# SECTION 1:
# BACKGROUND AND INVENTORY

# GILA BEND MUNICIPAL AIRPORT
## AIRPORT MASTER PLAN 2003

### INTRODUCTION

The Gannett Fleming Airport Development Group was retained by the Town of Gila Bend, Arizona to prepare an updated Airport Master Plan for the Gila Bend Municipal Airport, including the development of an updated Airport Layout Plan (ALP) set. The Master Plan was last updated in 1996 by Gannett Fleming. The original Master Plan was prepared in 1981 by Gannett Fleming's predecessor firm, Ellis-Murphy, Inc., in association with James Vercellino, Aviation Consultant.

In the Master Plan study, analysis is made of the factors affecting the future development of the airport, and recommendations are presented which, when implemented, will assure that the airport will develop consistent with the demand placed upon it, and with the goals of the Town of Gila Bend.

The Master Plan study focuses on three major points:

- To provide recommendations for cost-effective maintenance, repair and rehabilitation of the existing airport infrastructure to assure a safe operating environment, and provide an attractive location for future aeronautical and business activity.

- To provide realistic recommendations for future airport improvements which will assure that the airport will accommodate its future demand, in terms of aviation safety and capacity as well as future growth.

- To identify realistic alternatives for future airport development.

The twenty year planning period of the Master Plan covers calendar years 2003 through 2023.

## PROJECT APPROACH - THE PAC PROCESS

The master planning process utilized the "Planning Advisory Committee" (or PAC) team approach. PAC team members are persons who are interested in the outcome of the airport planning process, and who are willing and able to commit the time and resources necessary to provide timely review of all information submitted by the Consultant.

The PAC member roster included representatives from a cross section of the community who will be affected by the outcome of the Master Plan. The Consultant team and representatives from the Federal Aviation Administration (FAA) and the ADOT-Aeronautics Division also served on the PAC team as non-voting, advisory members.

Review of the Master Plan documents by the PAC was undertaken on a progressive basis during the project term. Each PAC member began with an empty notebook (the PAC Workbook). As each phase of the Plan was completed by the Consultant, draft Working Papers were prepared and copies were distributed to each PAC member for review.

PAC meetings were scheduled at key points in the planning process in order to discuss and ultimately approve each planning element Working Paper, as submitted by the Consultant. The PAC members were individually responsible for timely review of the information, and for active participation in each PAC meeting.

As each progressive element of the planning document was completed by the Consultant team and approved by the PAC, it became a part of the PAC Workbook. When all elements of the work were completed, the PAC Workbook was approved as the final Master Plan.

## WORK OUTLINE

The project began with inventories and field investigation of the airport's existing facilities, as well as research of existing demographic, economic, and other record information. The background information was compiled to use as a basis for the planning work, layouts and projections. This information is presented in this section (Section 1, Introduction, Background & Inventory), along with relevant historical data.

The Consultant team then developed forecasts of aviation activity for the planning period. This is presented in Section 2, Forecasts of Aviation Activity.

A general schedule of recommended facility improvements was developed, based on the results of the forecast projections and on input from the PAC team. This is included in Section 3, Airport Facility Requirements.

The next phase of the work consists of the development of alternatives for future improvement of the airport. The alternatives analysis focused on extension of Runway 4/22 so that it can accommodate some larger business aircraft in the future (see Section 4, Development Alternatives).

A summary evaluation of the proposed development plan for potential environmental impacts is contained in Section 5, Environmental Factors.

After selection of an alternative for future development by the PAC, the general development recommendations were refined, and a schedule of estimated construction costs and an Airport Layout Plan (ALP) set were prepared. The ALP was submitted to the FAA for review and approval as the official planning document for future development at the Gila Bend Municipal Airport (see Section 6, Airport Layout Plan).

Section 7 of the Master Plan consists of a Financial Plan for the airport.

## HISTORICAL BACKGROUND

The Town of Gila Bend is located in Southwestern Maricopa County in South Central Arizona at an elevation of 735 feet MSL. The town site was a thriving Indian village for centuries before it was discovered by Spanish explorers led by Father Francisco Garces in 1774. The Town was established on an overland Butterfield stage route in 1871, and was incorporated on July 2, 1962.

During and following World War II, large scale agricultural activity dominated the economic pattern of the area. General aviation activity, which grew at a rather fast rate during the late 1940's and early 1950's, was an increasingly active segment in rural agricultural areas of Central Arizona. Crop dusting became a large scale activity. The Arizona Flying Farmers were a major factor in the growth of general aviation throughout the entire agricultural area of Central Arizona.

As aviation activity continued to increase in the region throughout the 1950's and early 1960's, it became obvious that a larger and better airport was needed to accommodate the aviation demand for Gila Bend and the surrounding area. Efforts were undertaken to locate a suitable site for airport development, acquire the land, and construct the airport.

Property for construction of the Gila Bend Municipal Airport was acquired under Section 16 of the *Federal Airport Aid Program* (FAAP), in 1965. Prior to acquisition of airport land, it was necessary to negotiate a land exchange between the State of Arizona and the federal government. This was necessary in order to obtain fee title under Section 16 at no cost to the Town of Gila Bend.

A grant in the amount of $368,420 was received from the Federal Aviation Administration (FAA) in November of 1965 for the construction of a runway, small parking apron, fencing and connector taxiway. This was accomplished under FAAP Project Number 9-02-038-01. Total project costs were $461,447.65. The Arizona Department of Aeronautics (now Arizona Department of Transportation - Aeronautics Division, or ADOT-Aeronautics) and the Town provided the supplemental funding.

In 1966, ADOT-Aeronautics purchased a low intensity lighting system for the airport, which was installed by the Town. An operations building (Terminal) and hangar buildings were constructed through the combined efforts of the Town and the Fixed Base Operator (FBO).

A grant was received from the FAA in December of 1975 to extend the runway from its initial length of 2,600 feet to 3,800 feet. Supplemental funding was

provided by ADOT-Aeronautics.

On April 12, 1979, the Town received a grant in the amount of $264,000 to overlay the runway, reconstruct and expand the aircraft parking apron, and acquire an easement for a Clear Zone (now termed a Runway Protection Zone, or RPZ). Supplemental funding was again provided by ADOT-Aeronautics.

In 1981, the first Airport Master Plan was funded by the FAA and ADOT-Aeronautics. Total project costs were $32,000.

Medium Intensity Runway Lights (MIRL) and a rotating beacon were installed in 1984 at a cost of $99,840. The FAA and ADOT-Aeronautics provided funding, with supplemental funding by the Town.

In 1986, the Town received a grant from ADOT-Aeronautics for pavement preservation on the runway, taxiway and apron. Total project costs were $185,100.

In 1992, a grant was received from the FAA and ADOT-Aeronautics for extension of the runway from 3,800 feet to its current length of 5,200 feet. The grant funded an Environmental Assessment as well as design and construction of the extension. Total cost of the project was $495,692.

In 1995, the Town received a grant from ADOT-Aeronautics for pavement preservation on the runway, taxiway and apron. Total project costs were $ 55,853.

The FAA provided a grant for an update of the Airport Master Plan in 1995. Total cost was $32,000. ADOT-Aeronautics and the Town provided supplemental funding.

The Town received a grant from the FAA and ADOT-Aeronautics in 1999 to complete the parallel taxiway and to add new taxiway guidance signs, taxiway lighting and a lighted supplemental wind cone. Total project costs were $677,457.

In 2001, the Town received a grant from ADOT-Aeronautics for pavement preservation on Runway 4/22 and all taxiways. The Town provided supplemental funding. Total project costs were $142,060.

In 2001, the Town received a grant from FAA and ADOT-Aeronautics for reconstruction of the aircraft parking apron. The Town provided supplemental funding. Total project costs were $417,354.

In 2001, The Town received a grant from FAA and ADOT-Aeronautics for an

update of the Airport Master Plan (this study). Supplemental funding was provided by the Town. Total project costs were $40,000.

The table on the following page is a chronological summary of the development of the Gila Bend Municipal Airport.

| CHRONOLOGY OF AIRPORT DEVELOPMENT<br>Gila Bend Municipal Airport 1965-2001 | | |
|---|---|---|
| **YEAR*** | **PROJECT** | **COST** |
| 1965 | Land acquisition, initial construction of Runway 4/22 (2,600' x 75'), parking apron, connector taxiway and fencing. | $461,447 |
| 1966 | Installation of Low Intensity Runway Lights (LIRL) | $10,000 |
| 1968 | Construct Terminal Building and hangars | $25,000 (estimated) |
| 1975 | Extend Runway 4/22 to 3,800' and expand Aircraft Parking Apron | $293,330 |
| 1979 | Overlay Runway 4/22, reconstruct and expand Aircraft Parking Apron, and acquire Clear Zone (RPZ) easement | $264,000 |
| 1981 | Prepare initial Airport Master Plan | $32,000 |
| 1984 | Install Medium Intensity Runway Lights (MIRL) and Rotating Beacon. Expand Aircraft Parking Apron and construct parallel taxiway. | $99,840 |
| 1986 | Pavement Preservation for Runway 4/22, Taxiway and Apron | $185,100 |
| 1992 | Extend Runway 4/22 to 5,200' and prepare Environmental Assessment. | $495,692 |
| 1995 | Pavement Preservation for Runway 4/22, Taxiway and Apron | $55,853 |
| 1995 | Update the Airport Master Plan | $32,000 |
| 1999 | Complete the Parallel Taxiway, Taxiway Guidance Signs, Taxiway Lighting, and Lighted Supplemental Wind Cone. | $677,457 |
| 2001 | Pavement Preservation for Runway 4/22 and Taxiways | $142,060 |
| 2001 | Reconstruct the Aircraft Parking Apron | $417,354 |
| 2001 | Update the Airport Master Plan (this study) | $40,000 |
| **TOTAL INVESTMENT (NOT CORRECTED FOR CURRENT VALUE):** | | **$3,231,133** |

* Indicates date of grant receipt.

## INVENTORY OF EXISTING AIRPORT FACILITIES

The following is an inventory of the existing airport's infrastructure as it exists at the time of preparation of this Airport Master Plan (updated September, 2003).

In the narrative, each existing feature of the airport has been assigned a general condition rating of "Good", "Fair", or "Poor". A facility rated as "Good" may be assumed to be substantially adequate throughout the 20-year time frame of this study, assuming only normal maintenance. A rating of "Fair" means that the item will probably require major upgrade or replacement at some time during the planning period, but is at least serviceable at the present time. A rating of "Poor" indicates that the item is not adequate for its intended use at the present time.

Recommendations for improvements to the airport facilities are included in Section 3 of this report (Airport Facility Requirements).

**General Pavement Condition:**

This section documents the condition of the airport's existing pavements as they were in September of 2003.

Two separate ratings have been assigned to each of the paved facilities. In each case, the condition of the actual supporting structure of the pavement section was rated separately from the surface characteristics. The condition of the pavements were determined by visual observations. No testing was performed as a part of this inventory.

In general, the airport's pavement structures are in Good condition. There were no major deformations observed that could be attributed to subgrade deficiencies or failures.

Pavement surface conditions (condition of the asphalt and PCC pavements) are in generally Good condition as a result of recent pavement preservation on the runway and taxiways, and reconstruction of the aircraft apron.

The various pavement sections, their construction dates, and condition are presented graphically on **Figure 1-1:** Existing Pavement Inventory Map, at the end of this section.

**Runway 4/22:**

The present runway is aligned to a true bearing of N 47E 25' E. This equates to a magnetic bearing of about 035E, based on the magnetic variation of -12E17.5' E (calculated for 2003 using the International Geomagnetic Reference Field). Runway numeric designation is based on approximate magnetic bearing, rounded to the nearest 10 degrees and reduced to two significant digits (035E rounded = 040E = 04). Therefore, the existing runway is referred to as “Runway 4/22”.

Runway 4/22 was originally constructed to a length of 2,600' in 1965 with 2" of AC over 6" of ABC. It was extended to 3,800' in 1975 using the same pavement section. The runway received a flush coat in 1986. The runway was overlaid with 2" of AC in 1979, and extended to its present length of 5,200' in 1992. The 1992 extension was also constructed using the 2" AC / 6" ABC pavement section. A seal coat was applied to the runway in 1995. The runway was crack sealed and slurry sealed in 2002.


Runway Looking West

The Runway 4/22 surface has been classified as being in generally Fair condition. Random sealed surface cracking is in evidence to varying degrees along the runway. Recent pavement preservation in the form of crack sealing and slurry sealing has addressed these surface deficiencies for the short term.

In terms of structural integrity, Runway 4/22 is sound and has been classified as Good.

The runway shoulders are relatively clear of vegetation. They are appropriately graded and maintained to assure adequate drainage. Some erosion was noted along the shoulders and around culverts.

**Parallel Taxiway A:**

Taxiway A, the parallel taxiway, was constructed in two phases. The section between connector Taxiways D and F was originally constructed in 1985, using a 2" AC / 6" ABC pavement section. It was completed in 1999 with construction of the sections between connector Taxiways B and D and Taxiways F and G. The 1999 sections used a pavement section of 3" AC over 4" of ABC over 6" of select subbase material. The 1985 section of the taxiway received a flush coat in 1986 and a seal coat in 1995. The entire length of Taxiway A received a slurry seal and crack seal in 2002. This recent pavement preservation addressed some of the surface deficiencies, such as surface cracking and oxidation, associated with the

1985 portion of taxiway between connectors D and F.

The surface condition of the 1985 section of Taxiway A is classified as Fair and the 1999 portions are considered to be in Good condition.

Taxiway A is structurally sound and has been classified as Good.

The taxiway shoulders are relatively clear of vegetation. They are appropriately graded and maintained to assure adequate drainage. However, some erosion was noted along the shoulders and around culverts.


Culvert Along Taxiway A

**Connector Taxiways (B through G):**

Taxiway B was constructed in 1999 using a pavement section of 3" AC over 4" of ABC over 6" of select subbase material. It received a slurry seal in 2002. Structure and surface are Good.

Taxiway C was constructed in 1985 with 2" of AC over 6" of ABC. It received a flush coat in 1986, a seal coat in 1995, and was crack sealed and slurry sealed in 2002.

Taxiway D was part of the original airport construction in 1965. Pavement section originally consisted of 2" of AC over 6" of ABC. The taxiway was overlaid with 2" of AC in 1979. It received a flush coat in 1986, a seal coat in 1995, and was crack sealed and slurry sealed in 2002.

Taxiways E and F were constructed in 1985 with 2" of AC over 6" of ABC. They received a flush coat in 1986, a seal coat in 1995, and were crack sealed and slurry sealed in 2002.

The structure of connector Taxiways C through F is Good, but surface is Fair. Random sealed surface cracking is in evidence to varying degrees along Taxiways C thru F. These connectors received a crack seal and slurry seal in 2002, which addressed most of the surface deficiencies for the short term.

Taxiway G was constructed in 1999 using a pavement section of 3" AC over 4" of ABC over 6" of select subbase material. It received a slurry seal in 2002. Structure and surface are Good.

**Aircraft Parking Apron:**


Aircraft Parking Apron

The existing Aircraft Parking Apron was originally constructed in four phases. The eastern most section was a part of the original 1965 airport development. It was built using a pavement section consisting of 2" of AC over 6" of ABC. The 1965 section was overlaid with 2" of AC in 1979, when the apron was also expanded toward the west. The 1979 section consisted of 2" of AC over 6" of ABC. The Apron was again expanded in 1985 using the same pavement section. The entire Apron was given a flush coat in 1986 and a seal coat in 1995. The Aircraft Parking Apron was completely reconstructed in 2002. The taxiway areas used a pavement section of 2" AC over 6" of ABC over compacted subbase material. Aircraft parking areas used a pavement section of 5" PCC over compacted subbase material. Structure and surface are Good.

**Airport Property Line Fencing:**

The existing property is enclosed with a 4-strand barbed wire fence with steel posts. Access to the property is through a vehicular gate at the north end of the Parking Apron. The fencing is in Fair to Poor condition. Approximately 1,250 linear feet of fence crosses the Runway Safety Area (RSA) of Runway 4. This constitutes a hazard according to FAA criteria and should be removed.

*Note: The Runway Protection Zones (RPZ's) for Runways 4 and 22 will be acquired under a future FAA grant. This will allow relocation of the existing fence that crosses the Runway 4 RSA. The town has applied for acquisition of this land from the Arizona State Land Department.*


Access Road Looking North

**Terminal Area Security Fencing:**

The original 4-strand barbed wire fence, which separated the Aircraft Parking area from Auto Parking area, has recently been replaced with a 4 ft. high tubular steel fence. The fence is in Good condition, however it does not provide the level of Terminal Area security that the F.A.A. prefers.

**Automobile Parking Area and Access Road:**

Access to the airfield is off of State Highway 85, by a gravel road at the north end

of the property. A gravel automobile parking area is located to the north of the Apron. The Access Road and Automobile Parking area are in Fair condition.

**Fuel System:**

The Gila Bend airport has been without a fuel system since the removal of its underground fuel storage tanks and pumps in 1997. The system was removed in order to comply with Arizona Department of Environmental Quality (ADEQ) standards. A used 2,000 gallon above ground tank and pump has been acquired by the Town. It is located on a concrete slab adjacent to the south edge of the Aircraft Parking Apron. The tank was previously used for diesel fuel and was partially filled with diesel fuel at the time of this study. It is not likely that the tank could be effectively purged and cleaned before being used for aviation fuel. It is not connected to electrical power at the present time. The system is considered to be in Poor condition, not usable for its intended purpose. A concrete fuel island was constructed on the aircraft apron in 2002 for future installation of an above-ground fuel system. Conduits for future electrical circuits to the fuel island were also installed.

**Hangar/Shade:**


Hangar/Shade

The existing Hangar/Shade is a 40' x 80' steel frame structure. One-half of this structure (40' x 40') has been enclosed as a hangar, with a steel bifold door and steel siding. The siding is of a nonstandard material salvaged from surplus military shelving. The remaining half of the structure (40' x 40') serves as a covered aircraft parking shade. The Hangar/Shade's structure is in Good condition. The nonstandard steel siding is in Poor condition, exhibiting rust and loose panels. The hangar door is in Fair condition. This structure is owned by the Town of Gila Bend.


Terminal Building & Beacon

**Terminal Building:**

The existing Terminal Building is a concrete masonry structure with a wood frame shingled roof. It has approximately 24' x 25' under roof, and includes a pilot lounge, the airport's electrical equipment vault, a store room, and two restrooms. The building structure is in Good condition. The roof has

missing shingles and is in Poor condition. Interior appurtenances are in Poor condition. This structure is owned by the Town of Gila Bend.

**Rotating Beacon and Tower:**

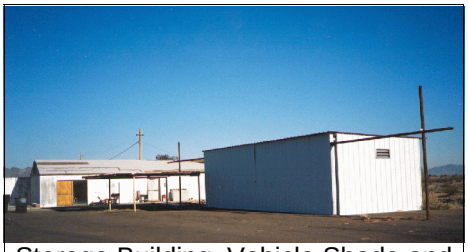
The airport Rotating Beacon is located on a steel frame tower adjacent to the Terminal Building. The tower is approximately 40 feet high. The Unicom antenna is also mounted on the tower. The tower, beacon and antenna are in Good condition.

**Storage Building:**

The Storage Building is a 24' x 40' wood frame structure located east of the Terminal Building at the northeast corner of the Aircraft Parking Apron. Its construction is not of standard materials and its structure appears to be in Poor condition. It is probable that this building could not be made to comply with current building codes. This structure is owned by the Town of Gila Bend.

**Private Hangar:**

A single privately owned hangar is located adjacent to the east edge of the Aircraft Parking Apron. This is a 38' wide by 30' deep "Tee" structure of steel frame construction, with corrugated steel siding and a sliding hangar door. The building is in Good condition.



Storage Building, Vehicle Shade and Private Hangar

**Vehicle Shade:**

A 20' x 20' vehicular parking shade is located immediately north of the Private Hangar. This structure is owned by the Town and is in Fair condition.

Airport Manager's Residence

**Airport Manager's Residence:**

The Airport Manager's Residence is a 12' x 60' mobile home, in Fair condition. This building is owned by the Town and is currently occupied by the airport caretaker.


The Airport Gazebo

**Gazebo:**

A small gazebo is located south of the Aircraft Parking Apron and north of Parallel Taxiway A. This structure is of nonstandard construction materials. It is built on a concrete slab. The slab is in Good condition, but the gazebo is in Poor condition.

**Lighting, Guidance Signage, Navigational and Visual Aids:**

Runway 4/22 is equipped with Medium Intensity Runway Lights (MIRL). All taxiways are equipped with Medium Intensity Taxiway Lights (MITL) and guidance signs. All fixtures are base-mounted and all wiring is installed in conduit. The MIRL/MITL system and Taxiway Guidance Signs are in Good condition.

Guidance Sign

A Very High Frequency (VHF) Omni Range/TACAN transmitter (VORTAC) is located on the airport property. The VORTAC is owned and operated by the FAA and is in Good condition.


Wind Cone & Segmented. Circle

**Wind Cone and Segmented Circle:**

The existing lighted wind cone and segmented circle are in Good condition.

**Utilities:**

The Terminal Building and Airport Manager's Residence use propane for heating. Water is furnished from a well and pressure pump on the airport property. The sanitary sewer system consists of a septic tank and leach field. Electricity is provided by APS, and telephone service is provided by Qwest (there is a public telephone at the Terminal Building). These facilities are in Good condition.

**Airport Drainage:**

A visual inspection of the existing airport storm drainage culverts and surface drainage features indicates that the system appears to be functional and in generally Good condition. However, some erosion was noted along the runway shoulders near the culverts.

**Established Airport Elevation:**

The established airport elevation is defined as the highest point on an airport's usable runway expressed in feet above mean sea level (MSL). The highest point on the airport's existing active runway is the threshold of Runway 22, at **781'** MSL.

**Airspace:**

The airspace surrounding the Gila Bend Municipal Airport is depicted in **Figure 1-2:** Gila Bend Municipal Airport - Existing Airspace System at the end of this section.

The airport is located directly north of the Gila Bend Air Force Auxiliary field and its Class D airspace, three extensive Restricted Areas (R-2301E, R-2305, and R-2304), and the Sells 1 Military Operations Area (MOA). Extensive military training activity is conducted within the Restricted Areas and the Sells MOA, and also on low-level military training routes that extend from these areas.

Civil aircraft utilizing the Gila Bend (GBN) VORTAC may be following the "Victor" airways that extend from the VORTAC facility. These include V 66 that runs west to Yuma and southest to Tucson (TUS) VORTAC, V 94-95 running east to Casa Grande's Stanfield (TFD) VORTAC, V 461 that runs north to the Buckeye (BXX) VORTAC, and V 94 that runs to the northwest and continues west to Blythe (BLH) VORTAC.

Although the Gila Bend airport is located in a fairly high density military training corridor, there are no significant airspace constraints that affect the airport's ability to function in its present role.

**Existing Airport and Adjacent Area Land Use:**

The entire airport property is used for aviation purposes. All land surrounding the airport property to the north, east and south is undeveloped State Trust Land. The land to the west is privately owned, undeveloped, and zoned for Light Industrial (I-1) use. The land upon which the airport managers residence is located is zoned for Residential (R-43) use. This R-43 zoned area extends northwest across Highway 85 and beyond.

## FAA AIRCRAFT AND AIRPORT CLASSIFICATIONS

The FAA classifies airports according to the type of aircraft they are able to accommodate. Airports that are designed to serve larger and/or faster aircraft are subject to different (stricter) design criteria than those that will serve only smaller aircraft. The various applicable design criteria are contained in FAA Advisory Circulars (AC's), as well as Federal Air Regulations (FAR's).

**Aircraft Classifications:**

Aircraft are grouped by the FAA by wingspan into six *Airplane Design Groups*, and by approach speed into four *Approach Categories*. The airport design criteria and dimensional standards for airport facilities are related to the Airplane Design Groups, Approach Categories, and type of approaches offered based on the minimum visibility required to legally execute an approach to landing, as follows:

- Visual;
- Instrument with visibility minimums of ¾ mile or greater;
- Instrument with visibility minimums less than ¾ mile.

The six Airplane Design Groups (ADG) and the five Aircraft Approach Categories are categorized in the tables on the following page.

**Airport Classifications**:

The FAA classifies airports by the type of traffic they experience, or are designed to accommodate. Each airport is assigned an *Airport Reference Code* (or *ARC*), which is a coding system used to relate airport design criteria to the operational and physical characteristics of the aircraft intended to operate at the airport.

The ARC is a two-component code. The first component, depicted by a letter between A and E, corresponds to the Aircraft Approach Category of the design aircraft for that airport (see the table above). The second component, depicted by a Roman numeral between I and VI, corresponds to the Airplane Design Group (ADG) of the design aircraft (see the tables on Page 1-17).

**Present Role of the Gila Bend Municipal Airport:**

Based on a comparison between the design criteria contained in FAA Advisory Circular AC 150/5300-13 and the existing airport facilities, the Gila Bend Municipal

Airport is presently able to accommodate small aircraft (less than 12,500 pound takeoff weights), up to Approach Category B (less than 121 knot approach speeds), and Airplane Design Group II (wingspan less than 79 feet). An ARC B-II reference code is indicated as the airport's present role.

**FAA Airplane Design Groups (ADG's)**

| | |
|---|---|
| **ADG I** | Wingspan up to but not including 49' (ie. Cessna 210, Piper Cheyenne). |
| **ADG II** | Wingspan from 49', up to but not including 79' (ie. Cessna Citation II). |
| **ADG III** | Wingspan from 79', up to but not including 118' (ie. Boeing 737). |
| **ADG IV** | Wingspan from 118', up to but not including 171' (ie. Boeing 707). |
| **ADG V** | Wingspan from 171', up to but not including 197' (ie. Boeing 747). |
| **ADG VI** | Wingspan from 197', up to but not including 262' (ie. Lockheed C-5A). |

**FAA Aircraft Approach Categories**

| | |
|---|---|
| **Category A** | Approach speed less than 91 knots (ie. Cessna 182, Beechcraft Bonanza). |
| **Category B** | Approach speed 91 knots or more but less than 121 knots (ie. Piper Cheyenne, Cessna Citation). |
| **Category C** | Approach speed 121 knots or more but less than 141 knots (ie. Learjet 25, Rockwell Sabre 75A). |
| **Category D** | Approach speed 141 knots or more but less than 166 knots (ie. Learjet 35A, Grumman Gulfstream II). |
| **Category E** | Approach speed 166 knots or more (pertains only to military types). |

Source: FAA AC 150/5300-13

## WIND AND WEATHER DATA

**Wind Analysis**:

The overall operational safety of an airport is affected by the direction of its runways in relationship to the prevailing wind. In general terms, smaller aircraft are affected more by wind, although wind conditions will affect operation of any aircraft to some degree. Crosswinds are often a contributing factor in light aircraft accidents. Therefore, orientation of the runway such that it is aligned with the prevailing wind for the greatest percentage of the time will add substantially to the safety and usefulness of an airport.

The *crosswind component* of wind direction and velocity is defined as the resultant vector which acts at right angles to the runway centerline, and is equal to the wind velocity multiplied by the sine of the angle between the wind direction and the runway direction.

*Wind coverage* is defined as the percentage of the time that the crosswind components are below an acceptable velocity, considered on an annual basis. These acceptable velocities vary with the airport's design Airport Reference Code (ARC), as follows:

**Acceptable Crosswind Components for Various Airport Reference Codes (ARC)**

| | |
|---|---|
| ARC A-IV through D-VI | 20.0 knots |
| ARC A-III, B-III, and C-I through D-III | 16.0 knots |
| ARC A-II and B-II | 13.0 knots |
| ARC A-I and B-I | 10.5 knots |

Source: FAA AC 150/5300-13, Appendix 1

The most desirable runway orientation based on wind is the one which has the greatest wind coverage. The FAA recommends a minimum wind coverage of 95%. If a single runway cannot meet this criteria, a crosswind runway is recommended, aligned such that the total combined wind coverage for the two runways will be at least 95%.

No wind record information for the Gila Bend Municipal Airport site is available. In order to analyze the site for wind coverage, a search for nearby wind record data was made. The National Climatic Data Center in Asheville, North Carolina was contacted to determine the nearest official wind data collection center. The nearest official station is the Phoenix Sky Harbor Airport, some 60 miles to the east. Because of the significant topographic changes that occur between the Phoenix metropolitan area and Gila Bend, it was determined that the Phoenix wind data is probably not applicable to the Gila Bend airport site.

A search of Internet sources and the consultant's records of prior planning work in the area was made to attempt to secure any available wind data from un unofficial station (that is, a station that is not providing data to the National Climatic Data Center). The previous Master Plan update, completed in 1996, utilized wind data collected by the Arizona Meteorological Network (AZMET) at its Paloma Ranch data collection site. The AZMET is operated by the University of Arizona Cooperative Extension. The Paloma Ranch site is located 11.3 miles west of Gila Bend Municipal Airport (32E55'36" N; 112E53'44" W). The site has been in operation since July 13, 1991.

The wind data records used in the 1996 Master Plan were hourly observations collected between July 13, 1991 and March 28, 1996. The AZMET data was converted to standard FAA data format and used with the FAA's Airport Design wind analysis software. The 1996 wind analysis indicated that the existing runway provides 98.58% crosswind coverage for the ARC B-II 13-knot threshold, well above the FAA's requirement of 95%.

Because this Master Plan update will not consider development of a new runway, or realignment of the existing runway, the 1996 analysis was accepted as representative of current conditions. However, the wind data analysis has been expanded to include preferred runway direction. The results of this analysis indicate that Runway 22 provides 57.67% coverage, and Runway 4 provides 40.91% coverage. This indicates that Runway 22 is usable more of the time, and may be the preferred runway for future instrument approaches.

The Gila Bend Municipal Airport's present design Airport Reference Code is ARC B-II. However, the airfield is used by a wide range of aircraft types, including those in the ARC A-I and B-I categories. There is a significant amount of training activity at the airport at the present time by light piston singles and twins in the ARC A-I category. Wind will potentially have the greatest effect on the safety of operations of these light aircraft. For this reason, the wind data analysis has been expanded to include the ARC A-I / B-I crosswind coverage threshold of 10.5 knots.

The results of the wind analysis are presented below.

## Gila Bend Municipal Airport
## Wind Data Analysis

| Runway Azimuth (True) | 13-Knot (15 mph) Wind Coverage | 10.5-Knot (12 mph) Wind Coverage |
|---|---|---|
| 04 . . . . . 47.42E | 40.91 % | 40.67 % |
| 22 . . . . . 227.42E | 57.67 % | 56.68 % |
| **04/22** Combined Coverage | **98.58 %** | **97.34 %** |

Wind Data Source: Records for Paloma Ranch AZMET site, July 13, 1991 through March 28, 1996.
(Calculations made using FAA Airport Design software)

**Weather:**

The following table is a summary of the average temperature and precipitation experienced in Gila Bend. The information is from the Arizona Department of Commerce's Community Profile - Gila Bend, Arizona, dated June , 2003.

The severe summer temperatures experienced at the airport makes it necessary to consider the effects that high ambient temperatures have on aircraft performance. Aircraft require longer takeoff runs at higher altitudes and at higher temperatures.
Because of the effect of gravity, air is less dense at higher altitudes. At an altitude of 18,000 feet the density of the air is half that of the air at sea level. Lift and drag vary directly with the density of air - as the air density increases, lift and drag increase; as the air density decreases, lift and drag decrease. If an airplane is to maintain its lift, the velocity of the air over the wings must be increased. An aircraft departing at an airport at a higher altitude will require a longer runway to attain flying speed.

Although Gila Bend is at a relatively low altitude (781' MSL), on a hot summer day a departing airplane will behave as if it is at a much higher altitude. Because air expands when heated, warm air is less dense than cool air. When other conditions remain the same, an airplane will require a longer takeoff run on a hot day than on a cool day. This contributes to the loss of lift, but also affects engine performance. Internal combustion engines produce less power at higher altitudes because they are operating in less dense air.

Propellers lose efficiency at high altitudes also, both because of engine power loss and because propellers are airfoils which suffer in the same manner as wings when operating in less dense air.

Density Altitude is the calculated altitude at which the aircraft would produce the same amount of lift and power, at standard temperature (59E F) and pressure (29.92"). For example, an aircraft departing a Sea Level airport when the air temperature is 80E F would perform as if it were at an altitude of 1,500' MSL at 59E F - a “Density Altitude” of 1,500'.

The following is an example of the increased runway length needed for a typical high-performance single engine propeller aircraft (a Piper PA-32-300 “Cherokee Six”) for takeoff run and climb to a 50 foot altitude as temperatures increase. The calculations are based on Gila Bend Municipal Airport’s elevation of 781' MSL, no wind and dry, paved runway conditions (note that the existing runway is 5,200' long).

**Approximate Runway Requirements**
**For a Piper PA-32-300**
**Operating at Gila Bend Municipal Airport**

| Temperature (E F) | Runway Length Required for Takeoff (Distance Over 50' Obstacle) |
|---|---|
| 70E | 1,810' |
| 80E | 1,940' |
| 90E | 2,080' |
| 100E | 2,235' |
| 110E | 2,400' |
| 120E | 2,590' |

In the above calculations, it was assumed that the airplane is operating at its maximum gross takeoff weight of 3,400 pounds.

After liftoff, climb performance suffers in a similar fashion. A minimum safe rate of climb after takeoff is about 400-500 feet per minute. A heavy or lower powered aircraft on a hot summer day may not be able to attain this rate, or any rate of climb at all after leaving ground effect. Any turns that are initiated after liftoff will further erode climb performance.

## General Weather Conditions at Gila Bend, Arizona

| Month | Average Temperature (EF) Daily Maximum | Daily Minimum | Average Total Precipitation |
|---|---|---|---|
| January | 67.8E | 37.5E | 0.62" |
| February | 73.3E | 40.3E | 0.44" |
| March | 78.0E | 44.6E | 0.65" |
| April | 87.5E | 51.3E | 0.30" |
| May | 96.6E | 59.3E | 0.10" |
| June | 104.8E | 66.7E | 0.04" |
| July | 109.1E | 77.1E | 0.76" |
| August | 106.8E | 76.3E | 1.08" |
| September | 103.1E | 69.0E | 0.50" |
| October | 92.3E | 57.3E | 0.33" |
| November | 77.9E | 45.3E | 0.35" |
| December | 69.4E | 38.6E | 0.59" |
| Year (Average) | 88.9E | 55.3E | 5.76" |

Source: Arizona Department of Commerce
Community Profile for Gila Bend, Arizona

## AREA DEMOGRAPHIC CHARACTERISTICS

### Airport Service Area:

FAA planning guidelines for airport siting indicate that a general aviation airport should be located no more than thirty minutes driving time from business, charter, and private aircraft users. This is a generally valid assumption, since from a financial standpoint the main advantage in flying is the savings in long distance travel time.

The actual service area of a general aviation facility may encompass an area somewhat less than the recommended thirty minute envelope. This is influenced by many factors; most notably the proximity of other airports which provide similar services.

A theoretical general aviation service area, representing the reasonable limit of travel for business, charter, and private users, has been established for the Gila Bend Municipal Airport. This is illustrated in **Figure 1-3:** Gila Bend Municipal Airport - Service Area Map at the end of this section. The service area boundary was determined by the application of a thirty minute driving time along existing highways, measured along the most direct route. The service area is truncated to the north at the midpoint between Gila Bend (FAA designator E63) and Buckeye Municipal Airport (BXX), along State Highway 85. It is similarly truncated to the east at the midpoint between Gila Bend and Casa Grande Municipal Airport (CZG), extending along Interstate Highway 8 to the Estrella Sailport (a limited-use facility with only a 2,500' long unlighted runway). The service area is truncated to the south along State Highway 85 at the midpoint between Gila Bend and the Ajo Municipal Airport (P01). The service area was extended to the west along Interstate 8 approximately 45 miles to a point just east of Dateland. This represents a driving time of approximately 40 minutes at 70 miles per hour. This extended service area is based on the fact that the nearest full service airport to the west is Yuma International Airport, 115 miles from Gila Bend.

The service area is approximately 1,200 square miles in land area, and encompasses the communities of Gila Bend, Theba, Sentinel, and Mobile, as well as the Gila Bend Indian Reservation and the Paloma Ranch. The Luke Air Force Base Gila Bend Auxiliary Field is within the service area, as well as the Paloma private airfield.

There is currently only one based aircraft at the Gila Bend Municipal Airport. The FAA Aircraft Registry indicates that there are 7 aircraft registered to owners who reside within the Gila Bend Zip Code (85337) area. Existing aircraft activity is discussed in detail in Section 2: Forecasts of Aviation Activity.

Service areas for airline operations may typically be much greater in area, and depend highly upon the level of carrier providing service at a specific location. The nearest location for air carrier service for the residents of Gila Bend is the Phoenix Sky Harbor International Airport, approximately 68 highway miles from Gila Bend.

**Service Area Population:**

The latest Arizona Department of Economic Security estimates of population for the incorporated Town of Gila Bend and the Gila Bend MPA (Municipal Population Area), Maricopa County, and the State of Arizona are presented below.

**State, County and Community Population**

| PLACE | POPULATION | | | | | |
|---|---|---|---|---|---|---|
| | 1990 | (1999) | 2000 | 2005 | 2010 | 2020 |
| Arizona | 3,679,056 | 4,778,332 | 5,130,632 | 5,553,849 | 6,145,108 | 7,363,604 |
| Maricopa County | 2,129,352 | 2,861,395 | 3,072,149 | 3,329,561 | 3,709,566 | 4,516,090 |
| Gila Bend MPA | | | 2,118 | 2,243 | 2,387 | 2,695 |
| Town of Gila Bend | 1,747 | 1,815 | 1,980 | 2,104* | 2,236* | 2,376* |

Source: Arizona Department of Economic Security
*Gannett Fleming population estimate

For the purposes of this study, the estimated population for the Gila Bend MPA will be used to represent the airport Service Area population. The estimated 2003 Service Area Population is 2,200 persons.

**Economic Indicators:**

The principal economic activity within the service area is agriculture. There are approximately 90,000 acres of land currently under cultivation in the Gila Bend area. Cotton heads the list of crops grown, along with alfalfa and grains.

The labor force in Gila Bend has grown from 763 in 1990 to 1,102 in 2002, and the unemployment rate increased from 7.9% to 9.5% within the same period (from

Arizona Department of Economic Security).

Taxable sales increased from $12.8 million in 1990 to $28.9 million in 2002 (from Arizona Department of Revenue).

The following table lists the estimated Per Capita Income for the State of Arizona, Maricopa County, and Gila Bend.

### State and County Per Capita Income Trends

| PLACE | PER CAPITA INCOME | |
|---|---|---|
| | 1990 | 2000 |
| Arizona | $17,187 | $24,988 |
| Maricopa County | $19,200 | $28,329 |
| Arizona Non-Metropolitan Portion | $12,575* | $17,768* |

Source: Arizona Department of Economic Security
* Bureau of Economic Analysis

For the purposes of this study, the Arizona Non-Metropolitan Portion per capita income will be used to represent the approximate per capita income for the airport Service Area. The 2003 Service Area per capita income is estimated to be $18,000.

**State Highway System AADT Volumes:**

The Arizona Department of Transportation compiles the AADT (Average Annual Daily Traffic) traffic data on an annual basis for the state highway system. The summary data is published on the ADOT Internet web site. The following is a summary of the average daily traffic volumes observed by ADOT on the highways serving the Gila Bend area.

## State Highway System AADT Volumes for Gila Bend Area

| Route | From | To | AADT Traffic Volumes | | | | Annual % Change |
|---|---|---|---|---|---|---|---|
| | | | 1998 | 1999 | 2000 | 2001 | |
| SR 85 | Gila Bend | I-8 Exit 116 | 2,278 | 2,455 | 2,546 | 2,651 | 5.20% |
| SR 85 | I-8 Exit 116 | Gila Bend AF Entrance | 1,990 | 2,144 | 2,223 | 2,316 | 5.20% |
| SR 85 | Buckeye | Gila Bend | 9,203 | 9,921 | 10,287 | 10,715 | 5.22% |
| I-8 | I-8 Exit 111 | I-8 Exit 115 | 7,988 | 8,221 | 8,524 | 9,358 | 5.46% |
| I-8 | I-8 Exit 115 | I-8 Exit 116 | 3,724 | 3,631 | 3,765 | 3,808 | 0.80% |
| I-8 | I-8 Exit 116 | I-8 Exit 119 | 4,511 | 5,000 | 5,185 | 4,479 | 0.31% |
| I-8 (BUS) | I-8 Exit 115 | SR 85 South | 4,420 | 4,607 | 4,777 | 5,134 | 5.13% |
| I-8 (BUS) | SR 85 South | SR 85 North | 6,203 | 6,464 | 6,703 | 7,768 | 7.93% |
| I-8 (BUS) | SR 85 North | I-8 Exit 119 | 2,650 | 2,762 | 2,864 | 3,035 | 4.63% |
| TOTAL VOLUME IN AREA: | | | 42,967 | 45,205 | 46,874 | 49,264 | 4.67% |

Source: ADOT AADT Web Site