City of Casa Grande

AIRPORT LAYOUT PLAN UPDATE & NARRATIVE REPORT

Final Report

CASA GRANDE MUNICIPAL AIRPORT

CASA GRANDE, ARIZONA | SEPTEMBER 2015

ARMSTRONG

Casa Grande Municipal Airport

Airport Layout Plan Update and Narrative Report

Prepared for

City of Casa Grande, Arizona

By

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CHAPTER ONE

INVENTORY OF EXISTING AIRPORT CONDITIONS AND FACILITIES

CITY OF CASA GRANDE
PINAL COUNTY, ARIZONA
AIRPORT LAYOUT PLAN UPDATE AND NARRATIVE REPORT

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Chapter 1 - Inventory of Existing Airport Conditions and Facilities

1.1 Introduction

An Airport Layout Plan (ALP) Update, with a Narrative Report, has been prepared for the Casa Grande Municipal Airport (Airport) at the request of the City of Casa Grande in order to address key issues, objectives, and goals pertinent to the Airport's development over the next five to 20 years. Elements contained herein include an inventory of existing airport conditions and facilities, forecasts of aviation demand, facility requirements and development plans, a financial plan, and selected ALP drawings. Input from the City of Casa Grande staff and airport personnel, airport users, the Federal Aviation Administration (FAA), the Arizona Department of Transportation Aeronautics Group (ADOT), and various others with interest in the airport was gathered and processed during the preparation of this ALP Update and Narrative Report.

The Narrative Report and ALP drawings have been prepared in accordance with FAA Advisory Circular (AC) 150/5300-13A, Airport Design, Title 14, Code of Federal Regulations (14 CFR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*, FAA ALP Checklist, and other related regulations and ACs. The methodology and rationale for the proposed improvements are included in this report and are depicted on the ALP drawings. Once approved by the FAA, this ALP will supersede the current ALP approved by the FAA in 1997.

1.2 Airport Role and Location

Since 1970, the Federal Aviation Administration (FAA) has classified a subset of the 5,400 public-use airports in the United States as vital to serving the public needs for air transportation, either directly or indirectly, and therefore may be made eligible for federal funding to maintain their facilities. These airports are classified within the National Plan of Integrated Airport Systems (NPIAS), where the airport service role reflects the type of public use the airport provides. The role also reflects the funding categories established by Congress to assist in airport development.

The current NPIAS has categorized Casa Grande Municipal Airport as a general aviation (GA) local/basic airport. The local/basic category describes airports that support local communities by providing access to local and regional markets and have moderate levels of activity with multi-engine propeller activity.

Likewise, the Arizona State Aviation System Plan (SASP) also classifies airports into service roles. Casa Grande Municipal Airport is categorized as a GA community airport. The SASP defines GA community airports as airports that serve regional economies, which in turn connects state and national economies. They also serve all types of general aviation aircraft. The SASP further defines a regional economy as the economic activity of an area that encompasses multiple communities or political jurisdictions.

Both the NPIAS and Arizona SASP classifications generally represent the role Casa Grande Municipal Airport plays in the local and regional community. The majority of the aircraft utilizing the Airport are single-engine and multi-engine piston aircraft; other prominent aircraft include turbo prop, light turbo jet, and rotorcraft aircraft. However, larger corporate jet aircraft (turbo fan and turbo jet) utilize the airport on occasion for business related activities.

Casa Grande Municipal Airport (CGZ) is located in the city of Casa Grande, Arizona, southwest of Interstate 10 and west of Arizona Highway 387 in Pinal County. Casa Grande is approximately 45 miles southeast of downtown Phoenix and approximately 73 miles northwest of downtown Tucson. The Airport is owned and operated by the City of Casa Grande. It is four miles north of downtown Casa Grande, and situated on 640 acres of land at an elevation of 1,464 feet above mean sea level (MSL). **Figure 1-1** depicts the geographic location of the Airport.

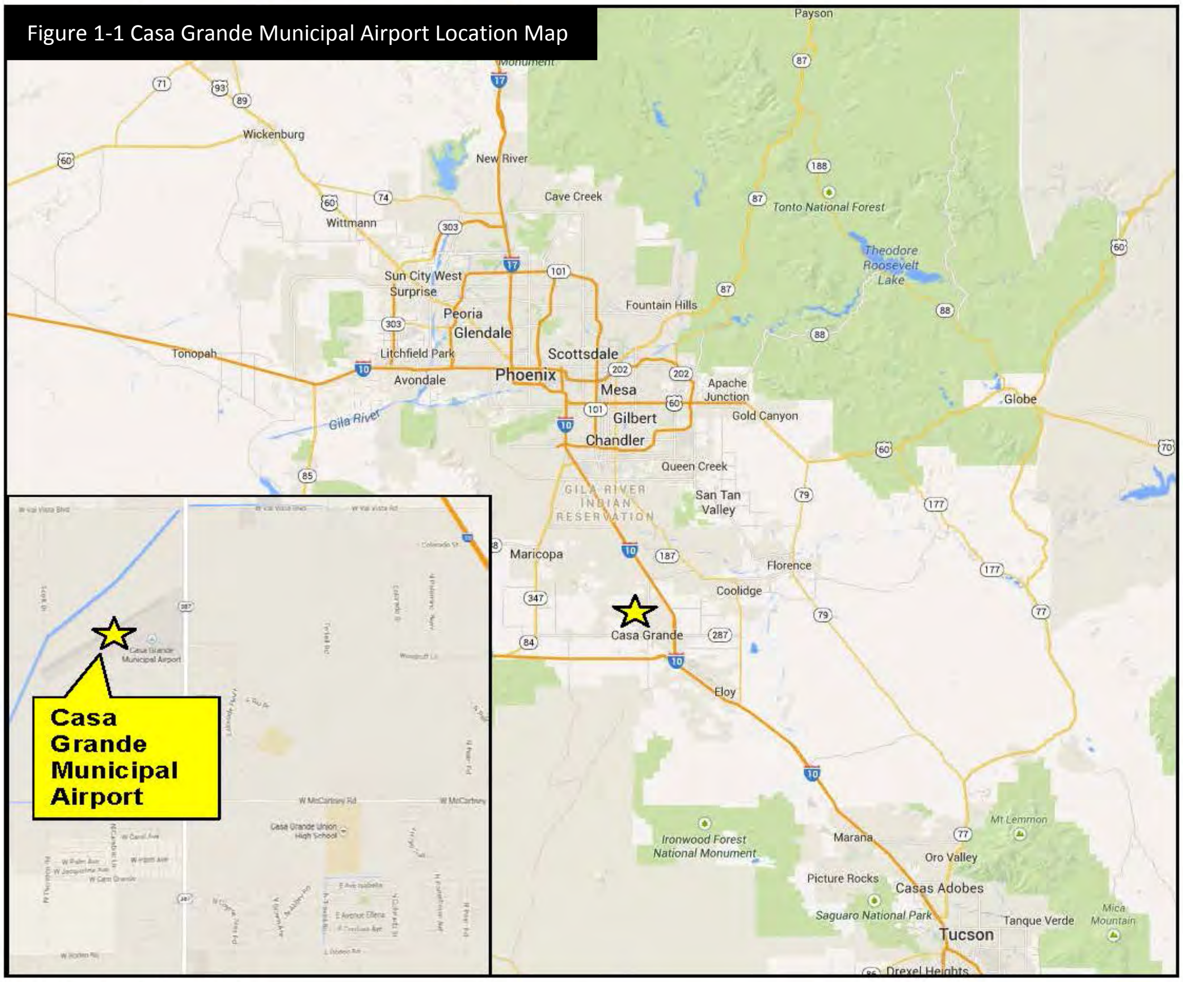


Figure 1-1 Casa Grande Municipal Airport Location Map

Source: Google Maps, 2014
Note: Outline denoting airport location may not depict actual Airport Property Line

1.3 Compatible Land Use

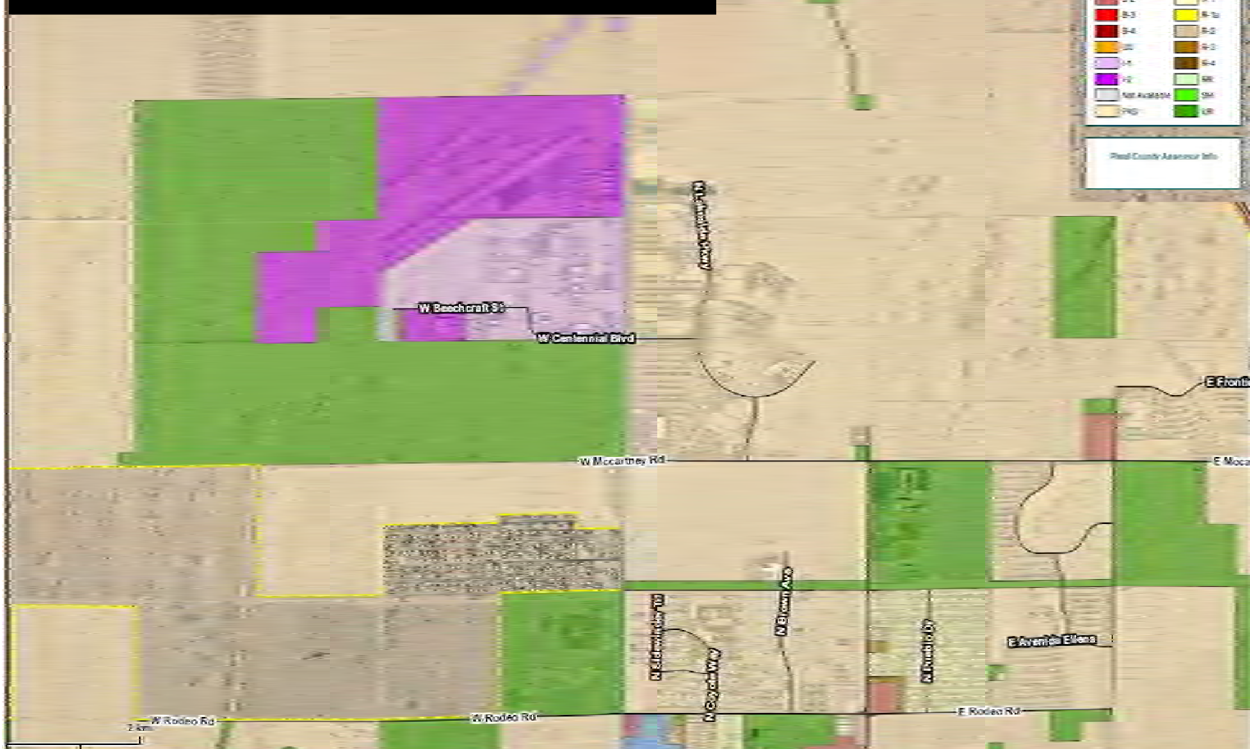
Land use compatibility conflicts are a common problem around many airports, including smaller general aviation facilities. In urban areas, as well as some rural settings, airport owners find that essential expansion to meet the demands of airport traffic is difficult to achieve due to the nearby development of incompatible land uses. Conflicts may also exist in the protection of runway approach/departure and transition zones; adequate land for this use should be either owned in fee or controlled through easements to ensure the safety of both the flying public and the adjacent property owners. In order to avoid land use compatibility conflicts around airports, it is important that the airport and adjacent property be adequately zoned for the types of activities usually associated with an airport.

The City of Casa Grande's Planning Division, within the Planning and Development Department, is responsible for the zoning districts found within city limits. The purpose of zoning is to guide the development of land in accordance with the City's General Plan, and to promote the public health, safety, and general welfare of the City's residents. Zoning districts specify permitted land uses, minimum lot sizes, and certain site development standards. There are 17 individual zoning districts found within the City of Casa Grande.

According to the zoning map found on the City of Casa Grande's Website, the entire Airport property is zoned General Industrial (I-2). The land surrounding the airport has several different zoning classifications: these include Garden and Light Industrial (I-1) to the south and a small narrow portion to the north, Urban Ranch (UR) directly to the west and south of the I-1 zone, and finally Planned Area Development (PAD) for the remaining land adjacent to the airport to the north and east, and eventually again to the south and west. **Figure 1-2** illustrates the various zoning districts described above.

The Planned Area Development procedures and regulations are an alternative to conventional zoning and development approaches and processes created to enhance the City's development growth in order that the public health, safety, and general welfare are preserved as Casa Grande increasingly urbanizes. According to the Planning Division, the PAD zone will "encourage a more creative approach in the utilization of land in order to accomplish a more efficient, aesthetic, and desirable development which may be characterized by special features of the geography, topography, size or shape of a particular property, and to provide a compatible and stable developed environment, in harmony with that of the surrounding area." Given that the Airport is adjacent to areas designated as PAD, it will be important for airport management to monitor the development in these areas and actively promote land use that is compatible with airports.

Figure 1-2 Casa Grande Municipal Airport Zoning District Map



Source: City of Casa Grande (2015)

Airport noise often is associated with land use compatibility issues; or rather, it can be a detrimental side effect of the lack of proper land use planning around airports. That is why zoning, land acquisition, and building codes, amongst other things, are essential around airports, even general aviation airports such as Casa Grande Municipal. To some, airport and aircraft noise will always be a nuisance. However, an airport can react proactively to this way of thinking by initiating voluntary measures to reduce aircraft noise to the greatest extents possible on and around the airport, or at least attempt to alter the times of day aircraft operate in and out of the airport. This "good neighbor" effort is usually published by the airport sponsor as voluntary noise abatement procedures. Casa Grande Municipal Airport currently has voluntary procedures in place to help mitigate aircraft noise; these procedures were developed for the airport in 2009. The recommended noise abatement procedures and map can be found in **Appendix E**.

1.4 Evaluation of Existing Documents

The previous Airport Master Plan (AMP) was completed by Coffman Associates in 2009. The AMP inventoried existing conditions, prepared aviation demand forecasts of future activity, and presented a plan for the future development of new and expanded facilities to meet anticipated future demand for the 20 year planning period.

The projects summarized in **Table 1-1** were included in the 20 year Capital Improvement Program (CIP) for the 2009 Airport Master Plan. The projects were reviewed to identity those which have been completed (noted in the table). The previously recommended improvements which have not been implemented will be revisited and carried forward if they remain valid based on the updated assessment of facility needs.

Table 1-1 Status of 2009 Airport Master Plan Projects

Completed Yes/No	Projects
	Short Term (2009-2013)
No	Acquire 213 Acres
No	Construct 2 Shade Hangars
No	Realign Drainage Canal
No	Construct Helicopter Parking Apron
No	Expand Terminal Parking Lot
Yes	Expand West Apron (11,000 sy)
No	Construct Airport Perimeter Service Road
No	Construct Aircraft Wash Rack
No	Construct Taxilane
No	Extend Runway 5/23 3,850'/Shift Runway 23 Threshold 650'
No	Relocate MALSR
No	Relocate Taxiway B 415' from Runway Centerline
	Medium Term (2014-2018)
No	Construct Taxiway to North Landside Development Area
No	Construct 11,700 sy Apron
No	Construct North Side Access Road and Parking Lot

Table 1-1 Status of 2009 Airport Master Plan Projects (Contd.)

No	Construct Airport Traffic Control Tower
No	Relocate Segmented Circle/Lighted Wind Cone
No	Construct 16,500 sy Apron
No	Construct Parallel Runway 3,800 feet
No	Construct Parallel Taxiway A 3,800 feet
No	Pavement Maintenance
	Long Term (2019-2029)
No	Strengthen Runway 5/23 and Taxiway B to 74,000 lbs. (dual wheel)
No	Construct Two High-Speed Taxiways
No	Construct One Right-Angled Exit Taxiway
No	Construct Parallel Taxiway C 3,800 feet
No	Construct 16,700 sy Apron
No	Expand North Automobile Parking Lot
No	Pavement Maintenance

Source: Casa Grande Municipal Airport Master Plan, 2009

1.5 Existing Airside Facilitity Inventory

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

1.5.1 Design Standards

Airport design standards provide basic guidelines for a safe, efficient, and economic airport system. The standards cover the wide range of size and performance characteristics of aircraft that are anticipated to use an airport. Various elements of airport infrastructure and their functions are also covered by these standards. Choosing the correct aircraft characteristics for which the airport will be designed needs to be done carefully so that future requirements for larger and more demanding aircraft are taken into consideration, while at the same time remaining mindful that designing for large aircraft that may never serve the airport is not economical.

According to FAA Advisory Circular 150/5300-13A, *Airport Design*, planning a new airport or improvement to an existing airport requires the selection of one or more “design aircraft.” In most cases, the design aircraft (for the purpose of airport geometric design) is a composite aircraft representing a collection of aircraft classified by the parameters:

- Aircraft Approach Category (AAC)
- Airplane Design Group (ADG)
- Taxiway Design Group (TDG)

For the purpose of selecting a design aircraft, the FAA recommends that the most demanding aircraft, or family of aircraft, which conducts at least 500 operations per year at the airport be chosen as the design aircraft. Additionally, when an airport has more than one active runway, a design aircraft is selected for each runway. The previous airport master plan recommended the Cessna Citation 550 be considered for future development at the Airport which has an Aircraft Approach Category (AAC) B and Airplane Design Group (ADG) II. Based on a review of the currrent operations at the Airport, the Cessna Citation 550 appears to be the appropraite design aircraft for the planning period.

1.5.1 - 1 Runway Design Code (RDC)

To arrive at the RDC, the AAC, ADG, and approach visibility minimums are combined to form the RDC of a particular runway. The RDC provides the information needed to determine certain design standards that apply. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the ADG and relates to the aircraft wingspan or tail height (physical characteristics). The final component relates to the visibility minimums expressed by runway visual range (RVR) values in feet of 1,200, 1,600, 2,400, 4,000, and 5,000. If a runway is only used for visual approaches, the term "VIS" should appear as the third component. The existing RDC for Runway 5 is B-II/4000, and the existing RDC for Runway 23 is B-II/VIS. The FAA AC 150/5300-13A, *Airport Design*, RDC requirements are depicted in **Table 1-2**.

Table 1-2 Runway Design Code Components

Aircraft Approach Category	Approach Speed
A	<91 knots
B	>91 knots but <121 knots
C	>121 knots but <141 knots
D	>141 knots but <166 knots
E	166 knots or greater

Airplane Design Group	Wingspan (ft.)	Tail Height (ft.)
I	< 49'	< 20'
II	49' - < 79'	20' - < 30'
III	79' - < 118'	30' - < 45'
IV	118' - < 171'	45' - < 60'
V	171' - < 214'	60' - < 66'
VI	214' - < 262'	66' - < 80'

Runway Visual Range (ft.)	Flight Visibility Category (statue mile)
VIS	Visual approach only
5,000	Not lower than 1 mile
4,000	Lower than 1 mile but not lower than ¾ mile
2,400	Lower than ¾ mile but not lower than ½ (CAT – I PA)
1,600	Lower than ½ mile but not lower than ¼ mile (CAT – II PA)
1,200	Lower than ¼ mile (CAT – III PA)

Source: FAA Advisory Circular 150/5300-13A, *Airport Design*, 2014

1.5.1 - 2 Airport Reference Code (ARC)

The ARC is not a design standard, rather it is an airport designation that signifies the airport's highest Runway Design Code (RDC), minus the third (visibility) component of the RDC. The ARC is used for planning purposes only, and does not limit the aircraft that may be able to operate safely on the airport. According to the previous airport master plan, the current ARC for the Airport is B-II.

1.5.2 Existing Runway and Visual/Navigational Aids

The existing Runway 5-23 is 5,200 feet long and 100 feet wide and oriented in a southwest/northeast direction. According to the 2009 Airport Master Plan, the runway is constructed of asphalt and has a reported pavement strength of 18,500 pounds single-wheel and 65,000 pounds dual-wheel aircraft landing gear loading. Runway 5 has precision pavement markings, while Runway 23 has non-precision pavement markings. The runway pavement markings appear to be in good condtion.

Visual and navigational aids in include an Instrument Landing System (ILS) to Runway 5, and a Medium-Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) to Runway 5. The runway also has Precision Approach Path Indicators (PAPI's) at both ends. The Airport also has a lighted wind cone and segmented circle located centerfield, north of the runway. **Table 1-3** summarizes the existing runway data.

Table 1-3 Summary of Runway Data

Runway Design Code (RDC)	**R/W 5**: B-II/4000 **R/W 23**: B-II/VIS
Length (feet)	5,200
Width (feet)	100
Effective Runway Gradient	0.4%
Surface /Condition	Asphalt/Excellent
Load Bearing Capacity (lbs.)	18,500 SWG/65,000 DWG[1]
Runway Marking	**R/W 5:** Precision Instrument **R/W 23:** Non-precision Threshold end bars, threshold markings, centerline stripe, aiming point markings
Runway Lighting	Edge: Medium Intensity Runway Lighting (MIRL)
Visual Aids	**R/W 5-23:** Precision Approach Path Indicators (PAPI-2 light)- 3.0 degree glide path **R/W 5:** Medium-Intensity Approach Lighting System (MALSR)
Navigational Aids	**R/W 5:** ILS, GPS, VOR/DME

Note. [1] ADOT PCN report indicates the pavement strength equals approximately 6,200 pounds single wheel gear loading as of October 2014.
Source: ACI, 2015

1.5.3 Existing Taxiway System

The TDG design standards are based on the overall main gear width (MGW) and the cockpit-to-main gear (CMG) distance. Taxiway/taxilane width and fillet standards, and in some instances, runway to taxiway and taxiway/taxilane separation requirements, are determined by the TDG. The FAA advises that it is appropriate for a series of taxiways on an airport to be built to a different TDG standards based on anticipated use.

For airports with two or more active runways, it is advisable to design all airport elements to meet the requirements of the most demanding RDC and Taxiway Design Group (TDG). However, it may be more practical and economical to design some airport elements such as a secondary runway to standards associated with a lesser demanding RDC and TDG. For example, it would not be prudent for an air carrier airport that has a separate general aviation runway, or a crosswind runway for general aviation traffic, to design that runway for air carrier traffic.

The existing taxiway system at the Airport consists of:

Taxiway A:

- Entrance taxiway to Runway 23
- Width: 40 feet
- Edge lighting: Medium Intensity Taxiway Lighting (MITL)

Taxiway B:

- Parallel taxiway
- Width: 40 feet
- Edge lighting: MITL

Taxiway D:

- Exit taxiway
- Width: 30 feet
- Edge lighting: MITL

Taxiway E:

- High speed exit taxiway
- Width: 30 feet
- Edge lighting: MITL

Taxiway F:

- Entrance taxiway to Runway 5
- Width: 40 feet
- Edge lighting: MITL

1.5.4 Existing Aircraft Parking Aprons

The aircraft parking aprons at the Airport consist of a terminal apron north and west of the existing passenger terminal building. The apron is approximately 40,000 square yards and includes 48 fixed wing aircraft tie-downs and a helicopter parking pad. The west apron is adjacent to the terminal apron and is approximately 38,000 square yards. The apron has 56 fixed wing aircraft tie-downs. In 2013, the west apron was expanded by approximately 11,000 square yards for future aircraft t-hangars to be constructed. All of the aircraft parking aprons are constructed of asphalt.

1.5.5 Pavement Condition Index (PCI)

According to the Arizona Department of Transportation (ADOT), the airport system in Arizona is a multimillion dollar investment of public and private funds that must be protected and preserved. The Arizona Pavement Preservation Program (APPP) has been established to assist in the preservation of the

Arizona airport system infrastructure. Every year ADOT's Multi-Modal Planning Divison (MPD) - Aeronautics Group, using the Airport Pavement Management System (APMS), identifies airport pavement maintenance projects eligible for funding for the upcoming five years. These projects will appear in the state's Five-Year Airport Improvement 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 APPP, or the airport sponsor may sign an inter-government agreement (IGA) with the Aeronautics Group to participate in the APPP.

Pavement defects are characterized in terms of type of distress, severity level of distress, and amount of distress. This information is then used to develop a composite index (PCI number) that represents the overall condition of the pavement in numerical terms, ranging from 0 (failed) to 100 (excellent). The PCI scale is visually depicted in **Figure 1-3**. In general terms, pavements above a PCI of 85 that are not exhibiting significant load-related distress will benefit from routine maintenance actions, such as periodic crack sealing or patching. Pavements with a PCI of 56 (65 for PCC pavements) to 85 may require pavement preservation, such as a surface treatment, thin overlay, or PCC joint resealing. Often, when the PCI is 55 or less, major rehabilitation, such as a thick overlay or reconstruction, are the only viable alternatives due to the substantial damage to the pavement structure.

Figure 1-4 depicts the 2013 PCI inspection for Casa Grande Municipal Airport. **Table 1-4** details the existing pavement at the Airport.

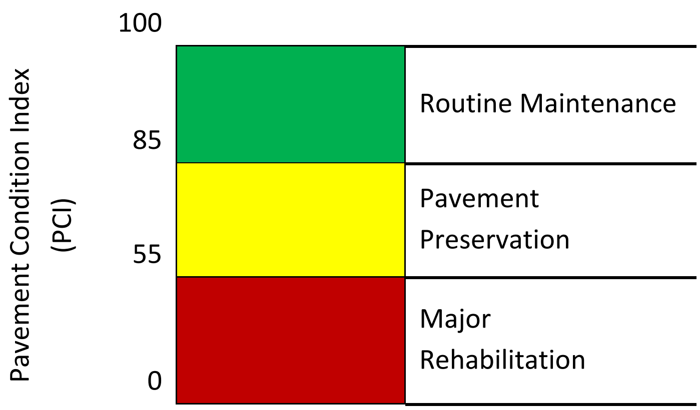


Figure 1-3 PCI Repair Scale

Source: ADOT MPD – Aeronautics Group, APMS Program, 2014

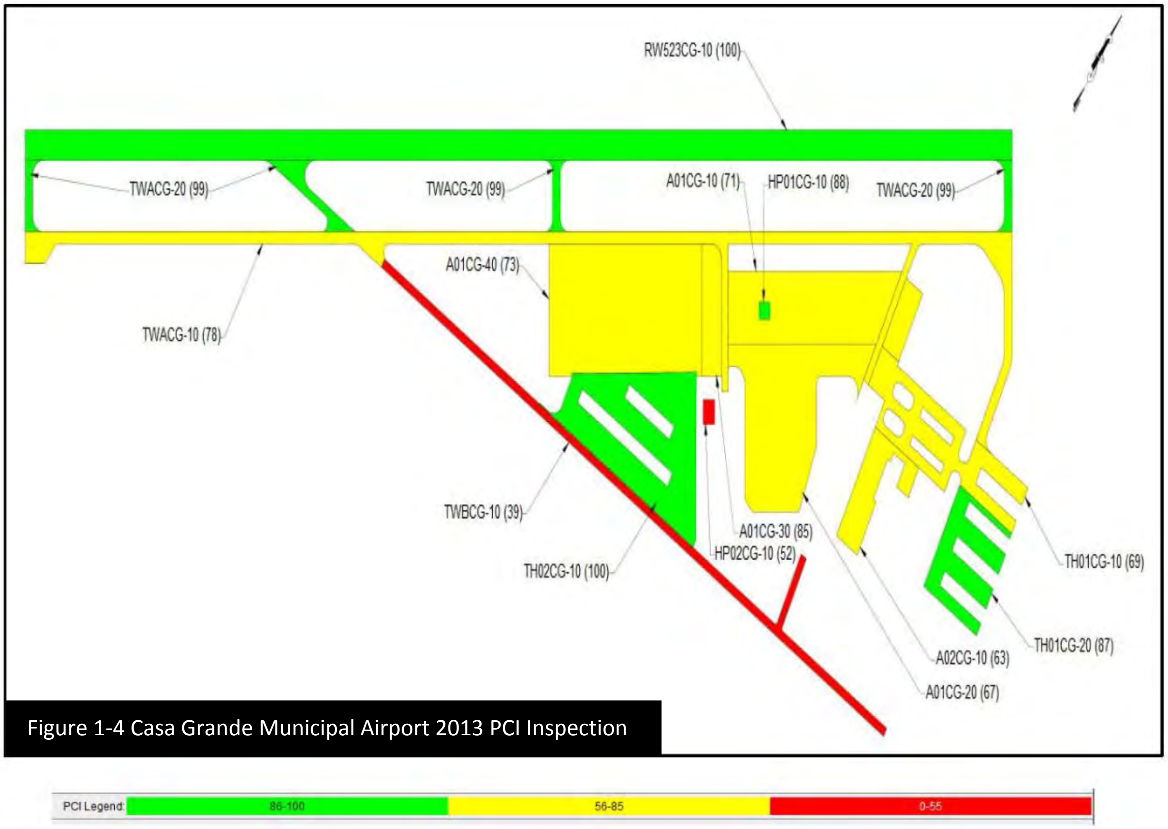


Figure 1-4 Casa Grande Municipal Airport 2013 PCI Inspection

Table 1-4 Summary of Pavement Condition Index Data

Location	PCI Index
Runway 5-23 (RW523CG-10)	100-Routine Maintenance
West Apron Expansion (TH02CG-10)	100-Routine Maintenance
Taxiway A,D, E (north), F (TWACG-20)	99-Routine Maintenance
Helicopter Parking Pad (HP01CG-10)	88-Routine Maintenance
South T-hangar Taxilanes (TH01CG-20)	87-Routine Maintenance
Taxiway B and taxilanes (TWACG-10)	78-Pavement Preservation
West Apron (A01CG-40)	73-Pavement Preservation
Terminal Apron (A01CG-10)	71-Pavement Preservation
Terminal Apron (A01CG-20)	67-Pavement Preservation
North Taxilanes (TH01CG-10)	69-Pavement Preservation
South Apron (A02CG-10)	63-Pavement Preservation
Helicopter Parking Pad (HP02CG-10)	52-Pavement Rehabilitation
Taxiway E (south) (TWBCG-10)	39-Pavement Rehabilitation

Source: ADOT PCI Report (2013)

1.5.6 Instrument Approach Procedures

Airport safety and capacity are greatly enhanced at airports where instrument approach procedures (IAP) are available during times of inclement weather. As the cloud ceiling and visibility around an airport decreases, electronic guidance provided by specialized equipment to aircraft (also equipped with specialized equipment) allows pilots to safely operate and land in weather where visibility is restricted.

Additionally, the availability of instrument approach capabilities at an airport increases capacity by allowing continued use of the airport by aircraft equipped to fly instrument procedures because they can still land at the airport while aircraft which can only fly during visual conditions cannot.

The instrument approach capabilities of an airport are typically broken into two categories: precision and non-precision. Precision instrument approach procedures provide very accurate electronic lateral and vertical guidance to aircraft. Non-precision instrument approach procedures also provide electronic guidance to aircraft, but the accuracy is less refined and is mainly limited to lateral guidance only. The type and accuracy of an instrument approach is highly dependent upon the airspace obstructions in the vicinity of the airport. Runways with no instrument approach capabilities are considered visual runways. Airports with published instrument approach procedures are known as Instrument Flight Rules (IFR) airports while airports with no published instrument approach procedures are considered Visual Flight Rules (VFR) airports.

The most common type of precision approach in use today is the Instrument Landing System (ILS). Runway 5 currently has a published ILS instrument approach. Non-precision approach capabilities have been greatly increased by the evolution of satellite technology, specifically Global Positioning System (GPS). The FAA has recently developed new approach procedures know as Localizer, or Lateral Performance with Vertical Guidance (LPV). This new capability utilizes the Wide Area Augmentation System (WAAS). While not considered a precision approach, LPV provides vertical guidance to aircraft to "near precision" accuracy. Another type of instrument approach is area navigation (RNAV). This is a method of instrument flight rules (IFR) navigation that allows an aircraft to choose any course within a network of navigation beacons, rather than navigating directly to and from the beacons. RNAV can be defined as a method of navigation that permits aircraft operation on any desired course within the coverage of station-referenced navigation signals or within the limits of a self-contained system capability, or a combination of these. This can conserve flight distance, reduce congestion, and allow flights into airports without navigational beacons.

Instrument approach procedures are developed by the FAA. GPS/RNAV and/or LPV approaches require no ground based equipment; thus, the FAA can now develop approach procedures at airports where it was previously not economically feasible. Combined with evolving technology, more and more aircraft are able to safely operate in more airport environments. Non-precision approaches at the Airport include a circling Very High Frequency Omni-Directional Range/Distance Measuring Equipment (VOR/DME) and GPS for Runway 5. The current published instrument approach procedures for the Airport are included in **Appendix D.**

1.6 Existing Landside Facility Inventory

The definition of landside is that portion of the airport designed to serve passengers or other airport users typically located outside of the public safety and security fenced perimeter; landside facilities include terminal buildings, parking areas, entrance roadways, and other buildings that may not necessarily conduct aviation related activities. The inventory of landside facilities provides the basis for the airfield demand/capacity analysis and the determination of any facility change requirements that might be identified.

1.6.1 Terminal Building

The City of Casa Grande owns the existing terminal building. The building was constructed in 2001 and currently houses the FBO, also operated by the City. The 4,800 square-foot building contains offices, restrooms, showers, pilot lounge, flight planning, conference room, and lobby area. The terminal building is on Airport Road off State Highway 387. **Figure 1-5** is the front entrance to the terminal building.

Figure 1-5 Casa Grande Municipal Airport Terminal Building Front Entrance

Source: ACI, 2015

1.6.2 Hangar Facilities

The hangar facilities at the Airport include 52 T-hangar bays, 20 T-shade tie-down spaces, and nearly 100 aircraft open tie-down spaces. The City of Casa Grande owns and maintains all T-hangars and T-shade structures, as well as one conventional box hangar in which they lease to individuals or businesses. The City has leased land to private owners, and currently has six privately owned hangars. The City has a hangar waiting list for 13 aircraft.

1.6.3 Access Road and Automobile Parking

Airport access is via State Highway 387 to Airport Road. Airport Road accesses a number of different roads to the terminal building, hangars, and businesses. Thirty vehicle parking spaces are available at the terminal building. Business and/or tenants access vehicle parking at the business or by the hangar areas.

1.6.4 Fuel Facilities

The fuel facilities at the Airport consist of one 12,000 gallon above ground fuel storage tank of Avgas (100LL) and one 12,000 gallon above ground fuel storage tank of Jet-A fuel. The Avgas is available through self-fueling with a credit card reader. The City owns three fuel trucks with Avgas capacity of 750 and 1,200 gallons; the Jet-A fuel truck has a capacity of 3,200 gallons. **Figure 1-6** depicts the fueling facility at the Airport.

Figure 1-6 Casa Grande Municipal Airport Fueling Facility

Source: ACI, 2015

1.6.5 FBO Facilities

The City of Casa Grande owns and operates the FBO at the Airport. The FBO is located in the terminal building and offers the following aviation-related services:

- Self-service aviation fuel (100LL)
- Jet A fuel
- Line service
- Aircraft hangar storage
- Passenger terminal and lounge
- Off - airport rental car
- Pilot lounge/flight planning service
- Restroom/shower facilities
- Catering

In addition to the FBO services, there are businesses on the airport that provide aircraft maintenance, aero-medical service, and aircraft rental.

1.7 Summary of Existing Airport Facilities

A summary of the existing airside and landside facilities at the Airport are shown in **Table 1-5**.

Table 1-5 Summary of Airport Inventory

Airport Inventory	Description
FAA Identifier	CGZ
Airport Reference Code	B-II
Runway Design Code	RW 5: B-II/4000; RW 23 B-II/VIS
Owner (sponsor)	City of Casa Grande
Airport Elevation	1,464’ MSL
Runway 5-23	5,200’ x 100’
Runway Markings	Precision RW 5 / Non-Precision RW 23
Pavement Strength	18,500 pounds SWG/ 65,000 pounds DWG[1]
Pavement Condition Indexes	Runway 5/23: 100 Taxiways: 99-39 Aprons: 100-63
Runway Lighting	MIRL
Instrument Approach	RW 5: ILS/GPS/VOR/DME
Approach Visibility Minimums (lowest)	RW 5: <1 mile but ≥ ¾ mile
Taxiways	TW A: Entrance/Exit; TW B: Parallel; TW D: Exit; TW E: High Speed; TW F: Entrance/Exit
Taxiway Lighting	MITL
Aircraft Tie-Downs	104
Hangar Facilities	52 T-hangar bays; 20 T-shade tie-downs; 7 Box hangars (6 are privately owned)
Fuel Storage	Avgas (100LL) 12,000 gallon tank; Jet A 12,000 gallon tank
Visual Aids	R/W 5: MALSR, RW 5/23: PAPI-2, Rotating Beacon, Lighted Wind Cone, Segmented Circle
Vehicle Parking	30 Terminal spaces
Weather Equipment	AWOS-III
Fixed Base Operator	City of Casa Grande

Note. [1] ADOT PCN report indicates the pavement strength equals approximately 6,200 pounds single-wheel gear loading as of October 2014.
Source: ACI, 2015

CHAPTER TWO

FORECASTS OF AVIATION DEMAND

CITY OF CASA GRANDE
PINAL COUNTY, ARIZONA
AIRPORT LAYOUT PLAN UPDATE AND
NARRATIVE REPORT

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Chapter 2 - Forecasts of Aviation Demand

2.1 Introduction

The forecast chapter presents projections of aviation activity at Casa Grande Municipal Airport. These projections are used for evaluating the capability of the existing Airport facilities to meet current and future demand and to estimate the extent to which facilities should be provided in the future.

Activity projections are made based on historical data, estimated growth rates, area demographics, industry trends, and other indicators. Forecasts are prepared for the short-term (0-5 years), the medium-term (6-10 years), and the long-term (11-20 years) planning periods. Using forecasts within these time frames allows airport improvements to be phased to meet demand.

Aviation activity forecasting is an analytical and subjective process. Actual activity that develops in future years may differ from the forecasts developed in this section as a result of future changes in local conditions, the dynamics of the general aviation industry, as well as economic and political changes for the local service area and the nation as a whole. Future facility improvements should be implemented as demand warrants rather than at set future timeframes. This will allow the Airport to respond to changes in demand, either higher or lower than the forecast, regardless of the year in which those changes take place.

The first step in preparing aviation forecasts is to examine historical and existing activity levels and available forecasts from other sources. The aviation forecasts developed as part of the 2009 Airport Master Plan (AMP) serve as the historical basis for the updated forecasts in this section. Current local and regional demographic information and aviation activity at the Airport since 2009, as well as FAA and State aviation forecasts, were used to update the forecast.

2.2 Historical Aviation Activity and Fleet Mix

As stated above, the based aircraft and operations forecasts found within the approved 2009 AMP for the Airport were reviewed for this ALP Update. Based aircraft are defined as aircraft that are stored at the airport for more than a six month period. An aircraft operation is defined as either a landing or take-off by an aircraft. The fleet mix for an airport is comprised of the various types of aircraft that are based at the airport.

According to the 2009 AMP for the Airport, there were 114 based aircraft in 2007 (the base year for the AMP). Also according to the report, in 1987 (the date of the previous master plan) there were 41 based aircraft; this is an increase of approximately 36 percent. In 2007, the based aircraft included 101 single-engine, five multi-engine, five rotorcraft, and three other aircraft; zero turboprop and jet aircraft were based at the Airport. Likewise, there were an estimated 117,282 total general aviation annual operations; including the estimated 1,900 military operations, the total annual operations for the Airport was estimated at 119,182. It should be noted that military operations are not normally included in the forecasts for projected aircraft operations; however, they were included as a part of the historical data because the number was readily available in the 2009 AMP. A summary of the historical based aircraft and annual operations data from the 2009 AMP is shown in **Table 2-1.**

Table 2-1 Historical and Forecasted Aviation Activity Data (2009 Airport Master Plan)

Based Aircraft			
	2007[1]	2012[2]	2017[2]
Single-engine	101	126	191
Multi-engine	5	7	12
Turboprop	0	3	6
Jet	0	3	10
Rotorcraft	5	7	10
Other	3	4	6
Total Based Aircraft	**114**	**150**	**235**
Annual Operations			
	2007	2012	2017
Itinerant general aviation	104,562	114,750	159,500
Local general aviation	12,720	18,630	33,440
Total General Aviation	**117,282**	**133,380**	**192,940**
Military	1,900	1,900	1,900
Total Annual Operations	**119,182**	**135,280**	**194,840**

Note. [1]2007 base year actual data. [2]Forecasted data
Source: Casa Grande Municipal Airport Master Plan, 2009

2.3 Existing Aviation Activity and Fleet Mix

General aviation activity includes a variety of aircraft, ranging from single-engine piston to multi-engine turbojets and rotorcraft. General aviation operations at Casa Grande Municipal Airport include personal and business transportation, flight instruction and training, air ambulance, law enforcement, and skydiving, as well as special events such as fly-ins and air shows.

Two sources for the existing based aircraft and annual operations figures were examined; these sources included airport management records and the FAA Form 5010-1, *Airport Master Record* for the 2014 calendar year.

According to the airport manager, there were approximately 100,000 aircraft operations in calendar year 2014. This number was derived from baseline operations data gathered by airport personnel in 2010; the 2010 data has been updated annually by accounting for fuel sales data and tracking of flight school activity and local/transient pilots flying in and out of the airport. Furthermore, according to airport records, there were 105 based aircraft on the airfield at the end of 2014. FAA Form 5010-1, *Airport Master Record*, is the official record kept by the FAA to document airport physical conditions and other pertinent information. The record normally includes an annual estimate of aircraft activity as well as the number of based aircraft. This information is normally obtained from the airport sponsor and depending on the sponsor's record keeping system, the accuracy will vary. The current FAA Form 5010-1 for Casa Grande Airport indicates 106 based aircraft and 119,680 annual aircraft operations. This varies slightly with what has been reported by airport management; however, the discrepancy could be due to an outdated version of the FAA 5010-1 Form found on the FAA's website. Besides Form 5010-1, the FAA also relies on data found on their sponsored website for the National Based Aircraft Inventory Program (www.basedaircraft.com). Non-primary NPIAS airports are required to enter and keep up-to-date based aircraft numbers via this database so that Form 5010-1 can be accurately updated by the FAA. The Airport was in the process of updating their based aircraft data on the website as of April of 2015. The existing based aircraft, including fleet mix make-up, and annual operations reported by airport management and FAA Form 5010-1 is summarized in **Table 2-2**.

Table 2-2 Existing Aviation Activity Data (2014 Base Year)

Airport Management Records (2014)		FAA Form 5010-1 (2014[1])	
Based Aircraft		**Based Aircraft**	
Single-engine	98	Single-engine	86
Multi-engine	2	Multi-engine	5
Jet	0	Jet	1
Rotorcraft	3	Rotorcraft	4
Other	2	Other	10
Total Based Aircraft	**105[2]**	**Total Based Aircraft**	**106**
Annual Operations		**Annual Operations**	
Air Taxi	0	Air Taxi	2,000
Itinerant general aviation	69,000	Itinerant general aviation	104,560
Local general aviation	30,000	Local general aviation	12,720
Total General Aviation	**99,000**	**Total General Aviation**	**119,280**
Military	1,000	Military	400
Total Annual Operations	100,000	Total Annual Operations	119,680

Note. [1]FAA Form 5010-1 data based on operations for 12 months ending April 29, 2014. [2]The based aircraft used in the preparation of the forecast was from data gathered in December 2014. According to the sponsor, more recent data as of April 2015 indicates that there are 97 based aircraft; the sponsor has updated basedaircraft.com to reflect this most current data, however, the forecasts were not revised to reflect this slight change because it would not have a significant impact on the overall outcome of the forecasts generated within this chapter.
Sources: Casa Grande Municipal Airport management, December 2014; FAA Form 5010-1, *Airport Master Record*, 2014

2.4 Federal and State Forecasts and Projections

Aviation forecasting also takes place on the national and state level. The FAA also makes projections for based aircraft and annual operations using the Terminal Area Forecast (TAF), the official forecast of aviation activity for U.S. airports. The TAF is commonly used by the FAA as a planning and budgeting tool. At the State level, the Arizona Department of Transportation (ADOT) Aeronautics Group also maintains a State Aviation System Plan (SASP), in which forecasts for all airports in the state are available. Data from the January 2015 TAF and 2008 Arizona SASP (most current available) for the Airport were reviewed for this ALP Update.

- The 2014-2034 TAF data for the Airport projects 97 based aircraft and 119,680 annual operations for each year over the course of this 20-year forecast period.
- According to the medium forecast contained in the Arizona SASP, in 2012 the Airport was projected to have 101 based aircraft and 68,300 annual operations; in 2017, it is projected to have 117 based aircraft and 72,800 annual operations.

For aircraft operations, the TAF and SASP data may not be as accurate for airports that do not have an air traffic control tower; normally aircraft operations are recorded by air traffic controllers and reported to the FAA. As such, for airports that do not have an air traffic control tower, like Casa Grande Municipal Airport, aircraft operations are more difficult to record and are often estimates made by airport management and staff. Knowing this, the FAA Statistics and Forecast Branch developed Equation #15, *Model for Estimating General Aviation Operations at Non-Towered Airports*. The model was used to estimate the number of operations at 2,789 non-towered general aviation airports included in the FAA TAF. Local factors such as the number of based aircraft, population, location, and the number of flight schools is applied to the equation resulting in an estimated number of annual operations.

2.5 Factors Potentially Affecting Future Aviation Operations at Casa Grande Municipal Airport

Many factors have the potential to influence aviation activity at general aviation airports such as Casa Grande Municipal Airport. Based on projected national and state trends in the general aviation industry, and from discussions with City of Casa Grande and airport personnel, several factors have been identified which may potentially affect aviation activity at the Airport in the future.

First, the projected growth of the general aviation industry is expected to grow at a modest pace over the next 20 years. This assumption is made by projections found within the FAA's *Aerospace Forecast Fiscal Years 2014-2034* and the 2008 Arizona SASP. Specifically, according to the *Aerospace Forecast*, the active general aviation fleet is projected to increase at an average annual rate of 0.5 percent over the 20-year forecast period, growing from an estimated 202,865 in 2013 to 225,700 aircraft by 2034. In addition, the total number of general aviation hours flown is projected to increase by 1.4 percent yearly over the forecast period. Hours flown by turbine aircraft (including rotorcraft) are forecast to increase 3.2 percent annually over the forecast period, compared with a decline of 0.4 percent for piston-powered aircraft. Jet aircraft are forecast to account for most of the increase, with hours flown increasing at an average annual rate of 4.2 percent over the forecast period. Turboprop hours are also expected to continue to increase, more so than originally foreseen. An increase in the general aviation fleet and total number of general aviation hours flown could potentially mean more based aircraft and increased operations at the Airport.

Secondly, the City of Casa Grande, alongside Pinal County, continues to see a large amount of population growth. Pinal County attributes its population growth to its diverse economy and high wage job opportunities stemming from its traditional agricultural and mining industries, as well as its growth in emerging industries such as aerospace, bio-medical, renewable/green technologies (solar and wind), and high tech manufacturing industries, as well as its robust recreational, cultural, and tourism opportunities. With the City of Casa Grande's tremendous growth over the past decade, it is now Pinal County's largest city. The latest information from the Arizona Department of Administration's Office of Employment and Population Statistics, estimates the population of Casa Grande to be approximately 50,938; this is an approximate increase of 37 percent in a ten-year period. The City of Casa Grande also boasts a strong local economy centered around manufacturing, retail trade, government, and tourist-related employment, as well as the potential for new business opportunities as a few of the reasons for its continued growth over the last decade. An increase in population for both the City of Casa Grande and Pinal County has the potential to include a portion of this population who uses general aviation aircraft for recreational or business purposes, and who may be inclined to either base an aircraft or fly to/from the Airport on a regular basis, thus increasing the Airport's aviation activity.

A third factor which may influence aviation activity at the Airport is the continued use of the Instrument Landing System (ILS) for Runway 5 by the Phoenix-area flight instruction schools. Airport management reports that student flight activity occurs on a daily basis, mostly for training on the precision-approach ILS. Even with the modest growth projected at the national and state levels over the next 20 years for general aviation, it is a safe assumption that local and nearby Phoenix flight schools will remain in operation, and therefore will continue to use the Airport for training student pilots. Flight training activity may remain relatively constant or it may increase over the next 20 years at the Airport; in either case, flight training activity will affect the total annual operations at the Airport over the forecast period.

Lastly, the construction of the 1.7 million square-foot trade center known as PhoenixMart in Casa Grande is anticipated to affect aviation activity at the Airport. PhoenixMart is a global commerce and exposition center combining retail, wholesale, amenities, and entertainment in one convenient location. Manufacturers, distributors, wholesalers, and retailers will have access to thousands of buyers within the U.S. and across the globe. PhoenixMart is modeled after similar centers in Dubai, China, and Paris. The main goal of the multi-functional PhoenixMart is to connect thousands of North American manufacturers and distributors with domestic and global buyers, and also help establish Arizona as a major trade hub. The center is being built several miles southeast of the Airport. According to a 2013 *Arizona's Builder's Exchange* article, up to 4 million people a year could visit PhoenixMart. As a result, the Airport may see an increase in operations, especially by corporate jet aircraft, as a direct result of the PhoenixMart operation and other related business surrounding the center.

2.6 Based Aircraft Forecast

Forecasts for based aircraft for the Casa Grande Municipal Airport were determined from data comprised of current based aircraft combined with existing forecasts from the Arizona SASP and FAA TAF, which consider growth rates for the community. A comparative analysis of this data led to the development of a preferred forecast for the Casa Grande Municipal Airport.

2.6.1 Per Capita Forecast

A per capita forecast was developed that projects the number of based aircraft in direct proportion to the projected population for Pinal County. As previously mentioned, Pinal County has experienced a significant amount of growth over the past decade, and continues to be the fastest growing county in the state of Arizona. According to the Arizona Department of Administration, Office of Employment and Population Statistics, the 2014 population estimate for Pinal County is 403,526. The 2014 estimated population of Pinal County and the existing based aircraft at the Airport were used to calculate the based aircraft per capita. The result of this calculation indicates approximately one based aircraft per 3,843 persons residing in Pinal County. This figure was then applied to the estimated Pinal County population for each year in the forecast period. The results of the per capita forecast are shown in **Table 2-3.**

Table 2-3 Per Capita Forecast

Year	Pinal County Population[1]	Based Aircraft
2014	403,526	105
2019	477,140	124
2024	561,844	146
2029	659,929	171
2034	775,533	201

Source: [1]Pinal County Population Projections: 2012 to 2050, Medium Series, Arizona Department of Administration, Office of Employment and Population Statistics, 2015

A review of historic based aircraft from the years 1987, 1990, 1996, 2004, 2007, and 2011 and populations for the same years produced positive and relatively constant based aircraft per capita figures over this time period. This data proves a strong correlation between population and based aircraft has existed in the past, and therefore, using the based aircraft per capita as a forecasting tool for the future seems reasonable.

2.6.2 Arizona State Airport System Plan Forecast

For the second forecast, the preferred based aircraft forecast from the 2008 Arizona SASP for Casa Grande Municipal Airport was used. The 2008 Arizona SASP calculated a low, medium, and high based aircraft forecast for each airport included in the SASP through the year 2030. Various factors were used to project these forecasts, such as population projections, nationwide aviation trends, and historic growth of based aircraft at Arizona's system airports. The medium forecast was selected as the preferred forecast in the SASP for the following reasons: 1) it was based on historic based aircraft growth and FAA industry forecasts, and 2) of the three forecasts (low, medium, and high), it was most likely to reflect how based aircraft will grow at Arizona airports, especially over the long term.

The Arizona SASP medium based aircraft forecast was selected for use in this update because of the reasons listed above, as well as the accuracy of its results. Although the forecast years are different from the ones for this update, the results for 2012 and 2017 are very close to the actual 2014 based aircraft data for the Airport. For example, the SASP projected 101 based aircraft in 2012 and 111 in 2017; the actual based aircraft number in 2014 according to airport management is 105. An average of the projected based aircraft in 2012 and 2017 results in 106. Thus, the medium preferred forecast presented in the SASP was considered reasonable to use to determine the projected based aircraft over the 2014-2034 forecast period. The CAGR used in the medium forecast for the Airport was 2.03 percent; likewise, the same percentage was used in this forecast. The results of the Arizona SASP forecast are shown in **Table 2-4**.

Table 2-4 Arizona State Airport System Plan Forecast

Year	Based Aircraft
2014	105
2019	116
2024	128
2029	142
2034	157

Source: Arizona State Airport Systems Plan, 2008

2.6.3 Cohort Forecast

A third forecast was developed using the cohort method; this method uses the average of the based aircraft from both the per capita forecast and the Arizona State Aviation System Plan forecast. The results of the cohort method are shown in **Table 2-5**.

Table 2-5 Cohort Forecast

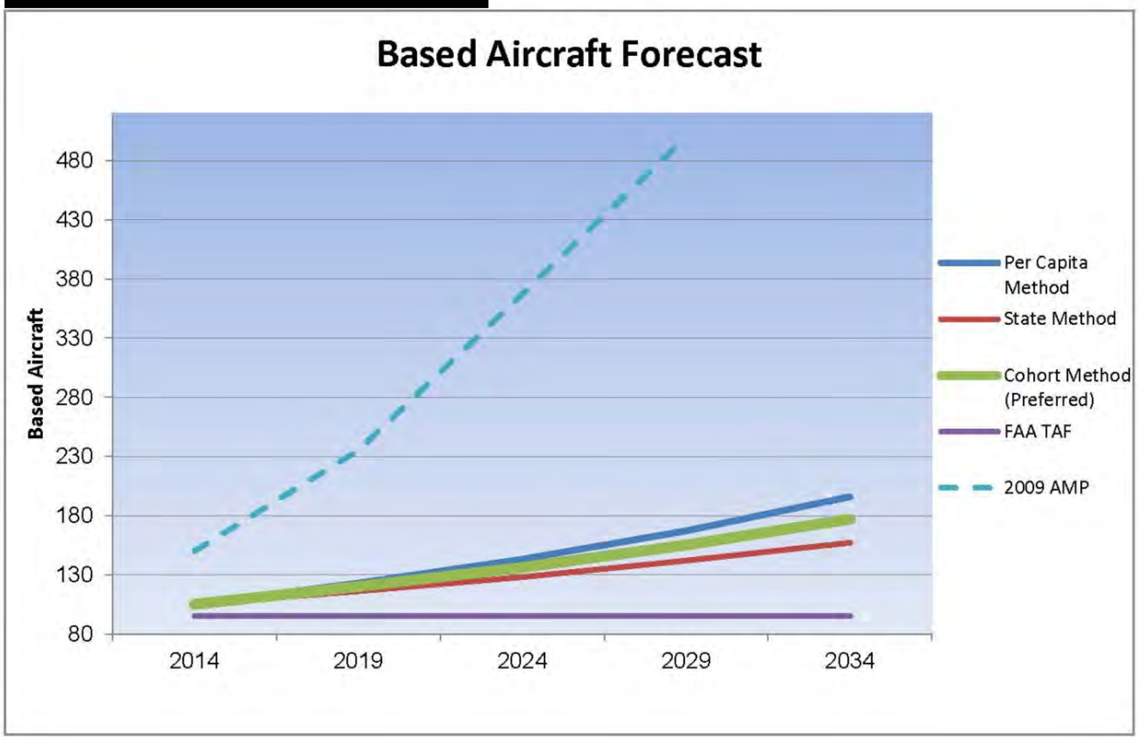
Year	Based Aircraft
2014	105
2019	120
2024	137
2029	157
2034	179

Source: Armstrong Consultants Inc. (ACI), 2015

2.6.4 Based Aircraft Forecast Summary

For comparative purposes, the three forecast methods were evaluated against the FAA TAF forecast for the years 2014-2034. The TAF shows no growth in based aircraft over the 20-year period, which is not uncommon for projections made by the FAA of general aviation airports similar to Casa Grande Municipal. A total of 97 based aircraft have been forecasted for each year over the forecast period. Also for comparative purposes, the based aircraft forecasted in the 2009 AMP were incorporated into the review. Based on the three forecasts and their corresponding methodologies, the cohort forecast has been selected as the preferred forecast. The cohort forecast incorporates the growth of Pinal County along with the preferred growth rate found in the Arizona SASP. It is believed this method best represents how based aircraft may increase at the Airport in the future. **Figure 2-1** illustrates the variation in based aircraft for each type of forecasting method.

Figure 2-1 Based Aircraft Forecast Methods



Source: ACI, 2015

2.7 Aircraft Operations Forecast

The forecast methodology used to project general aviation operations at the Airport was calculated using the current ratio of annual non-commercial and non-military operations per based aircraft (OPBA). This is a standard forecasting methodology used by the FAA. This ratio is multiplied by the projected number of based aircraft for each year in the forecast period (from the preferred based aircraft forecast). This forecast assumes that this ratio of operations per based aircraft will remain constant over the forecast period. Based on existing data of 105 based aircraft and approximately 99,000 general aviation operations (this excludes the estimated 1,000 annual military operations), the existing OPBA at Casa Grande Municipal Airport is 943.

The existing 943 OPBA at the Airport does not imply that each based aircraft performs 943 operations; rather, the ratio represents one based aircraft to 943 operations. This high OPBA ratio is consistent with the high amount of flight training activity that occurs at the airport. As previously mentioned, Phoenix-area flight schools use the ILS approach at the Airport extensively to practice instrument training due to the airport's location away from the busy Class B airspace surrounding the Phoenix area near Sky Harbor International Airport.

In order to develop a preferred forecast of aircraft operations at the Casa Grande Municipal Airport using the OPBA methodology, three different methods were analyzed. These methods are summarized as follows:

Method 1: Existing operations per based aircraft (OPBA 943)

Method 2: Arizona State Airports System Plan for Casa Grande Municipal Airport (OPBA 703)

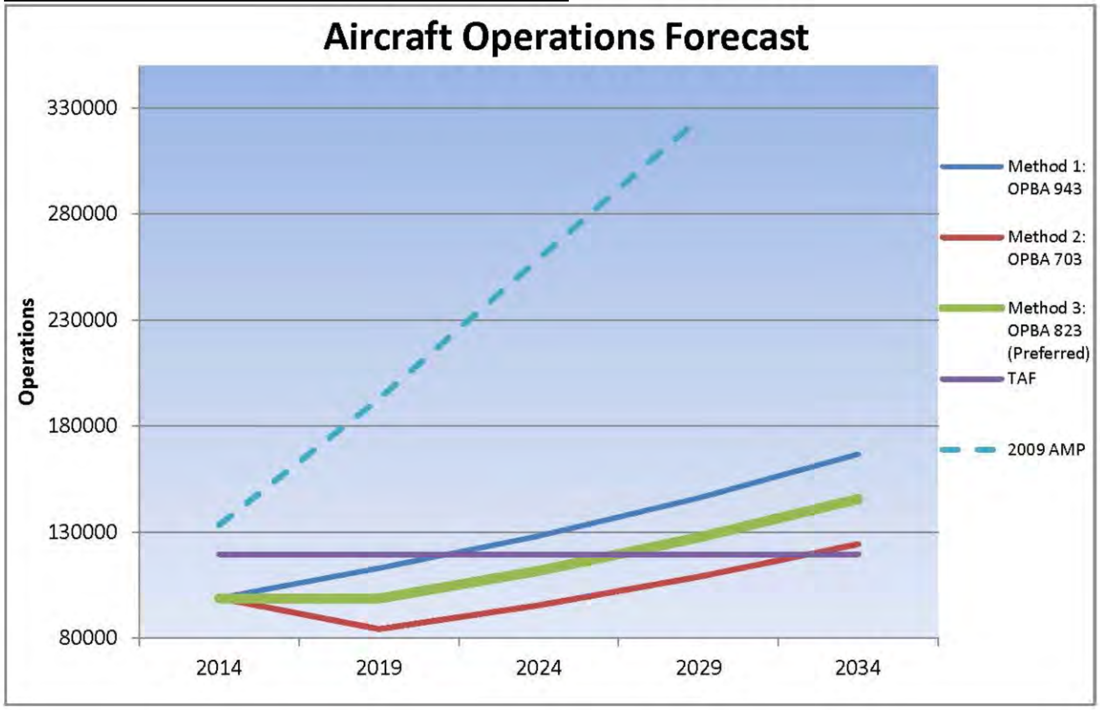
Method 3: Average between existing and Arizona State Airport System Plan (OPBA 823)

For Method 1, the OPBA of 943 was applied to the preferred based aircraft forecast over the forecast period. This ultimately results in 168,797 operations per year in 2034 (943 x 179 = 168,797). Method 2 utilizes the OPBA of 703 from the 2008 Arizona SASP specific to Casa Grande Municipal Airport. This ultimately results in 125,837 operations per year in 2034 (703 x 179 = 125,837). Finally, Method 3 uses the average OPBA between Method 1 and Method 2, which equals an OPBA of 823. This ultimately results in 147,317 operations per year in 2034 (823 x 179 = 147,317), or a CAGR of 2.70 percent over the forecast period.

2.7.1 Aircraft Operations Forecast Summary

These methods provide a likely range of projected future aircraft operations at the Airport. The results of each method are illustrated in **Figure 2-2**. The FAA TAF projections were also incorporated, as well as the projections found in the 2009 AMP for comparison. Upon review, Method 3 was selected as the preferred forecast, as it assumes reasonable growth in correlation with the existing local and itinerant operations currently being conducted at the Airport, and the likelihood of aircraft operations growing at a faster rate than based aircraft in the state of Arizona as predicted by the SASP.

Figure 2-2 Aircraft Operations Forecast Methods



Source: ACI, 2015

2.8 Instrument Operations Forecast

Forecasts of annual instrument approaches provide guidance in determining an airport's requirements for navigational aid facilities. Data was collected for the years 2008-2014 to determine the amount of Instrument Flight Rules (IFR) activity at the airport, as shown in **Table 2-6**. Generally IFR conditions require visibility less than 3 miles and/or when the cloud ceiling is at or below the minimum initial approach altitude. Based on historical data, a significant drop in both IFR arrivals and departures occurred after 2009. Since 2010, IFR traffic has leveled off, although it is at a much lower level than it was in 2008/2009. In conjunction with the national general aviation trends, IFR activity is forecast to remain near current levels through the planning period. Although, depending on the success of PhoenixMart, instrument operations may rise slightly in the short-term period and may continue to rise over the course of the planning period.

Table 2-6 Historical IFR Activity at Casa Grande Municipal Airport

Year	IFR Arrivals	IFR Departures
2008	340	350
2009	145	304
2010	91	263
2011	20	268
2012	23	179
2013	23	178
2014	17	177

Source: Airport IQ Data Center, GCR Inc., 2015

2.9 Hourly Demand and Peaking Tendencies

A common method used in aviation forecasting to determine reasonable estimates of demand at an airport is accomplished by calculating the levels of activity during peak periods. The periods normally used to determine peaking characteristics are defined below:

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

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

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

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

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

A formula is used to calculate the average daily operations in a given month, based on the percentage of the total annual operations for the month. A detailed description of the formula can be found in **Appendix C**. In this instance, fuel sales data was used to estimate the approximate number of operations for a given month. The self serve and full service fuel sales data for calendar year 2013 was used to determine the percent use calculation. The results of all calculations are shown in **Table 2-7**. As is evident in **Table 2-7**, the Design Day and Design Hour peak demand in the planning period occurs under VFR weather conditions in the month of April (highlighted in bold), with an average of 686 daily operations and approximately 77.2 operations per hour in 2034.

Table 2-7 Estimate of Monthly/Daily/Hourly Demand at Non-Towered General Aviation Airport

Planning Year: 2019					Planning Year: 2024				
Operations:	98,760				Operations:	112,751			
		Operations					Operations		
Month	% Use	Monthly	Daily	Hourly	Month	% Use	Monthly	Daily	Hourly
January	9.13%	8,971	295	33.2	January	9.13%	10,207	336	37.8
February	13.40%	13,166	433	48.7	February	13.40%	14,981	493	55.4
March	10.74%	10,553	347	39.0	March	10.74%	12,007	395	44.4
April	**14.38%**	**14,129**	**465**	**52.3**	**April**	**14.38%**	**16,077**	**529**	**59.5**
May	9.92%	9,747	320	36.1	May	9.92%	11,091	365	41.0
June	12.64%	12,419	408	45.9	June	12.64%	14,132	465	52.3
July	12.67%	12,449	409	46.0	July	12.67%	14,165	466	52.4
August	12.78%	12,557	413	46.4	August	12.78%	14,288	470	52.8
September	14.26%	14,011	461	51.8	September	14.26%	15,943	524	59.0
October	10.86%	10,670	351	39.5	October	10.86%	12,142	399	44.9
November	13.33%	13,097	431	48.4	November	13.33%	14,903	490	55.1
December	12.66%	12,439	409	46.0	December	12.66%	14,154	465	52.4

Table 2-7 Estimate of Monthly/Daily/Hourly Demand at Non-Towered General Aviation Airport (Contd.)

Planning Year: 2029					Planning Year: 2034				
Operations:	129,211				Operations:	147,317			
		Operations					Operations		
Month	% Use	Monthly	Daily	Hourly	Month	% Use	Monthly	Daily	Hourly
January	9.13%	11,623	382	43.0	January	9.13%	13,246	435	49.0
February	13.40%	17,060	561	63.1	February	13.40%	19,441	639	71.9
March	10.74%	13,673	450	50.6	March	10.74%	15,582	512	57.6
April	**14.38%**	**18,307**	**602**	**67.7**	**April**	**14.38%**	**20,863**	**686**	**77.2**
May	9.92%	12,629	415	46.7	May	9.92%	14,392	473	53.2
June	12.64%	16,092	529	59.5	June	12.64%	18,338	603	67.8
July	12.67%	16,130	530	59.7	July	12.67%	18,382	604	68.0
August	12.78%	16,270	535	60.2	August	12.78%	18,541	610	68.6
September	14.26%	18,154	597	67.1	September	14.26%	20,689	680	76.5
October	10.86%	13,826	455	51.1	October	10.86%	15,756	518	58.3
November	13.33%	16,970	558	62.8	November	13.33%	19,339	636	71.5
December	12.66%	16,117	530	59.6	December	12.66%	18,367	604	67.9

Note. Fuel sales data for calendar year 2013 was provided by airport management and used to determine the approximate monthly operations and percent use.
Source: ACI, 2015

2.10 Preferred Forecast Summary

The preferred based aircraft and annual operations forecasts for Casa Grande Municipal Airport are summarized in **Table 2-8**. These preferred forecasts estimate aviation activity levels at the Airport over the 20-year planning period using existing data as reported by airport management. Activity estimates for itinerant and local operations are currently 69 percent and 30 percent, respectfully. The one percent of military operations provided by airport management was not calculated in the total annual operations. The estimated based aircraft are also summarized on **Table 2-8**. Given the difficulty in determining the actual operations at non-towered general aviation airports, the proposed forecasts are considered reasonable as they represent moderate growth in operations and based aircraft and take into consideration the potential economic growth in the region.

Table 2-8 Summary of Preferred Forecast for Casa Grande Municipal Airport (2014-2034)

Year	Itinerant Operations	Local Operations	Military Operations	Total Annual Operations	Total Based Aircraft
2014	69,000	30,000	0	99,000	105
2019	68,144	29,628	0	98,760	120
2024	77,798	33,825	0	112,751	137
2029	89,155	38,763	0	129,211	157
2034	101,648	44,195	0	147,317	179

Note. Estimates of itinerant and local operations are approximate and may not equal the total annual operations due to rounding during calculations.
Source: ACI, 2015

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CHAPTER THREE

FACILITY REQUIREMENTS

CITY OF CASA GRANDE
PINAL COUNTY, ARIZONA
AIRPORT LAYOUT PLAN UPDATE AND
NARRATIVE REPORT

ARMSTRONG

Chapter 3 – Facility Requirements

3.1 Introduction

This chapter identifies the requirements for airfield and landside facilities to accommodate the forecast demand levels at Casa Grande Municipal Airport. In order to meet the demand levels, an assessment of the ability of existing airport facilities to meet current and future demand was conducted. The facility requirements were based on information derived from FAA advisory circulars and design standards, the sponsor's future vision of the airport, the condition and functionality of existing facilities, and other pertinent information.

The time frame for addressing development needs usually involves short-term (up to five years), medium-term (six to ten years), and long-term (eleven to twenty years) planning periods. Long-term planning primarily focuses on the ultimate role of the airport and is related to development. Medium-term planning focuses on a more detailed assessment of needs, while the short-term analysis focuses on immediate action items. Most important to consider is that a good plan is one that is based on actual demand at an airport rather than time-based predictions. Actual activity at the airport will vary over time and may be higher or lower than what the demand forecast predicts. Using the three planning milestones (short-term, medium-term, and long-term) the airport sponsor can make an informed decision regarding the timing of development based on the actual demand. This approach will result in a financially responsible and demand-based development of the Airport.

3.2 Design Standards

Airport design standards provide basic guidelines for a safe, efficient, and economic airport system. The standards cover the wide range of size and performance characteristics of aircraft that are anticipated to use an airport. Various elements of airport infrastructure and their functions are also covered by these standards. Choosing the correct aircraft characteristics for which the airport will be designed needs to be done carefully so that future requirements for larger and more demanding aircraft are taken into consideration, while at the same time remaining mindful that designing for large aircraft that may never serve the airport is not economical.

3.2.1 Runway Design Code (RDC)/Airport Reference Code (ARC)

As discussed previously in Chapter 1, the Runway Design Code (RDC) and Airport Reference Code (ARC) are two components of the FAA's design standards. The RDC can be used to determine the necessary facility requirements, where as the ARC is used for planning purposes only. The existing RDC for Runway 5 is B-II/4000, and Runway 23 is B-II/VIS; the ARC for the Airport is B-II. The existing design aircraft for Runway 5-23 is a small corporate jet, such as the Cessna Citation 550.

For the purpose of the ALP Update, it is recommended that the RDC/ARC remain a B-II for the planning period. Although the airport is experiencing operations by larger aircraft within the Airplane Approach Category C/D and Airplane Design Group II, operations do not meet the FAA's minimum threshold of more than 500 annual operations to warrant changing the RDC/ARC. Based on a review of historical operations, it is also not likely that the threshold will be met in the foreseeable future. Recognizing that previous planning efforts recommended a RDC/ARC of D-II, consideration for those types of aircraft needs to be considered at some point in the future, along with the airfield facilities necessary to accommodate them. Therefore, the previously planned runway extension will be depicted on the ALP for planning purposes only. A runway extension is not currently justified, but the City has considered the potential impacts of a longer runway in their land use planning efforts. Thus, it is reasonable to continue protecting the land needed for a potential runway extension at some point in the future.

3.3 Airside Facility Requirements

All airports are comprised of both airside and landside facilities as presented in Chapter 1. Airside facilities consist of those facilities that are related to aircraft arrival, departure, and ground movement, along with all associated navigational aids, airfield lighting, pavement markings, and signage.

3.3.1 Runway Length

There are many factors that may determine the runway length for an airport. FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance for determining runway length requirements. The information required to determine the recommended runway length(s) includes airfield elevation, mean maximum temperature of the hottest month, and the effective gradient for the runway. Also, the performance characteristics and operating weight of an aircraft impacts the amount of runway length needed. The following information for the Casa Grande Municipal Airport was used for the analysis:

- Field elevation: 1,460 feet mean sea level (MSL)
- Mean maximum temperature of hottest month (July): 106^{o} F
- Effective Runway 5-23 gradient: 16 feet

The process to determine recommended runway lengths for a selected list of critical design aircraft begins with determining the weights of the critical aircraft that are expected to use the airport on a regular basis. For aircraft weighing 60,000 pounds or less, the runway length is determined by family groupings of aircraft having similar performance characteristics. The first family grouping is identified as small aircraft, which is defined by the FAA as airplanes weighing 12,500 pounds or less at maximum takeoff weight (MTOW). The second family grouping is identified as large aircraft, which is defined by the FAA as aircraft exceeding 12,500 pounds but weighing less than 60,000 pounds. For aircraft weighing more than 60,000 pounds, the required runway length is determined by aircraft-specific length requirements.

With an existing runway length of 5,200 feet, Runway 5-23 can accommodate 100 percent of the small airplanes. However, based on the analysis, the potential need to extend the runway may exist in the distant future in order to accommodate large aircraft weighing more than 12,500 pounds but less than 60,000 pounds, and aircraft weighing more than 60,000 pounds (e.g. larger corporate jets such as the Gulfstream IV and V). Currently, some types of large aircraft operating at the airport may be constrained and may have to make adjustments to their MTOW, as may be the case in the future should an increase in operations by large aircraft take place. Thus, if the types and frequencies of operations change significantly at the airport from current levels, the need to revisit the runway length analysis may be warranted. The recommended runway length information per the Advisory Circular is illustrated in **Table 3-1**.

Table 3-1 FAA Recommended Runway 5-23 Length

Description	Runway Length (ft)
Existing Runway 5-23 Length	**5,200**
Recommended to accommodate:	
Small Aircraft (<12,500 lbs.,< 10 passenger)	
75 percent of these small airplanes	3,180
95 percent of these small airplanes	3,790
100 percent of these small airplanes	**4,460**
Large Aircraft (<60,000 lbs.)	
75 percent of these planes at 60 percent useful load	**5,500**
75 percent of these planes at 90 percent useful load	**8,300**
100 percent of these planes at 60 percent useful load	**7,190**
100 percent of these planes at 90 percent useful load	11,160
Aircraft more than 60,000 lbs.	**5,520** (approx.)

Source: FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*, 2005

3.3.2 Runway Width

The required runway width is a function of airplane approach category, airplane design group, and the approach minimums for the design aircraft expected to use the runway on a regular basis. The existing runway pavement width of 100 feet for Runway 5-23 meets the existing and future FAA design standards and should be maintained over the planning period.

3.3.3 Runway Pavement Strength

According to FAA guidance on pavement strength, the aircraft types and the critical aircraft expected to use the airport during the planning period are used to determine the required pavement strength, or weight bearing capacity, of airfield surfaces. The required pavement design strength is an estimate based on average levels of activity and is expressed in terms of aircraft landing gear type and configurations. Pavement design strength is not the maximum allowable weight; limited operations by heavier aircraft other than the critical aircraft may be permissible. It is important to note that frequent operations by heavier aircraft will shorten the lifespan of the pavement.

According to the FAA Airport Master Record (Form 5010-1), the existing runway pavement strength at the Airport is 18,500 pounds single-wheel gear and 65,000 pounds dual-wheel gear. The previous airport master plan also reported the existing runway pavement strength the same as the FAA Airport Master Record. However, as part of the latest ADOT Airport Pavement Management System (APMS) project, Applied Pavement Technology, Inc. (APTech) recently determined the Pavement Classification Number (PCN) for the runway, taxiways, and apron pavements. Based on the findings of the APMS project, the PCN for the runway is 2/F/D/Y/T. This PCN equates to a pavement strength rating of 6,200 pounds according to Table 3 contained in the Pavement Classification Number Report dated October 2014.

It is recommended that further review and verification of the runway pavement strength be undertaken in the near future. In order for the airport to accommodate heavier aircraft on a regular basis in the future, the pavement strength of the runway will need to be increased significantly.

3.3.4 Taxiway and Taxilane Requirements

The existing taxiways on the Airport exceed the minimum design standards for TDG 1B (25 feet wide) and TDG 2 (35 feet wide). Based on the recommended RDC and ARC of B-II, all future taxiways should be constructed in accordance with TDG 2 design standards. However, due to the current configuration of hangars located west of Piper Ave up to the intersection of Taxiway B and E, it is recommended Taxiway E (which is currently under design to be rehabilitated) remain in accordance with TDG 1 standards.

According to FAA AC 150/5300-13, *Airport Design*, there are two types of runway exit taxiways. The taxiways are classified as either “right angle” or “acute angle.” When the design-hour, peak-hour traffic is less than 30 operations (landings and takeoffs) a properly located right-angled exit taxiway will achieve an efficient flow of traffic. The acute angle taxiway will form a 30-degree angle with the runway centerline and is commonly referred to as a “high speed” exit taxiway. The purpose of a high speed exit taxiway is to enhance airport capacity. High speed taxiways are commonly found at airports regularly serving aircraft in approach category C and above.

The Casa Grande Municipal Airport has one high-speed taxiway designated as Taxiway E. The taxiway is located approximately 1,000 feet from the end of Runway 5. According to FAA AC 150/5300-13, *Airport Design,* the current location of the high-speed taxiway will result in a cumulative utilization of between 4 and 13 percent. In addition, the planned approach category for the planning period is approach category B. Therefore, the need for the high-speed taxiway and the location of the taxiway relative to the Runway 5 threshold will result in very low utilization of the taxiway. The need for the taxiway and its use may increase if the runway is extended at some point in the future.

3.3.5 Aircraft Apron

FAA AC 150/5300-13A, *Airport Design*, provides design criteria to assist in apron layout and capacity. For the purpose of calculating the necessary apron size, the following planning criterions were used:

- 800 square yards of apron per based aircraft for single-engine and multi-engine aircraft
- Itinerant aircraft apron requirements are based on the design hour operations

A summary of the apron requirements are shown in **Table 3-2**. Based on the above criterion and the results in Table 3-2, the existing apron size appears adequate in the short- and medium- term planning period. However, it may be necessary to add additional apron space in the long-term planning period. Should more apron space be needed in the future, the existing turf tie-down area located northeast of the terminal building could be used for this purpose.

Table 3-2 Aircraft Apron Requirements

Apron Type	2014 (Existing)	2019	2024	2029	2034
Based Aircraft Apron Area (sy)	-	19,040	21,695	24,815	28,411
Itinerant Aircraft Apron Area (sy)[1]	-	42,556	48,628	55,621	63,681
Total Aircraft Apron Area (sy)	**78,000**[2]	61,596	70,323	80,436	92,092

Note. Apron development will depend on actual demand. [1]Based on 800 square yards multiplied by the design hour operations. [2]Existing apron size is approximate.
Source: ACI, 2015

3.3.6 Lighting and Visual Aids

The existing airfield lighting and visual aids located at the Airport are all in good to excellent condition, and no major deficiencies in this area were found during the on-site inventory. Only a small portion of Taxiway E near the existing electrical building was observed to have several retro-reflector taxiway edge markers; it is recommended that during the reconstruction of this project taking place in 2015, that the retro-reflectors be replaced with Medium Intensity Taxiway Lights (MITL). It is also recommended that any future taxiways have MITL installed as well.

3.3.7 Instrument Approach Procedures

Approach to Runway 23: Although the precision Instrument Landing System (ILS) and non-precision GPS and VOR/DME approaches to Runway 5 are currently serving the airport well, the Airport may want to consider adding a GPS non-precision straight in approach (with 1 mile visibility minimums) to Runway 23 in the future. Currently, Runway 23 has a visual only approach. Given the use of the airport by flight students on a regular basis, the addition of a non-precision approach to Runway 23 may be beneficial. Before adding the approach, the FAA would conduct an airspace analysis to determine if the approach is feasible given any potential obstructions that may exist at that runway end.

Approach to Runway 5: The Airport may want to explore why the visibility minimums for Runway 5 are reported as <1 mile but ≥ ¾ mile. Although a detailed review of the published approach procedure was not conducted as part of this study, it seems reasonable that lower minimums should be attainable given the flat surrounding terrain. It should be noted that the previous Airport Master Plan reported the minimums for Runway 5 as lower than ¾ mile, but not lower than ½ (CAT 1). Many times it is an obstacle(s) that will cause the minimums to be raised. To enhance the reliability of the Airport, it is recommended that the current minimums be reviewed to determine if the penalty can be mitigated allowing for the minimums to be lowered. Any potential extension on the Runway 5 end should also be designed to provide for lower than ¾ mile, but not lower than ½ minimums.

3.3.8 Helicopter Parking Pads

As previously mentioned in Chapter 1, the airport is frequently utilized by emergency air medical evacuation (medevac) companies and law enforcement agencies operating various types of helicopters. One medevac company (PHI Air Medical) is currently based at the Airport. As of the writing of this report, PHI Air Medical was in the process of relocating from a building located on the apron southwest of the terminal building to a building located near the t-hangars southeast of the terminal building. Plans have already been made to pave the surrounding dirt infield near the new building and establish three helicopter parking pads. The helicopter parking pads will be designed to accommodate the Eurocopter AS350, as this is the current helicopter operating in and out of the Airport by PHI Air Medical. Likewise, one additional helicopter parking pad is suggested to be designated on the main aircraft apron to replace the existing parking pad which is incorrectly identified as a heliport (see the following section, Corrections to Non-Standard Conditions, which will address this issue in more detail).

3.3.9 Corrections to Non-Standard Conditions

Based on a recent site visit, some non-standard conditions on the airfield were noted. The following describes the observed conditions, and also suggests recommendations for their correction:

Runway 5 - glideslope critical area: It was noted that an existing 6-foot high chain-link fence with three strands of barbed wire and an existing wash transverse the existing glideslope critical area. According to FAA AC 150/5300-13A, *Airport Design*, the glideslope critical area should be free of vegetation and graded to remove surface irregularities. It is recommended that the fence be mitigated to enhance the performance of the glideslope. Mitigating the wash is more complex and would require more planning and resources than the fencing.

Pavement markings: A helicopter parking pad is located in the center of the existing aircraft parking apron. The existing pad is approximately 215 feet by 385 feet and is marked in paint with a **"H"**; this type of marking indicates that it is a heliport. Based on a review of the FAA Airport Master Record for the airport and a search of the FAA database for all existing heliports in the state of Arizona, an approved heliport does not exist at the airport. Therefore, the "H" and all other painted markings indicating a heliport should be removed to avoid confusion by pilots. A painted circle should be added to indicate that a helicopter parking pad is available per FAA Advisory Circular 150/5390-2C, *Heliport Design*. As mentioned in the previous section, this helicopter parking pad should be designed to accommodate the Eurocopter AS350.

Separation between existing t-hangars: It was noted that the separation between the existing t-hangars does not meet Airplane Design Group (ADG) II standards. In fact, the separation between the existing T-hangars does not meet ADG I standards. The separation distance between the existing t-hangars varied from 63 to 75 feet. Given that the aircraft using the T-hangars fall within ADG I standards, all future t-hangars should be separated by 79 feet to comply with ADG I standards.

Aircraft Tiedown Layout: Although not field verified, it appears that the existing aircraft tiedown layouts do not meet current standards. The City should consider remarking the aircraft tiedown layouts to meet FAA Advisory Circular 150/5300-13, *Airport Design*, as part of a future apron rehabilitation project.

3.4 Landside Facility Requirements

Landside facilities are an important aspect of any airport as they handle aircraft and passengers while on the ground at the airport. Landside facilities serve as the processing interface between two modes of transportation - air and ground. Likewise, landside facilities also offer travelers the first impression of the airport and the local community.

3.4.1 Terminal Building

The terminal building at general aviation airports typically offers various amenities to passengers, local and transient pilots, and airport management. Terminal buildings most often house public restrooms, public telephones, a pilot lounge area, and information regarding airport services. The existing terminal building at the Casa Grande Municipal Airport is utilized by the Airport's management and personnel and transient or local aircraft operators.

The accepted methodology used to project terminal building facility needs for general aviation airports is based on the number of airport users anticipated to use the facility during the design hour. The design hour is typically defined as the peak hour of an average day of the peak month. The design hour measures the number of passengers departing or arriving on aircraft in an elapsed hour of a typical busy (design) day. Estimating design hour passengers is typically a three-step process which involves the following:

- Determine the peak month,
- Determine the design day to be used, and
- Estimate the amount of daily activity (operations) that occurs in the design hour.

The number of peak hour passengers and pilots was derived by assuming 3.4 passengers and pilots per design hour operation. The terminal function size is based on providing 100 square feet per peak design hour. This process is applied to both the existing (base year) conditions as well as activity in future years. **Table 3-3** depicts the terminal building requirements based on conventional planning methods.

Table 3-3 General Aviation Terminal Building Requirements

Year	Design Hour Operations	Peak Hour Pilots and Passengers	Terminal Function Size (sf)
2014	47	160	16,030
2019	53	183	18,299
2024	61	209	20,910
2029	70	239	23,917
2034	80	274	27,383

Source: ACI, 2015

As described in Chapter 1, the existing terminal building is approximately 4,800 square feet. As shown in **Table 3-3**, the existing terminal building may not be adequately sized for the forecasted activity based on the conventional planning methods used to calculate the space requirements. However, at present, the existing terminal building appears adequate and no constraints have been noted or reported at the time of this writing. Should the terminal building need to be expanded in the future, there is adequate space surrounding the terminal building on either side of the existing building.

3.4.2 Hangar Facilities

Prefabricated conventional and T-hangar units are available from a variety of manufacturers throughout the nation. Storage space for based aircraft was determined using guidelines suggested in manufacturer’s literature. Typical aircraft sizes were also reviewed in light of the evolution of business aircraft sizes.

Conventional hangar standards:

- 1,200 square feet for single-engine aircraft
- 1,400 square feet for multi-engine aircraft
- 1,800 square feet for turboprop or turbojet aircraft

T-hangar standards:

- 1,400 square feet for single- and multi-engine aircraft

Using the above criterion, combined with consideration of the potential fleet mix, **Table 3-4** depicts the demand requirements for hangar space at the Airport. It should be noted that these requirements are not rigid, meaning that shifting of the space requirements between conventional and T-hangars is something that the City of Casa Grande will need to consider as operations fluctuate and the need to satisfy user's specific requirements are identified.

Table 3-4 Aircraft Hangar Requirements

	Year				
	2014[1]	2019	2024	2029	2034
Based Aircraft	105	120	137	157	179
Total Aircraft in Hangars (approximately 80%)	84	97	109	125	144
Aircraft in T-hangars (approximate)	62	72	81	93	107
Aircraft in Conventional Hangars (approximate)	22	25	28	32	37
Hangar Size Requirements					
T-hangars (sf)	86,800	100,800	113,400	130,200	149,800
Conventional Hangars (sf)[2]	28,600	32,500	36,400	41,600	48,100
Total Hangar Storage (sf) (approximate)	115,400	133,300	149,800	171,800	197,900

Note. Hangar development will depend on actual demand. Abbreviations: single-engine (SE); multi-engine (ME); square feet (sf) [1]Does not necessarily represent actual number of aircraft currently in hangars; [2]An average of 1,300 square feet was used to approximate the required space (average of 1,200 sf for SE conventional hangar and 1,400 sf for ME conventional hangar)
Source: ACI, 2015

As previously mentioned in Chapter 1, the Airport owns and leases 52 total T-hangar bays, 20 T-shade bays, and 1 conventional box hangar (the other six are privately owned). Furthermore, airport management indicated 13 aircraft are currently on a hangar waiting list. As such, one can infer that aircraft hangar storage is in demand at the Airport at current activity levels. Using the information provided by airport management and from the data shown in **Table 3-4**, the potential to add hangar facilities at the airport does exist over the course of the planning period.

The Airport has already planned for the development of future T-hangars and potentially one large conventional hangar to be located on the portion of west apron that was recently constructed in 2013. These facilities are shown on the ALP as future development.

3.4.3 Aviation Fuel Facilities

As discussed in Chapter 1, there are currently two fuel storage tanks on the Airport that are owned and operated by the City. Each fuel tank has a capacity of 12,000 gallons; 100LL AvGas and Jet A are available. A self-service system with a credit card reader is available for AvGas only. Three fuel trucks are also available for mobile fueling.

At present, the fuel facilities and equipment are adequate for the existing operations at the Airport. The fuel is centrally located, and there is adequate room for expansion in the future should it be needed. Additional fuel storage capacity should be planned when the airport is unable to maintain an adequate supply and reserve. For general aviation airports such as Casa Grande Airport, typically a 14 day supply is common. If the need for additional fuel storage becomes necessary, additional tanks should be added in 10,000 or 12,000 gallon increments. These increments will be the most economical to install.

3.4.4 Airport Property

The airport has expressed an interest in releasing a parcel of land contained within Parcel 2, as shown on the Exhibit “A” drawing within the ALP drawing set. The land is located immediately south of the airport entrance road and is adjacent to North Pinal Avenue/Highway 387. The land has no development on it and is approximately 2.75 acres. According to the previous airport master plan, the land was planned for non-aeronautical development, but was not identified as land to be released. The Airport is now interested in releasing the land for non-aeronautical development. To date, developers have not approached the airport about the land. However, if and when any development interest in the land emerges in the future, the Airport will ensure that any development of the released land will be compatible with the airport. Based on a review of the Exhibit “A,” the parcel was not acquired using Federal funds, therefore a prorated reimbursement to the FAA will not be required.

3.5 Summary of Facility Requirements

The facility requirements for the Casa Grande Municipal Airport are summarized in **Table 3-5**. The recommendations are based on the types and volume of aircraft currently using, and expected to use, the airport in the short-, medium-, and long-term time frames. These recommended facilities will enable the airport to continue to serve its users in a safe and efficient manner.

Table 3-5 Facility Requirements Summary

Item	Base Year Existing (2014)	Short-Term	Medium-Term	Long-Term
Airside Requirements				
Runway 5-23				
Runway Design Code (RDC)	RW 5: B-II/4000 RW 23: B-II/VIS	RW 5: Same as existing RW 5 (potential extension): B-II/2400 RW 23: B-II/5000		
Length (ft)	5,200	Maintain existing[1]		
Width (ft)	100	Maintain existing		
Pavement Strength (lbs)	18,500 S[2]; 65,000 D[2]	Verify existing strength	Potentially strengthen to 18,500 S;80,000 D	Maintain
Lighting	Edge: MIRL Approach (Rwy5): MALSR	Same as existing		
Markings	Precision/Non-precision	Same as existing		
Taxiways				
Type	Parallel: TW B Connector: TW A, D, F High Speed: E	Same as existing		
Taxiway Design Group (TDG)	Non-standard	TDG 2		
Width (ft)	Varies between 30-40	35		
Lighting	MITL	Same as existing		
Markings	Centerline	Same as existing		
Taxilanes (near T-hangars/T-shades/Box hangars)				
Taxiway Design Group (TDG)	TDG 1	TDG 1	TDG 1 (T/W E) /TDG 2 (all others)	
Width (ft)	25	25	25/35	
Lighting	No	MITL	Maintain	
Markings	Centerline	Maintain existing		

Apron[3]				
Tie-down/transient (sy)	78,000	Maintain existing		80,000 – 92,000
Landside Requirements				
Terminal[3]				
General Aviation (sf)	4,800	Same as existing	21,000	24,000 - 28,000
Hangars[3]				
T-hangars/T-shades (sf)	100,800	100,800	113,400	149,800
Conventional (sf)	1,300	32,500	36,400	48,100
Total (sf)	102,100	133,300	149,800	197,900
Fuel Facility				
Jet A (gal)	12,000	Same as existing		
AVGAS (100LL) (gal)	12,000	Same as existing		
Total (gal)	24,000	Same as existing		
Self-fueling/Credit card reader	Yes (AvGas only)	Maintain		

Note. [1]According to Table 3-1, the need to extend the runway at some point in the future may occur should operations from larger, more demanding aircraft take place on a more frequent basis; currently operations by large aircraft do not meet the FAA's condition of 500 operations annually to justify an increase in runway length; [2]As reported on the FAA Form 5010-1 and in the 2009 AMP; 2014 PCN report indicates a pavement strength of 6,200 pounds single-wheel landing gear; [3]Terminal space, hangar, and apron development will depend on actual demand.

Abbreviations: MIRL = Medium Intensity Runway Lights, MITL= Medium Intensity Taxiway Lights, MALSR = Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights, TDG = Taxiway Design Group, S = Single-wheel landing gear, D = Dual-wheel landing gear

Source: ACI, 2015

CHAPTER FOUR

FINANCIAL PLAN

CITY OF CASA GRANDE
PINAL COUNTY, ARIZONA
AIRPORT LAYOUT PLAN UPDATE AND
NARRATIVE REPORT

ARMSTRONG

Chapter 4 – Financial Plan

4.1 Introduction

The final chapter of an airport layout plan narrative report is intended to provide guidance on what will be required by the airport sponsor to fund the projects contained within the report. A more general discussion of the funding of medium and long-term projects is more reasonable because of the uncertainty of future Federal and State funding and possible shifts in the overall importance of those projects in reaction to aviation demand at the airport and changes in the economic climate in a community. The City's ability to fund the recommended projects is a major consideration in preparing the Capital Improvement Plan (CIP). The recommended development plan for the Casa Grande Municipal Airport is based on the facility requirements as presented in Chapter 3.

The proposed funding plan contained in this chapter assumes the continuation of the FAA's Airport Improvement Program (AIP), and the growth of the Airport's aviation activity as depicted in the approved forecasts.

4.2 Airport Development Plan

The future airport development at Casa Grande Municipal Airport contained in this study covers a 20-year planning period. Development is grouped into three phases:

- Phase I, Short-term (1-5 years)
- Phase II, Medium-term (6-10 years)
- Phase III, Long-term (11-20 years)

The development costs contained in this chapter are based on the proposed improvements shown on the Airport Layout Plan. The phasing of projects assists the airport sponsor in budgetary planning for future construction projects. **Table 4-1** outlines the 20-year development plan. The sequence in which the projects are completed is important, as the ultimate configuration of the Airport will require numerous projects.

Table 4-1 Development Plan Phasing

Phase I, Short-term Development		Total	FAA Share	State Share	Local Share[1]
A1	Re-construct Taxiway E	$750,000	$0	$675,000	$75,000
A2	Construct helicopter parking apron (12,000 sy)	$900,000	$819,540	$40,230	$40,230
A3	Construct bypass taxiways (both R/W ends)	$400,000	$364,240	$17,880	$17,880
A4	Construct connector taxiway	$180,000	$163,908	$8,046	$8,046
A5	Construct T-hangar	$300,000	$0	$0	$300,000
A6	Environmental Assessment – Re-route existing wash on the Runway 5 end	$450,000	$409,770	$20,115	$20,115
	Total Short-term Development Cost	**$2,980,000**	**$1,757,458**	**$761,271**	**$461,271**
Phase II, Medium-term Development					
B1	Construct T-hangar	$300,000	$0	$0	$300,000
B2	Re-route existing wash and fence relocation from GS critical area on the Runway 5 end	$2,500,000	$2,276,500	$111,750	$111,750
	Total Medium-term Development Cost	**$2,800,000**	**$2,276,500**	**$111,750**	**$411,750**
Phase III, Long-term Development					
C1	Acquire avigation easements (Runway 5 RPZ)	$350,000	$318,710	$15,645	$15,645
C2	Construct T-hangar	$300,000	$0	$0	$300,000
C3	Construct aircraft parking apron (20,000 sy)	$1,560,000	$1,420,536	$69,732	$69,732
C4	Expand passenger terminal building and vehicle parking lot	$750,000	$375,000[2]	$0	$375,000
C5	Expand aircraft parking apron (30,105 sy)	$2,350,000	$2,139,910	$105,045	$105,045
	Total Long-term Development Cost	**$5,310,000**	**$4,254,156**	**$109,422**	**$865,422**
	TOTAL DEVELOPMENT COST	**$11,090,000**	**$8,288,114**	**$1,063,443**	**$1,738,443**

Source: Armstrong Consultants, Inc., 2015

Note. All costs are calculated in 2015 dollars and are for planning purposes only. Assumes 91.06 percent funding for FAA eligible development and 4.47 percent funding for State eligible development (with 4.47 percent match by Sponsor (Local)); if State funding is not eligible, Sponsor's share is 8.94 percent. Some eligible projects may be funded without FAA participation, in which case the State funding share is 90 percent and the sponsor's share is 10 percent. Funding for eligible projects, regardless of FAA or State participation, is not guaranteed and is subject to funding availability.

[1] Local share may include sponsor funds and/or private development funds. [2] According to FAA Order 5100.38D, *Airport Improvement Program Handbook*, general aviation airports may use their non-primary entitlements on portions of a terminal building.

4.3 Funding Sources

Funding to support the development of the Airport comes from Federal, State, and local participation. This section will identify and quantify the anticipated sources of capital funds. Federal funds represent the majority of anticipated capital; however, a number of other sources are identified and discussed below.

4.3.1 Federal Aviation Administration

The most recent legislation affecting federal funds for airports across the country was enacted on February 17, 2012, and is entitled *The FAA Modernization and Reform Act of 2012.* The law authorizes the FAA's Airport Improvement Program (AIP) at $3.35 billion for fiscal years 2012 through 2015. Eligible airports, which include those in the National Plan of Integrated Airports System (NPIAS), can apply for AIP grants on an annual basis.

The source for AIP 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, equipment, and research and development). The Aviation Trust Fund also finances the operation of the FAA. It is funded through users' fees, including taxes on airline tickets, aviation fuel, and various aircraft parts.

For large and medium primary hub airports, AIP grants cover 75 percent of eligible costs (or 80 percent for noise program implementation). For small primary, reliever, and general aviation airports, the grants cover 90 - 95 percent of eligible costs, based on statutory requirements.

Entitlements - The term “entitlements” refers to the passenger, cargo service, and state apportionments (including non-primary apportionments when applicable) available to sponsors and states based on formulas found within the Modernization Act. Funds apportioned for any non-hub or non-primary airport remain available for obligation during the fiscal year for which the amount was apportioned and the three fiscal years immediately following that year. Apportioned funds that have been unused are protected and carryover for the airports through the three or four year periods. Non-primary entitlement funds are specifically for general aviation airports listed in the latest NPIAS that demonstrate needed airfield development. General aviation airports with an identified need are eligible to receive annually the lesser value of the following:

- 20 percent of the 5-year cost of their current NPIAS value, or
- $150,000 per year

A funding condition of the non-primary entitlement is that Congress must appropriate $3.2 billion or more for non-primary entitlement funds to exist in the fiscal year.

State Apportionment - If the AIP has funding available equal to, or more than $3.2 billion, a total of 20 percent (or if the AIP has funding available under $3.2 billion, a total of 18.5 percent) of the annual amount made available for obligation is apportioned for use at non-primary commercial service, general aviation, and reliever airports within the United States.

Discretionary - Airport capacity, safety, and security projects are funded on a national priority system based on need. Many of the most expensive projects in the CIP such as runway extensions are expected to be funded from discretionary funds. Other CIP projects may be eligible for FAA discretionary dollars, but are ranked lower or have portions of the project that may be funded from discretionary funds. Discretionary funds provide 91.06 percent of the cost of eligible projects.

4.3.2 State Funding Program

In Arizona under the current legislation, capital improvement projects are funded 91.06 percent by the FAA and 8.94 percent by the sponsor for fiscal year 2012 through 2015 (with the exception of some commercial service airports and some airports located in economically distressed areas). Beyond fiscal year 2015, the FAA will go through the re-authorization process, or pass continuing resolution(s) to continue funding the Aviation Trust Fund. The State's airport-assistance program for the five-year Airport Capital Improvement Plan (ACIP) includes two funding splits for grants based upon whether or not the FAA is participating. When the FAA participates, the Arizona Department of Transportation (ADOT) provides 50 percent of a sponsor's share. Current sponsor obligations on federal projects are 8.94 percent of a project's total cost, making the state share 4.47 percent. Each year, the ADOT ACIP program sets aside between $3.5 million (in FY 2011) to about $4.5 million (in FY 2014) to match federal grants. As airport sponsors receive a federal grant, they apply to the state for the matching funds. Additionally, some direct or “state only” grants (when the FAA is not participating in the funding) may be available to a sponsor for eligible projects. Currently, ADOT will fund 90 percent of eligible projects, leaving the remaining 10 percent share to be funded by the sponsor.

To fund revenue generating developments at airports, ADOT established the Arizona Development Loan Program. The program is designed to be a flexible funding mechanism to assist eligible airport sponsors in improving the economic status of their respective airports.

Eligible Applicants - The state, city, town, county, district, authority or other political subdivisions of the state, which owns and operates an airport(s), open to the public on a nondiscriminatory basis, is eligible for assistance under the Loan Program. Eligible airports must be identified in the ADOT State Airports System Plan dated November 2009 (or the most current version).

Eligible Projects - Typical eligible projects included airport related construction projects for runways, taxiways, aircraft parking ramps, aircraft storage facilities (hangars), fueling facilities, general aviation terminal buildings or pilot lounges, utility services (power, water, sewer, etc.) to the airport runway or taxiway lighting, approach aids (electronic or visual), ramp lighting, airport fencing, airport drainage, land acquisition, planning studies, and under certain conditions, the preparation of plans and specifications for airport construction projects. In addition, projects not eligible for funding under other programs and those designed to improve the airport self-sufficiency, may also be considered.

Pavement Maintenance Program - The Arizona Pavement Preservation Program (APPP) has been established to assist in the preservation of the Arizona airport system infrastructure. Every year ADOT's Aeronautics Group, using the Airport Pavement Management System (APMS), identifies airport pavement maintenance projects eligible for funding for the upcoming five-year ACIP. 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 APPP, or the airport sponsor may sign an inter-government agreement (IGA) with the Aeronautics Group to participate in the APPP.

The City has taken advantage of the pavement maintenance program at the Casa Grande Municipal Airport. Provided the program continues, it is recommended that the County continue to leverage this program to preserve the overall integrity of the airfield pavement. However, it should be noted that the APMS program is supplemental to the airport sponsor's own pavement management program, and therefore should not be solely dependent upon as a means for the upkeep of the airport's pavements.

4.3.3 Local Funding

Airport Rates and Charges - FAA Order 5190.6B, *FAA Airport Compliance Manual*, provides comprehensive guidance on the legal requirement that airport fees be fair, reasonable, and not unjustly discriminatory. The objective of the policy is to provide guidance to airports in establishing rates and charges that will help the airport work towards financial sustainability.

Several revenue generating activities that the City is already doing will continue to enhance revenues at the Airport, such as:

- Aircraft hangar rental
- Aircraft tie-down rental
- Fuel sale mark-up

Other more conventional methods of securing funding the City could consider include:

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

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

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

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

The airport funds some or all of the cost of capital projects by generating revenue from tenants, users and other sources. These airport funds can come from annual surplus, reserves, or borrowing. While capital projects are usually funded from variety of sources, in the end, airport contributed funds have a role in almost all projects, particularly as seed money to initiate projects and to provide the match of FAA funds.

4.4 Conclusion

This Airport Layout Plan Update has documented the existing and anticipated aviation demand based on existing conditions, as well as provided a practical and implementable development plan. The development plan presented herein is based on the continuation of FAA Airport Improvement Program (AIP) funding at the current levels. There is a competition for FAA funds, so the City will need to aggressively communicate its Capital Improvement Plan (CIP) needs to the FAA and State as opportunities arise.

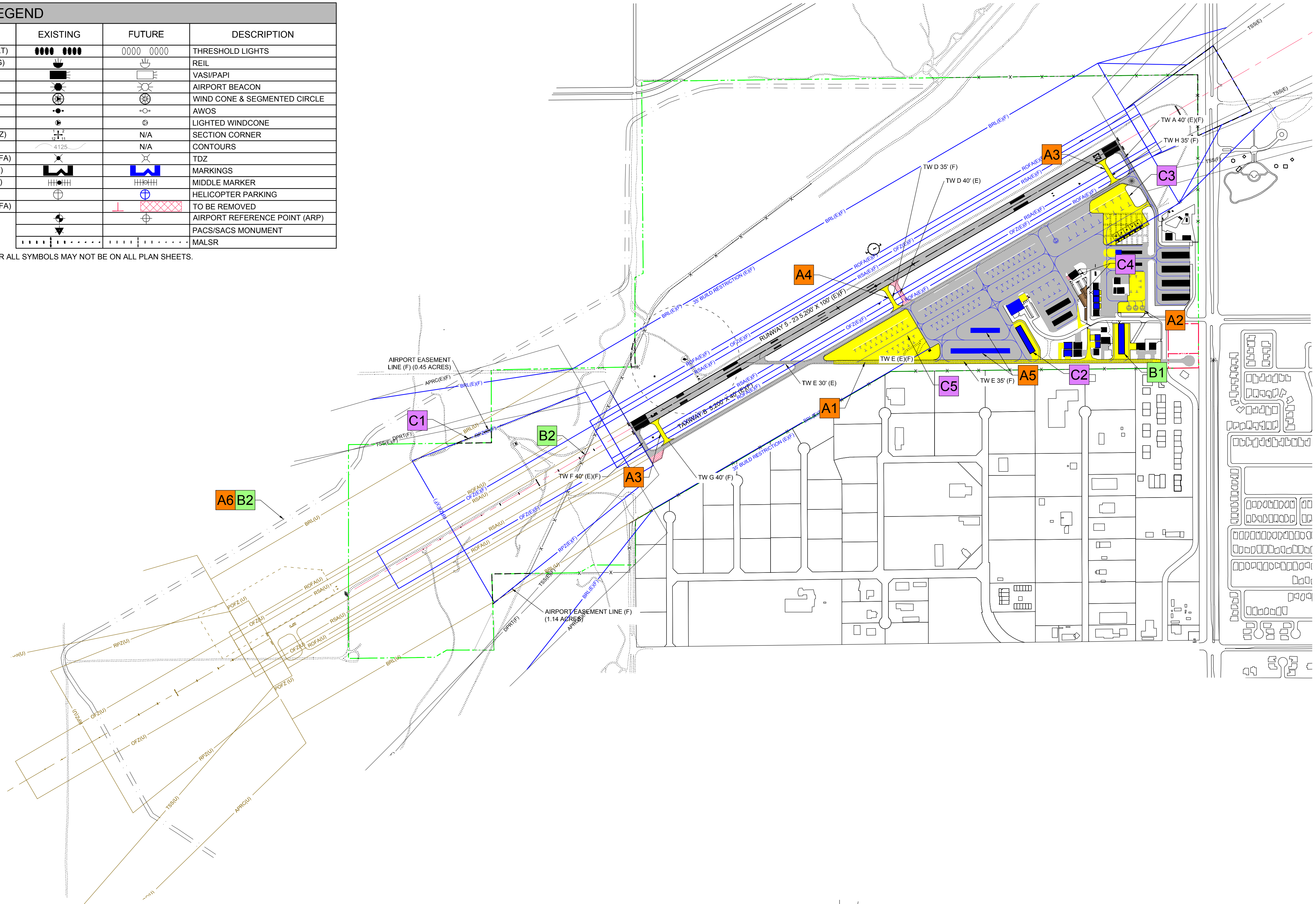
The CIP projects have been identified in **Table 4-1** are programmed within the 20-year planning period, as shown on **Exhibit A.** Based on the findings and the financial analysis presented in this study, the planned development depicted on the ALP along with the financial plan are considered feasible, thereby positioning the City to construct the necessary aviation facilities as recommended herein.

LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)			THRESHOLD LIGHTS
		STRUCTURE/FACILITIES (BUILDING)			REIL
		ROADS/PARKING			VASI/PAPI
		AIRPORT PROPERTY LINE (APL)			AIRPORT BEACON
		AIRPORT EASEMENT			WIND CONE & SEGMENTED CIRCLE
X G	XX G	FENCING/GATE			AWOS
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)			LIGHTED WINDCONE
OFZ(E)	OFZ(F)	PRECISION OBST. FREE ZONE (OFZ)		N/A	SECTION CORNER
POFZ(E)	POFZ(F)	OBSTACLE FREE ZONE (OFZ)	4125	N/A	CONTOURS
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			TDZ
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			MARKINGS
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)			MIDDLE MARKER
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			HELICOPTER PARKING
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)			TO BE REMOVED
					AIRPORT REFERENCE POINT (ARP)
					PACS/SACS MONUMENT
					MALSR

NOTE: LEGEND DEPICTS ALP DEVELOPMENT, HOWEVER ALL SYMBOLS MAY NOT BE ON ALL PLAN SHEETS.

PHASE-I SHORT TERM DEVELOPMENT ITEMS	
A1	RE-CONSTRUCT TAXIWAY E
A2	CONSTRUCT HELICOPTER PARKING APRON (12,000 SY)
A3	CONSTRUCT BYPASS TAXIWAYS (BOTH R/W ENDS)
A4	CONSTRUCT CONNECTOR TAXIWAY
A5	CONSTRUCT T-HANGAR
A6	ENVIRONMENTAL ASSESSMENT - RE-ROUTE EXISTING WASH ON RUNWAY 5 END
PHASE-II MEDIUM-TERM DEVELOPMENT ITEMS	
B1	CONSTRUCT T-HANGAR
B2	RE-ROUTE EXISTING WASH AND FENCE FROM GS CRITICAL AREA AT RWY 5 END
PHASE-III LONG-TERM DEVELOPMENT ITEMS	
C1	ACQUIRE NAVIGATION EASEMENTS (RWY 5 RPZ)
C2	CONSTRUCT T-HANGAR
C3	CONSTRUCT AIRCRAFT PARKING APRON (20,000 SY)
C4	EXPAND PASSENGER TERMINAL BUILDING AND VEHICLE PARKING LOT
C5	CONSTRUCT AIRCRAFT PARKING APRON (30,105 SY)



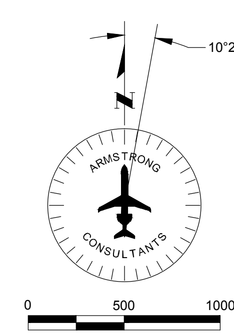


EXHIBIT A

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CHAPTER FIVE

AIRPORT LAYOUT PLAN DRAWING SET

CITY OF CASA GRANDE
PINAL COUNTY, ARIZONA
AIRPORT LAYOUT PLAN UPDATE AND
NARRATIVE REPORT

ARMSTRONG

Chapter 5 – Airport Layout Plan Drawing Set

5.1 Airport Layout Plan Drawing Set Contents

This chapter contains the ALP drawing set. There are twelve drawings, or sheets, which make up the entire set. The drawings within the set adhere to the guidelines set forth in the FAA's Standard Operating Procedures entitled *FAA Review and Approval of Airport Layout Plans (ALPs)* and *FAA Review of Exhibit 'A' Airport Property Inventory Maps* (ARP SOP 2.00 and 3.00). After the cover sheet, the remaining sheets include the following:

- Airport Layout Plan
- Airport Data Sheet
- Terminal Area Drawing
- 14 CFR Part 77 Airspace Drawing (2 sheets)
- 14 CFR Part 77 Profile
- Runway 5 Inner Approach (Existing & Future)
- Runway 23 Inner Approach (Existing & Future)
- On Airport Land Use Drawing
- Off Airport Land Use Drawing
- Exhibit A Airport Property Inventory Map
- Aerial Photograph

CASA GRANDE MUNICIPAL AIRPORT

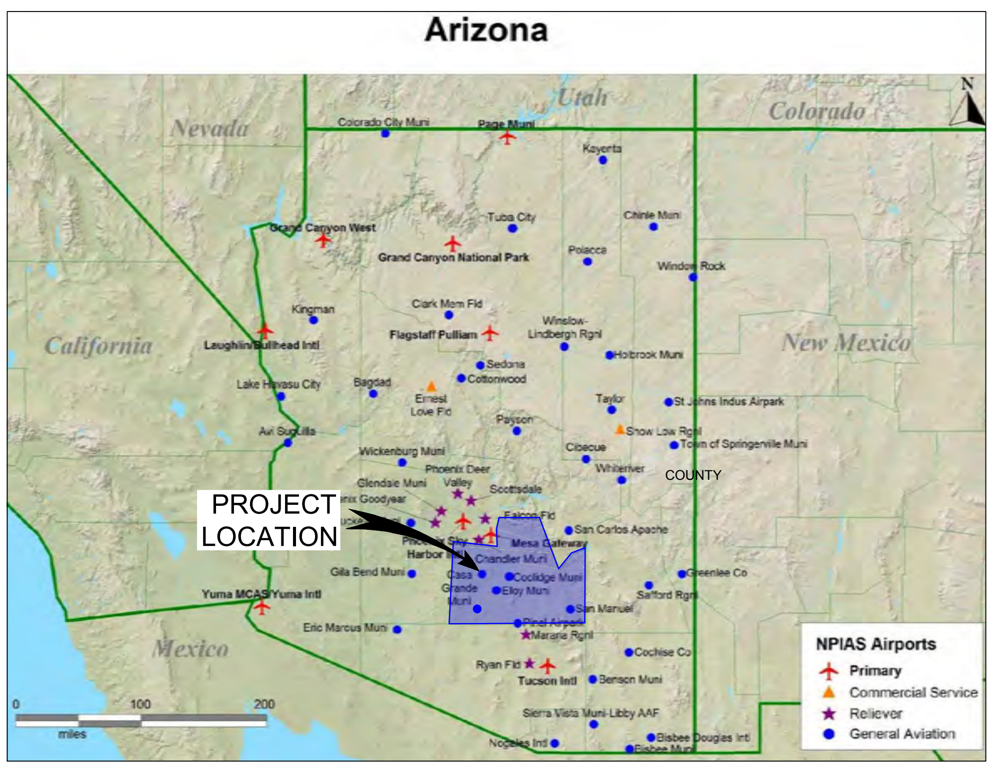
CITY OF CASA GRANDE, ARIZONA

AIRPORT LAYOUT PLANS

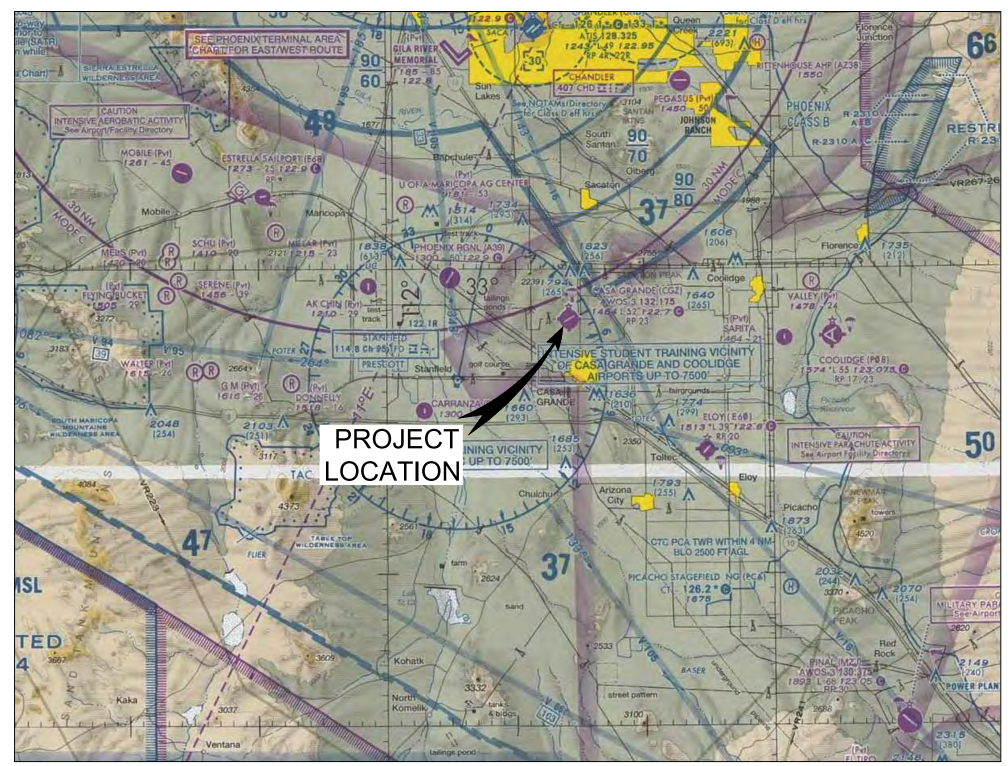
PREPARED BY:

ARMSTRONG CONSULTANTS, INC.

A.I.P. NO. 3-04-0007-017-14
ADOT NO. E5F2G
A.C.I. PROJECT NO. 146255
DATE: SEPTEMBER, 2015



LOCATION MAP
NTS



VICINITY MAP
NTS

INDEX TO SHEETS

(E = EXISTING, F = FUTURE)

No.	Project No.	Date	Revision / Description	File	Drwn.	Chkd.	Apprvd.
0	146255	9/2015	ORIGINAL ISSUE COPY AS NEEDED	146255100	LS	CM	JP

THE PREPARATION OF THIS DOCUMENT MAY HAVE BEEN SUPPORTED, IN PART, THROUGH THE AIRPORT IMPROVEMENT PROGRAM FINANCIAL ASSISTANCE FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER TITLE 49 U.S.C., SECTION 47104. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS REPORT BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE OR WOULD HAVE JUSTIFICATION IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

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146255100

AIRPORT FACILITIES LIST

NO.	EXIST.	FUTURE	FACILITY DESCRIPTION	TOP ELEV. (MSL-EST.)
1	○		ADMINISTRATION / TERMINAL BUILDING	±1471
2	○		TERMINAL AUTO PARKING	±1458
3	○		FUEL FARM	±1460
4	○		T-HANGAR	±1471
5	○		T-HANGAR	±1470
6	○		HANGAR	±1471
7	○		SPECIALTY OPERATIONS	±1465
8	○		SPECIALTY OPERATIONS	±1465
9	○		T-HANGAR	±1470
10	○		T-HANGAR	±1471
11	○		T-HANGAR	±1470
12	○		T-HANGAR	±1469
13	○		SHADE HANGAR	±1470
14	○		SHADE HANGAR	±1469
15	○		SPECIALTY OPERATIONS	±1465
16	○		HANGAR	±1470
17	○		HANGAR	±1469
18	○		HANGAR	±1474
19	○		HANGAR	±1469
20	○		HANGAR	±1469
21	○		HANGAR	±1469
22	○		HANGAR	±1469
23	○		HANGAR	±1470
24	○		HANGAR	±1470
25	○		BEACON	±1471
26	○		AWOS III	±1450
27	○		LOCALIZER	±1455
28	○		THRESHOLD LIGHT	-
29	○		WIND SOCK	±1462
30	○		PAPI	-
31	○		SEGMENTED CIRCLE / WIND CONE	±1456
32	○		GLIDE SLOPE ANTENNA	±1465
33	○		MALSR APPROACH LIGHTS	-
34	○		MIDDLE MARKER	-
35	○		ELECTRICAL BUILDING	±1450
36	○		ELECTRICAL EQUIPMENT SHELTER	±1456
37	○		LOCALIZER EQUIP. BLDGS	±1462
38		□	T-HANGAR	±1469
39		□	T-HANGAR	±1471

AIRPORT FACILITIES LIST

NO.	EXIST.	FUTURE	FACILITY DESCRIPTION	TOP ELEV. (MSL-EST.)
40		□	HANGAR	±1469
41		□	HANGAR	±1470
42		□	HANGAR	±1474
43		□	HANGAR	±1474
44		□	HANGAR	±1471
45		□	HANGAR	±1472
46		□	HANGAR	±1473
47		□	T-HANGAR	±1471
48		□	T-HANGAR	±1470
49		□	HANGAR	±1470
50		□	GLIDER T-HANGARS	±1458
51		□	HELO PARKING	±1465
52		□	WASH RACK	±1470
53		□	T-HANGAR	±1470
54		□	SHADE HANGAR	±1469
55		□	TERMINAL AUTO PARKING	±1458

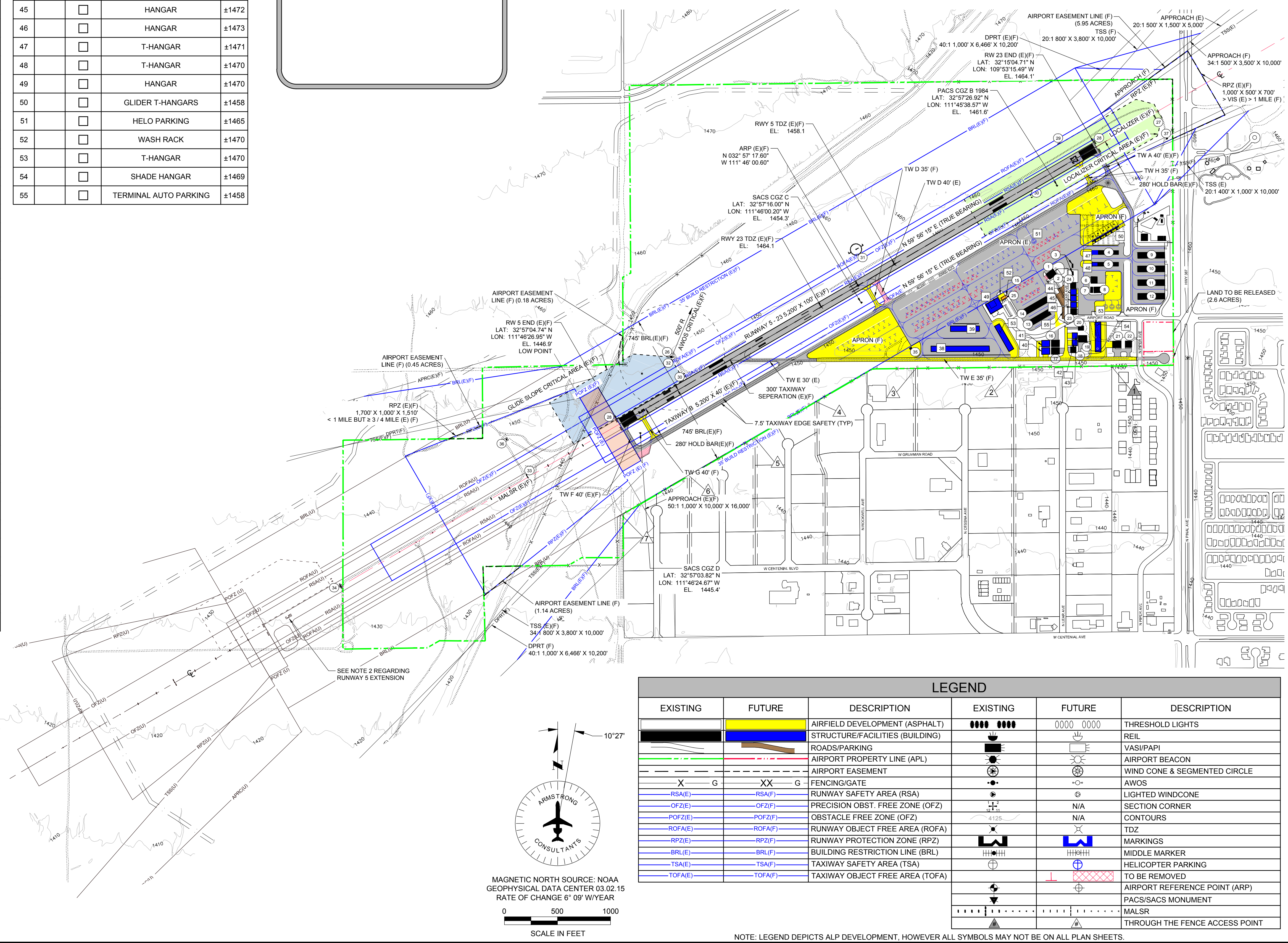
FAA APPROVAL

SPONSOR APPROVAL

City of Casa Grande　　DATE

NOTES

1. ALL LATITUDE/LONGITUDE COORDINATES SHOWN ARE 1983 NORTH AMERICAN DATUM (NAD 83).
2. THE CITY OF CASA GRANDE SHOULD ENCOURAGE COMPATIBLE LAND USE FOR POTENTIAL AVIATION PURPOSES ON PROPERTY NOT CURRENTLY OWNED OR CONTROLLED BY THE CITY. A POTENTIAL RUNWAY EXTENSION IS SHOWN FOR PLANNING PURPOSES ONLY.



LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)			THRESHOLD LIGHTS
		STRUCTURE/FACILITIES (BUILDING)			REIL
		ROADS/PARKING			VASI/PAPI
		AIRPORT PROPERTY LINE (APL)			AIRPORT BEACON
		AIRPORT EASEMENT			WIND CONE & SEGMENTED CIRCLE
—X— G	—XX— G	FENCING/GATE			AWOS
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)			LIGHTED WINDCONE
OFZ(E)	OFZ(F)	PRECISION OBST. FREE ZONE (OFZ)		N/A	SECTION CORNER
POFZ(E)	POFZ(F)	OBSTACLE FREE ZONE (OFZ)	4125	N/A	CONTOURS
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			TDZ
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			MARKINGS
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)			MIDDLE MARKER
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			HELICOPTER PARKING
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)			TO BE REMOVED
					AIRPORT REFERENCE POINT (ARP)
					PACS/SACS MONUMENT
					MALSR
					THROUGH THE FENCE ACCESS POINT

NOTE: LEGEND DEPICTS ALP DEVELOPMENT, HOWEVER ALL SYMBOLS MAY NOT BE ON ALL PLAN SHEETS.

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CASA GRANDE MUNICIPAL AIRPORT
CITY OF CASA GRANDE, ARIZONA

AIP No. 3-04-0007-017-14
AIRPORT LAYOUT PLAN

No.	Project No.	Date	Revision / Description	File	Dwn.	Chkd.	Apprvd
3							
2							
1							
0	146255	09/2015	ORIGINAL ISSUE	146255-100	LDS	CM	JZP

AIRPORT LAYOUT PLAN

Sheet: 2 of: 13

RUNWAY DATA

ITEM		RW 5 / 23 - EXISTING (E)		RW 5 / 23 - FUTURE (F)	
RUNWAY IDENTIFICATION		5	23	5	23
RUNWAY DESIGN CODE (RDC) / RUNWAY VISUAL RANGE (RVR)		B/II/4000	B/II/VIS	B/II/2400	B/II/5000
APPROACH REFERENCE CODE (APRC)		B/III/4000	B/III/VIS	B/III/4000	B/III/5000
DEPARTURE REFERENCE CODE (DPRC)		B/III	B/III	B/III	B/III
SURFACE MATERIAL, PAVEMENT STRENGTH & MATERIAL TYPE	SURFACE MATERIAL	ASPHALT		ASPHALT	
	STRENGTH BY WHEEL LOADING (LBS)	18.5 (S) / 65 (D)		18.5 (S) / 65 (D)	
	PCN (FOR BEARING STRENGTH OF 12,500 LBS OR GREATER)	2/F/D/YT		2/F/D/YT	
	SURFACE TREATMENT	NONE		NONE	
RUNWAY GRADIENT	EFFECTIVE (%)	0.33		0.33	
	MAXIMUM (%)	0.45		0.45	
	LINE OF SIGHT MET (Y OR N)	Y		Y	
PERCENT WIND COVERAGE	A / B-I - 10.5 KTS	97.93%		97.93%	
	A / B-II - 13 KTS	99.10%		99.10%	
RUNWAY DIMENSIONS					
RUNWAY DIMENSIONS (FT)		5,200' X 100'		5,200' X 100'	
RUNWAY SAFETY AREA (RSA)	WIDTH (FT)	300'		300'	
	LENGTH BEYOND RUNWAY END (FT)	150'	150'	150'	150'
RUNWAY COORDINATES (NAD 83)	RUNWAY END LATITUDE	32°57'04.74" N	32°15'04.71" N	32°57'04.74" N	32°15'04.71" N
	RUNWAY END LONGITUDE	111°46'26.95" W	109°53'15.49" W	111°46'26.95" W	109°53'15.49" W
	DISPLACED THRESHOLD LAT.	N/A	N/A	N/A	N/A
	DISPLACED THRESHOLD LONG.	N/A	N/A	N/A	N/A
RUNWAY ELEVATIONS (FT) (NAVD 88)	RUNWAY END	1446.9	1464.1	1446.9	1464.1
	DISPLACED THRESHOLD	N/A	N/A	N/A	N/A
	TOUCHDOWN ZONE (TDZ)	1446.9	1464.1	1446.9	1464.1
	HIGH POINT	1464.1		1464.1	
	LOW POINT	1446.9		1446.9	
RUNWAY LIGHTING TYPE		MIRL		MIRL	
RUNWAY PROTECTION ZONE (RPZ) (FT)		1,700' X 1,000' X 1,510'	1,000' X 500' X 700'	1,700' X 1,000' X 1,510'	1,000' X 500' X 700'
RUNWAY MARKING TYPE		PRECISION	NON-PRECISION	PRECISION	NON-PRECISION
14 CFR PART 77 APPROACH SURFACES	APPROACH TYPE	PRECISION	VISUAL	PRECISION	NON-PRECISION
	VISIBILITY MINIMUMS RVR (FT)	< 1 MILE BUT ≥ 3 / 4 MILE	VIS	< 1 MILE BUT ≥ 3 / 4 MILE	> 1 MILE
	APPROACH SLOPE DIMENSIONS (FT)	1,000' X 10,000' X 16,000' X 40,000'	500' X 1,500 X 5,000'	1,000' X 10,000' X 16,000' X 40,000'	500' X 3,500 X 10,000'
	APPROACH CATEGORY (SLOPE)	50:1 / 40:1	20:1	50:1 / 40:1	34:1
TYPE OF AERONAUTICAL SURVEY REQUIRED FOR APPROACH		N/A	N/A	N/A	NON-VERTICALLLY GUIDED
RUNWAY DEPARTURE SURFACE (YES OR N/A)		YES	N/A	YES	YES
RUNWAY OBJECT FREE AREA (ROFA)	WIDTH (FT)	500'	500'	500'	500'
	LENGTH BEYOND RUNWAY END (FT)	300'	300'	300'	300'
OBSTACLE FREE ZONE (OFZ)	WIDTH (FT)	400'	400'	400'	400'
	LENGTH BEYOND RUNWAY END (FT)	200'	200'	200'	200'
PRECISION OBSTACLE FREE ZONE (POFZ)	LENGTH (FT)	200'	N / A	200'	N / A
	WIDTH (FT)	800'	N / A	800'	N / A
THRESHOLD SITING SURFACE (TSS)	DIMENSIONS (FT)	800' X 3,800' X 10,000	400' X 1,000' X 10,000	800' X 3,800' X 10,000	800' X 3,800' X 10,000
	SLOPE	20:1	20:1	20:1	20:1
	PENETRATIONS	NO TSS PENETRATIONS	NO TSS PENETRATIONS	NO TSS PENETRATIONS	NO TSS PENETRATIONS
VISUAL AND INSTRUMENT NAVAIDS		VOR, LOCALIZER, GS, PAPI	PAPI	VOR, LOCALIZER, GS, PAPI	PAPI

TAXIWAY AND TAXILANE DIMENSIONS

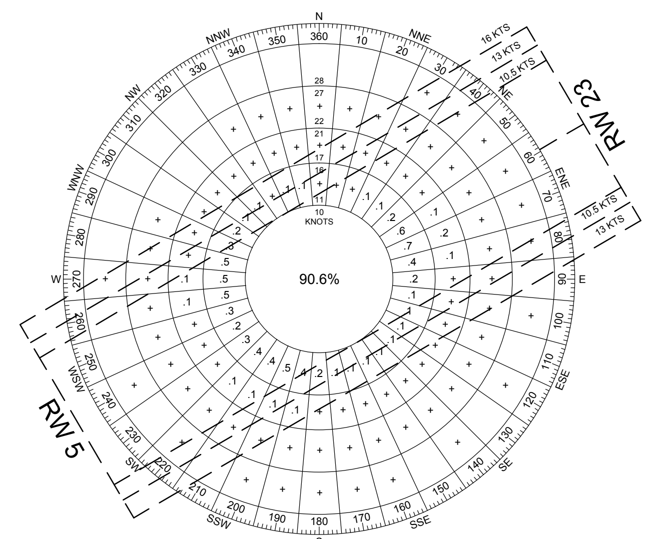
TAXIWAYS AND TAXLINES	EXISTING		FUTURE
TAXIWAY/TAXILANE DESIGN GROUP (TDG)	TDG -1	TDG -2	TDG -2
TAXIWAY AND TAXILANE DESIGNATION	D,E	A,B,F	ALL
TAXIWAY AND TAXILANE WIDTH (FT)	25	35	35
TAXIWAY SAFETY AREA (FT)	49	79	79
TAXIWAY OBJECT FREE AREA (FT)	89	131	131
TAXILANE OBJECT FREE AREA (FT)	79	115	115
TAXIWAY AND TAXILANE SEPARATION (FT)	70	105	105
TAXIWAY CENTERLINE TO FIXED OR MOVABLE OBJECT (FT)	44.5	65.5	65.5
TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT (FT)	39.5	57.5	57.5
TAXIWAY AND TAXILANE LIGHTING	MITL	MITL	MITL

HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 (NAD 83) VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 88). EXISTING ELEVATIONS & RUNWAY END COORDINATES FROM FAA NATIONAL FLIGHT DATA CENTER.

AIRPORT DATA

ITEM		EXISTING (E)	FUTURE (F)
AIRPORT REFERENCE CODE (ARC)		B-II	B-II
MEAN MAX. TEMP OF HOTTEST MONTH (°F) (JULY)		106.6°	106.6°
AIRPORT ELEVATION (MSL, FT) (NAVD 88) *		1,464.1	1,464.1
AIRPORT NAVIGATIONAL AIDS		AWOS-III, ROTATING BEACON, SEGMENTED CIRCLE, LIGHTED WIND CONE, MALSR, ILS, VOR	AWOS-III, ROTATING BEACON, SEGMENTED CIRCLE, LIGHTED WIND CONE, MALSR, ILS, VOR
AIRPORT REFERENCE POINT (ARP) COORDINATES (NAD 83)	LATITUDE	32° 57' 17.60" N	32° 57' 17.60" N
	LONGITUDE	111° 46' 00.60" W	111° 46' 00.60" W
MISCELLANEOUS FACILITIES		NONE	NONE
ARC AND CRITICAL AIRCRAFT	ARC	B-II	B-II
	AIRCRAFT	CESSNA CITATION 550	CESSNA CITATION 550
	WINGSPAN (FT)	53	53
	UNDERCARRIAGE (FT)	18.5	18.5
	APPROACH SPEED (KTS)	107	107
AIRPORT MAGNETIC VARIATION	VARIATION	10°27' E	9°91' E
	DATE	MAR-15	MAR-19
	SOURCE	NOAA	NOAA
NPIAS SERVICE LEVEL		General Aviation	General Aviation
STATE EQUIVALENT SERVICE		GA - Community	GA - Community

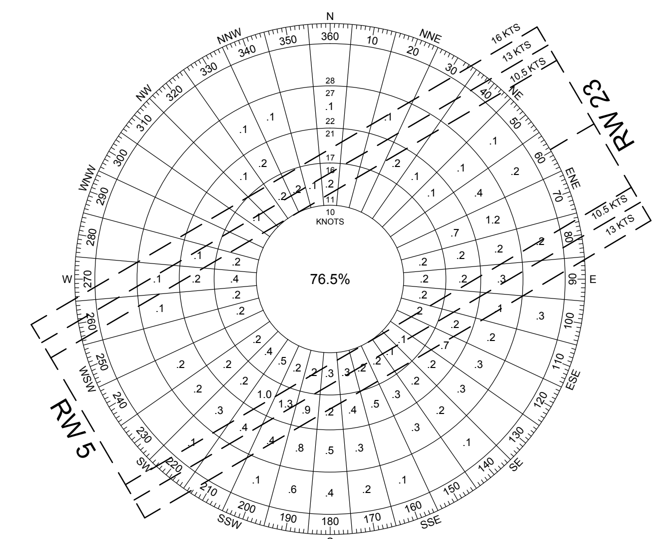
* ELEVATIONS TAKEN FROM FAA NATIONAL FLIGHT CENTER.



RUNWAY	10.5 KNOTS 13 MPH	13 KNOTS 16 MPH	16 KNOTS 20 MPH
5 / 23	97.93%	99.10%	99.77%

ALL WEATHER WIND ROSE

WIND DATA SOURCE: CASA GRANDE MUNICIPAL AIRPORT AWOS
(COLLECTION BETWEEN 2006 TO 2014).
NUMBER OF OBSERVATIONS: 399,449



RUNWAY	10.5 KNOTS 13 MPH	13 KNOTS 16 MPH	16 KNOTS 20 MPH
5 / 23	85.75%	88.86%	92.03%

IFR-WEATHER WIND ROSE

WIND DATA SOURCE: CASA GRANDE MUNICIPAL AIRPORT AWOS
(COLLECTION BETWEEN 2006 TO 2014).
NUMBER OF OBSERVATIONS: 1,206

THROUGH-THE-FENCE AIRPORT ACCESS POINTS

ACCESS POINT NUMBER	EXISTING OR FUTURE ACCESS POINT	AGREEMENT EXPIRATION DATE	TYPE OF THROUGH-THE-FENCE ACCESS (COMMERCIAL OR RESIDENTIAL)
1	EXISTING ACCESS POINT	PENDING	COMMERCIAL
2	FUTURE ACCESS POINT		TBD
3	FUTURE ACCESS POINT		TBD
4	FUTURE ACCESS POINT		TBD
5	FUTURE ACCESS POINT		TBD
6	FUTURE ACCESS POINT		TBD
7	FUTURE ACCESS POINT		TBD

DECLARED DISTANCES

ITEM	EXISTING	FUTURE	FAA APPROVAL DATE
	RW 5 / 23	RW 5 / 23	
TAKEOFF RUN AVAILABLE (TORA) (FT)	5200	5200	
TAKEOFF DISTANCE AVAILABLE (TODA) (FT)	5200	5200	
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA) (FT)	5200	5200	
LANDING DISTANCE AVAILABLE (LDA) (FT)	5200	5200	

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CASA GRANDE MUNICIPAL AIRPORT
CITY OF CASA GRANDE, ARIZONA

AIP No. 3-04-0007-017-14
AIRPORT LAYOUT PLAN

No.	Project No.	Date	Revision / Description	File	Drwn.	Chkd.	Apprvd.
3							
2							
1							
0	146255	09/2015	ORIGINAL ISSUE	146255 -100	LDS	CM	JZP

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AIRPORT DATA SHEET

LEGEND

EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)
		STRUCTURE/FACILITIES (BUILDING)
		ROADS/PARKING
		AIRPORT PROPERTY LINE (APL)
		AIRPORT PROPERTY LAND USE
		AIRPORT EASEMENT
X G	XX G	FENCING/GATE
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)
OFZ(E)	OFZ(F)	PRECISION OBST. FREE ZONE (OFZ)
POFZ(E)	POFZ(F)	OBSTACLE FREE ZONE (OFZ)
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)
		RUNWAY TDZ
		UTILITY POWER POLE
		AREA LIGHT POLE
		THRESHOLD LIGHTS
		REIL
		VASI/PAPI
		AIRPORT BEACON
		WIND CONE & SEGMENTED CIRCLE
		AWOS
		LIGHTED WINDCONE
		SECTION CORNER
4125	N/A	CONTOURS
	N/A	TDZ
		MARKINGS
		MIDDLE MARKER
		HELICOPTER PARKING
		TO BE REMOVED
		AIRPORT REFERENCE POINT (ARP)
		PACS/SACS MONUMENT
		MALSR

AIRPORT FACILITIES LIST

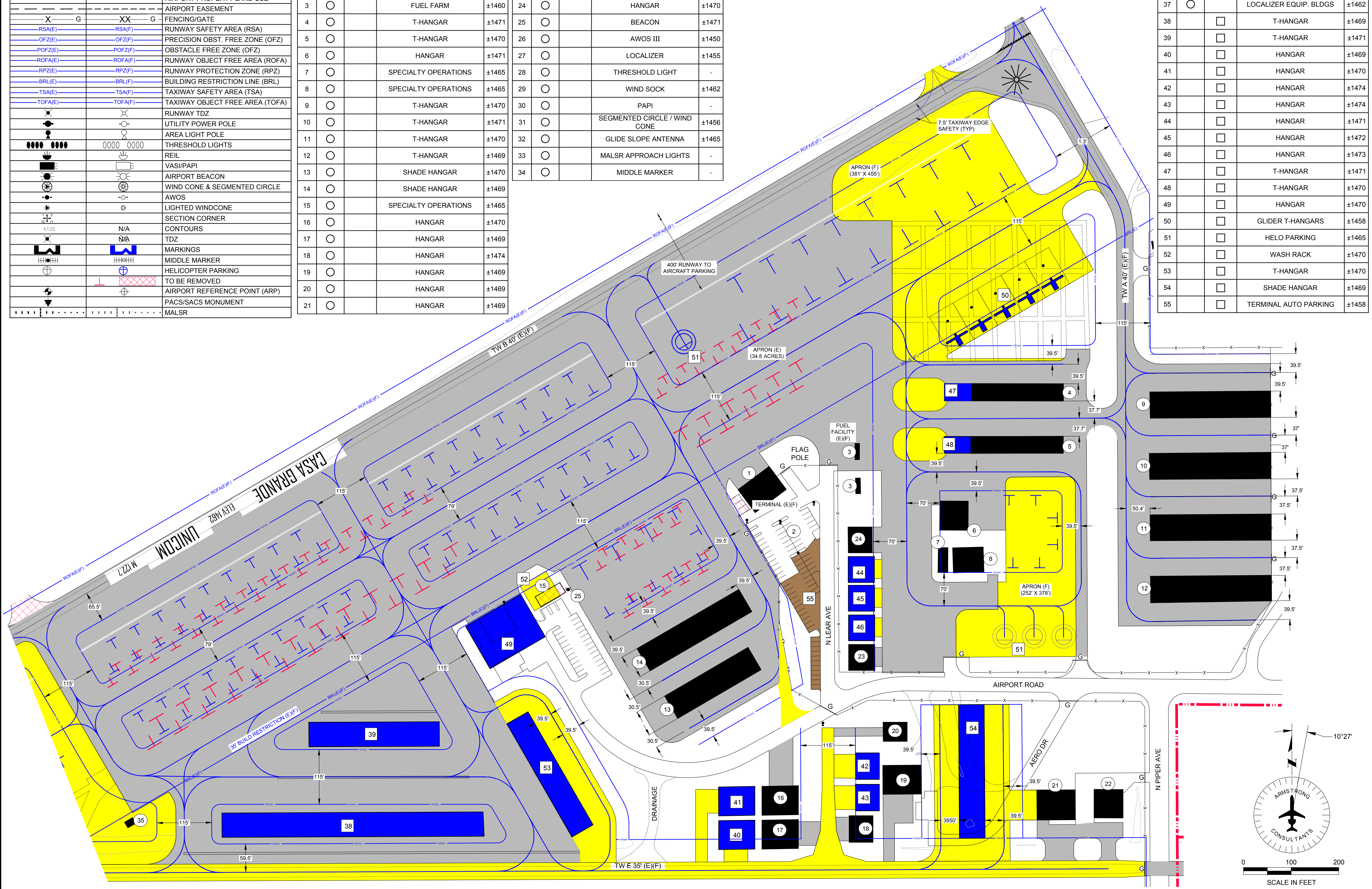
NO.	EXIST.	FUTURE	FACILITY DESCRIPTION	TOP ELEV. (MSL-EST.)
1	○		ADMINISTRATION / TERMINAL BUILDING	±1471
2	○		TERMINAL AUTO PARKING	±1458
3	○		FUEL FARM	±1460
4	○		T-HANGAR	±1471
5	○		T-HANGAR	±1470
6	○		HANGAR	±1471
7	○		SPECIALTY OPERATIONS	±1465
8	○		SPECIALTY OPERATIONS	±1465
9	○		T-HANGAR	±1470
10	○		T-HANGAR	±1471
11	○		T-HANGAR	±1470
12	○		T-HANGAR	±1469
13	○		SHADE HANGAR	±1470
14	○		SHADE HANGAR	±1469
15	○		SPECIALTY OPERATIONS	±1465
16	○		HANGAR	±1470
17	○		HANGAR	±1469
18	○		HANGAR	±1474
19	○		HANGAR	±1469
20	○		HANGAR	±1469
21	○		HANGAR	±1469

AIRPORT FACILITIES LIST

NO.	EXIST.	FUTURE	FACILITY DESCRIPTION	TOP ELEV. (MSL-EST.)
22	○		HANGAR	±1469
23	○		HANGAR	±1470
24	○		HANGAR	±1470
25	○		BEACON	±1471
26	○		AWOS III	±1450
27	○		LOCALIZER	±1455
28	○		THRESHOLD LIGHT	-
29	○		WIND SOCK	±1462
30	○		PAPI	-
31	○		SEGMENTED CIRCLE / WIND CONE	±1456
32	○		GLIDE SLOPE ANTENNA	±1465
33	○		MALSR APPROACH LIGHTS	-
34	○		MIDDLE MARKER	-

AIRPORT FACILITIES LIST

NO.	EXIST.	FUTURE	FACILITY DESCRIPTION	TOP ELEV. (MSL-EST.)
35	○		ELECTRICAL BUILDING	±1450
36	○		ELECTRICAL EQUIPMENT SHELTER	±1456
37	○		LOCALIZER EQUIP. BLDGS	±1462
38		□	T-HANGAR	±1469
39		□	T-HANGAR	±1471
40		□	HANGAR	±1469
41		□	HANGAR	±1470
42		□	HANGAR	±1474
43		□	HANGAR	±1474
44		□	HANGAR	±1471
45		□	HANGAR	±1472
46		□	HANGAR	±1473
47		□	T-HANGAR	±1471
48		□	T-HANGAR	±1470
49		□	HANGAR	±1470
50		□	GLIDER T-HANGARS	±1458
51		□	HELO PARKING	±1465
52		□	WASH RACK	±1470
53		□	T-HANGAR	±1470
54		□	SHADE HANGAR	±1469
55		□	TERMINAL AUTO PARKING	±1458



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CITY OF CASA GRANDE, ARIZONA

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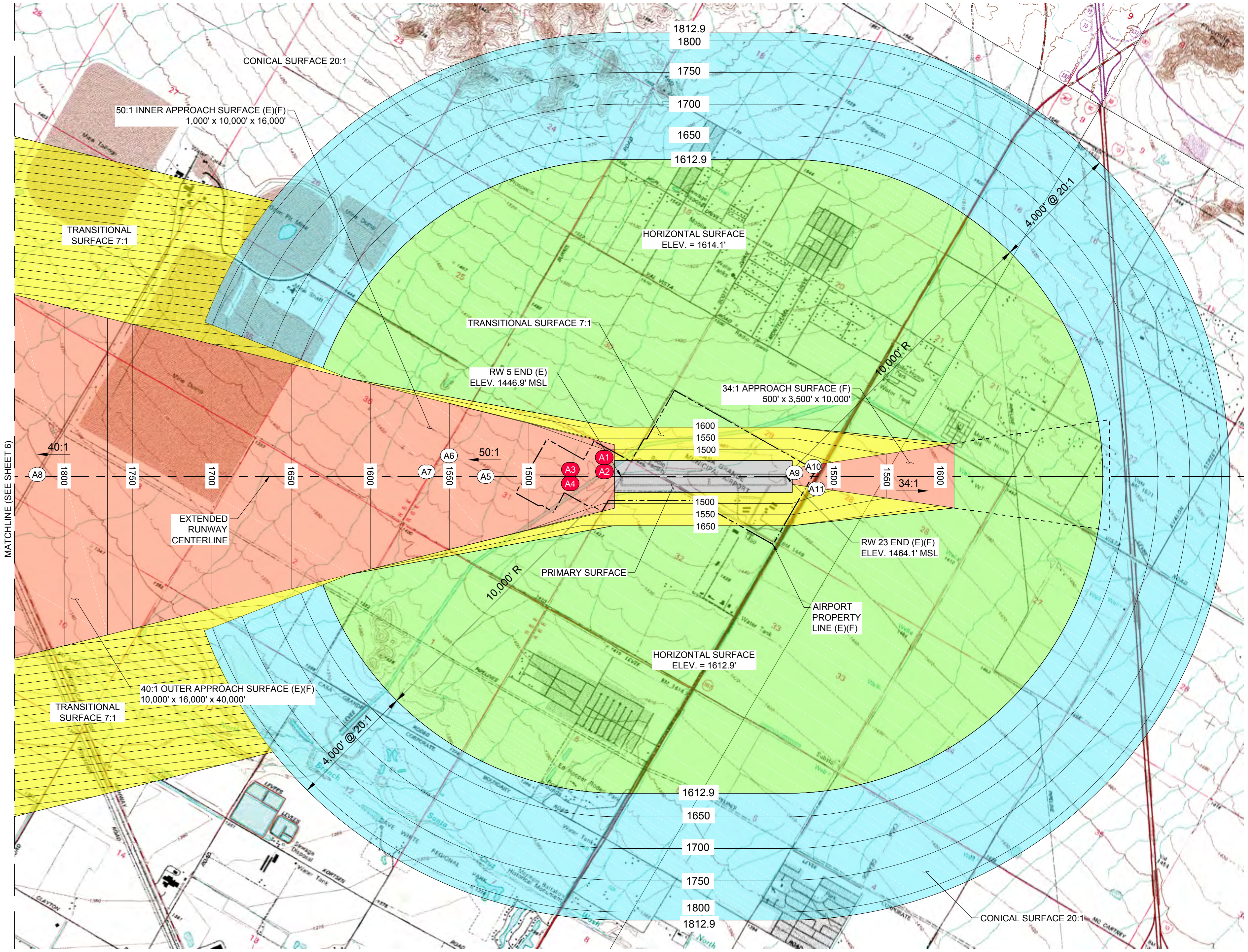
TERMINAL AREA DRAWING

Sheet: 4 of: 13



RUNWAY 5/23 PLAN

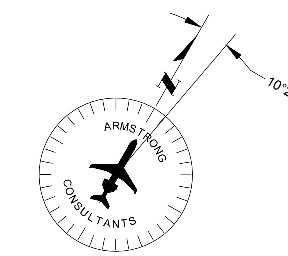
SCALE: PER BARSCALE

OBSTRUCTION CHART

PART 77 SURFACE	ITEM No.	DESCRIPTION	GROUND ELEVATION (MSL)(FEET)	ESTIMATED TOP ELEVATION (MSL)(FEET)	PENETRATION (FEET)	REMARKS
PRIMARY	-	-	-	-	NONE	-
APPROACH	A1	FENCE	1446	1453	7'	RELOCATE FENCE
	A2	SERVICE ROAD	1446	1456	10'	RELOCATE ROAD
	A3	FENCE	1446	1453	3'	RELOCATE FENCE
	A4	SERVICE ROAD	1446	1456	5'	RELOCATE ROAD
	A5	SERVICE ROAD	1428	1438	NONE	-
	A6	SERVICE ROAD	1422	1432	NONE	-
	A7	SERVICE ROAD	1418	1428	NONE	-
	A8	RAIL ROAD	1347	1370	NONE	-
	A9	SERVICE ROAD	1463	1473	NONE	-
	A10	HIGHWAY	1464	1484	NONE	-
	A11	HIGHWAY	1466	1486	NONE	-
7:1 TRANSITIONAL	-	-	-	-	-	-
HORIZONTAL	-	-	-	-	-	-
20:1 CONICAL	-	-	-	-	-	-

NOTE:

1. SURFACE PENETRATIONS: LOWER, MARK AND LIGHT, OR REMOVE PER FAA FLIGHT PROCEDURES OFFICE DETERMINATIONS.
2. SEE INNER APPROACH DRAWINGS FOR OBSTRUCTIONS IN RPZ.
4. ESTIMATED FROM 2009 ALP.
5. AIRPORT ELEVATION: 1464.1 MSL



2000 0 2000 4000

SCALE IN FEET

LEGEND

HORIZONTAL SURFACE	TRANSITIONAL SURFACE
CONICAL SURFACE	APPROACH SURFACE
PRIMARY SURFACE	TERRAIN PENETRATION
	WATER

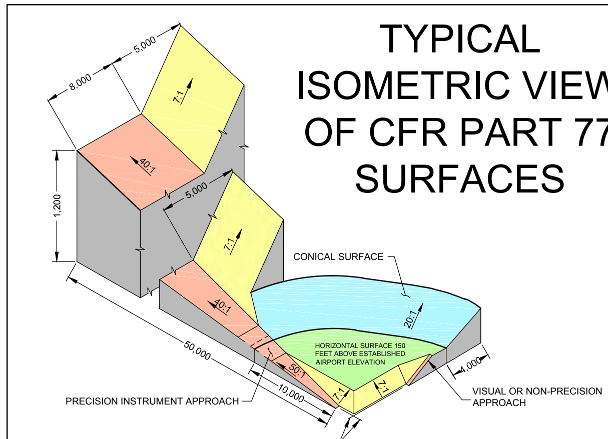
NOTES

A) REFER TO "INNER PORTION OF THE APPROACH SURFACE" DRAWINGS FOR DETAILS ON ANY CLOSE-IN APPROACH OBSTRUCTIONS.

B) AN FAA FORM 7460-1, "NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION" MUST BE SUBMITTED FOR ANY CONSTRUCTION OR ALTERATION (INCLUDING HANGARS AND OTHER ON-AIRPORT AND OFF-AIRPORT STRUCTURES, TOWERS, ETC.) WITHIN 20,000 HORIZONTAL FEET OF THE AIRPORT GREATER IN HEIGHT THAN AN IMAGINARY SURFACE EXTENDING OUTWARD AND UPWARD FROM THE RUNWAY AT A SLOPE OF 100 TO 1 OR GREATER IN HEIGHT THAN 200 FEET ABOVE GROUND LEVEL.

C) OBSTRUCTION INFORMATION WAS DETERMINED USING PREVIOUS OBSTRUCTION SURVEY INFORMATION AND AN INQUIRY OF THE FAA OE/AAA DATABASE.

TYPICAL ISOMETRIC VIEW OF CFR PART 77 SURFACES



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CASA GRANDE, ARIZONA

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1							
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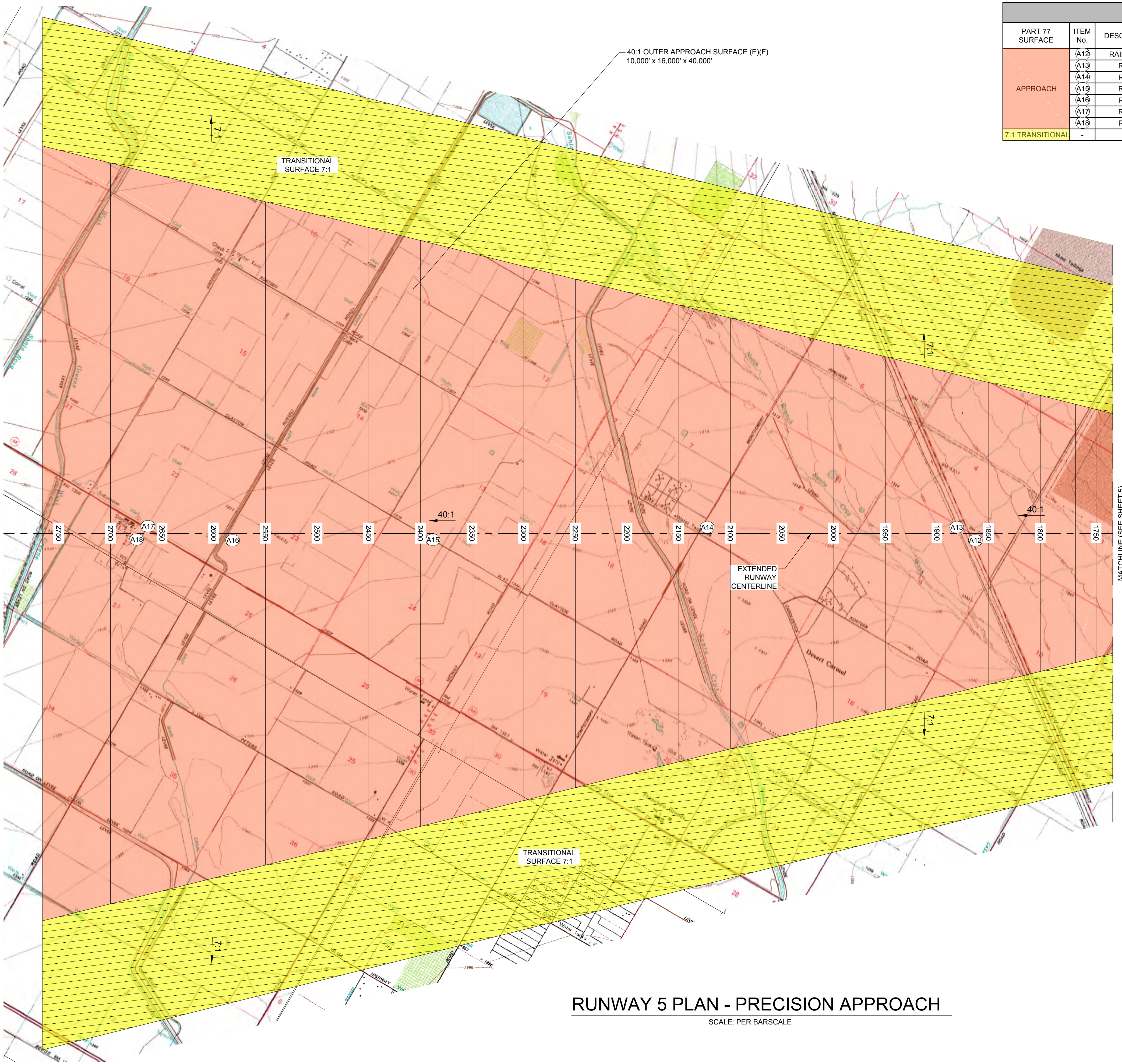
3							

14 CFR PART "77" AIRSPACE DRAWING

Sheet: 5 of: 13

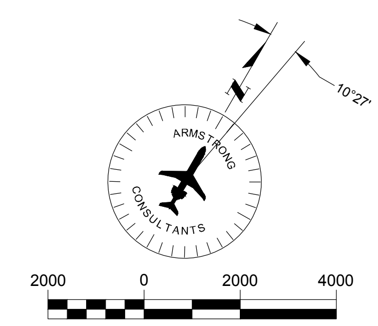
OBSTRUCTION CHART

PART 77 SURFACE	ITEM No.	DESCRIPTION	GROUND ELEVATION (MSL)(FEET)	ESTIMATED TOP ELEVATION (MSL)(FEET)	PENETRATION (FEET)	REMARKS
APPROACH	A12	RAIL ROAD	1335	1358	NONE	-
	A13	ROAD	1335	1350	NONE	-
	A14	ROAD	1325	1340	NONE	-
	A15	ROAD	1319	1334	NONE	-
	A16	ROAD	1311	1326	NONE	-
	A17	ROAD	1310	1325	NONE	-
	A18	ROAD	1310	1325	NONE	-
7:1 TRANSITIONAL	-	-	-	-	-	-



RUNWAY 5 PLAN - PRECISION APPROACH

SCALE: PER BARSCALE



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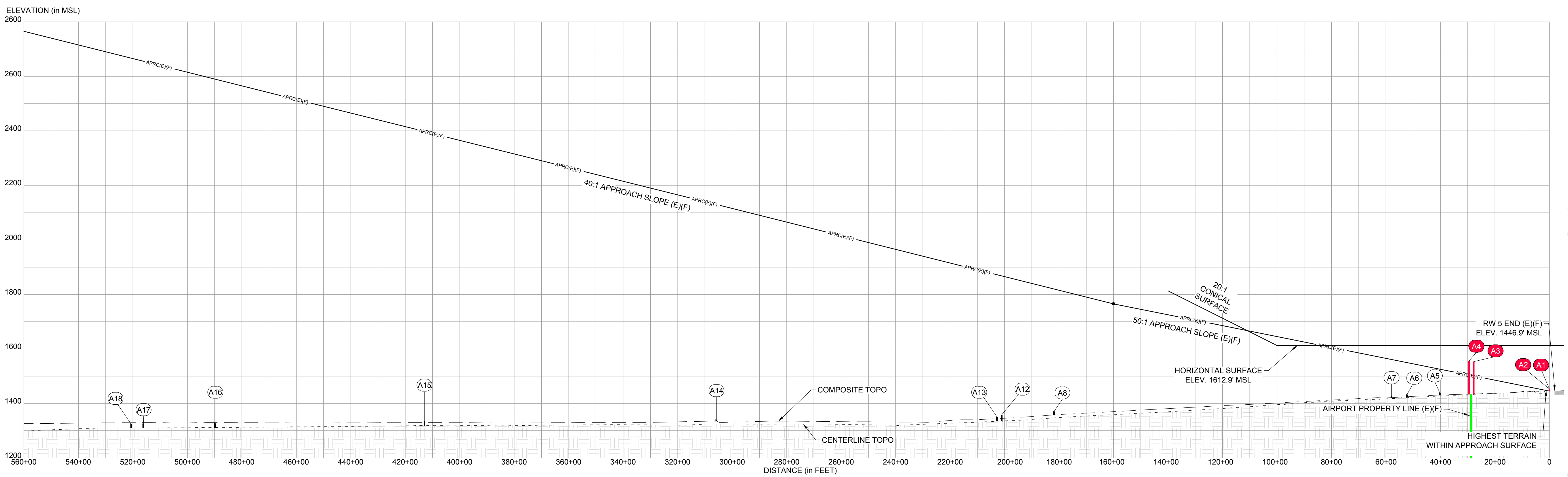
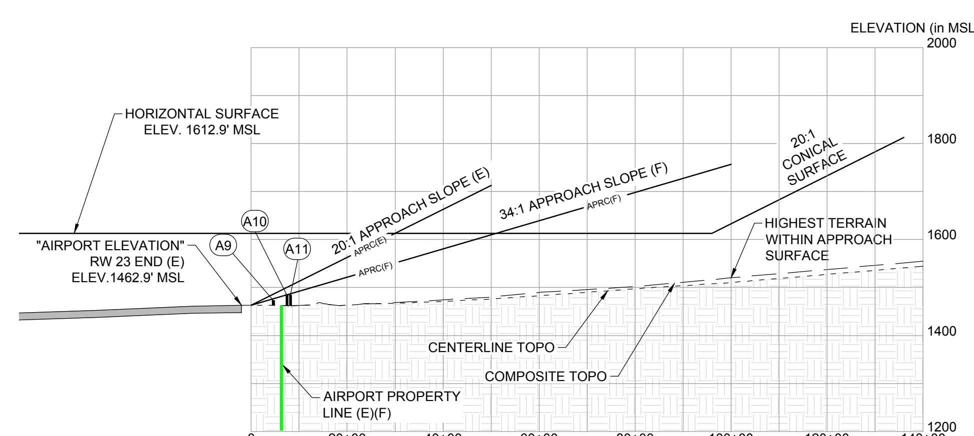
14 CFR PART "77" AIRSPACE DRAWING



PROFILE - RUNWAY 5 END (E)(F)

SCALE: PER GRID



PROFILE - RUNWAY 23 END (E)(F)

SCALE: PER GRID

2000 0 2000 4000
SCALE IN FEET

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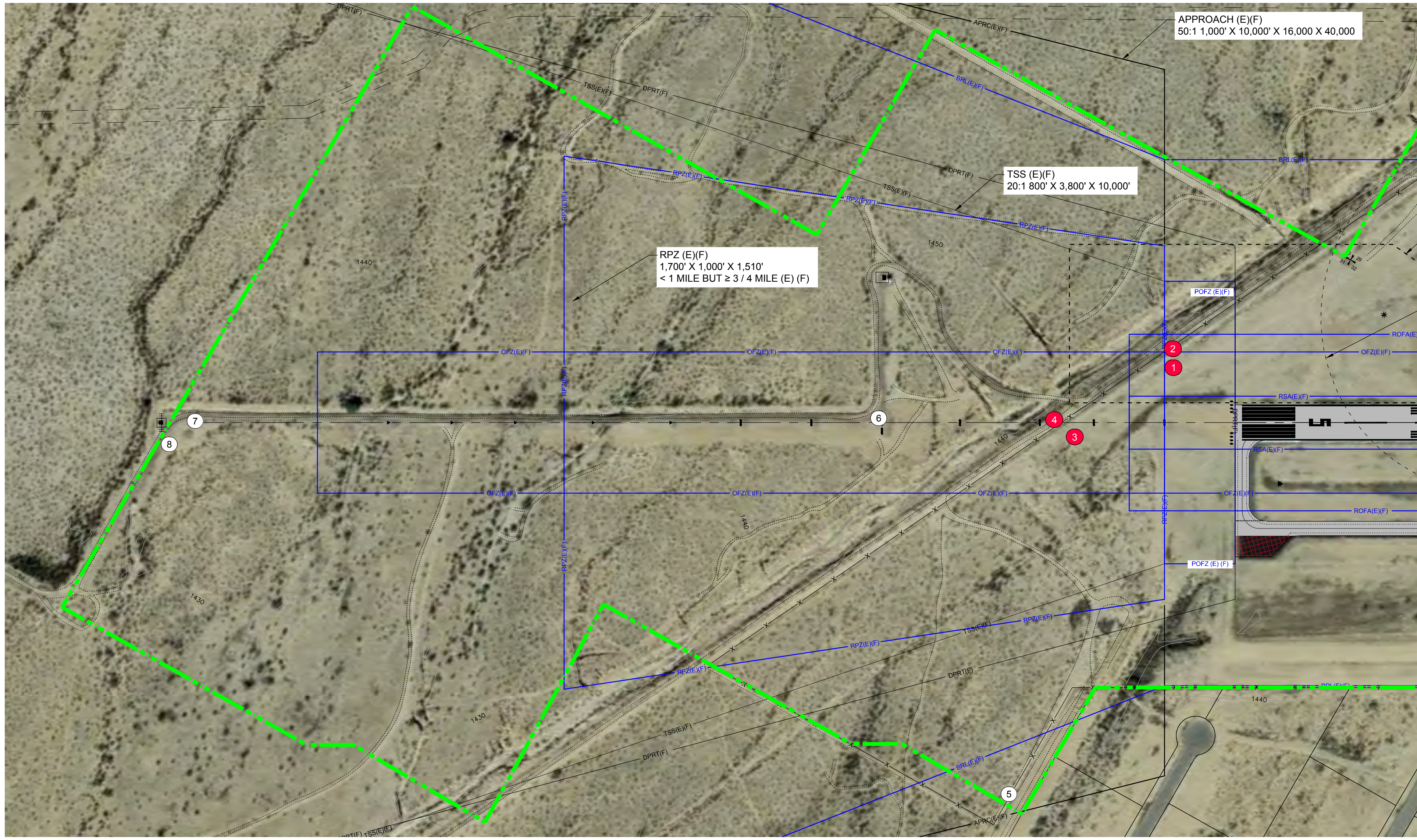
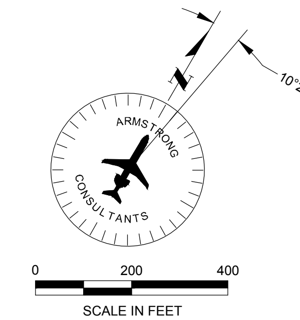
14 CFR PART "77" PROFILE

Sheet: 7 of: 13





PLAN - RUNWAY 5 END (E)(F)

SCALE: PER BARSCALE

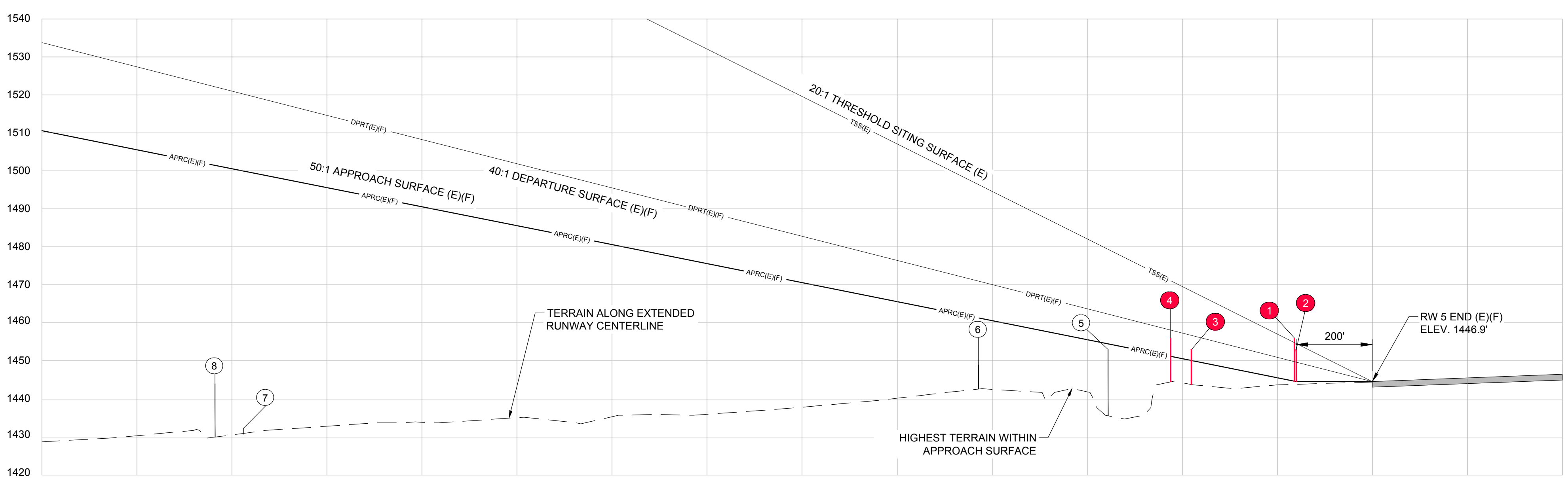
OBJECTS WITHIN RUNWAY 5, APRC, TSS AND DEPARTURE SURFACES

No.	OBJECT	EST. OBJECT HT.	TOP ELEV. (MSL)	20:1 TSS PEN.	50:1 APRC SURFACE PEN.	40:1 DEPT SURFACE PEN.	REMARKS
1	FENCE	7'	*1453'	1'	7'	3'	SEE NOTE 1
2	SERVICE ROAD	10'	*1456'	-	10'	6'	SEE NOTE 1
3	FENCE	7'	*1453'	-	3'	-	SEE NOTE 1
4	SERVICE ROAD	10'	*1456'	-	5'	-	SEE NOTE 1
5	FENCE	7'	*1443'	-	NONE	NONE	
6	SERVICE ROAD	10'	*1456'	NONE	NONE	NONE	
7	PROPERTY LINE	0'	*1434'	NONE	NONE	NONE	
8	SERVICE ROAD	10'	*1444'	NONE	NONE	NONE	

NOTE: OBJECT ELEVATIONS IN FEET MSL (VERTICAL DATUM NAVD88).
* = OBJECT ELEVATIONS ARE ESTIMATED AND NOT BASED ON A SURVEY.
● = OBJECT PENETRATION LOCATION
EST. = ESTIMATED; ELEV. = ELEVATION; HT. = HEIGHT; PEN. = PENETRATION; N/A = NOT APPLICABLE; O.L. = OBSTRUCTION LIGHT; GQS = GLIDESLOPE QUALIFICATION SURFACE; APRC = APPROACH SURFACE; TSS = THRESHOLD SITING SURFACE; DPRT = DEPARTURE SURFACE

NOTES:

1. APPROACH SURFACE PENETRATIONS: LOWER, MARK AND LIGHT, OR REMOVE PER FAA FLIGHT PROCEDURES OFFICE DETERMINATION.
2. LESS THAN 35' LOW, CLOSE-IN DEPARTURE SURFACE PENETRATIONS: ADD NOTE TO DEPARTURE PROCEDURE OR LOWER, MARK AND LIGHT, OR REMOVE PER FAA FLIGHT PROCEDURES OFFICE DETERMINATION.



PROFILE - RUNWAY 5 END (E)(F)

SCALE: PER GRID

NOTES:

1. APPROACH SURFACE PENETRATIONS: LOWER, MARK AND LIGHT, OR REMOVE PER FAA FLIGHT PROCEDURES OFFICE DETERMINATION.
2. LESS THAN 35' LOW, CLOSE-IN DEPARTURE SURFACE PENETRATIONS: ADD NOTE TO DEPARTURE PROCEDURE OR LOWER, MARK AND LIGHT, OR REMOVE PER FAA FLIGHT PROCEDURES OFFICE DETERMINATION.

LEGEND

EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)
		STRUCTURE/FACILITIES (BUILDING)
		AIRPORT PROPERTY LINE (APL)
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)
		TO BE REMOVED
APRC(E)	APRC(F)	APPROACH SURFACE
DPRT(E)	DPRT(F)	DEPARTURE SURFACE
TSS(E)	TSS(F)	THRESHOLD SITING SURFACE
GQS(E)	GQS(F)	GLIDE PATH QUALIFICATION SURFACE
		THRESHOLD LIGHTS
		REIL
4125	N/A	CONTOURS
		ROAD
		MARKINGS
X	XX	FENCE

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RUNWAY 5 INNER APPROACH (E)(F)

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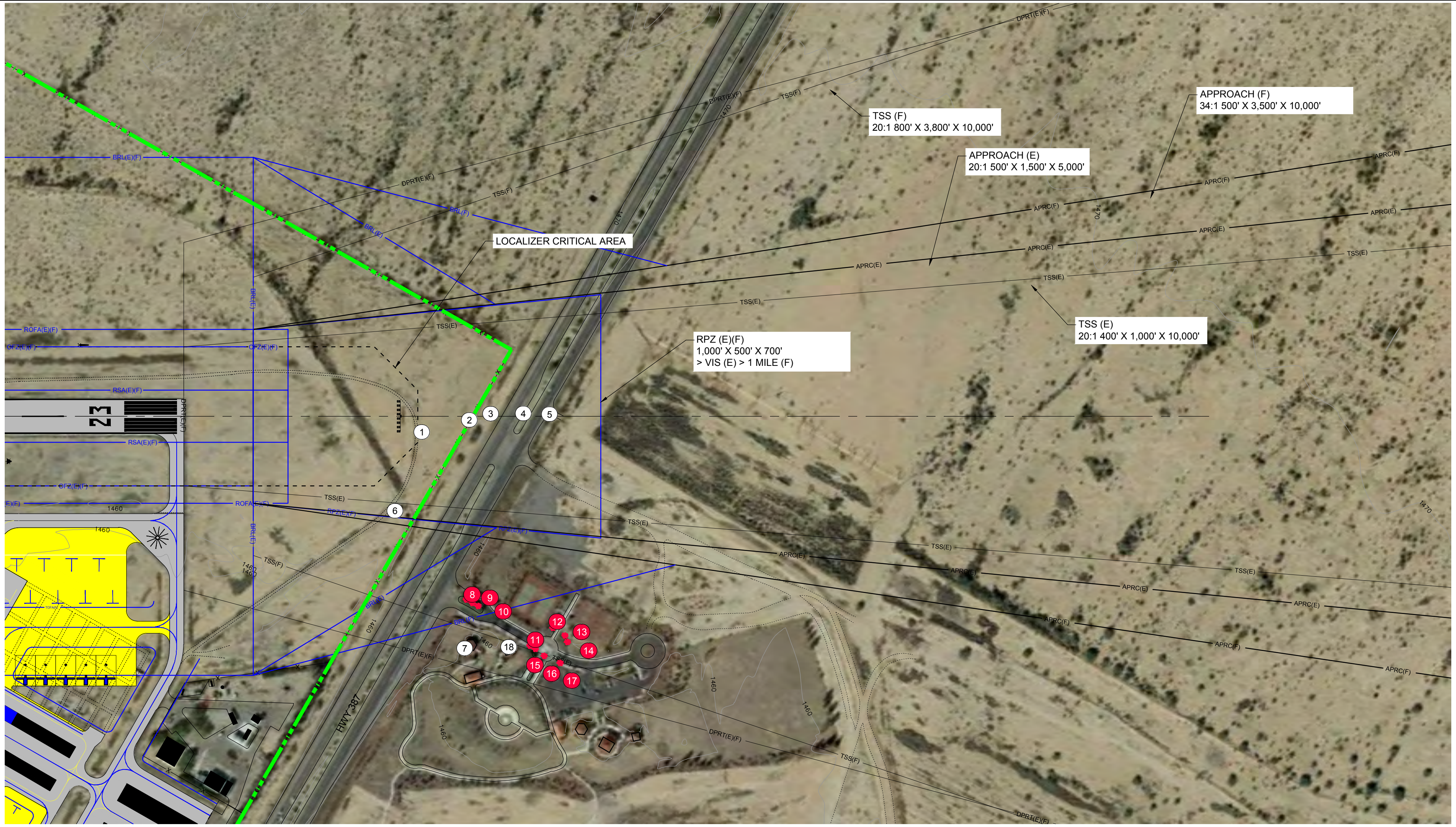
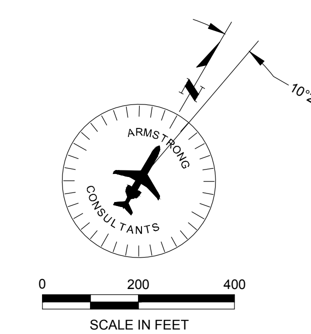


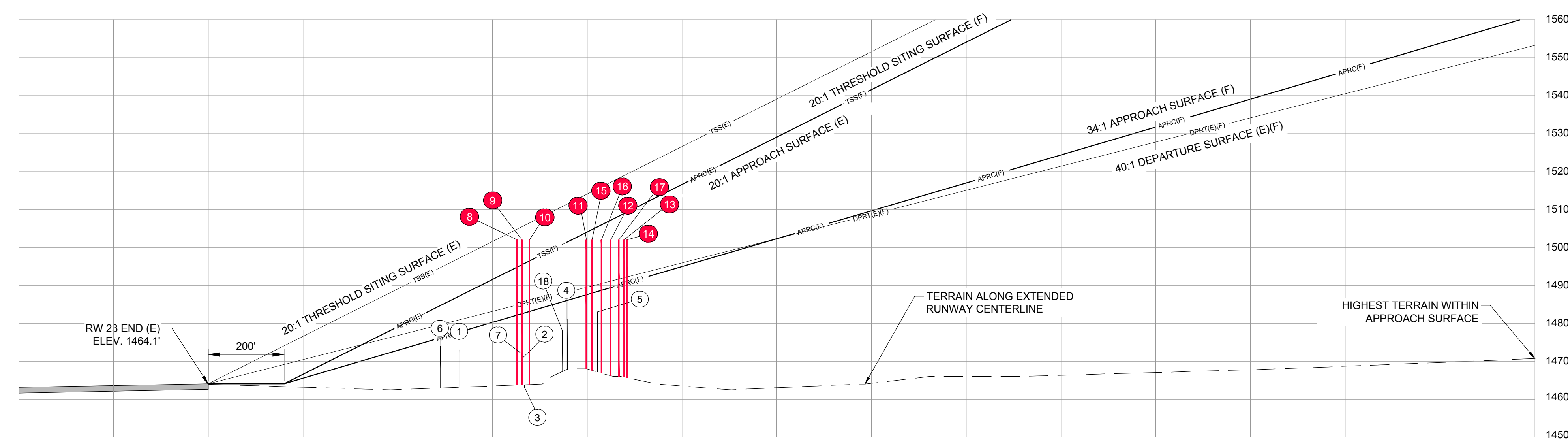
PLAN - RUNWAY 23 END (E)(F)

SCALE: PER BARSCALE



OBJECTS WITHIN RUNWAY 23, APRC, TSS AND DEPARTURE SURFACES								
No.	OBJECT	EST. OBJECT HT.	TOP ELEV. (MSL)	20:1 TSS PEN.	20:1 APRC SURFACE PEN.	34:1 APRC SURFACE PEN.	40:1 DPRT PEN.	REMARKS
1	SERVICE ROAD	10'	*1473	NONE	NONE	NONE	NONE	
2	FENCE	7'	*1471	NONE	NONE	NONE	NONE	
3	PROPERTY LINE	0'	*1464	NONE	NONE	NONE	NONE	
4	ROAD	17'	*1481	NONE	NONE	NONE	NONE	
5	ROAD	17'	*1483	NONE	NONE	NONE	NONE	
6	ELECTRICAL BLDG	12'	*1474	NONE	NONE	NONE	NONE	
7	BUILDING	16'	*1472	NONE	NONE	NONE	NONE	
8	TREE	40'	*1502	7'	NONE	NONE	17'	SEE NOTE 2
9	TREE	40'	*1502	7'	NONE	NONE	17'	SEE NOTE 2
10	TREE	40'	*1502	6'	NONE	NONE	16'	SEE NOTE 2
11	TREE	40'	*1502	NONE	NONE	NONE	12'	SEE NOTE 2
12	TREE	40'	*1502	NONE	NONE	NONE	11'	SEE NOTE 2
13	TREE	40'	*1502	NONE	NONE	NONE	10'	SEE NOTE 2
14	TREE	40'	*1502	NONE	NONE	NONE	10'	SEE NOTE 2
15	TREE	40'	*1502	NONE	NONE	NONE	12'	SEE NOTE 2
16	TREE	40'	*1502	NONE	NONE	NONE	11'	SEE NOTE 2
17	TREE	40'	*1502	NONE	NONE	NONE	10'	SEE NOTE 2
18	BUILDING	16'	*1478	NONE	NONE	NONE	NONE	

NOTE: OBJECT ELEVATIONS IN FEET MSL (VERTICAL DATUM NAVD88).
* = OBJECT ELEVATIONS ARE ESTIMATED AND NOT BASED ON A SURVEY.
● = OBJECT PENETRATION LOCATION
EST. = ESTIMATED; ELEV. = ELEVATION; HT. = HEIGHT; PEN. = PENETRATION; N/A = NOT APPLICABLE; O.L. = OBSTRUCTION LIGHT; GQS = GLIDESLOPE QUALIFICATION SURFACE; APRC = APPROACH SURFACE; TSS = THRESHOLD SITING SURFACE; DPRT = DEPARTURE SURFACE



PROFILE - RUNWAY 23 END (E)(F)

SCALE: PER GRID

NOTES:

1. APPROACH SURFACE PENETRATIONS: LOWER, MARK AND LIGHT, OR REMOVE PER FAA FLIGHT PROCEDURES OFFICE DETERMINATION.
2. LESS THAN 35' LOW, CLOSE-IN DEPARTURE SURFACE PENETRATIONS: ADD NOTE TO DEPARTURE PROCEDURE OR LOWER, MARK AND LIGHT, OR REMOVE PER FAA FLIGHT PROCEDURES OFFICE DETERMINATION.

LEGEND		
EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)
		STRUCTURE/FACILITIES (BUILDING)
		AIRPORT PROPERTY LINE (APL)
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)
OFZ(E)	OFZ(F)	OBSTACLE FREE ZONE (OFZ)
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)
		TO BE REMOVED
APRC(E)	APRC(F)	APPROACH SURFACE
DPRT(E)	DPRT(F)	DEPARTURE SURFACE
TSS(E)	TSS(F)	THRESHOLD SITING SURFACE
GQS(E)	GQS(F)	GLIDE PATH QUALIFICATION SURFACE
●●●● ●●●●	0000 0000	THRESHOLD LIGHTS
		REIL
4125	N/A	CONTOURS
		ROAD
		MARKINGS
X	XX	FENCE

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CASA GRANDE MUNICIPAL AIRPORT
CASA GRANDE, ARIZONA

AIP No. 3-04-0007-017-14
AIRPORT LAYOUT PLAN

No.	Project No.	Date	Revision / Description	File	Drwn.	Chkd.	Apprvd.
3							
2							
1							
0	146255	09/2015	ORIGINAL ISSUE	146255-105	LDS	CM	JZP

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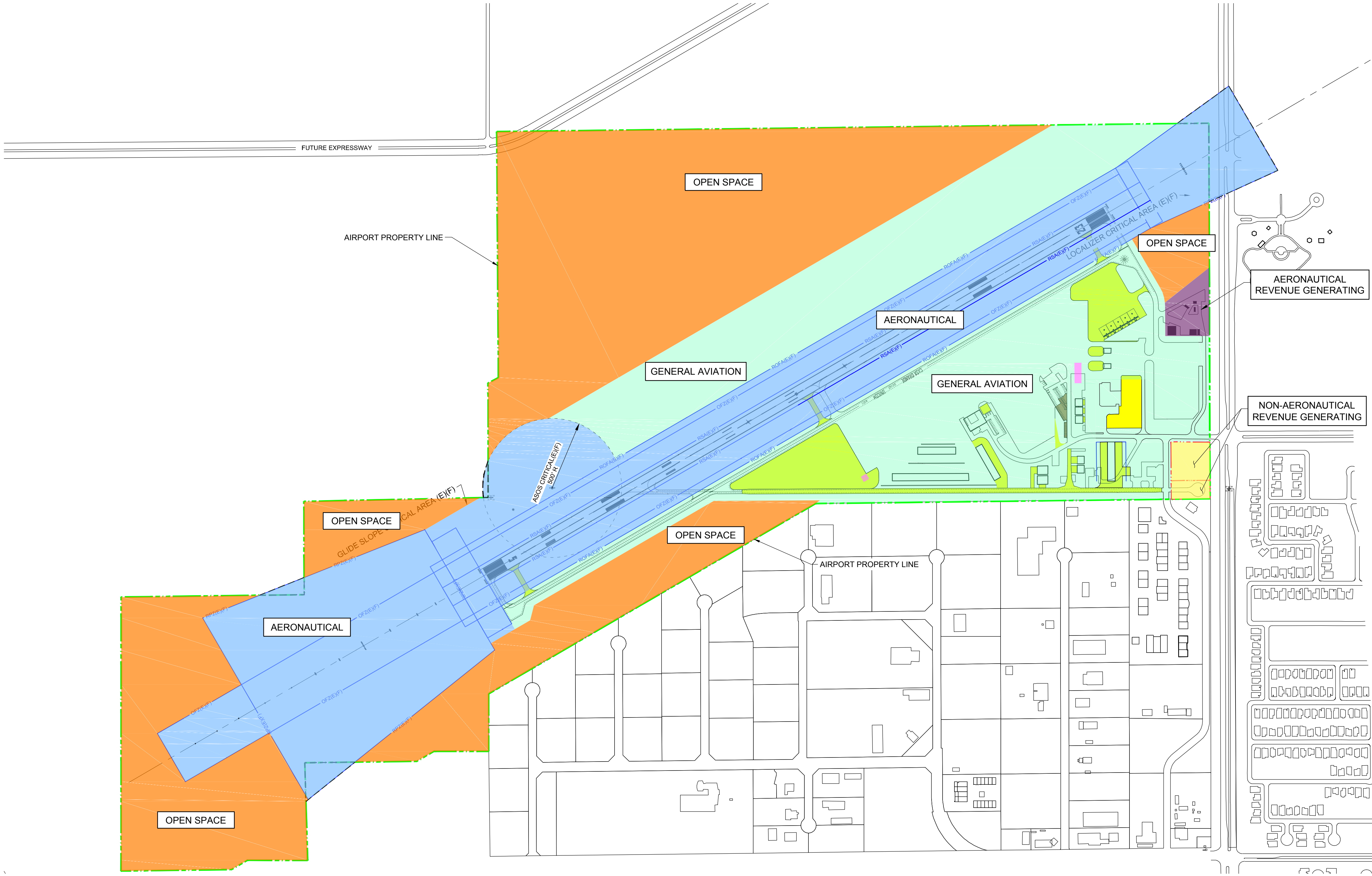
RUNWAY 23 INNER APPROACH (E)(F)

Sheet: 9 of: 13



LEGEND

- AERONAUTICAL
- GENERAL AVIATION
- OPEN SPACE
- AERONAUTICAL SERVICES
- AERONAUTICAL REVENUE GENERATING
- NON-AERONAUTICAL REVENUE GENERATING

10°27'

PHOTO DATE: DEC. 2014

0 400 800

SCALE IN FEET

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ON-AIRPORT LAND USE DRAWING

OFF AIRPORT LEGEND

EXISTING	DESCRIPTION
	THRESHOLD LIGHTS
	REIL
	VASI/PAPI
	AIRPORT BEACON
	WIND CONE & SEGMENTED CIRCLE
	AWOS
	LIGHTED WINDCONE
	MALSR
	MIDDLE MARKER
	RUNWAY PROTECTION ZONE (RPZ)
	RUNWAY SAFETY AREA
	EXISTING AIRPORT PROPERTY LINE
	FUTURE AIRPORT PROPERTY LINE
	FUTURE AIRPORT EASEMENT LINE

PUBLIC FACILITY LEGEND

CHURCH · HOSPITAL · SCHOOL · PARK

EXISTING ZONING DISTRICT LEGEND:

Casa Grande: City Limits, Planning Boundary, Zoning: B-1, B-2, B-3, B-4, CO, I-1, I-2, Not Available, PAD, PAD-RV, R-1, R-1a, R-2, R-3, R-4, RR, SH, UR

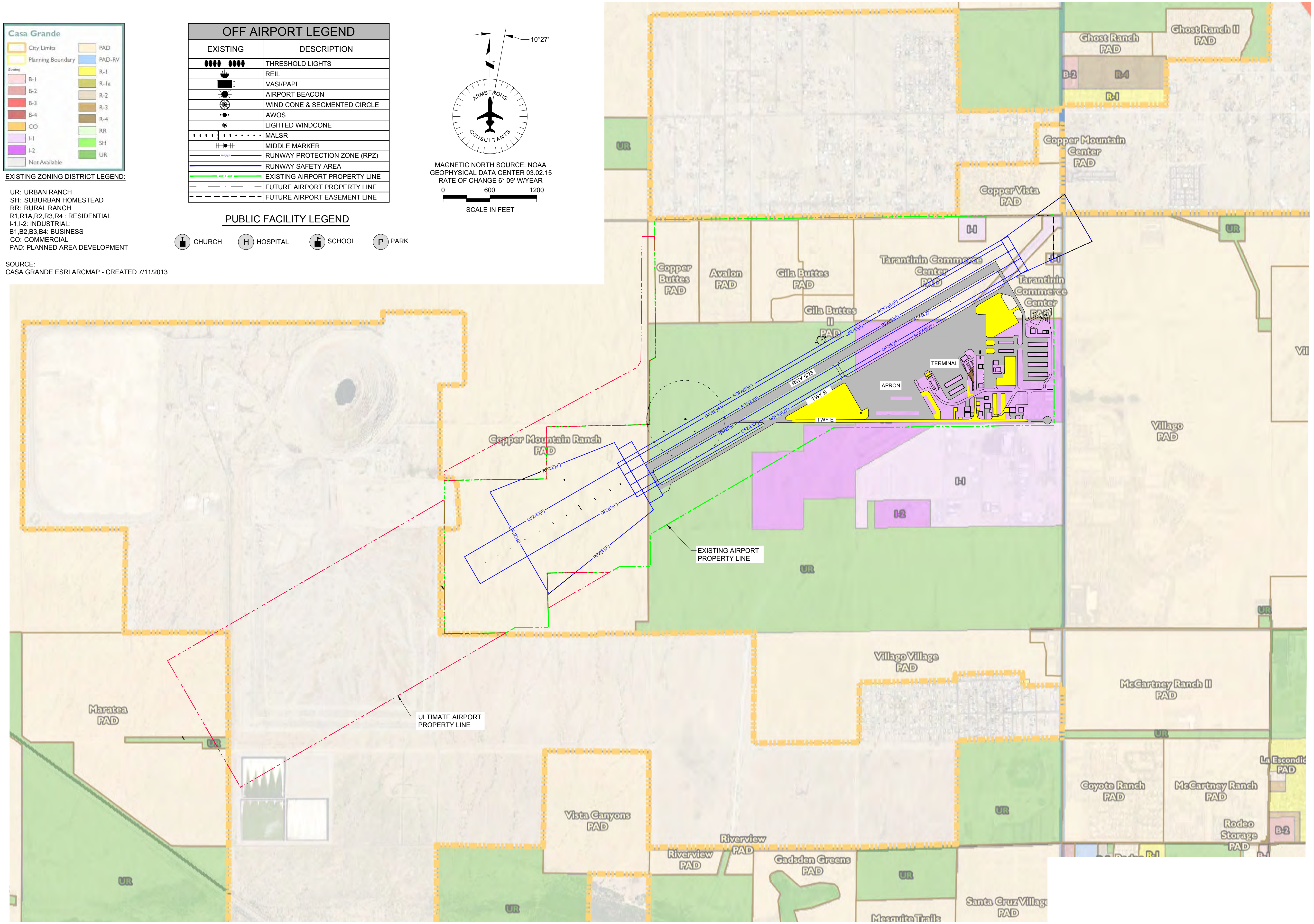
UR: URBAN RANCH
SH: SUBURBAN HOMESTEAD
RR: RURAL RANCH
R1,R1A,R2,R3,R4 : RESIDENTIAL
I-1,I-2: INDUSTRIAL:
B1,B2,B3,B4: BUSINESS
CO: COMMERCIAL
PAD: PLANNED AREA DEVELOPMENT

SOURCE:
CASA GRANDE ESRI ARCMAP - CREATED 7/11/2013

10°27'

MAGNETIC NORTH SOURCE: NOAA
GEOPHYSICAL DATA CENTER 03.02.15
RATE OF CHANGE 6° 09' W/YEAR

0 600 1200
SCALE IN FEET



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OFF-AIRPORT LAND USE DRAWING

EXISTING AIRPORT PROPERTY

PARCEL	CURRENT OWNER	INTEREST	BOOK/PAGE	DATE	ACREAGE	FEDERAL PARTICIPATION
1	CITY OF CASA GRANDE	PLAT	1650 / 398	06/26/2007	NOT AVAILABLE	NONE
2	CITY OF CASA GRANDE	QUIT CLAIM DEED	178 / 29	06/01/1956	299.50	NONE
3	CITY OF CASA GRANDE	QUIT CLAIM DEED	179 / 29	06/01/1956	30.72	NONE
4	CITY OF CASA GRANDE	WARRANTY DEED	1069 / 283	06/26/1981	59.15	NONE
5	CITY OF CASA GRANDE	WARRANTY DEED	1069 / 283	06/27/1981	23.17	NONE
6	CITY OF CASA GRANDE	WARRANTY DEED	1069 / 283	06/28/1981	21.58	NONE
7	CITY OF CASA GRANDE	ROW	1117 / 658	05/26/1982	NOT AVAILABLE	NONE
8	CITY OF CASA GRANDE	ROW	1148 / 251	01/21/1983	NOT AVAILABLE	NONE
9	CITY OF CASA GRANDE	ROW	1117 / 658	05/26/1982	0.78	NONE

PROPERTY TO BE ACQUIRED

PARCEL	INTEREST	ACREAGE	PURPOSE
10	FEE SIMPLE	0.45	RPZ PROTECTION
11	FEE SIMPLE	1.14	RPZ PROTECTION
12	FEE SIMPLE	0.18	AWOS CRITICAL AREA
13	FEE SIMPLE	5.95	RPZ PROTECTION

NOTES

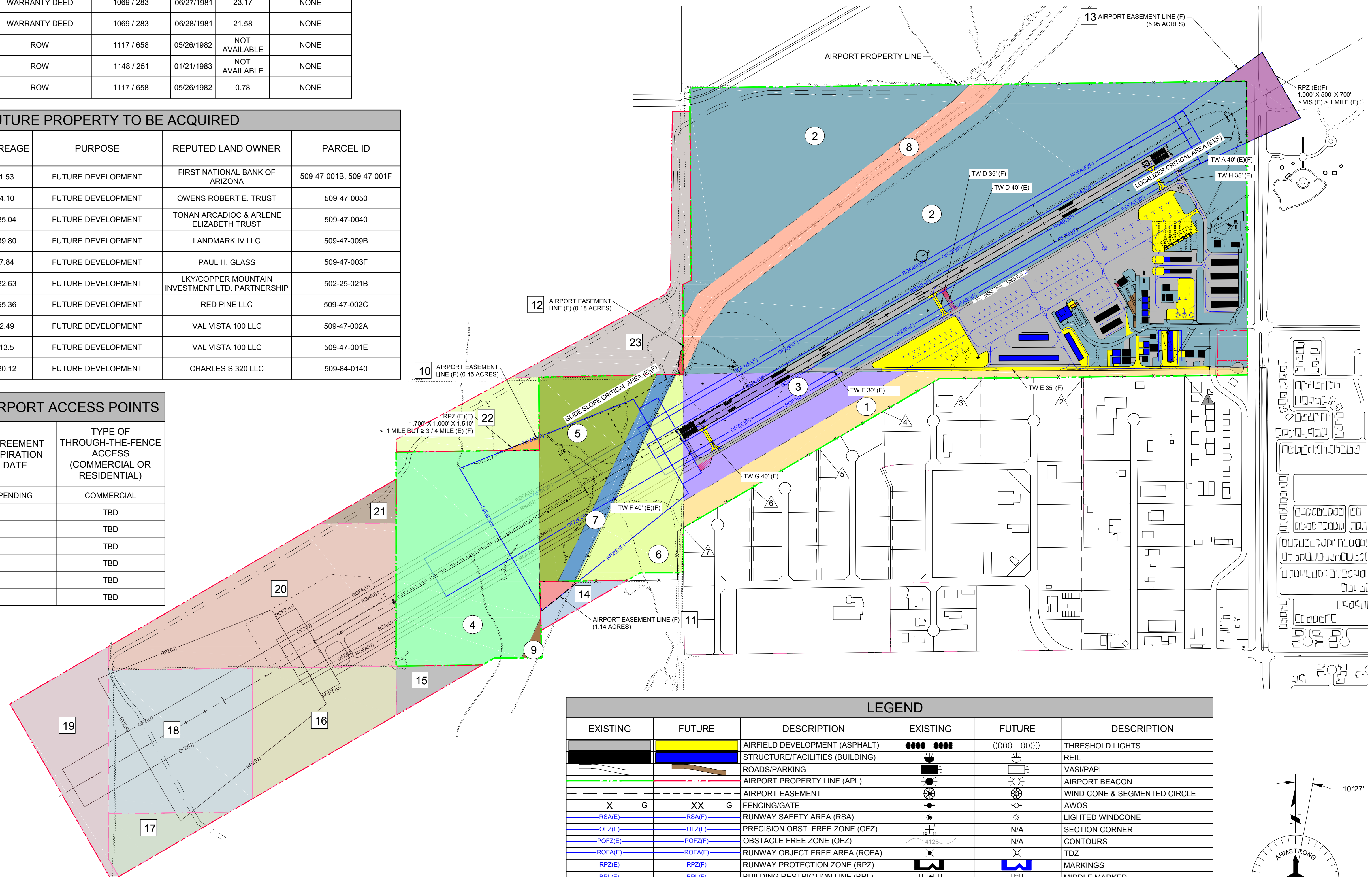
1. THE CITY OF CASA GRANDE SHOULD ENCOURAGE COMPATIBLE LAND USE FOR POTENTIAL AVIATION PURPOSES ON PROPERTY NOT CURRENTLY OWNED OR CONTROLLED BY THE CITY. A POTENTIAL RUNWAY EXTENSION IS SHOWN FOR PLANNING PURPOSES ONLY.

FUTURE PROPERTY TO BE ACQUIRED

PARCEL	INTEREST	ACREAGE	PURPOSE	REPUTED LAND OWNER	PARCEL ID
14	FEE SIMPLE	1.53	FUTURE DEVELOPMENT	FIRST NATIONAL BANK OF ARIZONA	509-47-001B, 509-47-001F
15	FEE SIMPLE	4.10	FUTURE DEVELOPMENT	OWENS ROBERT E. TRUST	509-47-0050
16	FEE SIMPLE	25.04	FUTURE DEVELOPMENT	TONAN ARCADIOC & ARLENE ELIZABETH TRUST	509-47-0040
17	FEE SIMPLE	39.80	FUTURE DEVELOPMENT	LANDMARK IV LLC	509-47-009B
18	FEE SIMPLE	7.84	FUTURE DEVELOPMENT	PAUL H. GLASS	509-47-003F
19	FEE SIMPLE	22.63	FUTURE DEVELOPMENT	LKY/COPPER MOUNTAIN INVESTMENT LTD. PARTNERSHIP	502-25-021B
20	FEE SIMPLE	55.36	FUTURE DEVELOPMENT	RED PINE LLC	509-47-002C
21	FEE SIMPLE	2.49	FUTURE DEVELOPMENT	VAL VISTA 100 LLC	509-47-002A
22	FEE SIMPLE	13.5	FUTURE DEVELOPMENT	VAL VISTA 100 LLC	509-47-001E
23	FEE SIMPLE	20.12	FUTURE DEVELOPMENT	CHARLES S 320 LLC	509-84-0140

THROUGH-THE-FENCE AIRPORT ACCESS POINTS

ACCESS POINT NUMBER	EXISTING OR FUTURE ACCESS POINT	AGREEMENT EXPIRATION DATE	TYPE OF THROUGH-THE-FENCE ACCESS (COMMERCIAL OR RESIDENTIAL)
▲	EXISTING ACCESS POINT	PENDING	COMMERCIAL
2	FUTURE ACCESS POINT		TBD
3	FUTURE ACCESS POINT		TBD
4	FUTURE ACCESS POINT		TBD
5	FUTURE ACCESS POINT		TBD
6	FUTURE ACCESS POINT		TBD
7	FUTURE ACCESS POINT		TBD



LEGEND

EXISTING	FUTURE	DESCRIPTION	EXISTING	FUTURE	DESCRIPTION
		AIRFIELD DEVELOPMENT (ASPHALT)			THRESHOLD LIGHTS
		STRUCTURE/FACILITIES (BUILDING)			REIL
		ROADS/PARKING			VASI/PAPI
		AIRPORT PROPERTY LINE (APL)			AIRPORT BEACON
		AIRPORT EASEMENT			WIND CONE & SEGMENTED CIRCLE
X G	XX G	FENCING/GATE			AWOS
RSA(E)	RSA(F)	RUNWAY SAFETY AREA (RSA)			LIGHTED WINDCONE
OFZ(E)	OFZ(F)	PRECISION OBST. FREE ZONE (OFZ)		N/A	SECTION CORNER
POFZ(E)	POFZ(F)	OBSTACLE FREE ZONE (OFZ)	4125	N/A	CONTOURS
ROFA(E)	ROFA(F)	RUNWAY OBJECT FREE AREA (ROFA)			TDZ
RPZ(E)	RPZ(F)	RUNWAY PROTECTION ZONE (RPZ)			MARKINGS
BRL(E)	BRL(F)	BUILDING RESTRICTION LINE (BRL)			MIDDLE MARKER
TSA(E)	TSA(F)	TAXIWAY SAFETY AREA (TSA)			HELICOPTER PARKING
TOFA(E)	TOFA(F)	TAXIWAY OBJECT FREE AREA (TOFA)			TO BE REMOVED
					AIRPORT REFERENCE POINT (ARP)
					PACS/SACS MONUMENT
					MALSR
					THROUGH THE FENCE ACCESS POINT

NOTE: LEGEND DEPICTS ALP DEVELOPMENT, HOWEVER ALL SYMBOLS MAY NOT BE ON ALL PLAN SHEETS.

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EXHIBIT "A"
AIRPORT PROPERTY INVENTORY MAP

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AERIAL PHOTOGRAPH

APPENDIX A

ACRONYMS / GLOSSARY OF TERMS

CITY OF CASA GRANDE
PINAL COUNTY, ARIZONA
AIRPORT LAYOUT PLAN UPDATE AND
NARRATIVE REPORT

ARMSTRONG

Acronyms

AGL	Above Ground Level
ADIZ	Air Defense Identification Zone
AOA	Air Operations Area
ARTCC	Air Route Traffic Control Center
ATC	Air Traffic Control
ATCT	Air Traffic Control Tower
ATCAA	Air Traffic Control Assigned Airspace
AAC	Aircraft Approach Category
AOPA	Aircraft Owners and Pilots Association
ARFF	Aircraft Rescue and Fire Fighting
ADG	Airplane Design Group
ACIP	Airport Capital Improvement Plan
AIP	Airport Improvement Program
APMS	Airport Pavement Management System
ARC	Airport Reference Code
A/FD	Airport/Facility Directory
ARP	Airport Reference Point
ASV	Annual Service Volume
AFFF	Aqueous Film Forming Foam
AHPA	Archeological and Historic Preservation Act
RNAV	Area Navigation
ADOC	Arizona Department of Corrections
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
APPP	Arizona Pavement Preservation Program
ASASP	Arizona State Airports System Plan
ACI	Armstrong Consultants, Inc.
ASOS	Automated Surface Observing System
AWOS	Automated Weather Observing System
AWSS	Automated Weather Sensor System
ATIS	Automatic Terminal Information Service
BMP	Best Management Practices
BLM	Bureau of Land Management
CIP	Capital Improvement Plan
CATEX	Categorical Exclusion
CAA	Clean Air Act
CZM	Coastal Zone Management
CMG	Cockpit-to-Main Gear
CTAF	Common Traffic Advisory Frequency
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CEQ	Council on Environmental Quality
DNL	Day-night Average Sound Level

dB	Decibel
DOD	Department of Defense
ESA	Endangered Species Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EAS	Essential Air Service
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FEMA	Federal Emergency Management Agency
FBO	Fixed Base Operator
FL	Flight Level
FSS	Flight Service Station
GAO	General Accounting Office
GA	General Aviation
GAMA	General Aviation Manufacturers Association
GARA	General Aviation Revitalization Act
GO	General Obligation
GPS	Global Positioning System
GHGs	Green House Gases
IAP	Instrument Approach Procedure
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IGA	Inter-governmental Agreement
I-10	Interstate 10
LED	Light-emitting Diode
LPV	Localizer/Lateral Performance with Vertical Guidance
MGW	Main Gear Width
MTOW	Maximum Takeoff Weight
MSL	Mean Seal Level
MIRL	Medium Intensity Runway Lighting
MITL	Medium Intensity Taxiway Lighting
MOU	Memorandum of Understanding
MOA	Military Operations Area
MTR	Military Training Route
NAS	National Airspace System
NAAQS	National Ambient Air Quality Standards
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service

NPIAS	National Plan of Integrated Airport Systems
NPDES	National Pollution Discharge Elimination System
NPL	National Priority List
NRHP	National Register of Historic Places
NWS	National Weather Service
NM	Nautical Mile
NAVAID(S)	Navigational aid(s)
NextGen	Next Generation Air Transportation System
NDB	Non-directional beacon
NOTAM	Notice to Airmen
OFA	Object Free Area
OFZ	Obstacle Free Zone
OPBA	Operations per Based Aircraft
PCI	Pavement Condition Index
PM	Particulate Matter
PHX ADO	Phoenix Airports District Office
PAPI	Precision Approach Path Indicator
RIASP	Regional Integrated Airport System Planning
RCRA	Resource Conservation and Recovery Act
RDC	Runway Design Code
REIL	Runway End Identifier Lights
ROFA	Runway Object Free Area
RPZ	Runway Protection Zone
RSA	Runway Safety Area
RVR	Runway Visual Range
SPCCP	Spill Prevention, Control, and Countermeasure Plan
SHPO	State Historic Preservation Office/Officer
SIP	State Implementation Plan
SIASP	Statewide Integrated Airport System Planning
SWPPP	Storm Water Pollution Prevention Plan
TACAN	Tactical Air Navigation
TDG	Taxiway Design Group
TOFA	Taxiway Object Free Area
TSA	Taxiway Safety Area
TAC	Technical Advisory Committee
TAD	Terminal Area Drawing
TAF	Terminal Area Forecast
TOS	Threshold of Significance
TPA	Traffic Pattern Altitude
TSA	Transportation Security Administration
US	United States
USACE	United States Army Corps of Engineers

USCBP	United States Customs and Border Protection
USDA-NCRS	United States Department of Agriculture - Natural Conservation Resource Service
USDOI	United States Department of the Interior
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
USFS	United States Forest Service
UAS	Unmanned Aerial System
UAV	Unmanned Aerial Vehicle
VHF	Very High Frequency
VOR/DME	VHF Omnidirectional Range/Distance Measuring Equipment
VORTAC	VHF Omnidirectional Range/Tactical Area Navigation
VASI	Visual Approach Slope Indicator
VFR	Visual Flight Rules
WAAS	Wide Area Augmentation System

GLOSSARY OF TERMS

Above Ground Level (AGL) - A height above ground as opposed to MSL (height above Mean Sea Level).

Advisory Circular (AC) - Publications issued by the FAA to provide non-regulative guidance and information in a variety of subject areas.

Airplane Design Group (ADG) – A classification of aircraft based on wingspan and tail height.

Airport Improvement Program (AIP) - The Airport and Airway Improvement Act of 1982, as amended. Under this program, the FAA provides funding assistance for the development of airports and airport facilities.

Aircraft Mix - The number of aircraft movements categorized by capacity group or operational group and specified as a percentage of the total aircraft movements.

Aircraft Operation - An aircraft takeoff or landing.

Airport - An area of land or water used or intended to be used for landing and takeoff of aircraft, includes buildings and facilities, if any.

Airport Elevation - The highest point of an airport’s useable runways, measured in feet above mean sea level.

Airport Hazard - Any structural or natural object located on or near a public airport, or any use of land near such airport, that obstructs the airspace required for flight of aircraft on approach, landing, takeoff, departure, or taxiing at the airport.

Airport Land Use Regulations - Are designed to preserve existing and/or establish new compatible land uses around airports, to allow land use not associated with high population concentration, to minimize exposure of residential uses to critical aircraft noise areas, to avoid danger from aircraft crashes, to discourage traffic congestion and encourage compatibility with non-motorized traffic from development around airports, to discourage expansion of demand for governmental services beyond reasonable capacity to provide services and regulate the area around the airport to minimize danger to public health, safety, or property from the operation of the airport, to prevent obstruction to air navigation and to aid in realizing the policies of a County Comprehensive Plan and Airport Master Plan.

Airport Layout Plan (ALP) - A graphic representation, to scale, of existing and proposed airport facilities, their location on the airport, and the pertinent applicable standards. To be eligible for AIP funding assistance, an airport must have an FAA-approved ALP.

Airport Master Record, Form 5010 - The official FAA document, which lists basic airport data for reference and inspection purposes.

Airport Reference Code (ARC) - The ARC is a coding system used to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at the airport.

Airport Reference Point (ARP) - The latitude and longitude of the approximate center of the airport.

Airspace - Space above the ground in which aircraft travel; divided into corridors, routes, and restricted zones.

Air Traffic - Aircraft operating in the air or on an airport surface, excluding loading ramps and parking areas.

Approach Surface - A surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based upon the type of approach available or planned for that runway end.

Automated Weather Observing System (AWOS) – Equipment that automatically gathers weather data from various locations on the airport and transmits the information directly to pilots by means of computer generated voice messages over a discrete frequency.

Based Aircraft - An aircraft permanently stationed at an airport.

Building Restriction Line - An imaginary line on an airport's ALP which identifies suitable building area locations on airports.

Ceiling - The height above the earth's surface of the lowest layer of clouds or other phenomena which obscure vision.

Conical Surface - A surface extending outward and upward form the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

Controlled Airspace – Airspace in which some or all aircraft may be subject to air traffic control to promote safe and expeditious flow of air traffic.

Day Night Level (DNL) - 24-hour average sound level, including a 10 decibel penalty for sound occurring between 10:00 PM and 7:00 AM.

Decibel - Measuring unit for sound based on the pressure level.

Design Aircraft - In airport design, the aircraft which controls one or more design items such as runway length, pavement strength, lateral separation, etc., for a particular airport. The same aircraft need not be critical for all design items.

Displaced Threshold - A threshold that is located at a point on the runway beyond the beginning of the runway.

Federal Aviation Administration (FAA) - The federal agency responsible for the safety and efficiency of the national airspace and air transportation system.

14 CFR Part 77 - airspace surrounding runways that the FAA requires protection for the safe navigation of aircraft.

Fixed Base Operator (FBO) - An individual or company located at an airport and providing commercial general aviation services.

Fuel Flowage Fees - Fees charged by the airport owner based upon the gallons of fuel either delivered to the airport or pump at the airport.

General Aviation (GA) - All aviation activity in the United States, which is neither military nor conducted by major, national, or regional commercial airlines.

Glider - A heavier-than-air aircraft that is supported in flight by the dynamic reaction of the air against its lifting surfaces and whose free flight does not depend principally on an engine (FAR Part 1).

Global Positioning System (GPS) - The global positioning system is a space based navigation system, which has the capability to provide highly accurate three-dimensional position, velocity and time to an infinite number of equipped users anywhere on or near the Earth. The typical GPS integrated system will provide: position, velocity, time, altitude, groundspeed and ground track error, heading and variation. The GPS measures distance, which it uses to fix position, by timing a radio signal that starts at the satellite and ends at the GPS receiver. The signal carries with it, data that discloses satellite position and time of transmission and synchronizes the aircraft GPS system with satellite clocks.

Hazard to Air Navigation - An object which, as a result of an aeronautical study, the FAA determines will have a substantial adverse effect upon the safe and efficient use of navigable airspace by aircraft, operation of air navigation facilities or existing or potential airport capacity.

Horizontal Surface - A horizontal plane 150 feet above the established airport elevation, the perimeter which is constructed by swinging arcs of specified radii form the center of each end of the primary surface of each runway of each airport and connecting the adjacent arcs by lines tangent to those arcs.

Imaginary Surfaces - Surfaces established in relation to the end of each runway or designated takeoff and landing areas, as defined in paragraphs 77.25, 77.28 and 77.29 of 14 CFR Part 77, *Safe, Efficient Use, and Preservation of Navigable Airspace*. Such surfaces include the approach, horizontal, conical, transitional, primary, and other surfaces.

Itinerant Operations - All operations at an airport, which are not local operations.

Knots - Nautical miles per hour, equal 1.15 statute miles per hour.

Large Airplane - An airplane that weighs more than 12,500 pounds maximum certified takeoff weight.

Local Operations – Operation by aircraft flying in the traffic pattern or within sight of the control tower, aircraft known to be arriving or departing from flight in local practice areas, or aircraft executing practice instrument approaches at the airport.

Location Identifier - A three-letter or other code, suggesting where practicable, the location name that it represents.

Maneuvering Area - That part of an airport to be used for the takeoff and landing of aircraft and for the movement of aircraft associated with takeoff and landing, excluding aprons.

Master Plan - A planning document prepared for an airport, which outlines directions and developments in detail for 5 years and less specifically for 20 years. The primary component of which is the Airport Layout Plan (ALP).

Mean/Maximum Temperature - The average of all the maximum temperatures usually for a given period of time.

Mean Sea Level (MSL) - Height above sea level.

Medium Intensity Runway Lights (MIRL) – Airfield lighting used on the edges of VFR runways or runways with a non-precision instrument flight rule (IFR) procedure for either a circling or straight-in approach.

Minimum Altitude - That designated altitude below which an IFR pilot is not allowed to fly unless arriving or departing an airport or for specific allowable flight operations.

National Airspace System - A plan prepared annually by the FAA which identifies, for the public, the composition of a national system of airports together with the airport development necessary to anticipate and meet the present and future needs of civil aeronautics, to meet requirements in support of the national defense, and to meet the special needs of the Postal Service. The plan includes both new and qualitative improvements to existing airports to increase their capacity, safety, technological capability, etc.

NAVAID - A ground based visual or electronic device used to provide course or altitude information to pilots.

Noise - Defined subjectively as unwanted sound. The measurement of noise involving the understanding of three characteristics of sound: intensity, frequency, and duration.

Noise Contours - Lines drawn about a noise source indicating constant energy levels of noise exposure. DNL is the measure used to describe community exposure to noise.

Noise Exposure Level - The integrated value, over a given period of time of a number of different events of equal or different noise levels and durations.

Non-Precision Instrument - A runway having an existing instrument approach procedure utilizing air navigation facilities with only horizontal guidance for which a straight-in, non-precision instrument approach procedure has been approved.

Notice to Airmen (NOTAM) - A notice containing information (not known sufficiently in advance to publicize by other means) concerning the establishment, condition or change in any component (facility, service, or procedure) of or hazard in the National Airspace System, the timely knowledge of which is essential to personnel concerned with flight operations.

Object - Includes, but is not limited to, above ground structures, NAVAIDs, people, equipment, vehicles, natural growth, terrain, and parked aircraft.

Object Free Area (OFA) - A two-dimensional ground area-surrounding runways, taxiways, and taxilanes which is clear of objects except for object whose location is fixed by function.

Obstacle Free Zone (OFZ) - The airspace defined by the runway OFZ and, as appropriate, the inner-approach OFZ and the inner-transitional OFZ, which is clear of object penetrations other than frangible NAVAIDs.

Obstruction to Air Navigation - An object of greater height than any of the heights or surfaces presented in Subpart C of Title 14 CFR Part 77, *Standards for Determining Obstructions to Air Navigation or Navigational Aids or Facilities.*

Parking Apron - An area of pavement intended to accommodate parked aircraft.

Pattern - The configuration or form of a flight path flown by an aircraft or prescribed to be flown, as in making an approach to a landing.

Precision Approach Path Indicators (PAPI) - The visual approach slope indicator system which provides vertical visual guidance to aircraft during approach and landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that they are the glide path.

Primary Surface - A surface longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway, but when the runway has no specially prepared hard surface, or planned hard surface, the primary surface ends at each end of that runway.

Rotating Beacon - A visual NAVAID operated at many airports. At civil airports, alternating white and green flashes indicate the location of the airport.

Runway - A defined rectangular surface on an airport prepared or suitable for the landing or takeoff of airplanes.

Runway Design Code (RDC) - A code signifying the design standard to which the runway is to be built.

Runway End Identifier Lights (REIL) - REILs are flashing strobe lights which aid the pilot in identifying the runway end at night or in bad weather conditions.

Runway Gradient - The average gradient consisting of the difference in elevation of the two ends of the runway divided by the runway length may be used provided that no intervening point on the runway profile lies more than five feet above or below a straight line joining the two ends of the runway. In excess of five feet the runway profile will be segmented and aircraft data will be applied for each segment separately.

Runway Orientation - The magnetic bearing of the centerline of the runway.

Runway Protection Zone (RPZ) - An area off the runway end used to enhance the protection of people and property on the ground.

Runway Safety Area (RSA) - A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershot, overshot, or excursion from the runway.

Segmented Circle - A basic marking device used to aid pilots in locating airports.

Small Aircraft - An airplane that weighs 12,500 pounds or less maximum certified takeoff weight.

Taxiway - A defined path established for the taxiing of aircraft from one part of an airport to another.

Taxiway Design Group (TDG) - A classification of airplanes based on outer to outer Main Gear Width (MGW) and Cockpit to Main Gear distance (CMG).

Terminal Area - The area used or intended to be used for such facilities as terminal and cargo buildings, gates, hangars, shops and other service buildings, automobile parking, airport motels, restaurants, garages, and automobile services and a specific geographical area within which control of air traffic is exercised.

Threshold - The beginning of that portion of the runway available for landing. “Threshold” always refers to landing, not the start of takeoff.

Touch and Go Operations - Practice flight performed by a landing touch-down and continuous takeoff without stopping.

Traffic Pattern - The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off form an airport. The usual components are the departure, crosswind, downwind, and base legs; and the final approach.

Transitional Surface - Surfaces that extend outward and upward at right angles to runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces.

Universal Communications (UNICOM) - A private aeronautical advisory communications facility for purpose other than air traffic control. Only one such station is authorized in any landing area. Services available are advisory in nature, primarily concerning the airport services and airport utilization. Locations and frequencies of UNICOMs are listed on aeronautical charts and publications.

Visual Flight Rules (VFR) - Rules that govern flight procedures under visual conditions.

Visual Runway - A runway intended for visual approaches only with no straight- in instrument approach procedure either existing or planned.

APPENDIX B

FORECASTS OF AVIATION ACTIVITY APPROVAL LETTER (FAA)

CITY OF CASA GRANDE
PINAL COUNTY, ARIZONA
AIRPORT LAYOUT PLAN UPDATE AND NARRATIVE REPORT

ARMSTRONG

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

Federal Aviation Administration
Phoenix Airports Field Office

3800 N Central Ave
Suite 1025
Phoenix, AZ 85012

June 26, 2015

Mr. Richard Wilkie
Economic Development Manager/Airport Manager
City of Casa Grande
3225 N Lear Ave
Casa Grande, AZ 85122

Dear Mr. Wilkie:

Casa Grande Municipal Airport (CGZ)
Aviation Activity Forecast Approval

The Federal Aviation Administration (FAA) has reviewed the aviation forecast for Casa Grande (CGZ) dated April 1, 2014. The FAA approves these forecasts for airport planning purposes, including Airport Layout Plan development.

In summary, while the difference between the FAA TAF and Casa Grande's forecast update regarding total operations isn't within the 10 percent allowance for the 5 year planning horizon, the airport forecast provides justification for this discrepancy. However, over the long-term planning horizon the difference between the TAF and the forecast update are within the 15 percent tolerance.

The forecast was developed using current data and appropriate methodologies, therefore the FAA locally approves this forecast for planning purposes at Casa Grande Municipal Airport. It is important to note that the approval of this forecast doesn't guarantee future funding for large scale capital improvements as future projects will need to be justified by current activity levels reached at the time the projects are proposed for implementation.

If you have any questions about this forecast approval, please call me at 602-379-3023.

Sincerely,

Kyler Erhard
Airport Planner

cc: Mr. Scott Driver, ADOT, Airport Grant Manager

APPENDIX C

AVERAGE DAILY OPERATIONS PER MONTH FORMULA

CITY OF CASA GRANDE
PINAL COUNTY, ARIZONA
AIRPORT LAYOUT PLAN UPDATE AND
NARRATIVE REPORT

ARMSTRONG

Estimated Peak Hourly Demand per Month Formula

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

Where T = Monthly percent of use (from curve)
M = Average monthly operations
A = Total annual operations
D = Average Daily Operations in a given month

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

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

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

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

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APPENDIX D

PUBLISHED INSTRUMENT APPROACH PROCEDURES

CITY OF CASA GRANDE
PINAL COUNTY, ARIZONA
AIRPORT LAYOUT PLAN UPDATE AND
NARRATIVE REPORT

ARMSTRONG

ILS or LOC/DME RWY 5
CASA GRANDE MUNI (CGZ)

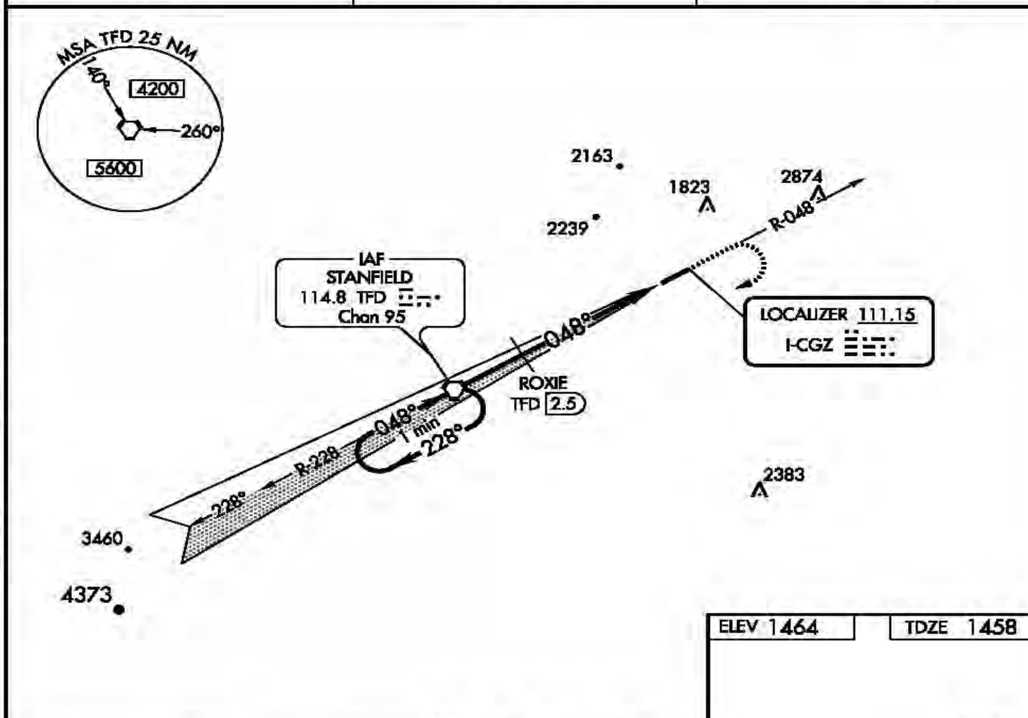
LOC I-CGZ	APP CRS	Rwy ldg 5200
111.15	048°	TDZE 1458
		Apt Elev 1464

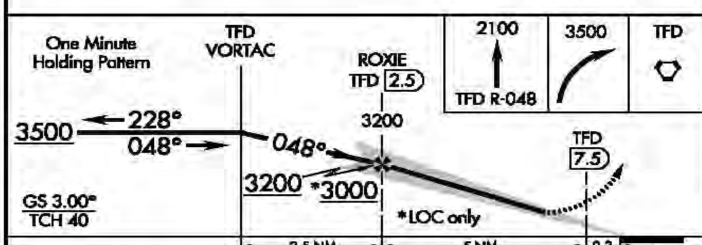
▼ ⚠NA — DME from TFD VORTAC; simultaneous reception of I-CGZ and TFD DME required. Autocoupled approach NA below 1650. Helicopter visibility reduction below ¾ SM NA. For inoperative MALSR, increase S-LOC 5 Cats A/B visibility to 1. Circling to Rwy 23 NA at night.

MALSR

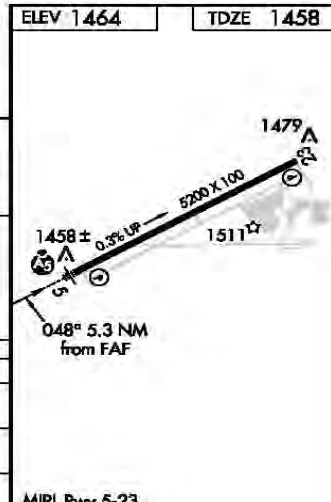
MISSED APPROACH: Climb to 2100 via TFD VORTAC R-048 then climbing right turn to 3500 direct to TFD VORTAC and hold.

AWOS-3	ALBUQUERQUE CENTER	UNICOM
132.175	125.4 269.3	122.7 (CTAF) Ⓛ





CATEGORY	A	B	C	D
S-ILS 5	1743-¾ 285 (300-¾)		NA	
S-LOC 5	1840-¾ 382 (400-¾)		NA	
CIRCLING	1960-1 496 (500-1)		NA	



SW-4, 13 NOV 2014 to 11 DEC 2014

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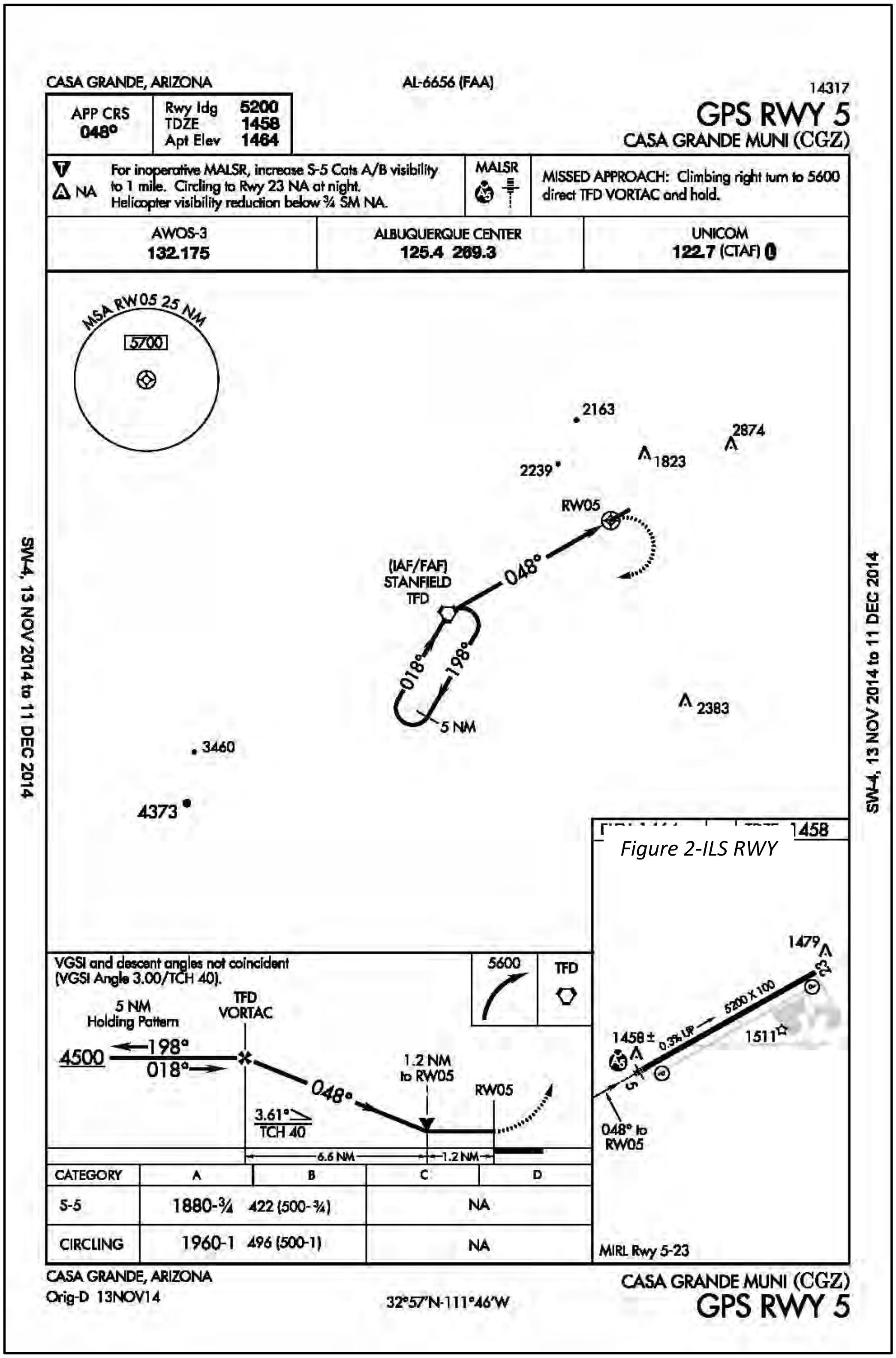

Figure 2-ILS RWY

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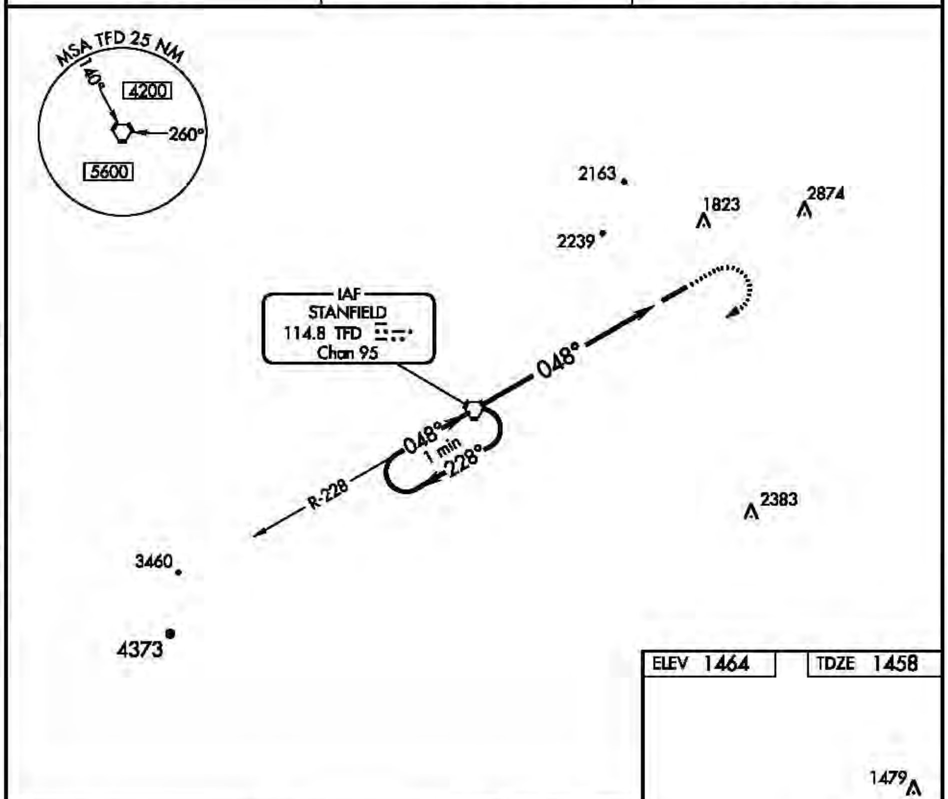
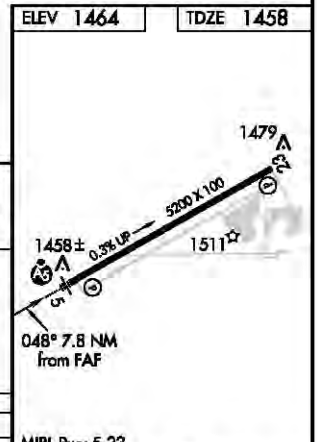
VORTAC TFD	APP CRS	Rwy ldg 5200
114.8	048°	TDZE 1458
Chan 95		Apt Elev 1464

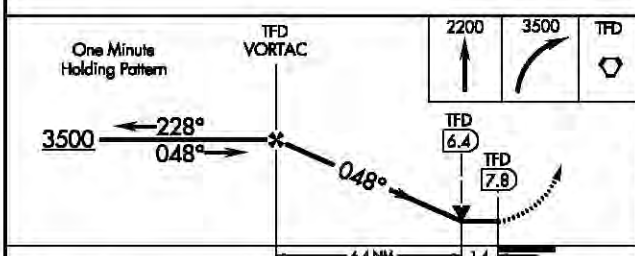
VOR RWY 5
CASA GRANDE MUNI (CGZ)

For inoperative MALSR, increase S-5 visibility Cats A/B to 1 mile. Helicopter visibility reduction below ¾ SM NA. Circling to Rwy 23 NA at night.	MALSR	MISSED APPROACH: Climb to 2200, then climbing right turn to 3500 direct TFD VORTAC and hold.

AWOS-3	ALBUQUERQUE CENTER	UNICOM
132.175	125.4 269.3	122.7 (CTAF)







CATEGORY	A	B	C	D
S-5	1960-¾	502 (500-¾)	NA	
CIRCLING	1960-1	496 (500-1)	NA	

FAF to MAP 7.8 NM					
Knots	60	90	120	150	180
Min:Sec	7:48	5:12	3:54	3:07	2:36

SW-4, 13 NOV 2014 to 11 DEC 2014

SW-4, 13 NOV 2014 to 11 DEC 2014

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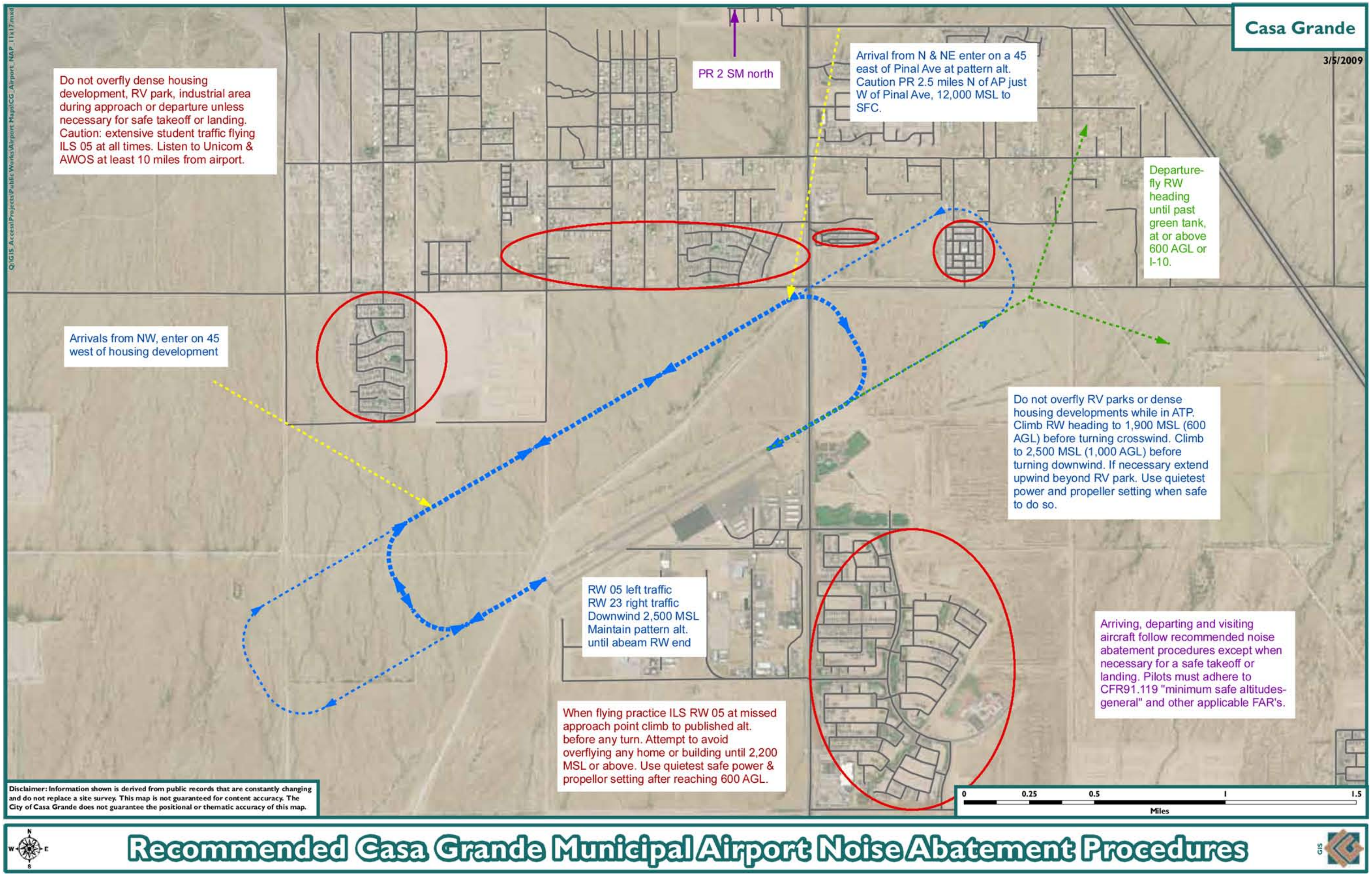
APPENDIX E

VOLUNTARY NOISE ABATEMENT PROCEDURES MAP

CITY OF CASA GRANDE
PINAL COUNTY, ARIZONA
AIRPORT LAYOUT PLAN UPDATE AND
NARRATIVE REPORT

ARMSTRONG


Casa Grande
3/5/2009
Do not overfly dense housing development, RV park, industrial area during approach or departure unless necessary for safe takeoff or landing. Caution: extensive student traffic flying ILS 05 at all times. Listen to Unicom & AWOS at least 10 miles from airport.
PR 2 SM north
Arrival from N & NE enter on a 45 east of Pinal Ave at pattern alt. Caution PR 2.5 miles N of AP just W of Pinal Ave, 12,000 MSL to SFC.
Departure- fly RW heading until past green tank, at or above 600 AGL or I-10.
Arrivals from NW, enter on 45 west of housing development
Do not overfly RV parks or dense housing developments while in ATP. Climb RW heading to 1,900 MSL (600 AGL) before turning crosswind. Climb to 2,500 MSL (1,000 AGL) before turning downwind. If necessary extend upwind beyond RV park. Use quietest power and propeller setting when safe to do so.
RW 05 left traffic
RW 23 right traffic
Downwind 2,500 MSL
Maintain pattern alt. until abeam RW end
Arriving, departing and visiting aircraft follow recommended noise abatement procedures except when necessary for a safe takeoff or landing. Pilots must adhere to CFR91.119 "minimum safe altitudes-general" and other applicable FAR's.
When flying practice ILS RW 05 at missed approach point climb to published alt. before any turn. Attempt to avoid overflying any home or building until 2,200 MSL or above. Use quietest safe power & propellor setting after reaching 600 AGL.
Disclaimer: Information shown is derived from public records that are constantly changing and do not replace a site survey. This map is not guaranteed for content accuracy. The City of Casa Grande does not guarantee the positional or thematic accuracy of this map.
0 0.25 0.5 1 1.5
Miles
Recommended Casa Grande Municipal Airport Noise Abatement Procedures