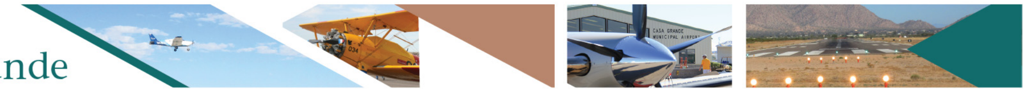
City of Casa Grande



AIRPORT MASTER PLAN

For

CASA GRANDE MUNICIPAL AIRPORT
Casa Grande, Arizona

Prepared for
The City of Casa Grande

By

Coffman Associates
Airport Consultants

January 2024

City of
Casa Grande
AIRPORT MASTER PLAN

Table of Contents

TABLE OF CONTENTS

Introduction

Chapter One – Inventory

Chapter One – Inventory (continued)

Chapter Two – Aviation Demand Forecasts

Chapter Two – Aviation Demand Forecasts (continued)

Chapter Three – Demand / Capacity and Facility Requirements

Chapter Four – Airport Development Alternatives

Chapter Four – Airport Development Alternatives (continued)

Chapter Five – Recommended Master Plan Concept

Chapter Six – Financial Management / Development Program

Chapter Six – Financial Management / Development Program (continued)

EXHIBITS

Introduction

Inventory

Forecasts

Demand / Capacity and Facility Requirements

EXHIBITS (continued)

Airport Development Alternatives

Recommended Master Plan Concept

Financial Management / Development Program

City of
Casa Grande
AIRPORT MASTER PLAN

Introduction

City of
Casa Grande
AIRPORT MASTER PLAN

Introduction

WHAT IS A MASTER PLAN?

The Federal Aviation Administration (FAA) recommends that airports update their long-term planning documents every seven to 10 years, or as necessary, to address local changes at the airport. The last Master Plan update for Casa Grande Municipal Airport (CGZ) was completed in 2009. The City of Casa Grande (City), the sponsor of the airport, received a grant from the Arizona Department of Transportation – Aeronautics Group (ADOT) to update this Airport Master Plan.

The City is responsible for funding capital improvements at the airport, as well as obtaining FAA and ADOT development grants. In addition, the City oversees facility enhancements and infrastructure development conducted by private entities at the airport. The Master Plan provides guidance for future development and justification for projects for which the airport may receive funding through an updated capital improvement program (CIP) to demonstrate the future investment required by the City, as well as the FAA and ADOT.

The Airport Master Plan follows a systematic approach outlined by the FAA to identify airport needs in advance of the actual need for improvements. This is done to ensure that the City can coordinate environmental reviews, project approvals, design, financing, and construction to minimize the negative effects of maintaining and operating inadequate or insufficient facilities. An important outcome of the Master Plan process is a recommended development plan, which reserves sufficient areas for future facility needs. Such planning will protect development areas and ensure they will be readily available when required to meet future needs. The intended outcome of this study is a detailed on-airport land use concept which outlines specific uses for all areas of airport property, including strategies for revenue enhancement.

The preparation of this study is evidence that the City recognizes the importance of the airport to the surrounding region and the associated challenges inherent in providing for its unique operating and improvement needs. The cost of maintaining an airport is an investment which yields impressive benefits to the local community. With a sound and realistic Master Plan, the airport can maintain its role as an important link to the regional, state, and national air transportation systems. Moreover, the plan will aid in supporting decisions for directing limited and valuable City resources for future airport development. Ultimately, the continued investments in the airport will allow the City to reap the economic benefits generated by historical investments.

Some common questions regarding what a master plan is / is not are answered in the graphic below.

An Airport Master Plan is:

- ✓ A comprehensive, long-range study of the airport and all air and landside components that describes plans to meet FAA safety standards and future aviation demand.
- ✓ Required by the FAA to be conducted every 7-10 years to ensure plans are up-to-date and reflect current conditions and FAA regulations. The last Master Plan was completed in 2009.
- ✓ Funded by the FAA through the Airport Improvement Program (AIP) or through ADOT's Aeronautics group. This study is being 90% funded by ADOT, with the remaining 10% funded by The City of Casa Grande.
- ✓ A local document that will ultimately be presented for approval from the City of Casa Grande. The FAA approves only two elements of the Master Plan, the Aviation Demand Forecasts and the Airport Layout Plan (ALP) drawing set.
- ✓ An opportunity for airport stakeholders and the general public to engage with airport staff on issues related to the airport and its current and future operations, and environmental and socioeconomic impacts. Three (3) public information workshops will be conducted throughout the Master Plan process to facilitate this public outreach effort.

An Airport Master Plan is not:

- ✕ A guarantee that the airport will proceed with any planned projects. Master Plans are guides that help airport staff plan for future airport development; however, the need/demand for certain projects may not ever materialize.
- ✕ A guarantee that the City of Casa Grande, ADOT, or the FAA will fund any planned projects. Project funding is considered on a project-by-project basis requiring appropriate need and demand. Certain projects may require the completion of a benefit-cost analysis.
- ✕ Environmental clearance for any planned projects. The Master Plan includes an environmental overview that identifies potential environmental sensitivities per the National Environmental Policy Act of 1969 (NEPA); however, most planned projects will require a separate NEPA study (Environmental Impact Statement/ Environmental Assessment/Categorical Exclusion) prior to construction.

WHO IS PREPARING THE MASTER PLAN?

The City has contracted with the airport planning firm Coffman Associates, Inc. to undertake the Airport Master Plan. Coffman Associates is an airport consulting firm that specializes in master planning and environmental studies. Coffman Associates will lead the planning team, with support from the following firms:

- C&S Companies | Engineering support primarily to offer insights into development alternatives and estimates of probable costs;
- SWCA | Conducting field surveys in support of the environmental elements of the plan; and
- Martinez Geospatial | Aerial photography, ground survey, and Geographic Information System (GIS) products to meet FAA 5300-18B requirements for Airports GIS data submittal.

The Airport Master Plan is being prepared in accordance with FAA requirements, including Advisory Circular (AC) 150/5300-13B, *Airport Design*, and AC 150/5070-6B, *Airport Master Plans* (as amended). The plan will be closely coordinated with other planning studies relevant to the area and with aviation plans developed by the FAA and ADOT. The plan will also be coordinated with the City of Casa Grande, as well as other local and regional agencies as appropriate.

GOALS AND OBJECTIVES

The primary goal of this Master Plan is to develop and maintain a financially feasible, long-term development program, which will satisfy aviation demand of the region; be compatible with community development, other transportation modes, and the environment; and enhance employment and revenue for the local area. Accomplishing this goal requires an evaluation of the existing airport to decide what actions should be taken to maintain a safe, adequate, and reliable facility.

Specific objectives of the study include the following:

- Document the issues that proposed development will address.
- Justify the proposed development through the technical, economic, and environmental investigation of concepts and alternatives.
- Provide an effective graphic presentation of the development of the airport and anticipated land uses in the vicinity of the airport.
- Establish a realistic schedule for the implementation of the development proposed in the plan, particularly the short-term capital improvement program.
- Propose an achievable financial plan to support the implementation schedule.
- Provide sufficient project definition and detail for subsequent environmental evaluations that may be required before the project is approved.

- Present a plan that adequately addresses the issues and satisfies local, state, and federal regulations.

- Document policies and future aeronautical demand to support municipal or local deliberations on spending, debt, land use controls, and other policies necessary to preserve the integrity of the airport and its surroundings.

- Set the stage and establish the framework for a continuing planning process. Such a process should monitor key conditions and permit changes in plan recommendations as required.

- Enhance/expand general aviation services to accommodate tenants/users, thus increasing the socioeconomic benefits to the community.

BASELINE ASSUMPTIONS

A long-range planning study requires several baseline assumptions that will be used throughout this analysis. The baseline assumptions for this study are as follows:

- CGZ will continue to operate as a local general aviation airport through the 20-year planning period;

- CGZ will continue to accommodate general aviation tenants, as well as itinerant and/or local aircraft operations by air taxi, general aviation, and military operators;

- The aviation industry will develop through the planning period as projected by the FAA. Specifics of projected changes in national aviation industries are described in Chapter Two – Forecasts;

- The socioeconomic characteristics of the region will generally change as forecast (see Chapter Two); and,

- A federal and state airport improvement program will be in place through the planning period to assist in funding future capital development needs.

MASTER PLAN ELEMENTS AND PROCESS

The Master Plan has 10 elements that are intended to assist in the evaluation of future facility needs and provide the supporting rationale for their implementation. **Exhibit iA** provides a graphical depiction of the process involved with the study.

Element 1 – Initiation includes the development of the scope of services and schedule, as well as the establishment of a Planning Advisory Committee (PAC). Study material will be assembled in a workbook format. General background information will be established that includes outlining the goals and objectives to be accomplished during the Master Plan.

INITIATION

- Goals and Objectives
- Project Website
- Planning Advisory Committee

PAC #1

INVENTORY

- Airport Facilities
- Airspace and Air Traffic Activity
- Airport Access and Parking, Utilities, and Aerial Photography
- Area Socioeconomic Data
- Local Planning and Land Use
- AGIS Survey

FORECASTS

- Based Aircraft and Fleet Mix
- Annual Operations
- Peaking Characteristics
- Critical Aircraft Analysis

FACILITY REQUIREMENTS

- Design Categories
- Runway Length and Strength
- Support Facilities
- Taxiways
- Airfield Capacity
- Hangar Facilities
- Terminal Building
- Aprons
- Navigational Aids

PAC #2 — Working Papers

PW #1

AIRPORT ALTERNATIVES

- Evaluate Development Scenarios
  - Airside
  - Landside
  - Support

PAC #3 — Working Papers

PW #2

RECOMMENDED MASTER PLAN CONCEPT AND CAPITAL FINANCIAL PLAN

- Detailed Master Plan Facility and Land Use Plans
- Cost Estimates
- Funding Sources
- Airport Capital Improvement Plan

ENVIRONMENTAL CONSIDERATIONS

- Noise Exposure
- Recycling Plan
- Review/Evaluation of NEPA Environmental Categories

PAC #4 — Working Papers

PW #3

AIRPORT LAYOUT PLANS

- Airport Layout Plan
- Landside Drawing
- Airspace/Approach Drawings
- On-Airport Land Use Plan
- Property Map
- Land Use Plans

PAC: Planning Advisory Committee
PW: Public Workshop

Exhibit iA
PROJECT WORK FLOW

Element 2 – Inventory is focused on collecting and assembling relevant data pertaining to the airport and the area it serves. Information is collected on existing facilities and operations. Local economic and demographic data is collected to define the local growth trends, and environmental information is gathered to identify potential environmental sensitivities that might affect future improvements. Planning studies which may have relevance to the Master Plan are also collected.

Element 3 – Forecasts examines the potential aviation demand at the airport. The analysis utilizes local socioeconomic information, as well as national air transportation trends to quantify the levels of aviation activity which can reasonably be expected to occur at CGZ over a 20-year period. An existing and ultimate critical design aircraft, based upon AC 150/5000-17, *Critical Aircraft and Regular Use Determination,* is also established to determine future planning design standards. The results of this effort are used to determine the types and sizes of facilities which will be required to meet the projected aviation demand at the airport through the planning period. This element is one of two elements that are submitted to the FAA for approval.

Element 4 – Facility Requirements determines the available capacities of various facilities at the airport, whether they conform with FAA standards, and what facility updates or new facilities will be needed to comply with FAA requirements and/or projected 20-year demand.

Element 5 – Airport Alternatives considers a variety of solutions to accommodate projected airside and landside facility needs through the long-term planning period. An analysis is completed to identify the strengths and weaknesses of each proposed development alternative, with the intention of determining a single direction for development.

Element 6 – Recommended Master Plan Concept and Capital Financial Plan provides both a graphic and narrative description of the recommended plan for the use, development, and operation of the airport. A CIP is established to define the schedules, costs, and funding sources for the recommended development projects.

Element 7 – Airport Plans is the preparation of the official Airport Layout Plan (ALP) drawings based on the recommended development concept. The ALP set is used by the FAA and ADOT – Aeronautics Group in determining grant eligibility. This element is the second element of the study that is submitted to the FAA for approval.

Element 8 – Environmental Evaluation involves providing environmental information to assist in the evaluation of airport alternatives and recommended development concepts and to provide information that will help expedite subsequent environmental review under NEPA. A recycling plan is also developed to assess the airport's existing waste management program and develop recommendations for improving on-airport recycling. This element also includes an update to the Public Airport Disclosure Map to reflect operational forecasts, noise contours, airfield facilities, and the airport traffic pattern airspace.

Element 9 – Public Coordination and Communication includes tasks related to PAC meetings as the Master Plan develops, as well as conducting periodic public information workshops with the aim of engaging the community in the study process. A study website is also developed for the purpose of distributing study materials and notices of public meetings.

Element 10 – Final Reports and Approvals provide documents which depict the findings of the study effort and present the study and its recommendations to appropriate local organizations. The final document incorporates the revisions to previous working papers prepared under earlier elements into a usable Master Plan document.

COORDINATION AND OUTREACH

The Casa Grande Municipal Airport Master Plan is of interest to many within the local community and region. This includes local citizens, local businesses, community organizations, City officials, airport users/tenants, and aviation organizations. As a component of the regional, state, and national aviation systems, CGZ is of importance to both state and federal agencies responsible for overseeing the air transportation system.

To assist in the development of the Master Plan, a PAC was established to act in an advisory role during preparation of the study. Committee members are scheduled to meet four times at designated points during the study to review study materials and provide comments to help ensure that a realistic, viable plan is developed.

Draft working paper materials will be prepared at various milestones in the planning process. The working paper process allows for timely input and review during each step within the Master Plan to ensure that all issues are fully addressed as the recommended program develops.

A series of three open-house public information workshops will also be conducted as part of the study coordination and outreach efforts. Workshops are designed to allow all interested persons to become informed and provide input concerning the Master Plan process. Notices of meeting times and locations will be advertised through local media outlets, and all draft reports, meeting notices, and materials will be made available to the public on the project website at https://casagrande.airportstudy.net/.

SWOT ANALYSIS

A SWOT analysis is a strategic business planning technique used to identify **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats associated with an action or plan. The SWOT analysis involves identifying an action, objective, or element, and then identifying the internal and external forces that are positively and negatively impacting that action, objective, or element in a given environment. A SWOT analysis was conducted with the PAC in January 2022. A summary of this exercise and discussion is included below.

SWOT DEFINITIONS

This SWOT analysis groups information into two categories:

- **Internal –** attributes of the airport and market area that may be considered strengths or weaknesses to the action, objective, or element.
- **External –** attributes of the aviation industry that may pose as opportunities or threats to the action, objective, or element.

The SWOT further categorizes information into one of the following:

- **Strengths –** internal attributes of the airport that are helpful to achieving the action, objective, or element.
- **Weaknesses –** internal attributes of the airport that are harmful to achieving the action, objective, or element.
- **Opportunities –** external attributes of the industry that are helpful to achieving the action, objective, or element.
- **Threats –** external attributes of the industry that are harmful to achieving the action, objective, or element.

It is important to note that some attributes may fit into multiple categories. For example, something can be considered both a strength and a weakness, depending on the perspective of the person or entity describing it.

S STRENGTHS	• Outside Phoenix's busy Class B airspace • Non-towered (easier, more convenient) • Through-the-fence access for adjacent tenants • Low fuel costs • Good weather with clear visibility most days • ILS precision approach to Runway 5	• Plenty of ramp space • Substantial property (640 acres) • Supportive airport and city staff • Good customer service • Local advocates in community & region
W WEAKNESSES	• Outside Class B airspace (can be challenging for pilots on IFR flight plan who are accustomed to controlled airspace) • Non-towered (see above) • Length of runway can be restrictive in summer • Lack of lighting on apron	• Lack of aircraft storage space • Portions of airport property on north side are inaccessible and lack utilities, hindering development • No FBO
O OPPORTUNITIES	• Through-the-fence access for adjacent tenants • FBO • Terminal & parking lot expansion • New hangar construction • Increased funding opportunities with 2022 infrastructure bill	• Land being used by fire department affords good airfield access and has the potential to be redeveloped for an aviation use • On-airport flight training school • Airport traffic control tower (ATCT)
T THREATS	• Unresolved situation with skydiving operation regarding drop zone has impacted federal funding opportunities	• Surrounding land uses & encroachment (residential development on east side) • National pilot shortage

City of
Casa Grande
AIRPORT MASTER PLAN

Chapter 1

Inventory

Chapter 1

Inventory

The inventory chapter of existing conditions is the initial step in the preparation of the Casa Grande Municipal Airport (CGZ) Master Plan. The inventory will serve as an overview of the airport's physical and operational features, including facilities, users, and activity levels, as well as specific information related to the airspace, air traffic activity, and role of the airport. Finally, a summary of socioeconomic characteristics and review of existing environmental conditions on and adjacent to the airport are thoroughly detailed, which will provide further input into the study process.

Information provided in Chapter One serves as the baseline for the remainder of the Master Plan, which is compiled using a wide variety of resources, including: applicable planning documents; on-site visits; interviews with airport staff, tenants, and users; aerial and ground photography; federal, state, and local publications; and project record drawings. Specific sources are those listed below, and environmental resources are detailed at the end of this chapter.

Inventory Source Documents:

- Casa Grande Municipal Airport *2009 Airport Master Plan Update*
- Casa Grande Municipal Airport *2015 Airport Layout Plan Update & Narrative Report*
- City of Casa Grande's airport website[1]
- Casa Grande Municipal Airport Federal Aviation Administration (FAA) Form 5010, *Airport Master Record*

AIRPORT SETTING AND BACKGROUND

LOCALE

Located approximately 40 miles southeast of Phoenix, the City of Casa Grande is situated between Arizona's two largest cities, Phoenix and Tucson. The city is named after the Casa Grande Ruins National Monument, which is actually located in nearby Coolidge. According to the U.S. Census Bureau, Casa Grande had a population of 53,658[2] as of April 1, 2020, and is the largest city in Pinal County. The city is known for its combination of historic charm and modern amenities and has been the recipient of several awards, including being ranked among the "Most Giving Cities in the U.S." [3]

CGZ is situated approximately five miles north of the city and encompasses approximately 470 acres. The airport sits at an elevation of 1,464.1 feet above mean sea level (MSL). The surrounding major surface roadways include N. Pinal Avenue to the east, which is accessible from Interstate 10, and Scott Drive which runs along the west side of the airport before turning to the north. Airport Road provides access to airport property as well as the Airport Industrial Park located to the south. **Exhibit 1A** depicts the airport in its regional setting.

AIRPORT ADMINISTRATION

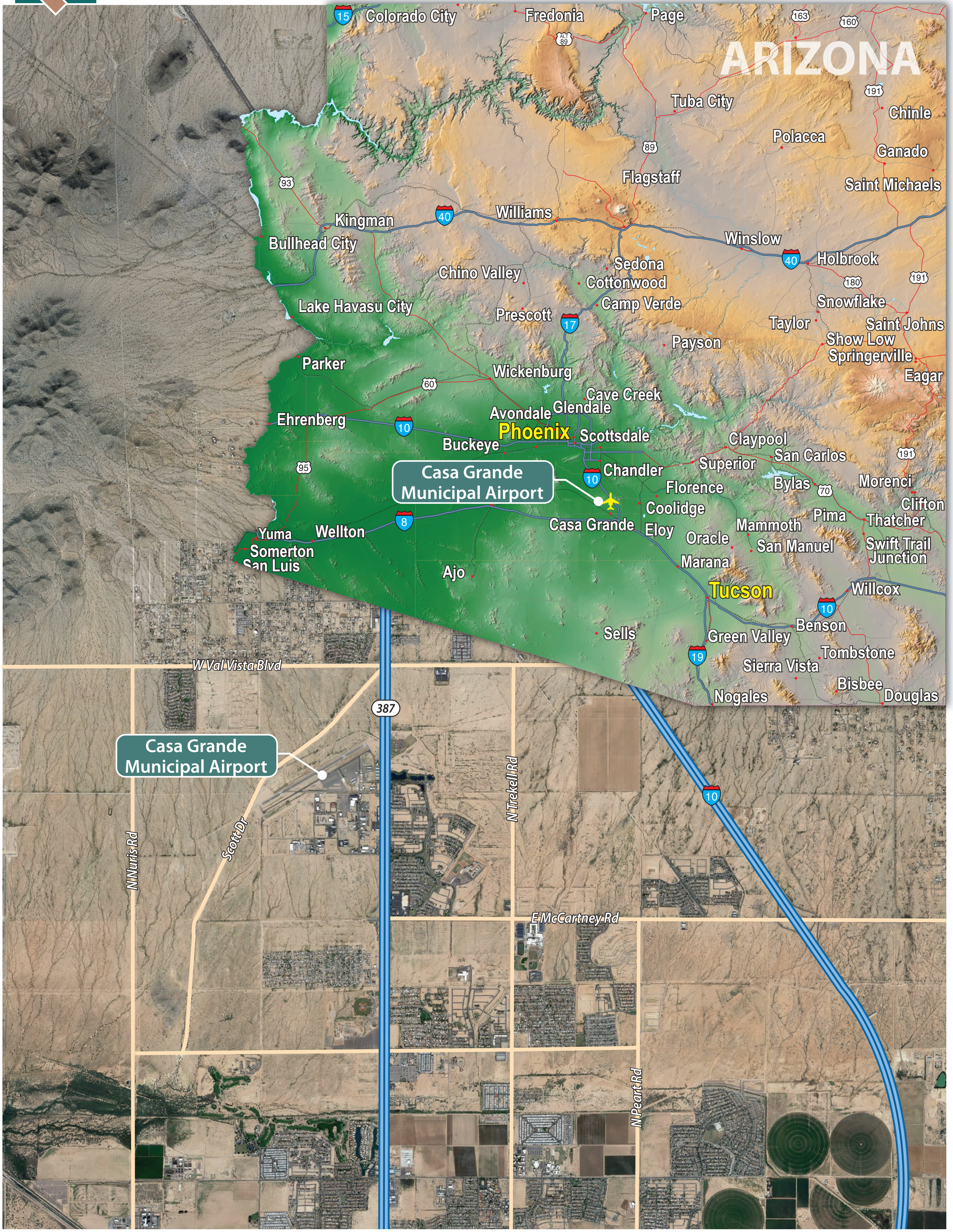
CGZ is owned and operated by the City of Casa Grande. An Airport Advisory Board has advisory and oversight responsibilities regarding policies, fees, and general operations at the airport. The Board consists of five individuals that are appointed by City Council and includes a chair, co-chair, and three members. An on-site airport manager provides day-to-day oversight of the airport and its maintenance and serves as a staff liaison to the Airport Advisory Board. The airport is staffed seven days per week between the hours of 6:00 a.m. and 4:00 p.m., with after-hours services available by request.

CLIMATE

Climate and local weather conditions are an important consideration in the master planning process as they can significantly impact an airport's operations. For example, high surface temperatures and

---

1 https://casagrandeaz.gov/municipal-airport/
2 U.S. Census Bureau, https://www.census.gov/quickfacts/fact/table/casagrandecityarizona,AZ,US/POP010220#POP010220
3 https://www.travelocity.com/inspire/25-giving-cities-u-s/


ARIZONA
Colorado City
Fredonia
Page
Tuba City
Chinle
Polacca
Ganado
Flagstaff
Saint Michaels
Kingman
Williams
Bullhead City
Winslow
Holbrook
Sedona
Chino Valley
Cottonwood
Camp Verde
Snowflake
Lake Havasu City
Prescott
Taylor
Saint Johns
Show Low
Payson
Springerville
Parker
Wickenburg
Eagar
Cave Creek
Avondale
Glendale
Ehrenberg
Phoenix
Scottsdale
Claypool
Buckeye
San Carlos
Superior
Chandler
Casa Grande
Municipal Airport
Florence
Bylas
Morenci
Coolidge
Clifton
Pima
Thatcher
Casa Grande
Eloy
Mammoth
Yuma
Wellton
Oracle
San Manuel
Swift Trail
Junction
Somerton
San Luis
Marana
Ajo
Tucson
Willcox
Benson
Sells
Green Valley
Tombstone
Sierra Vista
Bisbee
Nogales
Douglas
W Val Vista Blvd
387
Casa Grande
Municipal Airport
N Trekell Rd
Scott Dr
N Nuris Rd
E McCartney Rd
N Peart Rd
15
40
17
10
8
19
60
93
95
89
163
160
191
180
70

humidity increase runway length requirements, and runway orientation is dependent upon predominant wind patterns for the area. Cloud cover percentages and frequency of other climatic conditions also determine the need for navigational aids and light.

Casa Grande experiences long, hot summers and brief winters with mild daytime temperatures and cool nights, typical of a hot desert climate. **Figure 1A** displays weather patterns at the airport. July has the highest average maximum temperature of 107.1 degrees. December is the coolest month with an average minimum temperature of 37.0 degrees. Annual rainfall is less than 10 inches and is most plentiful during the monsoon season, which brings high winds and heavy rains. August is the rainiest month, averaging 1.7 inches.

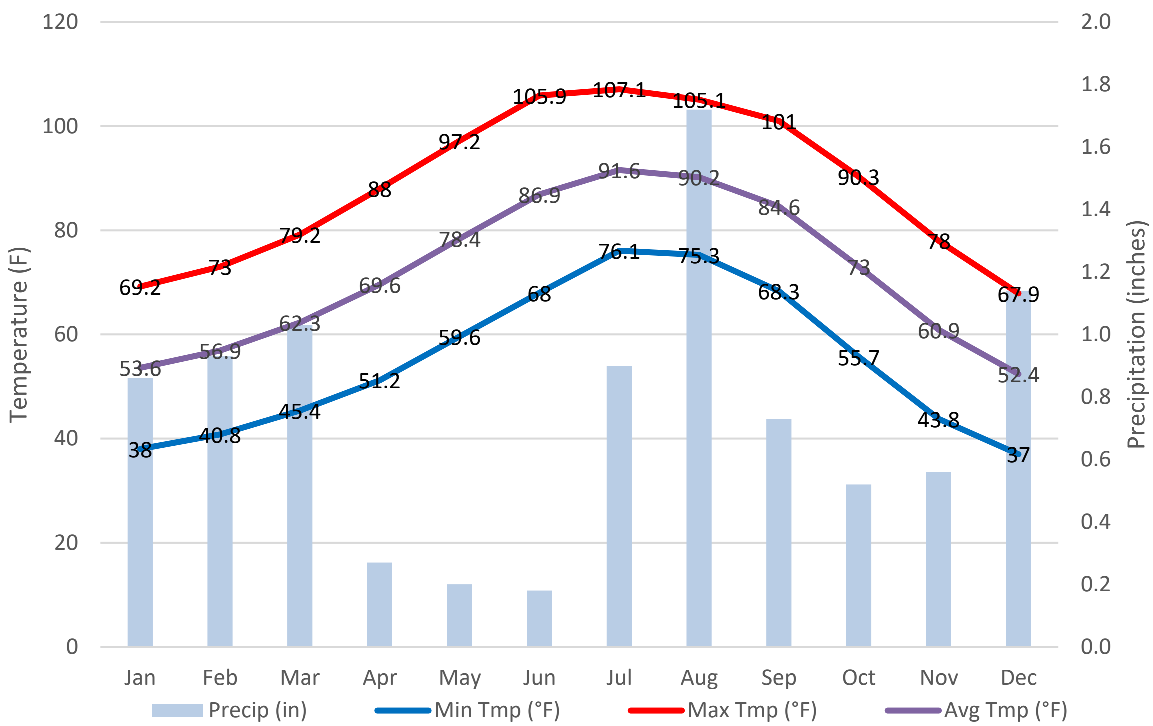


Figure 1A – Casa Grande Weather Patterns

Table 1A indicates that visual meteorological conditions (VMC) occur 99.38 percent of the time. When under VMC conditions, pilots can operate using visual flight rules (VFR) and are responsible for maintaining proper separation from objects and other aircraft. Instrument meteorological conditions (IMC) account for all weather conditions less than VMC conditions that still allow for aircraft to safely operate under instrument flight rules (IFR). Under IFR, pilots rely on instruments in the aircraft to accomplish navigation. IMC conditions occur 0.41 percent of the time. Less than IMC, or poor visibility conditions (PVC), are present 0.21 percent of the time. These weather conditions are lower than instrument approach minimums, making the airport inaccessible to most air traffic.

Table 1A | Weather Conditions			
Condition	**Cloud Ceiling**	**Visibility**	**Percent of Total**
VMC	≥ 1,000’ AGL	≥ 3 statute miles	99.38%
IMC	≥ 500’ AGL and < 1,000’ AGL	≥ 1 to < 3 statute miles	0.41%
PVC	< 500’ AGL	< 1 statute mile	0.21%
VMC: Visual Meteorological Conditions IMC: Instrument Meteorological Conditions PVC: Poor Visibility Conditions AGL: Above Ground Level			

Source: Station ID 72274803914, Observations from 1/1/2012 thru 12/31/2021

CAPITAL IMPROVEMENT HISTORY

Significant improvements have been made to the airport since its establishment. To assist in funding capital improvements, the FAA and Arizona Department of Transportation – Aeronautics Group (ADOT) have provided funding assistance to CGZ through the Airport Improvement Program (AIP). Airport improvement funds are collected through user fees, additional taxes on airline airfares, and aviation fuel taxes. As airports grow, or safety standards change over time, funding is needed to maintain a safe and efficient airport environment. The *Airport and Airway Development and Revenue Act* of 1970 established the Aviation Trust Fund which funds the AIP. Generally, federal AIP grants fund 91.06 percent of FAA-approved airport improvement projects for airports in the State of Arizona. Airport sponsors are responsible for the remaining 8.94 percent; however, through Arizona’s State Aviation Fund, airport sponsors are eligible to receive state matching grants for 50 percent of the sponsor’s share. As a result, a typical project cost is broken out as 91.06 percent federal funding, 4.47 percent state funding, and 4.47 percent airport sponsor funding.

Table 1B summarizes approximately $6.8 million in grant-aided capital improvement projects undertaken at the airport since 2001. Of this total, the airport has received approximately $5.2 million in federal grants and $1.5 million in state grants. This has included funding for a variety of airport improvement projects listed in the table. Additional funds that were granted as a result of the COVID-19 pandemic and subsequent economic relief legislation are also included.

Table 1B | Grant History			
Fiscal Year	**Grant Number**	**Project Description**	**Funds**
Federal AIP Grants			
2001	005	Construct taxiway connectors; install visual approach slope indicator and fencing	$150,000
2002	006	Conduct Airport Master Plan study	$45,530
		Install fencing	$104,470
2003	007	Install fencing	$150,000
2004	008	Install fencing; install runway vertical/visual guidance system	$150,000
2005	009	Construct apron	$210,000
2006	010	Construct apron (west apron, Phase II)	$1,030,623
2007	011	Install perimeter fencing	$596,637
2008	012	Conduct environmental study	$153,551

Table 1B | Grant History (continued)			
Fiscal Year	**Grant Number**	**Project Description**	**Funds**
Federal AIP Grants (continued)			
2009	013	Install runway lighting (MIRL); install taxiway lighting (MITL)	$112,412
2011	014	Install runway lighting - Phase II; install taxiway lighting; rehabilitate runway lighting (construct runway lighting electrical vault)	$806,651
2012	015	Install airfield guidance system; install misc. navaids (wind cone)	$122,619
	016	Expand apron (south terminal apron)	$1,528,153
2014	017	Update Airport Master Plan (ALP Narrative Report)	$77,464
AIP Grants Subtotal			**$5,238,110**
State Grants			
NA	E7F50	West apron expansion/DBE plan	$27,123
2006	E8F66	Fencing	$15,695
NA	E5S15	East terminal parking and utilities	$90,000
NA	E6S21	West terminal utilities	$45,000
NA	E7S78	South apron	$74,127
2008	E8S36	Master Plan update	$135,000
2011	E2F87	Runway construction	$25,684
NA	E3F3P	Install airfield guidance signs and marking	$5,481
NA	E3F2Y	Construct south apron (pavement, drainage, markings)	$75,015
2013	E5F2G	Update Airport Master Plan	$38,032
2013	E4S2B	Reconstruct Taxiway E (Design phase)	$81,597
2015	E5S3P	Reconstruct Taxiway E	$858,000
2021	E1S1N	Airport Drainage Master Plan Study	$225,000
2021	E1S1O	Airport Master Plan Update	$450,000
ADOT Grants Subtotal			**$2,145,754**
Miscellaneous Grants			
2020	3-04-0007-019-2020	Coronavirus Aid, Relief, and Economic Security Act (CARES) Supplemental Grant	$30,000
2021	3-04-0007-020-2021	Coronavirus Response and Relief Supplemental Appropriations (CRRSSA) Supplemental Grant	$13,000
2022	3-04-007-021-2022	American Rescue Plan Act (ARPA)	32,000
Misc. Grants Subtotal			**$75,000**
TOTAL			**$7,458,864**
NA: Not available			

Source: Airport records; FAA AIP Grant History; https://www.faa.gov/airports/aip/grant_histories/lookup/

ECONOMIC IMPACT

CGZ is a significant economic asset to the region and is utilized by Fortune 500 companies, law enforcement and local government agencies, and local businesses, among others. Top activities at the airport include skydiving, recreational flying, flight training, medical transport, and aircraft flight testing[4]. In 2021, ADOT undertook a state-wide economic impact study to measure how Arizona's airports stimulated the economy. Each airport was evaluated based on its direct impacts to the economy, as well as indirect or induced impacts. The study found that CGZ generated more than $24.2 million in total economic activity and supported 196 jobs with more than $8.6 million in total earnings. **Figure 1B** details CGZ's economic impact.

[4] 2021 Arizona Aviation Economic Impact Study

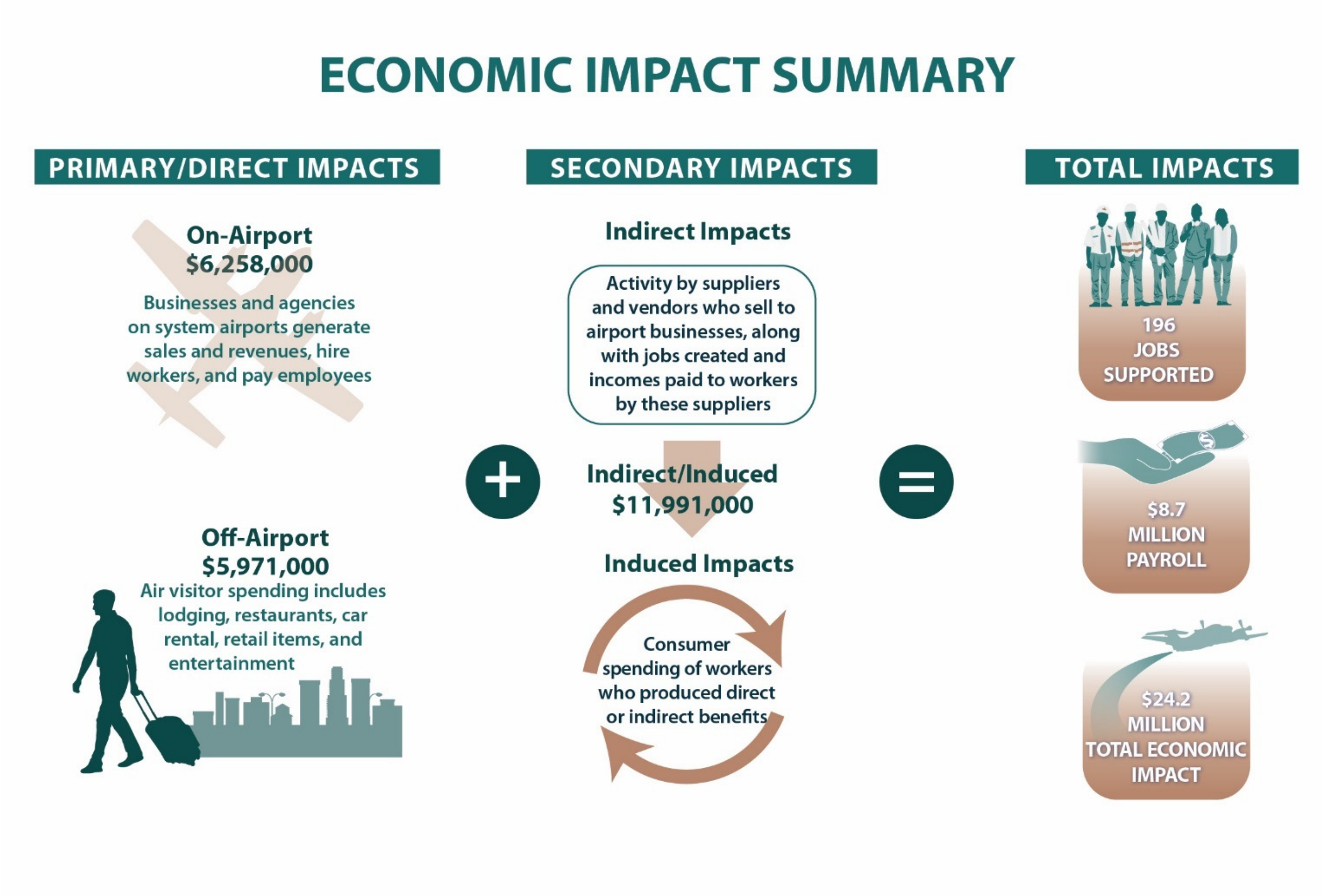


Figure 1B – CGZ Economic Impact

THE AIRPORT'S SYSTEM ROLE

Airport planning takes place at the local, state, and national levels, each of which has a different emphasis and purpose.

- **Local** | CGZ has an Airport Master Plan, which was last updated in 2009. An ALP Update & Narrative was approved in 2015.
- **State** | CGZ is included within the 2018 update to the *Arizona State Airport System Plan* (SASP).
- **National** | CGZ is included in the *National Plan of Integrated Airport Systems* (NPIAS), which categorizes overall airport roles and responsibilities based on input from local and state planning efforts (i.e., master plans and state system plans).

LOCAL AIRPORT PLANNING

2009 Airport Master Plan | The *2009 Airport Master Plan* provided a 20-year airport development vision based on aviation demand forecasts. The study used 2007 data for its aviation forecasts baseline. The primary recommendations from the *2009 Airport Master Plan* included extending Runway 5-23 by 3,850 feet to bring the runway length to 8,400 feet, construction of a 3,800-foot-long parallel runway to the north, expansion of the taxiway system, and additional landside facilities (aprons/taxilanes/hangars) on the north and south sides of the airfield, including an airport traffic control tower (ATCT) on the north side.

2015 Airport Layout Plan Update & Narrative Report | This planning document served as an update to the 2009 ALP drawing set. The most significant difference between the 2009 and 2015 plans is that the 2015 plan dropped the recommendation to extend Runway 5-23 or to construct a parallel runway. The 2015 plan includes the construction of bypass taxiways on both runway ends and expansion of landside facilities (apron and hangars) on the south side of the airfield.

STATE AIRPORT PLANNING

The primary planning document for the State of Arizona is the SASP, which was last updated in October 2018. The SASP focuses on keeping Arizona's airports highly advanced, safe, and responsive to the public's needs today and throughout the 20-year planning horizon. CGZ is classified as a General Aviation (GA) Community airport within the SASP. The SASP definition for a GA Community airport is to "serve regional economies, connect to state and national economies, and serve all types of GA aircraft."[5]

FEDERAL AIRPORT PLANNING

Many of the nation's existing airports were either initially constructed by the federal government or their development and maintenance was partially funded through various federal grant-in-aid programs to local communities. The system of airports existing today is, therefore, due, in large part, to federal policy that promotes the development of civil aviation. As part of a continuing effort to develop a national airport system, the U.S. Congress has maintained a national plan for the development and maintenance of airports.

The FAA maintains a database of airports that are eligible for AIP funding and are for public use called the *National Plan of Integrated Airport Systems* (NPIAS). The NPIAS is published and used by the FAA in administering the AIP, which is the source of federal funds for airport improvement projects across the country. The AIP is funded exclusively by user fees and user taxes, such as those on fuel and airline tickets. An airport must be included in the NPIAS to be eligible for federal funding assistance through the AIP.

The most current plan is the NPIAS 2021-2025, which identified 3,310 public-use airports (3,304 existing and six proposed) that are important to national air transportation. The plan estimates that approximately $43.6 billion in AIP-eligible airport projects will require financial assistance between 2021 and 2025, which is an increase of $8.5 billion identified in the previous NPIAS report.

The NPIAS categorizes airports by the type of activities that take place, including commercial service, cargo service, reliever operations, and general aviation. CGZ is currently classified as a Local GA airport

[5] https://azdot.gov/sites/default/files/2019/05/2018-arizona-sasp-update-technical-report.pdf

in the FAA's NPIAS. These airports provide a critical component to the national GA system and account for 37 percent of all NPIAS airports. They are typically located near population centers and have moderate levels of activity. They often accommodate flight training and emergency services, and average approximately 32 based propeller-driven aircraft (no jets) at their facilities.

AIRPORT FACILITIES AND SERVICES

There are three broad categories of facilities and services at the airport: airfield, landside, and support.

- **Airfield facilities** | Facilities directly associated with aircraft operations, including runways, taxiways, lighting, markings, navigational aids, and weather reporting.
- **Landside facilities** | Facilities necessary to provide a safe transition from surface to air transportation and support aircraft parking, servicing, storage, maintenance, and operational safety.
- **Support facilities** | Serve as a critical link to provide the necessary efficiency to aircraft ground operations, such as fuel storage, airport maintenance, firefighting, and fencing.

AIRSIDE FACILITIES

RUNWAY

Runway 5-23

As depicted on **Exhibit 1B**, CGZ has a single runway, Runway 5-23, that is oriented northeast/southwest. Runway 5-23 measures 5,200 feet long by 100 feet wide and is constructed of asphalt. Pavement conditions, which are shown on **Exhibit 1C**, are the result of a visual inspection conducted as part of the 2017 Arizona Airport Pavement Management System study. Pavement condition index (PCI) ratings range from 0 (failed) to 100 (excellent). As of the 2017 pavement inspection, Runway 5-23 has a PCI of 75 with some longitudinal and transverse cracking. The runway has a weight-bearing capacity of 18,500 pounds for single wheel (SWL) aircraft and 65,000 pounds for dual wheel (DWL) aircraft. The Runway 5 end is equipped with precision markings and a medium intensity approach lighting system with runway alignment indicator lights (MALSR), which supports the instrument landing system (ILS) approach. Runway 23 is equipped with non-precision markings, which support the area navigation (RNAV) global positioning system (GPS) approach. The runway slopes down from the 23 end at a gradient of 0.33 percent.

TAXIWAYS

The taxiway system at CGZ consists of a full-length parallel taxiway with four connectors, as identified on **Exhibit 1B**. The taxiways are constructed of asphalt, and the majority are 40 feet wide, with the exception being Taxiway E which is 30 feet wide. Taxiway B serves as the full-length taxiway with a 300-foot separation from the runway. Taxiway A provides access to Runway 23, and Taxiway F provides access to Runway 5. Taxiway D connects from the runway to the west apron, while Taxiway E serves as an acute-angled exit from the runway and extends along the airport's southern boundary with the industrial park. Taxiway C extends south from Taxiway B adjacent to the terminal apron.

AIRFIELD LIGHTING

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

Airport Identification Lighting

The location of the airport at night is universally identified by a rotating beacon. The rotating beacon projects two beams of light, one white and one green, 180 degrees apart. The beacon operates from sunset to sunrise and is located northwest of the shade hangars.

Rotating Beacon

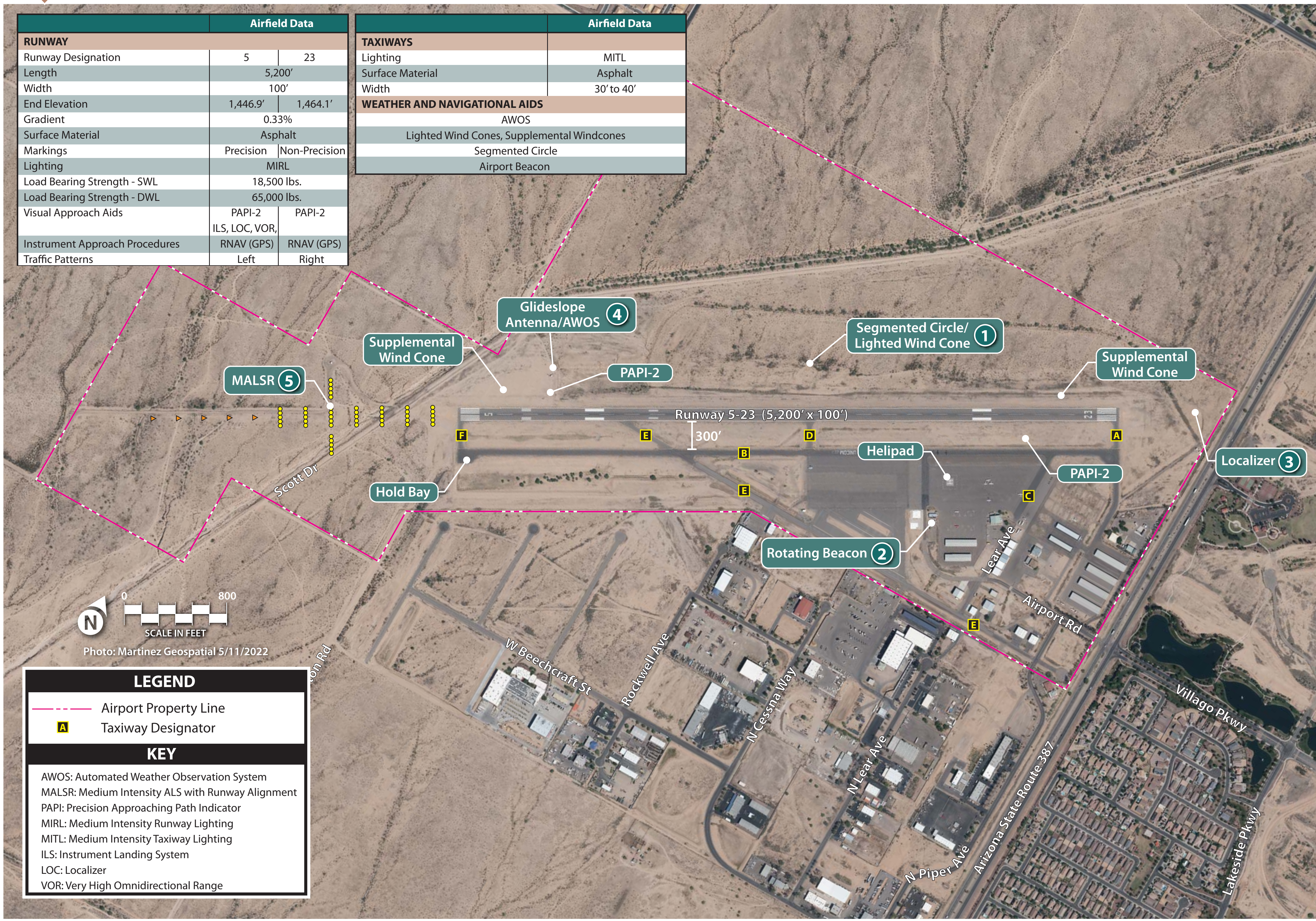
Pavement Edge Lighting

Pavement edge lighting defines the lateral limits of the pavement to ensure safe operations during night and/or times of low visibility, which maintains safe and efficient access to and from the runway and aircraft parking areas. Runway 5-23 is equipped with medium intensity runway lighting (MIRL). Each runway end is equipped with threshold lights, which emit green light outward from the runway and emit red light toward the runway. Green lights indicate the landing threshold to arriving aircraft and red lights indicate the end of the runway for departing aircraft.

Taxiways A, B, D, and F are equipped with medium intensity taxiway lighting (MITL), along with the portion of Taxiway E that extends between Runway 5-23 and Taxiway B.

RUNWAY	Airfield Data	
Runway Designation	5	23
Length	5,200′	
Width	100′	
End Elevation	1,446.9′	1,464.1′
Gradient	0.33%	
Surface Material	Asphalt	
Markings	Precision	Non-Precision
Lighting	MIRL	
Load Bearing Strength - SWL	18,500 lbs.	
Load Bearing Strength - DWL	65,000 lbs.	
Visual Approach Aids	PAPI-2	PAPI-2
Instrument Approach Procedures	ILS, LOC, VOR, RNAV (GPS)	RNAV (GPS)
Traffic Patterns	Left	Right

TAXIWAYS	Airfield Data
Lighting	MITL
Surface Material	Asphalt
Width	30′ to 40′
WEATHER AND NAVIGATIONAL AIDS	
AWOS	
Lighted Wind Cones, Supplemental Windcones	
Segmented Circle	
Airport Beacon	



LEGEND

Airport Property Line

A Taxiway Designator

KEY

AWOS: Automated Weather Observation System
MALSR: Medium Intensity ALS with Runway Alignment
PAPI: Precision Approaching Path Indicator
MIRL: Medium Intensity Runway Lighting
MITL: Medium Intensity Taxiway Lighting
ILS: Instrument Landing System
LOC: Localizer
VOR: Very High Omnidirectional Range

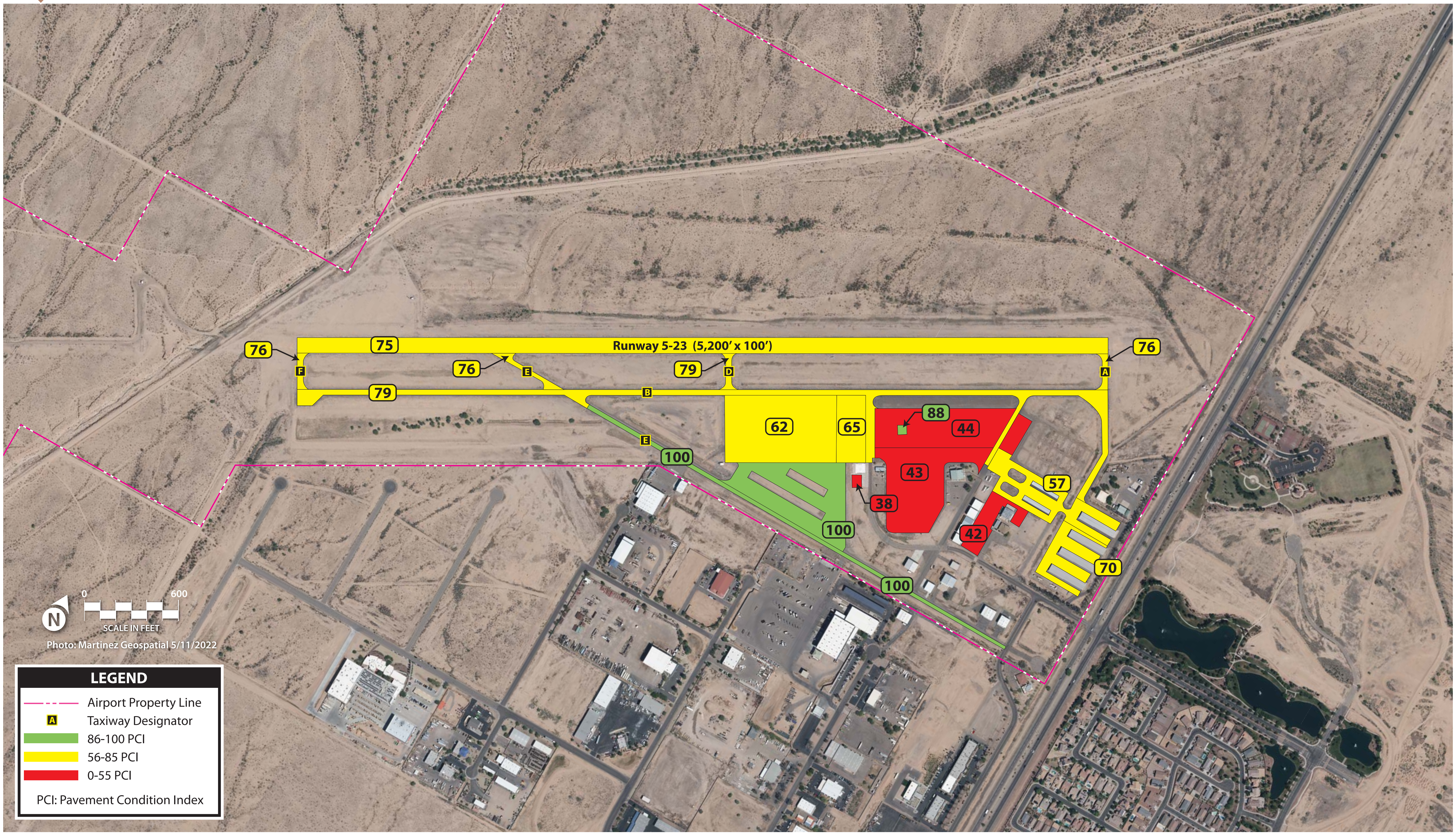
1 Segmented Circle/ Lighted Wind Cone

2 Rotating Beacon

3 Localizer

4 Glideslop Antenna/AWOS

5 MALSR



SOURCE: Arizona Airport Pavement Management System, 2017 Pavement Inspection

Approach Lighting System

An approach lighting system (ALS) is a configuration of lights positioned symmetrically along the extended runway centerline to supplement navigational aids, such as an ILS, to provide lower visibility minimums. Examples include the ALS with Flashing Lights (ALSF), ALS with Sequenced Flashers I & II (ALSF-1/ALSF-2), Medium Intensity ALS with Runway Alignment (MALSR), and the Medium Intensity ALS (MALS). Runway 5 is equipped with a MALSR, which supports the ILS approach.

MALSR serving Runway 5

Visual Approach Aids

Visual approach aids are installed at airports to assist pilots in determining the correct descent path to the runway end during landing. Each runway end at CGZ is equipped with a two-box precision approach path indicator (PAPI-2) system. PAPIs have an effective visual range of three miles during the day and 20 miles at night. The PAPIs have standard 3.00-degree glide paths.

PAPI-2

Runway end identification lights (REILs) provide a visual identification of the runway end for landing aircraft. The REILs consist of two synchronized flashing lights, located laterally on each side of the runway end, facing the approaching aircraft. These flashing lights can be seen day or night for up to 20 miles depending on visibility conditions. Runway 5-23 is not equipped with REILs.

Pilot-Controlled Lighting

During nighttime hours, pilots can use the pilot-controlled lighting (PCL) system to activate the MIRL and visual approach aids from their aircraft through a series of clicks of their radio transmitter using the common traffic advisory frequency (CTAF) (122.7 MHz).

AIRFIELD SIGNAGE AND MARKINGS

Airfield identification signs assist pilots in identifying runways, taxiway routes, holding positions, and critical areas. CGZ is equipped with lighted runway and taxiway designations, routing/directional, and runway distance remaining signage.

Airfield Signage

Pavement markings aid in the movement of aircraft along surfaces at the airport and identify closed or hazardous areas. The airport provides and maintains marking systems in accordance with Advisory Circular 150/5340-1, *Standards for Airport Marking*. As mentioned previously, the Runway 5 end has precision markings that include the runway centerline, designation, threshold markings, aiming points, edge markings, and touchdown zones, while the Runway 23 end has non-precision markings that include all of the above except the touchdown zone markings. All taxiways at the airport are marked with yellow centerline, holding position markings, and leadoff lines on normally used exits. Centerline markings assist pilots in maintaining proper clearance from pavement edges and objects near the taxiway edges. Aircraft holding positions are marked at each runway/taxiway intersection. Holding positions are located 280 feet from centerline on Runway 5-23.

NAVIGATIONAL AIDS AND INSTRUMENT APPROACH PROCEDURES

Navigational aids are electronic devices that transmit radio frequencies that pilots in properly equipped aircraft can translate into point-to-point guidance and position information. The very high omnidirectional range (VOR), in general, provides azimuth readings to pilots of properly equipped aircraft transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility (VOR/DME) to provide distance as well as direction information to the pilot. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. The VORTAC provides distance and direction information to both civil and military pilots. The CGZ area is served by four VORTACs (Stanfield, 8.3 nautical miles [nm] west; Willie, 21.7 nm northeast; Phoenix, 30.4 nm north; and Gila Bend, 45.8 nm west). The Stanfield VORTAC supports a non-precision instrument approach to Runway 5.

A non-directional beacon (NDB) is a radio transmitter at a known location, used as an aviation or marine navigational aid. The signal transmitted does not include *inherent* directional information, in contrast to other navigational aids, such as a VOR. NDB signals follow the curvature of the Earth, so they can be received at much greater distances at lower altitudes, a major advantage over VOR. Pilots at CGZ can utilize the Marana NDB (42.9 nm southeast) and Robles NDB (56.6 nm southeast).

The global positioning system (GPS) is an additional navigational aid for pilots. GPS was initially developed by the United States Department of Defense for military navigation around the world. GPS differs from an NDB or VOR in that pilots are not required to navigate using a specific facility. GPS uses satellites placed in orbit around the earth to transmit electronic radio signals, which pilots of properly equipped aircraft use to determine altitude, speed, and other navigational information. With GPS, pilots can directly navigate to any airport in the country and are not required to navigate using a specific navigation facility. GPS provides for enroute navigation and a localizer performance with vertical guidance (LPV) instrument approach to Runway 5 and a non-precision localizer navigation (LNAV) instrument approach to Runway 23.

Instrument approach procedures assist pilots in locating and landing at an airport during low visibility and cloud ceiling conditions. They are categorized as either precision, approach with vertical guidance (APV), or non-precision. Precision instrument approach aids provide an exact course alignment and vertical descent path for an aircraft on final approach to a runway with a height above threshold (HATh) lower than 250 feet and visibility lower than ¾ mile. APVs also provide course alignment and vertical guidance but have HATh s of 250 feet or more and visibility minimums of ¾ mile or greater. Non-precision instrument approaches provide only course alignment information with no vertical guidance.

Approach minimums are published for different aircraft categories (aircraft categories are described in greater detail in Chapter 2) and consist of a minimum "decision" altitude and required visibility. According to 14 Code of Federal Regulations (CFR) 91.175, a pilot must be able to make a safe landing, have the runway in sight, and the visibility requirement be met. For a precision approach or approach with vertical guidance, the decision altitude (DA) is the point at which the pilot must meet all three criteria for landing, otherwise they cannot land using the published instrument approach. For a non-precision approach, the minimum descent altitude (MDA) is a specified altitude at which the required visual reference must be made, or a missed approach initiated.

Airports offering full ILS approaches are equipped with both a glide slope antenna and localizer antenna array. Runway 5-23 is equipped with ILS equipment. The glide slope antenna is co-located with the automated weather observation system (AWOS) north of the Runway 5 end. The glide slope antenna provides vertical guidance to landing aircraft.


Glide Slope Antenna and AWOS

The localizer antenna array provides horizontal guidance and is used to establish and maintain an approaching aircraft's position relative to the runway centerline until visual contact confirms the runway alignment and location. Typically, the localizer antenna array is sited on the extended runway centerline between 1,000 feet and 2,000 feet from the end of the runway. At CGZ, the localizer antenna is located approximately 625 feet beyond the Runway 23 landing threshold. The equipment shelter, which houses electronic equipment, is located approximately 250 feet from the localizer antenna, as required by the FAA.


Localizer Antenna Array

Table 1C details the instrument approach procedures at CGZ.

Table 1C | Instrument Approach Procedures

	WEATHER MINIMUMS BY AIRCRAFT TYPE			
	Category A	Category B	Category C	Category D
ILS or LOC Runway 5				
Straight-in ILS	250' / ½-mile			
Straight-in LOC	342' / ½-mile		342' / ⅝-mile	
Circling	496' / 1-mile		496' / 1½-mile	796' / 2½-mile
RNAV (GPS) Runway 5				
LPV DA	250' / ½-mile			
LNAV/VNAV DA	250' / ½-mile			
LNAV MDA	342' / ½-mile		342' / ⅝-mile	
Circling	496' / 1-mile		496' / 1½-mile	796' / 2½-mile
RNAV (GPS) Runway 23				
LNAV MDA	436' / 1-mile		436' / 1¼-mile	
Circling	496' / 1-mile		496' / 1½-mile	796' / 2½-mile
VOR Runway 5				
Straight-in	502' / ¾-mile		NA	
Circling	496' / 1-mile		NA	

Aircraft categories are based on the approach speed of aircraft, which is determined as 1.3 times the stall speed in landing configuration as follows:
- Category A: 0-90 knots (e.g., Cessna 172)
- Category B: 91-120 knots (e.g., Beechcraft KingAir)
- Category C: 121-140 knots (e.g., Canadair Challenger, Boeing 737)
- Category D: 141-166 knots (e.g., Gulfstream IV, Boeing MD-88)
- Category E: Greater than 166 knots (e.g., certain large military or cargo aircraft)

Abbreviations:
- GPS - Global Positioning System
- LPV - A technical variant of GPS (Localizer Performance with Vertical Guidance)
- LNAV/RNAV/VNAV - A technical variant of GPS (Lateral, Area, Vertical Navigation)
- DA – Decision Altitude
- MDA - Minimum Descent Altitude

Note: (xxx'/ x-mile) = Decision height/Visibility minimum

Source: AirNav https://www.airnav.com/airport/KCGZ

WEATHER AND COMMUNICATION

CGZ is served by an automated weather observation station (AWOS). The system updates weather observations every minute, continuously reporting changes that can be accessed via radio frequency 132.175 MHz or by calling (520) 836-3392. The AWOS reports cloud ceiling, visibility, temperature, dew point, wind direction, wind speed, altimeter setting (barometric pressure), and density altitude (airfield elevation corrected for temperature). The AWOS is located on the north side of the runway near the Runway 5 end and is co-located with the glide slope antenna. The AWOS is situated approximately 300 feet from the Runway 5-23 centerline.

Lighted Wind Cone and Segmented Circle

CGZ also has a lighted wind cone and segmented circle located at midfield north of Taxiway D. The wind cone informs pilots of the wind direction and speed, while the segmented circle indicates aircraft traffic pattern information. Two supplemental wind cones are located at the approach end of each runway.

AREA AIRSPACE AND AIR TRAFFIC CONTROL

The *FAA Act of 1958* established the FAA as the responsible agency for the control and use of navigable airspace within the U.S. The FAA has established the National Airspace System (NAS) to protect persons and property on the ground, in addition to establishing a safe and efficient airspace environment for civil, commercial, and military aviation. The NAS covers the common network of U.S. airspace, including air navigation facilities; airports and landing areas; aeronautical charts; associated rules, regulations, and procedures; technical information; and personnel and material. The system also includes components shared jointly with the military.

AIRSPACE STRUCTURE

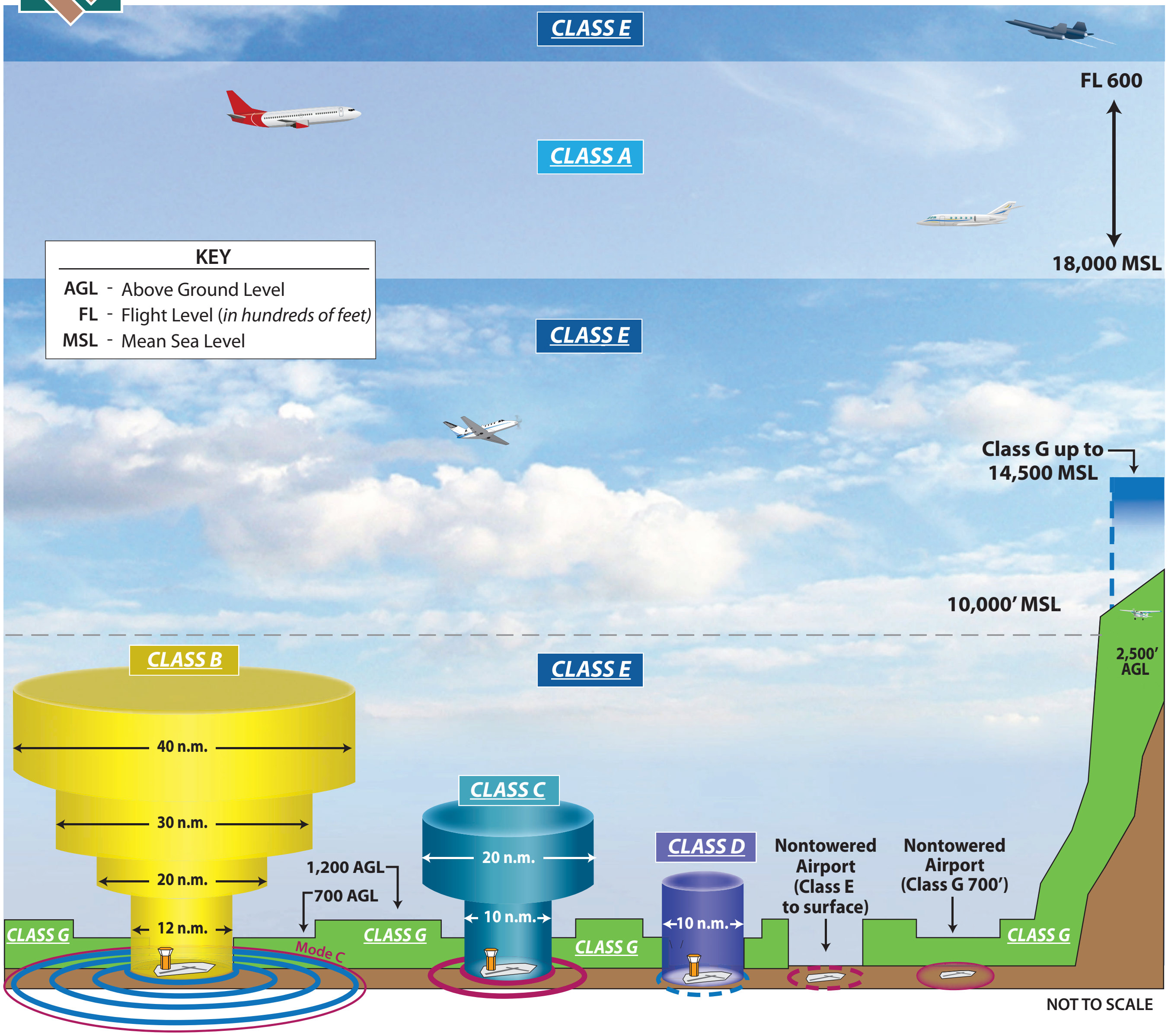
Airspace within the U.S. is broadly classified as either "controlled" or "uncontrolled." The difference between controlled and uncontrolled airspace relates primarily to requirements for pilot qualifications, ground-to-air communications, navigation and air traffic services, and weather conditions. Six classes of airspace have been designated in the U.S., as shown on **Exhibit 1D**. Airspace designated as Class A, B, C, D, or E is considered controlled airspace. Aircraft operating within controlled airspace are subject to varying requirements for positive air traffic control. Airspace near CGZ is depicted on **Exhibit 1E**.

Class A Airspace | Class A airspace includes all airspace from 18,000 feet MSL to flight level (FL) 600 (approximately 60,000 feet MSL) over the contiguous 48 states and Alaska. This airspace is designated in 14 CFR Part 71.33 for positive control of aircraft. All aircraft must be on an IFR clearance to operate within Class A airspace.

Class B Airspace | Class B airspace has been designated around some of the country's major airports, such as Phoenix Sky Harbor International Airport (PHX) to separate all aircraft within a specified radius of the primary airport. Each Class B airspace is specifically tailored for its primary airport. This airspace is the most restrictive controlled airspace routinely encountered by pilots operating under VFR in an uncontrolled environment. In order to fly within Class B airspace, an aircraft must be equipped with special radio and navigation equipment and must obtain clearance from air traffic control. A pilot is required to have at least a private pilot certificate or be a student pilot who has met the requirements of F.A.R. Part 61.95, which requires special ground and flight training for the Class B airspace. Aircraft are also required to utilize a Mode C transponder within a 30 nautical mile range of the center of the Class B airspace. A mode C transponder allows the ATCT to track the location and altitude of the aircraft.

CGZ is located approximately two nm from PHX's Class B airspace.

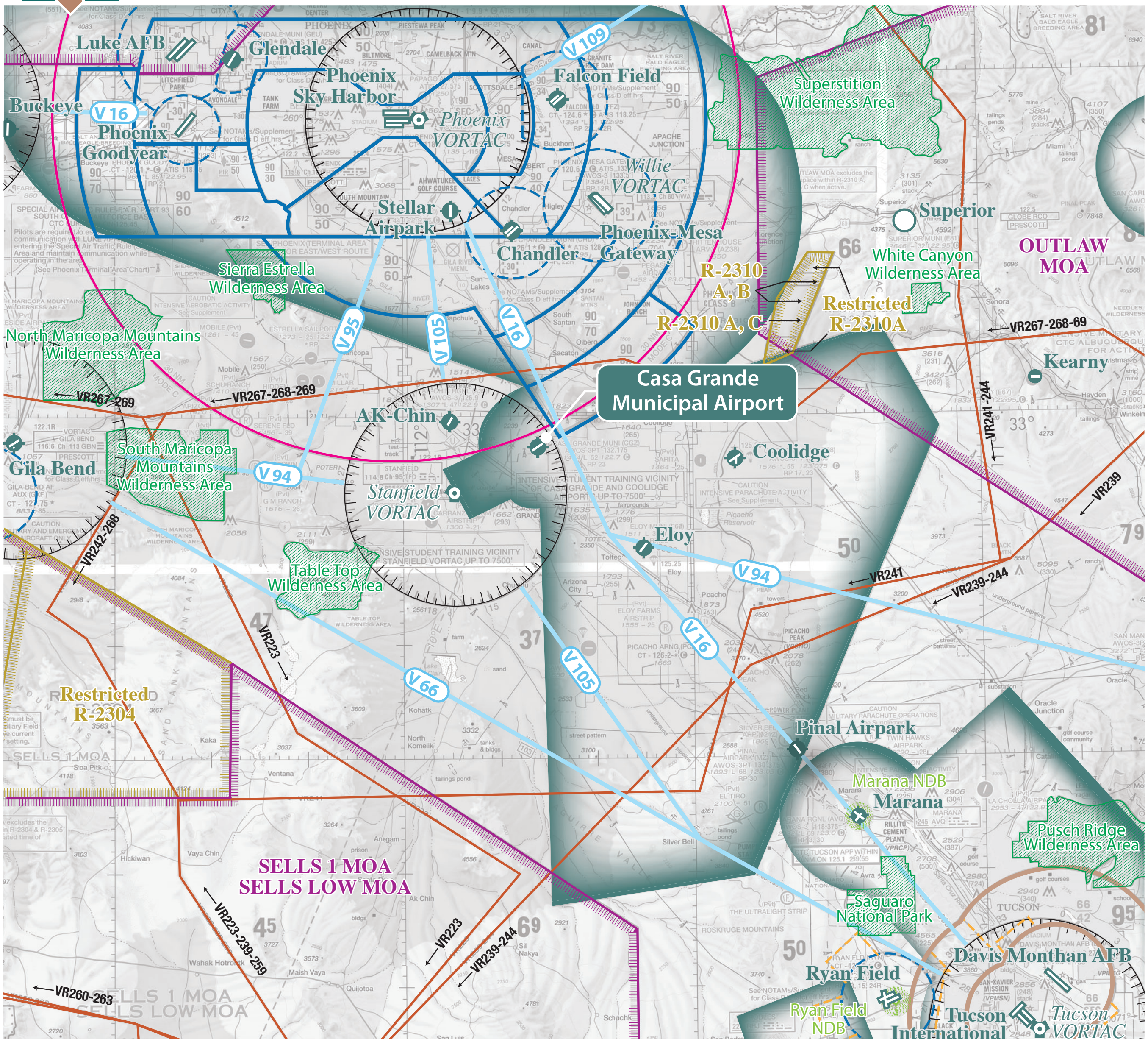
Class C Airspace | The FAA has established Class C airspace at approximately 120 airports around the country that have significant levels of IFR traffic. Class C airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at major airports. To fly inside Class C airspace, an aircraft must have a two-way radio, an encoding transponder, and have established communication with the ATC facility. Aircraft may fly below the floor of the Class C airspace or above the Class C airspace ceiling without establishing communication with ATC. The nearest Class C airspace to CGZ surrounds Tucson International Airport (TUS) and Davis Monthan Air Force Base (DMA).



DEFINITION OF AIRSPACE CLASSIFICATIONS

CLASS A	Think A - Altitude. Airspace above 18,000 feet MSL up to and including FL 600. Instrument Flight Rule (IFR) flights only, ADS-B 1090 ES transponder required, ATC clearance required.
CLASS B	Think B - Busy. Multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports. ADS-B 1090 ES transponder required, ATC clearance required.
CLASS C	Think C - Mode C. Mode C transponder required. ATC communication required. Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.
CLASS D	Think D - Dialogue. Pilot must establish dialogue with tower. Generally airspace from the surface to minimum 2,500 feet AGL surrounding towered airports.
CLASS E	Think E - Everywhere. Controlled airspace that is not designated as any other Class of airspace.
CLASS G	Think G - Ground. Uncontrolled airspace. From surface to a 1,200 AGL (in mountainous areas 2,500 AGL) Exceptions: near airports it lowers to 700' AGL; some airports have Class E to the surface. Visual Flight Rules (VFR) minimums apply.

Source: www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/15_phak_ch15.pdf



LEGEND

- Airport with other than hard-surfaced runway
- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- Compass Rose
- Non-directional Radio Beacon (NDB)
- VORTAC
- Military Operations Area (MOA)
- Prohibited, Restricted, and Warning Areas
- Mode C
- Class B Airspace
- Class C Airspace
- Class D Airspace
- Class E Airspace
- Class E (sfc) Airspace with floor 700 ft. above surface that laterally abuts 1200 ft. or higher Class E airspace
- Victor Airways
- Military Training Routes
- Wildlife Refuge

Source:
Phoenix Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration, December 2, 2021

NORTH

NOT TO SCALE

Class D Airspace | Class D airspace is controlled airspace surrounding airports with an ATCT. The Class D airspace typically constitutes a cylinder with a horizontal radius of four or five nautical miles (nm) from the airport, extending from the surface up to a designated vertical limit, typically set at approximately 2,500 feet above the airport elevation. Aircraft operators planning to operate within Class D airspace are required to contact air traffic control prior to entering or departing airspace and must maintain contact while within the controlled airspace to land or to transverse the area. The nearest Class D airspace surrounds Chandler Municipal and Phoenix-Mesa Gateway Airports, approximately 15 nm north of CGZ.

Class E Airspace | Class E airspace consists of controlled airspace designed to contain IFR operations near an airport and while aircraft are transitioning between the airport and enroute environments. Unless otherwise specified, Class E airspace terminates at the base of the overlying airspace. Only aircraft operating under IFR are required to be in contact with ATC when operating in Class E airspace. While aircraft conducting visual flights in Class E airspace are not required to be in radio communications with ATC facilities, visual flight can only be conducted if minimum visibility and cloud ceilings exist. CGZ is in Class E airspace with the surface beginning at 700 feet above ground level (AGL). Airspace below 700 feet AGL surrounding the airport is Class G airspace.

Class G Airspace | Airspace not designated as Class A, B, C, D, or E is considered uncontrolled, or Class G, airspace. Air traffic control does not have the authority or responsibility to exercise control over air traffic within this airspace. Class G airspace lies between the surface and the overlaying Class E airspace (700 feet AGL).

While aircraft may technically operate within this Class G airspace without any contact with ATC, it is unlikely that many aircraft will operate this low to the ground. Furthermore, federal regulations specify minimum altitudes for flight. F.A.R. Part 91.119*, Minimum Safe Altitudes*, generally states that except when necessary for takeoff or landing, pilots must not operate an aircraft over any congested area of a city, town, or settlement, or over any open-air assembly of persons, at an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.

Over less congested areas, pilots must maintain an altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure. Helicopters may be operated at less than the minimums prescribed above if the operation is conducted without hazard to persons or property on the surface. In addition, each person operating a helicopter shall comply with any routes or altitudes specifically prescribed for helicopters by the FAA.

Victor Airways | For aircraft arriving or departing the regional area using VOR facilities, a system of Federal Airways, referred to as Victor Airways, has been established. Victor Airways are corridors of airspace eight miles wide that extend upward from 1,200 feet above ground level (AGL) to 18,000 feet MSL and extend between VOR navigational facilities. Victor Airways near CGZ are identified on **Exhibit 1E**.

Alert Areas / Military Operations Area (MOA) & Military Training Routes (MTRs) / Restricted Areas | Alert areas, MOAs, MTRs, and restricted areas are depicted on aeronautical charts to inform nonparticipating pilots of areas that may contain a high volume of pilot training, military operations/activities, or an unusual type of aerial activity. Pilots should exercise caution near and within these areas. All activity within these areas, if granted by the controlling agency, should be conducted in accordance with regulations, without waiver, and pilots of participating aircraft, as well as pilots transitioning the area, are equally responsible for collision avoidance. The nearest point of the Outlaw MOA is approximately 21.6 nm northeast of CGZ, while restricted areas (R-2310A, B, and C) are located approximately 20.7 nm northeast of the airport. These restricted areas are used for live fire munitions training and unmanned aerial vehicle (UAV) training.

AIRSPACE CONTROL

The FAA has established 21 Air Route Traffic Control Centers (ARTCCs) throughout the continental U.S. to control aircraft operating under IFR within controlled airspace and while enroute. An ARTCC assigns specific routes and altitudes along Federal Airways to maintain separation and orderly traffic flow. The Albuquerque Center ARTCC controls IFR airspace enroute to and from CGZ at altitudes greater than 10,000 feet above ground level (AGL).

Flight Service Stations (FSS) are air traffic facilities which provide pilot briefings, flight plan processing, inflight radio communications, search and rescue (SAR) services, and assistance to lost aircraft and aircraft in emergency situations. FSSs also relay air traffic control clearances, process Notice to Air Mission (NOTAMs), and broadcast aviation meteorological and aeronautical information. The Prescott FSS is the nearest to CGZ.

LOCAL OPERATING PROCEDURES

The traffic pattern at the airport is maintained to provide the safest and most efficient use of the airspace. At CGZ, Runway 5 uses a left-hand traffic pattern, which means aircraft conduct left-hand turns within the traffic pattern when operating on the runway. Runway 23 uses a right-hand traffic pattern. As a result, aircraft operating at CGZ stay north of the airport and away from the industrial park south of the field. The typical traffic pattern altitude for rotorcraft is 500 feet AGL; piston aircraft is between 800 and 1,000 feet AGL; and 1,500 feet AGL for turbine aircraft.

REGIONAL AIRPORTS

A review of other public-use airports with at least one paved runway within a 30-nm radius of CGZ was conducted to identify and distinguish the types of air service provided in the region. It is important to consider the capabilities and limitations of these airports when planning for future changes or improvements at CGZ. **Table 1D** provides basic level information on six public-use airports within the vicinity of CGZ.

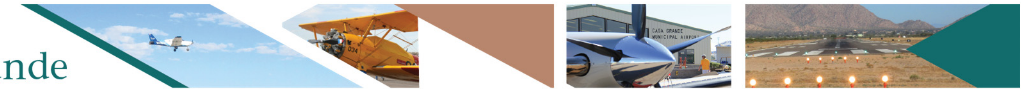


Table 1D | Airports Within 30 NM from CGZ					
Airport	**Nautical Miles/ Direction from CGZ[1]**	**FAA Service Level[2]**	**Based Aircraft[3]**	**Longest Runway (ft.)[1]**	**Lowest Visibility Minimum[1]**
Casa Grande Municipal	**--**	**GA**	**102[4]**	**5,200'**	**½-mile**
Ak-Chin Regional	7.9 nm/WNW	GA	14	4,751'	None
Eloy Municipal	12.7 nm/SE	GA	33	3,901'	None
Coolidge Municipal	17.2 nm/E	GA	37	5,564'	1-mile
Chandler Municipal	19.0 nm/N	Reliever	451	4,870'	¾-mile
Phoenix-Mesa Gateway	21.9 nm/NNE	Primary	126	10,401'	¾-mile
Stellar Airpark	21.9 nm/NNW	N/A	141	4,417'	1-mile

Sources: [1]www.airnav.com; [2]NPIAS; [3]basedaircraft.com; [4] Airport records

LANDSIDE FACILITIES

TERMINAL BUILDING

Constructed in 2001, the terminal building at CGZ is a 4,800 square foot (sf) facility that includes offices, a pilot briefing and flight planning area, a pilot's lounge, restrooms, and a fuel service desk. The terminal also contains a restaurant, which was closed during the COVID-19 pandemic and is planned to be reopened in Spring 2022. As depicted on **Exhibit 1F**, the terminal is located adjacent to the terminal apron and is accessible via Airport Road and N. Lear Avenue. The building is open daily from 6:00 a.m. to 4:00 p.m. during the months of May through October, and 6:30 a.m. to 4:30 p.m. from November through April.

FIXED BASE OPERATORS AND AVIATION BUSINESSES

Fixed base operator (FBO) services are provided in the terminal building by the City of Casa Grande. These services include fueling, aircraft parking, hangar leasing/sales, pilot supplies and flight planning. Other aviation service providers include:

- *Gosshawk Unlimited* – antique aircraft restoration; airframe and powerplant (A&P); inspection authorized (IA) aircraft maintenance shop
- *Dogbone Aviation LLC* – A&P/IA aircraft maintenance shop
- *The Plane Man LLC* – A&P/IA aircraft maintenance shop
- *Phoenix Skydive Center* – tandem skydive operator

AIRCRAFT HANGAR FACILITIES

Hangar facilities at CGZ include shade hangars, T-hangars, and executive box hangars, which are shown on **Exhibit 1F**. Shade hangars are the most basic form of aircraft protection and are common in warmer climates. These structures provide a roof covering, but no walls or doors. There are two shade (awning)

EXISTING LANDSIDE FACILITIES			
Building No.	**Description**	**Size (sf)**	**Condition**
1	Terminal	4,800	Good
2	Fuel Farm	NA	Good
3	T-hangar (6-unit)	7,000	Fair
4	T-hangar (6-unit)	7,000	Fair
5	T-hangar (10-unit)	14,000	Good
6	T-hangar (10-unit)	14,000	Good
7	T-hangar (10-unit)	14,000	Good
8	T-hangar (10-unit)	14,000	Good
9	Executive Hangar	3,500	Good
10	Specialty Operations	3,100	Fair
11	Specialty Operations	1,100	Fair
12	Executive Hangar	3,000	Good

EXISTING LANDSIDE FACILITIES			
Building No.	**Description**	**Size (sf)**	**Condition**
13	Executive Hangar	3,000	Excellent
14	Executive Hangar	3,000	Excellent
15	Executive Hangar	3,000	Excellent
16	Executive Hangar	3,000	Good
17	Shade Hangar (10-Unit)	13,000	Good
18	Shade Hangar (8-Unit)	10,800	Good
19	Old Terminal	1,400	Poor
20	Executive Hangar	4,600	Good
21	Executive Hangar	2,700	Good
22	Executive Hangar	4,900	Good
23	Executive Hangar	2,000	Good
24	Executive Hangar	5,100	Good
25	Executive Hangar	3,600	Good

hangars at the airport, providing approximately 23,800 sf of aircraft storage. There are six T-hangar facilities offering 52 individual storage units and comprising approximately 70,000 sf of storage space. These hangars are used primarily for small piston aircraft. Executive box hangars also offer individual storage space for tenants. There are nine executive box hangars on the airfield comprising approximately 32,400 sf of space. There are no conventional hangars on the airport, which are typically greater than 10,000 sf in size and are used to store larger aircraft, including jets. All of the hangars at CGZ combined offer approximately 135,200 sf of aircraft storage space. At the time of this writing (February 2022), all hangar spaces are occupied, and there are 37 individuals on a hangar waiting list.

THROUGH-THE-FENCE ACCESS

"Through-the-fence" activities are those that are permitted by the airport sponsor through an agreement that provides access to the airside infrastructure to independent entities that have property adjacent to airport property. At CGZ, there are currently three gates along Taxiway E providing airfield access to businesses located on the south side. There are plans in place to expand the taxiway system to allow access to future developers and tenants on the west side of the industrial area, south of the airport's property line. **Figure 1C** notes these features.

Figure 1C – "Through-the-Fence" Access

AIRCRAFT PARKING APRONS

There are two aircraft parking aprons at CGZ: the terminal apron and the west apron. The terminal apron, which is immediately north and west of the terminal building, encompasses approximately 44,000 square yards (sy). There are 45 marked tiedowns on this apron along with a helicopter parking pad. The west apron is approximately 43,000 sy and includes 55 marked tiedowns. Aircraft parking aprons are identified on **Exhibit 1F**.

VEHICLE PARKING

A vehicle parking lot is available at the front of the terminal building and is accessible via N. Lear Avenue. The parking lot has 32 marked vehicle parking spaces, including two handicapped spaces. Tenants of the executive/T-hangar facilities on the airport are authorized to pass through secured gates with their vehicles, so most of these facilities do not have separate vehicle parking areas.

SUPPORT FACILITIES

Firefighting Services

As a general aviation airport, CGZ is not required to maintain on-site aircraft rescue and firefighting (ARFF) equipment or services. Firefighting services are provided by the City of Casa Grande Fire Department, which operates four stations within the city. The nearest fire station to the airport is Station 504 located at 1637 E. McCartney Road. The city also maintains a firefighting training facility located on airport property; however, there is no ARFF equipment on-site.

Fuel Storage

Fuel storage facilities at CGZ are located east of the terminal building, as shown on **Exhibit 1F**. There are two aboveground tanks, one for 100LL fuel and one for Jet A. Both tanks have a 12,000-gallon capacity and are owned by the city. 100LL is dispensed via a self-service pump equipped with a credit card reader, while Jet A fuel is distributed by airport staff. The city also owns three fuel trucks, two for 100LL and one containing Jet A fuel. These trucks have capacities of 750 and 1,200 gallons for 100LL and 3,200 gallons for Jet A.

Historic fuel flowage data is summarized in **Figure 1D**. The airport dispensed 121,424 gallons of 100LL fuel in Fiscal Year (FY) 2021, and 106,700 gallons of Jet A. This is a notable increase from previous years (FY13-FY20), where an average of 66,275 gallons of 100LL and 55,059 gallons of Jet A were dispensed. It should be noted that self-service 100LL fuel was not available for parts of FY17 and FY18 due the self-service machine being out of service.

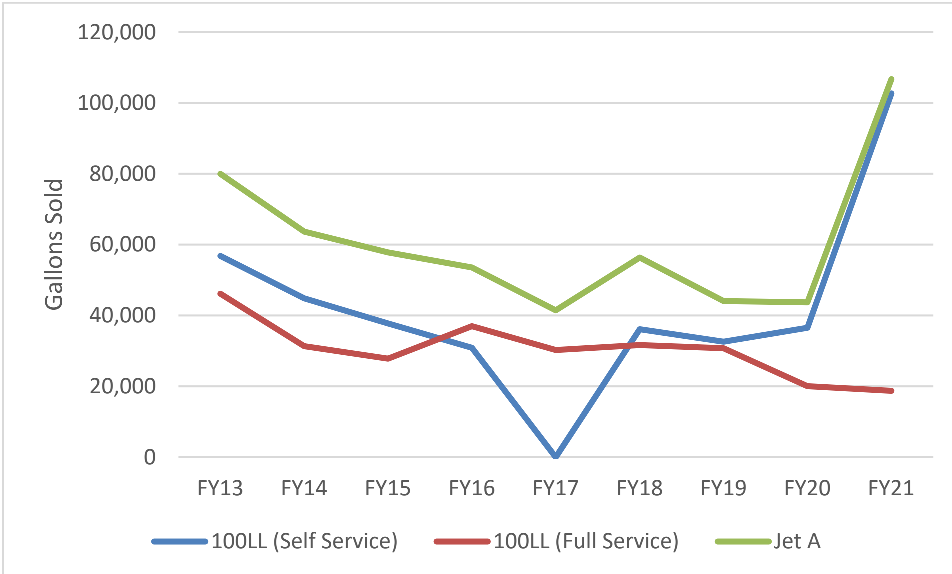


Figure 1D – Historic Fuel Flowage

Fuel storage facilities at CGZ

Airport Maintenance Facilities

CGZ does not have a dedicated maintenance facility. Instead, maintenance equipment is stored in various T-hangar storage areas. A list of equipment is detailed below.

- Tractor with attachments
- Dump trailer
- Golf cart with dump trailer
- Generator, chain saw, pole saw, weed eaters, lawn mowers, shovels, rakes, etc.
- Pallets of crack seal material
- Wheelbarrow, hand tools, fuel truck parts, etc.

PERIMETER FENCING AND SERVICE ROAD

Airport administrative staff and emergency service vehicles can access the airfield via Taxiway B and an unpaved perimeter service road that extends around the north side of the airfield. The airfield perimeter is also equipped with 6-foot-tall chain link security fencing topped with 3-strand barbed wire to restrict entry to unauthorized persons and vehicles. Motorized gates allow access the airfield and landside areas to authorized personnel only.

UTILITIES

The availability and capacity of the utilities serving the airport are factors in determining the development potential of the airport property, as well as the land immediately adjacent to the facility. Of primary concern in the inventory investigation is the availability of water, gas, sewer, and power sources. Providers are detailed below:

- Electric – APS
- Water – Arizona Water Company
- Phone – Century Link and Cox
- Sewer and trash – City of Casa Grande
- Internet – Century Link and Cox

AVIATION ACTIVITY

AIRCRAFT OPERATIONS

Aircraft operations (takeoffs and landings) are a primary indicator of aeronautical activity at CGZ. Aircraft operations are classified as local or itinerant. Local operations often consist of touch-and-go or pilot training activity. Itinerant operations consist of aircraft that arrive from or depart to destination airports outside the local operating area.

Aircraft operations can be separated into four general categories: air carrier, air taxi, general aviation, and military. Due to the absence of an airport traffic control tower (ATCT) at the airport, it can be difficult to maintain an accurate count of the airport's operations. An estimated account of annual activity is available via the FAA Form 5010, *Airport Master Record*. The most current data estimates that CGZ has approximately 122,000 operations per year. The *Airport Master Record* provides a breakdown of estimated operation totals for the airport by type. Chapter Two of the Master Plan will provide a more detailed account of aircraft operations for the airport. The following provides a description of the categories of aircraft operations detailed above.

- **Air Taxi** – operations associated with aircraft originally designed to have less than 60 passenger seats or a cargo payload of less than 18,000 pounds and carries cargo or mail on either a scheduled or charter basis, and/or carries passengers on an on-demand basis or limited scheduled basis.
- **Air Carrier** – operations defined as those conducted commercially by aircraft having a seating capacity of 60 or more seats and a cargo payload capacity of more than 18,000 pounds. There are currently no air carriers operating at the airport by definition of an air carrier operation.

- **General Aviation** – civil aviation operations other than scheduled air services and nonscheduled air transport operations for hire. CGZ caters to general aviation activities and the majority of its operations fall in this category.
- **Military** – operations conducted by aircraft and helicopters with a military designation.

BASED AIRCRAFT

Identifying the current number of based aircraft is an important part of the Master Plan process; however, it can be challenging to be accurate given the transient nature of aircraft storage. CGZ maintains a recent record of based aircraft, but other sources, including previous planning studies, the state system plan, and FAA records were also consulted to provide a broader history. Historic based aircraft levels at CGZ are shown on **Table 1E**.

Table 1E | Based Aircraft History		
Year	Based Aircraft	Source
2007	114	2009 Airport Master Plan
2014	105	2015 ALP Update
2016	105	State System Plan
2021	102	Airport Records

COMMUNITY PROFILE

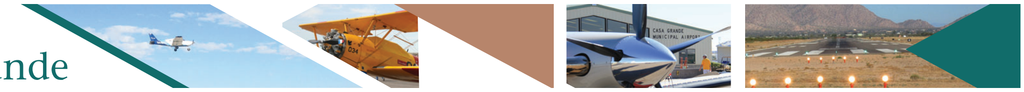
For an airport planning study, a profile of the local community including its socioeconomic characteristics are collected and examined to derive an understanding of the dynamics of growth within the study area. Socioeconomic information related to the local area is an important consideration in the master planning process. The community profile for the City of Casa Grande on **Exhibit 1G** is derived from the city's *General Plan* that was adopted in January 2021, as well as information sourced from the city's economic development department. From a population perspective, the city is projected to double in population by 2050, with more than 118,000 residents estimated by that time. Key industries in Casa Grande include education, health care, arts and entertainment, manufacturing, and retail, and these, along with others, support a labor force of nearly 20,000 people.

ENVIRONMENTAL INVENTORY

AIR QUALITY

The concentration of various pollutants in the atmosphere describes the local air quality. The significance of a pollution concentration is determined by comparing it to the state and federal air quality standards. In 1971, the U.S. Environmental Protection Agency (EPA) established standards that specify the maximum permissible short- and long-term concentrations of various air contaminants. The National Ambient Air Quality Standards (NAAQS) consist of primary and secondary standards for criteria pollutants: ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead (Pb).

City of Casa Grande

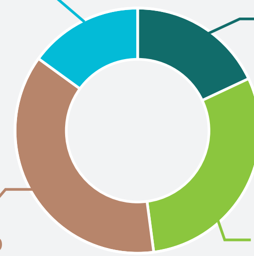


POPULATION

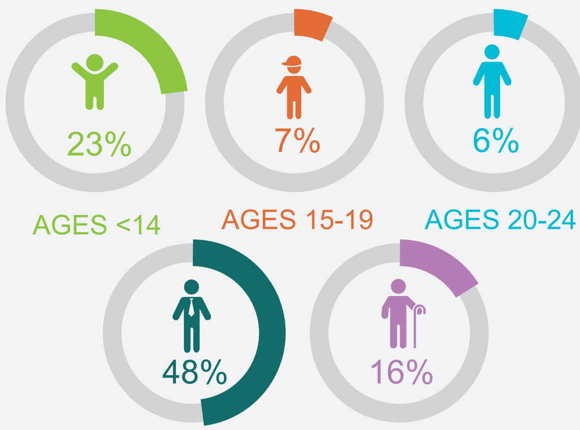
2020	57,518	
2030	75,049	
2040	92,880	
2050	118,395	

2.4% Growth

EDUCATION



POPULATION BY AGE



MAJOR EMPLOYERS

- Lucid Motors
- Frito-Lay
- Abbott Nutrition
- SRP
- Hexcel
- Wal-Mart
- Daisy Brand
- Banner Casa Grande Medical Center

HOUSEHOLDS

$52,841
MEDIAN HOUSEHOLD INCOME (2019)

$150,400
MEDIAN HOME VALUE (2019)

EMPLOYMENT BY SECTOR

4,034	Education, healthcare, and social services
2,578	Arts, entertainment, food and recreation
2,463	Manufacturing
2,350	Retail trade
1,795	Public administration
1,450	Professional, scientific, and administrative services
1,062	Transportation, warehousing, and utilities
919	Finance, insurance, and real estate
810	Construction
686	Other services
432	Agriculture, forestry, and mining
341	Wholesale trade
320	Information

Sources: Casa Grade General Plan, Arizona Office of Economic Opportunity, U.S. Census Bureau, Woods and Poole, The Complete Economic and Demographic Data Source, 2021
*Population estimates based on 2010 Census data

Based on federal air quality standards, a specific geographic area can be classified as either an "attainment," "maintenance," or "nonattainment" area for each pollutant. The threshold for nonattainment designation varies by pollutant.

The City of Casa Grande, including the airport, is within a serious nonattainment area for PM_{10} (i.e., West Pinal PM_{10} Nonattainment Area) (U.S. EPA 2021).[6] The airport and the city are outside the West Central Pinal $PM_{2.5}$ Nonattainment Area and are within attainment areas for all other federal criteria pollutants.[7]

BIOLOGICAL RESOURCES

Biotic resources include the various types of plants and animals that are present in an area. The term also applies to rivers, lakes, wetlands, forests, and other habitat types that support plants and animals. The airport and its surrounding area contain native vegetation characteristic of the Sonoran Desertscrub biome (Lower Colorado River Valley subdivision) with elevation ranges from 1,429 to 1,449 feet above mean sea level (MSL). Several of the native plant species are protected under the Arizona Native Plant Law (Arizona Revised Statutes 3-904). Native plant species observed during a December 2021 site visit were primarily located along the washes and canals in the desert portion of the airport.

Seven avian species were documented within the airport property during the site visit: Gila woodpecker (*Melanerpes uropygialis*), yellow-rumped warbler (*Setophaga coronata*), red-tailed hawk (*Buteo jamaicensis*), house finch (*Haemorhous mexicanus*), mourning dove (*Zenaida macroura*), verdin (*Auriparus flaviceps*), and American kestrel (*Falco sparverius*). These birds would be protected under the *Migratory Bird Treaty Act*.

The U.S. Fish and Wildlife Service (USFWS) is charged with overseeing the requirements contained within Section 7 of the *Endangered Species Act* (ESA). The ESA provides a framework to conserve and protect animal or plant species whose populations are threatened by human activities. The FAA and USFWS review projects to determine if a significant impact to protected species will result in the implementation of a proposed project. Significant impacts occur when a proposed action could jeopardize the continued existence of a protected species or would result in the destruction or adverse modification of federally designated critical habitat in the area.

Of the species listed by the USFWS on its Information for Planning and Consultation (IPaC) Trust Resource List as endangered, threatened, EXPN (i.e., experimental population, non-essential), or candidate species for Pinal County, one may occur in or near the airport (**Table 1F**). The airport is within the known range and contains vegetation and landscape features known to support monarch butterfly (*Danaus plexippus*), which is a candidate for listing on the ESA. The airport is beyond the known geographic or elevational range of the remaining 18 species, or it does not contain vegetation or landscape features known

[6] A General Conformity analysis for the *FY 2020-2029 Sun Corridor MPO Transportation Improvement Program* (TIP) and the *Sun Corridor MPO Regional Transportation Plan 2040* regarding the West Pinal PM_{10} Nonattainment Area was drafted in December 2019 by the Maricopa Association of Governments (MAG), whose planning area also overlaps the West Pinal PM_{10} nonattainment area. The General Conformity analysis found that the PM_{10} emissions projected for the action scenarios contained in the Sun Corridor MPO transportation planning documents are not greater than the PM_{10} emissions projected for the baseline scenarios in all conformity analysis years (i.e., 2020, 2025, 2035, and 2040). Thus, a finding of conformity has been made (MAG 2019, page 46, Table 9, and Figure 3).

[7] Arizona Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants | Green Book | US EPA

to support these species (SWCA Environmental Consultants, Inc. 2022). There is no federal critical habitat within or near the airport.

Table 1F | Federally Listed Endangered Species			
Federal Status	**Range or Habitat Requirements**	**Critical Habitat**	**Potential for Occurrence in Project Area**
Monarch Butterfly (*Dansus plexippus*)			
Candidate	Habitat is complex. Generally, breeding areas are virtually all patches of milkweed (*Asclepias* sp.). The species occurs throughout Arizona during the summer and migrates to winter in Mexico and California, though small numbers do overwinter in the low deserts of southwestern Arizona.	No critical habitat has been designated for this species.	May occur seasonally. The project area could potentially be used as a migratory stopover as flowering plants are present. Breeding is unlikely, given that there are no milkweed species present.
Northern Mexican Gartersnake (*Thamnophis eques megalops*)			
Threatened	Riparian obligate. Lotic and lentic habitats that include cienegas and stock tanks (earthen impoundments), and rivers containing pools and backwaters. Most frequently found between 3,000 and 5,000 feet amsl but may occur up to approximately 8,500 feet amsl. Uses adjacent terrestrial habitats for foraging, thermoregulation, gestation, shelter, immigration, emigration, and brumation. Core population areas in Arizona include mid/upper Verde River drainage, mid/lower Tonto Creek, and the San Rafael Valley.	Approximately 20,326 acres in La Paz, Mohave, Yavapai, Gila, Cochise, Santa Cruz, and Pima Counties, Arizona, and Grant County, New Mexico, fall within the boundaries of the critical habitat designation for the northern Mexican gartersnake. This critical habitat area does not overlap the airport.	Unlikely to occur. The project area is below the typical elevational range for the species, and suitable habitat for this species is not present in or adjacent to the project area.
Roundtail Chub (*Gila robusta*)			
Candidate	Found in cool to warm water over a wide range of elevations in rivers and streams throughout the Colorado River basin. The species prefers the deepest pools and eddies of mid-sized to larger streams with cover in the form of boulders, overhanging cliffs, undercut banks, or vegetation.	No critical habitat has been designated for this species.	Unlikely to occur. There are no permanent water sources suitable for this species in or adjacent to the project area
Sonoran Desert Tortoise (*Gopherus morafkai*)			
Candidate	Occurs on primarily rocky, and often steep, hillsides and bajadas of Mohave and Sonoran desertscrub, typically at elevations below 7,800 feet amsl. May occur, but is less likely to occur, in desert grassland, juniper woodland, and interior chaparral habitats and even pine communities.	No critical habitat has been designated for this species.	Unlikely to occur. The project area does not contain suitable habitat and is not within the known range of the species.
Sonoran Pronghorn (*Antilocapra americana sonoriensis*)			
EXPN	Found in Sonoran desertscrub within broad, intermountain alluvial valleys with creosote bush (*Larrea tridentata*)–bursage (*Ambrosia* spp.) and paloverde (*Parkinsonia* spp.)–mixed cacti associations at elevations between 2,000 and 4,000 feet amsl. The only extant U.S. population is in southwestern Arizona; however, the USFWS has established a 10(j) area for reintroductions. The only current reintroduction is in and near the Kofa National Wildlife Refuge.		Unlikely to occur. The project area is outside the species' currently known range and is not within a potential reintroduction area.
Yellow-billed Cuckoo (*Coccyzus americanus*)			
Threatened	Typically found in riparian woodland vegetation (cottonwood, willow, or saltcedar) at elevations below 6,600 feet amsl. Dense understory foliage appears to be an important factor in nest site selection. The highest concentrations in Arizona are along the Agua Fria, San Pedro, upper Santa Cruz, and Verde River drainages and Cienega and Sonoita Creeks.	Approximately 298,845 acres are designated as critical habitat in Arizona, California, Colorado, Idaho, New Mexico, Texas, and Utah. This critical habitat area does not overlap the airport.	Unlikely to occur. Suitable habitat for this species is not present in or adjacent to the project area.

Sources: SWCA Environmental Consultants 2022, Technical Memorandum re: Biological Evaluation for the Proposed Master Plan Update at the Casa Grande Municipal Airport, Pinal County, Arizona, January 19; USFWS IPaC (IPaC: Home (fws.gov); U.S Fish and Wildlife Service Critical Habitat Mapper USFWS Critical Habitat Mapper - (arcgis.com)

CLIMATE

The EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2017* found that the transportation sector, which includes aviation, accounted for approximately 29 percent of U.S. greenhouse gas (GHG) emissions in 2019. Of this, the aviation sector contributed approximately 175.0 million metric tons (MMT) of carbon dioxide equivalent (CO_2e), or nearly 9.4 percent of all transportation emissions. Transportation emission sources include cars, trucks, ships, trains, and aircraft. Most GHG emissions from transportation systems are carbon dioxide (CO_2) emissions result from the combustion of petroleum-based products in internal combustion engines. Relatively insignificant amounts of methane (CH_4), hydrofluorocarbon (HFC), and nitrous oxide (N_2O) are emitted during fuel combustion. From 1990 to 2017, total transportation emissions increased.

The upward trend is largely due to increased demand for travel; however, much of this travel was done in passenger cars and light-duty trucks. This information is being updated in the latest EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2020,* which is out for public review as of February 2022. In addition to transportation-related emissions, **Figure 1E** shows GHG emissions sources in the U.S. in 2019.[8]

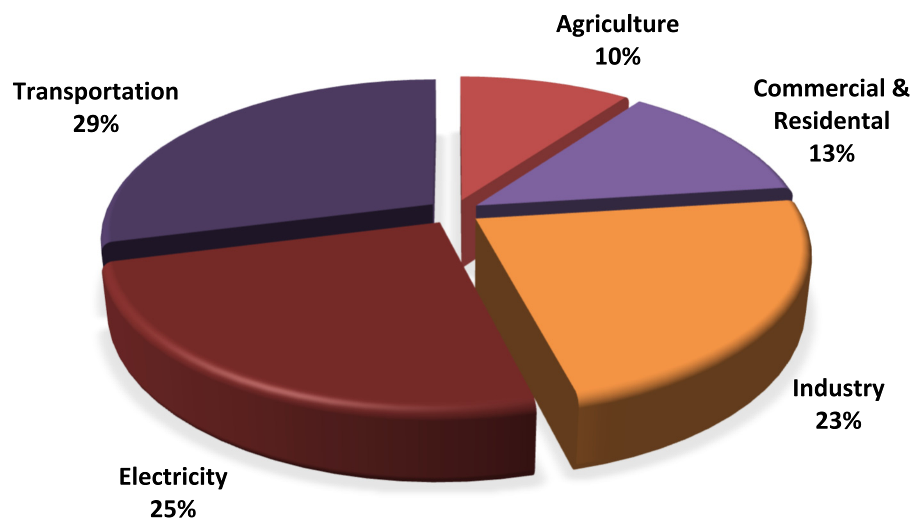


Figure 1E – 2019 Sources of Greenhouse Gas Emissions in the U.S. (EPA, 2021)

Several factors influence the quantities of greenhouse gas emissions released into the atmosphere including Agriculture, Commercial & Residential, Industry, Electricity, and Transportation. Increasing concentration of GHGs can affect global climate by trapping heat in Earth's atmosphere. Scientific measurements have shown that Earth's climate is warming with concurrent impacts, including warmer air temperatures, rising sea levels, increased storm activity, and greater intensity in precipitation events. Climate change is a global phenomenon that can also have local impacts (Intergovernmental Panel on Climate Change, 2014). GHGs, such as water vapor (H_2O), CO_2, CH_4, N_2O, and O_3, are both naturally occurring and anthropogenic (man-made). The research has established a direct correlation between fuel combustion and GHG emissions. GHGs from anthropogenic sources include CO_2, CH_4, N_2O, HFCs, perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). CO_2 is the most important anthropogenic GHG because it is a long-lived gas that remains in the atmosphere for up to 100 years.

Information regarding the climate for the City of Casa Grande and surrounding environments, including wind, temperature, and precipitation, are found earlier in this chapter.[9]

[8] U.S. Inventory of Greenhouse Gas Emissions and Sinks: 1990-2019 Inventory of U.S. Greenhouse Gas Emissions and Sinks | US EPA
[9] Source: Intergovernmental Panel on Climate Change AR5 Synthesis Report: Climate Change 2014 (http://www.ipcc.ch/)

COASTAL RESOURCES

Federal activities involving or affecting coastal resources are governed by the *Coastal Barriers Resource Act*, the *Coastal Zone Management Act*, and Executive Order (E.O.) 13089, *Coral Reef Protection*. CGZ is located approximately 191 miles from the Pacific Ocean, the nearest U.S. coastal area. Therefore, the airport is not located within a coastal zone. The closest National Marine Sanctuary is the Channel Islands National Marine Sanctuary, sited approximately 414 miles west of the airport.

DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(f)

Section 4(f) of the *Department of Transportation Act,* which was recodified and renumbered as Section 303(c) of 49 United States Code, provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly or privately owned historic sites, public parks, recreation areas, or waterfowl and wildlife refuges of national, state, regional, or local importance unless there is no feasible and prudent alternative to the use of such land, and the project includes all possible planning to minimize harm resulting from the use.[10]

The National Register of Historic Places shows no historic sites within a three-mile radius of CGZ. Nearest historic places are in Downtown Casa Grande with the closest NRHP building, the Wilson, C. J. (Blinky) House, five miles away from the airport.

Table 1G and **Exhibit 1H** detail the public parks located within three miles of the airport.

Table 1G | Department of Transportation Section 4(f) Resources

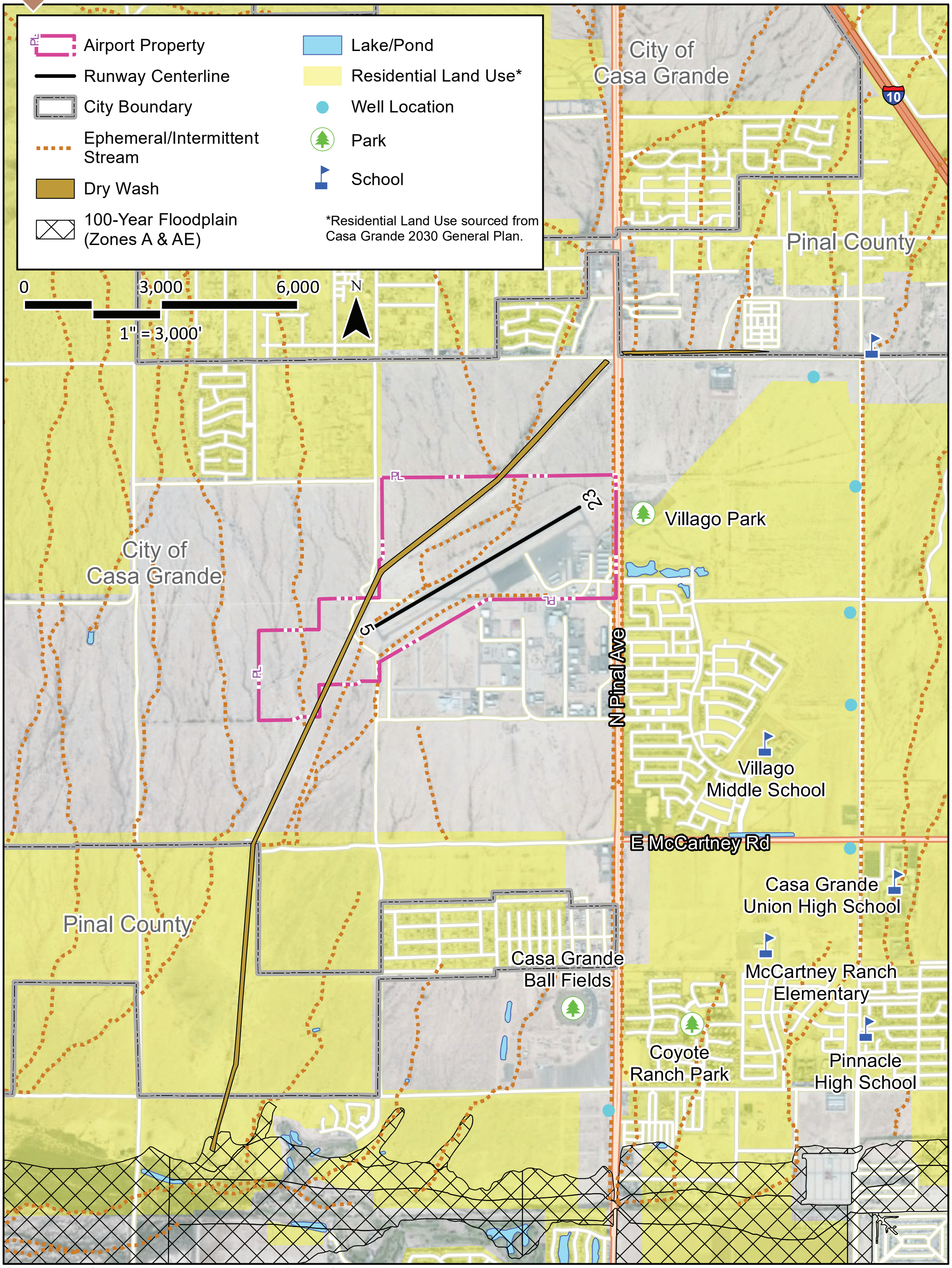
Facility	Distance From Airport (Miles)	Direction From Airport
Villago Park	0.18	Northeast
Casa Grande Dog Park	1.7	South
Paul Mason Sports Complex	1.8	South
Coyote Ranch Community Park	1.9	Southeast
Retention Park	2.7	Southeast
Village Middle School	1.0	Southeast
McCartney Ranch Elementary	1.7	Southeast
Casa Grande Union High School	1.9	Southeast
Pinnacle High School	2.3	Southeast

Source: Google Earth Aerial Imagery (December 2021); Coffman Associates analysis

There are no other Section 4(f) Resources within the vicinity of the airport (i.e., wilderness and recreation areas, wildlife refuges or waterfowl habitats). The nearest wilderness, wildlife and recreation areas are listed below:

- Wilderness Area: Table Top Wilderness (18 miles from the airport)
- Wildlife Refuge: San Bernardino National Wildlife Refuge (74 miles from the airport)
- Recreation Area: Lake Mead National Park (220 miles from the airport)

[10] Source: 49 U.S. Code § 303 - Policy on lands, wildlife and waterfowl refuges, and historic sites



Source: ESRI Basemap Imagery (2018), USDA, FEMA, City of Casa Grande.

FARMLANDS

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

Information obtained from the Natural Resource Conservation Service's (NRCS) Web Soil Survey (WSS) indicates that soils indicative of important farmlands are present throughout the airport property. The airport has soils that are either classified as "prime farmland if irrigated" or "prime farmland of unique importance."

Although the airport is not in a designated urban area, the airport is not used for farming nor is it irrigated. Thus, the FPPA is not likely to be applicable to on-airport projects. However, the USDA NRCS's Soil Conservationist may need to be consulted for projects that require the conversion of native soils.

HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

Federal, state, and local laws regulate hazardous materials use, storage, transport, and disposal. These laws may extend to past and future landowners of properties containing these materials. In addition, disrupting sites containing hazardous materials or contaminants may cause significant impacts to soil, surface water, groundwater, air quality, and the organisms using these resources. According to the EPA's *EJSCREEN*, there are no Superfund or brownfields sites within three miles of the airport. The Arizona Department of Environmental Quality (ADEQ) Underground Storage Tank (UST) database shows that six USTs were removed from the airport in the 1990s.

There are no municipal solid waste facilities within three miles of the airport. The nearest solid waste landfill is the Casa Grande Solid Waste Landfill, eight miles from the airport.

The airport currently operates a stormwater management pollution prevention plan (SWPPP) through the Arizona Pollutant Discharge Elimination System (AZPDES) industrial permit under the *Clean Water Act*, which is issued and regulated by the Arizona Department of Environmental Quality.[11]

HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Determination of a project's environmental impact to historic and cultural resources is made under guidance in the *National Historic Preservation Act* (NHPA) *of 1966*, as amended, the *Archaeological and Historic Preservation Act* (AHPA) *of 1974*, the *Archaeological Resources Protection Act* (ARPA), and the

[11] Source: Environmental Protection Agency EJSCREEN (epa.gov) ; https://azdeq.gov/emaps/; https://legacy.azdeq.gov/cgi-bin/databases/ust.pl

Native American Graves Protection and Repatriation Act (NAGPRA) *of 1990*. In addition, the *Antiquities Act of 1906*, the *Historic Sites Act of 1935*, and the *American Indian Religious Freedom Act of 1978* also protect historical, architectural, archaeological, and cultural resources. Impacts may occur when a proposed project causes an adverse effect on a resource which has been identified (or is unearthed during construction) as having historical, architectural, archaeological, or cultural significance.

An archaeological survey performed in 2022 identified 17 cultural properties, including one previously recorded site, one new recorded archaeological site, and 15 isolated occurrences (IOs).

The two sites are historic-era manifestations. The previously recorded site consists of the remnants of the original alignment of the World War II auxiliary field. The site was determined ineligible for listing in the National Register of Historic Places (NRHP). The newly recorded site consists of a historic-era trash scatter with a possible depression. Based on current observations, archeologists concurred with the early determination, and they recommend the newly recorded site as ineligible for the NRHP. The sites lack the potential to yield important information that would contribute to a broader understanding of history of the area beyond what has already been documented during this survey.

In addition, no evidence of the two other previously recorded NRHP-ineligible sites were found during the survey. One site (AZ AA:1:116[ASM]) was subjected to archaeological testing in 2000 and no subsurface deposits were identified (Douglas 2000). These sites are presumed to have been removed by airport maintenance activities. Therefore, no further archaeological work is recommended for these

LAND USE

Land use regulations near airports are achieved through local government codes, city policies and plans that include airport districts and planning areas. Regulations are used to avoid land use compatibility conflict around airports.

According to the Casa Grande zoning map, CGZ is located within the Casa Grande Airport Industrial Area, which is zoned as a I-2 (General Industrial). An industrial park is planned to the south of the Runway 5 approach end adjacent to the airport. The land surrounding the airport has several different zoning classifications including Light Industrial (I-1) - to accommodate light industrial and warehousing use, Urban Ranch (UR) and Planned Area Development (PAD) to promote land use compatibility with the airport. Along the back side of each lot, taxiway easements and thru-the-fence access points provide direct access to the airport.[12]

The airport is surrounded by open space on three sides. The south facing border of the airport is land held in trust by the State of Arizona and managed by the Arizona State Land Department. Residential parcels exist east of the airport on the other side of the adjacent state highway.[13]

[12] City of Casa Grande: Zoning Search: https://casagrandegis.maps.arcgis.com/apps/webappviewer/index.html?id=69fba5fe7e16473895548c2e33c916f5
[13] The Casa Grande General Plan: https://casagrandeaz.gov/2030-general-plan/

NATURAL RESOURCES AND ENERGY SUPPLY

Natural resources and energy supply provide an evaluation of a project's consumption of natural resources. It is the policy of FAA Order 1053.1, *Energy and Water Management Program for FAA Buildings and Facilities*, to encourage the development of facilities that exemplify the highest standards of design, including principles of sustainability.

Natural resources and energy supply are discussed earlier in this chapter under "Fuel Facilities and Equipment" and "Utilities." The State of Arizona currently has a renewable energy goal of 15 percent by 2025 for regulated electric utility providers, while rules to reach additional sustainable goals are also being proposed.[14]

NOISE AND NOISE COMPATIBLE LAND USE

Table 1H | Noise-Sensitive Land Uses	
Facility	**Distance/Direction From Airport**
Schools/Child Care Centers	
Early Childhood Learning Center – Casa Grande	1.0 mile southeast
Village Middle School	1.0 mile southeast
McCartney Ranch Elementary	1.7 miles southeast
Casa Grande Union High School	1.9 miles southeast
Pinnacle High School	2.3 miles southeast
Desert Willow Elementary	3.96 miles southeast
Places of Worship	
Church of Jesus Christ of Latter-Day Saints	1.6 miles southeast
Pinal County Cowboy Church	1.2 miles north
Senior Centers	
Oasis Pavilion Nursing & Rehabilitation	2.2 miles southeast

Federal land use compatibility guidelines are established under 14 Code of Federal Regulations (CFR) Part 150, *Airport Noise Compatibility Planning*. According to 14 CFR Part 150, residential land uses and schools are noise-sensitive land uses that are not considered compatible with a 65 decibel (dB) Day-Night Average Sound Level (L_{dn}). Other noise-sensitive land uses (such as religious facilities, hospitals, or nursing homes), if located within a 65 dB L_{DN} contour, are generally compatible when an interior noise level reduction of 25 dB is incorporated into the design and construction of the structure. Special consideration should also be given to noise-sensitive areas within Section 4(f) properties where the land use compatibility guidelines in 14 CFR Part 150 do not account for the value, significance, and enjoyment of the area in question.[15]

The *2030 Casa Grande General Plan* demonstrates noise contours adjusted to a proposed runway expansion (2027) (**Figure 1F**). Noise-sensitive land uses near the airport consist primarily of residential uses to the east.

Additional noise-sensitive land uses within approximately three miles of the airport are outlined in **Table 1H**.

[14] Authenticated U.S. Government Information Req-EO13423envtlmgmt.pdf (energy.gov); https://www.azcc.gov/utilities/electric/renewable-energy-standard-and-tariff; Arizona regulators adopt revamped energy rules (https://tucson.com/news/local/arizona-regulators-adopt-revamped-clean-energy-rules/article_43cd8a40-be69-11eb-86c8-db2ee6089b4c.html), updated November 24, 2021
[15] 49 U.S. Code § 47141- Compatible land use planning and projects by State and Local Governments

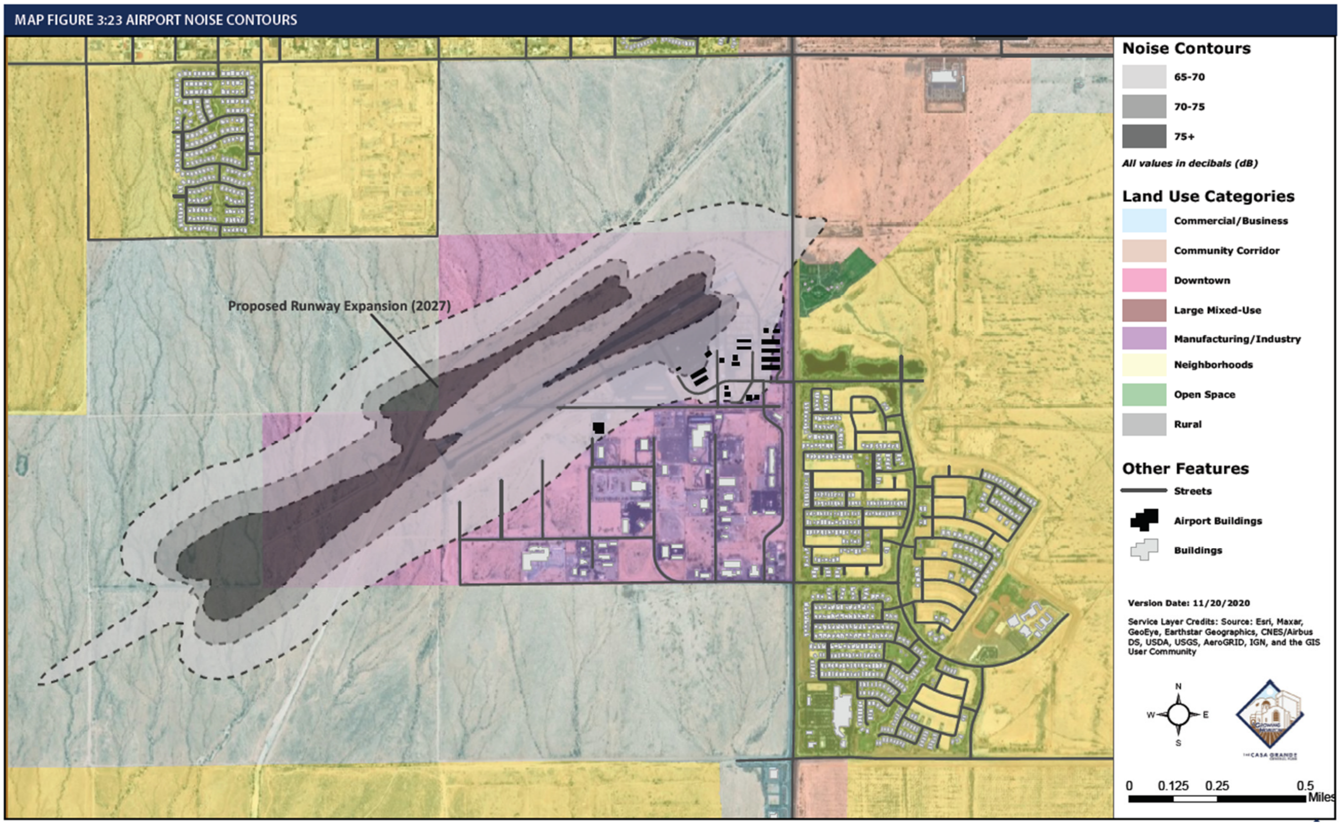


Figure 1F – Airport Noise Contours (2030 Casa Grande General Plan)

SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

Socioeconomics

Socioeconomics is an umbrella term used to describe aspects of a project that are either social or economic in nature. A socioeconomic analysis evaluates how elements of the human environment such as population, employment, housing, and public services might be affected by the proposed action and alternative(s).

FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* specifically requires that a federal action causing disproportionate impacts to an environmental justice population (i.e., a low-income or minority population), be considered, as well as an evaluation of environmental health and safety risks to children. The FAA has identified factors to consider when evaluating the context and intensity of potential environmental impacts.

Would the proposed action:

- Induce substantial economic growth in an area, either directly or indirectly;
- Disrupt or divide the physical arrangement of an established community;
- Cause extensive relocation when sufficient replacement housing is unavailable;

- Cause extensive relocation of community business what would cause severe economic hardship for affected communities;
- Disrupt local traffic patterns and substantially reduce the levels of service of roads serving an airport and its surrounding communities; or
- Produce a substantial change in the community tax base?

The EPA's *EJSCREEN* online tool identifies the presence of environmental justice areas within the vicinity of the airport. According to 2018 American Community survey estimates, the population within three miles of the airport is 15,032 persons, of which 36 percent of the population is considered low-income and 49 percent is considered a minority population.

Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies.

Meaningful involvement ensures that:

- people have an opportunity to participate in decisions about activities that may affect their environment and/or health;
- the public's contribution can influence the regulatory agency's decision;
- their concerns will be considered in the decision-making process; and
- the decision-makers seek out and facilitate the involvement of those potentially affected.[16]

The EPA's EJSCREEN identified minority populations within three miles. There are 7,345 persons identified as minority. Indicated in **Table 1J**, approximately 40 percent of the population has identified as Hispanic or Latino. The closest residential area is 300 feet east of the airport property line across State Route 387.

Table 1J | Population Characteristics

Characteristic	Three-Mile Buffer Around Airport
Total Population	15,032
Population by Race (%)	
White	76%
Black	3%
American Indian	4%
Asian	2%
Pacific Islander	0%
Some Other Race	8%
Population Reporting Two or More Races	7%
Total Hispanic population	40%

Source: EPA EJScreen (2021), 2018 ACS Estimate

[16] Environmental Justice | US EPA

Children's Environmental Health and Safety

Federal agencies are directed, per E.O. 13045, Protection of Children from Environmental Health Risks and Safety Risks, to make it a high priority to identify and assess the environmental health and safety risks that may disproportionately impact children. Such risks include those that are attributable to products or substances that a child is likely to encounter or ingest (air, food, water – including drinking water) or to which they may be exposed.

According to the U.S. EPA EJSCREEN report, approximately 27 percent of the population within the three-mile study area previously identified is under the age of 17.

VISUAL EFFECTS

Visual effects deal broadly with the extent to which a proposed action or alternative(s) would either (1) produce light emissions that create an annoyance or interfere with activities; or (2) contrast with, or detract from, the visual resources and/or the visual character of the existing environment. Each jurisdiction will typically address outdoor lighting, scenic vistas, and scenic corridors in zoning ordinances and their general plan.

Light Emissions

Light Emissions. Light emission impacts typically relate to the extent to which any light or glare results from a source that could create an annoyance for people or would interfere with normal activities. Generally, local jurisdictions will include ordinances in the local code addressing outdoor illumination to reduce the impact of light on surrounding properties.

Visual Resources and Visual Character

Visual character refers to the overall visual makeup of the existing environment where a proposed action or its alternative(s) would be located. For example, areas near densely populated areas generally have a visual character that could be defined as urban, whereas less developed areas could have a visual character defined by the surrounding landscape features, such as open grass fields, forests, mountains, or deserts, etc.

Visual resources include buildings, sites, traditional cultural properties, and other natural or manmade landscape features that are visually important or have unique characteristics. Visual resources may include structures or objects that obscure or block other landscape features. In addition, visual resources can include the cohesive collection of various individual visual resources that can be viewed at once or in concert from the area surrounding the site of the proposed action or alternative(s).

The *2030 Casa Grande General Plan* provides Residential and Non-Residential Specific Development Standards to enforce site design providing visual interest to elevations and streetscape. Provisions for recreational facilities, open space, and trails are outlined in the Casa Grande Regional Trail System Master Plan and Community Services Master Plan. Goals are listed to guide appropriate use and future expansion of open space, including plazas, courtyards, high quality parks, trails, and other pedestrian recreation areas.

Goals within the 2030 General Plan outline investment in Casa Grande's unique historic and natural features. Development standards are cited to build architecture that frames open space and existing historic structures and residential development.

The airport lies on the outskirts of the urban area and is visible from State Route 387. This highway is not a designated scenic highway within the state or the county.

WATER RESOURCES

Wetlands

The U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the United States, including adjacent wetlands, under Section 404 of the *Clean Water Act* (CWA). Wetlands are defined in E.O. 11990, *Protection of Wetlands*, as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction." Wetlands can include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mudflats, natural ponds, estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation. Wetlands exhibit three characteristics: the soil is inundated or saturated to the surface at some time during the growing season (hydrology), has a population of plants able to tolerate various degrees of flooding or frequent saturation (hydrophytes), and soils that are saturated enough to develop anaerobic (absent of air or oxygen) conditions during the growing season (hydric).

USFWS manages the National Wetlands Inventory on behalf of all federal agencies. The National Wetlands Inventory shows three (5.76-, 0.87-, and 0.85-acre) Freshwater Pond habitats existing east outside of the airport property, identified as non-tidal wetlands. There are also engineered drainages on the airport that collect airport drainage and convey it off the airport (**Exhibit 1H**). The National Wetlands Inventory maps these ditches and canals as Riverine. However, based on aerial and ground photography of the airport, including Google Earth mapping, the on-airport drainages do not convey waters to waters of the U.S. (i.e., traditional navigable waters) nor are there discernible features such as ordinary high water marks. Additionally, the NRCS Web Soil Survey indicates no presence of hydric soils on airport property. Therefore, waters of the U.S. are not present on the airport based on current regulations.

According to an Aquatic Resources Delineation completed on airport property, the closest downstream traditional navigable water (TNW) to the airport is the segment of the Gila River from Powers Butte to

Gillespie Dam, located more than 77 river miles northwest and downstream of the project area via the North Branch Santa Cruz Wash. The North Branch Santa Cruz Wash is an ephemeral drainage that has been disturbed, channelized, and has several flow impediments and impoundments along its reach from the point of intersection with Wash A of the project area and its confluence with the Gila River.

The Aquatic Resources Delineation report concluded that there are no jurisdictional waters present on the airport (SWCA Environmental Consultants 2022).[17]

Floodplains

E.O. 11988, *Floodplain Management*, directs federal agencies to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by the floodplains. A review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panels number 04021C1175E and 04021C1200E, effective on December 4, 2007 indicates that there are no Special Flood Hazard Areas such as a 100-year floodplain on the airport (**Exhibit 1H**).[18]

Surface Waters

The CWA establishes water quality standards, control discharges, develop waste treatment management plans and practices, prevent or minimize the loss of wetlands, and regulate other issues concerning water quality. Water quality concerns related to airport development most often relate to the potential for surface runoff and soil erosion, as well as the storage and handling of fuel, petroleum products, solvents, etc. Additionally, Congress has mandated (under the CWA) the National Pollutant Discharge Elimination System (NPDES). The Arizona Department of Environmental Quality has the authority to administer the NPDES program in the state, tribal lands excluded. The Arizona Pollutant Discharge Elimination System (AZPDES) permit mandates certain procedures required to prevent contamination of water bodies from stormwater runoff.

Examples of direct impacts to surface waters include any in-water work resulting from the expansion of an existing FAA facility adjacent to surface waters, or withdrawal of water from surface water for construction or operations.

The airport is in the Santa Cruz/Rio Magdelana/Rio Sonoita watershed. The Santa Cruz River is identified as the only impaired stream in the watershed, located southeast of the airport. All drainage points from the airport are primarily channelized and do not drain into any natural water feature.

---

[17] Wetlands Mapper (fws.gov); National Resources Conservation Service – U.S. Department of Agriculture (https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/hydric/?cid=nrcs142p2_053961), December 2021
[18] Federal Emergency Management Agency *Flood Map Service Center* (https://msc.fema.gov/portal/search?AddressQuery=casa%20grande%2C%20az#searchresultsanchor)

Groundwater

Groundwater is subsurface water that occupies the space between sand, clay, and rock formations. The term aquifer is used to describe the geologic layers that store or transmit groundwater, such as wells, springs, and other water sources. Examples of direct impacts to groundwater could include withdrawal of groundwater for operational purposes or reduction of infiltration or recharge area due to new impervious surfaces.[19]

The Upper Santa Cruz and Avra Basin sole source aquifer is located approximately 40 miles southeast of the airport.[20]

Wild and Scenic Rivers

The *National Wild and Scenic Rivers Act* was established to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

The Nationwide River Inventory (NRI) is a list of over 3,400 rivers or river segments that appear to meet the minimum *Wild and Scenic Rivers Act* eligibility requirements based on their free-flowing status and resource values. The development of the NRI resulted from Section 5(d)(1) in the *Wild and Scenic Rivers Act*, directing Federal agencies to consider potential wild and scenic rivers in the comprehensive planning process.

The closest designated wild and scenic river identified by the NRI is the Verde River, located 83 miles northeast of the airport. Another wild and scenic feature, a segment of the Gila River, is located 130 miles southeast of the airport.[21]

[19] What is groundwater? | U.S. Geological Survey: https://www.usgs.gov/faqs/what-groundwater
[20] Sole Source Aquifers: https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=9ebb047ba3ec41ada1877155fe31356b
[21] Nationwide Rivers Inventory: https://www.nps.gov/maps/full.html?mapId=8adbe798-0d7e-40fb-bd48-225513d64977

This page intentionally left blank

City of
Casa Grande
AIRPORT MASTER PLAN

Chapter 2

Aviation Demand Forecasts

City of Casa Grande
AIRPORT MASTER PLAN

Chapter 2

Aviation Demand Forecasts

The definition of demand that may reasonably be expected to occur during the useful life of an airport's key components (e.g., runways, taxiways, terminal buildings, etc.) is an important factor in facility planning. In airport master planning, this involves projecting potential aviation activity for at least a 20-year timeframe. Aviation demand forecasting for Casa Grande Municipal Airport (CGZ) will primarily consider based aircraft, aircraft operations, and peak activity periods.

The Federal Aviation Administration (FAA) has oversight responsibility to review and approve aviation forecasts developed in conjunction with airport planning studies. FAA will review individual airport forecasts with the objective of comparing them to its *Terminal Area Forecasts* (TAF) and the *National Plan of Integrated Airport Systems* (NPIAS). Even though the TAF is updated annually, in the past there was almost always a disparity between the TAF and master planning forecasts. This was primarily because the TAF forecasts are the result of a top-down model that does not consider local conditions or recent trends. While the TAF forecasts are to be a point of comparison for Master Plan forecasts, they serve other purposes, such as asset allocation by the FAA.

When reviewing a sponsor's forecast (from the master plan), the FAA must ensure that the forecast is based on reasonable planning assumptions, uses current data, and is developed using appropriate forecast methods. According to the FAA, forecasts should be:

- Realistic;
- Based on the latest available data;
- Reflective of current conditions at the airport (as a baseline);
- Supported by information in the study; and
- Able to provide adequate justification for airport planning and development.

The forecast process for an airport master plan consists of a series of basic steps that vary in complexity depending upon the issues to be addressed and the level of effort required. The steps include a review of previous forecasts, determination of data needs, identification of data sources, collection of data, selection of forecast methods, preparation of the forecasts, and documentation and evaluation of the results. FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, outlines seven standard steps involved in the forecast process, including:

1) **Identify Aviation Activity Measures**: The level and type of aviation activities likely to impact facility needs. For general aviation, this typically includes based aircraft and operations.
2) **Review Previous Airport Forecasts**: May include the FAA *Terminal Area Forecast*, state or regional system plans, and previous master plans.
3) **Gather Data**: Determine what data are required to prepare the forecasts, identify data sources, and collect historical and forecast data.
4) **Select Forecast Methods**: There are several appropriate methodologies and techniques available, including regression analysis, trend analysis, market share or ratio analysis, exponential smoothing, econometric modeling, comparison with other airports, survey techniques, cohort analysis, choice and distribution models, range projections, and professional judgment.
5) **Apply Forecast Methods and Evaluate Results**: Prepare the actual forecasts and evaluate for reasonableness.
6) **Summarize and Document Results**: Provide supporting text and tables as necessary.
7) **Compare Forecast Results with FAA's TAF**: Based aircraft and total operations are considered consistent with the TAF if they meet the following criteria:
   - Forecasts differ by less than 10 percent in the five-year forecast period, and 15 percent in the 10-year forecast period, or
   - Forecasts do not affect the timing or scale of an airport project, or
   - Forecasts do not affect the role of the airport as defined in the current version of FAA Order 5090.5, *Field Formulation of the National Plan of Integrated Airport Systems* (NPIAS) *and the Airports Capital Improvement Plan* (ACIP).

Aviation activity can be affected by many influences on the local, regional, and national levels, making it virtually impossible to predict year-to-year fluctuations of activity over 20 years with any certainty. Therefore, it is important to remember that forecasts are to serve only as guidelines, and planning must remain flexible enough to respond to a range of unforeseen developments.

The following forecast analysis for the airport was produced following these basic guidelines. Existing forecasts are examined and compared against current and historic activity. The historical aviation activity is then examined along with other factors and trends that can affect demand. The intent is to provide an updated set of aviation demand projections for the airport that will permit airport management to make planning adjustments as necessary to maintain a viable, efficient, and cost-effective facility.

The forecasts for this Master Plan will utilize a base year of 2021 with a long-range forecast out to 2041.

NATIONAL AVIATION TRENDS

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for the large air carriers, regional/commuter air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet the budget and planning needs of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the general public. The current edition upon preparation of this chapter was FAA *Aerospace Forecasts – Fiscal Years 2021-2041*, published in July 2021. The FAA primarily uses the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets. The following discussion is summarized from the FAA *Aerospace Forecasts*.

Since its deregulation in 1978, the U.S. commercial air carrier industry has been characterized by boom-to-bust cycles. The volatility that was associated with these cycles was thought by many to be a structural feature of an industry that was capital intensive but cash poor. However, the great recession of 2007-09 marked a fundamental change in the operations and finances of U.S. airlines. Since the end of the recession in 2009, U.S. airlines revamped their business models to minimize losses by lowering operating costs, eliminating unprofitable routes, and grounding older, less fuel-efficient aircraft. To increase operating revenues, carriers initiated new services that customers were willing to purchase and started charging separately for services that were historically bundled in the price of a ticket The industry experienced an unprecedented period of consolidation with three major mergers in five years. The results of these efforts were impressive: 2019 marked the eleventh consecutive year of profitability for the U.S. airline industry.

The COVID-19 pandemic has been the biggest factor affecting aviation since March 2020. The effect of the pandemic on the aviation industry has been most devastating to the commercial airline operators, who are still working to recover from staggering losses and add capacity back into networks. However, other segments of the aviation industry, including general aviation such as charters, air taxi, and fractionals, were not impacted quite so much as the airlines. In fact, they appear to have maintained pre-pandemic levels and, in many cases, showed increases in activity. Long-term, the strengths and capabilities developed over the past decade will become evident again. There is confidence that U.S. airlines have finally transformed from a capital intensive, highly cyclical industry to an industry that can generate solid returns on capital and sustained profits.

ECONOMIC ENVIRONMENT

According to the FAA forecast, over the next 20 years, the annual gross domestic product (GDP) of the U.S. is expected to increase by 2.4 percent. U.S. carrier profitability is projected to remain under pressure for several years due to depressed demand and competitive fare pressures. As carriers return to levels of capacity consistent with their fixed costs, shed excess debt, and see rising yields, profitability should gradually return. Over the long term, a competitive and profitable aviation industry should emerge, characterized by increasing demand for air travel, with airfares growing more slowly than overall inflation, reflective of growing U.S. and global economies.

Prior to the COVID-19 pandemic, the economy was recovering from the most serious economic downturn and slow recovery since the Great Depression. Fundamentally, demand for aviation is driven by economic activity. As economic growth picks up, so will growth in aviation activity. Overall, the FAA forecast calls for passenger growth over the next 20 years to average 4.9 percent annually, which includes three double-digit growth years during the recovery from a very low base in 2021. Oil prices averaged $43 per barrel in 2020 and are forecast to fall to $36 in 2021, before increasing to $94 per barrel by the end of the forecast period in 2041.

FAA GENERAL AVIATION FORECASTS

The long-term outlook for general aviation is promising, as growth at the high-end offsets continuing retirements at the traditional low end of the segment. The active general aviation fleet is forecast to remain relatively stable between 2021 and 2041. While steady growth in both GDP and corporate profits results in continued growth of the turbine and rotorcraft fleets, the largest segment of the fleet – fixed-wing piston aircraft – continues to shrink over the forecast period.

The FAA forecasts the fleet mix and hours flown for single engine piston aircraft, multi-engine piston aircraft, turboprops, business jets, piston and turbine helicopters, light sport, experimental, and others (gliders and balloons). The FAA forecasts "active aircraft," not total aircraft. An active aircraft is one that is flown at least one hour during the year. From 2010 through 2013, the FAA undertook an effort to have all aircraft owners re-register their aircraft. This effort resulted in a 10.5 percent decrease in the number of active general aviation aircraft, mostly in the piston category. **Table 2A** shows the primary general aviation demand indicators as forecast by the FAA.

Table 2A | FAA General Aviation Forecast

Demand Indicator	2021	2041	CAGR
General Aviation (GA) Fleet			
Total GA Fleet	205,870	208,790	0.07%
Total Fixed Wing Piston	139,065	116,905	-0.86%
Total Fixed Wing Turbine	25,790	35,780	1.65%
Total Helicopters	10,215	13,390	1.36%
Total Other (experimental, light sport, etc.)	30,800	42,715	1.65%
General Aviation Operations			
Total GA Operations	25,942,797	30,130,687	0.75%
Local	12,743,768	14,392,959	0.61%
Itinerant	13,199,029	15,737,728	0.88%
CAGR: compound annual growth rate (2021-2041)			

Source: FAA Aerospace Forecast - Fiscal Years 2021-2041

General Aviation Aircraft Fleet Mix

For 2021, the FAA estimates there are 139,065 piston-powered, fixed-wing aircraft in the national fleet. That number is forecast to decline by 0.9 percent by 2041, resulting in 116,905. This includes a decline of -0.9 percent of single-engine aircraft and a decline of -0.4 percent in multi-engine piston aircraft.

Total turbine aircraft are forecast to grow at an annual rate of 1.7 percent through 2041. The FAA estimates there are 25,790 fixed-wing turbine-powered aircraft in the national fleet in 2021, and there will be 35,780 by 2041. Turboprops are forecast to grow by 0.6 percent annually, while business jets are projected to grow by 2.3 percent annually through 2041.

Total helicopters are projected to grow by 1.4 percent annually in the forecast period. There are an estimated 10,215 total helicopters in the national fleet in 2021, and that number is expected to grow to a total of 13,390 by 2041. This includes annual growth rates of 0.9 percent for piston helicopters and 1.6 percent for turbine helicopters.

The FAA also forecasts experimental aircraft, light sport aircraft, and others. Combined, there are an estimated 30,800 other aircraft in 2021 that are forecast to grow to 42,715 by 2041, for an annual growth rate of 1.6 percent.

General Aviation Operations

The FAA also forecasts total operations based upon activity at control towers across the United States. Operations are categorized as air carrier, air taxi/commuter, general aviation, and military. While the fleet size remains relatively level, the number of general aviation operations at towered airports is projected to increase from 25.9 million in 2021 to 30.1 million in 2041, with an average increase of 0.8 percent per year as growth in turbine, rotorcraft, and experimental hours offset a decline in fixed-wing piston hours. This includes annual growth rates of 0.6 percent for local general aviation operations and 0.9 percent for itinerant general aviation operations.

Exhibit 2A presents the historical and forecast U.S. active general aviation aircraft and operations.

General Aviation Aircraft Shipments and Revenue

According to General Aviation Manufactures Association (GAMA), there is an expected rebound in aircraft demand once the impact of the COVID pandemic has passed and belief that innovations in electric propulsion and supersonic technologies will increase the sector's global reach. Despite the industry's fourth quarter rebound, the pandemic took its toll on 2020 shipments and billings. The least affected segment, piston airplanes (including both single engine and multi-engine aircraft), saw deliveries drop just 0.9 percent year over year to 1,312 units, but turboprop shipments declined 15.6 percent to 443 and business jet deliveries fell 20.4 percent to 644 aircraft. **Table 2B** presents currently available historical data related to general aviation aircraft shipments.

Table 2B | Annual General Aviation Airplane Shipments Manufactured Worldwide and Factory Net Billings						
Year	Total	SEP	MEP	TP	J	Net Billings ($millions)
2000	3,147	1,877	103	415	752	13,496
2001	2,998	1,645	147	422	784	13,868
2002	2,677	1,591	130	280	676	11,778
2003	2,686	1,825	71	272	518	9,998
2004	2,962	1,999	52	319	592	12,093
2005	3,590	2,326	139	375	750	15,156
2006	4,054	2,513	242	412	887	18,815
2007	4,277	2,417	258	465	1,137	21,837
2008	3,974	1,943	176	538	1,317	24,846
2009	2,283	893	70	446	874	19,474
2010	2,024	781	108	368	767	19,715
2011	2,120	761	137	526	696	19,042
2012	2,164	817	91	584	672	18,895
2013	2,353	908	122	645	678	23,450
2014	2,454	986	143	603	722	24,499
2015	2,331	946	110	557	718	24,129
2016	2,268	890	129	582	667	21,092
2017	2,324	936	149	563	676	20,197
2018	2,441	952	185	601	703	20,515
2019	2,658	1,111	213	525	809	23,515
2020	2,399	1,155	157	443	644	20,029
SEP - Single-Engine Piston; MEP - Multi-Engine Piston; TP - Turboprop; J - Turbofan/Turbojet						

Source: General Aviation Manufacturers Association, 2020 Annual Report

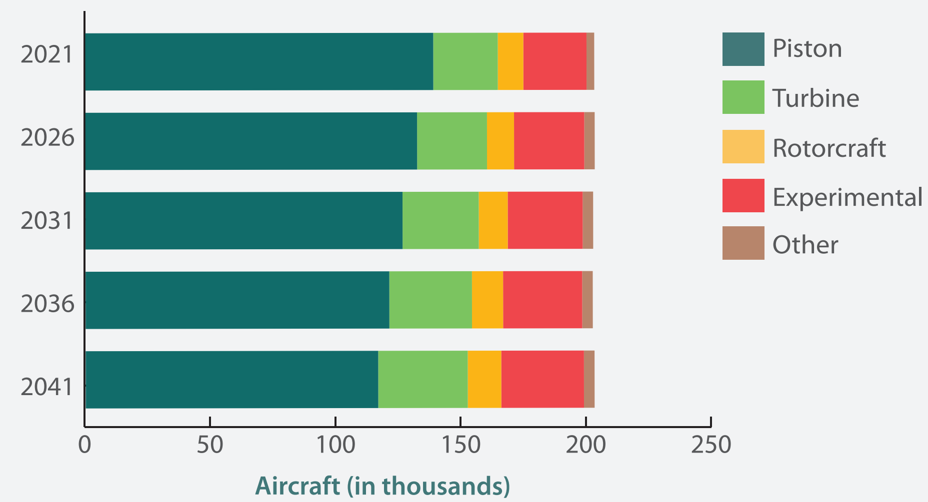
Worldwide shipments of general aviation airplanes declined in the year 2020 with a total of 2,399 units delivered around the globe, compared to 2,658 units in 2019, but still surpassed the 2,325 units in 2017. Worldwide general aviation billings were the highest in 2014. In 2020, there was a decline of new aircraft shipments with just over $20 billion compared to the previous year's $23.5 billion. North America continues to be the largest market for general aviation aircraft and leads the way in the manufacturing of piston, turboprop, and jet aircraft. The Asia-Pacific region is the second largest market for piston-powered, while Europe is the second leading in the turboprop and business jets.

Business Jets: Business jet deliveries decreased from 809 units in 2019 to 644 units in 2020, the second largest drop since the 2008-2009 economic recession. The North American market accounted for 66 percent of business jet deliveries, which is a 1.1 percent decrease in market share compared to 2019.

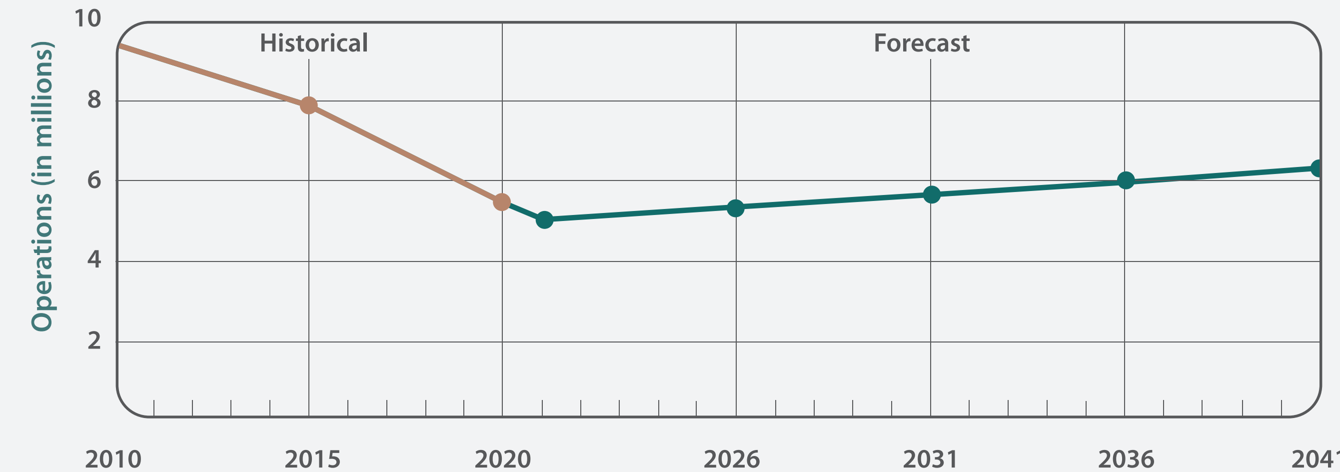
Turboprops: Turboprop shipments were down from 525 in 2019 to 443 in 2020. North America's market share of turboprop aircraft, however, increased by 4.6 percent in the last year. The European market also increased, while Latin America, Middle East Africana, and Asia-Pacific markets decreased their market share.

Pistons: In 2020, piston airplane shipments fell to 1,312 units compared to 1,324 units in the prior year. North America's market share of piston aircraft deliveries dropped 1.5 percent from the year 2019. The Asia-Pacific market experienced a positive rate in market share during the past year, while Europe, Latin-America, and Middle East saw a decline.

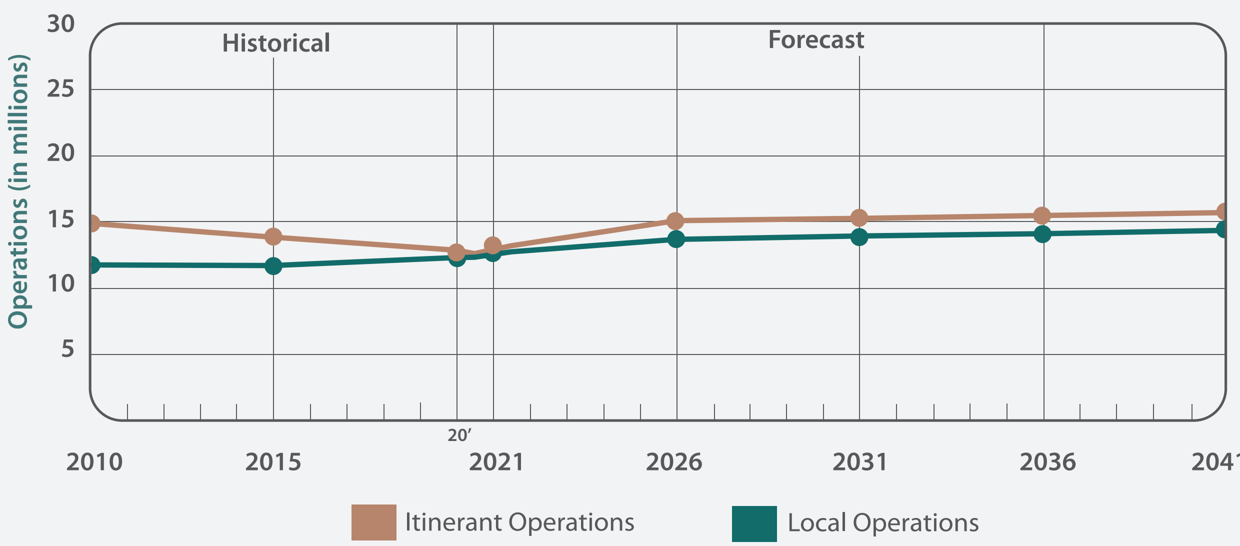
U.S. Active General Aviation Aircraft



U.S. Air Taxi Operations



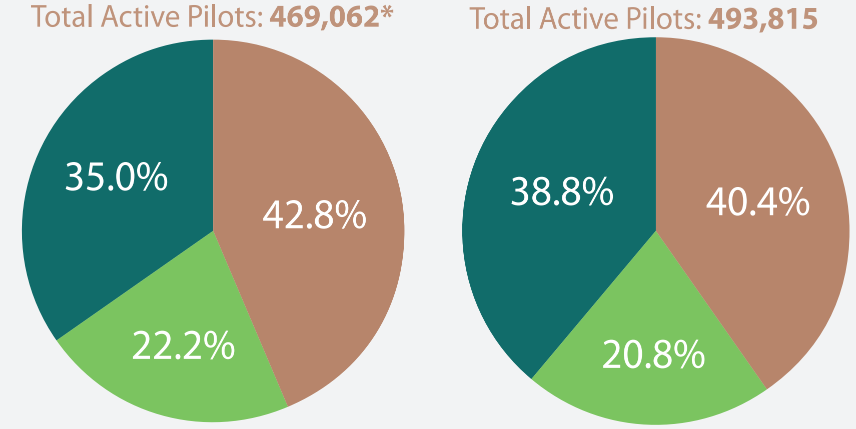
U.S. General Aviation Operations



Active Pilots By Certificate

2020 Total Active Pilots: **469,062***

2041 Total Active Pilots: **493,815**



Recreational / Sport Pilot / Private / Glider / Rotorcraft
Commercial
Airline Transport

**Excludes Student Pilot Certificates*

Source: FAA Aerospace Forecasts FY2021-2041

U.S. PILOT POPULATION

There were 469,062 active pilots certificated by the FAA at the end of 2020. All pilot categories, except for private, rotorcraft- and recreational-only certificates, continued to increase. Except for student pilots and airline transport pilots (ATP), the number of active general aviation pilots is projected to decrease about 2,654 (down 0.04 percent annually) between 2020 and 2041. The ATP category is forecast to increase by 27,407 (up 0.7 percent annually). Sport pilots are predicted to increase by 2.7 percent annually over the forecast period, while both private and commercial pilot certificates are projected to decrease at an average annual rate of 0.4 and 0.1 percent, respectively, until 2041. The FAA has currently suspended the student pilot forecast.

RISKS TO THE FORECAST

While the FAA is confident that its forecasts for aviation demand and activity can be reached, this is dependent on several factors, including the strength of the global economy, security (including the threat of international terrorism), and oil prices. Higher oil prices could lead to further shifts in consumer spending away from aviation, dampening a recovery in air transport demand. The COVID-19 pandemic has also presented a new risk without clear historical precedent. The long-term impact of COVID-19 on the aviation industry will not be understood until the full spread or intensity of the human consequences, as well as the breadth and depth of possible economic fallout, is known.

AIRPORT SERVICE AREA

The initial step in determining the aviation demand for an airport is to define its generalized service area for various segments of aviation. The service area is determined primarily by evaluating the location of competing airports, their capabilities, their services, and their relative attraction and convenience. In determining the aviation demand for an airport, it is necessary to identify the role of the airport, as well as the specific areas of aviation demand the airport is intended to serve. CGZ is classified as a Local General Aviation (GA) airport within the NPIAS, meaning that its primary role is to provide the community with access to local and regional markets. General aviation, which includes all segments of the aviation industry except commercial air carriers and the military, is the largest component of the national aviation system. It includes activities such as pilot training, recreational flying, and the use of sophisticated turboprop and jet aircraft for business and corporate use.

The service area for an airport is a geographic region from which an airport can be expected to attract the largest share of its activity. The definition of the service area can then be used to identify other factors, such as socioeconomic and demographic trends, that influence aviation demand at an airport. Aviation demand will be impacted by the proximity of competing airports, the surface transportation network, and the strength of general aviation services provided by an airport and competing airports.

As in any business enterprise, the more attractive the facility is in terms of service and capabilities, the more competitive it will be in the market. If an airport's attractiveness increases in relation to nearby airports, so will the size of its service area. If facilities and services are adequate and/or competitive, some level of aviation activity might be attracted to an airport from more distant locales.

As a Local GA airport, CGZ's service area is driven by aircraft owners/operators and where they choose to base their aircraft. The primary consideration of aircraft owners/operators when choosing where to base their aircraft is convenience (i.e., easy access and proximity to the airport). As a general rule, an airport's service area can extend up to and beyond 30 miles. The proximity and level of general aviation services are largely a defining factor when describing the general aviation service area. A description of nearby airports was previously completed in Chapter One, as presented on Table 1C. There are six public-use airports within 30 nautical miles (nm) of CGZ, with varying levels of services and amenities.

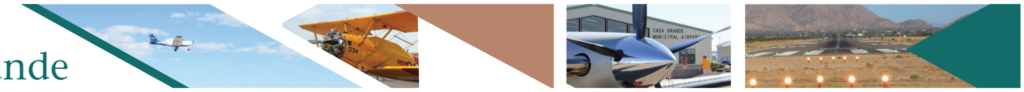
When discussing the general aviation service area, two primary demand segments need to be addressed. The first component is the airport's ability to attract based aircraft. Under this circumstance, the most effective method of defining the airport's service area is by examining the number of registered aircraft owners in proximity to the airport. As previously mentioned, aircraft owners typically choose to base at an airport near their home or business. Based on the current registered aircraft data, presented on **Exhibit 2B**, there are 1,528 registered aircraft within 30 nm of CGZ. Of these, 67 are based at the airport, with an additional 35 aircraft registered to addresses beyond 30 nm. The majority of registered aircraft within 30 nm of CGZ are located 20 to 30 nm north of the airport, south of the City of Phoenix near Chandler Municipal (CHD), Phoenix-Mesa Gateway (IWA), and Falcon Field (FFZ). The exhibit also depicts a 30-minute drive time isochrone, which is centered on Pinal County but extends north into Maricopa County.

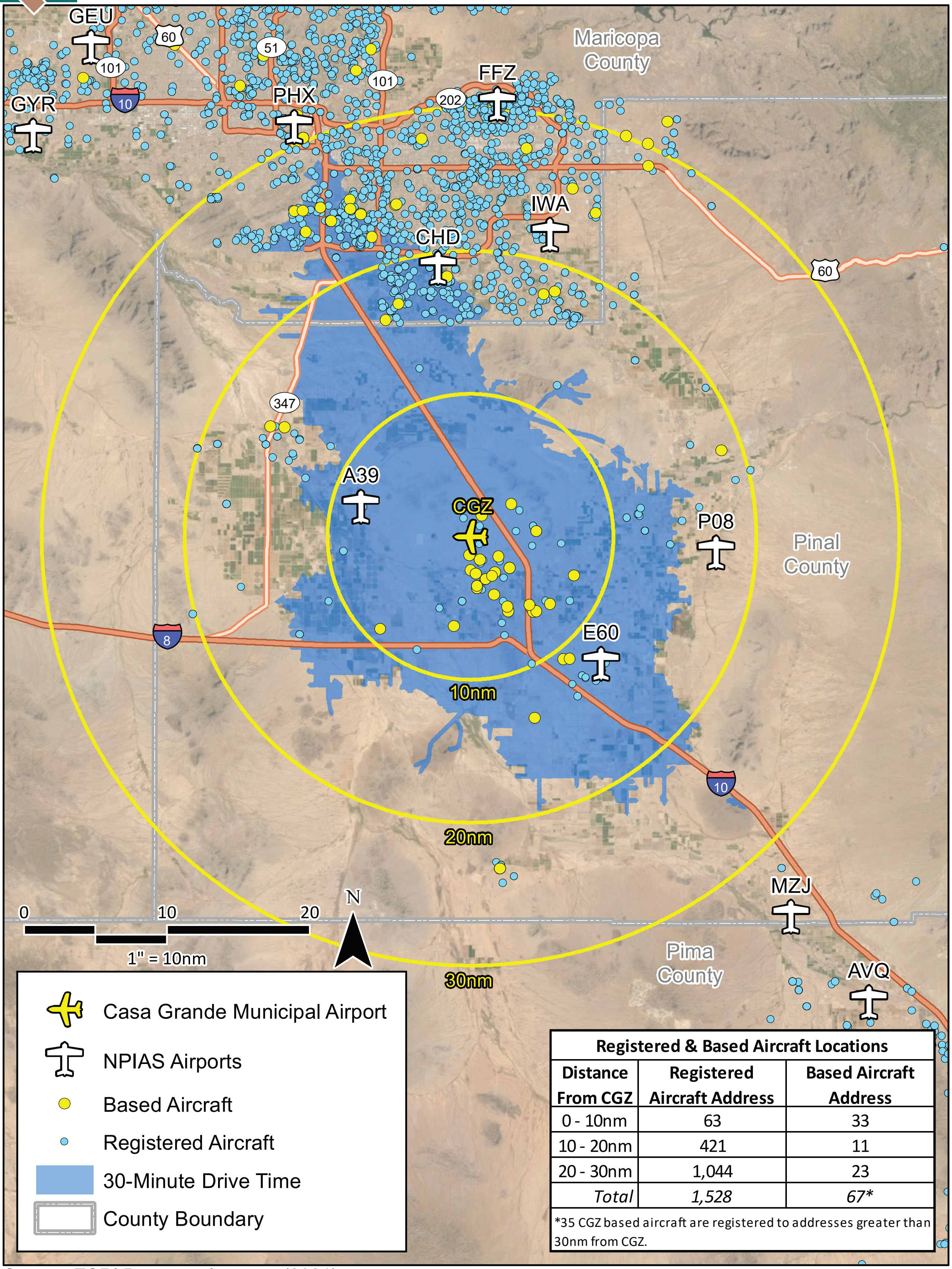
The second demand segment to consider is itinerant aircraft operations. In most instances, pilots will opt to utilize airports nearer their intended destination; however, this is also dependent on the airport's capabilities in accommodating the aircraft operator. As a result, airports offering better services and facilities are more likely to attract itinerant operators in the region.

With several competing airports in the region, Casa Grande Municipal Airport's primary service area is defined by its convenience to its users and its ability to compete for based aircraft. Of the six NPIAS airports within 30 nm of CGZ, three are located in Maricopa County, where the majority of aircraft in the area are registered. Most of CGZ's based aircraft are registered to addresses within 20 nm of the airport. In addition, the airport and its 30-minute drive time isochrone are centrally located within Pinal County, making it most accessible to users within the county. This, combined with the competition presented from CHD, IWA, and FFZ, results in Pinal County being defined as the airport's primary service area.

FORECASTING APPROACH

The development of aviation forecasts proceeds through both analytical and judgmental processes. A series of mathematical relationships is tested to establish statistical logic and rationale for projected growth. However, the judgment of the forecast analyst, based upon professional experience, knowledge of the aviation industry, and assessment of the local situation, is important in the final determination of the preferred forecast. The most reliable approach to estimating aviation demand is through the utilization of more than one analytical technique. Methodologies frequently considered include trend line/time-series projections, correlation/regression analysis, and market share analysis. The forecast analyst may elect not to use certain techniques depending on the reasonableness of the forecasts produced using other techniques.





Registered & Based Aircraft Locations		
Distance From CGZ	Registered Aircraft Address	Based Aircraft Address
0 - 10nm	63	33
10 - 20nm	421	11
20 - 30nm	1,044	23
Total	*1,528*	*67**

*35 CGZ based aircraft are registered to addresses greater than 30nm from CGZ.

Source: ESRI Basemap Imagery (2021),
FAA Registered Aircraft Database, ADOT.

Trend line/time-series projections are probably the simplest and most familiar of the forecasting techniques. By fitting growth curves to historical data, then extending them into the future, a basic trend line projection is produced. A basic assumption of this technique is that outside factors will continue to affect aviation demand in much the same manner as in the past. As broad as this assumption may be, the trend line projection does serve as a reliable benchmark for comparing other projections.

Correlation analysis provides a measure of direct relationship between two separate sets of historical data. Should there be a reasonable correlation between the data sets, further evaluation using regression analysis may be employed.

Regression analysis measures statistical relationships between dependent and independent variables, yielding a "correlation coefficient." The correlation coefficient (Pearson's "r") measures association between the changes in the dependent variable and the independent variable(s). If the "r^2" value (coefficient determination) is greater than 0.95, it indicates good predictive reliability. A value less than 0.95 may be used, but with the understanding that the predictive reliability is lower.

Market share analysis involves a historical review of the airport activity as a percentage, or share, of a larger regional, state, or national aviation market. A historical market share trend is determined, providing an expected market share for the future. These shares are then multiplied by the forecasts of the larger geographical area to produce a market share projection. This method has the same limitations as trend line projections but can provide a useful check on the validity of other forecasting techniques.

Forecasts will age the farther one is from the base year and the less reliable a forecast may become, particularly due to changing local and national conditions. Nonetheless, the FAA requires that a 20-year forecast be developed for long-range airport planning. Facility and financial planning usually require at least a ten-year view since it often takes more than five years to complete a major facility development program. However, it is important to use forecasts which do not overestimate revenue-generating capabilities or understate demand for facilities needed to meet public (user) needs.

A wide range of factors is known to influence the aviation industry and can have significant impacts on the extent and nature of aviation activity in both the local and national markets. Historically, the nature and trend of the national economy has had a direct impact on the level of aviation activity. Recessionary periods have been closely followed by declines in aviation activity. Nonetheless, over time, trends emerge and provide the basis for airport planning.

Future facility requirements, such as hangar, apron, and terminal needs, are derived from projections of various aviation demand indicators. Using a broad spectrum of local, regional, and national socioeconomic and aviation information, and analyzing the most current aviation trends, forecasts are presented for the following aviation demand indicators:

- Based Aircraft
- Based Aircraft Fleet Mix
- General Aviation Operations
- Air Taxi and Military Operations
- Operational Peaks

EXISTING FORECASTS

Consideration is given to any forecasts of aviation demand for the airport that have been completed in the recent past. For CGZ, the previous forecasts reviewed are those in the FAA *Terminal Area Forecast* (TAF), the 2009 Master Plan, the 2015 Airport Layout Plan Update & Narrative Report, and the 2018 *Arizona State Aviation System Plan* (SASP).

FAA *TERMINAL AREA FORECAST*

On an annual basis, the FAA publishes the TAF for each airport included in the *National Plan of Integrated Airport Systems* (NPIAS). The TAF is a generalized forecast of airport activity used by FAA for internal planning purposes primarily. It is available to airports and consultants to use as a baseline projection and important point of comparison while developing local forecasts. The current TAF was published in March 2022 and is based on the federal fiscal year (October-September).

As presented in **Table 2C**, the TAF projects general aviation activity at the airport to remain static over the next 20 years. Given that there is currently no commercial service activity at CGZ, the TAF does not reflect any existing and/or forecast air carrier operations; however, the TAF does reflect 2,038 air taxi operations over the forecast period. Operations are projected to be dominated by local and itinerant GA operations, which are estimated to account for approximately 11 percent and 87 percent of operations, respectively, over the planning period. Military operations are projected to account for less than one percent of total operations, with 410 projected for each of the plan years. Based aircraft are also projected to remain flat over the next 20 years, at 74. As noted previously, the FAA will compare the new forecasts developed for this Master Plan to the TAF.

Table 2C | 2022 FAA Terminal Area Forecast - CGZ

	2021	2026	2031	2041	CAGR 2021-2041
ANNUAL OPERATIONS					
Itinerant					
Air Carrier	0	0	0	0	0.0%
Air Taxi	2,038	2,038	2,038	2,038	0.0%
General Aviation	106,586	106,586	106,586	106,586	0.0%
Military	410	410	410	410	0.0%
Total Itinerant	109,034	109,034	109,034	109,034	0.0%
Local					
General Aviation	12,966	12,966	12,966	12,966	0.0%
Military	0	0	0	0	0.0%
Total Local	12,966	12,966	12,966	12,966	0.0%
Total Operations	***122,000***	***122,000***	***122,000***	***122,000***	0.0%
BASED AIRCRAFT					
Based Aircraft	***74***	***74***	***74***	***74***	0.0%

Source: FAA Terminal Area Forecast (TAF), March 2022

PREVIOUS FORECASTS

Forecasts of aviation activity at CGZ were previously prepared within the 2009 Airport Master Plan, the 2015 Airport Layout Plan Update & Narrative Report, and the 2018 SASP. **Table 2D** summarizes the forecasts of operations and based aircraft at CGZ that were prepared for these studies. It should be noted that, since the completion of the previous Master Plan, a national recession caused a significant reduction in aviation activity not only at CGZ but across the country. As a result, the projections from the previous Master Plan are no longer relevant.

The SASP projections were prepared most recently and account for the effects of the recession. The SASP forecasted operations to grow to 114,140 and based aircraft to increase to 117 by 2021. In terms of operations, activity at CGZ has exceeded this figure, with an estimated 122,000 annual operations as reported in the airport's FAA Form 5010, *Airport Master Record*. Growth in based aircraft has not met these projections, however, with the number of based aircraft declining slightly from the figure reported for 2016 in the SASP. Based on recent activity trends at CGZ and the time that has passed since the preparation of these previous forecasts, it is necessary to develop new forecasts utilizing the most current information available.

Table 2D | Previous Forecasts - CGZ

Year	Itinerant Operations	Local Operations	Total Operations	Based Aircraft
2009 Airport Master Plan (2007 Base Year)				
2007	104,562	12,720	119,182	114
2012	114,750	18,630	135,280	150
2017	159,500	33,440	194,840	235
2027	250,000	75,000	326,900	500
2015 Airport Layout Plan Update & Narrative Report (2014 Base Year)				
2014	69,000	30,000	99,000	105
2019	68,144	29,628	98,760	120
2024	77,798	33,825	112,751	137
2034	101,648	44,195	147,317	179
2018 *Arizona State Aviation System Plan* Update (2016 Base Year)				
2016	70,000	30,000	100,000	105
2021	79,900	34,240	114,140	117
2026	91,190	39,080	130,270	130
2036	118,800	50,910	169,710	159
Note: Some totals are approximate and may not equal the total annual operations due to rounding				

Sources: 2009 Master Plan; 2015 Airport Layout Plan Update & Narrative Report; 2018 Arizona State Aviation System Plan Update

GENERAL AVIATION FORECASTS

General aviation encompasses all portions of civil aviation except commercial service and military operations. To determine the types and sizes of facilities that should be planned to accommodate general aviation activity at the airport, certain elements of this activity must be forecast. These indicators of general aviation demand include based aircraft, aircraft fleet mix, operations, and annual operations.

The number of based aircraft is the most basic indicator of general aviation demand. By first developing a forecast of based aircraft for the airport, other demand indicators can be projected. The process of developing forecasts of based aircraft begins with an analysis of aircraft ownership in the primary general aviation service area through a review of historical aircraft registrations. An initial forecast of county-wide registered aircraft is developed and will be used as one data point to arrive at a based aircraft forecast for the airport.

BASED AIRCRAFT FORECAST

Forecasts of based aircraft may directly influence needed facilities and the applicable design standards. The needed facilities may include hangars, aprons, taxilanes, etc. The applicable design standards may include separation distances and object-clearing surfaces. The size and type of based aircraft are also an important consideration. The addition of numerous small aircraft may have no effect on design standards, while the addition of a few larger business jets can have a substantial impact on applicable design standards.

Because of the numerous variables known to influence aviation demand, several separate forecasts of based aircraft are developed. Each of the forecasts is then examined for reasonableness, and any outliers are discarded or given less weight. The remaining forecasts collectively will create a planning envelope. A single planning forecast is then selected for use in developing facility needs for the airport. The selected forecast of based aircraft can be one of the several forecasts developed or, based on the experience and judgement of the forecaster, it can be a blend of the forecasts.

Registered Aircraft Forecast

Historical registered aircraft in Pinal County since 2001 are included in **Table 2E**. Aircraft registrations have grown from a low of 305 in 2001 to 375 registrations reported in 2021. The historic peak was reached in 2009, when there were 430 aircraft registered in the county. Aircraft registration generally declined in the years following, likely due in part to the FAA's requirement that aircraft owners re-register their aircraft to retain U.S. civil aircraft status. As a result, previously registered aircraft that may have been sold, scrapped/destroyed, or registered to multiple addresses were dropped from the database.

Most registered aircraft in the county fall within the single-engine piston category. In 2021, 247 of the 375 county-registered aircraft were single-engine piston, accounting for 66 percent. The "other" category, which includes gliders, balloons, and experimental aircraft, made up the next largest segment with 59 registrations, followed by 17 turboprop aircraft. There were also 15 helicopters, 14 jets, 12 unmanned aerial vehicles (UAV), and 11 multi-engine aircraft.

Table 2E | Pinal County Registered Aircraft

Year	Single Engine Piston	Multi Engine Piston	Turbo Prop	Jet	Helicopter	UAV	Electric	Other	Total
2001	228	13	17	3	12	0	0	32	305
2002	228	13	17	5	12	0	0	32	307
2003	215	13	25	4	13	0	0	35	305
2004	233	13	23	4	19	0	0	35	327
2005	240	14	22	3	19	0	0	37	335
2006	272	21	8	3	17	0	0	35	356
2007	305	22	12	4	16	0	0	48	407
2008	305	21	21	4	16	0	0	49	416
2009	314	17	24	15	16	0	0	44	430
2010	308	17	21	12	17	0	0	50	425
2011	306	13	24	12	17	0	0	50	422
2012	292	12	26	10	18	0	0	42	400
2013	270	13	24	0	13	0	0	37	357
2014	257	11	22	5	17	0	0	45	357
2015	258	12	22	4	17	2	0	45	360
2016	262	10	22	7	20	4	1	43	369
2017	260	11	20	5	19	7	2	43	367
2018	242	12	17	6	15	9	2	44	347
2019	241	12	18	5	19	12	0	42	349
2020	236	14	17	6	17	12	0	57	359
2021	247	11	17	14	15	12	0	59	375

Source: FAA Registered Aircraft

Different forecasting strategies were used to determine registered aircraft projections, including market share analysis and ratio projection methods. Several regression forecasts were considered as well, including single- and multi-variable regressions examining registered aircraft's correlation with the service area population, employment, income, and gross regional product, and with U.S. active general aviation aircraft. None of the regressions produced a strong correlation (r^2 value over 0.9); therefore, the regression forecasts were not considered further.

Table 2F shows several projections of registered aircraft for the service area, with a goal of presenting a planning envelope that shows a range of projections based on historic trends. The first set of forecasts are based on market share, which considers the relationship between registered aircraft located in Pinal County and active aircraft within the United States. The next set of projections are based on a ratio of the number of aircraft per 1,000 county residents, and a final forecast is based on the historic growth rate of county-registered aircraft.

Table 2F | Registered Aircraft Projections for Pinal County					
Year	Service Area Registrations[1]	U.S. Active Aircraft[2]	Market Share of U.S. Aircraft	Service Area Population[3]	Aircraft per 1,000 Residents
2001	305	211,446	0.1442%	187,747	1.62
2002	307	211,244	0.1453%	197,082	1.56
2003	305	209,606	0.1455%	207,920	1.47
2004	327	219,319	0.1491%	219,472	1.49
2005	335	224,257	0.1494%	235,708	1.42
2006	356	221,942	0.1604%	271,328	1.31
2007	407	231,606	0.1757%	306,174	1.33
2008	416	228,664	0.1819%	335,311	1.24
2009	430	223,876	0.1921%	349,830	1.23
2010	425	223,370	0.1903%	379,094	1.12
2011	422	220,453	0.1914%	378,041	1.12
2012	400	209,034	0.1914%	382,251	1.05
2013	357	199,927	0.1786%	385,398	0.93
2014	357	204,408	0.1747%	395,322	0.90
2015	360	210,031	0.1714%	405,614	0.89
2016	369	211,794	0.1742%	417,193	0.88
2017	367	211,757	0.1733%	431,564	0.85
2018	347	211,749	0.1639%	446,806	0.78
2019	349	210,981	0.1654%	462,789	0.75
2020	359	204,980	0.1751%	475,400	0.76
2021	375	205,870	0.1822%	488,355	0.77
Constant Market Share of U.S. Active Aircraft (Low Range) – CAGR 0.07%					
2026	377	207,075	0.1822%	558,621	0.68
2031	377	207,070	0.1822%	638,998	0.59
2041	380	208,790	0.1822%	836,110	0.45
Increasing Market Share of U.S. Active Aircraft (Mid-Range) – CAGR 0.34%					
2026	382	207,075	0.1846%	558,621	0.68
2031	387	207,070	0.1871%	638,998	0.61
2041	401	208,790	0.1921%	836,110	0.48
Increasing Market Share of U.S. Active Aircraft (High Range) – CAGR 1.25% – Selected Forecast					
2026	399	207,075	0.1891%	558,621	0.71
2031	425	207,070	0.2071%	638,998	0.66
2041	481	208,790	0.2335%	836,110	0.58
Constant Ratio Projection per 1,000 County Residents – CAGR 2.73%					
2026	429	207,075	0.2072%	558,621	0.77
2031	491	207,070	0.2370%	638,998	0.77
2041	642	208,790	0.3075%	836,110	0.77
Increasing Ratio Projection per 1,000 County Residents – CAGR 3.28%					
2026	310	207,075	0.1497%	558,621	0.55
2031	419	207,070	0.2021%	638,998	0.66
2041	715	208,790	0.3425%	836,110	0.86
Historic Registered Aircraft Growth Rate – CAGR 1.04%					
2026	395	207,075	0.1941%	558,621	0.71
2031	416	207,070	0.2061%	638,998	0.65
2041	461	208,790	0.2300%	836,110	0.55

Sources:
1 FAA Aircraft Registration Database
2 FAA Aerospace Forecast - Fiscal Years 2021-2041
3 Woods & Poole 2021

Market Share Projections

- ***Constant Market Share*** – The low range market share forecast maintains the 2021 market share of county residents (0.1822%) at a constant throughout the planning period. The result is near stagnant growth in registrations over the 20-year planning period, with just five additional aircraft registrations in the county by 2041, reflective of a 0.07 percent compound annual growth rate (CAGR).
- ***Increasing Market Share*** – Two increasing market share forecasts were also considered. The first evaluated a mid-range scenario based on the county's historic high market share, which was 0.1921 percent in 2009. A return to this produces slightly more growth, with 401 aircraft projected by the end of the planning period (0.34 percent CAGR). The high-range market share forecast considered a more aggressive growth rate of 1.25 percent, which produced a forecast of 481 registered aircraft in the County by 2041.

Population Ratio Projections

- ***Constant Ratio*** – In 2021, there were 0.77 registered aircraft per 1,000 county residents. Carrying this ratio forward through the plan years results in a CAGR of 2.73 percent, or 642 aircraft by 2041, as the county's population is expected to grow substantially over the next 20 years.
- ***Increasing Ratio*** – Over the last 10 years, the county's registered aircraft to population ratio has fluctuated between 0.75 and 1.05, or an average of 0.86 aircraft per 1,000 people. Applying this average to the planning period results in a more aggressive growth scenario, with 715 registered aircraft by 2041. This equates to a CAGR of 3.28 percent and represents the high end of the planning envelope.

Historic Registered Aircraft Growth Rate

- Since 2001, county-registered aircraft have grown from 305 to 375, which is reflective of a 1.04 percent CAGR. This forecast considers registered aircraft in Pinal County maintaining this same growth rate over the next 20 years, which would result in 461 aircraft in the county by 2041.

A graph comparison of each projection is shown in **Figure 2A**. The registered aircraft projections result in a range between 380 and 715 registered aircraft in Pinal County by 2041, with the constant market share representing the low end and the increasing ratio projection the high end. Each of the forecasts has been evaluated for reasonableness. Both the low and mid-range market share forecasts show very slow growth in county-registered aircraft, and both are deemed unlikely based on the county's historic levels of registered aircraft. The two ratio projections resulted in much more aggressive growth, due to the increase in population anticipated to occur in Pinal County over the next 20 years. While population growth typically means an increase in active aircraft, the forecasts overstate the growth potential since aircraft registrations are unlikely to grow at the same rate as the population. Therefore, each of the above forecasts has been determined to be improbable.

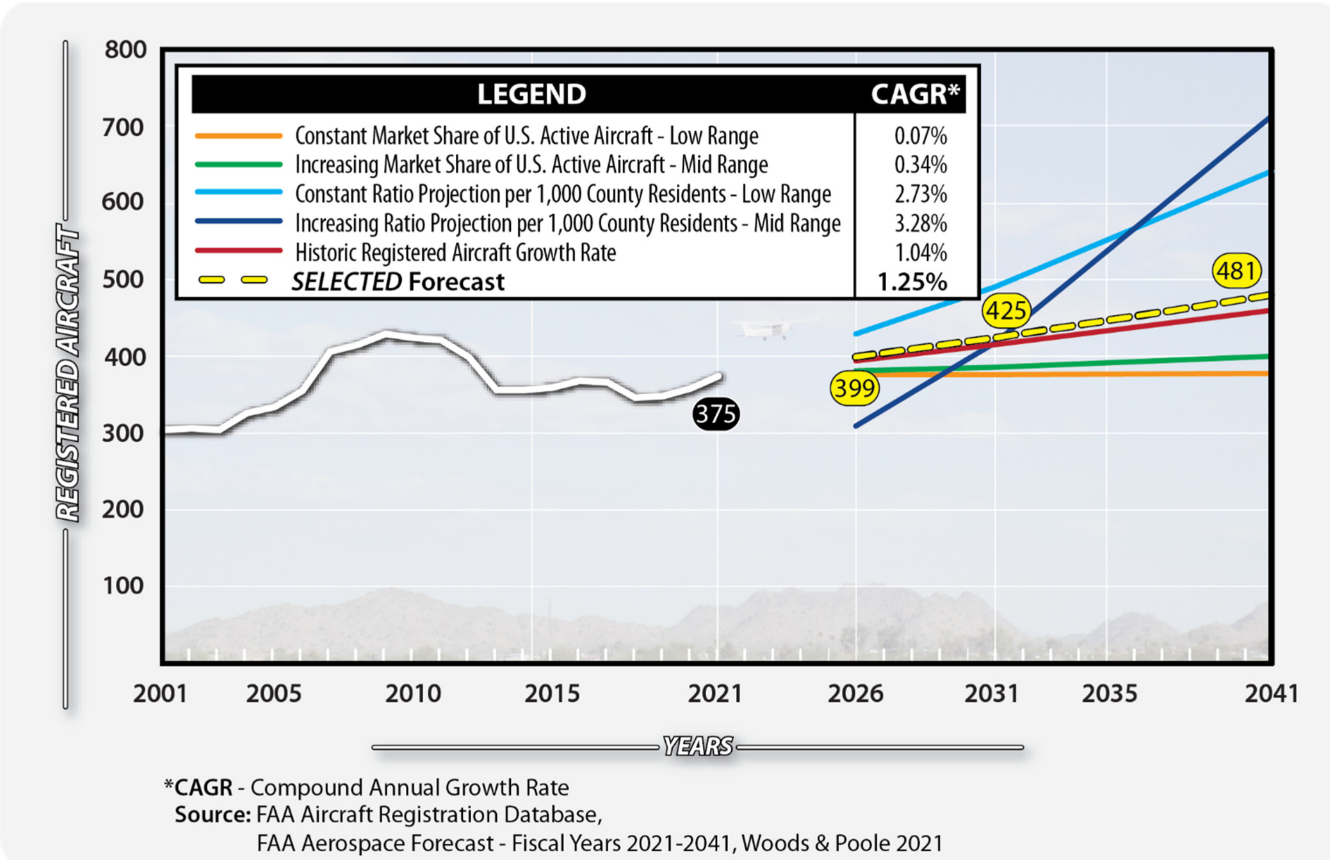


Figure 2A – Registered Aircraft Projections

The remaining projections, which resulted in 481 registered aircraft (1.25 percent CAGR) and 461 aircraft (1.04% CAGR) are both reasonable projections for registered aircraft in Pinal County over the next 20 years. Both show moderate levels of growth, in line with national and regional trends. Based on the significant growth in population expected to occur in the county, along with an uptick in county-registered aircraft over the last several years, the high-range increasing market share forecast is considered the most likely scenario and will be carried forward as the selected forecast for service area registered aircraft. This projection shows an increase from 375 registered aircraft in 2021 to 399 in 2026, 425 in 2031, and 481 in 2041 (1.25 percent CAGR).

Based Aircraft Forecast

Determining the number of based aircraft at an airport can be a challenging task. Aircraft storage can be somewhat transient in nature, meaning aircraft owners can and do move their aircraft. Some aircraft owners may store their aircraft at an airport for only part of the year. The FAA did not historically require airports to report their based aircraft counts, nor did they validate based aircraft at airports. This has changed in recent years, and now the FAA mandates that airports report their based aircraft levels. These counts are recorded in the National Based Aircraft Inventory program and maintained and validated by the FAA to ensure accuracy.

According to the FAA's database, CGZ has 71 based aircraft, a count which was last validated on December 13, 2019. However, records maintained and confirmed by airport staff show 102 based aircraft at the airport as of December 2021, which will serve as the base year count for forecasting purposes. As detailed in **Table 2G**, historic records were also available for the years 2007, 2014, and 2016, with these figures derived from previous planning studies. According to the historical data, based aircraft at CGZ over the last 14 years has ranged between 102 in 2021 and 114 in 2007.

Like the registered aircraft forecasts, two types of projections have been made for based aircraft at Casa Grande Municipal Airport – market share and ratio projection. The market share is based on the airport's percentage of based aircraft as compared to registered aircraft in the service area, while the ratio projection is based on the number of based aircraft per 1,000 county residents. The results of these analyses are detailed in **Table 2G** and depicted graphically in **Figure 2B**.

Market Share Projections

- ***Constant Market Share*** – In 2021, the airport had 102 based aircraft, which equates to 28.0 percent of the market share of registered aircraft in Pinal County. Carrying this percentage throughout the plan years results in an increase in based aircraft, reflective of a 1.25 percent CAGR. This projection yielded 131 based aircraft by 2041, which serves as the low range market share projection.
- ***Increasing Market Share*** – Two increasing market share forecasts were also evaluated. The mid-range scenario is based on the airport's historic high market share, with a return to 30.3 percent by 2041. This resulted in an increase in based aircraft to 145, or 1.79 percent CAGR, by the end of the planning period. The high-range market share forecast evaluated a stronger growth scenario, at a CAGR of 2.50 percent. Applying this growth rate to the base year total results in 167 based aircraft at CGZ by 2041.

Ratio Projections

- ***Constant Ratio*** – In 2021, the ratio of based aircraft per 1,000 county residents stood at 0.21. Maintaining this at a constant through 2041 resulted in a growth rate of 2.73 percent, or 175 based aircraft.
- ***Increasing Ratio*** – Mid- and high range growth scenarios were also evaluated. The mid-range scenario is based on the historic median ratio of 0.29 based aircraft per 1,000 residents. Applying this figure to the end of the planning period results in 243 based aircraft at the airport by 2041, at a CAGR of 4.44 percent. The high range scenario considers a return to the historic high ratio of 0.37 the airport experienced in 2007. With the estimated growth in County population, applying this ratio produces significant growth over the plan years, with 311 based aircraft forecast by 2041.

Table 2G | Based Aircraft Forecasts – CGZ					
Year	**CGZ Based Aircraft**	**Service Area Registrations**	**Market Share**	**Service Area Population**	**Aircraft Per 1,000 Residents**
2007	114	407	28.0%	306,174	0.37
2014	105	360	29.2%	405,614	0.26
2016	105	347	30.3%	446,806	0.24
2021	102	375	27.2%	488,355	0.21
Constant Market Share (Low Range) – CAGR 1.25%					
2026	109	399	27.2%	558,621	0.19
2031	115	425	27.2%	638,998	0.18
2041	131	481	27.2%	836,110	0.16
Increasing Market Share (Mid-Range) – CAGR 1.79%					
2026	112	399	28.0%	558,621	0.20
2031	122	425	28.7%	638,998	0.19
2041	145	481	30.3%	836,110	0.17
Increasing Market Share (High Range) – CAGR 2.50% – Selected Forecast					
2026	115	399	30.0%	558,621	0.21
2031	131	425	32.0%	638,998	0.20
2041	167	481	35.0%	836,110	0.20
Constant Ratio per 1,000 Residents (Low Range) – CAGR 2.73%					
2026	117	399	29.2%	558,621	0.21
2031	133	425	31.4%	638,998	0.21
2041	175	481	36.3%	836,110	0.21
Increasing Ratio per 1,000 Residents (Mid-Range) – CAGR 4.44%					
2026	128	399	32.1%	558,621	0.23
2031	160	425	37.6%	638,998	0.25
2041	243	481	50.5%	836,110	0.29
Increasing Ratio per 1,000 Residents (High Range) – CAGR 5.74%					
2026	140	399	35.0%	558,621	0.25
2031	186	425	43.7%	638,998	0.29
2041	311	481	64.8%	836,110	0.37
FAA TAF Comparison – CAGR -1.59%					
2026	74	399	18.5%	558,621	0.13
2031	74	425	17.4%	638,998	0.12
2041	74	481	15.4%	836,110	0.09

Sources: Airport records; State System Plan; Previous Planning Studies, 2022 FAA TAF; Woods & Poole CEDDS 2021

As a point of comparison, the FAA TAF projections for based aircraft at CGZ are also included. The TAF shows no growth in based aircraft, with the count flatlined at 74 throughout the planning period.

The forecasts produce a planning envelope ranging from 74 to 311 based aircraft at the airport by 2041. As of December 2021, there are no hangar vacancies, and 37 individuals are on a wait list for hangar space. New hangars are also under construction at the airport, another indication that strong demand for hangar space from aircraft owners exists. This, combined with the significant increase in county population projected over the next 20 years, justifies a more aggressive projection for based aircraft. Therefore, the high range, increasing market forecast has been selected as the preferred projection. With a CAGR of 2.50 percent, this forecast shows an increase of 65 based aircraft by the end of the planning period, for a total of 167 aircraft based at CGZ by 2041.

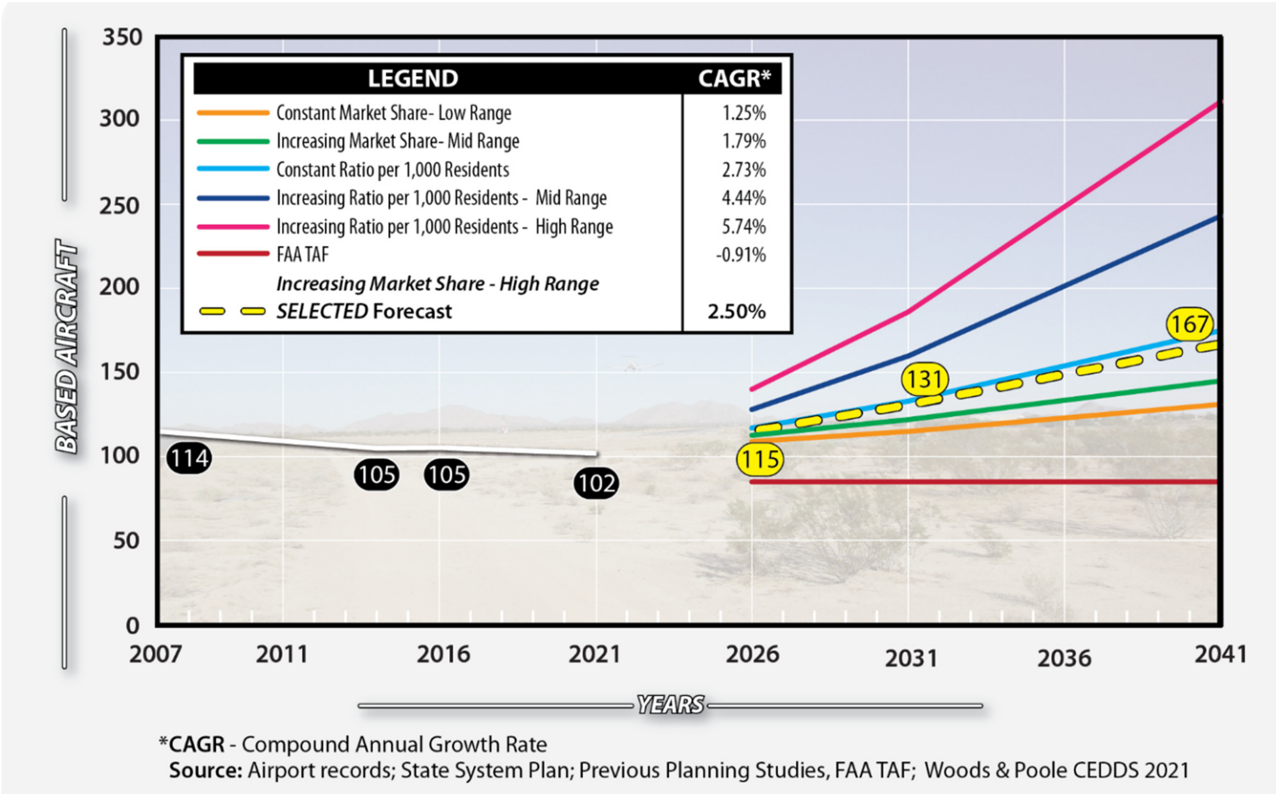


Figure 2B – Based Aircraft Projections

Based Aircraft Fleet Mix Forecast

The fleet mix of based aircraft is often more important to airport planning and design than the total number of aircraft. For example, the presence of one or a few large business jets can have a greater impact on design standards for the runway and taxiway system compared to a greater number of smaller, single engine piston-powered aircraft.

The based aircraft fleet mix forecast for CGZ is presented in **Table 2H**. Fleet mix projections have been developed based upon the FAA's estimates of how the national fleet mix will evolve over the same period. Local factors, such as the potential for increased turboprop and jet operations due to the presence of manufacturers such as Lucid Motors and Kohler, have also been considered.

Table 2H | Based Aircraft Fleet Mix – CGZ

	EXISTING		FORECAST					
Aircraft Type	**2021**	**%**	**2026**	**%**	**2031**	**%**	**2041**	**%**
Single Engine Piston	94	92%	104	90%	117	89%	141	84%
Multi-Engine Piston	7	7%	7	6%	5	4%	3	2%
Turboprop	0	0%	2	2%	4	3%	10	6%
Jet	0	0%	1	1%	2	2%	6	4%
Helicopter	1	1%	1	1%	3	2%	7	4%
Totals	**102**	**100%**	**115**	**100%**	**131**	**100%**	**167**	**100%**

Source: Airport records; Coffman Associates analysis

In 2021, most based aircraft (92 percent) at the airport fell into the single-engine piston category. This is projected to remain the majority category over the planning period, with slow and steady growth in the number of single-engine piston aircraft based at the airport by 2041. The next largest aircraft type is multi-engine piston, with seven of these aircraft based at CGZ in 2021. This segment, which comprised seven percent of the fleet mix in 2021, is expected to decline over the planning years as this type of aircraft is phased out of the national fleet, as projected by FAA. While multi-engines are expected to decline, turboprops, jets, and helicopters are all anticipated to increase both nationally and at CGZ, with 10 turboprops, six jets, and seven helicopters expected to base at the airport by 2041.

OPERATIONS FORECASTS

Operations at CGZ are classified as either general aviation, air taxi, or military. General aviation operations include a wide range of activity from recreational use and flight training to business and corporate uses. Air taxi operations are those conducted by aircraft operating under 14 Code of Federal Regulations (CFR) Part 135, otherwise known as "for-hire" or "on-demand" activity. Military operations include those operations conducted by various branches of the U.S. military.

Aircraft operations are further classified as local and itinerant. A local operation is a takeoff or landing performed by an aircraft that operates within sight of an airport, or which executes simulated approaches or touch-and-go operations at an airport. Generally, local operations are characterized by training activity. Itinerant operations are those performed by aircraft with a specific origin or destination away from an airport. Typically, itinerant operations increase with business and commercial use since business aircraft are used primarily to transport passengers from one location to another.

Because CGZ is not equipped with an airport traffic control tower (ATCT), precise operational (takeoff and landing) counts are not available. Sources for estimated operational activity at the airport include the FAA Form 5010 Airport Master Record, the FAA TAF, and the SASP. The 2022 FAA TAF indicates a total of 122,000 operations in 2021, as does Form 5010 for the 12-month period ending April 3, 2020. In both estimates, the majority of operations (87.4 percent) are itinerant, with 10.6 percent recorded as local operations. Air taxi and military operations are estimated at 1.7 percent and 0.3 percent of the total, respectively. On a more local level, the SASP provides an estimate of total operations, reporting 100,000 operations (70 percent itinerant and 30 percent local); no air taxi or military operations are estimated in the SASP. Based on discussions with airport staff, the baseline figure that will be utilized for general aviation operations forecasts is the one included in the FAA TAF and Form 5010, which reflects the following:

- 106,586 annual itinerant GA operations
- 12,966 annual local GA operations
- 2,038 annual air taxi operations
- 410 annual military operations

Itinerant General Aviation Operations Forecast

Table 2J presents several forecasts for itinerant GA operations. Three forecasts are based on the airport's market share of total U.S. itinerant GA operations, and the FAA TAF for CGZ and the SASP growth are also included for comparison purposes. Historic operational data is sourced from the 2009 Master Plan, which had a base year of 2007, and the 2018 SASP, which had a base year of 2016.

Table 2J | Itinerant General Aviation Operations Forecasts – CGZ			
Year	CGZ Itinerant Operations	U.S. ATCT Itinerant GA Operations	CGZ Share %
2007	104,562	18,577,200	0.5629%
2016	70,000	13,905,204	0.5034%
2021	106,586	13,199,029	0.8075%
Market Share - Maintain Constant – CAGR 0.88%			
2026	122,200	15,138,635	0.8075%
2031	123,800	15,333,205	0.8075%
2041	127,100	15,737,728	0.8075%
Market Share - Historic Growth Rate – CAGR 1.82%			
2026	116,700	15,138,635	0.7709%
2031	127,700	15,333,205	0.8328%
2041	152,900	15,737,728	0.9716%
Market Share - Median Growth Rate – CAGR 1.35% – Selected Forecast			
2026	114,000	15,138,635	0.7530%
2031	121,900	15,333,205	0.7950%
2041	139,400	15,737,728	0.8858%
FAA TAF – CAGR 0.00%			
2026	106,586	15,138,635	0.7041%
2031	106,586	15,333,205	0.6951%
2041	106,586	15,737,728	0.6773%
State System Plan Growth Rate – CAGR 2.68%			
2026	121,700	15,138,635	0.8039%
2031	138,900	15,333,205	0.9059%
2041	180,900	15,737,728	1.1495%

Sources: FAA Aerospace Forecast 2021-2041; FAA Form 5010; State System Plan; Previous Planning Studies; 2022 FAA TAF

Market Share Projections

In 2021, the airport held 0.8075 percent of the market share of national itinerant operations. The first forecast carries this figure forward as a constant through the planning period, resulting in 127,100 operations by 2041 and a CAGR of 0.88 percent.

Next, the historic market share growth rate of 1.82 percent was considered. When this figure is factored into the plan years, the result is 152,900 operations by 2041.

A mid-range market share analysis was also evaluated, which considered a median growth rate of 1.35 percent. Applying this percentage to the forecast years produced a result of 139.400 itinerant GA operations by the end of the planning period.

Other Projections

Lastly, projections presented in the FAA TAF and the SASP growth rate were considered, with the TAF projections included primarily for comparison purposes. The TAF estimates itinerant operations at CGZ to remain flatlined at 106,586 over the course of the planning period, which is reflective of a 0.00 percent CAGR. Conversely, the state system plan projected an overall growth rate of 2.68 percent for operations at CGZ. When this percentage is applied to the forecast years, notable growth in itinerant operations occurs, with 180,900 operations forecast for 2041.

Figure 2C presents a graph of the itinerant GA operation projections. Combined, the forecasts present a planning envelope ranging from 106,586 (TAF forecast) to 180,900 itinerant operations (SASP growth rate). Neither of these forecasts are considered reasonable, as the TAF figures are flatlined and show no growth, while the 2.68 percent CAGR associated with the SASP likely overestimates the growth potential CGZ is likely to experience. However, moderate growth in itinerant operations is anticipated as the area continues to grow and as itinerant operations increase nationally over the next 20 years. Therefore, the median growth rate market share forecast is the selected projection. This forecast predicts steady growth at 1.35 percent over the planning period, with itinerant operations reaching 139,400 in 2041.

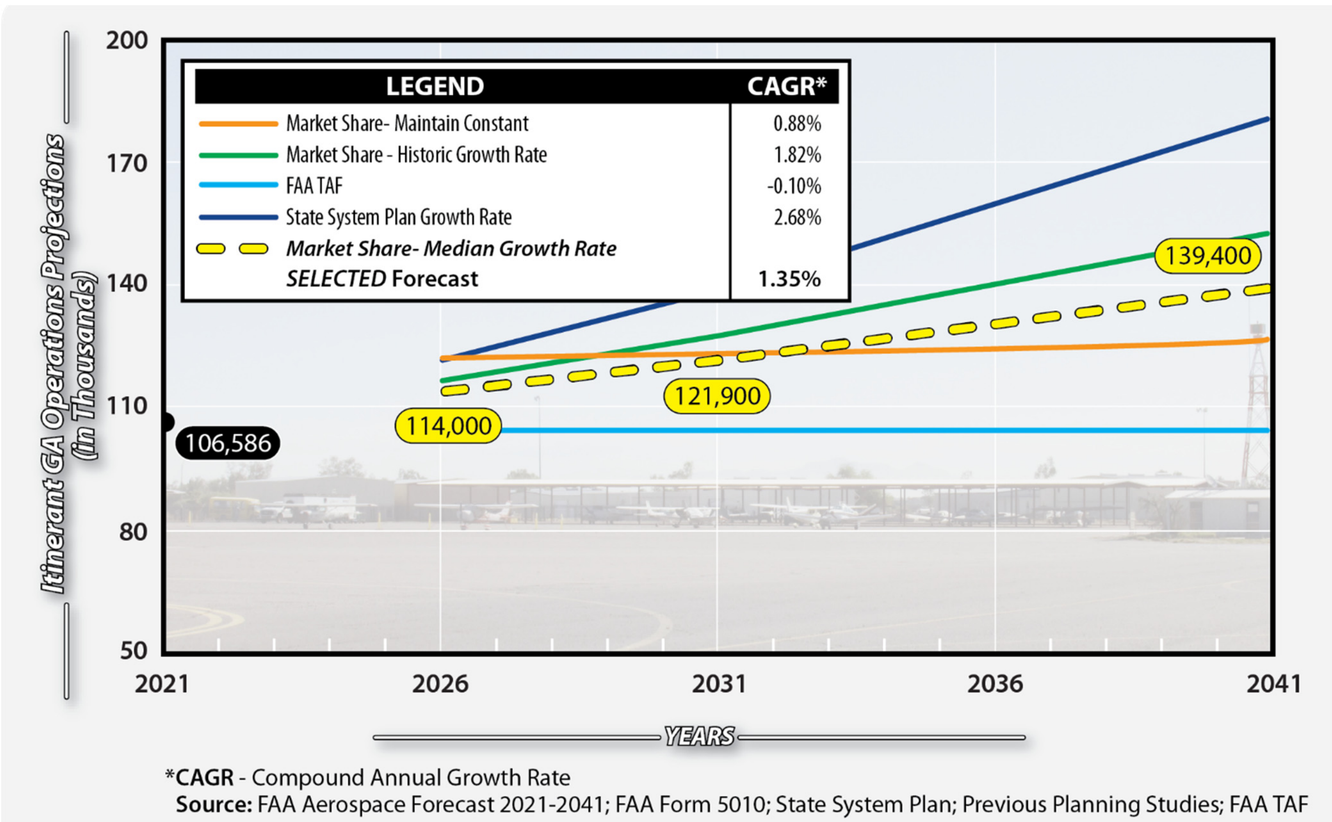


Figure 2C – Itinerant GA Operations Projections

Local General Aviation Operations Forecast

Local operations, or those that stay within the traffic pattern or are executing touch-and-go operations, have also been forecast. This type of operation comprises a smaller share of the total operations occurring at CGZ, with 12,966 local operations estimated in 2021. **Table 2K** details historic local operations at the airport utilizing the figures from the previous Master Plan and SASP. The base year of 2021 represents a market share of 0.1017 percent when compared to total U.S. local operations. Like the itinerant forecasts, several market share projections were made, as well as a forecast based on the SASP growth rate for the airport. The TAF projections for CGZ have also been included.

Table 2K | Local General Aviation Operations Forecasts – CGZ			
Year	**CGZ Local Operations**	**U.S. ATCT Local GA Operations**	**CGZ Share %**
2007	12,720	14,557,300	0.0874%
2016	30,000	11,632,612	0.2579%
2021	12,966	12,743,768	0.1017%
Market Share - Maintain Constant – CAGR 0.60%			
2026	13,900	13,631,535	0.1017%
2031	14,100	13,876,976	0.1017%
2041	14,600	14,392,959	0.1017%
Increasing Market Share (Low Range) – CAGR 3.52%			
2026	16,500	13,631,535	0.1213%
2031	19,500	13,876,976	0.1408%
2041	25,900	14,392,959	0.1798%
Increasing Market Share (High Range) – CAGR 5.40%			
2026	19,200	13,631,535	0.1408%
2031	25,000	13,876,976	0.1798%
2041	37,100	14,392,959	0.2579%
FAA TAF – CAGR 0.00%			
2026	12,966	13,631,535	0.0951%
2031	12,966	13,876,976	0.0934%
2041	12,966	14,392,959	0.0901%
State System Plan Growth Rate – CAGR 2.68% – Selected Forecast			
2026	14,800	13,631,535	0.1086%
2031	16,900	13,876,976	0.1218%
2041	22,000	14,392,959	0.1529%

Sources: FAA Aerospace Forecast 2021-2041; FAA Form 5010; State System Plan; Previous Planning Studies; 2022 FAA TAF

Market Share Projections

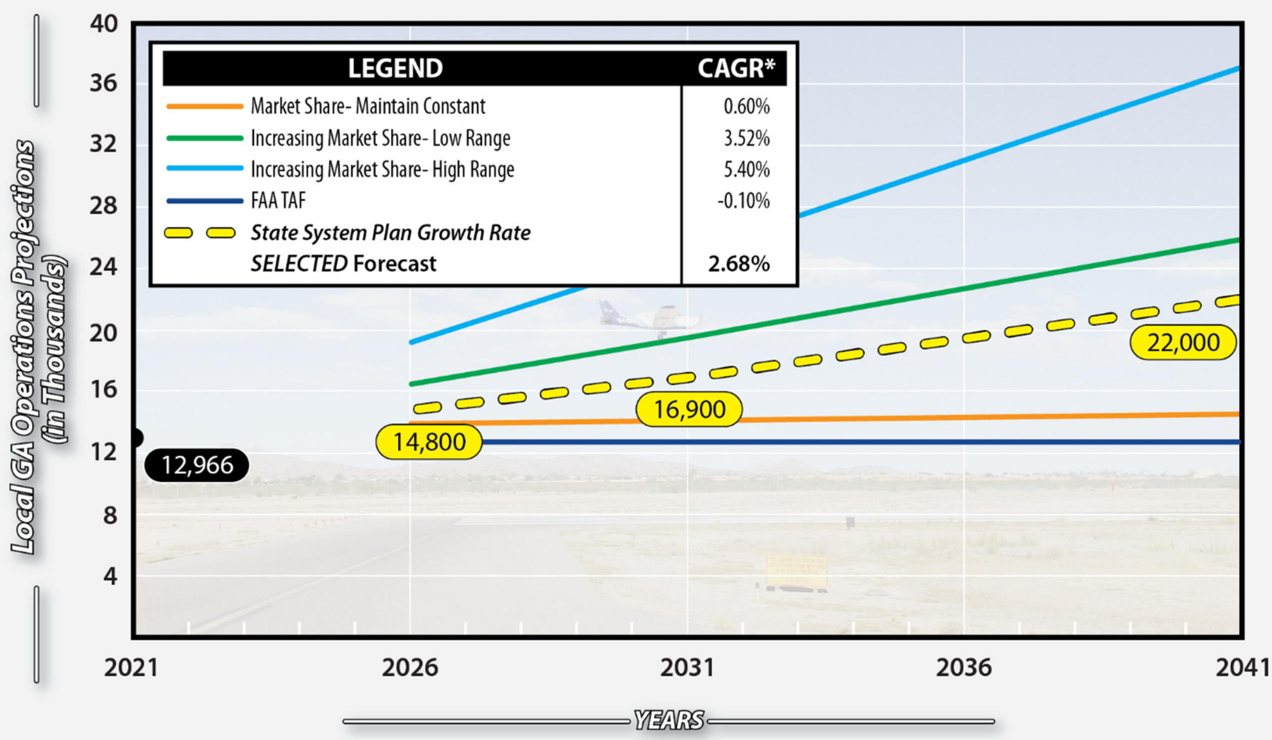
In the first forecast, the constant market share of 0.1017 percent was carried through the plan years. This resulted in 14,600 operations by 2041, for a CAGR of 0.60 percent.

The next two forecasts evaluated increasing market share scenarios, with the low range projection considering an increase to 0.1798 percent of the market share. This resulted in a 3.52 percent CAGR, or 25,900 local operations by 2041. A second increasing market share forecast considered an increase to the market share estimate based on the SASP. In this scenario, more aggressive growth in local operations is anticipated, with 37,100 operations by 2041, reflective of a 5.40 percent CAGR.

Other Projections

As mentioned, the TAF forecasts have also been included for comparison. The TAF estimates local operations to total 12,966 throughout the planning period, which equates to a 0.00 percent CAGR. The state system plan, on the other hand, projects growth in operations at 2.68 percent. Applying this growth rate to the plan years results in an increase to 22,000 local operations by 2041.

Figure 2D presents a graph of the local GA operation projections that have been developed. The planning envelope that results from these forecasts ranges from 12,966 to 37,100 local operations. Like the itinerant forecasts, the most reasonable forecast lies between the two extremes. In this case, the state system plan growth rate is the selected projection, resulting in 22,000 local GA operations by 2041—an increase of approximately 9,000 local operations over the next 20 years. Nationally, local GA operations are anticipated to grow at about 0.60 percent. While the selected forecast predicts a stronger growth rate for CGZ, the projection is reasonable due to local and regional trends in this type of operation, particularly for airports that support flight training operations, such as CGZ.



*CAGR - Compound Annual Growth Rate
Source: FAA Aerospace Forecast 2021-2041; FAA Form 5010; State System Plan; Previous Planning Studies; FAA TAF

Figure 2D – Local GA Operations Projections

Air Taxi Operations Forecast

The air taxi category, which is a subset of the itinerant operations category, is comprised of operations that are conducted by aircraft operating under 14 CFR Part 135. Part 135 operations are "for-hire" or "on-demand" and include charter and commuter flights, air ambulance, or fractional ownership aircraft operations. The FAA projects a 1.1 percent CAGR increase in air taxi operations between 2021 and 2041. The primary reasons for this increase are the technological advancements of the electric vertical take-off and landing aircraft (eVTOL) and the continued national growth in the business jet segment of the air taxi category.

Historic air taxi records at CGZ were not available. The base year count of 2,038 is derived from the FAA TAF and Form 5010 and accounts for 1.7 percent of total operations. Nationally, CGZ holds 0.0407 percent of the market share of air taxi operations. Market share and growth rate projections based on the state TAF and the SASP have been prepared, with the FAA TAF estimate included for comparison.

Market Share Projections

As presented in **Table 2L**, three market share projections were developed for air taxi operations at CGZ. Carrying 2021's market share of 0.0407 percent results in slow growth throughout the planning period. At a CAGR of 1.23 percent, the constant market share projection produces 2,600 air taxi operations by 2041, or about 600 more than what is estimated in 2021.

Stronger growth scenarios based on market share were also evaluated. The low range scenario considered CGZ holding 0.0600 percent of the national market share by 2041, which translated to 3,800 air taxi operations by the end of the planning period. This is reflective of a 1.92 percent CAGR. A high range projection was also prepared which assessed a 0.0700 percent market share by 2041. This produced a CAGR of 3.92 percent, or 4,400 air taxi operations.

Table 2L | Air Taxi Operations – CGZ

Year	CGZ Air Taxi Operations	U.S. ATCT Air Taxi Operations	CGZ Share %
2021	2,038	5,013,415	0.0407%
Constant Market Share – CAGR 1.23%			
2026	2,200	5,335,602	0.0407%
2031	2,300	5,645,919	0.0407%
2041	2,600	6,286,987	0.0407%
Increasing Market Share (Low Range) – CAGR 1.92% – Selected Forecast			
2026	2,400	5,335,602	0.0450%
2031	2,800	5,645,919	0.0500%
2041	3,800	6,286,987	0.0600%
Increasing Market Share (High Range) – CAGR 3.92%			
2026	2,700	5,335,602	0.0500%
2031	3,200	5,645,919	0.0575%
2041	4,400	6,286,987	0.0700%
State TAF 20-Year Forecast Growth Rate – CAGR 1.42%			
2026	2,200	5,335,602	0.0412%
2031	2,400	5,645,919	0.0425%
2041	2,700	6,286,987	0.0429%
FAA TAF – CAGR 0.00%			
2026	2,038	5,335,602	0.0382%
2031	2,038	5,645,919	0.0361%
2041	2,038	6,286,987	0.0324%

Sources: FAA Aerospace Forecast 2021-2041; FAA Form 5010; 2022 FAA TAF

Other Projections

Growth trend and TAF projections are also included within the forecast envelope. The growth trend forecast considers the projected growth rate of air taxi operations in the state between 2021 and 2041, as reported in the Arizona TAF. The state TAF anticipates a 1.42 percent growth in air taxi operations over the next 20 years. Applying this growth rate to the plan years yields 2,700 air taxi operations at CGZ by 2041.

Like the previous forecasts, the TAF projections were used as additional comparison points. The TAF projects air taxi operations at CGZ to remain at 2,038 annually throughout the plan years, which equates to a 0.00 percent CAGR.

Figure 2E presents a graph of the new air taxi operation projections. The air taxi forecasts range between a low of 2,038 operations, based on the TAF, and a peak of 4,400 operations based on a high range increasing market share. As mentioned previously, Casa Grande is growing, with large-scale manufacturers establishing a presence in the area. These are likely to fuel an uptick in air taxi operations, with executives and others traveling from headquarters based elsewhere. Therefore, moderate growth is anticipated for this operational segment, and the low range increasing market share will be carried forward as the selected forecast, with 3,800 air taxi operations projected by 2041.

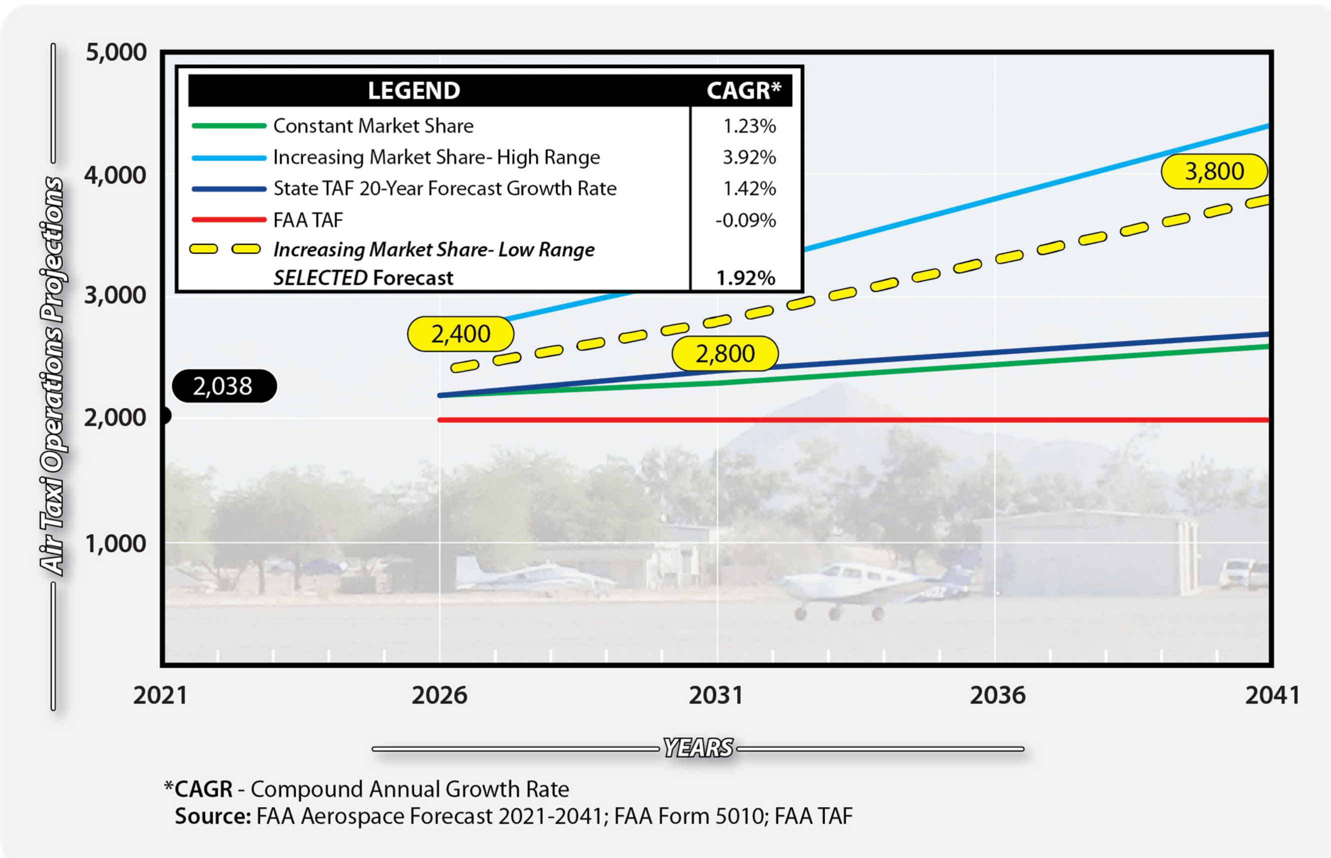


Figure 2E – Air Taxi Operations Projections

Military Operations Forecast

Military aircraft can and do utilize civilian airports across the country, including CGZ. However, it is inherently difficult to project future military operations due to their national security nature and the fact that missions can change without notice. Thus, it is typical for the FAA to use a flat-line number for military operations. For this planning study, military operations at CGZ are projected to stay constant through the plan years at 410 itinerant operations.

Annual Instrument Approaches

An instrument approach, as defined by the FAA, is "an approach to an airport with the intent to land by an aircraft in accordance with an Instrument Flight Rule (IFR) flight plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude." To qualify as an instrument approach, aircraft must land at the airport after following one of the published instrument approach procedures in less than visual conditions. Forecasts of annual instrument approaches (AIAs) provide guidance in determining an airport's requirements for navigational aid facilities, such as an instrument landing system. It should be noted that practice or training approaches do not count as annual AIAs, nor do instrument approaches conducted in visual conditions.

During poor weather conditions, pilots are less likely to fly and rarely would perform training operations. As a result, an estimate of the total number of AIAs can be made based on a percentage of itinerant operations regardless of the frequency of poor weather conditions. An estimate of 1.0 percent of total itinerant (general aviation and air taxi) operations is utilized to forecast AIAs at CGZ, as presented in **Table 2M**.

Table 2M | Annual Instrument Approaches – CGZ

Year	Annual Instrument Approaches	Itinerant Operations	Ratio
2021	1,066	106,586	1.00%
2026	1,140	114,000	1.00%
2031	1,219	121,900	1.00%
2041	1,394	139,400	1.00%

Source: FAA Form 5010; Coffman Associates analysis

PEAK PERIOD FORECASTS

Peaking characteristics play an important role in determining airport capacity and facility requirements. Because CGZ does not have a control tower, the generalized peaking characteristics of other non-towered general aviation airports have been used for the purposes of this study. The peaking periods used to develop the capacity analysis and facility requirements are described below.

- Peak month – the calendar month in which traffic activity is the highest
- Design day – the average day in the peak month, derived by dividing the peak month by the number of days in the month
- Design hour – the average hour within the design day
- Busy day – the busiest day of a typical week in the peak month

For the purposes of this study, the peak month for total operations was estimated at 10 percent of the annual operations. By 2041, the estimated peak month is projected to reach 16,560 operations. The design day is estimated by dividing the peak month by the number of days in month (31), and the busy day

Table 2N | Peak Period Forecasts – CGZ

	2021	2026	2031	2041
Annual	122,000	131,600	142,000	165,600
Peak Month	12,200	13,160	14,200	16,560
Design Day	394	425	458	534
Design Hour	55	57	60	69
Busy Day	492	526	563	646

is calculated at 1.25 times the design day. The design hour is then calculated at 14 percent of the design day in the base year, then decreasing gradually to 13 percent of the design day by the end of the planning period. This decrease is a result of the anticipated increase in operational activity over the long term. These projections are included in **Table 2N**.

Forecast Summary and Comparison to the FAA TAF

Demand-based forecasts of aviation activity at Casa Grande Municipal Airport over the next 20 years have been developed. An attempt has been made to define the projections in terms of short (1-5 years), intermediate (6-10 years), and long (11-20 years) term planning horizons. **Exhibit 2C** presents a 20-year forecast summary. Elements such as local socioeconomic indicators, anticipated regional development, historical aviation data, and national aviation trends were all considered when determining future conditions.

Historically, forecasts have been submitted to the FAA for evaluation and to be compared to the TAF. The FAA preferred that forecasts differ by less than 10 percent in the 5-year period and 15 percent in the 10-year period. Where the forecasts do differ, supporting documentation was necessary to justify the difference.

Table 2P presents a summary of the selected forecasts and a comparison to the FAA TAF. The direct comparison between the Master Plan forecasts and the TAF is presented at the bottom of the table. The operations forecast is within 10 percent of the TAF in the 5-year period but is slightly outside of the TAF tolerance for the 10-year period at 15.15 percent. This is due to operations being flatlined over the planning period, whereas the Master Plan predicts some level of growth in operations.

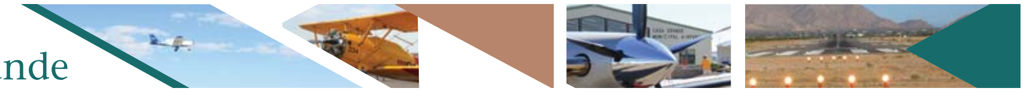
Table 2P | Comparison of Master Plan Forecasts to FAA TAF

	2021	2026	2031	2041	CAGR
Total Operations					
Master Plan Forecast	122,000	131,600	142,000	165,600	1.5%
TAF	122,000	122,000	122,000	122,000	0.0%
% Difference	0.00%	7.57%	15.15%	30.32%	
Based Aircraft					
Master Plan Forecast	102	115	131	167	2.5%
TAF	74	74	74	74	0.0%
% Difference	31.82%	43.39%	55.61%	77.18%	

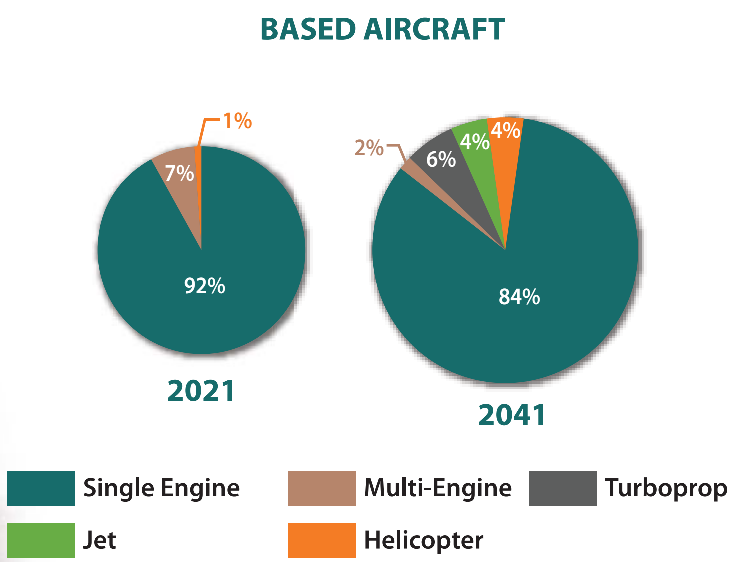
In terms of based aircraft, the Master Plan forecast is well outside the TAF tolerance for both the 5- and 10-year periods. Again, this is due in part to the TAF projecting no growth in based aircraft at CGZ over the next 20 years, but also due to the discrepancy in the 2021 count of based aircraft between the Master Plan and the TAF. While airport records maintained by staff show 102 based aircraft, the TAF only reports 74, further contributing to the larger percentage outside tolerance.

AIRCRAFT/AIRPORT/RUNWAY CLASSIFICATION

The FAA has established several aircraft classification systems that group aircraft types based on their performance (approach speed in landing configuration) and design characteristics (wingspan and landing



	BASE YEAR	2026	2031	2041
BASED AIRCRAFT				
Single Engine	94	104	117	141
Multi-Engine	7	7	5	3
Turboprop	0	2	4	10
Jet	0	1	2	6
Helicopter	1	1	3	7
TOTAL BASED AIRCRAFT	**102**	**115**	**131**	**167**
ANNUAL OPERATIONS				
Itinerant				
Air Carrier	0	0	0	0
Other Air Taxi	2,038	2,400	2,800	3,800
General Aviation	106,586	114,000	121,900	139,400
Military	410	410	410	410
Total Itinerant	***109,034***	***116,800***	***125,100***	***143,600***
Local				
General Aviation	12,966	14,800	16,900	22,000
Military	0	0	0	0
Total Local	***12,966***	***14,800***	***16,900***	***22,000***
Total Annual Operations	**122,000**	**131,600**	**142,000**	**165,600**
ANNUAL INSTRUMENT APPROACHES (AIA)	**1,066**	**1,140**	**1,219**	**1,394**
PEAKING				
Total Annual Operations	122,000	131,600	142,000	165,600
Peak Month	12,200	13,160	14,200	16,560
Design Day	394	425	458	534
Design Hour	55	57	60	69
Busy Day	492	526	563	646



gear configuration). These classification systems are used to determine the appropriate airport design standards for specific airport elements, such as runways, taxiways, taxilanes, and aprons.

AIRCRAFT CLASSIFICATION

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using, or are expected to use, an airport. The critical aircraft is used to define the design parameters for an airport. The critical aircraft may be a single aircraft type or a composite aircraft representing a collection of aircraft with similar characteristics. The critical aircraft is classified by three parameters: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG). FAA AC 150/5300-13B, *Airport Design*, describes the following airplane classification systems, the parameters of which are presented on **Exhibit 2D**.

Aircraft Approach Category (AAC): A grouping of aircraft based on a reference landing speed (V_{REF}), if specified, or if V_{REF} is not specified, 1.3 times stall speed (V_{SO}) at the maximum certificated landing weight. V_{REF}, V_{SO}, and the maximum certificated landing weight are those values as established for the aircraft by the certification authority of the country of registry.

The AAC generally refers to the approach speed of an aircraft in landing configuration. The higher the approach speed, the more restrictive the applicable design standards. The AAC, depicted by a letter A through E, is the aircraft approach category and relates to aircraft approach speed (operational characteristics). The AAC generally applies to runways and runway-related facilities, such as runway width, runway safety area (RSA), runway object free area (ROFA), runway protection zone (RPZ), and separation standards.

Airplane Design Group (ADG): The ADG, depicted by a Roman numeral I through VI, is a classification of aircraft which relates to aircraft wingspan or tail height (physical characteristics). When the aircraft wingspan and tail height fall in different groups, the higher group is used. The ADG influences design standards for taxiway safety area (TSA), taxiway object free area (TOFA), taxilane object free area, apron wingtip clearance, and various separation distances.

Taxiway Design Group (TDG): A classification of airplanes based on outer-to-outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance. The TDG relates to the undercarriage dimensions of the critical aircraft. The TDG is classified by an alphanumeric system: 1A, 1B, 2A, 2B, 3, 4, 5, 6, and 7. The taxiway design elements determined by the application of the TDG include the taxiway width, taxiway edge safety margin, taxiway shoulder width, taxiway fillet dimensions, and, in some cases, the separation distance between parallel taxiways/taxilanes. Other taxiway elements, such as the taxiway safety area (TSA), taxiway/taxilane object free area (TOFA), taxiway/taxilane separation to parallel taxiway/taxilanes or fixed or movable objects, and taxiway/taxilane wingtip clearances, are determined solely based on the wingspan (ADG) of the critical aircraft utilizing those surfaces. It is appropriate for taxiways to be planned and built to different TDG standards based on expected use.

The back side of **Exhibit 2D** summarizes the classification of the most common aircraft in operation today. Generally, recreational and business piston and turboprop aircraft will fall in AAC A and B, and ADG

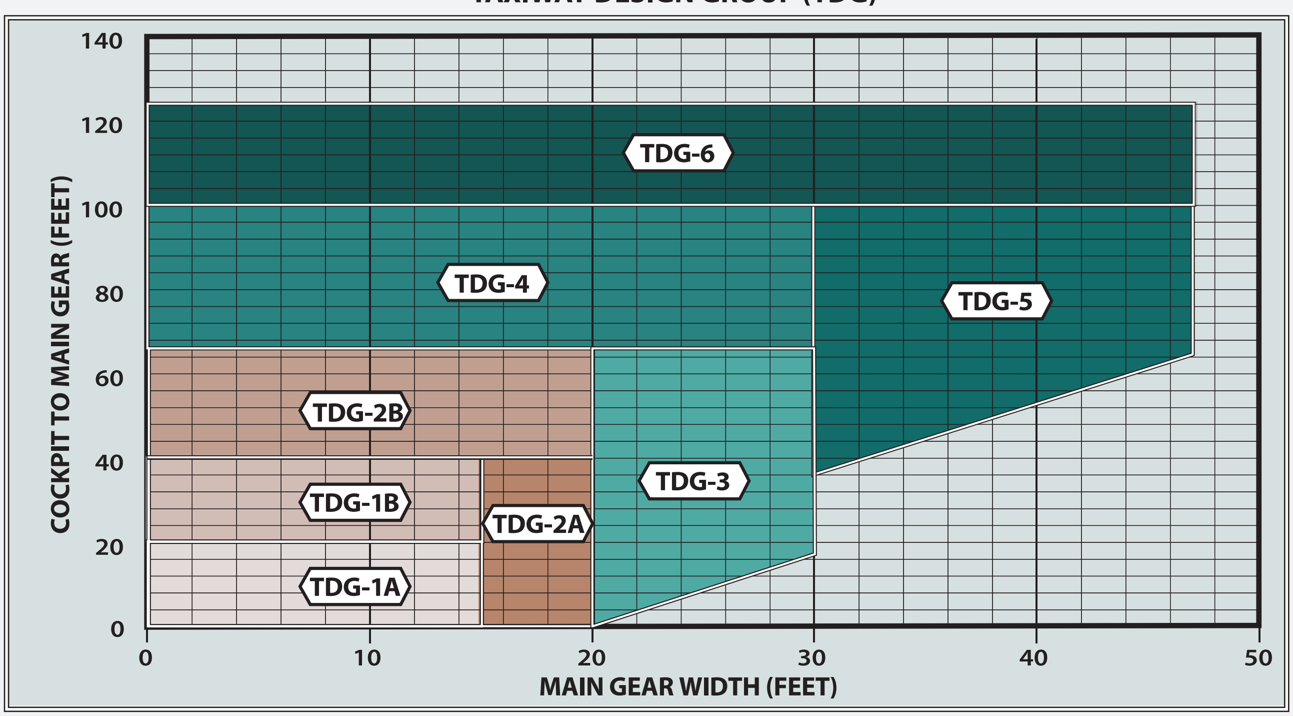
AIRCRAFT APPROACH CATEGORY (AAC)	
Category	**Approach Speed**
A	less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

AIRPLANE DESIGN GROUP (ADG)		
Group #	**Tail Height (ft)**	**Wingspan (ft)**
I	<20	<49
II	20≤30	49≤79
III	30≤45	79≤118
IV	45≤60	118≤171
V	60≤66	171≤214
VI	66≤80	214≤262

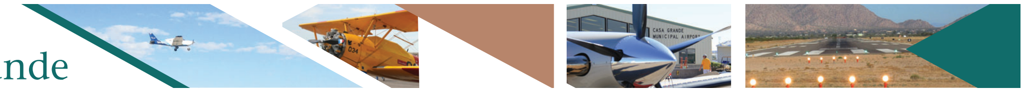
VISIBILITY MINIMUMS	
RVR* (ft)	**Flight Visibility Category (statute miles)**
VIS	3-mile or greater visibility minimums
5,000	Not lower than 1-mile
4,000	Lower than 1-mile but not lower than ¾-mile
2,400	Lower than ¾-mile but not lower than ½-mile
1,600	Lower than ½-mile but not lower than ¼-mile
1,200	Lower than ¼-mile

***RVR**: Runway Visual Range

TAXIWAY DESIGN GROUP (TDG)



Source: FAA AC 150/5300-13B, Airport Design



A-I

Aircraft	TDG
Beech Baron 55	1A
Beech Bonanza	**1A**
Cessna 150, 172	1A
Eclipse 500	1A
Piper Archer, Seneca	1A

B-I

Aircraft	TDG
Beech Baron 58	**1A**
Beech King Air 90	1A
Cessna 421	1A
Cessna Citation CJ1 (525)	1A
Cessna Citation 1(500)	2
Embraer Phenom 100	1B

A/B-II 12,500 lbs. or less

Aircraft	TDG
Beech Super King Air 200	**2**
Cessna 441 Conquest	1A
Cessna Citation CJ2 (525A)	2
Pilatus PC-12	1A

B-II over 12,500 lbs.

Aircraft	TDG
Beech Super King Air 350	2
Cessna Citation CJ3(525B), Bravo (550), V (560)	2
Cessna Citation CJ4 (525C)	**1B**
Cessna Citation Latitude/Longitude	1B
Embraer Phenom 300	1B
Falcon 10, 20, 50	1B
Falcon 900, 2000	2
Hawker 800, 800XP, 850XP, 4000	1B
Pilatus PC-24	1B

A/B-III

Aircraft	TDG
Bombardier Dash 8	3
Bombardier Global 5000, 6000, 7000, 8000	**2**
Falcon 6X, 7X, 8X	2

C/D-I

Aircraft	TDG
Lear 25, 31, 45, 55, **60**	**1B**
Learjet 35, 36 (D-I)	1B

C/D-II

Aircraft	TDG
Challenger 600/604/800/850	1B
Cessna Citation VII, X+	1B
Embraer Legacy 450/500	1B
Gulfstream IV, 350, 450 (D-II)	2
Gulfstream G200/G280	1B
Lear 70, 75	1B

C/D-III less than 150,000 lbs.

Aircraft	TDG
Gulfstream V	2
Gulfstream G500, 550, 600, **650 (D-III)**	**2**

C/D-III over 150,000 lbs.

Aircraft	TDG
Airbus A319-100, 200	3
Boeing 737 -800, 900, BBJ2 (D-III)	**3**
MD-83, 88 (D-III)	4

C/D-IV

Aircraft	TDG
Airbus A300-100, 200, 600	5
Boeing 757-200	4
Boeing 767-300, **400**	**5**
MD-11	6

D-V

Aircraft	TDG
Airbus A330-200, 300	5
Airbus A340-500, 600	6
Boeing 747-100 - 400	5
Boeing 777-300	6
Boeing 787-8, 9	**5**

Note: Aircraft pictured is identified in bold type.

I and II. Business jets typically fall in AAC B and C, while the larger commercial aircraft will fall in AAC C and D.

AIRPORT AND RUNWAY CLASSIFICATIONS

Airport and runway classifications, along with the aircraft classifications defined previously, are used to determine the appropriate FAA design standards to which the airfield facilities are to be designed and built.

Runway Design Code (RDC): A code signifying the design standards to which the runway is to be built. The RDC is based upon planned development and has no operational component.

The AAC, ADG, and runway visual range (RVR) are combined to form the RDC of a 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 either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive. The third component relates to the available instrument approach visibility minimums expressed by RVR values in feet of 1,200 (⅛-mile), 1,600 (¼-mile), 2,400 (½-mile), 4,000 (¾-mile), and 5,000 (1-mile). The RVR values approximate standard visibility minimums for instrument approaches to the runways. The third component reads "VIS" for runways designed for visual approach use only.

Approach Reference Code (APRC): A code signifying the current operational capabilities of a runway and associated parallel taxiway with regard to landing operations. Like the RDC, the APRC is composed of the same three components: the AAC, ADG, and RVR. The APRC describes the current operational capabilities of a runway under particular meteorological conditions where no special operating procedures are necessary, as opposed to the RDC, which is based upon planned development with no operational component. The APRC for a runway is established based upon the minimum runway-to-taxiway centerline separation.

Departure Reference Code (DPRC): A code signifying the current operational capabilities of a runway and associated parallel taxiway with regard to takeoff operations. The DPRC represents those aircraft that can takeoff from a runway while any aircraft are present on adjacent taxiways, under particular meteorological conditions with no special operating conditions. The DPRC is similar to the APRC but is composed of two components: AAC and ADG. A runway may have more than one DPRC depending on the parallel taxiway separation distance.

***Airport Reference Code (ARC)*:** 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 and design only and does not limit the aircraft that may be able to operate safely at an airport. The current Airport Layout Plan (ALP) for CGZ identifies the ARC as B-II.

CRITICAL AIRCRAFT

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using, or are expected to use, an airport. The critical aircraft is used to define the design parameters for an airport. The critical aircraft may be a single aircraft or a composite aircraft representing a collection of aircraft classified by the three parameters: AAC, ADG, and TDG.

The first consideration is the safe operation of aircraft likely to use an airport. Any operation of an aircraft that exceeds design criteria of an airport may result in a lesser safety margin; however, it is not the usual practice to base the airport design on an aircraft that uses the airport infrequently.

The critical aircraft is defined as the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport. Regular use is 500 annual operations, excluding touch-and-go operations. Planning for future aircraft use is of importance since the design standards are used to plan separation distances between facilities. These future standards must be considered now to ensure that short-term development does not preclude the reasonable long-range potential needs of the airport.

According to FAA AC 150/5300-13B, *Airport Design*, "airport designs based only aircraft currently using the airport can severely limit the airport's ability to accommodate future operations of more demanding aircraft. Conversely, it is not practical or economical to base airport design on aircraft that will not realistically use the airport." Selection of the current and future critical aircraft must be realistic in nature and supported by current data and realistic projections.

AIRPORT CRITICAL AIRCRAFT

There are three elements for classifying the airport critical aircraft. The three elements are the AAC, ADG, and the TDG. The AAC and ADG are examined first, followed by the TDG.

The FAA's Traffic Flow Management System Count (TFMSC) database captures an operation when a pilot files a flight plan and/or when flights are detected by the National Airspace System, usually via radar. It includes documentation of commercial traffic (air carrier and air taxi), general aviation, and military aircraft. Due to certain factors, such as incomplete flight plans, limited radar coverage, and VFR operations, TFMSC data does not account for all aircraft activity at an airport by a given aircraft type. However, the TFMSC does provide an accurate reflection of IFR activity. Operators of high-performance aircraft, such as turboprops and jets, tend to file flight plans at a high rate. **Exhibit 2E** presents the TFMSC operational mix at the airport for turbine aircraft operations for the last 10 years. As can be seen, the airport experiences activity by a full range of business jets; however, no single aircraft or family of aircraft has conducted 500 or more operations at the airport in recent years. In 2021, the greatest number of operations in any single design family was 100 in B-II, which accounted for approximately 39 percent of logged turbine aircraft activity. Over the 10-year period, the B-II design category has averaged approximately 104 annual operations, as reported by the TFMSC. Representative aircraft in this category include the Citation Sovereign and the Beechcraft King Air 200/300/350.

In the future, larger and more sophisticated jets are anticipated to operate more frequently at the airport. Nationally, the aircraft fleet is shifting to include more of this type of aircraft and fewer piston-powered aircraft. While single engine pistons will likely continue to dominate in terms of operations at the airport over the short and intermediate terms, it is important to plan for increased operations from larger jet aircraft over the long-term. According to TFMSC data, operations by aircraft in ARC C-II aircraft have generally increased over the last ten years. Combined with regional and local industrial/manufacturing growth, it is not unreasonable to assume that these numbers will continue to trend upward in the coming years, and it is prudent to plan facilities to accommodate this type of aircraft. Therefore, the ultimate critical aircraft for CGZ has been determined to fall within ARC C-II.

Airport Critical Aircraft Summary

The current aircraft approach category is “B” and the current airplane design group is “II.” Over the last 10 years, the most active B-II airplane at CGZ has been the Beechcraft King Air 200/300/350, which are TDG 2A aircraft. Therefore, the current airport critical aircraft is classified as B-II-2A. The future airport critical aircraft is planned to transition to C-II-2A, represented by mid-sized and larger business jet aircraft such as the Cessna III and Challenger 600/604.

RUNWAY DESIGN CODE

The RDC relates to specific FAA design standards that should be met in relation to a runway. The RDC takes into consideration the AAC, ADG, and the RVR. In most cases, the critical aircraft will also be the RDC for the primary runway.

Runway 5-23 should be designed to accommodate the overall airport critical aircraft, which has been identified as B-II-2. The primary runway is 5,200 feet long and 100 feet wide. Runway 5 has a precision instrument approach with visibility minimums as low as ½-mile, and Runway 23 has a non-precision approach with visibility minimums down to one-mile. Based on the current activity, the existing RDC is B-II-2400. Since the airport is anticipated to transition to serve ARC C-II aircraft in the future, the ultimate RDC for Runway 5-23 is planned to transition to C-II-2400.

APPROACH AND DEPARTURE REFERENCE CODES

The approach and departure reference codes (APRC and DPRC) describe the current operational capabilities of each runway and the adjacent parallel taxiways, where no special operating procedures are necessary. Essentially, the APRC and DPRC describe the current conditions at an airport in runway classification terms when considering the parallel taxiway.

ARC	Aircraft	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
A-I	A36 Bonanza	0	4	2	0	0	0	0	0	0	0
	Cessna 206/207/210	0	0	0	2	2	2	0	6	2	0
	Cirrus Vision Jet	0	0	0	0	0	2	0	4	2	2
	Eclipse 400/500	10	18	24	12	2	0	0	10	4	0
	Epic Dynasty	2	0	0	0	0	0	0	0	0	0
	Kodiak Quest	0	0	0	0	0	0	0	0	0	4
	Lancair Evolution/Legacy	2	0	0	6	0	8	4	0	4	0
	Piper Malibu/Meridian	22	4	16	22	16	24	32	14	6	22
	Socata TBM 7/850/900	8	4	2	8	10	6	2	2	6	4
	Total	**44**	**30**	**44**	**50**	**30**	**42**	**38**	**36**	**24**	**32**
A-II	Cessna Caravan	4	2	2	0	2	4	0	4	2	2
	De Havilland Twin Otter	0	0	2	0	4	0	0	2	4	2
	Pilatus PC-12	12	2	10	10	28	8	10	8	6	26
	Total	**16**	**4**	**14**	**10**	**34**	**12**	**10**	**14**	**12**	**30**
B-I	Aero Commander 680	0	0	2	2	0	0	2	0	0	0
	Beechjet 400	14	8	8	8	0	8	4	0	0	2
	Cessna 425 Corsair	0	2	12	10	4	28	20	4	4	2
	Citation CJ1	22	6	6	4	2	6	52	40	6	6
	Citation I/SP	2	2	2	2	0	0	0	0	2	0
	Citation Mustang	4	2	0	4	6	4	8	2	2	0
	Falcon 10	0	0	0	2	0	0	0	0	0	0
	Honda Jet	0	0	0	0	0	0	2	0	0	2
	King Air 90/100	44	10	12	10	40	20	2	6	12	24
	Mitsubishi MU-2	0	2	0	0	0	0	0	0	0	0
	Phenom 100	2	2	2	6	0	0	2	4	4	2
	Piaggio Avanti	12	0	0	0	0	0	0	0	4	0
	Piper Cheyenne	2	2	0	0	2	0	2	2	2	0
	Premier 1	0	2	0	0	2	2	0	0	2	0
	T-6 Texan	0	4	0	0	0	0	0	0	0	0
	Total	**102**	**42**	**44**	**48**	**56**	**68**	**94**	**58**	**38**	**38**
B-II	Aero Commander 690	4	0	0	2	2	0	0	0	0	0
	Beech 1900	0	0	0	0	2	0	2	0	0	0
	Cessna Conquest	4	2	4	4	6	6	6	2	4	4
	Challenger 300	6	2	4	8	2	6	12	12	2	4
	Citation CJ2/CJ3/CJ4	12	12	14	12	6	4	6	4	0	6
	Citation II/SP/Latitude	12	28	14	20	14	14	4	2	8	8
	Citation V/Sovereign	12	10	16	24	30	12	6	12	8	14
	Citation X	2	2	0	0	2	0	0	2	0	6
	Citation XLS	16	4	6	6	12	20	10	4	18	16
	Dornier 328	0	0	0	0	10	0	0	0	0	0
	Falcon 20/50	0	0	0	0	0	6	4	2	2	2
	Falcon 2000	14	10	22	6	0	4	4	10	4	2
	Falcon 900	0	0	0	2	4	4	0	0	0	0
	King Air 200/300/350	24	12	18	28	32	20	34	14	20	16
	King Air F90	0	4	2	0	0	0	0	0	0	0
	Phenom 300	0	0	4	4	4	0	6	8	10	22
	Pilatus PC-24	0	0	0	0	0	0	0	0	2	0
	Shorts 330/360	0	0	20	2	4	2	2	0	0	0

ARC	Aircraft	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
B-II	Shorts C-23	0	0	0	2	0	0	0	0	0	0
	Shorts Skyvan	0	0	2	10	0	8	2	0	0	0
	Swearingen Merlin	0	2	2	0	0	2	0	0	0	0
	Total	**106**	**88**	**128**	**130**	**130**	**108**	**98**	**72**	**78**	**100**
B-III	Bombardier Global 5000	0	2	0	0	0	0	0	0	0	2
	Bombardier Global Express	0	0	0	2	2	0	0	2	0	4
	Convair CV Series	2	2	0	2	2	0	0	0	0	0
	Falcon 7X/8X	0	0	0	0	0	0	2	0	0	0
	Total	**2**	**4**	**0**	**4**	**4**	**0**	**2**	**2**	**0**	**6**
C-I	Learjet 20 Series	2	0	0	0	0	0	0	0	0	0
	Learjet 31	2	0	0	2	2	6	2	0	2	0
	Learjet 40 Series	2	0	16	0	2	4	4	4	2	2
	Learjet 60 Series	2	8	4	8	8	0	6	4	0	4
	Westwind II	0	0	2	4	18	0	0	0	0	0
	Total	**8**	**8**	**22**	**14**	**30**	**10**	**12**	**8**	**4**	**6**
C-II	Challenger 600/604	0	4	4	4	2	6	4	6	0	22
	Citation III/VI	0	0	0	0	0	0	0	0	0	2
	Embraer 500/450 Legacy	0	0	0	0	0	0	2	2	0	2
	Gulfstream 100/150	2	2	0	0	0	0	4	4	0	4
	Gulfstream G-III	0	4	2	0	0	0	0	0	0	0
	Hawker 800 (Formerly Bae-125-800)	0	2	2	4	0	0	6	0	14	6
	Learjet 70 Series	0	0	0	2	2	2	2	0	2	2
	Total	**2**	**12**	**8**	**10**	**4**	**8**	**18**	**12**	**16**	**38**
C-III	Airbus A319/320/321	0	0	0	0	0	0	2	0	0	0
	Boeing 737 (200 thru 700 series)	0	0	0	0	0	0	2	0	0	0
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**
C-IV	t-6 Texan	0	4	0	0	0	0	0	0	0	0
	Total	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
D-I	Learjet 35/36	2	20	8	16	6	10	14	6	6	0
	Total	**2**	**20**	**8**	**16**	**6**	**10**	**14**	**6**	**6**	**0**
D-II	Gulfstream 200	4	2	4	0	2	0	0	0	0	0
	Gulfstream 450	10	12	12	14	4	6	4	0	0	2
	Total	**14**	**14**	**16**	**14**	**6**	**6**	**4**	**0**	**0**	**2**
D-III	Gulfstream 500/600	6	4	4	4	0	4	2	2	6	6
	Total	**6**	**4**	**4**	**4**	**0**	**4**	**2**	**2**	**6**	**6**
D-V	Boeing 747 All Series	0	2	0	0	0	0	0	0	0	0
	Total	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Exhibit 2E
HISTORICAL TURBOPROP AND JET OPERATIONS

ARC CODE SUMMARY

ARC CODE	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
A-I	44	30	44	50	30	42	38	36	24	32
A-II	16	4	14	10	34	12	10	14	12	30
B-I	102	42	44	48	56	68	94	58	38	38
B-II	106	88	128	130	130	108	98	72	78	100
B-III	2	4	0	4	4	0	2	2	0	6
C-I	8	8	22	14	30	10	12	8	4	6
C-II	2	12	8	10	4	8	18	12	16	38
C-III	0	0	0	0	0	0	4	0	0	0
C-IV	0	4	0	0	0	0	0	0	0	0
D-I	2	20	8	16	6	10	14	6	6	0
D-II	14	14	16	14	6	6	4	0	0	2
D-III	6	4	4	4	0	4	2	2	6	6
D-V	0	2	0	0	0	0	0	0	0	0
Total	302	232	288	300	300	268	296	210	184	258

APPROACH CATEGORY

AC	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
A	60	34	58	60	64	54	48	50	36	62
B	210	134	172	182	190	176	194	132	116	144
C	10	24	30	24	34	18	34	20	20	44
D	22	40	28	34	12	20	20	8	12	8
Total	302	232	288	300	300	268	296	210	184	258

DESIGN GROUP

DG	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
I	156	100	118	128	122	130	158	108	72	76
II	138	118	166	164	174	134	130	98	106	170
III	8	8	4	8	4	4	8	4	6	12
IV	0	4	0	0	0	0	0	0	0	0
V	0	2	0	0	0	0	0	0	0	0
Total	302	232	288	300	300	268	296	210	184	258

Source: FAA TFMSC - CGZ Jets & Turboprops
Data normalized annually

The parallel taxiway for Runway 5-23 is located 300 feet from the runway (centerline to centerline). Based on this separation distance and the lowest visibility minimums associated with the runway, the APRC for Runway 5-23 is B/III/4000, D/II/4000, and B/II/24000, and its DPRC is B/III and D/II.

AIRPORT AND RUNWAY CLASSIFICATION SUMMARY

Table 2Q summarizes the airport and runway classification currently and in the future. The critical aircraft is now defined by those aircraft in ARC B-II and is expected to transition to ARC C-II in the future.

Table 2Q | Airport and Runway Classifications | Casa Grande Municipal Airport

	Runway 5-23 Existing	Runway 5-23 Ultimate
Airport Reference Code (ARC)	B-II	C-II
Airport Critical Aircraft	B-II-2A	C-II-2A
Critical Aircraft (Typ.)	Beechcraft King Air 200/300/350	Challenger 600/604
Runway Design Code (RDC)	B-II-2400	C-II-2400
Approach Reference Code (APRC)	B/III/4000 D/II/4000 B/II/2400	D/IV/2400 D/V/2400
Departure Reference Code (DPRC)	B/III D/II	D/IV D/V
Taxiway Design Group (TDG)	2A	2A*

*Based on the King Air 200/300/350

Source: FAA AC 150/5300-13B, Airport Design

SUMMARY

This chapter has outlined the various activity levels that might reasonably be anticipated over the planning period, as well as the critical aircraft for the airport. Based aircraft are forecast to grow from 102 currently to 167 by 2041. Operations are forecast to grow from 122,000 in 2021 to 165,600 by 2041. The projected growth is driven by FAA's positive outlook for general activity nationwide, as well as positive outlooks for socioeconomic growth (population, employment, and income/GRP) in Casa Grande and the region.

The critical aircraft for the airport was determined by examining the FAA TFMSC database of flight plans. The current critical aircraft is described as B-II-2A and is best represented by a Beechcraft King Air 200/300/350, a twin-engine turboprop typically utilized for business operations or air charters. The future critical aircraft is projected to transition to C-II-2A, with the Challenger 600/604 serving as the representative aircraft.

The next step in the planning process is to assess the capabilities of the existing facilities to determine what upgrades may be necessary to meet future demands. The range of forecasts developed here will be taken forward in the next chapter as planning horizon activity levels that will serve as milestones or activity benchmarks in evaluating facility requirements.

This page intentionally left blank

City of
Casa Grande
AIRPORT MASTER PLAN

Chapter 3

Demand/Capacity and Facility Requirements

City of
Casa Grande
AIRPORT MASTER PLAN

Chapter 3
Demand/Capacity and Facility Requirements

Proper airport planning requires the translation of forecast aviation demand into the specific types and quantities of facilities that can adequately serve the identified demand. This chapter will analyze the existing capacities of Casa Grande Municipal Airport (CGZ) facilities. The existing capacities will then be compared to the forecast activity levels prepared in Chapter Two to determine the adequacy of existing facilities, as well as to identify if deficiencies currently exist or may be expected to materialize in the future. The chapter will present the following elements:

- Planning Horizon Activity Levels
- Airfield Capacity
- Airport Physical Planning Criteria
- Airside and Landside Facility Requirements

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

The facility requirements for CGZ were evaluated using guidance contained in several Federal Aviation Administration (FAA) publications, including the following:

- Advisory Circular (AC) 150/5300-13B, *Airport Design*
- AC 150/5060-5, *Airport Capacity and Delay*
- AC 150/5325-4B, *Runway Length Requirements for Airport Design*
- Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*
- FAA Order 5090.5, *Field Formulation of the National Plan of Integrated Airport Systems* (NPIAS) *and the Airports Capital Improvement Plan* (ACIP)

DEMAND-BASED PLANNING HORIZONS

An updated set of aviation demand forecasts for CGZ has been established and was detailed in Chapter Two. These activity forecasts include annual aircraft operations, based aircraft, aircraft fleet mix, and peaking characteristics. With this information, specific components of the airfield and landside system can be evaluated to determine their capacity to accommodate future demand.

Cost-effective, efficient, and orderly development of an airport should rely more upon actual demand at an airport than on a time-based forecast figure. In order to develop a Master Plan that is demand-based rather than time-based, a series of planning horizon milestones has been established that takes into consideration the reasonable range of aviation demand projections. The planning horizons are the short term (years 1-5), the intermediate term (years 6-10), and the long term (years 11-20).

It is important to consider that the actual activity at the airport may be higher or lower than what the annualized forecast portrays. By planning according to activity milestones, the resultant plan can accommodate unexpected shifts or changes in the area's aviation demand by allowing airport management the flexibility to make decisions and develop facilities based upon need generated by actual demand levels, rather than dates in time. The demand-based schedule provides flexibility in development, as development schedules can be slowed or expedited according to demand at any given time over the planning period. The resultant plan provides airport officials with a financially responsible and needs-based program. **Table 3A** presents the short-, intermediate-, and long-term planning horizon milestones for each aircraft activity level forecasted in Chapter Two.

Table 3A | Aviation Demand Planning Horizons	Base Year (2021)	Short Term (1-5 Years)	Intermediate Term (6-10 Years)	Long Term (11-20 Years)
BASED AIRCRAFT				
Single Engine	94	105	117	143
Multi-Engine	7	7	5	3
Turboprop	0	2	4	10
Jet	0	0	2	4
Helicopter	1	1	3	7
TOTAL BASED AIRCRAFT	**102**	**115**	**131**	**167**
ANNUAL OPERATIONS				
Itinerant				
Air Carrier	0	0	0	0
Air Taxi	2,038	2400	2800	3800
General Aviation	106,586	114,000	121,900	139,400
Military	410	410	410	410
Total Itinerant	**109,034**	**116,800**	**125,100**	**143,600**
Local				
General Aviation	12,966	14,800	16,900	22,000
Military	0	0	0	0
Total Local	**12,966**	**14,800**	**16,900**	**22,000**
TOTAL OPERATIONS	**122,000**	**131,600**	**142,000**	**165,600**

Source: Coffman Associates analysis

AIRFIELD CAPACITY

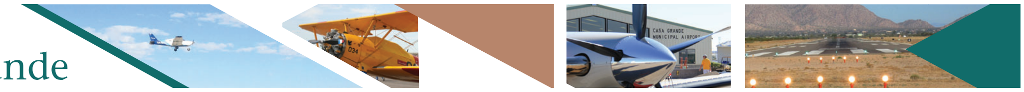
An airport's airfield capacity is expressed in terms of its annual service volume (ASV). ASV is a reasonable estimate of the maximum level of aircraft operations that can be accommodated in a year without incurring significant delay factors. As aircraft operations near or surpass the ASV, delay factors increase exponentially. CGZ's ASV was examined utilizing FAA AC 150/5060-5, *Airport Capacity and Delay*.

FACTORS AFFECTING ANNUAL SERVICE VOLUME

This analysis takes into account specific factors about the airfield in order to calculate the airport's ASV. These various factors are depicted in **Exhibit 3A**. The following describes the input factors as they relate to CGZ and include airfield layout, weather conditions, aircraft mix, and operations.

- **Runway Configuration** – The existing airfield configuration consists of a single runway supported by a full-length parallel taxiway. Runway 5-23 is 5,200 feet long and 100 feet wide, oriented northeast/southwest.

- **Runway Use** – Runway use in capacity conditions is controlled by wind and/or airspace conditions. For CGZ, the direction of takeoffs and landings is typically determined by the speed and direction of the wind. It is generally safest for aircraft to take off and land into the wind, avoiding a crosswind (wind that is blowing perpendicular to the travel of the aircraft) or tailwind components during



AIRFIELD LAYOUT

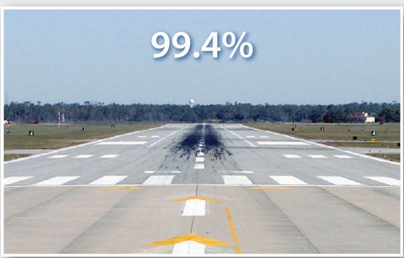
Runway Configuration

Runway Use

Number of Exits

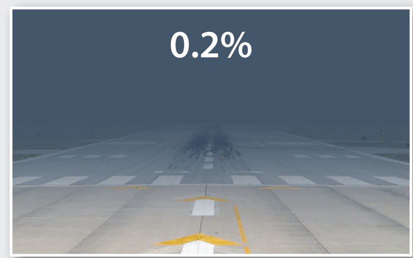
WEATHER CONDITIONS

VMC (VFR)
Visual Meteorological Conditions



IMC (IFR)
Instrument Meteorological Conditions

PVC
Poor Visibility Conditions



AIRCRAFT MIX

Category A & B Aircraft

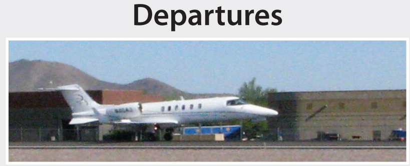
Category C Aircraft

Category D Aircraft

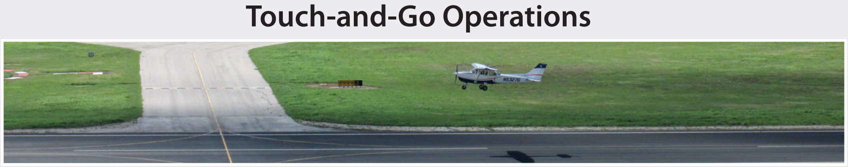
OPERATIONS

Arrivals

Departures



Touch-and-Go Operations



Total Annual Operations

these operations. Wind conditions dictate the use of Runway 23 approximately 28 percent of the time, and Runway 5 approximately 15 percent of the time. Calm wind conditions are present approximately 57 percent of the time. As Runway 5 is equipped with an instrument landing system (ILS) approach, it is used heavily by student pilots practicing approaches.

- **Exit Taxiways** – Exit taxiways have a significant impact on airfield capacity since the number and location of exits directly determine the occupancy time of an aircraft on the runway. The airfield capacity analysis gives credit to taxiway exits located within the prescribed range from a runway's threshold. This range is based upon the mix index of the aircraft that use the runways. Based upon mix, only exit taxiways between 2,000 feet and 4,000 feet from the landing threshold count in the exit rating at CGZ. The exits must be at least 750 feet apart to count as separate exit taxiways. Utilizing these criteria, Runway 5 is credited with one exit taxiway (Taxiway D) and Runway 23 is credited with two exit taxiways (Taxiways D and E). While Taxiway E is designed as a high-speed exit for aircraft landing on Runway 5, it is located approximately 1,300 feet from the threshold, and therefore is not counted as an exit taxiway in the capacity analysis.

- **Weather Conditions** – Weather conditions can have a significant impact on airfield capacity. Airfield capacity is usually highest in clear weather when flight visibility is at its best and is diminished as weather conditions deteriorate and cloud ceilings and visibility are reduced. As weather conditions deteriorate, the spacing of aircraft must increase to provide allowable margins of safety and air traffic vectoring. The increased distance between aircraft reduces the number of aircraft which can operate at the airport during any given period, thus reducing overall airfield capacity.

  According to local meteorological data, the airport operates under visual meteorological conditions (VMC) approximately 99.4 percent of the time. VMC exist whenever the cloud ceiling is greater than 1,000 feet above ground level (AGL) and visibility is greater than three statute miles. Instrument meteorological conditions (IMC) are defined when cloud ceilings are between 500 and 1,000 feet AGL or visibility is between one and three miles. Poor visibility conditions (PVC) apply for cloud ceilings below 500 feet and visibility minimums below one mile. **Table 3B** summarizes the weather conditions experienced at the airport over a 10-year period of time.

Table 3B | Weather Conditions

Condition	Cloud Ceiling	Visibility	Percent of Total
VMC	≥ 1,000' AGL	> 3 statute miles	99.38%
IMC	≥ 500' AGL to < 1,000' AGL	1-3 statute miles	0.41%
PVC	< 500' AGL	< 1 statute mile	0.21%

VMC- Visual Meteorological Conditions
IMC- Instrument Meteorological Conditions
PVC- Poor Visibility Conditions
AGL- Above Ground Level

Source: 162,268 All Weather Observations from Jan 1, 2012 thru Dec 31, 2021, CGZ Weather Station

- **Aircraft Mix** – The aircraft mix for the capacity analysis is defined in terms of four aircraft classifications. Classes A and B consist of small- and medium-sized propeller and some jet aircraft, all weighing 12,500 pounds or less. These aircraft are associated primarily with general aviation activity, but do include some air taxi, air cargo, and commuter aircraft. Class C consists of aircraft weighing between 12,500 pounds and 300,000 pounds. These aircraft include most business jets and some turboprop aircraft which utilize the airport on a regular basis. Class D aircraft consist of aircraft weighing more than 300,000 pounds.

  Most operations at CGZ are by Classes A and B aircraft. According to the FAA's Traffic Flow Management System Count (TFMSC) data for 2021, there were approximately 150 total operations by Class C aircraft at CGZ, which represents approximately 0.11 percent of all operations. There were no operations by Class D aircraft reported in the TFMSC.

- **Percent Arrivals** – The percentage of arrivals as they relate to total operations of the airport is important in determining airfield capacity. Under most circumstances, the lower the percentage of arrivals, the higher the hourly capacity. The aircraft arrival-departure percentage split is typically 50/50, which is the case at CGZ.

- **Touch-and-Go Activity** – A touch-and-go operation involves an aircraft making a landing and then an immediate takeoff without coming to a full stop or exiting the runway. As previously discussed in Chapter Two, these operations are normally associated with general aviation training activity and classified as a local operation. A high percentage of touch-and-go traffic normally results in a higher operational capacity because one landing and takeoff occurs within a shorter time period than individual operations. Touch-and-go operations at CGZ accounted for 11 percent of total annual operations in 2021. This percentage is anticipated to remain generally stagnant, with a slight increase to 13 percent by the end the planning period.

- **Peak Period Operations** – Average daily operations and average peak hour operations during the peak month are utilized for the airfield capacity analysis. Operations activity is important in the calculation of an airport's ASV as "peak demand" levels occur sporadically. The peak periods used in the capacity analysis are representative of normal operational activity and can be exceeded at various times throughout the year.

CALCULATION OF ANNUAL SERVICE VOLUME

The preceding information was used in conjunction with the airfield capacity methodology developed by the FAA to determine airfield capacity for CGZ.

Hourly Runway Capacity

The first step in determining ASV involves the computation of the hourly capacity of the runway configuration. The percentage use of the runway, the amount of touch-and-go activity, and the number and locations of runway exits are the important factors in determining hourly capacity.

Based upon these factors, the current and future hourly capacities for CGZ were determined. As the operational mix of aircraft at the airport changes to include a higher percentage of large aircraft weighing over 12,500 pounds, the hourly capacity of the system declines slightly. This is a result of the additional spacing and time required by larger aircraft in the traffic pattern and on the runway.

The current and future weighted hourly capacities are presented in **Table 3C**. Weighted hourly capacity is the measure of the maximum number of aircraft operations that can be accommodated on the airfield in a typical hour. It is a composite of estimated hourly capacities for different airfield operating configurations adjusted to reflect the percentage of time in an average year that the airfield operates under each specific configuration. The weighted hourly capacity on the airfield is projected to remain at 108 operations for the duration of the planning period.

Table 3C | Airfield Capacity Summary

	Base Year	Short Term	Intermediate Term	Long Term
OPERATIONAL DEMAND				
Annual	122,000	131,600	142,000	165,600
CAPACITY				
Annual Service Volume	238,000	247,000	254,000	256,000
Percent Capacity	51.3%	53.3%	55.9%	64.7%
Weighted Hourly Capacity	108	108	108	108

Source: FAA AC 150/5060-5, Airport Capacity and Delay

Annual Service Volume

The ASV is determined by the following equation:

Annual Service Volume = C x D x H

C = weighted hourly capacity
D = ratio of annual demand to the average daily demand during the peak month
H = ratio of average daily demand to the design hour demand during the peak month

The current ASV for the airfield has been estimated at 238,000 operations in the base year, increasing to 256,000 operations by the end of the planning period. This increase is the result of the operational growth anticipated to occur over the planning period. As activity increases, it also becomes more balanced (i.e., spread out throughout the day), thus increasing the ASV. Additionally, CGZ is not expected to see a significant increase in Class C and D aircraft that require more spacing. With Class A and B aircraft expected to continue to dominate in terms of operations, the ASV increases. With 2021 operations at 122,000, the airport is currently at 51.3 percent of its ASV. Long-range annual operations are forecast to reach 165,600, which would equate to 64.7 percent of the airport's ASV.

AIRCRAFT DELAY

The effect that the anticipated ratio of demand to capacity will have on users of CGZ can be measured in terms of delay. As the number of annual aircraft operations approaches the airfield's capacity, increasing operational delays begin to occur. Delays occur to arriving and departing aircraft in all weather conditions. Arriving aircraft delays result in aircraft holding outside the airport traffic pattern area, and departing aircraft delays result in aircraft holding at the runway end until they can safely takeoff.

Aircraft delay can vary depending on different operational activities at an airport. At airports where large air carrier aircraft dominate, delay can be greater given the amount of time these aircraft require in the traffic pattern and on approach to land. For airports that accommodate primarily small general aviation aircraft, delay is typically less since these aircraft are more maneuverable and require less time in the airport traffic pattern.

Table 3D summarizes the potential aircraft delay for CGZ. Estimates of delay provide insight into the impacts that steady increases in aircraft operations have on the airfield and signify the airport's ability to accommodate projected annual aircraft operations. The delay per operation represents an average delay per aircraft. It should be noted that delays of five to ten times the average could be experienced by individual aircraft during peak periods. As an airport's percent capacity increases toward the ASV, delay increases exponentially. Furthermore, complexities in the airspace system that surrounds an airport can also factor into additional delay experienced at the facility.

Table 3D | Airfield Delay Summary

	Base Year	Short Term	Intermediate Term	Long Term
Percent Capacity	51.3%	53.3%	55.9%	64.7%
DELAY				
Per Operation (Minutes)	0.24	0.27	0.31	0.36
Total Annual (Hours)	488	592	734	994

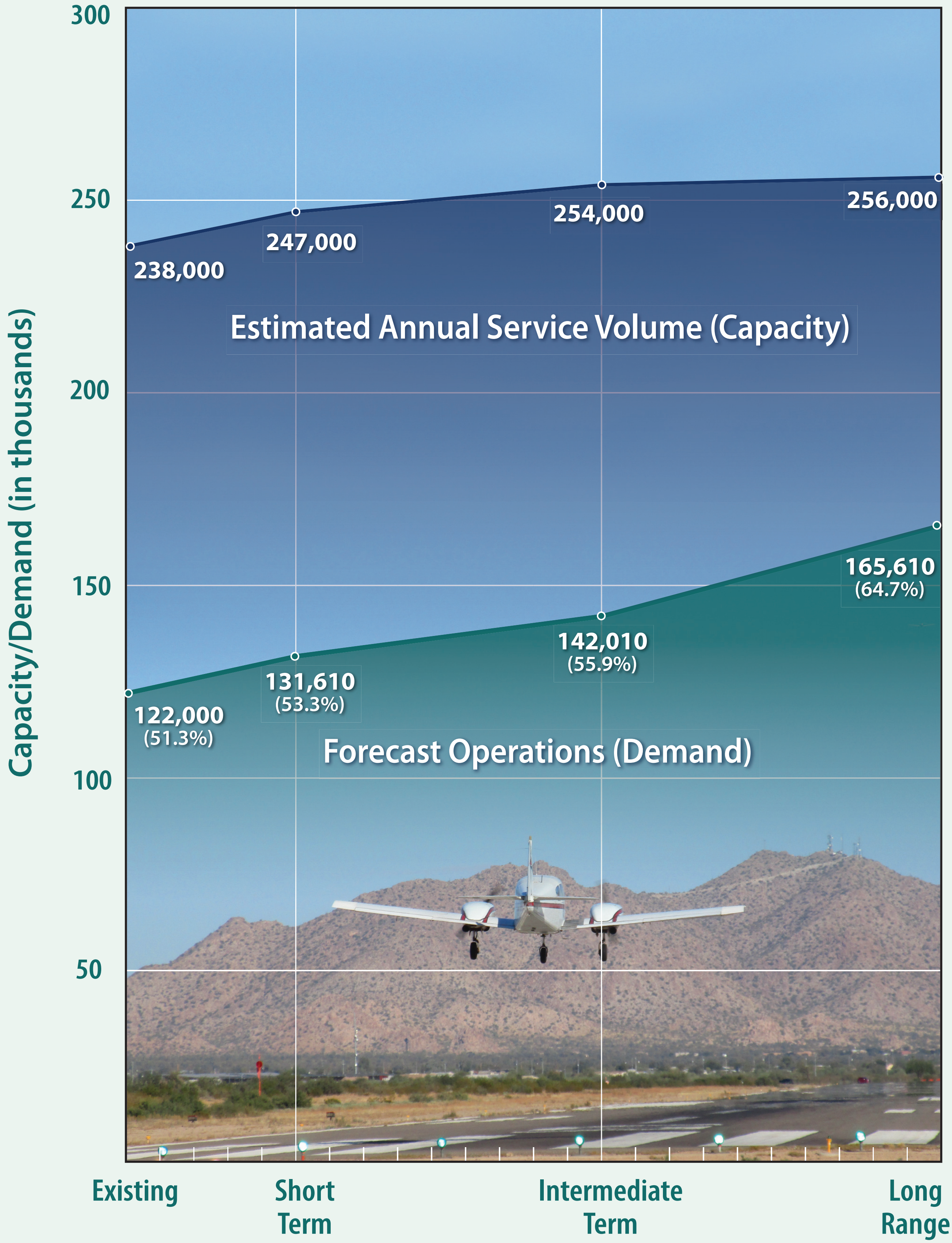
Source: FAA AC 150/5060-5, Airport Capacity and Delay

Current annual delay is estimated at 0.24 minutes per aircraft operation, or 488 annual hours. Analysis of delay factors for the long-term planning horizon indicates that annual delays can be expected to reach 0.36 minutes per aircraft operation, or 994 annual hours.

CAPACITY ANALYSIS CONCLUSION

Exhibit 3B compares the ASV to existing and forecast operational levels at CGZ. The 2021 operations level equates to 51.3 percent of the airfield's ASV. By the long-term planning horizon, total annual operations are expected to represent 64.7 percent of the ASV.

FAA Order 5090.5, *Field Formulation of the National Plan of Integrated Airport Systems* (NPIAS) *and the Airports Capital Improvement Plan* (ACIP), indicates that improvements for airfield capacity purposes should begin to be considered once operations reach 60 to 75 percent of the annual service volume. This is an approximate level to begin the detailed planning of capacity improvements. At the 80 percent level, the planned improvements should be made. As such, capacity improvements may be necessary by the long term, when the ASV is projected to reach approximately 65 percent. Therefore, options to improve airfield efficiency will be considered in the next chapter, including the potential for additional airfield exit taxiways or a secondary runway.


300
250
200
150
100
50
Capacity/Demand (in thousands)
238,000
247,000
254,000
256,000
Estimated Annual Service Volume (Capacity)
122,000
(51.3%)
131,610
(53.3%)
142,010
(55.9%)
165,610
(64.7%)
Forecast Operations (Demand)
Existing
Short Term
Intermediate Term
Long Range

AIRSIDE FACILITY REQUIREMENTS

Airside facilities include those facilities related to the arrival, departure, and ground movement of aircraft. Airside facility requirements are based primarily upon the Runway Design Code (RDC) for each runway. Analysis in Chapter Two identified the existing RDC as B-II-2400 for Runway 5-23 and RDC C-II-2400 as the ultimate RDC.

RUNWAYS

Runway conditions, such as orientation, length, width, and pavement strength, were analyzed at CGZ. From this information, requirements for runway improvements were determined for the airport.

Runway Orientation

Key considerations in the runway configuration of an airport involve the orientation for wind coverage and the operational capacity of the runway system. FAA AC 150/5300-13B, *Airport Design*, recommends that a crosswind runway should be made available when the primary runway orientation provides less than 95 percent wind coverage for any aircraft forecast to use the airport on a regular basis. **Table 3E** details the allowable crosswind component for each RDC.

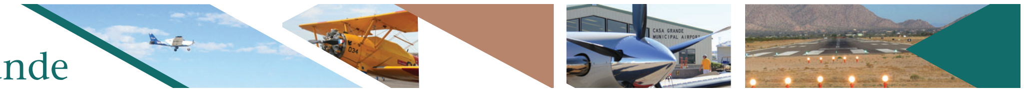
Table 3E | Allowable Crosswind Component by RDC

RDC	Allowable Crosswind Component
A-I and B-I (includes small aircraft)	10.5 knots
A-II and B-II	13 knots
A-III and B-III C-I through D-III	16 knots
A-IV and B-IV C-IV through C-VI D-IV through D-VI E-I through E-VI	20 knots

Source: FAA AC 150/5300-13B, Airport Design

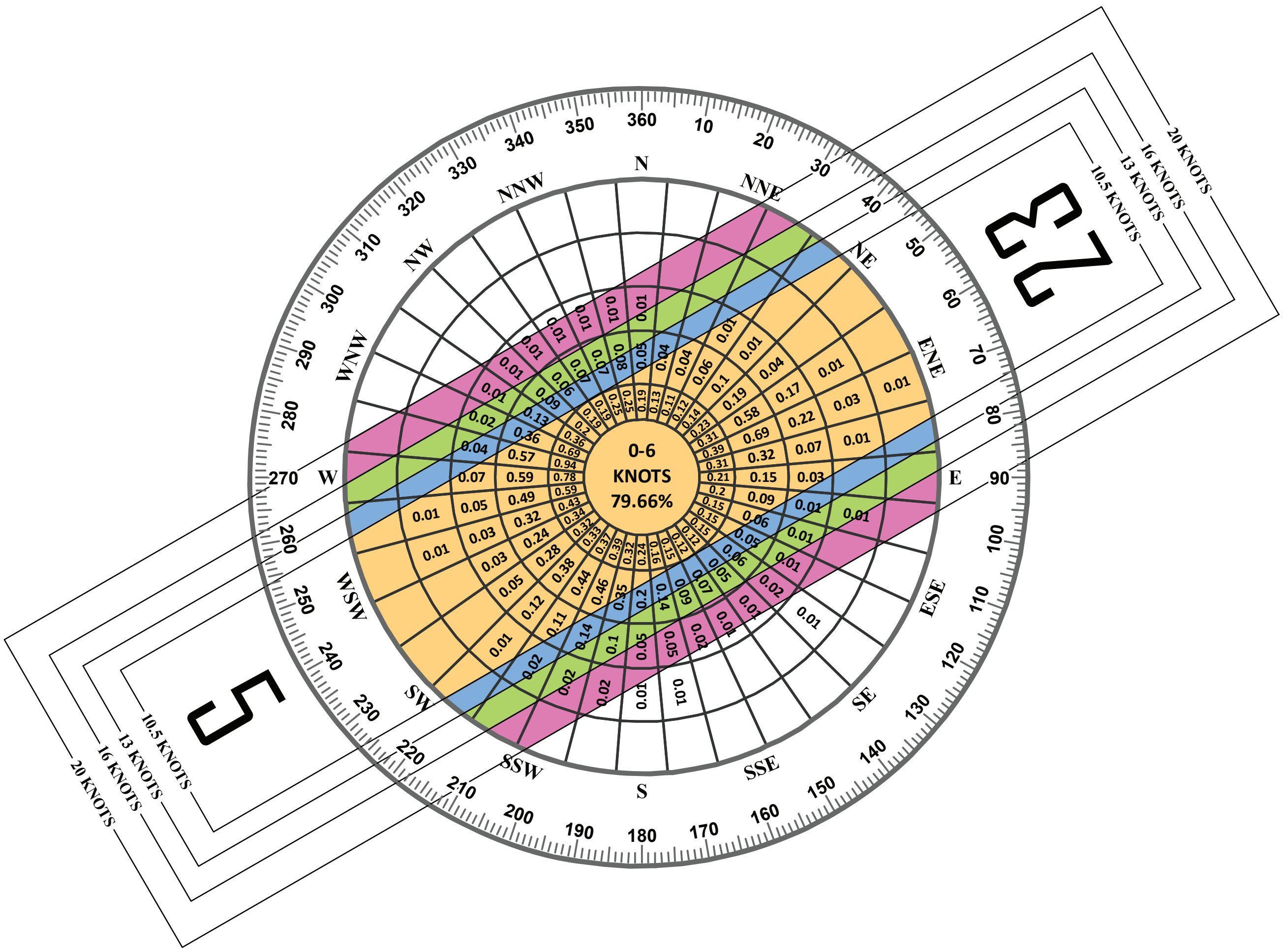
Exhibit 3C presents the all-weather wind rose for the airport. The previous 10 years of wind data[1] was obtained from the on-airport automated weather observation station (AWOS) and has been analyzed to identify wind coverage provided by the existing runway orientations. At CGZ, the orientation of the runway provides 97.67 percent coverage for the 10.5-knot component, 98.90 percent coverage for 13 knots, and greater than 99 percent coverage for 16- and 20-knot components. Thus, the current runway orientation at CGZ provides adequate wind coverage for all-weather conditions.

[1] 175,020 observations were collected for the period January 1, 2011 through December 31, 2020.



ALL WEATHER WIND COVERAGE

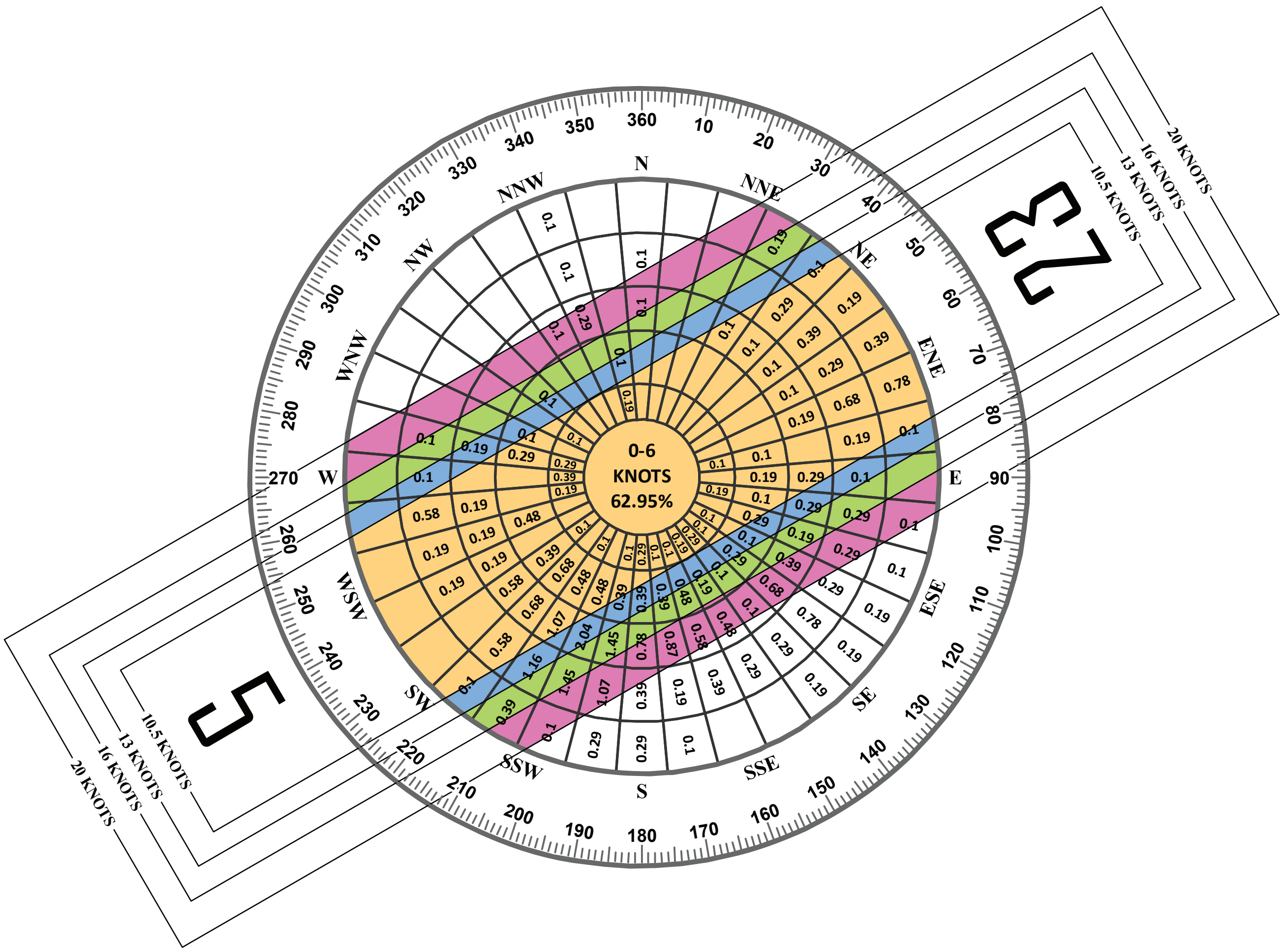
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 5-23	97.67%	98.90%	99.67%	99.92%



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Casa Grande Municipal Airport
Casa Grande, AZ

OBSERVATIONS:
175,020 All Weather Observations
Jan. 1, 2011 - Dec, 31 2020

IFR WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 5-23	78.45%	83.03%	88.42%	94.44%



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Casa Grande Municipal Airport
Casa Grande, AZ

OBSERVATIONS:
1,031 IFR Observations
Jan. 1, 2011 - Dec, 31 2020

Runway Designations

A runway's designation is based upon its magnetic headings, which are determined by the magnetic declination for the area. The magnetic declination near CGZ is 9° 45' E ± 0° 21' W per year. The runway has a true heading of 060°/240°. Adjusting for the magnetic declination, the current magnetic heading of the runway is 050°/230°, which would result in a runway designation of 5-23. As such, the existing runway designation is accurate and should be maintained.

Runway Length

AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance for determining runway length needs. The determination of runway length requirements for the airport is based on five primary factors:

- Mean maximum temperature of hottest month
- Airport elevation
- Runway gradient
- Critical aircraft type expected to use the runway
- Stage length of the longest nonstop destination (specific to larger aircraft)

The mean maximum daily temperature of the hottest month for CGZ is 107.1 degrees Fahrenheit (F), which occurs in July. The airport elevation is 1,464 feet mean sea level (MSL). Runway 5-23 has a gradient of 0.33 percent, which conforms to FAA design standards for gradient.

Airplanes operate on a wide variety of available runway lengths. Many factors will govern the sustainability of runway lengths for aircraft, such as elevation, temperature, wind, aircraft weight, wing flap settings, runway condition (wet or dry), runway gradient, vicinity airspace obstructions, and any special operating procedures. Airport operators can pursue policies that maximize the sustainability of the runway length. Policies such as area zoning and height and hazard restricting can protect an airport's runway length. Airport ownership (fee simple easement) of land leading to the runway ends reduces the possibility of natural growth or man-made obstructions. Planning of runways should include an evaluation of aircraft types expected to use the airport now and in the future. Future planning should be realistic and supported by the FAA-approved forecasts and should be based on the critical aircraft (or family of aircraft).

General Aviation Aircraft

Most operations occurring at CGZ are conducted using smaller GA aircraft weighing less than 12,500 pounds. Following guidance from AC 150/ 5325-4B, to accommodate 95 percent of these small aircraft with less than 10 passenger seats, a runway length of 3,900 feet is recommended. For 100 percent of these small aircraft, a runway length of 4,500 feet is recommended. For small aircraft with 10 or more passenger seats, 4,700 feet of runway length is recommended.

The airport is also utilized by aircraft weighing more than 12,500 pounds, including small- to medium-sized business jet aircraft. Runway length requirements for business jets weighing less than 60,000 pounds have also been calculated. These calculations take into consideration the runway gradient and landing length requirements for contaminated runways (wet). Business jets tend to need greater runway length when landing on a wet surface because of their increased approach speeds. AC 150/5325-4B stipulates that runway length determination for business jets consider a grouping of airplanes with similar operating characteristics. The AC provides two separate "family groupings of airplanes," each based upon their representative percentage of aircraft in the national fleet. The first grouping is those business jets that make up 75 percent of the national fleet, and the second group is those making up 100 percent of the national fleet. **Table 3F** presents a partial list of common aircraft in each aircraft grouping. A third group considers business jets weighing more than 60,000 pounds. Runway length determination for these aircraft must be based on the performance characteristics of the individual aircraft.

Table 3F | Business Jet Categories for Runway Length Determination

Aircraft	MTOW (lbs.)
75 Percent of the National Fleet	
Lear 35	20,350
Lear 45	20,500
Cessna 550	14,100
Cessna 560XL	20,000
Cessna 650 (VII)	22,000
IAI Westwind	23,500
Beechjet 400	15,800
Falcon 50	18,500
75-100 Percent of the National Fleet	
Lear 55	21,500
Lear 60	23,500
Hawker 800XP	28,000
Hawker 1000	31,000
Cessna 650 (III/IV)	22,000
Cessna 750 (X)	36,100
Challenger 604	47,600
IAI Astra	23,500
Greater than 60,000 Pounds	
Gulfstream II	65,500
Gulfstream IV	73,200
Gulfstream V	90,500
Global Express	98,000
Gulfstream 650	99,600
MTOW: Maximum Takeoff Weight	

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

Table 3G presents the results of the runway length analysis for business jets developed following the guidance provided in AC 150/5325-4B. To accommodate 75 percent of the business jet fleet at 60 percent useful load, a runway length of 5,500 feet is recommended. This length is derived from a raw length of 5,288 feet that is adjusted, as recommended, for runway gradient and consideration of landing length needs on a contaminated runway (wet and slippery). To accommodate 100 percent of the business jet fleet at 60 percent useful load, a runway length of 7,300 feet is recommended.

Table 3G | Runway Length Requirements

Fleet Mix Category	TAKEOFF LENGTHS		LANDING LENGTHS	Final Runway Length
	Raw Runway Length from FAA AC	Runway Length with Gradient Adjustment (+360')	Wet Surface Landing Length for Jets (+15%)*	
75% of fleet at 60% useful load	5,288	5,460	5,500	5,500
100% of fleet at 60% useful load	7,136	7,308	5,500	7,300
75% of fleet at 90% useful load	8,226	8,398	7,000	8,400
100% of fleet at 90% useful load	11,000	11,172	7,000	11,200
*Max 5,500' for 60% useful load and max 7,000' for 90% useful load in wet condition.				

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

Utilization of the 90 percent category for runway length determination is generally not considered by the FAA unless there is a demonstrated need at an airport. This could be documented activity by a business jet operator that flies out frequently with heavy loads. To accommodate 75 percent of the business jet fleet at 90 percent useful load, a runway length of 8,400 feet is recommended. To accommodate 100 percent of business jets at 90 percent useful load, a runway length of 11,200 feet is recommended.

Another method to determine runway length requirements for aircraft at CGZ is to examine aircraft flight planning manuals under conditions specific to the airport. Several aircraft were analyzed for takeoff length requirements at a design temperature of 107.1 degrees F at a field elevation of 1,464.1 feet MSL with a 0.33 percent runway grade. **Table 3H** provides a detailed runway length analysis for several of the most common turbine aircraft in the national fleet. This data was obtained from Ultranav software, which computes operational parameters for specific aircraft based on flight manual data. The analysis includes the maximum takeoff weight (MTOW) allowable and the percent useful load from 60 percent to 100 percent.

Table 3H | Business Aircraft Takeoff Length Requirements – Runway 5-23

		TAKEOFF LENGTH REQUIREMENTS (feet)				
		Useful load				
Aircraft Name	**MTOW**	**60%**	**70%**	**80%**	**90%**	**100%**
Pilatus PC-12	9,921	2,391	2,596	2,812	3,038	3,275
King Air C90GTi	10,100	2,836	3,043	3,270	3,497	3,724
King Air C90B	10,100	3,249	3,488	3,730	3,997	4,291
King Air 200 GT	12,500	3,901	4,057	4,192	4,313	4,422
Citation Sovereign	30,300	3,639	3,911	4,228	4,584	5,012
Citation CJ3	13,870	3,540	3,831	4,197	4,594	5,127
King Air 350	15,000	4,174	4,356	4,537	4,882	5,270
Gulfstream 450	74,600	5,327	5,886	6,503	7,150	7,909
Challenger 604/605	48,200	5,882	6,497	7,199	7,950	8,706
Gulfstream 550	91,000	5,552	6,265	7,190	8,215	9,248
Falcon 2000	35,800	5,883	6,460	7,032	7,841	9,465
Lear 60	23,500	6,403	6,960	7,682	8,607	9,769
Beechjet 400A	16,300	4,668	5,201	5,455	5,941	Climb Limited
Citation II (550)	13,300	3,948	4,397	4,880	5,397	Climb Limited
Citation 560 XLS	20,200	4,254	4,588	5,012	5,518	Climb Limited
Citation X	35,700	5,654	6,194	6,834	Climb Limited	Climb Limited
Citation III	21,500	5,478	Climb Limited	Climb Limited	Climb Limited	Climb Limited
Citation I/SP	11,850	3,373	3,671	3,988	Climb Limited	Climb Limited
Citation (525) CJ1	10,600	5,027	5,616	6,218	Climb Limited	Climb Limited
Citation (525A) CJ2	12,375	3,927	4,245	4,575	4,951	Climb Limited
Gulfstream 100	24,650	5,879	6,527	7,207	7,884	Climb Limited
Gulfstream 150	26,100	5,740	6,071	Climb Limited	Climb Limited	Climb Limited
Gulfstream 650	99,600	5,634	6,252	6,923	7,777	Climb Limited
Global Express	98,000	5,562	6,241	6,955	Climb Limited	Climb Limited
Hawker 800 (Non-T/R)	27,400	7,010	8,069	9,225	Climb Limited	Climb Limited
Lear 35A	19,600	7,303	Climb Limited	Climb Limited	Climb Limited	Climb Limited
Westwind II	23,500	6,269	Climb Limited	Climb Limited	Climb Limited	Climb Limited
Average Takeoff Length		**4,900**	**5,200**	**5,600**	**5,900**	**6,400**

Green figures are less than or equal to the length of the runway at CGZ; orange figures are greater than the length of the runway at CGZ.
'Climb Limited' indicates the input data is outside the operating limits of the aircraft planning manual.
MTOW - Maximum Takeoff Weight

Source: Ultranav software

The analysis shows that the current length of 5,200 feet available on Runway 5-23 is only adequate for about half of the business jets analyzed at 60 percent useful load. Progressively more jets become weight-restricted at 70 percent and greater useful loads, with many climb limited at 90 and 100 percent. The average takeoff length needed for all turbine aircraft analyzed at 100 percent useful load is 6,400 feet, excluding those aircraft that are climb limited.

Table 3J presents the runway length required for landing under three operational categories: Title 14 Code of Federal Regulations (CFR) Part 25, CFR Part 135, and CFR Part 91k. CFR Part 25 operations are those conducted by individuals or companies which own their aircraft. CFR Part 135 applies to all for-hire charter operations, including most fractional ownership operations. CFR Part 91k includes operations in fractional ownership which utilize their own aircraft under direction of pilots specifically assigned to said aircraft. Part 91k and Part 135 rules regarding landing operations require operators to land at the destination airport within 60 percent of the effective runway length. An additional rule allows for operators to land within 80 percent of the effective runway length if the operator has an approved destination airport analysis in the airport's program operating manual. The landing length analysis conducted accounts for both scenarios.

Table 3J | Business Aircraft Landing Length Requirements – Runway 5-23

		LANDING LENGTH REQUIREMENTS (feet)					
		Dry Runway Condition			Wet Runway Condition		
Aircraft Name	MLW	Part 25	80% Rule	60% Rule	Part 25	80% Rule	60% Rule
Westwind II	19,000	2,480	3,100	4,133	2,850	3,563	4,750
Citation I/SP	11,350	2,520	3,150	4,200	2,898	3,623	4,830
Global Express	78,600	2,740	3,425	4,567	3,151	3,939	5,252
King Air 350	15,000	2,988	3,735	4,980	3,436	4,295	5,727
Falcon 2000	33,000	3,219	4,024	5,365	3,702	4,628	6,170
Citation Sovereign	27,100	3,108	3,885	5,180	4,012	5,015	6,687
Hawker 800 (Non-T/R)	23,350	3,110	3,888	5,183	4,020	5,025	6,700
Citation (525) CJ1	9,800	3,067	3,834	5,112	4,151	5,189	6,918
Citation CJ3	12,750	3,285	4,106	5,475	4,472	5,590	7,453
Challenger 604/605	38,000	2,888	3,610	4,813	4,592	5,740	7,653
Lear 35A	15,300	3,399	4,249	5,665	4,758	5,948	7,930
Gulfstream 150	21,700	3,331	4,164	5,552	4,827	6,034	8,045
Citation (525A) CJ2	11,500	3,440	4,300	5,733	4,953	6,191	8,255
Lear 60	19,500	3,810	4,763	6,350	5,196	6,495	8,660
Gulfstream 550	75,300	2,856	3,570	4,760	5,407	6,759	9,012
Gulfstream 650	83,500	4,140	5,175	6,900	5,453	6,816	9,088
Beechjet 400A	15,700	3,926	4,908	6,543	5,853	7,316	9,755
Citation 560 XLS	18,700	3,687	4,609	6,145	5,875	7,344	9,792
Gulfstream 450	66,000	3,359	4,199	5,598	6,044	7,555	10,073
Citation X	31,800	4,234	5,293	7,057	6,058	7,573	10,097
Gulfstream 100	20,700	3,370	4,213	5,617	6,298	7,873	10,497
Citation II (550)	12,700	2,619	3,274	4,365	6,328	7,910	10,547
Citation III	19,000	4,370	5,463	7,283	6,403	8,004	10,672
King Air C90GTi	9,600	1,602	2,003	2,670	N/A	N/A	N/A
King Air 200 GT	12,500	2,941	3,676	4,902	N/A	N/A	N/A
King Air C90B	9,600	1,322	1,653	2,203	N/A	N/A	N/A
Pilatus PC-12	9,921	2,446	3,058	4,077	N/A	N/A	N/A
Average Landing Length		**3,100**	**3,900**	**5,200**	**4,800**	**6,000**	**8,000**

Green figures are less than or equal to the length of the runway at CGZ; orange figures are greater than the length of the runway at CGZ.
MLW – Maximum Landing Weight
N/A – Not Applicable. Turboprop aircraft landing lengths are not adjusted for wet runway conditions.
Source: Ultranav software

The landing length analysis shows that all Part 25 operations and most aircraft operating under Part 91k can land on the available runway length at CGZ during dry runway conditions. Approximately half of the aircraft analyzed can safely operate on a dry runway under Part 135 conditions. During wet or contaminated runway conditions, fewer aircraft are able to operate, and only two meet the landing length requirements under Part 135.

Runway Length Summary

Many factors are considered when determining appropriate runway length for safe and efficient operations of aircraft at CGZ. The airport should strive to accommodate business jets and turboprop aircraft to the greatest extent possible as demand would dictate. Runway 5-23 is currently 5,200 feet long and can accommodate many of these aircraft under moderate loading conditions, even during hot temperatures and at high percentage useful loads. At near maximum takeoff weights (MTOWs), some aircraft do have runway length requirements that exceed the available length on Runway 5-23, and many are climb limited.

Justification for any runway extension to meet the needs of turbine aircraft would require regular use on the order of 500 annual itinerant operations. This is the minimum threshold required to obtain FAA grant funding assistance. The existing critical aircraft, the King Air 200/300/350, can operate at up to 90 percent useful load. However, the ultimate critical aircraft, the Challenger 600/604, requires a longer runway than what is currently available when operating at 60 percent and greater useful loads. With many of the turbine aircraft currently using and anticipated to use the runway at CGZ unable to operate when taking on more than 60 percent useful loads, runway extension options should be considered. While the airport may not be able to justify an extension with 500 annual itinerant operations at present, planning should consider the potential for this threshold to be met at some point in the future. Previous planning studies completed for CGZ have also included a recommendation for a longer runway. Therefore, analysis in the next chapter will examine potential extensions up to at least 7,000 feet to Runway 5-23, while considering appropriate safety design standards (these standards will be detailed later in this chapter).

Runway Width

Runway width design standards are primarily based on the critical aircraft but can also be influenced by the visibility minimums of published instrument approach procedures. For Runway 5-23, existing RDC B-II-2400 and ultimate RDC C-II-2400 design criteria stipulate a runway width of 100 feet. Therefore, the existing width of 100 feet on Runway 5-23 should be maintained through the planning period.

Pavement Strength

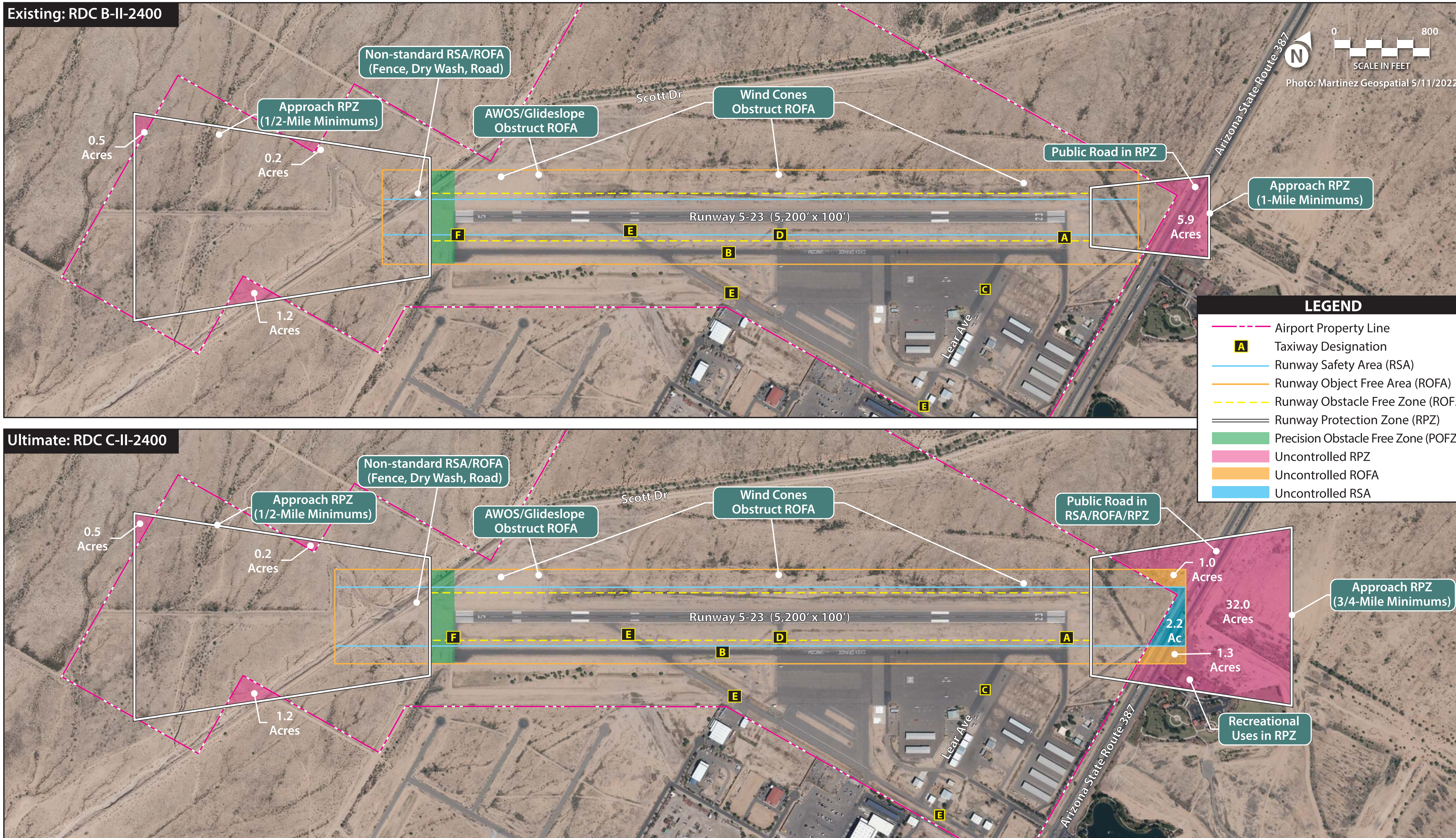
An important feature of airfield pavement is its ability to withstand repeated use by aircraft of varying weights. The FAA reports the pavement strength for Runway 5-23 as 18,500 pounds for single wheel (SWL) aircraft and 65,000 pounds for dual wheel (DWL) aircraft. The strength rating of a runway does not preclude aircraft weighing more than the published strength rating from using the runway. All federally obligated airports must remain open to the public, and it is typically up to the pilot of the aircraft to determine if a runway can support their aircraft safely. An airport sponsor cannot restrict an aircraft from using the runway simply because its weight exceeds the published strength rating. On the other hand, the airport sponsor has an obligation to properly maintain the runway and protect the useful life of the runway, typically for 20 years.

The strength rating of a runway can change over time. Regular usage by heavier aircraft can decrease the strength rating, while periodic runway resurfacing can increase the strength rating. The current runway strength rating on Runway 5-23 is adequate to accommodate the aircraft that currently operate at the airport. As previously mentioned, the ultimate critical aircraft includes the Challenger 604, which can weigh 47,600 pounds on dual-wheel main landing gear. Therefore, the existing pavement strength is sufficient throughout the planning period.

SAFETY AREA DESIGN STANDARDS

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

The entire RSA, ROFA, and runway obstacle free zone (ROFZ) must be under the direct ownership of the airport sponsor to ensure these areas remain free of obstacles and can be readily accessed by maintenance and emergency personnel. RPZs should also be under airport ownership. An alternative to outright ownership of the RPZ is the purchase of avigation easements (acquiring control of designated airspace within the RPZ) or having sufficient land use control measures in place which ensure the RPZ remains free of incompatible development. The various airport safety areas are presented graphically on **Exhibit 3D**, and **Table 3K** presents the FAA design standards as they apply to Runway 5-23 at CGZ.


Existing: RDC B-II-2400
Non-standard RSA/ROFA (Fence, Dry Wash, Road)
Approach RPZ (1/2-Mile Minimums)
AWOS/Glideslope Obstruct ROFA
Wind Cones Obstruct ROFA
Scott Dr
Public Road in RPZ
Approach RPZ (1-Mile Minimums)
Arizona State Route 387
0.5 Acres
0.2 Acres
1.2 Acres
5.9 Acres
Runway 5-23 (5,200' x 100')
A
B
C
D
E
F
Lear Ave
0
800
SCALE IN FEET
Photo: Martinez Geospatial 5/11/2022
LEGEND
Airport Property Line
Taxiway Designation
Runway Safety Area (RSA)
Runway Object Free Area (ROFA)
Runway Obstacle Free Zone (ROFZ)
Runway Protection Zone (RPZ)
Precision Obstacle Free Zone (POFZ)
Uncontrolled RPZ
Uncontrolled ROFA
Uncontrolled RSA
Ultimate: RDC C-II-2400
Non-standard RSA/ROFA (Fence, Dry Wash, Road)
Approach RPZ (1/2-Mile Minimums)
AWOS/Glideslope Obstruct ROFA
Wind Cones Obstruct ROFA
Scott Dr
Public Road in RSA/ROFA/RPZ
Approach RPZ (3/4-Mile Minimums)
Recreational Uses in RPZ
0.5 Acres
0.2 Acres
1.2 Acres
1.0 Acres
32.0 Acres
2.2 Ac
1.3 Acres
Runway 5-23 (5,200' x 100')
Lear Ave
Arizona State Route 387

This page intentionally left blank

Table 3K | Runway Design Standards	Runway 5-23 (Existing)		Runway 5-23 (Ultimate)	
Runway Design Code	B-II-2400		C-II-2400	
Visibility Minimums	½ mile (5) | 1-mile (23)		½ mile (5) | ¾-mile (23)	
RUNWAY DESIGN				
Runway Width	100’		100’	
RUNWAY PROTECTION				
Runway Safety Area				
Width	300’		500’	
Length Beyond Departure End	600’		1,000’	
Length Prior to Threshold	600’		600’	
Runway Object Free Area				
Width	800’		800’	
Length Beyond Departure End	600’		1,000’	
Length Prior to Threshold	600’		600’	
Runway Obstacle Free Zone				
Width	400’		400’	
Length Beyond Runway End	200’		200’	
Precision Obstacle Free Zone (Runway 5)				
Width	800’		800’	
Length Beyond Runway End	200’		200’	
Approach Runway Protection Zone				
Runway End	**5**	**23**	**5**	**23**
Inner Width	1,000’	500’	1,000’	1,000’
Outer Width	1,750’	700’	1,750’	1,510’
Length	2,500’	1,000’	2,500’	1,700’
Departure Runway Protection Zone				
Inner Width	500’		500’	
Outer Width	700’		1,010’	
Length	1,000’		1,700’	
RUNWAY SEPARATION				
Runway Centerline to:				
Hold Line Position	250’		250’	
Parallel Taxiway	300’		400’	
Note: All dimensions in feet unless otherwise noted.				

Source: FAA AC 150/5300-13B, Airport Design

Runway Safety Area

The RSA is defined in FAA AC 150/5300-13B, *Airport Design,* as a “defined area surrounding the runway consisting of a prepared surface suitable for reducing the risk of damage to aircraft in the event of undershoot, overshoot, or excursion from the runway.” The RSA is centered on the runway and dimensioned in accordance with the approach speed of the critical aircraft using the runway. The FAA requires the RSA to be cleared and graded, drained by grading or storm sewers, capable of accommodating the critical aircraft and fire and rescue vehicles, and free of obstacles not fixed by navigational purpose, such as runway edge lights or approach lights.

The FAA has placed a higher significance on maintaining adequate RSA at all airports. Under Order 5200.8, effective October 1, 1999, the FAA established the *Runway Safety Area Program.* The Order states, "The objective of the Runway Safety Area Program is that all RSAs at federally-obligated airports…shall conform to the standards contained in AC 150/5300-13, *Airport Design*, to the extent practicable." Each Regional Airports Division of the FAA is obligated to collect and maintain data on the RSA for each runway at the airport and perform airport inspections.

For existing RDC B-II-2400 design standards on Runway 5-23, the FAA calls for the RSA to be 300 feet wide and extend 600 feet beyond the runway ends. At these dimensions, the RSA is fully contained within existing airport property, but there are non-standard conditions off the Runway 5 end, including the airport's perimeter fencing, the dry wash, and a gravel road (Scott Drive). For ultimate RDC C-II-2400 design standards, the dimensions of the RSA increase to 500 feet wide and 1,000 feet beyond the runway ends. On the Runway 5 end, the RSA remains fully on airport property, but the same obstructions as the existing condition as present. On the Runway 23 end, the ultimate RSA extends beyond airport property northeast of the Runway 23 threshold by approximately 2.2 acres, as depicted on **Figure 3A**. Arizona State Route 387 (Pinal Avenue) also passes through the ultimate RSA, which is not a permissible condition. The alternatives chapter will consider options to mitigate this non-standard condition.

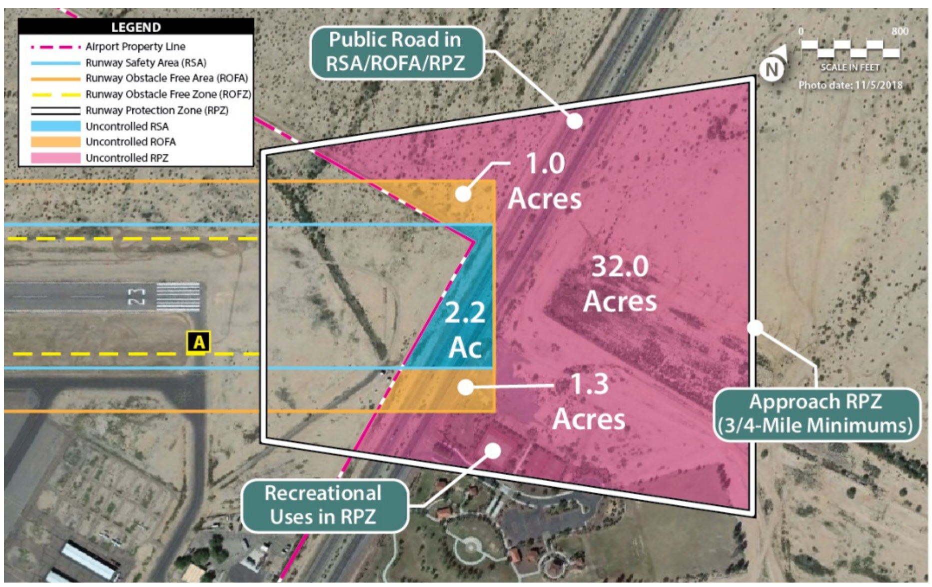


Figure 3A – Ultimate Condition Uncontrolled Safety Areas

Runway Object Free Area

The ROFA is "a clear area limited to equipment necessary for air and ground navigation, and provides wingtip protection in the event of an aircraft excursion from the runway." It is a two-dimensional ground area, surrounding runways, taxiways, and taxilanes, which is clear of objects except for objects whose location is fixed by function (i.e., airfield lighting). The ROFA does not have to be graded and level like the RSA; instead, the primary requirement for the ROFA is that no object in the ROFA penetrates the lateral elevation of the RSA. The ROFA is centered on the runway, extending out in accordance with the critical aircraft utilizing the runway.

For existing RDC B-II-2400 design standards on Runway 5-23, the FAA calls for the ROFA to be 800 feet wide, extending 600 feet beyond each runway end. In the existing condition, the ROFA is fully contained within airport property; however, there are obstructions present. The airport's perimeter fencing and Scott Drive obstruct the ROFA at the Runway 5 end, as does the glideslope antenna and AWOS. The lighted windcone located at midfield and the supplemental windcones located at each runway end are also obstructions and should be relocated outside of the ROFA.

In the ultimate RDC C-II-2400 condition, the ROFA width remains at 800 feet, but the length beyond the runway ends increases to 1,000 feet. Like the ultimate RSA, the ROFA northeast of the Runway 23 threshold extends beyond airport property, with approximately 2.3 acres uncontrolled by the airport (see **Figure 3A**). The obstructions to the existing ROFA carry over into the ultimate condition, along with Arizona State Route 387. The next chapter will evaluate options to correct these non-standard conditions.

Obstacle Free Zone

The ROFZ is an imaginary surface which precludes object penetrations, including taxiing and parked aircraft. The only allowance for ROFZ obstructions is navigational aids mounted on frangible bases which are fixed in their location by function, such as airfield signs. The ROFZ is established to ensure the safety of aircraft operations. If the ROFZ is obstructed, the airport's approaches could be removed, or approach minimums could be increased.

For all runways serving aircraft over 12,500 pounds, the ROFZ is 400 feet wide, centered on the runway, and extends 200 feet beyond the runway ends. This standard applies to Runway 5-23 at CGZ. Under current evaluation with available data, there are no ROFZ obstructions at the airport.

A precision obstacle free zone (POFZ) is further defined for runway ends with a ½-mile visibility precision approach, such as the ILS approach to Runway 5. The POFZ is 800 feet wide, centered on the runway, and extends from the runway's threshold for 200 feet. The POFZ is in effect when the following conditions are met:

a) The runway supports a vertically guided approach.
b) Reported ceiling is below 250 feet or visibility is less than ¾-mile.
c) An aircraft is on final approach within two miles of the runway threshold.

When the POFZ is in effect, a wing of an aircraft holding on a taxiway may penetrate the POFZ; however, neither the fuselage nor the tail may infringe on the POFZ. POFZ standards currently apply to Runway 5 as it is equipped with vertically guided approaches with instrument approach minimums below ¾-mile.

Runway Protection Zone

An RPZ is a trapezoidal area centered on the extended runway centerline beginning 200 feet from the end of the runway. This safety area has been established to protect the end of the runway from airspace penetrations and incompatible land uses. The RPZ dimensions are based upon the established RDC and the approach visibility minimums serving the runway. While the RPZ is intended to be clear of incompatible objects or land uses, some uses are permitted with conditions and other land uses are prohibited. According to AC 150/5300-13B, the following land uses are permissible within the RPZ:

- Farming that meets the minimum buffer requirements.
- Irrigation channels, as long as they do not attract birds.
- Airport service roads, as long as they are not public roads and are directly controlled by the airport operator.
- Underground facilities, as long as they meet other design criteria, such as RSA requirements, as applicable.
- Unstaffed navigational aids (NAVAIDs) and facilities, such as required for airport facilities that are fixed-by-function in regard to the RPZ.
- Above-ground fuel tanks associated with back-up generators for unstaffed NAVAIDS.

In September 2022, the FAA published AC 150/5190-4B, *Airport Land Use Compatibility Planning*, which states that airport owner control over RPZs is preferred. Airport owner control over RPZs may be achieved through:

- Ownership of the RPZ property in fee simple;
- Possessing sufficient interest in the RPZ property through easements, deed restrictions, etc.;
- Possessing sufficient land use control authority to regulate land use in the jurisdiction containing the RPZ;
- Possessing and exercising the power of eminent domain over the property; or
- Possessing and exercising permitting authority over proponents of development within the RPZ (e.g., where the sponsor is a State).

AC 150/5190-4B further states that "control is preferably exercised through acquisition of sufficient property interest and includes clearing RPZ areas (and keeping them clear) of objects and activities that would impact the safety of people and property on the ground." The FAA does recognize that land ownership, environmental, geographical, and other considerations can complicate land use compatibility within RPZs. Regardless, airport sponsors are to comply with FAA Grant Assurances, including but not limited to Grant Assurance 21, Compatible Land Use. Sponsors are expected to take appropriate measures to "protect against, remove, or mitigate land uses that introduce incompatible development within RPZs." For proposed projects that would shift an RPZ into an area with existing incompatible land uses, such as a runway extension or construction of a new runway, the sponsor is expected to have or secure sufficient control of the RPZ, ideally through fee simple ownership. Where existing incompatible land uses are present, the FAA expects sponsors to "seek all possible opportunities to eliminate, reduce, or mitigate existing incompatible land uses" through acquisition, land exchanges, right-of-first-refusal to purchase, agreement with property owners on land uses, easements, or other such measures. These efforts should be revisited during master plan or ALP updates, and periodically thereafter, and documented to demonstrate compliance with FAA Grant Assurances. If new or proposed incompatible land uses impact an RPZ, the FAA expects the airport to take the above actions to control the property within the RPZ, along with adopting a strong public stance opposing the incompatible land uses.

For new incompatible land uses that result from a sponsor-proposed action (i.e., an airfield project such as a runway extension, a change in the critical aircraft that increases the RPZ dimension, or lower minimums that increase the RPZ dimension), The airport sponsor is expected to conduct an Alternatives Evaluation. The intent of the Alternatives Evaluation is to "proactively identify a full range of alternatives and prepare a sufficient evaluation to be able to draw a conclusion about what is 'appropriate and reasonable.'" For incompatible development off-airport, the sponsor should coordinate with the Airports District Office (ADO) as soon as they are aware of the development, with the alternatives evaluation conducted within 30 days of becoming aware of the development within the RPZ. The following items are typically necessary in an Alternatives Evaluation:

- Sponsor's statement of the purpose and need of the proposed action (airport project, land use change or development)
- Identification of any other interested parties and proponents
- Identification of any federal, state, and local transportation agencies involved
- Analysis of sponsor control of the land within the RPZ
- Summary of all alternatives considered including:
  - Alternatives that preclude introducing the incompatible land use within the RPZ (e.g., zoning action, purchase, and design alternatives such as implementation of declared distances, displaced thresholds, runway shift or shortening, raising minimums)
  - Alternatives that minimize the impact of the land use in the RPZ (e.g., rerouting a new roadway through less of the RPZ, etc.)
  - Alternatives that mitigate risk to people and property on the ground (e.g., tunnelling, depressing and/or protecting a roadway through the RPZ, implementing operational measures to mitigate any risks, etc.)
- Narrative discussion and exhibits or figures depicting the alternative
- Rough order of magnitude cost estimates associated with each alternative, regardless of potential funding sources
- A practicability assessment based on the feasibility of the alternative in terms of cost, constructability, operational impacts, and other factors.

Once the Alternatives Evaluation has been submitted to the ADO, the FAA will determine whether or not the sponsor has made an adequate effort to pursue and give full consideration to appropriate and reasonable alternatives. **The FAA will not approve or disapprove the airport sponsor's preferred alternative; rather, the FAA will only evaluate whether an acceptable level of alternatives analysis has been completed before the sponsor makes the decision to allow or not allow the proposed land use within the RPZ.**

In summary, the RPZ guidance published in September 2022 shifts the responsibility of protecting the RPZ to the airport sponsor. The airport sponsor is expected to take action to control the RPZ or to demonstrate that appropriate actions have been taken. It is ultimately up to the airport sponsor on whether or not to permit existing or new incompatible land uses within an RPZ, with the understanding that they still have grant assurance obligations, and the FAA retains the authority to review and approve or disapprove portions of the ALP that would adversely impact the safety of people and property within the RPZ.

RPZs have been further designated as approach and departure RPZs. The approach RPZ is a function of the Aircraft Approach Category (AAC) and approach visibility minimums associated with the approach runway end. The departure RPZ is a function of the AAC and departure procedures associated with the runway. For a particular runway end, the more stringent RPZ requirements (usually associated with the approach RPZ) will govern the property interests and clearing requirements that the airport sponsor should pursue.

As shown on **Exhibit 3D**, portions of both RPZs extend beyond airport property in the existing condition, totaling approximately 7.8 acres of uncontrolled property. In addition to being uncontrolled, the existing RPZ associated with Runway 23 also encompasses a public road, Arizona State Route 387. As mentioned previously, public roadways are considered incompatible uses within an RPZ; however, the FAA can opt to "grandfather" the condition so that no corrective action is necessary. It should be noted that a change to the runway environment that alters the size of the RPZ may negate the "grandfathered" condition. The Runway 23 RPZ also extends over land that is currently undeveloped but is planned to become a park within the Villago neighborhood.

A shift to the ultimate condition, which includes the potential for instrument approach capabilities with down to ¾-mile visibility minimums for Runway 23, would increase the size of the RPZ. This change results in a larger portion (approximately 32.0 acres) of this RPZ being uncontrolled. As in the existing condition, the Runway 23 RPZ in the ultimate condition also encompasses Arizona State Route 387 and contains recreational facilities associated with the Villago neighborhood. With the potential change to the runway environment (transitioning from B-II to C-II and lower visibility minimums for Runway 23), neither of these are considered permissible land uses within an RPZ. The alternatives discussion in the next chapter will explore options for the airport to gain control over each of the RPZs and mitigate incompatibilities.

SEPARATION STANDARDS

There are several other standards related to separation distances from runways and taxiways. Each of these is designed to enhance the safety of the airfield.

Runway/Taxiway Separation

The design standard for the separation between runways and parallel taxiways is a function of the critical aircraft and the instrument approach visibility minimum. The separation standard for Runway 5-23 in the existing condition (RDC B-II-2400) is 300 feet from the runway centerline to the parallel taxiway centerline. Parallel Taxiway B is separated from the runway by 300 feet, meeting FAA design standards in the existing condition. In the ultimate condition, the separation standard increases to 400 feet. Thus, maintaining Taxiway B in its current location would not meet the design standard if/when the runway shifts to an RDC of C-II-2400. The alternatives in the next chapter will examine various options to meet this standard.

Hold Line Position Separation

Hold line position markings are placed on taxiways leading to runways. When instructed, pilots are to stop short of the holding position marking line. The existing and ultimate design standard calls for holding positions to be separated from the runway centerline by 250 feet. At CGZ, hold line position markings are situated 280 feet from the runway centerline, meeting existing and ultimate design standards.

Aircraft Parking Area Separation

According to FAA AC 150/5300-13B, aircraft parking positions should be located to ensure that aircraft components (wings, tail, and fuselage) do not:

1. Conflict with the object free area for adjacent runway or taxiways:
    a. Runway Object Free Area (ROFA)
    b. Taxiway Object Free Area (TOFA)
    c. Taxilane Object Free Area (TLOFA)
2. Violate any of the following aeronautical surfaces and areas:
    a. Runway approach or departure surface
    b. Runway Visibility Zone (RVZ)
    c. Runway Obstacle Free Zone (ROFZ)
    d. Navigational aid equipment critical areas

Existing aircraft parking positions at CGZ are located on the west apron and the terminal apron. **Figure 3B** depicts these areas, along with the existing/ultimate ROFA, TOFA, and TLOFA (TOFA and TLOFA standards are described in greater detail in the next section). As detailed in the graphic, the existing parking positions are clear of the ROFA; however, four of the parking positions on the terminal apron are located within the TLOFA and should be removed/relocated.

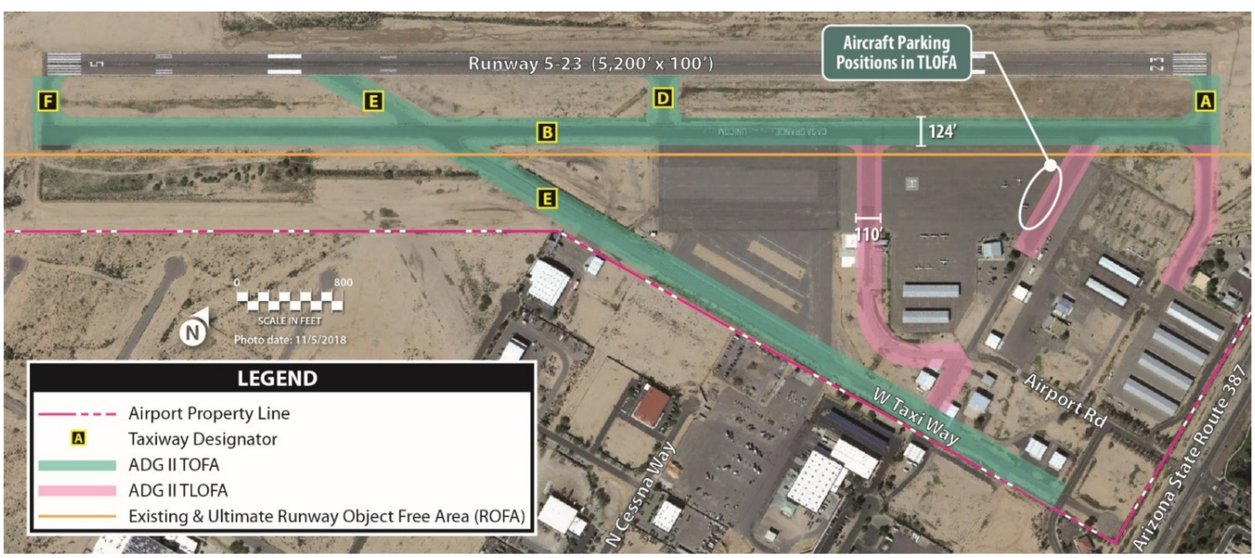


Figure 3B – Aircraft Parking Area Separation

TAXIWAYS

The design standards associated with taxiways are determined by the Taxiway Design Group (TDG) or the ADG of the critical aircraft. As determined previously, the applicable ADG for Runway 5-23 is ADG II. **Table 3L** presents the various taxiway design standards related to ADG II. The table also shows those taxiway design standards related to TDG. The TDG standards are based on the Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance of the critical aircraft expected to use those taxiways. Different taxiway and taxilane pavements can and should be planned to the most appropriate TDG design standards based on usage.

The current design for taxiways serving the runways is TDG 2, based upon the Beechcraft King Air 200/300/350, which dictates a width of 35 feet. Except for Taxiway E, which is 30 feet wide, the entire taxiway system at CGZ is 40 feet wide. While the greater width provides an added safety margin for aircraft operating at the airport, the FAA may elect not to fund regular pavement maintenance for the portions of taxiway pavement that exceed the standard. If the airport chooses to maintain the taxiways at their current widths, the costs may need to come from a local funding source rather than federal or state grant monies. Consideration should be given to increasing the width of Taxiway E to 35 feet. Certain portions of the landside area that are utilized exclusively by small aircraft, such as the T-hangar areas, should adhere to TDG 1A/1B standards.

Table 3L | Taxiway Dimensions and Standards

STANDARDS BASED ON WINGSPAN	***ADG II***
Taxiway and Taxilane Protection	
Taxiway Safety Area width (TSA)	79’
Taxiway Object Free Area width (TOFA)	124’
Taxilane Object Free Area width (TLOFA)	110’
Taxiway and Taxilane Separation	
Taxiway Centerline to Parallel Taxiway Centerline	102’
Taxiway Centerline to Fixed or Moveable Object	62’
Taxilane Centerline to Parallel Taxilane Centerline	94’
Taxilane Centerline to Fixed or Moveable Object	55’
Wingtip Clearance	
Taxiway Wingtip Clearance (feet)	23’
Taxilane Wingtip Clearance (feet)	16’
STANDARDS BASED ON TDG	***TDG 2***
Taxiway Width Standard	35’
Taxiway Edge Safety Margin	7.5’
Taxiway Shoulder Width	15’

ADG: Airplane Design Group
TDG: Taxiway Design Group
Note: All dimensions in feet

Source: FAA AC 150/5300-13B, Airport Design

Figure 3B on the previous page depicts the taxiway object free area (TOFA) and taxilane object free area (TLOFA), which are based upon ADG II standards. The TOFA for taxiways serving Runway 5-23 is 124 feet wide, while the TLOFA for taxilanes serving hangar areas is 110 feet wide. Like the ROFA, these areas should be cleared of objects and parked aircraft except for objects needed for air navigation or aircraft ground maneuvering purposes. The TOFAs associated with the airfield taxiways are clear of obstructions; however, as mentioned previously, four of the aircraft parking positions on the terminal apron are located within a TLOFA.

Taxiway and Taxilane Design Considerations

FAA AC 150/5300-13B, *Airport Design*, provides guidance on recommended taxiway and taxilane layouts to enhance safety by avoiding runway incursions. A runway incursion is defined as "any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft." The following is a list of the taxiway design guidelines and the basic rationale behind each recommendation included in the current AC as well as previous FAA safety and design recommendations.

1. **Taxiing Method**: Taxiways are designed for "cockpit over centerline" taxiing with pavement being sufficiently wide to allow a certain amount of wander. On turns, sufficient pavement should be provided to maintain the edge safety margin from the landing gear. When constructing new taxiways, upgrading existing intersections should be undertaken to eliminate "judgmental oversteering," which is where the pilot must intentionally steer the cockpit outside the marked centerline in order to assure the aircraft remains on the taxiway pavement.
2. **Curve Design**: Taxiways should be designed such that the nose gear steering angle is no more than 50 degrees, the generally accepted value to prevent excessive tire scrubbing.
3. **Three-Path Concept**: To maintain pilot situational awareness, taxiway intersections should provide a pilot a maximum of three choices of travel. Ideally, these are right, left, and a continuation straight ahead.
4. **Channelized Taxiing**: To support visibility of airfield signage, taxiway intersections should be designed to meet standard taxiway width and fillet geometry.
5. **Designated Hot Spots and Runway Incursion Mitigation (RIM) Locations**: A hot spot is a location on the airfield with elevated risk of a collision or runway incursion. For areas the FAA designates as a hot spot or RIM location, mitigation measures should be prioritized.
6. **Intersection Angles**: Design turns to be 90 degrees wherever possible. For acute-angle intersections, standard angles of 30, 45, 60, 120, 135, and 150 degrees are preferred.
7. **Runway Incursions**: Design taxiways to reduce the probability of runway incursions.
   - *Increase Pilot Situational Awareness*: A pilot who knows where he/she is on the airport is less likely to enter a runway improperly. Complexity leads to confusion. Keep taxiway systems simple using the "three-path" concept.
   - *Avoid Wide Expanses of Pavement*: Wide pavements require placement of signs far from a pilot's eye. This is especially critical at runway entrance points. Where a wide expanse of pavement is necessary, avoid direct access to a runway.
   - *Limit Runway Crossings*: The taxiway layout can reduce the opportunity for human error. The benefits are twofold – through simple reduction in the number of occurrences, and through a reduction in air traffic controller workload.

- *Avoid "High Energy" Intersections*: These are intersections in the middle third of runways. By limiting runway crossings to the first and last thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear.
- *Increase Visibility*: Right-angle intersections, both between taxiways and runways, provide the best visibility. Acute-angle runway exits provide greater efficiency in runway usage but should not be used as runway entrance or crossing points. A right-angle turn at the end of a parallel taxiway is a clear indication of approaching a runway.
- *Avoid "Dual Purpose" Pavements*: Runways used as taxiways and taxiways used as runways can lead to confusion. A runway should always be clearly identified as a runway and only a runway.
- *Direct Access*: Do not design taxiways to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway.
- *Hot Spots*: Confusing intersections near runways are more likely to contribute to runway incursions. These intersections must be redesigned when the associated runway is subject to reconstruction or rehabilitation. Other hot spots should be corrected as soon as practicable.

8. **Runway/Taxiway Intersections**
    - *Right Angle*: Right-angle intersections are the standard for all runway/taxiway intersections, except where there is a need for an acute-angled exit. Right-angle taxiways provide the best visual perspective to a pilot approaching an intersection with the runway to observe aircraft in both the left and right directions. They also provide optimal orientation of the runway holding position signs so they are visible to pilots.
    - *Acute Angle*: Acute angles should not be larger than 45 degrees from the runway centerline. A 30-degree taxiway layout should be reserved for high-speed exits. The use of multiple intersecting taxiways with acute angles creates pilot confusion and improper positioning of taxiway signage. The construction of high-speed exits is typically only justified for runways with regular use by jet aircraft in approach categories C and above.
    - *Large Expanses of Pavement*: Taxiways must never coincide with the intersection of two runways. Taxiway configurations with multiple taxiway and runway intersections in a single area create large expanses of pavement, making it difficult to provide proper signage, marking, and lighting.

9. **Taxiway/Runway/Apron Incursion Prevention**: Apron locations that allow direct access into a runway should be avoided. Increase pilot situational awareness by designing taxiways in such a manner that forces pilots to consciously make turns. Taxiways originating from aprons and forming a straight line across runways at mid-span should be avoided.
    - *Wide Throat Taxiways*: Wide throat taxiway entrances should be avoided. Such large expanses of pavement may cause pilot confusion and make lighting and marking more difficult.
    - *Direct Access from Apron to a Runway*: Avoid taxiway connectors that cross over a parallel taxiway and directly onto a runway. Consider a staggered taxiway layout or no-taxi island that forces pilots to make a conscious decision to turn.
    - *Apron to Parallel Taxiway End*: Avoid direct connection from an apron to a parallel taxiway at the end of a runway.

The taxiway system at CGZ generally provides for the efficient movement of aircraft, and there are no FAA-designated hot spots at the airport. However, there are several non-standard taxiway geometry conditions, as detailed on **Figure 3C**, including:

- Taxiway D provides direct access to a runway from an apron area.
- Taxiway E has acute-angled intersections with Runway 5-23 and Taxiway B. Taxiway E also extends farther southeast serving aviation development areas while connecting directly to the runway system.
- The holding bays at the ends of Taxiway B are a non-standard design. The FAA now considers these designs to be wide expanses of pavement and has set new standards for holding bay design.

In the alternatives chapter, potential solutions to these non-standard conditions will be presented. Analysis in the next chapter will also consider improvements which could be implemented on the airfield to minimize runway incursion potential, improve efficiency, and conform to FAA standards for taxiway design.

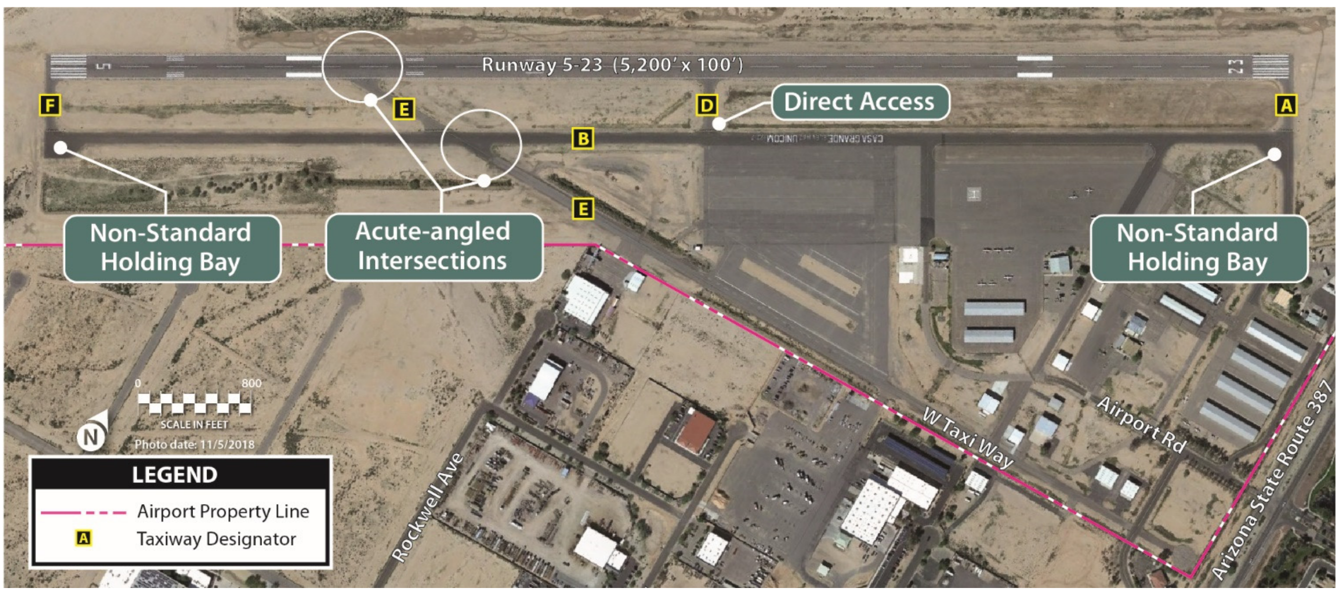


Figure 3C – Non-standard Taxiway Conditions

Taxilane Design Considerations

Taxilanes are distinguished from taxiways in that they do not provide access to or from the runway system directly. Taxilanes typically provide access to hangar areas. As a result, taxilanes can be planned to varying design standards depending on the type of aircraft utilizing the taxilane. For example, a taxilane leading to a T-hangar area only needs to be designed to accommodate those aircraft typically accessing the T-hangar.

NAVIGATIONAL AND APPROACH AIDS

Navigational aids are devices that provide pilots with guidance and position information when utilizing the runway system. Electronic and visual guidance to arriving aircraft enhance the safety and capacity of the airfield. Such facilities are vital to the success of an airport and provide additional safety to pilots and passengers using the air transportation system. While instrument approach aids are especially helpful during poor weather, they are often used by pilots conducting flight training and operating larger aircraft when visibility is good.

Instrument Approach Aids

CGZ has four published instrument approach procedures to Runway 5-23. Runway 5 has a precision instrument landing system (ILS) approach that provides visibility minimums down to ½-mile and a non-precision LPV-GPS approach with ½-mile visibility minimums. Runway 5 also has a straight-in VOR approach with visibility minimums down to ¾-mile. Runway 23 offers an LNAV-GPS approach with visibility minimums down to 1-mile. The ILS approach to Runway 5 provides for the lowest cloud ceiling, at 250 feet. Analysis in the next chapter will consider improvements necessary for enhancing instrument approach capabilities to Runway 23 (i.e., visibility minimums down to ¾-mile).

Runway 5 is equipped with a medium intensity approach lighting system with runway alignment indicator lights (MALSR) that enhances safety at the airport, especially during inclement weather or nighttime activity, and is a necessary component of the ILS.

Visual Approach Aids

In most instances, the landing phase of any flight must be conducted in visual conditions. To provide pilots with visual guidance information during landings to the runway, electronic visual approach aids are commonly provided at airports. Currently, both ends of Runway 5-23 are equipped with a two-box precision approach path indicator (PAPI-2). As more turbine aircraft begin to operate at the airport, consideration should be given to upgrading the PAPI-2 to a PAPI-4 (four-box system) on each runway end.

Runway end identification lights (REILs) are flashing lights located at the runway threshold end that facilitate rapid identification of the runway end at night and during poor visibility conditions. REILs provide pilots with the ability to identify the runway thresholds and distinguish the runway end lighting from the other lighting on the airport and in the approach areas. The FAA indicates that REILs should be considered for all lighted runway ends not planned for more sophisticated approach lighting systems. Since Runway 5 is equipped with a MALSR, a REIL system is not needed. However, Runway 23 is not equipped with any type of approach lighting system, so consideration should be given to adding REILs to this end of the runway.

Weather Reporting Aids

CGZ has a lighted wind cone and segmented circle located at midfield, as well as supplemental wind cones at both runway ends. The wind cones provide information to pilots regarding wind speed and direction. The segmented circle consists of a system of visual indicators designed to provide traffic pattern information to pilots.

The airport is also equipped with an AWOS, which provides weather observations 24 hours per day. The system updates weather observations every minute, continuously reporting significant weather changes as they occur in real time. This information is then transmitted via a designated radio frequency at regular intervals.

The wind cones and AWOS should be maintained through the planning period; however, as noted previously, their current locations within the ROFA is a non-standard condition and consideration should be given to relocating this equipment outside of this safety area.

AIRPORT TRAFFIC CONTROL TOWER

CGZ does not currently have an airport traffic control tower (ATCT). All traffic is coordinated through the local UNICOM radio frequency, which is monitored by airport staff. The current level of operations at the airport may indicate that airport safety could be enhanced if there were an ATCT. The following presents the process and initial analysis for justifying a federally funded ATCT.

Guidance for the establishment of an ATCT is provided in the following documents:

- FAA Advisory Circular 150/5300-13B, *Airport Design*;
- FAA Order 6480.7D, *Airport Traffic Control Tower and Terminal Radar Approach Control Facility Design Guidelines*;
- FAA Order 6480.4B, *Airport Traffic Control Tower Siting Process*;
- FAA Order 8260.3D, *United States Standard for Terminal Instrument Procedures (TERPS)*;
- FAA Handbook 7031.2C, *Airway Planning Standard Number One - Terminal Air Navigation Facilities and Air Traffic Control Services*.
- Federal Aviation Regulations (FAR) Part 170, *Establishment and Discontinuance Criteria for Air Traffic Control Services and Navigational Facilities*;
- FAA Report No. APO 90-7, *Establishment and Discontinuance Criteria for Air Traffic Control Towers.*

Establishment Criteria

ATCTs are established at airports to provide for a safe, orderly, and expeditious flow of traffic on, and in the vicinity of, an airport. Class D airspace surrounding the airport from the surface to 2,500 feet above the airport elevation (charted in mean sea level) is usually established in conjunction with a new ATCT. Many of the new control towers are part of the Federal Contract Tower Program.

The FAA has the authority to establish control towers or discontinue control tower services through the National Airspace System when activity levels and safety considerations merit such action. Criteria for establishing a control tower was initially developed and published in 1951. Current guidelines are established by the FAA Office of Aviation Policy and Plans (APO-200).

According to FAR Part 170.13, the following criteria, along with general facility establishment standards, must be met before an airport can qualify for a control tower:

1. The airport, whether publicly or privately owned, must be open to and available for use by the public as defined in the *Airport and Airway Improvement Act of 1982*;
2. The airport must be part of the NPIAS;
3. The airport owners/authorities must have entered into appropriate assurances and covenants to guarantee that the airport will continue in operation for a long enough period to permit the amortization of the control tower investment;
4. The FAA must be furnished appropriate land without cost for construction of the control tower; and
5. The airport must meet the benefit-cost ratio criteria utilizing three consecutive FAA annual counts and projections of future traffic during the expected life of the tower facility. (An FAA annual count is a fiscal year or a calendar year activity summary. Where actual traffic counts are unavailable or not recorded, adequately documented FAA estimates of the scheduled and non-scheduled activity may be used.)

The FAR specifically states that an airport is not guaranteed to receive a control tower, even if all the criteria listed above met. However, the FAA, responding to an airport sponsor's request for an air traffic control tower, can elect to establish a contract tower. The FAA will fund the operating costs of an ATCT included in the contract tower program, depending on the results of the benefit-cost analysis. Typically, the airport sponsor is responsible for the cost of construction of the tower. Recent changes to Federal legislation have made some funds available for ATCT construction. Additionally, the Bipartisan Infrastructure Law, which was passed in 2022, has allotted $5 billion to construction and improvements associated with air traffic facilities, including towers. As such, there is the potential for CGZ to obtain some level of federal funding support should an ATCT be justified through a benefit-cost analysis.

Benefit-Cost Ratio

The FAA prescribes benefit-cost-based criteria for establishment and discontinuance of control tower facilities as part of its mission to maximize safety and efficiency throughout the airport and airway system consistent with available resources. Decisions to establish and operate control towers have been, and will continue to be, based on benefits exceeding costs of such actions.

The criteria and computation methods used in determining the eligibility of terminal locations for VFR tower establishment and discontinuance is based on economic analysis of the costs and benefits of a control tower. The criterion compares the present value of VFR tower benefits (BPV) at a site with the present value of VFR tower costs (CPV) over a 15-year timeframe. A location is eligible for a control tower when the benefits derived from operating the tower exceed the installation and operation costs. This is the same as saying that value of benefits exceeds costs, or **BPV/CPV≥1.00**.

Site-specific activity forecasts are used to estimate three categories of tower benefits:

- Benefits from prevented collisions between aircraft;
- Benefits from other prevented accidents; and
- Benefits from reduced flying time.

Explicit dollar values are assigned to the prevention of fatalities and injuries and time saved. Tower establishment costs include:

- Annual operating costs including staffing, maintenance, equipment, supplies, and leased services; and
- Investment costs including facilities, equipment, and operational start-up.

The Federal Contract Tower (FCT) Program

The FCT has been in place since 1982 and currently provides for the contract operation of air traffic control (ATC) services at over 250 airports. Through the program, FAA contracts air traffic control services to the private sector at visual flight (VFR) airports. The primary advantages of the program are enhanced safety and significant cost savings to the federal government. FAA contract towers receive continuous oversight and monitoring by FAA, and all contract controllers are certified by the agency.

Initial Analysis

The establishment of a new ATCT follows a two-phase process as outlined in FAA Order 7031.2C*, Airway Planning Standard Number One - Terminal Air Navigation Facilities and Air Traffic Control Services*. The first phase involves identifying possible candidacy through analysis of operational levels at the airport. The formula presented in **Table 3M** has been utilized as an initial operational screening test to determine if it is reasonable for the airport to request a full benefit-cost analysis from the FAA.

Table 3M | ATCT Eligibility Calculations

		PLANNING YEAR	
Formula	**Function**	**2021**	**2041**
Air Carrier Operations/38,000	+	0.0000	0.0000
Air Taxi Operations/90,000	+	0.0226	0.0422
GA Itinerant Operations/160,000	+	0.6662	0.8713
GA Local Operations/280,000	+	0.0463	0.0786
Military Itinerant Operations/48,000	+	0.0085	0.0085
Military Local Operations/90,000	+	0.0000	0.0000
Total	**=**	**0.7437**	**1.0006**

Source: Coffman Associates

Experience at airports with similar annual operations to CGZ has shown that when the initial results of the formula are above 0.5, there is a possibility that the FAA benefit-cost ratio may be above 1.0 because it considers many additional factors, not just operations, with varying degrees of weight applied. Should the City of Casa Grande choose, they may notify the FAA of a desire to be included in the ATCT program so that a benefit-cost analysis can be conducted.

The second phase involves complex analysis of the benefits and costs of the establishment of an ATCT. The benefits, which derive from operating the tower, must exceed the installation and operation costs. The costs would include such items as construction, installation, salaries, and maintenance. The analysis applies values to the benefits, which include accident prevention and increases in efficiency.

Should a benefit-cost analysis be conducted, and it is found that the ratio is below 1.0, then under the contract tower cost-sharing program, the airport could qualify for ongoing operational FAA funding equal to the benefit-cost ratio. For example, if a benefit-cost ratio of 0.76 results, then the airport could be expected to receive funding to cover 76 percent of the annual operations cost. The city would then be responsible for the remaining 24 percent of the annual operating costs.

Since the airport has not been served by an ATCT, current operational counts are estimates and the FAA may require further justification of operational counts. In the past, the FAA has supported the use of acoustical counts or even established a temporary tower to obtain a more accurate operational count. Fuel sales records and manual monitoring of activity can also aid the FAA benefit-cost analysis.

Whether a positive benefit-cost ratio is realized in the short or long term, it is important to identify and reserve an appropriate location on the airport for a new ATCT. The alternatives chapter will include a basic site analysis for locating a new ATCT.

AIRFIELD LIGHTING, MARKING, AND SIGNAGE

There are several lighting and pavement marking aids serving pilots using the airport. These aids assist pilots in locating an airport and runway at night or in poor visibility conditions. They also serve aircraft navigating the airport environment on the ground when transitioning to/from aircraft parking areas to the runway.

Airport Identification Lighting | CGZ's rotating beacon is located on south side of the field, northwest of the shade hangars. The beacon is in good working order and should be maintained through the planning period.

Runway and Taxiway Lighting | Runway 5-23 is equipped with a medium intensity runway lighting (MIRL) system. This system is adequate and should be maintained. The taxiway system is equipped with medium intensity taxiway lighting (MITL). This system is also adequate and should be maintained. Planning should consider expansion of the MIRL and MITL systems if/when new pavements are constructed.

Airfield Signs | Airfield identification signs assist pilots in identifying their location on the airfield and directing them to their desired location. Lighted signs are installed on the runway and taxiway systems on the airfield. The signage system includes runway and taxiway designations, routing/directional, runway exits, and runway distance remaining. All these signs should be maintained throughout the planning period.

It should be noted that many airports are transitioning to light emitting diode (LED) systems. LEDs have many advantages, including lower energy consumption, longer lifespan, increased durability, reduced size, greater reliability, and faster switching. While a larger initial investment is required upfront, the energy savings and reduced maintenance costs will outweigh any additional costs in the long run. The majority of lighting on the airfield is LED, with the exception of the rotating beacon and the PAPIs. When these systems need to be repaired/replaced, consideration should be given to upgrading them to LED systems.

Pavement Markings | Runway markings are typically designed to the type of instrument approach available on the runway. FAA AC 150/5340-1K, *Standards for Airport Markings*, provides guidance necessary to design airport markings. Runway 5 has precision markings which aid in accommodating the ILS approach, while Runway 23 is equipped with non-precision markings. These runway markings should be maintained through the long-term planning horizon.

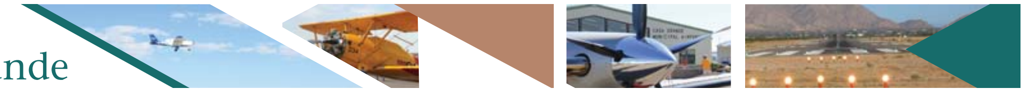
A summary of the airside facilities at CGZ is presented on **Exhibit 3E**.

LANDSIDE FACILITY REQUIREMENTS

Landside facilities are those necessary for the handling of aircraft and passengers while on the ground. These facilities provide the essential interface between the air and ground transportation modes. The capacity of the various components of each element was examined in relation to projected demand to identify future landside facility needs. At CGZ, this includes components for general aviation needs such as:

- General Aviation Terminal Facilities and Auto Parking
- Aircraft Storage Hangars
- Aircraft Parking Aprons
- Airport Support Facilities

In addition to landside facility requirements, potential non-aeronautical land uses will also be evaluated. These are portions of airport property that are suitable for non-aviation purposes and can generate revenue for the airport, such as agriculture or industrial. While airport property is generally subject to Airport Improvements Program (AIP) grant assurances, airports can request a release of aeronautical federal obligations for certain areas of property that are not necessary for aviation uses. These requests are facilitated under the *FAA Reauthorization Act of 2018*, Section 163, which governs the FAA's authority over non-aeronautical development.



CATEGORY	EXISTING	ULTIMATE
Runways	**5-23**	**5-23**
Runway Design Code (RDC)	B-II-2400	C-II-2400
Dimensions	5,200' x 100'	Consider extension; maintain width
Pavement Strength	18,500 lbs SWL | 65,000 lbs DWL	Maintain
Safety Areas*		
RSA	Non-Standard RSA (perimeter fencing, Scott Drive, dry wash)	2.2 acres uncontrolled; public road obstructs RSA - mitigation measures required
ROFA	Obstructions present (glideslope, AWOS, and windcones) - mitigation measures required	2.3 acres uncontrolled; obstructions present (glideslope, AWOS, windcones & public road) mitigation measures required
ROFZ	Standard ROFZ	Maintain
RPZ	Portions of both RPZs uncontrolled; public road in Runway 23 RPZ - mitigation measures may be necessary	Portions of both RPZs uncontrolled; public road and recreational uses in Runway 23 RPZ - mitigation measures may be necessary
Taxiways		
Design Group	2	Maintain
Parallel Taxiway	Taxiway B	Maintain
Parallel Taxiway Separation from Runway	300'	400' - consider parallel taxiway relocation
Widths	30' - 40'	Increase Taxiway E width to 35'; Maintain other taxiways at 40' if possible
Holding Position Separation	250'	Maintain
Notable Conditions	Direct Access from Apron via Taxiway D; acute-angled intersections; non-standard holding bays	Consider Corrective Measures
Navigational and Weather Aids		
Instrument Approaches	ILS (Runway 5), GPS, Straight-in VOR	Consider lower minimums on Runway 23
Weather Aids	AWOS, wind cones, rotating beacon	Maintain equipment
Approach Aids	MALSR (Runway 5), PAPI-2	Consider upgrade to PAPI-4; REILs on Runway 23
Lighting and Marking		
Runway Lighting	MIRL	Maintain
Runway Marking	Precision (Runway 5), Non-precision (Runway 23)	Maintain
Taxiway Lighting	MITL	Maintain

*Ultimate safety areas subject to change, depending on the ultimate runway environment

KEY

- **AWOS** - Automated Weather Observing System
- **DWL** - Dual Wheel Landing Gear Type
- **GPS** - Global Positioning System
- **ILS** - Instrument Landing System
- **LPV** - Localizer Performance Vertical Guidance
- **MALSR** - Medium Intensity Approach Lighting System with Runway Alignment
- **MIRL** - Medium Intensity Runway Lighting
- **MITL** - Medium Intensity Taxiway Lighting
- **REILs** - Runway End Identifier Lights
- **ROFZ** - Runway Obstacle Free Zone
- **ROFA** - Runway Object Free Area
- **RPZ** - Runway Protection Zone
- **RSA** - Runway Safety Area
- **PAPI** - Precision Approach Path Indicator
- **SWL** - Single Wheel Landing Gear Type

GENERAL AVIATION TERMINAL SERVICES

The general aviation terminal facilities at an airport are often the first impression of the community that corporate officials and other visitors will encounter. General aviation terminal facilities at an airport provide space for passenger waiting, pilots' lounge, flight planning, concessions, management, storage, and many other various needs. This space is not necessarily limited to a single, separate terminal building, but can include space offered by fixed base operators (FBOs) and other specialty operators for these functions and services. At CGZ, all general aviation terminal services are provided in the terminal building, which includes a pilots' lounge and waiting area, a conference room, the airport manager's office, restrooms, and a restaurant (planned to be re-opened in Spring 2022).

The methodology used in estimating general aviation terminal facility needs was based on the number of airport users expected to utilize general aviation facilities during the design hour. Space requirements for terminal facilities were based on providing 90 square feet (sf) per design hour itinerant passenger. A multiplier of 1.5 in the short term, increasing to 1.9 in the long term, was also applied to terminal facility needs to better determine the number of passengers associated with each itinerant aircraft operation. This increasing multiplier indicates an expected increase in larger aircraft operations through the long term. These operations typically support larger turboprop and jet aircraft, which can accommodate an increasing passenger load factor. Such is the case at CGZ, where an increasing number of turbine operations are anticipated.

Table 3N outlines the space requirements for general aviation terminal services at CGZ through the long-term planning period. The amount of space currently offered in the terminal is approximately 4,800 sf. As shown in the table, additional terminal space may be needed as early as the short-term, with 11,900 sf projected to be needed by the end of the long-term period.

General aviation vehicle parking demands have also been determined for CGZ. Space determinations for passengers were based on an evaluation of existing airport use, as well as standards set forth to help calculate projected terminal facility needs. There are currently 32 individual spaces provided at the terminal building, which can also serve some general aviation vehicle parking needs. However, most based aircraft owners prefer to park near their hangar. As can be seen in the table, vehicle parking needs is another segment that is anticipated to grow over the course of the planning period, with 83 spaces estimated to be needed by the end of the long term. This includes spaces for itinerant passengers, based aircraft owners, and other visitors to the airport.

Table 3N | General Aviation Terminal Area Facilities

	Currently Available	Short-Term Need	Intermediate-Term Need	Long-Term Need
Terminal Services Building (sf)	4,800	7,700	8,700	11,900
General Aviation Design Hour Passengers		85	97	132
Passenger Multiplier		1.5	1.6	1.9
Visitor/Tenant Vehicle Parking	32	55	62	83

Source: Coffman Associates analysis

AIRCRAFT HANGARS

Utilization of hangar space varies as a function of local climate, security, and owner preference. The trend in general aviation aircraft is toward more sophisticated (and consequently, more expensive) aircraft; therefore, many aircraft owners prefer enclosed hangar space as opposed to outside tiedowns.

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

While most aircraft owners prefer enclosed aircraft storage, several based aircraft will still use outdoor tiedown spaces, usually due to lack of available hangar space, high hangar rental rates, or operational needs. Therefore, enclosed hangar facilities do not necessarily need to be planned for each based aircraft.

Hangar types vary greatly in size and function. T-hangars, box hangars, and shade hangars are popular with aircraft owners that need to store one private aircraft. These hangars often provide individual spaces within a larger structure or in standalone portable buildings. There is a combined 93,800 sf of T-hangar and shade hangar storage space at the airport. For determining future aircraft storage needs, a planning standard of 1,200 sf per aircraft is utilized for these types of hangars.

Executive box hangars are open-space facilities with no interior supporting structure. These hangars can vary in size between 1,500 and 2,500 sf, with some approaching 10,000 sf. They are typically able to house single engine, multi-engine, turboprop, and jet aircraft, as well as helicopters. Executive box hangar space at CGZ is estimated at 41,400 sf. For future planning, a standard of 3,000 sf per turboprop, 5,000 sf per jet, and 1,500 sf per helicopter is utilized for executive box hangars.

Conventional hangars are the large, open-space facilities with no supporting interior structure. These hangars provide for bulk aircraft storage and are often utilized by airport businesses, such as an FBO or an aircraft maintenance operator. Conventional hangars are generally larger than executive box hangars and can range in size from 10,000 sf to more than 20,000 sf. Often, a portion of a conventional hangar is utilized for non-aircraft storage needs, such as maintenance or office space. There are no conventional hangars at CGZ. For planning purposes, the same aircraft sizing standards utilized for executive hangars is also utilized for conventional hangars.

Requirements for maintenance/service hangar area have also been calculated. While there are tenants on the airport who provide maintenance services, these are conducted within individual T-hangar units rather than conventional hangars, which are more commonly used for maintenance. To determine service hangar needs, a planning standard of 250 sf per based aircraft has been calculated.

Future hangar requirements for the airport are summarized in **Table 3P**. While some based aircraft will continue to utilize aircraft parking apron space as opposed to enclosed hangar space, the overall percentage of aircraft seeking hangar space is projected to increase during the long-term planning period.

Table 3P | Aircraft Hangar Requirements	Currently Available	Short-Term Need	Intermediate-Term Need	Long-Term Need	Difference
Total Based Aircraft	102	115	131	167	+65
Hangar Area Requirements					
T-Hangar/Shade Hangar (sf)	93,800	105,800	118,400	144,200	+50,400
Executive Box/Conventional Hangar Area (sf)	41,400	52,400	66,400	110,400	+69,000
Service Hangar Area (sf)	0	28,800	32,800	41,800	+41,800
Total Hangar Area (sf)	**135,200**	**187,000**	**217,600**	**296,400**	**+161,200**

Source: Coffman Associates analysis

The analysis shows that future hangar requirements indicate a potential need for more than 160,000 sf of new hangar storage capacity through the long-term planning period. This includes a mixture of hangar types, with the largest needs projected in the executive and conventional hangar categories. Due to the projected increase in based aircraft, annual general aviation operations, and hangar storage needs, facility planning will consider additional hangars at the airport. It is expected that the aircraft storage hangar requirements will continue to be met through a combination of hangar types.

It should be noted that hangar requirements are general in nature and based upon the aviation demand forecasts. The actual need for hangar space will further depend on the usage within the hangars. For example, some hangars may be utilized entirely for non-aircraft storage, such as maintenance; yet from a planning standpoint, they have an aircraft storage capacity. Therefore, the needs of an individual user may differ from the calculated space necessary.

AIRCRAFT PARKING APRONS

The aircraft parking apron is an expanse of paved area intended for aircraft parking and circulation. Typically, a main apron is centrally located near the airside entry point, such as the terminal building or FBO facility. Ideally, the main apron is large enough to accommodate transient airport users as well as a portion of locally based aircraft. Often, smaller aprons are available adjacent to FBO or specialty aviation service operator (SASO) hangars and at other locations around the airport. The apron layout at CGZ generally follows this typical pattern, with a terminal apron that serves primarily transient users, and the west apron that provides dedicated aircraft parking space for both transient and local operators.

To determine future apron needs, a planning criterion of 800 square yards (sy) was used for single and multi-engine itinerant aircraft, while a planning criterion of 1,600 sy was used to determine the area for transient turboprop and jet aircraft. A parking apron should also provide space for locally based aircraft that require temporary tiedown storage. Locally based tiedowns typically will be utilized by smaller single engine aircraft; thus, a planning standard of 650 sy per position is utilized.

The total apron parking requirements are presented in **Table 3Q**. Currently, the existing parking aprons at CGZ encompass approximately 87,000 sy of space. This is divided among the terminal apron (44,000 sy) and the west apron (43,000 sy). Using the planning standards described above and factoring in assumptions regarding operational and based aircraft growth, additional apron space is projected to be needed beginning in the short term. By the long term, approximately 126,800 sy of aircraft parking apron pavement is needed.

There are currently 101 marked parking positions available for based and itinerant aircraft at the airport. The terminal apron provides 45 marked positions for fixed wing aircraft and one helicopter parking area, and the west apron has 55 marked parking positions. As shown in the table, approximately 167 marked tiedown positions could be needed by the end of the planning period of this study, including two additional helicopter parking areas.

Table 3Q | Aircraft Parking Apron Requirements

	Available	Short Term	Intermediate Term	Long Term
Aircraft Parking Positions				
Based/Local GA Aircraft	55	58	66	84
Transient GA Aircraft	45	59	63	72
Corporate Jet Aircraft	0	3	5	8
Helicopter	1	1	2	3
Total Parking Positions	**101**	**121**	**136**	**167**
Total Apron Area	**87,000**	**90,200**	**102,500**	**126,800**

Source: Coffman Associates analysis

SUPPORT FACILITIES

Various other landside facilities that play a supporting role in overall airport operations have also been identified. These support facilities include:

- Aviation Fuel Storage
- Perimeter Fencing and Gates

Aviation Fuel Storage

The City of Casa Grande provides fuel for the airport and owns the two tanks located east of the terminal building. Each tank, one containing 100LL and one with Jet A fuel, has a storage capacity of 12,000 gallons. Based on historic fuel flowage records from the last three years, the airport pumped an average of 64,817 gallons of Jet A and 80,426 gallons of 100LL. Dividing the total fuel flowage by the total number of operations provides a ratio of fuel flowage per operation. Between 2019 and 2021, the airport pumped approximately 0.53 gallons of Jet A per turbine operation and 0.66 gallons of 100LL per piston operation.

Maintaining a 14-day fuel supply would allow the airport to limit the impact of a disruption of fuel delivery. Currently, the airport has enough static fuel storage to meet the 14-day supply criteria for both Jet A and 100LL fuel. Based on these usage assumptions and projected design day operations, no additional storage for either Jet A or 100LL is projected to be needed. **Table 3R** summarizes the forecasted fuel storage requirements through the planning period.

Fuel storage requirements are typically based upon keeping a two-week supply of fuel during an average month; however, more frequent deliveries can reduce the fuel storage capacity requirements. Generally, fuel tanks should be of adequate capacity to accept a full refueling tanker, which is approximately 8,000 gallons, while maintaining a reasonable level of fuel in the storage tank. Future aircraft demand experienced at the airport will determine the need for additional fuel storage capacity. It is important that airport personnel work with the city to plan for adequate levels of fuel storage capacity through the long-term planning period of this study.

Table 3R | Fuel Storage Requirements

			PLANNING HORIZON		
	Capacity	**2021 Need**	**Short-Term**	**Intermediate-Term**	**Long-Term**
Jet A					
Daily Usage (gal.)		209	226	243	284
14-Day Supply (gal.)	12,000	2,927	3,158	3,407	3,973
Annual Usage (gal.)		76,100	82,100	88,600	103,300
AvGas (100LL)					
Daily Usage (gal.)		259	280	302	352
14-Day Supply (gal.)	12,000	3,632	3,918	4,228	4,930
Annual Usage (gal.)		94,400	101,900	109,900	128,200

Sources: Historic fuel flowage data provided by airport administration; Fuel supply projections prepared by Coffman Associates.

Perimeter Fencing and Gates

Perimeter fencing is used at airports primarily to secure the aircraft operational area. The physical barrier of perimeter fencing provides the following functions:

- Gives notice of legal boundary of the outermost limits of the facility or security-sensitive areas;
- Assists in controlling and screening authorized entries into a secured area by deterring entry elsewhere along the boundary;
- Supports surveillance, detection, assessment, and other security functions by providing a zone for installing intrusion detection equipment and closed-circuit television (CCTV);
- Deters casual intruders from penetrating the aircraft operations areas on the airport;
- Creates a psychological deterrent;
- Demonstrates a corporate concern for facilities; and
- Limits inadvertent access to the aircraft operations area by wildlife.

As detailed in Chapter One, CGZ operations areas are completely enclosed by fencing, including 6-foot chain link fence topped by 3-strand barbed-wire. Controlled access gates are also available for use at the airport. All fencing and gates should be maintained throughout the planning period and should be regularly inspected to ensure they are functioning property and are undamaged.

A summary of the overall general aviation landside facilities is presented in **Exhibit 3F**.

Aircraft Storage Hangar Requirements

	Available	Short Term	Intermediate Term	Long Term
T-Hangar Units (#)	70	80	90	111
T-Hangar/Shade Hangar Area (sf)	93,800	105,800	118,400	144,200
Executive/Conventional Hangar Area (sf)	41,400	52,400	66,400	110,400
Service/Maintenance Area (sf)	0	28,800	32,800	41,800
Total Hangar Storage Area (sf)	135,200	187,000	217,600	296,400

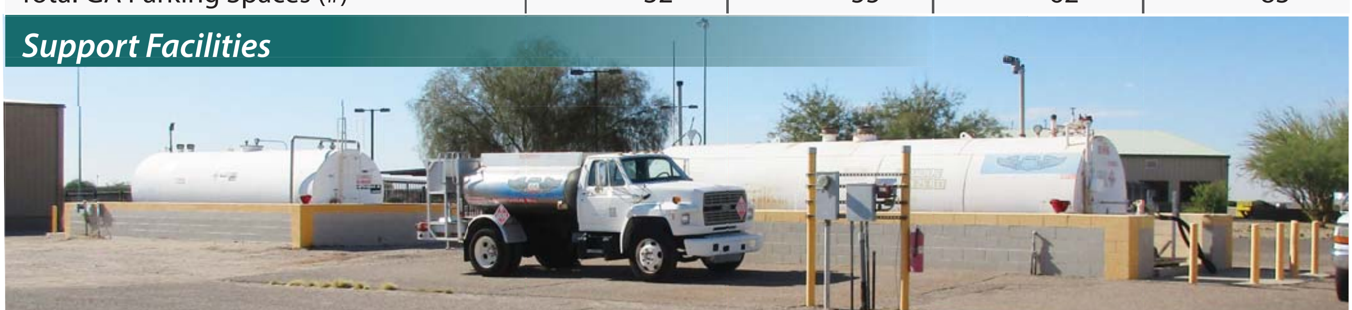
Aircraft Parking Apron

Aircraft Parking Positions (#)	101	121	136	167
Total Apron Area (sy)	87,000	90,200	102,500	126,800

General Aviation Terminal Facilities and Parking

Building Space (sf)	4,800	7,700	8,700	11,900
Total GA Parking Spaces (#)	32	55	62	83

Support Facilities



14-Day Fuel Storage - 100LL (gal.)	12,000	3,918	4,228	4,930
14-Day Fuel Storage - Jet A (gal.)	12,000	3,158	3,407	3,973

Exhibit 3F
LANDSIDE FACILITY REQUIREMENTS

SUMMARY

This chapter has outlined the safety design standards and facilities required to meet potential aviation demand projected at CGZ for the next 20 years. In an effort to provide a more flexible Master Plan, the yearly forecasts from Chapter Two have been converted to planning horizon levels. The short term roughly corresponds to a 5-year timeframe, the intermediate term is approximately 10 years, and the long term is 20 years. By utilizing planning horizons, airport management can focus on demand indicators for initiating projects and grant requests rather than on specific dates in the future.

In Chapter Four, potential improvements to the airside and landside systems will be examined through a series of airport development alternatives. Most of the alternatives discussion will focus on those capital improvements that would be eligible for federal and state grant funds. Other projects of local concern will also be presented. Ultimately, an overall airport development plan that presents a vision beyond the 20-year scope of this Master Plan will be developed for CGZ.

This page intentionally left blank

City of
Casa Grande
AIRPORT MASTER PLAN

Chapter 4

Airport Development Alternatives

City of Casa Grande
AIRPORT MASTER PLAN

Chapter 4

Airport Development Alternatives

In the previous chapter, aviation facilities required to satisfy airside and landside demand through the long-term planning period of the Master Plan were identified. In addition, various Federal Aviation Administration (FAA) standards were discussed that apply to airfield design. The next step in the planning process is to evaluate reasonable ways these facilities can be provided, and the design standards can be met. The purpose of this chapter is to formulate and examine rational development alternatives that address the short-, intermediate-, and long-term planning horizon levels. Because there are a multitude of possibilities and combinations, it is necessary to focus on those opportunities that have the greatest potential for success. Each alternative provides a differing approach to meet existing and future facility needs, and these layouts are presented for purposes of evaluation and discussion.

Some airports become constrained due to limited availability of space, while others may be constrained due to adjacent land use development. Careful consideration should be given to the layout of future facilities and impacts to potential airfield improvements at Casa Grande Municipal Airport (CGZ). Proper planning at this time can ensure the long-term viability of the airport for aviation and economic growth.

The primary goal of this planning process is to develop a feasible plan for meeting applicable safety design standards and the needs resulting from the projected market demand over the next 20 years. The plan of action should be developed in a manner that is consistent with the future goals and objectives of the City of Casa Grande, airport users, the local community, and the surrounding region, all of whom have a vested interest in the development and operation of CGZ.

The goal is to develop an underlying rationale which supports the final recommended concept. Through this process, an evaluation of the highest and best uses of airport property will be made, while also weighing local development goals, efficiency, physical and environmental factors, capacity, and appropriate safety design standards.

The alternatives presented in this chapter have been formulated as potential means to meet the overall program objectives for the airport in a balanced manner. Through coordination with the City of Casa Grande, CGZ management, the Planning Advisory Committee (PAC), and the public, an alternative (or combination thereof) will be refined and modified as necessary into a recommended development concept. Therefore, the planning considerations and alternatives presented in this chapter can be considered a beginning point in the evolution of a recommended concept for the future of CGZ.

PLANNING OBJECTIVES

A set of basic planning objectives has been established to guide the alternatives development process. It is the goal of this Master Planning effort to produce a development plan for the airport that addresses forecast aviation demand and meets FAA design standards to the greatest degree possible. As owner and operator, the City of Casa Grande provides the overall guidance for the operation and development of the airport. It is of primary concern that CGZ is marketed, developed, and operated for the betterment of the community and its users. The following basic planning principles and objectives will be utilized as general guidelines during this planning effort:

- To develop a safe, attractive, and efficient aviation facility in accordance with applicable federal, state, and local regulations;
- To preserve and protect public and private investments in existing airport facilities;
- To provide a means for the airport to grow as dictated by demand;
- To put into place a plan to ensure the long-term viability of the airport as well as to promote compatible land uses surrounding the airport;
- To develop a facility that is readily responsive to the changing needs of all aviation users;
- To be reflective and supportive of the long-term planning efforts currently applicable to the region;
- To develop a facility with a focus on self-sufficiency in both operational and developmental cost recovery; and,
- To ensure that future development is environmentally compatible.

REVIEW OF PREVIOUS AIRPORT PLANS

The previous Master Plan for CGZ was completed in 2009. More recently, the Airport Layout Plan (ALP) was updated in 2015 as part of an ALP Update/Narrative Report study. The existing ALP includes the following primary recommendations:

- Maintain Runway 5-23 at 5,200 feet long by 100 feet wide.
- Taxiway improvements, including the construction of bypass taxiways at both runway ends and relocating Taxiway D to the west to eliminate the direct access from the apron to the runway.
- Additional landside development in the form of apron pavement and hangars.

The analysis presented in this chapter will revisit the recommendations presented on the ALP Drawing as well as in the previous Master Plan. Since completion of the last plan, the FAA has made significant modifications to design standards as outlined in the previous chapter. As such, some of the previous plan's elements may be carried over to this Master Plan and others may be changed and/or removed from further consideration.

NO ACTION/NON-DEVELOPMENT ALTERNATIVES

The City of Casa Grande is charged with managing the airport for the economic betterment of the community and region. In some cases, alternatives may include a no action option; however, for CGZ, this would effectively reduce the quality of services being provided to the public, affect the aviation facility's ability to meet FAA design standards, and impact the region's ability to support aviation needs. The ramifications of a no action alternative extend into impacts on the economic well-being of the region. An analysis of the economic benefit of the airport completed in 2021 found that CGZ generates $24.2 million dollars in total economic impact and almost 200 jobs. If facilities are not maintained and improved so that the airport provides a pleasant experience for the visitor or business traveler, or if delays become unacceptable, then activity and business may shift elsewhere. The no action alternative is also inconsistent with the long-term goals of the FAA and Arizona Department of Transportation – Aeronautics Group (ADOT), which is to enhance local and interstate commerce. Therefore, a no action alternative is not considered further in this Master Plan.

Likewise, this study will not consider the relocation of services to another airport or development of a new airport site. The development of a new facility such as CGZ is a very complex and expensive option. A new site will require greater land area, duplication of investment in facilities, installation of supporting infrastructure that is already available at the existing site, and greater potential for negative impacts to natural, biological, and cultural resources.

The purpose of this Master Plan is to examine aviation needs at CGZ over the course of the next 20 years. Therefore, this Master Plan will examine the needs of the existing airport and will present a program of needed capital improvement projects to cover the scope of the plan. The airport is a lucrative business, transportation utility, and economic asset for the region. It can accommodate existing and future demand and should be developed accordingly to support the interests of local residents and businesses which rely upon it. Ultimately, the final decision with regards to pursuing development rests with the City of Casa Grande, FAA, and ADOT on an individual project basis. The analysis to follow considers airside and landside development alternatives that take into account an array of facility demands, including safety, capacity, access, and efficiency.

AIRSIDE ALTERNATIVES

The development alternatives are categorized into two functional areas: airside and landside. The airside relates to runways, taxiways, navigational aids, lighting and marking aids, etc., which require the greatest commitment of land area to meet the physical layout of an airport, as well as the required airfield safety standards. The design of the airfield also defines minimum set-back distances from the runway and object clearance standards. These criteria are defined first to ensure that the fundamental needs of CGZ are met. The landside includes terminal services, hangars, aircraft parking aprons, as well as utilization of remaining property to provide revenue support for the airport and to benefit the economic development and well-being of the regional area.

Each functional area interrelates and affects the development potential of the others. Therefore, all areas must be examined individually, and then coordinated as a whole, to ensure the final plan is functional, efficient, and cost-effective. The total impact of all these factors must be evaluated to determine if the investment in CGZ will meet the needs of the surrounding area, both during and beyond the planning period of this study.

As part of this alternatives analysis, Coffman Associates' subconsultant (C&S Companies) has prepared a preliminary engineering analysis for each of the airside alternatives. C&S Companies is providing engineering support for the Master Plan and is familiar with CGZ. This initial engineering analysis is provided at the end of each alternative description.

AIRSIDE CONSIDERATIONS

Airside planning considerations generally relate to those airport elements that contribute to the safe and efficient transition of aircraft and passengers from air transportation to the landside facilities at the airport. Planning must factor and balance many airside items, including meeting FAA design parameters of the established design aircraft, instrument approach capability, airfield capacity, runway length, taxiway layouts, and pavement strengths. Each of these elements for CGZ was analyzed in the previous chapter. The alternatives to follow will examine airside improvement opportunities to meet design standards and/or capacity constraints. A summary of the primary airside planning issues to be considered in this alternatives analysis is listed below.

Airside Planning Considerations

1. Meet ultimate Runway Design Code (RDC) C-II-2400 standards on Runway 5-23
2. Analyze extension of Runway 5-23 to better accommodate turbine aircraft
3. Mitigate non-standard conditions in safety areas (RSA, ROFA, RPZ)
4. Corrective measures for non-standard taxiway geometry (direct access via Taxiway D, acute-angled intersections, non-standard holding bays)
5. Relocate parallel Taxiway B 400 feet from runway centerline
6. Upgrade to PAPI-4 on both runway ends; Install REILs on Runway 23
7. Lower visibility minimums on Runway 23
8. Potential sites for an airport traffic control tower (ATCT)

Consideration #1 – Meet RDC C-II-2400 Design Standards

As detailed in Chapter Two, the critical aircraft analysis concluded that Runway 5-23 should meet Runway Design Code (RDC) C-II-2400 design standards in the ultimate condition. Currently, the runway is categorized as B-II-2400; however, due to anticipated growth in operations and based aircraft by larger, more demanding aircraft, including turboprops and jets, it is prudent to plan facilities to accommodate these users.

Consideration #2 – Runway 5-23 Extension

Runway 5-23 is currently 5,200 feet long and 100 feet wide. The existing width meets RDC C-II-2400 design standards; however, the runway length analysis in the previous chapter illustrated that some turbine operators are weight-restricted or unable to operate on the existing runway length, especially during hot weather. Past planning at the airport has included an extension to Runway 5-23, and extension options will be revisited in the airside alternatives to follow. Arizona State Route 387 is located approximately 860 feet from the Runway 23 threshold, prohibiting extension to the east. For this reason, the alternatives only consider extension options to the Runway 5 end.

Consideration #3 – Mitigate Non-standard Conditions in Safety Areas

The existing and ultimate RSA and ROFA are non-standard and contain obstructions. At the Runway 5 end, Scott Drive, a county-maintained gravel road that is not open to public use but is still accessible and is used by off-road vehicles, traverses the RSA and ROFA, as does the dry wash. Previous planning studies evaluated rerouting the dry wash to accommodate a planned runway extension and safety areas; however, the alternatives to be presented evaluate a different approach that involves covering the dry wash rather than rerouting it.

The perimeter fence also obstructs both of these safety areas at this end of the runway. Other obstructions to the existing/ultimate ROFA include the glideslope antenna, the automated weather observing system (AWOS), and the three wind cones located on the north side of Runway 5-23. On the Runway 23 end, the RSA and ROFA are obstructed by perimeter fencing and Arizona State Route 387 in the ultimate condition. Portions of both RPZs extend beyond airport property in both the existing and ultimate conditions, and the RPZ serving Runway 23 is also traversed by Arizona State Route 387, which may be considered an incompatible use. The alternatives to follow will explore options to mitigate these non-standard conditions.

Consideration #4 – Corrective Measures for Non-standard Taxiway Geometry

Direct Access

FAA taxiway geometry design standards recommend offsetting taxiway connections between aprons and runways to mitigate the potential of pilots unfamiliar with the airport layout unintentionally taxiing directly onto a runway resulting in a runway incursion. Taxiway D allows for direct access to the runway and is, therefore, a non-standard design. The airside alternatives present options for eliminating the direct access point and forcing pilots to make turns, which increases a pilot's situational awareness.

Acute-angled Intersections

FAA taxiway geometry standards recommend that taxiways be positioned 90 degrees to intersecting taxiways and runways to reduce the risk of incursions. Acute-angled intersections are present at CGZ on Taxiway E where it connects to Runway 5-23 and intersects with Taxiway B. Right-angle taxiways provide the best visual perspective to a pilot approaching an intersection, and the airside alternatives provide corrections to these taxiways.

Non-standard Holding Bays

The airport has holding bays located at each runway end. These holding aprons are a traditional design consisting of a wide, unmarked pavement area that allows aircraft to pull aside and perform pre-flight engine checks. New holding bay design standards incorporate clearly marked entrance/exits with independent parking areas that are either separated by islands or are clearly marked with centerlines to allow aircraft to safely bypass each other. The airside alternatives consider reconstructing the holding bays to meet current design standards.

Consideration # 5 – Relocate Taxiway B to Meet C-II-2400 Separation Standards

Taxiway B is currently separated from Runway 5-23 by 300 feet, centerline to centerline. This meets the separation standards for the existing B-II-2400 condition but falls 100 feet short of the 400-foot separation standard for a C-II-2400 design. Airside Alternatives 2, 3, and 4 illustrate the relocation of Taxiway B 100 feet to the south to meet the more stringent design standard that will need to be met if and when the airport transitions to C-II.

Consideration #6 – Visual Aids

Both runway ends are equipped with two-light precision approach path indicator (PAPI-2) systems, and Runway 5 has a medium intensity approach lighting system with runway alignment indicator lights (MALSR). A four-light PAPI is recommended for airports serving jet aircraft operations. As CGZ is anticipated to be utilized more frequently by jets, PAPI-4s are recommended for each runway end. Runway end identifier lights (REILs) are recommended for runway ends not served by a more sophisticated approach light system, such as a MALSR. Therefore, REILs should be planned for Runway 23. The alternative exhibits to follow each reflect upgrading the PAPI-2s to PAPI-4s and adding REILs to Runway 23.

Consideration #7 – Instrument Approach Procedures

CGZ is currently equipped with a precision instrument landing system (ILS) approach to Runway 5, a VOR approach to Runway 5, and GPS instrument approach procedures to each runway end (LPV on Runway 5 and RNAV on Runway 23). The lowest visibility minimums are via the ILS, which provides for 250-foot cloud ceilings and ½-mile visibility minimums. The RNAV GPS approach to Runway 23 provides for visibility minimums down to 1-mile for Category A and B aircraft and 1¼ mile for Category C and D aircraft. Consideration has been given to the potential for visibility minimums not lower than ¾-mile on Runway 23. To achieve this, additional analysis would need to be conducted by the FAA to ensure there are no penetrations to the approach and transitional surfaces. A not lower than ¾-mile approach would also result in a change to the size of the RPZ serving Runway 23, with the RPZ encompassing a larger area. To plan for this possibility of lower approach minimums, Airside Alternative 4 will show a comparison of the RPZs associated with a 1-mile GPS approach and a ¾-mile GPS approach.

Consideration #8 – Airport Traffic Control Tower

The airport is not currently equipped with an airport traffic control tower (ATCT). Preliminary analysis, detailed in Chapter Three, indicated that CGZ may be eligible for the addition of an ATCT. This initial assessment is based solely off estimated operational data and serves simply as a starting point. Should the City decide to pursue a tower, the FAA will conduct its own analysis utilizing additional factors. If the FAA determines that a tower is justified, additional study will be required before construction. However, for planning purposes, the alternatives will present four potential locations on or adjacent to airport property that meet FAA ATCT siting criteria. [1] Each site assumes a footprint of ¼-acre, with variable tower and cab heights. It should be clearly stated that these sites are preliminary in nature and are subject to change based on the ultimate tower design, runway disposition, and ultimate landside developments.

[1] This analysis utilized components of the operational requirements stated in FAA AC 6480.4b, specifically sections of 6480.4b Appendix D (Visibility Performance Analyses). The FAA Air Traffic Control Visibility Analysis Tool were utilized to determine minimum cab heights based on potential tower sites. Line of Sight analysis was not conducted at this phase of the study.

AIRSIDE ALTERNATIVE 1

Depicted on **Exhibit 4A**, Airside Alternative 1 focuses primarily on bringing the safety areas associated with Runway 5-23 into compliance with FAA standards in the existing condition (B-II-2400). While Runway 5-23 is projected to experience an increase in C-II operations and subsequently move to a design of C-II-2400 in the ultimate condition, consideration should also be given to correct safety area obstructions for the existing B-II condition. Airside Alternative 1 also maintains Runway 5-23 at its current length of 5,200 feet. This is an important scenario to consider because an extension to the runway is not a certainty. A runway extension still requires justification with the FAA to be eligible for funding through the Airport Improvement Program (AIP). Justification typically involves documentation of at least 500 annual operations by operators and aircraft expressing a need for the additional runway. An environmental assessment (EA) process would also need to be completed, along with public outreach. If justification for a runway extension is not achieved for several years or ever, a contingency airfield plan should be available.

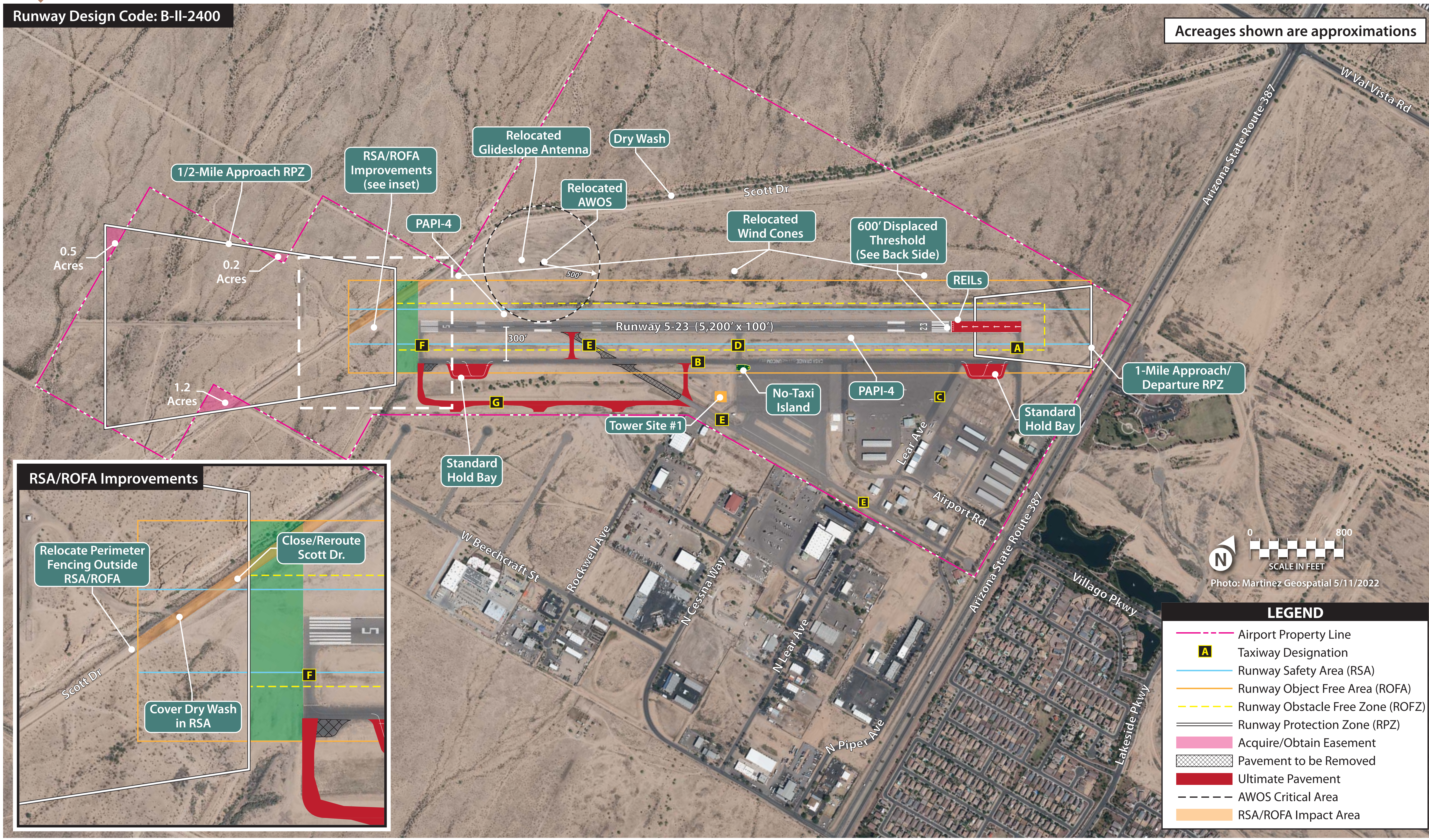
Airside Alternative 1 illustrates an option that would bring Runway 5-23 into compliance with FAA design standards as they relate to the Runway 23 RPZ while maintaining the existing runway length. This would be achieved by the application of declared distances, which are illustrated on the back side of **Exhibit 4A**. As detailed in the previous chapter, the Runway 23 RPZ encompasses Arizona State Route 387, which may be considered an incompatible land use by the FAA. The existing RPZ also encompasses land that is currently undeveloped but is planned to become park space within the Villago neighborhood. The RPZ can be shifted southwest off the highway and entirely onto airport property by displacing the Runway 23 threshold by 600 feet. While the impact to the airfield in terms of earthwork and construction would be minimal, as compared to other alternatives to be presented, the usable length of the runway would be lessened for some operations due to the implementation of declared distances.

Declared distances are used to define the effective runway length for landing and takeoff when a standard safety area cannot be achieved. The declared distances include:

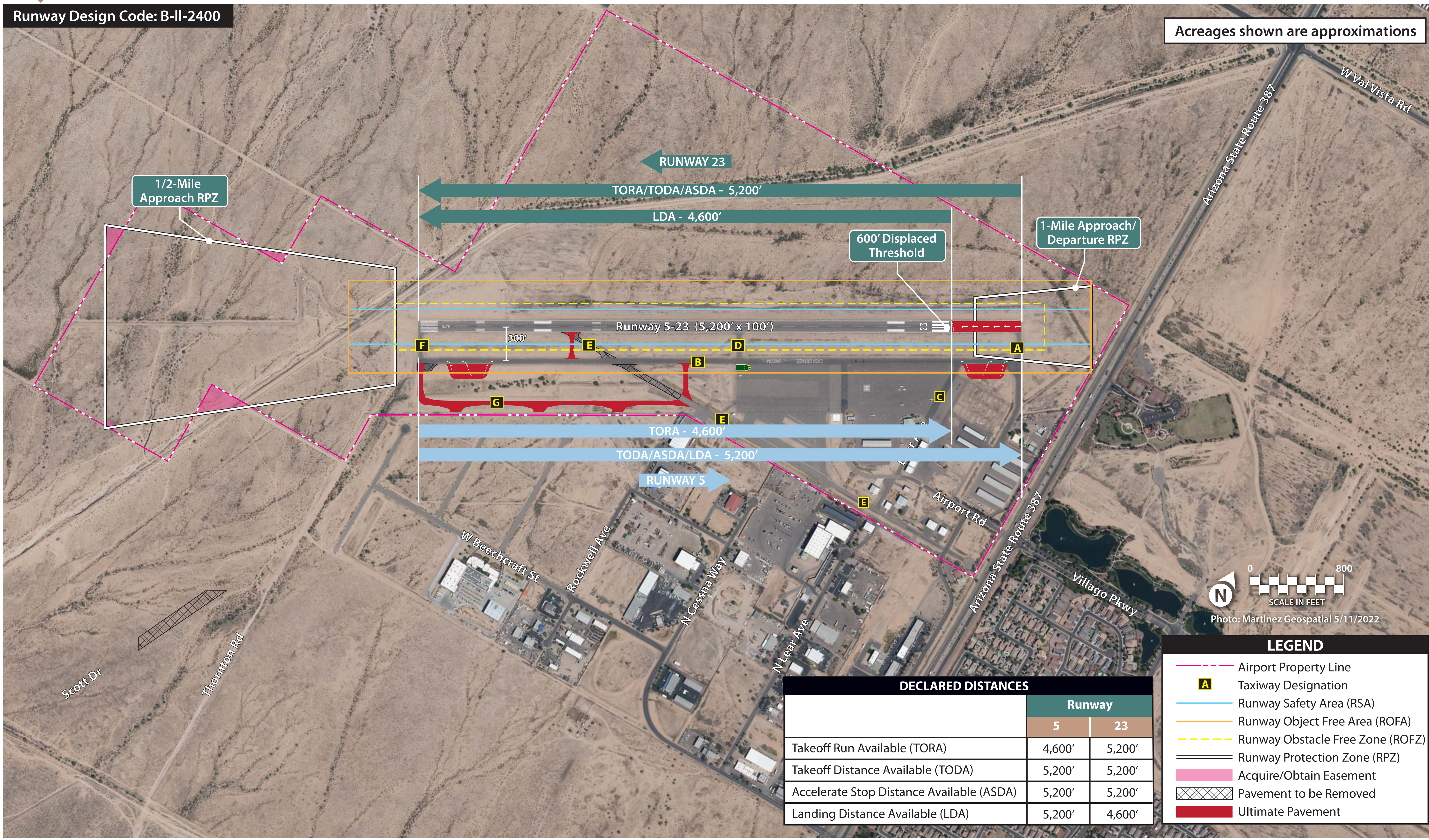
- Takeoff Run Available (TORA) – the runway length declared available and suitable for the ground run of an aircraft taking off (factors in the positioning of the departure RPZ);
- Takeoff Distance Available (TODA) – the TORA plus the length of any remaining runway or clearway beyond the far end of the TORA; the full length of the TODA may need to be reduced because of obstacles in the departure area;
- Accelerate-Stop Distance Available (ASDA) – the runway plus stopway length declared available and suitable for the acceleration and deceleration of an aircraft aborting a takeoff (factors in the length of RSA/ROFA beyond the runway end); and
- Landing Distance Available (LDA) – the runway length declared available and suitable for landing an aircraft (factors in the length of RSA/ROFA beyond the runway end and the positioning of the approach RPZ).

Runway Design Code: B-II-2400

Acreages shown are approximations



AIRSIDE ALTERNATIVE 1



DECLARED DISTANCES

	Runway 5	Runway 23
Takeoff Run Available (TORA)	4,600'	5,200'
Takeoff Distance Available (TODA)	5,200'	5,200'
Accelerate Stop Distance Available (ASDA)	5,200'	5,200'
Landing Distance Available (LDA)	5,200'	4,600'

With a 600-foot displaced threshold on Runway 23, the resulting declared distances are:

	Runway 5	Runway 23
TORA	4,600'	5,200'
TODA	5,200'	5,200'
ASDA	5,200'	5,200'
LDA	5,200'	4,600'

This alternative does not achieve a longer runway but does fully meet FAA design standards while eliminating the need to relocate Arizona State Route 387. The drawback to this alternative is that it reduces usable runway during certain operations. Pilots taking off on Runway 5 or landing on Runway 23 would only have 4,600 feet of operational pavement available to them, making it more restrictive to business jets

Non-standard safety area conditions are also present on the Runway 5 end, where Scott Drive, the dry wash, and the airport's perimeter fence obstruct the RSA and ROFA. Airside Alternative 1 proposes Scott Drive to be closed where it passes through these safety areas or rerouted around the ROFA. The dry wash is proposed to be covered where it passes through the RSA, and the perimeter fence is planned to be relocated outside the ROFA. The RSA is planned to be cleared and graded, in accordance with FAA standards. An alternate option to mitigate the non-standard conditions in these areas is to displace the Runway 5 threshold to bring these safety areas into compliance. However, this would further shorten the usable runway length and would necessitate the relocation of the MALSR and PAPIs serving Runway 5.

Other features of Airside Alternative 1 include:

1. Ultimate Taxiway G is planned to be constructed in 2024. This taxiway will extend southwest from Taxiway E to connect to Taxiways B and F. Its purpose is to provide access to/from the planned airpark industrial park.
2. Taxiway E connects to the runway and Taxiway B at acute angles. This alternative proposes the closure and removal of portions of Taxiway E and the construction of new taxiway pavement that provides right-angle connections. All proposed taxiway pavement is planned for a width of 35 feet, meeting TDG 2A standards, with fillets designed to meet this standard as well.
3. A no-taxi island is proposed at the entrance to Taxiway D to eliminate the direct access from the west apron to Runway 5-23.
4. Standard aircraft hold bays are planned at each runway end. The hold bay that currently exists at the Runway 5 end is a non-standard design. This alternative proposes a modification in design to one of the FAA's preferred hold bay configurations which includes centerline markings to allow for independent aircraft maneuvering and provides a visual cue to pilots to assist in situational awareness. At the Runway 23 end, a standard hold bay is also proposed. Hold bays are considered for each of the airside alternatives, rather than the bypass taxiways that were included on the 2015 ALP. Providing hold bays instead of bypass taxiways enhances capacity and are especially beneficial at busier airports, including those that experience high levels of training operations like CGZ.
5. REILs are proposed at the approach end of Runway 23.
6. The PAPI-2s at each runway end are planned to be upgraded to PAPI-4s.

7. Obstructions within the ROFA are planned to be relocated. This includes the perimeter fence, which was mentioned previously, as well as the AWOS equipment, glideslope antenna, and the three wind cones on the north side of the runway. The FAA recommends that an AWOS be located between 1,000 feet and 3,000 feet down runways, and at least 500 feet from the primary runway's centerline, unless this location is unnecessarily restrictive. The AWOS also has a 500-foot radius critical area, which should be kept free of any obstructions that could interfere with the sensors. If the AWOS is relocated to the site depicted on **Exhibit 4A**, the AWOS's critical area would be fully contained within airport property.
8. Approximately 1.9 acres of the Runway 5 approach RPZ[2] extend beyond airport property at various points. These are planned to be acquired in fee or control of these areas obtained via an avigation easement.
9. ATCT Site #1 is located adjacent to the west apron and is set back approximately 600 feet from the runway centerline. In this location, the cab is planned for an observer eye height of 53 feet. The tower is north facing; this orientation is preferred to lessen the effects of direct and indirect sun/sand glare.

Preliminary Engineering Analysis for Alternative 1: Displacing Runway 23 will require a runway closure to perform electrical and pavement marking improvements. The PAPI will be relocated, and edge light lens colors will be changed beyond the displaced threshold. Since the threshold is being moved an even 600', the new threshold should align with existing runway edge lights, preventing the need to relocate edge lights along the full length of the runway. This work could be performed at night to allow the runway to remain open during daylight hours.

Obstructions within the RSA and ROFA will require the relocation of the existing perimeter fence, AWOS, wind cones, and instrument landing glideslope equipment.

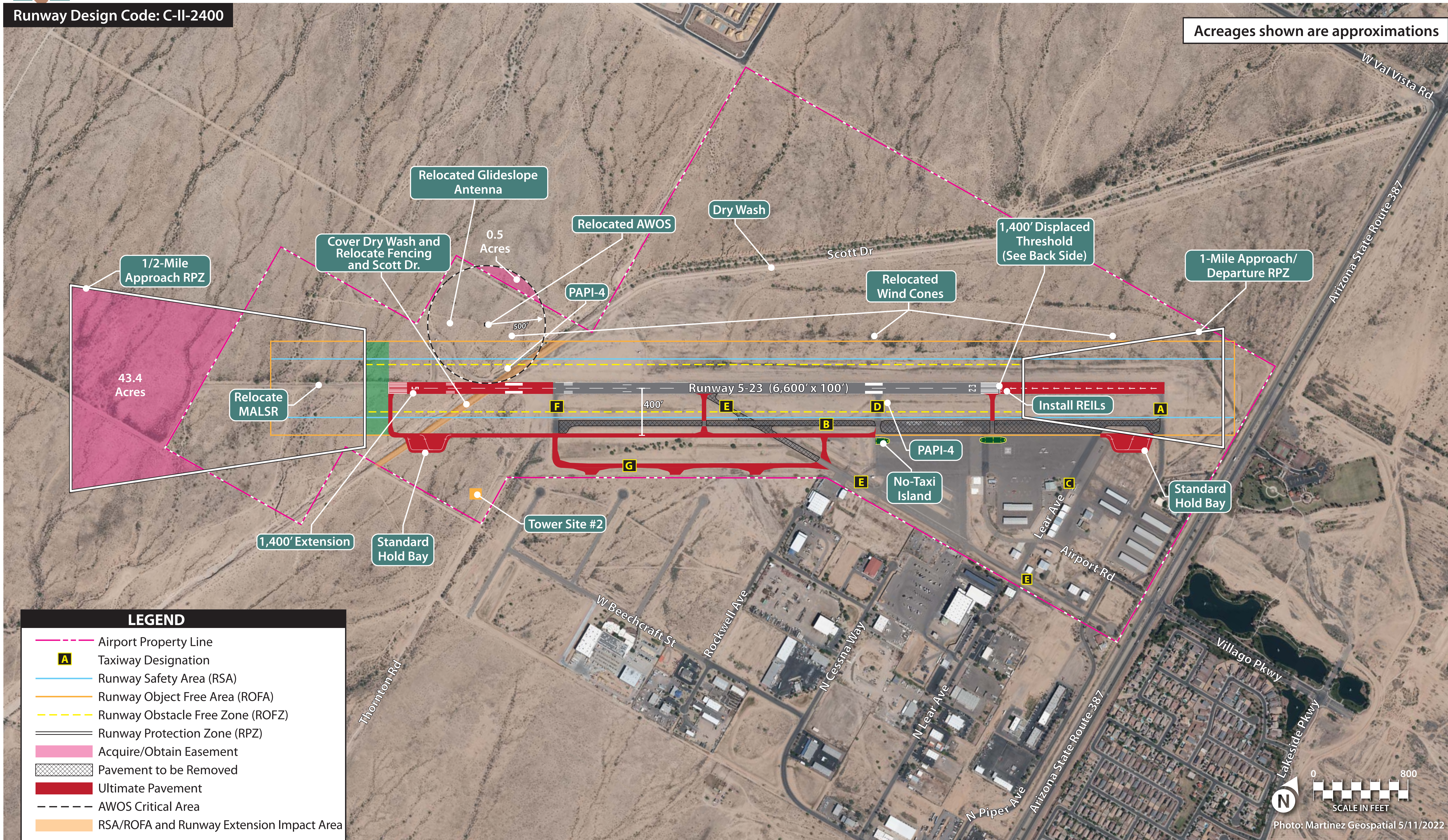
Constructing the new Taxiway E connector will require the closure of the runway and Taxiway B while working in the safety areas of each. The location of the taxiway could affect runway edge lights and may require temporary circuits to be installed during construction.

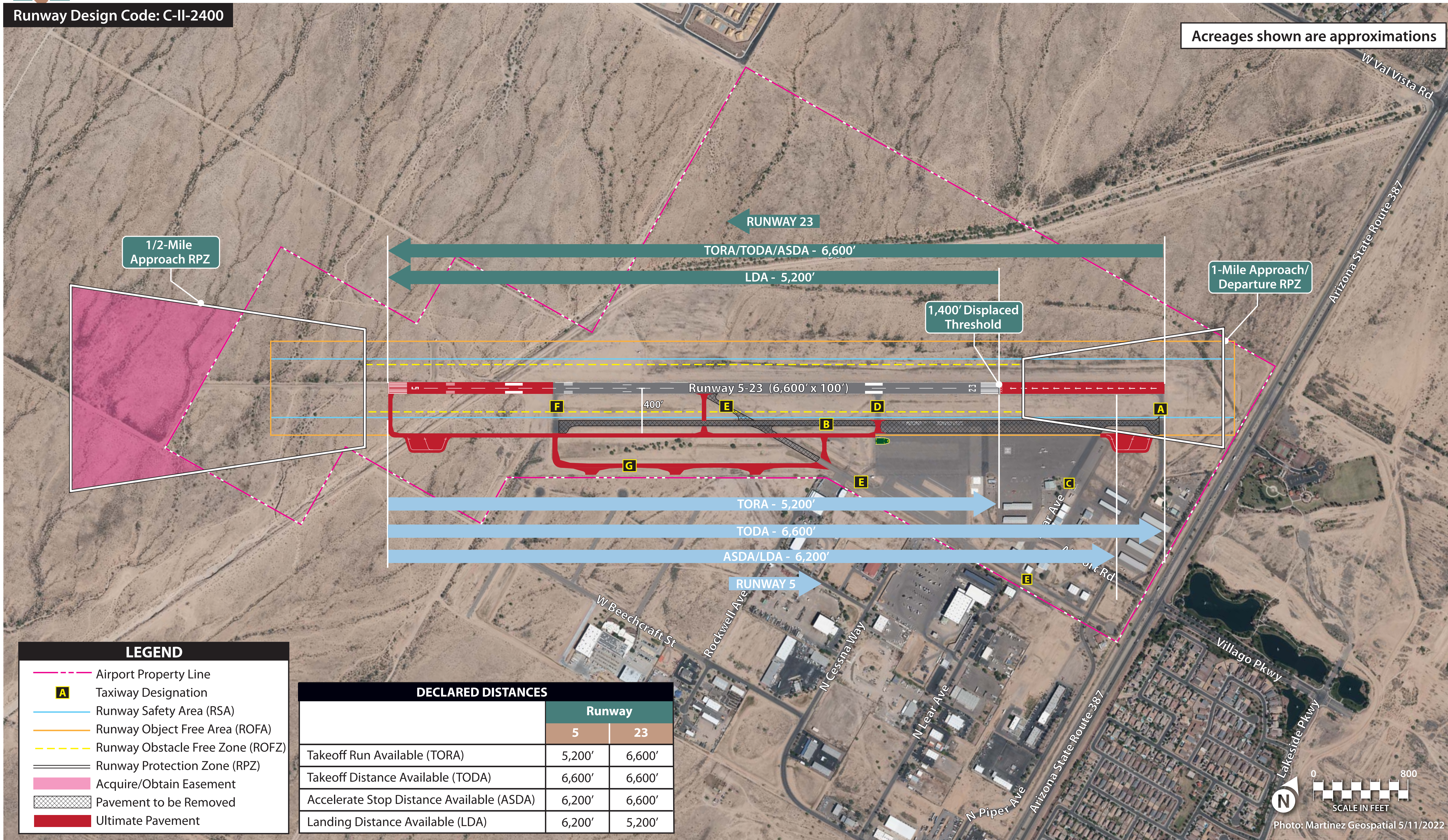
Constructing the new Taxiway G will have minimal effect on airport operations, but it does involve some significant drainage improvements to accommodate the existing detention basin that is located between Taxiway B and the new alignment for Taxiway G. The proposed runup aprons on Taxiway B will also affect the drainage in this area, and further improvements to the size of the basin or the outlet pipe may need to be made during that design.

AIRSIDE ALTERNATIVE 2

Depicted on **Exhibit 4B**, Airside Alternative 2 is similar to Airside Alternative 1 in that the Runway 23 threshold is displaced; however, this scenario is based ultimate RDC C-II-2400 design standards. As detailed in the previous chapter, the RSA, ROFA, and RPZ will expand in size when the airport transitions

[2] The Runway 5 departure RPZ is not depicted as its dimensions are smaller than the approach RPZ and it is fully contained within the approach RPZ.


Runway Design Code: C-II-2400
Acreages shown are approximations
Relocated Glideslope Antenna
Relocated AWOS
Dry Wash
Cover Dry Wash and Relocate Fencing and Scott Dr.
0.5 Acres
1/2-Mile Approach RPZ
PAPI-4
500'
Scott Dr
1,400' Displaced Threshold (See Back Side)
Relocated Wind Cones
1-Mile Approach/ Departure RPZ
43.4 Acres
Relocate MALSR
Runway 5-23 (6,600' x 100')
400'
F
E
D
B
A
G
C
Install REILs
PAPI-4
No-Taxi Island
Standard Hold Bay
Tower Site #2
1,400' Extension
Standard Hold Bay
W Val Vista Rd
Arizona State Route 387
Lear Ave
Airport Rd
W Beechcraft St
Rockwell Ave
N Cessna Way
N Lear Ave
N Piper Ave
Thornton Rd
Villago Pkwy
Lakeside Pkwy
LEGEND
Airport Property Line
Taxiway Designation
Runway Safety Area (RSA)
Runway Object Free Area (ROFA)
Runway Obstacle Free Zone (ROFZ)
Runway Protection Zone (RPZ)
Acquire/Obtain Easement
Pavement to be Removed
Ultimate Pavement
AWOS Critical Area
RSA/ROFA and Runway Extension Impact Area
0
800
SCALE IN FEET
N
Photo: Martinez Geospatial 5/11/2022



LEGEND

- Airport Property Line
- Taxiway Designation
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- Acquire/Obtain Easement
- Pavement to be Removed
- Ultimate Pavement

DECLARED DISTANCES

	Runway	
	5	23
Takeoff Run Available (TORA)	5,200'	6,600'
Takeoff Distance Available (TODA)	6,600'	6,600'
Accelerate Stop Distance Available (ASDA)	6,200'	6,600'
Landing Distance Available (LDA)	6,200'	5,200'

from B-II to C-II. As a result, a greater displacement of 1,400 feet is necessary in order to fully contain the Runway 23 RPZ on existing airport property. To offset this, this alternative proposes a 1,400-foot extension to the Runway 5 end.

As shown previously on Exhibit 3D, the C-II RSA and ROFA extend beyond airport property and are obstructed by the airport perimeter fence and Arizona State Route 387. Measuring from the end of these safety areas to the perimeter fence results in approximately 400 feet necessary to achieve the full C-II ROFA, which impacts the ASDA and LDA for Runway 5. Considering these factors and with a 1,400-foot displaced threshold on Runway 23 and a 1,400-foot extension to Runway 5, the resulting declared distances are:

	Runway 5	Runway 23
TORA	5,200’	6,600’
TODA	6,600’	6,600’
ASDA	6,200’	6,600’
LDA	6,200’	5,200’

This alternative allows for the current runway length of 5,200 feet, at a minimum, to be available for all operations while mitigating the non-standard conditions in the RSA, ROFA, and RPZ in both the existing and ultimate conditions.

Additional features of Airside Alternative 2 include:

1. In order to achieve the 1,400-foot extension to the Runway 5 end and the extended Taxiway B, the perimeter fencing will need to be removed and relocated around the ROFA. Scott Drive will need to be closed/removed, and the dry wash will also need to be covered from the north edge of the RSA to the south edge of extended Taxiway B and the hold bay. The RSA is planned to be cleared and graded in accordance with FAA standards, and the ROFA maintained clear of obstructions that protrude above the elevation of the RSA.
2. The MALSR and PAPIs on Runway 5 are planned to be relocated to accommodate the runway extension.
3. Taxiway B is proposed to be relocated 100 feet to the south to provide 400 feet of separation from Runway 5-23, centerline to centerline, in accordance with C-II-2400 design standards. Ultimate Taxiway B will serve as a full-length parallel taxiway to the extended runway. Existing Taxiway B pavement will be removed, and Taxiway F will be extended to connect to ultimate Taxiway B.
4. Ultimate Taxiway G is planned to be constructed in 2024. This taxiway will extend southwest from Taxiway E and will connect to Taxiway B. Its purpose is to provide access to/from the planned airpark industrial park.
5. Taxiway E connects to the runway and Taxiway B at acute angles. This alternative proposes the closure and removal of portions of Taxiway E and the construction of new taxiway pavement that provides right-angle connections. All proposed taxiway pavement is planned for a width of 35 feet, meeting TDG 2A standards, with fillets designed to meet this standard as well.

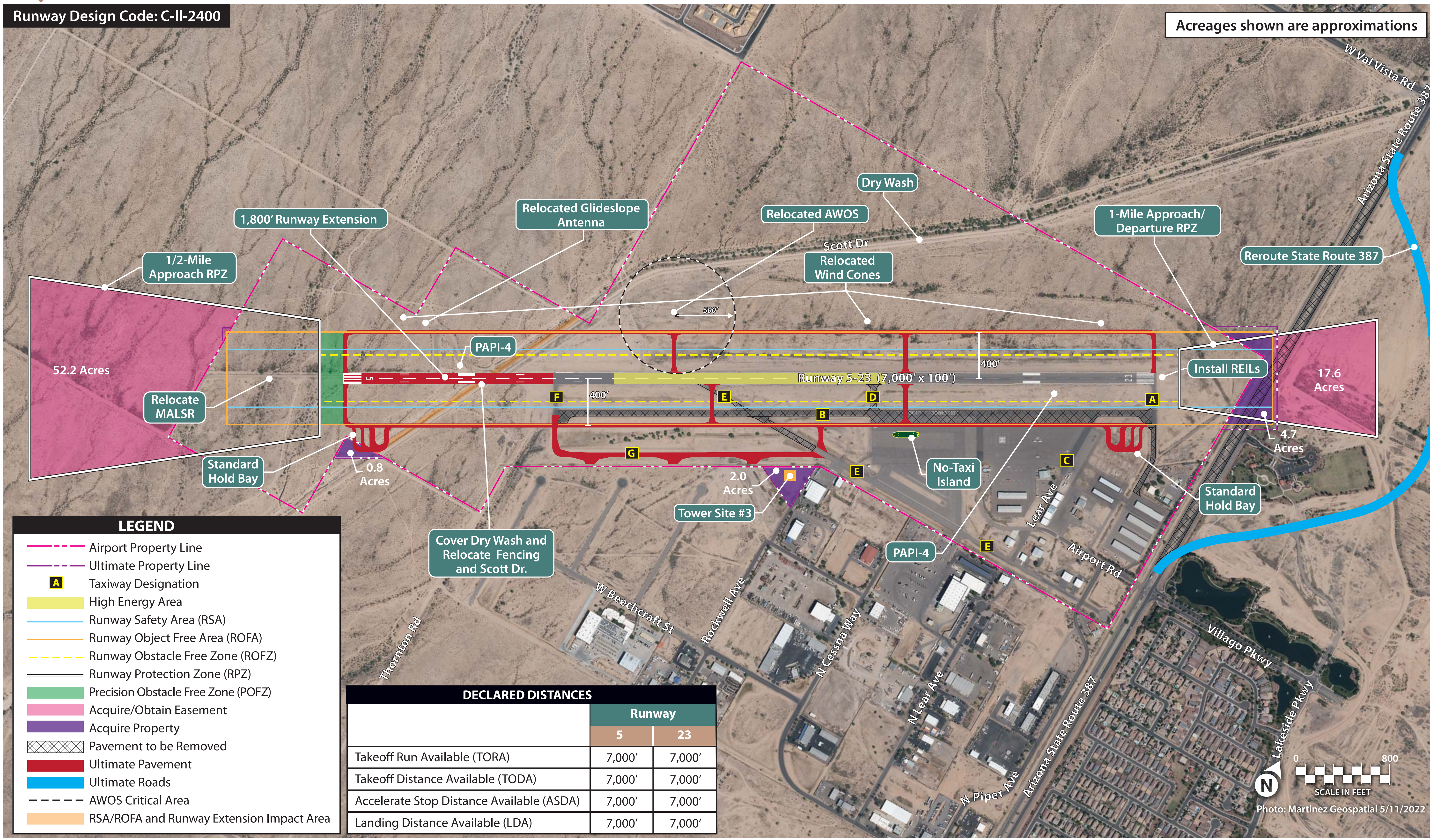
6. A no-taxi island is proposed at the entrance to extended Taxiway D to eliminate the direct access from the west apron to Runway 5-23.
7. Standard aircraft hold bays are planned at each runway end. The hold bay that currently exists at the Runway 5 end is a non-standard design, so this alternative proposes a change to one of the FAA's preferred hold bay designs which includes centerline markings to allow for independent aircraft movements and provide a visual cue to pilots to assist with situational awareness. At the Runway 23 end, a standard hold bay is also proposed.
8. REILs are proposed at the approach end of Runway 23.
9. The PAPI-2s at each runway end are planned to be upgraded to PAPI-4s.
10. Obstructions within the ROFA (AWOS equipment, glideslope antenna, and wind cones) are planned to be relocated. Airside Alternative 2 depicts the AWOS and glideslope co-located at the extended Runway 5 end, with approximately 0.5 acre of the AWOS critical area extending beyond the airport's property line. This property should be acquired or protected by an avigation easement.
11. Due to the runway extension, the Runway 5 RPZ is shifted and approximately 43.4 acres extend beyond airport property. This area is planned to be acquired in fee or control of these areas obtained via an avigation easement.
12. ATCT Site #2 is located adjacent to the west apron and is set back approximately 650 feet from the runway centerline. The north-facing cab is planned for an observer eye height of 115 feet.

Preliminary Engineering Analysis for Alternative 2: For this alternative, the extension of Runway 5 would likely need to occur first, followed by the displacement of Runway 23. This will ensure that there is enough usable runway for daylight operations while the Runway 23 displacement is constructed at night. The extension of Runway 5, Taxiway B, and the bypass taxiway would cross a wash/unpaved road, which will need to be re-routed around the ROFA. Box culverts could be installed underneath the runway, Taxiway B, and bypass taxiway to accommodate the wash, but the cost to install box culverts could outweigh the cost to re-route it.

This alternative also includes the relocation of Taxiway B to achieve a separation distance of 400' from the runway. This will have a major impact to the airport in that it and its TOFA will consume a significant amount of apron space currently used for tie-downs and helicopter parking. The taxiway will also impede on the detention basin between proposed Taxiway G and Taxiway B, which will require further drainage improvements in that area.

AIRSIDE ALTERNATIVE 3

Airside Alternative 3 is presented on **Exhibit 4C**. Like the previous alternatives, this option also evaluates the ultimate C-II-2400 scenario. The primary difference is that it does not include a displaced threshold or the implementation of declared distances to mitigate non-standard safety area conditions at the Runway 23 end. Rather, Airside Alternative 3 maintains the Runway 23 threshold in its existing location and



DECLARED DISTANCES

	Runway	
	5	23
Takeoff Run Available (TORA)	7,000′	7,000′
Takeoff Distance Available (TODA)	7,000′	7,000′
Accelerate Stop Distance Available (ASDA)	7,000′	7,000′
Landing Distance Available (LDA)	7,000′	7,000′

This page intentionally left blank

depicts the rerouting of Arizona State Highway 387 around the ultimate RPZ. [3] This alternative also illustrates an 1,800-foot extension to the runway to provide for a full 7,000 feet of usable pavement during all takeoff and landing operations.

Additional features of Airside Alternative 3 include:

1. To implement the 1,800-foot extension to the Runway 5 end, earthwork will need to be completed to cover the dry wash. This area, shaded in orange on the exhibit spans from the north edge of the property line to the southern edge and includes a portion of unowned property that is planned to be acquired to support a hold bay at the Runway 5 end (to be discussed). Scott Drive will need to be closed/removed, and the perimeter fencing will need to be removed and relocated around the ultimate ROFA. The RSA is planned to be cleared and graded in accordance with FAA standards, and the ROFA maintained clear of obstructions that protrude above the elevation of the RSA.
2. The MALSR and PAPIs on Runway 5 are planned to be relocated to accommodate the runway extension.
3. As mentioned, in order to maintain the Runway 23 threshold in its existing location and meet C-II-2400 design standards, a portion of Arizona State Route 387 is proposed to be closed. The highway is planned to be rerouted around the existing Villago development and the Runway 23 RPZ. Approximately 4.7 acres of property within the RSA and ROFA at the Runway 23 end are planned to be acquired in fee.
4. Like the previous alternative, Taxiway B is proposed to be relocated 100 feet to the south to provide 400 feet of separation in accordance with C-II-2400 design standards. Ultimate Taxiway B will serve as a full-length parallel taxiway to the extended runway. Existing Taxiway B pavement will be removed, and Taxiway F will be extended to connect to ultimate Taxiway B.
5. Ultimate Taxiway G is planned to be constructed in 2024. This taxiway will extend southwest from Taxiway E and will connect to Taxiway B. Its purpose is to provide access to/from the planned airpark industrial park.
6. Taxiway E connects to the runway and Taxiway B at acute angles. This alternative proposes the closure and removal of portions of Taxiway E and the construction of new taxiway pavement that provides right-angle connections. All proposed taxiway pavement is planned for a width of 35 feet, meeting TDG 2A standards, with fillets designed to meet this standard as well.
7. A full-length parallel taxiway on the north side of Runway 5-23 is planned to support future development potential on the north side of the airport. Connector taxiways are planned at various points and are situated so that they do not connect with any existing connectors in the high-energy portion of the runway. The FAA discourages runway crossings in the high-energy area.
8. A no-taxi island is proposed at the entrance to extended Taxiway D to eliminate the direct access from the west apron to Runway 5-23.

[3] The alignment of rerouted State Route 387 as depicted on Exhibit 4C is conceptual in nature. If the City of Casa Grande and ADOT elect to move forward with the option to reroute the highway, additional planning and design would be necessary to determine appropriate points of closure on the existing pavement, right-of-way clearances, curvature design, etc.

9. This alternative depicts another option for standard aircraft hold bays at each runway end. This configuration consists of unpaved islands that, along with centerline line markings, provide visual cues to pilots to improve situational awareness and allow independent aircraft movements. Approximately 0.8 acres of property would need to be acquired to support the hold bay at the Runway 5 end.
10. REILs are proposed at the approach end of Runway 23.
11. The PAPI-2s at each runway end are planned to be upgraded to PAPI-4s.
12. Obstructions within the ROFA (AWOS equipment, glideslope antenna, and wind cones) are planned to be relocated. Airside Alternative 3 depicts a potential AWOS location that keeps the critical area within the airport's property line and allows the airport to maintain the area free from interferences without the need for property easement acquisition.
13. Due to the runway extension, the Runway 5 RPZ is shifted and approximately 52.2 acres extend beyond airport property. This area is planned to be acquired in fee or control of these areas obtained via an avigation easement. At the Runway 23 end, approximately 17.6 acres of the RPZ are uncontrolled and should be protected with an easement.
14. ATCT Site #3 is located south of ultimate Taxiway G where it is planned to connect to Taxiway E. This site is outside the airport's current property line and would require the acquisition of approximately 2.0 acres to support the tower and vehicle parking for controllers. Like the previous alternative, the tower is oriented to face north. The tower site is approximately 850 feet from the runway and would require a cab height of 60 feet.

Preliminary Engineering Analysis for Alternative 3: This alternative represents a significant impact to the surrounding community in that it would involve the re-routing of Arizona State Route 387 to accommodate the ROFA. The processes, time, and cost involved in relocating the highway would be substantial, including the impact to the public and businesses using the highway.

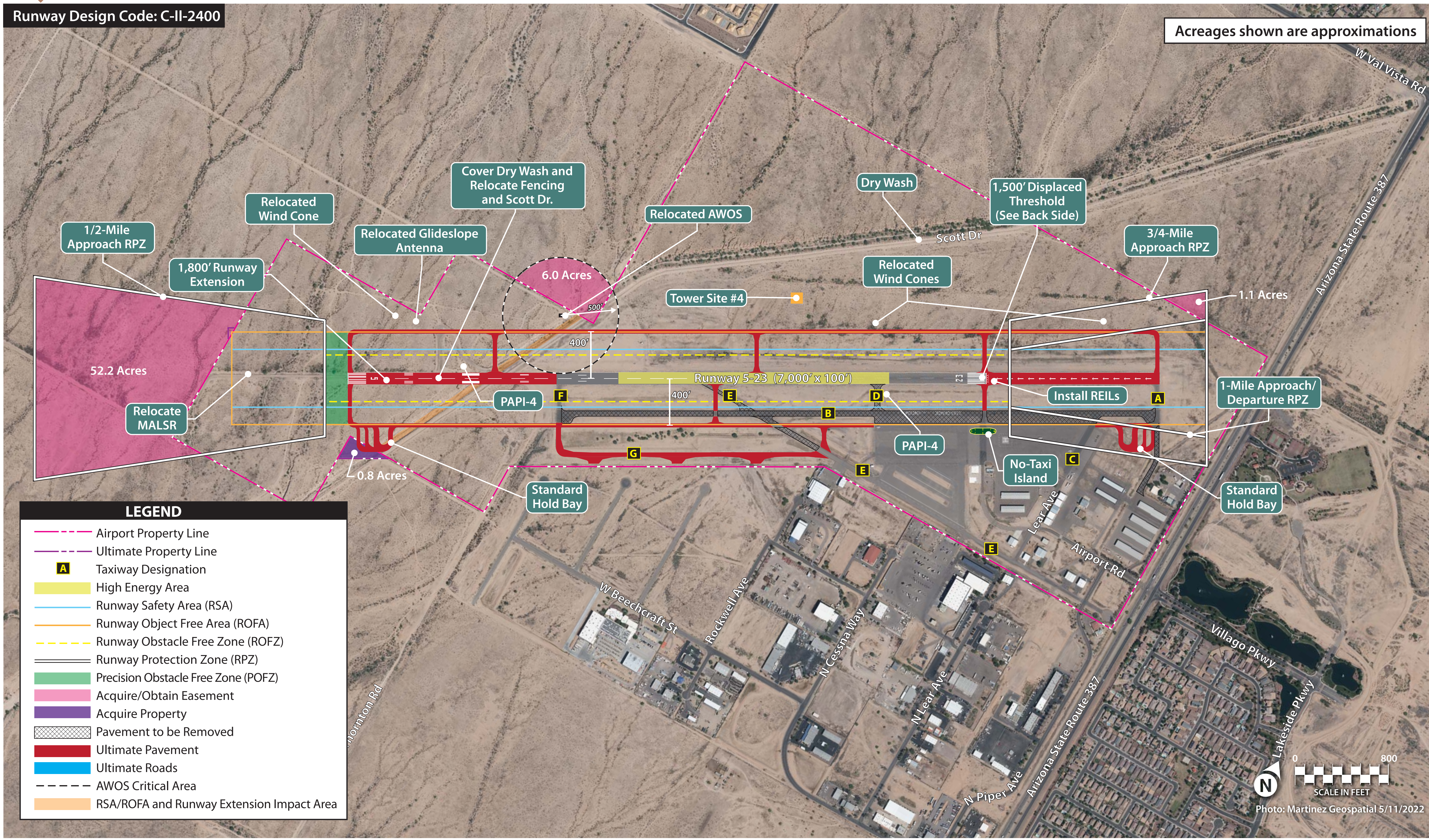
The extension of Runway 5, Taxiway B, and the bypass taxiway would cross a wash/unpaved road, which will need to be closed or re-routed around the ROFA. Box culverts could be installed underneath the runway, Taxiway B, and the bypass taxiway to accommodate the wash, but the cost to install box culverts could outweigh the cost to re-route it.

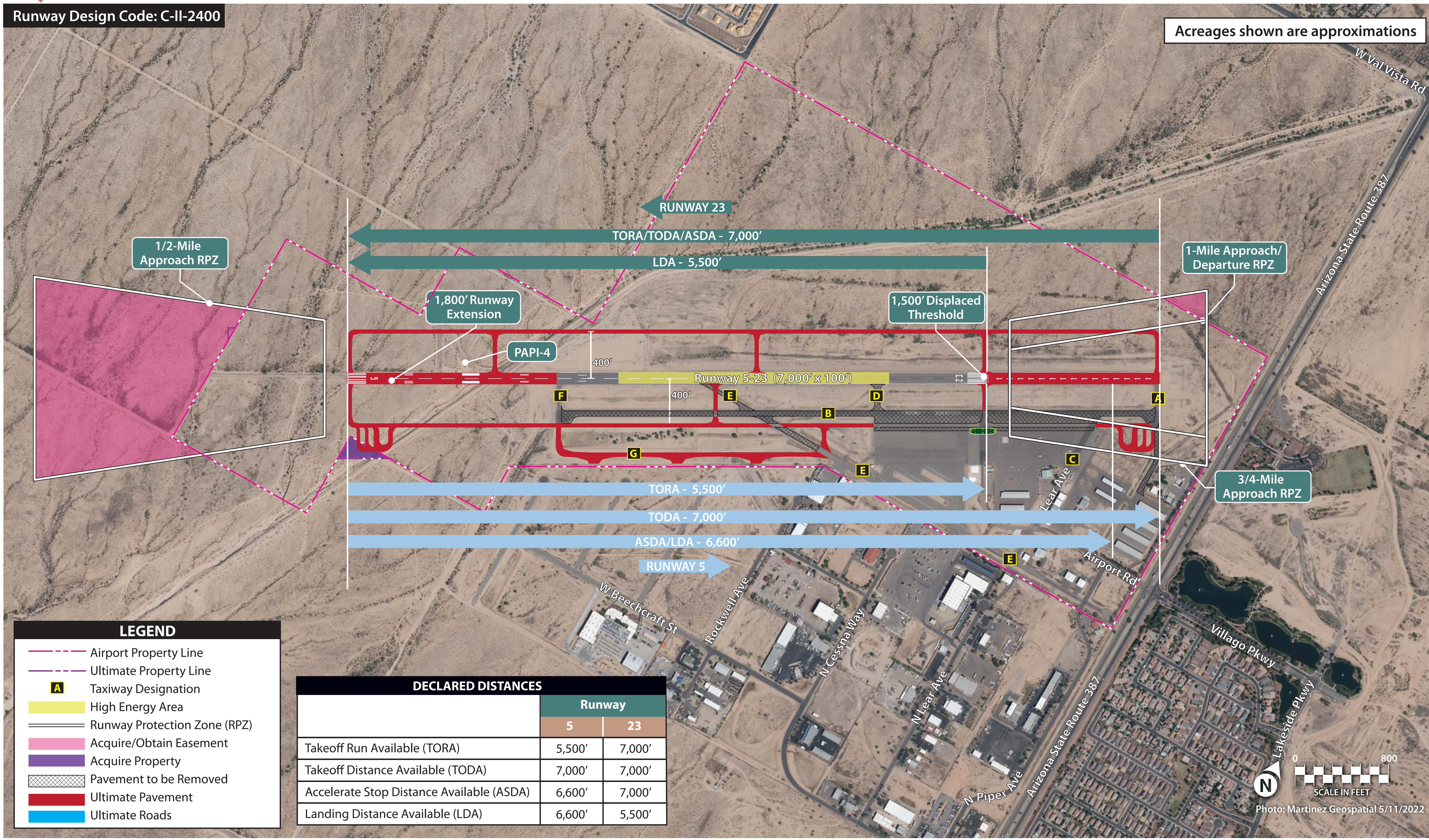
This alternative also includes a second parallel taxiway on the north side of the runway. This taxiway further impacts the wash that the Runway 5 and Taxiway B extensions affect, requiring a greater length to be re-routed. With the significant increase to the electrical system by adding new taxiway edge lights and guidance signs, new electrical vault equipment may be required.

AIRSIDE ALTERNATIVE 4

Airside Alternative 4, depicted on **Exhibit 4D**, combines elements of the previous alternatives, including a displaced threshold, a runway extension to 7,000 feet, and a second full-length parallel taxiway. This alternative maintains Arizona State Route 387 in its existing location, with declared distances proposed to mitigate non-standard safety area conditions in the ultimate C-II-2400 environment.

Runway Design Code: C-II-2400





DECLARED DISTANCES

	Runway	
	5	23
Takeoff Run Available (TORA)	5,500'	7,000'
Takeoff Distance Available (TODA)	7,000'	7,000'
Accelerate Stop Distance Available (ASDA)	6,600'	7,000'
Landing Distance Available (LDA)	6,600'	5,500'

Like Airside Alternative 2, this alternative depicts the displacement of the Runway 23 threshold in order to bring the RPZ almost entirely onto airport property and to ensure it remains free of incompatible land uses (State Route 387 and planned recreational uses in Villago). The primary difference between the alternatives, however, is in the instrument approach capability on Runway 23. Currently, an RNAV GPS approach with visibility minimums down to 1-mile for Category A and B aircraft, and 1¼-mile for Category C and D aircraft, is provided on Runway 23. If visibility minimums not lower than ¾-mile are pursued and achieved for this runway, the RPZ dimensions would increase in size. For comparison purposes, **Exhibit 4D** depicts both a 1-mile approach/departure RPZ and ¾-mile approach RPZ[4] on Runway 23. The larger RPZ associated with the lower visibility minimums would necessitate a greater displacement of the Runway 23 threshold, with 1,500 feet necessary to bring the ¾-mile RPZ onto airport-owned property, except for a 1.1-acre portion in the north corner that should be acquired or protected through an easement.

Like Alternative 2, there is also the need to bring the C-II RSA and ROFA onto airport property, which results in approximately 400 feet of reduced ASDA and LDA for aircraft taking off on Runway 5. This, combined with the 1,500-foot displaced threshold, results in declared distances of:

	Runway 5	Runway 23
TORA	5,500’	7,000’
TODA	7,000’	7,000’
ASDA	6,600’	7,000’
LDA	6,600’	5,500’

As detailed above, under Airside Alternative 4, the minimum length available to aircraft operating at CGZ is 5,500 feet – 300 longer than the current runway length of 5,200 feet. Pilots taking off from Runway 5 or landing on Runway 23 would have 5,500 feet of operational pavement, with 6,600 feet of pavement during a rejected takeoff from Runway 5 or a landing operation on Runway 5.

An alternate option to mitigate the non-standard conditions at the Runway 23 end would be to close and remove the 1,500 feet of pavement, rather than displacing the threshold. With the 1,800-foot extension to Runway 5, the resulting runway length would be 5,500 feet. However, this option does little to achieve the longer runway desired by the City of Casa Grande and necessary to support many jet operations.

Additional features of Airside Alternative 4 include:

1. To implement the 1,800-foot extension to the Runway 5 end, earthwork will need to be completed to cover the dry wash. This area, shaded in orange on the exhibit spans from the north edge of the property line to the southern edge and includes a 0.8-acre portion of unowned property that is planned to be acquired to support a hold bay at the Runway 5 end. Similar to previous alternatives, Scott Drive will need to be closed/removed, and the perimeter fencing will need to be removed and relocated around the ultimate ROFA. The RSA is planned to be cleared and

[4] The Runway 23 departure RPZ (¾-mile) is not depicted as its dimensions are smaller than the approach RPZ and it is fully contained within the approach RPZ.

graded in accordance with FAA standards, and the ROFA maintained clear of obstructions that protrude above the elevation of the RSA.

2. The MALSR and PAPIs on Runway 5 are planned to be relocated to accommodate the runway extension.
3. Taxiway B is proposed to be relocated 100 feet to the south to provide 400 feet of separation in accordance with C-II-2400 design standards, with existing Taxiway B pavement removed. Taxiway F will be extended to connect to ultimate Taxiway B.
4. Ultimate Taxiway G is planned to be constructed in 2024. This taxiway will extend southwest from Taxiway E and will connect to Taxiway B. Its purpose is to provide access to/from the planned airpark industrial park.
5. Taxiway E connects to the runway and Taxiway B at acute angles. This alternative proposes the closure and removal of portions of Taxiway E and the construction of new taxiway pavement that provides right-angle connections. All proposed taxiway pavement is planned for a width of 35 feet, meeting TDG 2A standards, with fillets designed to meet this standard as well.
6. Like Airside Alternative 3, a full-length parallel taxiway on the north side of Runway 5-23 is planned to support future development potential on the north side of the airport. Connector taxiways are planned at various points and are situated so that they do not connect with any existing connectors in the high-energy portion of the runway.
7. To eliminate the direct access from the west apron to Runway 5-23, Taxiway D is planned to be closed and the pavement removed. A new connector is planned approximately 930 feet to the northeast, with a no taxi island at the entrance to prohibit direct access.
8. Standard aircraft hold bays with unpaved islands are planned at each runway end.
9. REILs are proposed at the approach end of Runway 23.
10. The PAPI-2s at each runway end are planned to be upgraded to PAPI-4s.
11. Obstructions within the ROFA (AWOS equipment, glideslope antenna, and wind cones) are planned to be relocated. Airside Alternative 4 depicts a potential AWOS location farther down the runway and results in approximately 6.0 acres of uncontrolled property within the AWOS's critical area. This property should be protected via an avigation easement.
12. Due to the runway extension, the Runway 5 RPZ is shifted and approximately 52.2 acres extend beyond airport property. This area is planned to be acquired in fee or control of these areas obtained via an avigation easement. At the Runway 23 end, approximately 1.1 acres of the RPZ are uncontrolled and should be protected with an easement.
13. ATCT Site #4 is on the north side of the runway and considers a south-facing view. While this is not a preferred orientation due to sun/sand glare, the property north of the runway is currently undeveloped. Locating a tower here would keep the already-developed south side open for additional aviation development (i.e., hangars, apron); however, it would require significant investment in terms of road access and utility expansion. The north side tower site is approximately 670 feet from the runway and would require a cab height of 50 feet.

Preliminary Engineering Analysis for Alternative 4: This alternative represents a combination of Alternates 2 and 3, with a longer Runway 5 extension and the inclusion of the Runway 23 displacement to avoid re-routing State Route 387. The construction related concerns from those alternatives still apply to this one, but there is a significant change in that the proposed tower location is now on the north side of the runway. Locating the tower here would require the construction of an access road and the extension of utilities including water, sewer, electrical, telephone, and internet. A septic tank system could be utilized to reduce cost for sewer, but the other extensions will require thousands of feet of new pipes and conduits to be installed to tie into existing facilities.

AIRSIDE ALTERNATIVE 5

Airside Alternative 5, depicted on **Exhibit 4E**, considers all the same elements as Alternative 4, but includes a longer runway extension. Under this alternative, the runway is proposed to be extended 3,200 feet to the west, bringing the total runway length to 8,400 feet. At this length, Runway 5-23 would be capable of accommodating 75 percent of the business jet fleet at 90 percent useful load, as described previously in Table 3G (see Chapter Three). The last master plan also included a recommendation to extend the runway to 8,400 feet.

Like the previous alternative, the Runway 23 threshold would be displaced 1,500 feet to bring the RSA and ROFA onto airport property and shift the RPZ off of Arizona State Route 387. The following declared distances would be implemented:

	Runway 5	Runway 23
TORA	6,900’	8,400’
TODA	8,400’	8,400’
ASDA	8,000’	8,400’
LDA	8,000’	6,900’

As mentioned, each of the other proposed modifications, including new taxiway pavement, taxiway geometry changes, relocation of navaids and weather reporting equipment, and property acquisition/protection, have been carried over from Airside Alternative 4.

AIRSIDE SUMMARY

The sections above outlined five planning considerations for the airfield at CGZ. The primary issues on the airside are mitigating non-standard safety areas at both runway ends, addressing non-standard taxiway geometry, and evaluating runway threshold displacement/extension options. The safety area and displaced threshold/runway extension considerations will potentially be the most impactful to both the public and the aviation community. For this reason, it is vitally important that the PAC, airport/city management, and the public offer their feedback so that the best course of action is selected.

LANDSIDE ALTERNATIVES

Generally, landside issues are related to those facilities necessary or desired for the safe and efficient parking and storage of aircraft, movement of pilots and passengers to and from aircraft, airport support facilities, and overall revenue support functions. To maximize airport efficiency, it is important to locate facilities together that are intended to serve similar functions. The best approach to landside facility planning is to consider the development to be like that of a community where land use planning is the guide. For airports, the land use guide in the terminal area should generally be dictated by aviation activity levels. Consideration will also be given to non-aviation uses that can provide additional revenue support to the airport and support economic development for the region.

LANDSIDE CONSIDERATIONS

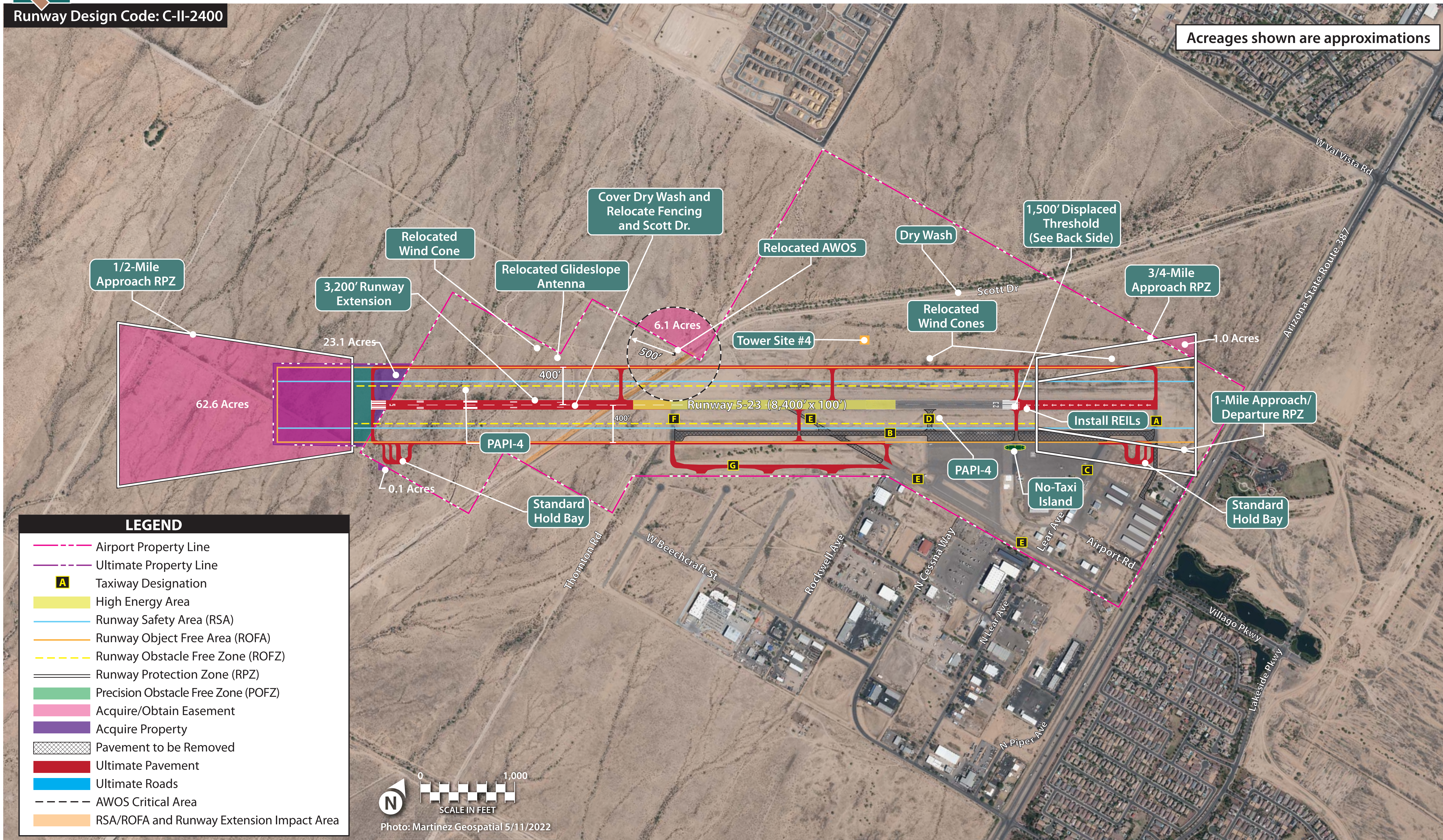
Landside planning considerations, summarized below, will focus on strategies following a philosophy of separating activity levels. Landside facility development at CGZ is focused primarily on the southeast side of airport property where the terminal and hangars are already located; however, there are approximately 150 acres on the north side of Runway 5-23 that are currently undeveloped and should be considered for development (aeronautical or non-aeronautical) or potential release.

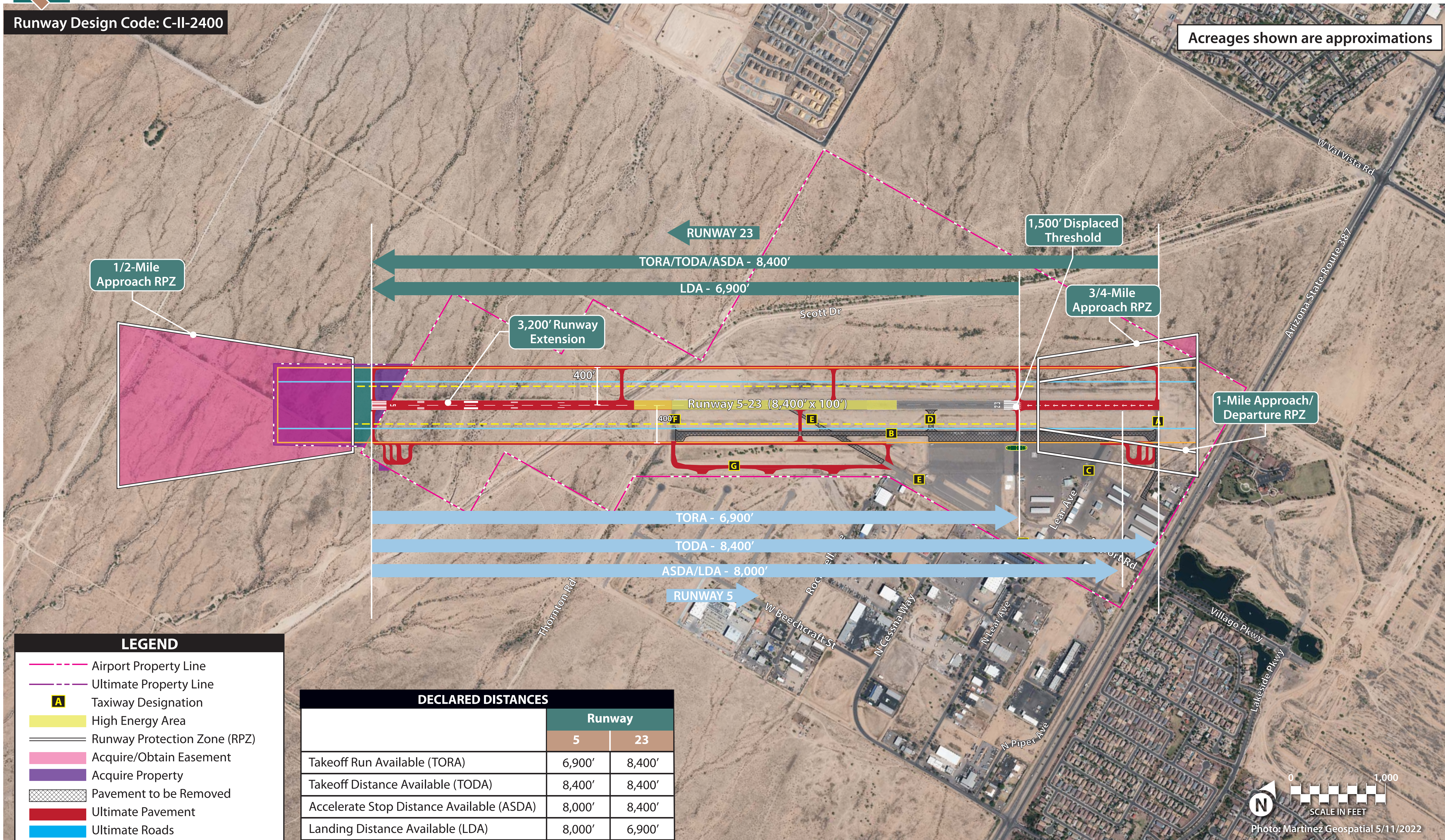
Landside Planning Considerations
1. Plan structures behind the Building Restriction Line (BRL)
2. Increase aircraft storage capacity
3. Expand aircraft parking apron and add additional marked aircraft and helicopter parking
4. Expand terminal capacity
5. Consider appropriate aviation and non-aviation-related uses for the future development of vacant property, or release of property

Consideration #1 – Building Restriction Line (BRL)

The BRL identifies suitable building area locations on the airport. It encompasses the RPZs, the OFA, navigational aid critical areas, areas required for terminal instrument procedures, and other areas necessary for meeting airport line-of-sight criteria. Two primary factors contribute to the determination of the BRL: type of runway ("utility" or "other-than-utility") and the capability of the instrument approaches. Runway 5-23 is considered an other-than-utility, precision instrument runway with visibility minimums not lower than ½-mile. The BRL is the product of CFR Part 77 transitional surface clearance requirements. These requirements stipulate that no object be located in the primary surface, defined as being 1,000 feet wide for precision instrument runways. From the primary surface, the transitional surface extends outward at a slope of one vertical foot to every seven horizontal feet.

At CGZ, the 35-foot BRL for Runway 5-23 is set at 745 feet from centerline, and the 25-foot BRL is set at 675 feet from centerline. Presently, all landside facilities are located beyond the BRL. Each of the landside alternatives to follow depict both the 35-foot and 25-foot BRL, and all proposed structures are located beyond the appropriate BRL, based on their assumed height (i.e., T-hangars may extend into the 35-foot BRL as they are typically less than 35 feet in height).


Runway Design Code: C-II-2400
Acreages shown are approximations
1/2-Mile Approach RPZ
62.6 Acres
23.1 Acres
3,200' Runway Extension
Relocated Wind Cone
Relocated Glideslope Antenna
Cover Dry Wash and Relocate Fencing and Scott Dr.
6.1 Acres
500'
400'
Relocated AWOS
Tower Site #4
Dry Wash
Scott Dr
Relocated Wind Cones
1,500' Displaced Threshold (See Back Side)
3/4-Mile Approach RPZ
1.0 Acres
Runway 5-23 (8,400' x 100')
1-Mile Approach/ Departure RPZ
Install REILs
PAPI-4
PAPI-4
No-Taxi Island
Standard Hold Bay
Standard Hold Bay
0.1 Acres
A
B
C
D
E
F
G
W Val Vista Rd
Arizona State Route 387
Thornton Rd
W Beechcraft St
Rockwell Ave
N Cessna Way
Lear Ave
N Lear Ave
Airport Rd
N Piper Ave
Village Pkwy
Lakeside Pkwy
LEGEND
Airport Property Line
Ultimate Property Line
Taxiway Designation
High Energy Area
Runway Safety Area (RSA)
Runway Object Free Area (ROFA)
Runway Obstacle Free Zone (ROFZ)
Runway Protection Zone (RPZ)
Precision Obstacle Free Zone (POFZ)
Acquire/Obtain Easement
Acquire Property
Pavement to be Removed
Ultimate Pavement
Ultimate Roads
AWOS Critical Area
RSA/ROFA and Runway Extension Impact Area
N
0
1,000
SCALE IN FEET
Photo: Martinez Geospatial 5/11/2022



LEGEND

- Airport Property Line
- Ultimate Property Line
- A Taxiway Designation
- High Energy Area
- Runway Protection Zone (RPZ)
- Acquire/Obtain Easement
- Acquire Property
- Pavement to be Removed
- Ultimate Pavement
- Ultimate Roads

DECLARED DISTANCES

	Runway 5	Runway 23
Takeoff Run Available (TORA)	6,900'	8,400'
Takeoff Distance Available (TODA)	8,400'	8,400'
Accelerate Stop Distance Available (ASDA)	8,000'	8,400'
Landing Distance Available (LDA)	8,000'	6,900'

Consideration #2 – Hangars

Hangar occupancy at CGZ stands at 100 percent, with 37 people on a waiting list for hangar space as of February 2022. With clear demand for additional hangar capacity at the airport, the landside alternatives will consider areas for the development of various hangar styles, including small aircraft facilities, executive/conventional hangars, and service/maintenance hangars. These areas are further defined below.

- **Small aircraft facilities** typically consist of T-hangars/T-shades. These facilities often have lower levels of activity and, as such, can be located away from the primary apron areas in more remote locations of the airport. Limited utility services are needed for these areas. The airport currently has approximately 93,800 sf of T-hangar/shade hangar storage space, with an additional 50,400 sf projected to needed by the end of the 20-year planning period.

- **Executive/conventional hangars** consist primarily of clear span hangars with no interior supporting structure. Executive hangars are typically less than 10,000 sf and can accommodate small aviation businesses, one larger aircraft, or multiple smaller aircraft, while conventional hangars can range in size from 10,000 sf to 20,000 sf. Both of these hangar types typically require all utilities and segregated roadway access. CGZ has approximately 41,400 sf[5] of combined executive/conventional hangar space, with an additional 69,000 sf estimated to be needed by the end of the planning period.

- **Service/maintenance hangars** house businesses that offer services such as aircraft maintenance, line service, aircraft manufacturing, and aircraft fueling. High levels of activity can be concentrated around these hangars, necessitating adequate apron space for the storage and circulation of aircraft. These facilities are best placed along ample apron frontage with good visibility from the runway system for transient aircraft. Utility services are needed for these types of facilities, as well as vehicle parking areas. The Master Plan anticipates approximately 41,800 sf of service/maintenance hangar space will be needed by the end of the planning period.

Consideration #3 – Aprons and Marked Aircraft Parking

CGZ has approximately 87,000 sy of apron space for aircraft parking and circulation, with 101 marked parking positions for fixed wing aircraft, and one helicopter parking pad. Based on projected growth in based aircraft and transient operations, an additional 39,800 sy of apron capacity is needed over the next 20 years. Since apron space is typically co-located with hangar facilities, the landside alternatives assume areas of hangar development will also include apron space. In terms of marked aircraft parking, and additional 66 spaces are projected to be needed, along with two more helicopter parking pads.

[5] At the time of this writing (June 2022), additional executive/conventional hangars are under construction or are planned for construction later this year. For planning purposes, these hangars have been included on the landside alternatives.

Consideration #4 – Terminal Building

Operations at CGZ are projected to continue to increase over the course of the next 20 years. As operations grow, so will the need for more terminal service space, which includes passenger and pilot lounges, flight planning areas, concessions, airport management offices, and storage space. The existing terminal building, constructed in 2001, will become undersized and outdated over time. In order to accommodate anticipated growth and remain competitive with other general aviation airports in the region, consideration should be given to expanding/updating the existing terminal building or developing a new, modern terminal building with all appropriate amenities. The airport and its terminal services are a very important link to the entire region, whether it is for business or pleasure. Consideration to aesthetics should be given high priority in all public areas, as the terminal will serve as the first impression a visitor may have of the community.

Consideration #5 – Land Development/Release

The landside alternatives present development and redevelopment areas on the airport for aviation-related and non-aviation related uses, considering highest and best use potential. Aviation-related uses are typically reserved for property with direct access to the airfield. For property that is segregated from the airfield, an airport should consider non-aviation related development. The FAA typically requires airports to receive approval through a land-use release to lease airport-owned land for non-aviation related purposes. The FAA stipulates that all land with reasonable airside access should be used or reserved for aviation purposes.

LANDSIDE ALTERNATIVES

The following sections describe a series of landside alternatives as they relate to considerations detailed above. Three alternatives have been prepared to illustrate potential development plans aimed at meeting the needs of general aviation through the long-term planning period and, in some cases, beyond. It should be noted that the alternatives to be presented are not the only reasonable options for development. In some cases, a portion of one alternative could be intermixed with another. Also, some development concepts could be replaced with others. The overall intent of this exercise is to outline basic development concepts to spur collaboration for a final recommended plan. The final recommended plan only serves as a guide for the airport, which will aid the City of Casa Grande in the strategic planning of airport property. Many times, airport operators change their plan to meet the needs of specific users. The goal in analyzing landside development alternatives is to focus future development so that airport property can be maximized, and aviation activity can be protected.

Hangar development is assumed to be funded by private developers through ground lease agreements with the sponsor. For this reason, and the fluid nature of landside development alternatives, development costs for the landside alternatives have not been prepared. Once a recommended development concept has been defined, cost estimates for landside features (excluding hangars) will be formulated.

LANDSIDE ALTERNATIVE 1

Depicted on **Exhibit 4F**, Landside Alternative 1 focuses on maximizing existing property on the south side of the airport to support additional hangars. Apron expansion with additional aircraft parking is another area of focus; however, it should be noted that this alternative maintains Taxiway B in its existing location with a 300-foot separation from Runway 5-23. The features of Landside Alternative 1 include:

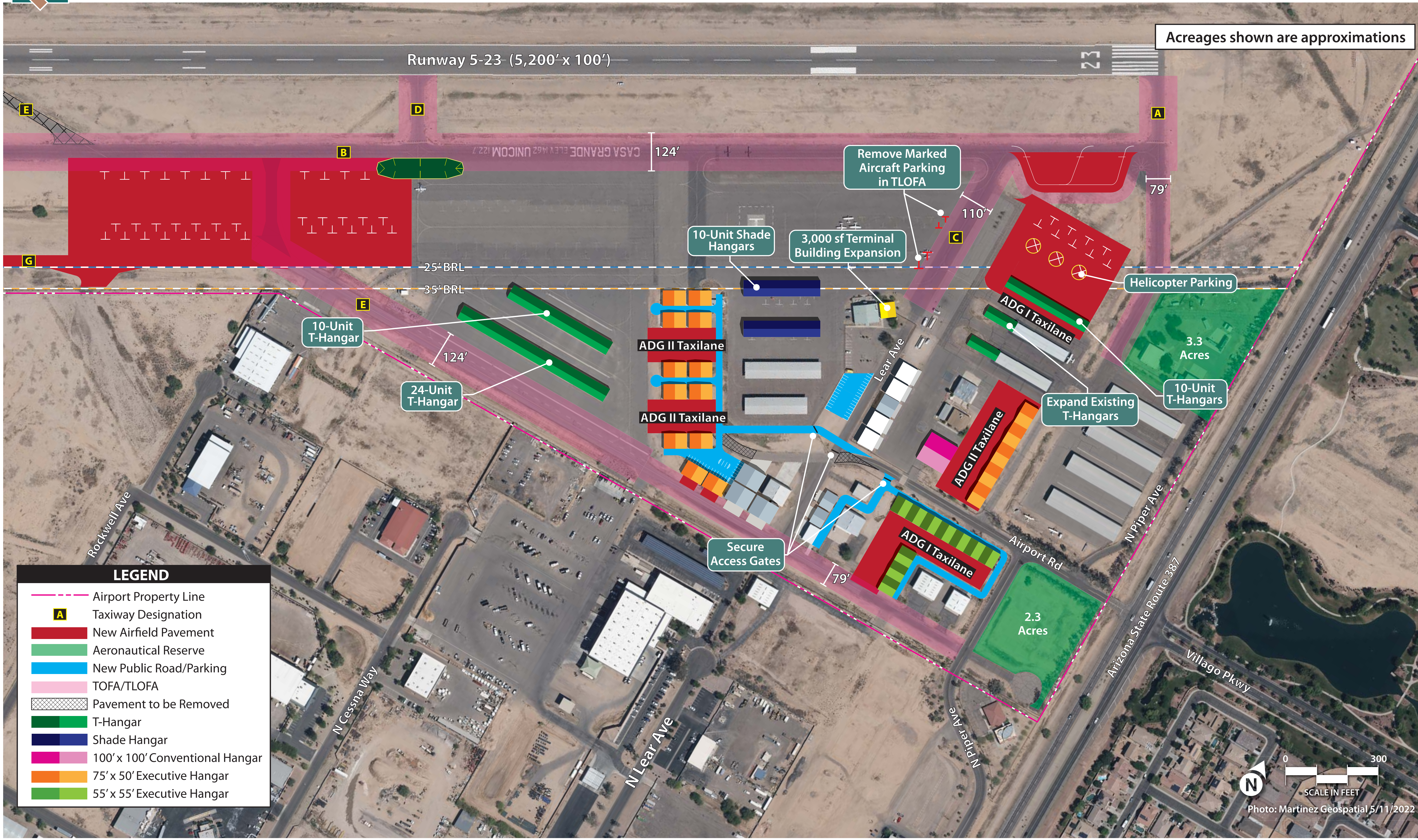
1. The existing terminal building is planned for a 3,000-sf expansion on the northeast side, bringing the total square footage to 7,800. While this does not meet the long-term projected need, it does meet the short-term need and allows for minimally impactful construction on the existing site.
2. The vehicle parking lot at the terminal building is also planned to be expanded, with additional pavement to the south providing 28 marked parking spaces. An adjacent gravel area can provide overflow parking when needed.
3. Three new T-hangars (shown in green on the exhibit) are proposed. Two, a 10-unit and a 24-unit, are located immediately south of the west apron in an area that has already been developed to support this style of hangar. A third T-hangar is planned on the east side where T-hangars already exist. As depicted on the exhibit, a new 10-unit T-hangar is planned to be constructed next to the existing 6-unit T-hangars, which are planned for expansion to 10 units.
4. Two 10-unit shade hangars (blue) are planned north of the existing shade hangars. It should be noted that construction of these hangars would eliminate 20 marked tiedown positions.
5. The remaining undeveloped portions south of the BRL are planned for a variety of conventional and executive hangars. On the west side, the old terminal building is planned to be demolished. In this area, gated vehicle access roads and taxilanes are planned to support 10 75’ x 50’ executive hangars (orange), with vehicle parking available at the south end behind the planned executive hangars fronting the taxilane that leads into Taxiway E.
6. The area that is bounded by Airport Road, N. Piper Avenue, and what is referred to as Taxiway C South is also planned for development. Particular focus has been given to segregating vehicular and aircraft traffic. This has been accomplished through the addition of a new, gated access road that extends from Airport Road and provides access to existing hangars and planned hangars in the area. This area is planned to support 10 55’ x 55’ executive hangars (lime green).
7. In the central portion of existing landside facilities, four 75’ x 50’ executive hangars (orange) and one 100’ x 100’ conventional hangar (pink) are planned.
8. Additional aircraft parking apron and marked parking are planned on the north side of the BRL where vertical development is limited or not possible. The west apron is planned to be expanded to the west along Taxiway B, with 37 marked tiedowns. A second parking area is planned north of the T-hangars near Taxiway C with nine parking spaces for fixed wing aircraft and three helicopter parking positions. All marked aircraft parking is planned outside of the taxiway object free areas (TOFA) and taxilane object free areas (TLOFA), and the four existing tiedowns located within the Taxiway C TLOFA are planned to be removed.
9. Two parcels are planned for aeronautical reserve. The first comprises approximately 3.3 acres and is located north of the 10-unit T-hangars along N. Piper Avenue. This area is currently being utilized as a training facility for the City’s fire department and should be considered for aviation development at some point in the future. The second parcel, approximately 2.3 acres in size, is

located on the southeast corner of airport property and is vacant. Its location at the junction of Airport Road and N. Piper Avenue makes it limited in terms of aeronautical development at present; however, as it is part of airport property, it should be considered for potential aviation development with the understanding that changes to the surrounding road network would be necessary in order for aircraft to access the area.

LANDSIDE ALTERNATIVE 2

Landside Alternative 2 is depicted on **Exhibit 4G**. This option again evaluates the development potential within the south side of the airfield but considers a relocated Taxiway B in accordance with ultimate C-II-2400 design standards. This shift eliminates some of the existing marked aircraft parking on the north side of the west apron and terminal apron. The features of Landside Alternative 2 include:

1. The existing terminal building is planned to be demolished and a new 12,100-sf building constructed approximately 700 feet to the southwest. At this size, the terminal would meet the needs of airport users through the long-term planning period.
2. A new vehicle parking lot with 66 spaces is planned south of the terminal building and would be accessible from new roadway pavement extending from Airport Road.
3. Nine new T-hangars (green) are proposed. Three 6-unit T-hangars are planned in the existing T-hangar area and would be accessible via Airport Road. To the north, three 10-unit T-hangars are planned in the area that is currently being used for firefighter training operations. This alternative also considers the addition of a new T-hangar area located outside the existing property line. A 4.5-acre parcel is planned to be acquired on the south side of Taxiway E. This area could support three 10-unit T-hangars, with tenant access from N. Cessna Way.
4. The existing shade hangars (blue) are planned to be expanded with new taxilane pavement constructed to allow for aircraft movement from the expanded areas.
5. Adjacent to the west apron, a new executive hangar complex is planned, with 14 75' x 50' executive hangars (orange) depicted. Moving west down Taxiway E, more executive hangars are planned. Two 40' x 40' hangars (dark orange) and four more 75' x 50' hangars (orange) are proposed. A new road is planned with gated access and parking for this area.
6. This alternative illustrates a different layout for the area that is bounded by Airport Road, N. Piper Avenue, and Taxiway C South, again segregating vehicular and aircraft traffic with the addition of new, gated access roads that extend from Airport Road and N. Piper Avenue. This layout plans for one 55' x 55' executive hangar (lime green) and four 75' x 75' executive hangars (purple).
7. A taxiway turnaround on the south side of the taxilane (Taxiway E) is also planned for this area. Presently, there is limited space for larger aircraft to turnaround if they inadvertently taxi into this area. If/when this happens, an aircraft unable to maneuver would have to be towed back to a point on the taxiway where proper wingtip clearance could be achieved. A turnaround eliminates the need for this, should it arise. However, it would require the acquisition of approximately 0.9 acres of property and is unlikely to be eligible for federal funding support.


Acreages shown are approximations
Runway 5-23 (5,200' x 100')
CASA GRANDE ELEV 1462 UNICOM 122.7
124'
79'
110'
Remove Marked
Aircraft Parking
in TLOFA
10-Unit Shade
Hangars
3,000 sf Terminal
Building Expansion
Helicopter Parking
25' BRL
35' BRL
10-Unit
T-Hangar
24-Unit
T-Hangar
ADG II Taxilane
ADG II Taxilane
ADG I Taxilane
ADG II Taxilane
ADG I Taxilane
3.3
Acres
10-Unit
T-Hangars
Expand Existing
T-Hangars
Secure
Access Gates
2.3
Acres
Lear Ave
Airport Rd
N Piper Ave
Arizona State Route 387
Villago Pkwy
Rockwell Ave
N Cessna Way
N Lear Ave
N Piper Ave
A
B
C
D
E
E
G
LEGEND
Airport Property Line
Taxiway Designation
New Airfield Pavement
Aeronautical Reserve
New Public Road/Parking
TOFA/TLOFA
Pavement to be Removed
T-Hangar
Shade Hangar
100' x 100' Conventional Hangar
75' x 50' Executive Hangar
55' x 55' Executive Hangar
0
300
SCALE IN FEET
N
Photo: Martinez Geospatial 5/11/2022

Acreages shown are approximations
Runway 5-23 (5,200' x 100')
400'
124'
110'
79'
124'
110'
A
B
C
D
E
G
Remove Marked Aircraft Parking in TOFA/TLOFA
Helicopter Parking
New Terminal 12,100 sf (110' x 110')
Relocated Fuel Farm
25' BRL
35' BRL
Expand Existing Shade Hangars
10-Unit T-Hangars
ADG I Taxilane
6-Unit T-Hangars
ADG II Taxilane
Acquire 4.5 Acres
Secure Access Gates
Acquire 0.9 Acres
2.3 Acres
Lear Ave
Airport Rd
N Piper Ave
Arizona State Route 387
Villago Pkwy
N Cessna Way
N Lear Ave
0
300
SCALE IN FEET
N
Photo: Martinez Geospatial 5/11/2022
LEGEND
Airport Property Line
Ultimate Property Line
Taxiway Designation
New Airfield Pavement
Aeronautical Reserve
New Public Road/Parking
TOFA/TLOFA
Pavement to be Removed
T-Hangar
Shade Hangar
75' x 75' Executive Hangar
75' x 50' Executive Hangar
55' x 55' Executive Hangar
40' x 40' Executive Hangar

8. Near the existing fuel storage tanks, two 55’ x 55’ executive hangars (lime green) are planned. These hangars and the existing hangars in the area are accessible via Lear Avenue, which is planned to be gated under this alternative.
9. Additional aircraft parking apron and marked parking are also planned with this alternative. The west apron is planned to be expanded to support three helicopter parking positions. A second parking area is planned north of the T-hangars near Taxiway C with 22 parking spaces for fixed wing aircraft. All marked aircraft parking is planned outside of the taxiway object free areas (TOFA) and taxilane object free areas (TLOFA). The four existing tiedowns located within the Taxiway C TLOFA are planned to be removed, and 15 tiedowns on the west apron would need to be removed due to the Taxiway B relocation project. With the terminal relocated and Lear Avenue gated and closed to the public, an expansion to the terminal apron is possible. New pavement that includes 13 additional tiedowns is planned to be constructed in this area.
10. Similar to Landside Alternative 1, the 2.3-acre southeast parcel at the junction of Airport Road and N. Piper Avenue is planned for future aviation development.
11. With the terminal relocation and apron expansion projects, the existing fuel tanks are planned to be relocated to a new site next to the new terminal building.

LANDSIDE ALTERNATIVE 3

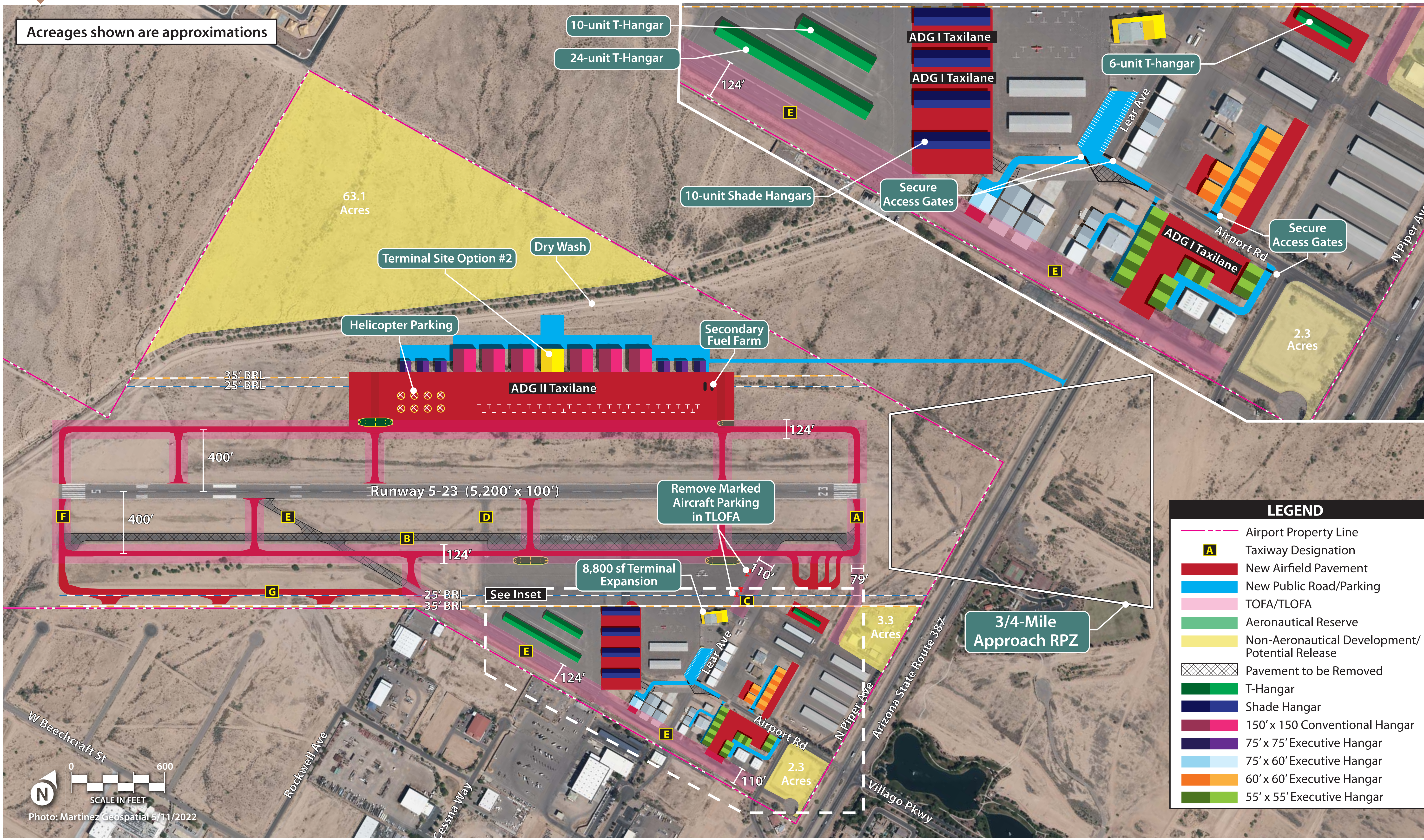
Depicted on **Exhibit 4H**, Landside Alternative 3 considers the development potential of both the south and north sides of airport property, with a major focus on hangar and apron expansion. The features of Landside Alternative 3 include:

1. Two development options for the terminal building are considered. The first evaluates an 8,800-sf expansion of the existing building, which would bring the terminal to 13,600 sf. A parking lot expansion is also shown, with 42 additional spaces. The second option considers a new site on the airport’s north side. In this location, a 22,500-sf terminal building could be constructed. This site would be more centrally located on the runway and would give the terminal better visibility from the airfield, especially as new hangars are added around the existing terminal site. A north side terminal could also help spur more development in this underutilized portion of airport property. To accomplish this, however, significant work would need to be completed in the way of utilities and ground access. As shown on the exhibit, a new road extending from Arizona State Route 387 is planned to provide access to this site.
2. Three new T-hangars (shown in green on the exhibit) are proposed on the south side. Like Landside Alternative 1, two, a 10-unit and a 24-unit, are located immediately south of the west apron in an area that has already been developed to support this style of hangar. A third T-hangar is planned on the east side where T-hangars already exist. As depicted on the exhibit, a new 6-unit T-hangar is planned to be constructed next to the existing 6-unit T-hangars.
3. Four additional 10-unit shade hangars (blue) are planned west of the existing shade hangars.
4. A new executive hangar complex is planned south of the 6-unit T-hangars, with seven 60’ x 60’ executive hangars (orange) depicted

5. A third layout for the area bounded by Airport Road, N. Piper Avenue, and Taxiway C South is depicted on this alternative. Two gated access roads extending from Airport Road separate vehicle traffic from aircraft and provide access to tenants in this area. This layout plans for 11 55’ x 55’ executive hangars (lime green).
6. On the other side of Taxiway C South, a 75’ x 60’ executive hangar (light blue) is planned that fronts Taxiway E.
7. On the north side of the airport where the second option for a new terminal is considered, a mix of conventional and executive hangars are proposed. This includes six 150’ x 150’ conventional hangars (pink) and six 75’ x 75’ executive hangars (purple). All are accessible from a new road extending off Arizona State Route 387, and each has vehicle parking at the rear of the building.
8. This alternative focuses aircraft apron and parking on the north side. The 97,000 sy apron is planned to support 45 fixed wing parking positions and eight helicopter parking spaces. On the south side, no additional parking is planned, and 19 marked tiedowns are proposed to be removed due to their location in the ultimate TOFA/TLOFA.
9. This alternative does not consider any parcels on airport property for aeronautical reserve. Rather, the 2.3-acre and 3.3-acre parcels along N. Piper Avenue are planned for non-aeronautical reserve or potential release, as are 63.1 acres on the north side of the dry wash. The 2.3-acre and the 63.1-acre parcels have limited utility in terms of aviation as they are currently inaccessible to the airfield. The 3.3-acre parcel, while afforded prime access to the airfield, is already being used in a non-aeronautical capacity. As such, this alternative earmarks each of these areas for non-aeronautical reserve or potential release from federal obligation. If the airport sponsor wishes to pursue release of these parcels through the *FAA Reauthorization Act of 2018*, Section 163, which changed how the FAA’s Office of Airport’s staff reviews and considers the release of airport property for non-aviation uses. The section focuses FAA’s review and approval of Airport Layout Plans (ALPs) to those portions of the ALP that materially impact the safe and efficient operation of airports, the safety of people and property on the ground adjacent to the airport, and the value of prior federal investments to a significant extent. In effect, this new guidance is intended to ease the process of gaining FAA approval of land releases.
10. With extensive development planned on the north side, a secondary fuel farm is planned.

LANDSIDE SUMMARY

The landside alternatives presented look to accommodate an array of aviation activities that either currently occur or could be expected to occur at CGZ in the future. There is demand for new facilities at CGZ, and with a changing fleet mix of aircraft that includes more sophisticated aircraft, airport management will need to determine how to develop its property in an organized and thoughtful way. Each of the development options considers a long-term vision that would, in some cases, extend beyond the 20-year scope of this Master Plan. Nonetheless, it is beneficial to provide a long-term vision for the airport for future generations.


Acreages shown are approximations
10-unit T-Hangar
24-unit T-Hangar
ADG I Taxilane
ADG I Taxilane
6-unit T-hangar
124'
E
Lear Ave
10-unit Shade Hangars
Secure Access Gates
Secure Access Gates
Airport Rd
ADG I Taxilane
N Piper Ave
E
2.3 Acres
63.1 Acres
Terminal Site Option #2
Dry Wash
Helicopter Parking
Secondary Fuel Farm
35' BRL
25' BRL
ADG II Taxilane
124'
400'
Runway 5-23 (5,200' x 100')
Remove Marked Aircraft Parking in TLOFA
400'
F
E
D
B
A
124'
110'
79'
8,800 sf Terminal Expansion
G
25' BRL
35' BRL
See Inset
C
3.3 Acres
3/4-Mile Approach RPZ
E
124'
Lear Ave
E
Airport Rd
N Piper Ave
Arizona State Route 387
2.3 Acres
110'
Villago Pkwy
W Beechcraft St
Rockwell Ave
Cessna Way
0
600
SCALE IN FEET
N
Photo: Martinez Geospatial 5/11/2022
LEGEND
Airport Property Line
A Taxiway Designation
New Airfield Pavement
New Public Road/Parking
TOFA/TLOFA
Aeronautical Reserve
Non-Aeronautical Development/ Potential Release
Pavement to be Removed
T-Hangar
Shade Hangar
150' x 150 Conventional Hangar
75' x 75' Executive Hangar
75' x 60' Executive Hangar
60' x 60' Executive Hangar
55' x 55' Executive Hangar

This page intentionally left blank

SUMMARY

This chapter is intended to present analysis of various options that may be considered for specific airport elements. The need for alternatives is typically spurred by projections of aviation demand growth and/or by the need to resolve non-standard airport elements. FAA design standards are frequently updated with the intent of improving the safety and efficiency of aircraft movements on and around airports, which can lead to certain pavement geometries now being classified as non-standard when previously they qualified to meet standard.

Several development alternatives related to both the airside and the landside have been presented. On the airside, the major considerations involve resolving non-standard safety area conditions on both ends of the runway, extending Runway 5-23, and improving airfield geometry to meet proper taxiway design standards. For the landside, alternatives were presented to consider additional aviation development on the south side of the airport and on the currently undeveloped north side as well. As the airport's fleet mix transitions to include more jets and turboprops, it will be important to clearly delineate development areas for facilities to accommodate those aircraft. Segregating jet and turboprop traffic from small aircraft operators contributes to operational safety and presents a more organized and efficient airport.

The next step in the Master Plan development process is to arrive at a recommended development concept. Participation of the PAC and the public will be important considerations. Additional consultation with the FAA and ADOT may also be required. Once a consolidated development plan is identified, a 20-year capital improvement program, with a list of prioritized projects tied to aviation demand and/or necessity, will be presented. Finally, a financial analysis will be presented to identify potential funding sources and to show airport management what local funds will be necessary to implement the plan.

This page intentionally left blank

City of Casa Grande
AIRPORT MASTER PLAN

Chapter 5

Recommended Master Plan Concept

City of
Casa Grande
AIRPORT MASTER PLAN

Chapter 5

Recommended Master Plan Concept

The airport master plan for Casa Grande Municipal Airport (CGZ) has progressed through a systematic and logical process with a goal of formulating a recommended 20-year development plan. The process began with an evaluation of existing and future operational demand, which aided in creating an assessment of future facility needs and were used to develop alternative facility plans. Each step in the planning process included the development of draft working papers, which were presented and discussed at Planning Advisory Committee (PAC) meetings and public information workshops and were available on the project website.

In the previous chapter, several development alternatives were analyzed to explore options for the future growth and development of CGZ. The development alternatives have been refined into a single recommended concept for the master plan. This chapter describes, in narrative and graphic form, the recommended direction for the future use and development of CGZ.

The recommended concept provides the ability to meet the disparate needs of an array of airport operators. The goal of this plan is to ensure the airport can continue, and even improve, in its role of serving general aviation activities in and around the City of Casa Grande and regional area. The plan has been specifically tailored to support existing and future growth in all forms of potential aviation activity as the demand materializes.

The recommended airport development concept, as shown on **Exhibits 5A** and **5B**, presents a long-term configuration for the airport, which preserves and enhances the role of the airport, while meeting Federal Aviation Administration (FAA) design standards. The phased implementation of the recommended development concept will be presented in Chapter Six. The following sections describe the key details of the recommended master plan concept.

AIRSIDE CONCEPT

The airside plan generally considers those improvements related to the runway and taxiway system and navigational aids.

DESIGN STANDARDS

The FAA has established design criteria to define the physical dimensions of runways and taxiways, as well as the imaginary surfaces surrounding them, to enhance the safe operation of aircraft at airports. These design standards also define the separation criteria for the placement of landside facilities.

As discussed previously, the design criteria primarily center on the airport's critical design aircraft. The critical aircraft is the most demanding aircraft, or family of aircraft, which currently, or are projected to, conduct 500 or more operations (takeoffs and landings) per year at the airport. Factors included in airport design are an aircraft's wingspan, approach speed, tail height, and, in some cases, the instrument approach visibility minimums for each runway. The FAA has established the Runway Design Code (RDC) to relate these design aircraft factors to airfield design standards. The most restrictive RDC is also considered the overall Airport Reference Code (ARC). In the case of CGZ, which has only one runway, the RDC for Runway 5-23 also serves as the ARC.

While airfield elements, such as safety areas, must meet design standards associated with the applicable RDC, landside elements can be designed to accommodate specific categories of aircraft. For example, an airside taxiway must meet taxiway object free area (TOFA) standards for all aircraft types using the taxiway, while the taxilane to a T-hangar area only needs to meet width standards for smaller single and multi-engine piston aircraft expected to utilize the taxilane.

The applicable RDC and critical design aircraft for Runway 5-23 at CGZ in the existing and ultimate conditions, as established in Chapter Two, are summarized in **Table 5A**.

Table 5A | Airport and Runway Classifications | Casa Grande Municipal Airport		
	Runway 5-23 Existing	Runway 5-23 Ultimate
Airport Reference Code (ARC)	B-II	C-II
Airport Critical Aircraft	B-II-2A	C-II-2A
Critical Aircraft (Typ.)	Beechcraft King Air 200/300/350	Challenger 600/604
Runway Design Code (RDC)	B-II-2400	C-II-2400
Approach Reference Code (APRC)	B/III/4000 D/II/4000 B/II/2400	D/IV/2400 D/V/2400
Departure Reference Code (DPRC)	B/III D/II	D/IV D/V
Taxiway Design Group (TDG)	2A	2A*
*Based on the King Air 200/300/350		
Source: FAA AC 150/5300-13B, Airport Design		

RUNWAY 5-23

Runway Designation | A runway's designation is based upon its magnetic headings, which are determined by the magnetic declination for the area. The magnetic declination in the area of CGZ is 9° 45' E ± 0° 21' W. The runway is oriented northeast/southwest with a true heading of 060°/240°. Adjusting for the magnetic declination, the current magnetic heading of the runway is 050°/230°. As a result, Runway 5-23 should maintain this designation.

Runway Dimensions | Runway 5-23 is currently 5,200 feet long and 100 feet wide, meeting RDC C-II-2400 design standards for runway width. At these current dimensions, the runway is capable of safely accommodating all small general aviation aircraft. Business jets can also operate on this runway under moderate loading conditions with shorter trip lengths and during cool to warm temperatures. Longer trips and hot summer days significantly limit business jet capabilities. As a general aviation airport, CGZ serves a wide array of piston and turbine aircraft, with operations by both aircraft types expected to increase over the planning period. The City of Casa Grande is also home to several large manufacturers, and significant growth potential exists for new industries basing in the area. These local factors, combined with a projected shift in the national fleet mix to include more turbine aircraft, support a need to plan for a longer runway. Increasing the utility of the runway to safely accommodate business jets will also expand CGZ's market potential, attracting new itinerant operators, based aircraft, and businesses that provide services to business jet clients.

The recommended development concept includes a plan to maintain the runway at 100 feet wide, with a 2,526-foot extension to Runway 5 and removal of 426 feet of pavement from Runway 23 (to be discussed in greater detail in a later section), achieving an ultimate length of 7,300 feet. At this length, 100 percent of the small to mid-sized business jet fleet could safely operate at 60 percent useful load[1].

Connected actions to the extension of Runway 5-23 include the following:

[1] Refer to Table 3G.

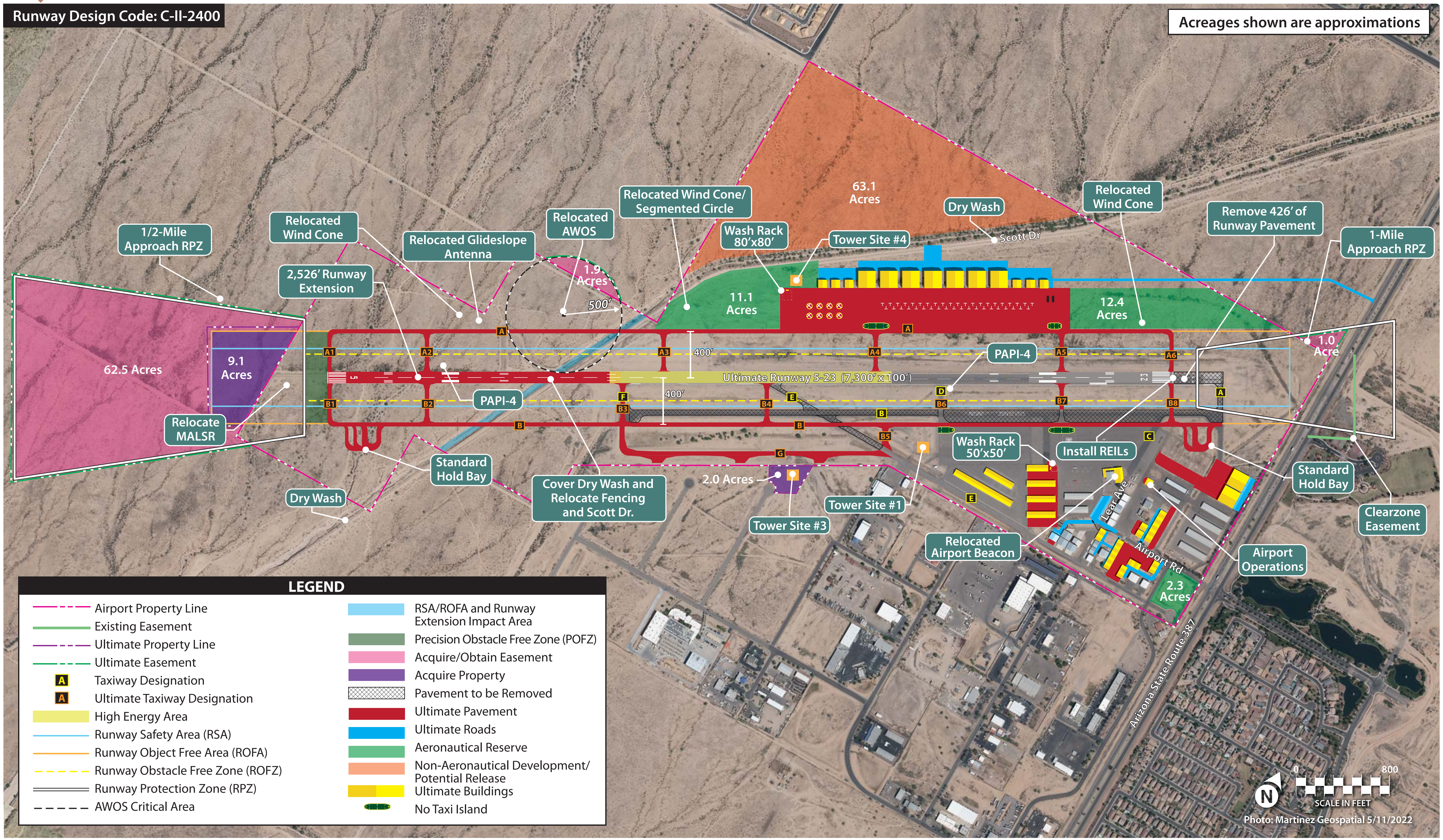
- Environmental analysis to determine the potential for environmental impacts to occur.
- Fee simple acquisition of approximately 9.1 acres in the ultimate runway safety area (RSA) and runway object free area (ROFA) at the Runway 5 end and acquisition of property interests over approximately 63.5 acres in the ultimate RPZs associated with each runway end. This could be in the form of fee simple acquisition or through obtaining an avigation easement to protect the compatibility of property on approach to the runway environment.
- Cover the dry wash west of the existing Runway 5 threshold.
- Extension of relocated Taxiway B to the ultimate Runway 5 end (to be discussed).
- Removal of 426 feet of pavement from the Runway 23 end (to be discussed).
- Relocation of the precision approach path indicator (PAPI) equipment, medium intensity approach light system with runway alignment (MALSR), and glideslope antenna on the Runway 5 end.
- All new runway pavement would be equipped with medium intensity runway edge lighting (MIRL).
- Re-mark runway with precision markings on Runway 5 and non-precision markings on Runway 23.

It should be noted that the runway extension is included for planning purposes only and is not currently justified. An extension project would require additional aircraft operations that demonstrate the need for increased runway length before the FAA will offer grant funding assistance for its construction.

Runway Safety Areas | The airport's AWOS, lighted wind cone located at midfield, and the supplemental wind cones located near the existing runway ends obstruct the ROFA in the existing and ultimate conditions. As such, the recommended plan includes relocating this equipment outside of the ultimate ROFA, as shown on **Exhibit 5A**.

The existing and ultimate RPZs for both ends of Runway 5-23 extend beyond airport property. On the existing Runway 5 end, approximately 1.9 acres of the ½-mile RPZ currently extend beyond the airport's boundary. If the runway is extended as planned, approximately 62.5 acres of the RPZ will be outside the airport's current boundary. As such, this property is proposed to be controlled via an avigation easement. On the Runway 23 end, the existing 1-mile RPZ also extends beyond the airport boundary and encompasses a potentially incompatible land use (Arizona State Route 387). If a lower approach minimum is pursued (lower than 1-mile but not lower than ¾-mile), the RPZ dimensions increase and additional property within the RPZ would be uncontrolled. The larger RPZ would also encompass property that is currently undeveloped but is planned for land uses the FAA may deem incompatible (i.e., recreational uses in the Villago development).

The airside alternatives in the previous chapter considered several scenarios for mitigating potentially incompatible uses within the RPZ. Options included displacement of the Runway 23 threshold and implementation of declared distances to artificially relocate the RPZ onto airport property, and relocation of Arizona State Route 387. Following discussions with airport and City staff and the FAA, it was determined that the Runway 23 RPZ should remain in its existing location and no action should be taken to relocate it or any of the land uses within it. In the ultimate C-II condition, the 1-mile RPZ increases in size, encompassing additional property; however, as this property is currently undeveloped, the development concept does not include any recommendations to shift the ultimate C-II RPZ or otherwise alter the land uses within it.


Runway Design Code: C-II-2400
Acreages shown are approximations
1/2-Mile Approach RPZ
Relocated Wind Cone
Relocated Glideslope Antenna
Relocated AWOS
Relocated Wind Cone/ Segmented Circle
Wash Rack 80'x80'
Tower Site #4
63.1 Acres
Dry Wash
Scott Dr
Relocated Wind Cone
Remove 426' of Runway Pavement
1-Mile Approach RPZ
2,526' Runway Extension
1.9 Acres
500'
11.1 Acres
12.4 Acres
1.0 Acre
62.5 Acres
9.1 Acres
400'
Ultimate Runway 5-23 (7,300' x 100')
PAPI-4
PAPI-4
Relocate MALSR
Standard Hold Bay
Dry Wash
Cover Dry Wash and Relocate Fencing and Scott Dr.
2.0 Acres
Tower Site #3
Tower Site #1
Wash Rack 50'x50'
Install REILs
Standard Hold Bay
Clearzone Easement
Relocated Airport Beacon
Lear Ave
Airport Rd
2.3 Acres
Airport Operations
Arizona State Route 387
LEGEND
Airport Property Line
Existing Easement
Ultimate Property Line
Ultimate Easement
Taxiway Designation
Ultimate Taxiway Designation
High Energy Area
Runway Safety Area (RSA)
Runway Object Free Area (ROFA)
Runway Obstacle Free Zone (ROFZ)
Runway Protection Zone (RPZ)
AWOS Critical Area
RSA/ROFA and Runway Extension Impact Area
Precision Obstacle Free Zone (POFZ)
Acquire/Obtain Easement
Acquire Property
Pavement to be Removed
Ultimate Pavement
Ultimate Roads
Aeronautical Reserve
Non-Aeronautical Development/ Potential Release
Ultimate Buildings
No Taxi Island
0
800
SCALE IN FEET
Photo: Martinez Geospatial 5/11/2022

This page intentionally left blank

A transition to C-II-2400 also results in an increase in the size of the RSA and ROFA, pushing these safety areas beyond the airport's existing property line at the Runway 23 end by 426 feet. FAA standards call for property within the RSA and ROFA to be owned by the airport sponsor, with the RSA graded and free of obstructions and the ROFA free from obstructions. Airside Alternative 3 considered an option to acquire property within the ultimate RSA and ROFA and reroute Arizona State Route 387; however, this alternative was rejected due to the significant costs associated with it, as well as anticipated opposition at the local and state levels. Therefore, in order to provide a standard RSA and ROFA in the ultimate C-II-2400 environment, Runway 23 is planned to be shortened by 426 feet, allowing for the full 1,000 feet of RSA/ROFA in the ultimate condition.

Pavement Strength | Runway 5-23 is currently strength-rated for up to 18,500 pounds for single wheel loading aircraft (SWL) and 65,000 pounds for dual wheel aircraft (DWL), which is adequate for all small aircraft and most small to mid-sized business jets. The critical design aircraft (Challenger 600/604) has a maximum takeoff weight (MTOWs) of 47,600 pounds or less. Therefore, the existing strength rating is adequate for all aircraft operating at CGZ currently and in the future, and no plans to strengthen the runway are recommended.

Instrument Approach Procedures | Runway 5 has three published instrument approach procedures, including an ILS approach with visibility minimums down to ½-mile. Runway 23 is equipped with an LNAV (GPS) approach with visibility minimums down to 1-mile for aircraft in categories A and B and 1¼-mile for C and D aircraft. The plan includes maintaining current instrument approach capabilities for both runways.

Visual Approach Aids | Runway 5-23 is currently equipped with PAPI-2s at both runway ends. The plan includes an upgrade to PAPI-4s at each runway end, as well as the installation of Runway End Identifier Lights (REILs) at the Runway 23 threshold to improve pilot situational awareness. As Runway 5 is already equipped with a MALSR, and this is planned to be maintained, REILs are not proposed for this runway end.

TAXIWAY IMPROVEMENTS

Taxiway Design | The entirety of the CGZ taxiway system is planned to meet Taxiway Design Group (TDG) 2A standards, which call for a width of 35 feet. All taxiways are 40 feet wide, with the exception of Taxiway E which is 30 feet wide and therefore does not meet FAA design standards for width. The recommended development concept includes a plan for all taxiways – existing and ultimate – to be at least 35 feet wide.

Taxiway Nomenclature | Current taxiway designations do not meet FAA Engineering Brief (EB) 89, *Taxiway Nomenclature Convention* standards. According to the EB, stub taxiways associated with a parallel taxiway should be designated with a letter and number, such as A1, A2, A3, etc., beginning with the northernmost stub for north/south taxiways and starting with the westernmost stub for east/west taxiways. Ultimate taxiway designations that meet the EB standards, along with the additional taxiway extensions/improvements, are identified on **Exhibit 5A**.

Taxiway B | Taxiway B, the full-length parallel taxiway supporting Runway 5-23, is separated from the runway by 300 feet, centerline to centerline. While this meets the existing B-II-2400 design standards for runway to taxiway separation, it does not meet ultimate C-II-2400 standards which call for 400 feet of separation. As such, the plan includes a recommendation to shift Taxiway B to the southeast to provide for a 400-foot separation from the runway. The relocation of Taxiway B will necessitate the removal of portions of existing Taxiway B pavement, as illustrated on **Exhibit 5A**. With Taxiway B shifted farther onto the apron, there are impacts to the marked aircraft parking that would be located with the ultimate Taxiway B TOFA. The bottom half of **Exhibit 5B** highlights the parking positions that are planned to be removed to ensure the TOFA remains clear of obstructions. Ultimate Taxiway B is also planned to be extended to the ultimate Runway 5 threshold. Ultimate Taxiways B3 and B6 will be maintained, with new connectors B1, B2, B4, B7, and B8 planned to provide access to various points along the runway. The existing connector to the existing Runway 23 end is planned to be removed at the time the runway is shortened.

Taxiway A | The recommended development concept includes a plan to develop the north side of airport property with various landside facilities. In order to transition aircraft to/from these planned facilities, a new parallel taxiway is planned on the north side of Runway 5-23. Ultimate Taxiway A is planned to serve as a full-length parallel taxiway, 35 feet wide and separated from the runway by 400 feet. Ultimate taxiway connectors A1 and A6 will provide access to the runway ends, while connectors A2, A3, A4, and A5 will serve as runway exits.

Taxiway E | Taxiway E currently serves as an exit from Runway 5-23, connecting at an acute angle to Runway 5-23 and existing Taxiway B. Taxiway E then extends farther east, providing access to landside facilities on the southeast side of the airport. As shown on **Exhibit 5A**, a portion of Taxiway E is planned to be removed to allow for new right-angled connecting taxiways (ultimate Taxiway B4 and B5), which is the FAA's preferred design. Removal of the western portion of Taxiway E also reduces the risk of a pilot inadvertently taxiing from landside facilities directly onto Runway 5-23. The new alignment forces pilots to make a turn prior to entering the runway environment, improving situational awareness, and promoting safer movements on the airfield.

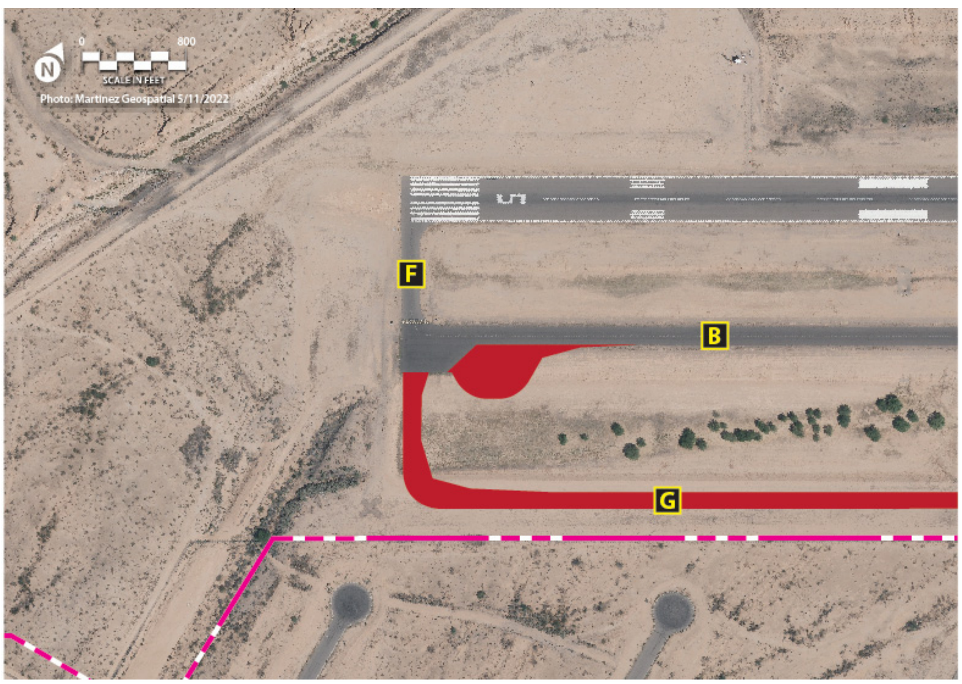
Taxiway G | Ultimate Taxiway G is a 35-foot-wide taxiway planned to serve users of the airpark industrial park. This taxiway is planned to extend from existing Taxiway E and connect to ultimate Taxiway B via ultimate Taxiways B3 and B5.

Taxiway Geometry Improvements | Previous chapters have discussed non-standard taxiway geometry issues at CGZ, including where existing Taxiway D provides direct access from the apron area to the runway and where taxiways intersect at acute angles. To eliminate the direct access on existing Taxiway D (ultimate Taxiway B6), the plan includes the addition of a no-taxi island. Marking the apron with a no-taxi island at the entrance to the taxiway forces pilots to make a turn prior to entering the runway, which would meet FAA design standards that call for taxiways leading from an apron to make at least one turn between 75 and 90 degrees prior to reaching the runway threshold. Ultimate connector taxiways leading from existing and planned apron areas are also planned to be equipped with no-taxi islands where a direct access condition would otherwise result. This includes ultimate Taxiways B7, A4, and A5. The existing helicopter parking is planned to be shifted south to accommodate the no-taxi island at the entrance to Taxiway B7.

As mentioned, existing Taxiway E has acute-angled connections with Runway 5-23 and Taxiway B. This is non-standard geometry that is planned to be mitigated by the closure and removal of Taxiway E, with new connections provided via ultimate Taxiways B4 and B5.

Holding Bays | The traditional holding apron at the end of existing Taxiway B where it connects to existing Taxiway F is now considered non-standard per FAA airfield design. The wide, expansive pavement area makes signage and lighting more difficult for pilots to see, which can lead to pilot confusion near the entrance to a runway. Therefore, the plan includes eliminating the existing holding apron and replacing it with a standard holding bay. A standard holding bay is also planned at the Runway 23 end. Holding bays have clear entrance/exit points and independent parking areas separated by islands. Each holding bay is designed to accommodate airport design group (ADG) II aircraft.

Prior to the relocation of Taxiway B, there is an interim plan in place to provide additional holding area for aircraft departing Runway 5 (see graphic below). While the existing hold bay serves this function currently, the planned construction of Taxiway G where it connects to existing Taxiway F will eliminate some of the usable pavement for holding aircraft. Therefore, additional pavement is planned in the interim to expand the hold bay. When Taxiway B is relocated, this pavement is planned to be removed.



Interim Hold Bay

Aircraft Control Tower Sites | Previous analysis determined that CGZ may be eligible for the addition of an airport traffic control tower (ATCT), pending further analysis conducted by FAA. For planning purposes, potential locations for siting an ATCT were examined in the Alternatives chapter. The recommended development concept has retained three of the four sites analyzed as potential locations that should be held in reserve should the City of Casa Grande pursue the construction of a tower. These are shown on **Exhibit 5A** and described below:

- ATCT Site #1 - located adjacent to the west apron and is set back approximately 600 feet from the runway centerline. In this location, the cab is planned for an observer eye height of 53 feet. The tower is north facing; this orientation is preferred to lessen the effects of direct and indirect sun/sand glare.

- ATCT Site #3[2] - located south of ultimate Taxiway G. This site is outside the airport's current property line and would require the acquisition of approximately 2.0 acres to support the tower and vehicle parking for controllers. Like the previous alternative, the tower is oriented to face north. The tower site is approximately 850 feet from the runway and would require a cab height of 71 feet.

- ATCT Site #4[3] – located north of the runway and considers a south-facing view. While this is not a preferred orientation due to sun/sand glare, the property north of the runway is currently undeveloped. Locating a tower here would require significant investment in terms of road access and utility expansion if the tower is constructed prior to planned north side development. The north side tower site is approximately 890 feet from the runway and would require a cab height of 57 feet.

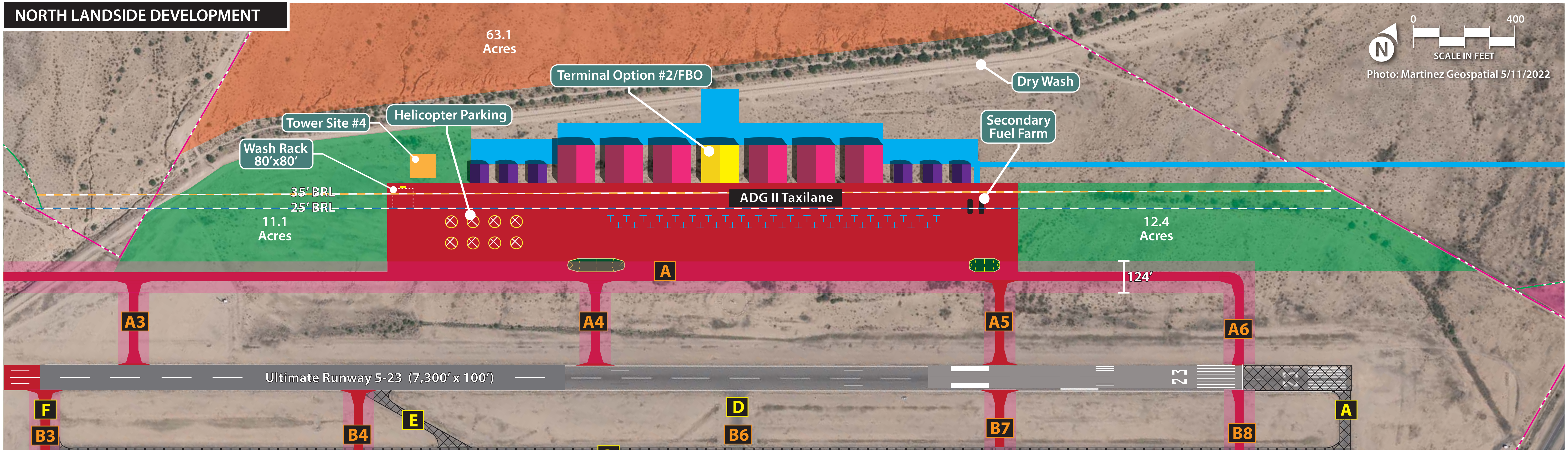
LANDSIDE CONCEPT

The primary goal of landside facility planning is to provide adequate space to meet reasonably anticipated general aviation needs, while also optimizing operational efficiency and land use. Achieving these goals yields a development scheme that segregates functional uses while maximizing the airport's revenue potential. The key issues to be addressed in the landside areas at CGZ are typical of most general aviation airports and include providing an expanded terminal services facility, increasing hangar and apron capacities, and adding amenities to accommodate existing users and attract new users. It should be clearly stated that all general aviation-related development, such as new hangar construction, should occur only as dictated by demand. The recommended concept is intended to be used strictly as a guide for CGZ staff when considering new developments.

Exhibit 5B depicts a close-in view of proposed landside facilities on both the north and south sides of the airport. A 25-foot and 35-foot building restriction line (BRL) is included on both frames of the graphic. As discussed in the previous chapter, the BRL serves as a guide for vertical construction on the airport by factoring in safety areas and Code of Federal Regulations (CFR) Part 77 surfaces. Structures should generally be planned beyond the BRL, farther from the runway, to ensure clearance of safety area and imaginary surfaces.

[2] Following the Alternatives analysis, it was determined that ATCT Site #3 should be shifted to the west as the initial site analyzed includes property unavailable for purchase.
[3] ATCT Site #4 has been shifted to allow for potential north side development as depicted on the recommended development concept.

NORTH LANDSIDE DEVELOPMENT



SOUTH LANDSIDE DEVELOPMENT

This page intentionally left blank

SOUTH SIDE

All of CGZ's existing landside facilities are located south of Runway 5-23. This includes the terminal building, aircraft parking aprons, and aircraft storage hangars. The Facility Requirements chapter determined that additional capacity may be needed in each of these areas by the end of the planning period, and the Alternatives chapter considered several facility layout concepts for the south side of the airport. The preferred development concept for landside facilities south of Runway 5-23 is depicted on the bottom half of **Exhibit 5B**.

Terminal Building & Vehicle Parking| The alternatives analysis considered different options for expansion of the existing terminal building, as well as the possibility to develop a new terminal on the north side. The recommended development concept has included both options, which affords the City of Casa Grande greater flexibility in planning when capacity reaches a point where expansion is needed. The south side development concept illustrates an 12,000 square foot (sf) expansion of the existing terminal building, with the bulk of the development occurring on the east side of the building. This expansion is intended to allow for the potential inclusion of an FBO while maintaining airport administration and staff offices in the same location. The vehicle parking lot on the south side of the building is also planned to be expanded to provide additional parking. The gravel lot south of the existing paved lot is planned to be paved and marked with parking stripes, with a secondary access point from Airport Road.

Airport Operations Building | A dedicated Airport Operations building is planned east of the fuel tanks on an undeveloped portion of property. The 3,600 sf building is intended to provide storage for airfield maintenance equipment and materials.

Aircraft Storage Facilities | As mentioned, all of CGZ's facilities are concentrated on the south side, including all of the hangars on the airport. Currently, there is a mix of shade hangars, T-hangars, and executive hangars at the airport. The recommended development plan includes development of each of these hangar types, as well as conventional hangars (>10,000 sf) that could support a fixed base operation (FBO) or specialized aviation service operator (SASO). The following aircraft storage development areas are planned for the airport's south side:

- **T-hangars** – The area south of the west apron has historically been planned for T-hangar development, and that plan is carried forward on the development concept. A 10-unit and a 24-unit T-hangar are planned for this area, shown in dark green on **Exhibit 5B**.

- **Shade Hangars** – Four 10-unit shade hangar hangars are planned for the area immediately west of the existing shade hangars. This area previously supported two hangars and the old terminal building. While the hangars have been removed, the old terminal building remains but is in poor condition and is planned to be demolished. The airport beacon is also located in this area and is planned to be relocated to an area adjacent to the terminal building.

- **Executive Hangars** – Several areas on the south side of the airport are planned for new executive hangars. Moving from west to east, a 75' by 60' hangar is planned to front Taxiway E. Farther down Taxiway E a new complex is planned, consisting of 11 executive hangars sized 55' by 55' with access from Airport Road. Two additional 55' by 55' hangars are planned near the intersection of Airport Road and Lear Avenue. These hangars are planned to support smaller, ADG I aircraft. On the other side of Airport Road, a development area is planned, with new apron/taxilane pavement supporting seven 60' by 60' executive hangars.

- **Conventional Hangars** – Two conventional hangars sized 150' by 150' are planned off of Piper Avenue in the area that is currently utilized by the city for firefighter training. These hangars are planned to be served by a new aircraft parking apron with a taxilane leading from it to the terminal apron.

Aircraft Parking Apron | Currently, CGZ offers aircraft parking on two aprons – the terminal apron and the west apron. The Facility Requirements identified a need for additional apron area and aircraft parking; however, the south side of the airport offers limited opportunity for this type of development. As such, the majority of new apron and aircraft parking development is planned for the north side of the airport. With the planned relocation of Taxiway B and installation of no-taxi islands, there is a reduction in existing apron area. Additionally, the relocation of Taxiway B also impacts marked aircraft parking in the shifted TOFA and requires their removal, as illustrated on **Exhibit 5B**. Similarly, marked aircraft parking located in the taxilane object free area (TLOFA) for Taxiway C are planned to be removed. New marked parking for fixed wing aircraft is planned where feasible on both the terminal and west aprons. Finally, the helicopter parking area located on the terminal apron is also planned to be shifted slightly to the southeast due to the inclusion of the no-taxi island at the entrance to Taxiway B7, necessitating the re-marking of pavement in this area.

Support Facilities | CGZ is a busy general aviation airport with more than 100 based aircraft. An airport of this type and size should provide a location where owners can clean their aircraft and the cleaning fluids are contained. The plan recommends the installation of two aircraft wash racks on the airfield. One is planned on the south side of the airfield near the planned shade hangars and is intended to accommodate smaller general aviation aircraft.

Vehicle Access and Parking | Consideration has been given to separating vehicular traffic from aircraft, particularly in the area south of Airport Road. The recommended plan includes new access roads to hangar developments to prevent aircraft and vehicles from using the same pavement. Each of these areas are accessible from Airport Road, with secure access gates and dedicated parking for tenants and airport staff.

Aeronautical Reserve | One area on the south side of the field has been set aside for aeronautical reserve. This 2.3-acre parcel is located on the southeast corner of Airport Road and Piper Avenue and is currently cut off from the airfield by these public roadways. However, it does hold value as a potential aeronautical use. As such, the recommended development concept plans to reserve this parcel for future aviation use.

NORTH SIDE

The north side of the airport is currently undeveloped but offers significant opportunity for future aviation and non-aviation developments. It is anticipated that once the south side reaches a built-out condition, new development will begin on the north side. A major challenge to development of the north side is a need for expanded utility infrastructure and vehicle access roads. Once this infrastructure is in place, the plan includes the addition of an 80,000 square yard (sy) aircraft parking apron with marked parking for both fixed wing aircraft and helicopters, as well as aircraft storage facilities and a potential site for a new terminal building. The north side concept is depicted on the top half of **Exhibit 5B**. Features of the north side development concept are described below.

Aircraft Parking Apron | As described above, there are two existing aircraft parking aprons at CGZ, both of which are located on the south side of the airport. Additional apron capacity is needed over the course of the next 20 years to accommodate growth in based aircraft, as well as spaces for transient operators. With limited area for apron expansion on the south side, the plan includes adding approximately 80,000 sy of new pavement on the north side of the runway, accessible from ultimate Taxiway A. This new apron space provides new parking spaces for fixed wing and rotor aircraft, with taxilane access for up to ADG II aircraft.

Hangar Development | The recommended plan includes the development of executive and conventional hangars that could house a mix of turboprops and business jets. The central portion of the apron is planned for the larger 150' by 150' conventional hangars, while smaller 75' by 75' executive hangars are planned at the ends of the apron.

Terminal/FBO Development | As mentioned, two options for meeting anticipated need in terms of terminal capacity have been retained for this plan. The first is an expansion of the existing terminal building (described previously), while the second option considers development of a new terminal on the north side. The plan depicts a potential terminal site at the apron's midpoint, which affords good visibility for transient operators. Another possibility for this area is the inclusion of an independent FBO. Currently, the City of Casa Grande provides services traditionally associated with an FBO, including aircraft fueling and parking, hangar leasing/sales, pilot supplies, and flight planning. The development concept includes the potential for development of either option, giving the city greater flexibility to choose the option that best meets the needs of the city and airport users when the time comes to develop the north side.

Support Facilities | Currently, the airport's fueling facilities are located on the south side, adjacent to the terminal building. While the existing fuel capacity is sufficient through the planning period, plans should consider the possible addition of a new fuel tank to store unleaded aviation fuel (100UL), which has recently been approved for use in all piston aircraft. Additionally, a secondary fuel farm and related facilities are planned for the north side of the airport. This is more convenient to north side users and eliminates the need for fuel trucks to travel from the south to fuel aircraft. A second aircraft wash rack, intended to serve larger aircraft, is also planned for the north side apron.

Vehicle Access | With no existing access to the north side of the airport, the plan identifies a new access road extending from Arizona State Route 387. This road is planned to be routed outside the Runway 23 RPZ and will connect to planned parking lots at the rear of the proposed hangars.

Aeronautical Reserve | Two areas on the north side have been reserved for future aeronautical use should the need for additional development along the flight line arise. This includes a 12.4-acre parcel east of the apron and an 11.1-acre area west of the apron.

Non-Aeronautical Development/Potential Release | The airport owns approximately 63.1 acres of property north of the dry wash that runs through airport property. This property is undeveloped with no road or utility access. Additionally, it is cut off from the airfield by the dry wash. Because it is inaccessible to the airfield, it cannot be developed for aviation-related uses. For this reason, the plan reserves this area for non-aeronautical development to include compatible commercial or industrial developments or potential release of the property.

Generally, airport property is subject to Airport Improvement Program (AIP) grant assurances; therefore, CGZ will need to request a release of these properties of federal obligations by the FAA. Once a release of federal obligation is issued by the FAA, the city would be able to lease or sell these certain properties to support revenue diversification and generation. The FAA Reauthorization Act of 2018, Section 163 changed how the FAA's Office of Airport's staff reviews and considers the release of airport property for non-aviation uses. The section focuses FAA's review and approval of Airport Layout Plans (ALPs) to those portions of the ALP that materially impact the safe and efficient operation of airports, the safety of people and property on the ground adjacent to the airport, and the value of prior federal investments to a significant extent. In effect, this new guidance is intended to ease the process of gaining FAA approval of land releases.

AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION

REGULATORY GUIDELINES

FAA Modernization and Reform Act of 2012

The *FAA Modernization and Reform Act of 2012* (FMRA), which amended Title 49, United States Code (USC), included several changes to the Airport Improvement Program (AIP). Two of these changes are related to recycling, reuse, and waste reduction at airports.

- Section 132(b) of the FMRA expanded the definition of airport planning to include "developing a plan for recycling and minimizing the generation of airport solid waste, consistent with applicable state and local recycling laws, including the cost of a waste audit."

- Section 133 of the FMRA added a provision requiring airports that have, or plan to prepare, a master plan and that receive AIP funding for an eligible project to ensure that the new or updated master plan addresses issues relating to solid waste recycling at the airport, including:
    - The feasibility of solid waste recycling at the airport;
    - Minimizing the generation of solid waste at the airport;
    - Operation and maintenance requirements;
    - A review of waste management contracts; and
    - The potential for cost savings or the generation of revenue.

State of Arizona Solid Waste Management

The Arizona Department of Environmental Quality's Waste Division Program established Arizona's Solid Waste Management Plan (March 1981). The plan was created to permit corrective action for solid waste facilities, performing inspections and providing compliance assistance, and advocating solid waste reduction, reuse, and recycling.

The plan includes state strategy for:

- Protecting public health and the environment from adverse effects associated with solid waste disposal;
- Encouraging resource recovery and conservation;
- Guiding for providing adequate disposal capacity in state; and
- Dealing with all other issues relevant to solid waste management.

SOLID WASTE

Typically, airport sponsors have purview over waste handling services in facilities owned and operated such as the passenger terminal building, airport-owned hangars, and maintenance facilities. Tenants of airport-owned buildings/hangars or tenants that own their own facilities are typically responsible for coordinating their own waste handling services.

For airports, waste can generally be divided into eight categories:[4]

- **Municipal Solid Waste** (MSW) is more commonly known as trash or garbage consisting of everyday items that are used and then discarded, such as product packaging.

- **Construction and Demolition Waste** (C&D) is considered non-hazardous trash resulting from land clearing, excavation, demolition, renovation, or repair of structures, roads, and utilities, including concrete, wood, metals, drywall, carpet, plastic, pipe, cardboard, and salvaged building components. C&D is also generally labeled as MSW.

- **Green Waste** is a form of MSW yard waste consisting of tree, shrub, and grass clippings, leaves, weeds, small branches, seeds, and pods.

- **Food Waste** includes unconsumed food products or waste generated and discarded during food preparation and is also considered MSW.

- **Deplaned Waste** is waste removed from passenger aircraft. Deplaned waste includes bottles, cans, mixed paper (newspapers, napkins, paper towels), plastic cups, service ware, food waste, and food soiled paper/packaging.

[4] Recycling, Reuse and Waste Reduction at Airports, FAA (April 24, 2013)

- **Lavatory Waste** is a special waste that is emptied through a hose and pumped into a lavatory service vehicle. The waste is then transported to a triturator[5] facility for pretreatment prior to discharge in the sanitary sewage system. Due to the chemicals in lavatory waste, it can present environmental and human health risks if mishandled. Caution must be taken to ensure lavatory waste is not released to the public sanitary sewage system prior to pretreatment.

- **Spill Clean and Remediation Wastes** are also special wastes and are generated during cleanup of spills and/or the remediation of contamination from several types of sites on an airport.

- **Hazardous Wastes** are governed by the Resource Conservation and Recovery Act (RCRA), as well as the regulations in 40 Code of Federal Regulations (CFR) Subtitle C, Parts 260 to 270. The U.S. Environmental Protection Agency (EPA) developed less stringent regulations for certain hazardous waste, known as universal waste, described in 40 CFR Part 237, *The Universal Waste Rule*.

As seen on **Exhibit 5C**, there are multiple areas where CGZ potentially contributes to the waste stream, including the terminal building, on-airport tenants, hangars, and airport construction projects. To create a comprehensive waste reduction and recycling plan for the airport, all potential inputs must be considered.

EXISTING SERVICES

Casa Grande Municipal Airport does not have an existing recycling program in place. CGZ's current solid waste provider is the City of Casa Grande. The city provides the airport with two community trash bins, public trash cans in the terminal building, oil collection (including used oil, oil filters, oil absorbents, antifreeze) and oil waste services, and battery disposal for the tenants. The community trash bins are centrally located by the T-hangar area and the T-shade and land lease hangar area. Currently, the airport will not accept waste items including paint, paint thinner, solvents, cleaners, or used/defueled aviation fuels (100LL or Jet-A).

SOLID WASTE MANAGEMENT SYSTEM

Airports generally utilize either a *centralized* or a *decentralized* waste management system. The differences between these two methods are described below and summarized in **Exhibit 5D**.

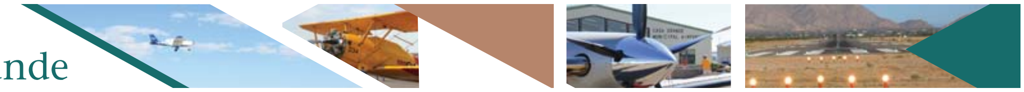
- **Centralized waste management system.** With a centralized waste management system, the airport provides receptables for the collection of waste, recyclables, or compostable materials and contracts for the removal by a single local provider.[6] The centralized waste management system allows for more participation from airport tenants who may not be incentivized to recycle on their own and can reduce the overall cost of service for all involved. A centralized strategy can be

---

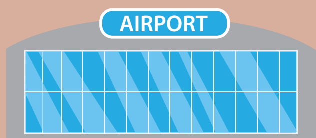
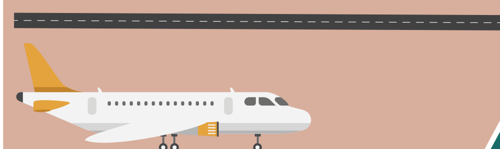
[5] A triturator facility turns lavatory waste into fine particulates for further processing.

[6] *Airport Waste Management and Recycling Practices* (2018) The National Academies of Sciences, Engineering, and Medicine Airport Cooperative Research Program, Synthesis 92.

City of
Casa Grande

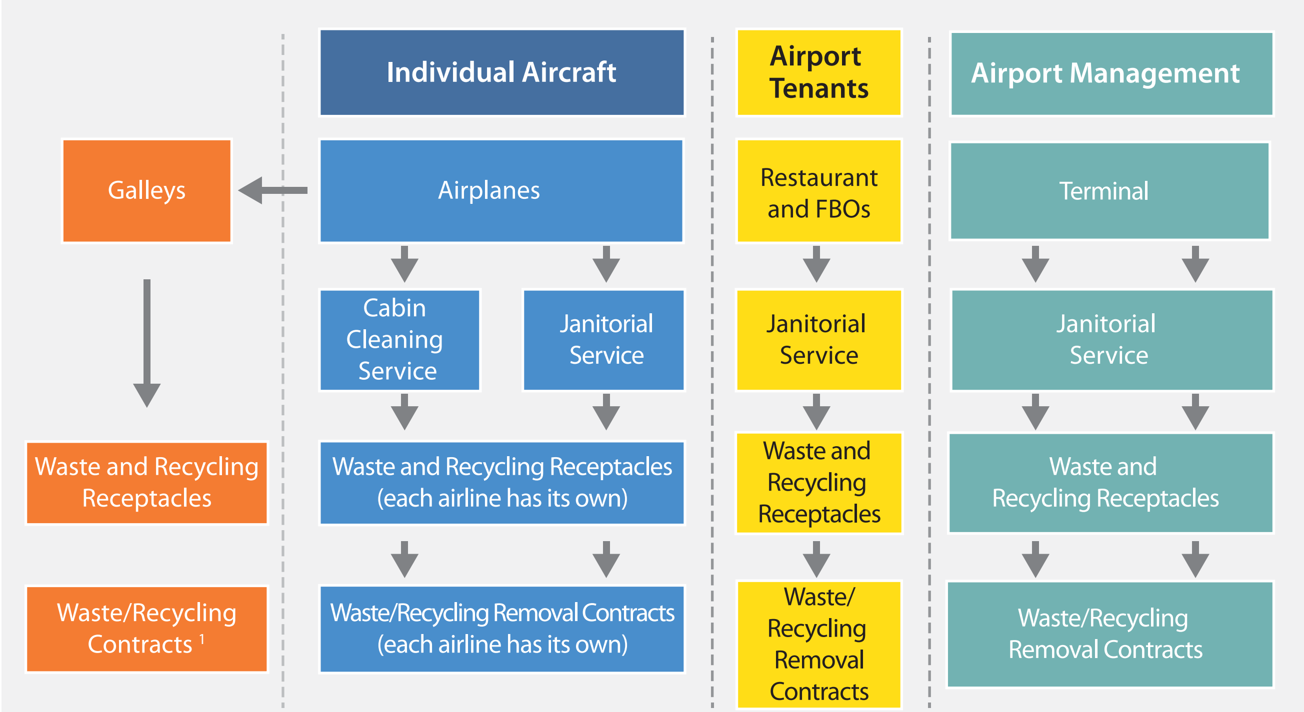


Airport Waste Streams

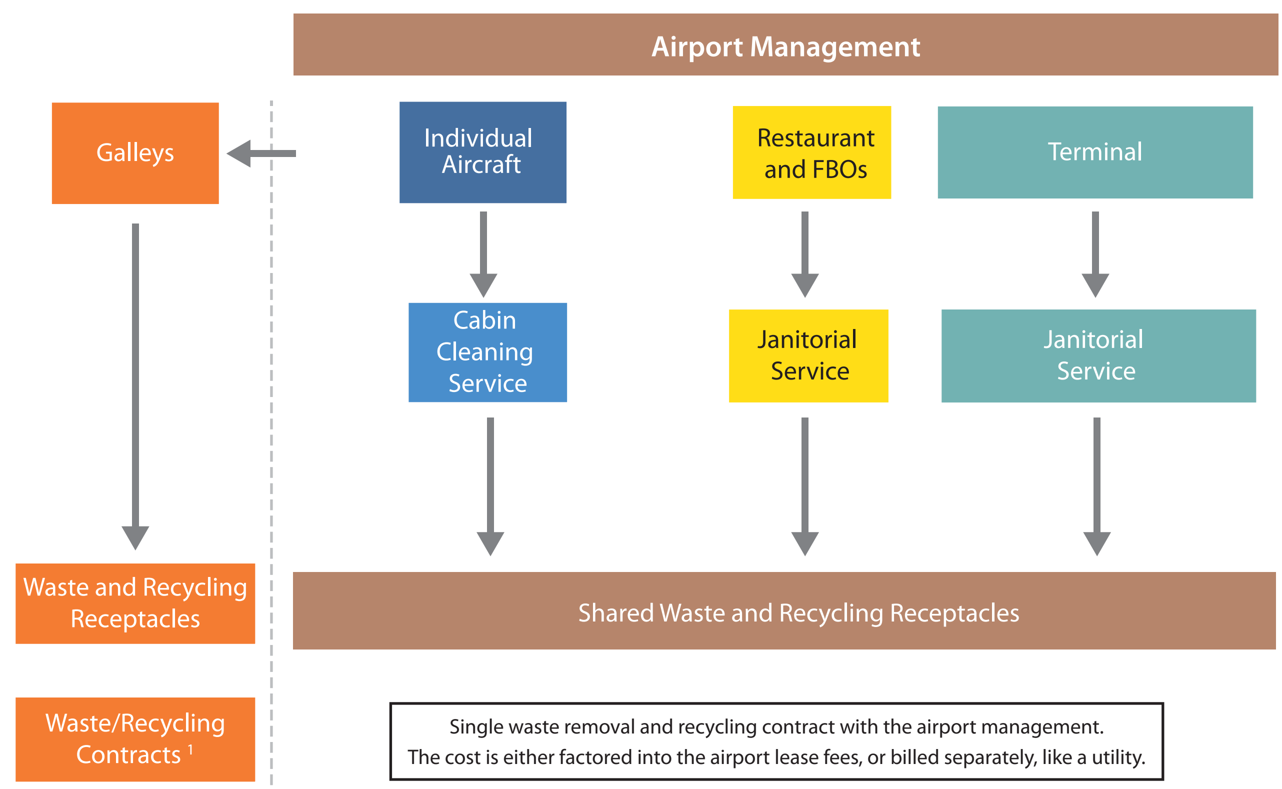
AIRPORT AREA	POTENTIAL INPUTS	POTENTIAL OUTPUTS
TERMINAL & ADMINISTRATION OFFICE 	Pilots Employees	Food Waste, Paper Plastic, Aluminum Cans Trash,Green Waste Deplaned Waste
AIRFIELD 	Aircraft Operations	Runway Rubber Green Waste
AIRCRAFT 	Aircraft Ground Support Equipment (GSE)	Vehicle Waste Plastic Wastewater Hazmat
AIRPORT CONSTRUCTION 	Demolition Construction Re-Construction	Reused Concrete Reused Asphalt Vehicle Waste Soils, Building Materials Wood, General Waste
FIXED BASE OPERATORS 	Employees Clients	Food Waste Paper, Plastic Aluminum Cans Trash, Grease & Oil Green Waste

Source: Recycling, Reuse, and Waste Reduction at Airports, FAA (April 24, 2013)

Components of a Decentralized Airport Waste Management System



Components of a Centralized Airport Waste Management System



[1] Galleys typically manage their own waste even if an airport relies on a centralized system

Source: Natural Resources Defense Council, Trash Landings: How Airlines and Airports Can Clean Up Their Recycling Programs, December 2006.

inefficient for some airports as it requires more effort and oversight on the part of airport management. However, the centralized system is advantageous in that is has fewer players involved in the overall management of the solid waste and recycling efforts and allows greater control by the city over the type, placement, and maintenance of dumpsters, thereby saving space and eliminating the need for each tenant to have their own containers.

- **Decentralized waste management system.** Under a decentralized waste management system, the airport provides waste containers and contracts for the hauling of waste materials in airport-operated spaces only. However, airport tenants, such as fixed base operators, retail shops, and others manage the waste from their leased spaces with separate contracts, billing, and hauling schedules. A decentralized waste management system can increase both the number of receptacles on airport property and the number of trips by a waste collection service provider, should the collection schedule for the tenant differ from the airport.

Currently, Casa Grande Municipal Airport uses a centralized waste management system since the airport provides waste receptacles and manages the hauling service for the airport and tenants.

GOALS AND RECOMMENDATIONS

Solid Waste and Recycling Goals

Table 5B outlines objectives that could help reduce waste generation and increase recycling efforts at the airport. To increase the effectiveness of tracking progress at the airport, a baseline state of all suggested metrics should be established to provide a comparison over time.

TABLE 5B | Waste Management and Recycling Goals - Casa Grande Municipal Airport

Goals	Objectives
Reduce amount of solid waste generated	Switch to online bill pay to eliminate monthly paper bills
	Conduct a waste audit to identify the most common types of waste
	Eliminate purchase of items that are not recyclable (i.e., Styrofoam, plastic bags)
Increase amount of materials recycled	Implement recycling services at the airport
	Improve waste and recycling tracking and data management
	Incorporate recycling requirements and/or recommendations into tenant lease agreements
	Expand recycling marketing and promotion efforts throughout public areas
	Require contractors to implement strategies to reduce, reuse, and recycle construction and demolition waste

Source: Coffman Associates

Recommendations

To maximize waste reduction and increase recycling efforts at the airport, the following recommendations are made:

- **Assign the responsibility of waste management to a dedicated individual(s).** Having one person or a group of people oversee and manage solid waste and recycling at the airport will create efficient and cost saving solutions to solid waste management. People dedicated to this operational aspect of the airport will have a familiarity of processes and will help identify areas of improvement and cost-cutting measures.

- **Audit the current waste management system.** The continuation of an effective program requires accurate data of current waste rates. There are several ways an airport can gain insight into their waste stream, such as requesting weights from the hauler or tracking the volume. Managing the waste system first starts with a waste audit. A waste audit is an analysis of the types of waste produced and is the most comprehensive and intensive way to assess waste stream composition, opportunities for waste reduction, and capture of recyclables. A waste audit should include the following actions:

    - Examination of records
        - Waste hauling and disposal records and contracts
        - Supply and equipment invoices
        - Other waste management costs (commodity rebates, container costs, etc.)
        - Track waste from the point of origin
        - Establish a baseline for metrics

    - Facility walk-through conducted by the airport
        - Qualitative waste information to determine major waste components and waste-generating processes
        - Identify the locations of the airport that generate waste
        - Identify what type of waste is generated by the airport to determine what can be reduced, reused, or recycled
        - Understand waste pickup and hauling practices

    - Waste sort
        - Provides quantitative data on total airport waste generation
        - Allows problem solving design/enhancing the recycling program for the airport

- **Create a tracking and reporting system.** Continuing to track solid waste generated will allow the airport to identify areas where a significant amount of waste is generated and will help the airport estimate annual waste volumes. Understanding the cyclical nature of waste generation will allow the airport to estimate costs and identify areas of improvement.

- **Reduce waste through controlled purchasing practices.** The airport can control the amount of waste generated by prioritizing the purchase of items or supplies that are reusable, recyclable, compostable, or made from recycled materials.

- **Create a recycling program at the airport.** While the focus of this plan is airport-operated facilities, the airport should work to incorporate facility-wide strategies that create consistency in waste disposal mechanisms. This would ultimately result in the reduction of materials sent to the landfill.

ENVIRONMENTAL OVERVIEW

Analysis of the potential environmental impacts of recommended airport development projects, as discussed in this chapter and depicted on **Exhibit 5A** is a key component of the airport master planning process. The primary purpose of this environmental overview is to identify significance thresholds for the various resource categories contained in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, Exhibit 4-1. The environmental overview then evaluates the development program to determine whether proposed actions could individually or collectively have a significant effect on the quality of the environment.

The construction of any improvements depicted on the recommended development concept plan would require compliance with the *National Environmental Policy Act* (NEPA) to receive federal financial assistance or to obtain a federal approval (i.e., a federal action). For projects not "categorically excluded" under FAA Order 1050.1F, compliance with NEPA is generally satisfied through the preparation of an environmental assessment (EA). An EA is prepared when the initial review of the proposed action indicates that it is not categorically excluded, involves at least one extraordinary circumstance, or the action is not one known normally to require an environmental impact statement (EIS). If none of the potential impacts are likely to be significant, then the responsible FAA official prepares a Finding of No Significant Impact (FONSI), which briefly presents, in writing, the reasons why an action, not otherwise categorically excluded, would not have a significant impact on the human environment and the approving official may approve it. Issuance of a FONSI signifies that FAA would not prepare an EIS and has completed the NEPA process for the proposed action.

In instances where significant environmental impacts are expected, an EIS may be required. An EIS is a clear, concise, and appropriately detailed document that provides agency decision-makers and the public with a full and fair discussion of significant environmental impacts of the proposed action and reasonable alternatives and implements the requirement in NEPA §102(2)(C) for a detailed written statement.

Table 5C summarizes potential environmental concerns associated with implementation of the recommended proposed development concept. Analysis under NEPA includes direct, indirect, and cumulative impacts. Direct impacts are those caused by the action and occur at the same time and place. Examples of direct impacts include:

- Construction of a facility or runway in a wetland which results in the loss of a portion of the wetland; or
- Noise generated by the proposed action or alternative(s) which adversely affects noise sensitive land uses.

Indirect impacts are those impacts caused by the action but are later in time or farther removed in distance but are still reasonably foreseeable. Indirect impacts may include growth inducing impacts and other effects related to induced changes in the pattern of land use, population density or growth rate, and related impacts on air and water and other natural systems, including ecosystems. Cumulative impacts are those that take into consideration the environmental impact of past, present, and future actions. Cumulative impacts vary based on the project type, geographic location, potential to impact resources, and other factors, such as the current condition of potentially affected impact categories.

TABLE 5C | Summary of Potential Environmental Concerns - Casa Grande Municipal Airport	
AIR QUALITY	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	***The action would cause pollutant concentrations to exceed one or more of the National Ambient Air Quality Standards (NAAQS), as established by the United States (U.S.) Environmental Protection Agency (EPA) under the Clean Air Act, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations.***
Potential Environmental Concerns	The airport resides in Pinal County. The airport is within a serious nonattainment area for PM_{10} (i.e., West Pinal PM_{10} Nonattainment Area). The portion of Pinal County that contains the airport is within attainment areas for all other federal criteria pollutants. Future airport improvements, such as hangars, aprons, and taxilanes, a runway extension, fencing, AWOS and wind cone relocations, a wash rack, and an ATCT, would result in additional temporary emissions. According to the most recent FAA *Aviation Emissions and Air Quality Handbook* (2015), an emissions inventory under NEPA may be necessary for any proposed action that would result in a reasonably foreseeable increase in emissions due to plan implementation. For construction emissions, a qualitative or quantitative emissions inventory under NEPA may be required, depending on the type of environmental review needed.
BIOLOGICAL RESOURCES (including fish, wildlife, and plants)	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS) determines that the action would be likely to jeopardize the continued existence of a federally listed threatened or endangered species or would result in the destruction or adverse modification of federally designated critical habitat.*** ***FAA has not established a significance threshold for non-listed species. However, factors to consider are if an action would have the potential for:*** - ***Long-term or permanent loss of unlisted plant or wildlife species;*** - ***Adverse impacts to special status species or their habitats;*** - ***Substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or their populations; or*** - ***Adverse impacts on a species' reproductive rates, non-natural mortality, or ability to sustain the minimum population levels required for population maintenance.***
Potential Environmental Concerns	According to a recent biological survey of the airport (December 2021), there is no potential habitat at the airport for federally listed species under the *Endangered Species Act.*[1] Monarch butterfly (*Danaus plexippus*) is a candidate species for federal listing. Monarch butterfly habitat is complex, and breeding areas include most, if not all, patches of milkweed (*Asclepias* sp.). The airport did not contain milkweed during the December 2021 biological survey. However, the airport could be used as a migratory stopover. Monarchs occur throughout Arizona during the summer and migrate to Mexico and California for the winter, although small numbers may overwinter in the low deserts of southwestern Arizona. Impacts from future development projects should consider the potential for effects to monarchs during construction activities but are not likely to result in a trend toward federal listing or loss of viability of the species. Non-listed species of concern include those protected by the *Migratory Bird Treaty Act*. The potential for impacts to migratory birds should be evaluated on a project-specific basis. This may include pre-construction surveys or scheduling construction outside of nesting seasons for these species.
CLIMATE	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Climate.*** *Refer to FAA Order 1050.1F Desk Reference and/or the most recent FAA Aviation Emissions and Air Quality Handbook for the most up-to-date methodology for examining impacts associated with climate change.*
Potential Environmental Concerns	Temporary increases of greenhouse gas (GHG) emissions would occur during construction of future airport improvements, such as hangars, aprons, and taxilanes, a runway extension, fencing, AWOS and wind cone relocations, a wash rack, and an ATCT.
COASTAL RESOURCES	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Coastal Resources. Factors to consider are if an action would have the potential to:*** • ***Be inconsistent with the relevant state coastal zone management plan(s);*** • ***Impact a coastal barrier resources system unit;*** • ***Pose an impact on coral reef ecosystems;*** • ***Cause an unacceptable risk to human safety or property; or*** • ***Cause adverse impacts on the coastal environment that cannot be satisfactorily mitigated.***
Potential Environmental Concerns	None. The airport is located 191 miles from the Pacific Ocean, the nearest U.S. Coastal Zone.

TABLE 5C (continued) | Summary of Potential Environmental Concerns - Casa Grande Municipal Airport	
***DEPARTMENT OF TRANSPORTATION ACT*, SECTION 4(f)** (NOW CODIFIED IN 49 UNITED STATES CODE [U.S.C.] § 303)	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The action involves more than a minimal physical use of a Section 4(f) resource or constitutes a "constructive use" based on an FAA determination that the aviation project would substantially impair the Section 4(f) resource. Resources that are protected by Section 4(f) are publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance; and publicly or privately owned land from an historic site of national, state, or local significance. Substantial impairment occurs when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished.***
Potential Environmental Concerns	No physical effects to historic sites, public parks, or other Section 4(f) resources would occur from future airport improvements. However, constructive use (i.e., substantial impairment) would need to be evaluated on a project-specific basis. The nearest Section 4(f) resource to the airport is Villago Park, which is less than 0.2 mile to the northeast across Arizona State Route 387 (N. Pinal Avenue). There are no historic sites listed on the Arizona or National Register of Historic Places (NRHP), wilderness areas or wildlife refuges near the airport that would be impacted by future proposed development. The closest NRHP-listed site is in downtown Casa Grande five miles from the airport. The closest wilderness area is TableTop Wilderness located 18 miles from the airport; the closest wildlife refuge is 74 miles from the airport.
FARMLANDS	

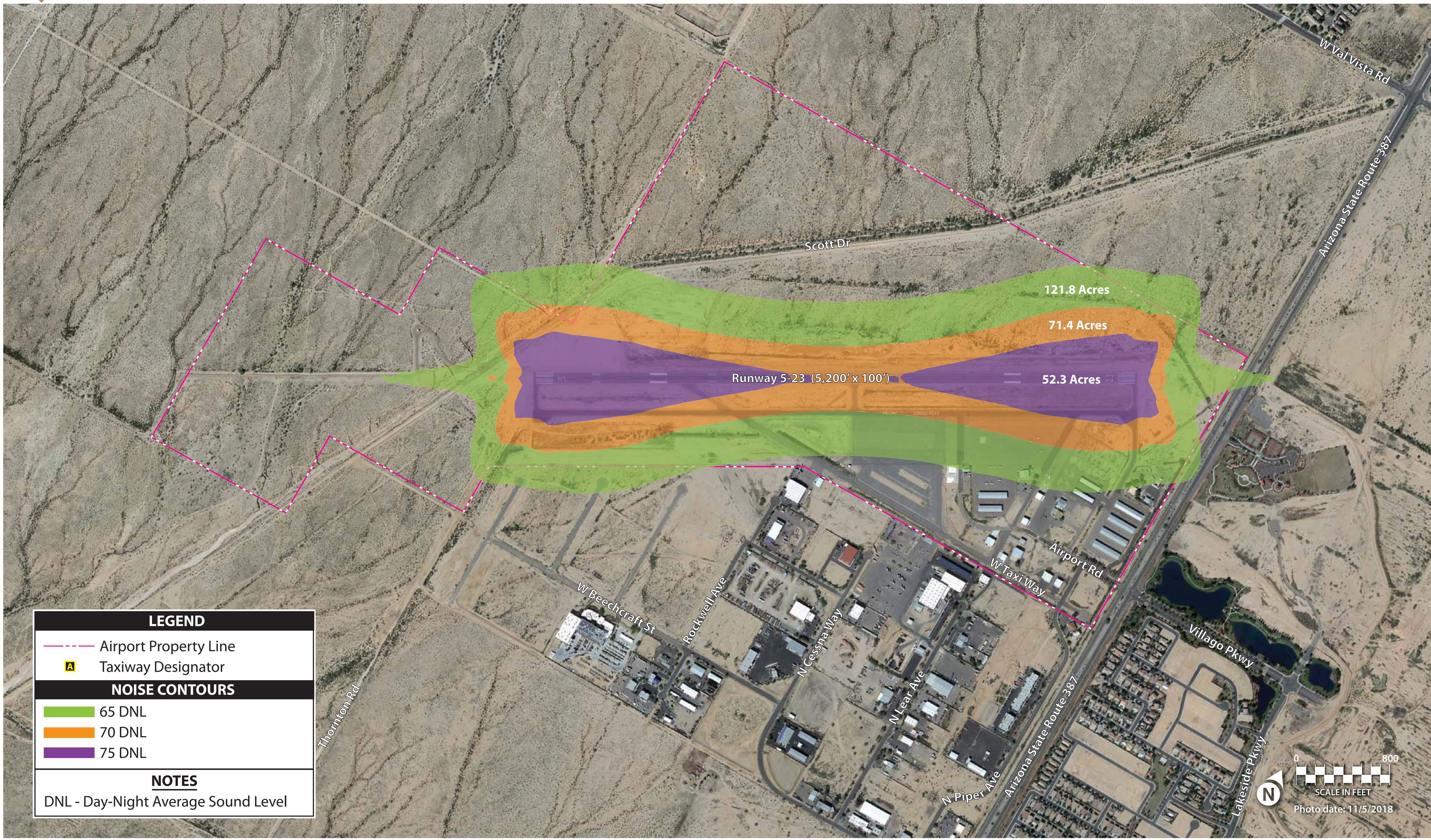
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The total combined score on Form AD-1006, Farmland Conversion Impact Rating, ranges between 200 and 260. (Form AD-1006 is used by the U.S. Department of Agriculture, Natural Resources Conservation Service [NRCS] to assess impacts under the Farmland Protection Policy Act [FPPA].)***
	
	FPPA applies when airport activities meet the following conditions:
	• *Federal funds are involved;*
	• *The action involves the potential for the irreversible conversion of important farmlands to non-agricultural uses. Important farmlands include pastureland, cropland, and forest considered to be prime, unique, or statewide or locally important land; or*
	• *None of the exemptions to FPPA apply. These exemptions include:*
	  ○ *When land is not considered "farmland" under FPPA, such as land already developed or already irreversibly converted. These instances include when land is designated as an urban area by the U.S. Census Bureau or the existing footprint includes rights-of-way.*
	  ○ *When land is already committed to urban development.*
	  ○ *When land is committed to water storage.*
	  ○ *The construction of non-farm structures necessary to support farming operations.*
	  ○ *The construction/land development for national defense purposes.*

Potential Environmental Concerns	The U.S. Department of Agriculture's Web Soil Survey shows soils rated as "prime farmland if irrigated" or "farmland of unique importance" throughout the airport property, and the airport is not currently within a designated urban area. However, the airport is not used for farming nor is it irrigated. Therefore, the FPPA may not apply. This should be confirmed on a project-by-project basis.
HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Hazardous Materials, Solid Waste, and Pollution Prevention. However, factors to consider are if an action would have the potential to:*** • ***Violate applicable federal, state, tribal, or local laws or regulations regarding hazardous materials and/or solid waste management;*** • ***Involve a contaminated site;*** • ***Produce an appreciably different quantity or type of hazardous waste;*** • ***Generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or would exceed local capacity; or*** • ***Adversely affect human health and the environment.***

TABLE 5C (continued) | Summary of Potential Environmental Concerns - Casa Grande Municipal Airport	
Potential Environmental Concerns	Because of the existing regulatory environment regarding hazardous materials and waste and stormwater management, no impacts related to future airport development are anticipated. There is one FBO that offers fuel services at the airport. The FBO is required to maintain spill response procedures to minimize non-stormwater discharges from contaminating waterways under federal regulations. The airport currently operates a SWPPP through the Arizona Pollutant Discharge Elimination System (AZPDES) industrial permit under the *Clean Water Act*, which is issued and regulated by the Arizona Department of Environmental Quality. Future airport development could include additional apron and taxilanes, a runway extension, fencing, AWOS and wind cone relocations, a wash rack, and an ATCT. The construction of planned developments would temporarily increase solid waste. The closest landfill is located eight miles from the airport called Casa Grande Solid Waste Landfill. No impacts related to solid waste disposal are expected.
HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Historical, Architectural, Archaeological, and Cultural Resources. Factors to consider are if an action would result in a finding of "adverse effect" through the Section 106 process. However, an adverse effect finding does not automatically trigger the preparation of an EIS (i.e., a significant impact).***
Potential Environmental Concerns	None. A cultural resource survey conducted in March 2022 identified 21 cultural properties, including one previously recorded site, one newly recorded archaeological site, 15 isolated occurrences (IOs), and four in-use historic-era structures.[2] Both sites are historic-era manifestations, and neither are considered eligible for listing in the Arizona or NRHPs. The previously recorded site consists of the remnants of the original alignment of the World War II auxiliary field. The newly recorded site consists of a historic-era trash scatter with a possible depression. The four identified in-use buildings consist of two hangars and two office buildings. Historic building inventories were completed on the buildings, and no additional work, including further documentation (e.g., Historic American Building Survey documentation), or research is required for the historic-era buildings. No mitigation measures are recommended. If previously undocumented buried cultural resources are identified during ground-disturbing activities for future airport development, all work must immediately cease within 30 meters (100 feet) until a qualified archaeologist has documented the discovery and evaluated its eligibility for the Arizona or NRHP, as appropriate. Work must not resume in the area without approval from FAA.
LAND USE	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Land Use. There are also no specific independent factors to consider. The determination that significant impacts exist is normally dependent on the significance of other impacts.***
Potential Environmental Concerns	Future proposed projects within the existing airport boundaries (i.e., additional apron and taxilanes, a runway extension, fencing, AWOS and wind cone relocations, and a wash rack) would not disrupt current land uses outside of the airport property. Although land within the future RPZ and safety area for the Runway 5 approach end is proposed for acquisition or avigation easements, these areas are adjacent to open desert. Similarly, a minor land acquisition proposed for a future hold bay off Taxiway B (0.9 acre) and acquisition or easements for a portion of the relocated AWOS critical area and a small portion of the Runway 23 approach end RPZ would not adversely affect adjacent vacant land off the airport. The only development that would potentially occur in these acquired areas would be the installation of security perimeter fencing. Directly south of the runway, adjacent to ultimate Taxiway G, 2.0 acres of land could be acquired for a new ATCT. If a tower were to be constructed on this site, it would abut a proposed off-airport industrial park and would not create land use incompatibilities. Finally, a 63.1-acre parcel of land north of Scott Drive and the dry wash is proposed for release from aeronautical land use since it is separated from the rest of the airport by these two physical barriers. This parcel is near a developing residential area to the northwest. Future non-aeronautical development proposals would need to be evaluated to ensure no land use interface issues occur.

TABLE 5C (continued) | Summary of Potential Environmental Concerns - Casa Grande Municipal Airport	
NATURAL RESOURCES AND ENERGY SUPPLY	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Natural Resources and Energy Supply. However, factors to consider are if the action would have the potential to cause demand to exceed available or future supplies of these resources.***
Potential Environmental Concerns	Planned development projects at the airport would have minimal increased demands on energy utilities, water supplies and treatment, and other natural resources for operation of new airport structures and facilities such as hangars or an ATCT. Should long-term impacts be a concern, coordination with service providers is recommended. During construction, demand for fossil fuels, building materials, and water for dust suppression would occur. No unusual demand is anticipated that would exceed available or future supplies.
NOISE AND NOISE-COMPATIBLE LAND USE	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The action would increase noise by Day-Night Average Sound Level (DNL) 1.5 decibel (dB) or more for a noise-sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe.*** ***Another factor to consider is that special consideration should be given to the evaluation of the significance of noise impacts on noise-sensitive areas within Section 4(f) properties where the land use compatibility guidelines in Title 14 Code of Federal Regulations (CFR) Part 150 are not relevant to the value, significance, and enjoyment of the area in question.***
Potential Environmental Concerns	Both existing and future aircraft operations are anticipated to be enough for the 65 DNL contour to go off-airport, extending outside the airport boundary on both the northeast and southwest sides of the airport **(Exhibit 5E)**. The 70 and 75 DNL contours would remain on the airport even in the ultimate condition, except for where the 70 DNL contour would go outside the airport property line in one small area within the existing Runway 5 approach end RPZ west of Scott Drive. (Scott Drive is a dirt road that crosses the airport and provides controlled vehicular access along the dry wash.) The 65 DNL contour could cover an additional 60 acres during the ultimate condition compared to the existing 65 DNL contour. However, no noise-sensitive land uses are located within the 65 DNL in either the existing or ultimate condition. The ultimate 65 DNL contour would cover vacant, undeveloped land or small portions of Arizona State Route 387 or Scott Drive.
SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS	
Socioeconomics	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Socioeconomics. However, factors to consider are if an action would have the potential to:*** • ***Induce substantial economic growth in an area, either directly or indirectly (e.g., through establishing projects in an undeveloped area);*** • ***Disrupt or divide the physical arrangement of an established community;*** • ***Cause extensive relocation when sufficient replacement housing is unavailable;*** • ***Cause extensive relocation of community businesses that would cause severe economic hardship for affected communities;*** • ***Disrupt local traffic patterns and substantially reduce the levels of service of roads serving the airport and its surrounding communities; or*** • ***Produce a substantial change in the community tax base.***
Potential Environmental Concerns	None. No division of existing neighborhoods or housing or businesses relocations would occur due to proposed development on the airport. The airport is bordered primarily by undeveloped vacant land. Future airport projects would not result in temporary disruption of local traffic patterns during construction or once operational.
Environmental Justice	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Environmental Justice. However, factors to consider are if an action would have the potential to lead to a disproportionately high and adverse impact to an environmental justice population (i.e., a low-income or minority population), due to:*** • ***Significant impacts in other environmental impact categories; or*** • ***Impacts on the physical or natural environment that affect an environmental justice population in a way that FAA determines is unique to the environmental justice population and significant to that population.***

TABLE 5C (continued) | Summary of Potential Environmental Concerns - Casa Grande Municipal Airport	
Potential Environmental Concerns	FAA is required by federal law to provide for meaningful public involvement for minority and low-income populations, as well as analysis that identifies and addresses potential impacts on these populations that may be disproportionately high and adverse. Low-income and minority populations have been identified within one mile of the airport. Although it is unlikely that future airport projects would affect nearby low-income or minority populations in a disproportionate or adverse manner, future airport projects causing impacts such as dust or noise off the airport should evaluate these impacts with respect to adjacent residents, including environmental justice populations. Refer to the discussion under Land Use.
Children's Health and Safety Risks	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Children's Environmental Health and Safety Risks. However, factors to consider are if an action would have the potential to lead to a disproportionate health or safety risk to children.***
Potential Environmental Concerns	Villago Park and the nearest residences are located 0.2-0.3 mile from the airport, while the nearest schools are located 1.0 mile away, i.e., Village Middle School and Early Childhood Learning Center of Casa Grande. Best management practices (BMPs) should be implemented during the construction of future airport projects to decrease environmental health risks to children. For example, during construction of proposed projects, appropriate measures should be taken to prevent access by unauthorized persons to construction project areas.
VISUAL EFFECTS (INCLUDING LIGHT EMISSIONS AND VISUAL RESOURCES/VISUAL CHARACTER)	
Light Emissions	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	***FAA has not established a significance threshold for Light Emissions. However, a factor to consider is the degree to which an action would have the potential to:*** • ***Create annoyance or interfere with normal activities from light emissions;*** • ***Affect the nature of the visual character of the area due to light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources;***
Potential Environmental Concerns	None. Runway 5-23 and its taxiways currently have medium intensity runway and taxiway lighting and 2-box PAPIs. New runway lights for the proposed extension of Runway 5-23 and REILs are proposed. The new lighting is not expected to adversely affect any homes or other sensitive land uses surrounding the airport. The Runway 5 approach end is surrounded by open space. The REILs would be located so as to be visible to pilots approaching the airport from the Runway 23 approach end. These lights would be part of the overall airport environment and are not expected to cause significant lighting issues to off-airport areas. During nighttime hours, the runway lights and visual approach aids are turned on when pilots approach the airport. They automatically turn back off when not being used. Night lighting during construction phases within the runway environment is typically directed down to the construction work area to avoid light from spilling outside the airport boundaries. Other future projects are likely to include additional lighting during operation of the airport's new structures and facilities but would not significantly change the amount of lighting seen from outside the airport.
Visual Resources/Visual Character	
FAA Order 1050.1F, *Significance Threshold/ Factors to Consider*	***FAA has not established a significance threshold for Visual Resources/Visual Character. However, a factor to consider is the extent an action would have on the potential to:*** • ***Affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources;*** • ***Contrast with the visual resources and/or visual character in the study area; and*** • ***Block or obstruct the views of the visual resources, including whether these resources would still be viewable from other locations.***
Potential Environmental Concerns	Future airport improvements would be similar to what currently exists at the airport and are not likely to change the airport's overall visual character, especially when viewed from outside the airport boundaries. However, a 63.1-acre parcel of land north of Scott Drive and the dry wash is proposed for release from aeronautical land use. This parcel is near a developing residential area to the northwest. Future non-aeronautical development proposals would need to be evaluated to ensure no visual issues occur.



W Val Vista Rd
Arizona State Route 387
Scott Dr
121.8 Acres
71.4 Acres
Runway 5-23 (5,200' x 100')
52.3 Acres
Airport Rd
W Taxi Way
W Beechcraft St
Rockwell Ave
N Cessna Way
N Lear Ave
N Piper Ave
Arizona State Route 387
Villago Pkwy
Lakeside Pkwy
Thornton Rd
LEGEND
Airport Property Line
Taxiway Designator
NOISE CONTOURS
65 DNL
70 DNL
75 DNL
NOTES
DNL - Day-Night Average Sound Level
0
800
SCALE IN FEET
N
Photo date: 11/5/2018

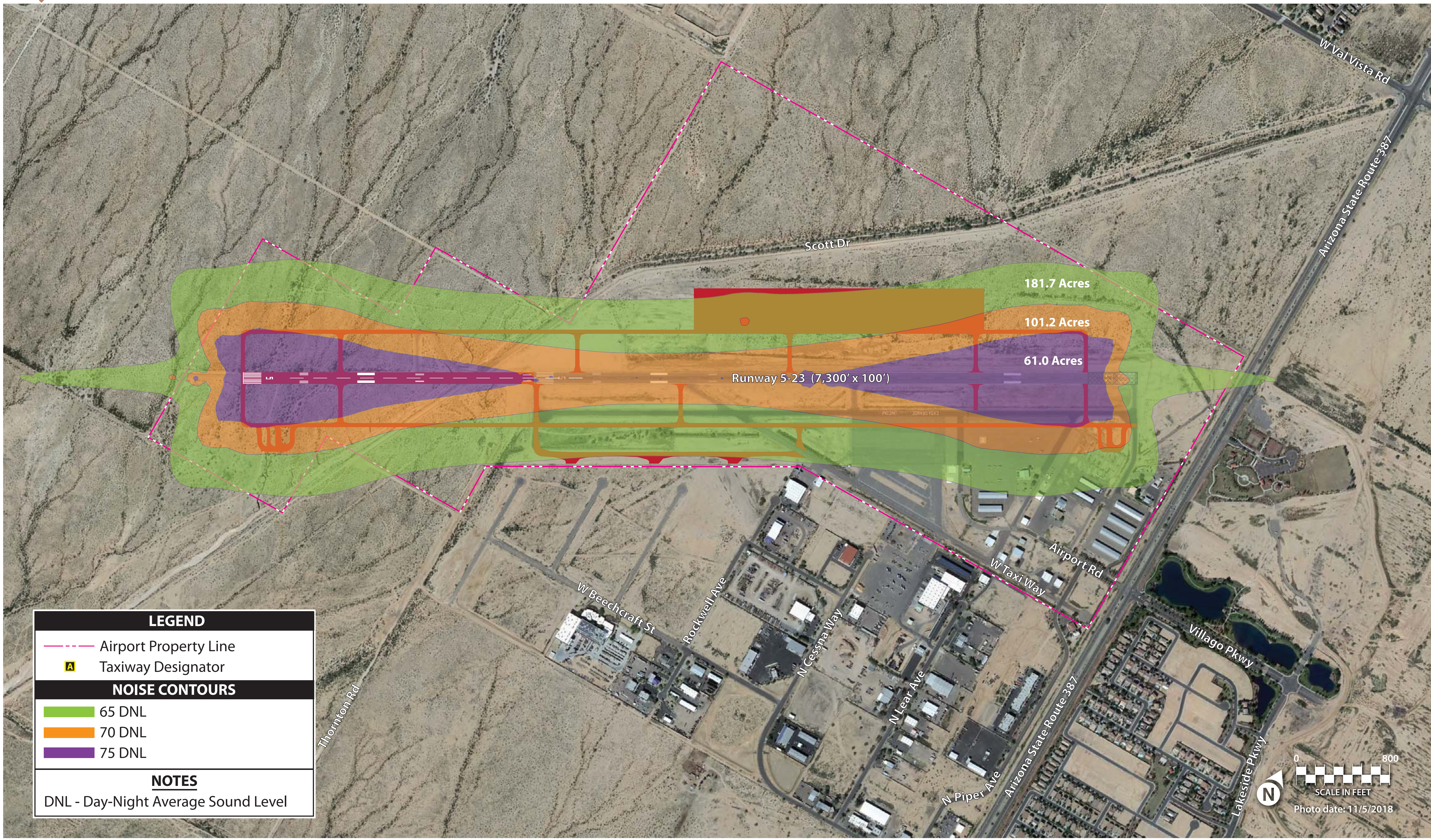


Exhibit 5E (continued)
ULTIMATE NOISE CONTOURS

TABLE 5C (continued) | Summary of Potential Environmental Concerns - Casa Grande Municipal Airport	
WATER RESOURCES (INCLUDING WETLANDS, FLOODPLAINS, SURFACE WATERS, GROUNDWATER, AND WILD AND SCENIC RIVERS)	
Wetlands	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The action would:*** ***1. Adversely affect a wetland's function to protect the quality or quantity of municipal water supplies, including surface waters and sole source and other aquifers;*** ***2. Substantially alter the hydrology needed to sustain the affected wetland system's values and functions or those of a wetland to which it is connected;*** ***3. Substantially reduce the affected wetland's ability to retain floodwaters or storm runoff, thereby threatening public health, safety or welfare (the term welfare includes cultural, recreational, and scientific resources or property important to the public);*** ***4. Adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding wetlands.*** ***5. Promote the development of secondary activities or services that would cause the circumstances listed above to occur; or,*** 6. ***Be inconsistent with applicable state wetland strategies.***
Potential Environmental Concerns	None. There are no jurisdictional waters present on the airport. An Aquatic Resources Delineation/Approved Jurisdictional Determination Request was completed for the airport in February 2022 with a written response from the U.S. Army Corps of Engineers on May 19, 2022.[3] The closest downstream traditional navigable water (TNW) to the airport is a segment of the Gila River located more than 77 river miles northwest and downstream of the project area via the North Branch Santa Cruz Wash. The North Branch Santa Cruz Wash is an ephemeral drainage that has been disturbed, channelized, and has several flow impediments and impoundments along its reach from the point of intersection with washes on the airport and its confluence with the Gila River.
Floodplains	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The action would cause notable adverse impacts on natural and beneficial floodplain values. Natural and beneficial floodplain values are defined in Paragraph 4.k of DOT Order 5650.2, Floodplain Management and Protection.***
Potential Environmental Concerns	None. According to the most current floodplain mapping by FEMA for the airport environs, Panel 04021C1175E and 04021C1200E (eff. 12/4/2007), the airport is not located within a Special Flood Hazard Areas such as a 100-year floodplain.
Surface Waters	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The action would:*** ***1. Exceed water quality standards established by federal, state, local, and tribal regulatory agencies; or*** ***2. Contaminate public drinking water supply such that public health may be adversely affected.***
Potential Environmental Concerns	None. The airport is in the Santa Cruz/Rio Magdelana/Rio Sonoita watershed. The Santa Cruz River is the only impaired waterbody in the watershed. All drainage points from the airport are primarily channelized and do not drain into any natural water feature. The airport currently operates a SWPPP through the AZPDES industrial permit under the *Clean Water Act*, which is issued and regulated by the Arizona Department of Environmental Quality.
Groundwater	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***The action would:*** ***1. Exceed groundwater quality standards established by federal, state, local, and tribal regulatory agencies: or*** ***2. Contaminate an aquifer used for public water supply such that public health may be adversely affected.*** ***Factors to consider are when a project would have the potential to:*** • ***Adversely affect natural and beneficial groundwater values to a degree that substantially diminishes or destroys such values;*** • ***Adversely affect groundwater quantities such that the beneficial uses and values of such groundwater are appreciably diminished or can no longer be maintained and such impairment cannot be avoided or satisfactorily mitigated; or*** • ***Present difficulties based on water quality impacts when obtaining a permit or authorization.***
Potential Environmental Concerns	None. The airport property does not serve as a significant source of groundwater recharge and is not located near a sole source aquifer (SSA). The nearest sole source aquifer, the Upper Santa Cruz & Avra Basin SSA, is 40 miles from the airport.

TABLE 5C (continued) | Summary of Potential Environmental Concerns - Casa Grande Municipal Airport	
Wild and Scenic Rivers	
FAA Order 1050.1F, *Significance Threshold/Factors to Consider*	***FAA has not established a significance threshold for Wild and Scenic Rivers. Factors to consider are when an action would have an adverse impact on the values for which a river was designated (or considered for designation) through:*** • ***Destroying or altering a river's free-flowing nature;*** • ***A direct and adverse effect on the values for which a river was designated (or under study for designation);*** • ***Introducing a visual, audible, or another type of intrusion that is out of character with the river or would alter outstanding features of the river's setting;*** • ***Causing the river's water quality to deteriorate;*** • ***Allowing the transfer or sale of property interests without restrictions needed to protect the river or the river corridor; or*** • ***Any of the above impacts preventing a river on the Nationwide Rivers Inventory (NRI) or a Section 5(d) river that is not included in the NRI from being included in the Wild and Scenic River System or causing a downgrade in its classification (e.g., from wild to recreational).***
Potential Environmental Concerns	None. There are no protected rivers in proximity to the airport. The closest National Wild and Scenic River is Verde River located 83 miles north of the airport. The closest National River Inventory feature is the Arnett/Telegraph Creeks located 40 miles northeast of the airport.
[1] SWCA Environmental Consultants 2022. *Technical Memorandum re: Biological Evaluation for the Proposed Master Plan Update at the Casa Grande Municipal Airport, Pinal County, Arizona*, January 19. [2] SWCA Environmental Consultants 2022. *A Cultural Resources Survey of 475 Acres for the Casa Grande Municipal Airport Master Plan Update in Casa Grande, Pinal County, Arizona*, March. [3] SWCA Environmental Consultants 2022. *Aquatic Resources Delineation/Approved Jurisdictional Determination Request for the Casa Grande Municipal Airport Master Plan Update in Casa Grande, Pinal County, Arizona*, February; U.S. Army Corps of Engineers, Los Angeles District, Approved Jurisdictional Determination, May 19, 2022.	

SUMMARY

This chapter has been prepared to help the City of Casa Grande make decisions on the future growth and development of CGZ by describing narratively and graphically the recommended master plan concept. It details environmental and land use conditions that must be taken into consideration when implementing the development plan. The plan represents an airfield facility that fulfills aviation needs for the airport, while conforming to safety and design standards to the extent practicable. It also provides a landside complex that can be developed as demand dictates and is subject to further refinement pending comments from the PAC, City of Casa Grande, and public.

Flexibility will be very important to future development at the airport, as activity may not occur as predicted. The recommended master plan concept provides stakeholders with a general guide that, if followed, can maintain the airport's long-term viability, and allow it to continue to provide air transportation service to the region. The next chapter of this master plan will provide a reasonable schedule for undertaking the projects based on safety and demand over the course of the next 20 years.

City of
Casa Grande
AIRPORT MASTER PLAN

Chapter 6

Financial Management Development Program

City of Casa Grande
AIRPORT MASTER PLAN

Chapter 6

Financial Management/ Development Program

The recommended master plan concept presented in the previous chapter outlined airside and landside improvements for Casa Grande Municipal Airport (CGZ) that provide the City of Casa Grande with a plan to preserve and develop the airport to meet future aviation demands. Using the concept as a guide, this chapter will provide a description and overall cost for projects identified in the 20-year capital improvement program (CIP) and development schedule. The program has been evaluated from a variety of perspectives and represents a comparative analysis of basic budget factors, demand, and priority assignments.

The presentation of the capital program is organized into two sections. First, the airport's CIP and associated cost estimates are presented in narrative and graphic form. The CIP has been developed following Federal Aviation Administration (FAA) guidelines for master plans and primarily identifies those projects that are likely eligible for FAA and Arizona Department of Transportation – Aeronautics Group (ADOT) grant funding. Second, capital improvement funding sources on the federal, state, and local levels are identified and discussed.

AIRPORT CAPITAL IMPROVEMENT PROGRAM

With the recommended concept and specific needs and improvements for the airport having been established, the next step is to determine a realistic schedule for project implementation and the associated costs for the plan. The capital program considers the interrelationships among the projects in order to determine an appropriate sequence of projects, while remaining within reasonable fiscal constraints.

The CIP, programmed by planning horizons, has been developed to cover the short- (years 0-5), intermediate- (years 6-10), and long-term (years 11-20+) planning horizons. By using planning horizons instead of specific years, the City of Casa Grande will have greater flexibility to adjust capital needs as demand dictates. **Table 6A** summarizes the key aviation demand milestones projected at CGZ for each of the three planning horizons.

Table 6A | Aviation Demand Planning Horizons

	Base Year (2021)	Short Term (1-5 Years)	Intermediate Term (6-10 Years)	Long Term (11-20 Years)
BASED AIRCRAFT				
Single Engine	94	105	117	143
Multi-Engine	7	7	5	3
Turboprop	0	2	4	10
Jet	0	0	2	4
Helicopter	1	1	3	7
TOTAL BASED AIRCRAFT	**102**	**115**	**131**	**167**
ANNUAL OPERATIONS				
Itinerant				
Air Carrier	0	0	0	0
Air Taxi	2,038	2400	2800	3800
General Aviation	106,586	114,000	121,900	139,400
Military	410	410	410	410
Total Itinerant	**109,034**	**116,800**	**125,100**	**143,600**
Local				
General Aviation	12,966	14,800	16,900	22,000
Military	0	0	0	0
Total Local	**12,966**	**14,800**	**16,900**	**22,000**
TOTAL OPERATIONS	**122,000**	**131,600**	**142,000**	**165,600**

Source: Coffman Associates analysis

A key aspect of this planning document is the use of demand-based planning milestones. The short-term planning horizon contains items of highest need and/or priority, many of which have been previously defined by airport management. As short-term horizon activity levels are reached, it will then be time to program for the intermediate term based upon the next activity milestones. Similarly, when the intermediate-term milestones are reached, it will be time to program for the long-term activity milestones. A demand-based master plan does not specifically require the implementation of any of the demand-based improvements. Instead, it is envisioned that implementation of any improvements would be examined against the demand levels prior to implementation. As such, the master plan establishes a plan for the use of airport facilities consistent with the potential aviation needs and capital needs required to support that use. Individual projects in the plan are not implemented until the need is demonstrated and the project is approved for funding.

Many development items included in the recommended concept will need to follow these demand indicators. For example, the plan includes expanding utility infrastructure and site preparation for constructing new landside facilities to support aircraft activity. Demand for new based aircraft will be a primary indicator for these projects. If based aircraft growth occurs as projected, additional hangars should be constructed to meet the demand. If growth slows or does not occur as forecast, some projects may be delayed. As a result, capital expenditures are planned to be made on an as-needed basis, leading to more responsible use of capital assets. Some development items do not depend on demand, such as airfield improvements to meet FAA design standards. These projects need to be programmed in a timely manner regardless of changes in demand indicators and should be monitored regularly by airport management.

At CGZ, some hangars are owned and managed by the airport and leased to individual tenants, while others are privately owned and managed on land leased from the airport. Because of economic realities, many airports rely on private developers to construct new hangars. In some cases, private developers can keep construction costs lower which, in turn, lowers the monthly lease rates necessary to amortize a loan. The CIP for CGZ assumes that site preparation and development for landside facilities will be constructed privately. As such, cost estimates for hangar construction are not included, except for the hangars planned as Project #7, which are already included in the airport's CIP and planned to be funded locally. Ultimately, the City of Casa Grande will determine, based upon demand and the specific needs of a potential developer, whether to self-fund landside facility development or to rely on private developers.

As a master plan is a conceptual document, implementation of the capital projects should only be undertaken after further refinement of their design and costs through architectural or engineering analyses. Moreover, some projects may require additional infrastructure improvements (i.e., drainage improvements, extension of utilities, etc.) that may increase the estimated cost of the project or increase the timeline for completion.

Once a list of necessary projects was identified and refined, project-specific cost estimates were prepared. These estimates include design, construction administration, and contingency costs that may arise on the project. ***Capital costs presented here should be viewed only as "order-of-magnitude" estimates subject to further refinement during engineering/architectural design.*** Nevertheless, they are considered sufficient for planning purposes. Cost estimates for each of the development projects in the CIP are based on present-day construction, design, and administration costs. Adjustments will need to be applied over time to account for inflation and changes in construction and capital equipment costs. Cost estimates for these projects were provided by C&S Companies, who is providing engineering support for the master plan and is familiar with CGZ, having been involved with the design and construction of capital projects on the airfield. Cost estimates for each of the development projects in the CIP are in current dollars.

Exhibit 6A presents the proposed 20-year CIP for CGZ. It should be stated clearly that the proposed CIP is a point-in-time analysis which will change annually based on actual demand and changing needs. An estimate of grant (FAA and/or ADOT) funding eligibility has been included, although actual funding is not guaranteed. For those projects that would be eligible for federal funding, Airport Improvement Program (AIP) reauthorization provides for 91.06 percent of the total project cost for CGZ. The remaining amount

Fiscal Year	Project No.	Project	Estimated Cost	Funding Sources: AIP	Funding Sources: ADOT	Funding Sources: Airport Sponsor
Short-Term Projects						
2023	1	Terminal Apron Pavement Rehabilitation (Design)	$110,000	$0	$99,000	$11,000
2024	2	Taxilane Pavement Reconstruction (Design)	$132,000	$120,199	$5,900	$5,900
2024	3	Relocate Wind Cones and Segmented Circle	$396,000	$360,598	$17,701	$17,701
2024	4	Mark Apron with No-taxi Island on Ultimate Taxiway B6	$240,000	$218,544	$10,728	$10,728
2025	5	Taxilane Pavement Reconstruction (Construct)	$1,760,000	$1,602,656	$78,672	$78,672
2026	6	Terminal Apron Pavement Rehabilitation (Construct)	$1,980,000	$0	$1,782,000	$198,000
2026	7	Aircraft T-hangar Construction	$4,000,000	$0	$0	$4,000,000
2027	8	Construct New Taxilane Pavement and Relocate Beacon	$1,266,000	$1,152,820	$56,590	$56,590
2027	9	Public Parking Lot Reconstruction and Expansion	$605,000	$0	$544,500	$60,500
2027	10	Construct New Landside Access Road	$295,000	$268,627	$13,187	$13,187
2027	11	Environmental Analysis	$30,000	$27,318	$1,341	$1,341
Intermediate-Term Projects						
FY 2028-2032	12	Obstruction Removal	$27,500	$25,042	$1,229	$1,229
	13	Construct Airport Operations Building	$3,981,500	$0	$2,000,000	$1,981,500
	14	Construct Aircraft Wash Rack and Install Fuel Tank	$985,000	$896,941	$44,030	$44,030
	15	West Apron Reconstruction (Design & Construct)	$1,897,500	$1,727,864	$84,818	$84,818
	16	Acquire 9.1 Acres of Ultimate RSA/ROFA; Obtain Easement for 63.5 Acres in Ultimate RPZs	$7,704,200	$7,015,445	$344,378	$344,378
	17	Construct Taxiway G and Interim Holding Bay	$2,995,000	$2,727,247	$133,877	$133,877
	18	Convert Airport Lighting to LED	$195,000	$0	$0	$195,000
	19	Relocate Taxiway B; Construct New Connector Taxiways	$3,415,000	$3,109,699	$152,651	$152,651
	20	Runway Extension and Related Projects	$6,430,000	$5,855,158	$287,421	$287,421
	21	Construct Holding Bays on Taxiway B	$1,107,000	$1,008,034	$49,483	$49,483
	22	Construct New Landside Access Roads	$211,000	$192,137	$9,432	$9,432
	23	Construct New Apron Pavement for Executive Hangars	$320,000	$291,392	$14,304	$14,304
	24	Expand Terminal Building	$9,880,600	$8,997,274	$441,663	$441,663
	25	Construct New Apron/Taxilane Pavement for Conventional Hangars	$248,000	$225,829	$11,086	$11086
	26	Routine Pavement Maintenance	$1,000,000	$910,600	$44,700	$44,700
Long-Term Projects						
FY 2033-2042	27	Construct New Landside Access Roads	$262,000	$238,577	$11,711	$11,711
	28	Construct New Apron Pavement for Executive Hangars	$663,000	$603,728	$29,636	$29,636
	29	Extend Utilities to Support North Landside Development	$1,748,000	$0	$0	$1,748,000
	30	Construct New Access Roads & Parking for North Landside Development	$1,928,000	$1,755,637	$86,182	$86,182
	31	Construct North Side Aircraft Parking Apron	$8,421,000	$7,668,163	$376,419	$376,419
	32	Construct Ultimate Taxiway A and Taxiway Connectors	$5,215,300	$4,749,052	$233,124	$233,124
	33	Construct Secondary Fuel Farm	$2,323,000	$2,115,324	$103,838	$103,838
	34	Construct North Side Aircraft Wash Rack	$477,000	$434,356	$21,322	$21,322
	35	Routine Pavement Maintenance	$2,000,000	$1,821,200	$89,400	$89,400
Short-Term CIP Subtotal			**$10,704,000**	**$3,750,761**	**$2,510,619**	**$4,442,619**
Intermediate-Term CIP Subtotal			**$40,397,300**	**$32,982,661**	**$3,619,069**	**$3,795,569**
Long-Term CIP Subtotal			**$23,037,300**	**$19,386,037**	**$951,632**	**$2,699,632**
Total Master Plan CIP			**$74,138,600**	**$56,119,459**	**$7,081,320**	**$10,937,820**

Note: All cost estimates from C&S Engineers, November 2022, with the exception of Projects #13, 16, 20, 24, 26, 32, and 35.

(8.94 percent) would be equally shared (4.47 percent each) between ADOT and the City of Casa Grande. This eligibility breakdown is based upon the airport's classification, in addition to the amount of public land within the State of Arizona. Other projects, such as the implementation of certain landside facilities (roadways), are typically not eligible for AIP grants (outside of non-primary entitlements) or would rank low on the priority scale. As a result, these projects should be planned for airport sponsor funding or funding through specific ADOT programs.

As detailed in the CIP, most projects listed are eligible for federal and state funding. Obviously, demand and justification for these projects must be provided prior to a grant being issued by either the FAA and/or ADOT. It should be noted that certain projects listed in the CIP, while eligible for federal and state funding, are designated for state funding assistance only per the airport's current CIP on file with the FAA and ADOT.

The FAA utilizes a national priority rating system to help objectively evaluate potential airport projects. Projects are weighted toward safety, infrastructure preservation, meeting design standards, and capacity enhancement. The FAA may participate in the highest priority projects before considering lower priority projects, even if a lower priority project is considered a more urgent need by the local sponsor. Nonetheless, the project should remain a priority, and funding support should continue to be requested in subsequent years.

Some projects identified in the CIP will require environmental documentation. The level of documentation necessary for each project must be determined in consultation with the FAA and ADOT. There are three major levels of environmental review to be considered under the *National Environmental Policy Act* (NEPA) that include categorical exclusions (CatEx), Environmental Assessments (EA), and Environmental Impact Statements (EIS). Each level requires more time to complete and more detailed information. Guidance on what level of documentation is required for a specific project is provided in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. The Environmental Overview presented in Chapter Five addresses NEPA and provides an evaluation of various environmental categories for CGZ.

The following sections will describe in greater detail the projects identified for the airport over the next 20 years. The projects are grouped based upon a detailed evaluation of existing and projected demand, safety, rehabilitation needs, and local priority. While the CIP identifies the priority ranking of the projects, the list should be evaluated and revised on a regular basis. It is also important to note that certain projects, while listed separately for purposes of evaluation in this study, could be combined with other projects during time of construction/implementation.

Engineering analysis has been provided by C&S Companies for many of the projects described below. Projects that do not include this analysis are those that were already included in the airport's current CIP and have already analyzed from an engineering perspective.

SHORT-TERM PROGRAM

The short-term projects are those anticipated to be needed during the first five years of the 20-year CIP. The projects listed are subject to change based on federal and state funding priorities. Projects related to safety and maintenance generally have the highest priority. This applies to many of the projects identified in the short-term CIP that are associated with maintaining/rehabilitating existing airfield pavements and improving airfield safety. The short-term program considers 11 projects for the planning period as presented on **Exhibit 6A** and depicted on **Exhibit 6B**. The following provides a detailed breakdown of each project.

Project #1: Terminal Apron Pavement Rehabilitation (Design)

- *Description:* This design phase project will precede planned rehabilitation of the terminal apron pavement and taxilane pavement serving the existing shade hangars.
- *Cost Estimate:* $110,000
- *Funding Breakdown:* FAA – 0 percent / ADOT – 90.0 percent / Airport Sponsor – 10.0 percent

Project #2: Taxilane Pavement Reconstruction (Design)

- *Description*: This design phase project will precede planned reconstruction of the taxilane pavement serving existing T-hangars on the east side.
- *Cost Estimate:* $132,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent

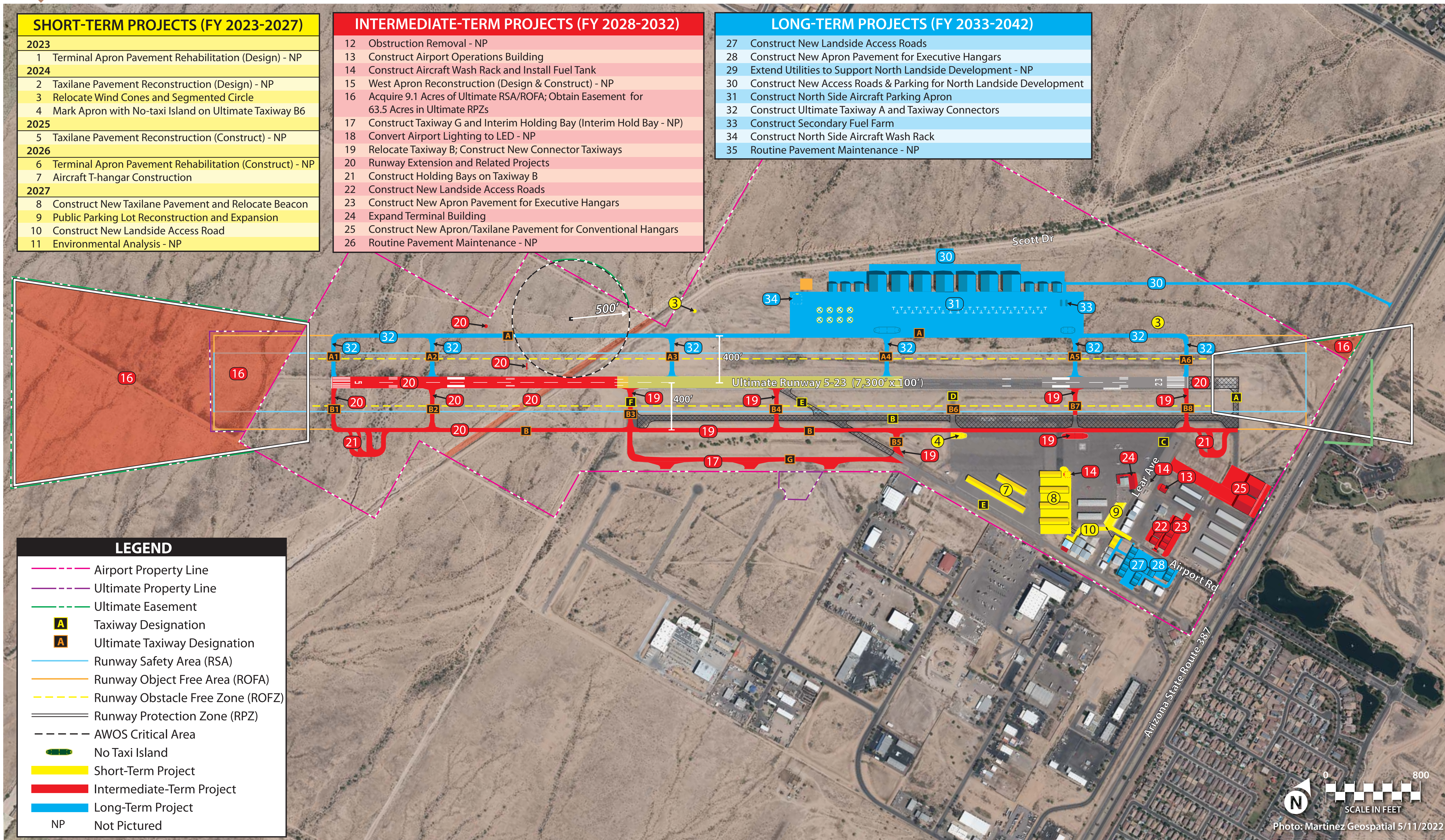
Project #3: Relocate Wind Cones and Segmented Circle

- *Description:* There are three wind cones at CGZ. A lighted wind cone co-located with a segmented circle is located at midfield, while supplemental wind cones serve each runway end. All three wind cones are obstructions to the existing and ultimate runway object free area (ROFA). This project plans for the relocation of the lighted wind cone/segmented circle and the supplemental wind cone located near the Runway 23 end outside of the ultimate ROFA to the locations depicted on **Exhibit 5B**. The wind cone serving Runway 5 will be removed until such a time that the runway is extended, and then it will be reinstalled to serve the extended Runway 5 end.
- *Cost Estimate:* $396,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* Relocating the lighted wind cone and segmented circle will have minimal impact to airfield operations. Haul routes and contractor access routes should be planned so that all activity remains outside of the Runway 5-23 safety area. If for any reason contractors must enter the runway safety area (RSA) or ROFA, the sponsor must be notified and proper Notice to Air Mission (NOTAMs) must be issued.

SHORT-TERM PROJECTS (FY 2023-2027)	
2023	
1	Terminal Apron Pavement Rehabilitation (Design) - NP
2024	
2	Taxilane Pavement Reconstruction (Design) - NP
3	Relocate Wind Cones and Segmented Circle
4	Mark Apron with No-taxi Island on Ultimate Taxiway B6
2025	
5	Taxilane Pavement Reconstruction (Construct) - NP
2026	
6	Terminal Apron Pavement Rehabilitation (Construct) - NP
7	Aircraft T-hangar Construction
2027	
8	Construct New Taxilane Pavement and Relocate Beacon
9	Public Parking Lot Reconstruction and Expansion
10	Construct New Landside Access Road
11	Environmental Analysis - NP

INTERMEDIATE-TERM PROJECTS (FY 2028-2032)	
12	Obstruction Removal - NP
13	Construct Airport Operations Building
14	Construct Aircraft Wash Rack and Install Fuel Tank
15	West Apron Reconstruction (Design & Construct) - NP
16	Acquire 9.1 Acres of Ultimate RSA/ROFA; Obtain Easement for 63.5 Acres in Ultimate RPZs
17	Construct Taxiway G and Interim Holding Bay (Interim Hold Bay - NP)
18	Convert Airport Lighting to LED - NP
19	Relocate Taxiway B; Construct New Connector Taxiways
20	Runway Extension and Related Projects
21	Construct Holding Bays on Taxiway B
22	Construct New Landside Access Roads
23	Construct New Apron Pavement for Executive Hangars
24	Expand Terminal Building
25	Construct New Apron/Taxilane Pavement for Conventional Hangars
26	Routine Pavement Maintenance - NP

LONG-TERM PROJECTS (FY 2033-2042)	
27	Construct New Landside Access Roads
28	Construct New Apron Pavement for Executive Hangars
29	Extend Utilities to Support North Landside Development - NP
30	Construct New Access Roads & Parking for North Landside Development
31	Construct North Side Aircraft Parking Apron
32	Construct Ultimate Taxiway A and Taxiway Connectors
33	Construct Secondary Fuel Farm
34	Construct North Side Aircraft Wash Rack
35	Routine Pavement Maintenance - NP



LEGEND

- Airport Property Line
- Ultimate Property Line
- Ultimate Easement
- A Taxiway Designation
- A Ultimate Taxiway Designation
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- AWOS Critical Area
- No Taxi Island
- Short-Term Project
- Intermediate-Term Project
- Long-Term Project
- NP Not Pictured

This page intentionally left blank

Project #4: Mark Apron with No-Taxi Island on Ultimate Taxiway B6

- *Description:* Ultimate Taxiway B6 provides direct access from the terminal apron to the runway, which is a non-standard condition. This project plans for the apron to be marked with a no-taxi island at the entrance to Taxiway B6. The no-taxi island will serve as a visual cue to pilots and require them to make a turn onto Taxiway B, improving safety and reducing the risk of inadvertent access to the runway.
- *Cost Estimate:* $240,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* Work in this area will require temporary closure of Taxiway B between connector Taxiway E and connector Taxiway A and surrounding portions of the main apron. Work within the safety areas of Taxiway B and main apron taxilanes can be phased to take place during nighttime closures to reduce the impact on airport operations.

Project #5: Taxilane Pavement Reconstruction (Construct)

- *Description:* This project plans for the reconstruction of the taxilane pavement serving existing T-hangars on the east side.
- *Cost Estimate:* $1,760,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent

Project #6: Terminal Apron Pavement Rehabilitation (Construct)

- *Description:* This project plans for the rehabilitation of the terminal apron pavement and taxilane pavement serving the existing shade hangars.
- *Cost Estimate:* $1,980,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent

Project #7: Aircraft T-hangar Construction

- *Description:* The recommended development concept includes the addition of one 10-unit and one 24-unit T-hangar south of the west apron in an area that has previously been planned for this use. This project includes the development costs associated with construction of the two T-hangars.
- *Cost Estimate:* $4,000,000
- *Funding Breakdown:* FAA – 0 percent / ADOT – 0 percent / Airport Sponsor – 100.0 percent

Project #8: Construct New Taxilane Pavement and Relocate Beacon

- *Description:* A new shade hangar complex with four 10-unit hangars is planned immediately west of the existing shade hangars. This project plans for the construction of new taxilane pavement to serve the planned shade hangars. This area is currently the site of the old terminal building, which is planned to be demolished as part of this project. CGZ's rotating beacon is also located here and is planned to be relocated to a new site near the current terminal building.
- *Cost Estimate:* $1,266,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* Work in this area will require closure of main apron located directly west of terminal building. Existing drainage systems on and off the airport will be affected due to the new paved areas.

Because the beacon is being relocated, the new one must be constructed and active before the old one is removed, or a NOTAM must be issued to notify incoming traffic that the beacon is out of service. This closure should have minimal impact to overall airport operations but can be phased to take place during nighttime closures to reduce impact.

Project #9: Public Parking Lot Reconstruction and Expansion

- *Description:* This project plans for the existing terminal building parking lot to be reconstructed and expanded to accommodate a projected increase in airport users and visitors. The existing lot will be expanded to the south, with new pavement constructed on the gravel area that currently exists.
- *Cost Estimate:* $605,000
- *Funding Breakdown:* FAA – 0 percent / ADOT – 90.0 percent / Airport Sponsor – 10.0 percent

Project #10: Construct New Landside Access Road

- *Description:* This project plans for the intersection of Airport Road and N. Lear Avenue to be reconstructed to limit access to hangar areas and better separate aircraft from vehicles. The current configuration includes a security gate that tenants use to access hangars along Taxiway E; however, portions of the roadways that extend beyond the gate are also used by taxiing aircraft. The new design depicted on **Exhibits 5A and 6B** includes removal of some existing pavement and construction of a new, gated road intended for vehicle use only. Once the road is constructed, the existing pavement currently used by both vehicles and aircraft will serve as a taxilane for aircraft movements only.
- *Cost Estimate:* $295,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* Work in this area should have minimal impact to airport operations as all work is landside. Contractor haul routes will be easily accessible from Airport Road. This project can be phased to maintain access to the terminal and can be phased for daytime or nighttime work.

Project #11: Environmental Analysis

- *Description:* The planned extension of Runway 5-23 necessitates the acquisition of approximately 1.8 acres of property southwest of the extended Runway 5 threshold in the ultimate RSA and ROFA. An additional 0.9 acres are planned for acquisition to support the ultimate hold bay on Taxiway B at the Runway 5 end, while an avigation easement over approximately 58.4 acres is planned to protect the ultimate Runway 5 runway protection zone (RPZ). Environmental documentation is required prior to major airfield projects involving property acquisition. At a minimum, a CatEx is necessary to determine potential environmental impacts. If additional analysis is needed, an EA may be necessary. The cost of this project assumes a CatEx for planning purposes.
- *Cost Estimate:* $30,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent

Short-Term Program Summary

The short-term CIP includes projects that enhance the overall safety, efficiency, and maintenance of the airfield. The total investment necessary for the short-term CIP is approximately $10.7 million as detailed on **Exhibit 6A**. Of the overall short-term CIP total, approximately $6.3 million is eligible for federal and state funding assistance. The remaining approximate $4.4 million is to be provided through airport sponsor funding outlets. The bulk of the sponsor/local share is concentrated on the construction of T-hangars, which are ineligible for federal or state funding.

INTERMEDIATE-TERM PROGRAM

The intermediate-term projects are those that are anticipated to be necessary in years six through 10 of the master plan. These projects are not tied to specific years for implementation; instead, they have been prioritized so that airport management has the flexibility to determine when they need to be pursued based on current conditions. It is not unusual for certain projects to be delayed or advanced based on changing conditions, such as funding availability or changes in the aviation industry. This planning horizon includes 15 projects for the five-year timeframe as listed on **Exhibit 6A** and depicted on **Exhibit 6B**. The following section includes a description of each project.

Project #12: Obstruction Removal

- *Description:* Ten palm trees off the northeast end of the runway obstruct the approach and departure surfaces for Runway 23. This project plans for the trees to be removed and/or relocated for safety concerns.
- *Cost Estimate:* $27,500
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent

Project #13: Construct Airport Operations Building

- *Description:* CGZ does not currently have a dedicated airport operations building. This project includes the construction of a new building, east of the existing fuel tanks, intended for the storage of airfield maintenance equipment and materials.
- *Cost Estimate:* $3,981,500
- *Funding Breakdown:* FAA – 0 percent / ADOT – 50.23 percent / Airport Sponsor – 49.77 percent

Project #14: Construct Aircraft Wash Rack and Install Fuel Tank

- *Description:* CGZ does not currently have an aircraft wash rack. An environmentally approved aircraft wash rack is planned for the south side of the airport to reduce/prevent contaminated water runoff from aircraft washing. The 50-foot by 50-foot wash rack area is planned west of the terminal, near the site of the old terminal where utilities are already present. This project also includes the addition of a new fuel tank intended to store unleaded aviation fuel (100UL).
- *Cost Estimate:* $985,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent

Project #15: West Apron Reconstruction (Design & Construct)

- *Description:* The west apron will require reconstruction during the early intermediate period, when the pavement is projected to deteriorate to a pavement condition index (PCI) rating of 46. This project plans for the design and construction of new pavement on the west apron.
- *Cost Estimate:* $1,897,500
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent

Project #16: Property Acquisition to Protect Safety Areas and Support Future Airside Development

- *Description:* In support of the planned extension to Runway 5-23, approximately 9.1 acres of the ultimate RSA/ROFA are planned to be acquired in fee by the airport sponsor. T9his project also plans for the purchase of an avigation easement covering approximately 63.5 acres in the ultimate RPZs associated with each runway end.
- *Cost Estimate:* $7,704,200
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* An environmental analysis (Project #11) will be required before beginning this project. Land acquisition will have no impact on airfield operations. This project will require a boundary survey to submit to the county recorder.

Project #17: Construct Taxiway G and Interim Holding Bay

- *Description:* Ultimate Taxiway G is a planned new taxiway providing access from the airpark industrial park to the airfield via a through-the-fence agreement. This taxiway is planned to extend from existing Taxiway E and connect to ultimate Taxiway B via ultimate Taxiways B2 and B4. An interim hold bay as describe previously in Chapter Five also planned with this project.
- *Cost Estimate:* $2,995,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* The detention basin capacity will need to be increased to ensure proper drainage after the addition of new pavement area. The material removed from the detention basin can be used as fill to balance the earthwork. Infield areas will need to be graded in a way that will allow for proper drainage. Construction of Taxiway G and the interim holding bay will require the temporary closure of Taxiway B west of connector Taxiway E, along with portions of Taxiway E north of Goss Hawk Aviation while working in their respective safety areas. All traffic coming in or out of Goss Hawk Aviation will need to be rerouted to the east and taxi across the main apron to access the runway. Work performed in these areas can be phased to allow for nighttime closures to minimize impact on airport operations if necessary.

Project #18: Convert Airport Lighting to LED

- *Description:* While most lighting on the airfield is LED, the PAPIs and the rotating beacon are equipped with incandescent lighting. In order to improve energy-efficiency and provide for a longer lifespan, the incandescent lighting associated with these navaids is planned to be replaced with LED lighting.
- *Cost Estimate:* $195,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent

Project #19: Relocate Taxiway B; Construct New Connector Taxiways

- *Description:* When CGZ transitions from Airport Reference Code (ARC) B-II to ARC C-II, the separation standard between the runway and the parallel taxiway increases from 300 feet to 400 feet. To meet this standard, this project plans for Taxiway B to be relocated 100 feet to the south. New taxiway pavement will extend east and west from the apron. Where Taxiway B spans the apron, pavement is planned to be removed and existing pavement will be re-marked to reflect the relocated taxiway. Ultimate taxiway connectors B4, B7, and B8 are also planned to be constructed with this project, with a no-taxi island included at the entrance to ultimate Taxiway B7. Taxiway E, where it extends from the runway to ultimate Taxiway B4, is planned to be removed, as is the interim holding area on Taxiway F (described previously in Project #16). This project includes the addition of medium intensity taxiway lighting (MITL) on all new taxiway pavement, as well as updated directional signage.
- *Cost Estimate:* $3,415,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* Demolition and reconstruction of the shifted and extended Taxiway B and connectors will need to be phased in a way to minimize disruption to airfield operations. A large amount of the demolished material may be used as fill for the construction of proposed taxiways. Existing drainage patterns at the airport will be affected due to the new paved areas. Grading and drainage improvements must allow for positive drainage. Runoff from the airport must be contained on the airport. With the removal and replacement of the taxiway lighting and signage system, additional electrical upgrades may be needed. Further electrical assessment may be required.

Project #20: Runway Extension and Related Projects

- *Description:* This project plans for a 2,526-foot extension to Runway 5, bringing the total length of Runway 5-23 to 7,300 feet. Taxiway B is also planned to be extended to the ultimate Runway 5 end, with connector B1 providing access to the threshold and ultimate Taxiway B2 constructed as an additional exit. In order to accomplish these projects, approximately 1,600 feet of the dry wash that extends through the southwest portion of airport property will need to be covered to support the new pavement and RSA. Navaids and other equipment that will need to be relocated as a result of the runway extension include the medium intensity approach lighting system with runway alignment (MALSR), the glide slope antenna, and the automated weather observation system (AWOS). The supplemental wind cone that previously served the Runway 5 end is planned to be reinstalled at the extended Runway 5 end (see Project #3). This project also plans for the upgrade of the existing PAPI-2 serving Runway 5 to a PAPI-4. New pavement markings (precision markings on Runway 5 and non-precision markings on Runway 23) are planned as well as additional MIRL and MITL on the extended runway and taxiway. Lastly, this project will also include the removal of 426 feet of pavement from the Runway 23 end in order to provide for a full C-II RSA and ROFA off this runway end.
- *Cost Estimate:* $6,430,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* This project will likely require an EA. Phasing should be set up such that all items located outside of the RSA will be completed first to minimize impact to Runway 5-23 and overall airfield operations. This includes constructing connector Taxiways B1, B2, and partial Taxiway B, relocating the AWOS and glideslope antenna, and installing the supplemental wind cone.

Relocating the PAPI and glideslope antenna will require flight checks be completed before reopened. Flight checks take approximately 3-6 months to schedule with the FAA and require a reimbursable agreement to be in place for the city to pay FAA to perform those checks. Close coordination will be required between the city and FAA during the design and start of construction to minimize downtime of the PAPIs and glideslope antenna once they are relocated.

When working on the Runway 5-23 extension, a temporary displaced threshold may be utilized to allow contractors full access to the project area while allowing the runway to remain open. This option would require temporary displaced threshold lights and markings which can typically be installed during a one-night closure of the runway. Alternatively, work done at either end of Runway 5-23 can be limited to night work only if the available runway length is insufficient for the aircraft using the airport. Additionally, temporary closures to the runway will be required when placing new markings along the runway. The final pavement markings can be applied at night, but it is usually best practice to paint during daylight hours for best results. With the removal and replacement of the runway lighting and signage system, additional electrical upgrades may be needed. Further electrical assessment may be required.

Project #21: Construct Holding Bays on Taxiway B

- *Description:* Standard holding bays are planned at each end of Taxiway B to provide space for queuing aircraft, enhancing capacity, and increasing safety. These holding bays reflect the design standards detailed in FAA Advisory Circular (AC) 150/5300-13B, *Airport Design*, and include islands that allow independent movements for aircraft bypassing one another.
- *Cost Estimate:* $1,107,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* Construction of new holding bays will require temporary closure of Taxiway B west of Taxiway B2 and east of Taxiway B8. Construction should be phased so that one holding bay is constructed at a time. This option will require the contractor to mobilize equipment and people multiple times and will increase the cost. Alternatively, work can be constructed at the same time in a way that ensures continued access to the runway and to minimize back taxiing maneuvers. Work within the safety areas of the runway and taxiways can take place during nighttime closures to reduce the impact on airport operations.

Project #22: Construct New Landside Access Roads

- *Description:* A new access road extending north from Airport Road to planned hangar facilities is included with this project. Similar to the previous landside access road project, the intent is to separate, as much as possible, aircraft and vehicle movement areas. A secure access gate is included to prevent unauthorized individuals from accessing this area. Funding eligibility will be further evaluated at the time of project design.
- *Cost Estimate:* $211,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis*: Work in this area should have no impact to airfield operations. Existing drainage patterns at the airport will be affected due to the new paved areas. Grading and drainage improvements must allow for positive drainage. Runoff from the airport must be contained on the airport via storm drains or drainage basins.

Project #23: Construct New Apron Pavement for Executive Hangars

- *Description:* New apron pavement is planned north of Airport Road and west of the existing T-hangars, near the old air ambulance building. This pavement is planned to support new executive hangars to complete the build-out of this area.
- *Cost Estimate:* $320,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis*: Work in this area should have no impact to airfield operations. Existing drainage patterns at the airport will be affected due to the new paved areas. Grading and drainage improvements must allow for positive drainage. Runoff from the airport must be contained on the airport.

Project #24: Expand Terminal Building

- *Description:* As detailed in previous chapters, the existing 4,800-square foot (sf) terminal building may become constrained over the planning period, as activity at the airport increases. This project plans for an 12,000-sf expansion of the existing building, which could include additional office/conference room space, a larger lobby, and potential fixed base operator (FBO) space. Funding eligibility for the terminal expansion will be further evaluated at the time of design and prior to construction.
- *Cost Estimate:* $9,880,600
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* Depending on affected areas, work done to the terminal may require operations to be moved to a temporary field office for the duration of work. If minimal impact, work shall be done in a way that does not cause any interruptions to power and minimal interruptions to water. During work in this area, it is important that perimeter and building security is maintained during construction.

Project #25 Construct New Apron and Taxilane Pavement for Conventional Hangars

- *Description:* New apron pavement is planned west of N. Piper Avenue in the area that is currently used for firefighter training activities. This apron is intended to support a pair of conventional hangars. The project also includes construction of new taxilane pavement that will connect the new apron to the terminal apron.
- *Cost Estimate:* $248,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent

Project #26: Routine Pavement Maintenance

- *Description:* As airfield pavements deteriorate over time, it is necessary to undergo overlay/rehabilitation/reconstruction projects. It is anticipated that this project could be split up into multiple projects based on future pavement maintenance needs.
- *Cost Estimate:* $1,000,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent

Intermediate-Term Program Summary

The total costs associated with the intermediate term program are estimated at $40.4 million as presented on **Exhibit 6A**. Of this total, approximately $36.6 million could be eligible for federal/state funding, and the airport sponsor share is projected at $3.6 million.

LONG-TERM PROGRAM

The long-term planning horizon considers nine projects for the 11-20+ year period that are mainly demand-driven. The projects and their associated costs are listed on **Exhibit 6A** and graphically depicted on **Exhibit 6B** as appropriate.

Project #27: Construct New Landside Access Roads

- *Description:* The area bordered by Airport Road to the north and Piper Avenue to the east currently contains executive hangars that are accessed via 'Taxiway C South' or N. Aero Drive. Neither of these options provide ideal entry points to this development area. As such, two new gated access roads extending from Airport Road are planned. Similar to Projects #10 and #23, these roads are planned to separate aircraft and vehicle movements, while also allowing for the maximum development potential in this area.
- *Cost Estimate:* $262,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis*: Work in this area should have no impact to airfield operations. Existing drainage patterns at the airport will be affected due to the new paved areas. Grading and drainage improvements must allow for positive drainage. Runoff from the airport must be contained on the airport via existing storm drains or existing drainage basins.

Project #28: Construct New Apron Pavement for Executive Hangars

- *Description:* This project plans for the construction of new apron pavement to support planned executive hangars (accessible from Airport Road) along Taxiway E. The apron is planned to meet airport design group (ADG) I standards.
- *Cost Estimate:* $663,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* Work in this area should have no impact to airfield operations. Existing drainage patterns at the airport will be affected due to the new paved areas. Grading and drainage improvements must allow for positive drainage. Runoff from the airport must be contained on the airport. Because of this, the capacity of the existing drainage basin on the airport may need to be increased or new drainage basins may need to be constructed on the airport to contain the runoff and avoid discharge into the surrounding areas.

Project #29: Extend Utilities to Support North Landside Development

- *Description:* In support of planned north side development, this project plans for the addition of utilities (electricity, gas, water, sewer, communications) to this side of the airport.
- *Cost Estimate:* $1,748,000
- *Funding Breakdown:* FAA – 0 percent / ADOT – 0 percent / Airport Sponsor – 100.0 percent
- *Engineer's Analysis*: An EA will be required before beginning this project. This project must account for all future developments including electrical, water, sewer, storm drain, etc. These utilities will support future developments including a new apron, new parallel taxiway and connectors, a series of hangars, an aircraft wash rack, and secondary fuel farm. Most of the work on this project will occur outside of airfield operations and safety areas and will have minimal or no impact to airfield operations. Short-term local closures and NOTAMs will be issued if needed. Contractor staging and haul routes should be located outside of runway and taxiway safety areas.

Project #30: Construct New Access Roads & Parking for North Landside Development

- *Description:* A new road extending from Arizona State Route 387 is necessary to provide access to planned north side development. This project plans for the construction of this public roadway.
- *Cost Estimate:* $1,928,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* Work in this area should have no impact to airfield operations. Existing drainage patterns at the airport will be affected due to the new paved areas. Grading and drainage improvements must allow for positive drainage, and new drainage considerations will be needed on this side of the airfield in order to contain the runoff and avoid discharge into the surrounding areas. Earthwork balance should be possible to avoid excessive cut or fill.

Project #31: Construct North Side Aircraft Parking Apron

- *Description:* Construction of a second general aviation apron is included in this project, which could support a variety of hangar types and sizes, as well as an FBO or specialized aviation service operators (SASOs). The north side is also planned as a secondary option for a new terminal building. Marked parking for fixed wing and helicopter aircraft is included on the apron. The entrances to ultimate Taxiways A3 and A4 are planned to be marked with no-taxi islands to mitigate direct access from the apron to the runway.
- *Cost Estimate:* $8,421,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* Work in this area should have no impact to airfield operations as all work is located outside of safety areas. Existing drainage patterns in the area will be affected due to the new paved areas. Grading and drainage improvements must be considered to allow for positive drainage. Runoff from the airport must be contained on the airport. Because of this, new drainage considerations will be needed on this side of the airfield in order to contain the runoff and avoid discharge into the surrounding areas. Apron lighting should be considered when designing this project. The proposed lighting should provide good coverage of the parking areas while remaining outside of the Part 77 surfaces.

Project #32: Construct Taxiway A and Taxiway Connectors

- *Description:* In order to access the landside facilities on the north side, this project plans for the construction of a second parallel taxiway, ultimate Taxiway A. Ultimate Taxiway A will extend to the west to connect to the Runway 5 end and to the east to connect to the Runway 23 pavement end. Connectors A1, A2, A3, A4, A5, and A6 will provide access/exits to and from the runway.
- *Cost Estimate:* $5,215,300
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* Construction of the new Taxiway A and connectors will require a significant amount of earthwork and drainage considerations. With the addition of the taxiway lighting and signage system, additional electrical upgrades may be needed. Further electrical assessment may be required.

  A significant portion of this project is located outside of the Runway 5-23 safety areas and can be done during daylight hours without disruption to airport operations. However, work performed on connector taxiways located within the Runway 5-23 safety areas can be phased to take place during nighttime closures to reduce impact on airport operations.

Project #33: Construct Secondary Fuel Farm

- *Description:* A secondary fuel farm with aboveground Jet A and 100LL/100UL storage tanks is included with this project. While the facilities on the south side of the airport are adequate in terms of capacity, a secondary fuel farm is much more convenient to tenants and airport users, as well as refueling trucks.
- *Cost Estimate:* $2,323,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* Before starting work, this project may require an EA. Fuel containment measures may need to be put in place to satisfy stormwater pollution prevention (SWPP) and environmental requirements. This work area will require temporary closures on the east side of the north apron to reduce impact on airport operations.

Project #34: Construct North Side Aircraft Wash Rack

- *Description:* An 80-foot by 80-foot aircraft wash rack is planned on the north apron with the intent of serving larger turboprop and jet aircraft.
- *Cost Estimate:* $477,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent
- *Engineer's Analysis:* Adding an aircraft wash rack will require adequate water supply. The drainage should connect to a sewer line to drain the wastewater. This may also require an oil/water separator to filter out contaminants before sending the runoff to the sewer system. Alternatively, a septic system may be considered for this area. This work area will require temporary closures in the surrounding area on the west side of the north apron.

Project #35: Routine Pavement Maintenance

- *Description:* As airfield pavements deteriorate over time, it is necessary to undergo overlay/rehabilitation/reconstruction projects. Similar to the line item in the intermediate term program, it could be anticipated that multiple projects would cover routine pavement maintenance during the 10-year period planning period.
- *Cost Estimate:* $2,000,000
- *Funding Breakdown:* FAA – 91.06 percent / ADOT – 4.47 percent / Airport Sponsor – 4.47 percent

Long-Term Program Summary

The total investment necessary for the long-term CIP detailed on **Exhibit 6A** is approximately $23.0 million. Approximately $20.3 million is eligible for federal/state funding assistance. The airport's share of long-term projects is projected at $2.7 million.

CAPITAL IMPROVEMENT PROGRAM SUMMARY

The CIP is intended as a road map of improvements to help guide the City of Casa Grande, the FAA, and ADOT. The plan as presented will help accommodate increases in forecast demand at CGZ over the next 20 years and beyond. The sequence of projects may change due to availability of funds or changing priorities based on an annual review by airport management, the FAA, and ADOT. Nonetheless, this is a comprehensive list of capital projects the airport should consider in the next 20+ years.

The total CIP proposes approximately $74.1 million in airport development needs. Of this total, approximately $63.2 million could be eligible for federal/state funding assistance. The local funding estimate for the proposed CIP is $10.9 million.

CAPITAL IMPROVEMENT FUNDING SOURCES

There are generally four sources of funds used to finance airport development, which include:

- Airport cash flow
- Revenue and general obligation bonds
- Federal/state/local grants
- Passenger facility charges (PFCs), which are reserved for commercial service airports

Access to these sources of financing varies widely among airports, with some large airports maintaining substantial cash reserves and the smaller commercial service and general aviation airports often requiring subsidies from local governments to fund operating expenses and finance modest improvements.

Financing capital improvements at CGZ will not rely solely on the financial resources of the City of Casa Grande. Capital improvement funding is available through various grant-in-aid programs on both the federal and state levels. Historically, the airport has received federal and state grants. While more funds could be available some years, the CIP was developed with project phasing to remain realistic and within the range of anticipated grant assistance. The following discussion outlines key sources of funding potentially available for capital improvements at the airport.

FEDERAL GRANTS

Through federal legislation over the years, various grant-in-aid programs have been established to develop and maintain a system of public-use airports across the United States. The purpose of this system and its federally based funding is to maintain national defense and to promote interstate commerce. The *FAA Modernization and Reform Act of 2012*, enacted on February 17, 2012, authorized the FAA's AIP at $3.35 billion for fiscal years 2012 through 2015. The law was then extended through a series of continuing resolutions. In 2016, Congress passed legislation (H.R. 636, *FAA Extension, Safety, and Security Act of 2016*) amending the law to expire on September 30, 2017. Subsequently, Congress passed a bill (H.R. 3823, *Disaster Tax Relief and Airport and Airway Extension Act of 2017*) authorizing appropriations to the FAA through March 31, 2018, and the *Consolidated Appropriations Act, 2018* extended FAA's funding and authority through September 30, 2018. In October 2018, Congress passed legislation entitled, *FAA Reauthorization Act of 2018*, which will fund the FAA's AIP at $3.35 billion annually until 2023. This bill reauthorizes the FAA for five years, at a cost of $97 billion, and represents the longest funding authorization period for the FAA since 1982.

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 and equipment, and research and development). The Aviation Trust Fund also finances the operation of the FAA. It is funded by user fees, including taxes on airline tickets, aviation fuel, and various aircraft parts.

Several projects identified in the CIP are eligible for FAA funding through the AIP, which provides entitlement funds to airports based, in part, on their annual enplaned passengers and pounds of landed cargo weight. Additional AIP funds, designated as discretionary, may also be used for eligible projects based on the FAA's national priority system. Although the AIP has been reauthorized several times and the funding formulas have been periodically revised to reflect changing national priorities, the program has remained essentially the same. Public-use airports that serve civil aviation, like CGZ, may receive AIP funding for eligible projects, as described in FAA's *Airport Improvement Program Handbook.* The airport must fund the remaining project costs using a combination of other funding sources, as discussed in the following sections.

Table 6B presents the approximate distribution of the AIP funds as described in FAA Order 5100.38D, Change 1, *Airport Improvement Program Handbook*, issued February 26, 2019. CGZ is eligible to apply for grants which may be funded through state apportionments, the small airport fund, and/or discretionary funds.

TABLE 6B | Federal AIP Funding Distribution - Casa Grande Municipal Airport

Funding Category	Percent of Total	Funds*
Apportionment/Entitlement		
Passenger Entitlements	27.01%	$904,840,000
Cargo Entitlements	3.50%	$117,250,000
Alaska Supplemental	0.67%	$22,450,000
Nonprimary Entitlements	12.01%	$402,340,000
State Apportionment	7.99%	$267,670,000
Carryover	22.85%	$765,480,000
Small Airport Fund		
Small Hubs	2.33%	$78,060,000
Nonhubs	4.67%	$156,450,000
Nonprimary (GA and Reliever)	9.33%	$312,560,000
Discretionary		
Capacity/Safety/Security/Noise	4.36%	$146,060,000
Pure Discretionary	1.45%	$48,580,000
Set Asides		
Noise and Environmental	3.37%	$112,900,000
Military Airports Program	0.39%	$13,070,000
Reliever	0.06%	$2,010,000
Totals	**100.00%**	**$3,350,000,000**

* FAA *Modernization and Reform Act of 2018*
AIP: Airport Improvement Program

Source: FAA Order 5100.38D, Change 1, Airport Improvement Program Handbook

Funding for AIP-eligible projects is undertaken through a cost-sharing arrangement in which the FAA share varies by airport size: generally, 75 percent for large- and medium-hub airports, and 90 percent for all other airports. Since the early days of federal participation in airport infrastructure projects, Congress has provided a higher federal share for airports located in states with more than five percent of their geographic acreage comprised of public lands and nontaxable tribal lands. For states that qualify, such as Arizona, the federal share is increased depending on the airport classification. As a general aviation airport, the federal share of eligible capital improvement projects for CGZ is 91.06 percent. In exchange for this level of funding, the airport sponsor is required to meet various Grant Assurances, including maintaining the improvement for its useful life, usually 20 years.

Another source for federal grants is the Bipartisan Infrastructure Law (BIL), which was signed into law in 2022 and plans for $25 billion to be invested into America's airports over the next five years. BIL funds are sourced from the U.S. Treasury General Fund and are split into two funding buckets, $20 billion for Airport Infrastructure Grants (AIG) and $4.85 billion for Airport Terminal Program (ATP). **Under BIL, CGZ will receive $159,000[1] in allocated AIG funding each year for the next five years.** Beginning in FY2022, this money can be used for repair and maintenance of existing infrastructure or construction of new facilities (i.e., airfield pavement, navaids, lighting, terminal building, etc.). ATP grants are competitive in nature and can be used for multi-modal terminal development and relocating, reconstructing, repairing, or improving an airport traffic control tower. The federal share for AIG is the same as an AIP grant, 91.06 percent with a local 8.94 percent match, while the federal share for ATP grants is 95 percent for non-primary airports. The same grant assurances that apply to AIP grants will also apply to BIL grants. BIL and AIP grants cannot be combined/mingled into a single grant.

Apportionment (Entitlement) Funds

AIP provides funding for eligible projects at airports through an apportionment (entitlement) program. Primary commercial service airports receive a guaranteed minimum level of federal assistance each year, based on their enplaned passenger levels and Congressional appropriation levels. A primary airport is defined as any commercial service airport enplaning at least 10,000 passengers annually. If the threshold is met, the airport receives $1 million annually in entitlement funds. Other entitlement funds are distributed to cargo service airports, states and insular areas (state apportionment), and Alaska airports.

General aviation airports included in the *National Plan of Integrated Airport Systems* (NPIAS) can receive up to $150,000 each year in non-primary entitlement (NPE) funds. These funds can be carried over and combined for up to four years, thereby allowing for completion of a more expensive project. It should be noted that CGZ is eligible for and receives NPE funds.

The FAA also provides a state apportionment based on a federal formula that takes into account area and population. The FAA then distributes these funds for projects at various airports throughout the state.

[1] https://www.faa.gov/bil/airport-infrastructure

Small Airport Fund

If a large- or medium-hub commercial service airport chooses to institute a PFC, which is a fee of up to $4.50 on each airline ticket for funding of capital improvement projects, then their apportionment is reduced. A portion of the reduced apportionment goes to the small airport fund. The small airport fund is reserved for small-hub primary commercial service airports, non-hub commercial service airports, reliever, and general aviation airports. As a general aviation airport, CGZ is eligible for funds from this source.

Discretionary Funds

In several cases, airports face major projects that will require funds in excess of the airport's annual entitlements. Thus, additional funds from discretionary apportionments under AIP become desirable. The primary feature about discretionary funds is that they are distributed on a priority basis. The priorities are established by the FAA, utilizing a priority code system. Under this system, projects are ranked by their purpose. Projects ensuring airport safety and security are ranked as the most important priorities, followed by maintaining current infrastructure development, mitigating noise and other environmental impacts, meeting standards, and increasing system capacity.

It is important to note that competition for discretionary funding is not limited to airports in the State of Arizona or those within the FAA Western-Pacific Region. The funds are distributed to all airports in the country and, as such, are more difficult to obtain. High priority projects will often fare favorably, while lower priority projects may not receive discretionary grants.

Set-Aside Funds

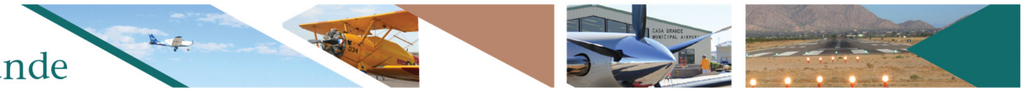
Portions of AIP funds are set-asides designed to achieve specific funding minimums for noise compatibility planning and implementation, select former military airfields (Military Airports Program), and select reliever airports. CGZ does not qualify for set-aside funding.

FAA Facilities and Equipment (F&E) Program

The Airway Facilities Division of the FAA administers the Facilities and Equipment (F&E) Program. This program provides funding for the installation and maintenance of various navigational aids and equipment of the national airspace system. Under the F&E program, funding is provided for FAA airport traffic control towers (ATCTs), enroute navigational aids, on-airport navigational aids, and approach lighting systems.

While F&E still installs and maintains some navigational aids, on-airport facilities at general aviation airports have not been a priority. Therefore, airports often request funding assistance for navigational aids through AIP and then maintain the equipment on their own[2].

[2] Guidance on the eligibility of a project for federal AIP grant funding can be found in FAA Order 5100.38D, *Airport Improvement Program Handbook*.



STATE AID TO AIRPORTS

ADOT recognizes the valuable contribution to the state's transportation economy that airports make. Therefore, it administers several programs to aid in maintaining airports in the state. The source for state airport improvement funds is the Arizona State Aviation Fund. Taxes levied by the state on aviation fuel, flight property, aircraft registration tax, and registration fees (as well as interest on these funds) are deposited in the Arizona State Aviation Fund. The State Transportation Board establishes the policies for distribution of these state funds.

AIP Grant Match and Stand-Alone State Grants

Under the State of Arizona's grant program, an airport can receive funding for one-half (4.47 percent of the total project cost) of the local share of projects receiving federal AIP funding. The AIP grant match program for an individual airport sponsor is limited to no more than 10 percent of the average revenue in the Arizona State Aviation Fund for a three-year period. The current maximum AIP matching grant is estimated at $2.0 million. CGZ is eligible for matching funds from this source.

The state also provides 90 percent funding for projects which are typically not eligible for federal AIP funding or have not received federal funding. The most available for a single project fluctuates but is approximately $2.0 million. CGZ is eligible for this funding source.

Pavement Maintenance Program

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

Public Law 103-305 requires that airports requesting federal AIP funding for pavement rehabilitation or reconstruction have an effective pavement maintenance program system. To this end, ADOT – Aeronautics Group maintains the APMS.

The Arizona APMS uses the Army Corps of Engineers' "Micropaver" program as a basis for generating a Five-Year Arizona Pavement Preservation Program (APPP). The APPP consists of visual inspections of all airport pavements. Evaluations are made of the types and severities observed, and then entered into a computer program database. PCI values are determined through the visual assessment of pavement conditions in accordance with the most recent FAA AC 150/5380-7, *Pavement Management System*, and range from 0 (failed) to 100 (excellent). Every three years, a complete database update with new visual observations is conducted. Individual airport reports from the update are shared with all participating system airports. ADOT ensures that the APMS database is kept current, in compliance with FAA requirements.

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

LOCAL FUNDING

The balance of project costs, after consideration has been given to grants, must be funded through local resources. A goal for any airport is to generate enough revenue to cover all operating and capital expenditures, if possible. There are several local financing options to consider when funding future development at airports, including airport revenues, issuance of a variety of bond types, leasehold financing, implementing a customer facility charge (CFC), pursuing non-aviation development potential, and collecting from special events. These strategies could be used to fund the local matching share or complete a project if grant funding cannot be arranged. Below is a brief description of the most common local funding options.

Airport Revenues

An airport's daily operations are conducted through the collection of various rates and charges. These airport revenues are generated specifically by airport operations. There are restrictions on the use of revenues collected by the airport. All receipts, excluding bond proceeds or related grants and interest, are irrevocably pledged to the punctual payment of operating and maintenance expenses, payment of debt service for as long as bonds remain outstanding, or for additions and improvements to airport facilities.

All airports should establish standard basis rates for various leases. All lease rates should be set to adjust to a standard index, such as the consumer price index (CPI), to assure that fair and equitable rates continue to be charged into the future. Many factors will impact what the standard lease rate should be for a particular facility or ground parcel. For example, ground leases for aviation-related facilities should have a different lease rate than for non-aviation leases. When airports own hangars, a separate facility lease rate should be charged. The lease rate for any individual parcel or hangar can vary due to availability of utilities, condition, location, and other factors. Nonetheless, standard lease rates should fall within an acceptable range.

Bonding

Bonding is a common method to finance large capital projects at airports. A bond is an instrument of indebtedness of the bond issuer to the bond holders, thus a bond is a form of loan or IOU. While bond terms are negotiable, typically the bond issuer is obligated to pay the bond holder interest at regular intervals and/or repay the principal at a later date.

Leasehold Financing

Leasehold financing refers to a private developer or tenant financing improvements under a long-term ground lease. The advantage of this arrangement is that it relieves the airport of the responsibility of having to raise capital funds for the improvement. As an example, an FBO might consider constructing hangars and charging fair market lease rates while paying the airport for a ground lease.

Customer Facility Charge (CFC)

A CFC is the imposition of an additional fee charged to customers for the use of certain facilities. The most common example is when an airport constructs a consolidated rental car facility and imposes a fee for each rental car contract. That fee is then used by the airport to pay down the debt incurred from building the facility.

Non-Aviation Development

In addition to generating revenue from traditional aviation sources, airports with excess land can permit compatible non-aviation development. Generally, an airport will extend a long-term lease for land not anticipated to be needed for aviation purposes in the future. The private developer then pays the monthly lease rate and constructs and uses the compatible facility. A 63.1-acre portion of airport property (northwest of the dry wash) has been reserved for non-aviation development. It should be noted that each individual proposed non-aviation development must be reviewed and approved by the FAA.

Special Events

Another common revenue-generating option is permitted use of airport property for temporary or single events. For example, some airports host open house or fly-in events that attracts thousands of spectators from around the region. Airports can also permit portions of their facility to be utilized for non-aviation special events, such as car shows or video production of commercials. This type of revenue generation must be approved by the FAA.

MASTER PLAN IMPLEMENTATION

To implement the master plan recommendations, it is key to recognize that planning is a continuous process and does not end with approval of this document. The airport should implement measures that allow it to track various demand indicators, such as based aircraft, hangar demand, and operations. The issues that this master plan is based on will remain valid for a number of years. The primary goal is for CGZ to best serve the air transportation needs of the region, while achieving economic self-sufficiency.

The CIP and the phasing program presented will change over time. An effort has been made to identify and prioritize all major capital projects that would require FAA and ADOT grant funding. Nonetheless, the airport and FAA review the five-year CIP on an annual basis.

The value of this study is keeping the issues and objectives at the forefront of the minds of decision-makers. In addition to adjustments in aviation demand, decisions on when to undertake the improvements recommended in this master plan will impact how long the plan remains valid. The format of this plan reduces the need for formal and costly updates by simply adjusting the timing of project implementation. Updates can be done by airport management, thereby improving the plan's effectiveness. Nonetheless, airports are typically encouraged to update their master plans every seven to 10 years, or sooner if significant changes occur in the interim.

In summary, the planning process requires the City of Casa Grande to consistently monitor the progress of the airport. The information obtained from continually monitoring activity will provide the data necessary to determine if the development schedule should be accelerated or decelerated.

City of
Casa Grande
AIRPORT MASTER PLAN

Appendix A
Glossary of Terms

GLOSSARY OF TERMS

A

Above Ground Level: The elevation of a point or surface above the ground.

Accelerate-Stop Distance Available (ASDA): See declared distances.

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

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

Air Route Traffic Control Center (ARTCC): A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the enroute phase of flight.

Air Taxi: An air carrier certificated in accordance with FAR Part 121 and FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.

Air Traffic Control: A service operated by an appropriate organization for the purpose of providing for the safe, orderly, and expeditious flow of air traffic.

Air Traffic Control System Command Center: A facility operated by the FAA which is responsible for the central flow control, the central altitude reservation system, the airport reservation position system, and the air traffic service contingency command for the air traffic control system.

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

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

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

Aircraft Approach Category: A grouping of aircraft based on 1.3 times the stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

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

- **Category D:** Speed 141 knots or more, but less than 166 knots.
- **Category E:** Speed greater than 166 knots

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

Aircraft Operations Area (AOA): A restricted and secure area on the airport property designed to protect all aspects related to aircraft operations.

Aircraft Owners And Pilots Association: A private organization serving the interests and needs of general aviation pilots and aircraft owners.

Aircraft Rescue And Fire Fighting: A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

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

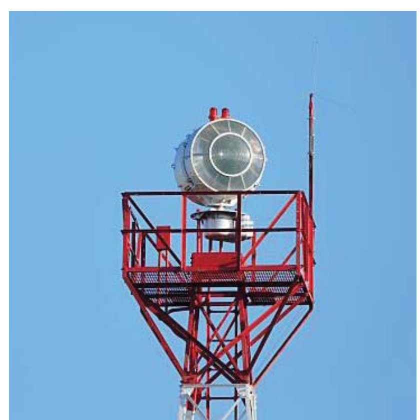
Airline Hub: An airport at which an airline concentrates a significant portion of its activity and which often has a significant amount of connecting traffic.

Airplane Design Group (ADG): A grouping of aircraft based upon wingspan. The groups are as follows:

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

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

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


Airport Beacon

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

Airport Elevation: The highest point on the runway system at an airport expressed in feet above mean sea level (MSL).

Airport Improvement Program: A program authorized by the Airport and Airway Improvement Act of 1982 that provides funding for airport planning and development.

Airport Layout Drawing (ALD): The drawing of the airport showing the layout of existing and proposed airport facilities.

Airport Layout Plan (ALP): A scaled drawing of the existing and planned land and facilities necessary for the operation and development of the airport.

Airport Layout Plan Drawing Set: A set of technical drawings depicting the current and future airport conditions. The individual sheets comprising the set can vary with the complexities of the airport, but the FAA-required drawings include the Airport Layout Plan (sometimes referred to as the Airport Layout Drawing (ALD), the Airport Airspace Drawing, and the Inner Portion of the Approach Surface Drawing, On-Airport Land Use Drawing, and Property Map.

Airport Master Plan: A local planning document that serves as a guide for the long-term development of an airport.

Airport Movement Area Safety System: A system that provides automated alerts and warnings of potential runway incursions or other hazardous aircraft movement events.

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

Airport Reference Code (ARC): A coding system used to relate airport design criteria to the operational (Aircraft Approach Category) to the physical characteristics (Airplane Design Group) of the airplanes intended to operate at the airport.

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

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

Airport Surface Detection Equipment: A radar system that provides air traffic controllers with a visual representation of the movement of aircraft and other vehicles on the ground on the airfield at an airport.

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

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

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

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

Alert Area: See special-use airspace.

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

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

Approach Lighting System (ALS): An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams by which the pilot aligns the aircraft with the extended centerline of the runway on final approach and landing.


Approach Lighting System

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

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

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

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

Automated Terminal Information Service (ATIS): The continuous broadcast of recorded non-control information at towered airports. Information typically includes wind speed, direction, and runway in use.

Automated Surface Observation System (ASOS): A reporting system that provides frequent airport ground surface weather observation data through digitized voice broadcasts and printed reports.

Automated Weather Observation System (AWOS): Equipment used to automatically record weather conditions (i.e., cloud height, visibility, wind speed and direction, temperature, dew point, etc.)

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

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

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

B

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

Based Aircraft: The general aviation aircraft that use a specific airport as a home base.

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

Blast Fence: A barrier used to divert or dissipate jet blast or propeller wash.

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

Building Restriction Line (BRL): A line which identifies suitable building area locations on the airport.


Blast Fence

C

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

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

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

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

Class A Airspace: See Controlled Airspace.

Class B Airspace: See Controlled Airspace.

Class C Airspace: See Controlled Airspace.

Class D Airspace: See Controlled Airspace.

Class E Airspace: See Controlled Airspace.

Class G Airspace: See Controlled Airspace.

Clear Zone: See Runway Protection Zone.

Commercial Service Airport: A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.

Common Traffic Advisory Frequency (CTAF): A radio frequency identified in the appropriate aeronautical chart which is designated for the purpose of transmitting airport advisory information and procedures while operating to or from an uncontrolled airport.

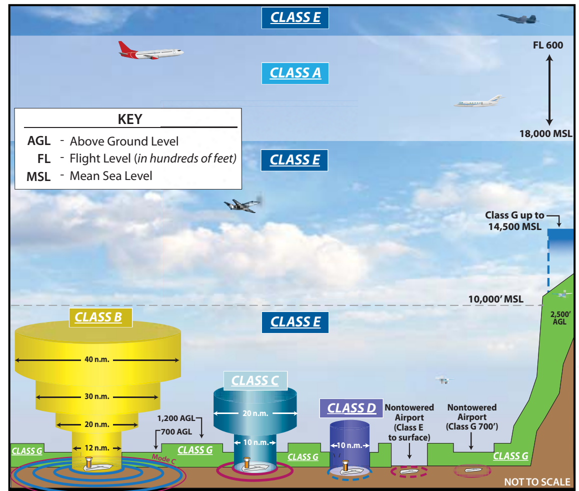
Compass Locator (LOM): A low power, low/medium frequency radio-beacon installed in conjunction with the instrument landing system at one or two of the marker sites.

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

Controlled Airport: An airport that has an operating airport traffic control tower.

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

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



Airspace Classifications

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

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

CLASS D: Generally, that airspace from the surface to 2,500 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower. Class D airspace is individually tailored and configured to encompass published instrument approach procedure. Unless otherwise authorized, all persons must establish two-way radio communication.

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

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

Controlled Firing Area: See special-use airspace.

Crosswind: A wind that is not parallel to a runway centerline or to the intended flight path of an aircraft.

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

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

D

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

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

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

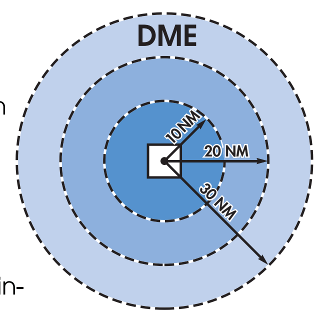
- **Takeoff Run Available (TORA):** The runway length declared available and suitable for the ground run of an airplane taking off.
- **Takeoff Distance Available (TODA):** The TORA plus the length of any remaining runway and/or clear way beyond the far end of the TORA.
- **Accelerate-stop Distance Available (ASDA):** The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff.
- **Landing Distance Available (LDA):** The runway length declared available and suitable for landing.

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

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

Displaced Threshold: A threshold that is located at a point on the runway other than the designated beginning of the runway.

Distance Measuring Equipment (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.



DNL: The 24-hour average sound level, in decibels, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m. as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.

Downwind Leg: A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg. Also see "traffic pattern."

E

Easement: The legal right of one party to use a portion of the total rights in real estate owned by another party. This may include the right of passage over, on, or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity, as well as any other legal rights in the property that may be specified in the easement document.

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

Enplaned Passengers: The total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and nonscheduled services.

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

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

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

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

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

Essential Air Service: A federal program which guarantees air carrier service to selected small cities by providing subsidies as needed to prevent these cities from such service.

F

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

Federal Inspection Services: The provision of customs and immigration services including passport inspection, inspection of baggage, the collection of duties on certain imported items, and the inspections for agricultural products, illegal drugs, or other restricted items.

Final Approach: A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. See "traffic pattern."

Final Approach and Takeoff Area (FATO): A defined area over which the final phase of the helicopter approach to a hover, or a landing is completed and from which the takeoff is initiated.

Final Approach Fix: The designated point at which the final approach segment for an aircraft landing on a runway begins for a non-precision approach.

Finding Of No Significant Impact (FONSI): A public document prepared by a Federal agency that presents the rationale why a proposed action will not have a significant effect on the environment and for which an environmental impact statement will not be prepared.

Fixed Base Operator (FBO): A provider of services to users of an airport. Such services include, but are not limited to, hangaring, fueling, flight training, repair, and maintenance.

Flight Level: A measure of altitude used by aircraft flying above 18,000 feet. Flight levels are indicated by three digits representing the pressure altitude in hundreds of feet. An airplane flying at flight level 360 is flying at a pressure altitude of 36,000 feet. This is expressed as FL 360.

Flight Service Station (FSS): An operations facility in the national flight advisory system which utilizes data interchange facilities for the collection and dissemination of Notices to Airmen, weather, and administrative data and which provides preflight and in-flight advisory services to pilots through air and ground based communication facilities.

Frangible Navaid: A navigational aid which retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft.

G

General Aviation: That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of convenience and necessity, and large aircraft commercial operators.

General Aviation Airport: An airport that provides air service to only general aviation.

Glideslope (GS): Provides vertical guidance for aircraft during approach and landing. The glideslope consists of the following:

- Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS; or
- Visual ground aids, such as PAPI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

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

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

Ground Based Augmentation System (GBAS): A program that augments the existing GPS system by providing corrections to aircraft in the vicinity of an airport in order to improve the accuracy of these aircrafts' GPS navigational position

H

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

High Intensity Runway Lights (HIRL): The highest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

High-speed Exit Taxiway: An acute-angled exit taxiway forming a 30 degree angle with the runway centerline, designed to allow an aircraft to exit a runway without having to decelerate to typical taxi speed.

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

Hot Spot: A location on an airport movement area with a history of potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary.

I

Initial Approach Fix: The designated point at which the initial approach segment begins for an instrument approach to a runway.

Instrument Approach Procedure: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

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

Instrument Landing System (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer	3. Outer Marker	5. Approach Lights
2. Glide Slope	4. Middle Marker	

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

Itinerant Operations: Operations by aircraft that are arriving from outside the traffic pattern or departing the airport traffic pattern.

K

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

L

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

Landing Distance Available (LDA): See declared distances.

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

Local Operations: Aircraft operations performed by aircraft that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport. Typically, this includes touch and-go training operations.

Localizer: The component of an ILS which provides course guidance to the runway.


Localizer

Localizer Type Directional Aid (LDA): A facility of comparable utility and accuracy to a localizer but is not part of a complete ILS and is not aligned with the runway.

Low Intensity Runway Lights: The lowest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

M

Medium Intensity Runway Lights: The middle classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

Military Operations: Aircraft operations that are performed in military aircraft.

Military Operations Area (MOA): See special-use airspace

Military Training Route: An air route depicted on aeronautical charts for the conduct of military flight training at speeds above 250 knots.

Missed Approach Course (MAC): The flight route to be followed if, after an instrument approach, a landing is not affected, and occurring normally:

- When the aircraft has descended to the decision height and has not established visual contact; or
- When directed by air traffic control to pull up or to go around again.

Movement Area: The runways, taxiways, and other areas of an airport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, air traffic control clearance is required for entry onto the movement area.

N

National Airspace System (NAS): The network of air traffic control facilities, air traffic control areas, and navigational facilities through the U.S.

National Plan Of Integrated Airport Systems (NPIAS): The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public use airports to meet national air transportation needs.

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

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

Navaid: A term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e., PAPI, VASI, ILS, etc.)

Navigational Aid: A facility used as, available for use as, or designed for use as an aid to air navigation.

Noise Contour: A continuous line on a map of the airport vicinity connecting all points of the same noise exposure level.

Non-directional Beacon (NDB): A beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine their bearing to and from the radio beacon and home on, or track to, the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.

NDB

Non-precision Approach Procedure: A standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

Notice To Air Missions (NOTAM): A notice containing information concerning the establishment, condition, or change in any component of or hazard in the National Airspace System, the timely knowledge of which is considered essential to personnel concerned with flight operations.

O

Object Free Area (OFA): An area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

Obstacle Free Zone (OFZ): The airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be kept clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance for aircraft landing or taking off from the runway, and for missed approaches.

Operation: The take-off, landing, or touch-and-go procedure by an aircraft on a runway at an airport.

Outer Marker (OM): An ILS navigation facility in the terminal area navigation system located four to seven miles from the runway edge on the extended centerline, indicating to the pilot that he/she is passing over the facility and can begin final approach.

P

Pilot-controlled Lighting: Runway lighting systems at an airport that are controlled by activating the microphone of a pilot on a specified radio frequency.

Precision Approach: A standard instrument approach procedure which provides runway alignment and glide slope (descent) information. It is categorized as follows:

- CATEGORY I (CAT I): A precision approach which provides for approaches with a decision height of not less than 200 feet and visibility not less than 1/2 mile or Runway Visual Range (RVR) 2400 (RVR 1800) with operative touchdown zone and runway centerline lights.
- CATEGORY II (CAT II): A precision approach which provides for approaches with a decision height of not less than 100 feet and visibility not less than 1200 feet RVR.
- CATEGORY III (CAT III): A precision approach which provides for approaches with minimal less than Category II.

Precision Approach Path Indicator (PAPI): A lighting system providing visual approach slope guidance to aircraft during a landing approach. A PAPI normally consists of four light units but an abbreviated system of two lights is acceptable for some categories of aircraft.

Precision Approach Path Indicator

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

Precision Object Free Zone (POFZ): An area centered on the extended runway centerline, beginning at the runway threshold and extending behind the runway threshold that is 200 feet long by 800 feet wide. The POFZ is a clearing standard which requires the POFZ to be kept clear of above ground objects protruding above the runway safety area edge elevation (except for frangible NAVAIDS). The POFA is only in effect when the approach includes vertical guidance, the reported ceiling is below 250 feet, and an aircraft is on final approach within two miles of the runway threshold.

Primary Airport: A commercial service airport that enplanes at least 10,000 annual passengers.

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

Prohibited Area: See special-use airspace.

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

R

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

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

Remote Communications Outlet (RCO): An unstaffed transmitter receiver/facility remotely controlled by air traffic personnel. RCOs serve flight service stations (FSSs). RCOs were established to provide ground-to-ground communications between air traffic control specialists and pilots at satellite airports for delivering enroute clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times.

Remote Transmitter/receiver (RTR): See remote communications outlet. RTRs serve ARTCCs.

Reliever Airport: An airport to serve general aviation aircraft which might otherwise use a congested air-carrier served airport.

Restricted Area: See special-use airspace.

RNAV: Area navigation - airborne equipment which permits flights over determined tracks within prescribed accuracy tolerances without the need to overfly ground-based navigation facilities. Used enroute and for approaches to an airport.

Runway: A defined rectangular area on an airport prepared for aircraft landing and takeoff. Runways are normally numbered in relation to their magnetic direction, rounded off to the nearest 10 degrees. For example, a runway with a magnetic heading of 180 would be designated Runway 18. The runway heading on the opposite end of the runway is 180 degrees from that runway end. For example, the opposite runway heading for Runway 18 would be Runway 36 (magnetic heading of 360). Aircraft can takeoff or land from either end of a runway, depending upon wind direction.

Runway Alignment Indicator Light (RAIL): A series of high intensity sequentially flashing lights installed on the extended centerline of the runway usually in conjunction with an approach lighting system.

Runway Design Code: A code signifying the FAA design standards to which the runway is to be built.

Runway End Identification Lighting (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.


REIL

Runway Gradient: The average slope, measured in percent, between the two ends of a runway.

Runway Protection Zone (RPZ): An area off the runway end to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape. Its dimensions are determined by the aircraft approach speed and runway approach type and minimal.

Runway Reference Code: A code signifying the current operational capabilities of a runway and taxiway.

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

Runway Visibility Zone (RVZ): An area on the airport to be kept clear of permanent objects so that there is an unobstructed line of sight from any point five feet above the runway centerline to any point five feet above an intersecting runway centerline.

Runway Visual Range (RVR): An instrumentally derived value, in feet, representing the horizontal distance a pilot can see down the runway from the runway end.

S

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

Segmented Circle: A system of visual indicators designed to provide traffic pattern information at airports without operating control towers, often co-located with a wind cone.

Shoulder: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection. The shoulder Does Not Necessarily Need To Be Paved.

Slant-range Distance: The straight line distance between an aircraft and a point on the ground.

Small Aircraft: An aircraft that has a maximum certified takeoff weight of up to 12,500 pounds.

Special-use Airspace: Airspace of defined dimensions identified by a surface area wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Special-use airspace classifications include:

- **ALERT AREA:** Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.
- **CONTROLLED FIRING AREA:** Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons or property on the ground.
- **MILITARY OPERATIONS AREA (MOA):** Designated airspace with defined vertical and lateral dimensions established outside Class A airspace to separate/segregate certain military activities from instrument flight rule (IFR) traffic and to identify for visual flight rule (VFR) traffic where these activities are conducted.
- **PROHIBITED AREA:** Designated airspace within which the flight of aircraft is prohibited.
- **RESTRICTED AREA:** Airspace designated under Federal Aviation Regulation (FAR) 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use. When not in use by the using agency, IFR/VFR operations can be authorized by the controlling air traffic control facility.
- **WARNING AREA:** Airspace which may contain hazards to nonparticipating aircraft.

Standard Instrument Departure (SID): A preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual form only.

Standard Instrument Departure Procedures: A published standard flight procedure to be utilized following takeoff to provide a transition between the airport and the terminal area or enroute airspace.

Standard Terminal Arrival Route (STAR): A preplanned coded air traffic control IFR arrival routing, preprinted for pilot use in graphic and textual or textual form only.

Stop-and-go: A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point. A stop-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

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

Straight-in Landing/approach: A landing made on a runway aligned within 30 degrees of the final approach course following completion of an instrument approach.

T

Tactical Air Navigation (TACAN): An ultrahigh frequency electronic air navigation system which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station.

Takeoff Runway Available (TORA): See declared distances.

Takeoff Distance Available (TODA): See declared distances.

Taxilane: A taxiway designed for low speed and precise taxiing. Taxilanes are usually, but not always, located outside the movement area and provide access to from taxiways to aircraft parking positions and other terminal areas.

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

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

Taxiway Safety Area (TSA): A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

Terminal Instrument Procedures: Published flight procedures for conducting instrument approaches to runways under instrument meteorological conditions.

Terminal Radar Approach Control: An element of the air traffic control system responsible for monitoring the enroute and terminal segment of air traffic in the airspace surrounding airports with moderate to high levels of air traffic.

Tetrahedron: A device used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.


Tetrahedron

Threshold: The beginning of that portion of the runway available for landing. In some instances, the threshold may be displaced.

Touch-and-go: An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

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

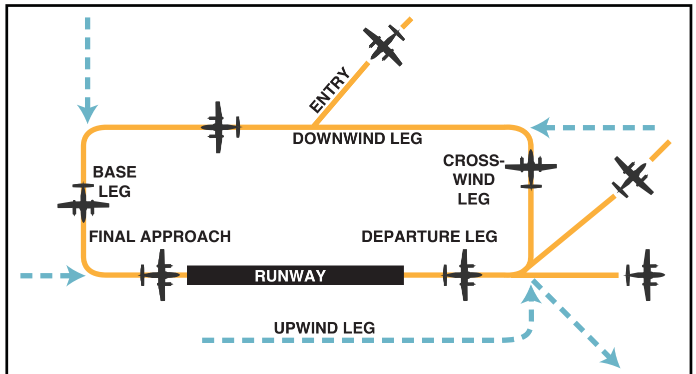
Touchdown and Lift-off Area (TLOF): A load bearing, generally paved area, normally centered in the FATO, on which a helicopter lands or takes off.

Touchdown Zone (TDZ): The first 3,000 feet of the runway beginning at the threshold.

Touchdown Zone Elevation (TDZE): The highest elevation in the touchdown zone.

Touchdown Zone Lighting: Two rows of transverse light bars located symmetrically about the runway centerline normally at 100-foot intervals. The basic system extends 3,000 feet along the runway.

Traffic Pattern: The traffic flow that is prescribed for aircraft landing at or taking off from an airport. The components of a typical traffic pattern are the upwind leg, crosswind leg, downwind leg, base leg, and final approach.



Traffic Pattern

U

Uncontrolled Airport: An airport without an airport traffic control tower at which the control of Visual Flight Rules traffic is not exercised.

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

Universal Communication (UNICOM): A non-government communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOMs are shown on aeronautical charts and publications.

Upwind Leg: A flight path parallel to the landing runway in the direction of landing. See "traffic pattern."

V

Vector: A heading issued to an aircraft to provide navigational guidance by radar.

Very High Frequency Omni-directional Range (VOR): A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the national airspace system. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature.

Very High Frequency Omni-directional Range/Tactical Air Navigation (VORTAC): A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment (DME) at one site.

Victor Airway: A system of established routes that run along specified VOR radials, from one VOR station to another.

Visual Approach: An approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.

Visual Approach Slope Indicator (VASI): An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing. The VASI is now obsolete and is being replaced with the PAPI.

Visual Flight Rules (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

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

Visual Runway: A runway without an existing or planned instrument approach.

VOR: See "Very High Frequency Omni-directional Range."

VORTAC: See "Very High Frequency Omni-directional Range/Tactical Air Navigation."

W

Warning Area: See special-use airspace.

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

Windsock/Windcone: A visual aid that indicates the prevailing wind direction and intensity at a particular location.


Windsock/Windcone

Abbreviations

AC: advisory circular

ACIP: airport capital improvement program

ADF: automatic direction finder

ADG: airplane design group

AFSS: automated flight service station

AGL: above ground level

AIA: annual instrument approach

AIP: Airport Improvement Program

AIR-21: Wendell H. Ford Aviation Investment and Reform Act for the 21st Century

ALS: approach lighting system

ALSF-1: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT I configuration)

ALSF-2: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II configuration)

AOA: Aircraft Operation Area

APRC: approach reference code

APV: instrument approach procedure with vertical guidance

ARC: airport reference code

ARFF: aircraft rescue and fire fighting

ARP: airport reference point

ARTCC: air route traffic control center

ASDA: accelerate-stop distance available

ASR: airport surveillance radar

ASOS: automated surface observation station

ASV: annual service volume

ATC: airport traffic control

ATCT: airport traffic control tower

ATIS: automated terminal information service

AVGAS: aviation gasoline - typically 100 low lead (100LL)

AWOS: automated weather observation station

BRL: building restriction line

CFR: Code of Federal Regulation

CIP: capital improvement program

DME: distance measuring equipment

DNL: day-night noise level

DPRC: departure reference code

DWL: runway weight bearing capacity of aircraft with dual-wheel type landing gear

DTWL: runway weight bearing capacity of aircraft with dual-tandem type landing gear

FAA: Federal Aviation Administration

FAR: Federal Aviation Regulation

FBO: fixed base operator

FY: fiscal year

GA: general aviation

GPS: global positioning system

GS: glide slope

HIRL: high intensity runway edge lighting

IFR: instrument flight rules (FAR Part 91)

ILS: instrument landing system

IM: inner marker

LDA: localizer type directional aid

LDA: landing distance available

LIRL: low intensity runway edge lighting

LMM: compass locator at middle marker

LNAV: lateral navigation

LOC: localizer

LOM: compass locator at outer marker

LP: localizer performance

LPV: localizer performance with vertical guidance

MALS: medium intensity approach lighting system

MALSR: MALS with runway alignment indicator lights

MALSF: MALS with sequenced flashers

MIRL: medium intensity runway edge lighting

MITL: medium intensity taxiway edge lighting

MLS: microwave landing system

MM: middle marker

MOA: military operations area

MSL: mean sea level

MTOW: maximum takeoff weight

NAVAID: navigational aid

NDB: non-directional radio beacon

NEPA: National Environmental Policy Act

NM: nautical mile (6,076.1 feet)

NPDES: National Pollutant Discharge Elimination System

NPIAS: National Plan of Integrated Airport Systems

NPRM: notice of proposed rule making

ODALS: omni-directional approach lighting system

OFA: object free area

OFZ: obstacle free zone

OM: outer marker

PAPI: precision approach path indicator

PFC: porous friction course

PFC: passenger facility charge

PCI: pavement condition index

PCL: pilot-controlled lighting

PIW: public information workshop

POFZ: precision object free zone

PVC: poor visibility and ceiling

RCO: remote communications outlet

RDC: runway design code

REIL: runway end identification lighting

RNAV: area navigation

RPZ: runway protection zone

RSA: runway safety area

RTR: remote transmitter/receiver

RVR: runway visibility range

RVZ: runway visibility zone

SALS: short approach lighting system

SASP: state aviation system plan

SEL: sound exposure level

SID: standard instrument departure

SM: statute mile (5,280 feet)

SRE: snow removal equipment

SSALF: simplified short approach lighting system with runway alignment indicator lights

STAR: standard terminal arrival route

SWL: runway weight bearing capacity for aircraft with single-wheel tandem type landing gear

TACAN: tactical air navigational aid

TAF: Federal Aviation Administration (FAA) Terminal Area Forecast

TDG: taxiway design group

TLOF: Touchdown and lift-off

TDZ: touchdown zone

TDZE: touchdown zone elevation

TODA: takeoff distance available

TORA: takeoff runway available

TRACON: terminal radar approach control

VASI: visual approach slope indicator

VFR: visual flight rules (FAR Part 91)

VHF: very high frequency

VOR: very high frequency omni-directional range

VORTAC: very high frequency omni-directional range/tactical air navigation

WAAS: wide area augmentation system

City of
Casa Grande
AIRPORT MASTER PLAN

Appendix B

Forecast Approval Letter

U.S. Department
of Transportation
Federal Aviation Administration

Federal Aviation Administration
Phoenix Airports Field Office

3800 N Central Ave
Suite 1025
Phoenix, AZ 85012

July 1, 2022

Dave Reffner
Airport Manager
3225 N Lear Ave
Casa Grande, AZ 85122

Dear Mr. Reffner;

Casa Grande Municipal Airport (CGZ)
Aviation Activity Forecast Approval

The Federal Aviation Administration (FAA) has reviewed the aviation forecast for the Casa Grande Municipal Airport (CGZ) dated May 6, 2022. The FAA approves both this forecast and the use of B-II for the existing and C-II for the future critical design aircrafts.

The forecast was developed using current data and appropriate methodologies and despite not being within TAF tolerance, it is approved for planning purposes, to include Airport Layout Plan development. It is important to note that the approval of this forecast doesn't guarantee funding for large scale capital improvements as future projects will need to be justified by current activity levels at the time the projects are proposed for implementation.

If you have any questions about this forecast approval, please call me at 602-792-1073.

Sincerely,

KYLER T ERHARD

Digitally signed by KYLER T ERHARD
Date: 2022.07.01 11:12:31 -07'00'

Kyler Erhard
Lead Program Manager

This page intentionally left blank

City of
Casa Grande
AIRPORT MASTER PLAN

Appendix C
Project Cost Estimates

3 Relocate Lighted Cone and Segmented Circle

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	COMPLIANCE WITH POLLUTION, EROSION, AND SILTATION CONTROL	1	LS	$ 10,000.00	$ 10,000.00
2	MOBILIZATION	1	LS	$ 30,000.00	$ 30,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	CLEARING AND GRUBBING	2	AC	$ 2,500.00	$ 5,000.00
5	UNCLASSIFIED EXCAVATION	3,500	CY	$ 12.00	$ 42,000.00
6	CONCRETE	1600	CF	$ 42.00	$ 67,200.00
7	NO. 8 600V, L-824, TYPE C CABLE, INSTALLED IN CONDUIT	240	LF	$ 12.00	$ 2,880.00
8	2-INCH DIA. PVC CONDUIT IN TURF	140	LF	$ 60.00	$ 8,400.00
9	INSTALL L-867 JUNCTION CAN	1	EA	$ 1,200.00	$ 1,200.00
10	REMOVE, SALVAGE AND REINSTALL EXISTING WINDCONE WITH NEW FOUNDATION	1	EA	$ 50,000.00	$ 50,000.00
11	REMOVE, SALVAGE AND REINSTALL EXISTING H-FRAME AND ELECTRICAL COMPONENTS	1	EA	$ 12,000.00	$ 12,000.00
				Subtotal	**$ 289,000.00**
				Design Fee (20%)	**$ 57,800.00**
				CM Fee (15%)	**$ 43,000.00**
				Sponsor Admin (2%)	**$ 6,000.00**
				Total	**$ 396,000.00**

4 MARK APRON WITH NO-TAXI ISLAND ON ULTIMATE TAXIWAY B5

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 18,000.00	$ 18,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	OBLITERATE EXISTING MARKINGS	1000	SF	$ 7.00	$ 7,000.00
4	PAINTSTRIPING (YELLOW, REFLECTORIZED)	2500	SF	$ 4.00	$ 10,000.00
5	PAINTSTRIPING (GREEN, REFLECTORIZED)	12000	SF	$ 5.00	$ 60,000.00

TOTAL		
	SUBTOTAL	**$ 175,000.00**
	Design Fee (20%)	**$ 35,000.00**
	CM Fee (15%)	**$ 26,000.00**
	Sponsor Admin (2%)	**$ 4,000.00**
	Total	**$ 240,000.00**

8 CONSTRUCT TAXILANE PAVEMENT FOR PLANNED T-HANGARS WEST OF TERMINAL 81,200 SF OF NEV

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	COMPLIANCE WITH POLLUTION, EROSION, AND SILTATION CONTROL	1	LS	$ 10,000.00	$ 10,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 100,000.00	$ 100,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 25,000.00	$ 25,000.00
4	PREPARATION OF JOINTS AND CRACKS	1	LS	$ 6,500.00	$ 6,500.00
5	CLEARING AND GRUBBING	3	AC	$ 2,400.00	$ 6,000.00
6	UNCLASSIFIED EXCAVATION	5,000	CY	$ 14.00	$ 70,000.00
7	7" THICK CRUSHED AGGREGATE BASE COURSE	2,000	CY	$ 120.00	$ 240,000.00
8	4" THICK ASPHALT SURFACE COURSE, GRADATION 2	1,500	TN	$ 175.00	$ 262,500.00
9	EMULSIFIED ASPHALT PRIME COAT	9,500	SY	$ 2.00	$ 19,000.00
10	EMULSIFIED ASPHALT TACK COAT	9,500	SY	$ 2.00	$ 19,000.00
11	PAINTSTRIPING (YELLOW, REFLECTORIZED)	120	SF	$ 7.00	$ 840.00
12	RELOCATE BEACON	1	LS	$ 200,000.00	$ 200,000.00

TOTAL		
	SUBTOTAL	**$ 958,840.00**
	Design Fee (15%)	**$ 143,826.00**
	CM Fee (15%)	**$ 144,000.00**
	Sponsor Admin (2%)	**$ 19,000.00**
	Total	**$ 1,266,000.00**

9 CONSTRUCT ACCESS ROAD EXTENDING FROM LEAR AVEL RECONFIGURE INTERSECTION AND RELOCATE/INSTALL SECURE ACESS GATE

11000 SF OF NEW

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	COMPLIANCE WITH POLLUTION, EROSION, AND SILTATION CONTROL	1	LS	$ 12,000.00	$ 12,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 25,000.00	$ 25,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 30,000.00	$ 30,000.00
6	CLEARING AND GRUBBING	0.25	AC	$ 2,600.00	$ 650.00
7	UNCLASSIFIED EXCAVATION	250	CY	$ 17.00	$ 4,250.00
8	7" THICK CRUSHED AGGREGATE BASE COURSE	250	CY	$ 145.00	$ 36,250.00
9	4" THICK ASPHALT SURFACE COURSE, GRADATION 2	500	TN	$ 200.00	$ 100,000.00
10	EMULSIFIED ASPHALT PRIME COAT	1,340	SY	$ 3.00	$ 4,020.00
11	EMULSIFIED ASPHALT TACK COAT	1,340	SY	$ 3.00	$ 4,020.00

TOTAL		
	SUBTOTAL	**$ 216,190.00**
	Design Fee (20%)	**$ 43,238.00**
	CM Fee (15%)	**$ 32,000.00**
	Sponsor Admin (2%)	**$ 4,000.00**
	Total	**$ 295,000.00**

15 Acquire 3.6 acres of ultimate RSA/ROFA (RW 5 end); obtain easement for 54.6 acres in RW 5 RPZ ; acquire 0.5 acre for ultimate west hold bay

INCLUDE COST TC

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	COMPLIANCE WITH POLLUTION, EROSION, AND SILTATION CONTROL	1	LS	$ 10,000.00	$ 10,000.00
2	MOBILIZATION	1	LS	$ 30,000.00	$ 30,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	CLEARING AND GRUBBING	0.5	AC	$ 2,500.00	$ 1,250.00
5	REMOVE EXISTING CHAIN-LINK FENCE	1,700	LF	$ 10.00	$ 17,000.00
6	INSTALL NEW CHAIN-LINK FENCE	1,800	LF	$ 20.00	$ 36,000.00
7	SURVEY 54.6 ACRES OF NEW EASEMENT FOR RPZ	1	LS	$ 15,000.00	$ 15,000.00
8	PURCHASE 4.1 ACRES OF LAND	4.1	AC	$ 85,000.00	$ 348,500.00
	ENVIRONMENTAL ASSESSMENT	1	LS	$ 250,000.00	$ 250,000.00

Subtotal	**$ 768,000.00**
Design Fee (20%)	**$ 153,600.00**
CM Fee (15%)	**$ 115,000.00**
Sponsor Admin (2%)	**$ 15,000.00**
Total	**$ 1,052,000.00**

16 Taxiway G and Interim Holding Bay

PHASE 1					
Item #	**DESCRIPTION**	**UNIT**	**QUANTITY**	**UNIT PRICE**	**AMOUNT**
	BASE BID				
1	MOBILIZATION	LS	1	$118,000.00	$118,000.00
2	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	LS	1	$20,000.00	$20,000.00
3	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SOLTATION CONTROL	LS	1	$15,000.00	$15,000.00
4	SAWCUT, REMOVE AND REPLACE AC PAVEMENT	SY	260	$150.00	$39,000.00
5	CLEAR AND GRUBB	AC	12.4	$1,000.00	$12,408.85
6	UNCLASSIFIED EXCAVATION	CY	5,260	$14.00	$73,640.00
7	6" P-208 CRUSHED AGGREGATE BASE COURSE	SY	21,660	$18.00	$389,880.00
8	3" P-401 ASPHALTIC CONCRETE SURFACE COURSE	SY	20,750	$26.25	$544,687.50
9	BITUMINOUS TACK COAT	SY	10	$1.00	$10.00
10	PAVEMENT MARKING (YELLOW REFLECTORIZED)	SF	2,630	$4.00	$10,520.00
11	INSTALL 24 INCH DIAMETER REINFORCED CONCRETE PIPE EXTENSION WITH SALVAGED END SECTION	LF	120	$250.00	$30,000.00
12	REMOVE AND SALVAGE EXISTING TAXIWAY EDGE LIGHT AND ISOLATION TRANSFORMER, DEMO BASE	EA	1	$300.00	$300.00
13	L-824, TYPE C, 1/C #8 AWG, 5KV CABLE	LF	110	$5.00	$550.00
14	2" CONDUIT IN PAVEMENT	LF	75	$50.00	$3,750.00
15	INSTALL NEW 6' CHAINLINK FENCE WITH 3 STRAND BARBED WIRE	LF	590	$20.32	$11,988.80
16	SAWCUT, REMOVE AND REPLACE AC PAVEMENT	SY	100	$150.00	$15,000.00
17	CLEAR AND GRUBB	AC	0.4	$1,000.00	$421.49
18	UNCLASSIFIED EXCAVATION	CY	570	$14.00	$7,980.00
19	6" P-208 CRUSHED AGGREGATE BASE COURSE	SY	2,350	$18.00	$42,300.00
20	3" P-401 ASPHALTIC CONCRETE SURFACE COURSE	SY	2,290	$26.25	$60,112.50
21	PAVEMENT MARKING (YELLOW REFLECTORIZED)	SF	410	$4.00	$1,640.00
22	REMOVE AND SALVAGE EXISTING TAXIWAY EDGE LIGHT AND ISOLATION TRANSFORMER, DEMO BASE	EA	7	$300.00	$2,100.00
23	INSTALL SALVAGED TAXIWAY EDGE LIGHT AND ISOLATION TRANSFORMER ON NEW L-867 BASE CAN	EA	7	$500.00	$3,500.00
24	NEW AIRFIELD GUIDANCE SIGN, ON NEW CONCRETE SIGN BASE	EA	1	$4,500.00	$4,500.00
25	L-824, TYPE C, 1/C #8 AWG, 5KV CABLE	LF	680	$5.00	$3,400.00
26	2" CONDUIT IN TURF	LF	590	$20.00	$11,800.00
				Total	**$1,422,489.14**
				Design Fee (15%)	**$213,373.37**
				Construction Admin. (10%)	**$142,250.00**
				Sponsor Administration (2%)	**$28,450.00**
				Sub-Total	**$1,806,562.51**

PHASE 2					
Item #	**DESCRIPTION**	**UNIT**	**QUANTITY**	**UNIT PRICE**	**AMOUNT**
27	MOBILIZATION	LS	1	$45,000.00	$45,000.00
28	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	LS	1	$10,000.00	$10,000.00
29	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	LS	1	$8,000.00	$8,000.00
30	SAWCUT, REMOVE AND REPLACE AC PAVEMENT	SY	140	$175.00	$24,500.00
31	CLEAR AND GRUBB	AC	3.5	$0.00	$0.00
32	UNCLASSIFIED EXCAVATION	CY	1,380	$17.00	$23,460.00
33	6" P-208 CRUSHED AGGREGATE BASE COURSE	SY	6,390	$21.00	$134,190.00
34	3" P-401 ASPHALTIC CONCRETE SURFACE COURSE	SY	6,070	$30.50	$185,135.00
35	BITUMINOUS TACK COAT	SY	10	$1.25	$12.50
36	PAVEMENT MARKING (YELLOW REFLECTORIZED)	SF	670	$5.00	$3,350.00
37	INSTALL NEW 6' CHAINLINK FENCE WITH 3 STRAND BARBED WIRE	LF	2,540	$20.00	$50,800.00
				Total	**$484,447.50**
				Design Fee (20%)	**$96,889.50**
				Construction Admin. (10%)	**$48,450.00**
				Sponsor Administration (2%)	**$9,690.00**
				Sub-Total	**$639,477.00**

PHASE 3					
Item #	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
38	MOBILIZATION	LS	1	$40,000.00	$40,000.00
39	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	LS	1	$10,000.00	$10,000.00
40	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	LS	1	$8,000.00	$8,000.00
41	SAWCUT, REMOVE AND REPLACE AC PAVEMENT	SY	120	$200.00	$24,000.00
42	CLEAR AND GRUBB	AC	2.4	$0.00	$0.00
43	UNCLASSIFIED EXCAVATION	CY	1,040	$19.00	$19,760.00
44	6" P-208 CRUSHED AGGREGATE BASE COURSE	SY	4,800	$24.00	$115,200.00
45	3" P-401 ASPHALTIC CONCRETE SURFACE COURSE	SY	4,580	$35.00	$160,300.00
46	BITUMINOUS TACK COAT	SY	10	$1.40	$14.00
47	PAVEMENT MARKING (YELLOW REFLECTORIZED)	SF	490	$5.50	$2,695.00
48	INSTALL NEW 6' CHAINLINK FENCE WITH 3 STRAND BARBED WIRE	LF	1,800	$20.00	$36,000.00
				Total	**$415,969.00**
				Design Fee(20%)	**$83,193.80**
				Construction Admin. (10%)	**$41,600.00**
				Sponsor Administration (2%)	**$8,320.00**
				Sub-Total	**$549,082.80**

Total	**$2,995,000.00**

19	Extend RW 5 by 2,100'; cover dry wash; include precision markings; construct B1 and partial TW B; relocate MALSR; relocate AWOS; include MIRL; relocate glideslope antenna, supp wind cone, and PAPI-4; Displace RW 23 threshold (remark runway)	approx 210,000 s

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	MOBILIZATION	1	LS	$450,000.00	$ 450,000.00
2	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$20,000.00	$ 20,000.00
3	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SOLTATION CONTROL	1	LS	$15,000.00	$ 15,000.00
4	SAWCUT, REMOVE AND REPLACE AC PAVEMENT	260	SY	$150.00	$ 39,000.00
5	CLEAR AND GRUBB	7.0	AC	$1,000.00	$ 7,000.00
6	UNCLASSIFIED EXCAVATION	8,900	CY	$14.00	$ 124,600.00
7	6" P-208 CRUSHED AGGREGATE BASE COURSE	5,900	CY	$14.00	$ 82,600.00
8	3" P-401 ASPHALTIC CONCRETE SURFACE COURSE	9,000	TN	$185.00	$ 1,665,000.00
9	BITUMINOUS TACK COAT	35,000	SY	$1.00	$ 35,000.00
10	PAVEMENT MARKING (YELLOW REFLECTORIZED)	1,250	SF	$4.00	$ 5,000.00
11	TEMPORARY PAVEMENT MARKING (WHITE, NON REFLECTORIZED)	26,000	SF	$4.00	$ 104,000.00
12	PAVEMENT MARKING (WHITE REFLECTORIZED)	26,000	SF	$5.00	$ 130,000.00
13	RELOCATE MALSR	1	LS	$100,000.00	$ 100,000.00
14	RELOCATE AWOS	1	LS	$100,000.00	$ 100,000.00
15	INSTALL MEDIUM INTENSITY RUNWAY LIGHTS	26	EA	$4,000.00	$ 104,000.00
16	RELOCATE GLIDESLOPE ANTENNA	1	LS	$100,000.00	$ 100,000.00
17	RELOCATE WINDCONE	2	LS	$100,000.00	$ 200,000.00
18	RELOCATE PAPI	2	LS	$150,000.00	$ 300,000.00
19	DISPLACE RW 23 THRESHOLD	1	LS	$200,000.00	$ 200,000.00
20	INSTALL TAXIWAY EDGE LIGHT AND ISOLATION TRANSFORMER	39	EA	$2,000.00	$ 78,000.00
21	L-824, TYPE C, 1/C #8 AWG, 5KV CABLE	10,500	LF	$5.00	$ 52,500.00
22	2" CONDUIT	10,500	LF	$50.00	$ 525,000.00
23	INSTALL NEW 6' CHAINLINK FENCE WITH 3 STRAND BARBED WIRE	800	LF	$20.32	$ 16,256.00

TOTAL		
	SUBTOTAL	**$ 4,452,956.00**
	Design Fee (10%)	**$ 445,295.60**
	CM Fee (15%)	**$ 668,000.00**
	Sponsor Admin (2%)	**$ 89,000.00**
	Total	**$ 5,655,000.00**

20	Relocate Taxiway B 400' from RW centerline; cover dry wash; remove existing Twy B and portion of apron; construct connectors B2, B3, B4, B6, B7; remove Twy E; include MITL and new signage, new no-taxi island	115,500 SF

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 250,000.00	$ 250,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	MILL	13000	SY	$ 5.00	$ 65,000.00
5	UNCLASSIFIED EXCAVATION	2750	CY	$ 14.00	$ 38,500.00
6	6" P-208 CRUSHED AGGREGATE BASE COURSE	2500	CY	$ 14.00	$ 35,000.00
7	3" P-401 ASPHALTIC CONCRETE SURFACE COURSE	2700	TN	$ 185.00	$ 499,500.00
8	EMULSIFIED ASPHALT TACK COAT	17000	SY	$ 1.00	$ 17,000.00
9	PAINTSTRIPING (YELLOW, REFLECTORIZED)	6200	SF	$ 3.00	$ 18,600.00
10	PAINTSTRIPING (GREEN, REFLECTORIZED)	12000	SF	$ 4.00	$ 48,000.00
11	NO. 8 AWG, 5 KV, L-824, TYPE C CABLE, INSTALLED IN CONDUIT	21000	LF	$ 10.00	$ 210,000.00
12	2-INCH DIA. PVC CONDUIT IN TURF	20000	LF	$ 50.00	$ 1,000,000.00
13	INSTALL NEW TAXIWAY EDGE LIGHTS ON NEW BASE WITH NEW BASE CAN	175	EA	$ 1,000.00	$ 175,000.00
14	INSTALL GUIDANCE SIGN ON NEW BASE WITH NEW BASE CAN	30	EA	$ 5,000.00	$ 150,000.00

TOTAL		
	SUBTOTAL	**$ 2,586,600.00**
	Design Fee (15%)	**$ 387,990.00**
	CM Fee (15%)	**$ 388,000.00**
	Sponsor Admin (2%)	**$ 52,000.00**
	Total	**$ 3,415,000.00**

21 Construct holding bays on TW B at each RW end

INCLUDE ACQUISI
60000 SF
60000 SF

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 85,000.00	$ 85,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	UNCLASSIFIED EXCAVATION	2700	CY	$ 14.00	$ 37,800.00
5	6" P-208 CRUSHED AGGREGATE BASE COURSE	2700	CY	$ 14.00	$ 37,800.00
6	3" P-401 ASPHALTIC CONCRETE SURFACE COURSE	1400	TN	$ 185.00	$ 259,000.00
7	EMULSIFIED ASPHALT TACK COAT	14500	SY	$ 1.00	$ 14,500.00
8	PAINTSTRIPING (YELLOW, REFLECTORIZED)	3000	SF	$ 3.00	$ 9,000.00
9	NO. 8 AWG, 5 KV, L-824, TYPE C CABLE, INSTALLED IN CONDUIT	4000	LF	$ 10.00	$ 40,000.00
10	2-INCH DIA. PVC CONDUIT IN TURF	4000	LF	$ 50.00	$ 200,000.00
11	INSTALL NEW TAXIWAY EDGE LIGHTS ON NEW BASE WITH NEW BASE CAN	20	EA	$ 1,000.00	$ 20,000.00
12	INSTALL GUIDANCE SIGN ON NEW BASE WITH NEW BASE CAN	5	EA	$ 5,000.00	$ 25,000.00

TOTAL	**SUBTOTAL**	**$ 808,100.00**
	Design Fee (20%)	**$ 161,620.00**
	CM Fee (15%)	**$ 121,000.00**
	Sponsor Admin (2%)	**$ 16,000.00**
	Total	**$ 1,107,000.00**

22 Construct access road extending from Airport Rd to planned hangar area north of Airport Rd; relocate secure access gate APPROX 10,500 S

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 16,000.00	$ 16,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	UNCLASSIFIED EXCAVATION	250	CY	$ 14.00	$ 3,500.00
5	4" P-208 CRUSHED AGGREGATE BASE COURSE	150	CY	$ 14.00	$ 2,100.00
6	3" P-401 ASPHALTIC CONCRETE SURFACE COURSE	240	TN	$ 185.00	$ 44,400.00
7	EMULSIFIED ASPHALT TACK COAT	1200	SY	$ 1.00	$ 1,200.00
7	REMOVE EXISTING CHAIN-LINK FENCE	60	LF	$ 10.00	$ 600.00
8	INSTALL NEW CHAIN-LINK FENCE	75	LF	$ 20.00	$ 1,500.00
9	INSTALL NEW SECURE ACCESS GATE	1	EA	$ 5,000.00	$ 5,000.00

TOTAL		
	SUBTOTAL	**$ 154,300.00**
	Design Fee (20%)	**$ 30,860.00**
	CM Fee (15%)	**$ 23,000.00**
	Sponsor Admin (2%)	**$ 3,000.00**
	Total	**$ 211,000.00**

23 CONSTRUCT APRON PAVEMENT NORTH OF AIRPORT RD 25000 SF OF NEW

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 24,000.00	$ 24,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	UNCLASSIFIED EXCAVATION	730	CY	$ 14.00	$ 10,220.00
5	6" P-208 CRUSHED AGGREGATE BASE COURSE	550	CY	$ 14.00	$ 7,700.00
6	3" P-401 ASPHALTIC CONCRETE SURFACE COURSE	580	TN	$ 185.00	$ 107,300.00
7	EMULSIFIED ASPHALT TACK COAT	3000	SY	$ 1.00	$ 3,000.00
8	PAINTSTRIPING (YELLOW, REFLECTORIZED)	300	SF	$ 3.00	$ 900.00

TOTAL		
	SUBTOTAL	**$ 233,120.00**
	Design Fee (20%)	**$ 46,624.00**
	CM Fee (15%)	**$ 35,000.00**
	Sponsor Admin (2%)	**$ 5,000.00**
	Total	**$ 320,000.00**

24 Terminal building expansion (8,800 sf) $600/sf

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 500,000.00	$ 500,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	TERMINAL BUILDING EXPANSION	8800	SF	$ 600.00	$ 5,280,000.00

TOTAL		
	SUBTOTAL	**$ 5,860,000.00**
	Design Fee (10%)	**$ 586,000.00**
	CM Fee (15%)	**$ 879,000.00**
	Sponsor Admin (2%)	**$ 117,000.00**
	Total	**$ 7,440,000.00**

CONSTRUCT NEW TAXILANE AND APRON PAVEMENT 10500 SF

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	COMPLIANCE WITH POLLUTION, EROSION, AND SILTATION CONTROL	1	LS	$ 10,000.00	$ 10,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 23,000.00	$ 23,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 25,000.00	$ 25,000.00
5	CLEARING AND GRUBBING	0.3	AC	$ 2,400.00	$ 600.00
6	UNCLASSIFIED EXCAVATION	250	CY	$ 14.00	$ 3,500.00
7	7" THICK CRUSHED AGGREGATE BASE COURSE	250	CY	$ 120.00	$ 30,000.00
8	4" THICK ASPHALT SURFACE COURSE, GRADATION 2	500	TN	$ 175.00	$ 87,500.00
9	EMULSIFIED ASPHALT PRIME COAT	1,300	SY	$ 2.00	$ 2,600.00
10	EMULSIFIED ASPHALT TACK COAT	1,300	SY	$ 2.00	$ 2,600.00
11	PAINTSTRIPING (YELLOW, REFLECTORIZED)	400	SF	$ 7.00	$ 2,800.00

TOTAL		
	SUBTOTAL	**$ 188,000.00**
	Design Fee (15%)	**$ 28,200.00**
	CM Fee (15%)	**$ 28,000.00**
	Sponsor Admin (2%)	**$ 4,000.00**
	Total	**$ 248,000.00**

26 CONSTRUCT ACCESS ROADS EXTENDING FROM AIRPORT RD TO PLANNED HANGAR AREA SOUTH OF AIRPORT RD/ WEST OF PIPER AVE APPROX 18,135SF

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 20,000.00	$ 20,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	UNCLASSIFIED EXCAVATION	450	CY	$ 14.00	$ 6,300.00
5	4" P-208 CRUSHED AGGREGATE BASE COURSE	250	CY	$ 14.00	$ 3,500.00
6	3" P-401 ASPHALTIC CONCRETE SURFACE COURSE	420	TN	$ 185.00	$ 77,700.00
7	EMULSIFIED ASPHALT TACK COAT	2200	SY	$ 1.00	$ 2,200.00
8	PAINTSTRIPING (YELLOW, REFLECTORIZED)	300	SF	$ 3.00	$ 900.00

TOTAL		
	SUBTOTAL	**$ 190,600.00**
	Design Fee(20%)	**$ 38,120.00**
	CM Fee (15%)	**$ 29,000.00**
	Sponsor Admin (2%)	**$ 4,000.00**
	Total	**$ 262,000.00**

27 Construct apron to support executive hangars west of Piper Ave — approx 56,000 sf

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 36,000.00	$ 36,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	UNCLASSIFIED EXCAVATION	1870	CY	$ 14.00	$ 26,180.00
5	6" P-208 CRUSHED AGGREGATE BASE COURSE	1250	CY	$ 14.00	$ 17,500.00
6	4" P-401 ASPHALTIC CONCRETE SURFACE COURSE	1710	TN	$ 185.00	$ 316,350.00
7	EMULSIFIED ASPHALT TACK COAT	6500	SY	$ 1.00	$ 6,500.00
8	PAINTSTRIPING (YELLOW, REFLECTORIZED)	400	SF	$ 3.00	$ 1,200.00

TOTAL		
	SUBTOTAL	**$ 483,730.00**
	Design Fee (20%)	**$ 96,746.00**
	CM Fee (15%)	**$ 73,000.00**
	Sponsor Admin (2%)	**$ 10,000.00**
	Total	**$ 663,000.00**

28 EXTEND UTILITIES TO NORTH SIDE

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 138,000.00	$ 138,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	UNCLASSIFIED EXCAVATION	4500	CY	$ 14.00	$ 63,000.00
5	MILL 1" DEPTH ON RUNWAY	32000	SY	$ 5.00	$ 160,000.00
6	8" SEWER	6400	LF	$ 55.00	$ 352,000.00
7	SANITARY SEWER MANHOLE	9	EA	$ 10,000.00	$ 90,000.00
8	8" WATER	6400	LF	$ 60.00	$ 384,000.00
9	2" DRY UTILITY	6400	LF	$ 9.00	$ 57,600.00

TOTAL		
	SUBTOTAL	**$ 1,324,600.00**
	Design Fee (15%)	**$ 198,690.00**
	CM Fee (15%)	**$ 199,000.00**
	Sponsor Admin (2%)	**$ 26,000.00**
	Total	**$ 1,748,000.00**

29 Construct access road/parking to north side development approx 263,700 sf of new

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 130,000.00	$ 130,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	UNCLASSIFIED EXCAVATION	5860	CY	$ 14.00	$ 82,040.00
5	4" P-208 CRUSHED AGGREGATE BASE COURSE	3900	CY	$ 14.00	$ 54,600.00
6	3" P-401 ASPHALTIC CONCRETE SURFACE COURSE	6000	TN	$ 185.00	$ 1,110,000.00
7	PAINTSTRIPING (YELLOW, REFLECTORIZED)	1350	SF	$ 3.00	$ 4,050.00

TOTAL		
	SUBTOTAL	**$ 1,460,690.00**
	Design Fee (15%)	**$ 219,103.50**
	CM Fee (15%)	**$ 219,000.00**
	Sponsor Admin (2%)	**$ 29,000.00**
	Total	**$ 1,928,000.00**

30	Construct north side apron; add marked parking for fixed wing aircraft and helicopters; mark with no taxi islands at entrances to A3 and A4	approx 904,100 sf of new

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 500,000.00	$ 500,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	UNCLASSIFIED EXCAVATION	30150	CY	$ 14.00	$ 422,100.00
5	6" P-208 CRUSHED AGGREGATE BASE COURSE	20100	CY	$ 14.00	$ 281,400.00
6	4" P-401 ASPHALTIC CONCRETE SURFACE COURSE	27600	TN	$ 185.00	$ 5,106,000.00
7	EMULSIFIED ASPHALT TACK COAT	100000	SY	$ 1.00	$ 100,000.00
8	PAINTSTRIPING (YELLOW, REFLECTORIZED)	2000	SF	$ 3.00	$ 6,000.00
9	PAINTSTRIPING (WHITE, REFLECTORIZED)	2500	SF	$ 3.00	$ 7,500.00
10	PAINTSTRIPING (GREEN, REFLECTORIZED)	6800	SF	$ 4.00	$ 27,200.00
11	APRON LIGHTING	1	LS	$ 100,000.00	$ 100,000.00

TOTAL	**SUBTOTAL**	**$ 6,630,200.00**
	Design Fee (10%)	**$ 663,020.00**
	CM Fee (15%)	**$ 995,000.00**
	Sponsor Admin (2%)	**$ 133,000.00**
	Total	**$ 8,421,000.00**

31 Construct TW A and connectors A1, A2, A3, A4, A5; include MITL

APPROX 318,500 SF NEW

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 400,000.00	$ 400,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	MILL	13000	SY	$ 5.00	$ 65,000.00
6	CLEARING AND GRUBBING	7.30	AC	$ 2,500.00	$ 18,250.00
5	UNCLASSIFIED EXCAVATION	10600	CY	$ 14.00	$ 148,400.00
6	6" P-208 CRUSHED AGGREGATE BASE COURSE	7000	CY	$ 14.00	$ 98,000.00
7	3" P-401 ASPHALTIC CONCRETE SURFACE COURSE	9800	TN	$ 185.00	$ 1,813,000.00
8	EMULSIFIED ASPHALT TACK COAT	38000	SY	$ 1.00	$ 38,000.00
9	PAINTSTRIPING (YELLOW, REFLECTORIZED)	9060	SF	$ 3.00	$ 27,180.00
10	NO. 8 AWG, 5 KV, L-824, TYPE C CABLE, INSTALLED IN CONDUIT	17500	LF	$ 10.00	$ 175,000.00
11	2-INCH DIA. PVC CONDUIT IN TURF	15000	LF	$ 50.00	$ 750,000.00
12	INSTALL NEW TAXIWAY EDGE LIGHTS ON NEW BASE WITH NEW BASE CAN	166	EA	$ 1,000.00	$ 166,000.00
13	INSTALL GUIDANCE SIGN ON NEW BASE WITH NEW BASE CAN	25	EA	$ 5,000.00	$ 125,000.00

TOTAL		
	SUBTOTAL	**$ 3,903,830.00**
	Design Fee (10%)	**$ 390,383.00**
	CM Fee (15%)	**$ 586,000.00**
	Sponsor Admin (2%)	**$ 78,000.00**
	Total	**$ 4,958,000.00**

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 180,000.00	$ 180,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	SECONDARY FUEL FARM	1	LS	$ 1,500,000.00	$ 1,500,000.00

TOTAL		
	SUBTOTAL	**$ 1,760,000.00**
	Design Fee (15%)	**$ 264,000.00**
	CM Fee (15%)	**$ 264,000.00**
	Sponsor Admin (2%)	**$ 35,000.00**
	Total	**$ 2,323,000.00**

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL	1	LS	$ 20,000.00	$ 20,000.00
2	MOBILIZATION (10% MAXIMUM)	1	LS	$ 18,000.00	$ 18,000.00
3	SAFETY, SECURITY AND MAINTENANCE OF TRAFFIC	1	LS	$ 60,000.00	$ 60,000.00
4	CONSTRUCT AIRCRAFT WASH RACK	1	LS	$ 250,000.00	$ 250,000.00

TOTAL		
	SUBTOTAL	**$ 348,000.00**
	Design Fee (20%)	**$ 69,600.00**
	CM Fee (15%)	**$ 52,000.00**
	Sponsor Admin (2%)	**$ 7,000.00**
	Total	**$ 477,000.00**

City of
Casa Grande
AIRPORT MASTER PLAN

Appendix D
Airport Layout Plans

U.S. Department
of Transportation
Federal Aviation Administration

Western Pacific Region
Office of Airports
Phoenix Airports District Office

3800 N. Central Ave.
Suite 1025 10th Floor
Phoenix, AZ 85012

December 18, 2023

David Reffner
Airport Manager
City of Casa Grande
Casa Grande Municipal Airport
3225 N Lear Avenue
Casa Grande, AZ 85122

Dear Mr. Reffner:

The Casa Grande Municipal Airport (CGZ), Airport Layout Plan (ALP), prepared by Coffman Associates and bearing your signature, is approved. A signed copy of the FAA approved ALP is enclosed.

An aeronautical study (no. 2023-AWP-5806-NRA) was conducted on the proposed development. This determination does not constitute FAA approval or disapproval of the physical development involved in the proposal. It is a determination with respect to the safe and efficient use of navigable airspace by aircraft and with respect to the safety of persons and property on the ground.

In making this determination, the FAA has considered matters such as the effects the proposal would have on existing or planned traffic patterns of neighboring airports, the effects it would have on the existing airspace structure and projected programs of the FAA, the effects it would have on the safety of persons and property on the ground, the effects that existing or proposed manmade objects (on file with the FAA), and known natural objects within the affected area would have on the airport proposal.

This ALP approval is conditioned on acknowledgement that any development on airport property requiring Federal environmental approval must receive such written approval from FAA prior to commencement of the subject development. This ALP approval is also conditioned on acceptance of the plan under local land use laws. We encourage appropriate agencies to adopt land use and height restrictive zoning based on the plan.

Approval of the plan does not indicate that the United States will participate in the cost of any development proposed. AIP funding requires evidence of eligibility and justification at the time a funding request is ripe for consideration. When construction of any proposed structure or development indicated on the plan is undertaken, such construction requires normal 45-day advance notification to FAA for review in accordance with applicable Federal Aviation Regulations (i.e., Parts 77, 157, 152, etc.). More notice is generally beneficial to ensure that all statutory, regulatory, technical and operational issues can be addressed in a timely manner.

This ALP approval is conditioned on acknowledgement that any development on airport property requiring Federal environmental approval must receive such written approval from FAA prior to commencement of the subject development. This ALP approval is also conditioned on acceptance of the plan under local land use laws. We encourage appropriate agencies to adopt land use and height restrictive zoning based on the plan.

The FAA Reauthorization Act of 2018, section 163(d), has limited the FAA's review and approval authority for ALPs. The Act limits the FAA's authority to those portions of the ALP that:

- Materially impact the safe and efficient operation of aircraft at, to, or from the airport;
- Adversely affect the safety of people or property on the ground adjacent to the airport as a result of aircraft operations; or
- Adversely affect the value of prior Federal investments to a significant extent.

FAA's approval of this ALP is limited to existing facilities only (or those specific areas that FAA retains approval authority). The FAA has not made a determination on whether or not it retains review and approval authority for any proposed facilities depicted on the ALP associated with this letter. Under Title 49 U.S.C. § 47107(a)(16) (as revised per section 163(d) of Pub.L. 115-254), FAA will separately determine whether it retains approval authority for each individual proposed facility depicted on an ALP before construction occurs.

Although section 163(d) has limited the FAA's review and approval authority of proposed projects depicted on an ALP, airport sponsors must continue to maintain an up-to-date ALP in accordance with Federal law, 49 U.S.C. § 47107(a)(16).

Please attach this letter to the ALP and retain it in the airport. We wish you great success in your plans for the development of the airport. If we can be of further assistance, please do not hesitate to call Mr. Kyler Erhard, Assistant Manager, at 602-792-1073.

Sincerely,

MICHAEL N WILLIAMS

Digitally signed by MICHAEL N WILLIAMS
Date: 2023.12.18 09:44:23 -07'00'

Mike N. Williams
Manager,
Phoenix Airports District Office

Attachment: Updated Airport Layout Plan

AIRPORT LAYOUT PLAN

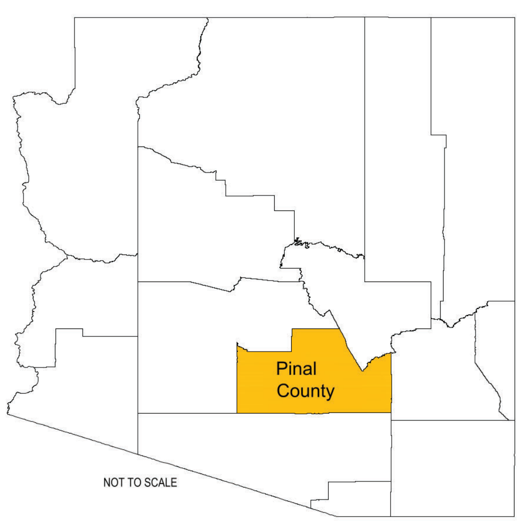
for the

CASA GRANDE MUNICIPAL AIRPORT

City of
Casa Grande

Prepared for
the City of CASA GRANDE, ARIZONA

LOCATION MAP



COUNTY MAP

DRAWING INDEX

1. TITLE SHEET
2. AIRPORT DATA SHEET
3. AIRPORT LAYOUT PLAN DRAWING
4. AIRPORT AIRSPACE DRAWING I
5. AIRPORT AIRSPACE DRAWING II
6. AIRPORT AIRSPACE PROFILE RUNWAY 5-23
7. AIRPORT AIRSPACE PROFILE RUNWAY 5 FAN
8. INNER PORTION OF THE APPROACH SURFACE DRAWING RUNWAY 5
9. INNER PORTION OF THE APPROACH SURFACE DRAWING RUNWAY 23
10. RUNWAY DEPARTURE SURFACE DRAWING
11. SOUTH TERMINAL AREA DRAWING
12. NORTH TERMINAL AREA DRAWING
13. AIRPORT LAND USE DRAWING
14. EXHIBIT "A" AIRPORT PROPERTY INVENTORY MAP

VICINITY MAP

NO.	REVISIONS	DATE	BY	APP'D.

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

CASA GRANDE MUNICIPAL AIRPORT

TITLE SHEET

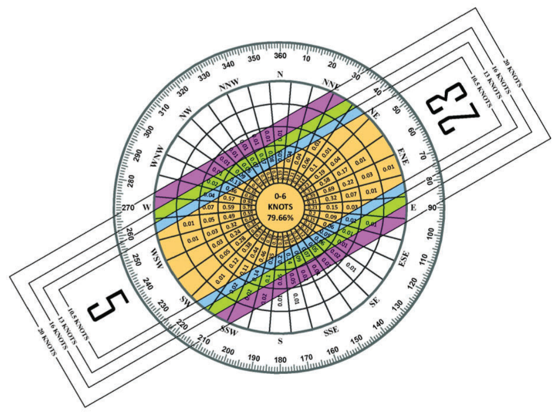
CASA GRANDE, ARIZONA

PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

July 2023 | SHEET 1 OF 14

Coffman Associates
Airport Consultants
www.coffmanassociates.com

ALL WEATHER WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 5-23	97.67%	98.90%	99.67%	99.92%



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Casa Grande Municipal Airport
Casa Grande, AZ

OBSERVATIONS:
175,020 All Weather Observations
Jan. 1, 2011 - Dec, 31 2020

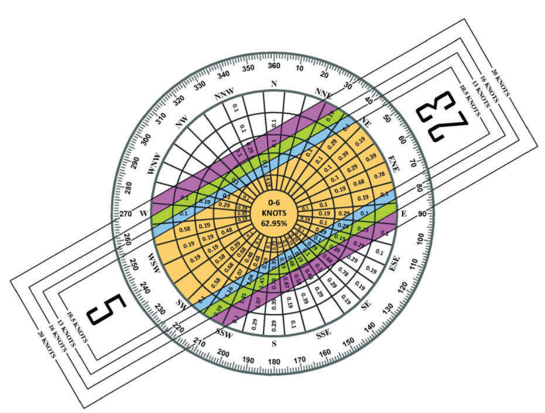
RUNWAY DATA TABLE		RUNWAY 5/23			
		EXISTING		ULTIMATE	
Runway Identification		5	23	5	23
Runway Design Code (RDC)		B-II-2400		C-II-2400	
Approach Reference Code (APRC)		B/II/2400	B/III/4000 & D/II/4000	B/IV/2400	D/IV/4000
Departure Reference Code (DPRC)		B/III & D/II		D/IV & D/V	
Runway Surface Material		ASPHALT		Same	
Runway Pavement Strength By Wheel Loading (in thousands of lbs.)		18.5(S)/65(D)		Same	
Runway Pavement Strength by PCN		2/F/D/Y/T		Same	
Runway Surface Treatment		NONE		Same	
Runway Effective Gradient		0.33%		0.37%	
Runway Percent Wind Coverage	10.5 knots	97.67%		Same	
	13 knots	98.90%		Same	
	16 knots	99.67%		Same	
	20 knots	99.92%		Same	
Runway Dimensions (L x W)		5,200' x 100'		7,300' x 100'	
Runway End Coordinates	Latitude	32° 57' 4.737" N	32° 57' 30.527" N	32° 56' 52.204" N	32° 57' 28.414" N
	Longitude	111° 46' 26.951" W	111° 45' 34.151" W	111° 46' 52.600" W	111° 45' 38.477" W
Runway End Elevation		1,447.20' msl	1,464.37' msl	1,437.00' msl	1,463.84' msl
Runway Displaced Threshold Coordinates	Latitude	N/A	N/A	Same	Same
	Longitude	N/A	N/A	Same	Same
Runway Displaced Threshold Distance		N/A	N/A	Same	Same
Runway Displaced Threshold Elevation		N/A	N/A	Same	Same
Runway Safety Area Dimensions (width x length beyond end) - Design Std.		300' x 600'		500' x 1,000'	
Runway Safety Area Dimensions (width x length beyond end) - Actual		300' x 600'		500' x 1,000'	500' x 1,000'
Runway Lighting Type		MIRL		Same	
Runway Protection Zone Dimensions		2,500' x 1,000' x 1,750'	1,000' x 500' x 700'	Same	500' x 1,700' x 1,010'
Runway Marking Type		Precision	Non-Precision	Same	Same
14 CFR Part 77 Approach Slope		50:1/40:1	34:1	Same	Same
14 CFR Part 77 Approach Type		PIR	NPC	Same	Same
Approach Visibility Minimums		1/2 MILE	1 MILE	Same	Same
Type of Aeronautical Survey Required for Approach		VG	NVG	Same	Same
Departure Surface (Yes or N/A)		Yes	Yes	Same	Same
Runway Object Free Area Dimensions (width x length beyond end)		600' x 800'		800' x 1,000'	800' x 1,000'
Runway Obstacle Free Zone Dimension (width x length beyond end)		400' x 200'		Same	
13B Approach Surfaces*		5,6	4	Same	Same
Runway Visual and Instrument Navaids		PAPI-2, VOR, ILS (5), GPS, MALSR (5) RNAV (5,23)		PAPI-4, VOR, ILS (5), GPS, REILs (23), MALSR (5) LPV (23), RNAV (5,23)	
Touchdown Zone Elevation (TDZE)		1,458.38' msl	1,464.37' msl	1,450.05' msl	1,461.64' msl
Vertical Datum		NAVD88			
Horizontal Datum		NAD83			

*Tables 3-2, 3-3, & 3-4 in AC 150/5300-13B

AIRPORT DATA			
City: CASA GRANDE		County: PINAL	Owner: CASA GRANDE
Airport Name & ID: Casa Grande Muni. (KCGZ)		EXISTING	ULTIMATE
Airport Reference Code (ARC)		B-II	C-II
Mean Maximum Temperature of Hottest Month		107.1° (July)	Same
Airport Elevation (NAVD 88)		1,464.37' msl	1463.84 msl
Airport Navigational Aids		Rotating Beacon, PAPI-2, ILS(5), MALSR(5), RNAV (5,23), VOR	Rotating Beacon, PAPI-4, ILS(5), MALSR(5), LPV (23), VOR, REILs (23)
Airport Reference Point (ARP) Coordinates	Latitude	32° 57' 17.632" N	32° 57' 10.311" N
	Longitude	111° 46' 0.551" W	111° 46' 11.541" W
Miscellaneous Facilities		AWOS-III, Segmented Circle, Lighted Wind Cone	Same
Design Critical Aircraft		King Air 200/300/350	Challenger 600/604
Wingspan of Design Aircraft (Feet)		53	64
Approach Speed of Design Aircraft (Knots)		107	125
Undercarriage Width of Design Aircraft (Feet)		15'	13'
Magnetic Declination (Degrees)		9° 45' E	
Declination Date		May 5 2022	
Declination Source		NOAA	
NPIAS Code		General Aviation	Same
State System Plan Role		GA Local	SAME

RUNWAY DECLARED DISTANCE	EXISTING		ULTIMATE	
	5	23	5	23
Takeoff Run Available (TORA)	5,200'	5,200'	7,300'	7,300'
Takeoff Distance Available (TODA)	5,200'	5,200'	7,300'	7,300'
Accelerate-Stop Distance Available (ASDA)	5,200'	5,200'	7,300'	7,300'
Landing Distance Available (LDA)	5,200'	5,200'	7,300'	7,300'

IFR WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 5-23	78.45%	83.03%	88.42%	94.44%



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Casa Grande Municipal Airport
Casa Grande, AZ

OBSERVATIONS:
1,031 IFR Observations
Jan. 1, 2011 - Dec, 31 2020

Taxiway Data Table						
Existing/Ultimate Taxiway/Taxilane Designation	Width	Taxiway/Taxilane Safety Area Dimension	Taxiway Object Free Area	Taxilane Object Free Area	Taxiway/Taxilane Lighting	Taxiway & Taxilane Separation[1]
A	40'	79'	124'	124'	MITL	55'
B	40'	79'	124'	124'	MITL	55'
C	40'	79'	124'	124'	MITL	55'
D/B6	40'	79'	124'	124'	MITL	55'
E	30'	79'	124'	124'	MITL	55'
F/B3	40'	79'	124'	124'	MITL	55'
A	35'	79'	124'	124'	MITL	55'
A1	35'	79'	124'	124'	MITL	55'
A2	35'	79'	124'	124'	MITL	55'
A3	35'	79'	124'	124'	MITL	55'
A4	35'	79'	124'	124'	MITL	55'
A5	35'	79'	124'	124'	MITL	55'
A6	35'	79'	124'	124'	MITL	55'
B	35'	79'	124'	124'	MITL	55'
B1	35'	79'	124'	124'	MITL	55'
B2	35'	79'	124'	124'	MITL	55'
B4	35'	79'	124'	124'	MITL	55'
B5	35'	79'	124'	124'	MITL	55'
B7	35'	79'	124'	124'	MITL	55'
B8	35'	79'	124'	124'	MITL	55'
G	35'	79'	124'	124'	MITL	55'

[1] Objects located inside the TSA & TOFA/Distance from object to taxiway/taxilane centerline. See paragraph 404a. & Table 4-1 in AC 150/5300-13B

MODIFICATIONS TO STANDARDS APPROVAL TABLE			
APPROVAL DATE	AIRSPACE CASE NUMBER	STANDARD MODIFIED	DESCRIPTION
None Required			

NAVAID Ownership	
NAVAID	Owner
Airport Beacon	FAA
MALSR	FAA
Localizer	FAA
Glideslope	FAA
AWOS	FAA
Lighted Wind Cones	CGZ
PAPI-2	CGZ

NO.	REVISIONS	DATE	BY	APP'D.

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

CASA GRANDE MUNICIPAL AIRPORT

AIRPORT DATA SHEET

CASA GRANDE, ARIZONA

PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

July 2023

Coffman Associates
Airport Consultants
www.coffmanassociates.com

ULTIMATE AIRPORT FACILITIES

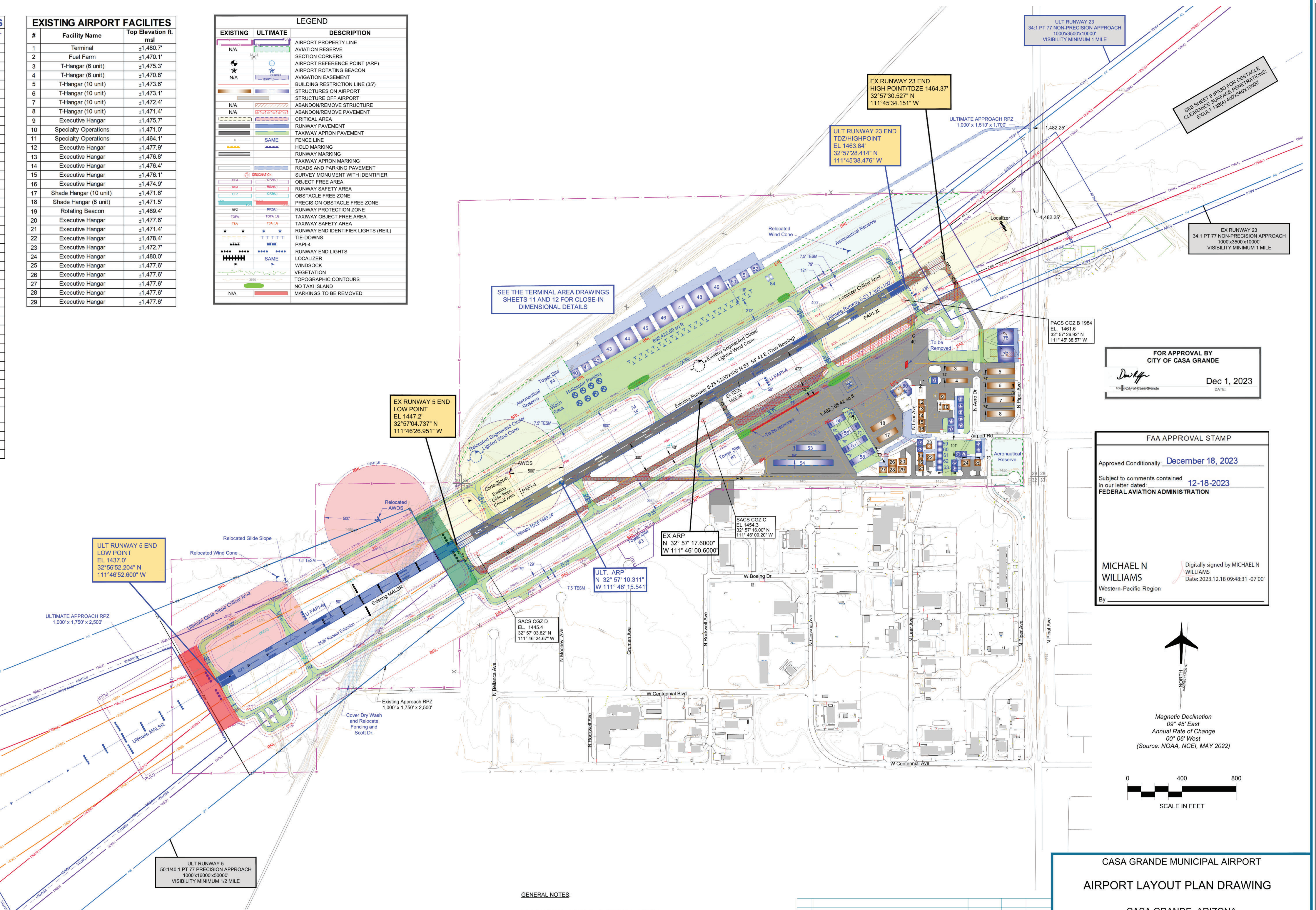
#	Facility Name	Top Elevation ft. msl*
40	75'x75' Executive Hangar	±1482'
41	75'x75' Executive Hangar	±1482'
42	75'x75' Executive Hangar	±1482'
43	150'x150' Conventional Hangar	±1482'
44	150'x150' Conventional Hangar	±1482'
45	150'x150' Conventional Hangar	±1482'
46	150'x150' Conventional Hangar	±1482'
47	150'x150' Conventional Hangar	±1482'
48	150'x150' Conventional Hangar	±1482'
49	150'x150' Conventional Hangar	±1482'
50	75'x75' Executive Hangar	±1482'
51	75'x75' Executive Hangar	±1482'
52	75'x75' Executive Hangar	±1482'
53	10 unit T-Hangar	±1482'
54	24 unit T-Hangar	±1482'
55	10 unit Shade Hangars	±1482'
56	10 unit Shade Hangars	±1482'
57	10 unit Shade Hangars	±1482'
58	10 unit Shade Hangars	±1482'
59	55'x55' Executive Hangar	±1477'
60	55'x55' Executive Hangar	±1477'
61	55'x55' Executive Hangar	±1477'
62	55'x55' Executive Hangar	±1477'
63	55'x55' Executive Hangar	±1477'
64	55'x55' Executive Hangar	±1477'
65	55'x55' Executive Hangar	±1477'
66	55'x55' Executive Hangar	±1477'
67	55'x55' Executive Hangar	±1477'
68	55'x55' Executive Hangar	±1477'
69	55'x55' Executive Hangar	±1477'
70	60'x60' Executive Hangar	±1477'
71	60'x60' Executive Hangar	±1477'
72	60'x60' Executive Hangar	±1477'
73	60'x60' Executive Hangar	±1477'
74	60'x60' Executive Hangar	±1477'
75	60'x60' Executive Hangar	±1477'
76	60'x60' Executive Hangar	±1477'
77	150'x150' Conventional Hangar	±1482'
78	150'x150' Conventional Hangar	±1482'
79	Aircraft Wash Rack	±1456'
80	Terminal Expansion/Rotating Beacon	±1480'
81	Airport Operation	±1477'
82	55'x55' Executive Hangar	±1477'
83	55'x55' Executive Hangar	±1477'
84	Fuel Farm	±1476'

EXISTING AIRPORT FACILITES

#	Facility Name	Top Elevation ft. msl
1	Terminal	±1,480.7'
2	Fuel Farm	±1,470.1'
3	T-Hangar (6 unit)	±1,475.3'
4	T-Hangar (6 unit)	±1,470.8'
5	T-Hangar (10 unit)	±1,473.6'
6	T-Hangar (10 unit)	±1,473.1'
7	T-Hangar (10 unit)	±1,472.4'
8	T-Hangar (10 unit)	±1,471.4'
9	Executive Hangar	±1,475.7'
10	Specialty Operations	±1,471.0'
11	Specialty Operations	±1,464.1'
12	Executive Hangar	±1,477.9'
13	Executive Hangar	±1,476.8'
14	Executive Hangar	±1,476.4'
15	Executive Hangar	±1,476.1'
16	Executive Hangar	±1,474.9'
17	Shade Hangar (10 unit)	±1,471.6'
18	Shade Hangar (8 unit)	±1,471.5'
19	Rotating Beacon	±1,469.4'
20	Executive Hangar	±1,477.6'
21	Executive Hangar	±1,471.4'
22	Executive Hangar	±1,478.4'
23	Executive Hangar	±1,472.7'
24	Executive Hangar	±1,480.0'
25	Executive Hangar	±1,477.6'
26	Executive Hangar	±1,477.6'
27	Executive Hangar	±1,477.6'
28	Executive Hangar	±1,477.6'
29	Executive Hangar	±1,477.6'

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
		AIRPORT PROPERTY LINE
N/A		AVIATION RESERVE
		SECTION CORNERS
		AIRPORT REFERENCE POINT (ARP)
		AIRPORT ROTATING BEACON
N/A		AVIGATION EASEMENT
		BUILDING RESTRICTION LINE (35')
		STRUCTURES ON AIRPORT
		STRUCTURE OFF AIRPORT
N/A		ABANDON/REMOVE STRUCTURE
N/A		ABANDON/REMOVE PAVEMENT
		CRITICAL AREA
		RUNWAY PAVEMENT
		TAXIWAY APRON PAVEMENT
	SAME	FENCE LINE
		HOLD MARKING
		RUNWAY MARKING
		TAXIWAY APRON MARKING
		ROADS AND PARKING PAVEMENT
DESIGNATION		SURVEY MONUMENT WITH IDENTIFIER
OFA	OFA(U)	OBJECT FREE AREA
RSA	RSA(U)	RUNWAY SAFETY AREA
OFZ	OFZ(U)	OBSTACLE FREE ZONE
POFZ	POFZ(U)	PRECISION OBSTACLE FREE ZONE
RPZ	RPZ(U)	RUNWAY PROTECTION ZONE
TOFA	TOFA (U)	TAXIWAY OBJECT FREE AREA
TSA	TSA (U)	TAXIWAY SAFETY AREA
		RUNWAY END IDENTIFIER LIGHTS (REIL)
		TIE-DOWNS
		PAPI-4
		RUNWAY END LIGHTS
	SAME	LOCALIZER
		WINDSOCK
		VEGETATION
3660		TOPOGRAPHIC CONTOURS
		NO TAXI ISLAND
N/A		MARKINGS TO BE REMOVED



NORTH

Magnetic Declination
09° 45' East
Annual Rate of Change
00° 06' West
(Source: NOAA, NCEI, MAY 2022)

0 400 800
SCALE IN FEET

GENERAL NOTES:

1. Horizontal Datum: NAD83 – Vertical Datum NAVD88.
2. Mapping data from Martinez Geospatial. Survey Date: 5/11/2022.
3. Perimeter fencing consists of 6' security fencing topped with 3-strand barbed wire.

NO.	REVISIONS	DATE	BY	APP'D.

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

CASA GRANDE MUNICIPAL AIRPORT

AIRPORT LAYOUT PLAN DRAWING

CASA GRANDE, ARIZONA

PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

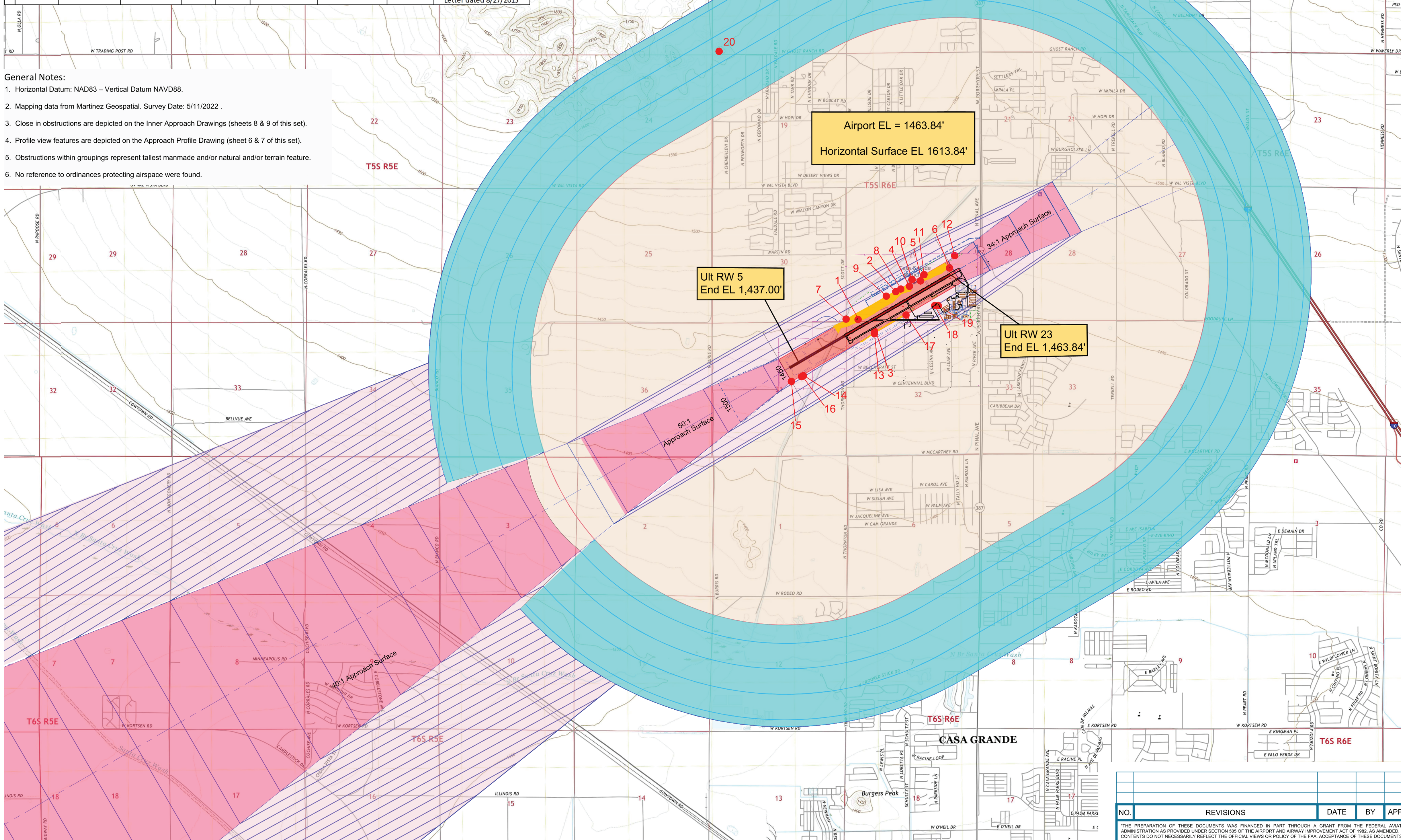
July 2023

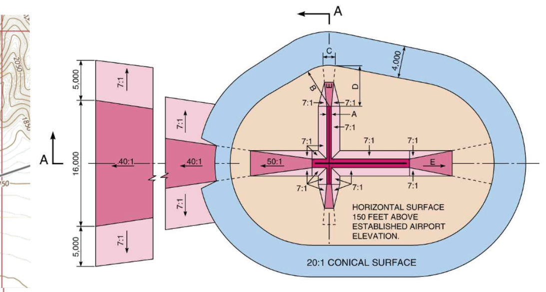
Coffman Associates
Airport Consultants
www.coffmanassociates.com

Runway 5 Approach Obstructions									
ID	Feature	Source	Ground Elevation (ft. msl.)	AGL (ft.)	Elevation (ft. msl.)	FAA Study #	Surface Obstructed	Penetration Value (ft.)	Remediation
1	Antenna	Martinez Analysis	1,451.71	34.30	1,486.01	N/A	Primary Surface	36.30	To Remain
2	Terrain	Martinez Analysis	1,457.73	0.00	1,457.73	N/A	Primary Surface	1.13	Re-Grade
3	Tree	Martinez Analysis	1,441.72	23.35	1,465.07	N/A	Primary Surface	14.22	Remove Tree
4	Tree	Martinez Analysis	1,459.05	14.57	1,473.62	N/A	Primary Surface	14.50	Remove Tree
5	Tree	Martinez Analysis	1,460.46	14.13	1,474.59	N/A	Primary Surface	13.34	Remove Tree
6	Utility Pole	Martinez Analysis	1,461.61	11.21	1,472.82	N/A	Primary Surface	8.92	To Remain
7	Fence	Martinez Survey	1,451.12	5.41	1,456.53	N/A	Transitional Surface	3.11	Relocate Fence
8	Terrain	Martinez Survey	1,458.15	0.00	1,458.15	N/A	Transitional Surface	1.74	Re-Grade
9	Tree	Martinez Survey	1,456.64	16.77	1,473.41	N/A	Transitional Surface	15.16	Remove Tree
10	Tree	Martinez Survey	1,460.38	15.90	1,476.28	N/A	Transitional Surface	3.75	Remove Tree
11	Tree	Martinez Survey	1,460.86	15.27	1,476.13	N/A	Transitional Surface	15.19	Remove Tree
12	Tree	Martinez Survey	1,463.84	17.52	1,481.36	N/A	Transitional Surface	6.93	Remove Tree
13	Tree	Martinez Survey	1,441.71	20.23	1,461.94	N/A	Transitional Surface	10.30	Remove Tree
14	Tree	Martinez Survey	1,433.14	11.05	1,444.19	N/A	Transitional Surface	0.07	Remove Tree
15	Tree	Martinez Survey	1,430.65	12.12	1,442.77	N/A	Transitional Surface	5.15	Remove Tree
16	Tree	Martinez Survey	1,431.48	12.13	1,443.61	N/A	Transitional Surface	0.81	Remove Tree
17	Tree	Martinez Survey	1,451.68	7.59	1,459.27	N/A	Transitional Surface	3.47	Remove Tree
18	Utility Pole	Martinez Survey	1,455.92	51.88	1,507.80	N/A	Transitional Surface	13.01	Lower/Relocate
19	Utility Pole	Martinez Survey	1,455.25	55.75	1,511.00	N/A	Transitional Surface	6.62	Lower/Relocate
20	Tank	Martinez Survey	1,700.00	33.00	1,733.00	N/A	Conical Surface	12.10	Add Obstruction Lighting
21	Tower	Martinez Survey	1,531.00	257.00	1,788.00	2013-AWP-2383-OE	Conical Surface	15.88	None Required - See FAA Letter dated 8/27/2013

General Notes:

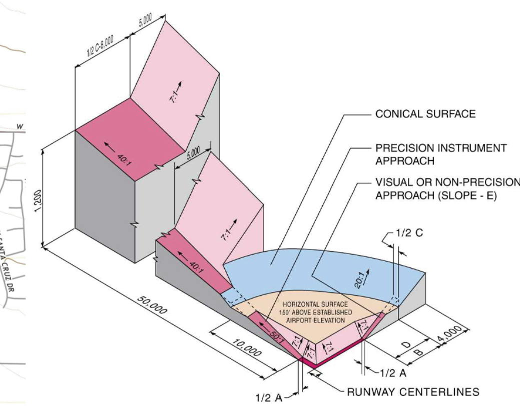
1. Horizontal Datum: NAD83 – Vertical Datum NAVD88.
2. Mapping data from Martinez Geospatial. Survey Date: 5/11/2022 .
3. Close in obstructions are depicted on the Inner Approach Drawings (sheets 8 & 9 of this set).
4. Profile view features are depicted on the Approach Profile Drawing (sheet 6 & 7 of this set).
5. Obstructions within groupings represent tallest manmade and/or natural and/or terrain feature.
6. No reference to ordinances protecting airspace were found.





DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B C	B D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		A	B	A	B C	B D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET



ISOMETRIC VIEW OF SECTION A-A

SOURCE: FAA Order JO 7400.2J, Figure 6-3-3

LEGEND

OBSTRUCTION IDENTIFIER

OBSTRUCTION AREA GROUPING

Magnetic Declination
09° 45' East
Annual Rate of Change
00° 06' West
(Source: NOAA, NCEI, MAY 2022)

0 2000 4000
SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.

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

CASA GRANDE MUNICIPAL AIRPORT

AIRPORT AIRSPACE DRAWING I

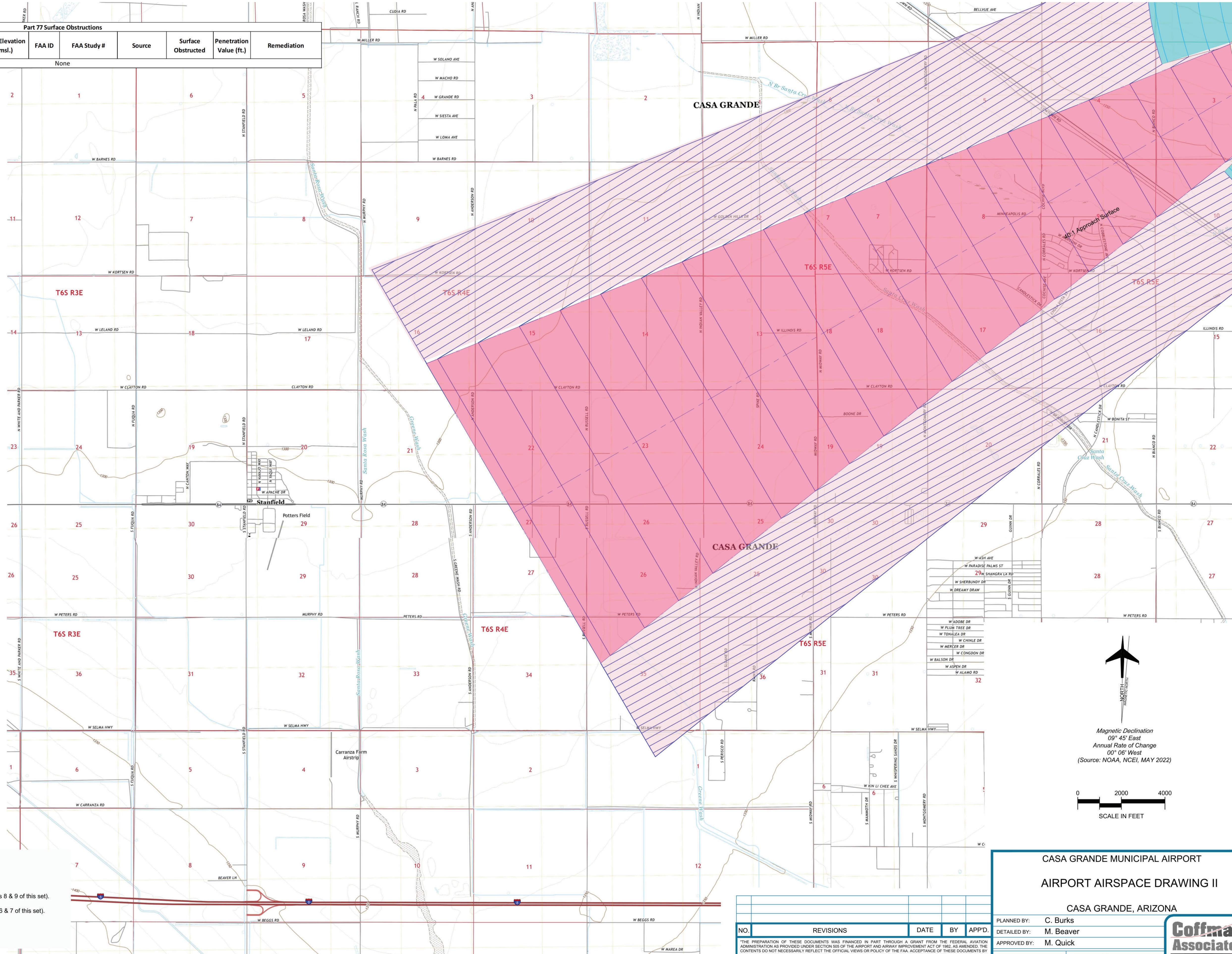
CASA GRANDE, ARIZONA

PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

July 2023 SHEET 4 OF 14

Coffman Associates
Airport Consultants
www.coffmanassociates.com

Part 77 Surface Obstructions											
ID	Raw Obstruction ID	Feature	Elevation (ft. msl.)	AGL (ft.)	Ground Elevation (ft. msl.)	FAA ID	FAA Study #	Source	Surface Obstructed	Penetration Value (ft.)	Remediation
None											



General Notes:

1. Horizontal Datum: NAD83 – Vertical Datum NAVD88.
2. Mapping data from Martinez Geospatial. Survey Date: 5/11/2022 .
3. Close in obstructions are depicted on the Inner Approach Drawings (sheets 8 & 9 of this set).
4. Profile view features are depicted on the Approach Profile Drawing (sheet 6 & 7 of this set).
5. No reference to ordinances protecting airspace were found.

NO.	REVISIONS	DATE	BY	APP'D.

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

CASA GRANDE MUNICIPAL AIRPORT

AIRPORT AIRSPACE DRAWING II

CASA GRANDE, ARIZONA

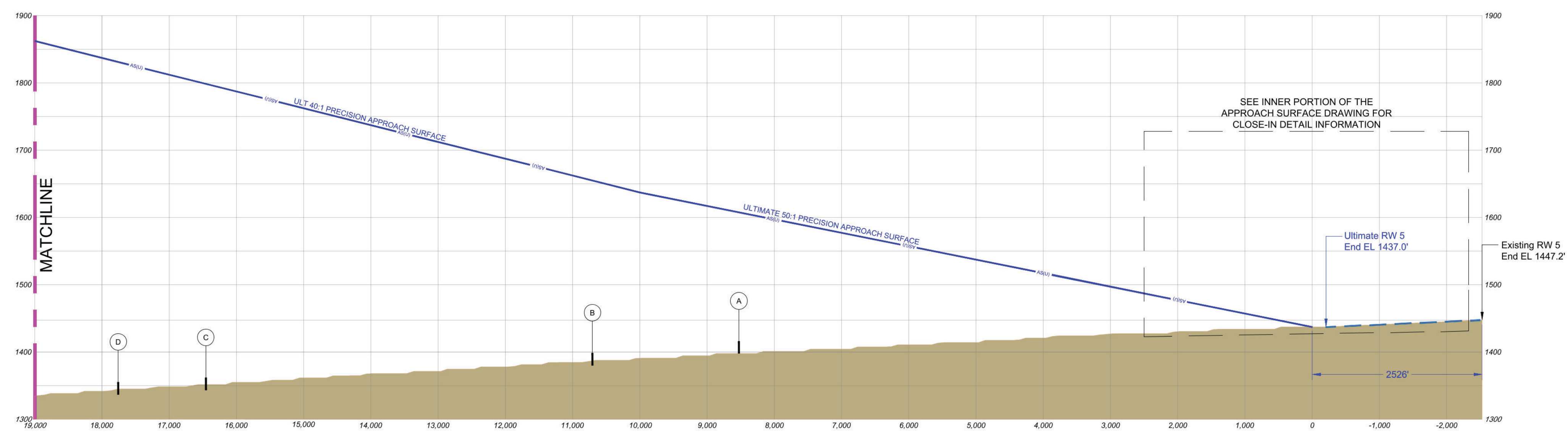
PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

July 2023 SHEET 5 OF 14

Coffman Associates
Airport Consultants
www.coffmanassociates.com

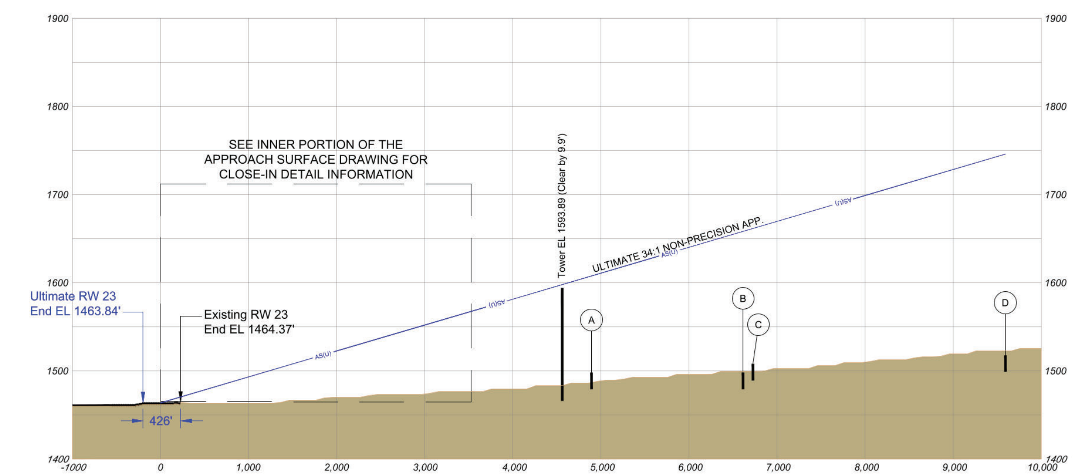
GENERAL NOTES :

1. HORIZONTAL DATUM: NAD83 – VERTICAL DATUM NAVD88.
2. MAPPING DATA FROM MARTINEZ GEOSPATIAL. SURVEY DATE: 5 /11/2022 .



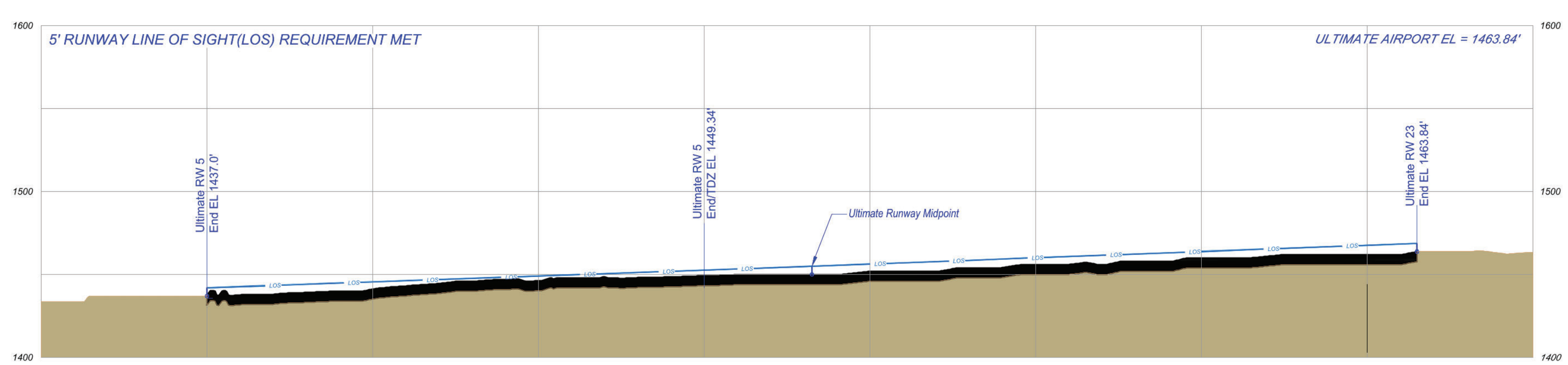
Runway 5 Approach Obstructions									
ID	Feature	Source	Ground Elevation (ft. msl.)	AGL (ft.)	Elevation (ft. msl.)	FAA Study #	Surface Obstructed	Penetration Value (ft.)	Remediation
No Obstructions									

Ultimate Runway 5 End Road Traverse Points					
ID	Feature	Ground Elevation (ft. msl.)	Adjustment Height (ft.)	Top Elevation (ft. msl.)	Clearance (ft.)
A	Ethington	1,400.92	15	1,415.92	199.58
B	Ethington	1,384.51	15	1,399.51	235.22
C	Ethington	1,364.83	15	1,379.83	286.66
D	Southern Pacific Railroad	1,371.39	23	1,394.39	355.99
E	Southern Pacific Railroad	1,348.43	23	1,371.43	417.42
F	Southern Pacific Railroad	1,338.58	23	1,361.58	446.93
G	Southern Pacific Railroad	1,332.02	23	1,355.02	486.73
H	Southern Pacific Railroad	1,341.86	23	1,364.86	514.68
I	Clayton	1,332.02	15	1,347.02	802.53
J	Midway	1,309.06	15	1,324.06	848.93
K	Midway	1,322.18	15	1,337.18	910.84
L	Midway	1,335.30	15	1,350.30	986.33
M	Indian Valley	1,305.77	15	1,320.77	991.30
N	Indian Valley	1,318.90	15	1,333.90	1,065.27
O	Indian Valley	1,332.02	15	1,347.02	1,159.04



Runway 23 Approach Obstructions									
ID	Feature	Source	Ground Elevation (ft. msl.)	AGL (ft.)	Elevation (ft. msl.)	FAA Study #	Surface Obstructed	Penetration Value (ft.)	Remediation
No Obstructions									

Runway 23 End Road Traverse Points					
ID	Feature	Ground Elevation (ft. msl.)	Adjustment Height (ft.)	Top Elevation (ft. msl.)	Clearance (ft.)
A	Val Vista	1,482.94	15.00	1,497.94	93.32
B	Trekell	1,482.94	15.00	1,497.94	146.08
C	Val Vista	1,492.78	15.00	1,507.78	141.84
D	Val Vista	1,502.62	15.00	1,517.62	232.01



RUNWAY 5-23 PROFILE

0 500 1000
HORIZONTAL SCALE IN FEET

0 50 100
VERTICAL SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.

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

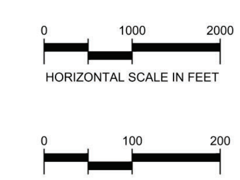
AIRPORT AIRSPACE APPROACH PROFILE RUNWAY 5-23

PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

July 2023 SHEET 6 OF 14

Coffman Associates
Airport Consultants
www.coffmanassociates.com

Ultimate Runway 5 End Road Traverse Points					
ID	Feature	Ground Elevation (ft. msl.)	Adjustment Height (ft.)	Top Elevation (ft. msl.)	Clearance (ft.)
A	Ethington	1,400.92	15	1,415.92	199.58
B	Ethington	1,384.51	15	1,399.51	235.22
C	Ethington	1,364.83	15	1,379.83	286.66
D	Southern Pacific Railroad	1,371.39	23	1,394.39	355.99
E	Southern Pacific Railroad	1,348.43	23	1,371.43	417.42
F	Southern Pacific Railroad	1,338.58	23	1,361.58	446.93
G	Southern Pacific Railroad	1,332.02	23	1,355.02	486.73
H	Southern Pacific Railroad	1,341.86	23	1,364.86	514.68
I	Clayton	1,332.02	15	1,347.02	802.53
J	Midway	1,309.06	15	1,324.06	848.93
K	Midway	1,322.18	15	1,337.18	910.84
L	Midway	1,335.30	15	1,350.30	986.33
M	Indian Valley	1,305.77	15	1,320.77	991.30
N	Indian Valley	1,318.90	15	1,333.90	1,065.27
O	Indian Valley	1,332.02	15	1,347.02	1,159.04



GENERAL NOTES :

1. HORIZONTAL DATUM: NAD83 – VERTICAL DATUM NAVD88.

2. MAPPING DATA FROM MARTINEZ GEOSPATIAL. SURVEY DATE: 5 /11/2022 .

NO.	REVISIONS	DATE	BY	APP'D.

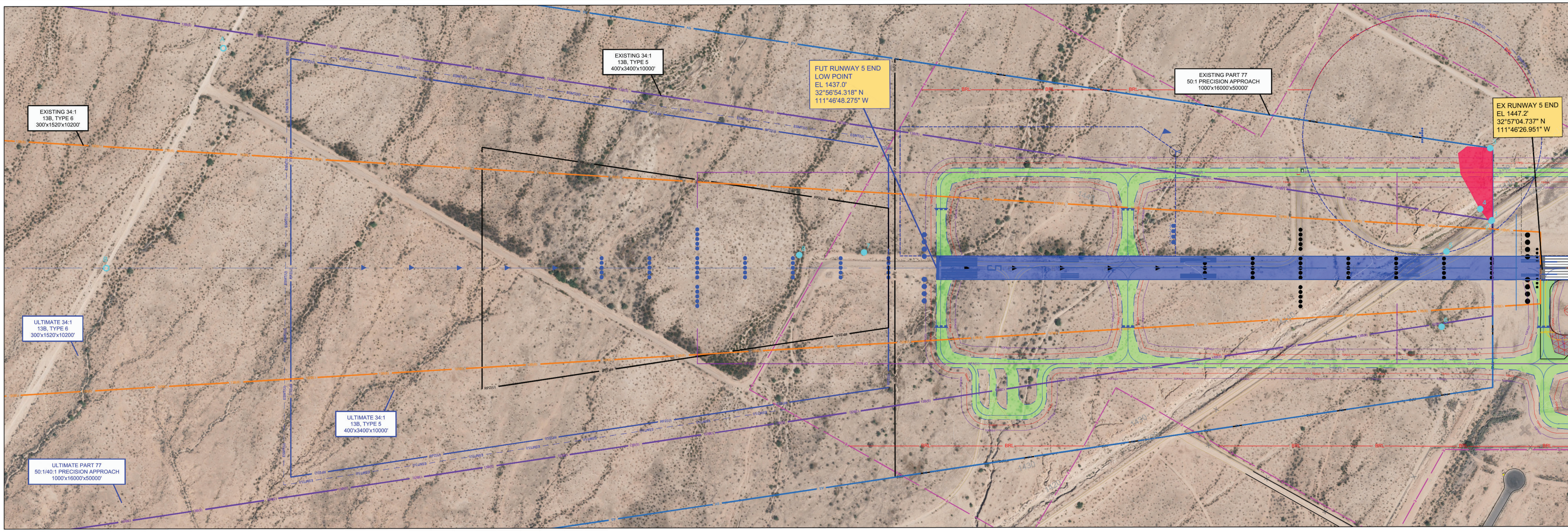
"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF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

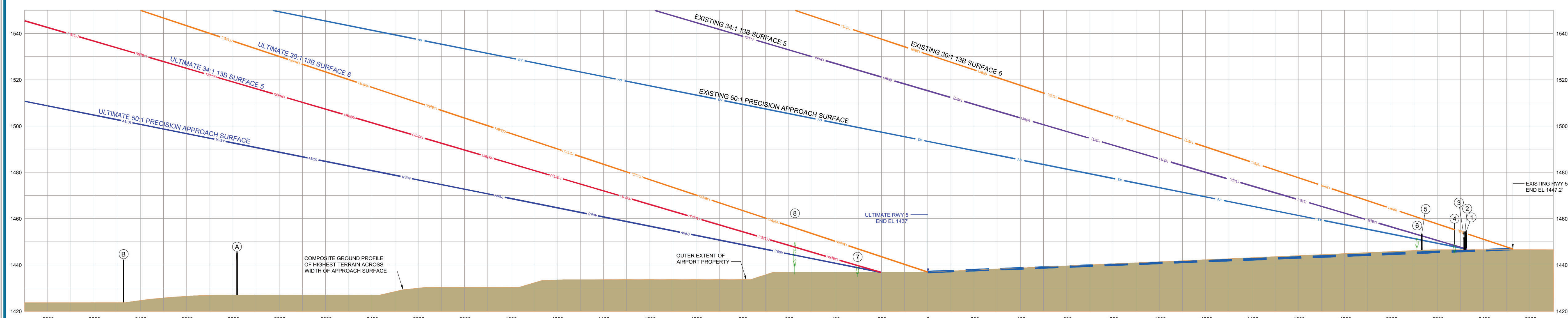
AIRPORT AIRSPACE
APPROACH PROFILE RUNWAY 5 - FAN

PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

July 2023 SHEET 7 OF 14

Coffman Associates
Airport Consultants
www.coffmanassociates.com





Runway 5 Approach Obstructions								
ID	Feature	Source	Ground Elevation (ft. msl.)	AGL (ft.)	Elevation (ft. msl.)	Surface Obstructed	Penetration Value (ft.)	Remediation
1	Fence	Martinez Survey	1449.064	5.47	1454.534	Existing Part 77 Approach	7.31	Relocate Fence
2	Fence	Martinez Survey	1449.034	5.45	1454.484	Existing Part 77 Approach	7.16	Relocate Fence
		Martinez Survey				Existing 13B #5	7.1	
3	Terrain	Martinez Survey	1451.903	0	1451.903	Existing Part 77 Approach	4.49	Re-Grade
4	Tree	Martinez Survey	1438.407	10.53	1448.937	Existing Part 77 Approach	0.65	Remove Tree
5	Fence	Martinez Survey	1448.067	5.52	1453.587	Existing Part 77 Approach	2.53	Relocate Fence
		Martinez Survey				Existing 13B #5	0.71	
6	Tree	Martinez Survey	1442.917	8.65	1451.567	Existing Part 77 Approach	0.08	Remove Tree
7	Tree	Martinez Survey	1435.254	8.24	1443.494	Ultimate Part 77 Approach	4.43	Remove Tree
		Martinez Survey				Ultimate 13B #5	3.45	
8	Tree	Martinez Survey	1433.255	19.31	1452.565	Ultimate Part 77 Approach	8.08	Remove Tree
		Martinez Survey				Ultimate 13B #5	4.56	

Existing Runway 23 Approach Road Points					
ID	Feature	Ground Elevation (ft. msl.)	Adjustment (ft.)	Top Elevation (ft. msl.)	Clearance (ft.)
A	Burris	1,430.45	15.00	1,445.45	47.22
B	Burris	1,417.32	15.00	1,432.32	70.14

GENERAL NOTES :

1. HORIZONTAL DATUM: NAD83 – VERTICAL DATUM NAVD88.
2. MAPPING DATA FROM MARTINEZ GEOSPATIAL. SURVEY DATE: 5 /11/2022.
3. OBSTRUCTIONS WITHIN GROUPINGS REPRESENT TALLEST MANMADE AND/OR NATURAL AND/OR TERRAIN FEATURE.
4. ULTIMATE OBSTRUCTIONS TO BE REMOVED PRIOR TO CONSTRUCTION OF RUNWAY 5 EXTENSION.

LEGEND

OBSTRUCTION GROUPING

OBSTRUCTION IDENTIFIER

SIGNIFICANT OBJECT

NORTH

Magnetic Declination
09° 45' East
Annual Rate of Change
00° 06' West
(Source: NOAA, NCEI, MAY 2022)

0 200 400
HORIZONTAL SCALE IN FEET

0 20 40
VERTICAL SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.

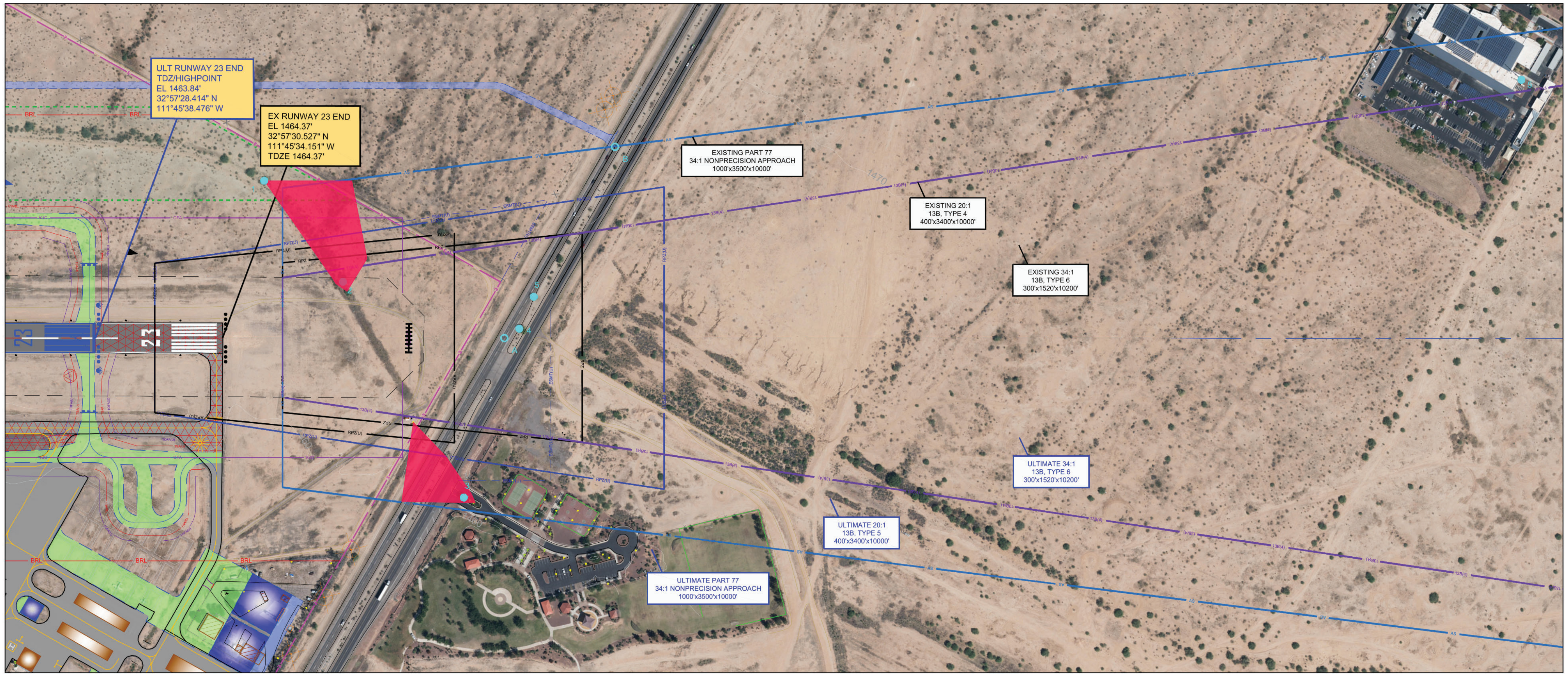
"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF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

CASA GRANDE MUNICIPAL AIRPORT
INNER PORTION OF THE APPROACH SURFACE DRAWING RUNWAY 5
CASA GRANDE, ARIZONA

PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

July 2023

Coffman Associates
Airport Consultants
www.coffmanassociates.com



LEGEND

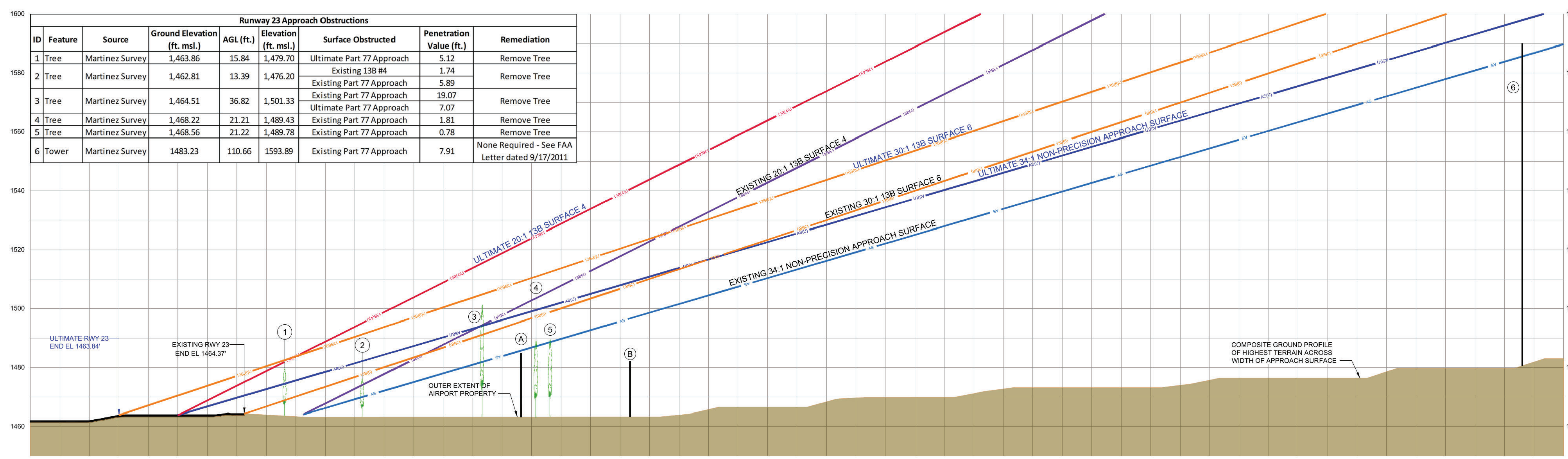
- OBSTRUCTION GROUPING
- OBSTRUCTION IDENTIFIER
- SIGNIFICANT OBJECT

Magnetic Declination
09° 45' East
Annual Rate of Change
00° 06' West
(Source: NOAA, NCEI, MAY 2022)

VERTICAL SCALE IN FEET (0, 20, 40)

HORIZONTAL SCALE IN FEET (0, 200, 400)

Runway 23 Approach Obstructions								
ID	Feature	Source	Ground Elevation (ft. msl.)	AGL (ft.)	Elevation (ft. msl.)	Surface Obstructed	Penetration Value (ft.)	Remediation
1	Tree	Martinez Survey	1,463.86	15.84	1,479.70	Ultimate Part 77 Approach	5.12	Remove Tree
2	Tree	Martinez Survey	1,462.81	13.39	1,476.20	Existing 13B #4	1.74	Remove Tree
						Existing Part 77 Approach	5.89	
3	Tree	Martinez Survey	1,464.51	36.82	1,501.33	Existing Part 77 Approach	19.07	Remove Tree
						Ultimate Part 77 Approach	7.07	
4	Tree	Martinez Survey	1,468.22	21.21	1,489.43	Existing Part 77 Approach	1.81	Remove Tree
5	Tree	Martinez Survey	1,468.56	21.22	1,489.78	Existing Part 77 Approach	0.78	Remove Tree
6	Tower	Martinez Survey	1483.23	110.66	1593.89	Existing Part 77 Approach	7.91	None Required - See FAA Letter dated 9/17/2011



Existing Runway 23 Approach Road Points					
ID	Feature	Ground Elevation (ft. msl.)	Adjustment (ft.)	Top Elevation (ft. msl.)	Clearance (ft.)
A	Hwy 387	1,467.25	15.00	1,482.25	3.90
B	Hwy 387	1,470.00	15.00	1,485.00	12.01

General Notes :

1. Horizontal Datum: NAD83 – Vertical Datum NAVD88.
2. Mapping data from Martinez Geospatial. Survey Date: 5 /11/2022.
3. Obstructions within groupings represent tallest manmade and/or natural and/or terrain feature.

NO.	REVISIONS	DATE	BY	APP'D.

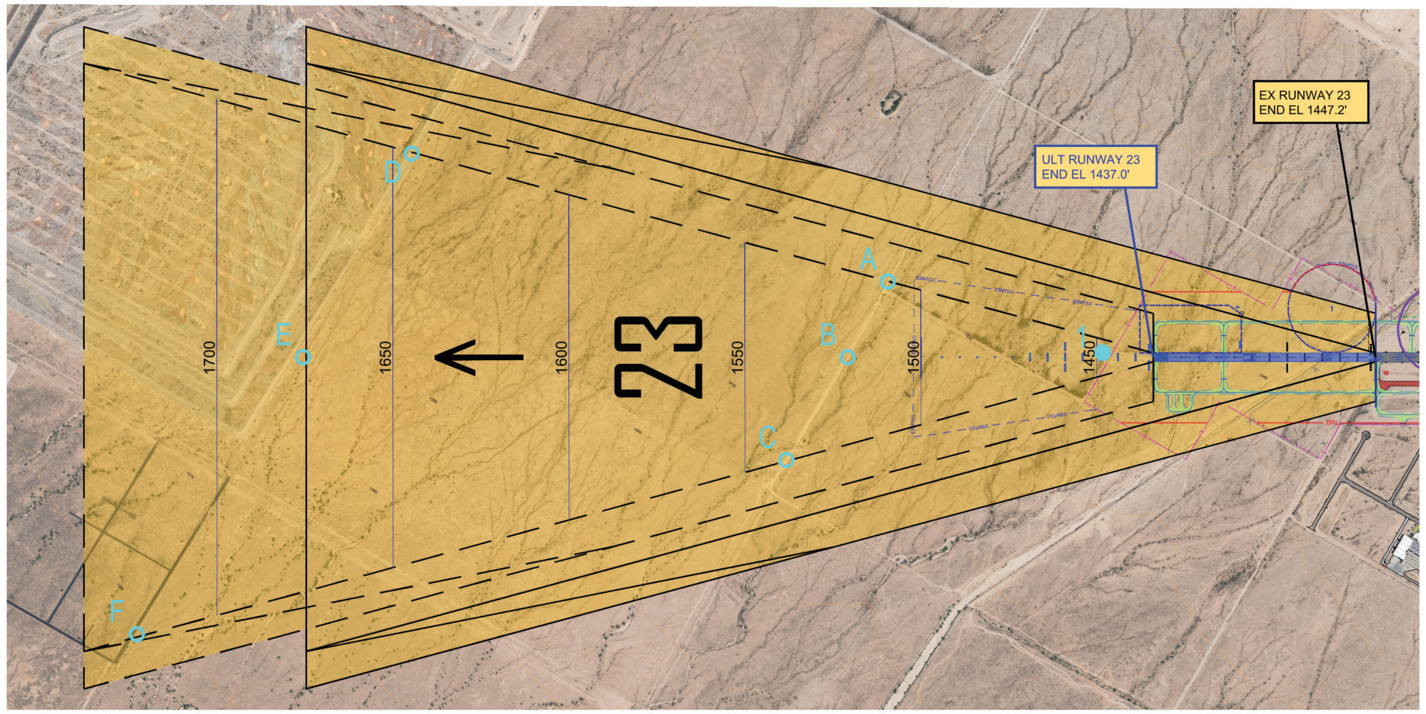
"THE PREPARATION OF THESE DOCUMENTS WAS FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER SECTION 505 OF THE AIRPORT AND AIRWAY IMPROVEMENT ACT OF 1982, AS AMENDED. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF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

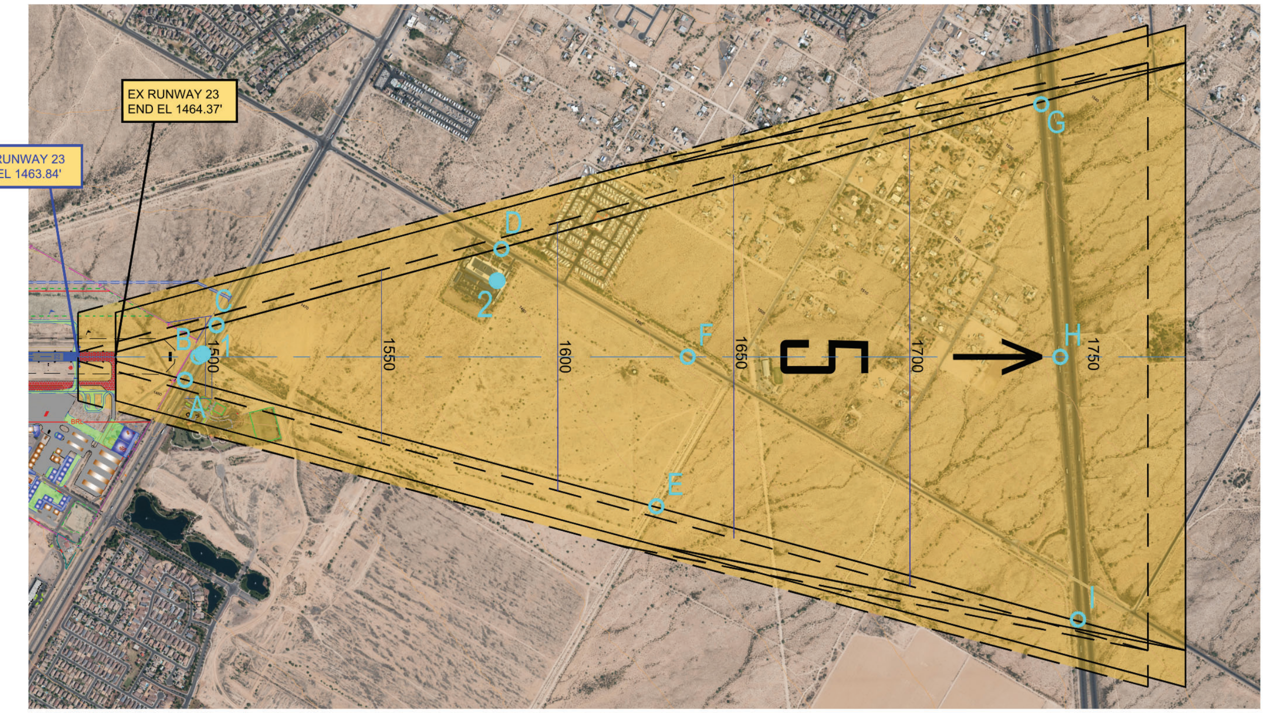
CASA GRANDE MUNICIPAL AIRPORT
INNER PORTION OF THE APPROACH SURFACE DRAWING RUNWAY 23
CASA GRANDE, ARIZONA

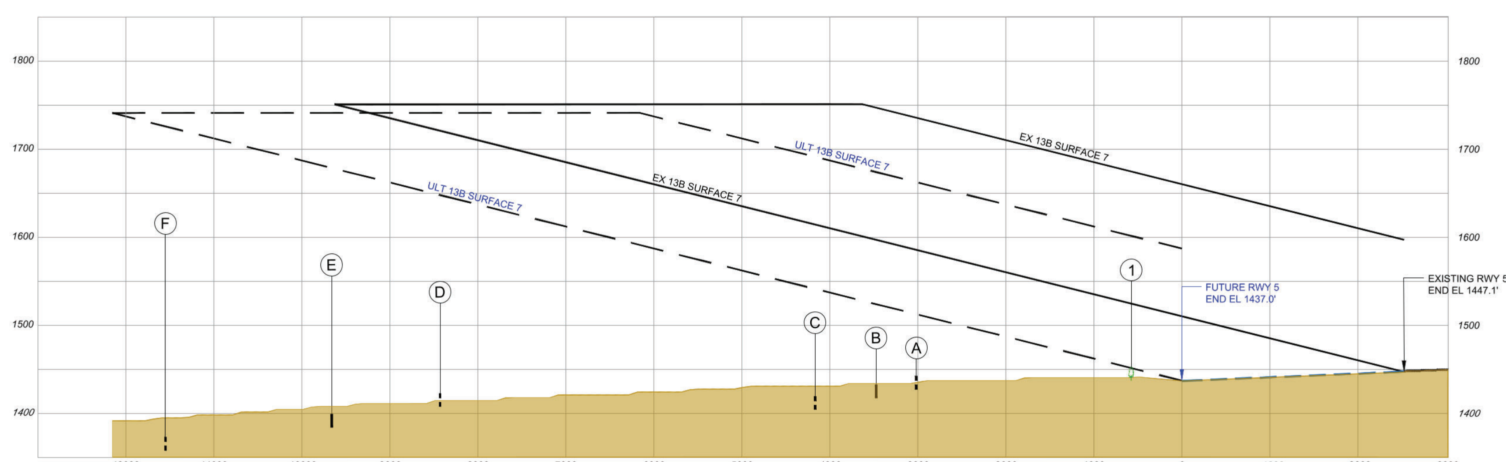
PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

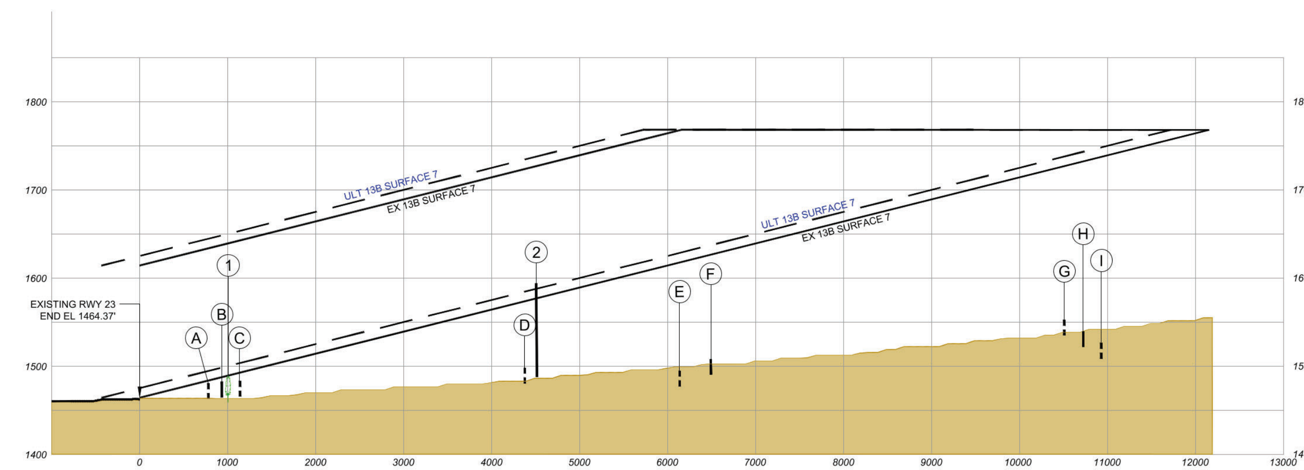
July 2023 — SHEET 9 OF 14

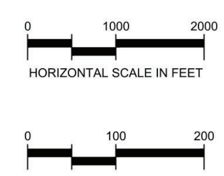
Coffman Associates
Airport Consultants
www.coffmanassociates.com











Previous Runway 5 End Departure Obstructions

ID	Feature	Source	Ground Elevation (ft. msl.)	AGL (ft.)	Elevation (ft. msl.)	FAA Study #	Surface Obstructed	Penetration Value (ft.)	Remediation
1	Tree	Martinez Survey	1433.255	19.31	1452.565	N/A	Ultimate Departure	1.21	Remove Tree

Ultimate Runway 5 End Departure Road Points

ID	Feature	Ground Elevation (ft. msl.)	Adjustment (ft.)	Top Elevation (ft. msl.)	Clearance (ft.)
A	Burris	1,427.17	15.00	1,442.17	70.24
B	Burris	1,417.32	15.00	1,432.32	91.51
C	Burris	1,404.20	15.00	1,419.20	121.96
D	Ethington	1,407.48	15.00	1,422.48	225.22
E	Ethington	1,384.51	15.00	1,399.51	279.00
F	Ethington	1,358.27	15.00	1,373.27	352.43

Runway 23 End Departure Obstructions

ID	Feature	Source	Ground Elevation (ft. msl.)	AGL (ft.)	Elevation (ft. msl.)	FAA Study #	Surface Obstructed	Penetration Value (ft.)	Remediation
1	Tree	Martinez Survey	1468.22	21.21	1489.43	N/A	Existing Departure	0.3	Remove Tree
2	Tower	Martinez Survey	1483.23	110.66	1593.89	2011-AWP-2660-OE	Existing Departure	21.15	None Required - See FAA Letter dated 8/17/2011
							Ultimate Departure	11.03	

Existing Runway 23 End Departure Road Points

ID	Feature	Ground Elevation (ft. msl.)	Adjustment (ft.)	Top Elevation (ft. msl.)	Clearance (ft.)
A	Hwy 387	1,465.50	15.00	1,480.50	3.58
B	Hwy 387	1,467.25	15.00	1,482.25	5.63
C	Hwy 387	1,468.14	15.00	1,483.14	9.91
D	Val Vista	1,482.94	15.00	1,497.94	76.01
E	Trekell	1,479.66	15.00	1,494.66	123.31
F	Val Vista	1,492.78	15.00	1,507.78	119.05
G	Hwy 10	1,535.43	17.00	1,552.43	174.81
H	Hwy 10	1,522.31	17.00	1,539.31	193.33
I	Hwy 10	1,509.19	17.00	1,526.19	211.53

General Notes :

1. Horizontal Datum: NAD83 – Vertical Datum NAVD88.
2. Mapping data from Martinez Geospatial. Survey Date: 5/11/2022 .

LEGEND

- EXISTING PROPERTY BOUNDARY
- FUTURE PROPERTY BOUNDARY
- OBS # — OBSTRUCTION IDENTIFIER
- A — ROAD IDENTIFIER

NO.	REVISIONS	DATE	BY	APP'D.

CASA GRANDE MUNICIPAL AIRPORT

RUNWAY 5-23 DEPARTURE SURFACE DRAWING

CASA GRANDE, ARIZONA

PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

July 2023

Coffman Associates
Airport Consultants
www.coffmanassociates.com

EXISTING AIRPORT FACILITES

#	Facility Name	Top Elevation ft. msl
1	Terminal	±1,480.7'
2	Fuel Farm	±1,470.1'
3	T-Hangar (6 unit)	±1,475.3'
4	T-Hangar (6 unit)	±1,470.8'
5	T-Hangar (10 unit)	±1,473.6'
6	T-Hangar (10 unit)	±1,473.1'
7	T-Hangar (10 unit)	±1,472.4'
8	T-Hangar (10 unit)	±1,471.4'
9	Executive Hangar	±1,475.7'
10	Specialty Operations	±1,471.0'
11	Specialty Operations	±1,464.1'
12	Executive Hangar	±1,477.9'
13	Executive Hangar	±1,476.8'
14	Executive Hangar	±1,476.4'
15	Executive Hangar	±1,476.1'
16	Executive Hangar	±1,474.9'
17	Shade Hangar (10 unit)	±1,471.6'
18	Shade Hangar (8 unit)	±1,471.5'
19	Rotating Beacon	±1,469.4'
20	Executive Hangar	±1,477.6'
21	Executive Hangar	±1,471.4'
22	Executive Hangar	±1,478.4'
23	Executive Hangar	±1,472.7'
24	Executive Hangar	±1,480.0'
25	Executive Hangar	±1,477.6'
26	Executive Hangar	±1,477.6'
27	Executive Hangar	±1,477.6'
28	Executive Hangar	±1,477.6'
29	Executive Hangar	±1,477.6'

ULTIMATE AIRPORT FACILITIES

#	Facility Name	Top Elevation ft. msl*
53	10 unit T-Hangar	±1482'
54	24 unit T-Hangar	±1482'
55	10 unit Shade Hangars	±1482'
56	10 unit Shade Hangars	±1482'
57	10 unit Shade Hangars	±1482'
58	10 unit Shade Hangars	±1482'
59	55'x55' Executive Hangar	±1477'
60	55'x55' Executive Hangar	±1477'
61	55'x55' Executive Hangar	±1477'
62	55'x55' Executive Hangar	±1477'
63	55'x55' Executive Hangar	±1477'
64	55'x55' Executive Hangar	±1477'
65	55'x55' Executive Hangar	±1477'
66	55'x55' Executive Hangar	±1477'
67	55'x55' Executive Hangar	±1477'
68	55'x55' Executive Hangar	±1477'
69	55'x55' Executive Hangar	±1477'
70	60'x60' Executive Hangar	±1477'
71	60'x60' Executive Hangar	±1477'
72	60'x60' Executive Hangar	±1477'
73	60'x60' Executive Hangar	±1477'
74	60'x60' Executive Hangar	±1477'
75	60'x60' Executive Hangar	±1477'
76	60'x60' Executive Hangar	±1477'
77	150'x150' Conventional Hangar	±1482'
78	150'x150' Conventional Hangar	±1482'
79	Aircraft Wash Rack	±1456'
80	Terminal Expansion/Rotating Beacon	±1480'
81	Airport Operation	±1477'

LEGEND

EXISTING	ULTIMATE	DESCRIPTION
	SAME	AIRPORT PROPERTY LINE
N/A		AVIATION RESERVE
32 33 5 4		SECTION CORNERS
		AIRPORT ROTATING BEACON
		BUILDING RESTRICTION LINE (35')
		STRUCTURES ON AIRPORT
N/A		ABANDON/REMOVE STRUCTURE
N/A		ABANDON/REMOVE PAVEMENT
	SAME	RUNWAY PAVEMENT
		TAXIWAY APRON PAVEMENT
		FENCE LINE
		HOLD MARKING
		RUNWAY MARKING
		TAXIWAY APRON MARKING
		ROADS AND PARKING PAVEMENT
DESIGNATION		SURVEY MONUMENT WITH IDENTIFIER
OFA	OFA(U)	OBJECT FREE AREA
RSA	RSA(U)	RUNWAY SAFETY AREA
OFZ	OFZ(U)	OBSTACLE FREE ZONE
RPZ	RPZ(U)	RUNWAY PROTECTION ZONE
TOFA	TOFA (U)	TAXIWAY OBJECT FREE AREA
TSA	TSA (U)	TAXIWAY SAFETY AREA
		TIE-DOWNS
		PAPI-4
		NO TAXI ISLAND
N/A		MARKINGS TO BE REMOVED

General Notes :

1. Horizontal Datum: N AD83 – Vertical Datum NAVD88.
2. Mapping data from Martinez Geospatial. Survey Date: 5/11/2022.

NORTH
MAGNETIC NORTH

Magnetic Declination
09° 45' East
Annual Rate of Change
00° 06' West
(Source: NOAA, NCEI, MAY 2022)

0 100 200
SCALE IN FEET

NO.	REVISIONS	DATE	BY	APP'D.

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

CASA GRANDE MUNICIPAL AIRPORT

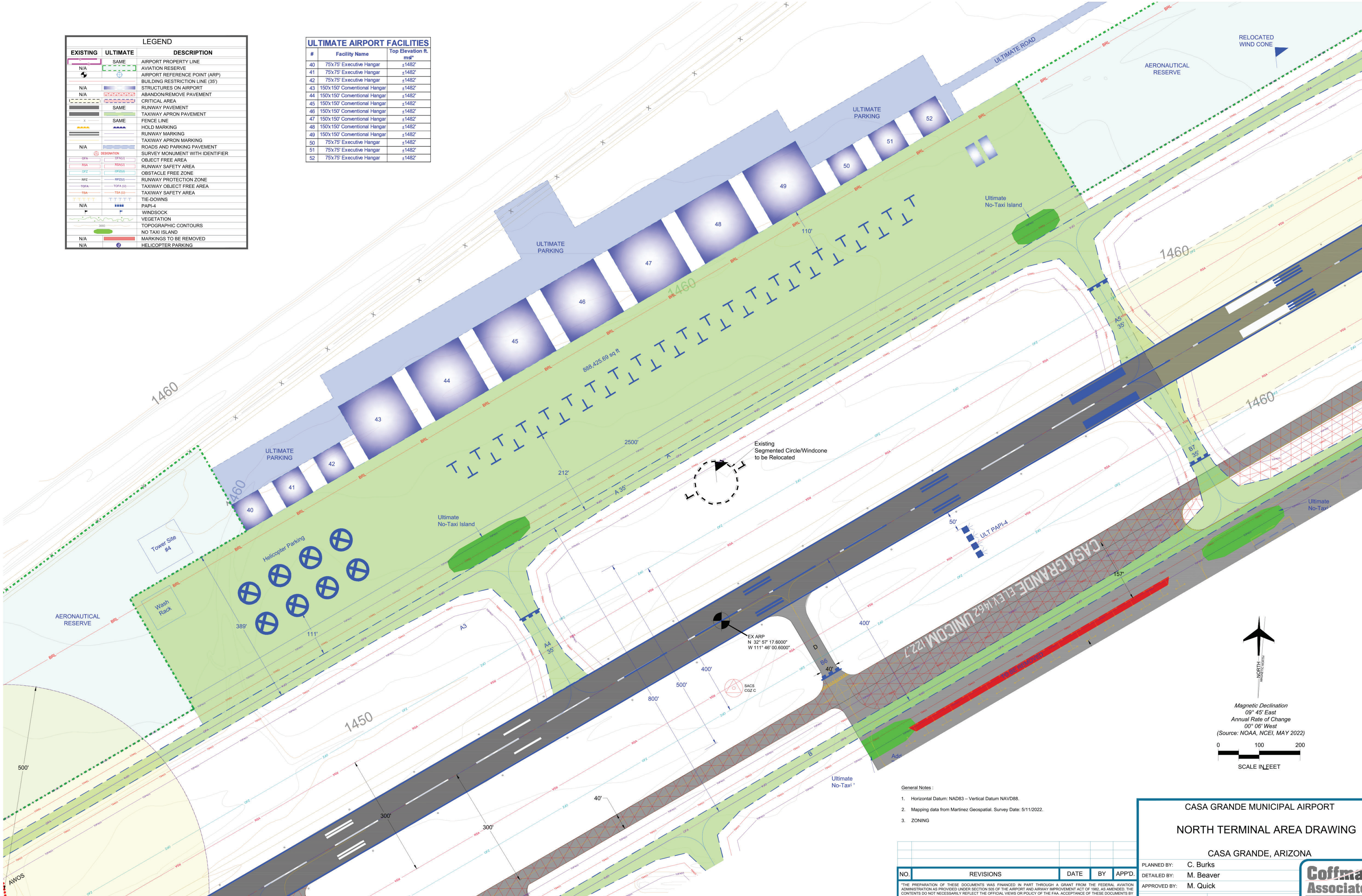
SOUTH TERMINAL AREA DRAWING

CASA GRANDE, ARIZONA

PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

July 2023 SHEET 11 OF 14

Coffman Associates
Airport Consultants
www.coffmanassociates.com



LEGEND

EXISTING	ULTIMATE	DESCRIPTION
	SAME	AIRPORT PROPERTY LINE
N/A		AVIATION RESERVE
		AIRPORT REFERENCE POINT (ARP)
		BUILDING RESTRICTION LINE (35')
N/A		STRUCTURES ON AIRPORT
N/A		ABANDON/REMOVE PAVEMENT
		CRITICAL AREA
	SAME	RUNWAY PAVEMENT
		TAXIWAY APRON PAVEMENT
X	SAME	FENCE LINE
		HOLD MARKING
		RUNWAY MARKING
		TAXIWAY APRON MARKING
N/A		ROADS AND PARKING PAVEMENT
DESIGNATION		SURVEY MONUMENT WITH IDENTIFIER
OFA	OFA(U)	OBJECT FREE AREA
RSA	RSA(U)	RUNWAY SAFETY AREA
OFZ	OFZ(U)	OBSTACLE FREE ZONE
RPZ	RPZ(U)	RUNWAY PROTECTION ZONE
TOFA	TOFA (U)	TAXIWAY OBJECT FREE AREA
TSA	TSA (U)	TAXIWAY SAFETY AREA
		TIE-DOWNS
N/A		PAPI-4
		WINDSOCK
		VEGETATION
3660		TOPOGRAPHIC CONTOURS
		NO TAXI ISLAND
N/A		MARKINGS TO BE REMOVED
N/A		HELICOPTER PARKING

ULTIMATE AIRPORT FACILITIES

#	Facility Name	Top Elevation ft. msl*
40	75'x75' Executive Hangar	±1482'
41	75'x75' Executive Hangar	±1482'
42	75'x75' Executive Hangar	±1482'
43	150'x150' Conventional Hangar	±1482'
44	150'x150' Conventional Hangar	±1482'
45	150'x150' Conventional Hangar	±1482'
46	150'x150' Conventional Hangar	±1482'
47	150'x150' Conventional Hangar	±1482'
48	150'x150' Conventional Hangar	±1482'
49	150'x150' Conventional Hangar	±1482'
50	75'x75' Executive Hangar	±1482'
51	75'x75' Executive Hangar	±1482'
52	75'x75' Executive Hangar	±1482'

General Notes :

1. Horizontal Datum: NAD83 – Vertical Datum NAVD88.
2. Mapping data from Martinez Geospatial. Survey Date: 5/11/2022.
3. ZONING

NO.	REVISIONS	DATE	BY	APP'D.

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

CASA GRANDE MUNICIPAL AIRPORT

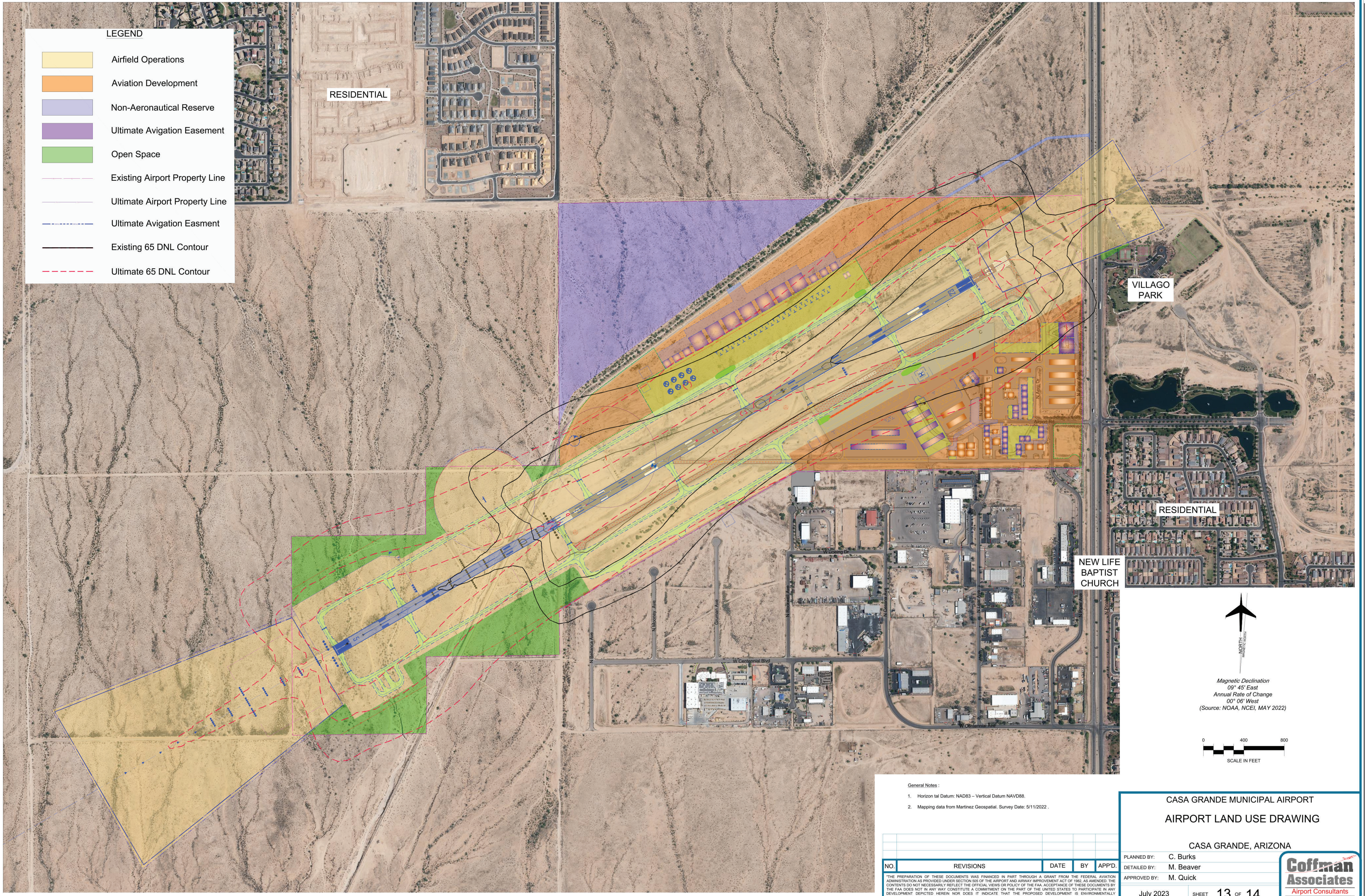
NORTH TERMINAL AREA DRAWING

CASA GRANDE, ARIZONA

PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

July 2023

Coffman Associates
Airport Consultants
www.coffmanassociates.com



General Notes :

1. Horizon tal Datum: NAD83 – Vertical Datum NAVD88.
2. Mapping data from Martinez Geospatial. Survey Date: 5/11/2022 .

NO.	REVISIONS	DATE	BY	APP'D.

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

CASA GRANDE MUNICIPAL AIRPORT

AIRPORT LAND USE DRAWING

CASA GRANDE, ARIZONA

PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

July 2023 SHEET 13 OF 14

Coffman Associates
Airport Consultants
www.coffmanassociates.com

Property To Be Acquired		
Tract ID	**Type**	**Acreage**
A	Future Property	10.9
B	Future Property	1.60
C	Future Property	0.97
D	Future Avigation Easement	64.98
E	Future Avigation Easement	2.25
F	Future Avigation Easement	1.50
G	Future Clear Zone Easement	1.95

Tract/Parcel ID	Grantor	Interest Type	Acreage	Intrument	Book/Page	FAA Grant #	Easment	Date	Current Parcel ID	Purpose of Acquisition
1	Unavailable	Fee Simple	14.88	Plat	1650/398	N/A	N/A	6/26/2007	509810810	Airport Development
2	Unavailable	Fee Simple	299.5	Quit Clain Deed	178/29	N/A	N/A	6/1/1956	509460050	Airport Development
3	Unavailable	Fee Simple	30.72	Quit Clain Deed	179/29	N/A	N/A	6/1/1956	509810810	Airport Development
4	Unavailable	Fee Simple	59.15	Warranty Deed	1069/283	N/A	N/A	6/26/1981	50947001G	Airport Development
5	Unavailable	Fee Simple	23.17	Warranty Deed	1069/283	N/A	N/A	6/27/1981	50947001C	Airport Development
6	Unavailable	Fee Simple	21.58	Warranty Deed	1069/283	N/A	N/A	6/8/1981	50947001D	Airport Development
7	Unavailable	Fee Simple	7.33	Right of Way	1117/658	N/A	ROW	5/26/1982	509477000	Right of Way
8	Unavailable	Fee Simple	18.91	Right of Way	1148/251	N/A	ROW	1/21/1983	509467000	Right of Way
9	Unavailable	Fee Simple	0.78	Right of Way	1117/658	N/A	ROW	5/26/1982	509477000	Right of Way

General Notes:

1. Horizontal Datum: NAD83 – Vertical Datum NAVD88.
2. Mapping data from Martinez Geospatial. Survey Date: 5/11/2022.
3. As part of the ALP Update, property information including deed records were consulted to complete the "Exhibit A" Property Map in accordance with the SOP 3.00. The above information represents these findings.

NO.	REVISIONS	DATE	BY	APP'D.

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

CASA GRANDE MUNICIPAL AIRPORT

EXHIBIT "A"
AIRPORT PROPERTY INVENTORY MAP

CASA GRANDE, ARIZONA

PLANNED BY: C. Burks
DETAILED BY: M. Beaver
APPROVED BY: M. Quick

July 2023 SHEET 14 OF 14

Coffman Associates
Airport Consultants
www.coffmanassociates.com

Coffman Associates

Airport Consultants

www.coffmanassociates.com

KANSAS CITY
(816) 524-3500

12920 Metcalf Avenue
Suite 200
Overland Park, KS 66213

PHOENIX
(602) 993-6999

4835 E. Cactus Road
Suite 235
Scottsdale, AZ 85254