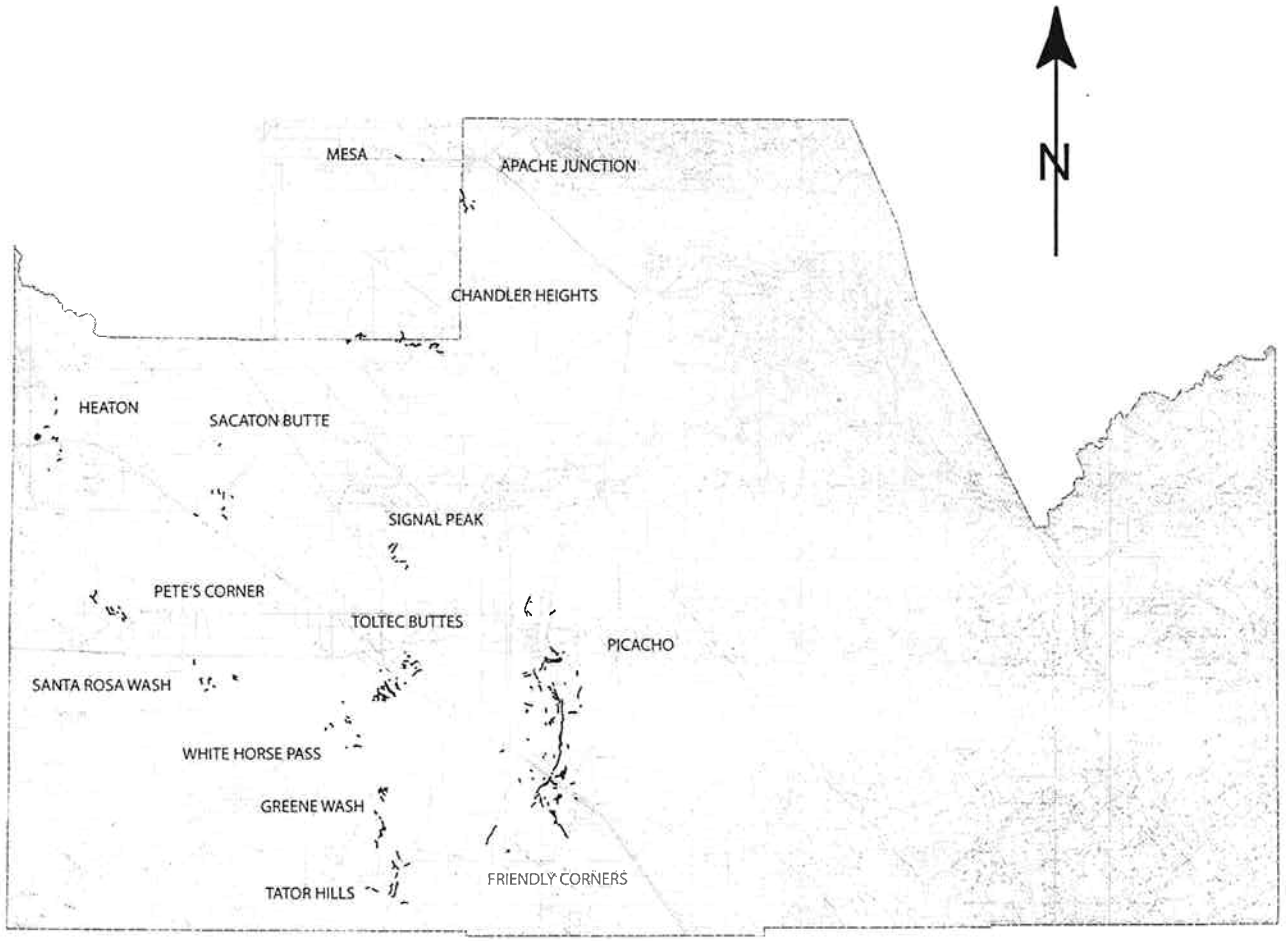
A. J. Blaha, P.E.
Deputy Director
Pinal County Department of Public Works
P.O. Box 727
Florence, Arizona 85232
Ph: 520-866-6411
Fax: 520-866-6325
aj.blaha@co.pinal.az.us

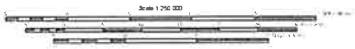
PINAL COUNTY, ARIZONA EARTH FISSURE PLANNING MAP

by Todd Shipman

Arizona Geological Survey Open File Report 07-01, version 1.0
June, 2007

Citation for this map: Shipman, T.C., 2007
Pinal County Earth Fissure Planning Map, Arizona:
Arizona Geological Survey Open File Report 07-01.v1,
Sheet 1, scale 1:250,000





This map identifies known or reported earth fissures and indicates study areas for detailed mapping of the fissures by the Arizona Geological Survey. A 1:250,000 USGS topographic base in the background, shows the topography and major physiographic features. Enlargement of this map image does not improve the 1:250,000 scale location accuracy of the mapped features. This map should not be used for site specific evaluation.

Study areas were identified based on three criteria; 1) potential for rapid development of communities; 2) the presence of known or reported fissures; and 3) areas where rapid land subsidence has been reported.

Map Index

Black lines on this map represent the approximate location of earth fissures as interpreted on air photos or by field reconnaissance. Many of the earth fissures have not been verified on the ground. The map is incomplete due to 1) masking of fissures by development and agriculture, 2) ongoing changes in fissure length and geometry, 3) the presence of incipient fissures that lack surface expression, and 4) the potential that photogeologically mapped features are incorrectly identified as earth fissures. A blank area on the map does not necessarily mean earth fissures are not present.

County Line Boundary

PICACHO — Names identify areas that will be systematically and sequentially mapped by the AZGS.

Topographic base from USGS 1:250,000 scale maps; Ajo, Phoenix, Mesa, and Tucson.
Contour interval 200 feet with supplementary contours at 100 foot intervals.

416 W. Congress Street, Suite 100
Tucson, AZ 85701
(520) 770-3500
www.azgs.az.gov

www.coffmanassociates.com

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(602) 993-6999

4835 E. Cactus Road
Suite 235
Scottsdale, AZ 85254