

CVB CASTROVILLE MUNICIPAL AIRPORT

AIRPORT MASTER PLAN

Final Report

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Prepared for:

Castroville Municipal Airport
Castroville, Texas



&

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Aviation Division
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CHAPTER ONE

INVENTORY




Castroville
MUNICIPAL AIRPORT

01 INVENTORY OF EXISTING CONDITIONS

1.1 OVERVIEW

The following Airport Layout Plan (ALP) Update narrative will define a concept for development at Castroville Municipal Airport (KCVB or the Airport) to facilitate the region's growing aviation demands. This plan will feature a 20-year planning period and has been prepared in collaboration with airport management, federal and state agencies, local officials, businesses, and interested airport users/stakeholders. A key goal of this study is to identify needs and evaluate development alternatives to provide guidance for future development of the Airport. The plan recommends improvements in accordance with Federal Aviation Administration (FAA) criteria, taking into consideration anticipated changes in aviation activity and development opportunities at the local, regional, and national levels.

The primary objective of this planning effort is to produce a comprehensive planning guide for the continued development of a safe, efficient, and successful aviation facility that meets the goals of the City of Castroville, airport users, tenants, and the surrounding market area. The plan must also satisfy FAA guidelines for the development of airport plans and facilities while incorporating characteristics that are unique to the area. This study focuses on aeronautical forecasts, economic development opportunities, need and justification improvements, and a staged plan for recommended development. Specifically, the Castroville Airport (ALP) Update will consist of the following elements:

- Inventory of Existing Conditions
- Forecasts of Aviation Activity
- Facility Requirements
- Airport Development Alternatives
- Airport Plans
- Recommended Development Plan Implementation



Typically, the staged plan looks at planning horizons of 0-5, 6-10, and 11-20 years, with the first phase addressing existing facility deficiencies or non-compliance to airport design standards as outlined in FAA Advisory Circular (AC) 150/5300-13B, *Airport Design*.

The first step in the planning process includes collecting data about the Airport and its environment. The information gathered during this phase will provide the foundation for subsequent phases. The inventory of existing conditions for Castroville Municipal Airport will include the following:

- Existing physical facilities: runways, taxiways, parking aprons, navigational aids, and facility areas associated with general aviation, corporate, and airport support.
- The Airport's role, including development history, location, and access relationship to other transportation modes.
- Socioeconomic and business trends within the Airport's service area.
- A review of the existing Airport, community, and regional plans and studies that contain information pertinent to the development and implementation of the plan's overall recommendations.

The data collected for this phase was obtained from various sources, including airport management, tenants, users, the City of Castroville, area businesses, community organizations, and airport service providers. The data collected is current as of June 2022 and will serve as a baseline for the remainder of the study. Additional sources of information referenced include:

- Castroville Municipal Airport Master Plan, 2005
- City of Castroville website (www.castrovilletx.gov)
- City of Castroville Comprehensive Plan (2016)
- FAA 5010-1, *Airport Master Record*
- FAA Operational Data



1.2 CITY OF CASTROVILLE & CASTROVILLE MUNICIPAL AIRPORT

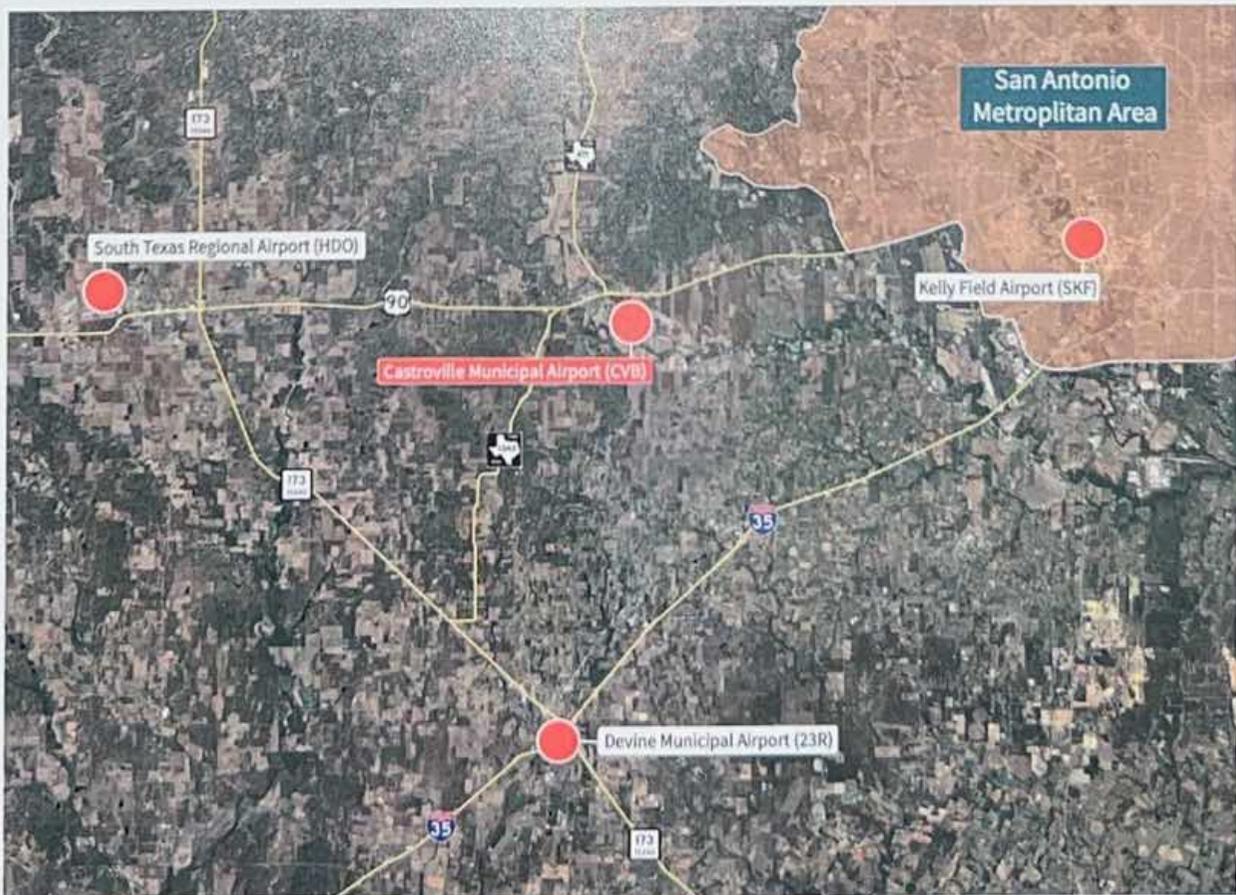
Located in Medina County, the City of Castroville is located approximately 25 miles west of San Antonio, along U.S. Highway 90. According to the Castroville Area Chamber of Commerce, the city was originally known as “The Little Alsace of Texas.” Founded by Henri Castro in 1844, the first people to settle in Castroville were farmers from a region in France known as Alsace. Castroville would become the first town colonized on the Medina River. This rich, fertile farmland provided opportunities that land in Europe could not match. The original settlers voyaged 66 days across the Atlantic to land at the Port of Galveston in January of 1844. In September of 1844, these first settlers arrived and began to set up camp, construct a storeroom, and begin cultivating the land. The early days of Castroville were centered around the farming community. However, the town would continue to grow and facilitate new ways of life, including agriculture, civic, commercial, and industrial.

Castroville Municipal Airport (CVB) originally served as a strategic landing strip for Kelly Air Force Base. It was later donated to the city for public use in 1949 following its decommissioning as a military airfield.

1.3 AIRPORT LOCATION AND ACCESS

The City of Castroville, Texas, is located in Medina County, approximately 25 miles west of San Antonio. The Airport is located approximately 2 miles east of downtown Castroville and situated on 459 acres at an elevation of 773.9 feet above sea level. Primary vehicular access is provided by U.S. Highway 90 and Texas FM 471 and 1343, with terminal access being provided via Airport Road. U.S. Highway 90 provides the primary arterial access to the City of Castroville, the Greater San Antonio Metropolitan area, and the Airport.

EXHIBIT 1.1 – AIRPORT LOCATION MAP



1.4 AIRPORT PROJECT HISTORY

To assist in ongoing capital improvements, the FAA provides funding through the Airport Improvement Program (AIP). Table 1.1 summarizes CVB capital improvement projects since 2003 that have been received through the FAA's AIP. Airports that apply for and accept AIP grants must adhere to various grant assurances, which include maintaining the airport facility in a safe and efficient capacity in accordance with specific conditions. The duration of the assurances depends on the type of airport, the useful life of the facility being developed, and other factors. Typically, the useful life for an airport development project is a minimum of 20-years. Thus, when an airport accepts AIP grant funding, the airport is obligated to maintain that facility in accordance with FAA standards for the useful life expected. The project history at CVB, totaling over \$7 million highlights the importance of the airport to state and surrounding community as well as continued support from the FAA and the Texas Department of Transportation Aviation Division (TxDOT).

TABLE 1.1 – AIRPORT PROJECT HISTORY (2001-2022)

Year	Description	Project Cost
2003	Repair Lighting, drainage work, renovate terminal building	\$29,132
2004	Construct terminal building and aircraft ramp parking area	\$177,188
2004	Loan	\$278,748
2004	Ramp paving, repair existing pavement	\$60,000
2004	Prepare airport layout plan	\$39,831
2005	Install AWOS	\$85,139
2005	Pavement renovation in hangar, ramp at commercial hangar	\$30,510
2006	Reconstruct airport road to hangars	\$9,988
2006	Design and construction to pave aircraft ramp	\$90,008
2006	Design to extend runway, rehabilitate runway and taxiways	\$282,855
2009	AWOS Maintenance	\$11,182
2009	Install PAPI-2, Mark Runway	\$766,207
2010	Miscellaneous TxDOT contract	\$14,428
2011	AWOS Maintenance	\$30,556
2012	Design for Box hangars and access pavement	\$784,786
2012	AWOS Maintenance	\$47,282
2013	AWOS Maintenance	\$91,976
2013	Survey, appraisal, environmental, and land for runway extension	\$1,201,680
2014	Extend and mark runway	\$2,607,379
2014	AWOS Maintenance	\$28,736
2015	General Maintenance	\$30,704
2016	General Maintenance	\$57,838
2017	Design and install Jet-A Fuel Farm	\$360,759

2018	General Maintenance	\$47,372
2019	General Maintenance	\$93,190
2020	General Maintenance	\$100,000
2021	General Maintenance	\$99,900
2003-2022	Total Budget	\$7,457,374

TABLE 1.2 -- EXISTING CONDITIONS

Airport Name	Castroville Municipal Airport
FAA Designation	CVB
Associated City	Castroville, Texas
Airport Owner/Sponsor	City of Castroville, Texas
Airport Management	Full-time Manager and city staff; on-site
Date Established	1949
Airport Roles	FAA NPIAS – General Aviation/Local
Commercial Air Service	None
Airport Acreage	459
Airport Reference Point (ARP)	29°20'32.6000" N / 98°51'04.4000" W
Airport Elevations	773.9 ft.
Area Mean Max Temperature	96° (August)

Source: Castroville Municipal Airport Administration, FAA Form 5010-1 Data

1.5 AIRPORT SYSTEM ROLE

Castroville Municipal Airport is a general aviation airport serving the aviation needs of Medina County, the City of Castroville, and the surrounding market area. All airports play a variety of different functional roles and contribute at varying levels to meet the transportation and economic needs on a national, state, and local level. Identifying and understanding the various roles an airport plays is essential for any airport in a system, so it can continue developing facilities and services that appropriately fulfill its respective role.

1.5.1 ECONOMIC IMPACT

In 2018, the Texas Department of Transportation (TxDOT) updated their statewide economic impact study, a key component of the overall system planning effort. This study assists TxDOT in determining what capital improvements best serve the state's general aviation needs. Overall, Castroville Municipal Airport plays an integral part in the local and regional economy, witnessed by the total overall economic impact of 51 jobs, \$1 million in payroll, and \$3.9 million in output.

1.5.2 NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS (NPIAS)

Many of the nation's existing airports were initially constructed by the federal government, or their development and maintenance were partially funded through various federal grant-in-aid programs to local communities. The system of airports that exists today is due in part to federal policy that promotes the development of civil aviation. As part of the ongoing effort to develop a national airport system (NAS), the U.S. Congress maintains a national plan for the development and upkeep of airports.

The National Plan of Integrated Airport Systems (NPIAS) is a repository of airports that are eligible for AIP funding and used by the FAA to administer the AIP, which is the source of federal funds for airport improvement projects nationwide. The AIP is funded exclusively by user fees and user taxes, such as aviation fuel and airline tickets. An airport must be included in the NPIAS to be eligible for federal assistance through the AIP.

The most current plan available is the NPIAS 2021-2025, which identified 3,304 public-use airports important and necessary to the national air transportation system. The plan estimated that approximately \$43.6 billion in AIP-eligible airport projects will require financial assistance between 2021 and 2025. This is an increase of \$8.5 billion (24 percent) from the NPIAS issued two years ago. The NPIAS categorizes airports by type of activities that occur at an airport – commercial service, air cargo, reliever operations, and general aviation. Castroville Municipal Airport is currently classified as a local general aviation airport in the FAA's NPIAS.

Local airports are typically located near larger population areas, but not necessarily within the metropolitan areas. These airports support local economies with local and some regional flying and have moderate levels of activity, including multiengine propeller aircraft. Local airports average about 32 total based aircraft, and no jets. The 1,213 Local airports currently listed in the NPIAS account for 37 percent of the total development reported in the 2021-2025 report.

1.5.3 SURROUNDING AIRPORTS

Table 1.4 provides detail of airports within the Castroville Municipal Airport Market Area (30nm radius) with at least one paved runway. Identifying and comparing these facilities will help the Airport distinguish other types of service within the region and consider the capabilities and limitations of these airports when planning for future improvements.

TABLE 1.3 – LOCAL AIRPORT CHARACTERISTICS

Airport Name	ID	Runway(s)	Based AC / Ops	NPIAS Role	State Role
Devine Municipal Airport	23R	17/35 – 3,399' x 60'	15 / 6,000	Local – General Aviation	Community Service (TASP)
Kelly Field Airport	KSKF	16/34 – 11,550' x 150'	49 / 900	Military	Military
South Texas Regional Airport at Hondo	KHDO	17L/35R – 6,002' x 100' 17R/35L – 3,224' x 140' 13/31 – 5,545' x 150' 8/26 – 3,451' x 75'	75 / 24,820	Local – General Aviation	Business/Corporate (TASP)
Stinson Municipal Airport	KSSF	9/27 – 5,000' x 100' 14/32 – 4,128' x 100'	74 / 93,075	Regional – Reliever	Reliever (TASP)
San Antonio International Airport	KSAT	4/22 – 8,505' x 150' 13R/31L – 8,502' x 150' 13L/31R – 5,519' x 100'	225 / 165,345	Commercial Service – Primary	Primary (TASP)

Source: FAA Form 5010-1 Data, CY 2021
National Plan of Integrated Airport Systems (NPIAS), 2021-2025
Texas Airport System Plan (TASP), 2010

1.6 AIRPORT ACTIVITY

Castroville Municipal Airport supports general aviation aircraft activities including, business aviation, flight training, cargo, medical transport, and recreational flying. Reviewing historical enplanement and operations activity helps provide a barometer of operation conditions and provides a necessary baseline for future demand activity. The following Table 1.5 summarizes activity at the Airport since the year 2011.

Activity is segregated into specific categories:

- **General Aviation** – all other activity not classified as air carrier, air taxi, or military
- **Local** – operations within 20 nm of the airfield. Consists mostly of flight training and touch-and-go activity
- **Itinerant** – operations that are not local and have an origin and/or destination
- **Military** – operations conducted by aircraft or helicopters with military designations

TABLE 1.4 – HISTORICAL AVIATION ACTIVITY

Year	Itinerant	General Aviation	Military	Total
2012	8,000	21,000	100	29,100
2013	8,000	21,000	100	29,100
2014	5,600	11,200	100	16,900
2015	5,600	11,200	100	16,900
2016	5,200	11,200	0	16,400
2017	5,200	11,200	0	16,400
2018	5,200	11,200	0	16,400
2019	5,200	11,200	0	16,400
2020	5,200	11,200	0	16,400
2021	5,200	11,200	0	16,400

Source: FAA Terminal Area Forecasts, Castroville Municipal Airport
 FAA 5010-1, Airport Master Record
 Airport Personnel

1.6.1 SOCIOECONOMIC CHARACTERISTICS

The various demographic and socioeconomic characteristics of the local area that an airport serves will affect its demand for aviation services and is collected to derive and assess the dynamics of growth within the study area. Typically, the demographic characteristics of an airport's service area can influence the level, type, and growth of aircraft operations. Whereas population activity (positive or negative) has been a simple and important measure of the potential demand for air services, levels of income is a standard predictor of the propensity for the population to travel, the level of use of existing based general aviation aircraft and services at the Airport. Additionally, this type of information is essential in generating forecasting activity at the Airport and helps examine the ability of the region to sustain a strong economic base over an extended period. The following Table 1.6 provides a historical summary of the socioeconomic indicators for Medina County.

TABLE 1.5 – MEDINA COUNTY SOCIOECONOMIC CHARACTERISTICS

Historical						Projected				
1980	1990	2000	2010	2021	AAGR (1980- 2021)	2027	2032	2037	2042	AAGR (2021- 2042)
POPULATION										
23,200	27,422	39,484	46,114	52,011	1.99%	55,100	57,418	59,834	62,351	0.83%
PER CAPITA INCOME (in 2012 dollars)										
\$17,024	\$20,649	\$25,462	\$30,843	\$38,505	2.01%	\$43,324	\$47,589	\$52,063	\$56,734	1.81%
MEDIAN HOUSEHOLD INCOME (in 2012 dollars)										
\$51,821	\$60,814	\$74,921	\$87,689	\$106,954	1.78%	\$119,034	\$130,792	\$143,754	\$157,459	1.88%
EMPLOYMENT										
8,283	9,685	14,265	15,667	20,097	2.19%	21,883	23,423	25,017	26,673	1.33%

Source: Woods and Poole Complete Economic and Demographic Data, 2021; Medina County
AAGR = Average Annual Growth Rate

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1.7 AIRSIDE FACILITIES AND SERVICES

Castroville Municipal Airport operates with a single runway and full-length parallel taxiway, which provides access to the terminal and other facilities on the Airport. The following Exhibit A.2 provides a graphic representation of the existing airport facilities.

1.7.1 RUNWAYS

The primary runway at the Airport has a designation of 16/34 and is 5,001 feet in length and 75 feet in width. It is constructed of asphalt and has a gross weight-bearing capacity of 15,000 lbs. single wheel. The runway is equipped with Medium Intensity Runway Lights (MIRL), a two-light Precision Approach Slope Indicator (PAPI-2L) on the left side of each runway end and features non-precision approach runway markings (NPI). Table 1.7 outlines the existing runway data for the Airport.

TABLE 1.6 – EXISTING RUNWAY DATA

Category	B-II	B-II
Aircraft Design Group (ADG)	B-II	B-II
Length	5,001	
Width	75'	
Surface Composition (Condition)	ASPH (E)	
Runway Bearing (True)	161	341
Runway End Elevations	773.9'	762.2'
Runway Lighting	MIRL	MIRL
Runway Marking	NPI-G	NPI-G
Navigational Aids	RNAV (GPS)	RNAV (GPS)
Visual Aids (Lighting)	PAPI-2L	PAPI-2L

Source: FAA Form 5010-1 Data, Castroville Municipal Airport Master Record, 2021

1.7.2 TAXIWAYS

The taxiway system at Castroville Municipal Airport consists of both parallel and connector taxiways. Table 1.8 provides detail of each taxiway and its characteristics. Taxiways are designed to route aircraft quickly and efficiently between the runway and various locations around the airport.

Runway 16/34 features a full-length parallel taxiway. Taxiway "A" is situated 190 feet east of Runway 16/34 and offers four (4) connectors (A, A1, A2, A3 & A4) that are 35 feet wide and provide primary access to airport facilities including the general aviation terminal, aircraft parking apron, self-service fuel, and all hangar facilities. All taxiways are equipped with standard markings and LED Medium Intensity Taxiway Lighting (MITL).

A review of the Federal Aviation Administration's (FAA) "hotspot" database revealed no current areas on the airfield being designated as "hotspots", which are defined as areas of increased risk or having a history or potential for runway incursions.

TABLE 1.7 – EXISTING TAXIWAY DATA

Name	Width	Type	Lights/Reflectors	Pavement
A	35	Full-Length Parallel	MITL	Asphalt/Concrete - Good
A1	35	Connector	MITL	Concrete - Good
A2	35	Connector	MITL	Concrete - Good
A3	35	Connector	MITL	Concrete - Good
A4	35	Connector	MITL	Concrete - Good

Source: FAA Form 5010-1 Data, Castroville Municipal Airport Master Record, 2021

1.7.3 WEATHER REPORTING SYSTEM

The Airport is served by an Automated Weather Observing System (AWOS-3) located at Kelly Field (14 nm East) accessible on frequency 120.45. An AWOS unit is a suite of automated sensors that measure, collect, and disseminate minute-by-minute weather data to help pilots and flight dispatchers monitor weather conditions and plan routes for navigation to or from the Airport.

1.7.4 AIRFIELD LIGHTING AND VISUAL AIDS

Beacon – Operating sunset to sunrise, the beacon is a visual navigation aid displaying white and green flashes to indicate a lighted airport or white flashes only for an unlighted airport. The airport beacon is situated midfield, approximately 900 feet east of parallel Taxiway "A".

Medium Intensity Runway Lights are on the runway as a visual aid to the pilot to align themselves with the center of the runway in night flying. These lights have intensity control from the pilot to allow them to make the lights brighter or dimmer to assist on their landing sequence.

Visual Approach Aids – Assist aircraft on final approach by providing vertical situational awareness in relation to the runway threshold. Runway 16/34 is equipped with a two-light Precision Approach Path Indicator (PAPI-2L) situated on the left side of each runway end.

Additional aids to navigation include a lighted wind cone and segmented circle. At Castroville Municipal Airport, the primary lighted wind cone and segmented circle are located west of the terminal apron adjacent to Taxiway "A". Additionally, a tetrahedron is located on the east side of Runway 16/34 near the segmented circle. Windcones are free rotating, truncated cones used to indicate wind direction and velocity. The segmented circle aids pilots in locating the Airport and provides traffic pattern information.



LEGEND

- EXISTING BUILDINGS
- EXISTING PAVEMENT
- RUNWAY PROTECTION ZONE
- PROPERTY LINE



BUILDING LEGEND

NO.	DESCRIPTION	ELEVATION
1	GENERAL AVIATION TERMINAL	786.6'
2	FUEL FARM	788.1'
3	KOATING BEACON	815.5'
4	BOX HANGAR	788.1'
5	BOX HANGAR	790.6'
6	BOX HANGAR	790.6'
7	BOX HANGAR	777.9'
8	BOX HANGAR	779.4'
9	BOX HANGAR	779.4'
10	BOX HANGAR	779.4'
11	SHADE HANGAR	778.4'
12	BOX HANGAR	777.4'
13	BOX HANGAR	781.6'
14	BOX HANGAR	781.6'
15	BOX HANGAR	778.1'
16	BOX HANGAR	784.7'
17	BOX HANGAR	779.8'
18	BOX HANGAR	777.4'
19	BOX HANGAR	777.4'
20	BOX HANGAR	777.4'

PROPERTY/ASSESSMENT DEFICIENCIES

NO.	PROPERTY/ASSESSMENT ADEQUACY
1	11.82 AC
2	1.44 AC
3	DIRECT ACCESS TAXIWAY

Exhibit 1.2 - EXISTING AIRPORT FACILITIES

1.8 LANDSIDE FACILITIES

As reflected in Exhibit 1.2, the existing landside development area at the Airport consists of a general linear layout. The primary development area runs parallel and west of Runway 16/34 and parallel Taxiway "A". The various facilities include a city-owned general aviation terminal/fixe-base operator (FBO), general aviation hangar facilities, self-service fuel, airframe, powerplant, and avionics maintenance providers.

1.8.1 TERMINAL BUILDING/FBO AND AUTO PARKING

The Castroville Municipal Airport Terminal provides 3,000 square feet of amenities including, a pilot lounge with a restroom and shower, FBO and administration offices, flight planning room, passenger waiting and vending area, public restrooms, and conference room. The terminal and waiting area includes parking for 21 automobiles, including two handicap accessible parking positions.



1.8.2 HANGAR FACILITIES

Currently, all hangar facilities at Castroville Municipal Airport are located west of Runway 16/34 and parallel to Taxiway "A". These facilities consist of a mixture of T-hangars, box and corporate hangars, and business hangar facilities. Included in this area are the general aviation terminal and several on-airport businesses. According to airport management, the airport accommodates 19 box hangars, four (4) T-hangar structures providing a total of 32 units, one (1) shade hangar providing a total of 12 units. To date, the airport administration maintains an ongoing waitlist of approximately 43 individuals for hangar space.

1.8.3 FUEL STORAGE FACILITIES

Currently, the Airport's fuel storage area(s) are located east of the general aviation apron (100LL and Self-Service). The fuel is owned by the City of Castroville and consists of two above-ground storage tanks. Tanks consist of one 12,000-gallon AVGAS/100LL with Qtpod Self-Service available 24/7, one 12,000-gallon Jet-A tank, one 3,000-gallon fuel truck, and an on-field company owns a 12,000-gallon Jet A above ground tank, a fuel truck, and two small auto fuel tanks for company use. Full service for Jet-A is provided via one 3,000-gallon truck. All tanks comply with Environmental Protection Agency (EPA) guidelines, including associated spill containment requirements. Table 1.9 details fuel sales for FY 2018 to 2021. In 2021, 100LL accounted for approximately 81% of total flowage, while Jet-A makes up the remaining 19% of flowage.

TABLE 1.8 – ANNUAL FUEL SALES IN GALLONS

Year	100LL	Jef-A	Total
2018	35,451	6,756	42,207
2019	34,998	7,358	42,356
2020	37,351	10,200	47,551
2021	48,426	12,190	60,616
Average	39,057	8,751	47,808

Source: Airport Administration

1.8.4 SECURITY / PERIMETER FENCING

Perimeter fencing at the Airport is a combination of types. A large portion of the Airport surrounding the general aviation terminal, apron, and hangars is served by standard 3-strand barbed wire fencing. Further discussion to address updated perimeter fencing will be reflected in the Alternatives and Implementation chapters of this report.

1.9 AIRSPACE SYSTEM / NAVIGATION AND COMMUNICATION AIDS

Castroville Municipal Airport operates within the larger National Airspace System (NAS), which comprises a wide array of services, systems, and requirements for airports as well as for the pilots that function within it. The following sections provide an overview of the Airport's key considerations with respect to navigating and operating within the NAS.

- Air Traffic Service Areas
- National Airspace System
- Navigational Aids
- Part 77 Airspace Surfaces

1.9.1 AIR TRAFFIC SERVICE AREA AND AVIATION COMMUNICATIONS

FAA Order 7110.65Y, *Air Traffic Control (ATC)*, established that the mission of ATC is safety by stating that the "primary purpose of the ATC system is to prevent a collision between aircraft operating in the system and to organize and expedite the flow of traffic". ATC is the means by which aircraft are directed and separated within controlled airspace.

Within the continental United States, there are some 22 geographic areas that are under ATC jurisdiction. Air traffic services within each area are provided by air traffic controllers in Air Route Traffic Control Centers (ARTCCs). The ARTCCs provide air traffic service to aircraft operating on Instrument Flight Rules (IFR) flight plans within controlled airspace and primarily during the enroute phase of flight. Those aircraft operating under Visual Flight Rules (VFR) that depend primarily on the "see and avoid" principle for separation may also contact the ARTCC or other ATC services to request traffic advisory services. Traffic advisory service is used to alert pilots of other known aircraft in the vicinity or within the flight path of the aircraft. The airspace overlying CVB is contained within the Houston (ZHU) ARTCC jurisdiction, which has a coverage area of airspace in portions of Texas, Louisiana, Mississippi, and Southeast Alabama.

Aircraft operating on instrument flight plans that are approaching or departing an airport are also subject to airspace and ATC. At CVB, clearance delivery, approach, and departure services are provided by San Antonio Approach on frequency 118.05. The primary means of controlling aircraft employed by air traffic controllers is computerized radar systems that

are supplemented with two-way radio communications. Altitude assignments, speed adjustments, and radar vectors are examples of techniques used by controllers to ensure that aircraft maintain proper separation. The specified lateral and vertical separation criterion for aircraft used by controllers is as follows.

- Lateral Aircraft Separation: three (3) miles (radar environment)
- Lateral Aircraft Separation: five (5) miles (non-radar environment)
- Vertical Aircraft Separation: 1,000 feet below (below 29,000 feet) and 2,000 feet (29,000 feet and above)

1.9.2 NATIONAL AIRSPACE SYSTEM

To ensure a safe and efficient airspace environment for all aspects of aviation, the FAA has established an airspace structure through the Federal Aviation Regulations (FAR) that regulates and establishes procedures for aircraft that use the NAS. This airspace structure essentially provides two basic categories of airspace: controlled (classified as A, B, C, D, and E) and uncontrolled (classified as G).

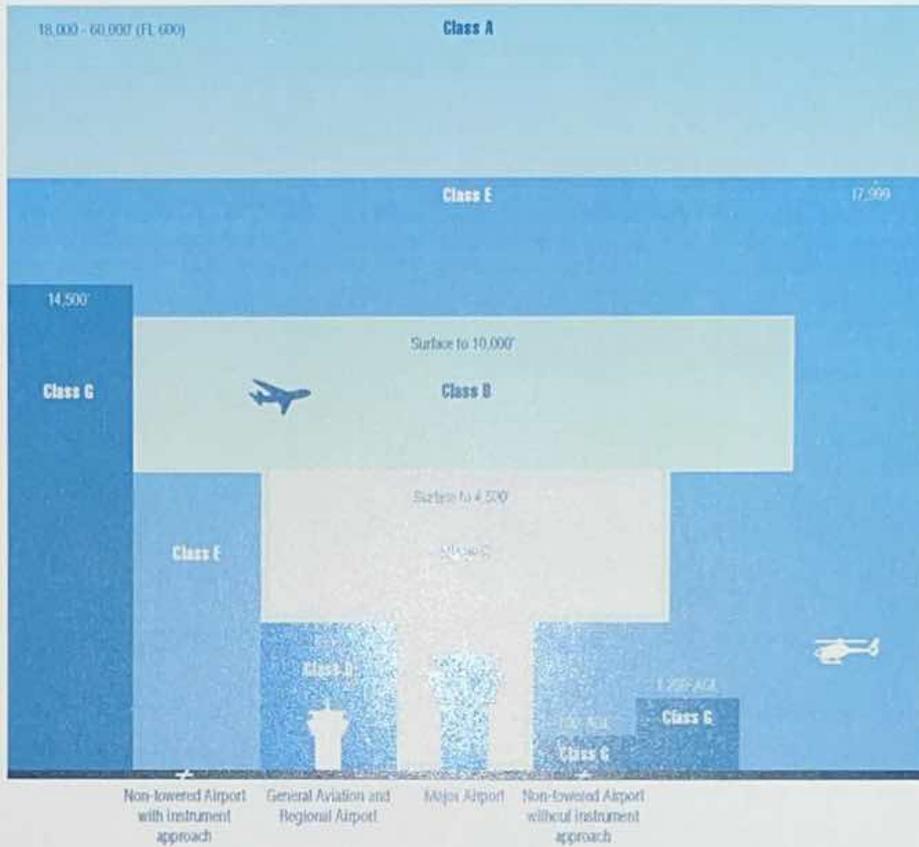
Further, FAR Part 71 and FAR Part 73 established these classifications of airspace with the following characteristics.

- **Class A** airspace is generally the airspace from 18,000 feet mean sea level (MSL) up to Flight Level 600 (or 60,000 feet MSL). Unless otherwise authorized, all operations in Class A airspace are conducted under instrument flight rules (IFR).
- **Class B** airspace is generally airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of operations or passenger enplanements. An ATC clearance is required for all aircraft to operate within Class B airspace, and all aircraft that are so cleared receive separation services within the airspace. Clearance into Class B airspace can only be received when the controller specifically calls the tail number of the aircraft and grants explicit clearance to enter the airspace (e.g., "N1234, you are cleared to enter the Class B airspace").
- **Class C** airspace is generally airspace from the surface up to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by radar approach control, and have a certain number of IFR operations or passenger enplanements. Each aircraft must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and, thereafter, maintain those communications while in the airspace.
- **Class D** airspace is generally from the surface up to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower. Unless otherwise authorized, each aircraft must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while in the airspace.
- If the airspace is not classified as A, B, C, or D, and is controlled airspace, then it is Class E airspace. Class E airspace extends upward from either the surface or designated altitude to the overlying or adjacent controlled airspace. Only aircraft operating under IFR are required to be in contact with ATC when operating within Class E airspace.
- **Class G** or uncontrolled airspace is the portion of airspace that has not been designated with any of the above classifications. It extends from the surface to the base of the overlying Class E airspace. Although ATC has no authority or responsibility to control air traffic, pilots must still abide by visual flight rules (VFR) minimums in Class G airspace.

Castroville Municipal Airport lies within Class E airspace, which is controlled airspace not classified as A, B, C, or D airspace. A large amount of the airspace over the United States is designated as Class E airspace. In most areas, the Class E airspace base is either the surface or 700 feet AGL. Class E airspace typically extends up to, but not including, 18,000 feet MSL (the lower limit of Class A airspace). Exhibits 1.3 and 1.4 show airspace classifications and the portion of the sectional chart published by the FAA's National Aeronautical Charting Office for the immediate regional airspace around CVB.

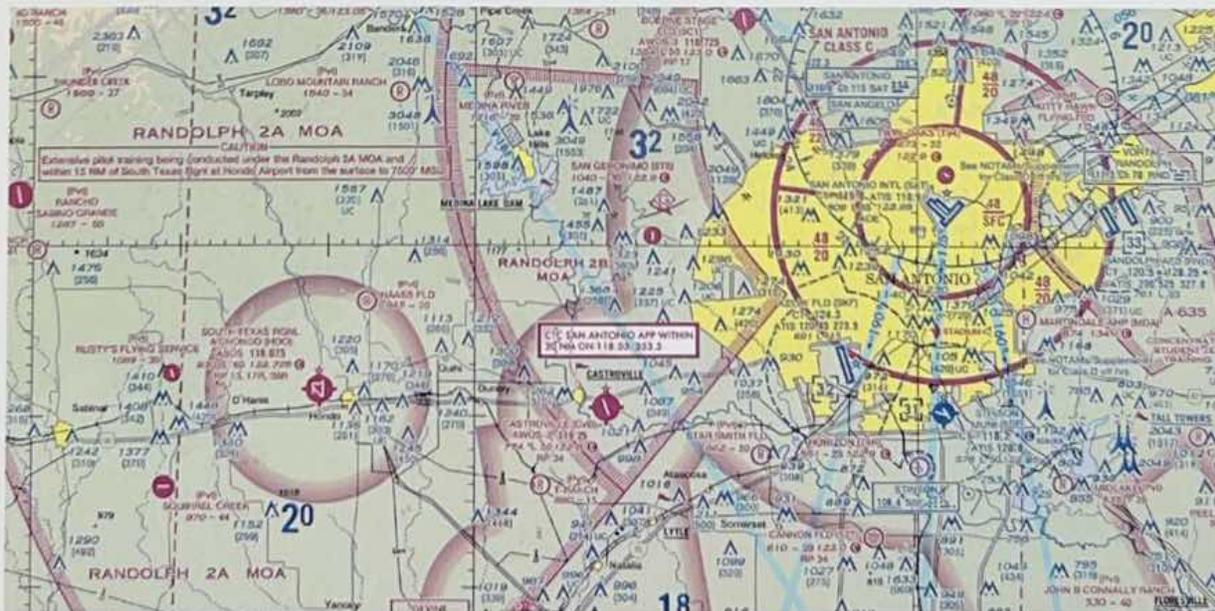
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EXHIBIT 1.3 – FAA AIRSPACE CLASSIFICATION



Source: Federal Aviation Administration

EXHIBIT 1.4 – FAA SECTIONAL CHART



Source: SkyVector, 26 March 2022

1.9.3 NAVAIDS / COMMUNICATIONS

In 2003, the FAA implemented Wide Area Augmentation System (WAAS) availability to public airports. Pilots are now benefiting from the large number of Area Navigation (RNAV) Global Positioning System (GPS) approaches and lower minimums provided by WAAS-enabled systems. These systems are greatly more abundant than Instrument Landing Systems (ILS) and other ground-based systems from the 20th century. As of October 7, 2021, there are 4,088 Wide Area Augmentation System (WAAS) Localizer Performance with Vertical Guidance (LPV) approach procedures serving 1,965 airports, 1,195 of these airports are non-ILS facilities. Currently, there are also 731 Localizer Performance (LP) approach procedures in the U.S., serving 535 airports, 432 of which are non-ILS facilities.

A variety of navigational facilities are currently available to pilots around Castroville Municipal Airport, whether based at the field or at other locations in the region. Many of these navigational aids (NAVAIDs) are available to en-route air traffic as well. The NAVAIDs available for use by pilots in the vicinity of CVB are VOR and VORTAC facilities.

A VORTAC is a Very High-Frequency Omnidirectional Range / Tactical Air Navigation station transmitting very high frequency signals, 360 degrees in azimuth oriented from magnetic north, with equipment used to measure, in miles, the slant range distance of an aircraft from that navigation aids. A VORTAC provides VOR azimuth, TACAN azimuth, and TACAN distance measure equipment (DME) at one site. The VOR located nearest Castroville Municipal Airport is the STINSON VORTAC (SSF, 108.40), located 21.9 miles east of the field, while the nearest VORTAC is the SAN ANTONIO VORTAC (SAT, 116.80), located 27.2 miles northeast of the field.

There are two (2) published instrument approach procedures that serve Castroville Municipal Airport. Table 1.10 summarizes each published approach and associated visibility minimums.

TABLE 1.9 – INSTRUMENT APPROACH PROCEDURES

Instrument Approach	Lowest Straight-In Minimums		Lowest Circling Minimums	
	Ceiling	Visibility	Ceiling	Visibility
RNAV (GPS) Runway 16	426'	1-Mile	466'	1-Mile
RNAV (GPS) Runway 34	431'	1-Mile	426'	1-Mile

Source: FAA Terminal Procedures, 24 March 2022 – 21 April 2022

1.9.4 PART 77 / IMAGINARY SURFACES

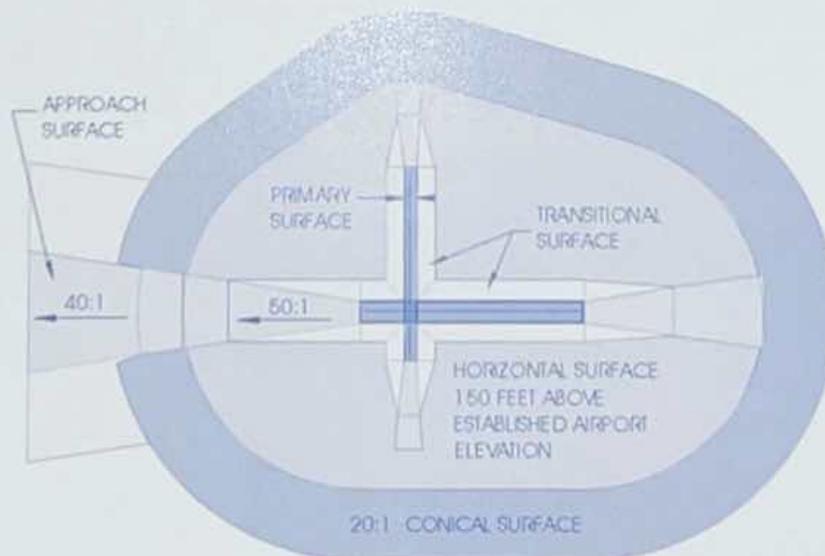
Federal Aviation Regulation (FAR) Part 77, Objects Affecting Navigable Airspace, is a tool used to protect the airspace over and around a given airport and each of its approaches from potential obstructions to air navigation. It is important to note that as a federal regulation, all airports included in the NAS are subject to the requirements of Part 77. To determine whether an object is an obstruction to air navigation, Part 77 establishes several imaginary surfaces in relation to an airport and each runway end. The dimensions and slopes of these surfaces depend on the configuration and approach categories of each airport's runway system. The size of the imaginary surfaces depends largely on the type of approach to the runway. The principal imaginary surfaces are described in Exhibit 1.6.

- **Primary Surface:** Longitudinally centered on the runway at the same elevation as the nearest point on the runway centerline.
- **Horizontal Surface:** Located 150 feet above the established airport elevation, the perimeter of which is

established by swinging arcs of specified radii from the center of each primary surface end and connected via tangent lines.

- **Conical Surface:** Extends outward and upward from the periphery of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet.
- **Approach Surface:** Longitudinally centered on the extended centerline and extending outward and upward from each runway end at a designated slope (e.g., 20:1, 34:1, 40:1, and 50:1) based on the runway approach.
- **Transitional Surface:** Extends outward and upward at a right angle to the runway centerline at a slope of 7:1 up to the horizontal surface.

EXHIBIT 1.6 – PART 77 | IMAGINARY SURFACES



Known obstructions to the Part 77 surfaces described above will be illustrated on the ALP set being prepared alongside this planning effort. It is important to note that updated obstruction information for the Airport and its surrounding should be collected through an aerial photogrammetry/survey effort prior to any physical changes to the runway or modifications to approaches serving either runway end.

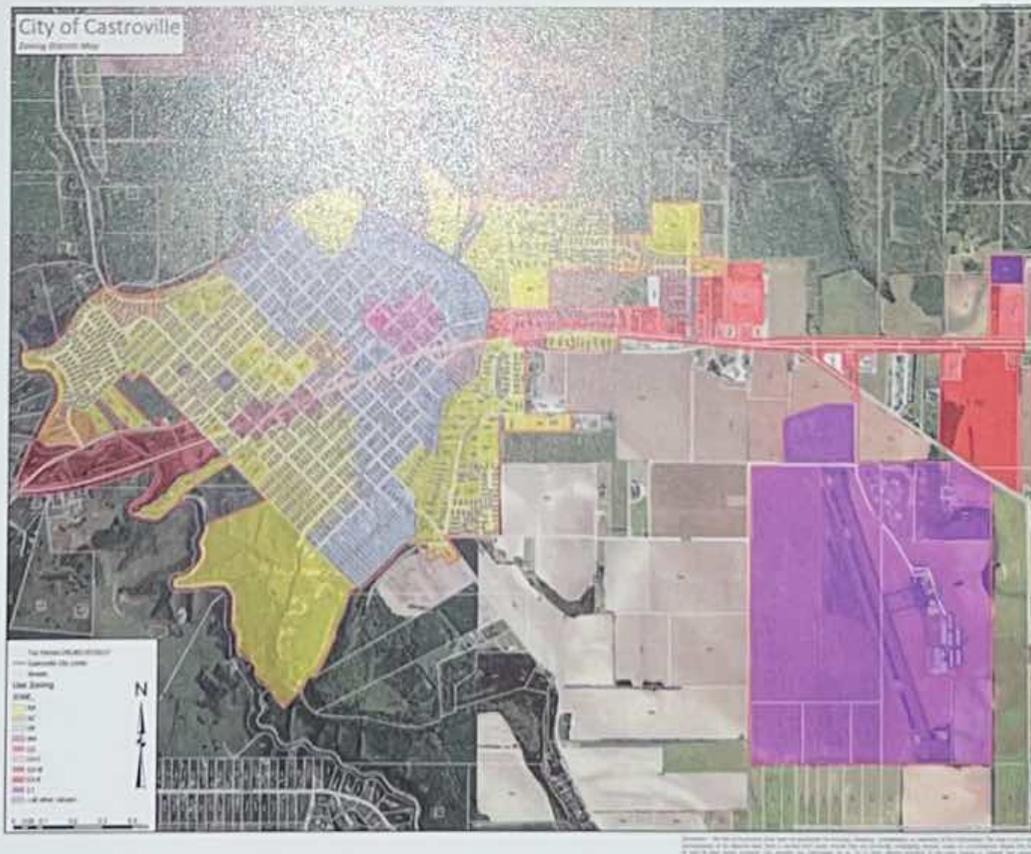
1.10 AIRPORT ENVIRONS

This section addresses and examines the regional setting of the Airport and land uses that surround it. This task is critical to the future development of the Airport because local land-use patterns will ultimately affect the potential for expansion and capital improvements.

1.10.1 EXISTING ZONING

The City of Castroville maintains a zoning map that demonstrates appropriate zoning in areas throughout the city, including the Airport, and height hazard zoning in the vicinity of the Airport. Exhibit 1.7 graphically depicts the existing zoning surrounding the Castroville Municipal Airport.

EXHIBIT 1.7 – EXISTING ZONING



1.10.2 HEIGHT HAZARD ZONING

Although the Federal Aviation Administration (FAA) has the authority to regulate the flight of aircraft, it has only limited authority to ensure that areas surrounding airports are free of hazards. Without regulatory authority at the Federal level of government, the responsibility for ensuring that areas surrounding an airport are free from hazards is left to the local government.

The implementation of Avigation Easements may give the Airport further control over future land uses that might be hazardous to flight operations. An avigation easement protects the surrounding airspace, above a specific height, from



future obstructions by retaining those rights to a property from a landowner to limit the use of the land use subject to the easement.

Currently, the City of Castroville has not adopted formal height hazard zoning standards. Following the completion of the Airport Layout Plan (ALP) Update, the recommendation should be made to council to adopt new height hazard zoning standards for the City of Castroville to protect the future development of Castroville Municipal Airport.

1.11 SUMMARY

This inventory chapter represents a consolidated resource containing the Airport's data that will be referenced during the completion of the Castroville Municipal Airport Layout Plan (ALP) Update. When necessary, the data presented in this chapter will be expanded on for the completion of specific planning tasks. In addition, as the development plan progresses, new and/or updated data related to facilities and infrastructure examined in this chapter may become available. When appropriate, new data will be incorporated into this chapter and the entire ALP Update narrative.

The inventory data presented in this chapter provides a framework from which analysis of the Airport will proceed. Some inventory data, such as the Airport's history, provides general background knowledge. Other types of inventory data, such as airport role and existing airport facilities, are used to help determine future facility requirements. Subsequent chapters, especially the Forecast of Aviation Demand, will also be key components to the development of facility requirements.



Much of the data presented in this chapter is used to conduct numerous analyses as the development planning process works towards identifying a recommended development plan for CVB. The next step in the planning process is to formulate forecasts for the quantity and type of future aviation activity expected to occur at the Airport during the 20-year planning period.

CHAPTER TWO

FORECAST




Castroville
MUNICIPAL AIRPORT

02 AVIATION DEMAND FORECAST

2.1 OVERVIEW

The demand forecast element of the planning process is used to determine the need for future capital development, as well as investment in the airport facility itself. Essential to this determination is the generation of forecasts and projected increases in airport activity. Demand forecasts provide a means of determining the type, extent, size, location, timing, and financial feasibility of future capital improvements. Consequently, demand forecasts influence the remaining phases of the planning process.

Forecasting aviation activity requires more than an extrapolation of past trends; it involves the application of statistical measures to correlate future demand with population projections, economic performance, and demographic data. Because demand forecasting is not an exact science, it requires the application of professional judgment and experience and an understanding of the market forces that promote or limit aviation growth.

Demand forecasts have been prepared and are presented in this chapter to assist the city in evaluating the performance-based needs of the Airport during the next 20-years. Additionally, the Federal Aviation Administration (FAA) will review and accept the forecasts to ensure they are reasonable compared to current FAA forecasting projections. The forecasts are organized to include a range of activities, including based aircraft, operational fleet mix, annual operations (itinerant and local), and ultimate critical aircraft.

2.2 DATA SOURCES

The forecasting process begins by obtaining recorded data pertinent to the operation and administration of Castroville Municipal Airport. Generally, aviation activity forecasting commences by utilizing the present time as an initial point, supplemented with historical trends obtained from previous years' activity and recorded information. This data has evolved from a comprehensive examination of historical airport records provided by airport personnel, FAA Form 5010-1, *Airport Master Record*, *FAA Terminal Area Forecasts*, and the *FAA Aerospace Forecasts Fiscal Years 2022-2042*. Supplemental publications providing trends and conditions of the aviation industry include the *General Aviation Statistical Databook Industry Outlook* and *Business Aviation Fact Book, 2018*. These documents were assembled in different years, making the base year data quite variable and emphasizing the need for establishing a well-defined and well-documented set of historical information from which to project future aviation activity trends.

2.3 FACTORS AFFECTING FUTURE AVIATION DEMAND

Before examining future activity, several assumptions and conditions that help form the basis or foundation for the development of forecasts should be noted. These statements cover a wide variety of physical, operational, industry, and socioeconomic considerations.

2.3.1 DEMOGRAPHICS

The existing socio-economic condition of a particular region historically impacts aviation within an area and is often analyzed in the forecasts of aviation activity. Provided by Woods and Poole, the most current demographic data for Medina County shows average annual increases to the year 2042 for the population at 0.83%, per capita income at 1.81%, and employment at 1.32%.

2.3.2 COMMUNITY SUPPORT

Castroville Municipal Airport benefits from the support of the surrounding community and government, local industry, strategic partnerships, and citizens. The Airport is recognized as a vital asset to both the City of Castroville and Medina County, contributing to the stability and future of the area's economy. Additionally, much of the region benefits from the proximity of a regional aviation facility and, in turn, provides an economic base that can attract additional based aircraft and industrial/business development to the Airport.

2.3.3 COVID-19

Nothing has impacted the global or national aviation industry since the 2008/09 recession as the existing COVID-19 pandemic. This virus outbreak has led to major declines in demand for air carrier and general aviation activity and led those in the industry to announce severe cost-cutting measures, request government funding assistance, and/or ground fleets. The spread of the virus has created a concern for both short- and long-term effects within the aviation industry nationally and globally.

Similar to the well-known and stated declines with airlines, the general aviation sector has not been immune to similar impacts. General Aviation provides more than one (1) percent of \$247 billion of the GDP in the U.S. and accounts for over 1.3 million jobs. Typically, the GA sector's strength is based on sales and aircraft deliveries to various purchasers across the globe. When analyzing details provided by the General Aviation Manufacturers Association (GAMA), 2020 started strong and was on par to replicate or exceed 2019; however, when health and safety restrictions were put into place to respond to COVID-19, supply chains and deliveries were shut down and negatively impacted. The following Table 2.1 compares general aviation aircraft sales and deliveries from the first quarter of 2019 to the first quarter of 2020. As reflected, decreases are exhibited across the board from all aircraft sectors.

TABLE 2.1 – GAMA SALES COMPARISON 2019-2020

Aircraft Type	2019	2020	% Change
Piston Airplanes	877	889	1.4%
Turboprop Airplanes	348	254	-27.0%
Business Jets	516	378	-26.7%
Total Airplanes	1,741	1,521	-12.6%
Total Airplane Billings	\$14.9B	\$11.9B	-20.1%
Piston Helicopters	141	105	-25.5%
Turbine Helicopters	434	333	-23.3%
Total Helicopters	575	438	-23.8%
Total Helicopter Billings	\$2.2B	\$1.9B	-16.2%

Source: General Aviation Manufacturers Association (GAMA).

While overall shipments were down, discussions provided by the National Business Aviation Association indicate the industry is on a trajectory that is turning the corner and headed back in the right direction. Fractional aircraft owner shares have witnessed significant increases in customer base who understand the "inherent advantages of business aviation: going more places in less time, reaching destinations they didn't think they could reach, and flying in a safe, secure, and

healthy manner” and “clients see business aviation as an option to eliminate concerns about airlines cabins packed with people.” These statements, along with the approval and dissemination of COVID-19 vaccines, are providing the framework to help put general aviation back on course for growth and potential record-breaking activity. Table 2.2 provides an updated comparison of aircraft deliveries from the third quarter of 2020 to the third quarter of 2021, showing an upward trend.

TABLE 2.2 – GAMA SALES COMPARISON 2020-2021

Aircraft Type	2020	2021	% Change
Piston Airplanes	901	895	-0.7%
Turboprop Airplanes	254	357	40.6%
Business Jets	378	438	15.9%
Total Airplanes	1,533	1,690	10.2%
Total Airplane Billings	\$11.9B	\$13.4B	13.0%
Piston Helicopters	105	131	24.8%
Turbine Helicopters	332	410	23.5%
Total Helicopters	437	541	23.8%
Total Helicopter Billings	\$1.8B	\$2.4B	37.3%

Source: General Aviation Manufacturers Association (GAMA).

2.4 GENERAL AVIATION TRENDS

At the national level, fluctuating trends related to general aviation usage and economic uncertainty resulting from the national and international business cycles significantly impact general aviation demand levels. General aviation aircraft are classified as all aircraft not flown by commercial airlines or the military. This includes an incredibly diverse array of flying that ranges from a personal vacation getaway in a small single-engine plane to overnight package delivery to an emergency medical evacuation to a morning sightseeing flight to flight instruction that trains new pilots to helicopter traffic reports that keep drivers informed of rush-hour delays. Simply stated, general aviation encapsulates all those individual unscheduled aviation activities that enrich, enhance, preserve, and protect our lives.

As defined by the FAA, general aviation activities are divided into six use categories:

- **Personal** – About a third of all private flying in the United States is for personal reasons, including practicing flight skills, personal or family travel, personal enjoyment, or personal business.
- **Instructional** – All private flight instruction for purposes ranging from private pilot to airline pilot is conducted through general aviation.
- **Corporate** – About 12 percent of the total private flying in the U.S. is done in aircraft owned by a business and piloted by a professional. Many of these flights are in jets and cover long distances, with some flying to intercontinental and international destinations. Businesses elect to fly these trips to save time and expand their geographic and operational networks.
- **Business** – About 11 percent of the total private flying in the U.S. is done by business individuals flying themselves to meetings or other events, primarily in piston or turboprop aircraft. Most pilots own or work

for relatively small businesses and use the aircraft to accomplish missions that would otherwise take more time or be infeasible.

- **Air Taxi** – When scheduled air service is either unavailable or inconvenient, businesses and individuals use charter aircraft from air taxi service providers. These flights save time and make it possible to fly directly to those places that cannot be reached by scheduled service. (Note that “air taxi” is also utilized as a charter or on-demand commercial air service classification).
- **Other** – All other activities are classified as being “other.” Given the diverse nature of general aviation, this includes disaster relief, search and rescue, police operations, news reporting, border patrol, forest firefighting, aerial photography and surveying, crop dusting, and tourism activities, among many others.

2.4.1 BUSINESS USE OF GENERAL AVIATION

Business and corporate aviation are the fastest-growing facets of general aviation. Companies and individuals use aircraft as tools to improve the efficiency and productivity of their businesses and personnel. The use of general aviation aircraft affords businesses direct control of their travel itineraries and destinations and significantly reduces travel times and inconveniences often associated with scheduled airline service.

According to the NBAA’s Business Aviation Fact Book, only 3 percent of the approximately 15,000 business aircraft registered in the U.S. are flown by large, Fortune 500 companies. The remaining 97 percent are operated by a broad cross-section of organizations, including government, universities, charitable organizations, and businesses of all sizes. Most U.S. companies that utilize business aircraft (85 percent) are small and mid-size businesses, many of which are based in the dozens of communities across the county where the airlines have reduced or eliminated service. The benefits of corporate general aviation are evidenced by the significant growth that business/corporate general aviation has recently experienced.

Business use of general aviation ranges from small, single-engine aircraft rentals to corporate aircraft fleets supported by dedicated flight crews and mechanics. Business aircraft usage by smaller companies has also escalated dramatically as various chartering, leasing, fractional ownership, interchange agreements, partnerships, and management contracts have emerged.

Of particular note is the immense popularity of fractional ownership operations, which began in 1986 with the creation of a program that offered aircraft owners increased flexibility in the ownership and operation of aircraft. The program uses current aircraft acquisition concepts, including shared or joint aircraft ownership, and provides for the management of the aircraft by an aircraft management company. The aircraft owners participating in the program agree not only to share their own aircraft with others having a shared interest but also to lease their aircraft to others in the program. The aircraft owners use a common management company to provide aviation management services, including maintenance of the aircraft, crew training and assignment, and leasing management.

Even in an unsteady economy, fractional operators say business has continued to improve as existing customers re-enter the market or increase their fractional aircraft usage. In addition, they say an increasing number of new prospects are making a move to fractional ownership as an alternative to flying commercially or owning a business jet outright. Fractional-share ownership makes up 15% of business aviation flights.

Growing segments of the business aircraft fleet mix include business liners and very light jets (VLJ). Business liners are large business jets, such as the Boeing Business Jet (BBJ) and Airbus ACJ, reconfigured versions of passenger aircraft flown by large commercial airlines. Labeled as “personal jets” VLJs are small, six-seat jets costing substantially less

than typical business jet aircraft. Popular aircraft models in this category include the Eclipse 500 and 550, Embraer Phenom 100, Cessna Mustang, HondaJet, and the Cirrus Vision Jet.

2.4.2 GENERAL AVIATION OUTLOOK

National general aviation activity trends are monitored and forecasted by the FAA on an annual basis in the FAA Aerospace Forecasts publication. The most current edition covers Fiscal Years 2022-2042.

Single and multi-engine piston aircraft experienced a decline in the number of total aircraft between 2010 and 2020. Although still the largest portion of aircraft in the active fleet, the number of single-engine aircraft fell from 139,500 in 2010 to 127,920 in 2020, a 0.9 percent average annual decline. During that same period, multi-engine piston aircraft had a much steeper decline, falling from 15,900 aircraft to 12,395, a 2.5 percent annual decrease. In total, active piston aircraft decreased at 1.0 percent annually over the last ten years. In its annual aviation forecast, the FAA indicates that it expects the number of active piston general aviation aircraft to continue to decline, but by a lower rate than in the past decade. Over the next decade, the decrease in the number of piston aircraft is expected to be 0.9 percent per year over the next two decades. The result of these predictions shows total piston aircraft (combined single and multi-engine) falling from 143,396 in 2019 to 116,905 in 2041.

Conversely, turboprop and jet aircraft experienced substantial growth between 2010 and 2020, increasing from approximately 20,853 to 25,450 aircraft, a 2 percent average annual increase over that period. One of the most important trends identified by the FAA in their forecasts is the growth anticipated in active general aviation jet aircraft. The active general aviation turboprop and jet aircraft fleet is anticipated to continue to increase dramatically over the projection period, to 35,780 aircraft in 2041, with jet aircraft almost doubling in numbers within this same time period.

The FAA also tracks and projects a valuable metric known as active general aviation and air taxi hours flown. This measurement captures a number of activity-related data, including aircraft utilization, frequency of use, and duration of use. Hours flown in general aviation piston aircraft experienced a decrease of 1.0 percent annually from 2010 to 2020, while turboprop and jet aircraft hours flown reflected a 2.0 percent average annual growth for the same period. Combined, general aviation hours flown are expected to grow at a rate of 1.0 percent per year through 2042.

2.4.3 SUMMARY

The aviation industry has navigated significant challenges (9/11 and 2008 global financial crisis), after which passenger numbers flatlined for 2-3 years before continuing the upward trajectory. Following these crises, many companies and their supply chains emerged and restructured to thrive. While there is no crystal ball on predicting when the turnaround will be realized, the International Air Transport Association (IATA) is postulating full recovery not occurring until at least 2023, with a worst-case scenario of 2025, assuming vaccine implementation continues, restrictions for international travel have relaxed, the global economy rebuilds, and passenger confidence increases. This sentiment is echoed by the airline data analytics firm OAG, which states, "several years of industry growth has been lost, and it could take until 2022 or 2023 before the volume of fliers returns to levels expected in 2020".

Additionally, it is anticipated general aviation will witness the same rebound as the airlines, with a more expedited time frame. Increases in general aviation activity have already shown signs of starting to rebound and are expected to hit pre-COVID levels sooner than anticipated. Based on this information, the forecasting outcomes for CVB in the following sections will be based on a combination of industry trends pre- and post-COVID. Ultimately, the forecasts will be based on lower baseline numbers or reflect slower demand in the short-term while the long-term will be unaffected.

2.5 AVIATION FORECAST METHODOLOGY

2.5.1 DEMAND FORECAST APPROACH

In an effort to garner FAA approval and acceptance of aviation forecasts, certain methods of forecast development are necessary for evaluation. Choosing the appropriate forecasting methodology is important as developing forecasting scenarios to properly plan for the future. Forecast scenarios developed for CVB will consider historical operational data but will also rely largely upon expert judgment. It is important to emphasize the fact that aviation forecasting is not an “exact science” so experienced aviation judgment and practical considerations will influence the level of detail and effort required to establish a reasonable forecast and the development of decisions that result from them.

A qualitative forecast will give an explanation, understanding, or interpretation of current airport conditions and also explain why future development scenarios are justifiable. Forecasting scenarios for CVB will be developed by examining the meaningful and symbolic content of qualitative data, coupling it with available historical data. Sources and methods for forecasting are provided by several FAA documents, including Federal Aviation Administration Advisory Circular 150/5070-6B, *Airport Master Plans*, FAA Office of Aviation Policy and Plans, *Forecasting Aviation Activity by Airport, Review, and Approval of Aviation Forecasts, 2008*.

Projections of aviation demand incorporate local and national industry trends in assessing current and future demand. Therefore, socioeconomic factors such as local population, income, and employment are also analyzed for the effect they may have on historical and future levels of activity. The comparison of relationships among these various indicators provides the initial step in the development of realistic forecasts of aviation demand. Methodologies used to develop forecasts described in the section include:

- Time-Series Methodologies
- Market Share Methodologies
- Socioeconomic Methodologies

2.5.2 TIME SERIES METHODOLOGY

Historical trend lines and linear extrapolation are widely used methods of forecasting. These techniques utilize time-series types of data and are most useful for a pattern of demand that demonstrates a historical relationship with time. Linear extrapolation establishes a linear trend by fitting a straight line using the least-squares method to known historical data. Historical trend lines used in this chapter examine historical compounded annual growth rates (CAGR) and extrapolate future data values by assuming a similar compounded annual growth rate for the future.

2.5.3 MARKET SHARE METHODOLOGY

Market share, ratio, or top-down models compare local levels of activity with a larger entity. Such methodologies imply that the proportion of activity that can be assigned to the local level is a regular and predictable quantity. This method has been used extensively in the aviation industry to develop forecasts for the local level. It is most commonly used to determine the share of total national traffic activity that will be captured by a particular region or airport. Historical data is examined to determine the ratio of local traffic to total national traffic. The FAA develops national forecasts annually in its FAA Aerospace Forecasts document. This data source is compared with historical levels of activity reported by Castroville Municipal Airport.

2.5.4 SOCIOECONOMIC METHODOLOGY

Though trend line extrapolation and market share analysis may provide mathematical and formulaic justification for demand projections, there are many factors beyond historical levels of activity that may identify trends in aviation and impact on aviation demand locally. Socioeconomic or correlation analysis examines the direct relationship between two or more sets of historical data. Local conditions that are examined in this chapter include population, per capita income, and total retail sales. Based upon the observed and projected correlation between historical aviation activity and the socioeconomic data sets, future aviation activity projects are developed.

2.6 GENERAL AVIATION ACTIVITY FORECASTS

2.6.1 BASED AIRCRAFT

Based aircraft are defined as those aircraft that are permanently stored at an airport, either in a hangar or on an aircraft parking apron. Estimating the number and types of aircraft expected to be based at CVB over the 20-year study period will impact the planning for its future facility and infrastructure requirements. As the number of aircraft based at an airport increases, so do the aircraft storage requirements at the facility.

There are many factors that determine the number of general aviation aircraft that can be expected to be based at an airport, such as available facilities and services, proximity and access to the airport, amenities, and facilities at adjacent, nearby airports. General aviation aircraft owners and operators are particularly sensitive to both the quality and location of their basing facilities. Owners would rather be in close proximity to their home and/or work and typically weigh this need as primary when considering aircraft storage needs. According to airport personnel, a total of 68 aircraft are stored on the field.

According to FAA Aerospace Forecasts, Fiscal Years 2022-2042, between 2010 and 2020, the active general aviation aircraft in the U.S. decreased at a CAGR of -0.9 percent. During this same time frame, the number of piston aircraft (single-engine and multi-engine) in the U.S. fleet decreased at an average annual rate of 1.0 percent, while turbine (turboprop and jet) aircraft increased at an average CAGR of 2.0 percent. As has been the trend, piston aircraft continue to see year over year decreases while turbine aircraft remain in a positive growth mode. Conversely, for the projected years 2022-2042, the FAA projects a negative growth rate of 0.8 percent for piston aircraft and a positive rate of 1.9 percent for turbine aircraft. Overall, the total general aviation fleet (including rotorcraft, experimental, and light sport aircraft) is projected with a positive CAGR of 0.1 percent.

2.6.2 MARKET SHARE METHODOLOGY

Castroville Municipal Airport's market share of the total U.S. general aviation fleet between 2012 and 2021 has fluctuated from a low of 0.0167% in 2015 to a high of 0.0320% in 2021, with the average calculated at 0.0219%. For the constant market share, the 2021 value of 0.0320% will be utilized for the 20-year planning period. Based on these percentages, based aircraft growth based on the constant market share provides a CAGR of 0.0 percent, and the increasing market share reflects a CAGR value of 1.9%. Table 2.3 show both market share scenarios.

TABLE 2.3 – MARKET SHARE BASED AIRCRAFT FORECASTS

Year	CVB Based Aircraft	Total U.S. Active Aircraft	CVB Market Share
2012	37	218,036	0.0170%
2013	37	215,369	0.0172%
2014	37	212,702	0.0174%
2015	35	210,031	0.0167%
2016	58	211,794	0.0274%
2017	53	211,757	0.0250%
2018	53	211,758	0.0250%
2019	53	211,759	0.0250%
2020	52	211,749	0.0246%
2021	68	212,335	0.0320%
Increasing Market Share Projection			
2027	68	211,400	0.0320%
2032	68	210,440	0.0320%
2037	68	209,960	0.0320%
2042	67	210,380	0.0320%
<i>CAGR (2021-2042) = 0.0%</i>			
Increasing Market Share Projection			
2027	75	211,400	0.0350%
2032	81	210,440	0.0390%
2037	87	209,960	0.0420%
2042	95	210,380	0.0450%
<i>CAGR (2021-2042) = 1.6%</i>			

Source: KSA; FAA Aerospace Forecasts, 2022-2042.

2.6.3 SOCIOECONOMIC – INCOME METHODOLOGY

Income can often be a strong indicator of one's propensity to own an aircraft. The socioeconomic income variable methodology compares historical-based aircraft at Castroville Municipal Airport to per capita income in Medina County. According to data obtained by Woods and Poole, Inc. per capita income in Medina County has increased steadily from 2012 to 2021 and is anticipated to increase to \$56,734 by 2042. The 2021 figure of 0.0018 based aircraft per \$1 income is applied to projections of per capita income and shown in Table 2.4. This forecast posits a CAGR of 1.9 percent for a total of 100 based aircraft by the end of the planning period.

TABLE 2.4 – SOCIOECONOMIC – INCOME VARIABLE BASED AIRCRAFT FORECASTS

Year	CVB Based Aircraft	Medina County Per Capita Income	Based A/C per \$1 Income
2012	37	\$20,928	0.0018
2013	37	\$22,880	0.0016
2014	37	\$24,832	0.0015
2015	35	\$26,784	0.0013
2016	58	\$28,736	0.0020
2017	53	\$30,688	0.0017
2018	53	\$32,640	0.0016
2019	53	\$34,592	0.0015
2020	52	\$36,544	0.0014
2021	68	\$38,505	0.0018
Socioeconomic – Income Variable			
2027	77	\$43,324	0.0018
2032	84	\$47,589	0.0018
2037	92	\$52,063	0.0018
2042	100	\$56,734	0.0018

CAGR (2021-2042) = 1.9%

Source: KSA; FAA Aerospace Forecasts, 2022-2042.

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2.6.4 SOCIOECONOMIC – POPULATION METHODOLOGY

The socioeconomic population variable methodology compares historical-based aircraft at the Airport with the population of Medina County. Between 2012 and 2021, the population of Medina County increased from 47,186 to approximately 52,011. The 2021 figure of 0.0013 based aircraft per capita is applied to the population projections of Medina County and reflected in Table 2.5.

TABLE 2.5 – SOCIOECONOMIC – POPULATION VARIABLE BASED AIRCRAFT FORECASTS

Year	CVB Based Aircraft	Medina County Population	Based A/C per capita
2012	37	47,186	0.0008
2013	37	47,722	0.0008
2014	37	48,258	0.0008
2015	35	48,794	0.0007
2016	58	49,330	0.0012
2017	53	49,866	0.0011
2018	53	50,402	0.0011
2019	53	50,938	0.0010
2020	52	51,474	0.0010
2021	68	52,011	0.0013
Socioeconomic – Population Variable			
2027	72	55,100	0.0013
2032	75	57,418	0.0013
2037	78	59,834	0.0013
2042	82	62,351	0.0013

CAGR (2021-2042) = 0.9%

Source: KSA; FAA Aerospace Forecasts, 2022-2042.

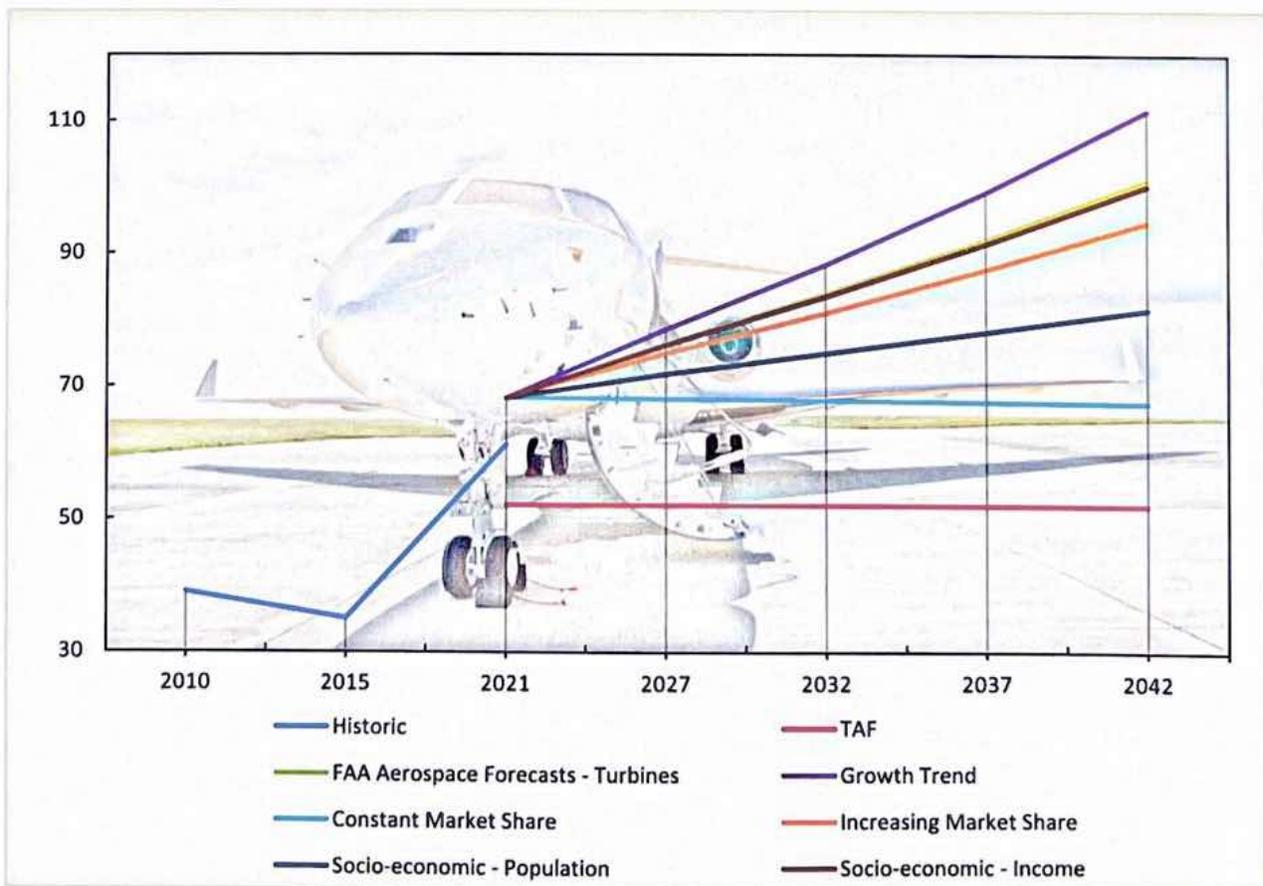
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TABLE 2.6 – PREFERRED BASED AIRCRAFT FORECAST, 2021-2042

Year	FAA TAF Summary	FAA Aerospace Forecasts	Constant Market Share	Increasing Market Share	Socioeconomic Income	Socioeconomic Population
2021	52	68	68	68	68	68
2027	52	76	68	75	76	72
2032	52	84	68	81	83	75
2037	52	92	68	87	91	78
2042	52	101	67	95	100	82
CAGR	0.0%	1.9%			1.9%	0.9%

Source: KSA; FAA Aerospace Forecasts, 2022-2042.

EXHIBIT 2.1 – PREFERRED BASED AIRCRAFT FORECAST



2.6.5 PREFERRED BASED AIRCRAFT FORECAST

A comparison of projected based aircraft using the methodologies described in previous sections is shown above in Table 2.6 and Exhibit 2.1. All the methods anticipate either retention of the existing or an increase in based aircraft demand over the next 20-years. With the airport exhibiting a current hangar waitlist of 43 individuals, the preferred-based aircraft forecast follows course with the socioeconomic-income methodology. This scenario increases based aircraft from the current level of 68 to 100 by 2042, an approximate CAGR of 1.9 percent. It should be noted this preferred forecast CAGR of 1.9 percent is on par with the CAGR of 1.9 percent reflected in the *FAA Aerospace Forecast, 2022-2042* for national fleet mix growth of turbine aircraft.

2.7 BASED AIRCRAFT FLEET MIX

The current based aircraft fleet mix at CVB consists of 60 single-engine piston aircraft, five (5) multi-engine piston aircraft, one (1) turboprop, one (1) business jet, and one (1) helicopter. FAA's anticipated average annual growth rates for various components of the national general aviation fleet were considered when determining a projected based aircraft fleet mix for the airport. As reflected in Table 2.7, it is anticipated the number of piston aircraft (single and multi-engine) based at the airport as a percent of total will decrease over the 20-year forecast period, but the number of piston aircraft will continue to increase. This can be attributed to the high level of flight training operations conducted at Castroville Municipal Airport. Additionally, based turbine and jet aircraft will continue to increase during the planning period.

TABLE 2.7 – GENERAL AVIATION BASED AIRCRAFT FLEET MIX, 2021-2042

Aircraft Type	2021	2027	2032	2037	2042
Single-Engine Piston	60	67	71	75	79
Multi-Engine Piston	5	5	6	6	7
Turboprop (Single-Engine)	1	2	2	4	5
Turboprop (Multi-Engine)	0	1	2	3	4
Jet	1	1	2	2	3
Helicopter	1	1	1	2	2
Total	68	76	83	91	100

Source: KSA; FAA Aerospace Forecasts, 2022-2042.

2.8 GENERAL AVIATION OPERATIONS FORECASTS

General aviation operations are those which are not categorized as commercial or military. Several forecast scenarios were developed to appropriately reflect current general aviation operational activity and provide realistic projections for the 20-year planning period. The forecast scenarios generated assume, for the most part, straight-line growth. While it is recognized that straight-line (consistent) growth never occurs years after year, average annual growth methodologies often serve to illustrate intermediate- and long-range planning. It should be noted that it is not actual numbers that are most important but the reasoning, assumptions, and trends the numbers represent. The following methodologies were considered in determining projections of general aviation demand.

- **FAA Terminal Area Forecasts (TAF)** – Data from the March 2022 *FAA Terminal Area Forecast (TAF)* is shown (0.0 percent).

- **FAA Aerospace Forecasts** – As indicated in this projection and according to the *FAA Aerospace Forecasts, Fiscal Years, 2022-2042*, general aviation operations nationwide are expected to increase at an average annual rate of 1.0 percent.
- **FAA Aerospace Forecasts (turbine growth)** – As reflected in the *FAA Aerospace Forecasts, Fiscal Years, 2022-2042*, turbine-type aircraft are anticipated to grow at an average annual growth rate of 1.9%. This growth reflects increased flying by business and corporate aircraft overall.
- **FAA Aerospace Forecasts (avg. general aviation and turbine growth)** – This methodology assumes a CAGR of 1.5 percent, reflecting the combined average annual growth rates in the *FAA Aerospace Forecasts, Fiscal Years, 2022-2042*, for both the general aviation and turbine fleets.
- **Operations Per Based Aircraft** – Generally, there is a relationship between aviation activity and based aircraft, stated in terms of *Operations Per Based Aircraft (OPBA)*. The national trend has been changing, with more aircraft being used for business purposes and less for leisure. This impacts the OPBA in that business aircraft are usually flown more often than recreational or leisure aircraft. It is anticipated the OPBA will provide a CAGR of 1.9 percent. This growth rate is the preferred option for anticipated general aviation operations for the planning period.
- **Demographics (Population and Income)** – As previously mentioned, socio-economic conditions of a particular area or region can affect aviation activity. This methodology utilizes the combined average annual population and income growth for Medina County of 1.4 percent.

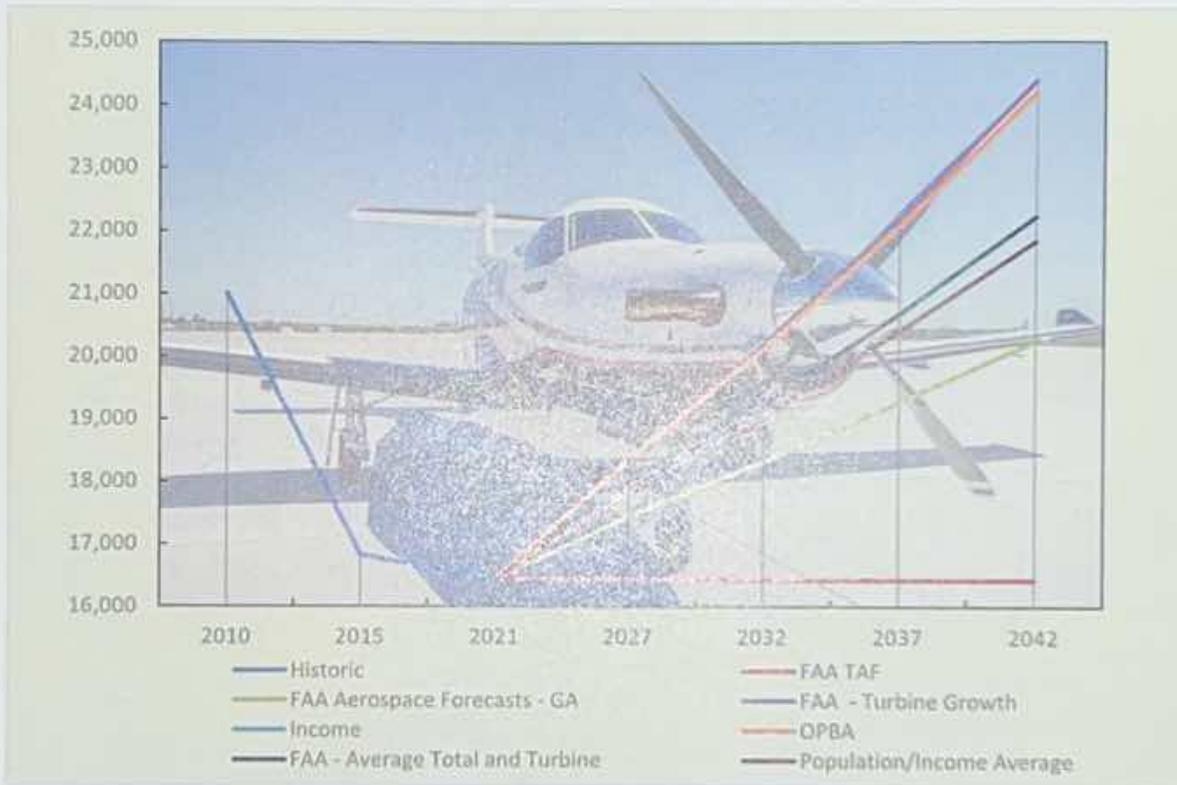
Table 2.8 shows the results of the various general aviation operations forecasts. Based on the long-term trends previously mentioned for the general aviation industry, as well as the opportunity to attract additional business to the area, it is anticipated, at a minimum, the Airport is capable of achieving operational growth similar to national trends levels for general aviation at 1.0 percent annually. However, as previously shown, data for the general aviation fleet and operations is increasing at a more rapid pace within the turbine sector of aviation. This factor, coupled with the previously described increases in population and income for Medina County and newly constructed runway extension to 6,800 feet, postulate a CAGR of 1.5% as the preferred general aviation operations forecast.

TABLE 2.8 – PREFERRED GENERAL AVIATION FORECASTS, 2021-2042

Year	FAA TAF Summary	FAA Aerospace Forecasts (Total GA)	FAA Aerospace Forecasts (Turbine Growth)	FAA Aerospace Forecasts (Average of Total GA and Turbine)	OBPA	Medina County Population / Income Avg.
2021	16,420	16,420	16,420	16,420	16,420	16,420
2027	16,420	17,430	18,383	17,901	18,343	17,812
2032	16,420	18,319	20,197	19,237	20,116	19,061
2037	16,420	19,254	22,190	20,673	22,061	20,398
2042	16,420	20,236	24,380	22,216	24,194	21,828
CAGR	0.0%	1.0%	1.9%	1.5%	1.9%	1.4%

Source: KSA

EXHIBIT 2.2 – PREFERRED GENERAL AVIATION OPERATIONS FORECAST



2.9 OPERATIONS FORECAST BY AIRCRAFT TYPE

As indicated in the following **Table 2.9**, total aircraft movements and operations are expected to increase an average of 1.5% annually from the current level of 16,420 to approximately 22,216 by the end of the planning period, with general aviation operations representing the majority percentage of activity through the planning period.

TABLE 2.9 – SUMMARY OF OPERATIONS BY AIRCRAFT TYPE, 2021-2042

Aircraft Type	2021	2027	2032	2037	2042
Air Taxi	164	179	192	207	222
Single-Engine Piston	13,957	14,783	15,396	16,009	16,846
Multi-Engine Piston	821	895	962	1,034	1,111
Turbo-prop (SE)	0	179	385	827	1,111
Turbo-prop (ME)	0	179	385	620	889
Business Jet	164	358	577	620	666
Helicopter	164	179	192	207	222
Military	1,149	1,149	1,149	1,149	1,149
Total	16,420	17,901	19,237	20,673	22,216

Totals may not equal due to rounding. Source: KSA

2.10 LOCAL / ITINERANT OPERATIONS FORECAST

The FAA defines a local operation as any operation performed by an aircraft operating in the local traffic pattern or within sight of the tower, or aircraft known to be operating in local practice areas, or aircraft executing practice instrument approaches. According to the airport records, itinerant operations constituted approximately 50 percent of the overall operations total, with local operations contributing the remaining 50 percent. The airport will continue to serve as a center for business and other related general aviation operations, with the forecast percentage of itinerant operational activity expected to remain the same through the end of the planning period. Table 2.10 reflects the total local and itinerant operations for the planning period.

TABLE 2.10 – LOCAL AND ITINERANT OPERATIONS FORECAST, 2021-2042

Year	Itinerant Operations	Local Operations	Total Operations
2021	8,210	8,210	16,420
2027	8,951	8,951	17,901
2032	9,619	9,619	19,237
2037	10,337	10,337	20,673
2042	11,108	11,108	22,216

Source: KSA; Airport Master Record 5010-1; Castroville Municipal Airport personnel

2.11 CRITICAL AIRCRAFT

The development of airport facilities is impacted by both the demand for those facilities, typically represented by total based aircraft and operations at an airport, and the type of aircraft that will use those facilities. In general, airport infrastructure components are designed to accommodate the most demanding aircraft, referred to as the critical aircraft, which will utilize the infrastructure on a regular basis. The factors used to determine an airport's critical aircraft are the approach speed and wingspan/tail height of the most demanding class of aircraft that is anticipated to perform at least 500 annual operations at the airport during the planning period. These 500 operations can be conducted by a single aircraft type or composite aircraft representing a collection of aircraft with similar qualities.

2.12 RUNWAY DESIGN CODE (RDC)

The RDC is a three-component code that defines the applicable design standards that apply to a specific runway. The first component, depicted by a letter (A-E), is the Aircraft Approach Category (AAC) and relates to the approach speed of the design aircraft. Generally, the AAC 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. The second component, Airport Design Group (ADG), depicted by a Roman numeral (I-VI), relates to the greatest wingspan or tail height of the design aircraft, whichever is most restrictive. The ADG influences design standards for taxiways, aircraft wingtip clearances, and separation distances. The third component relates to runway visibility minimums as expressed in Runway Visual Range (RVR) equipment measurements. RVR-derived values represent feet of forward visibility that have statute mile equivalents (e.g., 2400 RVR = 1/2-mile). RDC classifications are summarized in Table 2.11

TABLE 2.11 – RUNWAY DESIGN CODE

Aircraft Approach Category (AAC)		
AAC	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	

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'

Approach Visibility Minimums	
RVR (ft)	Flight Visibility Category (statute mile)
5000	Not lower than 1-mile
4000	Lower than 1-mile but not lower than ¾-mile
2400	Lower than ¾-mile but not lower than ½-mile (CAT-I)
1600	Lower than ½-mile but not lower than ¼-mile CAT-II)
1200	Lower than ¼-mile (CAT-III)

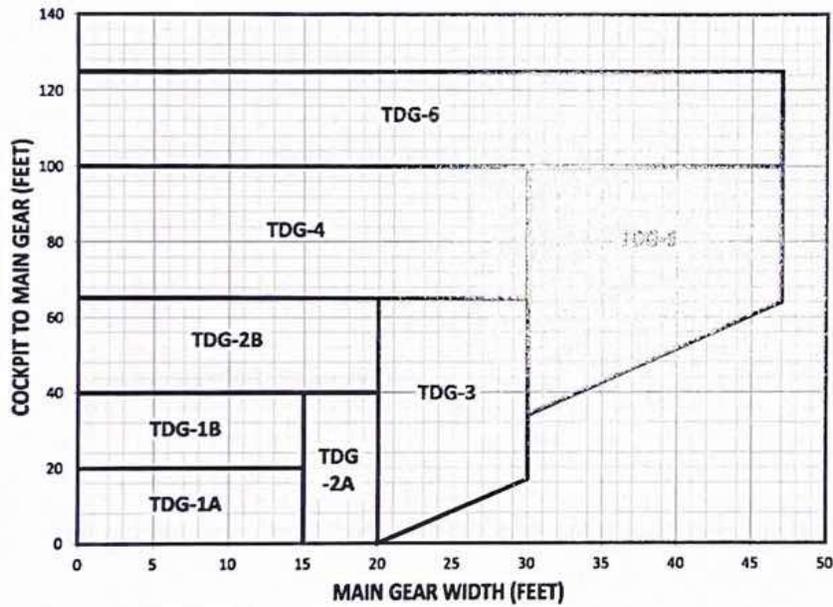
RVR – Runway Visual Range. The approximate visibility (in feet) as measured by the RVR light transmission/reception equipment or equivalent weather observer report.

2.13 TAXIWAY DESIGN CODE (TDG)

The separation between runways, taxiways, taxilanes, and objects is related to the aircraft characteristics encompassed by the ADG wingspan or tail height restriction. The Taxiway Design Group (TDG) takes into account the dimensions of the aircraft undercarriage or landing gear to determine taxiway widths and pavement fillets to be provided at taxiway intersections. Other taxiway elements such as taxiway safety and object-free areas (TSA and TOFA), taxiway/taxilane separation standards, and taxiway/taxilane wingtip clearances are based solely on ADG.

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EXHIBIT 2.3 – TAXIWAY DESIGN GROUP DETERMINATIONS



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

2.14 AIRPORT REFERENCE CODE (ARC)

The Airport Reference Code (ARC) is a coding system used to relate and compare airport design criteria to the operational and physical characteristics of the aircraft intended to operate at the airport. The ARC is similar in scope to the RDC, minus the third element of visibility. Based on the examination of the operational information and existing airport plans, it has been determined to maintain the B-II designation on Runway 16/34. Table 2.12 summarizes the critical aircraft and design aircraft components for Runway 16/34 at Castroville Municipal Airport.

TABLE 2.12 – CRITICAL AIRCRAFT PARAMETERS

Existing				
Runway	Critical Design Aircraft	RDC	ARC	TDG
16 / 34	Grumman/Gulfstream III	B-II-5000	B-II	2A
Ultimate				
Runway	Critical Design Aircraft	RDC	ARC	TDG
16 / 34	Cessna Citation 650	B-II-5000	B-II	2A

Source: KSA, FAA A/C 150/5300-13B, Airport Design

2.15 SUMMARY

Aircraft activity at Castroville Municipal Airport has fluctuated in recent history. This is not an uncommon theme at many U.S. airports, as economic uncertainty and increased travel costs have impacted travel behavior. Despite rapid volatility in fuel cost, airline bankruptcies, system-wide route restructuring, aircraft fleet overhauls, and impacts and uncertainty associated with COVID-19, the forecasts developed for this Airport Layout Plan (ALP) Update suggest positive growth in the number of based aircraft and total aircraft operations at the Airport over the next 20 years.

The following tables summarize the forecasts of aviation activity that have been presented in this chapter. This information will be utilized in the next chapter, *Facility Requirements*, to document, analyze, and quantify airside and landside needs. Therefore, the forecasts of aviation activity are an important part of the information base which will be used to develop ultimate plans for the airport and formulate implementation decisions relating to Airport development.

To secure approval for these projections, the FAA requires a comparison of forecasts to the annually produced TAF, which are completed for each airport in the NPIAS and updated each year. The FAA prefers that airport planning forecasts not vary significantly from the TAF and looks for forecasts to be within 10 percent of their five-year forecasts and 15 percent of their ten-year forecasts. The FAA templates for summarizing and documenting airport planning forecasts and for comparing projections with the FAA TAF Forecasts are presented in Tables 2.13 and 2.14. The final Table 2.15 provides a final summary of the forecast aviation demand.

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TABLE 2.13 – SUMMARY OF OPERATIONS BY AIRCRAFT TYPE, 2021-2042

Operations	2021	2027	2032	2037	2042
Air Taxi	164	179	192	207	222
Single-Engine Piston	13,957	14,289	15,396	16,009	16,846
Multi-Engine Piston	821	895	962	1,034	1,111
Turbo-prop (SE)	0	179	385	827	1,111
Turbo-prop (ME)	0	179	385	620	889
Business Jet	164	358	577	620	666
Helicopter	164	179	192	207	222
Military	1,149	1,149	1,149	1,149	1,149
TOTAL OPERATIONS	16,420	17,901	19,237	20,673	22,216
Local Operations	8,210	8,951	9,619	10,337	11,108
Itinerant Operations	8,210	8,951	9,619	10,337	11,108
Based Aircraft					
Single-Engine Piston	60	67	71	75	79
Multi-Engine Piston	5	5	6	6	7
Turboprop (Single-Engine)	1	2	2	4	5
Turboprop (Multi-Engine)	0	1	2	3	4
Jet	1	1	2	2	3
Helicopter	1	1	1	2	2
Total	68	76	83	91	100

Source: KSA

TABLE 2.14 – COMPARISON OF ACTIVITY AND TAF FORECASTS, 2021-2042 (FAA FORMAT)

Year	Airport Forecasts	TAF Forecast	AF / TAF % Difference
Base Year (2021)	16,420	16,420	0.0%
2027	17,901	16,420	9.0%
2032	19,237	16,420	17.2%
2037	20,673	16,420	25.9%
2042	22,216	16,420	35.3%

Source: KSA

TABLE 2.15 – SUMMARY OF AIRCRAFT PLANNING FORECASTS, 2021-2042 (FAA FORMAT)

	2021	2027	2032	2037	2042	Average Annual Compound Growth Rate			
						2027	2032	2037	2042
Operations – Itinerant									
General Aviation	7,061	7,802	8,470	9,188	9,959	1.68%	1.67%	1.66%	1.65%
Military	1,149	1,149	1,149	1,149	1,149	0.00%	0.00%	0.00%	0.00%
Operations – Local									
General Aviation	8,210	8,951	9,619	10,337	11,108	1.45%	1.45%	1.45%	1.45%
Military	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%
TOTAL OPERATIONS	16,420	17,901	19,237	20,673	22,216	1.45%	1.45%	1.45%	1.45%
Peak Hour Operations	4	4	5	5	6	1.45%	1.45%	1.45%	1.45%
Based Aircraft									
Single-Engine Piston	60	67	71	75	79	1.42%	1.52%	1.40%	1.33%
Multi-Engine Piston	5	5	6	6	7	1.03%	1.41%	1.55%	1.62%
Turboprop (Single-Engine)	1	2	2	4	5	7.22%	8.68%	8.44%	7.98%
Turboprop (Multi-Engine)	0	1	2	3	4	105.79%	59.21%	42.03%	33.03%
Jet	1	1	2	2	3	-4.48%	4.75%	3.84%	5.38%
Helicopter	1	1	1	2	2	-4.48%	-1.65%	3.84%	3.37%
Total	68	76	83	91	100	1.86%	1.86%	1.86%	1.86%

Source: KSA

2.16 FORECAST APPENDIX

In discussions with airport personnel, a 2021 total operations figure of 25,000 was determined to be the most accurate. However, due to the large discrepancy between this number and the figure of 16,420 provided by the FAA's TAF, it was not used in the primary report. The following sections provide what forecasts would have been if 25,000 operations per year were used as a base.

2.8A GENERAL AVIATION OPERATIONS FORECASTS

General aviation operations are those which are not categorized as commercial or military. Several forecast scenarios were developed to appropriately reflect current general aviation operational activity and provide realistic projections for the 20-year planning period. The forecast scenarios generated assume, for the most part, straight-line growth. While it is recognized that straight-line (consistent) growth never occurs year after year, average annual growth methodologies often serve to illustrate intermediate- and long-range planning. It should be noted that it is not actual numbers that are most important but the reasoning, assumptions, and trends the numbers represent. The following methodologies were considered in determining projections of general aviation demand.

- **FAA Terminal Area Forecasts (TAF)** – Data from the March 2022 *FAA Terminal Area Forecast (TAF)* is shown (0.0 percent).
- **FAA Aerospace Forecasts** – As indicated in this projection and according to the *FAA Aerospace Forecasts, Fiscal Years, 2022-2042*, general aviation operations nationwide are expected to increase at an average annual rate of 1.0 percent.
- **FAA Aerospace Forecasts (turbine growth)** – As reflected in the *FAA Aerospace Forecasts, Fiscal Years, 2022-2042*, turbine-type aircraft are anticipated to grow at an average annual growth rate of 1.9%. This growth reflects increased flying by business and corporate aircraft overall.
- **FAA Aerospace Forecasts (avg. general aviation and turbine growth)** – This methodology assumes a CAGR of 1.5 percent, reflecting the combined average annual growth rates in the *FAA Aerospace Forecasts, Fiscal Years, 2022-2042*, for both the general aviation and turbine fleets.
- **Operations Per Based Aircraft** – Generally, there is a relationship between aviation activity and based aircraft, stated in terms of *Operations Per Based Aircraft (OPBA)*. The national trend has been changing, with more aircraft being used for business purposes and less for leisure. This impacts the OPBA in that business aircraft are usually flown more often than recreational or leisure aircraft. It is anticipated the OPBA will provide a CAGR of 1.9 percent. This growth rate is the preferred option for anticipated general aviation operations for the planning period.
- **Demographics (Population and Income)** – As previously mentioned, socio-economic conditions of a particular area or region can affect aviation activity. This methodology utilizes the combined average annual population and income growth for Medina County of 1.4 percent.

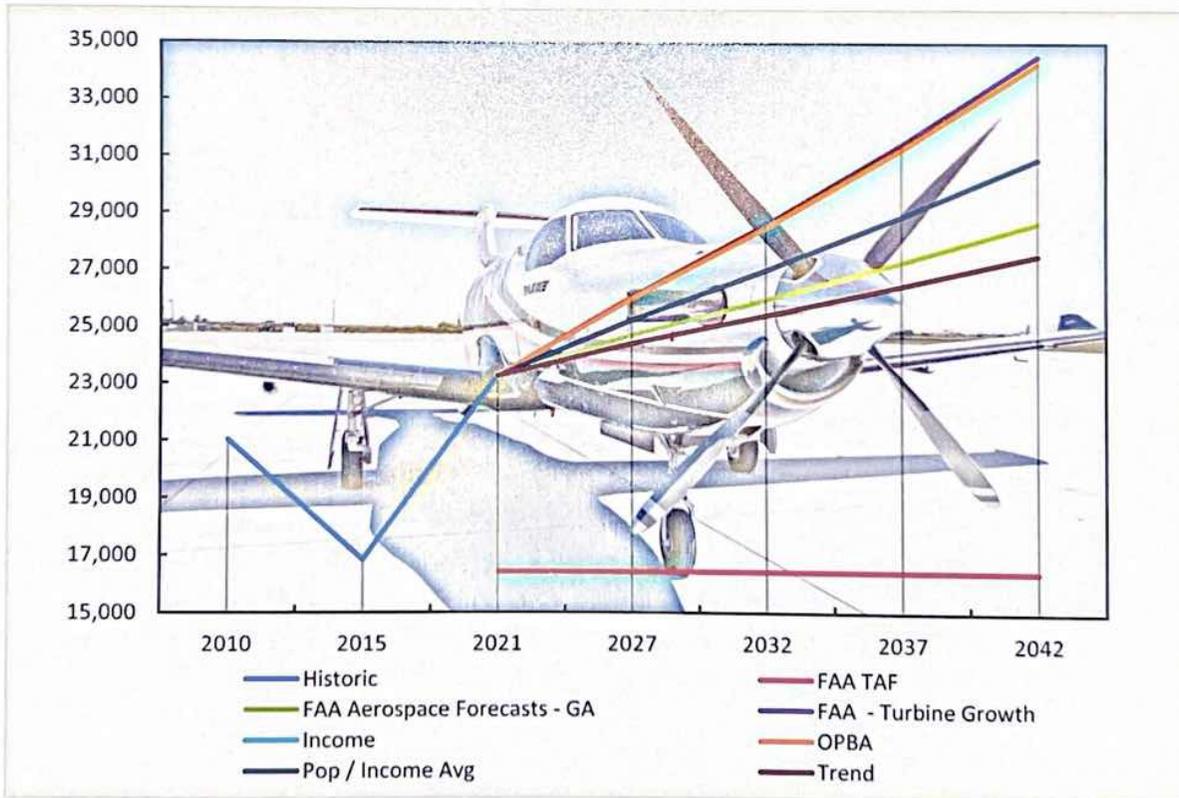
Table 2.8A shows the results of the various general aviation operations forecasts. Based on the long-term trends previously mentioned for the general aviation industry, as well as the opportunity to attract additional business to the area, it is anticipated, at a minimum, the Airport is capable of achieving operational growth similar to national trends levels for general aviation at 1.0 percent annually. However, as previously shown, data for the general aviation fleet and operations is increasing at a more rapid pace within the turbine sector of aviation. This factor, coupled with the previously described increases in population and income for Medina County and newly constructed runway extension to 6,800 feet, postulate a CAGR of 1.8% as the preferred general aviation operations forecast.

TABLE 2.8A – PREFERRED GENERAL AVIATION FORECASTS, 2021-2042

Year	FAA TAF Summary	FAA Aerospace Forecasts (Total GA)	FAA Aerospace Forecasts (Turbine Growth)	OBPA	Medina County Population / Income Avg.
2021	16,420	23,250	23,250	23,250	23,250
2027	16,420	24,680	26,030	25,973	25,220
2032	16,420	25,939	28,598	28,484	26,989
2037	16,420	27,262	31,420	31,237	28,882
2042	16,420	28,653	34,521	34,257	30,908
CAGR	0.0%	1.0%	1.9%	1.9%	1.4%

Source: KSA

EXHIBIT 2.2A – PREFERRED GENERAL AVIATION OPERATIONS FORECAST



2.9A OPERATIONS FORECAST BY AIRCRAFT TYPE

As indicated in the following Table 2.9A, total aircraft movements and operations are expected to increase an average of 1.9% annually from the current level of 25,000 to approximately 36,007 by the end of the planning period, with general aviation operations representing the majority percentage of activity through the planning period.

TABLE 2.9A – SUMMARY OF OPERATIONS BY AIRCRAFT TYPE, 2021-2042

Aircraft Type	2021	2027	2032	2037	2042
Air Taxi	250	277	302	330	360
Single-Engine Piston	21,250	22,924	24,250	25,628	27,416
Multi-Engine Piston	1,250	1,386	1,512	1,649	1,800
Turbo-prop (SE)	0	277	605	1,319	1,800
Turbo-prop (ME)	0	277	605	990	1,440
Business Jet	250	554	907	990	1,080
Helicopter	250	277	302	330	360
Military	1,750	1,750	1,750	1,750	1,750
Total	25,000	27,723	30,234	32,987	36,007

Totals may not equal due to rounding; Source: KSA

2.10A LOCAL / ITINERANT OPERATIONS FORECAST

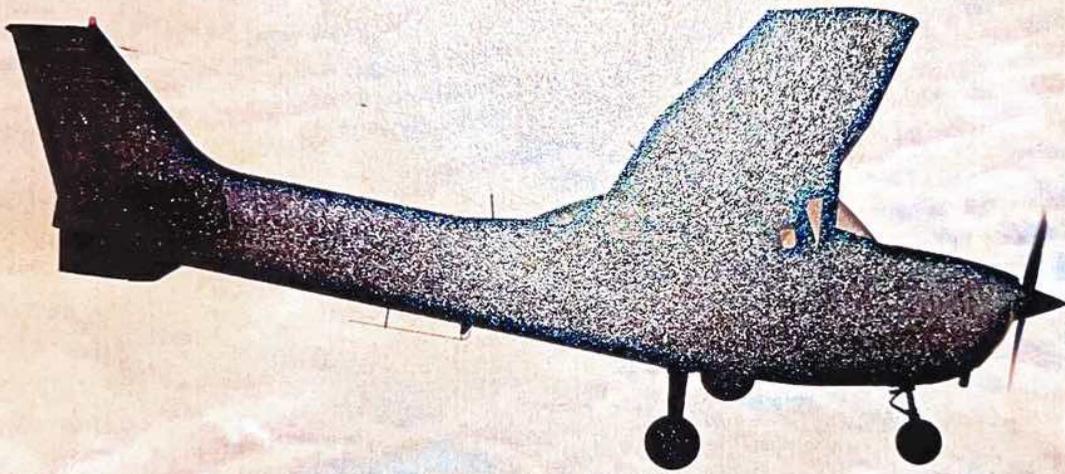
The FAA defines a local operation as any operation performed by an aircraft operating in the local traffic pattern or within sight of the tower, or aircraft known to be operating in local practice areas, or aircraft executing practice instrument approaches. According to the airport records, itinerant operations constituted approximately 50 percent of the overall operations total, with local operations contributing the remaining 50 percent. The airport will continue to serve as a center for business and other related general aviation operations, with the forecast percentage of itinerant operational activity expected to remain the same through the end of the planning period. Table 2.10A reflects the total local and itinerant operations for the planning period.

TABLE 2.10A – LOCAL AND ITINERANT OPERATIONS FORECAST, 2021-2042

Year	Itinerant Operations	Local Operations	Total Operations
2021	12,500	12,500	25,000
2027	13,861	13,861	27,723
2032	15,117	15,117	30,234
2037	16,494	16,494	32,987
2042	18,003	18,003	36,007

Source: KSA; Airport Master Record 5010-1; Castroville Municipal Airport personnel

FACILITY REQUIREMENTS




Castroville
MUNICIPAL AIRPORT

03 FACILITY REQUIREMENTS

3.1 OVERVIEW

A key step in the planning process is developing requirements of airport facilities, which will allow for airside and landside evolution over the term of the planning period. By comparing the existing conditions of the Airport to forecast aviation activity based upon both existing and future aircraft usage, the requirements for runways, taxiways, aprons, terminals, and other related facilities to accommodate growth over the short, intermediate, and long-term planning periods can be determined. Demand-capacity analyses aid in the identification of airport deficiencies, surpluses, and opportunities for future development.

This chapter of the Airport Layout Plan (ALP) Update narrative will analyze the ability of the current facilities at Castroville Municipal Airport (CVB) to meet the forecast planning activity shown in Chapter 2, *Forecast of Aviation Demand*. Using Federal Aviation Administration (FAA) methodologies and logical sizing factors, the aviation projections are converted into facility requirements over the 20-year planning period.

An essential step in the process of estimating airport needs is the determination of an airport's current capacity to accommodate anticipated demand. Demand-capacity analysis yield information that is ultimately used to design the airport layout plan and state facility development. This chapter will examine the ability of CVB to accommodate anticipated aviation demand and outline specific facility requirements necessary to address any deficiencies in the existing airport system. Specifically, this analysis will extend into the following areas:

- Airfield Capacity, Runway Orientation, and Design Standards including Runway and Taxiway System
- Approach and Navigational Aids
- Airfield Lighting, Signage, and Pavement Markings
- Aircraft Parking Aprons
- Aircraft Storage Hangars
- Aircraft Fuel Storage
- Public Automobile Parking
- Ground Access
- Airport Security and Fencing

3.2 AIRFIELD DEMAND AND CAPACITY

The major components of the airfield system to be considered when determining capacity include runway orientation and configuration, runway length, and runway exit locations. Additionally, the capacity of a given system is affected by operational characteristics such as fleet mix, climatology, and air traffic control (ATC) procedures. Each of these components has been examined as part of the airside capacity analysis. Runway orientation and the degree to which it meets wind coverage requirements influence how the runway system is utilized. Design standards established by the FAA set geometric clearance guidelines for airfield components. Upon completion of the analysis of these elements, a review of existing facilities is performed, and any additional requirements necessary to meet the forecasted demand are identified.

FAA guidance for airfield capacity is contained in AC 150/5060-5, *Airport Capacity and Delay*. According to the FAA, airfield capacity is generally defined as the number of aircraft operations that can be safely accommodated on both the runway and taxiway system at a given point in time before an unacceptable level of delay is experienced. The method of analysis for determining airside capacity is Annual Service Volume (ASV). The ASV identifies the maximum number of annual operations that can be accommodated at the Airport without excessive delay. To determine ASV, the following determinants specific to CVB need to be identified.

- Predominant Meteorological Conditions
- Runway Use Configuration
- Aircraft Mix (based on existing aircraft group demand)
- Percentage of Arrival Operations
- Touch and Go Operations

3.2.1 ANNUAL SERVICE VOLUME

Using the guidance from FAA AC 150/5060-5, the ASV for the existing runway layout at CVB is calculated to be approximately 230,000, with a VFR capacity of 98 operations per hour and an IFR capacity of 59 operations per hour. For the base year 2021, the recorded operations at Castroville Municipal Airport were calculated at 16,420, with a forecast of 22,216 by 2042. This number accounts for approximately 10 percent of the current ASV. Based on the current level and forecast level of demand at CVB, no capacity enhancement projects will be needed during the planning period.

By using this measure, it is easy to compare current and projected annual operations numbers and analyze capacity. Although not always viable for hourly capacity or delay peak periods, this guideline is helpful for long-range 20-year planning horizons. Planning guidelines typically assume that when an airport meets 60 percent capacity, planning for capacity enhancements should begin. At 80 percent capacity, construction for those projects should begin. If 100 percent capacity is reached, serious impacts on airport operations may occur, resulting in increased delays.

3.3 AIRFIELD REQUIREMENTS

The design or critical aircraft is defined as the largest aircraft family or single aircraft anticipated to utilize an airport on a regular basis. A "regular basis" is defined by the FAA as conducting at least 500 annual itinerant operations, with an operation classified as either a take-off or landing. The selection of the design aircraft allows for the identification of the Airport Reference Code (ARC).

3.3.1 RUNWAY DESIGN CODE

The RDC is a coding system developed by the FAA to relate airport design criteria to the operational and physical characteristics of the airplane types that will operate at a particular airport. The RDC has three components relating to the airport design aircraft. The first component, depicted by a letter, is the aircraft approach category and relates to airplane wingspan. The second component relates to the designated, or planned, visibility minimums expressed by runway visual range (RVR) values in feet.

Generally, aircraft approach speed applies to runways and runway length-related features. Airplane wingspan primarily relates to separation criteria and width-related features. Airports expected to accommodate single-engine airplanes normally fall into Airport Reference Code A-I or B-I. Airports serving larger general aviation and commuter-type planes are usually Airport Reference Code B-II or B-III. Small to medium-sized airports serving air carriers are usually Airport

Reference Code C-III, while larger air carrier airports are usually Airport Reference Code D-VI or D-V. As established in the forecast chapter of this study, the RDC at Castroville Municipal Airport is B-II-5,000. Table C.1 details the FAA Runway Design Code guidelines. Based on existing and ultimate operations at the Airport and the existing and ultimate critical aircraft, the current B-II ARC is deemed appropriate for the 20-year planning period.

3.3.2 TAXIWAY DESIGN GROUP (TDG)

Similar to runways, taxiways are also required to be designed to certain limitations and offer a set of criteria referred to as Taxiway Design Group (TDG). TDG is based on guidance that established requirements based on overall Main Gear Width (MGW) and the Cockpit to Main Gear Distance (CMG) for all aircraft operating at the Airport. This criterion helps establish design standards for fillets and edge safety margins to help limit pilot error and use a consistent taxi method throughout the Airport. FAA Advisory Circular 150/5300-13B, *Airport Design*, Table C.2, provides the essential requirements for taxiway design and the associated groups.

TABLE C.1 – RUNWAY DESIGN CODE

AAC		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'
Approach Visibility Minimums		
RVR (ft)	Flight Visibility Category (statute mile)	
5000	Not lower than 1-mile	
4000	Lower than 1-mile but not lower than ¾-mile	
2400	Lower than ¾-mile but not lower than ½-mile (CAT-I)	
1600	Lower than ½-mile but not lower than ¼-mile CAT-II)	
1200	Lower than ¼-mile (CAT-III)	

RVR – Runway Visual Range. The approximate visibility (in feet) as measured by the RVR light transmission/reception equipment or equivalent weather observer report.

Source: FAA A/C 150/5300-13B, *Airport Design*, Change 1

TABLE C.2 – TAXIWAY DESIGN GROUP (TDG) CRITERIA

Item	Taxiway Design Group							
	1A	1B	2A	2B	3	4	5	6
Taxiway Width	25'	25'	35'	35'	50'	50'	75'	75'
Taxiway Edge Safety Margin	5'	5'	7.5'	7.5'	10'	10'	14'	14'
Taxiway Shoulder Width	10'	10'	15'	15'	20'	20'	30'	30'

Source: FAA Advisory Circular 150/5300-13B

3.3.3 RUNWAY ORIENTATION / WIND ANALYSIS

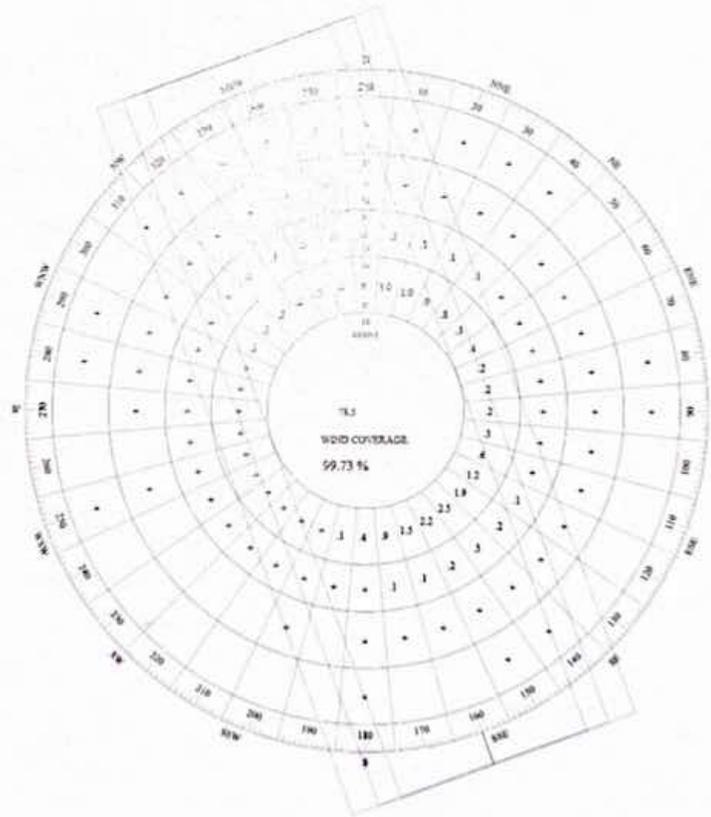
Surface wind conditions have a direct effect and impact on airport functionality. Runways that are not oriented to take the fullest advantage of prevailing winds will restrict the capacity of the Airport to varying degrees. When landing and taking off, aircraft are able to operate on a runway properly and safely as long as the wind velocity perpendicular to the direction of flight (i.e., crosswind) is not excessive. The wind coverage analysis translates the crosswind velocity and direction into a "crosswind component." Smaller aircraft are more easily affected by crosswinds than larger aircraft; thus, they have a smaller crosswind component.

The determination of the appropriate crosswind component is dependent upon the RDC, as described above, which is B-I for Runway 16/34 at CVB. According to AC 150/5300-13B, Airport Design, the maximum crosswind component used for RDC's A-I and B-I is 10.5-knots, a 13-knot crosswind component is used for RDC A-II and B-II, and for RDC's C-I and C-II, a 16-knot maximum crosswind component is used.

Accurate wind velocity and directional data during all weather conditions were obtained from the National Climate Data Center (NCDC), which compiles the data provided by the Automated Weather Observing System (AWOS-3) at Kelly Field (SKF) 17 nautical miles east of CVB. Using the data, an all-weather wind rose was constructed and is presented in the following Exhibit C.1.

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EXHIBIT C.1 – ALL-WEATHER WIND ROSE



Source: National Climate Data Center, Station 722535, Lackland Airforce Base (Kelly Field), Period 2011-2020

The desirable wind coverage for an airport is 95%, meaning the runway system should be oriented so that the maximum crosswind component is not exceeded by more than 5% of the time annually. Based on the all-weather wind analysis for Castroville Municipal Airport, Runway 16/34 provides 99.73% wind coverage for the 16-knot crosswind component, 98.42% for the 13-knot crosswind component, and 96.09% for the 10.5-knot crosswind component. Table C.3 quantifies the wind coverage provided by Runway 16/34 during all weather conditions at the Airport.

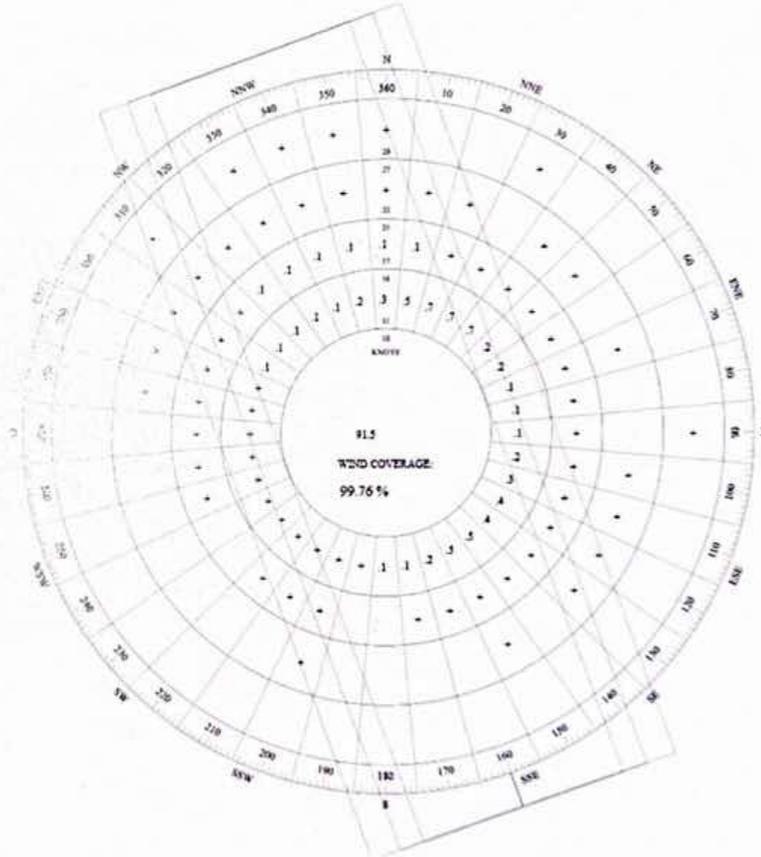
TABLE C.3 – ALL WEATHER CROSSWIND

	10-5 Knot	13-Knot	16-Knot
Runway 16	84.98%	86.12%	86.92%
Runway 34	64.11%	65.79%	66.89%
Runway 16/34	96.09%	98.42%	99.73%

Source: National Climate Data Center, Station 722535, Lackland Airforce Base (Kelly Field), Period 2011-2020

To analyze the effectiveness of the existing instrument procedures and the need for placement of improved or additional procedures, an Instrument Flight Rules (IFR) wind rose has been constructed and is presented in the following Exhibit C.2.

EXHIBIT C.2 – IFR WIND ROSE



Source: National Climate Data Center, Station 722535, Lackland Airforce Base (Kelly Field), Period 2011-2020

Table C.4 presents wind coverage analysis provided during IFR meteorological conditions (i.e., weather conditions having a ceiling less than 1,000 feet, but equal to or greater than 200 feet and/or visibility less than 3-miles, but equal to or greater than 1/2-mile). The table quantifies the wind coverage provided by Runway 16/34 and the individual ends. From this analysis, it can be concluded that Runway 17 provides the best wind coverage for all crosswind components.

TABLE C.4 – IFR ONLY CROSSWIND

	10-5 Knot	13-Knot	16-Knot
Runway 16	88.45%	89.06%	89.56%
Runway 34	79.98%	81.18%	81.89%
Runway 16/34	97.39%	98.90%	99.76%

Source: National Climatic Data Center, Station 722535, Lackland Air Force Base (Kelly Field), Period 2011-2020

3.3.4 RUNWAY LENGTH

As outlined in FAA AC 150/5325-4B, Runway Length Requirement for Airport Design, the runway length necessary for an airport is depended on several factors, including airport elevation, temperature, wind velocity, aircraft operating weight and configurations, runway surface condition (wet or dry), obstructions present in the vicinity of the Airport, and departure/arrival procedures.

Castroville Municipal Airport's primary runway, Runway 16/34 is 5,001 feet in length. This runway length allows the Airport to serve a wide variety of aircraft in the general aviation fleet, including a variety of small to medium business jets.

The method for determining the recommended runway length is based on examining the Airport's critical aircraft (ARC B-II) and the characteristics of aircraft included in that design category. In order to determine the ultimate required length of a runway, several factors must be considered, including the characteristics of the critical aircraft that will use the runway, the typical stage length being flown by the critical aircraft, as well as common atmospheric conditions at the Airport. In general, longer stage lengths require aircraft to carry more fuel, thereby increasing the aircraft's weight at takeoff, and subsequently, the runway length required for takeoff. Similarly, warmer air temperatures (and the corresponding impact on air density) result in increased runway takeoff length requirements for most aircraft.

FAA runway length requirements are based on small aircraft with weights of 12,500 pounds or less, large aircraft between 12,500 and 60,000 pounds, and large aircraft weighing greater than 60,000 pounds. The Citation 650 has a maximum takeoff weight (MTOW) of 22,002 lbs.

The results of the runway length analysis conducted for Castroville Municipal Airport indicate that the current runway length is more than sufficient to accommodate operations by all small airplanes. Runway length requirements for large aircraft between 12,500 and 60,000 pounds are calculated based on the percentage of aircraft in that category that can be accommodated as well as the useful load of those aircraft. As shown in Table C.5, the runway length analysis indicates that a runway length of 4,850 feet is sufficient to accommodate approximately 75% of large airplanes (less than 60,000 pounds) when operating at 60% of their average useful load, and 7,450 feet would be required for 75% of large aircraft at 90% useful load. A runway length of approximately 6,050 feet would be required to accommodate 100% of the aircraft at 60% useful load, while 9,450 feet would be needed to accommodate 100% of large aircraft at 90% useful load. Unless a specific aircraft is identified, that requires a runway approaching this length, 100% of the fleet at a 60% useful load should be planned for.

It is important to note that aircraft greater than 60,000 pounds can safely operate at the Airport with its current runway length; however, some aircraft may have to fly at less than 100 percent of their useful load and may not be able to fly the maximum range of their aircraft when temperatures are high. Again, aircraft performance characteristics determine the required runway length.

Table C.5 presents the recommended FAA design standard lengths for runways using various categories of aircraft at standard useful loads.

TABLE C.5 – RUNWAY LENGTH ANALYSIS SUMMARY

Airport and Runway Data	
Airport Elevation (MSL)	773.9'
Mean daily maximum temperature of the hottest month	97.2°
Maximum difference in runway centerline elevation	11.7'
Existing Runway Condition Runway 16/34	5,001'
Small aircraft < 19,000 lbs. Maximum Gross Weight	
95% of the fleet	3,400'
100% of the fleet	4,050'
Small aircraft with more than 10 seats	4,450'
Aircraft between 19,000 lbs. and 60,000 lbs. Maximum Gross Weight	
75% of Fleet – 60% useful load	4,850'
75% of Fleet – 90% useful load	7,450'
100% of Fleet – 60% useful load	6,050'
100% of Fleet – 90% useful load	9,450'
Large Aircraft > 60,000 pounds	Refer to individual aircraft manufacturer's planning manual

Source: FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*. Lengths based on 773.9' MSL, 97.2 degrees F Mean Max Temperature, 500 NM stage length, and the maximum difference in runway centerline elevation of 11.7'.

As the runway length analysis indicates, the existing runway length at Castroville Municipal Airport is sufficient to accommodate a significant portion of the active general aviation fleet. Even the largest business jets can safely operate on the existing runway system. Again, in certain scenarios, these large aircraft may have to take weight and range penalties. As the number of corporate general aviation jets in the national fleet increases and the number of operations conducted by these aircraft at the Airport increases, a runway extension resulting in an ultimate runway length of 6,050 feet may be warranted at the Airport.

3.3.5 BALANCED FIELD LENGTH

While the FAA runway analysis provides an overview of aircraft categories, balanced field length is a more precise calculation to determine the runway length requirements for a certain aircraft. Specific to each aircraft and determined by the aircraft manufacturer, balanced field length is defined as the "distance required to stop an accelerating aircraft in exactly the same distance as that required to reach take-off speed." As with those distances presented in Table C.5, balanced field length requirements are based on airport elevation, temperature, MTOW, and stage length. Table C.6 details a cross-section of the largest corporate aircraft that currently operate at the field or within the national fleet.

TABLE C.6 – BALANCED FIELD LENGTH ANALYSIS SUMMARY

Aircraft	MTOW (lbs.)	Approximate Length	
		Standard Day (59°)	Mean Max Temp (97.2°)
Beechcraft King Air 350	15,000 lbs.	3,644'	4,308'
Embraer Phenom 300	17,968 lbs.	3,471'	4,102'
Cessna Citation 550	15,100 lbs.	5,012'	5,934'
Cessna Citation CJ3+	13,870 lbs.	3,516'	4,156'
Cessna Citation Sovereign	30,775 lbs.	4,189'	4,956'
Challenger 604	47,600 lbs.	6,278'	7,439'
Gulfstream G450	71,780 lbs.	6,102'	7,229'
Gulfstream G600	94,600 lbs.	6,209'	7,356'
Global Express 5500	92,500 lbs.	5,824'	6,899'
Global Express 6500	99,500 lbs.	6,684'	7,922'
Global Express 7500	114,850 lbs.	6,273'	7,433'

Source: Flight Planning Guides, Airport Planning Manuals, Manufacturer websites

These lengths provide a general overview of the approximate requirements for larger corporate aircraft to operate at the field. As the Airport continues to grow and it is determined local demand justifies the implementation of a runway extension, this project could be completed in conjunction with other runway or taxiway improvements that may be planned at the Airport over the study period. Justification for a runway extension would be required to determine eligibility for funding. Such justification could include letters from operators requesting an extension for a specific aircraft or type of aircraft.

3.3.6 RUNWAY WIDTH

The required width of a runway is determined by the critical aircraft and the instrumentation available for the Airport. Based on FAA design criteria and existing instrument approach procedures, the existing width of 75 feet provided by Runway 16/34 is adequate for meeting the existing and proposed operational levels during the 20-year planning period.

3.3.7 PAVEMENT STRENGTH

Runway pavement strength is typically expressed by common landing gear configurations. Example aircraft for each type of gear configuration are as follows:

- **Single Wheel:** each landing gear unit has a single tire; example aircraft include light aircraft and some business jet aircraft.
- **Dual Wheel:** each landing gear unit has two tires; example aircraft are the King Air 350, Citation Longitude, and Gulfstream 500.
- **Dual-Tandem:** main landing gear unit has four tires arranged in the shape of a square, i.e., Boeing 757.

The aircraft gear type and configuration dictate how aircraft weight is distributed to the pavement and determines the pavement response to loading. As previously mentioned in the *Inventory of Existing Conditions*, the current runway

pavement strength is 15,000 pounds for single-wheel loaded aircraft (S) and not rated for dual-wheel loaded aircraft (DW).

The strength rating of a runway does not preclude aircraft weighting more than the published strength rating from utilizing the airfield, it simply provides the ability to support a high volume of aircraft at or below the published weight. While aircraft weighing more than the published weight could potentially damage the runway in severe conditions, it more commonly reduces the life cycle of the pavement over time.

3.3.8 TAXIWAYS

The FAA recently updated taxiway design requirements to aid in the appropriate design for spacing and size of taxiway. It is important to note that the FAA lists seven conditions which should be addressed to reduce the potential for runway incursions:

- **Increase Pilot Situational Awareness:** Keep taxiways simple, “three-node” concept.
- **Avoid Wide Expanses of Pavement:** Requires signage placed away from the pilot’s line of sight.
- **Limit Runway Crossings:** Reduces the number of occurrences and ATC workload.
- **Avoid “High-Energy” Intersections:** Intersections in the middle third of the runway create the potential for a high speed/energy collision.
- **Increase Visibility:** Using right-angle intersections, both between taxiways and between taxiways and runways, provides the best visibility for pilots.
- **Avoid “Dual Purpose” Pavements:** Dual purpose runways/taxiways can lead to confusion.
- **Indirect Access:** Taxiways leading directly from an apron to a runway without requiring a turn increase the possibility for incursions.

Per AC 150/5300-13B, the FAA required a full-length parallel taxiway for runways configured with instrument approach procedures with visibility minimums below one mile and recommended for all other conditions. Runway 16/34 at Castroville Municipal Airport is served by a full-length parallel Taxiway “A”. No additional taxiways are recommended for construction at this time.

It should be noted that Taxiway “A” is currently 35 feet wide with runway connectors of the same width.

3.4 NAVIGATIONAL AIDS

Navigational Aids (NAVAIDs) are any visual or electronic devices, airborne or on the ground, that provide point-to-point guidance information or position data to aircraft in flight. Airport NAVAIDs provide guidance to a specific runway end or to an airport. An airport is equipped with precision, non-precision, or visual capabilities in accordance with design standards that are based on safety considerations and airport operational needs. The type, mission, and volume of activity used in association with meteorological, airspace, and capacity considerations determine an airports eligibility and need for various NAVAIDs.

3.4.1 INSTRUMENT NAVAIDS

This category of NAVAID aids aircraft performing instrument approach procedures to an airport. An instrument approach procedure is defined as a series of predetermined maneuvers for guiding an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing can be made visually.

The current instrument approached outlined in Chapter 1, *Inventory of Existing Conditions*, are sufficiently meeting the current demand at CVB.

3.4.2 AUTOMATED WEATHER

Castroville Municipal Airport is served by Automated Weather Observing System (AWOS-3) at nearby airports, Lackland Airforce Base (SKF, 15nm E) and South Texas Regional Airport at Hondo (HDO, 17nm W), which can be tuned on frequency 119.675 or by phone at (830) 426-3060 (HDO), or by phone at (210) 927-9391 (SKF). An AWOS unit provides pilots with a computer-generated voice message which is broadcast via radio frequency in the vicinity of the Airport. The message contains pertinent weather information including wind speed and direction, visibility, temperature, dew point, and cloud ceiling heights.

FAA Order JC 6560.20C, *Siting Criteria for Automated Weather Observing Systems*, establishes siting criteria for observation systems that provide weather information at airports and heliports. This criterion applies to all federally owned, as well as non-federal systems commissioned by the FAA. At airports supporting Visual and/or Non-Precision Instrument Runways, the preferred siting of the cloud height, visibility, and wind sensors is adjacent to the primary runway, or runway with the lowest minimums.

This sensor should be located between 1,000 to 3,000 feet down the runway from the threshold at a minimum distance perpendicular from the runway centerline of 500 feet, with a maximum distance from the runway centerline not to exceed 1,000 feet. If the elevation of the wind sensor site is above the runway centerline elevation, a positive adjustment of seven (7) feet for every one (1) foot of elevation difference is required. Within the planning period, it is recommended that the airport installs an AWOS-3 sensor and locates it on the airfield within the FAA siting requirements.

3.5 DIMENSIONAL STANDARDS

Dimensional standards include measurements that account for physical runway and taxiway characteristics as well as safety-related areas. These standards, contained in FAA AC 150/5300-13B, are shown in Table C.7 as they pertain to CVB. As established in previous sections, the design aircraft is within the ARC B-II group category for Runway 16/34 and the supporting airfield infrastructure.

The following dimensional standards are important to the design of the runway and taxiway system at CVB, as well as the safety of the aircraft operating within the airport environment.

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TABLE C.7 – FAA DESIGN CRITERIA SUMMARY

Design Item	Runway 16/34 (B-II); Not lower than 1-mile vis. minimums
Runway	
Width	75'
Safety Areas (SA)	
Width	150'
Length Beyond Departure End	300' / 300'
Length Prior to Threshold	300' / 300'
Object Free Areas	
Width	500'
Length Beyond Departure End	300' / 300'
Length Prior to Threshold	300' / 300'
Taxiway	
Width	35'
Safety Area	79'
Object Free Area	131'
Centerline to Fixed or Movable Object	57.5'
Runway Centerline to:	
Holdline	200'
Taxiway Centerline	240'
A/C Parking Area	400'

Source: FAA AC 150/5300-13B, *Airport Design*, Change 1

3.5.1 RUNWAY SAFETY AREA

The Runway Safety Area (RSA) is the surface surrounding the runway prepared or suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway. Based on FAA RDC B-II design standards for existing conditions, the RSA should extend beyond the departure end of the runway for 1,000 feet, prior to the runway threshold for 600 feet, and be 500 feet wide. Runway 16/34 meets the necessary dimensional criteria.

3.5.2 OBJECT FREE AREA

The Object Free Area (OFA) is 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 the purpose of air navigation or aircraft ground maneuvering.

Currently, RDC B-II standards indicate requirements for the OFA to be 300 feet wide, extending 300 feet beyond the departure end of the runway, and 300 feet prior to the runway threshold. Runway 16/34 meets the necessary dimensional criteria.

3.5.3 BUILDING RESTRICTION LINE

The FAA no longer has fixed-distance standards for the Building Restriction Line (BRL) location. Rather, the BRL is a line that identifies suitable building area locations on airports. It considers such things as runway protection zones, the appropriate OFAs and OFZs, NAVAID critical areas, areas required for TERPS, and air traffic control (ATCT) line of sight (at airports where ATCTs exist). Typically, the closer development is to the Aircraft Operations Area (AOA), the more impact it will have on future expansion capabilities of the Airport. Future considerations, including development coinciding with the completion of Runway 16/34 will be examined in the alternatives section of this study.

3.5.4 RUNWAY PROTECTION ZONES

Runway Protection Zones (RPZ) are trapezoidal areas off the end of each runway end that serve to enhance the protection of people and property on the ground in the event an aircraft lands or crashes beyond the runway end. RPZs underlie a portion of the approach closest to the Airport. Many land uses are prohibited by FAA guidelines within these areas. However, these limitations are only enforceable if the RPZ is owned or controlled by the airport sponsor. Airport control of these areas is strongly recommended and is primarily achieved through airport property acquisition but can also occur through easements or zoning to control development and land use activities.

Runway 16/34 features RPZ dimensions of 500' x 1,000' x 700', accommodating the not lower than 1 mile approach visibility minimums. Currently, most of the RPZ property relating to the Runway 16 end is owned or controlled by CVB. However, a majority of the Runway 34 RPZ are not controlled by the Airport. It is recommended that the Airport pursue control of these areas via fee simple property acquisition or easement.

3.6 LANDSIDE REQUIREMENTS

This section describes the landside requirements needed to accommodate CVB's general aviation activity throughout the planning period. Areas of particular focus include the hangars, aprons, tie-down areas, automobile parking, as well as the various associated support facilities.

3.6.1 HANGARS

Hangars are the preferred method for based aircraft storage at Castroville Municipal Airport to protect aircraft from high temperatures, sun exposure, and severe weather. The Airport currently has a waiting list for hangar rentals. Currently, there are 19 box hangars, four (4) T-hangar structures providing a total of 32 units, one (1) shade hangar providing a total of 12 units.

All aircraft based at CVB are stored in hangars. The aforementioned rate is assumed for the future based aircraft at CVB and used in determining the demand for additional hangars. The aircraft type influences the type of storage required for based aircraft. Taking this into consideration, the projected based aircraft fleet mix was used to identify the number of

additional hangars by type projected over each phase of the planning period. For the end of the planning period (2042), hangar space requirements were calculated as follows in Table C.8.

TABLE C.8 – AIRPORT HANGAR SPACE REQUIREMENTS

Percent of Aircraft Type	Type of Storage
100% of Jet Aircraft	Corporate/Executive Hangar
50% of Multi Engine Aircraft	Corporate Hangar
50% of Multi Engine Aircraft	T-Hangar/Box Hangar
50% of Single Engine Aircraft	T-Hangar
50% of Single Engine Aircraft	Corporate Hangar

Conventional hangar space requirements assumed 10,000 square feet per based jet aircraft, 2,500 square feet per turboprop, and 1,500 square feet per helicopter. T-hangar units assumed 1,200 square feet per single-engine piston and 1,500 square feet per multi-engine piston-based aircraft. Applying these standards to the forecasted based aircraft yielded the following hangar needs for the year 2042.

- Corporate/Conventional Hangar Space: 105,984 square feet
- T-Hangar Units: 50,377 square feet

3.6.2 AIRCRAFT PARKING APRONS

Aircraft parking area requirements were calculated on the assumption that paved apron areas will be provided for all based general aviation aircraft not kept in hangars at CVB. This was estimated to be equivalent to two percent of all single-engine based aircraft throughout the planning period. A total of 229 square yards of apron per aircraft was used for planning the local apron requirement. By the year 2042, a total of 460 square yards of based aircraft parking apron will be needed.

In addition, additional transient apron space required to meet itinerant general aviation demand was estimated using an approach outlined by the FAA is AC 150/5300-13B, *Airport Design*. This approach indicates that the area needed for transient aircraft parking will differ by airport, but principals should include an allowance for an appropriate amount of apron per transient aircraft. For this analysis, it was assumed that 50 percent of the daily itinerant operations on a busy day (a busy day is 10 percent busier than the average day) would represent aircraft on the ground at any one time. Transient apron requirements for general aviation aircraft at CVB indicated that 2,065 to 10,000 square feet per itinerant aircraft was a reasonable distribution. This will permit the accommodation of aircraft ranging from single-engine piston aircraft to large business jets. Based on the forecast demand, a total of 26,045 square yards will be needed by the year 2042.

3.6.3 TERMINAL SPACE

The existing general aviation terminal building at Castroville Municipal Airport was completed in 2004 and provides 3,000 square feet of amenities, including a pilot's lounge with restroom and shower, FBO and administrative offices, flight planning room, passenger waiting and vending area, public restrooms, and a conference room. Based on the forecast demand, this terminal building size should continue to be sufficient throughout the planning period.

3.6.4 AUTO PARKING

Auto space requirements are a function of the number of passengers, employees, and pilots expected to use an airport during the daily peak hour. At medium activity general aviation airports, planning standards indicated that roughly 1.3 auto parking spaces per total number of peak day general aviation pilots and passengers are adequate. CVB currently accommodates 21 auto parking positions. Based on forecast demand, it is anticipated that the Airport will require a total of 49 parking positions by 2042.

3.6.5 FUEL STORAGE FACILITIES

Castroville Municipal Airport is equipped with 15,000-gallons of Jet-A fuel and 18,000-gallons of AVGAS/100LL. Given the demand forecast, it is anticipated that the current fuel storage facilities will meet the needs of the airport throughout the planning period.

3.7 SUMMARY OF FACILITY REQUIREMENTS

Table C.9 presents a summary of the facility needs for Castroville Municipal Airport. As shown, the forecast of aviation demands indicates the need for additional landside hangar and parking facilities.

TABLE C.9 – FACILITY REQUIREMENTS SUMMARY

ITEM	2027	2032	2042
Airport Reference Code	B-II	B-II	B-II
Pavement Load-Bearing Capacity	30,000 lbs.	30,000 lbs.	30,000 lbs.
Lighting Systems & Approach Aids	MIRL	MIRL	MIRL
Conventional Hangar Space	56,524 sq. ft.	73,060 sq. ft.	105,984 sq. ft.
T-Hangar Space	42,091 sq. ft.	44,736 sq. ft.	50,377 sq. ft.
Apron Area	20,964 sq. yds.	22,537 sq. yds.	26,045 sq. yds.
Based Aircraft Apron	349 sq. yds.	382 sq. yds.	460 sq. yds.
Itinerant Apron	20,616 sq. yds.	22,155 sq. yds.	25,585 sq. yds.
Terminal Building Space	1,119 sq. ft.	1,503 sq. ft.	2,430 sq. ft.
Auto Parking	22 spaces	30 spaces	49 Spaces
Miscellaneous			
Fuel Farm	No change	No change	No Change

CHAPTER FOUR

ALTERNATIVES




Castroville
MUNICIPAL AIRPORT

04 DEVELOPMENT ALTERNATIVES

4.1 OVERVIEW

The previous chapter identified the airside and landside facility requirements needed to satisfy the forecast demand throughout the 20-year planning period. Using the identified requirements, the following recommendations have been made to address how those requirements will be met using various development alternatives. This chapter will analyze the benefits and weaknesses associated with each alternative to provide a strategy for selecting a preferred airport development plan. Once selected, the preferred alternative will be implemented into the Airport Layout Plan (ALP) set.

This effort aims to develop a balanced airside infrastructure and appropriate landside aircraft storage infrastructure to best serve the forecast aviation demands. Assessment of each alternative is grounded primarily in local, state, and federal planning standards; however, technical judgment must also be applied to determine the appropriate course of action, and factors surrounding the development and evaluation of design options should be assessed. These factors include:

- Develop a safety-oriented and efficient aviation facility through compliance with Federal Aviation Administration (FAA) airport design standards and airspace criteria defined in FAA Advisory Circular (AC) 150/5300-13B, *Airport Design*.
- The short and long-term development cost of the defined alternatives.
- Compatibility with existing and proposed land uses concerning zoning ordinances, and neighboring off-airport uses.
- Compatibility with the short and long-range goals of the City of Castroville, Texas Department of Transportation, and the Federal Aviation Administration.
- Minimization of environmental impacts on and off-airport.

Alternatives to be considered will include options for both airside and landside development.

4.2 FACILITY REQUIREMENTS SUMMARY

Facility requirements are intended to compare existing facilities with current safety standards and the demand for new or expanded facilities. The facilities previously outlined in Chapter 3, *Facility Requirements*, have provided the baseline to determine the feasibility of accommodating various alternatives. In addition, airfield demand/capacity, airside facility requirements, and landside capacity have all been evaluated during the selection of alternatives. Two primary standards are considered when evaluating facility requirements. First, alternatives must meet the design requirements established by the current and future Airport Reference Code (ARC). Second, standards identified in FAA Advisory Circular 150/5300-13B, *Airport Design*, must be met.

To meet future facility requirements, Castroville Municipal Airport must make provisions to accommodate future operations. The demand for additional facilities was calculated in the previous chapter and can be summarized by examining forecast based aircraft and operations.

1. **Based Aircraft:** CVB currently accommodates 68 based aircraft; this number is expected to increase to as many as 100 by 2042. (Table 4.1).

2. **Operations:** In 2021, CVB had 16,420 operations, which is expected to rise to 22,216 by 2042. (Table 4.1)

TABLE 4.1 – FORECASTS

Operations	2021	2027	2032	2037	2042
Air Taxi	164	179	192	207	222
Single-Engine Piston	13,957	14,783	15,396	16,009	16,846
Multi-Engine Piston	831	895	962	1,034	1,111
Turbo-prop (SE)	5	179	385	827	1,111
Turbo-prop (ME)	0	179	385	620	889
Business Jet	164	358	577	620	666
Helicopter	164	179	192	207	222
Military	1,149	1,149	1,149	1,149	1,149
TOTAL OPERATIONS	16,420	17,901	19,237	20,673	22,216
Local Operations	8,210	8,951	9,619	10,337	11,108
Itinerant Operations	8,210	8,951	9,619	10,337	11,108
Based Aircraft					
Single-Engine Piston	60	67	71	75	79
Multi-Engine Piston	5	5	6	6	7
Turboprop (Single-Engine)	1	2	2	4	5
Turboprop (Multi-Engine)	0	1	2	3	4
Jet	1	1	2	2	3
Helicopter	1	1	1	2	2
Total	68	76	83	91	100

Source: KSA

4.2.1 AIRSIDE REQUIREMENTS

Airside facilities include infrastructure that interacts with the arrival and departure of aircraft and their subsequent movement around the airfield to parking and storage areas. Areas of focus include runway/taxiway dimensions, aprons, navigational aids (NAVAIDs), landing aids, and dimensional standards. These criteria are considered during the development of the airside alternatives.

The following airside improvements outlined in Table 4.2 were recommended in the previous chapter and are intended to meet future design requirements and enhance the airfield's safety and efficiency. Each proposed alternative will incorporate these improvements while ensuring compliance with FAA Airport Design Standards.

TABLE 4.2 – SUMMARY OF FACILITY REQUIREMENTS

Facility	Key Considerations	Justification
Airport Reference Code	8-ft – existing and ultimate time frame dictated by a change in fleet mix.	Safety and Capacity
Runway 16/34	Maintain existing 5,001' with ultimate option for extension to 6,000', 3" structural overlay of existing Runway 16/34.	Capacity
Parallel Taxiway	Maintain existing 35' width, construct new taxiway connectors and demolish mid-field connector to eliminate direct access.	Safety, Capacity, and Standards
Pavement Strength	26,000 lbs. single-wheel, 40,000 lbs. dual-wheel resulting from the structural analysis completed by KSA.	Capacity
Runway / Taxiway Lighting	Upgrade Runway 16/34 lighting to LED MIRL, consider the construction of LED MITL for taxiways and upgrade PAPI 2L to PAPI 4L.	Safety and Capacity
Hangar Space	Various hangars will be necessary during the planning period and vary depending on size and market needs.	Airport revenue enhancement (FAA grant assurances).
Aircraft Parking Apron	Aircraft parking expansion. Long-term need of 26,045 square yards.	Capacity
Terminal Building Space	Maintain current square footage.	Capacity
Parking and Access	Auto parking expansion. 22 spaces are needed in the short term, and 49 spaces need in the long term. Relocate the airport entrance road.	Access
Security Fencing	Complete 8-foot security/wildlife fencing and implement controlled access (i.e., RFID, Security Cameras, etc.)	Safety/Security
Weather Reporting	Replace and Relocate AWOS to the west side of the airfield.	Safety

Source: KSA

4.2.2 LANDSIDE REQUIREMENTS

Various landside improvements are recommended to accommodate current and forecast aviation activity throughout the planning period at Castroville Municipal Airport. As stated in Chapter 3, *Facility Requirements*, areas of particular focus include:

- Provide additional aircraft storage hangars of various sizes:
 - Conventional Hangars
 - Box Hangars
 - T-Hangars
- Expanded Automobile Parking
- Expanded Aircraft Parking Apron
- Expand 8' Wildlife/Security Fencing
- Preservation of Land for Expansion and Development

These facility requirements are developed from the analysis of the demand capacity requirements and are based on standards established by FAA Advisory Circular 150/5300-13B, *Airport Design*. Each of these proposed alternatives will incorporate these improvements while following compliance with FAA Airport Design Standards.

4.3 DEVELOPMENT ALTERNATIVES EVALUATION

The following section will evaluate four development alternatives representing a variety of airside and landside options. As outlined in the Inventory chapter, Castroville Municipal Airport is based on a single runway system. Runway 16/34 is 5,001' by 75' and is served by a full-length parallel taxiway.

To help determine terminal support area facilities for future planning periods, landside capacity and future demand were evaluated for itinerant and based aircraft parking aprons, aircraft storage facilities, automobile parking, fuel storage, and support area requirements. Both conventional and T-hangars are needed during all phases of the planning period.

Development strategies were explored at Castroville Municipal Airport based on the following criteria:

- Market Position
- Regional Economic Development Opportunities
- SWOT Analysis Results from Stakeholders

According to the forecast based-aircraft counts, increases in local and itinerant operations are anticipated. Alternative development options have been established to accommodate the projected demand for the 20-year planning period. It should be noted that future development of aircraft storage facilities is demand-based and market-driven.

The number, size, and location of these facilities will vary depending on the demand for the specific type and flexibility to accommodate a variety of users. Additionally, there are important development guidelines that the airport sponsor should consider when making hangar placement determinations at the airport, which include:

- Each executive hangar should be supplied with taxiway access that is separated from automobile access and adjacent automobile parking. This is most efficiently accomplished when a row of hangars is developed and provides taxiway access on one side and automobile access and parking on the other.
- Each T-hangar should be nested and developed with taxiway access to both sides of the hangar. Controlled automobile access should be provided to the taxiway/apron area near the T-hangars. A public parking area should be provided near the T-hangar facilities to accommodate users and visitors.

The following alternatives have been assembled to provide a full range of design options. These alternatives are based on the forecasts of aviation activity, facility requirement needs, and potential expansions at the Airport. These alternatives include hangar, apron, and access taxiway development improvements based on input from airport personnel and stakeholders and the projected airport storage improvements needed to serve the aviation user. It is important to recognize that the ultimate build-out of the various aviation development areas presented far exceeds that which is projected for the 20-year planning periods of the study.

4.3.1 ALTERNATIVE ONE

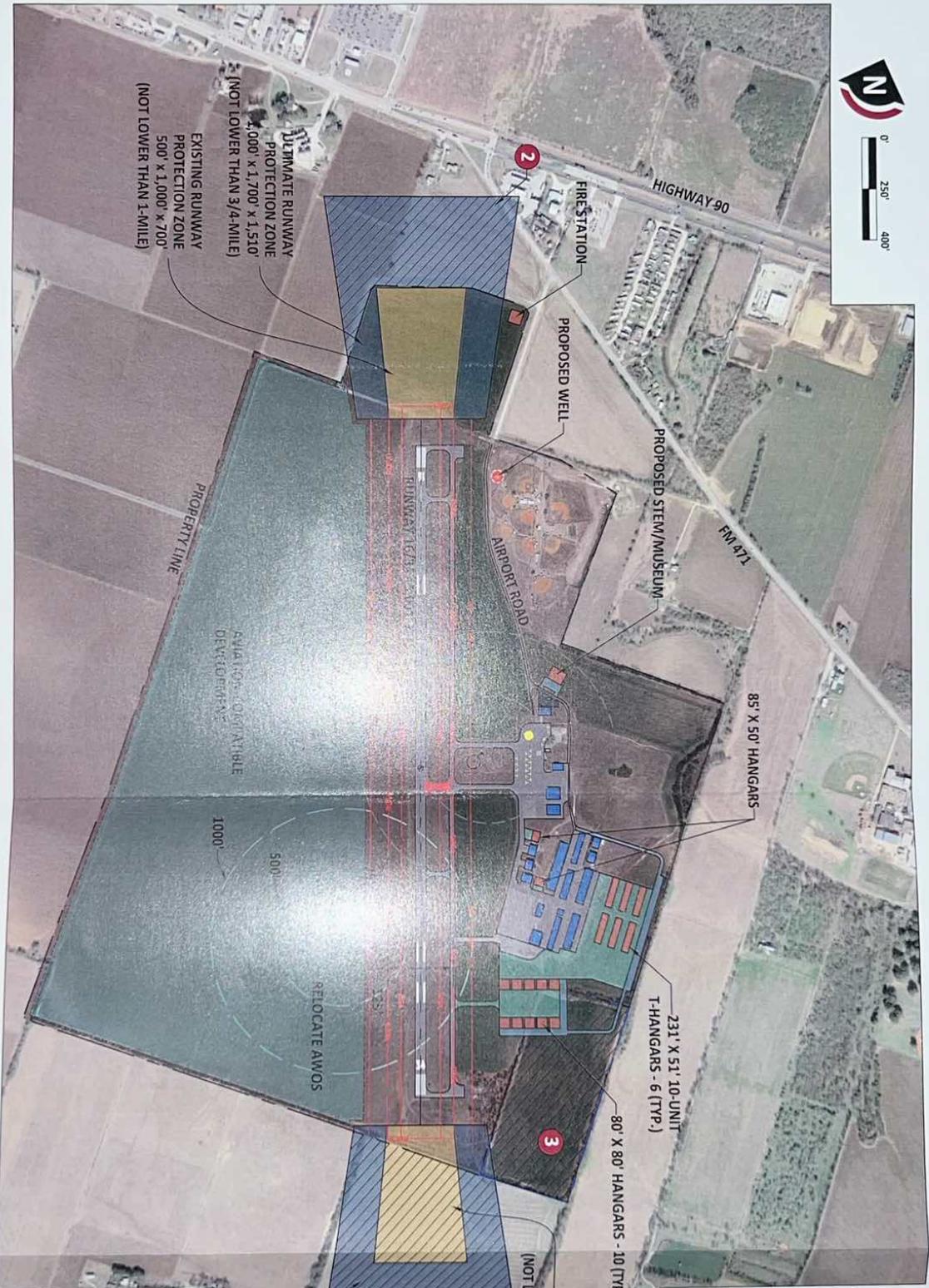
Graphically depicted in Exhibit 4.1, *Alternative One* recommends retaining the existing runway length of 5,001 feet while focusing on preserving airport infrastructure and crafting the future development of Castroville Municipal Airport. The primary objective of this alternative is to maximize terminal area development and promote economic development. Consideration is given to the placement of additional aircraft storage facilities. Like most general aviation airports across the U.S., available hangar space is limited at CVB. Additionally, consideration is given to replacing and relocating the Automated Weather Observing System (AWOS) to the west side of Runway 16/34. The existing AWOS equipment is approaching the end of its useful life. It is located in an area prime for future apron development and contains structures incompatible with the critical areas protecting the integrity of weather data collection.

Airside Design Considerations Summary

- Remove the midfield connector taxiway and replace with two (2) new connectors, bringing the taxiways into compliance with FAA design standards and removing direct access from the general aviation apron to Runway 16/34.
- Relocate and replace the Automated Weather Observing System (AWOS) to an open area on the west side of the airfield. In its present location, the various sensor critical areas serving the weather station do not meet the dimensional criteria noted in FAA Order 6560.20C, *Siting Criteria for Automated Weather Observing Systems*.
- Increase Runway Protection Zone (RPZ) dimensions to accommodate Not Lower Than 3/4-Mile approaches. Obtain land via fee simple acquisition or avigation easements for the land underlying these RPZs.

Landside Design Considerations Summary

- Relocate the airport entrance road, allowing for future aeronautical development on the east side of Runway 16/34.
- Cooperate with the City of Castroville to construct a fire station on or in the vicinity of airport property. This development will enhance emergency response time to the airfield and thereby improve the operational safety of the Airport.
- Consider the development of various aircraft storage facilities, including conventional and T-hangars, to accommodate the forecast based aircraft demand.



LEGEND

- EXISTING BUILDINGS
- EXISTING PAVEMENT
- RUNWAY PROTECTION ZONE
- PAVEMENT TO BE REMOVED
- AVIATION DEVELOPMENT AREA
- PROPERTY ACQUISITION
- PROPERTY LINE

ULTIMATE RUNWAY PROTECTION ZONE 1,000' x 1,700' x 1,510' (NOT LOWER THAN 3/4-MILE)

EXISTING RUNWAY PROTECTION ZONE 500' x 1,000' x 700' (NOT LOWER THAN 1-MILE)

EXISTING RUNWAY PROTECTION ZONE 500' x 1,000' x 700' (NOT LOWER THAN 1-MILE)

ULTIMATE RUNWAY PROTECTION ZONE 1,000' x 1,700' x 1,510' (NOT LOWER THAN 3/4-MILE)

PROPERTY/ASESMENT DEFICIENCIES	
NO.	PROPERTY/ASESMENT ACRAGE
1	43,845 AC R92 (NOT LOWER THAN 1-MILE)
2	47,299 AC R82 (NOT LOWER THAN 1-MILE)
3	24,421 AC

Exhibit 4.1 - ALTERNATIVE ONE

4.3.2 ALTERNATIVE TWO

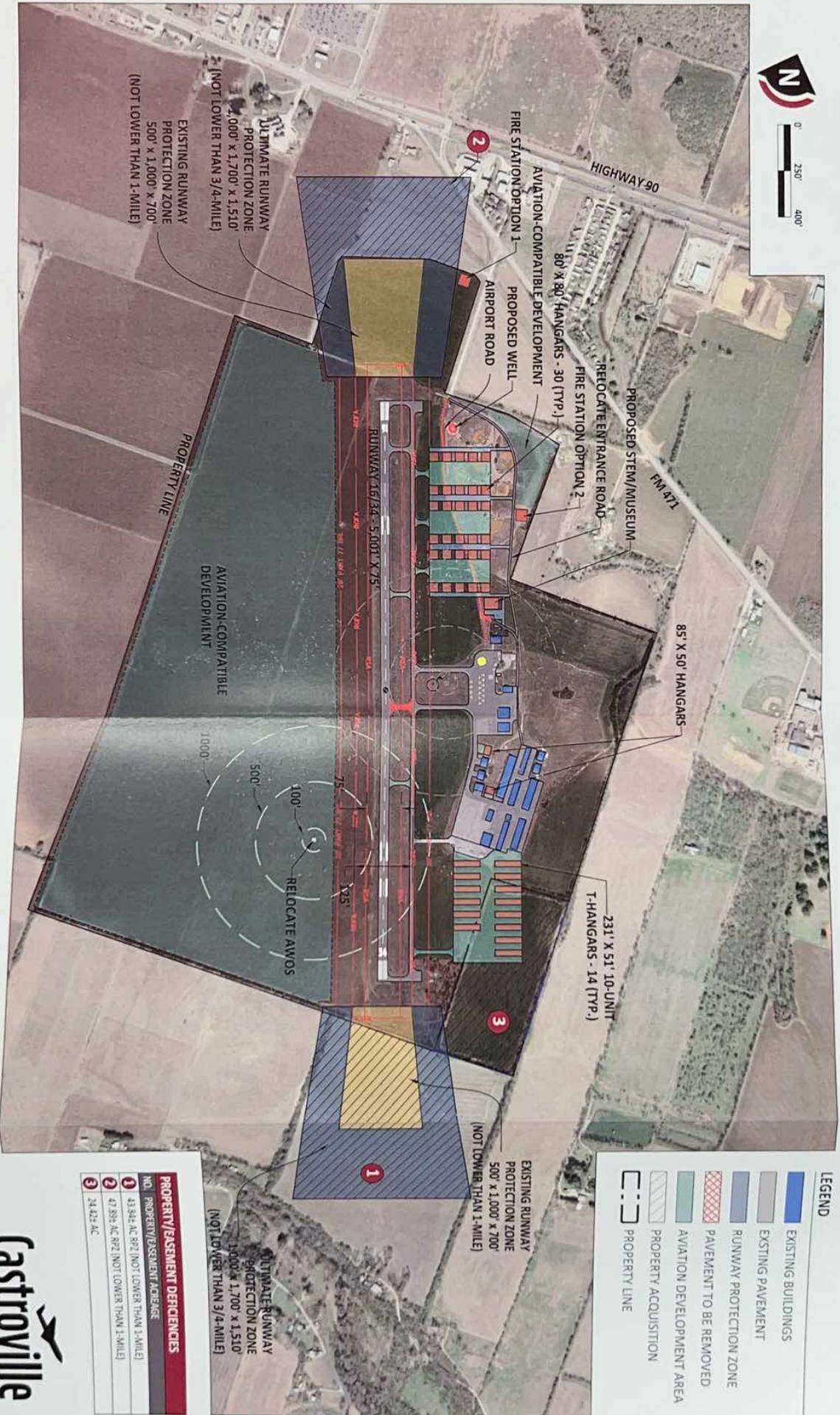
Graphically depicted in **Exhibit 4.2**, *Alternative Two* expands on the recommendations provided in the first alternative, offering alternative locations for developing aircraft storage facilities. Similar to *Alternative One*, it is recommended to retain the existing runway length of 5,001 feet while focusing on preserving airport infrastructure and crafting the future development of Castroville Municipal Airport. The primary objective of this alternative is to maximize terminal area development and promote economic development. Consideration is given to the placement of additional aircraft storage facilities. Like most general aviation airports across the U.S., available hangar space is limited at CVB. Additionally, consideration is given to replacing and relocating the Automated Weather Observing System (AWOS) to the west side of Runway 16/34. The existing AWOS equipment is approaching the end of its useful life. It is located in an area prime for future apron development and contains structures incompatible with the critical areas protecting the integrity of weather data collection.

Airside Design Considerations Summary

- Remove the midfield connector taxiway and replace with two (2) new connectors, bringing the taxiways into compliance with FAA design standards and removing direct access from the general aviation apron to Runway 16/34.
- Relocate and replace the Automated Weather Observing System (AWOS) to an open area on the west side of the airfield. In its present location, the various sensor critical areas serving the weather station do not meet the dimensional criteria noted in FAA Order 6560.20C, *Siting Criteria for Automated Weather Observing Systems*.
- Increase Runway Protection Zone (RPZ) dimensions to accommodate Not Lower Than 3/4-Mile approaches. Obtain land via fee simple acquisition or avigation easements for the land underlying these RPZs.

Landside Design Considerations Summary

- Relocate the airport entrance road, allowing for future aeronautical development on the east side of Runway 16/34.
- Cooperate with the City of Castroville to construct a fire station on or in the vicinity of airport property. This development will enhance emergency response time to the airfield and thereby improve the operational safety of the Airport.
- Consider the development of various aircraft storage facilities, including conventional and T-hangars, to accommodate the forecast based aircraft demand.



- LEGEND**
- EXISTING BUILDINGS
 - EXISTING PAVEMENT
 - RUNWAY PROTECTION ZONE
 - PAVEMENT TO BE REMOVED
 - AVIATION DEVELOPMENT AREA
 - PROPERTY ACQUISITION
 - PROPERTY LINE

PROPERTY/EASEMENT DEFICIENCIES

NO.	PROPERTY/EASEMENT ADEQUACY
1	43 S42 AC 892 (NOT LOWER THAN 1-MILE)
2	47 S35 AC 892 (NOT LOWER THAN 1-MILE)
3	24 A22 AC

Exhibit 4.2 - ALTERNATIVE TWO

4.3.3 ALTERNATIVE THREE

Graphically depicted in Exhibit 4.3, *Alternative Three* reflects the ultimate build-out of the Airport's airside infrastructure, proposing a 999' extension to Runway 16/34, bringing the ultimate length to 6,000'. Like *Alternatives One* and *Two*, consideration is given to the placement of additional aircraft storage facilities. Like most general aviation airports across the U.S., available hangar space is limited at CVB. Additionally, consideration is given to replacing and relocating the Automated Weather Observing System (AWOS) to the west side of Runway 16/34. The existing AWOS equipment is approaching the end of its useful life. It is located in an area prime for future apron development and contains structures incompatible with the critical areas protecting the integrity of weather data collection.

Airside Design Considerations Summary

- Extend Runway 16/34 999' South to an ultimate length of 6,000'.
- Extend Parallel Taxiway 999' South to coincide with Runway 16/34 Extension.
- Remove the midfield connector taxiway and replace with two (2) new connectors, bringing the taxiways into compliance with FAA design standards and providing direct access from the general aviation apron to Runway 16/34.
- Relocate and replace the Automated Weather Observing System (AWOS) to an open area on the west side of the airfield. In its present location, the various sensor critical areas serving the weather station do not meet the dimensional criteria noted in FAA Order 6560.20C, *Siting Criteria for Automated Weather Observing Systems*.
- Increase Runway Protection Zone (RPZ) dimensions to accommodate Not Lower Than 3/4-Mile approaches. Obtain land via fee simple acquisition or aviation easements for the land underlying these RPZs.

Landside Design Considerations Summary

- Relocate the airport entrance road, allowing for future aeronautical development on the east side of Runway 16/34.
- Cooperate with the City of Castroville to construct a fire station on or in the vicinity of airport property. This development will enhance emergency response time to the airfield and thereby improve the operational safety of the Airport.
- Consider the development of various aircraft storage facilities, including conventional and T-hangars, to accommodate the forecast based aircraft demand.



LEGEND

	EXISTING BUILDINGS
	EXISTING PAVEMENT
	RUNWAY PROTECTION ZONE
	PAVEMENT TO BE REMOVED
	AVIATION DEVELOPMENT AREA
	PROPERTY ACQUISITION
	PROPERTY LINE

PROPERTY/EASEMENT DEFICIENCIES

NO.	PROPERTY/EASEMENT AVERAGE
1	58.514 AC 892 (NOT LOWER THAN 1-MILE)
2	47.894 AC 892 (NOT LOWER THAN 1-MILE)
3	24.424 AC

Exhibit 4.3 - ALTERNATIVE THREE

4.3.4 ALTERNATIVE FOUR

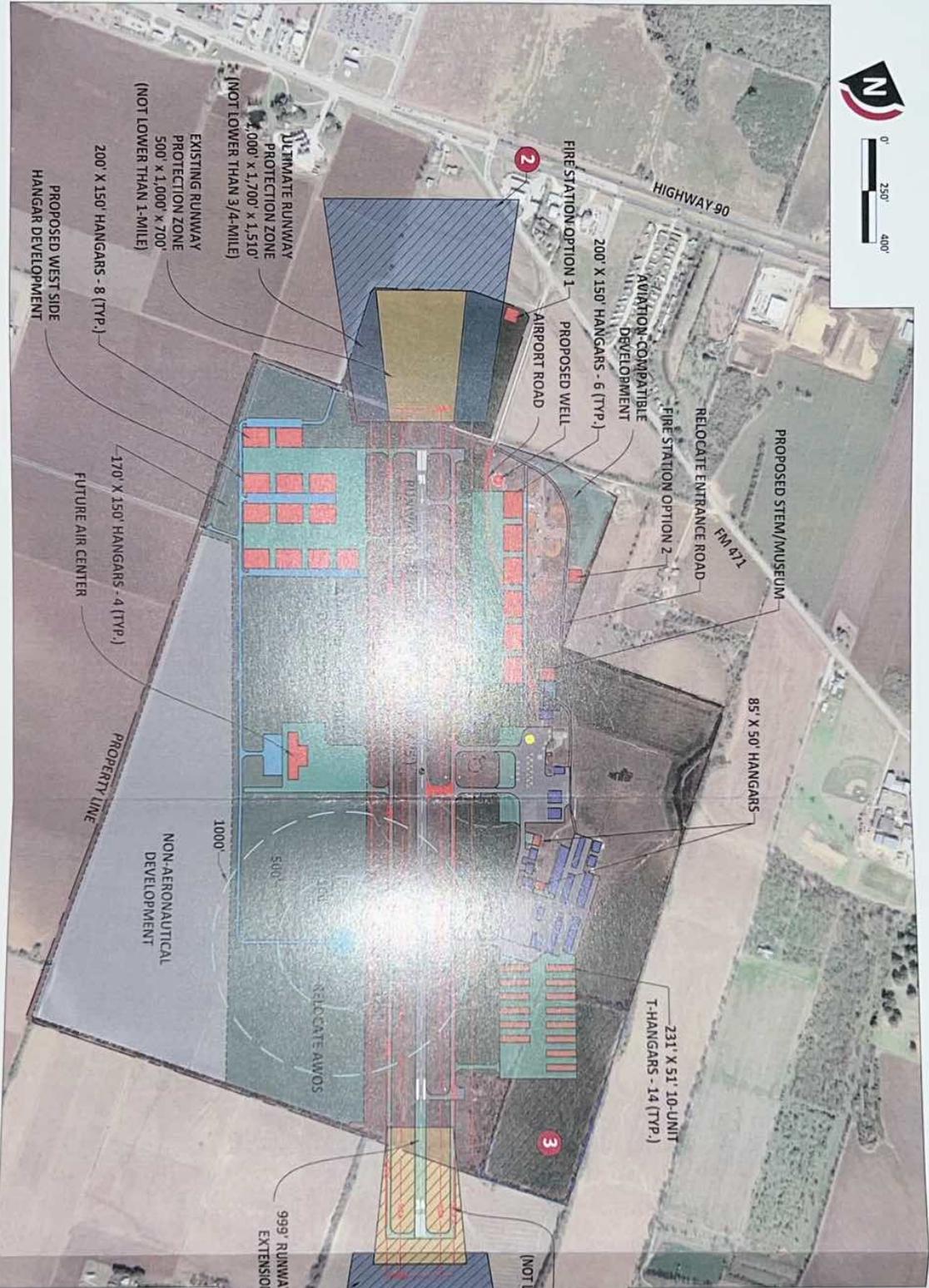
Graphically depicted in Exhibit 4.4, *Alternative Four* reflects the ultimate build-out of the Airport's airside infrastructure, proposing a 999' extension to Runway 16/34, bringing the ultimate length to 6,000'. Special consideration was given to enhancing development opportunities on the airport's west side, including aeronautical and non-aeronautical development. Like *Alternatives One* and *Two*, consideration is given to the placement of additional aircraft storage facilities. Like most general aviation airports across the U.S., available hangar space is limited at CVB. Additionally, consideration is given to replacing and relocating the Automated Weather Observing System (AWOS) to the west side of Runway 16/34. The existing AWOS equipment is approaching the end of its useful life. It is located in an area prime for future apron development and contains structures incompatible with the critical areas protecting the integrity of weather data collection.

Airside Design Considerations Summary

- Extend Runway 16/34 999' South to an ultimate length of 6,000'.
- Extend Parallel Taxiway 999' South to coincide with Runway 16/34 Extension.
- Remove the midfield connector taxiway and replace with two (2) new connectors, bringing the taxiways into compliance with FAA design standards and removing direct access from the general aviation apron to Runway 16/34.
- Relocate and replace the Automated Weather Observing System (AWOS) to an open area on the west side of the airfield. In its present location, the various sensor critical areas serving the weather station do not meet the dimensional criteria noted in FAA Order 6560.20C, *Siting Criteria for Automated Weather Observing Systems*.
- Increase Runway Protection Zone (RPZ) dimensions to accommodate Not Lower Than 3/4-Mile approaches. Obtain land via fee simple acquisition or aviation easements for the land underlying these RPZs.

Landside Design Considerations Summary

- Relocate the airport entrance road, allowing for future aeronautical development on the east side of Runway 16/34.
- Cooperate with the City of Castroville to construct a fire station on or in the vicinity of airport property. This development will enhance emergency response time to the airfield and thereby improve the operational safety of the Airport.
- Consider the development of various aircraft storage facilities, including conventional and T-hangars, to accommodate the forecast based aircraft demand.
- Provide consideration for future development on the airport's west side, including commercial aeronautical and non-aeronautical development, aimed at maximizing airport revenue sources.



LEGEND

-  EXISTING BUILDINGS
-  EXISTING PAVEMENT
-  RUNWAY PROTECTION ZONE
-  PAVEMENT TO BE REMOVED
-  AVIATION DEVELOPMENT AREA
-  NON-AVIATION DEVELOPMENT AREA
-  PROPERTY ACQUISITION
-  PROPERTY LINE

PROPERTY/EASEMENT DEFICIENCIES	
NO.	PROPERTY/EASEMENT DEFICIENCY
1	58.51E AC 892 (NOT LOWER THAN 1-MILE)
2	47.89E AC 892 (NOT LOWER THAN 1-MILE)
3	24.42E AC

Exhibit 4.4 - ALTERNATIVE FOUR

4.4 RECOMMENDED DEVELOPMENT PLAN

The overall Recommended Development Plan combines aspects of each airside and landside alternative. Also, it considers input provided by the Planning Advisory Committee (PAC) following the review of the draft development alternatives. Each alternative's most feasible and relevant elements are included to provide on consolidated overview of what development might look like at the Airport. Understanding what projects should be expected during the planning period is essential to meet FAA design standards and user needs while providing adequate services to the aviation community. This recommended plan will be included in the Airport Layout Plan (ALP) for approval and will be the basis of the implementation and Capital Improvement Program (CIP) moving forward.

4.4.1 AIRSIDE

The airside portion of these recommendations considers improvements to areas including the runway and taxiway infrastructure, focused on safety, planning, design criteria, and capability to accommodate the airport's existing and future operational needs. Operational activity at Castroville Municipal Airport is forecast to increase throughout the 20-year planning timeframe, serving a full range of general and business aviation users. Major airside improvements addressed in the recommended plan include:

- Upgrade Runway 16/34 Lighting to LED Medium Intensity Runway Lighting.
- Construct a taxiway lighting system with Medium Intensity Taxiway Lighting.
- Extend Runway 16/34 999' South to an ultimate length of 6,000'.
- Extend Parallel Taxiway 999' South to coincide with Runway 16/34 Extension.
- Replace PAPI-2L units with PAPI-4L units.
- Construct a 3" structural overlay of existing Runway 16/34.
- Remove the midfield connector taxiway and replace with two (2) new connectors, bringing the taxiways into compliance with FAA design standards and removing direct access from the general aviation apron to Runway 16/34.
- Relocate and replace the Automated Weather Observing System (AWOS) to an open area on the west side of the airfield. In its present location, the various sensor critical areas serving the weather station do not meet the dimensional criteria noted in FAA Order 6560.20C, *Siting Criteria for Automated Weather Observing Systems*.
- Increase Runway Protection Zone (RPZ) dimensions to accommodate Not Lower Than 3/4-Mile approaches. Obtain land via fee simple acquisition or avigation easements for the land underlying these RPZs.

4.4.2 LANDSIDE

The following landside recommendations aim to provide the Airport with adequate terminal and aircraft storage facilities while maximizing operational efficiencies. Landside components include the terminal facility, hangars, and automobile parking. Major landside improvements considered in this recommended plan include:

- Construct 11,230 linear feet of 8' wildlife/security fencing.
- Construct 12,000 square yard expansion to the primary general aviation terminal.
- Relocate the airport entrance road, allowing for future aeronautical development on the east side of Runway

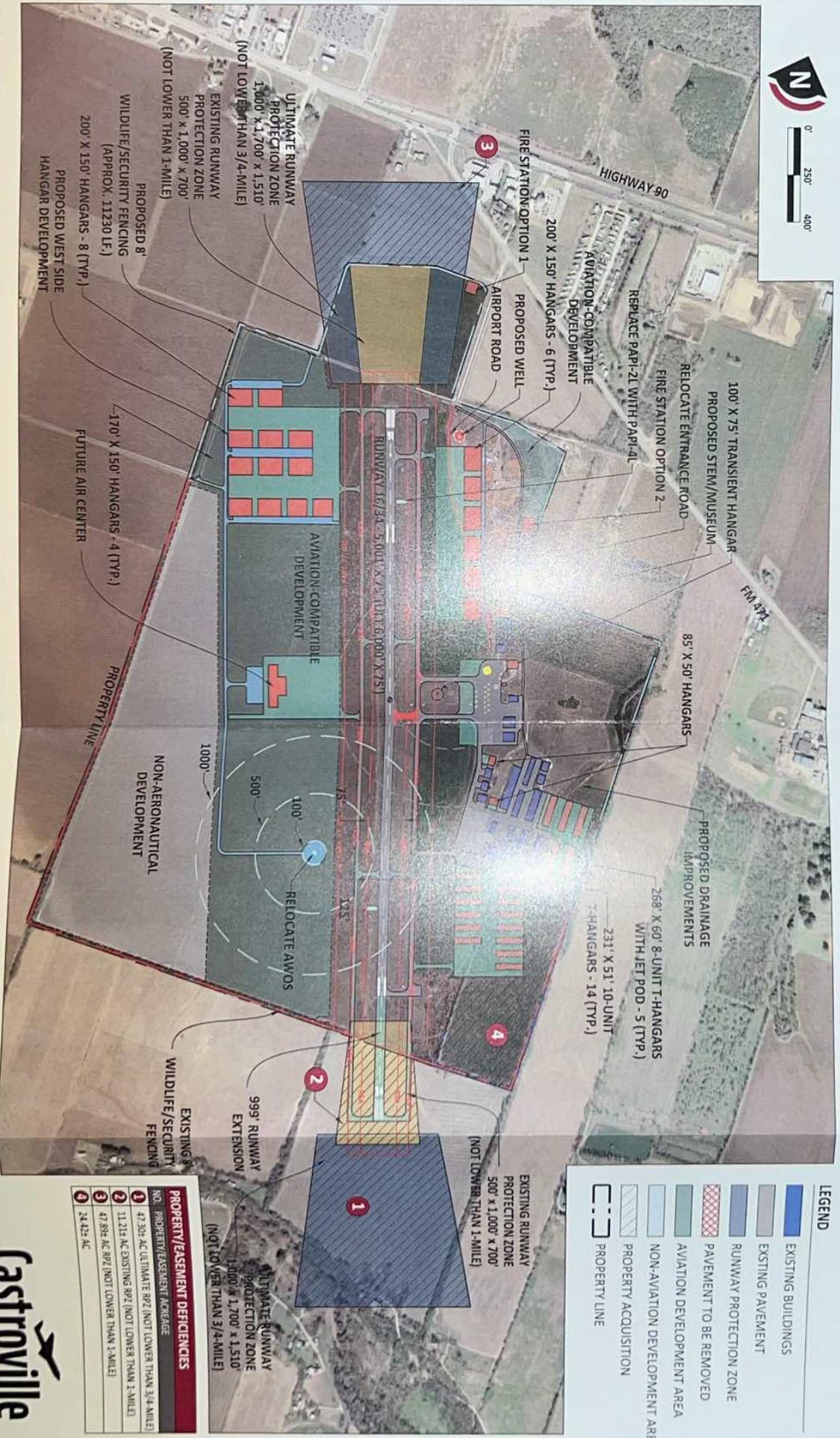
16/34.

- Cooperate with the City of Castroville to construct a fire station on or in the vicinity of airport property. This development will enhance emergency response time to the airfield and thereby improve the operational safety of the Airport.
- Consider the development of ~~various~~ aircraft storage facilities, including conventional and T-hangars, to accommodate the forecast based aircraft demand.
- Provide consideration for future development on the airport's west side, including commercial aeronautical and non-aeronautical development, aimed at maximizing airport revenue sources.



LEGEND

- EXISTING BUILDINGS
- EXISTING PAVEMENT
- RUNWAY PROTECTION ZONE
- PAVEMENT TO BE REMOVED
- AVIATION DEVELOPMENT AREA
- NON-AVIATION DEVELOPMENT AREA
- PROPERTY ACQUISITION
- PROPERTY LINE



ULTIMATE RUNWAY PROTECTION ZONE 1,000' x 1,700' x 1,510' (NOT LOWER THAN 3/4-MILE)

EXISTING RUNWAY PROTECTION ZONE 500' x 1,000' x 700' (NOT LOWER THAN 1-MILE)

WILDLIFE/SECURITY FENCING (APPROX. 11230 LF.)

200' X 150' HANGARS - 8 (TYP.)

PROPOSED WEST SIDE HANGAR DEVELOPMENT

170' X 150' HANGARS - 4 (TYP.)

FUTURE AIR CENTER

NON-AERONAUTICAL DEVELOPMENT

EXISTING WILDLIFE/SECURITY FENCING

999' RUNWAY EXTENSION (NOT LOWER THAN 3/4-MILE)

PROPERTY/EASEMENT DEFICIENCIES	
NO. PROPERTY/EASEMENT ACREAGE	
1	47.30± AC ULTIMATE RPTZ (NOT LOWER THAN 3/4-MILE)
2	11.21± AC EXISTING RPTZ (NOT LOWER THAN 1-MILE)
3	47.89± AC RPTZ (NOT LOWER THAN 1-MILE)
4	24.42± AC

Exhibit 4.5 - Recommended Development

AIRPORT PLANS



**Castroville**
MUNICIPAL AIRPORT

05 AIRPORT PLANS

5.1 OVERVIEW

As required by the Federal Aviation Administration, an Airport Layout Plan (ALP) set was prepared to graphically depict the airport environs and the subsequent recommendations for development described in this planning effort. Recommendations for airfield geometry, obstructions, and landside development are described in the following:

- Cover Sheet
- Airport Layout Plan Drawing
- Inner Portion of the Approach Surface Drawing (Runways 1 and 19)
- Runway Departure Surface Drawing (Runways 1 and 19)
- Terminal Area Drawing
- Land Use Plan
- Exhibit "A" Property Map

5.2 AIRPORT LAYOUT PLAN DRAWING

The Airport Layout Plan (ALP), which illustrates both airside and landside facilities, depicts the existing and ultimate airport facilities required for the airport to accommodate the forecast future demand adequately. Additionally, the ALP provides detailed information on airport and runway design criteria, which is necessary to define relationships with applicable standards.

5.3 INNER PORTION OF THE APPROACH SURFACE DRAWINGS

Inner portion drawings provide a more detailed view of the inner portion of the FAR Part 77 imaginary approach surfaces. This drawing offers large-scale plan and profile delineations of the approach surfaces out to a distance where the surface is 100 feet above the runway end elevation. They are intended to facilitate the identification of roads, utility lines, railroads, structures, trees, vegetation, and other possible obstructions that may lie within the confines of the approach surfaces close to the runway ends. Inner portion drawings are based on the ultimate planned runway lengths, the ultimate planned approaches to each runway end, and the ultimate end elevations.

5.4 RUNWAY DEPARTURE SURFACE DRAWINGS

This drawing is a large-scale plan and profile illustration depicting the dimension and slope of the departure end of the runway (DER) surfaces. This drawing is based on the ultimate planned runway length and the ultimate planned departure surface extending from the runway. No objects should penetrate a surface beginning at the elevation of the DER or end of the clearway, whichever is greater, that slopes to a 40 to 1 gradient.

5.5 TERMINAL AREA PLAN

The terminal area plan illustrates the projected facilities layout of the airport based on the recommended development plan. This plan specifies the location and size of hangars, aprons, taxilanes, fuel farms, and other improvements based on the 20-year footprint.

5.6 LAND USE DRAWING

The land use drawing aims to provide the airport with a plan for leasing revenue-producing areas on the airport. All existing and future development within the airport boundary will be compatible with the primary functions of the airport and will generate lease revenue for the airport's operation.

This drawing also guides local authorities in establishing appropriate land-use zoning near the airport. As specified by FAA Grant Assurance 21, *Compatible Land Use*, the airport sponsor "will take appropriate action, to the extent reasonable, including the adoption of zoning laws, restrict the use of land adjacent to, or in the vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and take-off of aircraft."

5.7 EXHIBIT "A" AIRPORT PROPERTY MAP

This map indicates how various tracks of airport property and easements were acquired and the dates of such acquisition. Its purpose is to provide documentation of the current, and future aeronautical use of land acquired with federal funds or through an FAA Administered Land Transfer Program.

DRAFT ALP SHEETS TO BE INCLUDED IN FINAL DELIVERABLE FOLLOWING SUBMISSION TO TXDOT

AIRPORT LAYOUT PLAN

CASTROVILLE MUNICIPAL AIRPORT (CVB)

CASTROVILLE, TEXAS

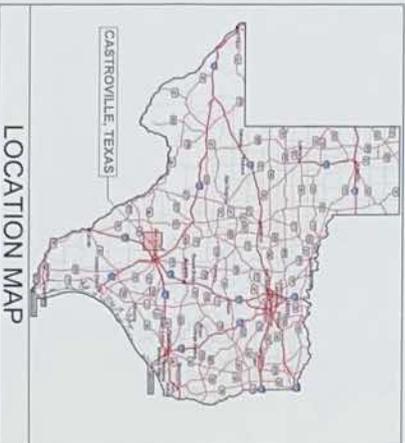
SPONSOR

Castroville
MUNICIPAL AIRPORT

PREPARED BY

KSA

July 25, 2023



LOCATION MAP

INDEX OF SHEETS

Sheet Number	Sheet Title
1	COVER SHEET
2	AIRPORT DATA SHEET
3	AIRPORT LAYOUT DRAWING - EXISTING
4	AIRPORT LAYOUT DRAWING - ULTIMATE
5	AIRPORT AIRSPACE DRAWING
6	AIRPORT AIRSPACE PLAN - RUNWAY 16-34 EXTENDED APPROACH PROFILES
7	INNER APPROACH SURFACE DRAWING - RUNWAY 16
8	INNER APPROACH SURFACE DRAWING - RUNWAY 16
9	RUNWAY DEPARTURE SURFACE DRAWING - RUNWAY 34
10	RUNWAY DEPARTURE SURFACE DRAWING - RUNWAY 16
11	SIGNIFICANT OBJECTS TABLE I
12	SIGNIFICANT OBJECTS TABLE II
13	AIRPORT TERMINAL AREA DRAWING I
14	AIRPORT TERMINAL AREA DRAWING II
15	AIRPORT LAND USE DRAWING
16	AIRPORT PROPERTY MAP



VICINITY MAP

AIRPORT SPONSOR

CURRENT AND FUTURE DEVELOPMENT DERIVED ON THIS AIP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR

TITLE AIRPORT SPONSOR'S REPRESENTATIVE _____

SIGNATURE _____ DATE _____

DESIGNED BY _____ DATE _____

SIGNATURE _____ DATE _____

FAX AIRPORT _____ DATE _____

ISSUE RECORD

DES. ED	NO.	BY	DATE	REVISION
DR: ED				
CH: MM				
APP: MM				

Castroville
MUNICIPAL AIRPORT
CASTROVILLE, TEXAS

AIRPORT LAYOUT PLAN

COVER SHEET

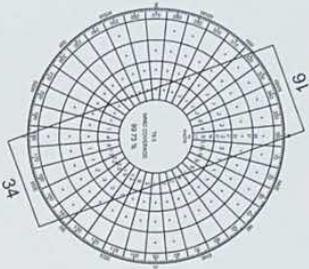
1

AIP GRANT NO. KSA JOB NO. DATE
3-14-0215-04-2019 CS 043 July 25, 2023

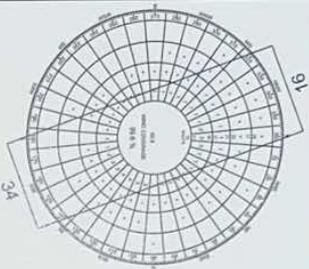
SHEET NO.

KSA

ALL-WEATHER WIND COVERAGE DATA



IFR WIND COVERAGE DATA



RUNWAY	10-5 KNOTS	13 KNOTS	16 KNOTS
16	84.6%	96.1%	80.0%
34	64.1%	63.3%	60.6%
16-34	96.9%	98.4%	99.7%

OBSERVATIONS PERIOD: 2011-2020 STATION: 7225L, MOJLAND AIRFORCE BASE (MELLY FIELD). FAA APP DATA NOT AVAILABLE FOR CWS DATA SOURCE: DATA PROCESSING DIVISION, NATIONAL CLIMATE CENTER, NOAA

RUNWAY	10-5 KNOTS	13 KNOTS	16 KNOTS
16	84.6%	96.0%	80.0%
34	79.9%	61.1%	60.6%
16-34	87.5%	84.8%	90.3%

OBSERVATIONS PERIOD: 2011-2020 STATION: 7225L, MOJLAND AIRFORCE BASE (MELLY FIELD). FAA APP DATA NOT AVAILABLE FOR CWS DATA SOURCE: DATA PROCESSING DIVISION, NATIONAL CLIMATE CENTER, NOAA

Declared Distances Table

	Existing		Upgrade	
	16	34	16	34
Take-Off Run Available (TORA)	5001'	5001'	6,000'	6,000'
Take-Off Distance Available (TODA)	5001'	5001'	6,000'	6,000'
Accelerated Stop Distance Available (ASDA)	5001'	5001'	6,000'	6,000'
Landing Distance Available (LDA)	5001'	5001'	6,000'	6,000'

Taxiway Data Table

Taxiway Design Group	Existing	Upgrade
Taxiway Width	24'	24'
Taxiway Safety Area Width	35'	35'
Taxiway Object Free Area Width	79'	74'
Taxiway Markings / Lighting	None	MIL / Centerline Markings
Taxiway/Runway Separation	240'	240'

Survey Control Stations

Designation	Identifier	Latitude	Longitude
CASTROPTF (PACS)	AVT100	N 29° 20' 34.143"	W 98° 50' 59.449"
CASTROPTF (PACS)	AVT101	N 29° 20' 44.851"	W 98° 50' 56.647"
CASTROPTF AZ MK (PACS)	AVT101	N 29° 20' 46.689"	W 98° 51' 08.013"

Source: National Geospatial Survey Data Explorer; January 2023

Modifications to Standards Approval Table

Approval Date	Amendment Case No.	Standard to be Modified	Description
		None Required	

Runway Data Table

	Existing		Upgrade	
	16	34	16	34
Runway Design Code (RDC)	B-II-5000	B-II-5000	B-I-5000	B-I-5000
Runway Reference Code (RWC)	15/5	15/5	15/5, 40/0	B-I-5000
Pavement Design Strength (K _t 1,000 LB-F)	ASPHALT	ASPHALT	ASPHALT	ASPHALT
Pavement Type	11U/C/VT	11U/C/VT	11U/C/VT	11U/C/VT
Strength R/C/I	0.29%	0.29%	0.29%	0.29%
Maximum Gradient	7'	7'	7'	7'
Grade of Right	98.42%	98.42%	98.42%	98.42%
Percent Width Coverage (11 Knots)	5001' x 75'	N/A	6000' x 75'	N/A
Runway Length & Width	N/A	N/A	N/A	N/A
Runway Discharge Threshold	160'	340'	160'	340'
Runway Bearing (True)	N 29° 20' 56.05"			
Runway End Coordinates (NAD 83)	W 98 51 13.58"	W 98 51 13.58"	W 98 51 13.58"	W 98 50 51.54"
Runway End Elevation (NAD 83)	773.9'	782.2'	773.9'	759.86'
Proposed Runway End Conditions (NAD83)	N/A	N/A	N/A	N/A
Proposed Runway End Elevation (NAD83)	N/A	773.9' / 782.2'	N/A	773.9' / 759.86'
Runway Height / Low Zone Elevation (T021)	773.9'	782.2'	773.9' / 759.86'	766.9'
Runway Coordinates Zone Elevation (T021)	773.9'	782.2'	773.9'	766.9'
Runway Lighting	MRE	MRE	MRE	MRE
Runway Marking	SP	SP	SP	SP
Runway Protection Zone Dimensions	500' x 1,000' x 200'	1,000' x 1,200' x 1,510'	1,000' x 1,200' x 1,510'	1,000' x 1,200' x 1,510'
Approximate Visibility Minimum	> 2.1 NM	> 3.0 NM	> 3.0 NM	> 3.0 NM
Approximate Visibility Minimum (Night/Visual Aid) (Beacon)	N/A	N/A	N/A	N/A
Visual Aid (Lighting)	MEL, PAPI-2L, Windcone, Beacon			
14 CFR Part 77 Approach Category	CN1	CN1	CN1	CN1
Aeronautical Survey Required for Approach	YES	YES	YES	YES
Runway Discharge Surface	YES	YES	YES	YES
Runway Safety Area Width	150'	150'	150'	150'
Runway Safety Area Beyond RW End	300'	300'	300'	300'
Runway Safety Area Prior to Threshold	300'	300'	300'	300'
Runway Object Free Area Width	500'	500'	500'	500'
Runway Object Free Area Beyond RW End	300'	300'	300'	300'
Runway Object Free Area Prior to Threshold	300'	300'	300'	300'
Runway Object Free Area Width	400'	400'	400'	400'
Runway Object Free Area Beyond RW End	200'	200'	200'	200'
Runway Object Free Area Prior to Threshold	200'	200'	200'	200'
Runway CL to A/C Parking Area	400'	400'	400'	400'
Approach Surface	5	5	5	5

Airport Data Table

	Existing	Upgrade
Airport Reference Code (ARC)	B-II	B-I
Main Runway (Runway Number)	8R / 7.0L	8R / 7.0L
Approach Elevation (ASST) MVD 88	773.9'	773.9'
Approach & Terminal Runways	0/5	0/5
Maintenance Facilities	Windcone	Windcone
Airport Reference Point (ARP) MVD 83	N 29° 20' 32.85"	N 29° 20' 22.97"
NAD83 Service Level	W 98° 51' 04.85"	W 98° 51' 02.58"
State System Code	RCAL BS	RCAL BS
Critical Allevat	Cross Creek Sovereign	Cross Creek Sovereign
Wingspan (feet)	77.85'	53.5'
Undercarriage Width (feet)	37.89'	21.33'
Approach Speed (feet)	125	126
Maximum Take off Weight (Lb)	69,700	22,000
Airport Magnetic Variation	3° 54.07' E	

NOAA, February 2022



DES: ED
DR: ED
CH: MM
APP: MM

ISSUE RECORD

NO.	BY	DATE	REVISION

CASTROVILLE
MUNICIPAL AIRPORT
CASTROVILLE, TEXAS

AIRPORT LAYOUT PLAN

AIRPORT DATA SHEET

APP ORGANT NO. KSA 038 NO. DATE: MAY 28, 2023
CAS 043 SHEET NO. 2



DES: ED	DR: ED	CH: MM	APP: MM
ISSUE RECORD	NO.	BY	DATE

CASTROVILLE MUNICIPAL AIRPORT
CASTROVILLE, TEXAS
AIRPORT LAYOUT PLAN

AIP GRANT NO. 3-18-0215-3X-2018
KSA JOB NO. CAS 043
DATE: JULY 25, 2023
SHEET NO. 3
AIRPORT LAYOUT DRAWING -
EXISTING

AIRPORT SPONSOR
CURRENT AND FUTURE DEVELOPMENT PROJECTS ON THIS AIP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR.
THE AIRPORT SPONSOR REPRESENTATIVE
SIGNATURE _____ DATE _____
DESIGNED BY _____ DATE _____
CHECKED BY _____ DATE _____



NOTES:
 1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE NORTH CENTRAL ZONE US FOOT. MAD 832718.
 2. ALL VERTICAL COORDINATES ARE SHOWN IN MAD 88.
 GRAPHIC SCALE IN FEET
 0 100 200 300 400 500
 ANNUAL RATE OF CHANGE: 0.98"/100"
 ELEV. 781.31'
 ELEV. 782.2'
 ELEV. 783.1'
 ELEV. 784.0'
 ELEV. 785.0'
 ELEV. 786.0'
 ELEV. 787.0'
 ELEV. 788.0'
 ELEV. 789.0'
 ELEV. 790.0'
 ELEV. 791.0'
 ELEV. 792.0'
 ELEV. 793.0'
 ELEV. 794.0'
 ELEV. 795.0'
 ELEV. 796.0'
 ELEV. 797.0'
 ELEV. 798.0'
 ELEV. 799.0'
 ELEV. 800.0'

▲	PACS AND SACS MARKERS
⬤	AIRPORT REFERENCE POINT (ARP)
○	SEGMENTED CIRCLE
◀	WINDCONE
■	PAPI
⬢	AWOS
⬠	ROTATING BEACON
⬢	RUNWAY END IDENTIFIER LIGHTS (REIL)
⬢	FENCE
—	APPROACH SURFACE
—	TAXIWAY SAFETY AREA (TSA)
—	TAXIWAY OBJECT FREE AREA (TOFA)
—	INNER APPROACH OBJECT FREE ZONE (OAFZ)

ITEM	EXISTING
AIRPORT PROPERTY	—
AIRPORT PAVEMENT TAXIWAY/TAXIWAY	—
AIRPORT PAVEMENT TO BE REMOVED	—
ROAD/DRIVE/HIGHWAY	—
BUILDING/HANGAR	—
WETLANDS	—
RUNWAY PROTECTION ZONE (RPZ)	—
BUILDING RESTRICTION LINE (BRL)	—
RUNWAY OBJECT FREE AREA (ROFA)	—
RUNWAY SAFETY AREA (RSA)	—
RUNWAY OBJECT FREE ZONE (ROFZ)	—

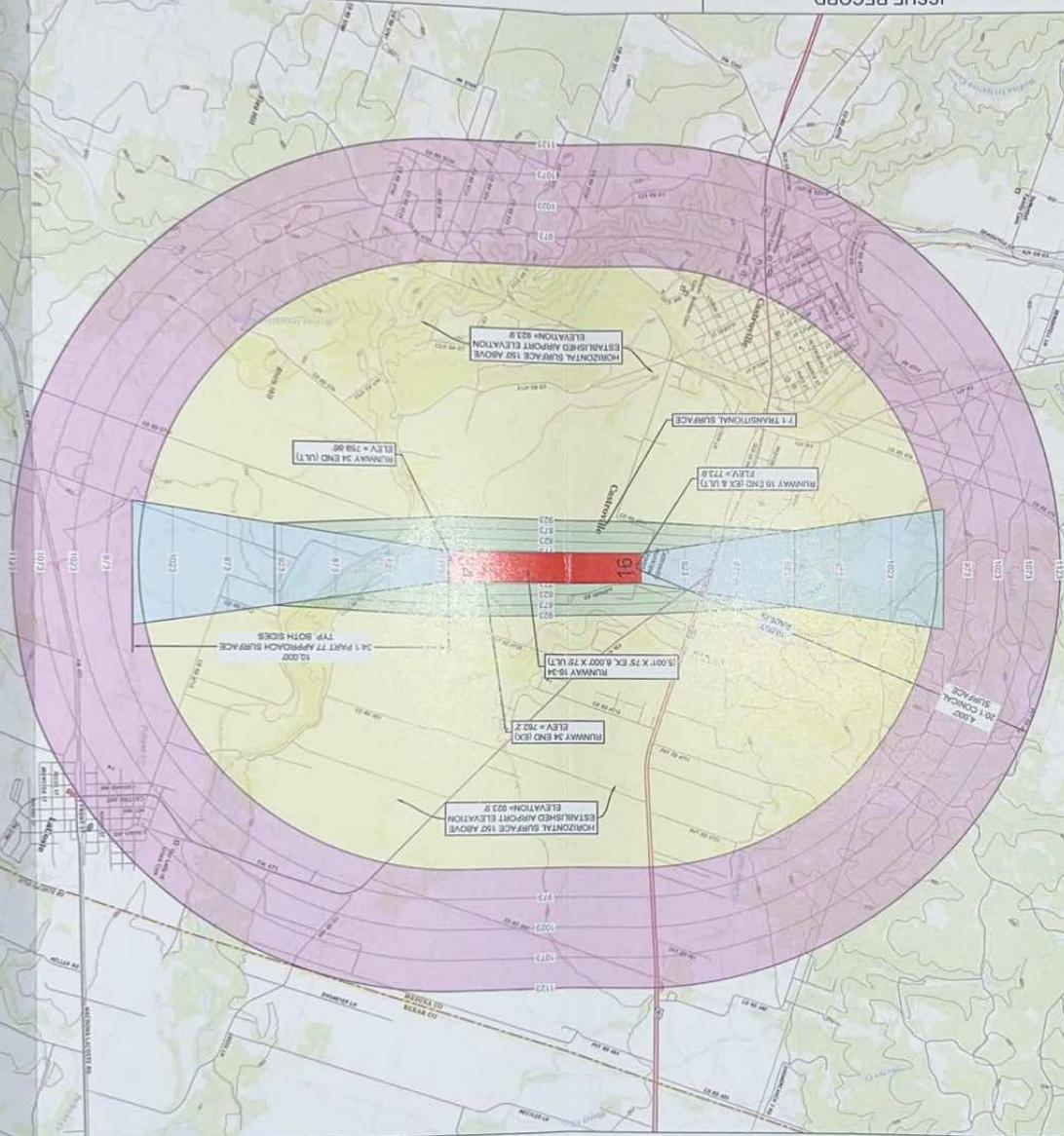
DES: ED
 DR: ED
 CH: MM
 APP: MM

ISSUE RECORD			
NO	BY	DATE	REVISION

CASTROVILLE MUNICIPAL AIRPORT
CASTROVILLE, TEXAS

AIRPORT LAYOUT PLAN

AIP GRANT NO. KSA JOB NO. CAS 043
 DATE: July 25, 2023
AIRPORT AIRSPACE DRAWING



LEGEND

Blue	PART 77 APPROACH SURFACE
Yellow	CONICAL SURFACE
Red	PRIMARY SURFACE
Purple	TRANSITIONAL SURFACE
Green	HORIZONTAL SURFACE

NOTES:
 1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE NORTH CENTRAL ZONE US FOOT AND BOSTER.
 2. ALL VERTICAL COORDINATES ARE SHOWN IN MGS 88.

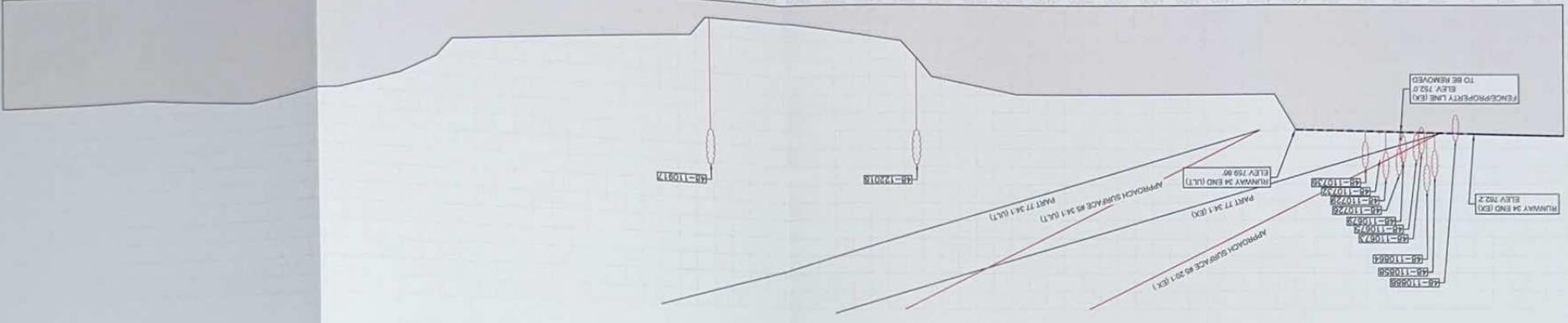




DES: ED	DR: ED	CH: MM	App: MM
ISSUE RECORD			
NO.	BY	DATE	REVISION

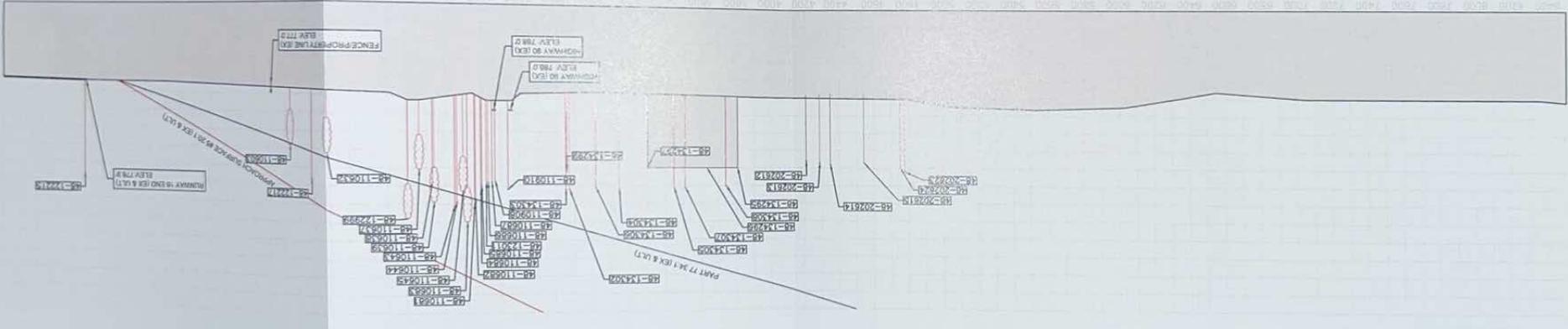
Castroville Municipal Airport
 CASTROVILLE
 MUNICIPAL AIRPORT
 CASTROVILLE, TEXAS

AP GRANT NO. CAS 043
 KSA JOB NO. CAS 043
 DATE July 25, 2023
 APPROACH PROFILES
 RUNWAY 16-34 EXTENDED
 AIRPORT AIRSPACE PLAN
 SHEET NO. 6



RUNWAY 34 OBSTRUCTION TABLE

No.	OBJECT DESCRIPTION	LATITUDE (N)	LONGITUDE (W)	DISTANCE FROM RUNWAY END	OFFSET FROM RWY CL	TOP ELEVATION	AMOUNT OF PART 77 PENETRATION	REMEDATION
1	NONE							

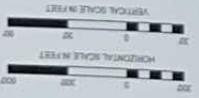


RUNWAY 16 OBSTRUCTION TABLE

No.	OBJECT DESCRIPTION	LATITUDE (N)	LONGITUDE (W)	DISTANCE FROM RUNWAY END	OFFSET FROM RWY CL	TOP ELEVATION	AMOUNT OF PART 77 PENETRATION	REMEDATION
1	SEE SHEETS 11-12							

NOTES:

1. ALL HORIZONTAL COORDINATES ARE SHOWN IN FEET. NAD 83/91S.
2. ALL VERTICAL COORDINATES ARE SHOWN IN FEET. NAD 83/91S.
3. TEXAS STATE PLANE SOUTH CENTRAL ZONE (S) USED.
4. NO OBSTRUCTION SURVEY PROVIDED.
5. OBSTACLE DATA WAS OBTAINED FROM THE FAA AIRPORT DATA AND INFORMATION PORTAL WEBSITE.



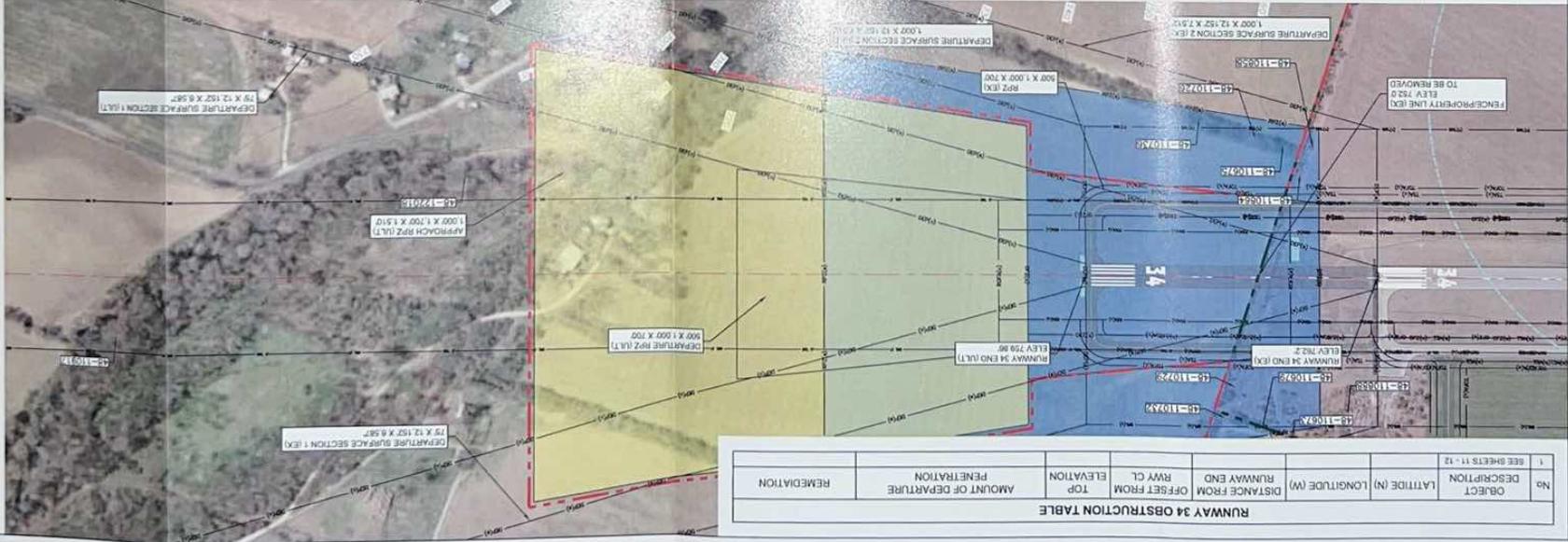
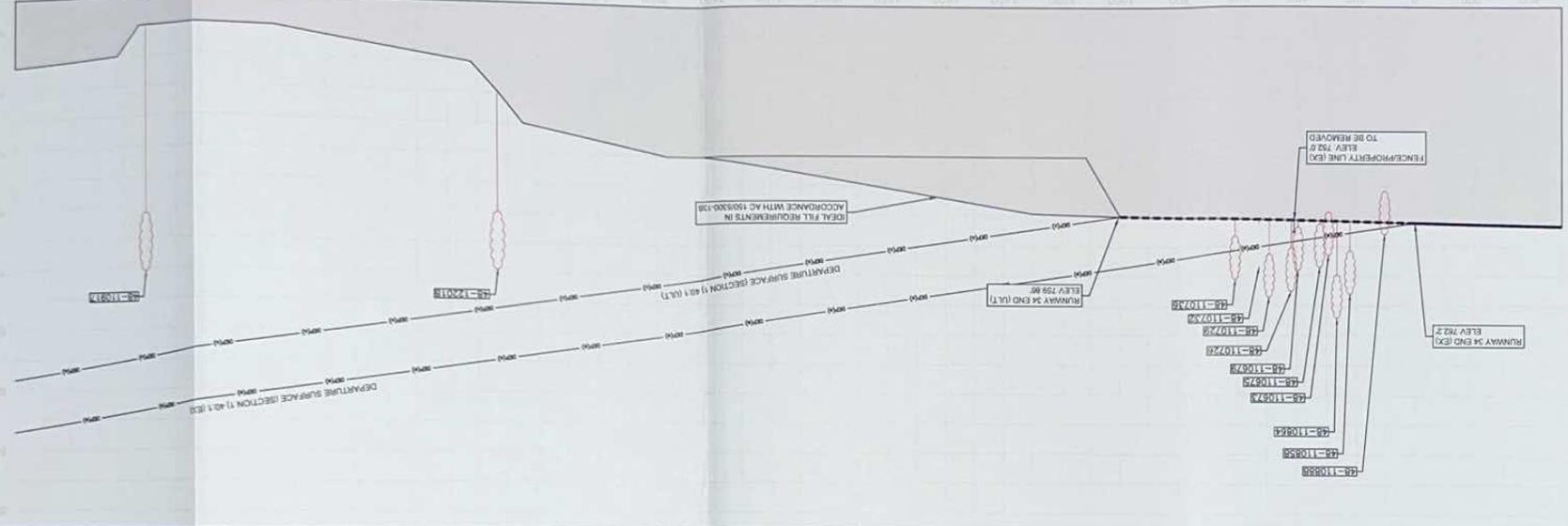
DES: ED	DR: ED	NO.	BY	DATE	REVISION
CH: MM	APP: MM				



CASTROVILLE
MUNICIPAL AIRPORT
CASTROVILLE, TEXAS

AIRPORT LAYOUT PLAN

SHEET NO. 10	AP GRANT NO. 3-48-0215-KX-2019	KSA JOB NO. CAS 043	DATE JULY 25, 2023
	DRAWING - RUNWAY 34 RUNWAY DEPARTURE SURFACE		



RUNWAY 34 OBSTRUCTION TABLE

No.	OBJECT DESCRIPTION	LATITUDE (N)	LONGITUDE (W)	DISTANCE FROM RUNWAY END	OFFSET FROM RWY CL	TOP ELEVATION	AMOUNT OF DEPARTURE SURFACE PENETRATION	REMEDIATION
1	SEE SHEETS 11 - 12							

NOTES

1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE SOUTH CENTRAL ZONE, US FOOT. NAD 83/2011.
2. ALL VERTICAL COORDINATES ARE SHOWN IN MGS 88.
3. NO OBSTRUCTION SURVEY PROVIDED. OBSCURE DATA WAS OBTAINED FROM THE FAA. ASPECT DATA NOT OBTAINED FROM THE FAA. WHERE:





DES: ED
 DR: ED
 CH: MM
 APP: MM

NO. BY DATE
 REVISION

ISSUE RECORD



CASTROVILLE
 MUNICIPAL AIRPORT
 CASTROVILLE, TEXAS

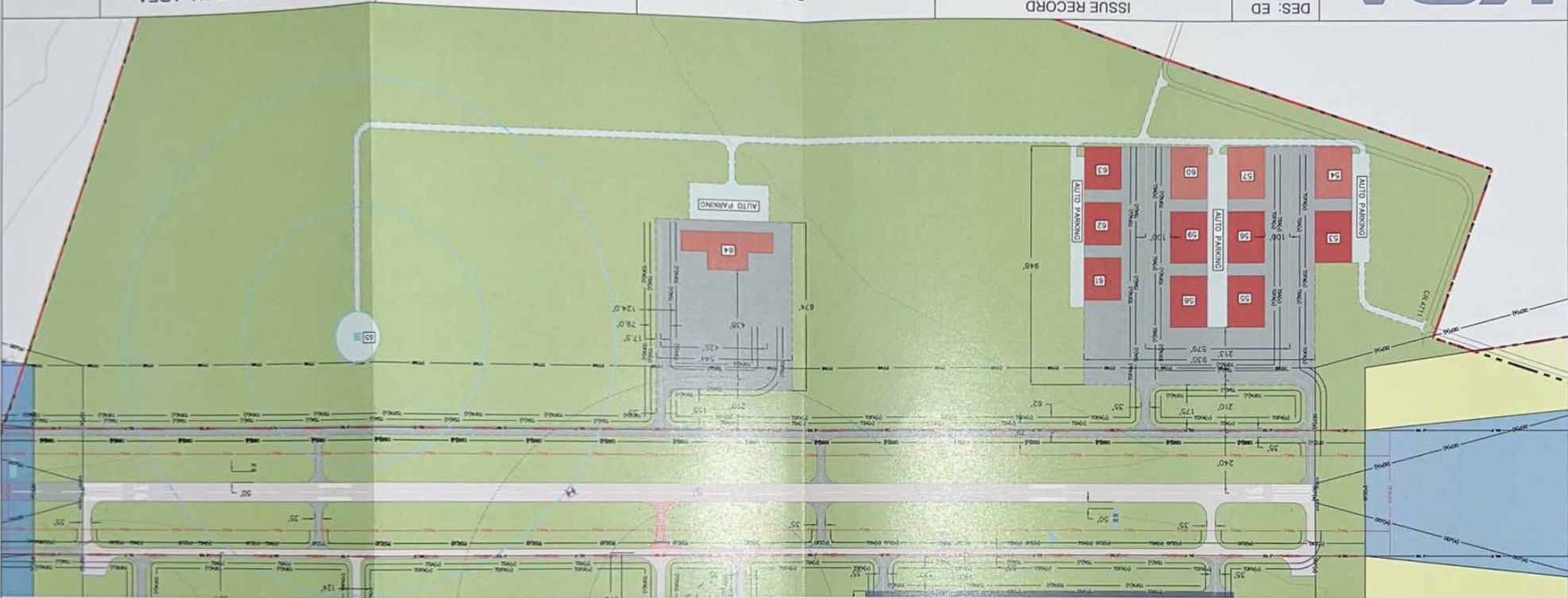
AIRPORT LAYOUT PLAN

AIRPORT TERMINAL AREA
 DRAWING II

AP GRANT NO. 349-0215-KX-2019
 KSA JOB NO. CAS 043
 DATE July 25, 2023

SHEET NO.

14



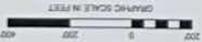
AIRPORT FACILITY LIST

BUILDING NUMBER	DESCRIPTION		ELEVATION TOP
	EXISTING	ULTIMATE	
53	-	BOX HANGAR	-
54	-	BOX HANGAR	-
55	-	BOX HANGAR	-
56	-	BOX HANGAR	-
57	-	BOX HANGAR	-
58	-	BOX HANGAR	-
59	-	BOX HANGAR	-
60	-	BOX HANGAR	-
61	-	BOX HANGAR	-
62	-	BOX HANGAR	-
63	-	BOX HANGAR	-
64	-	BOX HANGAR	-
65	-	AMOS	-
66	-	FUTURE AIR CENTER	-

IPASD LEGEND

FEATURE	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE	[Solid Grey]	[Dashed Grey]
RUNWAY/TAXIWAY TO BE REMOVED	[Dotted Grey]	[Dotted Grey]
BUILDING/FACILITIES	[Red]	[Red]
AIRPORT PROPERTY LINE	[Green]	[Green]
ROTATING BEACON	[Star]	[Star]
PROPOSED WELL	[Cross]	[Cross]
AMOS	[Square]	[Square]
PAVE	[Dotted]	[Dotted]
RWY END IDENTIFIER LIGHTS (EELS)	[Dotted]	[Dotted]
WINOCONE	[Triangle]	[Triangle]
SEGMENTED CIRCLE	[Circle]	[Circle]
GROUND CONTOURS	[Line]	[Line]

NOTES:
 1. ALL HORIZONTAL COORDINATES ARE SHOWN IN 1983 US STATE PLANE NORTH CENTRAL ZONE US FOOT AND GEODIC.
 2. ALL VERTICAL COORDINATES ARE SHOWN IN NAVD 83.



SCALE: HORIZ. 1"=200'
 ANNUAL RATE OF CHANGE: 0.75"/K" (1")
 SOURCE: U.S. NAD 83



DES: ED
 DR: ED
 CH: MM
 APP: MM

NO.	BY	DATE	REVISION



CASTROVILLE
 MUNICIPAL AIRPORT
 CASTROVILLE, TEXAS

AIRPORT LAYOUT PLAN

AIRPORT LAND USE DRAWING

AIP GRANT NO. 2-48-0215-XX-2019
 KSA JOB NO. CAS 043
 DATE July 25, 2023
 SHEET NO.



LAND USE LEGEND

[Yellow box]	RUNWAY PROTECTION ZONE (RPZ)
[Pink box]	AIRPORT OPERATIONS AREA
[Orange box]	AVIATION RELATED DEVELOPMENT AREA
[Purple box]	FUTURE AVIATION RELATED DEVELOPMENT AREA
[Green box]	PROPOSED NON-AERONAUTICAL DEVELOPMENT AREA
[Red box]	COMMERCIAL
[Blue box]	AGRICULTURAL
[Light blue box]	MUNICIPAL
[Dark blue box]	RESIDENTIAL
[Dashed line]	EXISTING PROPERTY LINE
[Dotted line]	ULTIMATE PROPERTY LINE

NOTES:

1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE NORTH CENTRAL ZONE, US FOOT, NAD 83/2011.
2. ALL VERTICAL COORDINATES ARE SHOWN IN MGD 88.

GRAPHIC SCALE IN FEET

DATE: FEB. 2023
 ANNUAL RATE OF CHANGE: 0.86 IN/IN
 SOURCE: U.S. MDO

AIRPORT PROPERTY - DATA TABLE

PARCEL	GRANTOR	INTEREST	ACREAGE	DATE ACQUIRED	VOLUME AND PAGE NUMBER	FEDERAL PROJECT NO.
1	UNITED STATES GOVERNMENT	CONVERSION	191.32	7/28/1949	VOLUME 147, PAGE 164	
2	CASTROVILLE CITY OF	CONVERSION	204.88	7/28/1949	VOLUME 147, PAGE 204	
3	CASTROVILLE CITY OF	WARRANTY DEED	23.6	-	PROPOSED IMPROVEMENTS (MORON EXPANSION)	
4	CSI STATIONS TEXAS LLC	DEED	0.18	-	PROPOSED IMPROVEMENTS (RIZZ CONTROL)	
5	UNKNOWN	UNKNOWN	13.97	-	PROPOSED IMPROVEMENTS (RIZZ CONTROL)	
6	HWY 90 CASTROVILLE PARTNERS LTD	WARRANTY DEED	4.04	-	PROPOSED IMPROVEMENTS (RIZZ CONTROL)	
7	KELLEY, RENEALDO ESTATE	UNKNOWN	5.97	-	PROPOSED IMPROVEMENTS (RIZZ CONTROL)	
8	CASTROVILLE CITY OF	WARRANTY DEED	29.609	5/6/2014	VOLUME 147, PAGE 204	
9	UNITED STATES GOVERNMENT	CONVERSION	24.1	7/28/1949	VOLUME 147, PAGE 204	
10	UNITED STATES GOVERNMENT	CONVERSION	24.1	7/28/1949	VOLUME 147, PAGE 204	
11	UNITED STATES GOVERNMENT	CONVERSION	14.88	7/28/1949	VOLUME 147, PAGE 204	
12	LANGE, JOSEPH & CONNIE	WARRANTY DEED	49.89	-	PROPOSED IMPROVEMENTS (RIZZ CONTROL)	
13	BETH GERBA INVESTMENTS LTD	WARRANTY DEED	2.88	-	PROPOSED IMPROVEMENTS (RIZZ CONTROL)	
14	LANGE, JOSEPH & CONNIE	GET DEED	0.55	-	PROPOSED IMPROVEMENTS (RIZZ CONTROL)	
15	LANGE, JOSEPH & CONNIE	WARRANTY DEED	0.55	-	PROPOSED IMPROVEMENTS (RIZZ CONTROL)	
16	RODRIGUEZ, SERRANIN & YOLANDA G	WARRANTY DEED	3.75	-	PROPOSED IMPROVEMENTS (RIZZ CONTROL)	



DATE: 1/28, 2023
 ANNUAL RATE OF CHANGE: 0.70%/1"=1"
 GRAPHIC SCALE IN FEET

NOTES:
 1. ALL HORIZONTAL COORDINATES ARE SHOWN IN TEXAS STATE PLANE NORTH CENTRAL ZONE (SOUTH) AND BENTON
 2. ALL VERTICAL COORDINATES ARE SHOWN IN MGS 83



DES: ED			ISSUE RECORD		
DR: ED	NO.	BY	DATE	REVISION	
CH: MM					
APP: MM					



CASTROVILLE
 MUNICIPAL AIRPORT
 CASTROVILLE, TEXAS

AIRPORT LAYOUT PLAN

AIRPORT PROPERTY MAP

AIR GRANT NO.	KSA JOB NO.	DATE
3-49-0215-AK-2019	CAS 049	JULY 25, 2023

CHAPTER SIX

RECOMMENDED PLAN AND IMPLEMENTATION




Castroville
MUNICIPAL AIRPORT

06 RECOMMENDED PLAN AND IMPLEMENTATION

6.1 OVERVIEW

With the selection of the Recommended Development Plan, the following sections present a summary of airport improvements identified for inclusion in the Capital Improvement Program (CIP), anticipated phasing, and funding sources. The analysis provides preliminary cost estimates to identify the local share of project costs and the total capital investment required from the airport sponsor over the planning period. These costs and associated funding sources should be used for planning purposes only and are subject to change during project implementation based on construction costs, bidding, and project scope.

Additionally, the phasing and timing of future projects are essential and will be subject to funding availability, sponsor contributions, and operational demand/justification. Projects may be chosen from the plan and implemented based on dynamic market conditions and needs. The following analysis will serve as a guide for project implementation and will be flexible based on real-world factors and conditions.

6.2 CAPITAL IMPROVEMENT PROGRAM

The Capital Improvement Program (CIP) identifies improvement projects recommended for the Airport over the various phases of the planning period, anticipates the order in which the projects might take place, and calculates preliminary project costs and funding sources. As the planning period progresses, the CIP becomes more flexible. It is recommended that the CIP be updated annually as new projects are identified and priorities change. Table 6.1 summarizes the projects identified for the 20-year planning period.

TABLE 6.1 – AIRPORT DEVELOPMENT SUMMARY

Runway	<ul style="list-style-type: none"> Extend Runway 16/34 999' South (6,000' ultimate runway length). Replace PAPI-2 Units with PAPI-4 to Coincide with Runway Extension Upgrade Runway Lighting to LED Medium Intensity Runway Lighting (MIRL) Construct 3" Structural Overlay on Existing Runway 16/34
Taxiway	<ul style="list-style-type: none"> Extend Parallel Taxiway 999' South to Coincide with Runway 16/34 Extension. Construct Two (2) Taxiway Connectors from Existing Parallel Taxiway to Runway 16/34. Demolish Existing Midfield Taxiway Connector (eliminate direct access). Construct Medium Intensity Taxiway Lighting (MITL) Construct West-Side Full-Length Parallel Taxiway.
Apron	<ul style="list-style-type: none"> Construct Primary General Aviation Terminal Apron Expansion (12,000 sq. yds.)
Miscellaneous	<ul style="list-style-type: none"> Conduct Environmental Assessment (EA) for Runway/Parallel Taxiway Extension. Construct 11,230 Linear Feet of 8' Wildlife/Security Fencing Construct Relocated Airport Entrance Road.

- Relocate AWOS to the West Side of Runway 16/34.
- Property Acquisition of 11.21 Acres for Existing Runway 34 RPZ Control.
- Property Acquisition of 47.30 Acres for Proposed Runway 16/34 Extension and Ultimate RPZ Control.
- Property Acquisition of 47.89 Acres for Ultimate Runway 16 RPZ Control
- Property Acquisition of 24.42 Acres for Future Aeronautical Development

6.3 COST ESTIMATES

Projects presented in the Recommended Development Plan may involve many variables and phases. Costs associated with these projects usually include preliminary engineering, design, construction, and administration oversight. The type and associated complexity will determine the lifecycle of each project. For instance, runway projects may involve many phases, and detailed engineering plans will be scoped and estimated during project implementation. Due to these variables, most estimates of costs are on a scale comparable to airports with similar types of projects and requirements. However, these estimates are usually conservative for planning purposes, allowing for adequate future budgeting.

In addition to raw materials, other factors are usually rolled into each project to give a total estimated cost, including the following:

- Preliminary Engineering Reports
- Design (usually estimated at 10% of construction costs)
- Construction, including mobilization costs for contractors
- Construction Administration (usually estimated at 12% of construction costs)

These estimates have been presented using the latest cost estimates at the time of implementation (November 2022). It is assumed that actual costs will be subject to yearly inflation, and revised costs will be generated, if necessary, at the time of implementation. Table 6.2 details estimated costs for projects included in the CIP, while Table 6.3 summarizes projects anticipated to require private partner or third-party funding.

Traditionally, hangars are not considered high-priority projects and are often constructed with private or third-party funds; however, they are an integral component for attracting operators and businesses to the field and one of the few primary revenue sources generated by airports. While there are federally assisted funding programs for hangars, other priority items at an airport usually preclude these projects from being constructed in the short and intermediate planning periods. Additionally, hangars are constructed based on market conditions. Costs for hangars are provided for information purposes and are variable depending on the potential tenant's needs and lease agreement with the Airport.

TABLE 6.2 – COST ESTIMATES

Project Description	Engineering	Construction	Total Project
Replace & Relocate AWOS to the West Side of Runway 16/34	\$25,000	\$225,000	\$250,000
Property Acquisition (Existing Runway 34 RPZ) 11.21 Acres	-	-	Fair Market Value*
Property Acquisition (Ultimate Runway 34 RPZ) 47.30 Acres	-	-	Fair Market Value*
Property Acquisition (Ultimate Runway 16 RPZ Control) 47.89 Acres	-	-	Fair Market Value*
Construct Relocated Airport Entrance Road	\$146,164	\$1,315,472	\$1,461,635
Construct Primary General Aviation Apron Expansion (12,000 sq. yds.)	\$288,954	\$2,600,585	\$2,889,539
Construct Two (2) Taxiway Connectors from Existing Parallel Taxiway to Runway 16/34	\$125,597	\$1,130,370	\$1,255,967
Demolish Existing Midfield Taxiway Connector (eliminate direct access)	\$37,102	\$333,918	\$371,020
Conduct Environmental Assessment (EA) for Runway/Parallel Taxiway Extension.	-	-	\$200,000
Extend Runway 16/34 999' South (6,000' ultimate runway length)	\$290,211	\$2,611,899	\$2,902,110
Replace PAPI-2 Units with PAPI-4 to Coincide with Runway 16/34 Extension	\$21,000	\$189,000	\$210,000
Extend Parallel Taxiway 999' South to Coincide with Runway 16/34 Extension	\$171,824	\$1,546,415	\$1,718,239
Construct West-Side Full-Length Parallel Taxiway.	\$738,836	\$6,649,520	\$7,388,356
Construct 11,230 lf. of 8' Wildlife Fencing	\$57,546	\$517,914	\$575,460
Replace Runway 16/34 Lighting with LED MIRL	\$5,100	\$45,900	\$51,000
Construct Taxiway Lighting with LED MITL	\$154,966	\$1,394,692	\$1,549,658
3" Structural Overlay of Existing Runway 16/34	\$214,949	\$1,934,545	\$2,149,494
Property Acquisition of 24.42 Acres for Future Aeronautical Development	-	-	Fair Market Value**
TOTAL	\$2,277,248	\$20,495,230	\$22,972,478

Source: KSA, November 2022

*Property Acquisition costs should be estimated using Fair Market Value

**Property currently owned by the city, potential land swap

TABLE 6.3 – PRIVATE DEVELOPMENT COST ESTIMATES

Project Description	Engineering	Construction	Total Project
Construct 80' x 60' Box Hangar and Apron	\$173,098	\$1,557,884	\$1,730,982
Construct 100' x 75' Transient Aircraft Storage Hangar	\$270,840	\$2,437,560	\$2,708,400
Construct 10 Unit T-Hangar	\$184,580	\$1,661,217	\$1,845,797
TOTAL	\$628,518	\$5,656,611	\$6,285,179

Source: KSA, November 2022

6.4 PROJECT SCHEDULE

As detailed in the cost estimates, the anticipated funding required to enact the Recommended Development Plan will be substantial. This is not expected to be completed in a singular time frame and is included in a schedule and phased implementation. With nearly \$23 million in improvements, projects must be completed incrementally to remain financially feasible. Projects have been broken down into phases below to help Airport and municipal staff prioritize projects and plan accordingly. Depending on funding priority and user needs over the planning period, certain projects may be shifted into other phases.

6.4.1 SHORT-TERM (0-5 YEARS)

Projects listed in this phase are considered high priority and must be addressed soon after the plan's adoption. As previously mentioned, this is dependent on funding levels. This portion of the planning period aims to address safety and design deficiencies, upgrades to airport lighting infrastructure, and promote compatible land use, specifically associated with the Runway 34 Runway Protection Zone (RPZ). Additionally, it is recommended that 11,230 linear feet of 8' wildlife/security fencing be constructed on the north side of the Airport property, matching that fencing already existing around the southern boundary of the field.

The following projects are expected to occur in the short-term planning period.

1. Relocate AWOS to the West Side of Runway 16/34
2. Construct 11,230 Linear Feet of 8' Wildlife/Security Fencing
3. Upgrade/Replace Runway 16/34 Lighting with LED MIRL
4. Construct Taxiway Lighting with LED MITL
5. Property Acquisition (Existing Runway 34 RPZ) 11.21 Acres
6. Construct Two (2) Taxiway Connectors from Existing Parallel Taxiway to Runway 16/34
7. Demolish Existing Midfield Taxiway Connector (eliminate direct access)

6.4.2 MID-TERM (6-10 YEARS)

This phase of the plan is usually the most difficult to project. Improvements not funded as planned in the short term can fall into this timeframe quite often. However, it is important to keep these in mind as development progresses on the Airport to ensure proper sequential development. In this planning period, the focus is given to preparing the airport for future aeronautical development, pavement maintenance, and rehabilitation, improving airport safety/compatible land uses, and laying the foundation for the proposed extension to Runway 16/34 and the parallel taxiway. Major capacity-related projects often require detailed environmental analysis to be performed and accepted by the FAA before the project

can proceed. It is anticipated that an environmental assessment will be required during this period for the proposed extension project.

The following projects are expected to occur in the mid-term planning period.

1. Construct Relocated Airport Entrance Road
2. Construct Primary General Aviation Apron Expansion (12,000 sq. yds.)
3. Construct a 3" Structural Overlay of Existing Runway 16/34
4. Conduct Environmental Assessment (EA) for Runway/Parallel Taxiway Extension
5. Property Acquisition (Ultimate Runway 16 RPZ Control) 47.69 Acres
6. Property Acquisition (Ultimate Runway 34 RPZ Control) 47.30 Acres

6.4.3 LONG-TERM (11-20)

The following projects are combined into ten years during the last phase of the planning horizon. These large-scale improvements focus on increasing the capacity of Castroville Municipal Airport while setting the foundation for future growth. These projects have been slated in this period due to the demand/justification that will need to be in place for these projects to qualify for funding assistance. Inherently, these improvements provide the most flexibility as they are far into the future of the Airport.

1. Extend Runway 16/34 999' South (6,000' Ultimate Runway Length)
2. Replace PAPI-2 Units with PAPI-4 to Coincide with Runway 16/34 Extension
3. Extend Parallel Taxiway 999' South to Coincide with Runway 16/34 Extension
4. Construct West-Side Full-Length Parallel Taxiway
5. Property Acquisition (Future Aeronautical Development) 24.42 Acres

6.5 ROUTINE MAINTENANCE PROJECTS

As airport infrastructure ages, routine maintenance will be required throughout the 20-year planning period to maintain a safe environment for aircraft operations. The Airport should routinely assess the pavement condition and airside operational requirements, such as markings and lighting, to ensure sound operational conditions.

6.6 FUNDING SOURCES

This section describes funding sources and eligibility criteria for programs the Airport may use to aid in funding future development projects. It is not guaranteed that all funding sources will be available and used on airport projects; however, it lists the available options and funding criteria. During the financial implementation of projects at the Airport, all funding sources should be evaluated and coordinated with the appropriate funding source for eligibility.

6.6.1 STATE FUNDING

Funding for airport projects falls under the purview of the Texas Department of Transportation (TxDOT) Aviation Division. As a Block Grant state, the State of Texas oversees the eligibility and distribution of grant funding for General Aviation and Reliever Airports. Texas is one of 10 Block Grant states that allocate funding on behalf of the FAA. Funding is eligible for cities and counties to obtain and disburse federal and state funds for these airports included in the 300-airport Texas Aviation System Plan (TASP). Continued justification and local sponsor cost share are determining factors in the timely implementation of these projects. Projects identified in the current year will go before the Texas Transportation

Commission for approval before going out for proposals and funding. Most grant items funded through this program are 90/10 cost share.

This program will fund the largest share of the Airport's capital improvement needs over the duration of the development plan. Airport sponsors should consistently engage TxDOT Aviation staff of airport projects needs for consideration in the ACIP.

6.6.2 BIPARTISAN INFRASTRUCTURE LAW

At the end of 2021, the Federal Government passed the Bipartisan Infrastructure Law, which includes funding for airports over the next five years. Airports can utilize these funds for runways, taxiways, safety, terminal, airport-transit connections, and roadway projects. The funding will be provided annually, and each year, Castroville Municipal Airport will be entitled to \$159,000. These funds will be provided at a 90/10 cost-share basis, like the state funding outlined above.

6.6.3 RAMP PROGRAM

TxDOT Aviation Division also administers the Routine Airport Maintenance Program (RAMP), which matches local government grants (50/50) up to \$150,000 for basic improvements such as parking lots, fencing, and other airside and landside needs. This program aims to assist airports to continue providing quality services and infrastructure through annual maintenance. Projects that may not be eligible under other funding sources may be used hereafter until other obligations are met. The local government match is 50% of actual costs plus any excess of \$100,000 in total costs.

This program includes smaller budget airside and landside improvements such as:

- Construction of airport entrance roads
- Pavement of public airport parking lots
- Installation of security fencing
- Replacement of rotating beacon

TxDOT determines the eligibility of specific items and insists that airside improvements are secure before requesting assistance with landside maintenance and improvements.

6.6.4 HANGAR PROGRAM

This program allows an airport to utilize a four-year bank of Non-Primary Entitlement (NPE) for the construction of hangars. However, an airport's airside and safety deficiency needs must be met to qualify. Other considerations that must be met include justification for the additional hangar need, site-specific location based on an approved Airport Layout Plan (ALP), fair market hangar lease and rate structure in place, and adoption of airport minimum standards. This program assists airport sponsors with funding these structures with a local share of 10%, with the state contributing 90% up to a state maximum contribution of \$600,000. It is important to note that should the Airport pursue funding under this program, it would be exempt from discretionary funding for the following three (3) years.

6.6.5 TERMINAL PROGRAM

One additional program that TxDOT Aviation provides is specific to general aviation terminal buildings. Many airports across the state need upgraded or new terminal facilities for pilot lounges, FBO facilities, and airport administration staff. This program assists airport sponsors that have not previously been awarded funding for new terminal buildings at a local share of 50% up to a maximum state contribution of \$500,000.

6.6.6 SPONSOR FUNDING

Airport funds are typically approved annually through the sponsor's budgeting process, and funds are allocated to the account for airport facilities operations and all activities necessary to provide services. As such, the airports' revenues, such as hangar lease income and other services, are used to match grant requirements. Maximizing revenues to fund such activities with revenue generated directly from the airport is important. This fund will be critical to maintaining the ability to match future large Capital Improvement Projects.

6.6.7 ALTERNATE FUNDING SOURCES

When projects are not eligible for funding through traditional aviation funding sources, other local and alternative funding options should be considered. Innovative financial strategies can be evaluated with the support of local elected officials and the public. In addition to traditional municipal debt services such as general bond elections, other funding sources may be applicable.

Texas Enterprise Fund – The Texas Enterprise Fund (TEF) is the largest fund of its kind in the nation. The fund is a final incentive tool for projects that offer significant projected job creation and capital investment where a single Texas site competes with another viable out-of-state option. This may be useful in attracting aeronautical companies to the airport from other states, significantly impacting the local and state economy.

State Financing – Texas is committed to facilitating funding for companies and communities with expansion and relocation projects in the state. Asset-based loans for companies leverage loans to communities, and tax-exempt bond financing are just a few means of obtaining the capital necessary for a successful project.

Tax Incentives – The state also offers a variety of tax incentives and innovative solutions for businesses expanding in or relocating to Texas. Programs include Enterprise Zone sales tax refunds, manufacturing sales tax exemptions, property tax value limitations, and “freeport” inventory tax exemptions.

In addition to the possible funding courses mentioned above, federal programs assist with workforce, job creation, research, and innovation. Partnerships with area universities and junior colleges may be an exciting way to involve education in the Airport's development goals.

6.7 CAPITAL IMPROVEMENT PROGRAM SUMMARY

This program outlined in this chapter will not be solely funded by the airport sponsor. The cost estimates previously presented are broken down by phase and give an estimated cost share based on eligibility. Subject to approval and funding, the following estimates by project type are listed in Table 6.4.

6.8 PHASING PLAN

The cost estimates indicate the suggested phasing for projects during the short, intermediate, and long-range planning periods. The proposed improvements for each phase are illustrated graphically by period. These are suggested schedules, and variance from them will almost certainly be likely, particularly during the later periods. Attention has been given to the first five years as being the most critical, and the scheduled projects outlined in this timeframe should be adhered to as much as possible. The demand for certain facilities and the economic feasibility of their development are the prime factors influencing the timing of individual project implementation. Care must be taken to provide an adequate lead time for detailed planning and construction of facilities to meet aviation demands. Table 6.5 presents the phasing plan timeline for Castroville Municipal Airport. Exhibit 6.1 provides a graphical illustration of the phasing plan.

TABLE 6.4 – PROJECT COST SUMMARY

	Project Description	Total	Federal / State Share	Local / Private Share
1	Relocate AWOS to the West Side of Rwy 16/34	\$250,000	\$225,000	\$25,000
2	Construct 11,230 lf. of 8' Wildlife Fencing	\$575,460	\$517,914	\$57,546
3	Prop. Acquisition (Ex Rwy 34 RPZ) 11.21 Ac.	*	*	*
4	Construct 2x Connector Taxiways	\$1,255,967	\$1,130,370	\$125,587
5	Demolish Existing Midfield Connector	\$371,020	\$333,918	\$37,102
6	Replace Rwy 16/34 Lighting with LED MIRL	\$51,000	\$45,900	\$5,100
7	Construct Taxiway Lighting with LED MITL	\$1,554,245	\$1,394,692	\$154,966
	Short-term Subtotal	\$6,752,185	\$6,071,795	\$405,311
8	Construct Relocated Airport Entrance Road	\$1,461,635	\$1,315,472	\$146,164
9	GA Apron Expansion (12,000 sq. yds.)	\$2,889,539	\$2,600,585	\$288,954
10	3" Structural Overlay of Existing Rwy 16/34	\$2,149,494	\$1,934,545	\$214,949
11	Conduct EA for Runway/Taxiway Improvements	\$200,000	\$180,000	\$20,000
12	Prop. Acquisition (Ult Rwy 16 RPZ) 47.89 Ac.	*	*	*
13	Prop. Acquisition (Ult Rwy 34 RPZ) 47.30 Ac.	*	*	*
	Mid-term Subtotal	\$6,700,668	\$6,030,601	\$670,067
14	Extend Rwy 16/34 999' South (6,000' Ult)	\$2,902,110	\$2,611,899	\$290,211
15	Replace PAPI-2 Units with PAPI-4	\$210,000	\$189,000	\$21,000
16	Extend Parallel Taxiway 999' South	\$1,718,239	\$1,546,415	\$171,824
17	Construct West-Side Full-Length Parallel Twy	\$7,388,356	\$6,649,520	\$738,836
18	Prop. Acquisition (Future Aero Dev.) 24.42 Ac.	*	*	*
	Long-term Subtotal	\$12,218,705	\$10,996,835	\$1,221,871
	TOTALS	\$22,972,478	\$20,675,230	\$2,297,248

Source: KSA, November 2022

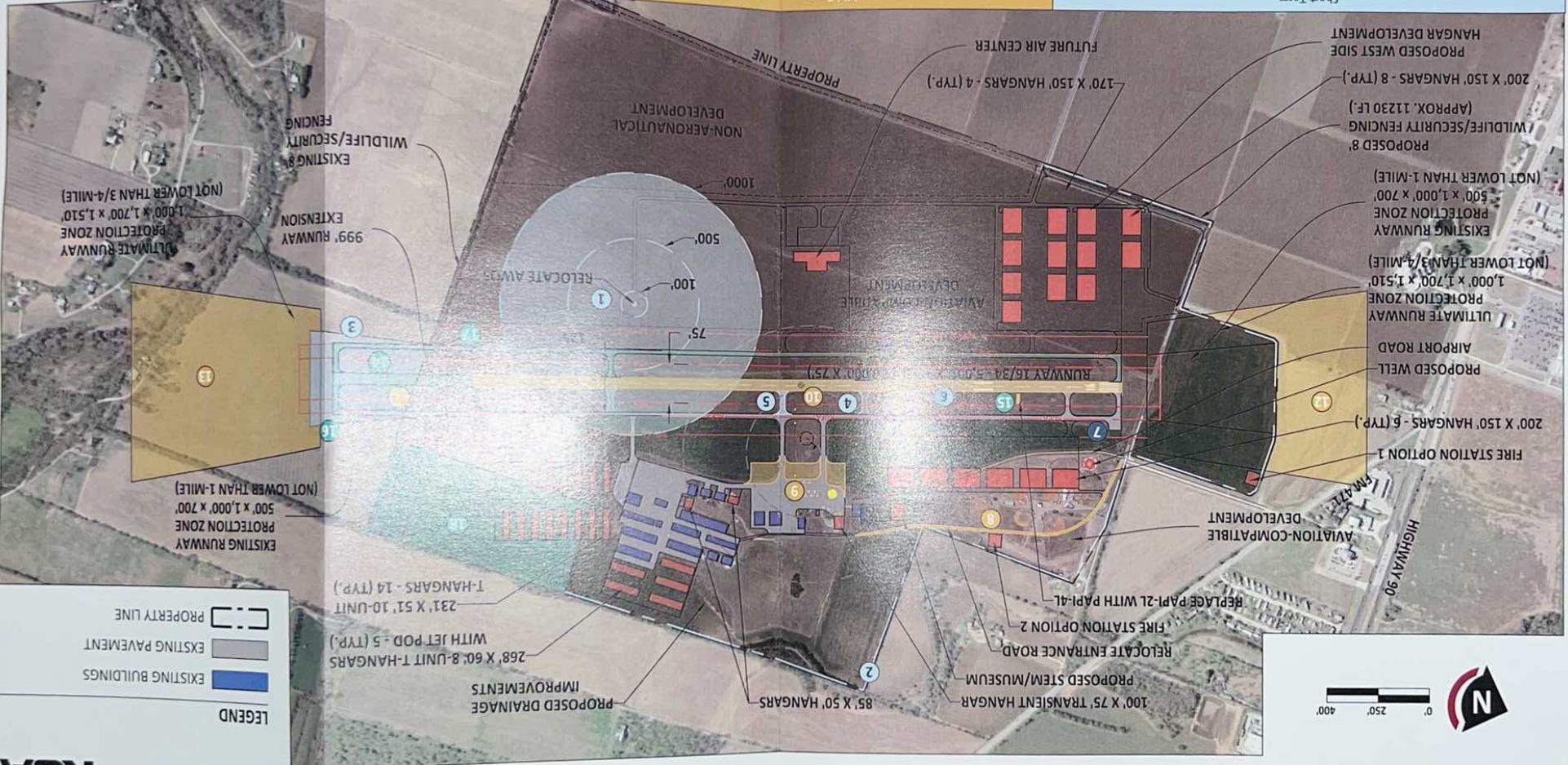
*Property Acquisition costs should be estimated using Fair Market Value

TABLE 6.5 – PROJECT COST SUMMARY

Project Description	Justification	Total Cost
Short-Term (0-5 Years)		
Relocate AWOS to the West Side of Runway 16/34	Safety/Standards	\$250,000
Construct 11,230 lf. of 8' Wildlife/Security Fencing	Safety	\$575,460
Property Acquisition (Existing Runway 34 RPZ) 11.21 Acres	Safety	Fair Market Value*
Construct Two (2) Taxiway Connectors to Runway 16/34	Safety/Standards	\$1,255,967
Demolish Existing Midfield Taxiway Connector	Safety/Standards	\$371,020
Replace Runway 16/34 Lighting with LED MITL	Safety	\$51,000
Construct Taxiway Lighting with LED MITL	Safety	\$1,549,658
Mid-Term (6-10 Years)		
Construct Relocated Airport Entrance Road	Safety/Capacity	\$1,461,635
Construct General Aviation Apron Expansion (12,000 sq. yds.)	Capacity	\$2,889,539
Construct 3" Structural Overlay of Existing Runway 16/34	Safety/Capacity	\$2,149,494
Conduct EA for Runway/Taxiway Extension	Capacity	\$200,000
Property Acquisition (Ultimate Runway 16 RPZ) 47.89 Acres	Safety	Fair Market Value*
Property Acquisition (Ultimate Runway 34 RPZ) 47.30 Acres	Safety	Fair Market Value*
Long-Term (11-20 Years)		
Extend Runway 16/34 999' South (6,000' Ultimate Length)	Capacity	\$2,902,110
Replace PAPI 2 Units with PAPI 4	Safety	\$210,000
Extend Parallel Taxiway 999' South	Capacity	\$1,718,239
Construct West-Side Full-Length Parallel Taxiway	Capacity	\$7,388,356
Property Acquisition (Future Aero Development) 24.42 Acres	Capacity	Fair Market Value*
TOTAL		\$22,972,478

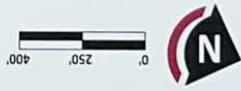
Source: KSA, November 2022

*Property Acquisition costs should be estimated using Fair Market Value



Short-Term Mid-Term Long-Term

1	Relocate AWOS to the West Side of Runway 16/34	8	Construct Relocated Airport Entrance Road
2	Construct 11,230 ft. of 8' Wildlife/Security Fencing	9	Construct Primary General Aviation Apron Expansion (12,000 sq. yds.)
3	Property Acquisition (Existing Runway 34 RPZ) 11.21 Acres	10	3" Structural Overlay of Existing Runway 16/34
4	Construct Two (2) Taxiway Connectors from Existing Parallel Taxiway to Runway 16/34	11	Conduct Environmental Assessment (EA) for Runway/Taxiway Extension
5	Demolish Existing Midfield Taxiway Connector (eliminate direct access)	12	Property Acquisition (Ultimate Runway 16 RPZ Control) 47.89 Acres
6	Replace Runway 16/34 Lighting with LED MILR	13	Property Acquisition (Ultimate Runway 34 RPZ Control) 47.30 Acres
7	Construct Taxiway Lighting with LED MITL	14	Extend Runway 16/34 999' South (6,000' Ultimate Runway Length)
		15	Replace PAPI-2 Units with PAPI-4 to Coincide with Runway 16/34 Extension
		16	Extend Parallel Taxiway 999' South to Coincide with Runway 16/34 Extension
		17	Construct West-Side Full-Length Parallel Taxiway
		18	Property Acquisition (Future Aeronautical Development) 24.42 Acres



LEGEND

	EXISTING BUILDINGS
	EXISTING PAVEMENT
	PROPERTY LINE

PROPOSED DRAINAGE IMPROVEMENTS
 268' X 60'-8" UNIT T-HANGARS WITH JET POD - 5 (TYP.)
 231' X 51'-10" UNIT T-HANGARS - 14 (TYP.)

100' X 75' TRANSPARENT HANGAR
 PROPOSED STEM/MUSEUM
 FIRE STATION OPTION 2
 RELOCATE ENTRANCE ROAD
 REPLACE PAPI-2L WITH PAPI-4L
 AVIATION-COMPATIBLE DEVELOPMENT
 FIRE STATION OPTION 1
 200' X 150' HANGARS - 6 (TYP.)
 PROPOSED WELL
 AIRPORT ROAD
 ULTIMATE RUNWAY PROTECTION ZONE 1,000' X 1,700' X 1,510' (NOT LOWER THAN 3/4-MILE)
 EXISTING RUNWAY PROTECTION ZONE 500' X 1,000' X 700' (NOT LOWER THAN 1-MILE)
 PROPOSED 8' WILDLIFE/SECURITY FENCING (APPROX. 11,230 LF.)
 200' X 150' HANGARS - 8 (TYP.)
 HANGAR DEVELOPMENT

85' X 50' HANGARS
 170' X 150' HANGARS - 4 (TYP.)
 FUTURE AIR CENTER
 PROPERTY LINE
 NON-AERONAUTICAL DEVELOPMENT
 AVIATION-COMPATIBLE DEVELOPMENT
 1000'

EXISTING RUNWAY PROTECTION ZONE 500' X 1,000' X 700' (NOT LOWER THAN 1-MILE)
 EXISTING RUNWAY PROTECTION ZONE 1,000' X 1,700' X 1,510' (NOT LOWER THAN 3/4-MILE)
 999' RUNWAY EXTENSION
 WILDLIFE/SECURITY FENCING

EXISTING RUNWAY PROTECTION ZONE 500' X 1,000' X 700' (NOT LOWER THAN 1-MILE)
 EXISTING RUNWAY PROTECTION ZONE 1,000' X 1,700' X 1,510' (NOT LOWER THAN 3/4-MILE)
 999' RUNWAY EXTENSION
 WILDLIFE/SECURITY FENCING



SWOT SUMMARY

A SWOT SUMMARY

A.1 INTRODUCTION

A key component of the beginning of the planning exercise was a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis, completed during the Kickoff Meeting on February 9, 2022. The SWOT analysis is to be performed to determine the internal and external influences on the operation and management of the Airport. This exercise helps determine facility requirements and identify the vision for Castroville Municipal Airport, forming the framework for the planning process.

The primary objective of the SWOT is to produce tangible, identifiable focus areas for the business objectives. In this case, it applies to improving the Airport's services, development areas, and key market drivers. As previously mentioned, SWOT stands for strengths, weaknesses, opportunities, and threats. To accurately determine how to apply factors in each category, we must first understand each factor.

Internal Factors: These factors are the most easily understood in most SWOT analyses because they are internal to the business/entity. The Airport can (even if indirectly) control most of these factors and are directly related to the Airport. When determining initial action items related to a SWOT, these internal factors can be prioritized and easily influenced by direct action. For example, if an airport has identified that airport staffing levels are a weakness, they may be able to directly change the factor by adding staff.

- **Strengths:** The characteristics of the Airport that give it an advantage over others or are perceived by customers as a positive asset. We must first understand what gives the Airport an advantage.
- **Weaknesses:** These are the characteristics that may be limiting the success of the Airport. These may be perceived as negative aspects or areas of needed improvement compared to others. These may be one of the most important aspects of creating a successful SWOT analysis and are usually the basis for improvement moving forward.

External Factors: It is important to note that these external factors present the environment within which the Airport is operating. Therefore, many of these factors can't be directly changed by the Airport but influence how the objectives of the Airport may be impacted.

- **Opportunities:** After clearly identifying what the Airport's strengths and weaknesses are, the sponsor must identify opportunities that can help grow the success of the Airport. These factors serve as a catalyst to improve upon the Airport and help realize future goals.
- **Threats:** The last element in the analysis is the potential pitfalls or competitive disadvantages that may arise during the implementation of previously identified opportunities. This will ensure a reality-based business approach for achieving the goals set forth in the analysis.

Identifying SWOT factors is important and can be applied to airports, just as with any business enterprise. In fact, most municipally owned and operated airports greatly benefit if the management of the Airport is influenced by business approaches. Often, new revenue streams, market opportunities, and partnerships are realized by the results of a SWOT exercise. When combined with an airport planning effort, the results of a SWOT can expedite implementation.

A.2 EFFECTIVE SWOT ANALYSIS

There is no right or wrong way to conduct a SWOT analysis. The goal is to be engaging, diverse, and thorough. Brainstorming issues in each key area is a positive way to get thoughts and ideas down on paper that can be put in perspective. In this exercise, participants are encouraged to come up with as many ideas as possible even though they may apply in multiple areas in the SWOT.

Once ideas are documented, a SWOT diagram can be made in various shapes and sizes to help articulate the thoughts of the exercise. This diagram is helpful in organizing thoughts and visualizing the strengths, weaknesses, opportunities, and threats. Only after quantifying these and putting them into the diagram can focus and priority be given to improvement and capitalizing on these. When adding strengths and weaknesses, one must always keep in mind that they are internal factors that are generally easy to identify. Factors can vary significantly depending on the purpose of the business venture and SWOT analysis.

A.3 STRENGTHS

- To be included

A.4 WEAKNESSES

- To be included

A.5 OPPORTUNITIES

- To be included

A.6 THREATS

- To be included