2023

Watsonville Municipal Airport
Master Plan Update

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Prepared For:

WATSONVILLE MUNICIPAL AIRPORT

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Prepared By:

Kimley»Horn

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1 Inventory of Existing Conditions

The previous Master Plan for Watsonville Municipal Airport (the Airport or WVI) was last completed in 2001,[1] with a smaller update in 2008. Several of these plans' inputs and conditions have changed. Additionally, in the past two decades, the national and regional economy has fluctuated, changes in the aviation industry have occurred, and the FAA has implemented new guidance and standards. The purpose of this Master Plan Update (Plan or MPU) is to address those changes and enhance the long-term operational sustainability of WVI by establishing an updated framework to guide land use and development decisions on and near the Airport. This Plan provides the City and its stakeholders with a comprehensive, organized, and rational plan for developing Airport facilities over the next 20 years. This MPU effort began in 2020, with the Recommended Development Plan finalized in 2022, and the MPU published in 2023.

The master planning process creates a comprehensive guide for future airport development that considers safety, efficiency, economic growth, and environmental compatibility. There are several key components within the master planning process including identifying study goals, collecting an inventory of existing conditions, conducting aeronautical forecasts, developing justification for development, and creating a feasible implementation plan for recommended capital projects or enhancements. Enhancements or improvements that stem from master plan findings must adhere to standards that promote safe aviation facilities that meet current and future demand. Typically, findings from a master plan are staged in the short (0-5 years), mid (6-10 years), and long term (11-20 years). Information on the future airport expansion and improvement contained in an airport master plan would be incorporated into the development of comprehensive land use plans to ensure land use compatibility around the Airport.

As the initial step in the planning process, this chapter outlines the baseline data pertinent to the Airport and its service area. The baseline data presented within this chapter is used in subsequent analysis to formulate aviation forecasts and identify recommended enhancements for the Airport.

1.1 Study Goal and Objectives

In order to create a master plan that is effective in supporting development at WVI, there is a need to develop a framework to guide the master planning efforts. The primary goal of this MPU is to identify the current and future needs of the Airport, while also factoring in the perspective of the City of Watsonville, Airport user's and tenants, residents within the service area, and other stakeholders, ultimately resulting in a proposed development plan that reflects a balanced approach. Specific objectives within this MPU scope of services to achieve this primary goal are as follows:

- Obtain new aerial mapping and FAA Airports Geographical Information System (AGIS) safety-critical data including airfield coordinates and elevations, navigation aid locations, and airspace obstacle information.
- Prepare an updated, reasonable forecast of aviation activity and user demand that is accepted and approved by the FAA.
- Engage stakeholders, tenants, customers, and the public in the planning process to ensure their interests and concerns are taken into consideration.
- Identify an airport land use strategy that promotes compatibility and balances aviation and non-aeronautical uses and, where feasible, provides opportunities for enhanced revenue generation.
- Create a realistic and comprehensive development plan for WVI that considers the Airport environs, satisfies future aviation needs, enhances safety, and conforms with current FAA standards, orders, and advisory criteria. This includes consideration of airfield geometry and runway length.
- Prepare an updated Airport Layout Plan (ALP) drawing set that is approved by FAA.

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[1] The 2001 Master Plan was environmentally cleared and approved by City Council in 2003 (City Resolution 179-03).

- Provide a plan that is focused on being "implementable".

These objectives can be considered a road map, that, when followed, lead to an effective master planning document that is grounded in accurate data-driven findings. The findings within the master plan make it an essential resource for airport development and a great asset to the community.

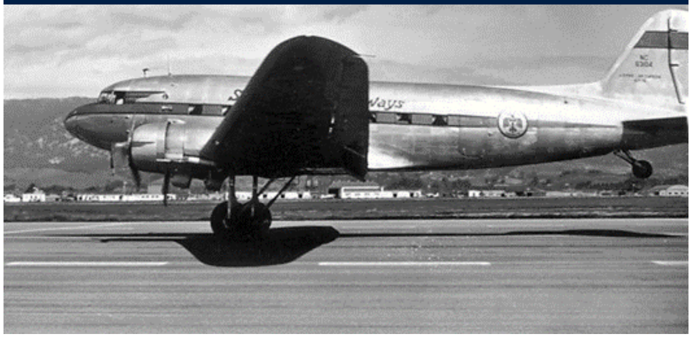
1.2 Airport Background

WVI is a non-towered, general aviation (GA) airport located in the City of Watsonville (the City) in Santa Cruz County, California. The Airport is owned and operated by the City of Watsonville. WVI is the only airport in Santa Cruz County and is one of five public-use airports in the Monterey Bay area.

Watsonville Airport, 1930s

Aircraft first began operating regularly around Watsonville in the 1920s and the first official airfield in the city opened in 1931. WVI was developed at its current location in 1942 after the City passed a local bond issue and received a grant from the Civil Aeronautics Authority. Prior to the airfield's opening, the City leased the newly constructed Airport to the United States Government. The Airport was commissioned on October 23, 1943, as Naval Air Auxiliary Station (NAAS) Watsonville and served as one of two naval auxiliary bases in the Watsonville area. During World War II, WVI acted as a training base for torpedo and diving bombing squadrons, often being used by Douglas SBD Dauntless, Grumman TBM Avenger, and F6F Hellcat aircraft flying to and from aircraft carriers in the Pacific Ocean. The Navy expanded the airfield significantly, building a concrete ramp and several support buildings.

Watsonville Airport, 1950s



NAAS Watsonville was decommissioned in November 1945 and was reverted to the City of Watsonville in July 1948. The City subsequently sold 32 acres of the original military property to the local school district. Scheduled air service first began in December 1946 when Southwest Airways (which would eventually become Northwest Orient Airlines) initiated DC-3 service to and from WVI. Airline service would continue until 1956. In 1964, the West Coast Antique Fly-In occurred for the first time, attracting pilots from around northern California.

In the 1960s, the City launched a series of improvement projects at WVI that would continue through the 1980s and make up much of the infrastructure that exists at the Airport today. These initial projects included the construction of T-hangars, runway and taxiway lighting systems, a new midfield taxiway, and airport perimeter fencing. Airport Boulevard was constructed in segments along the eastern perimeter of the Airport during this time, requiring the demolition of several original military buildings. WVI installed apron lighting in 1971 and constructed a new terminal building, complete with a restaurant, public restrooms, and pilot lounge, that opened in 1974 and remains operational at the Airport today.

In 1976, WVI gained significant functionality when a localizer (a navigational aid) was installed and a non-precision instrument approach was established at the Airport, enabling aircraft to operate during inclement weather conditions. In 1980, a non-directional beacon (NDB) was constructed and visual approach slope indicators (VASIs) were installed on both ends of Runway 2-20, complementing the existing instrument approach. The City constructed Fire Station No. 2 on Airport Boulevard in 1978, greatly improving the safety of Airport users and the surrounding community. Airfield infrastructure was expanded in

1980, and again in 1984, as the south taxiway was realigned and the apron area was extended first, and thereafter additional T-hangars were constructed.

WVI continued to complete several maintenance and development projects through the 1990s and 2000s, including reconstructing the runway lighting system, replacing various parcels of pavement and drainage areas, and building additional T-hangars and 12 corporate hangars. In 1993 the Airport installed a self-service fuel island that provides AvGas and Jet A fuel. In 2012 the self-service fuel island and the fuel farm island were upgraded to meet County environmental standards. That same year, the terminal lobby, UNICOM room, and restrooms were renovated in an effort to update the aging terminal building (built in 1974) and support the opening of the new restaurant tenant that would remodel the dining area and outdoor patio.

The importance of the Airport was illustrated in the days following the 1989 Loma Prieta earthquake when several roads leading out of the Watsonville area were damaged. WVI provided the only access to the valley and was used to airlift more than 100 tons of supplies to Watsonville and the surrounding communities.

Watsonville Fly-in & Airshow

Additionally, the Watsonville Fly-in and Airshow, which grew from the original West Coast Antique Fly-In and ran for fifty years, concluding in 2014. The Fly-In served as an annual event that attracted thousands of spectators from around the region and supports economic activities at the Airport and in the surrounding community. In 2017 the Airport reinvigorated its commitment to the community by hosting a July 4th Airport Open House. The event, dubbed “Fire-In-The-Sky”, is held each July 4th holiday and showcases the Airport’s viability, vitality and value as a community, city and regional asset.

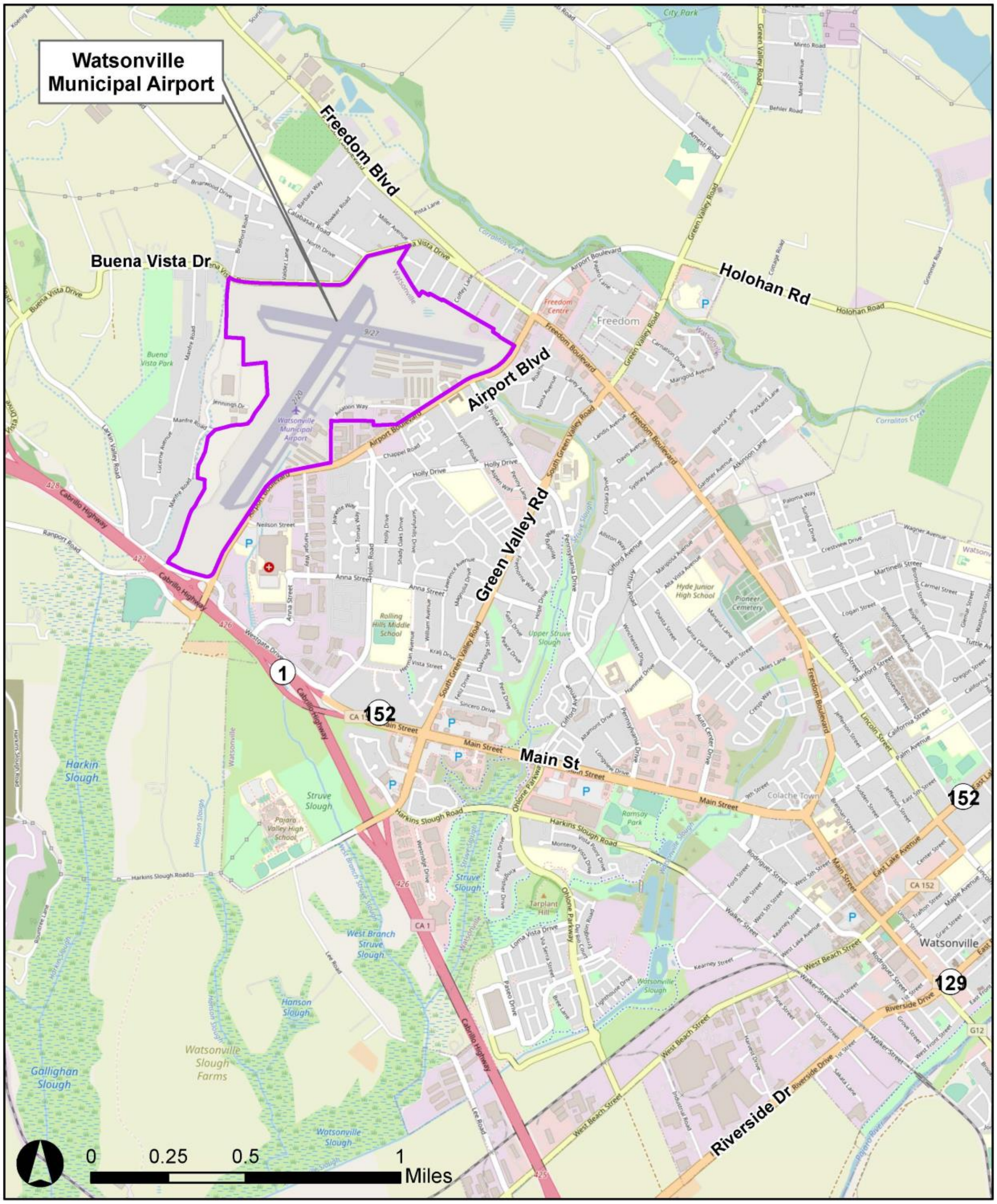
1.3 Airport Location and Access

An airport’s location and accessibility directly influence its role in the community and in the national network of transportation infrastructure. Airports need to be located within a reasonable distance to the community they serve and have appropriate multimodal accessibility to provide benefit to airport users and members of the community. The location and surface accessibility of WVI is discussed below. The primary roads and highways surrounding WVI are illustrated in **Figure 1-1**.

Strawberry Fields in Watsonville

Watsonville is located in Santa Cruz County along the central California coast, approximately three miles east of Monterey Bay. The City sits at the mouth of the Pajaro River Valley, and the river flows along the southern edge of the town. Watsonville is part of the Santa Cruz-Watsonville Metropolitan Statistical Area (MSA), which includes the entirety of Santa Cruz County. The City sits just north of the Salinas Valley, and, as such, agricultural activities dominate the economic and social activities of the region. The area is known for growing artichokes, strawberries, lettuce, and many other vegetables. Santa Cruz County is also home of the University of California, Santa Cruz, which has approximately 20,000 students with popular majors in Computer and Information Sciences, Psychology, Business/Managerial Economics, Cellular and Molecular Biology, and Sociology.

Figure 1-1: Regional Airport Access



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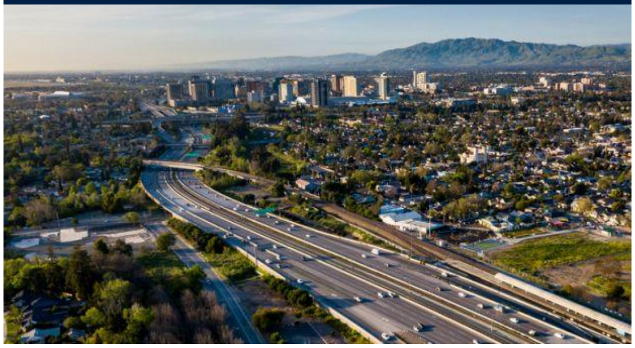
San Jose in Silicon Valley



Watsonville is located approximately 30 miles south of San Jose and is closely tied to the socioeconomic activities of the Bay Area. It is not uncommon for members of the workforce in the Bay Area to live in Santa Cruz County and commute on a daily basis. Watsonville and Santa Cruz are popular beach destinations for Bay Area residents.

Additionally, Monterey Bay is home to six marine preservation areas, making the area a popular destination for scuba diving, fishing, and whale watching. Watsonville is surrounded by a number of social and cultural destinations including the Monterey Bay Aquarium, Santa Cruz Beach Boardwalk, and Sunset State Beach.

WVI is located on the northwestern edge of the City of Watsonville, approximately three miles northwest of the City's central business district. WVI is the only public-use airport in Santa Cruz County and 85 percent of the pilots that base aircraft at the Airport live in Santa Cruz County[2], so WVI's catchment area is considered to be Santa Cruz County.

Sunset State Beach

WVI is bordered by the City of Watsonville on its southern and eastern sides, while the unincorporated community of Freedom, which is under the jurisdiction of the County, surrounds the northern and western edges of the airport. The airfield, including both runways and associated taxiways, as well as hangars and all landside facilities, are situated on a parcel of land that covers approximately 291 acres. The Airport owns an additional 53 acres of land for runway protection zone (RPZ) that is not connected to the airfield. The total acreage of WVI is approximately 344 acres[3].

Access

Airports are only able to provide utility to their local and regional communities and the national airport system if they can be easily accessed. As such, the surface transportation system surrounding an airport must connect to the larger surface transportation network to provide efficient access for airports. WVI is surrounded by multiple surface roads and highways that provide rapid connection to the City and other communities in the region.

Airport Boulevard provides direct access to WVI including the terminal, hangars, and many on-airport businesses. Airport Boulevard travels along the southern and eastern edge of the Airport's property, extending northeast to the northern edge of the City before joining Holohan Road. Approximately one block northeast of the Airport's property line, Airport Boulevard intersects Freedom Boulevard, which extends southeast into the central business district of Watsonville. Freedom Boulevard runs north of the Airport where it meets Buena Vista Drive, which borders the northern edge of the Airport's property and provides access to the community of Freedom.

Airport Boulevard provides access to California State Route 1 (also known as the Cabrillo Highway) at the southern corner of the Airport's property. State Route 1 travels nearly the entire length of the state, connecting Watsonville with Santa Cruz to the north and Monterey to the south, and extending all the way to the Los Angeles and San Francisco metropolitan areas.

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[2] Based on the 2020 National Based Aircraft Program list of registered addresses.
[3] Per City of Watsonville geographic information system (GIS) data in October 2020.

Additionally, State Route 1 joins Main Street approximately one mile south of the Airport, which provides direct access to downtown Watsonville. WVI is bordered on its northern and western flanks by several residential streets, including Manfre Road, which connects Buena Vista Drive with Larkin Valley Road (a frontage road for State Route 1). Users can access the Airport via Aviation Way, which is accessible from Airport Boulevard on the east and west end of the Airport.

1.4 Airport Role

WVI is the only public-use airport in Santa Cruz County; however, it exists within a network of airports and aviation infrastructure assets. This network is the national airport system, which provides a wide range of services to aviation stakeholders including:

- Air travel for business and leisure purposes
- Transportation of goods and raw materials
- Hosting emergency, aerial firefighting, surveying/mapping, law enforcement, medical evacuation, and military operations
- Aircraft maintenance and repair, flight training, banner towing, and skydiving

Airports in the national airport system are categorized by multiple funding agencies based on their size, location, ownership structure, operational capabilities, and socioeconomic conditions of the surrounding communities. The functional role of each airport within the system must be considered during the master planning process to ensure development recommendations meet current stakeholder needs and future visions while maximizing the efficiency of the system.

National Plan of Integrated Airport Systems (NPIAS)

The Federal Aviation Administration (FAA) uses the National Plan of Integrated Airport System (NPIAS) to assign roles to approximately 3,300 airports across the country. The NPIAS is used to facilitate the Airport Improvement Program (AIP) and promote the FAA's goals of a safe and efficient airport system. Airports in the NPIAS are eligible to receive AIP funding from the FAA and in return are required to fulfill a series of sponsor assurances regarding the airport's operations and management. Airports in the NPIAS are grouped into two categories: primary and nonprimary, as defined below: **Figure 1-2** presents the approximate Airport location in context of the City and surrounding airports.

Primary Airports – Publicly owned commercial service airports that have more than 10,000 passenger boardings or enplanements each calendar year and receive scheduled passenger service. Primary airports are then classified by hub size. There are 23 primary airports in California. The nearest primary airports to WVI are Monterrey Regional (MRY) and Norman Y. Mineta San Jose International Airport (SJC). Further to the north in the Bay Area, approximately 50 nautical miles (NM) from WVI, are San Francisco International (SFO) and Oakland International (OAK).

Nonprimary Airports – Publicly owned general aviation airports and commercial service airports that have at least 2,500 and not more than 10,000 passenger boardings each year and that primarily support general aviation aircraft. There are 166 nonprimary airports in California. Nonprimary airports are further classified into three categories based on different factors:

Commercial Service – Publicly owned airports with scheduled commercial flights with levels between 2,500 and 9,999 passenger boardings each year. There are four nonprimary commercial service airports in the state, the nearest of which is Merced Regional/Macready Field (MCE), located approximately 75 miles east of WVI.

Reliever Airports – Airports designated by the FAA to relieve congestion at commercial service airports and to provide improved access to the community for general aviation users. Reliever airports may be publicly or privately owned. There are 35 reliever airports in California including Reid-Hillview (RHV), Half Moon Bay (HAF), San Carlos (SQN), Hayward (HWD), Livermore (LVK), Palo Alto (PAO), and San Martin (E16) to the north in the Bay Area.

General Aviation Airports – Airports that are not categorized as commercial service or reliever airports in the national system. General aviation (GA) airports can be publicly or privately owned. There are 127 GA airports in the state. Other nearby GA airports within 25 miles of WVI include Hollister Municipal Airport (CVH), Marina Municipal Airport (OAR), and Salinas Municipal Airport (SNS).

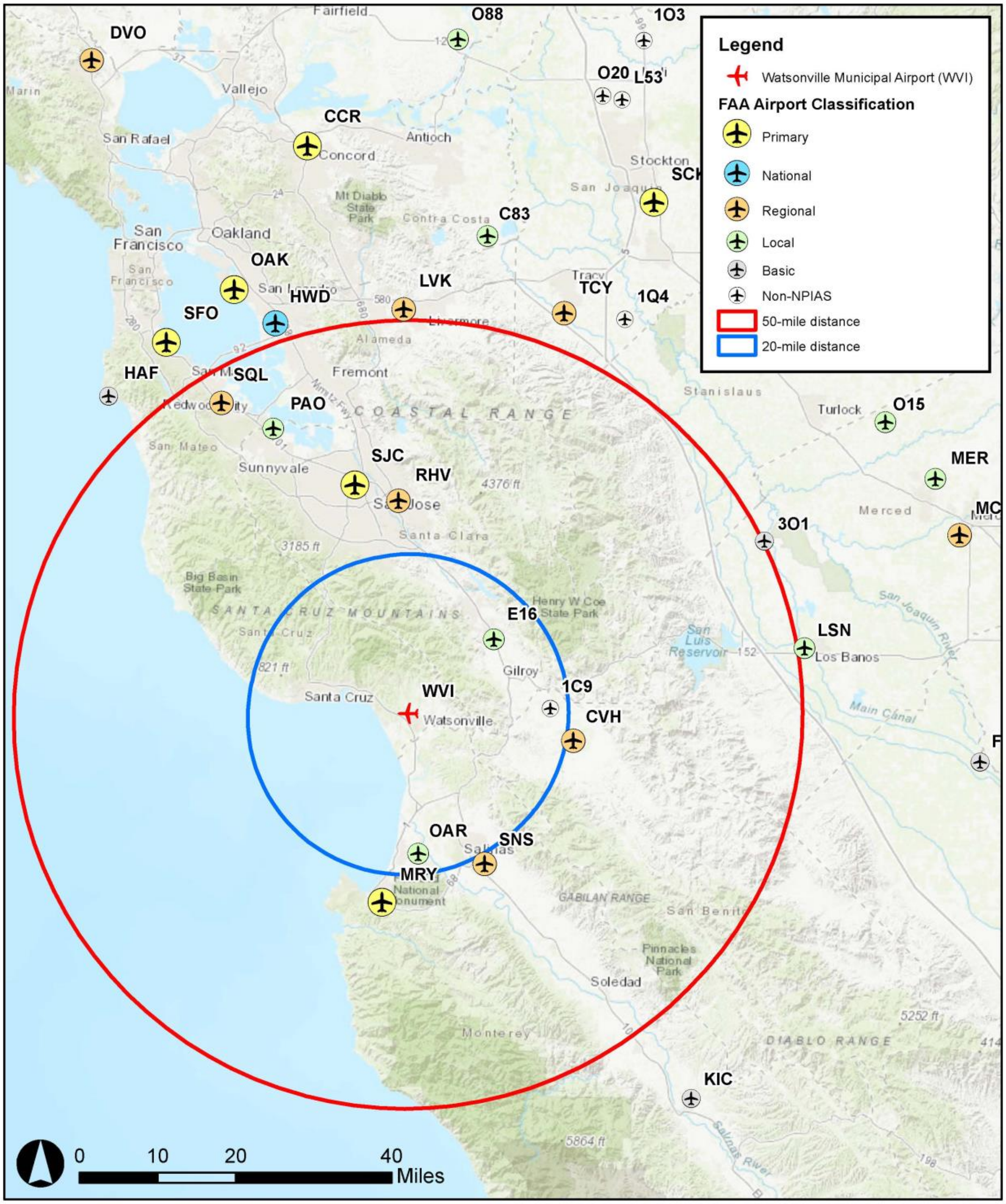
According to the most recent publication, the 2021-2025 FAA NPIAS report, WVI is categorized as a GA airport, meaning that WVI does not have scheduled commercial service. WVI fulfills a critical role by providing aviation access for the City of Watsonville and Santa Cruz County and supporting business activities on and off the Airport.

The nonprimary NPIAS airports are further categorized by role or classification, originally known as ASSET classifications. These classifications were developed to provide additional context for airports and policy makers. The five categories and the number of each in California are summarized in **Table 1-1**. WVI is categorized as a Regional airport in the latest NPIAS, signifying that the Airport has high levels of activities and serves a wide variety of general aviation aircraft and users.

Table 1-1: Non-Primary Airport Classifications and Criteria in California

Airport Classification	Criteria
National (10): Supports national and state system by providing communities with access to national and international markets in multiple states and throughout the U.S.	◦ 5,000+ instrument operations, 11+ based jets, 20+ international flights, or 500+ interstate departures OR ◦ 10,000+ enplanements OR ◦ 500+ million pounds of landed cargo
Regional (36): Supports regional economies connecting communities to statewide and interstate markets. ***WVI is a Regional Airport.***	◦ Metropolitan Statistical Area (MSA) and 10+ domestic flights of 500 miles, 1,000 instrument ops, 1+based jet or 100+ based aircraft OR ◦ Located in an MSA and meets definition of commercial service
Local (61): Supplements local communities by providing access to intrastate and some interstate markets.	◦ 10+ instrument operations and 15+ based aircraft or 2,500+ passengers
Basic (38): Provides basic aeronautical needs in local economy.	◦ 10+ based aircraft; OR ◦ 4+ based helicopters; OR ◦ Located 30+ miles from nearest NPIAS airport ◦ Used by U.S. Forest Service, or U.S. Marshalls, or U.S. Customs and Border Protection, or U.S. Postal Service, or has essential air service; OR ◦ New or replacement airport activated after 1/1/2001; and ◦ Public or private "reliever" with a minimum of 90 based aircraft
Unclassified (21): Currently in NPIAS but has limited activity.	◦ Does not meet the criterion for any other classification
Source: FAA, 2021-2025 FAA NPIAS Report	

Figure 1-2: Regional Aviation Facilities



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California State Aviation System Plan (CASP)

In addition to federal classifications, many state agencies classify airports into categories to facilitate the allocation of state aviation funds. The 2010 California State Aviation System Plan (CASP), published by the California Department of Transportation (Caltrans) designated WVI as a Regional General Aviation airport. This plan also forms the basis of state-mandated minimum standards for airport facilities such as runway design, pilot aids, and minimum services, providing additional context for airports to plan future development projects. In the context of the CASP, Regional General Aviation airports serve larger communities, accommodate business, charter, and corporate flying, and provide full service to pilots and aircraft. The draft 2020 CASP (released for comment in November 2020) maintains the designation of a regional airport for WVI. The minimum standards outlined for the functional classification of Regional General Aviation airport are discussed in subsequent sections of this MPU.

1.5 Socioeconomic Data

The socioeconomic characteristics of a community and region have a direct relationship with the activities of the airports that serve it. As such, documentation of socioeconomic characteristics is crucial to consider during the master planning process as they provide context for the existing conditions of the airport and provide a basis for developing projections of future aviation activity.

Downtown Watsonville

In 2019, an economic benefit analysis demonstrated that the Airport contributed $67 million in total economic benefits. Key factors that made up this contribution from aviation activity include:

- Airport activity supported 452 total jobs with payrolls of $27.2 million (14 aviation employers and 15 non-aviation employers)
- Airport activity added $3.7 million to local and state tax revenues
- The airport creates daily economic benefits of $183,600, with $74,600 paid daily to area workers
- Airport employers purchased $9.7 million of goods and services in the region, supporting 59 jobs
- Based aircraft were valued at $24.1 million and paid property taxes of $280,000

Downtown Watsonville

Watsonville is a vibrant community with rich history and sits within Santa Cruz County, an area that has seen significant economic growth in recent years. Data was gathered from Woods and Poole Economics, Inc., an independent firm that generates long-term economic and demographic projections for metropolitan areas. A summary of socioeconomic data for the Santa Cruz-Watsonville MSA, which incorporates the entirety of

Santa Cruz County, and also for the State of California is provided in this section. The Compound Annual Growth Rates (CAGR) of each socioeconomic data metric is presented where numerical data are provided.

Table 1-2 presents historic population data for the Santa Cruz-Watsonville MSA and the State of California between 2000-2019. As shown, Santa Cruz County's population CAGR for the period 2010-2019 is 0.297 percent lower than California's CAGR (0.872 minus 0.575). According to U.S. Census estimates, the City's 2019 population is approximately 53,856, which is approximately 20 percent of the total population of Santa Cruz County.

Downtown Watsonville

Table 1-2: Historical Population

Year	Santa Cruz-Watsonville MSA	California
2000	255,835	33,987,977
2010	263,213	37,336,011
2015	273,018	39,155,924
2016	274,442	39,542,295
2017	275,874	39,932,706
2018	277,309	40,326,531
2019	278,748	40,724,054
CAGR (2010-2019)	**0.575%**	**0.872%**

Source: Woods and Poole Economics, Inc., 2020

Table 1-3 presents historic data related to employment and total earnings in the Santa Cruz-Watsonville MSA and the State of California. Once again, the CAGR of total employment and total earnings is lower in the Santa Cruz-Watsonville MSA than it is in the rest of the state during the 10-year timeframe. However, the Santa Cruz-Watsonville MSA total employment growth rate is more than double the population growth rate over the same timeframe, meaning that the employment rate has increased in the area over the last 10 years.

Local Grocery Store

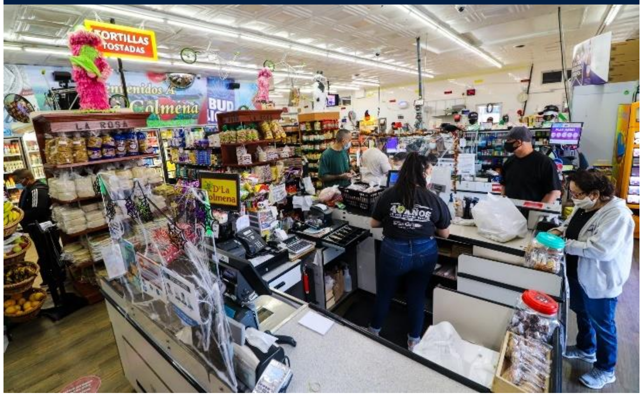

Table 1-3: Historical Employment Summary

Year	Santa Cruz-Watsonville MSA		California	
	Total Employment	Total Earnings (in Millions of 2009 Dollars)	Total Employment	Total Earnings (in Millions of 2009 Dollars)
2010	138,820	$ 6,201	19,803,747	$ 1,129,268
2015	151,060	$ 7,084	22,417,830	$ 1,321,182
2016	153,376	$ 7,247	22,789,465	$ 1,352,650
2017	155,629	$ 7,408	23,154,146	$ 1,383,998
2018	157,835	$ 7,569	23,514,573	$ 1,415,439
2019	160,024	$ 7,729	23,874,477	$ 1,447,138
CAGR (2010-2019)	**1.432%**	**2.228%**	**1.887%**	**2.511%**

Source: Woods and Poole Economics, Inc., 2020

Table 1-4 summarizes the 10 industries that provide the primary sources of employment in the Santa Cruz-Watsonville MSA between 2015 and 2019. While these industries provided the greatest number of Full-Time Equivalent (FTE) jobs during the analysis window, they did not necessarily provide the highest amount of total earnings in the region. For example, the health care and social assistance industry was ranked as the top industry for employment, but state and local government jobs generated more than 30 percent more in total earnings. Other notable industries that generate a greater amount of total earnings compared to total jobs are construction and farming which were ranked ninth and 10th in total jobs, respectively, but ranked third and seventh in total earnings.

Pajaro Bridge

Table 1-5 compares the personal income per capita of the Santa Cruz-Watsonville MSA and the State of California between 2010 and 2019. The personal income per capita in the Santa Cruz-Watsonville MSA has been greater than California every year since 2000. Additionally, the CAGR of per capita personal income is 0.548 percent higher in the Santa Cruz-Watsonville MSA than in the rest of the state.

Table 1-4: Top 10 Industries in the Santa Cruz-Watsonville MSA by Total Employment, 2015-2019

Industry	Year				
	2015	2016	2017	2018	2019
Health Care and Social Assistance	18,599	19,058	19,528	20,009	20,502
State and Local Government	18,123	18,426	18,725	19,019	19,308
Retail Trade	15,274	15,560	15,811	16,024	16,220
Accommodations and Food Service	12,230	12,379	12,528	12,675	12,823
Professional and Technical Services	11,390	11,486	11,584	11,683	11,784
Real Estate, Rental, and Lease Employment	8,898	9,046	9,196	9,347	9,501
Administrative and Waste Services	8,008	8,099	8,197	8,299	8,405
Construction	7,658	7,846	8,006	8,160	8,311
Manufacturing	7,899	7,975	8,037	8,088	8,129
Farming	7,482	7,536	7,588	7,638	7,687

Source: Woods and Poole Economics, Inc., 2020

Table 1-5: Personal Income per Capita Comparison

Year	Santa Cruz-Watsonville MSA	California
2010	$ 42,808	$ 42,411
2015	$ 53,730	$ 50,943
2016	$ 55,163	$ 52,158
2017	$ 56,819	$ 53,597
2018	$ 58,623	$ 55,183
2019	$ 60,644	$ 56,976
CAGR (2010-2019)	**3.544%**	**2.996%**

Source: Woods and Poole Economics, Inc., 2020

As indicated in **Table 1-2** through **Table 1-5,** WVI is located in an area that has experienced slower population growth than the State of California as a whole. However, growth in total earnings and personal income per capita in the Santa Cruz-Watsonville MSA demonstrate that the region is an economic center for the state. It is important to note that the Santa Cruz-Watsonville MSA is located adjacent to the Salinas Valley, which is one of the most productive agricultural regions in

California, and the Bay Area, a technology driven, dense populous region. As such, many people living in each region commute between the areas to work, shop, and participate in recreational activities. These factors may influence the demographics and socioeconomic characteristics of the City of Watsonville, however, as WVI's catchment area includes all of Santa Cruz County, this analysis only discusses the characteristics of the Santa Cruz-Watsonville MSA.

1.6 Economic Impact

Per the 2020 Economic Benefit Analysis, WVI created 2019 economic benefits of 452 total jobs supported, total payrolls for workers of $27.2 million, and total output of $67.0 million The total benefits include both direct and secondary benefits, measuring the airport's overall contribution to the regional economy. Highlights of the economic benefits of Watsonville Municipal Airport include:

- The direct on-airport economic benefits resulted from the activity of 27 private tenants, 2 public agencies, and various capital improvement projects during 2019. Direct on- airport output was $36.3 million, with payroll to 242 on-airport workers of $15.5million.
- The direct economic benefit of air visitors to Watsonville Municipal Airport in 2019 brought an injection of $2.2 million of visitor spending into the economy, creating employment for 24 workers in the hospitality industry, with payroll of $909,000.
- The combined direct benefits of on-airport and visitor activity summed to output of $38.5million, 266 direct jobs created, and payroll of $16.4million. The combined secondary benefits, computed through IMPLAN, created an additional $28.5 million of revenues, jobs for 186 additional workers, and payroll of $10.9 million as the initial spending recycled through the region.

1.7 Airfield Facilities

Airfield facilities are the most critical component of an airport's infrastructure as they facilitate the safe movement of aircraft on the ground and during flight operations. An examination of the conditions and characteristics of airfield facilities is an essential element of the airport master planning process as it determines their ability to meet future needs of the City and airport users. The inventory of existing airfield facilities was completed through physical inspection, discussions with Airport management and staff, review of prior airport planning studies and airport layout plans, and publicly available information related to the Airport. The Airport's existing facilities are depicted in **Figure 1-3.** The inventory includes the following components of airfield infrastructure:

- Runways and Taxiways
- Airfield Lighting, Markings, and Signage
- Weather Reporting and Navigational Aids
- Climatic and Meteorological Conditions
- Parachute Landing Area

1.7.1 Runways and Taxiways

WVI is served by two intersecting runways, Runway 2-20 and Runway 9-27. Runway 2-20 is 4,501 feet long by 149 feet wide and is constructed with an asphalt surface that is listed to be in excellent condition. Runway 9-27, meanwhile, is 3,998 feet long by 98 feet wide and has an asphalt surface that is reported by the FAA to be in fair condition, however, both runways were last rehabilitated in 2019. The actual pavement conditions are higher than the reported conditions. As Runway 2-20 is the longest of the two runways and is equipped with an instrument approach, it is considered the primary runway at WVI.[4]

Runway 20 is the preferred calm wind runway at WVI. Runway 27 is available for landings but is not available for aircraft departures as it does not meet certain FAA runway design standards, which are discussed in future sections of the MPU. Runway 9 is available for departures and landings. Runways 9-27 are not available for night operations. The dimensions, conditions, weight bearing capacity, and pavement condition index (PCI) of each runway are summarized in **Table 1-6.**

Table 1-6: Runway Characteristics

Runway Characteristic	Runway 2-20	Runway 9-27
Length (Feet)	4,501	3,998
Width (Feet)	149	98
Surface	Asphalt-Very Good	Asphalt-Excellent
Pavement Condition Index (PCI)[3]	72-77	82-90
Weight Limitations (lbs. (Thousands))	81.0 (SW*)/96.0 (DW**)/167.0 (2DW***)	45.0 (SW)/65.0 (DW)

**SW=Single-wheel; **DW=Dual Wheel; ***2DW=Tandem Dual Wheel*
Sources: FAA 5010 Airport Master Record, 2020, Watsonville Pavement Evaluation, 2022

WVI's most recent Pavement Maintenance Management Plan (PMMP) was conducted in early 2021 to update the analysis of the structural conditions and strength of airport pavement surfaces. The information from this PMMP regarding the maintenance of the airfield surfaces during the immediate and long-term planning time frame will be included in the implementation and phasing plan of this MPU in subsequent chapters.

The Airport has multiple taxiways that provide aircraft access between aircraft parking areas and the two runways. Taxiway A is a 50-foot wide, full length, parallel taxiway for Runway 2-20. Runway 2-20 is also served by two connector taxiways, Taxiways D and E, which are both approximately 50 feet wide. Based on satellite imagery data, it appears that Taxiway A is 120 feet wide at the approach end of Runway 20 to allow aircraft to pull off and complete run-up checks. However, this area is not currently marked as an officially designated run-up area but will be considered as part of this MPU[5].

Taxiway C serves as the parallel taxiway for Runway 9-27 however, the taxiway joins Taxiway A for approximately 100 feet adjacent to the main apron. Taxiway C is approximately 35 feet wide on the western side of Runway 2-20, 45 feet wide between Runway 2-20 and Taxiway A, and 30 feet wide on the eastern side of Taxiway A. Taxiway C is connected to Runway 9-27 via a connector taxiway. The length, width, surface type, and PCI of Taxiway A and Taxiway C are summarized in **Table 1-7**. It should be noted that Taxiway B, which is approximately 40 feet wide, serves as a connector taxiway between Taxiway C and Runway 9-27 near the T-hangar area.

[4] The Primary Runway is the preferred runway for aircraft operations when prevailing weather conditions allow. Oftentimes, the primary runway will be the longest runway at an airport and be designated as the instrument runway. Maintenance and expansion projects on primary runways receive funding priority over additional and crosswind runways.
[5] As of January 2023, this area had been officially designated as a run-up area with appropriate non-movement area markings.

Figure 1-3: Existing Facilities

SCALE: 1"= 500'
DATE: 1/18/2023

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Table 1-7: Taxiway Specifications

	Taxiway A (Runway 2-20)	Taxiway C (Runway 9-27)
Length (compared to runway)	Full Parallel	Full Parallel
Width (Feet)	50	35*
Surface	Asphalt-Excellent	Asphalt-Fair
PCI per 2022 PMMP	84-90	88-90

**Taxiway C is approximately 35 feet wide on the western side of Runway 2-20, 45 feet wide between Runway 2-20 and Taxiway A, and 30 feet wide on the eastern side of Taxiway A.*

Source: FAA 5010 Airport Master Record, 2020; 2022 Pavement Management Plan

1.7.2 Airfield Lighting, Markings, and Signage

Airfield lighting, markings, and signage provide information to pilots during takeoff and when approaching the runway for landing. Appropriate markings, lighting, and signage facilitate the efficient movement of aircraft on the airfield. In addition, airfield lighting, markings, and signage greatly improve airport safety by alerting pilots and ground vehicles when approaching movement areas during nighttime or low visibility operations.

As depicted in **Table 1-8**, Runway 2-20 is painted with non-precision markings that are reported by the FAA to be in good and fair conditions on the Runway 2 and Runway 20 approach ends, respectively. These markings were repainted during the 2019 pavement rehabilitation and as such are both actually in good condition. Runway 2-20 is equipped with medium intensity runway lighting (MIRL) that provides additional guidance to pilots during nighttime and low-visibility operations. Additionally, both ends of Runway 2-20 are equipped with runway threshold lights that are critical for pilots approaching Runway 20 as it has a displaced threshold. Runway 2 is equipped with pilot-controlled lighting and runway end identifier lights (REILs) that provide positive identification of the end of a runway.

Runway 9-27 is painted with basic markings that are reported by the FAA to be in fair condition on both ends of the runway and provide guidance to pilots during visual operations. These markings were also repainted during the 2019 pavement rehabilitation and as such are actually in good condition. Runway 9-27 does not have runway lighting or a REIL system.[6] However, Taxiways A, C, and the associated connectors to both Runways 02-20 and 09-27 are equipped with medium intensity taxiway lighting (MITL). Additional runway lighting such as visual glide slope indicators (VGSIs) are discussed in Section 1.7.3.

[6] Runway edge lighting was previously installed while the Airport was utilized by the Navy, but any remaining infrastructure is obsolete or unusable.

Table 1-8: Existing Lighting, Markings, and Signage

Runway Characteristic	Runway 2	Runway 20	Runway 9	Runway 27
Marking Type	Non-Precision	Non-Precision	Basic	Basic
Marking Conditions	Good	Good	Good	Good
Lighting	MIRL	MIRL	None	None
REILs	Yes	No	No	No
Source: FAA's 5010 Airport Master Record				

1.7.3 Weather Reporting and Navigational Aids

Navigational aids (NAVAIDs) assist pilots in keeping their aircraft on course when traveling between airports and when flying during instrument meteorological conditions (IMC). NAVAIDs can take the form of visual or electronic devices located on the ground or in the air (GPS satellites) and provide position information, point-to-point navigation, and directional guidance. There are several NAVAIDS on site at WVI and in the area that aid pilots when arriving at or departing from the Airport.

Visual NAVAIDs at WVI provide guidance to pilots whiling operating under visual conditions. These visual aids include a standard white-green rotating beacon that provides positive identification of a civil airport when flying over the area. The beacon is located atop a 50-foot tall tower on the east side of the airfield near the terminal. The Airport is also equipped with a lighted windsock and a lighted wind tee located in the Airport's segmented circle on the west side the airfield near the intersection of Runway 2-20 and 09-27. The lighted wind indicators provide information to pilots to choose the appropriate runway to take off and land based on current wind conditions.

WVI is also equipped with visual aids at the ends of the runways that provide directional guidance to pilots approaching the Airport. Runway 2-20 and Runway 9 are equipped with 2-light Precision Approach Path Indicators (PAPIs) with a three-degree glide path that help pilots remain on glideslope while landing. However, Runway 20's PAPI system is unusable beyond four miles from the runway end due to high terrain.

WVI also maintains a compass rose located near the main apron. A compass rose points to magnetic north and is used by airport Specialized Aviation Service Operators (SASOs) to verify the accuracy of an aircraft's magnetic compass. In August 2018 the Airport completed a "Compass Rose Survey" to formally certify the compass rose per FAA Advisory Circular (AC) 150/5300-13A, *Airport Design*. The certification expires on August 7, 2023. Members of the Monterey Bay Ninety-Nines, an organization of women pilots that voluntarily paints the compass rose markings, completed the last painting at WVI in November 2018."

Ninety-Nines Painting Compass Rose at WVI

WVI has a weather reporting system that provides near real-time weather and visibility information to pilots operating in the area. The Airport has an Automated Surface Observation System (ASOS) unit on site that transmits the wind speed and direction, visibility, sky conditions, air pressure, ceiling height, and precipitation. The ASOS usually generates reports with updated weather conditions once per minute and often provides the most accurate and timely weather information to pilots. As the system records weather in one-minute intervals, special observations can be reported if conditions change rapidly. ASOS information can be accessed on the designated frequency or by calling a dedicated phone number. The system is critical to pilots arriving and departing from WVI and greatly improves the safety of Airport operations, particularly during IMC.

1.7.4 Climatic and Meteorological Conditions

Local climatic and meteorological conditions significantly affect the operations at an airport in a number of ways. As such, proper airport planning and development can minimize the impacts that climatic and meteorological conditions have on aircraft operations and can ensure the maximum utilization of airport facilities. Wind conditions, temperatures, and precipitation at an airport can directly influence many airfield design decisions including runway orientation and length, airfield pavement type, and location of NAVAIDs at the airport.

Climate

WVI's proximity to the Pacific Ocean means that the Airport experiences mild climatic and meteorological conditions year-round. Mean maximum temperatures range from 61° Fahrenheit (F) in January to 74° F in September. Mean minimum temperatures range from 39° F to 54° F. Like many of California's coastal regions, Watsonville is classified as a cool summer Mediterranean Climate.[7] As such, the region often experiences relatively wet winters between November and April and mild, dry summers between May and October. Average monthly precipitation ranges from 0.01 inches of precipitation in the driest month (July) to 4.84 inches of precipitation in the wettest (February).

Meteorological Conditions

When describing weather conditions at an airport, the FAA considers the following general weather classifications:

- Visual flight rule (VFR) conditions - VFR is the set of regulations, procedures, and conditions that permit a pilot to operate and navigate an aircraft based on visual reference to the surrounding environment with limited instrumentation. This usually requires favorable weather conditions with a ceiling of 1,000 feet above ground level (AGL) or greater and visibility of at least three statute miles (also referred to as visual meteorological conditions or VMC).

- Instrument flight rule (IFR) conditions - Specific IFR procedures must be used when operating in IMC, meaning the cloud ceiling is less than 1,000 feet AGL and/or the visibility is less than three statute miles. Appropriately trained pilots can operate equipped aircraft using navigational systems that provide lateral and/or vertical path guidance based on specific meteorological conditions during IFR flight.

- Poor visibility conditions (PVC) - These conditions occur when the cloud ceiling is below 200 feet and visibility is below less than ½ mile (RVR 2,400 feet), making the airport unusable for most aircraft operations. Under these conditions only specific airports with advanced navigational systems and correspondingly trained pilots with properly equipped aircraft, may operate.

Weather and wind conditions at WVI are again influenced by the Airport's proximity to Monterey Bay. During the late spring and summer, moisture and cool air flow inland from the bay, creating marine fog and low stratus clouds over Watsonville. This fog typically forms during the evening and dissipates by mid-morning each day; however, this can create low visibility during morning and evening flight operations. The marine fog usually moves towards the Airport from the southwest, causing the

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[7] The Weather Channel (2020). "Watsonville, CA Monthly Weather" Available Online at: https://weather.com/weather/monthly/l/57e0b951507859344f85e4140a81fe3f1c4b03ca40c8ef9c2b71bc1736dccaf7 (Accessed September 2020).

approach to Runway 2 and the departure from Runway 20 to be impacted by IMC before the fog arrives and after it dissipates at the Airport.

Crosswind Coverage

Prevailing wind speed and direction influences airport design and runway use. Runways are ideally oriented parallel with the prevailing wind, allowing aircraft to land and take off into the wind, reducing ground roll distance and minimizing the need for crosswind corrections. The FAA recommends that the primary runway at an airport should be capable of operating under allowable wind conditions at least 95 percent of the time. This recommendation is based on the crosswind (i.e. wind direction and speed as a vector relative to aircraft's direction of flight) not exceeding the following:[8]

- 10.5 knots (12 mph) for small single-engine and light-twin aircraft
- 13 knots (15 mph) for the larger and heavier turboprop and medium jet type aircraft
- 16 knots (18.4 mph) for the larger corporate/military jet and narrow-body commercial type aircraft
- 20 knots (23.0 mph) for larger narrow-body and wide-body commercial type aircraft

Table 1-9 details the calculated crosswind coverage for each of the aforementioned crosswind components for each runway and combined in various weather conditions at WVI.

Table 1-9: Annual Wind Coverage

Weather Classification	Runway	Percent of Wind Coverage			
		10.5 Knots	13 Knots	16 Knots	20 Knots
All Weather	02-20	99.60%	99.84%	99.98%	100%
	09-27	98.42%	99.14%	99.74%	99.93%
	Combined	99.88%	99.97%	100%	100%
IFR	02-20	99.76%	99.92%	99.98%	100%
	09-27	98.39%	98.96%	99.57%	99.86%
	Combined	99.86%	99.96%	99.99%	100%
VFR	02-20	99.46%	99.79%	99.97%	100%
	09-27	98.21%	99.09%	99.77%	99.95
	Combined	99.87%	99.97%	100%	100%

Sources: FAA Wind Analysis / Wind Rose Generator, NOAA Weather Station at Watsonville Municipal Airport, 2010-2019

1.7.5 Parachute Landing Area (PLA)

The Parachute Landing Area (PLA) is located on the northwest area of WVI adjacent to Runway 9, shown as #43 on **Figure 1-3**. The PLA is accessed by vehicles for pickup of participants through Manfre Road adjacent to the business Nordic Naturals. The circular PLA is 366 feet in diameter and outlined by painted markers and mowed grass. The skydiving activity is

[8] Specific crosswind limitations based on Runway Design Code (RDC) are described in FAA Advisory Circular 150/5300-13A, *Airport Design*

operated by GoJump Santa Cruz and based out of Hangar #21. As part of the operating agreement with the Airport, only tandem jumps are performed as no instruction of students is allowed.[9]

It should be noted that the PLA is not for the exclusive use of the on field skydive operator[10] and could conceivably be used by non-affiliated sky divers. Airport management requires prior permission be obtained before PLA use by the general public. It should be noted that the Airport is required to make the airport available for public use to all types, kinds, and classes of aeronautical activities per the FAA grant assurances as a federally obligated airport.

The location of the PLA is under review by the Airport as the current location is proposed to be as part of a land swap between the Airport and Nordic Naturals. Nordic Naturals would like to expand their facility adjacent to the Airport, but their current property where the expansion would occur falls within Caltrans Safety Zone Five, in which the CalTrans Airport Land Use Planning Handbook recommends avoiding high-intensity non-residential uses. In order to comply with the Caltrans Safety Zone recommendations and still allow for the development, a discussion was started to swap the land currently owned by Nordic Naturals for the land occupied by the existing PLA. The net effect of the approved land swap would effectively bring Caltrans Safety Zone Five under the sole control of the Airport. In exchange for the land swap the Airport would relinquish an equal portion of land in Safety Zone Six, just south of the approach end of Runway 9, which allows for this type of development.

1.8 Landside Facilities

Landside facilities support airport operations in a number of ways and serve a variety of crucial purposes at airports. Landside facilities include such facilities as aircraft storage and apron space, airport terminals (including GA terminals), refueling facilities, pilot lounges, and other support facilities including access roads, vehicle parking, and more. Landside facilities can also support revenue generation at airports through the sale of fuel, lease payments from concessionaries or other businesses, and aircraft storage fees.

An examination of the conditions and characteristics of landside facilities is an essential element of the airport master planning process as it determines the ability of the Airport to meet future needs of the City and users. The inventory of existing landside facilities was completed through physical inspection, discussions with Airport management and staff, review of prior airport planning studies and airport layout plans, and publicly available information related to the Airport. The inventory includes the following components of landside facilities and services:

- Apron and Aircraft Storage
- Airport Terminal and Support Facilities
- Fueling Facilities
- Vehicle Access, Circulation, and Parking
- Security
- Drainage and Utilities
- Airport Business and Services

1.8.1 Apron and Aircraft Storage

The primary purpose of an aircraft hangar is aircraft storage, as outlined in the FAA's Policy on Use of Hangars at Obligated Airports, which is incorporated in FAA Order 5190.6B, Airport Compliance Handbook. There are several hangar configurations

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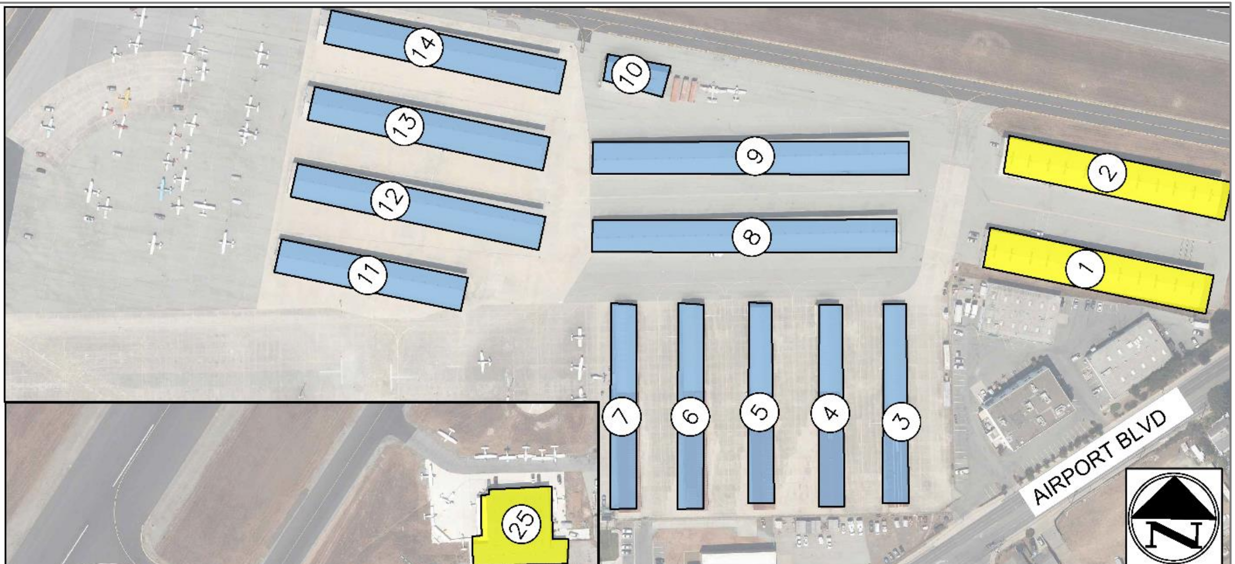
9 WVI's Minimum Commercial Standards (MCS) define a process to ensure "other than Tandem jumps" require airport approval. Per discussion with the current operator PLA there are instances where single jumpers accompany tandem jumps for video recordings. On numerous occasions it may appear as though there is a single jumper when in fact it is considered to be part of a tandem operation. Given neither the City or Airport controls the surrounding airspace but is obligated to support aeronautical activities it relies on pilots and airmen (including jumpers) to adhere to the generally accepted "Best Practices", chief among those is "See and Avoid."

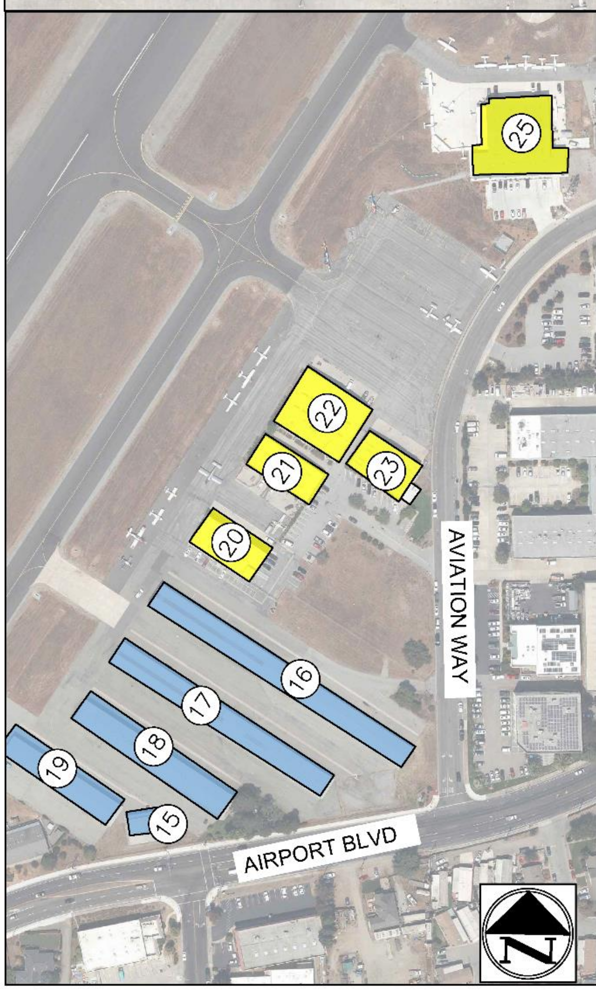
10 In 2021, SkyDive Surf City replaced GoJump as the on field skydiving operation.

at the Airport including T-hangars, conventional box hangars, mini-hangars, and commercial hangars reserved for maintenance and corporate aircraft (see **Figure 1-4**). While all property is owned by the City, the hangar structures on the Airport are a mix of month-to-month permitted use and longer-term City approved leases. One hangar, #25, is currently owned by the tenant with the intent to revert to City ownership at the end of the ground lease. The hangars are fairly spread out at WVI across the aircraft operating area, with a cluster of hangars located southeast of the terminal building and another cluster of hangar structures located next to the SASO facilities on the west side of the Airport.

The Airport currently has a waitlist for T-hangars, Box hangars and Corporate hangars for aircraft storage. The waitlist has over 80 applicants on it, with the majority of applicants waitlisted for a T-hangar space to become available.

Figure 1-4: Apron and Aircraft Storage





HANGARS		
NO.	TYPE	NAME
1	CONVENTIONAL	CORPORATE HANGARS 1–6
2	CONVENTIONAL	CORPORATE HANGARS 7–12
3	T–HANGAR	A
4	T–HANGAR	B
5	T–HANGAR	C
6	T–HANGAR	D
7	T–HANGAR	E
8	T–HANGAR	F
9	T–HANGAR	G
10	CONVENTIONAL	L
11	T–HANGAR	H
12	T–HANGAR	I
13	T–HANGAR	J
14	T–HANGAR	K
15	CONVENTIONAL	M
16	T–HANGAR	W
17	T–HANGAR	X
18	T–HANGAR	Y
19	T–HANGAR	Z
20	CONVENTIONAL	COMMERCIAL/MAINTENANCE HANGARS
21	CONVENTIONAL	COMMERCIAL/MAINTENANCE HANGARS
22	CONVENTIONAL	COMMERCIAL/MAINTENANCE HANGARS
23	CONVENTIONAL	COMMERCIAL/MAINTENANCE HANGARS
25	CONVENTIONAL	COMMERCIAL/MAINTENANCE HANGARS

SCALE: 1"= 250'
DATE: 2/2/23

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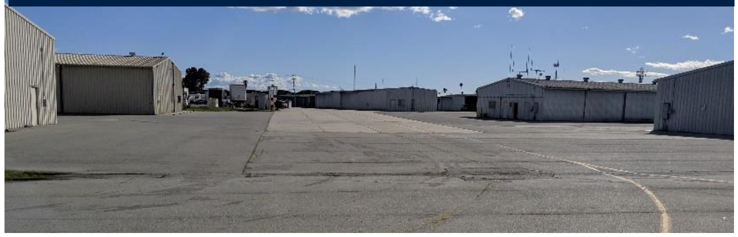
T-Hangars

T-hangars are shaped like the letter "T" and typically nested together facing opposite directions, helping to create more densely configured aircraft storage spaces. The t-shape allows for the aircraft to be towed or reversed into the space with the wings fitting nicely into the top cross section of the t-shape. Aircraft are stored in t-hangars next to one another, with the aircraft positioned wings to tails. T-hangars can vary in size to accommodate different aircraft; however, they are typically reserved for aircraft that only require 1,100 square feet or less. **Figure 1-5** displays an example configuration of a nested T-hangar row.

T-Hangars



There are 15 rows of T-hangars that account 206 T-hangar spaces at the Airport. The rows are different configurations:

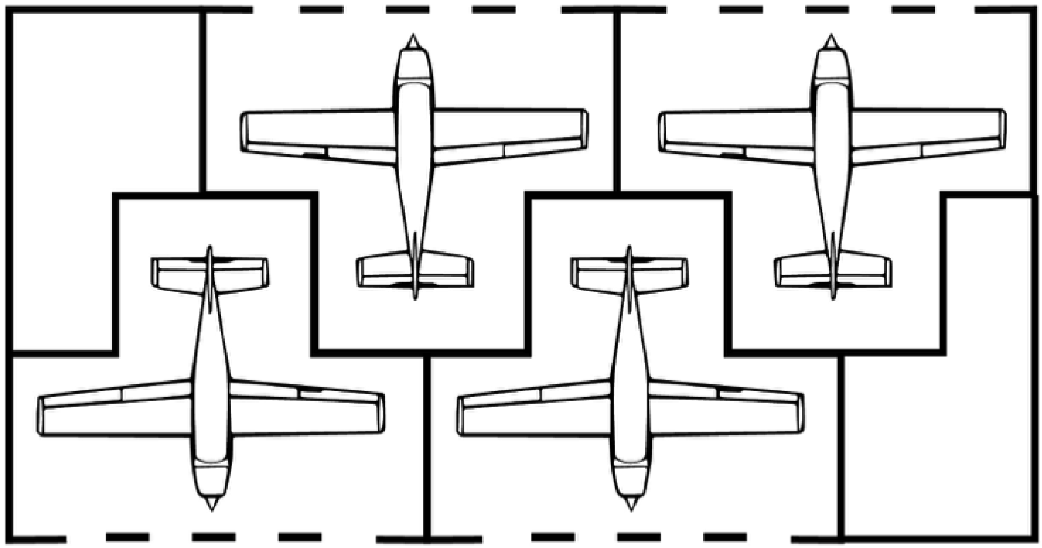
T-Hangars

- Hangars A to E, labeled #3 through #7 range from 900 to 975 square feet per unit on **Figure 1-4.** These hangars are located east of the terminal building outside of an on-airport business. These are the oldest hangars on the field, built in the 1950s and 1960s.
- Hangars F to K and labeled #8, #9, and #11 through #14. These T-hangars are slightly larger than Hangars A to E, at 1,000 square feet per unit, and located adjacent to Taxiway B. These are the newest hangars onsite, built between 1993 and 1996.
- Hangars W to Z, labeled #16 through #19, are on the south side of the airfield, near Taxiway A. These structures are the largest T-hangars and are approximately 1,100 square feet per unit. These hangars were built in phases during the late 1970s and mid-1980s.

Various T-hangar rows have restrooms, so tenants do not need to walk across the aprons to utilize the restrooms within the terminal.

In addition to the aircraft storage hangars shown in **Table 1-10**, the Airport also has 14 mini-hangars and 30 end or middle rooms within the T-hangar buildings that can be rented out or used by the Airport for other storage. The mini hangars are approximately 500 square feet each and the end or middle rooms are approximately 120 square feet. These spaces are not big enough or configured in such a way that would allow an aircraft to be stored but allow for the overall building to be a rectangular shape.

Figure 1-5: Example of T-hangar and Mini-Hangar Configuration



Conventional Hangars

Conventional/Corporate Hangar

Conventional hangars are large single room structures that can house one or more aircraft and are referred to by many names depending on the airport and arrangement, including box or corporate hangars. Therefore, there is often more than one space inside a conventional hangar. According to the Airport Cooperative Research Program (ACRP) Report 113: Guidebook on General Aviation Facility Planning, hangars with a square footage of 3,600 feet can accommodate approximately 28 percent of the current GA fleet. Approximately 70 percent of the GA fleet can be accommodated by conventional box hangars that are 4,900 square feet. Depending on the size of an aircraft, hangars between 2,200 and 3,600 feet can hold 1 to 3 single engine aircraft. Hangars between 3,600 square feet and 5,700 square feet could hold 2 to 4 single engine or smaller multi-engine aircraft. Conventional or corporate hangars can support economic activity in the region because they attract business users who need to base an aircraft in the area.

The Airport has 15 conventional hangar units (12 designated as “Corporate” and 3 designated as “Box”) of varying sizes and uses, as shown on **Figure 1-3**.

There are two corporate (or box) hangar rows, labeled #1 and #2. These hangars are located in the east corner of the airfield, near Runway 27 and Taxiway C. Each row contains 6 hangars for a total of 12. This style of hangars allows for more flexibility of storage configuration than T-hangars and may house multiple aircraft with a combination of office or storage space or other amenities such as restrooms. These hangars are typically utilized for larger aircraft operated by flight departments of local businesses.

Hangars L (two units in one structure) and M (one unit in one structure), labeled #10 and #15, respectively, are approximately 2,200 square feet each, and are leased, along with all T-hangars, on a month-to-month basis. Hangar M is located on the south side of the airfield, closer to Taxiway A, and Hangar L is located northeast of the terminal building.

Commercial/Maintenance Hangars

Similar to a conventional hangar, commercial/maintenance hangars are large, single room buildings that can house multiple aircraft. However, commercial/maintenance hangars are only used by Specialized Aviation Service Operators (SASOs) for storage of aircraft owned by or being stored by the SASOs, usually when undergoing maintenance or repairs. As such, commercial/maintenance hangars are not available for general based aircraft storage and are not counted as available space for future demand.

There are seven total commercial/maintenance hangars at WVI with varying sizes and uses, as shown in **Figure 1-3**. Section 1.8.7 discusses the businesses and tenants that occupy these buildings.

A series of maintenance hangars, labeled as #20 through #23, are known as the Watsonville Airport Center, located along Aviation Way that can accommodate a variety of aircraft and businesses. Adjacent to building #22 and #23 is a 57,000 square foot apron. There are 14 tie downs and 5 helicopter parking spaces available on this apron. This Watsonville Airport Center also accommodates approximately 40 vehicles for tenants and visitors. Additional vehicle parking is available along Aviation Way outside of the perimeter fence.

The commercial/maintenance conventional box-hangar labeled #23 is approximately 6,600 square feet and also located on the west side of Aviation Way.

A commercial/maintenance hangar labeled as #25 is approximately 14,100 square feet with an associated 20,000 square foot apron that allows for parking for 3 to 5 aircraft. An additional 8 aircraft can be parked along the edge of the taxilane to the hangar. Behind the hangar, connected to Aviation Way, is parking for 15 to 20 vehicles for tenants and visitors.

There is a commercial/maintenance hangar that is labeled #30 and is approximately 2,700 square feet (50' x 54'). The hangar is located adjacent to the east tie down ramp and shares a 12-space vehicle parking lot with the Airport Operations Building.

Hangar #31

There is also a large commercial/maintenance hangar labeled #31 that is approximately 8,000 square feet (approximately 80' x 100') for aircraft maintenance with an additional 2,000 square feet dedicated to the office space and restrooms. This hangar is located adjacent to hangar #30 east of the Airport terminal building.

Apron Parking

In addition to covered aircraft storage, WVI is also equipped with apron parking, also referred to as aircraft tie downs. Apron parking is a crucial element to WVI's landside facilities because it offers parking for permanent based aircraft that do not have a hangar and for transient aircraft. Often times, airports charge transient or overnight tie down fees and it can be another way that airports generate revenue. There are four dedicated ramp areas on the airfield, shown in **Figure 1-3**.

- The east transient tie down ramp labeled #33 is approximately 170,800 square feet and has 23 tie downs, including 3 spaces for jets. 16 spaces are currently leased to an on-airport business and 7 are utilized for longer term transient aircraft. When the lease ends the tie downs will revert to City management and may be utilized for transient aircraft.
- The north tie down ramp labeled #36 is 244,700 square feet and is utilized by permanent based aircraft. It can accommodate 68 aircraft and 2 helicopters.
- The transient ramp labeled #35 is approximately 116,547 square feet and can accommodate 20 aircraft.

- An additional apron adjacent to building #22 is 57,000 square feet and can accommodate 14 aircraft and 5 helicopters. This apron is for use by the commercial/maintenance hangar tenants only. There are 3 additional tie downs adjacent to Hangar L, temporarily designated for dilapidated aircraft storage.

Main Apron

The four ramp areas account for approximately 136 apron tie down spaces. There are 25 spaces reserved for transient aircraft and two spaces reserved for transient helicopters on the terminal and east transient ramps, and approximately 104 spaces reserved for based aircraft and five spaces reserved for based helicopters on the east, west, and north tie down ramps.

Helicopter Parking

There are two separate helicopter parking areas at WVI that accommodate rotorcraft activity. A commercial leasehold dedicated to rotary wing aircraft serves as the primary helicopter parking area and is located on the south side of the airfield, just east of the intersection of Taxiways A and D and has 5 dedicated helicopter parking spaces that can accommodate rotorcraft with up to a 36-foot rotor span. There is also a secondary helicopter parking area located north of the Compass Rose near the main tie down ramp that can accommodate 2 helicopters that have up to a 40-foot rotor span and 60-foot length.

Summary of Aircraft Storage

Aircraft storage by building and apron at the Airport is shown in **Table 1-10** and **Table 1-11** displays a summary of aircraft storage by type.

Table 1-10: Aircraft Storage by Building and Apron

Number	Type	Name	Square Footage	Units/Tie downs
24	Apron	Helicopter Parking	8,000	5
36	Apron	Transient Helicopter Ramp	20,000	2
24	Apron	Tenant Parking	57,000	14
25	Apron	Tenant Parking	20,000	10
33	Apron	East Transient Ramp	170,800	23
35	Apron	Terminal Transient Ramp	116,500	18
36	Apron	Permanent Tie down Ramp	244,700	61
Adjacent to 37	Apron	Dilapidated Aircraft Tie downs	2,500	3
1	Conventional	Corporate Hangars 1-6	23,500	-
2	Conventional	Corporate Hangars 7-12	23,400	-
10	Conventional	"L" Conventional Box	4,400	2

Number	Type	Name	Square Footage	Units/Tie downs
15	Conventional	“M” Conventional Box	2,200	1
20	Conventional	Commercial/Maintenance Hangar	6,200	1
21	Conventional	Commercial/Maintenance Hangar	6,200	2
22	Conventional	Commercial/Maintenance Hangar	12,100	15
23	Conventional	Commercial/Maintenance Hangar	6,600	3
25	Conventional	Commercial/Maintenance Hangar	14,100	5
30	Conventional	Commercial/Maintenance Hangar	2,700	1
31	Conventional	Commercial/Maintenance Hangar	8,000	6
3	T-Hangar	A	12,800	10
4	T-Hangar	B	13,000	10
5	T-Hangar	C	12,900	10
6	T-Hangar	D	14,100	10
7	T-Hangar	E	14,100	10
8	T-Hangar	F	26,300	23
9	T-Hangar	G	27,300	24
11	T-Hangar	H	17,100	14
12	T-Hangar	I	22,800	19
13	T-Hangar	J	21,600	18
14	T-Hangar	K	21,600	18
16	T-Hangar	W	20,000	14
17	T-Hangar	X	16,400	12
18	T-Hangar	Y	11,800	8
19	T-Hangar	Z	8,800	6

Sources: 2020 WVI; Google Earth

Table 1-11: Summary of Aircraft Storage

Storage Type	Total Number of Units	Total Square Footage
Based Tie downs	80	418,000
Transient Tie downs	25	116,500
Helicopter Parking	7	28,000
Tenant Only Tie downs	24	77,000
T-Hangar	206	260,600
Conventional Hangar	15	53,800
Commercial/Maintenance Hangar	33	55,900
Sources: 2020 WVI; Google Earth		

1.8.2 Airport Terminal and Support Facilities

There is a single-story administration/terminal building located along Aviation Way that pilot and Airport users can access during Airport hours. The terminal building and attached covered patio is approximately 6,500 square feet with roughly 3,000 square feet dedicated for airport use and 3,500 square feet for the attached restaurant. The aviation terminal provides users and visitors with a variety of services and amenities, including:

- Temperature controlled lobby with chairs, front desk and flat panel television
- Wireless internet
- Restrooms
- Restaurant
- Free vehicle parking during regular business hours
- ATM
- Vending machine

Various aeronautical businesses on the airfield provide other pilots' necessities such as bottled oxygen and aeronautical charts.

The restaurant, Ella's at the Airport, is open for lunch and dinner and provides indoor and covered outdoor dining, a full-service bar, and catering. Special musical events take place regularly. Outside of the building there is a 14,000 square foot area of grass and pavement that can be utilized to gather, relax, and watch the aviation activity on the airfield.

The Airport relies on support facilities to maintain efficient and safe daily operations. Support facilities are such structures as on-airport maintenance buildings, storage buildings, public safety buildings, and so on. The Airport is equipped with a 900-square foot maintenance and storage building, labeled #29. Equipment utilized at the Airport include a street sweeper, dump truck, a cargo trailer, aircraft tug, tractors, golf carts, and utility vehicles.

There is also Fire Station No. 2 on Airport property, across Aviation Way, labeled #51, that can provide emergency response to the Airport if needed. While there is no written agreement with local emergency providers (fire, police, medical), the Airport is in contact with the providers and provides training for aircraft emergencies and provides airport familiarization and access codes.

Additionally, there are emergency relief storage containers on the airfield, labeled #37, operated by the Watsonville Emergency Airlift Command Team (WEACT). WEACT is operated by volunteer staff and are activated in the event of an earthquake, major fire, or other similar emergency situation. The three containers are for administration, storage, and cargo and staging material and each has electricity and Wi-Fi and the ability to communicate over short wave radio. There is also a communications station within Hangar #10 for the WEACT.

Aviation Way Entrance to Airport Terminal

Transient Ramp Entrance to Airport Terminal

Area Outside of Airport Terminal

Airport Operations Center

1.8.3 Fueling Facilities

Self-Serve Fuel Island

The fueling facilities at the Airport are owned and operated by the City, and Airport management has been the only fuel provider since the 1960s. While offering full-service upon request, a self-service fuel facility is located approximately 150 feet east of the terminal building adjacent to an aircraft parking apron. Fuel is stored in three 12,000-gallon underground storage tanks (USTs). The three tanks store Jet-A fuel, 100LL fuel, and UL94 fuel.

The Airport currently offers full-service and self-service UL94, 100LL, and Jet-A fuel. The self-service fuel island can service multiple aircraft at one time due to its four-pump configuration design. Full-service is available from 8:30 to 4:30 daily, except the 13 annual holidays; a surcharge is applied to fueling requests outside of these hours.

The Airport's five fuel trucks are used for full-service fueling. The three 100LL trucks carry 450 gallons, 800 gallons, and 1,200 gallons. The two Jet-A trucks carry 1,200 gallons and 5,000 gallons.

One of the grant assurances airports must commit to in order to receive FAA funding is to provide equal access to airport facilities while also being able to derive economic benefits from the services they offer. Therefore, public-use airports that own and operate their own fuel sales must adhere to the assurance of providing fair and nondiscriminatory pricing. This mandate, and other efforts put forth by WVI, supports fair and competitive cost of fuel. Moreover, the Airport established a new fuel discount policy in 2012 by developing purchase programs that increase customer savings on aviation fuel. The discount program includes the following discounts:

- Self-Service Discount
- Cash Purchase Discount
- Second Weekend Fuel Sale
- Volume Purchase Discount
- Value Purchase Discount
- Charitable Activities Discount

According to AirNav on October 1s, 2020, the fuel prices at the Airport were $4.50 per gallon for both 100LL and Jet-A for full serve, or $4.00 per gallon for self-service.

1.8.4 Vehicle Access, Circulation, and Parking

WVI is accessible to the local community through a network of highways and surface roads that are discussed in detail in **Section 1.3.** The terminal and hangar areas on the east side of the Airport are accessible from Airport Boulevard and Aviation Way. Curbside parking along Aviation Way allows Airport users to easily access the GA terminal building and drop off pilots and passengers. There are three automatic vehicle access gates along Aviation Way and one access gate located along Airport Boulevard. These gates provide access to the south T-hangar area, the main Airport apron, and the east hangar area. There are 13 additional pedestrian access gates that allow authorized Airport users to park their vehicles at the terminal or near an airport business and walk to their aircraft or hangar on the airfield.

WVI has two paved and lighted parking lots located adjacent to the terminal building that provide access to the terminal, restaurant, and the main aircraft apron. The largest of the two lots is on the west side of the terminal and has 44 standard painted parking spaces with two designated handicap parking spaces and four electric vehicle (EV) charging stations. There are eight standard and two handicap parking spaces in the curbside parking area along Aviation Way. The east parking lot has an additional 24 standard parking spaces and one designated handicap parking space.

Pilots with based aircraft at WVI typically park their vehicles in their tie down location or within their hangar during flights. Pilots are not permitted to leave their vehicles unattended in front of their hangars.

1.8.5 Security

Airport security is a high priority at all airports, including GA airports. The 2017 GA Security Guidelines document published by the Transportation Security Administration (TSA) provides guidance for GA airports using an Airport Security Assessment and Protective Measures Matrix. The assessment tool allows airports to determine a baseline from which they can develop security measures that will improve airport safety and security. The assessment is written to help sponsors implement security practices that promote preparedness, detection, responsiveness, and recovery. While not all factors included in the assessment are applicable or required for GA airports, the assessment is a good tool for GA airports to determine their existing security levels and areas where they could see improvement. The FAA also published an Airport Security and Program Template in the 2017 GA Security Guidelines document to further assist GA airports in enhancing airport security. **Table 1-12** shows a list of some of the topics and specific improvements or activities airports can conduct to improve their security and provides a summary for some of the security procedures in place at the Airport.

Table 1-12: GA Security Assessment Topics

Security Topic	Security Improvement Activity	Present at WVI
Airport Security Plan	○ Identify aircraft movement areas ○ Identify airport personnel and/or vehicles ○ Develop Airport Security Plan	○ Airport personnel are badged with Airport-specific City employee IDs ○ Restricted access gate opens with code only given to authorized individuals ○ Plans are in place to move to a numeric entry system that assigns unique codes to each tenant and will be changed more frequently ○ Daily report of activity ○ Routine after-hour inspections by private security firm
Airport Emergency Plan	○ Identify types of emergencies & response procedures ○ Identify business and operations continuity procedures ○ Develop Airport Emergency Plan	○ Employees must participate in safety trainings ○ Emergency Plan

Security Topic	Security Improvement Activity	Present at WVI
Access Controls	○ Implement controlled entrances ○ Construct a secure perimeter ○ Implement restricted access areas ○ Develop CCTV ○ Implement signage	○ Six restricted access vehicle gates and thirteen pedestrian gates open with security code given to authorized individuals ○ Airport personnel are badged with Airport-specific City employee IDs ○ Equipped with CCTV in the terminal and airport operations center (AOC) ○ Appropriate signage indicating restricted areas posted ○ Additional signage is planned to be posted for restricted entry points
Barriers	○ Use walls, earth banks and berms as barriers ○ Implement vehicle barriers (bollards, planters, etc.) ○ Construct fences with barbed wire and/or chain link	○ Equipped with 6' fencing that is barbed in some areas
Monitoring and Surveillance	○ Develop CCTV systems ○ Use motion detectors ○ Use metal detectors ○ Use chemical agent, radiological, and/or explosive detectors	○ Equipped with CCTV in the terminal and Airport operations center (AOC) ○ Flood lights installed throughout ramps, hangars, and vehicle parking areas
Communications	○ Availability of telephone and radios ○ Use of interoperable equipment ○ Use of redundant and backup communication devices	○ Emergency phone numbers posted in the terminal ○ Reminders and emergency alerts sent through email alert notifications and Notice to Airmen (NOTAMs) ○ AOPA Airport Watch Program posters ○ Emergency backup generator for lighting, restaurant, terminal, and beacon ○ Airport employees need to meet Airport Certified Employee (ACE) communication requirements prior to promotions

Security Topic	Security Improvement Activity	Present at WVI
Inspection	○ Use check points ○ Conduct personnel searches ○ Conduct aircraft and hangar searches ○ Conduct cargo and shipment searches	○ Signage to remind users to tie down aircraft while parked ○ Random hangar safety inspections and thorough annual inspections for code violations (flammable or hazardous materials, drip pans, and current fire extinguisher) ○ Routine perimeter inspections and coordination with third party security firm and Watsonville Police to report intrusions
Sources: 2017 TSA GA Security Guidelines; Watsonville Municipal Airport 2020		

Perimeter Fencing

WVI has implemented a variety of security activities or improvements that enhance Airport security and meet FAA guidelines. For example, there is a chain-link perimeter fence at the Airport that encompasses the airfield area and is routinely inspected. This perimeter fence also has controlled entry access points at critical locations to enforce security practices. In addition, the Airport requires that personnel receive adequate safety training and offer in-house trainings, such as Airport familiarization and on-field driving training. The Airport also offers fuel-vendor safety trainings. Airport tenants are not required to complete trainings, but they are required to familiarize themselves with safety regulations outlined in Airport regulations. The Airport's Emergency Plan highlights the key steps to be taken considering an emergency on Airport property. The Plan outlines who should be notified and in what order, the roles and responsibilities of airport staff members, and protocols for reopening the airport.

While security measures are comprehensive at the Airport, there are areas where the Airport would like to see improvement. On occasion, people trespass through the fence adjacent to the water tanks and utilize the Airport property as a shortcut. This is evident because of weekly holes that Airport staff find in the perimeter fence during regular perimeter inspections. These intrusions are reported to the Airport's third-party security company as well as the Watsonville Police Department.

In addition, the restricted access gates are currently accessed by entering a code into a keypad. The code is only provided to authorized individuals, however security at the access gate could be enhanced by implementing a radio-frequency identification (RFID) key system, where approved personnel would access the gate with an electronic key fob or card key. The Airport was equipped with a similar system two decades ago, but the system was prone to failure, so the keypad was installed.

The following images show examples of controlled entry points for vehicles and pedestrians and the chain link perimeter fence. Moreover, the Airport has implemented restricted area controls, is equipped with adequate communications systems and implemented CCTV systems for monitoring and surveillance purposes.

Controlled Access Point to the Airfield Operating Area

Controlled Access Point to the Airfield Operating Area

1.8.6 Drainage and Utilities

The Airport completed a 2020 Drainage and Utility Master Plan and prepared a Storm Water Pollution Prevention Plan (SWPPP) based on the findings of the drainage study. The drainage study analyzed both offsite and onsite drainage at the Airport. It was determined that there are four offsite drainage inlets on Airport property. These four drainage inlets do not contribute water flowage to the Airport's industrial storm water monitored drainage area as the offsite water flows across non-industrial parts of the Airport. In terms of on-site drainage, there are seven drain outlets that discharge from the Airport. These seven outlets handle the bulk of the Airport's storm water discharge. The storm water that is exposed to industrial activity occurs in drainage area "L", and that run-off is discharged at the Airport to the storm water sample point. Drainage area "L" is located in the area surrounding the terminal building.

The Airport's water and sewer services are provided by City of Watsonville facilities, while electrical power is supplied by PG&E. AT&T is the Airport's telephone provider.

Located on Airport property, but outside of the perimeter fence is the Burchell Water Tank, which is owned and operated by the City of Watsonville and serves a part of the municipality's critical water facilities. The City is proposing an additional tank adjacent to this tank following a citywide water master plan to assist with future capacity and allow for continued maintenance of the existing tank.

1.8.7 Airport Businesses and Services

Airports can generate income by leasing out available space to aeronautical firms, other commercial businesses, public agencies, or utility companies. If an area is zoned and developed appropriately then the airport can lease that space out to an interested party. The more that an airport can diversify its available land for business, utility, or light industrial development, the greater opportunity they have for attracting tenants. Moreover, the more services an airport can provide or support the more attractive it can become to users and investors. Offering a variety of services and amenities can attract more airport users, retain current airport users, and generate more activity at an airport. Many of the services provided come from business tenants who help airports generate income through lease payments.

Sample of Watsonville Businesses

The Airport has over 30 different leaseholders amounting to approximately 1.5 million square feet of rentable space. These leaseholders represent a variety of different industries and firms, indicating economic diversification and significant opportunity for income generation. Airport leaseholders are a mix of aeronautical and non-aeronautical firms, public agencies, and utility companies who rent space for cell-towers.

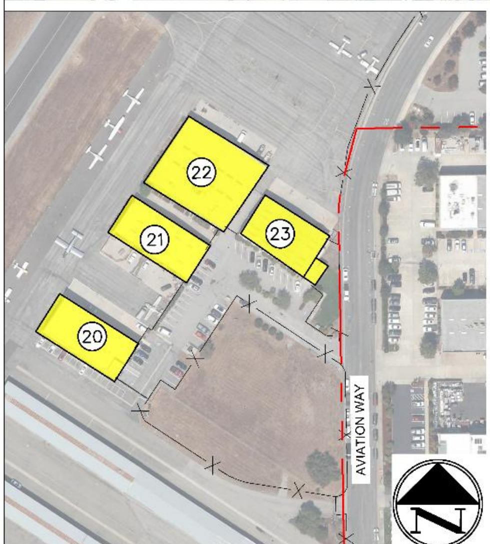
The Airport currently has 16 aeronautical activity tenants that provide a variety of essential aviation services. Many of the business's activities include flight training, aircraft maintenance/repair, aviation education, or other services that benefit the Airport and its users. Additionally, CALSTAR Air Medical Services operates an emergency air medical transport base at the airport. CALSTAR utilizes an Airbus EC135 helicopter to rapidly transport critically ill or injured patients from incident sites to area hospitals, greatly improving the safety of the local community.

Figure 1-6 depicts the present location of aeronautical businesses associated with the Airport and includes the types of services provided by each firm. The comprehensive list of aeronautical services these businesses provide is an asset to the Airport because it promotes a variety of uses and caters to all aviation needs.

Non-Aeronautical Business Building (Head'n Home)

In addition to the aeronautical business leaseholders at the Airport, there are also a variety of non-aeronautical business that lease space. A number of the non-aeronautical tenants are located on Airport property, but across Aviation Way from the airfield. The non-aeronautical businesses located at the Airport contribute to its ability to generate revenue and the diversity of firms leasing from the Airport indicates strong and sustainable economic activity. **Figure 1-7** and **Figure 1-8** provide a list and location of the non-aeronautical firms at the Airport and list the services they provide. Additionally, there are three cell towers that lease property from the Airport. In **Figure 1-6** through **Figure 1-8**, each building is labeled with its corresponding number and position from **Figure 1-3**.

Figure 1-6: Locations of Aeronautical Businesses



AERONAUTICAL BUSINESS TENANTS

Location	Business Name	Services Provided
20	CalStar	Aero-medical Services
21	SkyDive Surf City	Skydiving
22	Specialized Aviation	Air & Recreation Tours
	Strawberry Aviation	FBO Services, A&P Services, Aircraft Rentals, Fight Training
23	Gary Air	Air Taxi Service
25	Belardi Interiors, Inc	Aircraft Interiors and Upholstery
	NorCal Avionics	Avionics Maintenance and Repairs Overhaul (MRO)
	United Flight Services	FBO Services, A&P Services, Aircraft Rentals, Fight Training
30	Watsonville Aviation Education Center	Education Facility
	EAA #119	Experimental Aircraft Association Chapter
	Santa Cruz Flying Club	Non-profit Social Flying Club and Flight Instruction
31	Calibro	Avionics and Aircraft Repair and Maintenance

NOTE: NON-AERONAUTICAL BUSINESSES ARE ILLUSTRATED IN A SEPARATE FIGURE.

LEGEND

AIRPORT PROPERTY LINE

APPROX. FENCE LINE

ON-AIRPORT BUSINESS

WATSONVILLE MUNICIPAL AIRPORT
Serving the City, County and Country Since 1947!

SCALE: 1"= 200'

DATE: 1/19/2023

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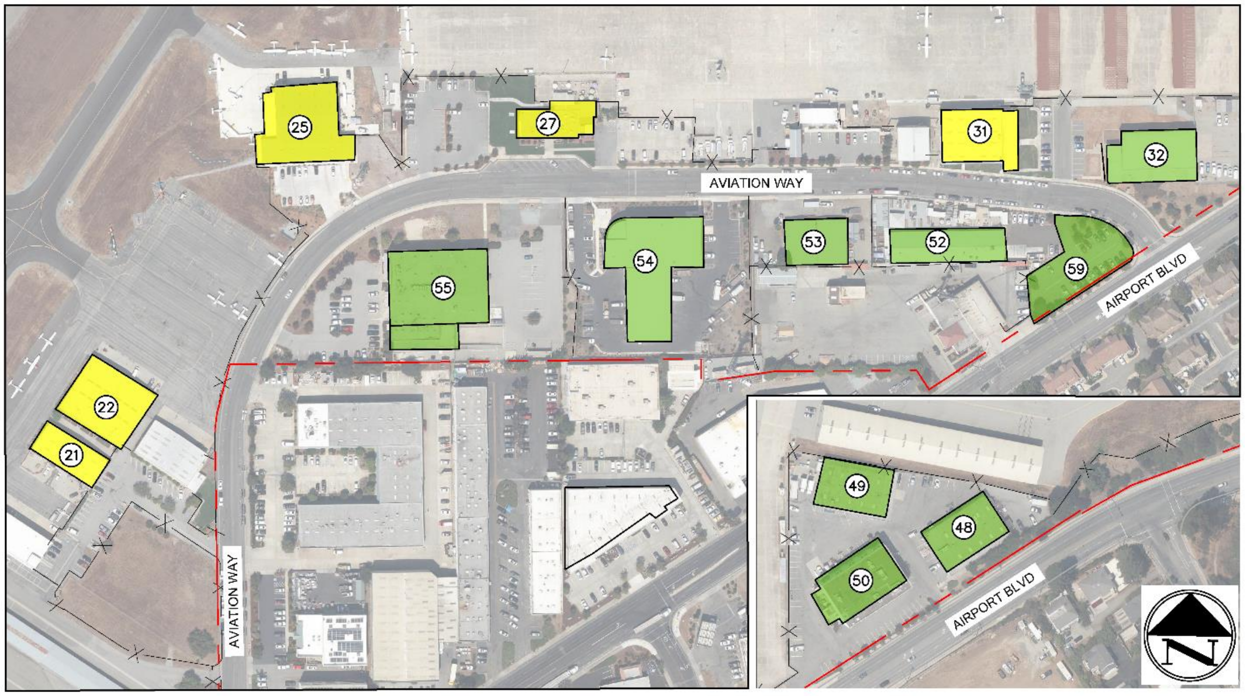
Figure 1-7: Locations of Non-Aeronautical Businesses – Terminal Area



LEGEND

AIRPORT PROPERTY LINE	ON–AIRPORT BUSINESS
APPROX. FENCE LINE	OFF–AIRPORT BUSINESS

NON-AERONAUTICAL BUSINESS TENANTS

Location	Business Name	Services Provided
21	Pacific Ag Pak	Agricultural Packing
22	Sundance Berries	Produce & Farming
25	Seabright Mortgage	Mortgage Services
27	Ella's–at–the–Airport	Restaurant
31	Hertz Rental Car	Rental Car Service
32	California Conservation Corps	Government
48	Pied Piper	Pest Control
	Precision Dynamics	Industrial & Commercial Machining
49	Mid Valley Supply	Janitorial, Paper, and Office Supplies
50	Bill Knowlton Construction	General Contractor
	Sage Instruments	Telecom & Signal Processing

Location	Business Name	Services Provided
52	Beer Mule Bottle	Bar & Restaurant
	Mr. Z's Crepes & Teas	Cafe
	Zameen At the Hangar	Restaurant
	EKB Partners	Property Manager of Bldgs
53	Tin Can Alley	Car Dealership
54	Watsonville Diesel	Diesel Engine Services
55	American Hat Makers – Head'n Home	Hat Production & Retail
	Expo Imaging	Aftermarket Professional Photography
	CA Department of General Services	Government
59	CA Conservation Corps Parking Lot	Parking Lot

NOTE: AERONAUTICAL BUSINESSES ARE ILLUSTRATED IN A SEPARATE FIGURE.

SCALE: 1"= 250'
DATE: 1/18/2023

Kimley»Horn

Figure 1-8: Locations of Non-Aeronautical Businesses

LEGEND

- CITY LIMITS
- AIRPORT PROPERTY LINE
- APPROX. FENCE LINE
- ON–AIRPORT BUSINESS
- OFF–AIRPORT BUSINESS

NON-AERONAUTICAL BUSINESS TENANTS

Location	Business Name	Services Provided
41	Police Firing Range	Public Safety & Training Facility
56	Santa Cruz County Animal Shelter	Animal Shelter
57	Pacific Golf Center	Golf Practice Facility
58	C&M Farms	Grocers

NOTE: AERONAUTICAL BUSINESSES ARE ILLUSTRATED IN A SEPARATE FIGURE.

SCALE: 1"= 500'
DATE: 1/18/2023

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1.9 Airspace

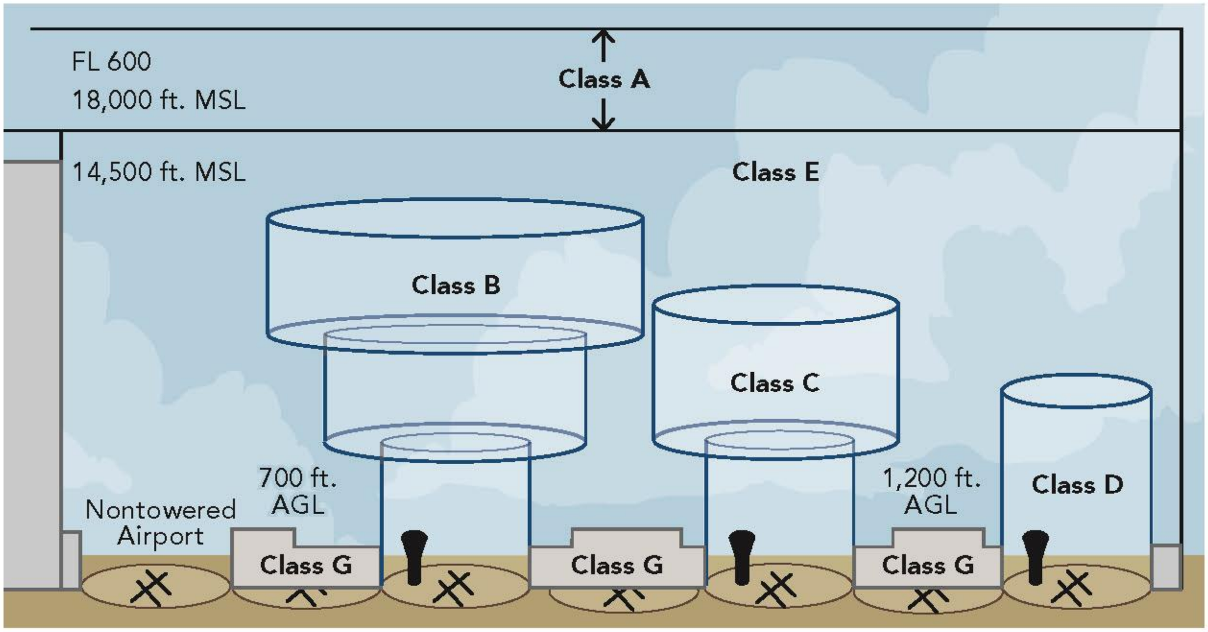
Airspace in the U.S. is classified generally as controlled, uncontrolled, or special use. Controlled airspace encompasses those areas where there are specific certification, communication, and navigation equipment requirements that pilots and aircraft must meet to operate in that airspace.

Local Airspace

Through Federal Aviation Regulations (FARs), airspace classifications have been developed to promote the safe and efficient movement and control of aircraft during flight and approach/departure procedures. Airspace classifications are identified on sectional aeronautical charts published by the FAA's National Aeronautical Charting Office.

As the summary descriptions of airspace classifications indicate and **Figure 1-9** and **Figure 1-10** show, different classes of airspace have different characteristics, dimensions, altitudes, and requirements based on the types of activity that they are intended to support. Existing airspace classifications in the vicinity of WVI and those that could have the potential to impact aircraft operations at the Airport have been identified. Any potential impacts that these airspace classifications and areas may have on the Airport will be examined prior to identifying the recommended development plan for the Airport. As a non-towered airport, the airspace above WVI is Class G (uncontrolled) from the surface up to but not including 700 feet above ground level (AGL). Class E controlled airspace begins above at 700 feet AGL. These classifications are further discussed below.

Figure 1-9: Airspace Classifications



FL – Flight Level, MSL – Mean Sea Level, AGL – Above Ground Level

Source: FAA Aeronautical Information Manual

FAR Part 71 and FAR Part 73 establish classifications of airspace with the following characteristics:

Class A Airspace – Class A airspace is not shown on aeronautical charts. It begins at 18,000 feet above mean sea level (MSL) and extends to higher altitudes. Only pilots flying IFR can enter this airspace and prior permission is required. Class A airspace does not significantly impact the operation of WVI.

Class B Airspace – Class B airspace is found around major airports. Pilots must get permission to enter this airspace from the controlling agency, typically the Terminal Radar Approach Control (TRACON) facility associated with the airport and region as well as have a two-way radio and transponder with altitude reporting capability. The closest Class B airspace near WVI is surrounding SFO, approximately 50NM to the northwest. The Class B airspace comes as close as 12 NM to the northeast of WVI over the Santa Cruz Mountains at a bottom elevation of 6,000 and 8,000 MSL.

Class C Airspace – Class C airspace is the airspace from the surface to 4,000 feet above the airport elevation. Although the configuration of each Class C airspace area is individually tailored, the airspace usually consists of a surface area with a five-mile radius, and an outer circle with a 10-mile radius that extends from 1,200 feet to 4,000 feet above the airport elevation. An aircraft must establish two-way radio communication with the controlling agency providing air traffic services prior to entering the airspace and thereafter maintain those communications while within the airspace. Visual Flight Rule (VFR) aircraft are only separated from Instrument Flight Rule (IFR) aircraft within the airspace. There are two airports with Class C airspace located near WVI: SJC, approximately 25 NM to the north and MRY, approximately 21 NM to the south.

Class D Airspace – Class D airspace exists at any airport with an operating air traffic control tower where Class B or Class C airspace does not exist. Class D airspace typically extends 5 miles from the airport to an altitude of 2,500 feet AGL. Pilots must establish two-way radio communication with the controlling agency, usually the air traffic control tower, before entering this classification of airspace. The closest airport with Class D airspace is SNS, approximately 18 NM to the southeast of WVI.

Class E Airspace (with floor 700 feet above surface) – Class E airspace typically surrounds airports having instrument approaches and encompasses portions of the instrument approach paths. The flight requirements within Class E airspace result in increased aircraft separation requirements thereby promoting safety and minimizing potential incidents between IFR and VFR aircraft in this airspace. The airspace above WVI is classified as Class E and joins with airspace surrounding SNS, MRY, CVH, and OAR. WVI is also adjacent to Class E space around E16 and a private facility.

Class G Airspace – Class G airspace is referred to as uncontrolled airspace and is not depicted on aeronautical charts. This classification of airspace comprises all airspace not identified as another class. IFR flights may originate or terminate in the Airport's Class G airspace, but typically IFR flights do not operate enroute in Class G airspace, as no Air Traffic Control (ATC) services are provided. VFR flights are permitted as long as visibility and cloud clearance minimums are met. Class G airspace at WVI begins at the surface and extends to 700 feet AGL.

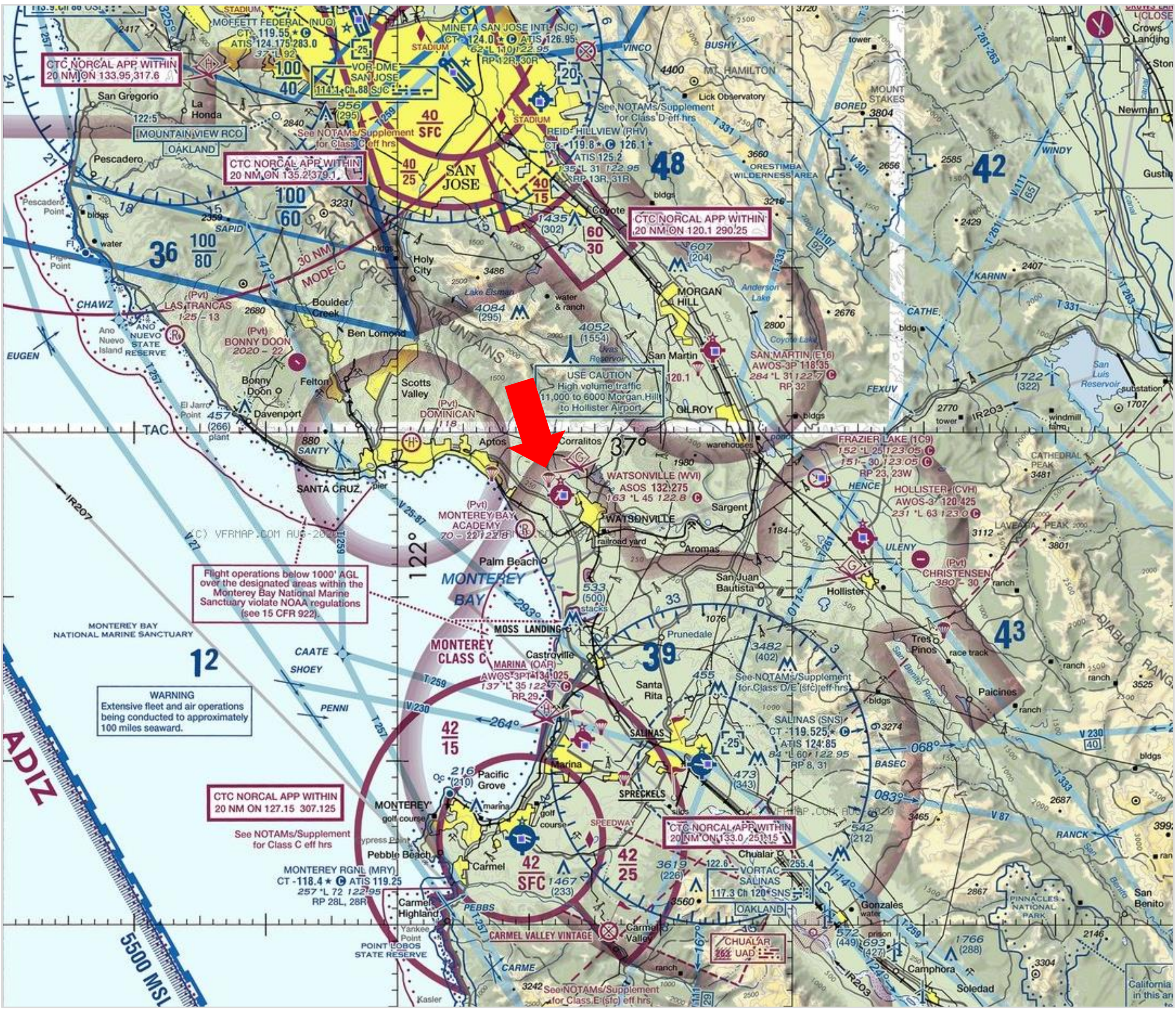
Restricted Areas – Restricted areas contain airspace identified by an area on the surface of the earth within which the flight of aircraft, while not wholly prohibited, is subject to restrictions. Restricted areas denote the existence of unusual, often invisible, hazards to aircraft; examples include artillery firing, aerial gunnery, or guided missiles. Penetration of restricted areas without authorization from the using or controlling agency may be extremely hazardous to the aircraft and its occupants. The closest restricted areas near WVI are R-2531, approximately 40 NM north near Tracey, and R-2513 and R-2504 A&B, approximately 50 NM to the south in the Santa Lucia Mountain Range for Fort Hunter-Liggett.

Prohibited Areas – Prohibited areas contain airspace within which the flight of unauthorized aircraft is prohibited. Such areas are established for security or other reasons associated with the national welfare. Prohibited areas are published in the National Register and are depicted on aeronautical charts. There are no areas of prohibited airspace proximate to WVI.

Alert and Military Operation Areas – Alert areas are depicted on aeronautical charts to inform nonparticipating pilots of areas that may contain a high volume of pilot training or an unusual type of aerial activity. Pilots should be particularly alert when flying in these areas. All activity within an alert area shall be conducted in accordance with the Code of Federal Regulations (CFRs), without waiver, and pilots of participating aircraft as well as pilots transiting the areas shall be equally responsible for collision avoidance. Military operation areas (MOAs) consist of airspace of defined vertical and lateral limits established for the purpose of separating certain military training activities from IFR traffic. Whenever a MOA is being used, nonparticipating IFR traffic may be cleared through the MOA if IFR separation can be provided by air traffic control. Otherwise, air traffic control will reroute or restrict nonparticipating IFR traffic. Pilots operating under VFR should exercise caution while flying within a MOA when military activity is being conducted. The closest alert areas near WVI are a series of five Hunter Low & High MOA areas and Roberts MOA approximately 50 NM to the south in the Santa Lucia Mountain Range for Fort Hunter-Liggett.

Special Areas – As WVI is located along the western coast of California, adjacent to the Pacific Ocean, there is the additional restriction in place on flight operations below 1,000 feet AGL over the designated areas within the Monterey Bay National Marine Sanctuary. Flights below 1,000 feet violate National Oceanic and Atmospheric Administration's (NOAA) regulations, 15 Code of Federal Regulations (CFR) 922.

Figure 1-10: Airspace Surrounding Watsonville Airport



Source: FAA Aeronautical Charts, August 13, 2020

Approach and Departure Procedures

An instrument approach procedure (IAP) is defined as a series of predetermined maneuvers that guide an aircraft from the beginning of the initial approach to a landing, or a point from which a landing may be made visually. IAPs are especially important during IMC. IAPs rely on NAVAID equipment to provide the necessary guidance to pilots in flight. The current IAPs, special alternative minimums, departure procedures, and special take-off minimums are available in **Appendix A**.

IAPs are classified as precision approaches (PA), approaches with vertical guidance (APV), or non-precision approaches (NPA) based on the guidance provided to pilots. PAs are procedures that provide both vertical guidance, typically via a glide slope, and horizontal guidance, typically with a localizer, to aircraft. APV procedures provide vertical guidance utilizing navigational systems that are not required to meet the precision approach standards of International Civil Aviation Organization (ICAO) Annex 10, but still provides both course and glidepath deviation information. NPA procedures and equipment provide only horizontal guidance to pilots. Instrument approach equipment and available non-precision approaches at WVI are summarized in **Table 1-13.** The ability of these approach procedures to safely and efficiently accommodate current and future activity levels at the Airport is determined in a subsequent task in the master planning process.

Localizer (LOC) – A ground-based non-precision instrument approach system that uses radio signals and lighting to provide pilots with lateral guidance on their approach. The LOC approach into WVI has aircraft arrive from the southwest (198-degree heading), over the Monterey Bay, utilizing the VOR from SNS as the initial approach fix.

Very-High Frequency Omnidirectional Radio (VOR) – A non-precision instrument approach that utilizes a radio signal from an on or off airport facility to aid in an instrument approach. The circling VOR approach into WVI has the aircraft arrive from the southeast (134-degree heading) towards the center of the airfield between Runways 02 and 27.

Area Navigation with Global Positioning System (GPS/RNAV) – A non-precision instrument approach type utilizing radio signals from Area Navigation equipment and/or radio signals from a network of navigational satellites. The RNAV approach into WVI has aircraft arrive from the southeast over the Monterey Bay. Based on the instruments within the aircraft, pilots have the ability to utilize vertical guidance similar to a glide slope but is not considered a precision approach. This is known as localizer performance with vertical guidance (LPV). Lateral navigation (LNAV)/vertical navigation (VNAV) and LNAV approaches also have both lateral and vertical guidance, but higher minimums than LPV approaches. Additionally, an LNAV approach is based on the Minimum Descent Altitude (MDA), which represents the lowest altitude to which a pilot may descend on a specific approach segment. The others are based on Decision Altitude (DA)[11], at which the pilot must have visual contact with the runway, runway environments, or lights to continue to land.

Table 1-13 also displays the special alternate minimums. Federal Aviation Regulation (FAR) 91.169 states that IFR flight plans must include an alternate airport unless the weather is at least 2,000-foot ceiling and 3 miles visibility from one hour before to one hour after the planned landing time. The standard alternative minimums for non-precision instrument approaches are 800-foot ceiling and 2 statute miles (SM) visibility. Based on the specific airport conditions, a higher than standard minimum can be set for the individual approaches based on the category of aircraft flying the approach. If the alternative airport's weather does not meet the special alternative minimums it cannot be listed on the IFR flight plan as the pilot's alternate airport.

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[11] Decision Altitude (DA) is measured in Mean Sea Level and Decision Height (DH) in Above Ground Level.

Table 1-13: Instrument Approaches

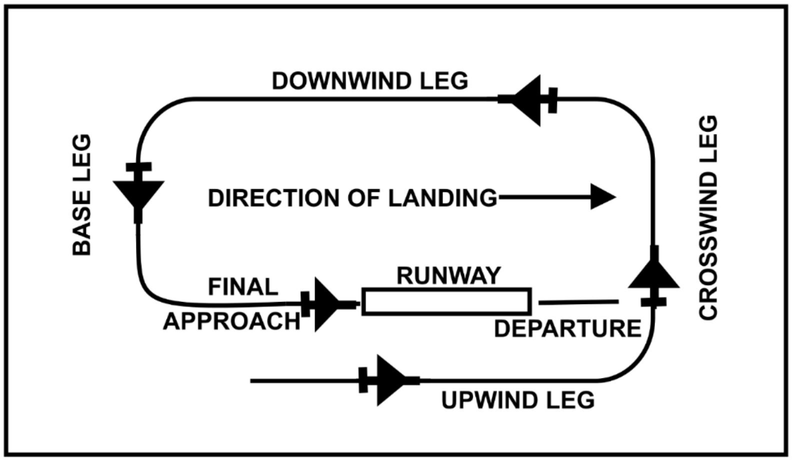
Runway End	Approach Type	Minimum Decision Altitude (MSL)	Site Distance (SM)	Special Alternate Minimums
Other (Circling)	VOR-A	1,300	1 ¼ miles	Not Authorized when local weather is not available; Categories A, B, 1200-2; Categories C, D 1200-3
02	LOC	700	1 mile	-
02	GPS/RNAV			Category D, 1000-3
	LPV	448	7/8 mile	
	LNAV/VNAV	772	1 ¾ mile	
	LNAV	700	1 mile	
Source: FAA 5010 Airport Master Record, 2020				

There are several obstacles that need to be avoided within the vicinity of WVI including poles, trees, buildings, fences, vehicles on roads, transmission lines, and towers. As such, Takeoff Minimums and (Obstacle) Departure Procedures have been developed for WVI. The GARLK ONE departure procedure is available for WVI, which allows aircraft departing Runway 20 and 02 to head southwest over the Monterey Bay to the GARLK waypoint. The Watsonville Four Departure provides routes from Runways 09 and 20 towards the SNS VOR that help pilots avoid obstacles in the area.

Traffic Patterns

The traffic pattern at an airport is the standard path followed by an aircraft when taking off or landing that improves safety by providing a method to coordinate traffic amongst multiple aircraft utilizing the same runway, whether the airport has an Air Traffic Control Tower (ATCT) or not. At WVI, the traffic patterns for both runways are left hand, consist of left turns, with a 1,200’ MSL (1,000’ AGL) Traffic Pattern Altitude (TPA).

Figure 1-11: WVI Standard Left-hand Traffic Pattern



Source: FAA Aeronautical Information Manual

Noise Abatement

As WVI is surrounded by noise sensitive areas, voluntary noise abatement procedures have been established. Airport management has partnered with Whisper Track[12] to provide a clear list of procedures in a database that is regularly used by pilots. Airport management is forthcoming that safety supersedes noise abatement procedures and that air traffic control instructions and other safety considerations caused by weather or emergencies should be complied with. It is understood that at the time of writing this MPU that departures are not allowed from Runway 27 due to airfield obstructions. The noise abatement procedures for Runway 27 are still included in this section as landings are currently permitted and it is intended for Runway 27 to be fully operational in the future.

While Runway 20 is identified as the preferred calm wind runway, during the late Spring and throughout the Summer, the coastal stratus may preclude the safe use of Runway 20. Under these conditions, pilots should consider a righthand pattern for Runway 27 to avoid the coastal stratus.

In general, Airport management has requested that overflights of the High School to the south of the Airport should be avoided.

For all runways, pilots are asked to keep the engine revolutions per minute (RPM) and power settings as low as possible during arrivals and the downwind leg of the traffic pattern.

For departures on all runways, there should be no turns below 900 feet MSL and full power climbouts should be avoided on downwind departures over congested areas. When Runway 27 is operational, pilots should climb to the TPA prior to turning. For Runway 20, there should be no turns prior to the freeway.

For flight training maneuvers, pilots are requested to be at the TPA over the freeway on the downwind leg of Runway 20 and not to use Runway 9-27 for touch-and-go’s.

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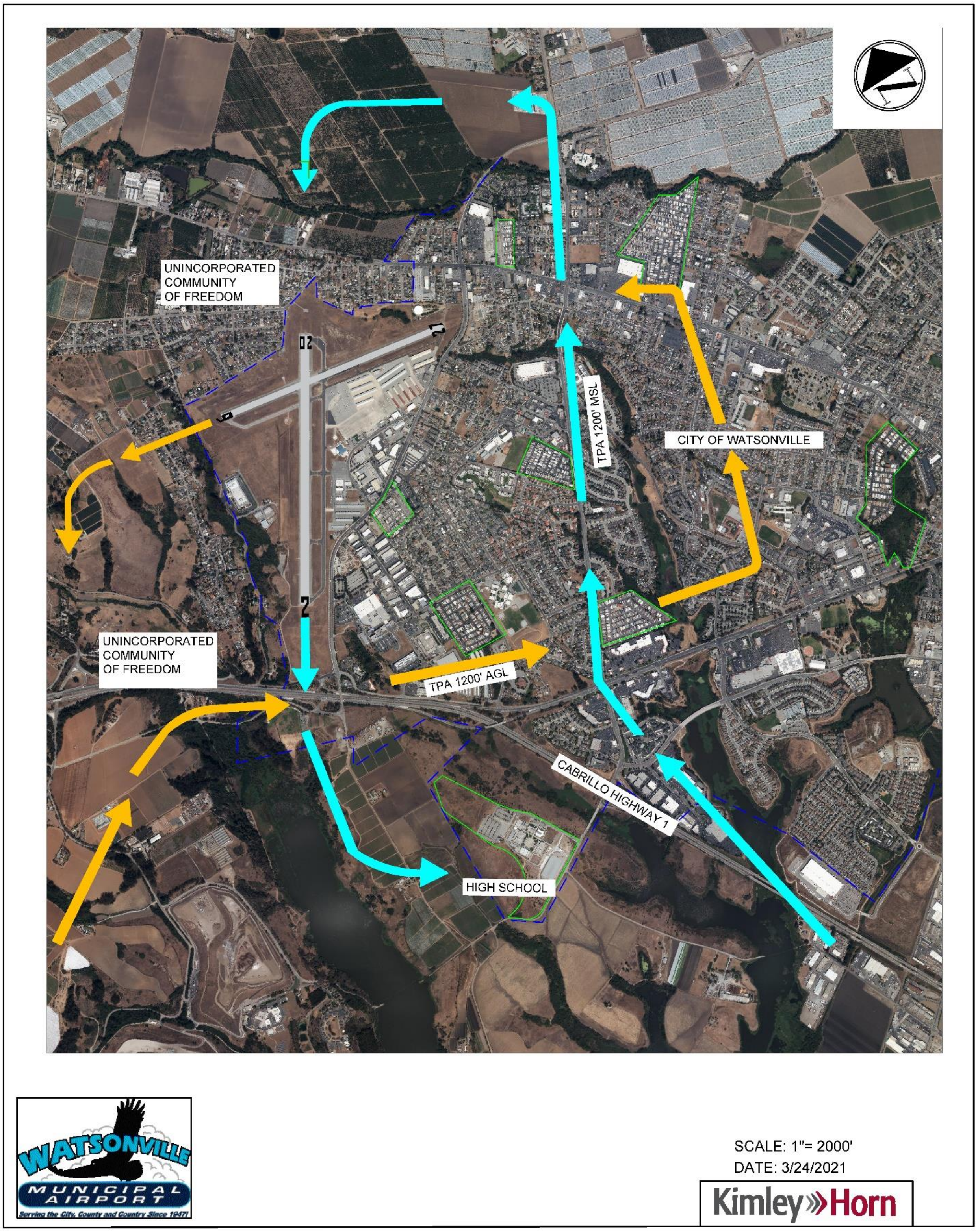
[12] https://whispertrack.com/airports/KWVI (Accessed September 2020)

Figure 1-12: Noise Abatement Procedures



1.10 Current Aviation Activity

Determining the current levels of aviation activity is an essential component of the master planning process. Airport activity is measured by number and type of annual operations and based aircraft. This data is helpful for assessing how the Airport's existing capacity and conditions are support current activity levels. Moreover, understanding a baseline for current aviation activity is helpful during forecasting efforts.

Operations

Aircraft operations are counted by either a take-off or landing conducted by an aircraft. Therefore, a touch-and-go, which includes a take-off and landing, counts as two operations. Only airports with an ATCT that is open 24 hours a day can determine an accurate count of operations because all operations are monitored. Non-towered airports estimate their operations since they are typically not consistently monitored, and as such these estimations may not always reflect the actual total number of annual operations that occur.

As a non-towered airport, WVI has relied on various methods of counting operations. From 2013 to 2017, WVI utilized the service of AAP, Inc. AAP developed an aircraft activity counter using an infrared camera system designed for capturing images of aircraft operations. The system consists of a remote unit located at each runway end. Every time an aircraft departs or lands, the system takes a picture and automatically stores it on a SD card for later upload to a database. At the end of the observation period, the airport operations are tallied and organized into categories such as the number of engines, type of aircraft (piston, turbine, jet, or helicopter), and the time of day. **Figure 1-13** displays the annual operations from 2013 to 2017 from AAP, Inc., which range from a low of 38,776 (as result of unusually heavy rainy season and runway pavement rehabilitation) to a high of 61,434 (as a result of substantial traffic increase leading up to and immediately after the National Football League's Super Bowl 50 held in Santa Clara California. WVI was designated one of a few "satellites" airports requested by the NFL). The average operations within this time period are approximately 53,500.

In late 2019, WVI began utilizing equipment from Maritime Information Systems (MIS) to track the activity in the vicinity of the airfield through Automatic Dependent Surveillance-Broadcast (ADS-B) technology. MIS offers a cloud-based subscription which leverages the nationwide ADS-B infrastructure to compile data in a customized dashboard. ADS-B is a newer technology for the aviation industry that provides real-time location of aircraft. As of January 1, 2020, all aircraft were required to be equipped with ADS-B equipment if flying within airspace as defined in 14 CFR 91.225, which includes Class A, B, and C, as well as certain areas of Class E and G.[13] As of October 1, 2020, it is estimated that approximately 40 percent of aircraft registered in California are equipped. In addition to unequipped aircraft, there are times where the evolving technology does not always capture every flight. While this database is robust, not every operation is being counted to rely on the results for a complete picture of the Airport's operations.

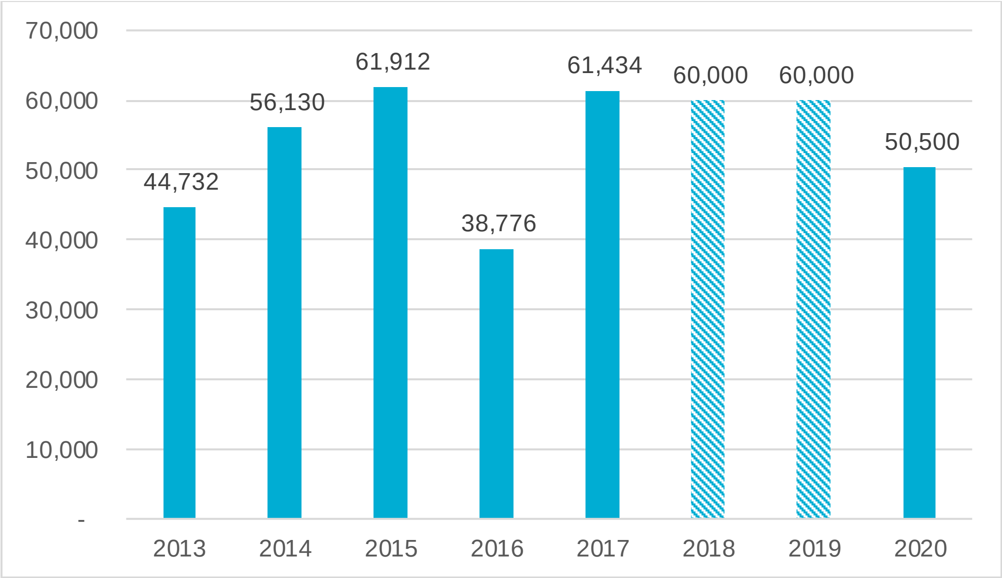
Figure 1-13 displays the annual operations from 2013 to 2020 based on the AAP and MIS data. 2018 and 2019 are estimated as there is no accurate information recorded for this year as ADS-B was not yet an FAA requirement for aircraft. This estimate is based on the growth from 2013 to 2017 and general understanding of the high level of traffic experienced by GA nationwide. 2020 is based on a review of the MIS data along with considerations of the extraordinary events of 2020. There were approximately 44,000 operations from January to November 2020. December is estimated to be approximately 4,000 operations, for a total of 48,000 operations. Additional factors must be considered to estimate the total annual operations for 2020 beyond just the ADS-B data.

There are two main events that impacted the total number of operations at WVI in 2020: the COVID-19 pandemic and the CZU Lightning Complex Fire. A case can be made that if these extraordinary events did not take place, the annual operations

[13] ADS-B equipment is required to be used in Class E airspace above 10,000' MSL and in Class E and G airspace within the Mode C veil that extends from the surface to 10,000' MSL within 30 NM from Class B airports.

in 2020 would have been higher. It can be reasonably concluded that an additional 2,500 operations would have been conducted, resulting in a 2020 total annual operations estimate of 50,500. These events are described below.

Figure 1-13: Annual Operations from 2013 to 2020



Sources: 2013-2017 AAP Inc., 2018 and 2019 Estimated, 2020 MIS

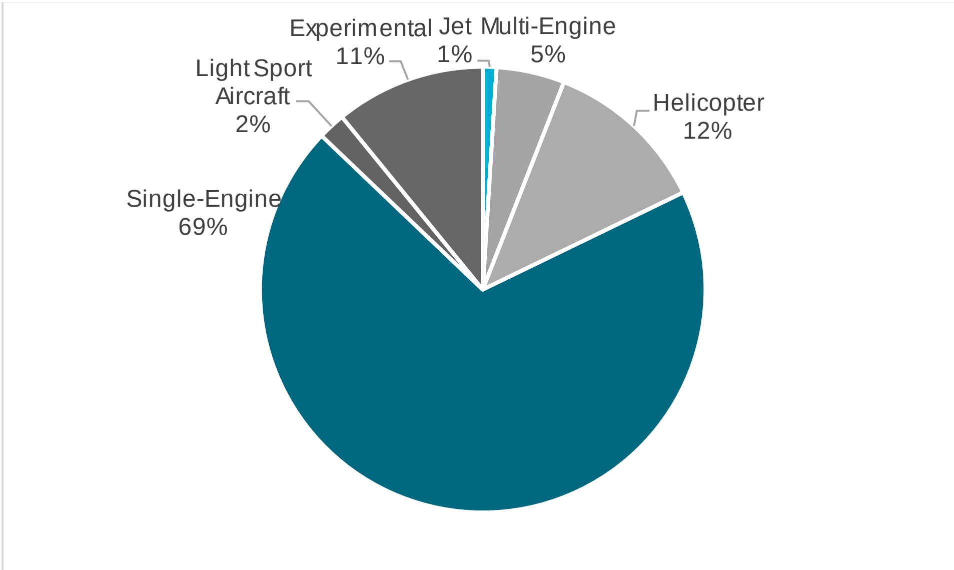
COVID-19: Just prior to the start of this study, the global COVID-19 pandemic began in March 2020. In May 2020, U.S. passenger travel was down 95 percent compared to the prior year for the months of March and April. Globally, the number of scheduled flights was down 70 percent compared to the same week in May of last year. While GA activity has not been as impacted as commercial flights throughout the pandemic, there was a noticeable difference in the early months. WVI operations dropped by over 1,000 from February to March, but then began climbing again starting in April, just one month after COVID shutdowns began. While COVID will have lasting impacts to commercial service and GA, the operations at WVI since March demonstrate a promising recovery for WVI post-COVID. This minimal impact is reflected at WVI by the fact that only a few thousand less operations were recorded in 2020 than the five-year average from 2014-2018. For the purposes of this MPU, a conservative estimate is that COVID reduced operations by approximately 1,400 operations for 2020.

CalFire Operating in Santa Cruz Mountains

CZU Lightning Complex Fire: The 2020 fire season also had an impact on operations due to heavy smoke and temporary flight restrictions (TFR) at WVI. As of December 14, 2020, CalFire estimated that 4.18 million acres in California burned across 9,639 incidents in 2020. In August 2020, WVI activated its Emergency Aerial Support Action Plan (E-ASAP) to support CalFire efforts in combating the CZU Lightning Complex Fire that ravaged the nearby Santa Cruz Mountain range. The CZU Lightning Complex Fire, which was started by a lightning storm on August 16th, burned more than 86,000 acres and took almost six weeks to extinguish. WVI housed seven helicopters with their support personnel and equipment including mobile fuelers and support vehicles. During this time, Runway 9-27 was closed to support the activity while the remainder of the airfield was open. The impact of annual fire season can be seen starting in July, with the lowest point in August during the CZU Lightning Complex Fire. The ADS-B database displayed a sharp decline of weekly operations from the first half of August to the second half of August – almost 600 operations per week to less than 200. While forest fires are anticipated to take place annually, the proximity of fires, thus the impact to WVI in 2020, would be considered extraordinary. For the purposes of this MPU, it is estimated that 900 operations were not conducted due to the CZU Lightning Complex fire and associated hazardous conditions.

Figure 1-14 displays the percent of operations in 2020 by aircraft type according to MIS data. Additional information on operations will be provided in subsequent chapters of this MPU.

Figure 1-14: 2020 Operations by Aircraft Type 2020

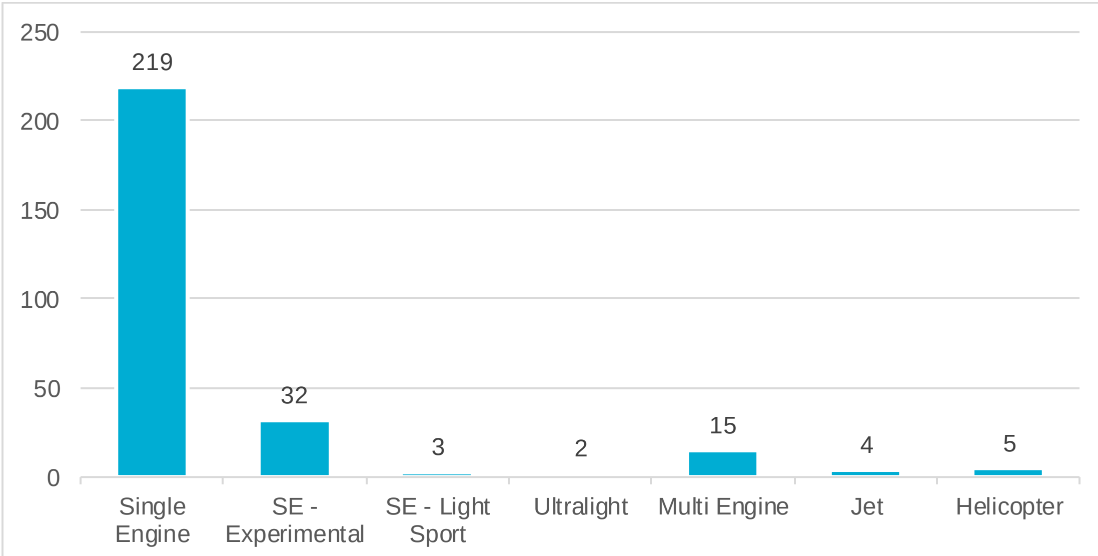


Source: 2020 MIS Database (January-November)

Based Aircraft

A based aircraft is generally defined as an aircraft that is stored at an airport for much of the year. An accurate based aircraft recording can provide insight to the adequacy of aircraft storage and facility capacity at an airport. The number of based aircraft at any given facility is subject to fluctuations as aircraft owners may choose to move their aircraft, buy or sell, and other factors. The number of based aircraft can be recorded by multiple sources; however, the FAA's National Based Aircraft Inventory Program is often the most commonly used source for based aircraft data. The FAA gathers and maintains this data because of its aircraft registration program and makes the data available via BasedAircraft.com. According to BasedAircraft.com there are 280 validated based aircraft at the Airport. The number excludes duplicates and aircraft not recorded in FAA Aircraft Registration Data. As shown in **Figure 1-15**, the majority of aircraft registered at the Airport are single engine, amounting to 256 aircraft, or 91 percent of the fleet mix. Of the 256 single engine aircraft, 32 of them are experimental aircraft, three light sport aircraft and two ultralight aircraft, meaning there are 219 standard single-engine, based aircraft. The remaining nine percent of the fleet is made up of 15 multi-engine aircraft, four jet aircraft, and five helicopters. A breakdown of the current activity by specific aircraft type is provided in later chapters of this study.

Figure 1-15: 2020 Based Aircraft Fleet Mix



Source: FAA National Based Aircraft Registry (BasedAircraft.com), January 2021

The owners of the aircraft based at WVI include private, recreational pilots, small aviation-related business owners, local agricultural companies, governmental agencies, and large corporations. The images below are representative of aircraft based at WVI.

PAC 750XL

Beechcraft Bonanza

Cessna Citation CJ2

Robinson 44

1.11 Environmental Overview

Due to the FAA's participation in airport planning and development projects, airport owners are obligated to incorporate the evaluation of environmental concerns affecting both the human and natural environments into their development programs. An environmental and land use inventory has been undertaken relative to WVI in concert with FAA AC 150/5070-6B, Airport Master Plans. The information was gathered through desktop review of existing environmental documents, agency databases, and previous studies. The overview also considers the enabling legislation, the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

Struve Slough

The overview examines the local land use and environmental conditions to identify the applicable jurisdictional authorities and recognize environmental factors that could potentially be affected by future airport development. It is intended that the information is used to help guide and evaluate future facility development concepts. **Appendix B** provides more detailed information on the topics listed below.

- Land Use and Zoning
- Wildlife Hazard Attractants
- Water Resources
- Section 4(f) and 6(f) Resources
- Air Quality
- Biotic Resources and Endangered Species
- Coastal Resources
- Farmlands
- Hazardous Materials
- Underground Storage Tanks
- Historic and Cultural Resources

Santa Cruz Tarplant

The potential impact to any identified environmental considerations will be evaluated, along with development of a strategy for environmental clearance, subsequently in this MPU.

2 Aviation Forecasts

Projections of future aviation activity at an airport provide the foundation for effective decision-making in airport planning and development. Such forecasts are used to determine the type, size, and timing of new or expanded airport facilities to meet anticipated user demands and needs. They are also used to help justify the financial investment in those improvements.

This chapter presents forecasts of aviation activity at Watsonville Municipal Airport (WVI or Airport) for a 20-year planning horizon, with 2020 as the base year and 2040 as the outmost forecast year[1]. These forecasts are unconstrained, implying that it is assumed that requisite facilities will be developed to accommodate all aviation activity demand over the forecast period. Specific facility needs resulting from these forecasts are presented in later chapters of this Master Plan Update.

This forecasting effort identifies aviation demand that is anticipated to occur over a 20-year planning period using acceptable forecasting analysis techniques consistent with FAA guidance including *Forecasting Aviation Activity by Airport* (July 2001) and *Guidance on Review and Approval of Local Aviation Forecasts* (June 2008). The techniques or methods used to forecast demand consider a variety of factors that are aviation and non-aviation related. Specifically, as a result of changes that have occurred in the aviation industry in recent years, both on a broad national level and in the region, there is a need to review and consider the influences that these factors have played in the California general aviation (GA) market and individually at WVI.

Included in this chapter are overviews of historical aviation activity, assumptions used in forecast analyses, and methodologies implemented to project future demand at the Airport. Data were collected from various FAA and other sources, including the Airport's counting system and Automated Dependent Surveillance – Broadcast (ADS-B) database, FAA Terminal Area Forecast (TAF) records, the FAA Traffic Flow Management System Counts (TFMSC) database, the FAA Form 5010-1 Airport Master Record (5010 Airport Master Record), and the FAA National Based Aircraft Inventory Program. Additionally, socioeconomic data for the Santa Cruz-Watsonville Metropolitan Statistical Area (MSA) and the State of California were evaluated for conditions and trends that may impact demand at the Airport.

Forecasts of aviation-related demand are presented in the following sections:

- Trends and Factors Impacting Aviation Demand
- Historic Aviation Activity and Previous Forecasts
- Forecast Methodologies
- Based Aircraft Forecasts
- Aircraft Operations Forecasts
- Forecasts of Operations by Type
- Peaking Characteristics
- Recommended Forecast Summary
- FAA Forecast Review and Approval
- Critical Aircraft

[1] The MPU effort began in 2020, with the forecast approval given in 2021. The MPU was finalized and published in 2023.

2.1 Trends and Factors Impacting Aviation Demand

During the development of an airport's forecasts, recent and anticipated trends in the aviation industry must be analyzed to develop a general understanding of what factors may influence future airport activity. These trends exist at local, regional, and national levels and impact aviation activity at individual airports including WVI. An understanding of these factors provides direction and insight to the forecast methodology outcomes, and aids in the selection of a preferred forecast. Since activity at WVI is associated with general aviation (also referred to as GA), this section focuses on past and anticipated trends in the GA industry. Additionally, the emergence of the novel coronavirus (COVID-19) pandemic in March 2020 has significantly affected the global economy and the aviation industry, at least temporarily. The potential impact of COVID-19 on future aviation activity is also examined to provide context to the Airport's activity forecast methodology and results.

2.1.1 Impacts of COVID-19

In December 2019, a new strain of coronavirus (COVID-19) emerged in Wuhan, China. The virus was first reported in the U.S. in late January 2020 and began to spread rapidly in early March, leading the World Health Organization (WHO) to declare the outbreak a global pandemic on March 11, 2020. In response, many world governments, including the U.S., issued travel restrictions between countries in an effort to slow the spread of the virus. In the following weeks, California joined 44 other states by enacting a Stay Home order that required residents and travelers to remain in their home except to do essential shopping, seek medical attention, or go to a job that was deemed essential. The Stay Home order and subsequent public heath orders have been both loosened and tightened in terms of restrictions in certain areas of the state depending on infection rates and, as of February 2021, all of Santa Cruz County and the Bay Area remained under a regional stay-at-home mandate. These orders have impacted many of the businesses at WVI, but aviation, including flight training and support activities, was declared an essential industry, reducing the overall impact to WVI's operations. As of February 24, 2021, there have been more than 3.5 million COVID-19 cases reported in California as well as almost 50,000 COVID-19 related deaths. Worldwide, reported COVID-19 cases have exceeded 112 million along with 2.5 million COVID-19-related deaths.[2]

The travel restrictions stemming from the COVID-19 pandemic dramatically affected the global aviation industry, at least in the near-term. Commercial aviation has been the most impacted as global passenger traffic decreased by an estimated 2.85 billion passengers in 2020 compared to the previous year.[3] GA activities have been less impacted, but there have still been widespread declines in GA traffic and fuel sales across the country, mostly in terms of business and/or corporate GA flying. Most states declared aviation an essential service, which allowed pilots to maintain flight proficiency during the pandemic. The General Aviation Manufacturing Association (GAMA) reported that air traffic declined the furthest in early April 2020, as national piston air traffic was down by 49 percent, turboprop air traffic was down by 50 percent, and business jet traffic was down 78 percent.[4] Traffic rebounded in the early summer, and by the end of June 2020 piston traffic exceeded levels seen in the weeks before the pandemic. Air traffic at WVI largely followed national trends, as traffic levels dipped to the lowest point in the last week of March 2020 before recovering to the same levels seen prior to the start of the pandemic by the late spring. However, traffic levels at WVI decreased less than the national average, as monthly operations in March and April 2020 still exceeded 65 percent of average monthly operational counts from the two months preceding the pandemic. By May 2021 monthly air traffic had exceeded traffic levels from January and February 2020.

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[2] Johns Hopkins University. (January 2021). "COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)." Available online at https://www.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6. (Accessed January 2021).

[3] International Civil Aviation Organization (ICAO). (January 2021). "Effects of Novel Coronavirus (COVID-19) on Civil Aviation: Economic Impact Analysis". Available online at: https://www.icao.int/sustainability/Documents/COVID-19/ICAO_Coronavirus_Econ_Impact.pdf. (January 2021)

[4] Croft, J. & Duquette, A. (September 2020). "General Aviation and COVID-19" (Episode 3) [Audio podcast episode]. In *The Air Up There* Podcast. FAA. Available online at: https://www.faa.gov/podcasts/the_air_up_there/?file=2020-09-04-003.mp3&permalink. (Accessed January 2021).

The FAA and Congress have taken several actions to reduce the pandemic's impacts on airports and aviation users. On March 27, 2020, the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) was passed to provide financial relief to businesses and people impacted by the pandemic, including $10 billion in funds allotted to the FAA to distribute to eligible airports. Funding amounts allotted to GA airports were determined using the FAA's National Plan of Integrated Airport Systems (NPIAS) classifications, and, as a Regional airport, WVI was eligible to receive $69,000 in funding.[5] CARES Act funds are available to cover operating expenses and debt service payments related to the Airport. WVI received additional assistance from the Airport Coronavirus Response Grant Program (ACRGP), which was funded through the Coronavirus Response and Relief Supplemental Appropriations Act (CRRSAA). The CRRSAA was passed into law on December 27, 2020 and allocated nearly $2 billion in funds for eligible airports. WVI was allocated $23,000 in funds available for similar uses as CARES Act funds. WVI also received $59,000 from the American Rescue Plan Act (ARPA) of 2021, which was signed into law on March 11, 2021 and allocated $8 billion to airports. In mid-December 2021, the Bipartisan Infrastructure Law's (BIL) Fiscal Year (FY) 2022 allocations to individual airports were announced. WVI was noted to receive $295,000 in FY 2022, which is anticipated to be the same amount for the five years of BIL.

Although WVI and the GA segment have been less impacted than many other parts of the aviation industry, it will still take time for the entire GA industry to return to normal, pre-pandemic operational levels. Several forecasts have been developed since the onset of the pandemic projecting the outlook of commercial aviation activities in the near future, and most generally agree that the global commercial aviation industry will take 5-6 years to return to pre-pandemic traffic levels. Business aviation has already shown indications that it is recovering more quickly than commercial service, as North American business aviation activities in September 2020 were only down 17 percent from the year prior.[6] Teal Group Corporation, a globally-recognized aerospace analysis firm, projected that new deliveries of business aircraft will remain relatively constant in 2021 before growing by 4.2 percent from 2021 through 2022.[7] The growing fleet, coupled with rapidly-recovering aircraft utilization rates, will likely result in steady recovery of business aviation activities. Unfortunately, there are very few comprehensive forecasts addressing the GA segment. However, as previously noted, the GA segment has been generally less impacted than commercial aviation, so it is anticipated that recovery will follow a faster recovery timeline. Following previous industry upsets (9/11 and the 2008 financial crisis), GA operations grew more quickly than commercial aviation, once again reaffirming that the GA segment will likely return to pre-pandemic activity levels faster than the commercial airline industry.

2.1.2 National and State General Aviation Trends

The national and state general aviation industry has experienced many changes in recent years, beyond the impacts of COVID-19. At the national level, upturns and downturns in the nation's business cycle creates fluctuation in aviation usage and future demand. The FAA provides an overview of national GA trends and activity forecasts in its annual Aerospace Forecast. The most recent edition, the *FAA Aerospace Forecast 2020-2040*, was published in April 2020, shortly after the onset of the COVID-19 Pandemic which is noted but not fully addressed in the report (FAA 2020). The California Department of Transportation (CalTrans) Division of Aeronautics publishes the California Aviation System Plan (CASP) that explores trends that may affect future aviation demand in the state. The most recent version of the CASP was published as a draft for public comment in late 2020 and, similar to the *FAA Aerospace Forecast 2020-2040*, the 2020 CASP acknowledges the COVID-19 pandemic but does not examine the impacts of the crisis on the California GA airport system. Given this, the projections in the forecasts are generally more optimistic than what will likely occur before complete recovery from COVID-19 is experienced. The CASP utilizes information from the FAA publication and examines many of the same trends and patterns.

[5] FAA. (April 2020). "Map of Cares Funding". Available online at: https://www.faa.gov/airports/cares_act/map/. (Accessed January 2021)
[6] Lampert, A. (October 2020). "New Business Jet Travelers help Fuel Order Recovery During Pandemic". Available online at: https://www.reuters.com/article/us-health-coronavirus-business-jets/new-business-jet-travelers-help-fuel-order-recovery-during-pandemic-idUSKBN27C0I3 (Accessed January 2021).
[7] Aboulafia, R.; Bolen, E.; Kough, B. & MicMillin, M. (January 2021). "Business Aviation: What's Coming In 2021?" [Webinar]. Available online at: https://aviationweek.com/business-aviation/webinar-business-aviation-whats-coming-2021 (Accessed January 2021).

Changes in General Aviation Fleet Mix

The *FAA Aerospace Forecast 2020-2040* acknowledged that GA activity in the U.S. has experienced a decline in recent years and projects a 0.9 percent decline in the total GA fleet between 2020 and 2040. This decrease is the result of a projected decline (-1.0 percent annually) in the largest segment of the GA fleet, fixed wing, single-engine piston aircraft, over the planning period. Conversely, the turbine (including rotorcraft) and light sport aircraft (LSA) segments are expected to grow, but their small relative size compared to the single engine fleet will result in a marginal net decrease in total fleet size. As more sophisticated and longer-range aircraft, particularly business jets, have entered the GA market, total hours are forecast to increase by 0.7 percent per year through 2040, despite the decrease in the total GA fleet. Overall, total GA operations are forecast to increase an average 0.4 percent per year through 2040, primarily due to increases in turbine aircraft and LSA activity.

Changes in Commercial Pilot Workforce

GA activity is also dictated by the number of active certified pilots and the demand for commercial pilots that need to be trained for future job openings. The *FAA Aerospace Forecast 2020-2040* projects that the number of GA pilots will decrease by 0.2 percent annually between 2020 and 2040, resulting in a reduction of 12,120 GA pilots in the GA industry. However, pilots pursuing commercial licenses utilize GA aircraft in their initial flight training phases. According to the *FAA Aerospace Forecast 2020-2040*, the number of active commercial and air transport pilot (ATP) certificates have increased steadily between 2016 and 2019 and is anticipated to increase 0.7 percent annually through 2040, growing the number of ATP pilots by 25,150. As such, the number of pilots utilizing GA airports that support flight training, including WVI, is expected to grow slightly during the forecasting window. However, Airlines for America (A4A) estimated that the number of passenger and cargo airline employees (including pilots, flight attendants, and support staff) has declined by 10 percent between February and November 2020 as a result of more than 78,000 employee layoffs, furloughs, or retirements.[8] The staffing cuts have flooded the applicant pool, eliminating the job availability for newly-trained pilots in the near future. As airlines recover, experienced commercial pilots will be available to fill some open positions, however, there will likely be an increased demand for new commercial and ATP pilots to be trained in the coming years. Given this, the *FAA Aerospace Forecast 2020-2040* forecast of pilots using GA airports is likely overly optimistic in the short term but may be accurate later in the planning timeframe.

Changes in Fuel Availability and Prices

Additional uncertainties in GA forecasting include future oil prices and the transition from the use of 100LL AvGas to unleaded AvGas. According to the U.S. Government Accountability Office (GAO), a positive correlation has been found to exist between oil prices and GA hours flown. Although oil prices were forecast by the *FAA Aerospace Forecast 2020-2040* to gradually increase throughout the planning period, the COVID-19 pandemic has caused significant market volatility in recent months, further proving the considerable uncertainty of the future of oil prices, especially in the near-term. In recent years, the FAA and the Environmental Protection Agency (EPA) have expressed concern over the environmental impacts of leaded fuel usage in the GA industry, however, the consequences of the transition to unleaded AvGas are still unknown. Multiple companies that produce petroleum products have been testing the use of unleaded AvGas in recent years. Cursory examination of airports that offered both 100LL and unleaded AvGas found that the two fuels were similar in cost, yet in many cases, unleaded AvGas was priced lower to incentivize purchase. While it is estimated that two-thirds of the current piston-engine GA aircraft fleet can operate with unleaded AvGas, the technology has been slow in mass distribution. WVI offers unleaded AvGas (UL94) in addition to 100LL, only the second airport in California with such a capability. This may affect activity demand at WVI if the GA fleet transitions away from the use of leaded aircraft fuel, however, the extent of the impact is difficult to project.

Introduction and Growth of Emerging Technologies

The implementation of NextGen technologies and increased use of Unmanned Aircraft Systems (UAS) have also impacted the GA industry in recent years. NextGen is a portfolio of initiatives from the FAA to develop technology geared toward making air

[8] Airlines for America (January 2021). "Tracking the Impacts of COVID-19". Available online at: https://www.airlines.org/dataset/impact-of-covid19-data-updates/#. (Accessed January 2021).

travel safer and more efficient by replacing older/existing technology to better manage airspace. There are many initiatives being developed specifically for airports to help accommodate the demand for additional capacity in a safe, efficient, and environmentally responsible manner, such as the FAA's En Route Automation Modernization (ERAM), which processes data from 64 radars and tracks 1,900 aircraft at a time to allow air traffic controllers to space and route aircraft for maximum efficiency. While NextGen is an FAA-driven initiative, it requires aircraft operators of both private and commercial operators to equip aircraft and pursue NextGen practices, including ADS-B Out equipment, which became mandatory for aircraft flying in certain airspace on January 1, 2020. ADS-B uses satellite and transponder technologies to provide real-time traffic surveillance for controllers and pilots, offering a replacement for traditional radar. WVI has utilized ADS-B technology to track aircraft operations, which improves the Airport's traffic monitoring capability but creates further necessity for aircraft operating at the Airport to implement the technology. This requirement has historically proven to be a slight deterrent to small, recreational, and antique aircraft activity and could continue to impact system-wide operational activity in the future.

UAS technologies (commonly referred to as drones) have experienced significant growth in their demand and use in several industries in recent years, significantly increasing concerns of the safety of the National Airspace System (NAS). Given the recent changes, continued study is needed to influence and direct policies at multiple levels of government and administration to ensure the NAS can successfully integrate manned and unmanned aircraft. The existing requirements and regulations regarding the operation of UAS are ever evolving, and, in many instances, are not followed as many UAS users do not have prior experience or knowledge of aviation regulations. The FAA has promoted numerous outreach efforts, such as B4UFLY to support the safe integration of UAS into the NAS, but the effects are difficult to determine due to the complexity involved with collecting accurate data on their use. The presence of UAS in the NAS, and the expansion of their abilities based on improved battery life, improved range, and reduced cost, will ultimately have an ever-increasing impact on the NAS and on all aviation activity, particularly on smaller GA aircraft that typically operate at lower altitudes. It is unknown at this juncture how UAS will impact future activity at the Airport or at other airports throughout the U.S. This growing segment of the aviation industry will continue to be monitored.

In recent years, UAS technology has shown indications that it can be utilized to transport passengers and cargo short distances in urban areas. Urban Air Mobility (UAM), also known as Advanced Air Mobility (AAM), promises to relieve some level of ground traffic congestion by using small aircraft to travel to different points within and between cities. The travel between some destinations may not require the use of airports as these are electric powered vertical takeoff and landing (eVTOL) aircraft. However, the emergence of AAM has raised several questions for regulators and aviation users including but not limited to their safe integration into the existing National Airspace System (NAS), land use compatibility, and the nexus between "traditional" modes of transportation with cutting-edge innovations. The consequences of AAM on airport activity demand is not yet known, however, it is likely that it will have some impact on the operations and infrastructure of airports, including WVI.

Other trends, such as the growth of e-commerce and air cargo, emergence of electric aircraft, and continued popularity of experimental aircraft present potential future opportunities for growth at the Airport. Although electric aircraft have existed for more than five decades, recent developments in battery technology have enabled more aircraft manufacturers to develop electric propulsion systems. The number of electrically-propelled aircraft in development has grown by more than 50 percent since 2016, reaching 215 aircraft in development worldwide, including 28 in California alone.[9] Given existing limitations in battery technologies, most of the aircraft being developed are meant to compete with light sport, general aviation, and small air taxi aircraft. The *FAA Aerospace Forecast 2020-2040* does not forecast the outlook of the electric aircraft segment, however, other industry organizations including the International Civil Aviation Organization (ICAO) anticipate electric aircraft development to continue to grow, first in the small general aviation aircraft category and eventually moving to larger airliner-type aircraft. As such, this segment of the aviation industry has potential for significant growth in based aircraft both locally at WVI and nationally.

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[9] Thompson, R. (January 2020). "*The number of electrically propelled aircraft developments grew by ~30% in 2019*". Available online at: https://www.rolandberger.com/en/Insights/Publications/Electric-propulsion-is-finally-on-the-map.html. (Accessed January 2021).

2.1.3 Local Trends

Every airport has unique qualities and characteristics that influence the types and amount of activities that occur there. As such, trends exist at WVI and within the local community that will likely affect future activity demands at the Airport. The 2008 Watsonville MPU did not address local issues that affect demand, so these trends were identified through discussions with the Airport staff and members of the Watsonville Municipal Airport Planning Review Committee (PRC). Local trends identified by these stakeholders include the following:

Changes in Flight Training Activities at WVI

Multiple Airport stakeholders reported observing a decline in flight training activities in recent years. PRC members, who are active in pilot and community organizations at WVI, noted that some of the certified flight instructors (CFIs) that taught at the Airport transitioned to flight crew positions at airlines, while others retired from the industry entirely. However, Specialized Helicopters has increased its level of both fixed wing and helicopter flight training activities within the last few years, especially in 2020. Unfortunately, it is difficult to track flight training activities as they use the same types of aircraft as most other general aviation pilots. Additionally, neither an infrared camera system nor ADS-B tracking system delineates between flight training and other general aviation activities, so the exact amount of flight training activities cannot be determined, and a projected growth rate cannot be identified. However, it can be expected that flight training will see nominal growth while the aviation industry recovers from the COVID-19 pandemic. If the national pilot shortage worsens as airlines return to normal operations, flight training activities may increase at WVI as new pilots prepare to join the workforce.

Changes in Fleet Mix at WVI

Airport stakeholders suggested that the single-engine piston aircraft fleet at WVI does not seem to be declining as the trend published in the *FAA Aerospace Forecast 2020-2040* would indicate due to several aircraft being purchased and based at WVI and surrounding airports. However, it is estimated that a portion of these aircraft were purchased as “used” or “previously owned”, which would not affect the total number of aircraft in the GA fleet. Additionally, some of the aircraft that have reportedly moved to WVI fall into the experimental or light sport (LSA) categories, which are projected to grow by 2040. As such, the Airport may not experience a decline in single-engine aircraft, however, the fleet of standard-certificated aircraft (not experimental or LSA) at WVI will likely follow nationwide trends.

Aging Pilot Population

Population demographics have a considerable influence on an airport’s activity demand. Some aviation businesses, primarily airlines, have mandatory retirement requirements for pilots 65 years or older. Additionally, most private and all commercial pilots must pass periodic medical examinations, which can become difficult for pilots as they age. The median age in the Watsonville-Santa Cruz MSA has increased in the last 20 years, from 35 years in 2000 to 37 years in 2019. However, the median age of the pilot population is higher than that of the total population, as all pilots must be at least 17 years old to obtain their certificate. Nationally, the average age of the pilot population was nearly seven years older than the total population in 2019 (44.2 years compared to 37.7 years).[10] [11] The population of Watsonville-Santa Cruz MSA residents aged 55 years and older has nearly doubled since 2000, from approximately 45,000 in 2000 (17.6 percent of total population) to over 81,000 in 2019 (29.4 percent of total population).[12] As the local population grows older, many pilots may retire from actively flying, reducing overall usage. If new pilots do not replace those who have stopped flying, it is probable that activity demand at WVI will decrease during the planning timeframe.

[10] FAA. (2020). “2019 U.S. Civil Airman Statistics.” Available online at: https://www.faa.gov/data_research/aviation_data_statistics/civil_airmen_statistics/ (Accessed March 2021)
[11] U.S. Census Bureau (2010) “Quick Facts”. Available online at: https://www.census.gov/quickfacts/fact/table/US/PST045219. (Accessed March 2021)
[12] Woods and Poole Economics, Inc. (2020)

2.2 Historic Aviation Activity and Previous Forecasts

2.2.1 Historic Aviation Activity

At general aviation airports such as WVI, there are two primary indicators of activity: based aircraft and aircraft operations. A based aircraft is generally defined as an aircraft that is considered airworthy and is stored at an airport for the majority of the year. An aircraft operation represents either a take-off or landing conducted by an aircraft; as a result, a take-off and a landing—such as those that occur with flight training “touch-and-go” practice flights—count as two operations. Several data sources identify operational information and based aircraft at the Airport:

- **FAA Terminal Area Forecast (TAF):** The TAF is the official FAA forecast of aviation activity for U.S. airports, containing historical data and projections for active airports in the NPIAS. The TAF is updated annually and reports data based on the FAA’s fiscal year (October 1 through September 30). Though the FAA TAF is updated annually, at non-towered airports like WVI, yearly historical and projected activity is often reported as flat (no growth) due to the lack of reliable data to develop projections.
- **FAA Traffic Flow Management System Counts (TFMSC):** The TFMSC database reports operations by aircraft type, weight class, date, approach and design category, and user class. However, it does not always contain this data for every operation conducted at an airport because it is usually derived from filed flight plans and/or radar detection.
- **FAA 5010 Airport Master Record:** The FAA 5010 Airport Master Record contains data describing the physical and operational characteristics of civil public-use airports, joint-use military airports, and private-use military airports that are active and in the NAS. The data source provides a “snapshot” of operational activity and based aircraft for the year it is published based on TAF data. The latest published 5010 Airport Master Record for WVI includes annual operations and based aircraft for the 12-month period ending on July 31, 2019.
- **FAA National Based Aircraft Inventory Program:** Airports are required to upload based aircraft data to the FAA National Based Aircraft Inventory Program database (basedaircraft.com) annually for registered aircraft to be properly validated at the correct airport. It is often the case that a host airport has more aircraft recorded onsite than the databased shows as being “registered” at that airport. This is typically attributed to an aircraft being registered at a location other than at the host airport’s location, or when an aircraft is based seasonally at multiple airports.

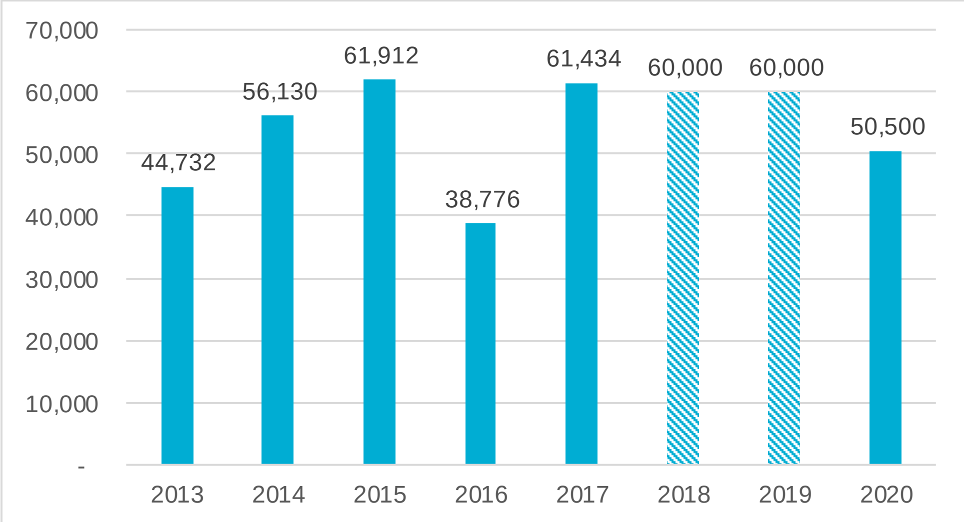
As a non-towered, GA airport, accurate historical operational data are largely limited. Available data published in the FAA’s TFMSC database are based on filed IFR flight plans and often do not accurately reflect total operations at non-towered airports. Additionally, there are often discrepancies between the actual number of based aircraft that require permanent or semi-permanent accommodations and the number that is validated in the FAA’s National Based Aircraft Inventory Program. **Table 2-1** displays the historical activity at WVI from these FAA sources from 2010 to 2020.

Table 2-1: FAA Sources for Historical Activity at WVI

Year	TAF		TFMSC		5010 Airport Master Record		National Based Aircraft Inventory	
	Operations	Based Aircraft	Operations	Based Aircraft	Operations	Based Aircraft	Operations	Based Aircraft
2010	99,970	308	4,053	-	-	-	-	-
2015	65,100	384	2,639	-	-	-	-	-
2020	60,000	256	2,163	-	60,000	256	-	280
Sources: FAA TAF 2020; FAA TFMSC 2020; FAA Form 5010-1 Airport Master Record 2019; National Based Aircraft Inventory Program 2020								

As discussed in detail in Section 1.9, from 2013 to 2017, WVI utilized the service of AAP, Inc. AAP developed an aircraft activity counter using an infrared camera system designed for capturing images of aircraft operations. In late 2019, WVI began utilizing equipment from Maritime Information Systems (MIS) to track the activity in the vicinity of the airfield through ADS-B technology. These sources have shown that total annual operations from 2013 to 2020 range from 38,770 to almost 62,000. **Figure 2-1** displays the annual operations from 2013 to 2020 based on the AAP and MIS data and estimates. Total annual operations at WVI for 2020, the base year for this forecasting effort, are estimated at 50,500.

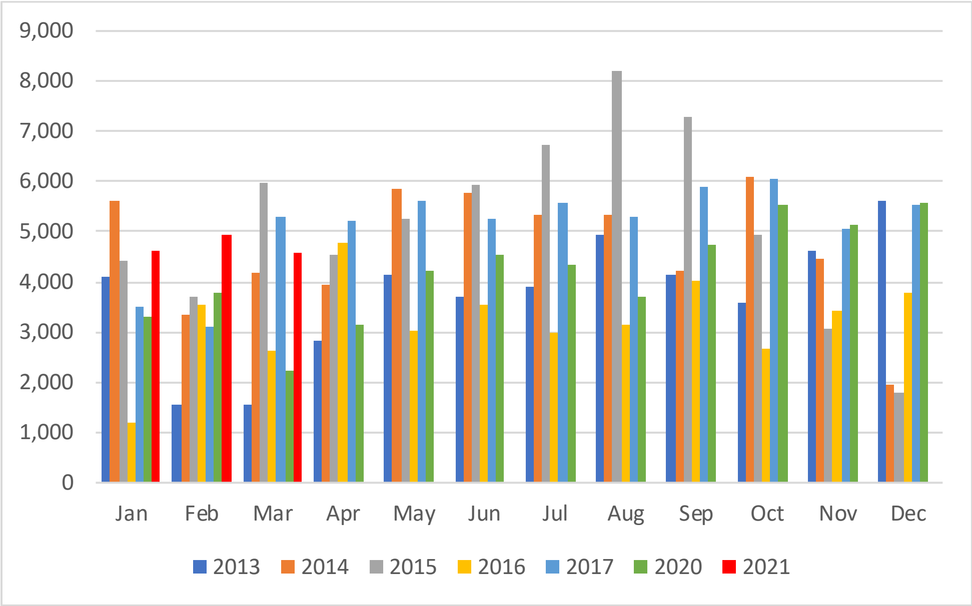
Figure 2-1: WVI Annual Operations from 2013 to 2020



Sources: 2013-2017 AAP Inc., 2018 and 2019 Estimated, 2020 MIS

Based on the extraordinary events of 2020 of COVID-19 and the CZU Lightning Complex Fire, the 2020 Base Year of operations is considered a depressed year; these events are discussed in detail in Section 1.9. **Figure 2-2** displays the monthly operations for years 2013 to 2017 and 2020, and the months of January, February, and March of 2021. The three months of available data for 2021, shown in red below, display that WVI is already set to outperform 2020 and more in line with activity in 2014 and 2015 which were respectively 56,000 and 62,000 annual operations.

Figure 2-2: WVI Monthly Operations from 2013 to 2021

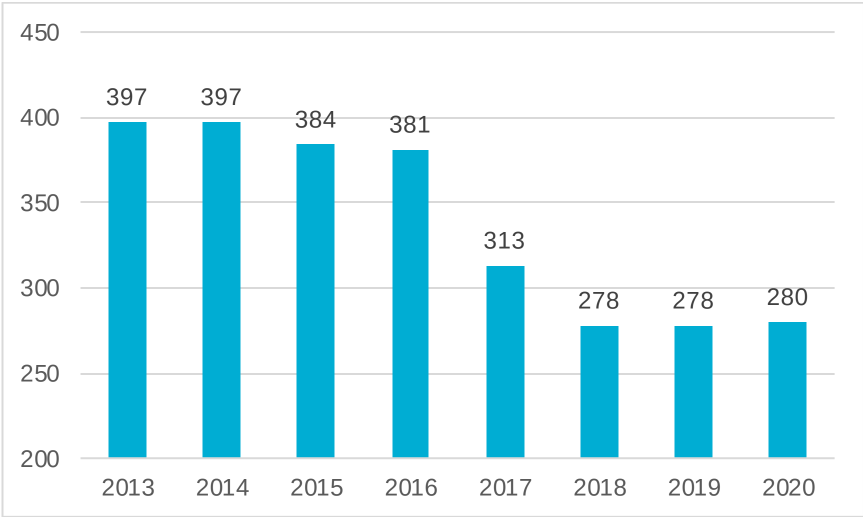


Sources: 2013-2017 AAP Inc.; 2020 and 2021 MIS

Figure 2-3 displays the based aircraft from 2013 to 2020 based primarily on TAF data. While the Airport has experienced a reduction in based aircraft over the past decade, this is attributed to better accuracy in the data reporting and tracking in recent years. The number of based aircraft appears to have been steady over the past few years. It should be noted that the Airport reported 300 based aircraft in 2019 and 327 in 2020 to the FAA based on counts of actual aircraft sitting at the Airport, but the validation process through the FAA's National Based Aircraft Inventory Program resulted in reducing the number to 280. The Airport is in the process of reviewing these results with the FAA as many of the aircraft noted to be at other airports have registered addresses in the Monterey Bay Area[13]. While the MPU will utilize the validated 280 based aircraft for 2020, the actual number may be closer to 300.

[13] A specific example of this includes the number of helicopters utilized by WVI business tenants noted to be also claimed by other airports in the Bay Area per the FAA validation process.

Figure 2-3: WVI Based Aircraft from 2013 to 2020



Sources: 2013-2017 FAA TAF, 2019 – 2020 FAA National Based Aircraft Inventory Program, Watsonville Municipal Airport

2.2.2 Previous Forecasts

In addition to historical activity, previous planning and forecasting efforts have also been evaluated to inform the forecasts presented in this Chapter; the results are shown in **Table 2-2**. It is evident that the prior forecasting efforts were based on a higher operational activity level that may or may not have been accurate due to inability to accurately count operations at WVI as a non-towered airport.

Table 2-2: Previous Forecasts for WVI

Year	FAA's TAF		California Aviation System Plan (CASP)		2010 Revised Forecasts		2008 Master Plan		2001 Master Plan	
	Operations	Based Aircraft	Operations	Based Aircraft	Operations	Based Aircraft	Operations	Based Aircraft	Operations	Based Aircraft
2010	99,970	308	130,190	327	135,000	360	149,400	405	130,190	345
2015	65,100	384	137,160	345	144,000	377	160,900	425	137,160	363
2020	60,000	256	138,307	-	153,000	395	172,300	450	144,503	381
2030	60,000	256	145,528	-	170,000	430	-	-	-	-
2040	60,000	256	-	-	-	-	-	-	-	-
CAGR	-1.69%	-0.61%	0.56%	1.08%	1.16%	0.89%	1.44%	1.06%	1.05%	1.00%

Sources: FAA TAF 2020, 2020 CASP Draft Report, Watsonville Municipal Airport Revised Forecasts 2010, Watsonville Municipal Airport Master Plan 2008, Watsonville Municipal Airport Master Plan 2001

2.3 Forecast Methodologies

Forecasts of aviation activity utilize several methodologies that are typical of airport master plans, but also include methodologies that analyze the market share from airports within an approximate 20-mile radius of WVI. This section describes the methodologies and associated growth rates utilized in the based aircraft and operational forecasts displayed in Sections 2.4 and 2.5. Each of the methodologies below utilize the Compound Annual Growth Rate (CAGR) which calculates a constant rate of change over a given time period. It dampens the effect of volatility during periods that experience significant change and is essentially a "smoothed" annual growth rate. The CAGR has been applied to the 2020 base year for the 20-year planning horizon for each methodology as discussed below.

As previously discussed, Airport data indicates that, despite an initial decrease of activity due to the onset of stay-at-home orders and personal safety precautions, WVI has experienced healthy growth month-over-month in 2020. This indicates that overall activity at the Airport should remain steady in the near-term with possible fluctuations based on potential regional outbreaks, and that long-term activity is not expected to be adversely impacted by COVID-19.

Forecasting Assumptions

Aviation activity at an airport is generally driven by controllable factors (e.g., hangar rents, services provided, maintenance of facilities) and non-controllable factors (e.g., local/national economic conditions, availability of funding, location). As shifts in activity type and volume are anticipated to occur over the 20-year planning horizon, the following assumptions pertaining to forecast development have been identified:

- Based on historical activity and existing facilities and services, it is assumed the Airport will continue to sustain its FAA-designated GA status by catering to smaller GA aircraft, including single and twin piston, small- to medium-sized turboprop aircraft, and some small- to medium-sized corporate jets.
- The Airport is not expected to serve scheduled commercial service over the 20-year planning horizon.
- Socioeconomic data provided by Woods & Poole Economics, Inc. are indicative of existing and future conditions at the state, regional, and local levels.
- The Airport will continue to be included in the FAA's NPIAS and will be eligible to receive AIP grants.
- Forecasts presented in this chapter are unconstrained, meaning that there are no extenuating circumstances that are anticipated to limit or restrict potential demand or operational functionality of the Airport.

Historic Activity Methodology

While past performance is not a guaranteed predicter of future activity, it does provide a baseline for understanding how local, regional, and national aviation-related and demographic trends may be linked for an airport. As a non-towered, GA airport, accurate historical operational data for WVI is limited. The Airport has data on historic operations from AAP dating back to 2013. AAP data ended in 2017, and ADS-B data is available for 2020. The change in operations was calculated by using the earliest available data considered to be validated, 2013, and the base year data in 2020. More details on the historical activity and base year data is available in Chapter 1 and Section 2.2.

While the TAF count of based aircraft is known to be inaccurate for the current year when compared to the National Based Aircraft Inventory, other sources for historic based aircraft were not available for this MPU. To match the forecasting dates used for operations, the change in based aircraft was calculated from 2013 TAF data and the Airport-reported values for 2020. The resulting CAGR are shown below. Based aircraft decreased and operations increased over the eight-year period.

- Based Aircraft: -4.96% CAGR (2013 - 2020)
- Operations: 2.62% CAGR (2013 - 2020)

Socioeconomic Factor Methodologies

As discussed in more detail in Chapter 1, socioeconomic characteristics provide insight to the economic health of a specific locality or region. Population, per capita personal income (PCPI), employment, and other indicators can reflect propensity to own or operate aircraft, both in terms of based aircraft and operations. Socioeconomic data were provided by Woods and Poole Economics, Inc., an independent firm that specializes in long-term economic and demographic projections. Socioeconomic data were analyzed and grouped in two regions: Santa Cruz-Watsonville MSA, which incorporates the entirety of Santa Cruz County, and also for the State of California. The socioeconomic factors and resulting CAGR's for the regional MSA were considered for this forecasting effort to reflect local conditions and are in line with the information reported in the 2019 Economic Benefit Analysis, as discussed in Chapter 1. Additional information for the socioeconomics of the region and statewide are detailed in **Tables 1-3, 1-4, and 1-6** of Chapter 1:

- Population (the total number of persons residing within a specific geographic area): 0.58% CAGR (2010-2019)
- Employment (the total number of employed persons within a specific geographic area): 1.43% CAGR (2010-2019)
- Per capita personal income (PCPI)[14] (a composite measure of market potential which indicates the general ability of persons to purchase products and services): 3.54% CAGR (2010-2019)

Historical Activity Relative to Socioeconomic Factor Methodologies

Aviation activity can be influenced by both overall societal changes as well as local socioeconomic factors. Owning and operating an aircraft may become more affordable and more accessible, increasing overall aviation activity. Additionally, a particular location may experience a population boom or economic growth, so the local aviation activity may see a greater increase than national trends. These factors can combine to influence the historic aviation activity at a given location.

This forecast methodology established ratios between historic operations and historic socioeconomic factors. The CAGR in those ratios between 2013 and the 2020[15] base year was determined for use in forecasting. Socioeconomic forecasts were correlated with these ratios to forecast future activity. Socioeconomic data comes from Woods & Poole for the Santa Cruz-Watsonville MSA.

Population and employment were both increasing for the Santa Cruz-Watsonville MSA between 2013 and 2020. At the same time, total operations increased and based aircraft decreased. The resulting growth rate (or CAGR) for based aircraft illustrate that a smaller ratio of the local residents or employees have chosen to own aircraft or base their aircraft at WVI than in the past. This downward trend does not seem to impact operations at WVI which could have several meanings, such as a potential for an increase in fractional ownership or rentals as part of flight training rather than purchasing new aircraft.

- Based Aircraft per Thousand Population: -5.00% CAGR (2013-2020)
- Based Aircraft per Thousand Employment: -5.38% CAGR (2013-2020)
- Operations per Thousand Population: 2.48% CAGR (2013-2020)
- Operations per Thousand Employment: 2.10% CAGR (2013-2020)

[14] It should be noted that PCPI data obtained from Woods and Poole was reported in constant dollars (year 2016) to adjust for inflation over time.
[15] While socioeconomic data is available for 2010, accurate historic activity for WVI was not available until 2013. Thus, this methodology varies slightly in the years from the purely socioeconomic methodologies.

Market Share Methodology

Market share forecasts compare an individual airport's share of a certain component or indicator (such as based aircraft at WVI) with that of a larger market. The analysis looked at the state of California and regional airports in a 20-mile radius from Watsonville, including San Martin (E16), Salinas Municipal (SNS), Hollister Municipal (CVH), Marina Municipal (OAR), and Monterey Regional (MRY).[16] airports.

The market share analysis was developed using FAA TAF values of based aircraft and operations for the current year and projections for future years. The market share of based aircraft in 2020 was determined, and then held constant for the projected market in future years. The analysis for operations had a little more nuance as the TAF identifies several categories of operations such as GA, commercial, and military. WVI would not be impacted by regional forecasts for growth in other categories like commercial flights so commercial operations were not included.

For each of the categories present at WVI, the market shares were determined as shown below and the forecasts for these categories were used to estimate WVI's future operations. Those were summed to determine total operations for future years. The TAF data does not forecast significant growth in itinerant military operations in California between 2020 and 2040, and none in Watsonville's region. Therefore, assuming a constant market share in that category has the same result as assuming a constant number of operations.

WVI Market Share of 2020 TAF for Select California Regional Airports:

- Based Aircraft: 32.5%
- Operations: 12% Itinerant, 28% Local, 1% Military

Resulting CAGR:

- Based Aircraft: 0.25%
- Operations: 0.11%

WVI Market Share of 2020 TAF for California Airports Only:

- Based Aircraft: 1.4%
- Operations: 0.52% Itinerant, 0.95% Local, 0.02% Military

Resulting CAGR:

- Based Aircraft: 0.78%
- Operations: 0.19%

FAA Aerospace Forecast Methodology

The FAA's forecast of the number of active general aviation and air taxi aircraft and hours flown, by type of aircraft, was used to develop a CAGR comparable to the based aircraft and operations by aircraft type at WVI. The *FAA Aerospace Forecast 2020-2040* predict the following for operations:

- Standard single-engine piston operations will decrease at an annual rate of 1.0% through 2040.
- Multi-engine piston operations will decrease at an annual rate of 0.3% through 2040.
- Jet operations will increase at an annual rate of 2.2% through 2040.
- Helicopter operations will increase at an annual rate of 1.1% through 2040.
- Light sport operations will increase at an annual rate of 4.0% through 2040.
- Experimental operations will increase at an annual rate of 1.6% through 2040.

These annual growth rates were applied to base year operations by aircraft type. As described in the Historic Aviation Activity section, base year operations by aircraft type was included in the ADS-B dataset, with Light Sport and Experimental

[16] As MRY is a commercial service airport, only GA activity and based aircraft at MRY were utilized for the regional market share analysis.

designations coming from the based aircraft fleet mix. This resulted in a -0.22% CAGR in operations from 2020 to 2040, primarily due to the large number of single-engine aircraft present at WVI.

The *FAA Aerospace Forecast 2020-2040* predict the following for active aircraft:

- Standard single-engine piston aircraft will decrease at an annual rate of 1.0% through 2040.
- Multi-engine piston aircraft will decrease at an annual rate of 0.5% through 2040.
- Jet aircraft will increase at an annual rate of 1.8% through 2040.
- Helicopter aircraft will increase at an annual rate of 1.6% through 2040.
- Light sport aircraft will increase at an annual rate of 3.3% through 2040.
- Experimental aircraft will increase at an annual rate of 0.9% through 2040.

As with operations, these annual growth rates were applied to WVI 2020 based aircraft according to aircraft type. This resulted in a -0.66% CAGR in based aircraft from 2020 to 2040, primarily due to the large number of single-engine aircraft present at WVI.

Operations per Based Aircraft (OPBA) Methodology

For 2020 each based aircraft represented 180 of the total annual operations performed at WVI. The OPBA estimate is based on the 2020 based aircraft and 2020 operations. The OPBA methodology would include applying the 180 operations to the preferred forecast for based aircraft to determine the total annual operations. It was decided this methodology would not be utilized in this MPU.

2.4 Based Aircraft Forecasts

The methodologies discussed in **Section 2.3** resulted in a wide range of results for future based aircraft as shown in **Table 2-3** and **Figure 2-4.** The 20-year based aircraft forecasts displayed a low of 93 fewer aircraft (Aircraft per Employment Historic Growth Rate) and a high of 561 based aircraft (Per Capita Income Historic Growth Rate). The forecasting results were compared against the historical data to better determine the reasonableness of the forecasts in order to select a preferred forecast of based aircraft.

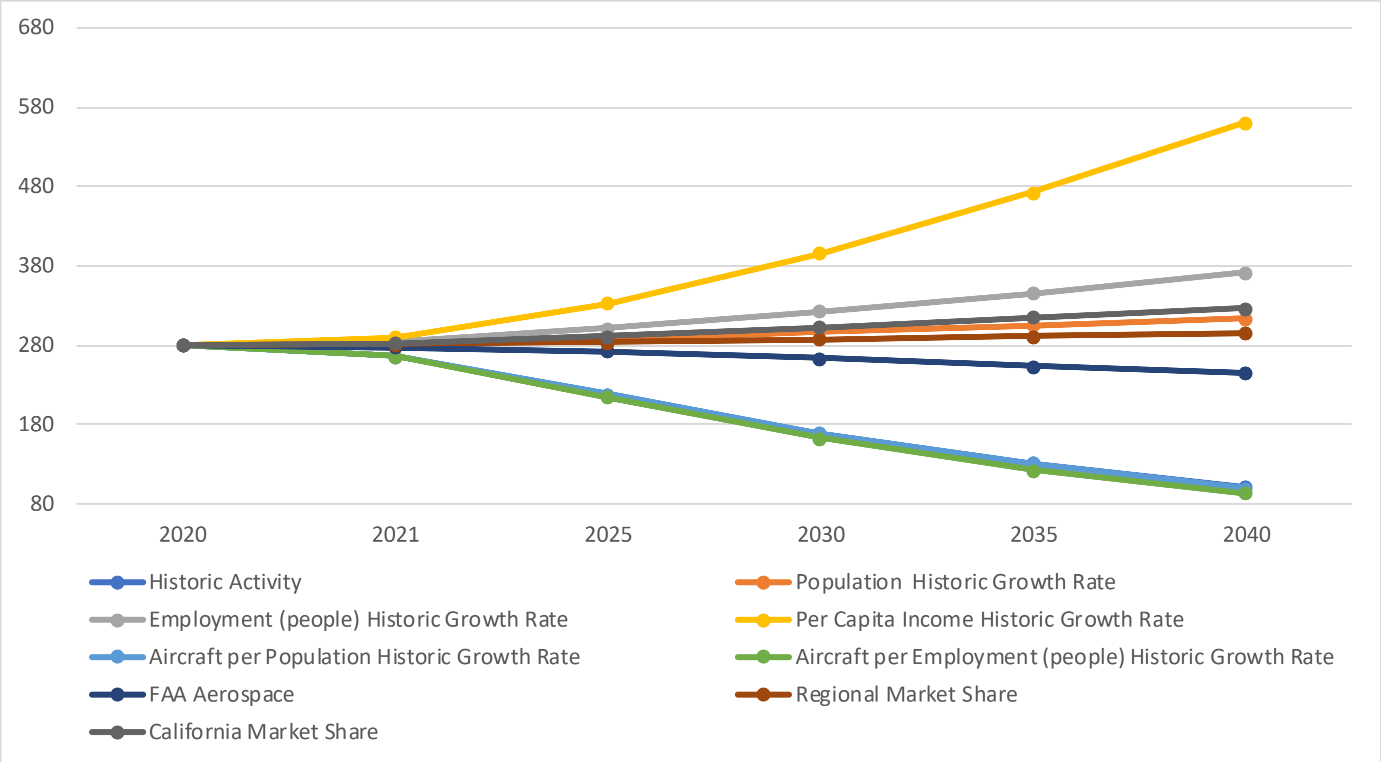
In the case of the declining growth rate in terms of historic activity, while the Airport has experienced a reduction in based aircraft over the past decade, this is primarily attributed to better accuracy in the data reporting and tracking in recent years. The number of based aircraft appears to have been steady over the past few years, so it doesn't seem reasonable to show a decline of almost 5 percent over the next 20 years. This is a similar condition for the two growth rates related to aircraft per population and employment.

Others such as the PCPI methodology, which had the highest growth rate of 3.54 percent, demonstrate too aggressive of a growth rate. As discussed previously, the FAA Aerospace methodology, which has a declining growth rate of -0.66 percent, represents national trends only and may not effectively reflect local or state factors.

Table 2-3: Summary of WVI Based Aircraft Forecast Results

Year	Historic Activity	Population Historic Growth Rate	Employment (people) Historic Growth Rate	PCPI Historic Growth Rate	Aircraft per Population Historic Growth Rate	Aircraft per Employment (people) Historic Growth Rate	Regional Market Share	California Market Share	FAA Aerospace
2020	280	280	280	280	280	280	280	280	280
Forecast									
2021	266	282	284	290	266	266	281	282	278
2025	217	288	301	333	218	214	284	291	272
2030	168	297	323	396	169	163	287	303	263
2035	131	305	346	472	131	123	291	315	254
2040	101	314	372	561	100	93	295	327	245
Change (CAGR 2021-2040)	**-4.96%**	**0.58%**	**1.43%**	**3.54%**	**-5.00%**	**-5.38%**	**0.25%**	**0.78%**	**-0.66%**
Sources: Woods & Poole Economics Inc. 2020, 2020 FAA TAF, FAA Aerospace Forecast 2020-2040, Kimley-Horn 2021									

Figure 2-4: Summary of WVI Based Aircraft Forecast Results



Sources: Woods & Poole Economics Inc. 2020, 2020 FAA TAF, FAA Aerospace Forecast 2020-2040, Kimley-Horn 2021

2.4.1 Preferred Based Aircraft Methodology

Based on the review of the results of each methodology, the California Market Share methodology was selected as the preferred forecast as shown in **Table 2-4**. This is an increase of 47 aircraft over the 20-year period from 280 in 2020 to 327 in 2040. As noted in **Section 2.2.1**, the based aircraft at WVI may in fact be closer to 300 once the validation effort is coordinated between the FAA and WVI, thus may only be an increase in 27 based aircraft. This forecast also provides flexibility to ensure that the MPU adequately accommodates the airfield infrastructure for a range of potential scenarios.

Table 2-4: WVI Based Aircraft Preferred Forecast

Year	Based Aircraft
2020	280
Forecast	
2021	282
2025	291
2030	303
2035	315
2040	327
Change (CAGR 2021-2040)	0.78%
Source: Kimley-Horn 2021	

2.4.2 Based Aircraft Fleet Mix

An airport's fleet mix dictates facility needs pertaining to size and type of aircraft storage hangars, aircraft tiedowns, ai rcraft parking apron, and others. **Table 2-5** displays the existing and future based aircraft fleet mix for WVI. Generally, the fleet mix is projected to remained consistent with the existing fleet mix as noted in Section 1.9 throughout the forecast period. It was assumed that by 2040 the percent of jet aircraft would increase from 1.4 percent to 2.5 percent with a corresponding decrease in single engine aircraft. This reflects the current actions of the Airport to increase attractiveness of WVI to jet operators and the national trends for aircraft fleet mix.

Table 2-5: WVI Based Aircraft Fleet Mix

Year	Total Based Aircraft	Jet	Multi-Engine	Helicopter	Single Engine
2020	280	4	15	5	256
Forecast					
2021	282	4	15	5	258
2025	291	4	16	5	266
2030	303	6	16	5	275
2035	315	6	17	6	286
2040	327	8	18	7	294
Source: Kimley-Horn 2021					

2.5 Aircraft Operations Forecasts

As discussed in Section 2.2.1, the 2020 Base Year can be considered a depressed year and 2021 is already outperforming 2020 activity. The first three months of 2021 operations are approximately 30 percent higher than the same months in 2020. As such, a conservative estimate of 55,000 operations were utilized for 2021. The forecasting methodologies from **Section 2.3** were then applied to the 2021 year given the significant change between 2020 and 2021.

Nearly all of the methodologies generally resulted in positive growth in operations for WVI as shown in **Table 2-6** and **Figure 2-5.** The 20-year activity forecasts displayed a range from a low of 52,800 (FAA Aerospace) to a high of 106,500 (PCPI Historic Growth Rate). As with the based aircraft forecasts, the forecasting results were compared against the historical data to better determine the reasonableness of the forecast methodologies.

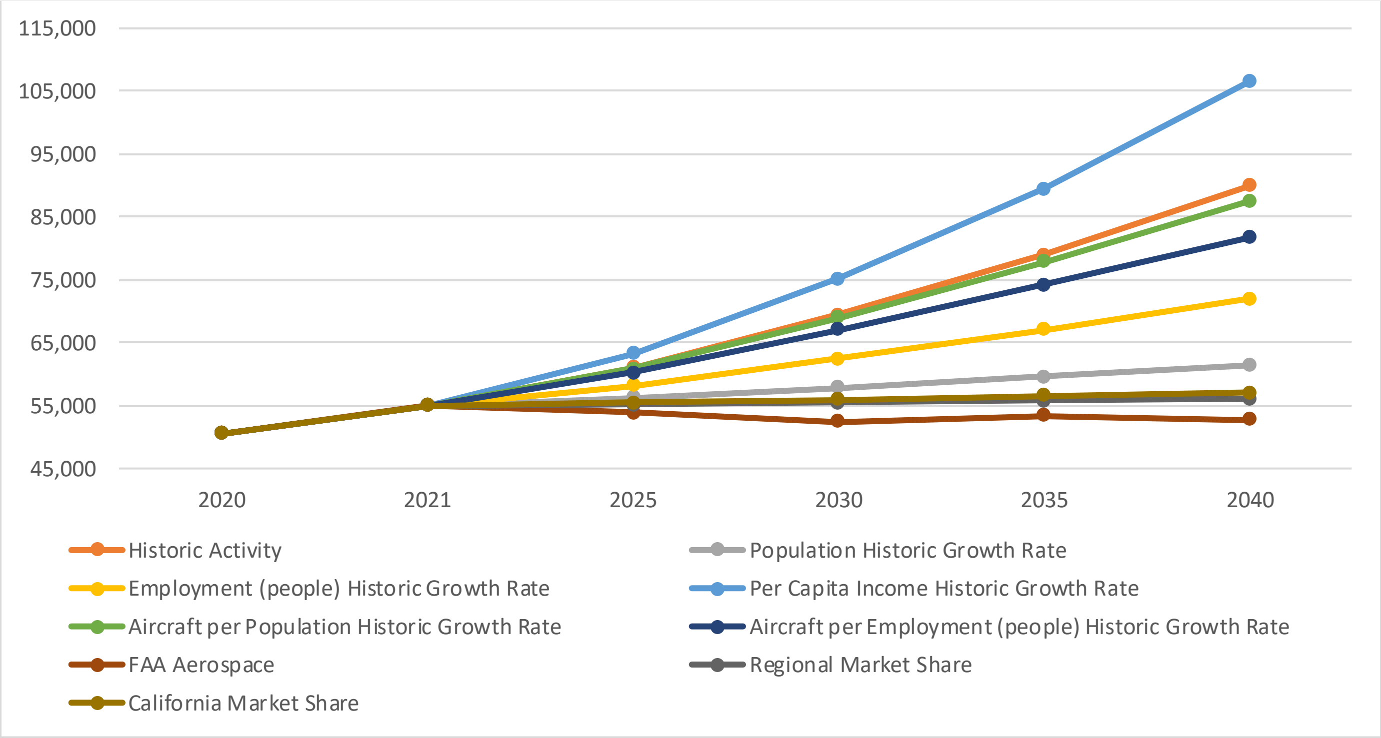
The results of historic activity growth rate were based on actual operational data over the last eight years and provide a reasonable growth in operations to almost 70,000 in 10 years and 90,000 in 20 years. This growth rate is also similarly in line with the Aircraft per Population and Employment Historic Growth Rates which resulted in 85,700 and 81,700 annual operations in 20 years.

As with based aircraft, the PCPI methodology, which had the highest growth rate of 3.54 percent, was considered to demonstrate too aggressive of a growth rate. Conversely, the market share methodologies, which grew by 0.11 and 0.19 percent to less than 58,000 in 20 years, would be considered too low based on the historical activity, especially what is transpiring in 2021 and late in 2020. As discussed previously, the FAA Aerospace methodology, which has a declining growth rate of -0.22 percent represents national trends only and may not effectively reflect local or state factors.

Table 2-6: Summary of WVI Aircraft Operations Forecast Results

Year	Historic Activity	Population Historic Growth Rate	Employment (people) Historic Growth Rate	PCPI Historic Growth Rate	Aircraft per Population Historic Growth Rate	Aircraft per Employment (people) Historic Growth Rate	Regional Market Share	California Market Share	FAA Aerospace
2020	50,500	50,500	50,500	50,500	50,500	50,500	50,500	50,500	50,500
Forecast									
2021	55,000	55,000	55,000	55,000	55,000	55,000	55,000	55,000	55,000
2025	61,000	56,300	58,200	63,200	60,900	60,200	55,200	55,400	53,900
2030	69,400	57,900	62,500	75,200	69,000	67,000	55,500	56,000	52,400
2035	79,000	59,600	67,100	89,500	77,900	74,200	55,800	56,500	53,400
2040	89,900	61,400	72,000	106,500	87,500	81,700	56,100	57,100	52,800
Change (CAGR 2021-2040)	**2.62%**	**0.58%**	**1.43%**	**3.54%**	**2.48%**	**2.10%**	**0.11%**	**0.19%**	**-0.22%**
Sources: Woods & Poole Economics Inc. 2020, 2020 FAA TAF, FAA Aerospace Forecast 2020-2040, Kimley-Horn 2021									

Figure 2-5: Summary of WVI Aircraft Operations Forecast Results



Sources: Woods & Poole Economics Inc. 2020, FAA Form 5010-1 Airport Master Record 2019, FAA Aerospace Forecast 2020-2040, Kimley-Horn 2021

2.5.1 Preferred Methodology

Based on the review of the results of each methodology as discussed in more detail in **Section 2.5**, the Historic Activity methodology was selected as the preferred forecast as shown in **Table 2-7**. This is an increase of 39,400 operations over the 20-year period to 89,900.

The Historic Activity methodology is based on data from the Airport's robust aircraft operations tracking system over the past eight years. There are a large number of experimental and light sport aircraft and associated organizations at WVI, which partially accounts for the growth of single-engine operations as these types of aircraft operations are forecast to grow at the national level. Additionally, more than 12 percent of the annual operations at WVI are due to helicopters, which are also forecast to grow at the national level. WVI is home to a helicopter training school that has seen tremendous growth in the last year, including adding aircraft to their fleet. This contributes to a stronger, more sustainable growth than the average GA airport relying primarily on traditional based single-engine aircraft. WVI is located within a strong agricultural area that relies on the Airport to transport their business executives domestically and internationally. The Airport is also home to a thriving tourism industry with aerial sightseeing over the coastline and an active skydiving business.

Table 2-7: Preferred WVI Activity Operations Forecast

Year	Operations
2020	50,500
Forecast	
2021	55,000
2025	61,000
2030	69,400
2035	79,000
2040	89,900
Change (CAGR 2021-2040)	2.62%
Source: Kimley-Horn 2021	

2.5.2 Operational Fleet Mix

Operational fleet mix projections identify the type of aircraft that currently operate and are anticipated to operate at WVI. **Table 2-8** displays the existing and future operational fleet mix for WVI. As with the based aircraft, the future operational fleet mix is generally considered to remain consistent with the existing fleet mix as noted in Section 1.9 throughout the forecast horizon. The only exception is to this trend is jet aircraft traffic, which is forecast to increase from one percent to three percent of total operations, corresponding with the relative decrease in the share of single engine aircraft operations. The share of multi-engine and helicopter operations are expected to remain relatively constant through the forecast period. This growth in jet traffic reflects trends that have been identified at the Airport and efforts made by the Airport to attract future activity, as described below.

Airport staff reported a noticeable increase in jet traffic shortly before and immediately following the National Football League's Super Bowl 50, held in Santa Clara, California in February 2016. This increase included both transient charter aircraft and based corporate aircraft using WVI to transport employees and customers to and from Watsonville. Several agricultural businesses with farming operations in the Pajaro Valley utilize WVI as a base for their corporate flight departments. At the time of this writing, these businesses base three jet and three turboprop corporate aircraft at WVI. The operators of the turboprop aircraft have reported plans to replace the turboprop aircraft with jet aircraft in the near future. Another large construction business has also indicated to Airport staff its desire to move its based corporate jet from Monterey (MRY) to WVI and expressed interest in constructing a large conventional hangar to store the aircraft.

The Airport identified three primary factors that contribute to the recent growth in corporate and charter aircraft traffic: (1) WVI has a lower average cost compared to other nearby airports as it does not have landing fees and has lower fuel prices than the surrounding region;[17] (2) WVI is easily accessible from California Highway 1, providing easy travel between Watsonville and the Bay area; and (3) WVI is located near popular areas for business and leisure activities in both Santa Cruz and Monterey.

Furthermore, Airport staff surveyed both pilots and passengers of transient jet aircraft arriving at the Airport to understand why these visitors chose to land at WVI. Jet aircraft users reported consistent and noticeable timesavings when operating at WVI compared to other airports in the Bay area due to the lack of delays at WVI, even if the aircraft user needs to drive into the Bay Area to reach their final destination. Charter aircraft operators such as NetJets indicated a preference towards WVI as the Airport allows ground vehicles to access the apron. This enables passengers to transfer directly from the aircraft to their car, saving time and providing added convenience for users. Additionally, jet aircraft pilots have stated the lack of airport and airspace congestion around WVI allows them to fly a slower and more direct approach to the Airport, providing a smoother and less chaotic experience to their passengers.

Airport staff hope to capitalize on these factors to continue to grow jet activity in the future at a faster rate than has occurred historically. The Airport has developed a business plan which includes a marketing campaign to highlight the economic and logistic advantages of operating at WVI. The Airport has recently invested in fuel servicing equipment, a mobile Ground Power Unit (GPU), and lavatory service units to service corporate and charter aircraft. Additionally, the Airport's co-located restaurant facility is well positioned to serve as a catering option for charter operations in the immediate future. These equipment and services provide great benefit to corporate jet aircraft operators and make WVI significantly more attractive to potential users. The Airport has already seen some benefits from these efforts and plans to continue to further grow jet operations through the forecast period.

As mentioned, multi-engine and helicopter traffic is expected to grow at a consistent rate compared to the overall fleet mix. Specialized Aviation is currently the only operator on the airfield providing flight training for multi-engine and helicopter pilots. The business has expanded in recent years and is expected to continue to do so, but not at such a rate that would increase the relative share of these operations. While the increased significance of helicopter traffic is not reflected in the projected operational fleet mix (helicopter traffic is expected to remain at 12 percent of total traffic during the forecast period), the benefits these operations provide to the Airport and community are widely felt. As discussed in **Chapter 1,** the California Department of Forestry and Fire Protection (CAL FIRE) utilizes WVI as a temporary operation base during fire season. Most notably, WVI hosted seven CAL FIRE helicopters, including the Bell UH -1H Super Huey, Sikorski S70i, and Bell 206B JetRanger during the CZU Lightning Complex fire in August 2020. The proximity of WVI to the fire allowed firefighting aircraft to quickly respond to flare-ups, lessening the overall impact of the wildfires. CAL FIRE has indicated its intentions to use WVI as a temporary base in the event of future fires in the Santa Cruz mountains or surrounding areas.

[17] WVI staff conducted an analysis of aircraft fuel prices at GA airports within 100 nautical miles of WVI in August 2020. The study found AvGas was on $0.30 less expensive per gallon than the average price at surrounding airports while JetA fuel was $0.22 more expensive per g allon than average. However, when compared to larger airports with significant corporate aircraft traffic such as San Jose (SJC) and Monterrey (MRY), JetA fuel at WVI is two dollars less expensive per gallon on average. (Source: Watsonville Municipal Airport, *WAAC Requested Research on Fuel Pricing*, 2020)

Table 2-8: WVI Operational Fleet Mix

Year	Total Operations	Jet	Multi-Engine	Helicopter	Single Engine
2020	50,500	505	2,525	6,060	41,410
Forecast					
2021	55,000	550	2,750	6,600	45,100
2025	61,000	610	3,050	7,320	50,020
2030	69,400	1,040	3,470	8,330	56,560
2035	79,000	1,580	3,950	9,480	63,990
2040	89,900	2,700	4,500	10,800	71,900
Source: Kimley-Horn 2021					

2.6 Forecasts of Operations by Type

The following presents more detailed information on the forecasted operations at WVI that provide better insight into the activity at WVI and will be further utilized in subsequent chapters of the MPU. Each of the operational statistics below were reviewed and confirmed with the Airport.

2.6.1 Local / Itinerant Operations

According to the FAA, local operations are defined as those conducted by aircraft that operate in the local traffic pattern or within sight of the airport; are known to be departing for, or arriving from, flight in local practice areas located within a 20-mile radius of the airport; or execute simulated instrument approaches or low passes at the airport. Itinerant operations are all aircraft operations other than local operations. According to the FAA TAF, in 2020 approximately 66 percent of aircraft operations at WVI were identified as local operations and 33 percent as itinerant. This MPU assumes this split remains consistent throughout the planning period, as shown in **Table 2-9.**

Table 2-9: WVI Local / Itinerant Operations

Year	Total	Local	Itinerant
Percent		67%	33%
2020	50,500	33,835	16,665
Forecast			
2021	55,000	36,850	18,150
2025	61,000	40,870	20,130
2030	69,400	46,498	22,902
2035	79,000	52,930	26,070
2040	89,900	60,233	29,667
Sources: 2020 FAA TAF, Kimley-Horn 2021			

2.6.2 Day / Evening Operations

A specific component of this MPU is to forecast daytime/evening operations. This is an important element to include as noise impacts created by aircraft arriving or departing at night are greater than during the day. According to the ADS-B database, approximately 18 percent of aircraft operations occur during evening hours, defined by the FAA as 5:00 PM to 10 PM, and night hours, defined by the FAA as 10:00 PM to 7:00 AM. The remaining 82 percent occur from 7:00 AM to 5:00 PM. This MPU assumes the splits remain consistent throughout the planning period, as shown in **Table 2-10**.

Table 2-10: WVI Day / Night Operations

Year	Total	Daytime (7 AM to 5 PM)	Evening (5 PM to 10 PM)	Night (10 PM to 7 AM)
Percent		82%	17%	1%
2020	50,500	41,410	8,585	505
Forecast				
2021	55,000	45,100	9,350	550
2025	61,000	50,020	10,370	610
2030	69,400	56,908	11,798	694
2035	79,000	64,780	13,430	790
2040	89,900	73,718	15,283	899
Sources: 2020 ADS-B Data, Kimley-Horn 2021				

2.6.3 Annual Instrument Approaches

Because the Airport does not have an air traffic control tower, the precise number of annual instrument approaches (AIA) cannot be decisively established. However, the FAA's TFMSC database includes data for flights that fly under Instrument Flight Rules (IFR) and are captured by the FAA's enroute computers. Most Visual Flight Rule (VFR) and some non-enroute IFR traffic is excluded from reported data. For this MPU it is estimated that approximately six percent of the total operations are instrument approaches, as shown in **Table 2-11**.

Table 2-11: WVI Instrument Approaches

Year	Total Operations	Annual Instrument Approaches
Percent		6%
2020	50,500	3,030
Forecast		
2021	55,000	3,300
2025	61,000	3,660
2030	69,400	4,164
2035	79,000	4,740
2040	89,900	5,394
Sources: 2020 FAA TFSMC, Kimley-Horn 2021		

2.6.4 Touch-and-Go Operations

A touch-and-go operation is defined as an operation conducted by an aircraft that lands and departs on a runway without stopping or exiting. This type of operation is typically associated with flight training. Touch-and-go operations forecasts are important to identify because they impact airfield capacity, which is presented in a subsequent chapter.

Based on the ADS-B database, it was assumed that touch-and-go operations account for approximately 15 percent of total activity at the Airport, as shown in **Table 2-12.** It should be noted that touch-and-go operations are not permitted on Runway 9-27 due to noise sensitive residential areas southeast of the Airport. Additionally, many of the touch-and-go operations are conducted by helicopters due to the helicopter flight school located at WVI.

Table 2-12: WVI Touch-and-Go Operations

Year	Total Operations	Touch-and-Go Operations
Percent		15%
2020	50,500	7,575
Forecast		
2021	55,000	8,250
2025	61,000	9,150
2030	69,400	10,410
2035	79,000	11,850
2040	89,900	13,485
Sources: 2020 ADS-B Data, Kimley-Horn 2021		

2.7 Peaking Characteristics

The capacity of an airport relates to activity levels during a peak (or design) period. Annual forecasts are used to determine the operational peaking characteristics and are used to inform the facility requirements. To ensure that a facility isn't overbuilt, several factors are used to analyze needs. The average day of the peak month, or the design day, is an accepted industry methodology used in evaluating peaking characteristics. Metrics such as average annual day don't adequately take into consideration increased activity at certain times of the year. Planning for only the busy or peak day of the peak month, however, may result in facilities that are overbuilt.

The periods used in the capacity analysis and facility requirements are as follows:

- Peak Month — the calendar month when peak passenger volumes of aircraft operations occur
- Peak Month Average Day (PMAD) — the average day in the peak month; derived by dividing the peak month operations by the number of days in a month (average of 30 days per a month)
- Design Hour — the peak hour within the design day

While WVI may be considered a "fair-weather" airport by pilots, the average operations from month to month are relatively consistent. Operations dip slightly during winter from January to March and tend to be highest in late summer from July to October. This MPU assumed that 11 percent of annual activity occurred during the peak month and 15 percent of the operations during the PMAD occurred within the peak hour. These percentages were held constant through the planning period, as shown in **Table 2-13**.

Table 2-13: WVI Peaking Characteristics

Year	Total Operations	Peak Month Operations	Peak Month Average Day (PMAD)	Peak Hour
Percent	-	11%	-	15%
2020	50,500	5,555	185	28
Forecast				
2021	55,000	6,050	202	30
2025	61,000	6,710	224	34
2030	69,400	7,634	254	38
2035	79,000	8,690	290	43
2040	89,900	9,889	330	49
Source: Kimley-Horn 2021				

2.8 Recommended Forecast Summary

Table 2-14 presents a summary of the recommended forecasts for WVI. This forecast provides a reasonable growth over the 20-year planning horizon based on a robust set of historical data that the Airport has been able to capture.

Table 2-14: Recommended WVI Forecast Summary

Category	2020	2021	2025	2030	2035	2040
Total Operations	**50,500**	**55,000**	**61,000**	**69,400**	**79,000**	**89,900**
Jet	*505*	*550*	*610*	*1,040*	*1,580*	*2,700*
Multi-Engine	*2,525*	*2,750*	*3,050*	*3,470*	*3,950*	*4,500*
Helicopter	*6,060*	*6,600*	*7,320*	*8,330*	*9,480*	*10,800*
Single Engine	*41,410*	*45,100*	*50,020*	*56,560*	*63,990*	*71,900*
Local	*33,835*	*36,850*	*40,870*	*46,498*	*52,930*	*60,233*
Itinerant	*16,665*	*18,150*	*20,130*	*22,902*	*26,070*	*29,667*
Day	*41,410*	*45,100*	*50,020*	*56,908*	*64,780*	*73,718*
Evening/Night	*9,090*	*9,900*	*10,980*	*12,492*	*14,220*	*16,182*
Instrument Approaches	*3,030*	*3,300*	*3,660*	*4,164*	*4,740*	*5,394*
Touch-and-Go	*7,575*	*8,250*	*9,150*	*10,410*	*11,850*	*13,485*
Based Aircraft	**280**	**282**	**291**	**303**	**315**	**327**
Jet	*4*	*4*	*4*	*6*	*6*	*8*
Multi-Engine	*15*	*15*	*16*	*16*	*17*	*18*
Helicopter	*5*	*5*	*5*	*5*	*6*	*7*
Single Engine	*256*	*258*	*266*	*275*	*286*	*294*
Source: Kimley-Horn 2021						

2.9 FAA Forecast Review and Approval

FAA Airports District Offices (ADOs) or Regional Airports Divisions are responsible for forecast approvals. When reviewing a sponsor's forecast, the FAA must ensure that the forecast is based on reasonable planning assumptions, uses current data, and is developed using appropriate forecast methods. After a thorough review of the forecast, FAA then determines if the forecast is consistent with the TAF.

The TAF is the official forecast for each airport in the NPIAS. The TAF contains forecasts for passenger enplanements, aircraft operations, and the number of based aircraft using data from the U.S. Department of Transportation (USDOT) T-100 database, Air Traffic Control Tower (ATCT) records, and FAA Master Records (Form 5010-1). The TAF is based on historical aircraft operations data, which are often estimated for smaller non-towered airports. With technological advances such as ADS-B technology, greater precision is anticipated in tracking and counting aircraft operations at small airports. For WVI, the TAF remains flat from 2019 through 2040 at 256[18] based aircraft and 60,000 annual operations.

For all classes of airports, forecasts for based aircraft and total operations are considered consistent with the TAF if they meet the following criterion: Forecasts differ by less than 10 percent in the five-year forecast period, and 15 percent in the 10-year forecast period. The FAA-template comparison of the Recommended Forecasts and the TAF is presented in **Table 2-15** and **Table 2-16.**

Table 2-15: Comparison of Recommended WVI Forecasts to FAA's TAF – Based Aircraft

Based Aircraft	Year	WVI Forecast	TAF Forecast[19]	WVI/TAF % Difference
Base yr.	2020	280	280	0.00%
Base yr. + 1	2021	282	280	0.71%
Forecast				
Base yr. + 5	2025	291	280	3.93%
Base yr. + 10	2030	303	280	8.21%
Base yr. + 15	2035	315	280	12.50%
Base yr. + 20	2040	327	280	16.79%
Sources: FAA TAF 2020, Kimley-Horn 2021				

[18] The 2019 TAF Forecast of 256 was utilized for this MPU analysis based on the information available at the time of writing (April 2021). Since this chapter was originally written, the FAA released the 2020 TAF in May 2021 which displays 261 based aircraft.
[19] Following discussions with the FAA, Table 2-15 TAF Forecast column utilizes a based aircraft number based on the FAA's National Based Aircraft Inventory Program of 280 (2/8/21) rather than the TAF's 256 (2019) for better comparison purposes.

Table 2-16: Comparison of Recommended WVI Forecasts to FAA's TAF - Operations

Itinerant Operations	Year	WVI Forecast	TAF Forecast	WVI/TAF % Difference
Base yr.	2020	16,665	20,100	-17.09%
Base yr. + 1	2021	18,150	20,100	-9.70%
Forecast				
Base yr. + 5	2025	20,130	20,100	0.15%
Base yr. + 10	2030	22,902	20,100	13.94%
Base yr. + 15	2035	26,070	20,100	29.70%
Base yr. + 20	2040	29,667	20,100	47.60%
Local Operations	**Year**	**WVI Forecast**	**TAF Forecast**	**WVI/TAF % Difference**
Base yr.	2020	33,835	39,900	-15.20%
Base yr. + 1	2021	36,850	39,900	-7.64%
Forecast				
Base yr. + 5	2025	40,870	39,900	2.43%
Base yr. + 10	2030	46,498	39,900	16.54%
Base yr. + 15	2035	52,930	39,900	32.66%
Base yr. + 20	2040	60,233	39,900	50.96%
Total Operations	**Year**	**WVI Forecast**	**TAF Forecast**	**WVI/TAF % Difference**
Base yr.	2020	50,500	60,000	-15.83%
Base yr. + 1	2021	55,000	60,000	-8.33%
Forecast				
Base yr. + 5	2025	61,000	60,000	1.67%
Base yr. + 10	2030	69,400	60,000	15.67%
Base yr. + 15	2035	79,000	60,000	31.67%
Base yr. + 20	2040	89,900	60,000	49.83%
Sources: FAA TAF 2020, Kimley-Horn 2021				

2.10 Critical Aircraft

Facility planning for general aviation airports is impacted by existing and anticipated levels of aviation-related demand, both based aircraft and annual aircraft operations, as well as the size and type of aircraft that currently operating and are projected to operate at an airport. Each airport and runway has a 'critical' or 'design' aircraft which represents the most demanding aircraft or grouping of aircraft with similar characteristics currently using or anticipated to use an airport on a 'regular basis', defined as 500 annual operations, excluding touch-and-go operations. The following section describes the classification system and identifies the existing and future critical aircraft for WVI.

2.10.1 Aircraft Classification System

The FAA has established aircraft classification systems that group aircraft types based on their performance and geometric characteristics. These classification systems are used to determine the appropriate airport design standards for specific runway, taxiway, taxilane, apron or other facilities, as described in FAA AC 150/5300-13A, Change 1. These systems include the following:

- Aircraft Approach Category (AAC): A grouping of aircraft based on a reference landing speed (VREF), if specified, or if VREF is not specified, 1.3 times stall speed (VSO) at the maximum certificated landing weight. VREF, VSO and the maximum certificated landing weight are established for the aircraft by the certification authority of the country of registry.
- Airplane Design Group (ADG): A classification of aircraft based on wingspan and tail height. When the aircraft wingspan and tail height fall in different groups, the higher group is used.

Table 2-17 summarizes the classifications for determining these components.

Table 2-17: FAA Aircraft Classification Criteria

Aircraft Approach Category (AAC)	Approach Speed	Airplane Design Group (ADG)	Wingspan (feet)	Tail Height (feet)
A	Less than 91	**I**	Less than 49	Less than 20
B	91 to 120	**II**	49 to 78	21 to 29
C	121 to 140	**III**	79 to 117	30 to 44
D	141 to 165	**IV**	118 to 170	45 to 59
E	166 or Greater	**V**	171 to 213	60 to 65
		VI	214 up to but less than 262	66 up to but less than 80
Source: FAA Advisory Circular 150/5300-13A, Change 1, Airport Design				

The critical or design aircraft family represents the most demanding aircraft or grouping of aircraft with similar characteristics (relative to AAC, ADG) currently using or anticipated to use an airport on a regular basis.

The FAA uses these aircraft classifications relative to classifying airports and runways. As defined in FAA Advisory Circular 150/5300-13A, Change 1, the FAA classifies airports by Airport Reference Code (ARC), which identifies the overall planning and design criteria for the airport. The ARC is assigned based on the size of the largest aircraft that generally records at least 500 operations annually at an airport; this aircraft is known as the airport's "critical aircraft", also referred to as the design aircraft.

The ARC is based on the highest Runway Design Code (RDC) of a particular airport. The RDC is comprised of the previously discussed AAC and ADG, as well as the approach visibility minimums. Instrument approach visibility minimums are expressed in RVR values but are associated with flight visibility as described in **Table 2-18**.

Table 2-18: Instrument Approach Visibility Minimums

RVR (ft)	Flight Visibility Category (statute mile)
VIS	Visual approaches only
5,000	Not lower than 1 mile
4,000	Lower than 1 mile but not lower than ¾ mile (APV ≥ 3/4 but < 1 mile)
2,400	Lower than 3/4 mile but not lower than 1/2 mile (CAT-I PA)
1,600	Lower than 1/2 mile but not lower than 1/4 mile (CAT-II PA)
1,200	Lower than 1/4 mile (CAT-III PA)
Source: FAA Advisory Circular 150/5300-13A, Change 1, Airport Design	

The RDC provides the guidelines for pavement surfaces, safety area dimensions, runway lengths, separation standards, and taxiway criteria in an attempt to ensure that the airfield layout and geometry provide a safe and efficient operating environment for the aircraft that typically use the airport.

Aircraft with approach speeds included in categories A and B are typically small, piston-engine aircraft, whereas aircraft with C, D, and E category approach speeds are normally larger turboprop or turbine powered aircraft. Similarly, the wingspan and tail height of small, piston-engine aircraft normally correspond to design group I. Typical aircraft in design group II would be a Beechcraft King Air, Cessna Citation, or smaller Gulfstream business jets. Design groups III, IV, and V would represent air carrier aircraft, such as Boeing 737, B-757, and B-747, respectively. Group VI would include the largest of aircraft, such as an Airbus A380 or a C-5 military cargo aircraft.

2.10.2 Current and Future Critical Aircraft

The 2013 Airport Layout Plan listed the current and future critical aircraft as a Cessna Citation II, a B-II aircraft, for Runway 02-20 and Beech Baron 58, a B-I aircraft, for Runway 09-27. A detailed analysis of the 2020 ADS-B database was conducted along with discussions with the Airport to determine the current critical aircraft for both runways at WVI. It was determined that the current critical aircraft for Runway 02-20 is a Beech King Air 350 (BE350), a B-II aircraft and for Runway 09-27, a Cessna 340, a B-I Small aircraft.

Critical Aircraft

Beech King Air 350 (B-II) ***Runway 2-20***	***Cessna 340 (B-I Small)*** ***Runway 9-27***
	

While there was no single type of B-II aircraft that conducts at least 500 operations there were more than 650 operations conducted by aircraft in the B-II family. **Table 2-19** presents a summary of the annual operations recorded at WVI in 2020 by aircraft type**.** As shown, the King Air 300/350 conducted just more than half of the operations but did not reach 500 during the calendar year. The 340 remaining B-II operations were conducted by the following: Beech King Air 200, Beech King Air C90GTX, Cessna Citation Jet 2, Cessna Citation Jet 3, Cessna Citation V, Cessna Citation Latitude, Cessna Citation Sovereign, and Embraer Phenom 300.The images below are representative of the B-II family of aircraft typically operating at WVI.

Table 2-19: B-II Aircraft 2020 Annual Operations by Type

Aircraft Type	Annual Operations (2020)
Beechcraft King Air 350 (B350)	261
Beechcraft King Air 200 (BE20)	141
Beechcraft King Air 300 (BE30)	78
Beechcraft King Air C90GTX (BE9L)	50
Cessna Citation Jet 3 (C25A)	31
Cessna Citation Jet 2 (C25B)	30
Embraer Phenom 300 (E55P)	25
Cessna Citation II (C550)	20
Cessna Citation Sovereign (C680)	14
Cessna Citation Latitude (C68A)	10
Other B-II *(less than 10 annual operations)*	19
Total B-II	**679**
Source: 2020 MIS Database	

Additional Representative Aircraft of the B-II Family

Cessna Citation Jet 2

Beechcraft King Air C90 GTX

Embraer Phenom 300

Cessna 550 Citation II

Similar to the B-II aircraft family, no single type of B-I Small aircraft conducts more than 500 annual operations at the Airport. As shown in **Table 2-20**, Beechcraft 58 Baron, Cessna 340, and Cessna Citation Jet 1 account for more than 300 annual operations of B-I aircraft. Operations were also conducted by the following aircraft types: Beechcraft King Air 100, Beechcraft 60, Cessna Citation M2, Cessna 414, Cessna Citation Mustang, Diamond DA-62, Piper PA-31 Navajo, and Embraer Phenom 100. The images below are representative of the B-I Small family of aircraft.

Table 2-20: B-I Small Aircraft 2020 Annual Operations by Type

Aircraft Type	Annual Operations (2020)
Cessna Citation Jet 1 (C525)	177
Beechcraft Baron 58 (BE58)	114
Cessna 340 (C340)	100
Cessna 414 (C414)	17
Cessna Citation M2 (C25M)	12
Cessna Mustang (C10)	10
Other B-I Small *(less than 10 annual operations)*	19
Total B-I Small	**449**
Source: 2020 MIS Database (January-November)	

Additional Representative Aircraft of the B-I Small Family

Cessna 340	*Beechcraft 58 Baron*
	

There were several aircraft larger than B-II that operate at WVI but no single aircraft or grouping had at least 500 operations to be designated as the critical aircraft. These aircraft include Cessna Citation X, Bombardier Challenger 300, Bombardier Challenger 600, Boeing DC-10, Gulfstream 280, Gulfstream 2, Gulfstream 4, Gulfstream 5, Learjet 75, and Piaggio P-180. Many of these aircraft were operated by charter operations such as NetJets or FlexJet.

Based on the criteria described in FAA AC 150/5300-13A, Runway 02-20 has an RDC of B/II/4000 and Runway 09-27 has an RDC of B/I/VIS (Small).

3 Facility Requirements

The purpose of this chapter is to identify Watsonville Municipal Airport's (WVI or the Airport) facility development needs over the 20-year planning window. The needs are determined by comparing WVI's existing facilities presented in **Chapter 1: Inventory of Existing Conditions** with the projected aviation-related activity levels presented in **Chapter 2: Aviation Forecasts.** This chapter identifies the improvements that will be necessary to meet user demand and/or design standards set by the Federal Aviation Administration (FAA).

The demand, capacity, design standards and overall airport facility requirements were evaluated using guidance sourced from several FAA publications:

- Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*
- AC 150/5300-13A, *Airport Design* [1]
- AC 150/5325-4B, *Runway Length Requirements for Airport Design*
- AC 150/5340-30J, *Design and Installation Details for Airport Visual Aids*
- AC 150/5340-1L, *Standards for Airport Markings*
- AC 150/5340-5C, *Segmented Circle Airport Marker System*
- AC 150/5340-18G, *Standards for Airport Sign Systems*
- AC 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports*,
- AC 150/5070-6B, Change 2: *Airport Master Plans*
- Airport Cooperative Research Program (ACRP) Report 113, *Guidebook on General Aviation Facility Planning*
- Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*
- Order 8260.3, *United States Standards for Terminal Instrument Procedures (TERPS)*
- Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*

It is important to note that the needs and issues identified in this analysis are a part of a phased plan that is subject to changing guidance, policies, and interpretation. For example, FAA AC 150/5300-13A, *Airport Design* was last updated in 2012 and a new version (-13B) was in draft at the time this MPU analysis was completed and has since been published. As such, some of the facility standards described in this analysis may change in the near term based on this guidance and new requirements may become applicable during the 20-year planning window. Resolutions for all of the items described in this chapter cannot and do not need to be implemented immediately. It will be important for WVI to discuss the latest FAA guidance as implementation planning is initiated to confirm the recommendations made in this MPU are applicable at the time of implementation.

Additionally, there is a heightened level of uncertainty associated with long-range demand forecasting due to the unprecedented circumstances surrounding the COVID-19 pandemic. As such, planning activity levels (PALs) may be used to represent future levels of operational activity at which certain airport facilities would be necessary for this MPU. The use of PAL "triggers" allows for planning that is tied to future activity levels as they occur rather than improvements being planned for arbitrary milestone years (short-, medium- and long-term). Some types of airport improvements such as aircraft storage

[1] An updated version of AC-150/5300-13 (-13B) was published in March 2022. The design requirements of the draft AC are reviewed in this chapter to ensure that the Airport remains compliant with proposed draft FAA design standards after the cancelation of the existing guidance (-13A), which was still in effect at the time of writing.

facilities are more dependent on activity levels than others. Therefore, these projects can be programmed using PALs rather than milestone years. Project phasing is discussed in further detail in **Chapter 5.**

3.1 Airfield Demand and Capacity Assessment

WVI's airfield capacity requirements were based on objectives outlined below:

- Confirm the airfield provides sufficient capacity throughout the 20-year planning window.
- Confirm that access to runways, taxiways, and aprons sufficient to meet operational demands, requirements, and FAA design standards throughout the 20-year planning window.

Airfield capacity refers to the maximum number of aircraft operations (takeoffs and landings) an airfield can accommodate in a specified amount of time (i.e. hourly or annually) assuming there is always demand for the runway. As demand approaches capacity, traffic congestion and the average amount of delay per aircraft can increase.

An assessment of the airfield's capacity was performed utilizing the methodologies described in FAA AC 150/5060-5, *Airport Capacity and Delay* to evaluate WVI's ability to handle current and projected levels of aircraft activity. This assessment is used in long-range planning to identify and justify capacity-related airfield improvements that may be needed over the planning horizon. Definitions of hourly and annual capacity utilized by the FAA are as follows:

- Hourly Capacity – the maximum number of aircraft operations the airfield can safely accommodate under continuous demand in a one-hour period
- Annual Service Volume (ASV) – the maximum number of aircraft operations that an airfield can safely accommodate in a one-year period without excessive delay.

3.1.1 Capacity Calculation Factors

Airfield capacity calculations take key operational factors and WVI-specific assumptions into consideration. Consistent with the guidance provided in FAA AC 150/5060-5, these are described in the following subsections.

Aircraft Fleet Mix

Due to varying performance characteristics between different types of aircraft, an airport's fleet mix can have a significant impact on an airfield's capacity. While not necessarily applicable to WVI, the FAA mandates that greater lateral spacing is needed between aircraft to avoid wake turbulence when larger, heavier aircraft operate at an airfield, reducing the hourly and annual capacity of the airfield. The Airport's aircraft fleet mix index helps determine the size of the typical aircraft operating at the airfield and the frequency of their operations. The following are the four classifications of aircraft fleet mix specific to conducting airfield capacity calculations:

- Class A – 12,500 lbs. or less, single engine
- Class B – 12,500 lbs. or less, multi-engine
- Class C – 12,500 to 300,000 lbs.
- Class D – over 300,000 lbs.

The mix index is calculated for each runway-use configuration by adding the percentage of Class C aircraft to three-times the percentage of Class D aircraft (*C+3D*). Flight plan information was collected from the ADS-B database to identify specific aircraft types that operate at WVI.[2] At WVI, operations of Class C aircraft accounted for 1.2 percent of the Airport's total operations during the data recording period. ADS-B data indicated that Class D aircraft accounted for less than 0.1 percent of total operations. It is assumed that Class D aircraft will not operate at WVI during the forecast period. Therefore, according to the FAA AC 150/5060-5, during visual flight rule (VFR) and instrument flight rule (IFR) conditions at WVI, the aircraft fleet mix index is 1.5.

Runway-Use Configurations

The overall capacity of an airfield is directly related to the number and orientation of the runways available during various operating conditions. An airfield may have multiple operating configurations depending on weather/wind conditions, time of day, and/or types of approach procedures available. If an airport has two or more runways, then the runways can be considered *dependent* or *independent* of each other. Dependent runways are configured in such a way that aircraft must wait for traffic to complete operations on the other runway before continuing their own operations. Dependent runways usually consist of intersecting or closely paralleled runways (less than 700 feet separation for VFR operations/less than 4,300 feet for IFR operations). An independent runway is one that is not affected by operations on other runways during normal airport operation. Independent runways are usually parallel runways that have adequate lateral separation. As WVI's two runways intersect, they are considered dependent runways.

At WVI, the Runway Visibility Zone (RVZ) issue precludes the use of Runway 27 for departures at all times, which limits the overall capacity of the airfield and restricts hourly capacity when the wind is blowing from the west. However, as discussed in **Section 3.5**, Runway 2-20 provides 98 percent crosswind coverage, so the restrictions of Runway 27 have a limited impact on the airport's ASV. **Table 3-1** summarizes the runway configuration and usage at WVI based on historical activity.

Table 3-1: Runway Use Configuration and Utilization

Runway End Average Utilization			
02	**20**	**09**	**27**
10%	83%	3%	4%
**** Note: Runway 27 not available for departures due to RVZ requirements*** ***Source: AAP, Inc.***			

Aircraft Activity Peaking Characteristics

As mentioned in **Chapter 2: Aviation Forecasts**, aircraft activity fluctuates throughout different times of the year. Given this, it is important to determine the level of aircraft activity that is forecast to occur on the peak month's average day (PMAD) during the planning period. Facilities should be designed to accommodate traffic during peak times while not overbuilding the Airport for what is necessary on an average day.

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[2] ADS-B data for WVI were gathered by Maritime Information Systems (MIS)

Table 3-2 presents the historic peaking characteristics based on 2020 data and the forecast peaking characteristics for 2040 based on the information discussed in Section 2.7.

Table 3-2: WVI Peaking Characteristics

Year	Total Operations	Peak Month Operations	Peak Month Average Day (PMAD)	Peak Hour
2020	50,500	5,555	185	28
2040	89,900	9,889	330	49
Source: Kimley-Horn				

Airfield Capacity Summary

FAA AC 150/5060-5, *Airport Capacity and Delay* outlines several methodologies that are available to calculate airfield capacity. For purposes of this MPU, the accepted calculations published in FAA AC 150/5060-5 were utilized to estimate airfield capacity based on runway configuration and aircraft fleet mix. The analysis considered the characteristics of WVI and applied certain assumptions to determine the existing and planned airfield capacity of the Airport. These assumptions include:

- No scheduled commercial service
- Landings generally equal take-offs during peak periods
- Simultaneous operations[3] on Runway 2-20 and Runway 9-27 are not conducted

Based on these assumptions, WVI's current airfield configuration is calculated to be able to accommodate 98 aircraft operations per hour during VFR operations and 59 operations per hour during IFR operations, resulting in an ASV of 230,000 operations.[4] As noted, hourly operations are expected to peak at 49 operations by 2040, meaning that the capacity of the existing airfield configuration (98 operations per hour) is sufficient to accommodate future demand. Additionally, annual operations at WVI are projected to reach 89,900 by 2040, which equates to approximately 39 percent of total annual capacity or ASV. The FAA recommends that airports begin planning for improvements to make capacity improvements when activity levels reach 60 to 75 percent of the annual capacity. Given this, it is anticipated that WVI will have adequate airfield capacity to meet demand and will not need to plan for nor make improvements to increase airfield capacity during the planning period.

It should be noted, as Runway 2-20 and Runway 9-27 are intersecting and simultaneous operations are not to be conducted, the closure of either runway would not impact the airfield capacity. There are no planned significant airfield changes (i.e., different runway configuration), therefore, the airfield capacity is expected to remain the same throughout the 20-year planning window.

3.2 FAA Aircraft and Airfield Classifications

Airport master plans aim to achieve compliance with all FAA design and safety standards related to airfield facilities including airfield dimensions, separation distances, protection zones, and clearance requirements. Design standards work to balance

[3] Simultaneous operations mean that aircraft can operate on both runways at the same time.
[4] FAA AC 150/5060-5 does not consider external factors to airfield capacity such as airspace, and wind conditions. As such, the actual capacity of WVI may be lower than what is determined using the AC.

interests at airports including safe operations, increased capacity and efficiency, economic viability, and environmental protection. Additionally, design standards support consistent quality and configuration of airfield facilities between airports. As such, any deviations from these standards require a separate review and approval process that is discussed in later sections of this report.

Design standards, as identified in the FAA AC150/5300-13A, *Airport Design* describe these criteria that apply to runways, taxiways, and other related airfield infrastructure to provide clearance for aircraft from hazards on and surrounding the Airport. These design standards are dependent on the following classifications that apply to:

- The airport - Airport Reference Code (ARC)
- Each individual runway (Runway Design Code [RDC])
- Both the approach and departure procedures (Approach Reference Code [APRC] and Departure Reference Code [DPRC])
- The taxiway system (Taxiway Design Group [TDG])

Although AC 150/5300-13A contains an overview of the above classifications and most other aspects of airfield design, there are several additional FAA publications that address specific parts of airport design, providing more specific requirements for airport planners and operators to refer to when adding or modifying facilities.

3.2.1 Runway Design Code (RDC)

RDCs are used to establish the design standards that each individual runway should adhere. RDCs have three components: the Aircraft Approach Category (AAC), the Aircraft Design Group (ADG), and the runway's visibility minimums. The AAC is based on an aircraft's approach speed and is depicted as a letter between A through E. The ADG, meanwhile classifies aircraft based on wingspan and tail height and is depicted using Roman numerals between I and VI. Runway visibility minimums are communicated in feet of Runway Visual Range (RVR). The categories of the AAC, ADG, and visibility minimums are summarized in **Table 3-3.**

Table 3-3: Runway Design Code Specifications

Aircraft Approach Category (AAC)		Aircraft Design Group (ADG)			Visibility Minimums	
Category	Speed	Group	Wingspan Size	Tail Height	RVR (ft)	Flight Visibility Categories (statute miles)
A	< 91 knots	I	< 49'	< 20'	Visual	Visual approaches only
B	91 to 120 knots	II	49' to < 79'	20' - < 30'	5000	>1 sm
C	121 to 140 knots	III	79' to < 118'	30' - < 45'	4000	< 1 sm - ¾ sm
D	141 to 165 knots	IV	118' to < 171'	45' - < 60'	2400	< ¾ sm - ½ sm
E	166 knots or more	V	171' to < 214'	60' - < 66'	1600	< ½ sm - 1/4 sm
-	-	VI	214' to < 262'	66' - <80'	1200	< 1/4 sm
Source: FAA AC 150/5300-13A						

Runway 2-20 has visibility minimums that are equal to a 4000 RVR (7/8 mile) and therefore has an RDC of B-II-4000. Runway 9-27 meanwhile, only allows visual approaches, which results in an RVR designation of VIS and a corresponding RDC of B-

I(S)-VIS.[5] As mentioned in **Chapter 2**, the representative aircraft of the B-II family is the Beechcraft King Air 350, while the representative aircraft of the B-I Small family is the Cessna 340.

3.2.2 Airport Reference Code (ARC)

The ARC is defined as an airport's highest RDC, minus the visibility minimums (i.e. B-II). The ARC is used for planning only and does not restrict the types of aircraft that can operate from the airport. As discussed above, the existing and planned critical aircraft at WVI during the planning timeframe is the Beechcraft King Air 350, which has an AAC-ADG designation of B-II. Therefore, the ARC at WVI is designated as B-II. However, larger, more demanding aircraft may safely operate at WVI during the planning timeframe but are not expected to regularly use the airfield.

3.2.3 Approach and Departure Reference Code (APRC and DPRC)

APRCs and DPRCs describe the *current* operational capabilities of a runway and adjacent taxiways where no special operating procedures are necessary, as opposed to the RDC, which considers *planned* development. Like the RDC, the APRC is composed of three components: AAC, ADG, and visibility minimums. The APRC indicates which classes of aircraft can operate on parallel taxiways while aircraft land during specific meteorological conditions and identifies several design criteria including runway lighting and marking requirements, threshold siting criteria, obstacle free zones, and FAA obstacle identification surfaces. As the APRC is dependent on the approach visibility minimums, the APRC differs between each runway end. The APRC for each runway end is described below.

- Runway 2: B-II-4000
- Runway 20: B-II-VIS
- Runway 9: B-I(S)-VIS
- Runway 27: B-I(S)-VIS

The DPRC represent the class of aircraft that are allowed to take off from a runway while any aircraft are present on adjacent taxiways under particular meteorological conditions with no special operational procedures in place. The DPRC is similar to the APRC but is only composed of the AAC and the ADG. The DPRC for Runway 2-20 is B-II, while the DPRC for Runway 9-27 B-I(S).

3.2.4 Taxiway Design Group (TDG)

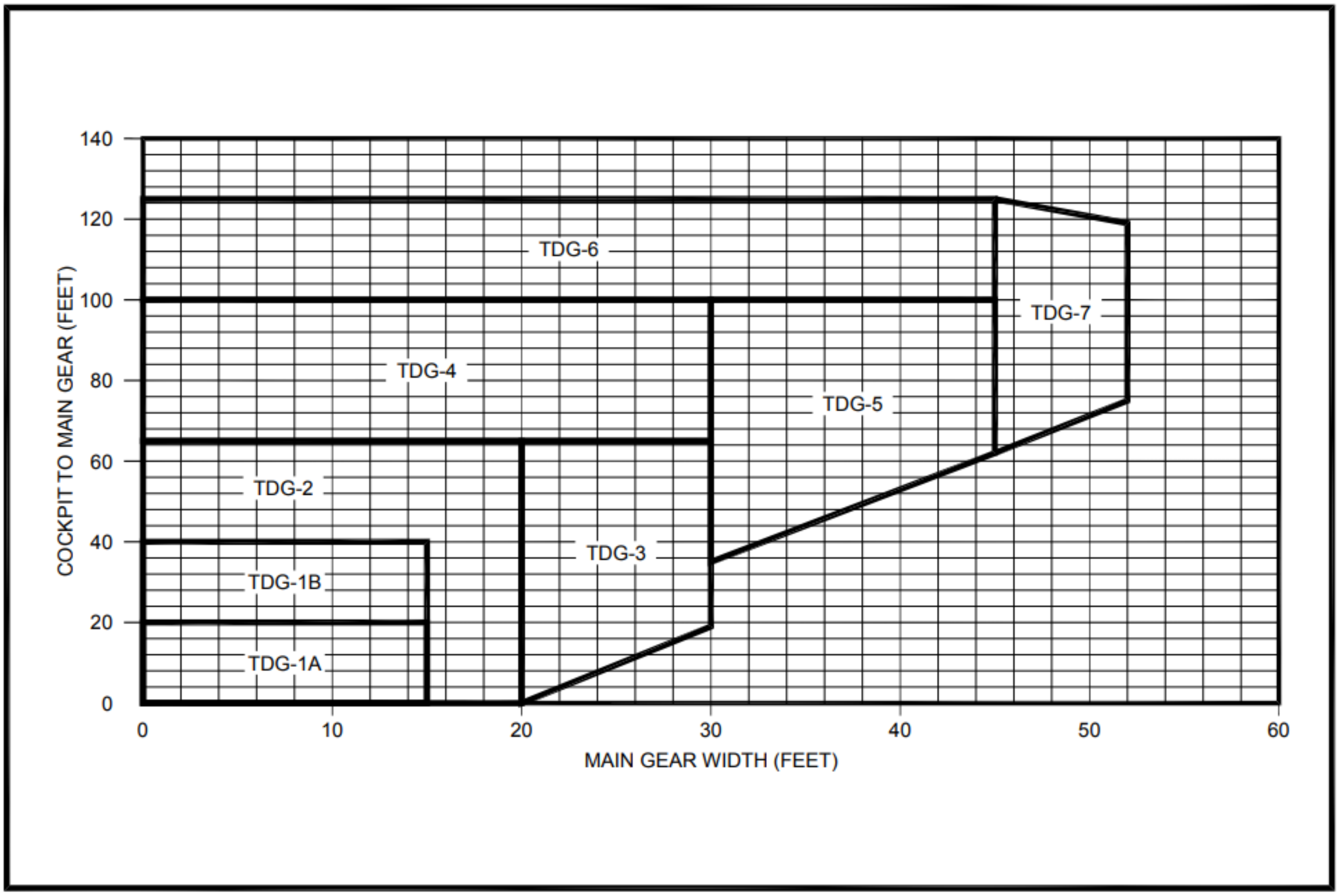
The TDG is the design standard for taxiways and establishes the classification of aircraft based on distance between the outer main gear and the distance between the main gear and the cockpit. These measurements are used because taxiways are designed for 'cockpit over centerline' taxiing, meaning that longer and larger aircraft will need wider taxiways to turn. **Figure 3-1** presents the dimensions of the Taxiway Design Group classifications as described in FAA AC 150/5300-13A. It is important to note that an updated draft of AC-150/5300-13 (-13B) was made available in July 2020 for public comment. This analysis reviewed the design requirements of the draft AC are reviewed in this chapter to ensure that the Airport remains compliant with proposed draft FAA design standards after the cancelation of the existing guidance (-13A).

Not all taxiways on an airport may necessarily need to be designed to the same critical aircraft standards. For example, taxiways or taxilanes leading to hangar areas capable of accommodating only smaller aircraft may be designed to smaller standards whereas the main parallel taxiway, which supports all aircraft types, should be designed to the larger aircraft

[5] (S): Small Aircraft

standards. Based on the critical aircraft of Runway 2-20, the Beechcraft King Air 350, the TDG of the parallel taxiway (Taxiway A) is TDG-2.[6] The TDG of Taxiway C, the parallel taxiway of Runway 9-27, is TDG-1A based on the critical aircraft being the Cessna 340.

Figure 3-1: FAA Taxiway Design Group Classifications



Source: FAA AC 150/5300-13A

[6] For draft AC-150/5300-13B, the Beechcraft King Air 350 will be a TDG-2A.

3.2.5 FAA Airfield Classification Summary

Table 3-4 summarizes the existing and projected design classifications of WVI as defined by FAA AC 150/5300-13A, *Airport Design*.

Table 3-4: FAA Airfield Classification Summary

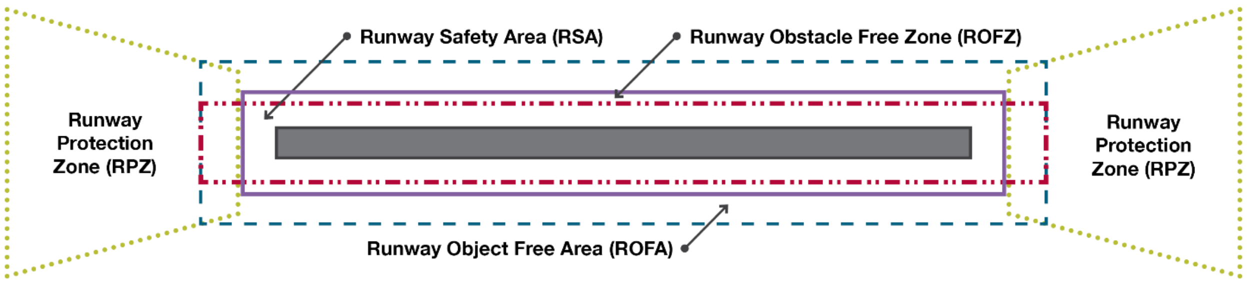
Design Classification Type	WVI Existing & Planned Classification			
	Runway 2	Runway 20	Runway 9	Runway 27
Airport Reference Code (ARC)	B-II			
Runway Design Code (RDC)	B-II-4000		B-I(S)-VIS	
Approach Reference Code (APRC)	B-II-4000	B-II-VIS	B-I(S)-VIS	B-I(S)-VIS
Departure Reference Code (DPRC)	B-II		B-I	
Taxiway Design Group (TDG) (Parallel Taxiway)	2		1A	
Sources: FAA AC 150/5300-13A, Kimley-Horn				

3.3 FAA Runway Design Standards

As mentioned, FAA AC 150/5300-13A, *Airport Design,* describes the dimensions and separation criteria for runways, taxiways, and other airport facilities to provide adequate clearance between aircraft. This section describes the runway design requirements that are set forth in the Advisory Circular as they pertain to WVI. As these requirements are unique for each runway, they are determined by the RDC.

Figure 3-2 illustrates the approximate shape and location of several of the runway design standards in relation to one another.

Figure 3-2: Runway Design Standards



Source: Kimley-Horn

3.3.2 Runway Safety Area (RSA)

The Runway Safety Area (RSA) is a "defined 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." The RSA must be cleared of all objects except for those needed in the area due to their function such as runway lights and signage. Objects that must remain in the RSA must be constructed on frangible mounts, allowing the object to breakaway and minimize aircraft damage in the event of a collision or mishap.

Runway 2-20's RSA is 150 feet wide and extends 300 feet beyond the approach departure ends of the runway. The RSA for Runway 2-20 is clear within these dimensions and meets the current standards for the B-II-4000 RDC. The RSA of Runway 9-27 is 120 feet wide and extends 240 feet beyond each end of the runway and is clear within these dimensions which meets RDC B-I(S)-VIS standards.

3.3.3 Runway Object Free Area (ROFA)

The Runway Object Free Area (ROFA) is centered around the runway centerline, it provides enhanced safety for aircraft operations by requiring clearing of all above-ground objects that protrude above the RSA edge elevation, except for objects that need to be located in the ROFA to facilitate aircraft navigation and ground maneuvering. Similar to the RSA, all objects in the ROFA must be constructed on frangible mounts.

The Runway 2-20 ROFA is 500 feet wide and extends 300 feet beyond the ends of the runway, and is clear of any objects, meeting the dimensional standards for the B-II-4000 RDC.

As of May 2021, the Airport perimeter fence and several bushes, trees, and shrubs along Airport Boulevard are located within the ROFA, 205 feet from the Runway 27 approach end. This is 35 feet less than what is required for RDC B-I(S)-VIS. The Airport is currently reviewing options to remove the obstructions. Other than the fence and foliage, Runway 9-27's ROFA is 250 feet wide, extends 240 feet beyond the end of the Runway 9 end, and is clear of any objects.

3.3.4 Runway Obstacle Free Zone (ROFZ)

The Obstacle Free Zone (OFZ) is defined by the FAA as the volume of airspace centered above the runway centerline that extends 200 feet beyond each runway end that precludes taxiing or parked airplanes and object penetrations, except for frangible NAVAIDS and airfield signage, similar to the ROFA. The width of the ROFZ is determined by the visibility minimums, and the approach speed (50 knots and above) and size of aircraft using the runway.

Both Runway 2-20 and Runway 9-27 have ROFZs that are 250 feet wide and extend 200 feet beyond each end of the runway. Both ROFZs are clear of any obstacles within these dimensions which means the ROFZs meet the dimensional standards.

3.3.5 Runway Protection Zone (RPZ)

The Runway Protection Zone (RPZ) is a trapezoidal area that is centered on the runway centerline and begins 200 feet beyond the runway end. The RPZ is a compatible land use measure that is intended to protect people and property on the ground in the event of an undershoot. It is recommended that airports maintain positive control over RPZs through fee simple land acquisition, avigation easement, or use restrictions or agreements. This ensures that RPZ areas are cleared of incompatible land uses and activities. Runways with displaced thresholds and declared distances may require the application of separate approach and departure RPZs. RPZ dimensions vary depending on the approach minimums of the runway, which may necessitate different dimensions for the approach and departure RPZs. **Figure 3-3** depicts the existing approach and departure RPZs at WVI. As a visual runway, the approach and departure RPZs of Runway 9-27 occupy the same area. Yellow shading represents the land within the existing RPZs that is not owned by the Airport.

Figure 3-3: Existing RPZs

Sources: Google Earth, 2020, Kimley-Horn

Runway 2-20

The standard approach RPZ dimensions for a B-II-4000 runway such as Runway 2 is 1,700 feet long, 1,000 feet wide at its inner boundary and 1,510 feet wide at its outer boundary. The standard dimensions of Runway 2's departure RPZ measure 1,000 feet long with an inner width of 500 feet and an outer width of 700 feet. While these are dimensions meet FAA standards, several obstacles limit the actual area dedicated for airport use. The existing objects in the Runway 2 approach RPZ include the Airport perimeter Road, California Highway 1, Airport Boulevard, Larkin Valley Road, and two homes. The Runway 2 departure RPZ contains trees along the Airport perimeter and a small stretch of Larkin Valley Road (southbound Buena Vista Drive). As the Airport does not have complete control of the land on which these objects sit, the RPZs are considered deficient compared to FAA standards. These objects limit the inner width of the unobstructed approach RPZ to 792 feet, the outer width to 715 feet, and the length of the approach RPZ to 832 feet. The departure RPZ has an unobstructed length of 955 feet, an inner width of 500 feet, and an outer width of 610 feet, 90 feet less than what is required by the FAA.

Due to the 590-foot displaced threshold at the approach end of Runway 20, the approach and departure RPZs are required to be in separate locations. The standard dimensions of both the approach and departure RPZs are 1,000 feet in length with an inner width of 500 feet and an outer width of 700 feet. The departure RPZ begins 590 beyond the beginning of the approach RPZ and extends into the nearby Unincorporated Community of Freedom, over which the Airport does not have positive control. Objects in the Runway 20 approach and departure RPZs include Calabasas Road and 41 residential structures. The approach RPZ is cleared for the first 832 feet. The inner width of the cleared approach RPZ meets standards but the outer width is limited to 650 feet due to Buena Vista Drive. The departure RPZ, meanwhile, has an unobstructed length of 286 feet, an inner width of 500 feet and an outer width of 559 feet. **Table 3-5** presents the types and number of objects in the approach and departure RPZs of Runway 2-20. It is recommended that the Airport gains positive control of the entire RPZs and ideally, would clear them of all objects per FAA recommendations.

Table 3-5: Objects in Runway 2-20 RPZs

Object Type	Runway 2		Runway 20	
	Approach	Departure	Approach	Departure
Structures/Residences	2	0	2	41
Public Roads/Highways	5	1	1	1
Private/Dirt Roads	1	1	0	1
Total Objects Within RPZ	**8**	**2**	**3**	**43**
Area outside of Airport Property Line (Acres)	27.5		7.7	
Source: Kimley-Horn				

Runway 9-27

As Runway 9-27 does not have displaced thresholds and has a visual approach, the approach and departure RPZs at each end of the runway have the same starting location and dimensions. The RPZs are 1,000 feet long with an inner width of 250 feet and an outer width of 450 feet. Objects in the Runway 9 RPZ include Manfre Road and 20 residential structures and outbuildings. The Runway 9 RPZ has an unobstructed length of 276 feet, an inner width of 250 feet, and an outer width of 300 feet. The Runway 27 RPZ extends across Airport Boulevard into the nearby commercial and residential area. As such, there are more than 35 structures in the RPZ for Runway 27. The Runway 27 RPZ is cleared for the first 48 feet and is only 260 feet wide at its outer width, 190 feet less than standard due to Airport Boulevard. It is recommended that the Airport regains positive control of the RPZ and would ideally clear the RPZ of structures and other obstacles per FAA guidance. **Table 3-6** presents the number and types of objects in the RPZs of Runway 9-27.

Table 3-6: Objects in Runway 9-27 RPZs

Object Type	Runway 9	Runway 27
	Approach/Departure	Approach/Departure
Structures/Residences	20	36
Public Roads/Highways	1	3
Private/Dirt Roads	2	0
Total Objects Within RPZ	**23**	**39**
Area outside of Airport Property Line (Acres)	3.4	6.3
Source: Kimley-Horn		

3.3.6 Runway Separation Standards

The FAA defines several separation standards that are measured from the centerline of the runway and are established to ensure safety of airport users during aircraft operations. The following separation standards are applicable to WVI:

- Runway Centerline to Aircraft Holding Position
- Runway Centerline to Parallel Taxiway/Taxilane Centerline
- Runway Centerline to Aircraft Parking Area

RDC B-II-4000 design standards require 200 feet of separation from the runway centerline to aircraft holding positions, 240 feet from the runway centerline to a parallel taxiway or taxilane centerline, and 250 feet from the runway centerline to the aircraft parking area. The current separations from the Runway 2-20 centerline to the aircraft holding position, parallel taxiway centerline, and the aircraft parking area are 200 feet, 300 feet, and 375 feet, respectively. Therefore, Runway 2-20 meets current FAA runway separation standards for all of these separate standards.

The current separation standards require a B-I(S)-VIS runway to be separated by 125 feet from the runway centerline to the aircraft holding position, 150 feet from the runway centerline to the parallel taxiway centerline, and 125 feet from the runway centerline to the aircraft parking area. Runway 9-27's centerline is separated from the aircraft holding position by 125 feet and the aircraft parking area is separated by 217 feet. Taxiway C, the parallel taxiway to Runway 9-27, is separated from the runway centerline by 200 feet east of Taxiway A and 300 feet from the runway west of Taxiway A. These separation distances meet current FAA design standards.

Table 3-7 and **Table 3-8** present the existing performance of Runway 2-20 and Runway 9-27, respectively, in comparison to the corresponding FAA standards for each of the design requirements listed above. As noted, neither of the runways have paved shoulders or blast pads. Although AC 150/5300-13A lists dimensional standards for these items, the FAA does not require these items at airports supporting ADG-II or smaller aircraft types. Therefore, the deficiencies for these items are not applicable and are marked as "N/A".

Table 3-7: Summary of Runway 2-20 FAA Design Standards

Design Criteria	Runway 2-20 Existing Conditions		B-II-4000 Standards	Deficiencies
	02	20		
Runway Protection:				
RSA Length (Beyond runway end)	300’	300’	300’	None
RSA Width	150’		150’	None
ROFA Length (Beyond runway end)	300’	300’	300’	None
ROFA Width	500’		500’	None
ROFZ Length (Beyond runway end)	200’		200’	None
ROFZ Width	250’		250’	None
Approach RPZ Length*	832’	833’	1,700’/1,000’	868’/167’
Approach RPZ Inner Width*	792’	500’	1,000’/500’	208’/None
Approach RPZ Outer Width*	715’	650’	1,510’/700’	795’/50’
Approach RPZ Area (Acres)**	21.4	13.3	48.978/13.77	27.58/0.47
Departure RPZ Length*	955’	286’	1,000’	45’/714’
Departure RPZ Inner Width*	500’	500’	500’	None
Departure RPZ Outer Width*	610’	559’	700’	90’/141’
Departure RPZ Area (Acres)**	13.31	6.37	13.77	0.46/7.4
Runway Separation:				
Aircraft Holding Position	200’		200’	None
Aircraft Parking Edge	375’		250’	None
Parallel Taxiway Centerline	300’		240’	None

Note: Existing RPZ dimensions represent unobstructed land controlled by Airport. All RPZs must be designed to FAA standards and are recommended to be controlled and cleared of any unnecessary obstacles.

*****Note: Existing RPZ areas represent land owned and controlled by Airport.***

Sources: Kimley-Horn, FAA AC 150/5300-13A

Table 3-8: Summary of Runway 9-27 FAA Design Standards

Design Criteria	Runway 9-27 Existing Conditions		B-I(S)-VIS Standards	Deficiencies
	09	27		
Runway Protection:				
RSA Length	240’		240’	None
RSA Width	120’		120’	None
ROFA Length	240’	205’	240’	240’
ROFA Width	250’		250’	None
ROFZ Length	200’		200’	None
ROFZ Width	250’		250’	None
Approach RPZ Length*	276’	48’	1,000’	276’
Approach RPZ Inner Width*	250'	250'	250'	250'
Approach RPZ Outer Width*	300’	260’	450’	300’
Approach RPZ Area (Acres)**	4.43	1.56	8.035	4.43
Departure RPZ Length*	276’	48’	1,000’	276’
Departure RPZ Inner Width*	250'	250'	250'	250'
Departure RPZ Outer Width*	300’	260’	450’	300’
Departure RPZ Area (Acres)**	4.43	1.56	8.035	4.43
Runway Separation:				
Aircraft Holding Position	125’		125’	None
Aircraft Parking Edge	217’		*125’*	None
Parallel Taxiway Centerline	200/300’***		150’	None

Note: Existing RPZ dimensions represent unobstructed land controlled by Airport. All RPZs must be designed to FAA standards and are recommended to be controlled and cleared of any unnecessary obstacles

*****Note: Existing RPZ areas represent land owned and controlled by Airport.***

******Note: Taxiway C is separated from Runway 9-27 by 300’ west of Taxiway A and 200’ east of Taxiway A***

Sources: Kimley-Horn, FAA AC 150/5300-13A

3.3.7 Runway Visibility Zone (RVZ)

The FAA has established runway visibility zone (RVZ) or "line-of-sight" requirements that are intended to allow departing and arriving aircraft to see and verify the location and actions of other aircraft and vehicles that may be operating on active runways. This is particularly important at airports with intersecting runways and no air traffic control tower (ATCT) such as WVI. The area within the RVZ should be cleared of permanent objects and terrain should be graded to allow unobstructed view between runways. The RVZ is created by drawing imaginary lines between designated points on each runway, determined by the length of each runway beyond the intersection point. It should be noted that if the runway length is changed then the dimensions of the RVZ will also change.

Per FAA standards as described in FAA AC 150/5300-13A, *Airport Design, Section 305 Line of Sight Requirements*, the existing RVZ between Runways 02-20 and 09-27 is depicted in **Figure 3-4.** Within this area, any point five feet above the runway centerline must be mutually visible with any other point five feet above the centerline of the crossing runway and inside of the RVZ. As shown, the RVZ transects the north tie down ramp with parked aircraft and the "J" and "K" T-Hangar buildings, which block visibility between the two runways within the RVZ. After the MPU analysis was completed, the Airport Design AC was updated to -13B which included slight changes to the RVZ calculation. These changes and applicability to WVI are documented in **Appendix D**.

The existing nonstandard conditions of the RVZ have been acknowledged by the FAA and the Airport and are considered a safety concern. As such, the FAA has required the Airport to issue a Notice to Airmen (NOTAM) prohibiting the use of Runway 27 for departures. The airport administration applied for a Modification to Standards (MOS) in 2018 to install signage and issue a NOTAM that restricted Runway 27 departures for the first 800-feet with the additional commitment to investigate additional options prior to a renewal of the MOS. The FAA did not provide the MOS for the RVZ condition, thus the NOTAM prohibiting the use of Runway 27 for departures is still in place.

During the stakeholder engagement process, pilots indicated that the departure restriction associated with the RVZ limits operational capabilities of the Airport, particularly when the wind is blowing from the west. It is recommended that the Airport bring the RVZ into compliance with FAA standards, whether the obstructing items are removed, or Runway 9-27 is reconfigured. Alternative solutions of how to address this issue will be discussed in **Chapter 4: Alternatives Analysis.**

Figure 3-4: Existing Runway Visibility Zone

3.4 Runway Analysis

This section summarizes the following requirements, standards, and recommendations for Runway 2-20 and Runway 9-27.

- Runway Orientation
- Runway Length
- Runway Width
- Runway Pavement Strength
- Runway Lighting, Markings, and Instrumentation

3.4.1 Runway Orientation

Ideally, a runway is oriented with the prevailing wind direction, as taking off and landing into the wind enhances aircraft performance. The FAA recommends that the primary runway have at least 95 percent wind coverage, which means that 95 percent of the time, the wind at an airport is within acceptable crosswind limitations for aircraft to operate safely. If 95 percent coverage cannot be met by the primary runway, a crosswind runway may be needed to safely accommodate aircraft operating in these conditions. If a crosswind runway is not feasible for an airport, the primary runway could be widened to accommodate aircraft in higher crosswind conditions. The FAA sets the following standard speeds to determine maximum acceptable crosswind components for different types of aircraft.

- 10.5 knots (12 mph) for small single-engine and light-twin aircraft
- 13 knots (15 mph) for the larger and heavier turboprop and medium jet type aircraft
- 16 knots (18.4 mph) for the larger corporate/military jet and narrow-body commercial type aircraft

Larger aircraft have a higher tolerance for crosswind than smaller aircraft due to their size, weight, and operational speed. When crosswinds exceed the allowable tolerance for the aircraft categories using the airport, the availability of a crosswind runway is highly desirable. Without one, arriving aircraft may need to divert to an alternate airport or wait for the wind conditions to change. Below the 95 percent threshold, FAA funding assistance for the development of a crosswind runway may be justifiable.

ADS-B data obtained from MIS indicates that the majority of aircraft operating at WVI fall under the ADG-I Small Aircraft classification, while larger ADG II and ADG III aircraft use the Airport intermittently. Considering this and the FAA-provided wind data, the calculations of crosswind coverage provided by Runways 02-20 and 09-27 are presented for the 10.5, 13 and 16 knot crosswind components in **Table 3-9.**

Table 3-9: Crosswind Coverage

Weather Classification	Runway	Percent of Wind Coverage			
		10.5 Knots	13 Knots	16 Knots	20 Knots
All Weather	02-20	99.60%	99.84%	99.98%	100%
	09-27	98.42%	99.14%	99.74%	99.93%
	Combined	99.88%	99.97%	100%	100%
IFR	02-20	99.76%	99.92%	99.98%	100%
	09-27	98.39%	98.96%	99.57%	99.86%
	Combined	99.86%	99.96%	99.99%	100%
VFR	02-20	99.46%	99.79%	99.97%	100%
	09-27	98.21%	99.09%	99.77%	99.95
	Combined	99.87%	99.97%	100%	100%
Sources: FAA Wind Analysis / Wind Rose Generator, NOAA Weather Station at Watsonville Municipal Airport, 2010-2019					

As noted above, the FAA sets the threshold for crosswind runway funding eligibility threshold at 95 percent. If an airport cannot achieve this minimum threshold with their primary runway, FAA policy states that a crosswind runway will be eligible to receive AIP funding for construction and upkeep. Conversely, airports that can provide adequate crosswind coverage using only the primary runway will not be eligible for federal funds to develop or maintain a crosswind runway. The above calculations indicate that Runway 2-20 provides acceptable crosswind coverage more than 98 percent of the time no matter the conditions. Therefore, the existing layout of the Airport exceeds the 95 percent eligibility threshold set by the FAA. Runway 9-27 was also found to provide adequate wind coverage, meaning that, in the event of the closure of Runway 2-20, the Airport could still provide adequate crosswind coverage for all aircraft types assuming Runway 9-27 was maintained in a good condition for aircraft operations.

During the stakeholder engagement process, pilots indicated that Runway 2-20 can be impeded during the late spring and early summer due to coastal fog and low stratus clouds limiting visibility and during which aircraft require Runway 27 for landings. As such, this analysis considered a number of other conditions including day, night, and seasonal conditions to determine if there was a specific time of the year when Runway 2-20 does not provide consistent safe landing conditions for aircraft based on FAA's 95 percent coverage standard. However, all of these analyses resulted in wind coverage percentages of more than 98 percent.[7]

FAA Order 5100.38D, *Airport Improvement Program (AIP) Handbook,* notes "*Per FAA policy, the Airport District Office (ADO) can only fund a single runway at an airport unless the ADO has made a specific determination that one or more crosswind or secondary runways are justified. The requirements, justification, and eligibility for runways are listed in Table G-1."* A secondary runway is defined as a runway providing capacity when the primary runway is at more than 60 percent of its annual capacity or when the ADO makes a specific determination that the runway is required for operation of the airfield.

[7] The FAA Wind Analysis Tool used in this MPU does not consider approach visibility or sky conditions when calculating runway wind coverage. Per FAA requirements, only IFR and VFR weather conditions were examined.

Given the FAA's above stated policy and the wind coverage provided by Runway 2-20, the FAA's participation in funding future enhancements or maintenance of this runway is likely to be limited based on current FAA definition of crosswind runways. This MPU does not recommend the closure of Runway 9-27 based on the wind coverage analysis, as Runway 9-27 provides other benefits to pilots such as redundancy for airport users during emergencies or coastal fog conditions that are prevalent at WVI and when Runway 2-20 is undergoing maintenance. However, future pavement maintenance would likely be required to be paid for by local sources.

As such, it is recommended the Airport engage in the nationwide policy discussion regarding the future eligibility of crosswind runways as well as discuss the applicability of the definition of a "secondary" runway to Runway 9-27 with the ADO.

Runway End Designation

The runway end designation is a whole number, rounded to the nearest one-tenth of the magnetic azimuth along the runway centerline when viewed from the direction of the approach. Due to the changing magnetic declination of the earth, runway end designations are subject to change over time. The magnetic declination recorded at WVI is 12.99 degrees east and is changing by 0.08 degrees west per year (NOAA, 2021). As such, it is estimated the runway designators will change from 02 to 03, from 20 to 21, from 09 to 10, and from 27 to 28 in approximately 50 years.

3.4.2 Runway Length

FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design* provides planning guidance for determining runway length needs. The FAA states that the objective of an airport's primary runway is to "provide a runway length for all airplanes that will regularly use it without causing operational weight restrictions." For FAA funding purposes the definition of "regular use" is 500 annual operations by either the critical aircraft or family grouping of aircraft with similar operational characteristics. Factors that affect needed runway length include average maximum daily temperature, airport elevation, runway gradient, and wet or dry runway conditions. FAA AC 150/5325-4B contains several charts of "Runway Length Curves" that can be used to determine recommended runway length for families of aircraft having similar characteristics. The runway length requirement results are categorized for small aircraft weighing less than or equal to 12,500 pounds, aircraft weighing more than 12,500 pounds but less than 60,000 pounds, and large aircraft weighing more than 60,000 pounds.

Runway 2-20

As mentioned in **Chapter 2: Aviation Forecasts** the current critical aircraft for Runway 2-20 is a Beech King Air 350 (BE350), a B-II aircraft with a Maximum Takeoff Weight (MTOW) of 15,000 pounds. Therefore, this analysis used the charts for aircraft weights between 12,500 pounds and 60,000 pounds to determine the needed runway length for Runway 2-20. These charts are subdivided into two separate categories that compose 75 percent of aircraft within that fleet category, and 100 percent of aircraft within that category. Recommended runway lengths within the 75 percent and 100 percent subcategories are contingent upon aircraft weight and are therefore assigned separate runway length curves for 60 percent of useful load and 100 percent of useful load. Recommended runway lengths are calculated based on these runway length curves and utilizing inputs from the Airport's the elevation and temperature. Adjustments are then made for runway gradient (for takeoff only) and wet or dry runway conditions (for turbojet landings only) to produce four distinct recommended lengths that are presented in

Table 3-10. Based on the aircraft types that operate at WVI and typical stage lengths, the recommended runway length should accommodate 100 percent of the aircraft fleet at 60 percent useful load.

Table 3-10: Runway 2-20 Length Requirements

Airport Data		
Airport Elevation	163 feet MSL	
Average daily maximum temperature of hottest month	74°F	
Runway 2-20 effective gradient	0.4%	
Runway Lengths for Runway 2-20 Design		
Percentage of fleet and useful load factor	**Adjusted for Gradient**	**Adjusted for turbojet landing in wet or slippery conditions**
75% of fleet at 60% useful load	4,730’	5,267’
75% of fleet at 90% useful load	5,950’	5,800’
100% of fleet at 60% useful load	**5,120’**	5,716’
100% of fleet at 90% useful load	7,250’	8,165’
Source: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design		

Based on this evaluation, the minimum recommended length for Runway 2-20 is 5,120 feet which accounts for an adjustment due to the gradient. This is 619 feet longer than the existing Runway 2-20 pavement length of 4,501 feet and would require an extension to the runway to achieve this length. Additionally, the 2010 California Aviation System Plan (CASP) recommended runway lengths at Regional General Aviation airports such as WVI be long enough to accommodate 100 percent of the aircraft fleet at 60 percent of useful load, the same as the MPU recommendation. The CASP also results in a recommended runway length of 5,120’ feet, which is consistent with the recommendations of FAA AC 150/5325-4B. Previous planning studies including the 2008 Airport Master Plan and the 2013 FAA-Approved Airport Layout (ALP) depicted an ultimate paved runway length of 5,182 feet. It should be noted the FAA has indicated that the distances recommended by FAA AC 150/5325-4B can be used for airport planning purposes only. An individual critical aircraft type will need to be identified as a regular user to justify a minimum length if the Airport wishes to complete an extension.

Runway 9-27

The critical aircraft for Runway 9-27 is the Cessna 340, a B-I(S) aircraft with an MTOW of 5,990 pounds. Given this, the runway length requirement for Runway 9-27 was determined using the runway length curves for the category of small aircraft weighing less than 12,500 pounds. This small aircraft category is subdivided between small aircraft with less than 10 passenger seats and small aircraft with more than 10 seats. Runway length recommendations for small aircraft with less than 10 seats compose either 95 percent or 100 percent of the fleet of similar aircraft. The 95 percent category applies to airports that are intended to serve small or medium size population communities with a diversity of usage and a greater potential for increased aviation activities. The 100 percent category includes airports primarily intended to serve communities located on the fringe of a metropolitan area or a relatively large population remote from a metropolitan area. Runway length recommendations for small aircraft with more than 10 seats are presented in a single runway-length curve chart that covers 100% of the fleet of these type of aircraft. AC 150/5325-4B identifies several representative aircraft for this aircraft fleet. ADS-

B data indicated that these representative aircraft do not frequently operate at WVI and are not expected to regularly use the Airport during the planning timeframe. As such, it is not recommended that Runway 9-27 be designed to accommodate 100 percent of small aircraft with more than 10 passenger seats.

The runway length requirement for Runway 9-27 was calculated from these three runway length curve charts and the Airport's elevation and temperature data in a similar fashion as Runway 2-20. However, small aircraft runway length recommendations presented in FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design* include predetermined corrections for runway gradient and wet or slippery conditions, thus, they do not require further adjustment. The resulting runway lengths are presented in **Table 3-11**. Given the location and operational characteristics of WVI, it is recommended that the length of Runway 9-27 be sufficient to accommodate 100 percent of the small aircraft fleet with less than 10 passenger seats.

Table 3-11: Runway 9-27 Length Requirements

Airport Data	
Airport Elevation	163 feet MSL
Average daily maximum temperature of hottest month	74°F
Runway 9-27 effective gradient	0.9%
Runway Lengths for Runway 9-27 Design	
Percentage of fleet and useful load factor	**Recommended Runway Length**
Small Airplanes with less than 10 passenger seats	
95% of fleet	2,950'
100% of fleet	**3,490'**
Small Airplanes with more than 10 seats	3,920'
Source: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design	

Based on this evaluation, the minimum recommended length for Runway 9-27 is 3,490 feet. Runway 9-27 exceeds the recommended length by 508 feet and is considered sufficient to meet Airport needs.

3.4.3 Runway Width

The FAA design standard for runway width is determined by the AAC and ADG of the aircraft anticipated to use the runway on a regular basis and the approach visibility minimums of the runway, as defined in FAA AC 150/5300-13A, *Airport Design.* The existing width of Runway 2-20 is 149 feet, which exceeds the minimum design standard of 75 feet for an RDC B-II-4000 runway. Runway 9-27 is currently 98 feet wide, which exceeds the 60-foot minimum required width for an RDC B-I(S)-VIS runway.

While no reduction in runway width is suggested, it is important to note that the design standards can be used by the FAA to indicate eligibility for projects that rehabilitate or involve any change to the runway. While the FAA would not require a reduction in runway width, the FAA may not fully participate in funding any projects associated with the full width of the runway and may limit participation only to the portion of the runway deemed required to meet the standard based on the RDCs.

3.4.4 Runway Pavement Strength and Condition

Pavement strength rating is related to the operating weight of aircraft anticipated to operate at an airport, the landing gear type and geometry, and the volume of annual aircraft operations, by type. Pavement strength requirements do not represent the maximum aircraft weight limit a runway can accommodate. Aircraft weighing more than the certified strength can operate on the runways on an infrequent basis, however, frequent activity by heavier aircraft can reduce the useful life of the pavement.

According to the latest FAA Form 5010-1 Airport Master Record, Runway 2-20 has an existing pavement design strength of 81,000 pounds for single-wheel configuration, 96,000 pounds for dual-wheel configuration, and 167,000 for dual tandem-wheel configuration and is in excellent condition. As mentioned previously, Runway 2-20's critical aircraft is the B-II family of aircraft with the Beechcraft King Air 350 representing the most demanding aircraft in the group. The King Air 350 has a dual wheel configuration and MTOW of 15,000 pounds. While B-II aircraft are not expected to operate at MTOW due to the runway's length, the pavement strength is considered sufficient for all aircraft that regularly operate at WVI. Also, according to the latest FAA Form 5010-1, Runway 9-27 has a pavement design strength of 45,000 pounds for single wheel configuration and 65,000 pounds for dual-wheel configuration. As Runway 9-27 has a B-I(S) RDC, it is expected that all aircraft that regularly use the runway will have a MTOW of 12,500 pounds or less. As such, the current pavement strength is considered sufficient to accommodate existing and projected demand.

Pavement condition is important to providing a safe operating environment for aircraft. For an airport, this can be expressed as a Pavement Condition Index (PCI), where 100 refers to pavement in perfect condition and zero refers to pavement that is completely unusable. The PCI were updated in 2021 through an update to the Pavement Maintenance / Management Plan[8] for each area of pavement, as shown in **Figure 3-5** and discussed in more detail in **Section 1.7.1**. A large portion of the airfield has a PCI above the 55, or rating of good. The north tie down ramp and apron around T-hangars M through Z scored the lowest PCI with a rating in the 20's. The MPU will incorporate the findings of the Pavement Management Plan into the subsequent implementation and phasing plan.

[8] April 2022 Pavement Evaluation Study – Pavement Maintenance/Management Plan (PMMP)

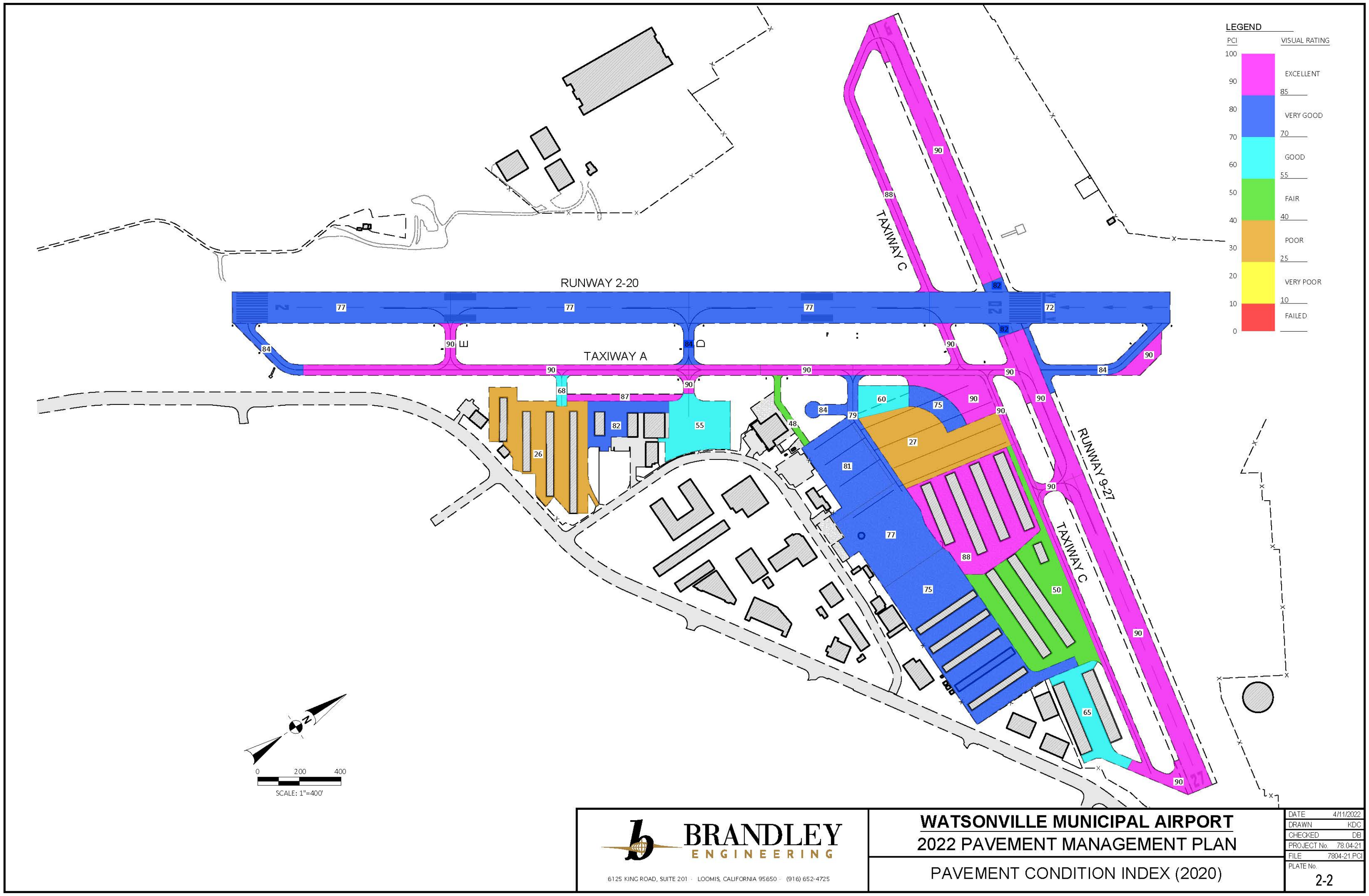


Figure 3-5: 2021 Pavement Condition Index

3.4.5 Runway Lighting, Markings, & Instrumentation

Runway lighting, marking and instrumentation allows for the safe operation of aircraft during nighttime hours and low visibility conditions. FAA-required airfield lighting standards are described in FAA AC 150/5340-30J, *Design and Installation Details for Airport Visual Aids,* while airport marking standards are addressed in FAA AC 150/5340-1L, *Standards for Airport Markings*. Other airport navigational aids and lighting systems are discussed in further detail in **Section 3.7**.

As mentioned in **Chapter 1**, Runway 2-20 is equipped with Medium Intensity Runway Lighting (MIRL) and Runway End Identifier Lights (REILs) on the approach end of Runway 2. Runway 2-20 is painted with non-precision runway markings that are reported by the Airport to be in good condition on the Runway 2 and Runway 20 approach ends, respectively. Runway 9-27 does not have a lighting system or REILs. Runway 9-27 is painted with basic runway markings that are in good condition. Runway 2-20 and Runway 9 are outfitted with 2-light Precision Approach Path Indicators (PAPIs), a type of Visual Glideslope Indicator (VGSI) system with a three-degree glide path that provide additional guidance to pilots approaching the Airport. Runway 27 has no additional visual aids for approaching aircraft.

The current non-precision runway markings and MIRL on Runway 2-20 meet the necessary design standards for a non-precision instrument (NPI) runway as described by the FAA Advisory Circulars. The REIL lighting system on Runway 2 satisfies both FAA and CASP requirements for approach lighting. The REILs were flight checked in 2018 by the FAA to ensure they were installed and operating properly. Pilots have also requested the installation of a Medium Intensity Approach Lighting System with Sequenced Flashers (MALSF) is further enhance visibility. To provide enhanced visibility of the runway environment during IMC, FAA AC 150/5340-30J recommends a MALSF and could be considered for installation at WVI following discussions with the FAA on eligibility.

The visual runway markings painted on Runway 9-27 meet the standards in FAA AC 150/5340-1L, *Standards for Airport Markings.* While it is not required by the FAA, installation of a low- or medium intensity runway lighting system (MIRLs) on Runway 9-27 is recommended to improve the safety of aircraft using the runway during nighttime visual flight operations. The lighting systems and pavement markings at WVI will require maintenance and replacement during the planning period but are considered adequate for the Airport's activity and service level.

3.4.6 Proposed Turf Runway

Airport staff reported some aircraft take off and land in the grass infield area adjacent to Runway 27, which is not marked or graded as an aircraft operating area. This presents a potential safety area to these aircraft and aircraft and people on the ground as sufficient separation is not provided. Additionally, during the stakeholder involvement process, stakeholders expressed an interest in constructing a turf runway on the airfield for use by-turf runway capable aircraft.

Turf runways provide several benefits for vintage, experimental, and conventional landing gear ("taildragger") aircraft, namely, unpaved surfaces provide better high-speed stability and cause less tire wear than paved runways. Turf runways are almost exclusively used by small aircraft (less than 12,500 lbs.) as larger aircraft can sink into soft surfaces. A turf runway would also be beneficial to pilots and students who wish to practice soft field operations, whether practicing for backcountry flying or for potential emergency landings.

Airport stakeholders have suggested the turf runway could be constructed as an Alternate Operating Area (AOA) under the premise that these areas would not have to meet the full design and separation standards of a normal runway. The FAA has provided little previous guidance on AOAs and has indicated that a national policy on this issue is forthcoming.[9] As such, a

[9] FAA A N M Regional Guidance Memorandum: 2019-01 – *Considerations for Alternate Operating Areas* (2019) identified evaluation criteria for AOAs and outlined relevant considerations and factors. However, the memorandum was only applicable in the FAA Northwest Mountain Region and has since been canceled. Therefore, the guidance and standards published in the memo cannot be considered for the incorporation of a Turf runway at WVI.

new turf runway would have to be constructed using dimensional and separation standards as defined by FAA AC 150/5300-13A, in the same manner as the paved runways at the Airport and require adequate infrastructure to access the turf runway. Some of the design and separation standards that would be applicable to a proposed turf runway, which would be designed to the smallest of RDCs (A-I(S)-VIS) are presented in **Table 3-12.** It is expected that a turf runway would not be used for simultaneous operations with the paved runway and is not being considered relative to operational capacity.

FAA AC 150/5300-13A requires the minimum separation between runways conducting simultaneous operations in daytime VFR conditions to be 700 feet. At this time, there are no locations on the Airport that could sufficiently accommodate an appropriately separated turf runway without significantly impacting existing infrastructure. As such, the Airport would likely have to apply for a Modification to Standards (MOS) to allow for the turf runway to be placed within 700 feet of one of the paved runway centerlines. The Airport would have to apply for an extension of the MOS every five years. The FAA may not approve the MOS in the future, which would nullify the validity of a turf runway on the airfield.

The soft surface of turf runways creates more rolling resistance and can be more slick than paved surfaces, increasing the amount of space an aircraft needs to accelerate to take off and slow after landing. The FAA recommends that takeoff, landing, and accelerate-stop distances be increased by a factor of 1.2 to compensate. FAA AC 5340-4B recommends an A-I(S)-VIS runway to be 3,540 feet to accommodate 75 percent of the national fleet of small aircraft with less than 10 passengers. However, similar to Runway 20, the FAA recommends the minimum runway length be selected based on the requirements of a specific critical aircraft rather than a class of aircraft. As such, the minimum length of the turf runway at WVI is recommended to meet the needs of the Cessna 180, a taildragger aircraft that operated from WVI more than 300 times in 2019. The ground roll length for a Cessna 180 at maximum take-off length expected to be slightly above 900 feet under normal conditions at the Airport. Therefore, the turf runway is proposed to be 1,000 feet long by 60 feet wide, meeting the dimensional and safety area standards of an A-I(S)-VIS runway.

Use of the turf runway would be restricted to daytime use during VFR conditions and may require other special considerations. It is recommended the Airport publish standard operating procedures in the chart supplement describing use of the turf runway prior to initiating operation, regardless of its location on the airfield. Use of the turf runway would be restricted to daytime use during VFR conditions and may require other special considerations. It would also be recommended the Airport provide education trainings to based and visiting pilots to provide understanding about the use of the turf runway in relation to the existing runways and facilities on the airfield.

It is important to note that since the initial writing of this MPU the FAA published AC 150/5300-13B: *Airport Design* to replace AC 150/5300-13A as the primary document for airport design standards. AC 150/5300-13B included a paragraph addressing aircraft operations conducted in the unpaved portion of an RSA adjacent to paved runway. The FAA does not inherently approve regular operations from unpaved portions of the RSA and cannot guarantee airfield separation and airspace protection for aircraft operating from unpaved RSAs. AC 150/5300-13B recommends airports with a demonstrated need for turf operations develop an official turf runway using normal runway design and separation standards (which remain unchanged between AC 150/5300-13A and -13B).

For airports that wish to allow aircraft operations from unpaved RSAs, the FAA requires a safety assessment to be conducted to ensure the airport remains compliant with AIP Sponsor Grant Assurances which require the operation of the airfield in a safe and serviceable condition. The safety assessment is conducted through the FAA's Flight Standards District Office (FSDO) and requires the airport to provide data and documentation assessing potential safety implications and ensuring an acceptable level of safety for aircraft, vehicles, individuals and facilities on and surrounding the airport. If the safety assessment is accepted by the FSDO, the FAA recommends the airport consider factors including pilot education programs and chart supplement information, hold line and taxiway separation standards, enhanced inspections of unpaved RSAs, and other applicable state and federal guidelines.

The feasibility and possible locations of a potential turf runway are discussed in **Chapter 4: Alternatives Analysis**.

Table 3-12: Turf Runway Design Requirements

Design Criteria	A-I(S)-VIS Standards
Runway Protection:	
RSA Length (Beyond runway end)	240'
RSA Width	120'
ROFA Length (Beyond runway end)	240'
ROFA Width	250'
ROFZ Length (Beyond runway end)	200'
ROFZ Width	250'
Runway Separation:	
Parallel Runway Centerline	700'*
Aircraft Holding Position	125'
Aircraft Parking Edge	125'
Parallel Taxiway Centerline	150'
**Minimum separation for parallel runways supporting simultaneous takeoffs and landings in visual conditions*	
Source: FAA AC 150/5300-13A	

3.4.7 Summary of Runway Requirements

Table 3-13 summarizes the overall runway requirements for WVI. These requirements are based on the FAA guidelines published in the various Advisory Circulars and are intended to improve safety for aircraft operating at WVI.

Table 3-13: Summary of Runway Requirements

Runway Requirement Category	Existing	Recommended	Deficiency
Runway 2-20			
Wind Coverage (Orientation)	98% (10.5 Kts)	95%	None
Length	4,501'	5,120'	619'
Width	149'	75'	None
Pavement Strength	96,000 lbs. (Dual Wheel)	96,000 lbs. (Dual Wheel)	None
Lighting	MIRL & REIL	MIRL & MALSF	None*
Markings	Non-Precision	Non-Precision	None
Visual Glideslope Indicator (VGSI)	PAPI	PAPI or VASI	None

Runway Requirement Category	Existing	Recommended	Deficiency
Runway 9-27			
Wind Coverage (Orientation)	98.4% (10.5 Kts)	95%	None
Length	3,998'	3,490'	None
Width	98'	60'	None
Pavement Strength	65,000 lbs. (Dual Wheel)	65,000 lbs. (Dual Wheel)	None
Lighting	None	LIRL or MIRL**	Lighting System
Markings	Visual	Visual	None
VGSI	PAPI (Runway 9)	PAPI or VASI	None

**Note: Existing REIL system meets FAA and 2010 CASP requirements. Airport stakeholders indicated that existing REILs are not always sufficient for pilots operating under reduced visibility conditions.*

***Note: While the CASP requirement for runway lighting is satisfied by existing MIRL on Runway 2-20, FAA AC 150/5340-30J:* Design and Installation Details for Airport Visual Aids *recommends that visual runways have LIRL or MIRL.*

Sources: FAA AC 150/5300-13A,* Airport Design; *FAA AC 150/5325-4B,* Runway Length Requirements for Airport Design; *FAA AC 150/5340-1L,* Standards for Airport Markings*; FAA AC 150/5340-30J,* Design and Installation Details for Airport Visual Aids; *FAA Form 5010-1,* Airport Master Record*; NOAA Weather Station at Watsonville Municipal Airport, 2010-2019

3.5 Taxiway System

An airport's taxiway system links the runways with other operational areas at an airport. An effective taxiway system allows for the orderly movement of aircraft and enhances operational efficiency and safety by reducing the potential for congestion, runway incursions, and pilot confusion. The following evaluates the taxiway infrastructure at WVI and identifies recommended enhancements to meet the circulation needs of the various based and transient aircraft operators.

As mentioned in **Chapter 1**, both runways at WVI have full length parallel taxiways that provide access to and from the aprons. Taxiway A is the parallel taxiway for Runway 2-20 and is connected to the runway by Taxiways D and E. Taxiway C serves as the parallel taxiway for Runway 9-27 and is connected to the runway near its midpoint by Taxiway B.

3.5.1 Taxiway Design Standards

Like the runway design standards described in **Section 3.4**, FAA AC 150/5300-13A, *Airport Design* identifies dimensional standards pertaining to taxiways and taxiway-related separations that are intended to provide adequate operational clearance between other aircraft and fixed and moveable objects. These standards are dependent on either the ADG or the TDG of the critical aircraft and include the following:

- Taxiway Width
- Taxiway Edge Safety Margin (TESM) [10]
- Taxiway Safety Area (TSA)

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[10] Taxiway Edge Safety Margin (TESM): The distance between edge of taxiway and outer main landing gear of design aircraft. TESM is determined by subtracting the width of the outer main gear of the critical aircraft from the taxiway width and dividing by two.

- Taxiway Object Free Area (OFA)
- Taxilane Object Free Area (OFA)
- Taxiway Centerline to Parallel Taxiway Centerline Separation
- Taxiway Centerline to Fixed or Moveable Object Separation
- Taxilane Centerline to Parallel Taxiway Centerline Separation
- Taxilane Centerline to Fixed or Moveable Object Separation

Most of the small recreational and flight training aircraft that operate at WVI in the ADG-I group are classified under TDG-1A, including the Cessna 340. Many of the larger turboprop and jet aircraft that currently utilize WVI including the Beechcraft King Air 350 and the Cessna Citation CJ2 are classified as either TDG-1 or TDG-2. It is assumed that TDG-3 and larger aircraft will not regularly use the Airport during the planning period. The existing conditions of the parallel taxiways at WVI, A and C, are compared to the corresponding FAA taxiway design standards for these various aircraft classifications in **Table 3-14** and **Table 3-15**. The characteristics and conditions of the additional connector taxiways around the airfield are discussed in detail below.

Taxiway A

Taxiway A is 50 feet wide while its connectors, Taxiways D and E, are both 45 feet wide. As Taxiway A is expected to support all types of aircraft operating at WVI, it is recommended that it meet the highest standards applicable at the Airport. Taxiway A meets current taxiway and TSA width requirements based on ADG-II and TDG-2 requirements. Taxiway A's TESM is 15 feet which exceeds the requirements for TDG-2. There are no paved shoulders on Taxiway A which is considered by the FAA to be adequate to accommodate existing and projected activity as long the Airport continues to maintain the unpaved shoulders and monitor for erosion. Taxiway A is separated from the Runway 2-20 centerline by 300 feet but does not run parallel to another taxiway. Therefore, the FAA's Taxiway Centerline to Parallel Taxiway Centerline separation requirement is not applicable to Taxiway A. The existing Taxiway A OFA and separation from the centerline to fixed or moveable objects does not meet current ADG-II separation standards, as satellite imagery indicates that the perimeter fencing near the connector to Runway 2 end are located within 55 feet of the taxiway centerline, which is approximately 11 feet less than what is required by AC 150/5300-13A. The obstruction would need to be removed or relocated to provide standard separation.

Taxiway C

Taxiway C is situated parallel to Runway 9-27 for most of the length of the runway, with the exception of a 100-foot stretch where Taxiway C joins with Taxiway A near the main apron. Taxiway C is approximately 35 feet wide on the western side of Runway 2-20, 45 feet wide between Runway 2-20 and Taxiway A, and 30 feet wide on the eastern side of Taxiway A. Taxiway C is recommended to meet ADG-I and TDG-1A/B dimensional and separation standards. Taxiway C meets TDG-1A/B dimensional standards for taxiway, TSA, and taxiway OFA width, as well as TESM width and taxiway centerline to fixed or movable object separation. While paved shoulders are not required, when provided they should be at least 10 feet wide. The taxiway has seven-foot paved shoulders on the western side of Runway 2-20. There are no paved shoulders along Taxiway C east of Runway 2-20.

Table 3-14: Taxiway Design Standards Based on ADG

Item	Taxiway A Existing Conditions	ADG-II Design Standards	Deficiency	Taxiway C Existing Conditions	ADG-I Design Standards	Deficiency
TSA Width	79’	79’	None	49’	49’	None
Taxiway OFA Width	120’	131’ [11]	11’	89’	89’	None
Taxiway Centerline to:						
Parallel Taxiway/Taxilane Centerline	N/A	105’	None	N/A	70’	None
Fixed or Moveable Object	54.5’	65.5’	11’	64’	44.5’	None
***Source: FAA AC 150/5300-13A,* Airport Design**						

Table 3-15: Taxiway Design Standards Based on TDG

Item	Taxiway A Existing Conditions	TDG-2 Standards [12]	Deficiency	Taxiway C Existing Conditions	TDG-1A/B Standards	Deficiency
Taxiway Width	50’	35’	None	35’/30’/45’*	25’	None
Taxiway Edge Safety Margin (TESM)	15’	7.5’	None	11’	5’	None
Note: Taxiway C is approximately 35 feet wide on the western side of Runway 2-20, 45 feet wide between Runway 2-20 and Taxiway A, and 30 feet wide on the eastern side of Taxiway A.* **Source: FAA AC 150/5300-13A, Airport Design						

It is important to note that not all taxiways on an airport may necessarily need to be designed to the same standards. For example, taxiways or taxilanes leading to hangar areas capable of accommodating only smaller aircraft may be designed to smaller standards whereas the main parallel taxiways that support a variety of aircraft types should be designed to the largest applicable aircraft standards.

Taxiways D and E

Taxiways D and E connect Runway 2-20 and Taxiway A approximately 1,100 feet and 2,200 feet from the Runway 2 threshold, respectively. Both connector taxiways can be expected to serve the largest aircraft that regularly use the Airport. As such, it is recommended that each taxiway meets ADG-II and TDG-2 standards. Both taxiways are 50 feet wide and meet all applicable dimensional and separation standards. Taxiways D and E do not have paved shoulders, but, similar to Taxiway A, these should accommodate future activity so long as the Airport continues to maintain the unpaved areas.

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[11] This design standard is planned to be reduced to 124 feet in draft AC 150/5300-13B so the deficiency would be reduced to four feet.
[12] There are no changes to these design standards in draft AC 150/5300-13B.

Taxiway B

Taxiway B is approximately 40 feet wide and serves as the connector between Taxiway C and Runway 9-27 near the runway midpoint. Taxiway B is recommended to meet ADG-I and TDG-1A/B standards as the connector taxiway will primarily serve small aircraft operating to and from Runway 9-27. Taxiway B meets all applicable dimensional and separations standards, but does not have paved shoulders, similar to the other taxiways on the airfield.

Apron Taxilanes

WVI has several taxilanes transecting the aprons, providing access from individual hangars and parking spots to the taxiways. These taxilanes extend between rows of tie downs and hangars on the aprons and in the tenant parking areas. As such, it is vital that appropriate separation is maintained to ensure safe aircraft movement. Given that a variety of aircraft types utilize taxilanes to reach hangars and tie downs in several different locations on the airfield, it is recommended that all taxilanes meet ADG-II design standards as described by FAA AC 150/5300-13A, *Airport Design.* The FAA taxilane design standards are presented in **Table 3-16.**

Table 3-16: Taxilane Design Standards

Item	Current ADG-II Design Standards	Draft AC 150/5300-13B ADG-II Design Standards
Taxilane Object Free Area (OFA)	115’	110’
Taxilane Centerline to		
Parallel Taxilane Centerline	97’	94’
Fixed or Movable Object	57.5’	55’
***Source: FAA AC 150/5300-13A,* Airport Design**		

There are nearly 30 different taxilanes at WVI, several of which do not meet current design standards. The location of the taxilanes and apron areas that do not meet dimensional standards are presented in **Figure 3-6.** It is recommended that the apron be remarked to follow FAA design criteria in conjunction with the next pavement rehabilitation/reconstruction project that is completed on each ramp. An analysis was not conducted for the planned changes with AC 150/5300-13B for these design standards.

Figure 3-6: Locations of Non-Standard Taxilane and Apron Markings

3.5.2 Taxiway Configuration

In addition to the design and separation standards presented in the previous section, FAA AC 150/5300-13A also provides guidance on taxiway configurations, including the following design principles that are intended to enhance safety by limiting the potential for runway incursions and pilot confusion. Many of these taxiway design considerations were instituted as part of the 2012 update to the FAA AC 150/5300-13A and have been a focus of the FAA nationwide through the Runway Incursion Mitigation (RIM) program. The RIM program was instituted to identify risk factors that may contribute to runway incursions and develop strategies to help airport sponsors mitigate these risks. While there are no specific locations at WVI that have been identified by FAA as a "hotspot" it is still important to integrate the design principles moving forward.

Three-Node Concept – Keep the geometry simple and reduce the number of taxiways intersecting at a single location. Present the pilot with no more than three choices in selecting a direction – ideally left, right and straight ahead.

Intersection Angles – Design 90-degree turns when possible to provide the best visibility to the left and right. In other situations, and where necessary, standard angles of 30, 45, and 60 degrees are preferred. Acute angled taxiway exits enhance runway utilization but should not be used as runway entrance or crossing points.

Wide Expanses of Pavement – Wide pavements should be avoided as they require placement of signs far from a pilot's sight and reduce readily observable visual clues. Under low visibility conditions, or due to a pilot focus on the centerline, signs can be missed. This guidance is especially critical at runway entrance points. When wide expanses of pavement are unavoidable, steps should be taken to avoid direct access to the runway.

Runway Crossings – Limiting the number of runway crossings reduces the potential for human error and aircraft incident and reduces the workload for both pilots and air traffic control (ATC) personnel.

Taxiway Crossings in the Center Third, or 'High-Energy' Section of a Runway – Runway intersections/ crossings should be limited to the outer thirds of runways where pilots have more options to maneuver and avoid potential collisions.

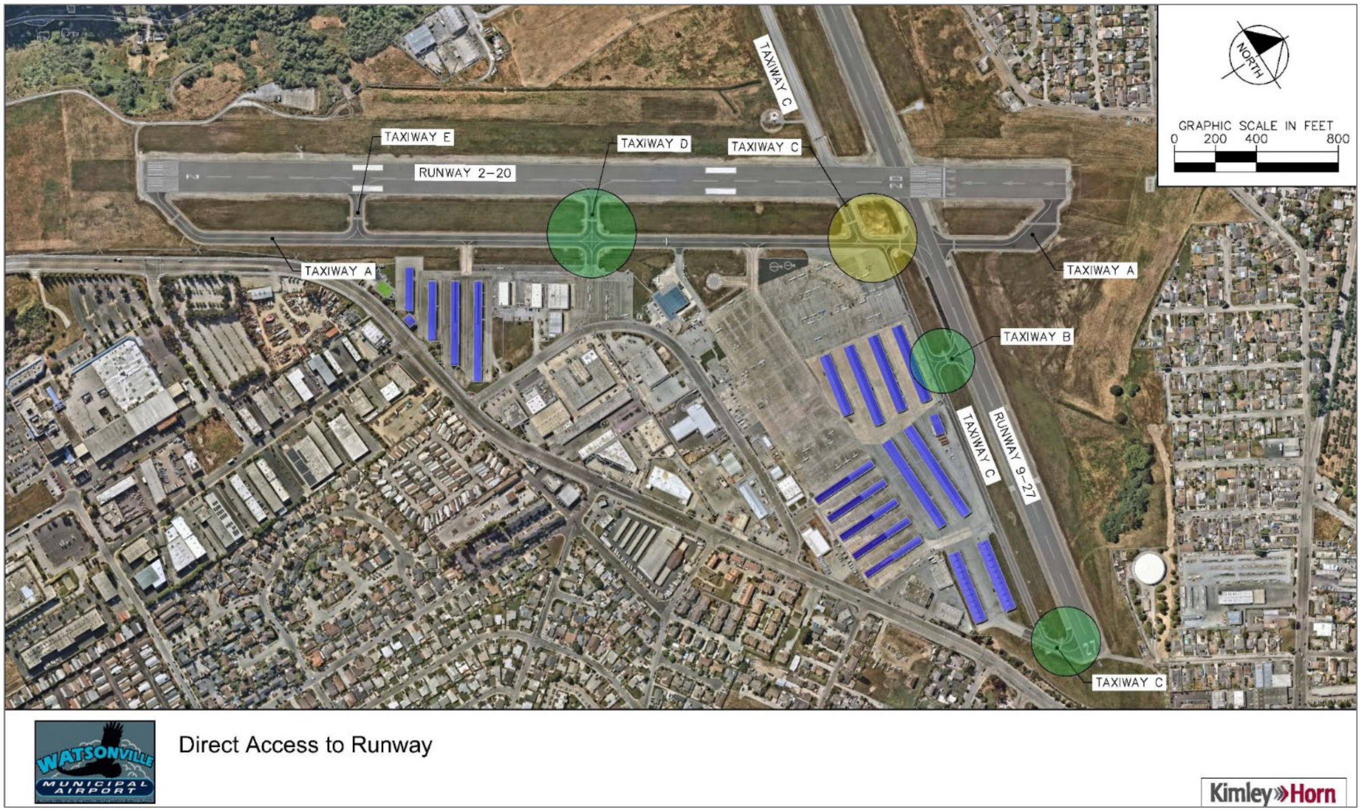
Indirect Access – Design taxiways in a manner that requires aircraft to make a turn between exiting the ramp and entering a runway. Taxiways with direct access from the apron to the runway have been shown to lead to confusion when a pilot typically expects to encounter a parallel taxiway but instead accidently enters a runway.

In consideration of these design methodologies, the following describes areas of concern for the Airport. Some of the noted recommendations will have multiple solutions that will be discussed in greater detail in **Chapter 4: Alternatives Analysis**.

- **Intersection Angles -** Taxiway C intersects Runway 2-20 and Taxiway A at a non-standard angle, approximately 65 degrees. This may cause reduced visibility to pilots crossing the runway while taxiing to or from the approach end of Runway 9. Taxiway C could be relocated so as to intersect Runway 2-20 at a standard angle, preferably 90 degrees.
- **Intersection Angles -** Taxiways A and C join Runways 02-20 and 09-27, respectively, at acute angles that require pilots to turn 135 degrees upon entering the runway to properly line up for takeoff. This reduces a pilot's visibility of other aircraft rolling out on the runway after landing or aborted takeoff. It is preferred that the taxiways be reconfigured to connect with each runway at 90-degree angles to increase pilot visibility.
- **Wide Expanses of Pavement -** Taxiway A widens to approximately 120 feet at the Runway 20 end where the current runway holding position marking is located. This places appropriate runway entry signage far from the pilot's line of site, which may cause additional confusion. It is recommended that the wide pavement area be modified at the runway entry point to bring observable visual cues closer to the taxiway centerline.

- **Taxiway Crossings in the Center Third of a Runway -** Taxiway A intersects Runway 9-27 in the center third, 'high-energy' section of the runway. It is recommended that the taxiway or the runway be reviewed for the potential to move this intersection to the outer 'low energy' sections of the runway.
- **Indirect Access -** As shown in **Figure 3-7**, Taxiways B, C, and D provide direct access from various areas of the apron to the runways. It is recommended that all direct access taxiways are removed or relocated.

Figure 3-7: Taxiways with Direct Access to Runway



3.5.3 Taxiway Lighting, Marking and Signage

The taxiway system at WVI is denoted using a system of lighting, marking and signage that provide visual guidance to pilots. All taxiways are marked with yellow-painted markings that are one foot wide and are in good conditions, having been last repainted in 2019.[13] The individual taxiways, Taxiway A, B, C, D, and E, are denoted with lighted signage that is reported to be in good condition. Finally, Taxiway A is lighted with Medium Intensity Taxiway Lighting (MITL), which is also in good condition. With the exception of the taxiway design and separation standard issues discussed in the previous sections, the taxiway markings meet FAA design requirements. The lighted signage meets the standards of AC 150/5340-18G while the MITL meets both the CASP and FAA recommendations for a B-II airport.

The FAA recommends all runway entrance taxiways have a unique designator with appropriate markings and signage. At WVI, Taxiways A connect at both ends of Runway 2-20 while Taxiways D and E provide midfield connections between

[13] The yellow runway holding positions markings on Taxiway C west of Runway 2-20 are outlined in black due to the light pavement color, per the standards of FAA AC 150/5340-1M.

Taxiway A and Runway 2-20. Taxiway C connects to both ends of Runway 9-27 with Taxiway B connecting the runway near its midpoint. As Taxiways A and C provide connections at both ends of the respective runways, the designations do not meet FAA recommendations. Additionally, Taxiways B, D, and E may cause confusion as they do not clearly indicate which parallel taxiway they connect to. It is therefore recommended the Airport coordinate with the FAA to update the designations of the taxiways so that each has its own unique designation, meeting FAA standards and providing more clarity for pilots and ground vehicles.

3.6 Airport Lighting and Navigational Aids

Navigational aids (NAVAIDs) are any visual or electronic devices airborne or on the ground which provide point-to-point guidance information or position data to aircraft in flight. As described previously in **Section 3.5**, the runways at WVI have lighting and NAVAID systems that are considered adequate to meet Airport needs during the planning time frame. While these systems provide guidance to aircraft when approach or departing from the runways, there are additional systems that assist aircraft when moving on the ground or overflying the Airport. WVI is equipped with the following non-runway lighting and NAVAIDs:

- White-green rotating beacon
- Lighted windsock
- Lighted wind tee
- Segmented circle
- Automated Surface Observation System (ASOS)
- Localizer

While the FAA does not specify which NAVAIDs are required at GA airports, the 2010 CASP identified minimum objective equipment that should be present at public-use airports. As a Regional General Aviation airport, the CASP recommends that WVI has 24-hour on-field weather observation. The existing lighting and NAVAIDs present at the Airport therefore meet the recommendations set forth in the CASP. The existing rotating beacon and the wind indicators meet FAA design recommendations for size and placement on the airfield. The segmented circle also meets dimensional standards described in AC 150/5340-5C, *Segmented Circle Airport Marker System,* however, does not currently contain traffic pattern indicators. The Airport intends to install these indicators around the segmented circle to provide additional guidance to pilots and promote compliance with noise abatement procedures in 2022. With routine maintenance, the existing airfield lighting and NAVAIDs at WVI are expected to meet the user needs not specified in the CASP over the planning horizon.

3.7 Parachute Landing Area

As mentioned, the existing parachute landing area (PLA) at WVI is located on the west side of the airfield and has an established radius of 183 feet (366-foot diameter). The PLA is primarily used for tandem jumps conducted by a private operator and the Airport requires prior approval for all other skydiving operations in order for the Airport management to ensure that the operator will comply with the Airport's standard operating procedures. It should be noted that the Airport is required to make the airport available for public use to all types, kinds, and classes of aeronautical activities per the FAA grant assurances as a federally obligated airport.

There is limited formal guidance or design standards available through the FAA for a PLA at an airport. The FAA published DOT/FAA/AR-11/30: *Development of Criteria for Parachute Landing Areas on Airports* in 2012 to provide guidance for airports planning or using PLAs, however, the report was never officially adopted by the FAA as policy. The United States Parachute Association (USPA) provides industry best practices in the *Skydiver's Information Manual Section 2: Basic Safety*

Requirements (BSRs)[14]. BSRs establish minimum dimensions for PLAs[15] to ensure that skydivers have a safe landing area free of obstacles and hazards including trees, buildings, powerlines, and bodies of water, and generally agree with the findings of DOT/FAA/AR-11/30.

The size of the PLA is determined by the type of skydiving operations that occur. As the PLA at WVI only supports tandem parachute jumps, the minimum USPA-required radius for the PLA is 165 feet (330-foot diameter). DOT/FAA/AR-11/30notes that there is no requirement for the PLA to be circular. It recommends a minimum PLA size of 84,500 square feet with a 40-foot clearance on all sides from any hazards such as aboveground structures, towers, and open bodies of water. The existing PLA therefore exceeds dimensional requirements established by the USPA and DOT/FAA.

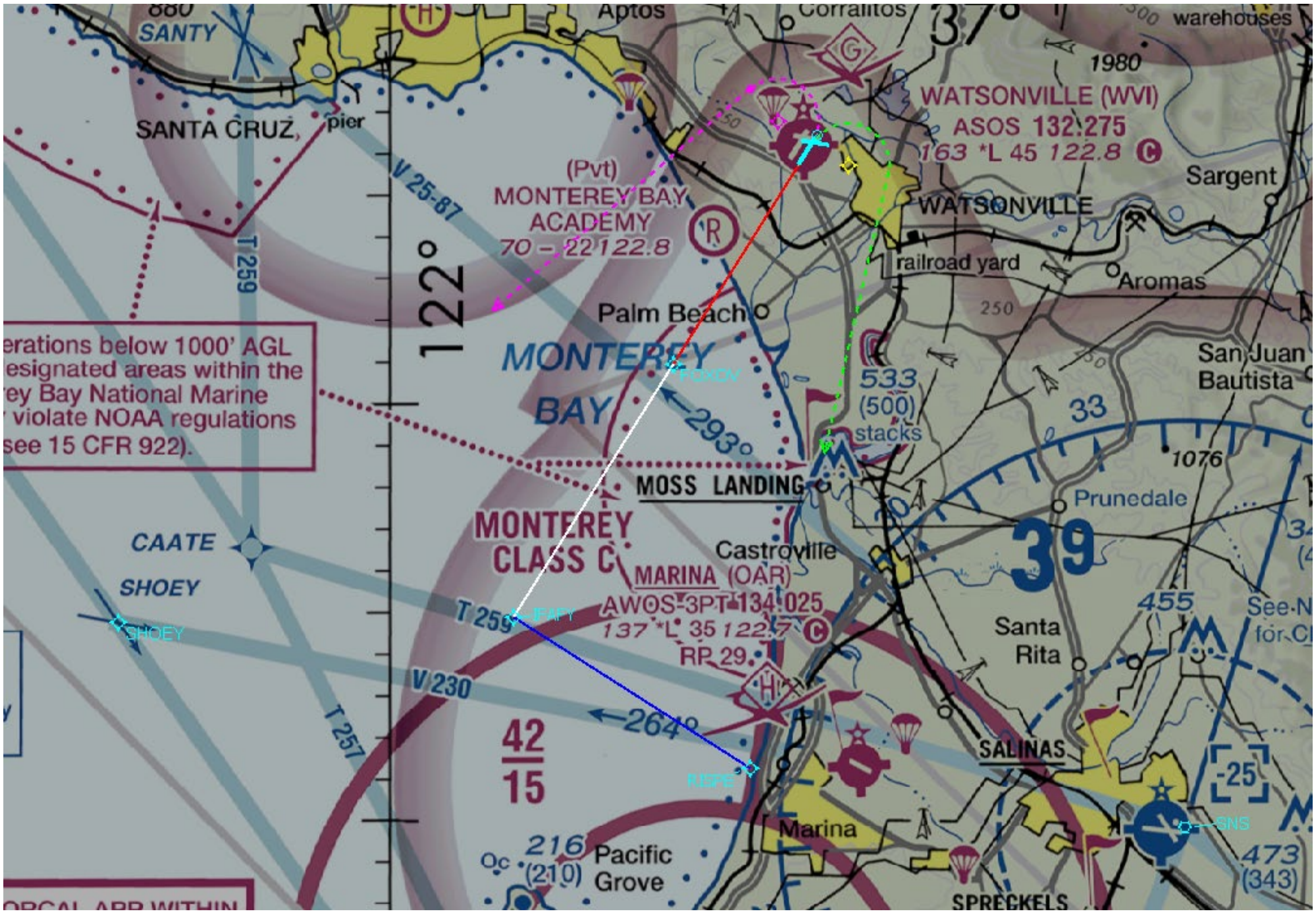
As noted in **Chapter 1**, the existing location of the PLA is under review by the Airport as it is included in a proposed land swap between the Airport and Nordic Naturals. Nordic Naturals is working with the Airport to ensure the new PLA would meet minimum dimensional standards as described by the applicable BSR.

Airport stakeholders have noted a concern over the location of the PLA in regard to the missed approach for the RNAV RWY 02 IAP which asks pilots to climb to 700 feet and then turn left. In many cases, this means pilots turn left in the vicinity of the PLA. As parachuters do not operate in IMC conditions, it is unlikely that pilots will be conducting a missed approach while the PLA is active. In cases where a pilot is practicing the missed approach during non-IMC conditions, several safety measures should be in operation to avoid any potential collision. Firstly, pilots should be listening to the radio to know if parachuters have deployed and react accordingly. Second, pilots practicing instrument procedures are required to have a safety pilot which should alert them to parachuters and direct them to avoid any parachuters. The Airport discussed these concerns with the FAA in November 2021 to determine if the missed approach procedure can be adjusted to ensure enough distance can be had between the PLA and direction to turn. The Airport submitted the request through the FAA's Instrument Flight Procedures (IFP) Gateway and the FAA will soon begin their validation and prioritization process with a tentative schedule for an amendment in 2024. **Figure 3-8** displays the potential adjustment to the RNAV (GPS) Runway 2 missed approach procedures to a right turn rather than a left turn as proposed by the FAA Western Flight Procedures (AJV-W24) in November 2021.

[14] The USPA *Skydivers Information Manual* is available online at: https://uspa.org/SIM

[15] PLAs are referred to as "Drop Zones" in the *Skydivers Information Manual.*

Figure 3-8: Potential Adjustment to RNAV (GPS) Runway 2 Missed Approach Procedures



Source: FAA Western Flight Procedures (AJV-W24), November 2021

3.8 Airspace

The safe and efficient operation of aircraft requires that certain areas on and near an airport remain clear of objects that could present a hazard to air navigation. Airports that are listed in the National Plan of Integrated Airport Systems (NPIAS) and receive federal funding support through the Airport Improvement Program (AIP) are considered "federally obligated" and as such, are subject to FAA Grant Assurances 20 and 21 which require airport sponsors to take appropriate actions to protect the surrounding airspace from incompatible land uses and to prevent/mitigate hazardous obstacles to navigation.

3.8.1 Instrument Approaches

The ability of an aircraft to safely land at an airport is dependent on prevailing weather conditions, the level of pilot training, and the type of navigational equipment available both in the aircraft and on the ground, and approach procedures that have been established by the FAA. During Visual Meteorological Conditions (VMC), which is defined as conditions with a cloud ceiling of higher than 1,000 feet above ground level (AGL) and at least three statute miles' visibility, pilots may approach an airport using only visual cues to navigate. During Instrument Meteorological Conditions (IMC), only properly trained pilots flying adequately equipped aircraft can follow FAA-published Instrument Approach Procedures (IAPs) to an approach an airport for landing.

The FAA classifies standard IAPs, and the runways supporting those procedures, based on the type of electronic navigation guidance and the lowest approach minimums (visibility and decision height/HATh) provided by that procedure. The classifications include Non-Precision, Precision, and Approach Procedures with Vertical Guidance (APV). Precision instrument approaches provide both lateral and vertical guidance and are traditionally supported by multiple ground-based NAVAIDs collectively called an Instrument Landing System (ILS). An ILS includes a Localizer (providing lateral guidance), a Glideslope (providing vertical guidance), and an approach lighting system (providing close-in visual guidance).

Non-Precision approaches provide only lateral guidance from NAVAIDs located either on the ground, such as Omnidirectional Range (VOR) or a Localizer (LOC) or in space using Global Positioning System (GPS). Another form of a non-precision approach is an Approach Procedure with Vertical Guidance (APV). These approach procedures use GPS technology to provide ILS-like approach capability without the need for traditional ground-based ILS NAVAID equipment. Certain APVs utilize Wide-Area Augmentation System (WAAS) to provide greater accuracy from GPS signals, allowing for lower visibility minimums. These IAPs are referred to as Localizer Performance with Vertical Guidance (LPV) approaches.

WVI has three IAPs that provide guidance in visibility conditions as low as $^7/_8$ of a mile. Two of these use ground-based NAVAIDs (VOR and LOC) to provide lateral guidance to Runway 2 in visibility minimums as low as 1 mile. The third IAP is an LPV approach that allows aircraft to land on Runway 2 with the cloud ceiling as low as 448 feet and $^7/_8$-mile visibility.[16] The existing IAPs at WVI as of May 7, 2021 are outlined in **Table 3-17**.

Table 3-17: WVI Approach Procedures

Runway(s)	Approach Class	Guidance Provided	Approach Type	Lowest Minimums Supported
09-27	Visual	None	Visual	Ceiling ≥ 1,000’ and visibility ≥ 3 miles
02-20	Non-Precision	Lateral	○ Localizer (LOC) ○ VHF Omnidirectional Range (VOR)	Ceiling ≥ 700’ and visibility ≥1 mile
02	Approach Procedure with Vertical Guidance (APV)	Lateral & Vertical	Localizer Performance w/ Vertical Guidance (LPV)	Ceiling ≥ 448’ and visibility ≥ $^7/_8$ mile
Sources: FAA AC 150/5300-13A,* Airport Design*; AirNav, 2020				

As noted in previous sections of this analysis, most of the air traffic operating at WVI includes small personal, business, and corporate aircraft. As such, the existing 448-foot decision altitude and 7/8-mile visibility is considered adequate to accommodate current and future activities. Furthermore, the existing APV approach meets the recommended approach capabilities described in the 2010 CASP. The existing APV meets these recommendations and is expected to be adequate.

[16] Since the writing of this chapter, the Airport has coordinated with the FAA Western Flight Procedures Office to reduce the minima of the LPV approach to 408 feet MSL and ¾ -mile visibility.

It is important to note that a project to construct the necessary infrastructure to implement an ILS has been listed on the Airport's Capital Improvement Program (ACIP) since 2011. However, the APV approach was implemented in 2016, before the FAA could initiate such a project. Airport staff indicated that the existing ceiling and visibility minimums provided by the APV are only about 50 feet higher than what would have been provided by an ILS. As such, it is not considered necessary to install an ILS at this time. However, during the stakeholder engagement process, pilots reported that the APV requires aircraft to have navigational equipment that can cost more than $25,000 to install. Given this, it may be beneficial for the Airport to review the need for an ILS in future planning projects.

There is a desire among Airport stakeholders and staff to implement a GPS-based IAP (RNAV or LPV) for the Runway 20 approach. Runway 20 is the preferred calm wind runway at WVI, and its approach is normally less affected by coastal fog and low clouds, allowing aircraft to land in IMC when visibility conditions are below minimums for the Runway 2 IAP. There is terrain to the east that renders the PAPI unusable beyond 4 NM. The Airport has discussed the addition of an IAP for Runway 20 but was told that it does not qualify through the FAA based on the low number of procedures conducted each year. The FAA has also previously indicated the establishment of a Runway 20 approach would mean that the Runway 2 RNAV or Localizer approach would have to be removed. As such, it is recommended that the Airport continue to coordinate with the FAA to investigate the feasibility of an IAP for the Runway 20 approach without impacting the approach capabilities of Runway 2 as technology improves and operations increase.

3.8.2 FAR Part 77 Requirements

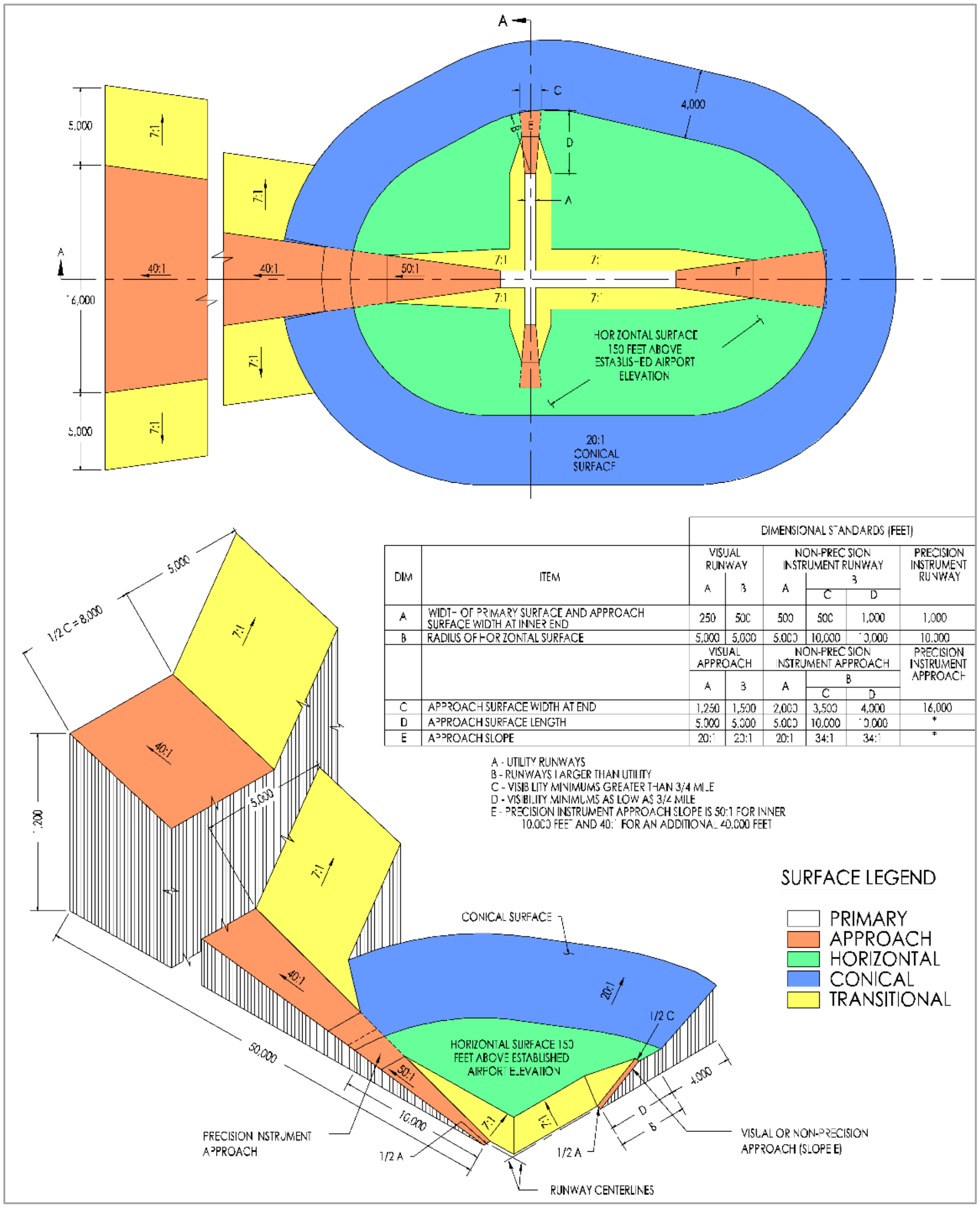
Title 14 Code of Federal Regulations (CFR) Part 77, *Objects Affecting Navigable Airspace*, (also referred to as FAR Part 77) establishes standard imaginary surfaces around an airport to identify potential obstructions to air navigation. These surfaces primarily pertain to land use on and around the airport and are primarily used by the FAA Airports Division. Imaginary surfaces vary in size, shape, and slope depending on the approach capability of each runway end. The Part 77 surfaces applicable at WVI are described below and are shown in **Figure 3-9**. It should be noted that as there is no recommendation for modifying the IAP or visibility minimums and that the dimensions of the Part 77 surfaces are intended to remain the same throughout the planning period.

- **Primary Surface**: The Primary Surface is longitudinally centered on the runway centerline. The elevation of any point along the primary surface is the same as the elevation of the nearest point along the runway centerline. The primary surface extends 200 feet beyond each end of the runway. The width of the Primary Surface for Runway 2-20 is 500 feet and 250 feet for Runway 9-27.
- **Approach Surface**: The Approach Surface is centered along the runway centerline, beginning at the end of the Primary Surface, and sloping upward and outward away from the Primary Surface. The approach surface has the same inner width as the width of the Primary Surface for the corresponding runway. The slope of the Approach Surface is dependent on the type of approach that is available or planned on either end of the runway. As Runway 2 has a non-precision instrument approach, the inner width of the Approach Surface is 500 feet, the outer width of the Approach Surface is 3,500 feet, and the surface slope is 34:1, meaning that the surface increases one foot in height for every 34 feet of lateral distance. The Runway 20 Approach Surface has an inner width of 500 feet, an outer width of 1,500 feet, and a 20:1 slope. Runway 9-27 is considered a utility runway[17] and therefore both ends have the following Approach Surface dimensions: 250-foot inner width, 1,250-foot outer width, and 20:1 slope.

[17] A Utility Runway is defined as a runway that is constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight and less.

- **Transitional Surface**: The Transitional Surface extends outward and upward from the sides of the Primary Surface and the Approach Surface at a slope of 7:1, up to the height of the Horizontal Surface. For parts of the Approach Surface that extend beyond the limits of the Conical Surface, the Transitional Surface extends 5,000 feet from the edge of the Approach Surface.
- **Horizonal Surface**: This surface is a horizontal plane, located 150 feet above the established airport elevation. The perimeter of the Horizontal Surface is determined by swinging arcs of a specified radii from the center of each end of the primary surface. The Horizontal Surface extends 10,000 feet from the end of the Runway 2 Primary Surface and 5,000 feet from the ends of the Runway 20, Runway 9, and Runway 27 primary surfaces.
- **Conical Surface**: The Conical Surface extends outward and upward from the periphery edges of the Horizontal Surface. The Conical Surface extends at a slope of 20:1 for a horizontal distance of 4,000 feet.

Figure 3-9: Part 77 Imaginary Surfaces

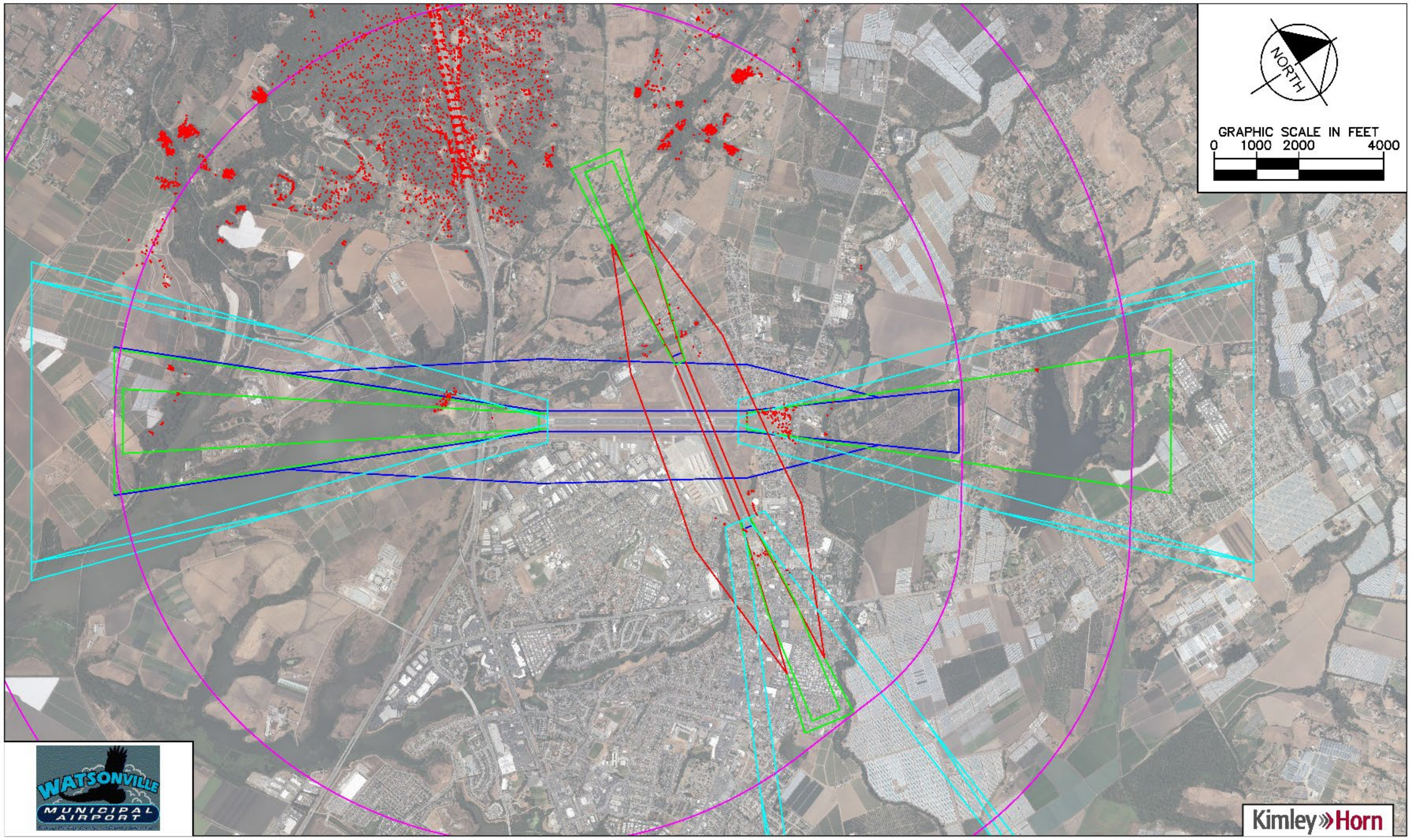


Source: 14 CFR Part 77 Safe Efficient Use and Preservation of Navigable Airspace, 2015

Figure 3-10 illustrates all the obstructions based on the existing conditions at the Airport, including the FAR Part 77 Surfaces. Penetrations to these imaginary surfaces, either natural or manmade, are identified as obstructions and must be evaluated by the FAA. If not removable, obstacles can be mitigated through appropriate marking and/or lighting. More than 290 objects have been identified through the existing airspace analysis as obstructions that penetrate the aforementioned Part 77 surfaces. These include trees, buildings (including houses), utilities poles, and high terrain to the west of the airfield If not mitigated appropriately, obstacles could adversely affect approach and departure minimums and/or operational procedures.

Refer to the Airport Layout Plan (ALP) Drawing Set for detailed summary of obstructions and recommendations to address the areas of concern.

Figure 3-10: Existing FAR Part 77 Obstructions

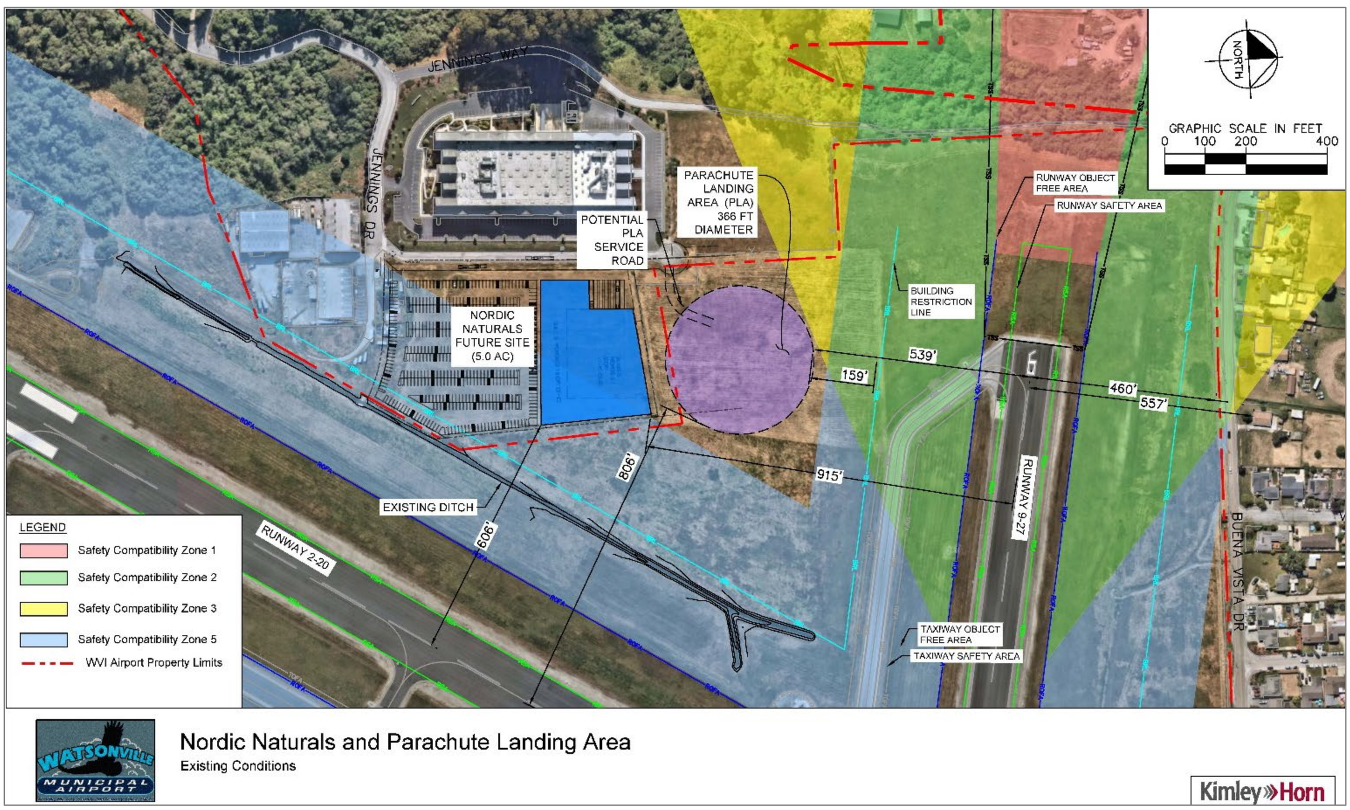


Source: Kimley-Horn, 2021

3.8.3 Proposed Adjacent Building Development

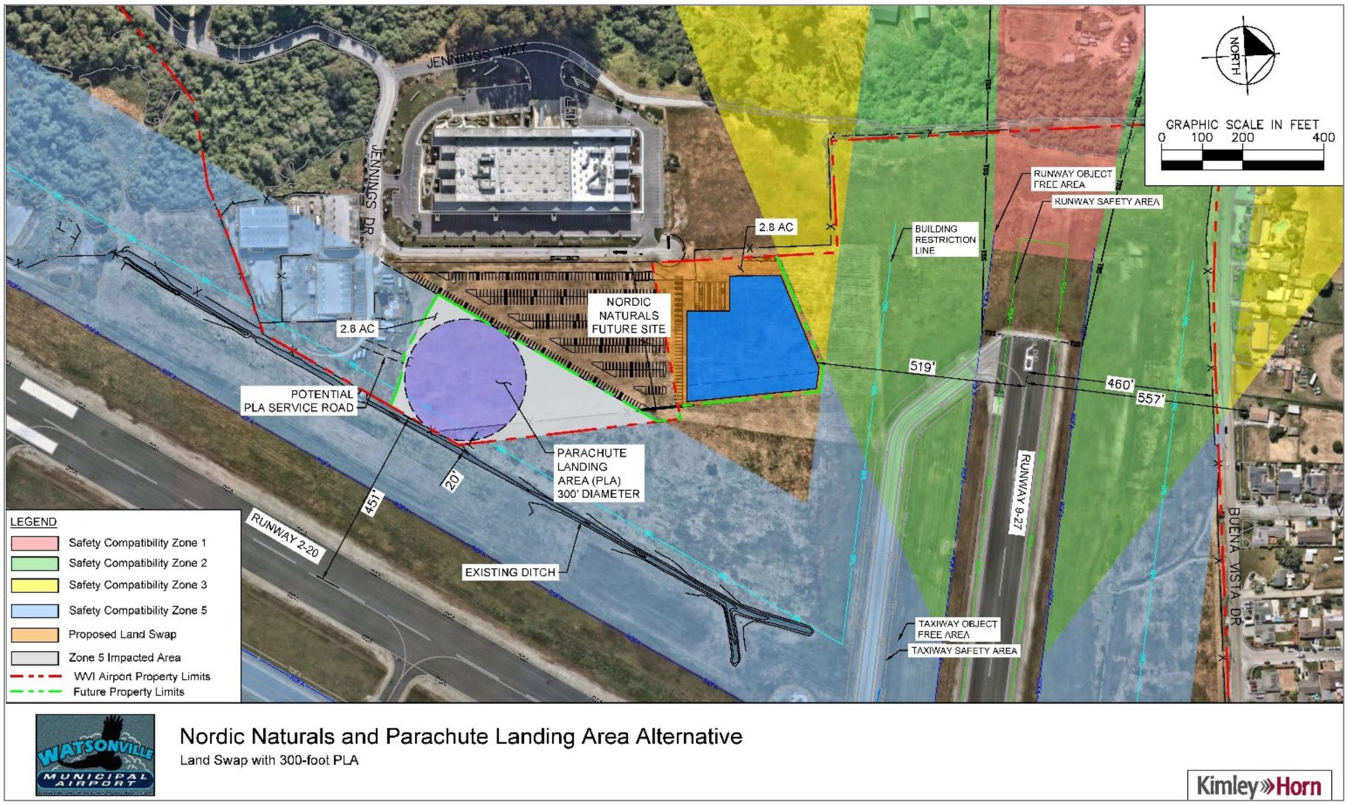
As noted in Section 1.6.5, Nordic Naturals has discussed expanding their facility on the west side of the airfield. As their current property resides within the Caltrans Safety Zone 5, their original development proposal as shown in **Figure 3-11** would have resulted in a building being located within this zone. As that is not desirable, the Airport and Nordic Naturals have been discussing a land swap that would result in the building being located in the current PLA location as shown in **Figure 3-12**. While it is understood concerns have been raised regarding a building being located closer to a runway end, the location of the building in either location is outside of the FAA clear areas such as the RSA and ROFA and beyond the Building Restriction Line (BRL). The BRL loosely identifies the area that is suitable for building area locations on an airport and is traditionally based on required distance to clear a 35-foot-tall building utilizing the 7:1 slope of the Part 77 Transitional Surface. It is not uncommon at GA airports for buildings to be constructed directly adjacent to the BRL.

Figure 3-11: Originally Proposed Nordic Naturals Development



Source: Kimley-Horn 2021, Nordic Naturals 2020, City of Watsonville 2020

Figure 3-12: Revised Proposed Nordic Naturals Development



Source: Kimley-Horn 2021, Nordic Naturals 2020, City of Watsonville 2020

3.8.4 Runway End Siting Requirements

As outlined in Order 8260.3, United States Standards for Terminal Instrument Procedures (TERPS), the FAA has established sloping Obstacle Clearance Surfaces (OCS) that are used in the design and approval of instrument flight procedures. TERPS criteria specify the minimum measure of obstacle clearance that is considered by the FAA to supply a satisfactory level of vertical protection from obstructions and are predicated on normal aircraft operations. These are intended to provide obstacle-free paths for aircraft descending on a glide path to landing or climbing in a departure or missed approach. They also effectively add another layer of protection in cases where objects that penetrate the FAR Part 77 Surfaces cannot be removed or mitigated. The basic TERPS surfaces are also referenced in FAA AC 150/5300-13A and are used to establish landing threshold and departure end of runway locations. Like the FAR Part 77 Surfaces, these surfaces can vary in shape, size, and slope based on the approach capability of each specific runway end.

Threshold Siting Surface (TSS)

The TSS [18] is generally a trapezoidal shaped surface that extends outwards and upwards from the runway along the extended centerline at a specific slope. The significance of this TERPS surface is that it is generally less encumbering than the FAR Part 77 Approach Surface, but it is more critically sensitive to obstacle penetrations. In this regard, FAR Part 77 can be viewed

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[18] Also known as an Approach Surface per FAA AC 150/5300-13A, *Airport Design*, Table 3-2 "Approach/Departure Standards"; and should not be confused with the Approach Surfaces as defined in FAR Part 77.

as an initial screening mechanism for obstructions and the airport owner should develop a mitigation strategy and continually strive to remedy areas of concern. However, the TSS is much more critical, and penetrations must be addressed with urgency to ensure the safety of aircraft operations which would otherwise result in adjustments to the approach procedures to restore safety. Any penetrations to these surfaces must be addressed immediately and could require displacement of the threshold that would reduce available runway length. Obstructions to TERPS surfaces that cannot be removed will often result in increased approach minimums and if the obstructions are severe enough – cancellation of the approach procedure.

For Runway 2, the TSS begins 200 feet beyond the runway end and extend outwards for 10,000 feet. The inner width is 400 feet and the outer width is 3,400 feet. The slope of the surface is 20:1. The TSS of Runway 20 begins at the runway end and extends outwards and upwards 5,000 feet at a slope of 20:1. The inner width is 250 feet and the outer width is 700 feet. For Runway 9-27, the TSS begins at each end of the runway and extends 5,000 feet. The inner width of the TSS is 250 feet, the outer width is 700 feet, and the slope is 20:1.

The existing airspace analysis identified more than 40 objects that penetrate the TSS of the four runway ends. The objects include treetops, antennas, utility poles and buildings that penetrate the TSS by as much as 32 feet. There are five obstacles that obstruct the Runway 20 TSS, thus requiring the use of the 590-foot displaced threshold. It is recommended that these objects be appropriately mitigated to avoid any penetrations to the TSS. Refer to the ALP Drawing Set for a detailed summary of obstructions and recommendations to address the areas of concern.

Glide Path Qualification Surface (GQS)

The GQS is an imaginary surface applied to runway ends that supports instrument approaches with vertical guidance. The surface extends 10,000 feet from the runway threshold along the runway centerline extended to the Decision Altitude (DA) for the procedure. For Runway 2, these surfaces have an inner width of 350 feet and an outer width of 1,520 feet; the slope is 30:1. This analysis determined that no objects penetrated the existing GQS for Runway 2.

Departure Surface

The Departure Surfaces, when clear, allow pilots to follow standard instrument departure procedures (SIDS) with standard rates of climb. FAA AC 150/5300-13A acknowledges that obstacles frequently penetrate departure surfaces. Known penetrations to these surfaces are identified in the FAA's flight procedure publications used by pilots for flight planning. If the penetrations are substantial enough, the FAA may require non-standard rates of climb, higher departure minimums, or reduction in runway length available for takeoff.

The Departure Surface is a trapezoid shape that begins at the end of the runway. The Departure Surface begins at an inner width of 1,000 feet, extends along the extended runway centerline for 10,200 feet at a slope of 40:1, to an outer width of 6,466 feet for the departure ends of Runways 02, 09, and 20. Runway 27 is not currently authorized for instrument departures and therefore, the 40:1 departure surface is not currently applicable to Runway 27. However, it is the intention to make Runway 27 available for aircraft departures during the planning window. As such, a departure surface with the dimensions noted above would extend beyond the departure end of Runway 27.

The airspace analysis identified more than 180 objects that penetrate the departure surfaces of the three runway ends. Most of these objects are treetops but also include buildings, antennas, and roads that penetrate [19] the surface by as little as six inches and as much as 52 feet. Refer to the ALP Drawing Set for a detailed summary of obstructions and recommendations to address the areas of concern.

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[19] For planning purposes, a 15-foot tall vehicle is assumed to be on the road for an obstruction analysis.

3.8.5 Hazardous Wildlife Attractants

As mentioned in Appendix B, certain land use practices and habitats can influence the wildlife species and populations that are attracted to the airport environment. **Table B-2** lists more than 40 areas have been identified as potential wildlife hazard attractants adjacent to WVI. Notable hazardous wildlife attractants include the Harkins Slough, City of Watsonville Landfill, and the City of Watsonville Wastewater Plant. Pilots have reported that these landfills, sloughs, and Pinto Lake are the primary attractants for birds within the traffic pattern at the Airport. However, there have been very few bird strikes reported to the Airport in recent years, indicating that these attractant areas have had limited impacts on regular aircraft operations.

Hazardous wildlife attractants within the immediate approach and departure areas of a runway are of particular concern. FAA AC 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports*, strongly recommends that for runways serving turbine powered aircraft, a minimum 10,000 feet separation be maintained between wildlife attractants and the airfield. It further recommends that within the approach and departure areas, a 5-mile separation be provided. As a number of attractants are located within this distance and cannot be removed or relocated, the Airport conducted a Wildlife Hazard Assessment (WHA) in 2014 and a Wildlife Hazard Management Plan (WHMP) in 2016. The WHMP recommended activity is listed in Section B.1.2. The AMPU recommends that the Airport continue to follow guidance in the WHMP to manage and monitor wildlife in the vicinity.

3.9 General Aviation Facilities

The purpose of this evaluation is to determine the capacity of the existing GA facilities and their ability to meet forecast levels of demand during the planning period. The term “GA Facility” refers to a facility that provides aviation services to airport users and aircraft operators. This section includes evaluation of the general aviation facilities at WVI including the terminal building, aircraft storage infrastructure, vehicle access and parking, Specialized Aviation Service Operators (SASOs) requirements, and airport security.

3.9.1 General Aviation Terminal Building

General Aviation terminal buildings serve as a transfer facility for passengers and flight crews moving to and from the aircraft. Terminal buildings can range in size and capability depending on several factors, specifically related to the types of users present at the airport. GA terminal buildings can range from a small pilot room used for flight planning and resting to a large multi-room building that provides space and service for multiple uses. Access to public facilities 24/7 from both the airside (aircraft apron and hangar areas) and the landside (ground vehicle parking area) is desirable.

Airport Cooperative Research Program (ACRP) Report 113, *Guidebook on General Aviation Facility Planning* describes recommended standards for GA terminal facilities. ACRP recommends that terminals at general aviation airports should offer the following minimum services:

- Passenger Lounge
- Restrooms
- Pilot Lounge
- Food/Drink Vending

As mentioned in **Chapter 2**, the GA terminal at WVI provides a variety of services and amenities to users and visitors, which meet many of the recommended services listed in ACRP Report 113.

The existing administration/terminal building at WVI has approximately 4,500 square feet of interior space and 2,000 square feet of covered patio space. Approximately 3,000 square feet of the terminal building is dedicated to Airport-use while 3,500 square feet is used by the attached restaurant. ACRP Report 113 provides planning guidelines to develop spatial requirements of terminal buildings at general aviation airports. A factor of 2.5 people (pilots and passengers) per peak hour operation is assumed, while an area of 100 to 150 square feet of space per person is considered adequate to accommodate the peak hour traffic. Based on these assumptions, the formula used to determine the recommended size of the terminal building is as follows:

(Peak Hour Operations) × (2.5) × (100 sf to 150 sf) = Building square footage

The results of the terminal size analysis are presented in **Table 3-18** and are compared to the existing administration/terminal building. As shown, the existing terminal building at WVI is considered smaller than desired to meet projected levels of operations and passenger activity. It is understood that many of the services that could be provided in a single terminal are provided by different tenants throughout WVI currently. However, previous airport plans noted that the Airport has tentative plans to reconfigure and expand the terminal building to approximately 9,000 square feet, although the ultimate size could be modified based on the space available and the needs of Airport users. How the current services are provided should not dissuade the Airport from providing a larger GA terminal in the future.

Table 3-18: GA Terminal Building Size Requirements

Year	Peak hour Operations	Peak Hour Passengers (Including pilot)	Terminal Size Required	Existing Terminal Building Size	Surplus/Deficiency
2020	28	69	6,944	6,500	(444)
2021	30	76	7,563	6,500	(1,063)
2025	34	84	8,388	6,500	(1,888)
2030	38	95	9,543	6,500	(3,043)
2035	43	109	10,863	6,500	(4,363)
2040	49	124	12,361	6,500	(5,861)
***Sources: Kimley-Horn; ACRP Report 113,* Guidebook on General Aviation Facility Planning**					

3.9.2 Aircraft Storage

Airports need to have appropriate storage facilities to accommodate the safekeeping of both based and transient aircraft. As noted in **Chapter 2**, there were 280 based aircraft at WVI in 2020 and it is projected that this number will increase to 327 by 2040. This analysis uses information available as of May 2021 and recognizes that the number and size of storage facilities available at WVI may change during the planning period.

Aircraft are traditionally stored in one of three types of facilities: conventional hangars, T-Hangars, or apron tie downs (parking spaces). These storage types are explained in the following:

- **Conventional Hangars:** This type of hangar is a large building which can house multiple aircraft in protective storage, and usually contains a large door through which aircraft can pass. There are 22 conventional hangar units at WVI ranging in size from 2,000 to 9,680 square feet, resulting in approximately 81,300 feet of total aircraft storage space. Seven of these units are considered commercial/maintenance hangars that are leased by

SASOs that use the facilities for aircraft storage and to repair aircraft and aircraft parts. The remaining 15 units are leased by private aircraft owners and are primarily used for aircraft storage. While these hangars can accommodate multiple aircraft there is no requirement on the tenant to fill the hangar to capacity.

- **T-Hangars:** This type of hangar is an individual storage unit for a small aircraft, usually a single-engine or light twin aircraft classified under ADG I. T-Hangars are shaped like the letter "T" and are typically nested together facing opposite directions, helping to create more densely configured aircraft storage spaces. There are 206 T-Hangar units that range in size between 900 and 1,100 square feet.

- **Apron Tie Downs:** Apron tie downs are hardpoints that allow pilots to secure their aircraft (including helicopters) when parked on the ramp. Tie downs do not provide protection from weather but do prevent unintended aircraft movement caused by wind and other factors. WVI has four dedicated tie down apron areas that are described in the following and summarized in **Table 3-19**.
  - The east transient tie down ramp is approximately 170,800 square feet and has 23 tie downs, including three spaces for jets. Seven tie downs on the east transient ramp are currently utilized for longer term transient aircraft. When the lease ends the seven tie downs will revert to City management and be utilized for transient aircraft.
  - The north tie down ramp is 244,700 square feet and is utilized by permanent based aircraft. It has tie downs for 68 aircraft and two helicopters.
  - The transient ramp in front of the terminal building is approximately 116,547 square feet and can accommodate 20 aircraft.
  - An additional apron located southeast of the GA terminal building adjacent to the commercial/maintenance hangars is 57,000 square feet and can accommodate 14 aircraft and five helicopters. This apron is for use by the hangar tenants only. There are three additional tie downs adjacent to Hangar L, temporarily designated for dilapidated aircraft storage.

Table 3-19: Existing Aircraft Storage Space

Conventional Hangar Space (Sq Ft)	T-Hangar Units	Based Aircraft Tie downs	Transient Aircraft Tie Downs	Helicopter Parking Spaces
81,300	206	98 [20]	25	7
Sources: 2020 WVI; Google Earth				

Aircraft storage needs were determined by identifying the number of based and transient aircraft projected to use the Airport during the planning timeframe. The fleet mix of the Airport's based aircraft fleet is discussed in **Chapter 2**, establishing the number of each aircraft type (single-engine piston, multi-engine piston, jet, rotorcraft) that is projected to be based at WVI during the planning period. Additionally, **Section 3.2** discusses the number of itinerant operations expected to occur at the

[20] Since the initial writing of the AMPU, the Airport removed 6 tie downs designated for based aircraft. Thus, the number available was reduced from 104 to 98.

Airport on an average day during the peak month (PMAD) throughout the planning period. The following assumptions were used to determine what percentage of these operations account for transient aircraft that will require overnight storage:

- 33 percent of all traffic is itinerant
- 25 percent of itinerant traffic are transient aircraft in need of storage (8 percent of total traffic)

These assumptions were considered in the following analyses to determine conventional hangar, T-Hangar, apron tie down, and helicopter parking space needs.

Conventional Hangars

The demand for conventional and T-Hangars is dependent upon the number and type of aircraft based at an airport, as well as local climate conditions, airport security, hangar availability, rates and charges, and owner preferences. The percentage of based aircraft stored in hangars varies from airport to airport but is usually greatest in regions subject to extreme weather conditions. Indoor aircraft storage is typically desired within the Monterrey Bay area due to sun exposure, heat, and moisture.

As aircraft vary in shape and size, the exact storage space required differs between each aircraft model. For planning purposes, several assumptions were determined using guidelines suggested in ACRP Report 113.

Table 3-20 presents the assumptions used to determine conventional hangar needs.

Table 3-20: Conventional Hangar Storage Assumptions

Assumption	Aircraft Type			
	Single-Engine Piston	Multi-Engine Piston	Jet	Rotorcraft
Storage space required per aircraft (Sq Ft)	1,000	2,000	2,500	1,000
Percent of based aircraft fleet stored in conventional hangars	10%	50%	100%	50%
Percent of transient aircraft fleet stored in conventional hangars	20%	60%	60%	60%
Source: Kimley-Horn				

Based on the above criterion, and the aviation forecasts, combined with the consideration of potential fleet mix and projected activity peaking characteristics, **Table 3-21** depicts the demand requirements for conventional hangars at the Airport. The current conventional hangar aircraft storage space appears to be adequate for existing and planned demand during the planning window. However, it is anticipated that conventional hangar space at WVI will be near capacity by 2040, however, the analysis shows there will be sufficient Conventional Hangar space throughout the 20-year period. It should be noted that requirements are not rigid, meaning that shifting of the space requirements between conventional and T-Hangars is something that will need to be considered as operations fluctuate and user's specific requirements are identified. The amount of available storage space may also change due to the reversion of commercial/maintenance hangars to City management once the current leases expire.

Table 3-21: Conventional Hangar Storage Requirements

Summary	2020	2021	2025	2030	2035	2040
Aircraft Requiring conventional hangars	42	44	45	49	53	57
Conventional Hangar Space Required (Sq Ft)	57,500	59,500	61,500	68,500	73,500	81,500
Conventional Hangar Space Available (Sq Ft)	81,300	81,300	81,300	81,300	81,300	81,300
Surplus/(Deficit)	**24,100**	**22,100**	**20,100**	**13,100**	**8,100**	**100**
Sources: WVI, Kimley-Horn						

T-Hangars

Unlike conventional hangars, T-Hangars can only house one aircraft per unit and are traditionally used to house based aircraft. As such, storage space requirements for T-Hangars are determined based on units available rather than square footage. Planning assumptions were made to determine how many T-Hangar units will be required at WVI during the 20-year planning window. This analysis assumed that T-Hangars will not be utilized to store transient aircraft of any type and will not be used to house jets or helicopters. It is assumed that 40 percent of based multi-engine piston aircraft and 80 percent of based single-engine piston aircraft will be stored in T-Hangars during the planning period.

Table 3-22 presents the results of the T-Hangar storage analysis based on the aforementioned planning assumptions. The analysis indicates that there is currently a deficiency of T-Hangar units at WVI, which is concurrent with what has been reported by Airport staff and stakeholders. It is projected that the Airport will need 13 additional T-Hangars by 2025 and 36 additional units by 2040. Once again, these requirements are not rigid, as shifting aircraft owner preferences may change the number of aircraft needing T-Hangar storage over the planning period.

Table 3-22: T-Hangar Storage Requirements

Summary	2020	2021	2025	2030	2035	2040
T-Hangar Units Required	211	212	219	226	235	242
T-Hangar Units Available	206	206	206	206	206	206
Surplus/(Deficit)	(5)	(6)	(13)	(20)	(29)	(36)
Sources: WVI, Kimley-Horn						

Apron Tie downs

The layout and size of an apron is dependent on the aircraft that frequent an airport, ground vehicle circulation needs, and FAA design standards. ACRP Report 113 also provides design guidance for apron layout and capacity. For the purpose of calculating required aircraft parking apron needs, the assumptions listed in **Table 3-23** were applied to the forecast data above.

Table 3-23: Apron Aircraft Storage Assumptions

Assumption	Aircraft Type			
	Single-Engine Piston	Multi-Engine Piston	Jet	Rotorcraft*
Percent of based aircraft fleet stored on apron	10%	10%	0%	50%
Percent of transient aircraft fleet stored on apron	80%	40%	40%	40%

**Note: Rotorcraft were not included in the apron tie down analysis as they required parking areas with specialized markings and separation.*
Source: Kimley-Horn

Table 3-24 presents the results of the apron storage requirement analysis based on the planning assumptions listed above. As shown, this analysis indicated that a total of 55 apron tie downs will be required for based and transient aircraft at WVI by 2040. This results in a surplus of 68 tie downs at the end of the planning horizon. It is understood that currently the tie down spaces are almost completely utilized, which seems contradictory to the surplus shown as part of the MPU. The MPU analysis bases the utilization on the preferred storage of the aircraft types as outlined in storage assumptions above.

It should be noted that the number of tie downs available at the Airport may change during the planning period as there are currently 41 tie downs that are located within the existing RVZ, as discussed in **Section 3.4**. If the Airport achieves compliance with FAA RVZ standards, some or all of these tie downs may be eliminated. Possible scenarios for this development are discussed further in **Chapter 4**.

Table 3-24: Apron Aircraft Storage Requirements

Summary	2020	2021	2025	2030	2035	2040
Apron Tie Downs Required	42	43	46	49	51	55
Apron Tie Downs Available	123	123	123	123	123	123
Surplus/(Deficit)	**81**	**80**	**77**	**74**	**72**	**68**
Surplus/(Deficit) with Removal of 41 Tie downs for RVZ compliance	***40***	***39***	***36***	***33***	***31***	***27***
Sources: WVI, Kimley-Horn						

Helicopters Tie Downs

As helicopters and rotorcraft have different operational and storage needs compared to fixed wing aircraft, dedicated apron parking areas often need to be provided to ensure safe movement of aircraft and people on the apron. WVI has two dedicated parking areas with five spaces for based rotorcraft and two spaces for transient rotorcraft. These parking spaces can accommodate helicopters that have up to a 40-foot rotor span and a 60-foot length. It is important to note that these parking spaces are not helipads as the FAA requires additional design and separation standards to be able to utilize them for landings and takeoffs.

As noted in **Table 3-21** and **Table 3-23,** it is assumed that 50 percent of based helicopters will be stored in conventional hangars while 50 percent will be stored on the apron. Sixty percent of transient rotorcraft are assumed to be stored in conventional hangars and 40 percent are planned to be stored on the apron. No helicopters are planned to be stored in T-Hangars. Helicopter storage needs in conventional hangars were included in the conventional hangar analysis above.

Based on the above assumptions, **Table 3-25** presents the results of the rotorcraft apron parking analysis. As shown, it is projected that the Airport will require four helicopter parking spaces on the aprons by 2040. Three of these spaces will be used by based helicopters while one is projected to be used by transient rotorcraft. As such, there is anticipated to be a surplus of two total parking spaces at the end of the planning period. However, one of the two spaces are located on the apron reserved for hangar tenants only. While the existing facilities are expected to be sufficient during the planning period, the Airport may want to consider allowing transient aircraft to use the based aircraft apron in the future.

It should also be noted that the Airport is currently redesigning one of the tenant-leased apron areas to provide additional helicopter parking.

Table 3-25: Helicopter Apron Parking Requirements

Summary	2020	2021	2025	2030	2035	2040
Helicopter Parking Spaces Required	4	4	4	4	4	5
Helicopter Parking Spaces Available	7	7	7	7	7	7
Surplus/(Deficit)	**3**	**3**	**3**	**3**	**3**	**2**
Sources: WVI, Kimley-Horn						

Aircraft Storage Summary

A summary of overall aircraft storage requirements by facility type is shown in **Table 3-26**. As shown, apron tie down facilities are projected to meet Airport needs throughout the 20-year planning window. Conventional hangar space is expected to meet Airport needs for most of the planning window, with only a small deficit emerging at the 20-year projection (200 SF). It is anticipated that WVI will need an additional 36 T-Hangar units for based aircraft during the planning period.

Table 3-26: Aircraft Storage Requirement Summary

Summary		2020	2021	2025	2030	2035	2040
Conventional Hangars	Space Required (Sq Ft)	57,500	59,500	61,500	68,500	73,500	81,500
	Space Available (SF)	81,300	81,300	81,300	81,300	81,300	81,300
	Surplus/(Deficit)	**23,800**	**21,800**	**19,800**	**12,800**	**7,800**	**(200)**
T-Hangars	Units Required	211	212	219	226	235	242
	Units Available	206	206	206	206	206	206
	Surplus/(Deficit)	**(5)**	**(6)**	**(13)**	**(20)**	**(29)**	**(36)**
Apron Tie Downs	Tie Downs Required	42	43	46	49	51	55
	Tie Downs Available	123	123	123	123	123	123
	Surplus/(Deficit)	**81**	**80**	**77**	**74**	**72**	**68**
Helicopter Parking	Parking Spaces Required	4	4	4	4	4	5
	Parking Spaces Available	7	7	7	7	7	7
	Surplus/(Deficit)	**3**	**3**	**3**	**3**	**3**	**2**

Sources: WVI, Kimley-Horn

3.9.3 Airport Access and Automobile Parking

WVI is currently accessed from Airport Boulevard, which provides access to many of the hangars along the south and east sides of the airfield. Aviation Way connects to Airport Boulevard at two points and provides direct access to the terminal and the SASO hangars. There are four public access points that allow entry to the GA terminal and SASO parking lots. Although these entrances are not gated, all airside facilities beyond them are only accessible through controlled access gates. There are three automatic vehicle access gates along Aviation Way and one access gate located along Airport Boulevard. Additionally, 13 pedestrian gates provide controlled access to various parts of the aprons and hangar areas. Airport staff have indicated that the existing access roads meet Airport needs and will not be a concern during the planning window.

During the stakeholder engagement process of this MPU, aircraft owners noted that the south hangar area is not readily accessible from the terminal apron without entering the active taxiway or exiting the airside area and driving along Aviation Way. These stakeholders requested that a dedicated path be identified to allow for ground vehicle movement between the various areas of the airfield. Any vehicle access road would have to be designed to meet all pertinent design and separation standards as well as airport regulations. Based on the Airport Rules and Regulations, driving on a taxiway is not permitted, thus it is recommended that aircraft owners that cannot travel along a taxilane exit the airfield, drive along Aviation Way, and reenter the airfield at the desired location.

WVI has two paved and lighted vehicle parking lots located adjacent to the terminal building that have spaces to accommodate 81 vehicles, including five handicap spaces. The Airport Operations Center has a parking lot that has 12 additional parking spaces for Airport employees. There are also parking lots adjacent to the several of the SASO hangars that have 80 additional parking spaces for tenant staff and visitors. Airport staff, tenants, and Airport stakeholders have indicated that automobile parking is sufficient for the Airport's needs. Additionally, the existing parking lots meet requirements set by the

City of Watsonville Municipal Code for air transportation facilities. It is therefore anticipated that automobile parking for airport users will not be a concern for the 20-year planning period.

3.9.4 Specialized Aviation Service Operators (SASOs)

Although WVI does not have a traditional private fixed-base operator (FBO), as is common at many GA airports, many of the same essential services are provided to pilots by SASOs located on the Airport. Companies such as United Flight Services, Strawberry Aviation, Specialized Helicopters, and Gary Air offer a range of services including aircraft maintenance, repair, and overhaul (MRO), aircraft rentals, aerial tours, flight training, aircraft painting and interior installation, and air taxi services. The services offered by the SASOs at WVI complement the services offered by the Airport in the GA terminal building, providing an excellent overall level of service to pilots and Airport users. However, there is a limited number of services available to jet aircraft operators. As the Airport plans to attract a greater number of business and corporate jet aircraft in the future, it is recommended that the Airport consider adding amenities and services such as an aircraft ground power unit (GPU), lavatory cart, catering, and potable water cart to better serve jet aircraft.

3.9.5 Airport Security

Security guidelines for GA airports are provided by the Transportation Security Administration (TSA) using an Airport Security Assessment and Protective Measures Matrix. The Airport Security Assessment is a good tool for GA airports to determine their existing security levels and areas where they could see improvement. The results of the assessment for WVI are presented in **Chapter 1**. Notable security features at WVI include full perimeter six-foot fencing that is barbed in some areas, restricted vehicle and pedestrian gates, security signage, CCTV systems, and after-hours security inspections by a third-party contractor.

While WVI meets most of the recommendations established in the TSA Airport Security Assessment, there are still areas that the Airport would like to see improvement in. Airport staff and stakeholders indicated that people trespass through the northern perimeter fence adjacent to the water tanks and use the Airport property as a shortcut. While it may be difficult to completely eliminate these intrusions, it is recommended that the Airport continue to maintain the fencing and inspection procedures to deter unauthorized persons from entering the airfield. Additionally, the existing access gates use a security code to allow approved personnel into security areas. The security system could be improved by implementing a radio-frequency identification (RFID) key system, where approved personnel would access the gate with an electronic key fob. To meet this need, the Airport plans to implement gate card access at all entrance points in 2023.

3.10 Airport Sustainability

FAA AC 150/5070-6B Change 2, *Airport Master Plans* recommends that all airport master plans incorporate elements of sustainability throughout the planning process. Sustainability plans are tailored to individual airport needs and can vary in scope and content between airports. However, the AC requires all master plans to review the Airport's plans for recycling and minimizing the generation of airport solid waste and address any issues related to solid waste recycling. The FAA provides guidance for waste minimization programs through its 2014 document titled *Recycling, Reuse, and Waste Reduction at Airports.*

Of the seven types of waste identified by the FAA, the following are typically produced at WVI:

- Municipal Solid Waste (MSW) — everyday items that are used and then discarded, such as product packaging, bottles, food scraps, and newspapers.

- Construction and Demolition Waste (C&D) — any non-hazardous solid waste from land clearing, excavation, and/or the construction, demolition, renovation, or repair of structures, roads, and utilities.
- Green Waste — tree, shrub, and grass clippings, leaves, weeds, small branches, seeds, pods, and similar debris generated by landscape maintenance activities.
- Food Waste — food that is not consumed or is the waste generated and discarded during food preparation activities.
- Spill Cleanup and Remediation Wastes — these are materials that are generated and remediation of contamination from a variety of sources on an airport (storage tanks, vehicular leaks, spills from maintenance activities, etc.).
- Hazardous Waste — must be handled in accordance with stringent federal regulations. Wastes designated as "hazardous" are covered by regulations outlining legal handling, treatment, or disposal. Hazardous waste at WVI is discussed in greater detail in **Appendix B.**

WVI participates in the City of Watsonville Garbage Removal and Recycling Program and the Construction and Demolition Waste Recycling Program. The Airport has eight dumpsters placed in various locations around the hangar and apron areas for solid waste disposal and recycling. These containers each have an eight-cubic-yard capacity and four of them are dedicated to recycling. These dumpsters are serviced on a weekly basis by the City of Watsonville Sanitation Department, which hauls garbage and recyclables to the Watsonville Waste and Recycling Drop-off Center. The Center is capable of recycling metal, concrete, wood, plastic, cardboard, electronics, and appliances, among other MSW and C&D waste. WVI has special collection areas to separate batteries, tires, paint, and chemicals from the general refuse stream. The Airport also maintains an oil recycling tank that can be used by aircraft owners to safely dispose of used engine oils and filters. The oil tank is emptied every 180 days or as needed to comply with California environmental regulations.

During construction projects, the Sanitation Department places larger (15-cubic-yard) disposal containers on the Airport to collect and construction and demolition waste for recycling. All Airport design and/or construction contracts include sustainability language to ensure compliance with Leadership in Energy and Environmental Design (LEED) standards. The Airport and its contractors also adhere to city permitting processes to ensure proper waste recycling or disposal.

Although the aforementioned sustainability practices greatly reduce the environmental impacts of the Airport, there are some areas that could be improved. Namely, Airport staff reported that a considerable amount of waste is dumped on the airfield without appropriate processing or collection. Much of the waste that causes issues for the Airport is placed in the dumpsters near the corporate hangars and the south hangar area, often causing the dumpsters to overflow. As such, a significant amount of MSW and C&D waste is left uncontained until Airport Staff can coordinate with the Sanitation Department to remove the waste. This increases the risk of environmental contamination from garbage and forces the Airport to conduct additional garbage pick-ups. While all eight dumpsters are only accessible to Airport users, Airport staff indicated that the majority of excess waste is not aviation-related. It is recommended that the Airport work with users and tenants to reduce excess waste buildup on the Airport. Furthermore, the Airport should continue to participate in the City's disposal and recycling programs to comply with FAA guidance.

3.11 Support Facilities

Various support facilities are needed at an airport to maintain safe, efficient aircraft operations and effectively serve the travelling public. At WVI, these facilities include aviation fuel storage and supply infrastructure, airport maintenance and equipment storage buildings, and aircraft wash facilities. The following evaluates these facilities and their ability to meet the operational needs of the Airport.

3.11.1 Aviation Fuel Storage and Supply

The existing aircraft fueling facilities at WVI include three 12,000-gallon underground storage tanks (USTs), a 24/7 self-service fueling island, and five mobile refueling trucks that provide full-service. In total, WVI is able to store a total of approximately 45,00 gallons of fuel; 26,450 gallons of 100LL AvGas and 18,200 gallons of Jet A Fuel. As of August 2020, WVI sold approximately 140,000 gallons of AvGas and 60,000 gallons of Jet A per year. Given this, the Airport's existing fuel storage facilities are expected to be sufficient to hold more than 30 days' worth of fuel during the planning period, which is the recommended amount for GA airports. The existing USTs and fuel dispensers were installed in 1992 and are nearing the end of their useful lifespan. Airport staff has reported reliability issues with fuel delivery systems and trucks. Inspections conducted by the Santa Cruz County Health Service Department identified a number of issues with these systems that need to be addressed to meet environmental standards. The FAA recommends all new fuel farms be constructed with aboveground storage tanks, which are generally easier to maintain and have a smaller environmental impact. As such, it is recommended that the Airport replace the USTs and fueling system with above ground storage tanks and new fuel trucks.

It should be noted that the Airport made unleaded AvGas (UL94) available in September 2021 in order to support the desire for the availability of alternative fuels. UL94 is a recently developed aviation fuel with reduced environmental impacts compared to 100LL. As of 2021, approximately 66 percent of the U.S. piston aircraft fleet is approved to run on UL94 without modifications.[21] UL94 is considered an interim solution while higher octane unleaded fuels such as 100UL are developed and introduced. WVI is tentatively planning to fully transition from 100LL and UL94 to 100UL by 2024, depending on market availability. Initially, the Airport is considering converting one 12,000 UST to house UL94 before both AvGas tanks are converted to 100UL use. As many of the small aircraft that currently use 100LL can safely transition to UL94 use, it is anticipated that the remaining 100LL and proposed UL94 facilities will be sufficient to meet demand at the Airport. However, the future demand for UL94, 100LL, 100UL, and Jet A may fluctuate depending on market conditions and fleet mix. As such, it is recommended that the Airport monitor demand to determine if how much storage capacity is allocated to each fuel type.

3.11.2 Airport Maintenance and Equipment Storage

Airport maintenance facilities include equipment and infrastructure pertaining to the safety and operational capability of an airport. WVI is equipped with a 900-square foot maintenance equipment storage (MES) building, located adjacent to the Airport Operations Center along Aviation Way. Equipment utilized at the Airport include a street sweeper, dump truck, a cargo trailer, aircraft tug, tractors, golf carts, and utility vehicles. The existing MES building is not capable of housing vehicles, so all utility vehicles and tractors must be stored on the apron. This increases the weather exposure to these vehicles which may wear them down faster and may reduce the service life of the equipment.

As such, it is recommended that WVI develop a maintenance facility that is capable of housing maintenance vehicles and equipment. ACRP Report 113 provides guidance on the recommended size of airport MES buildings. As WVI occupies 344 acres, ACRP recommends that the MES building have four storage bays for vehicle and equipment storage (2,400 to 3,200 square feet) and one bay for support facilities (600-800 square feet), resulting in a total building size of 3,000-4,000 square feet.

3.11.3 Aircraft Wash Facility

Aircraft wash facilities (wash racks) provide a common area for GA aircraft owners to access water to clean their aircraft. Although an aircraft wash rack is not present nor required at WVI, several stakeholders indicated the desire for one to be

[21] Swift Fuels. (n.d.) "Frequently Asked Questions". Available online at: https://www.swiftfuelsavgas.com/faq (Accessed May 2021).

made available at the Airport. Wash racks are designed to catch wash water and drainage, allowing airports to meet any environmental regulations pertaining to wash water and chemical discharge into the environment. Wash racks are usually constructed in one of the three following layouts, open air (exposed pavement slab with drainage), covered (roof with open sides), and enclosed (hangar with or without door).

ACRP Report 113 recommends that wash racks be large enough to accommodate the largest aircraft in use at the facility, be located outside of all safety and object-free areas, not interfere with airfield and emergency operations, and not obstruct FAR Part 77 imaginary surfaces. Potential locations for an aircraft wash rack are discussed in **Chapter 4**, however, ACRP Report 113 recommends that the wash rack be located near appropriate utilities (water, electricity, sanitary sewage, and communications), but away from high traffic areas such as the terminal, helicopter parking area, and SASO facilities. Given that WVI's critical aircraft is expected to be the Beechcraft King Air 350, it is recommended that a wash rack would be 70 feet by 70 feet to accommodate the 57-foot wingspan of the King Air plus 13 feet to allow for personnel movement around the aircraft. A 10-foot clear area is recommended to surround the wash rack, and, as such, the total area for the wash rack is recommended to be 90 feet by 90 feet. ACRP Report 113 recommends certain features and layouts for aircraft wash racks depending on local drainage capabilities and environmental requirements. Given that local and state regulations require wash water to be treated, it is recommended that a wash rack would either be an open-air facility with a valved drainage system that only opens during wash events, a covered facility, or an enclosed facility.

3.12 Utility Systems Infrastructure

As mentioned in previous sections of this analysis, the Airport's water and sewer services are provided by City of Watsonville facilities, while electrical power is supplied by PG&E. AT&T is the Airport's telephone provider. The Burchell Water Tank is located on Airport property and a critical asset to the City of Watsonville's network of water facilities. Airport stakeholders and staff have indicated that the existing utility infrastructure and services adequately meet the needs of the current Airport facilities. Undeveloped areas of the airfield do not currently have utilities. As such, any future development projects in these areas would require an extension of most or all of the aforementioned utilities to the new development.

The 2010 WVI Drainage and Utility Master Plan indicated that the Airport has several areas with inadequate drainage infrastructure to handle even moderate storms. The 2010 Drainage Plan identified a series of potential projects that would improve stormwater drainage and prevent flooding of the aprons and adjacent properties surrounding the airport. It is recommended that the Airport follow the recommendations of the 2010 Drainage Plan to address these issues.

Additionally, Airport stakeholders indicated a desire for electric aircraft to begin operating at the Airport in the future. The Airport would require additional electrical infrastructure and potentially capacity to support electric aircraft including aircraft chargers and battery swap/charging stations. It is recommended that the Airport continue to explore electric aircraft needs in the future to determine the exact needs for the facility.

3.13 California Aviation System Plan Requirements

As mentioned throughout this analysis, the California Department of Transportation (Caltrans) sets minimum facility and service standards for public-use airports through the California Aviation System Plan (CASP). The most recent version of the CASP was published in 2010, although a new draft plan was released for public comment in November 2020. The 2010 CASP classified WVI as a Regional General Aviation and established minimum standards for WVI and similar airports in the state. These minimum standards and WVI's performance in each metric are summarized in **Table 3-27.** WVI meets all CASP standards with the exception of the recommended runway length, which recommends the primary runway to be 5,120 feet long, which concurs with the recommended length determined using FAA AC 150/5325-4B.

Table 3-27: Minimum Standards for Regional General Aviation Airports

Project Description (in order of priority)	Regional GA Airports	Watsonville Metrics
Runway Length/Extension	Sufficient to accommodate 100% of the aircraft fleet at 60% useful load per FAA AC 150/5325-4B ***WVI: 5,120'***	**Does not Meet**
Runway Width	75'	Exceeds
Runway Weight Limit (lbs.)	12,500 single wheel	Exceeds
Runway Safety Area (RSAs)	Formula determined per AC 150/5300-13	Meets
Visual Aids	VASI/PAPI to lighted runway in no approach lights; REIL for IFR runway without approach lights	Meets
Approach Procedures	GPS/VOR	Meets
Runway Approach Lighting	None	Exceeds
24-hour On-field Automated Weather (AWOS/ASOS)	24 hour on-field weather observation	Meets
Fuel Available	Jet A and 100LL	Meets
Airport Layout Plan	Approval date fewer than 5-years old (month/year)	In Progress
Source: 2010 California Aviation System Plan, General Aviation System Needs Assessment Element		

3.14 Facility Requirements Summary

Based on the facility requirements identified in this chapter, **Table 3-28** presents a summary of recommended deficiencies to address to the Airport's existing facilities throughout the planning period:

Table 3-28: Summary of Facility Requirements

Number	Facility Requirement
Runways	
1	Extend Runway 2-20 to achieve full length of at least 5,120 feet
2	Acquire fee-simple property or avigation and land use easement for RPZs to Runway 2-20 and Runway 9-27
3	Develop a strategy to address Runway Visibility Zone (RVZ) standards and regain full operational capabilities of Runway 9-27
4	Investigate feasibility of MIRL system for Runway 9-27
5	Investigate development of future turf runway
6	Investigate feasibility for MALSF system and FAA eligibility
7	Develop strategy for engaging in national policy on eligibility of non-primary runways
Taxiways	
8	Reconfigure Taxiway A to meet ADG-II taxiway separation to fixed or moveable object standards
9	Widen existing paved shoulders on Taxiway C to meet ADG-II design standards, if continue to provide paved shoulders
10	Reconfigure Taxiways A and C to address non-standard runway intersection angles and acute-angle runway entrance taxiways
11	Reconfigure Taxiway A to modify wide expanse of pavement at Runway 20 entrance
12	Reconfigure Taxiway Taxiways B, C, and D to eliminate taxiways with direct access from apron to runways
13	Consider options to reconfigure A to eliminate runway crossing in high-energy sections of the runways
14	Reconfigure apron and hangar area taxilanes to meet TDG-2 and ADG-II design and separation standards
15	Update designations of Taxiways B, D, and E; and runway entrance Taxiways A and C
Parachute Landing Area (PLA)	
16	Continue to coordinate with Nordic Naturals on land swap agreement
17	Coordinate relocation of PLA while maintaining USPA standards
Airspace	
18	Coordinate with FAA regarding maintenance of the on-airport localizer and existing APV, VOR, and LOC approach procedures
19	Continue to coordinate with FAA to investigate feasibility of GPS-based IAP to Runway 20 as technologies improve

Number	Facility Requirement
20	Remove on-airport FAR Part 77 obstacles and coordinate with adjacent property owners to remove or mitigate obstacles to the approach and transitional surfaces
21	Coordinate with adjacent property owners to remove obstacles from the Runway 20 Threshold Siting Surface (TSS) in order to remove 590-foot displaced threshold
22	Continue to follow guidance in the Wildlife Hazard Management Plan to manage and monitor wildlife in the vicinity.
General Aviation Facilities	
23	Expand GA Terminal Building to meet Airport and users' needs
24	Develop hangars as demand arises and financial conditions allow
25	Improve ground handling services for Jet Aircraft (e.g., lavatory cart, catering cart, GPU)
Sustainability	
26	Coordinate with Airport users and tenants to mitigate excess dumping of non-aviation solid waste
Support Facilities	
27	Construct Maintenance Equipment Storage (MES) building based on guidance from ACRP Report 113
28	Construct aircraft wash rack based on guidance from ACRP Report 113
29	Improve airfield drainage based on findings of 2010 WVI Drainage and Utilities Master Plan
30	Extend Airport utilities as needed for future development
31	Determine location for future aboveground fuel facilities

Source: Kimley-Horn

Watsonville
MUNICIPAL AIRPORT

Alternatives Analysis and Recommended Development Plan

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Prepared for

City of Watsonville

Prepared by

Kimley»Horn

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4 Alternatives Analysis

This chapter identifies and evaluates potential development alternatives for Watsonville Municipal Airport (WVI) to meet the existing and future facility needs identified in Chapter 3. This element of the Master Plan Update (MPU) was developed using an iterative process, beginning with an exploration of how various facilities could be improved to meet current and projected demands. The needs that were identified include specific elements of the airside and landside, each of which was examined independently to ascertain the preferred alternative for that element. Certain aspects of development would impact other areas, requiring an examination of how to combine the various alternatives, including potential modifications to preferred, facility-specific alternatives, into a Recommended Development Plan (RDP). In some cases, a single, logical improvement plan made the most sense and for others, multiple potential configurations or alternatives were considered.

A key aspect of the alternatives analysis was to provide the stakeholders and the community with the opportunity to review the various alternatives and provide input prior to any decisions being made. This stakeholder and public outreach process was accomplished through a series of meetings with the Project Review Committee (PRC), public open houses, and discussions with individual stakeholders in which draft materials were presented for review, discussion, and input. The alternatives analysis is presented as follows:

- Evaluation Criteria
- Acknowledgement of Potential Airport Closure
- No-Analysis Alternatives
- Airside Alternatives
- Landside Alternatives
- Recommended Development Plan

The goal of this chapter is to identify a range of alternatives for airfield and landside development that are consistent with the Federal Aviation Administration (FAA) guidelines and standards and goals of WVI. The alternatives are based on a review of Airport's needs as well as current environmental, physical, and financial constraints. Note that prior to the development of any airport project, an environmental analysis and permitting may be required, as further discussed in **Chapter 5**.

As noted in **Chapter 3**, it is important to remember that the potential solutions and selected RDP identified in this chapter will be part of a 20-year phased plan that is subject to changing guidance, policies, and interpretation. The RDP cannot and does not need to be implemented immediately. For example, FAA Advisory Circular (AC) 150/5300-13A, *Airport Design* was last updated in 2012 and a new version (-13B) was in draft at the time of this chapter's writing and has since been published. This analysis evaluates airfield facilities based on the standards of -13A. As such, some of the facility standards that are the basis for the identified alternatives may change based on the final guidance and new requirements may become applicable during the 20-year planning window. It will be important for WVI to discuss the latest FAA guidance as implementation is initiated for each project to confirm the recommendations made in this MPU are applicable at the time of implementation.

4.1 Evaluation Criteria

Each of the alternatives was weighed against a set of evaluation criteria that reflect the overarching design and management objectives of the Airport and this MPU. The purpose of the evaluation was to identify which alternatives provide the greatest benefit with the least impact, which ultimately inform the selection of the preferred alternative. The general evaluation criteria are listed below and are applied to the various analysis, as applicable.

- **Satisfy Future Demand:** Alternative accommodates future demand volumes and forecast fleet mix and operational needs of the Airport.
- **Meet FAA Design Standards:** Alternative meets current FAA design standards, which are intended to enhance the operational safety of the Airport and reduce the need for a Modification of Standard (MOS).
- **Minimize On-airport Impacts:** Alternative ensures compatibility with existing facilities by minimizing impact to surrounding facilities and uses and providing a balanced use of Airport property for short- and long-term plans.
- **Cost:** Estimated capital development costs that also consider continued operation and maintenance costs to ensure the project is achievable in a manner that does not overburden the financial resources of the Airport.
- **Flexibility:** Alternative can be scaled, phased, or adjusted to meet changing market conditions well into the future.
- **Environmental Considerations:** Alternative is compatible with environmental considerations on-airport and minimizes negative impacts to the community and natural environment.
- **Airport User Preferences:** Alternative best suits Airport user and stakeholder preferences.

4.2 Acknowledgement of Potential Airport Closure

As it has been discussed by the public and the City of Watsonville Council Members, it was considered prudent for the MPU to acknowledge the potential for the Airport's closure. While the MPU neither recommends the closure of WVI nor considers it a viable alternative, it does acknowledge that the Airport sponsor must do its due diligence in investigating what it would take to close the Airport and the implications of such a decision. This MPU does not cover all considering factors for airport closure but does provide a high-level overview of the process and implications. More information on airport closures and preservation of airports can be found in FAA Compliance Guidance Letter (CGL) 2018-2, *The Process for the Release and Permanent Closure of Federally Obligated Airports*, and the Airport Cooperative Research Program (ACRP) Report 44, *A Guidebook for the Preservation of Public-use Airports.*

Throughout the U.S., local residents and elected officials sometimes request that an airport be closed, or its operational capacity be severely reduced. The reasons for these requests can range from a perceived burden on local financial resources to environmental concerns to noise complaints. Airport closures can result in immediate implications for the airport sponsor, aviation-related users, and the community in which the airport is located. Airports serve as a driver of economic activity and contribute to the safety, security, and social wellbeing of the communities in which they are located, as well as provide other benefits to aviation and non-aviation users. These benefits include, but are not limited to, supporting corporate passenger service, general aviation activities, air taxi, air medivac and military operations, as well as attracting people to a region for business or pleasure.

Airport closures may also negatively impact the capability of the state aviation system to provide comprehensive air connectivity across California. The closure of an airport does not automatically mean that the aircraft and businesses owners will also cease to exist, but instead may relocate to a nearby airport. This can negatively impact those facilities if they do not have sufficient airfield or storage capacity for these new operations and tenants.

CalFire Operating in Santa Cruz Mountains

In many cases of requests for airport closures, there is a lack of understanding of the types of activities that take place at these airports and that they can provide immense economic value to the region as well as life-saving activities. For example, WVI operated as a base of operations for CalFire during the August 2020 CZU Lightning Complex Fire that ravaged the nearby Santa Cruz Mountain range. WVI housed seven helicopters with personnel and equipment including mobile fuelers and support vehicles. WVI also played a vital role in the disaster relief efforts following the 1989 Loma Prieta earthquake. During the closure of the major roadway access routes due to damage, WVI was the County's conduit for incoming supplies.[1] Additionally, the 2015 Santa Cruz County Operational Area Emergency Management Plan considers WVI as an essential facility in disaster response. As described further in **Chapter 1**, WVI's 2019 total economic benefits included 452 jobs, $27.2 million in payroll for workers, and $67.0 million in output.

While the closure or deactivation of an airport is not impossible, it is a complex and lengthy process. Additionally, there are three guiding principles used to determine when the FAA generally will not consider airport closure unless a replacement airport is being constructed:[2]

- If the airport serves a unique role and there is no comparable alternative within its vicinity
- If the airport is part of a system of airports and the role it fulfills is important to the continued operation of the local airport system
- If the airport is classified as a National or Regional airport in the current National Plan of Integrated Airport Systems (NPIAS)

As a Regional airport, the closure of WVI is unlikely unless the Airport sponsor provides sufficient justification for closure acceptable to the FAA. In addition to these guiding principles, airports that have accepted federal funds to keep the airport operating safely agree to 39 grant assurances (also referred to as obligations). Grant assurances federally obligate airports through the useful life of grant-funded improvements, intended to not exceed 20 years from the date of grant acceptance (for each individual grant). When federal grant funds are used to purchase land, or when airport land is conveyed to the sponsor as a surplus or non-surplus property, obligations tied to those funds do not expire, as the useful life of the land is presumed to be into perpetuity. Should WVI decide to pursue closure, a complete review of grant obligations and land deeds for would need to be completed to confirm the extent of applicable federal obligations. If these obligations were found for Airport property at WVI, the City would need to provide the FAA with justification for its request to close as well as complete an environmental review through the National Environmental Policy Act (NEPA) for the closure. The FAA would also create a public notice for a "Change in Use of Aeronautical Property" in the Federal Register to afford the public an opportunity to comment.

[1]Santa Cruz County Grand Jury Report 2005-2006
[2] CGL 2018-2, The Process for the Release and Permanent Closure of Federally Obligated Airports (August 1, 2018), pgs. 1-2.

The FAA reviews release requests in terms of the following major considerations:

- Reasonableness and practicality of the sponsor's request
- Disposition and effect of the request on all airport assets
- Net benefit to civil aviation
- Compatibility of the proposal with the needs of civil aviation
- Existing airport being in a safe and operable condition
- State aeronautical agency's recommendation on the sponsor's request

If the FAA does approve a sponsor's request to be released from its federal obligations, there are a series of steps that must be completed by the sponsor to dispose of airport property, including but not limited to:

- Determine the Fair Market Value (FMV) of the land and infrastructure based on the highest and best use. Additionally, the value realized from the disposal of any buildings and improvements owned by the airport sponsor must be treated as airport revenue regardless of original financing source
- Reinvest the federal share of grant-funded improvements back into a new FAA-approved AIP-eligible project if the original project's duration of useful life has not expired
- Disposal of Airport Property (land and infrastructure) plans shown to FAA benefit civil aviation

If WVI were to undergo this process, it is important to note that the sale of the property would not automatically be available for the City's General Fund and may be required to be reimbursed to the FAA or reinvested in other aviation infrastructure.

It is also important to note that per Grant Assurance C.19.a, the airport sponsor is obligated to "…suitably operate and maintain the airport and facilities..." While waiting for the FAA grant assurances to expire, an airport sponsor may not allow an airport to fall into disrepair while considering a closure. The airport sponsor remains obligated to operate the airport and all facilities necessary to serve the aeronautical users of the airport at all times in a safe and serviceable condition and in accordance with the minimum standards as may be required or prescribed by applicable federal, state, and local agencies for maintenance and operation. This can include maintenance of the pavement, lighting, navigational aids, and removal of obstructions, among many other regular maintenance items. Without FAA funding, this can result in millions of dollars in local funds being expended to maintain WVI while waiting for the grant assurances to expire.

4.3 No-Analysis Alternatives

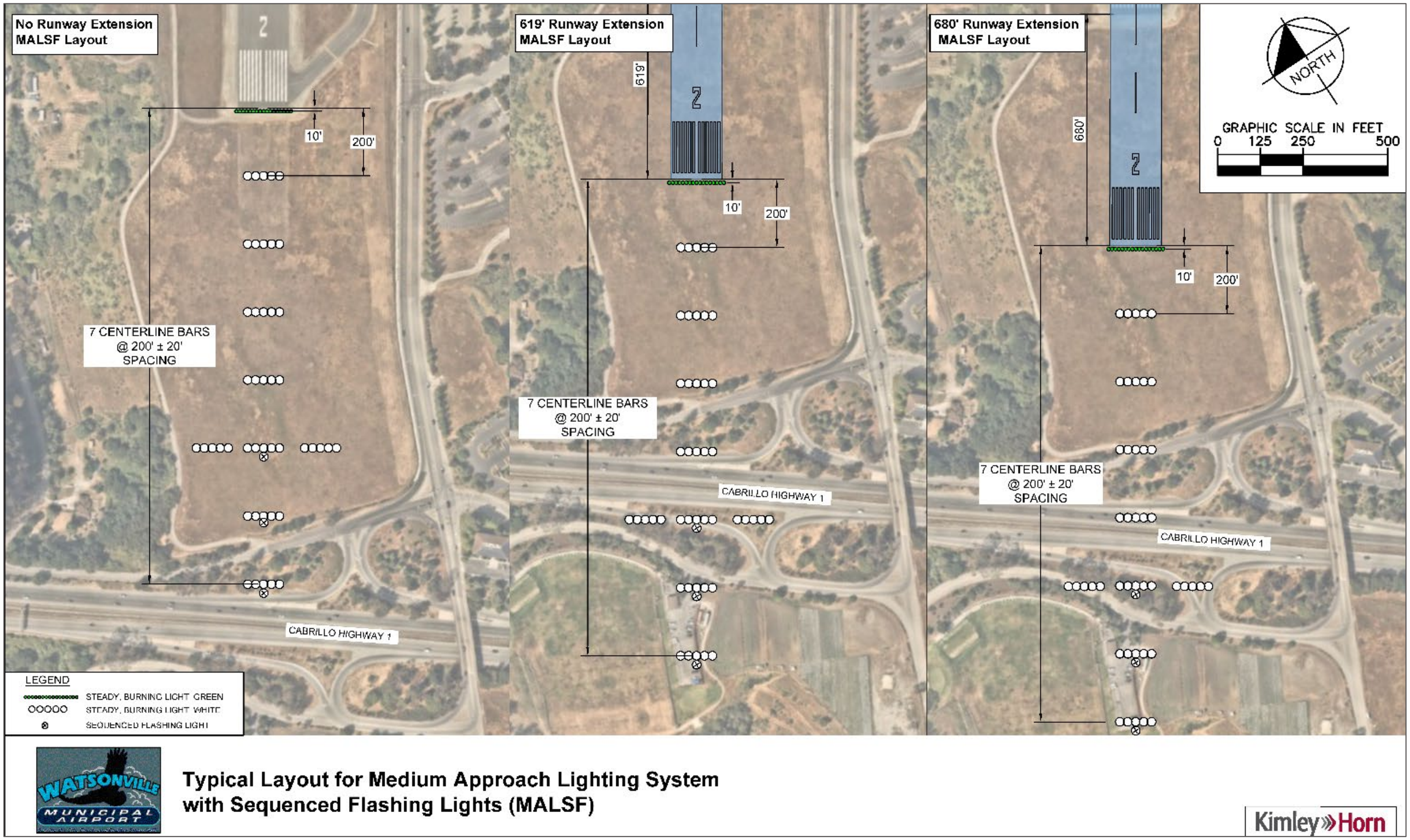
Generally, facility improvements may be categorized as those that require in-depth alternatives analyses and those that do not. Some improvements do not offer alternatives as the conditions or needs should be met and there are no other options to achieving the infrastructure improvement. These improvements may have limited complexity and therefore do not require a full analysis. For the purposes of this MPU, improvements that do not require in-depth analyses are primarily focused on upgrading existing Airport infrastructure and/or standardizing conditions per FAA guidance. Such recommended improvements at WVI are listed below and depicted later in this chapter in **Figure 4-29.** More details on the background for each of these are provided in **Chapter 3.**

- **Acquire fee-simple property or avigation and land use easement for Runway Protection Zones (RPZs) to Runway 2-20 and Runway 9-27.** The RPZs are intended to protect people and property on the ground in the event of an aircraft undershoot. It is recommended that the Airport gain positive control over the land use within the RPZs through fee-simple property acquisition, avigation easements, or land use easements.
- **Investigate feasibility for Medium Intensity Approach Lighting System with Sequenced Flashing Lights (MALSF) system and FAA eligibility.** As mentioned in **Chapter 3**, FAA AC 150/5340-30J recommends a MALSF lighting system for runways with non-precision approaches and where approach area identification is difficult. FAA Order 6850.2 requires that the minimum land available for a MALSF system begin 200 feet from the approach end of the runway and extend at least 1,400 feet outwards with a 400-foot width. Given the existing conditions of Runway 2, the MALSF lights would extend across Highway 1 and would require the Airport to coordinate with Caltrans to establish an easement to install lights in the area of the highway and associated on-ramps.

  If Runway 2-20 is extended to the recommended length of 5,120 feet (a 619-foot extension) or the maximum possible length of 5,181 feet (a 680-foot extension), the MALSF lights would extend into the portion of Airport property currently being used as a golf range. In this case, the Airport would also have to install aviation equipment in the golf range and adjacent parking lot. It is important to note that a MALSF or Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) would be required if the instrument approach procedure (IAP) is upgraded to a precision IAP such as an Instrument Landing System (ILS) approach, discussed further in **Section 4.4.6.**

  As the MALSF is not required in the runway's current configuration, installation of such a system may not be eligible for FAA funding. Therefore, it is recommended the Airport continue to explore the feasibility of a MALSF in conjunction with potential development of the Runway 2-20 extension and the implementation of precision IAP. It is not recommended at this time as a standalone project for the current runway conditions. **Figure 4-1** presents the typical layout of a MALSF installed on the approach end of Runway 2 as it would be constructed in the runway's existing conditions, Runway 2 with a 619-foot extension, and Runway 2 with a 680-foot extension. The exact placement would need to be further verified during a future design effort.

Figure 4-1: Runway 02 End Typical MALSF Layout



- **Investigate feasibility of MIRL system for Runway 9-27:** Runway lighting provides added guidance to pilots on the ground and in the air. It was therefore recommended the Airport investigate the feasibility of installing a low- or medium-intensity lighting system (LIRL/MIRL) for Runway 9-27. Installation of such a system would require the extension of electricity to both sides of the runway and the construction of the lighting fixtures per the standards of FAA AC 150/5340-30J, *Design and Installation Details for Airport Visual Aids.* Given that FAA currently does not consider Runway 9-27 to be eligible for AIP funding (as discussed in the following bullet), construction of a MIRL system will need to be funded locally or using state funds. The Airport will also be financially responsible for the ongoing upkeep of the lighting and associated conduit. As such, it is not recommended the Airport pursue installation of a LIRL/MIRL system at this time, rather, the Airport should engage in funding eligibility discussions as described below.
- **Develop strategy for engaging in national policy on funding eligibility of non-primary runways**. As mentioned in **Chapter 3**, the FAA does not typically fund maintenance or improvement projects on crosswind runways if the primary runway provides adequate crosswind coverage, defined to be at least 95 percent of the time. Given this policy and the wind coverage provided by Runway 2-20, the primary runway, the FAA's participation in funding future enhancements or maintenance of this runway is likely to be limited, putting increased financial burden on the Airport to maintain Runway 9-27. As such, it is recommended that WVI coordinate with other affected airports, the FAA Office of Airport Planning and Programming, and pertinent industry organizations to discuss the future of the policy and the FAA's actions regarding its enforcement.

  In addition to engaging in the nationwide policy, it is recommended that the Airport discuss applying the definition of a "secondary" runway to Runway 9-27 to ensure the runway would still be eligible for FAA funding per FAA Order 5100.38D. The ADO has the authority to make a specific determination that the runway is required for operation of the airfield.
- **Reconfigure Taxiway A to meet Airport Design Group (ADG)-II taxiway separation to fixed or moveable object standards.** The taxiway must be configured in such a way as to ensure that the taxiway separation to fixed or moveable object separation meets ADG-II standards without compromising other design or separation standards. As such, it is recommended the Airport perimeter fence be relocated from its current location near the connector to Runway 2 end to ensure that design standards are met.
- **Widen existing paved shoulders on Taxiway C to meet ADG-II design standards, if continuing to provide paved shoulders.** While paved taxiway shoulders are not required per ADG-II design standards, it is recommended that the existing paved shoulders be widened by three feet to meet ADG-II standards. Alternatively, the Airport can choose to remove the pavement and instead construct shoulders using turf, aggregate-turf, soil cement, lime, or bituminous stabilized soil to reduce potential for erosion.
- **Reconfigure Taxiways A and C to address non-standard runway intersection angles and acute-angle runway entrance taxiways.** FAA AC 150 150/5300-13A recommends right-angle runway entrance taxiways wherever possible. This provides pilots the best visibility of both the runway and the approach to the runway. Right angle taxiways also provide clear indication of an approaching runway. It is recommended that Taxiway A and Taxiway C be reconfigured to meet Runway 2-20 and Runway 9-27 at 90-degree angles during the next pavement rehabilitation project. **Figure 4-2** presents the recommended configuration of Taxiways A and C.
- **Reconfigure Taxiways B, C, and D to eliminate taxiways with direct access from apron runways**. FAA AC 150 150/5300-13A states that taxiways that provide direct, straight-line access between the aircraft parking apron/ramp and the runway are inadvisable due to the increased risk of runway incursions. WVI currently has three taxiways that provide direct access and one area of potential concern: Taxiway B, D, and C at the end of Runway 27**.** It is recommended that

the Airport relocate Taxiways B and D to eliminate direct access by demolishing the current pavement and shifting the entrance taxiways during the next pavement rehabilitation project. Additionally, it is recommended that the taxilane connecting the corporate hangars to Taxiway C be reconfigured to include two turns before joining Runway 27. **Figure 4-2** shows the recommended configuration of Taxiways B, C, and D.

While not technically a direct access taxiway, Taxiway C is a potential area of concern at the intersection with Taxiway A, adjacent to the north tie down ramp. Currently, Taxiway A is marked with a double-yellow taxiway edge marking to warn pilots not to cross between the ramp and Taxiway C. However, there is no physical barrier between the ramp and the taxiway, which would allow aircraft to taxi directly between the ramp and Runway 2-20. It is recommended that the Airport monitor aircraft traffic on the ramp to determine whether aircraft cross the taxiway edge markings to access Taxiways A or C. If this does occur, it is recommended the Airport repaint the north tie down ramp to include a no-taxi island along Taxiway A at the intersection of Taxiways A and C, per the standards of FAA AC 150/5340-1M: *Standards for Airport Markings* and AC 150/5300-13A. It is important to note that the north tie down ramp may need to be remarked or removed to correct the non-standard runway visibility zone (RVZ) concerns at the Airport, which could eliminate the issue of a direct access taxiway. In this case, the apron would be temporarily reconfigured to address the direct access taxiway until it is modified to meet RVZ standards.

Similarly, Taxiway C is marked with a solid double-yellow taxiway edge line along the north T-hangar area. If Taxiway B is reconfigured to the east, as shown in **Figure 4-2**, it is recommended the Airport monitor aircraft traffic on the ramp to determine whether aircraft cross the taxiway edge markings to access Taxiway B. If aircraft cross the taxiway edge line to access Taxiway B and Runway 27, it is recommended that the Airport repaint the T-hangar down ramp to include a no-taxi island. It is recommended these improvements be completed in conjunction with the next taxiway rehabilitation/reconstruction project, with the exception of the relocation of Taxiway B. As Taxiway B will likely be impacted by modifications made to the airfield to correct the non-standard runway visibility zone (RVZ), it is recommended that Taxiway B be relocated at the time those modifications are completed.

- **Update designations of Taxiways B, D, and E; and runway entrance Taxiways A and C:** FAA AC 150 150/5300-13A recommends all runway entrance taxiways have a unique designator with appropriate markings and signage. At WVI, Taxiways A and C connect at both ends of Runway 2-20 and 9-27, respectively, causing potential confusion for pilots unfamiliar with the Airport. As such, it is recommended the Airport coordinate with the FAA to redesignate Taxiways A and C at each runway end to provide unique designations for each entrance (i.e., Taxiway A would be redesignated Taxiway A1 at the Runway 2 end, and A4 at the Runway 20 end). It is also recommended Taxiways B, D, and E be redesignated to correspond with the parallel taxiways they connect to (i.e., Taxiway B would be redesignated Taxiway C2, and Taxiway E be redesignated Taxiway A2, etc.). Numbering midfield taxiway connectors often offer pilots a better understanding of where their aircraft is located on an airfield and what major taxiway they are approaching when exiting the runway after landing.
  The Airport will need to update the taxiway pavement and airfield signage and coordinate with the FAA to change the FAA Chart Supplement and Airport Diagram. It is recommended this be completed in conjunction with the next taxiway rehabilitation project and the realignment of the direct access and runway entrance taxiways. Furthermore, it is recommended the entire taxiway designation and signage system be updated at the same time to avoid any incongruencies among markings, signage, and airfield chart designations.

Figure 4-2: Recommended Taxiway Configuration

Recommended Taxiway Configuration

Kimley»Horn

- **Taxiway A - Runway 27 Intersection.** Currently, Taxiway A crosses Runway 9-27 176 feet west of the runway center point, which presents an increased risk of high-speed collision in the event of a runway incursion. FAA AC 150/5300-13A recommends that taxiways should avoid crossing runways in the 'high-energy' center one-third of the runway in an effort to reduce this risk, although it is not an airfield design requirement. Therefore, it was recommended that this intersection be reviewed to determine the feasibility of shifting the intersection to the outer 'low energy' sections of the runway.

  It is important to consider operational impacts when reviewing any potential relocation of the taxiway. As discussed in **Chapter 1**, Runway 20 is the preferred calm wind runway for the Airport and the runway supports approximately 74 percent of operations based on 2018-2020 Automatic Dependent Surveillance-Broadcast (ADS-B) data. Taxiway A is the sole access point for the Runway 20 end and is heavily trafficked by both arriving and departing aircraft. Any relocation of Taxiway A could cause increased operational inefficiencies as aircraft departing Runway 20 would have a longer taxi from the apron area. If Taxiway A was relocated to the west side of Runway 2-20, aircraft would be required to cross both runways to reach the Runway 20 end, increasing the risk for runway incursions and incidents. Additionally, a threatened plant species, the Santa Cruz tarplant has been reported in the area surrounding Runway 9-27 intersection. As such, it is recommended that Taxiway A not be relocated from its current location at the Runway 9-27 intersection.

- **Reconfigure apron and hangar area taxilanes to meet Taxiway Design Group (TDG)-2 and ADG-II design and separation standards**. Several taxilanes do not meet appropriate separation distance for TDG-2 and ADG-II standards. It is recommended that the Airport repaint the transient ramp, north tie down ramp, east transient ramp, Specialized helicopter ramp, and taxilanes in the north hangar area to meet these standards. It is recommended that the Airport complete this work during the next apron rehabilitation/reconstruction project, as the final layout of the taxilanes may be impacted by changes to apron size and configuration.

- **Coordinate with FAA regarding maintenance of the on-airport localizer and existing instrument approach procedures.** The FAA's Aeronautical Information Services (AIS) Department is responsible for developing and maintaining all public instrument flight procedures and airways. As such, it is important for the Airport to coordinate with AIS to ensure the existing approach procedures are maintained without changes to approach minima or capability. This will require routine maintenance of NAVAIDs on and off the field as well as evaluation of obstructions along the IAP path. The maintenance should be done in accordance with FAR Part 77 and FAA Order 8260.3.

- **Continue to follow guidance in the Wildlife Hazard Management Plan (WHMP) to manage and monitor wildlife in the vicinity.** FAA AC 150/5200-33B describes general separation criteria and best land use practices to mitigate the risk of hazardous wildlife on and around an airport. As the Airport developed a WHMP in 2016 and has been successful in managing the wildlife to date, it is recommended that staff continue to follow the recommended actions in the WHMP and update it as necessary. Described further in **Appendix B**, this would include training new staff on proper procedures, keeping apprised of current technologies for wildlife management, and reviewing any new development within 10,000 feet of WVI for potential wildlife attractants.

- **Improve ground handling services for Jet Aircraft (e.g., lavatory cart, catering cart, ground power unit [GPU]).** As mentioned in **Chapter 3**, the Airport expects to attract a greater number of jet aircraft in the next five years, which will require improved infrastructure and amenities to service these aircraft and their users. The Airport has already begun to modify the east transient ramp to allow for convenient transient jet parking in front of the terminal building. It is recommended that the Airport acquire additional equipment for servicing jet aircraft including, at minimum, a GPU, catering and potable water cart, lavatory cart, and aircraft tug or towbars capable of accommodating most light to medium business jet aircraft.

- **Enhance restricted access gates.** As mentioned in **Chapter 1**, the Airport's secured areas are accessed through four vehicle gates and 13 pedestrian gates located around the property. Authorized individuals can pass through these gates using keypads and security codes. While the system is adequate, the existing keypad system is somewhat vulnerable as security codes can be shared between authorized personnel and non-authorized individuals. The 2017 TSA General Aviation (GA) Security Guidelines document recommends the use of advanced-technology such as a radio-frequency identification (RFID) key system. RFID systems allow Airport staff to keep a record of user's movements through the access gates and to disable RFID keys if an authorized user reports a key being lost or stolen. The Airport has plans to implement an RFID gate card system at all access points in 2023 to enhance airfield security.
- **Coordinate with Airport users and tenants to mitigate excess dumping of non-aviation solid waste.** Solid waste can present several hazards to the Airport and surrounding environment. Airport staff indicated that excess non-aviation waste builds up around dumpsters near the corporate hangars and the south hangar area. It is recommended that the Airport work to educate users and tenants about the risks associated with excess waste and the need to reduce excess waste. This could include added signage near dumpsters, education programs for users, and added language to the Airport minimum standards to improve awareness for users.
- **Improve airfield drainage based on findings of 2010 WVI Drainage and Utilities Master Plan.** The 2010 WVI Drainage and Utilities Master Plan identified a number of areas of inadequate drainage infrastructure on the aircraft aprons and many other areas of the Airport property. It is recommended that the Airport follow the recommendations of the 2010 Drainage Plan to address these issues.
- **Extend Airport utilities as needed for future development.** As additional development is added throughout the Airport property, appropriate utilities should be extended as required.
- **Designate Airport-owned, off-airfield parcel as dedicated Santa Cruz Tarplant Habitat.** As noted in **Appendix B**, much of WVI's airfield is designated as a critical habitat for the Santa Cruz Tarplant, a threatened plant species which has been identified growing in undeveloped areas along both runways and parallel taxiways. The presence of tarplant on the airfield poses a significant challenge for future airfield development, as several federal and state statutes require the preservation and protection of threatened or endangered species. While the Airport is working to mitigate impacts to tarplant onsite, it is likely that some of the developments recommended in this chapter may affect the existing and future tarplant areas. As such, the Airport is coordinating with the California Department of Fish and Wildlife (CDFW) to designate the parcel of Airport-owned land west of California Highway 1 (#57 and #58) as a dedicated habitat for Tarplant to offset lost critical habitat in other areas of the airfield. It is unknown if this plan will be considered a sufficient mitigation effort at this time, but it is recommended the Airport continue to coordinate with the CDFW to ensure a critical habitat is preserved for tarplant on airport property.
- **Complete Pavement Maintenance.** As discussed in **Section 3.5,** the pavement conditions were assessed through the 2022 Pavement Evaluation Study - Pavement Maintenance / Management Plan (PMMP). The PMMP determined the remaining life of the existing pavements and the recommend maintenance and rehabilitation schedules based on the forecasted aircraft operations at WVI from this MPU. When the PMMP schedule was developed, consideration was given to the requirements to maintain a good operational surface, to be cost effective, and to spread out the work in such a manner as to maintain a reasonably uniform annual cost of rehabilitation. The results of the PMMP were reviewed and incorporated into the Airport Capital Improvement Plan (ACIP) presented in **Chapter 5** and no further analysis was done as part of this MPU.

4.4 Airside Alternatives

The development of airside alternatives focused on issues affecting the operations and regulatory compliance of WVI. This presents various alternatives for previously identified needs including the extension of Runway 2-20, nonstandard RVZ, Parachute Landing Area (PLA), implementation of a turf runway, reconfiguration of Taxiway A, improvements to instrument approach procedures, and mitigation of airspace obstructions. An analysis of the alternatives for each need was conducted utilizing the previously discussed evaluation criteria to select a preferred alternative to satisfy the need. The preferred alternatives were then reviewed collectively, including the no-analysis, those presented in this section, and those presented in **Section 4.5**, and combined to create the RDP, discussed in **Section 4.6.**

4.4.1 Runway 2-20 Extension

Runway length alternatives were developed primarily to address the insufficient length of Runway 2-20. An extension to at least the length recommended in FAA AC 150/5325-4B is critical for the Airport to meet the needs of the current grouping of aircraft as well as future anticipated demand. Alternative 1 presents the potential benefit and impacts if a runway extension is not completed, while Alternatives 2 and 3 identify ways to improve insufficient runway length conditions. These alternatives were assessed, and a preferred alternative is presented below. As stated in **Chapter 3,** the FAA has indicated that the distances recommended by FAA AC 150/5325-4B used in this analysis should only be used for airport planning purposes. If the Airport wishes to construct a runway extension, it will need to identify an individual critical aircraft type as a regular user to justify a minimum length prior to conducting the environmental review or design of the extension. At this time, Runway 2-20 meets the minimum recommended length of the Airport's current critical aircraft, the Beechcraft King Air 350. As such, a runway extension would not be justified at this time, so a runway extension is being considered in this MPU as an ultimate development to be completed outside of the 20-year planning timeframe. However, the extension is included in this analysis to ensure the ongoing protection of land and airspace from future development until aviation activity warrants an extension to meet the needs of larger and faster aircraft. At that time, it is recommended the Airport validate the type and number of aircraft operations occurring at the Airport to identify a critical aircraft that regularly uses the Airport and requires a runway extension. An example of such an aircraft is the Dassault Falcon 900, which has operated at the Airport in recent years and has a recommended runway length of 5,130 feet under normal conditions at WVI.

Runway 2-20 Alternative 1: Maintain Current Conditions

This alternative would maintain Runway 2-20 in its current condition of 4,501 feet in length. As noted in **Chapter 3**, the minimum recommended length of Runway 2-20 is 5,120 feet. If an extension is not constructed, the runway would not meet the length recommended by the FAA AC for the B-II group of aircraft but would meet the needs of the current critical aircraft (Beechcraft King Air 350). Moreover, if an extension is not constructed, the Airport would limit its potential to serve a greater flying community. The Airport would not be able to cater to larger aircraft, specifically medium and large corporate jet aircraft, whose users have already requested a longer runway. Serving larger aircraft typically indicates the potential for increased Airport revenues as larger aircraft usually purchase more fuel, request additional services, and can pay higher service charges for the extra space needs.

Declining to extend the runway will save the City money from the design and construction costs for the initial project as well as future pavement maintenance projects for the extension.

The benefits, impacts, and considerations of Alternative 1 are summarized below.

Benefits

- Cost savings of up-front design and construction of runway

Impacts/Considerations

- Limited ability for the Airport to support larger and more business/corporate jet aircraft
- Runway 2-20 does not meet recommended length per FAA AC 150/5325-4B

Runway 2-20 Alternative 2: Extend Runway to 5,120 feet (619-foot-long extension)

This alternative extends Runway 2-20 619 feet to the southeast as depicted in **Figure 4-3.** Taxiway A and all required safety and clearance zones would also shift to the southeast by 619 feet to meet FAA design standards. This extension would achieve an ultimate runway length of 5,120 feet, the recommended length for Runway 2-20 from the FAA AC. This would allow the Airport to serve most of the corporate aircraft fleet, improving the Airport's service capabilities and assisting the Airport in achieving its goal to attract more jet aircraft to Watsonville. A 619-foot-long extension of the runway would require demolition of approximately 16,100 square feet of existing Taxiway A pavement and construction of 134,100 square feet of new runway and taxiway pavement.

Additionally, a runway extension would require the approach and departure RPZs to shift to the southwest by 619 feet. This would increase the amount of land within the RPZ that is not owned or controlled by the Airport from 27.58 acres to 28.03 acres and may introduce new obstacles to the approach surface. If this Alternative is selected, it is recommended that the Airport conduct an airspace study to determine if any obstacles penetrate the various FAR Part 77 and Order 8260.3, *United States Standards for Terminal Instrument Procedures* (TERPS) surfaces, as described in **Chapter 3**. Additionally, the additional runway length would slightly increase the size of the existing RVZ, thereby increasing the number of tie downs and T-hangars impacted by the RVZ.

The following bullets summarize the benefits and impacts of a 619-foot-long runway extension.

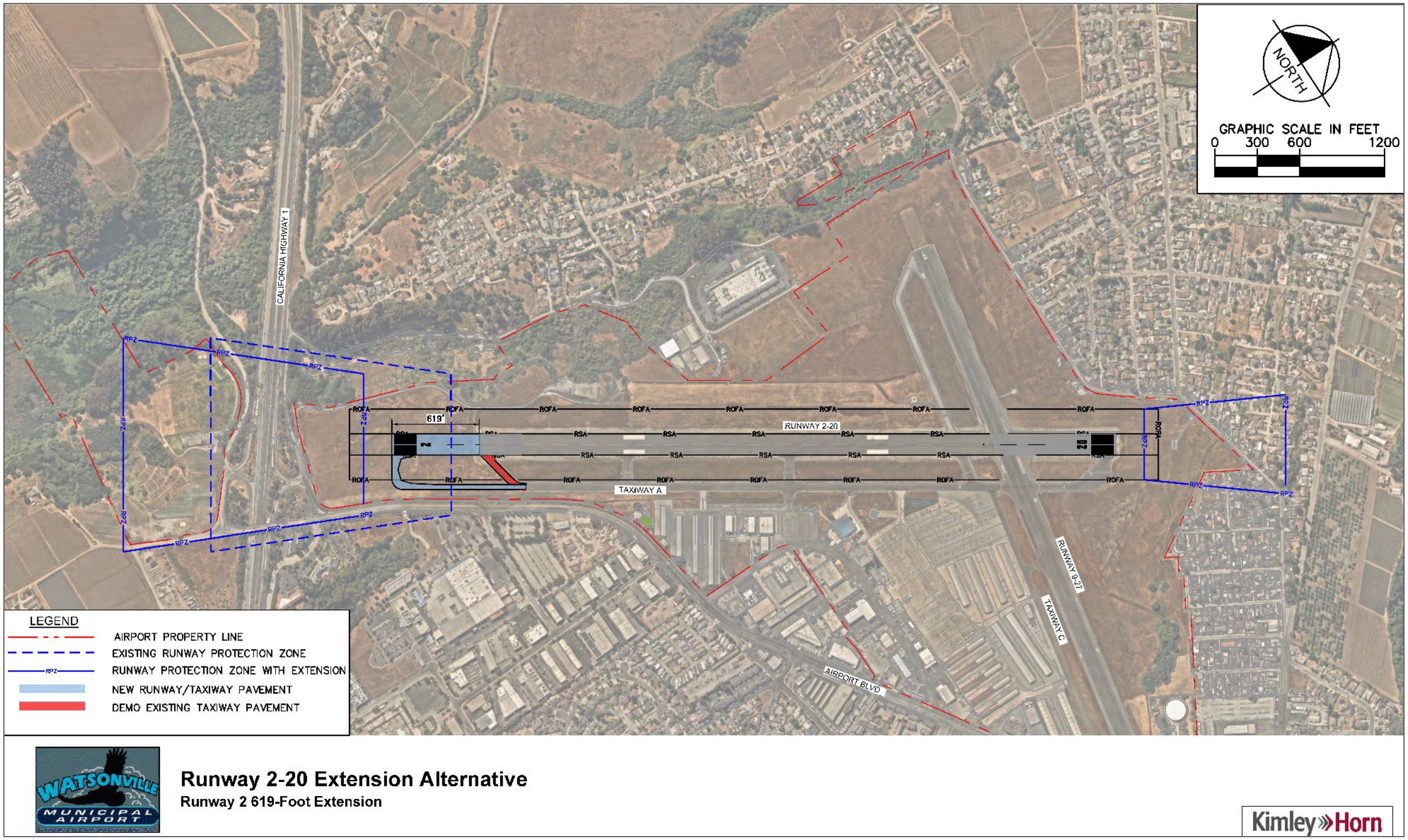
Benefits

- Runway 2-20 meets recommended length per FAA AC 150/5325-4B
- Increases Airport's capability to accommodate jet and turboprop aircraft

Impacts/Considerations

- Costs of runway/taxiway design and construction and future maintenance for 134,100 square feet of pavement
- Small increase in number of tie downs and hangars impacted by non-standard RVZ
- RPZ shift and possible new approach surface obstacles

Figure 4-3: Alternative 2 - Runway 2-20 619-foot-long Extension



Runway 2-20 Alternative 3: Extend Runway to 5,181 feet (680-foot-long extension)

This alternative extends Runway 2-20 680 feet to the southeast to achieve an ultimate runway length of 5,181 feet and is shown in **Figure 4-4**. Similar to Alternative 2, Taxiway A and all required safety and clearance zones would also shift to the southeast by 680 feet to meet FAA design standards. This ultimate length provides the maximum length of runway that could be achieved within the existing Airport property boundary while still meeting applicable design standards. The 680-foot-long extension would provide nominal improvements in capability over Alternative 2, however, it would offer the maximum amount of airspace protection for the Airport in the event of future developments.

A 680-foot-long extension of the runway would require demolition of approximately 16,100 square feet of existing taxiway pavement and construction of 143,250 square feet of new runway and taxiway pavement. The proposed runway extension would require the approach and departure RPZs to also shift to the southwest by 680 feet. This would slightly reduce the amount of land within the RPZ that is not owned or controlled by the Airport from 27.58 acres to 27.32 acres but may introduce new obstacles to the runway approach surface. If Alternative 3 is selected, it is recommended that the Airport conduct an airspace study in a similar fashion to that suggested in Alternative 2. Additionally, the additional runway length would slightly modify the size of the existing RVZ to impact a few more hangars and tie downs.

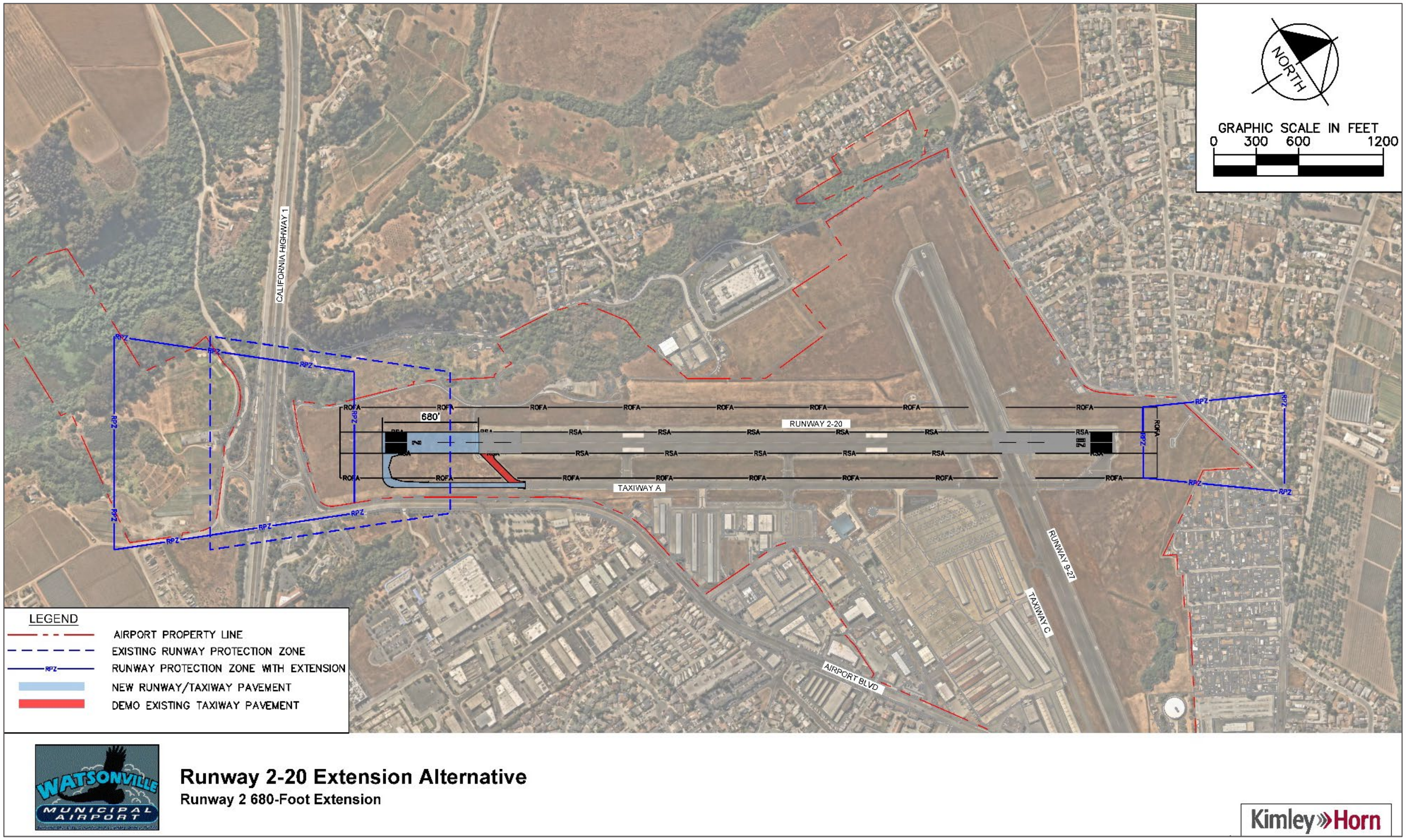
Benefits

- Runway 2-20 meets recommended length per FAA AC 150/5325-4B
- Increases Airport's capability to accommodate jet and turboprop aircraft

Impacts/Considerations

- Costs of runway/taxiway design and construction and future maintenance for 143,250 square feet of pavement
- Small increase in number of tie downs and hangars impacted by non-standard RVZ
- RPZ shift and possible new approach surface obstacles

Figure 4-4: Alternative 3 - Runway 2-20 680-foot-long Extension



Runway 2-20 Extension Evaluation

The alternatives presented above were evaluated using several quantitative and qualitative aspects that are considered important to Airport stakeholders and staff. It is important to note that while an extension to Runway 2-20 has been planned and discussed since at least 2003 the operations at the Airport have changed. While an alternatives analysis was conducted to address this project that has been in discussion for nearly 20 years, any extension of Runway 2-20 is not currently justified by the forecast air traffic during the planning period. It is recommended the Airport continue to monitor aircraft activity and engage specific Airport users to determine what length of runway would accommodate their needs.

The runway extension alternatives were scored on a scale of 1 to 3, with three being the best score for each evaluation criterion. Relevant criteria selected for this evaluation include:

- **Meet Design Standards**: Meets current FAA length and separation standards
- **Satisfy Future Demand**: Accommodates future activity demand
- **Cost:** Capital development, operational, and maintenance costs
- **Environmental Considerations:** Minimizes negative impacts to the community and natural environment

Table 4-1 presents the evaluation of the three development alternatives for the extension of Runway 2-20. Alternative 1 scores slightly lower than Alternatives 2 and 3 as it does not meet the recommended length per FAA AC 150/5325-4B. Alternatives 2 and 3 score similarly as there are minimal differences between the 619-foot-long extension and the 680-foot-long extension. As such, it is recommended the Airport pursue Alternative 3 to extend Runway 2, 680 feet to the south to provide the maximum allowable length and protect the most airspace around the airfield.

Table 4-1: Runway 2-20 Extension Alternative Evaluation

Alternative	Meet FAA Design Standards	Satisfy Future Demand	Cost	Environmental Considerations	Total Score
1: Maintain Current Conditions	2	2	3	3	10
2: Extend Runway 2-20 by 619 Feet	3	3	2	3	11
3: Extend Runway 2-20 by 680 Feet	3	3	2	3	11
Source: Kimley-Horn					

4.4.2 Runway Visibility Zone (RVZ)

As described in **Chapter 3**, three T-hangar buildings (27 units) and 41 apron tie downs currently impede the line-of-sight between the two intersecting runways within the area known as the RVZ. To reduce the potential for adverse aircraft collisions, aircraft departures are currently prohibited from Runway 27. It should be noted that after the MPU analysis was completed, the Airport Design AC was updated to -13B which included slight changes to the RVZ calculation. These changes and applicability to WVI are documented in **Appendix D**. The new guidance does not modify the alternatives described in this section unless noted.

The following sections describe eight alternatives to achieve compliance with FAA RVZ standards. These include:

- Maintain current conditions
- Construction of an air traffic control tower (ATCT)
- Removal or relocation of hangars and tie downs
- Relocation of Runway 27 threshold:
    - So RVZ does not impact on hangars
    - So RVZ does not impact on hangars or tie downs
    - To eliminate intersection with Runway 2-20
- Shift Runway 9-27 west to have no impact on existing tie downs and hangars
- Closure of Runway 9-27

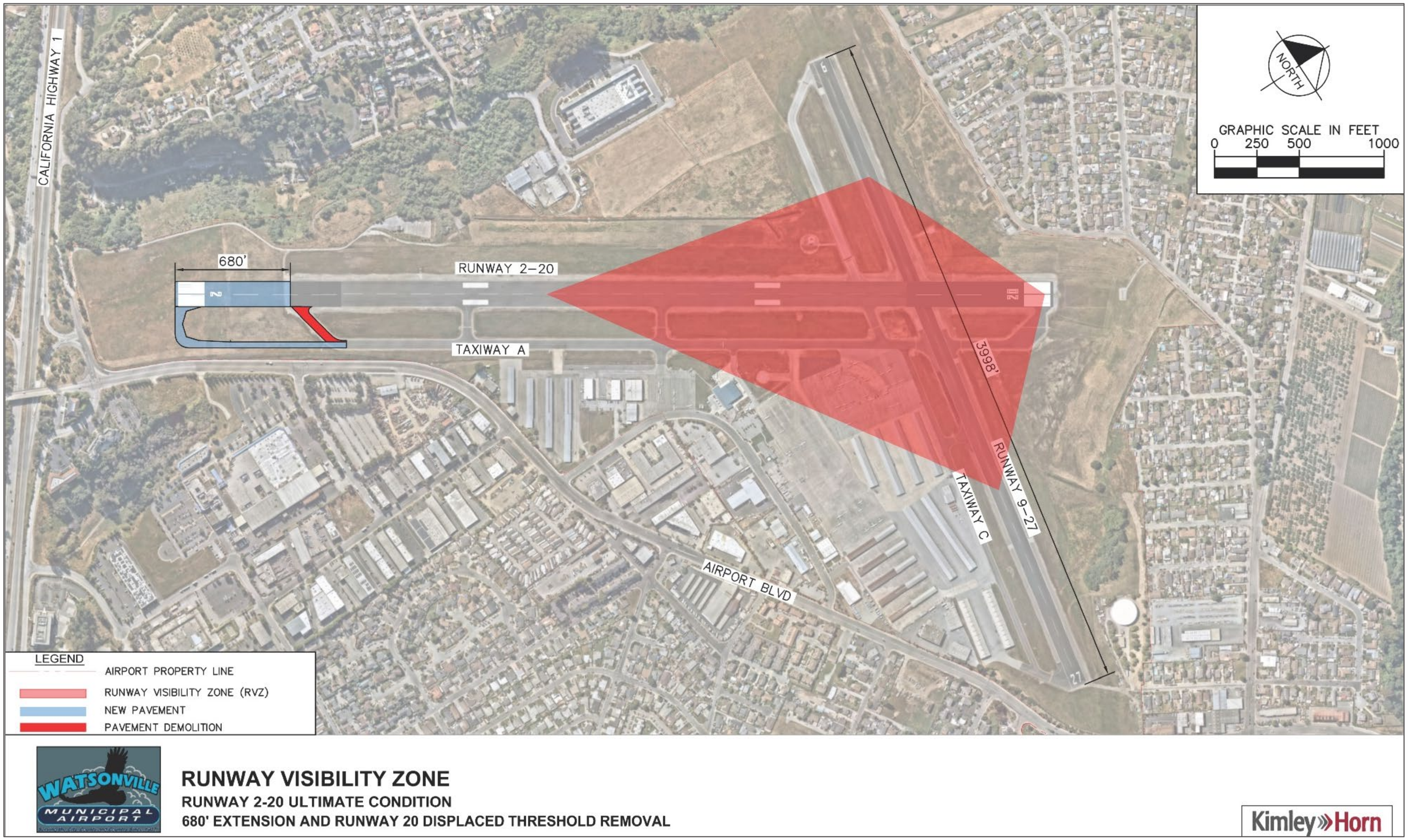
Additionally, a 255-foot-long extension of Runway 9 is discussed, which by itself would not resolve RVZ issues but could be paired with another alternative to increase the length of Runway 9-27, as appropriate.

The calculations and figures presented in the following sections make assumptions regarding the ultimate configuration of the Airport's runways. Runway 2-20 is assumed to be extended 680 feet from the approach end of Runway 2, the longest the runway can be extended while meeting FAA design and separation standards within existing Airport property. While the runway extension only has minor implications on the overall size of the RVZ, it assumes the most conservative RVZ conditions that could be present at the Airport. In Runway 2-20's ultimate configuration, 41 tie downs on the north tie down ramp (#36) and 29 T-hangar units in buildings I (#12), J (#13), and K (#14) would be fall within the RVZ. **Figure 4-5** presents the ultimate condition of Runway 2-20 with a 680-foot extension to the southwest and the corresponding RVZ.[3]

It is important to note each of the eight alternatives may have significant financial implications for the Airport, not only related to the initial design and construction of each alternative but also the ongoing maintenance of Runway 9-27. As discussed in **Chapter 3**, Runway 9-27 may no longer be considered eligible for FAA Airport Improvement Program (AIP) funding under current FAA policy. As such, the Airport is likely to be wholly responsible for the long-term maintenance costs and capital costs of any improvements made to the runway.

[3] This extension is assumed to occur sometime in the future, beyond the 20-year horizon of the Master Plan. It is therefore identified as an "ultimate" condition rather than a "future" condition, which indicates it is anticipated within the 20-year planning period. The Airport will continue to monitor aircraft operations and needs to provide the required justification to support this extension at such time it is warranted. Refer to **Section 4.4.1** for further information about the runway extension.

Figure 4-5: Runway Visibility Zone – Runway 2/20 Ultimate Condition



RVZ Alternative 1: Maintain Current Conditions

Alternative 1 maintains the current configuration of the airfield, thereby retaining the existing operational limitations of Runway 9-27. This alternative would ensure that Runway 9-27 maintains its current length, thus continuing to support the fleet of aircraft currently using the runway. This alternative would require the Airport to continue to restrict the use of Runway 27 for aircraft departures. For planning purposes, restricted use of Runway 27 would not affect airfield capacity, as discussed in **Chapter 3**. However, the Airport and stakeholders have expressed a desire to regain full use of Runway 27 as it provides an alternative departure direction if wind and/or visibility conditions preclude the use of Runway 20. Maintaining current conditions would be the least environmentally impactful alternative as it would not require any additional development. Additionally, this alternative would be the least cost, as the Airport would avoid the upfront costs of designing, demolishing, and constructing pavement and buildings on the airfield, though future maintenance of the runway pavement could be wholly at the cost of the Airport due to funding eligibility as discussed above. While there are some benefits to maintaining current conditions, this alternative does not provide a permanent solution to the nonstandard RVZ, as the FAA has previously indicated it will eventually require action from the airport to eliminate this issue.

The following bullets summarize the potential benefits and impacts/considerations of maintaining current RVZ conditions.

Benefits

- No change in Runway 9-27 length
- No impact to endangered species habitats
- Cost savings of up-front design and construction of runway and hangar construction/modification

Impacts/Considerations

- Continued operational limitations for Runway 27
- Airport would be responsible for maintenance of the full length of Runway 9-27
- Does not provide a permanent solution, which FAA requires as part of this Master Plan

RVZ Alternative 2: Construct Air Traffic Control Tower (ATCT)

Alternative 2 includes construction of an ATCT on the airfield. FAA AC 150/5300-13A dictates that objects may restrict line-of-sight visibility within the RVZ if an operational ATCT is present on the airfield when a MOS is obtained. The MOS must be renewed with the FAA every five years and in the future may not satisfy RVZ requirements[4]. The MOS also requires the ATCT to be operational to satisfy RVZ requirements. As such, the ATCT would be required to be operated 24/7 or the Airport would have to restrict use of Runway 27 outside of hours of ATCT operation. An additional benefit of an ATCT is that while the ATCT is operational, both runways may be used simultaneously, increasing the airfield's hourly and annual capacity.[5]

Based on the activity forecasts discussed in **Chapter 2**, the current and projected aviation activity levels do not warrant the construction of an ATCT. As such, the Airport would be fully financially responsible for the cost of the siting, design, construction, and ongoing maintenance of an ATCT building. Siting the ATCT can often be a challenge in itself, as the tower will require clear line of site of both runways and all taxiways in the movement area. Construction of an ATCT may preclude development of certain areas of the airfield based on these sightlines and other regulations. The Airport would also be

[4] The newly released 2022 AC 150/5300-13B Airport Design indicates that an MOS would no longer be required to remove the requirement of the RVZ if an ATCT were constructed. An RVZ would now become recommended best practice.
[5] Current and forecast aircraft activity demand is satisfied within the capacity of the airfield without the simultaneous operation of both runways.

required to pay for the staffing and operational costs of the ATCT, likely with partial or no financial assistance from the FAA Contract Tower program.

Furthermore, the Airport would be responsible for the ongoing maintenance and upkeep of the full length of Runway 9-27. If, at some point in the future, Runway 9-27 becomes too costly to maintain and is closed, then the ATCT would become entirely redundant as traffic at the Airport would not warrant operations with a single runway. The Airport could explore alternative options such as a virtual tower, which is in testing and is thought to have lower construction and maintenance costs than a traditional ATCT, however, this technology would still require significant upfront and ongoing capital investment, as well as staffing. Given the significant costs associated with the construction, upkeep, staffing and operation of an ATCT, this alternative is not considered a viable option for the Airport.

Benefits:

- RVZ design standard is no longer applicable to intersecting runways assuming MOS obtained
- Allows for simultaneous use of both runways, increasing airfield capacity

Impacts/Considerations

- The Airport would be fully responsible for cost of contract tower as current and forecast aviation activity does not warrant construction of ATCT
- Requires siting of ATCT on airfield, limiting other development based on sightlines and regulations
- Requires a MOS
- Airport would likely be financially responsible for maintenance and upkeep of both Runway 9-27 and ATCT
- Requires 24/7 ATCT operation, which current activity levels do not warrant; or Runway 27 would only be available for departures during hours of ATCT operation

RVZ Alternative 3: Remove/Relocate Hangars/Tie downs

This alternative would entail the partial demolition of three T-hangar buildings, removing 29 T-hangar units (16 units from T-hangar Building K, 10 units from T-hangar Building J, and 3 units from T-hangar Building I). Additionally, 41 apron tie downs would be removed from the north tie down ramp. While the Airport could still meet forecasted demand with the remaining aircraft tie downs, removal of T-hangar units would exacerbate the existing shortage of T-hangar units.

If the Airport were to relocate the impacted T-hangars as part of Alternative 4 rather than just remove them, it would have significant design and construction costs. Due to limitations of FAA funding, it is likely the Airport would have to bear the full financial responsibility of hangar relocation or construction. Based on current local funding availability, it is highly unlikely that the aircraft storage could be replaced at the same time as this alternative is implemented without assistance from a private developer.

This alternative would enable the Airport to provide full operational capabilities of both runways and maintain the current length of Runway 9-27. This would best allow the runway to serve the widest variety of aircraft but would also have the highest associated maintenance and upkeep costs due to the additional runway length compared to other alternatives.

Benefits

- No change in Runway 9-27 length
- Enables full operational capability of both runways

Impacts/Considerations

- Loss of 29 T-hangar units, increasing T-hangar deficiency from six (as of 2020) to 35
- Challenges to replacing infrastructure on Airport due to limited funding sources
- Airport would be responsible for maintenance of the full length of Runway 9-27

RVZ Alternative 4-A: Relocate Runway 27 Threshold 800 Feet West – No Hangar Impact

Alternative 4-A relocates the Runway 27 threshold west by 800 feet to shift the RVZ so T-hangar buildings I, J, and K are not impacted. As depicted in **Figure 4-6**, this alternative would provide an ultimate runway length of 3,198 feet, 292 feet shorter than the length recommended by FAA AC 150/5325-4B. Alternative 4-A would require the removal of 27 aircraft tie downs on the north tie down ramp, leaving 22 tie downs remaining. Even with the removal of 27 tie downs, the Airport is still projected to have a surplus of apron tie downs through the 20-year planning period. More importantly, the Airport would regain the capability to operate from both ends of Runway 9-27.

While the runway length proposed in Alternative 4-A does not meet the recommended length from AC 150/5325-4B, it exceeds the required takeoff length of its critical aircraft, the Cessna 340. As such, relocating the Runway 27 threshold 800 feet west would have marginal impacts on the runway's ability to serve as a substitute to Runway 2-20 during crosswind conditions, however, the runway is still anticipated to accommodate more that 95 percent of the aircraft it is forecast to serve.

As part of this alternative, a review of the runway lengths, fleet mix, and the 2019 annual operations of other regional airports was conducted. Reid-Hillview (RHV) has two parallel runways of 3,100 feet, six based multi-engine aircraft, and almost 200,000 annual operations. San Carlos (SQL) has a 2,621-foot-long runway, four based jets and six based multi-engine aircraft, and over 80,000 annual operations. Palo Alto (PAO) has a 2,443-foot-long runway, six based multi-engine aircraft and over 155,000 annual operations. The activity at these three airports demonstrates that the current fleet mix and annual operations that take place at WVI could be conducted on a shortened Runway 9-27. Due to the aforementioned eligibility concerns, the Airport may be responsible for the upfront costs of relocating the end of Runway 27, demolishing Taxiway C at the existing runway threshold, and construction of a new connector taxiway. Additionally, the Airport would be financially responsible for the upkeep of Runway 9-27, although these costs would be less than those associated with Alternatives 1, 3 and 4 due to the reduced runway length. The Runway 27 RPZ would also shift west, increasing the amount of land in the RPZ that is already controlled by the Airport.

It is important to note the proposed end of Runway 27 in this alternative would align with the taxilane exiting the east hangar area. If this alternative is selected, the runway end entrance taxiway would need to be shifted approximately 70 feet west to avoid a direct access configuration. This would in turn shift the runway threshold west by an additional 70 feet, which would reduce the total runway length of 3,128 feet. Prior to implementation, additional review should be conducted to determine if there are other viable options such as no-taxi islands rather than shifting the runway threshold the additional 70 feet.

The benefits, impacts, and considerations associated with Alternative 4-A are summarized in the bullets below.

Benefits

- Enables full operational capability of both runways
- No impact to existing T-hangar deficiency
- Increases amount of land in the Runway 27 RPZ controlled by the Airport

Impacts/Considerations

- Runway 9-27 length is 292 feet less than the length recommended for 100% of B-I-Small aircraft fleet per FAA AC 150/5325-4B

- Marginally limits Runway 9-27's ability to serve larger jet and turboprop GA aircraft
- Airport would be responsible for maintenance of Runway 9-27

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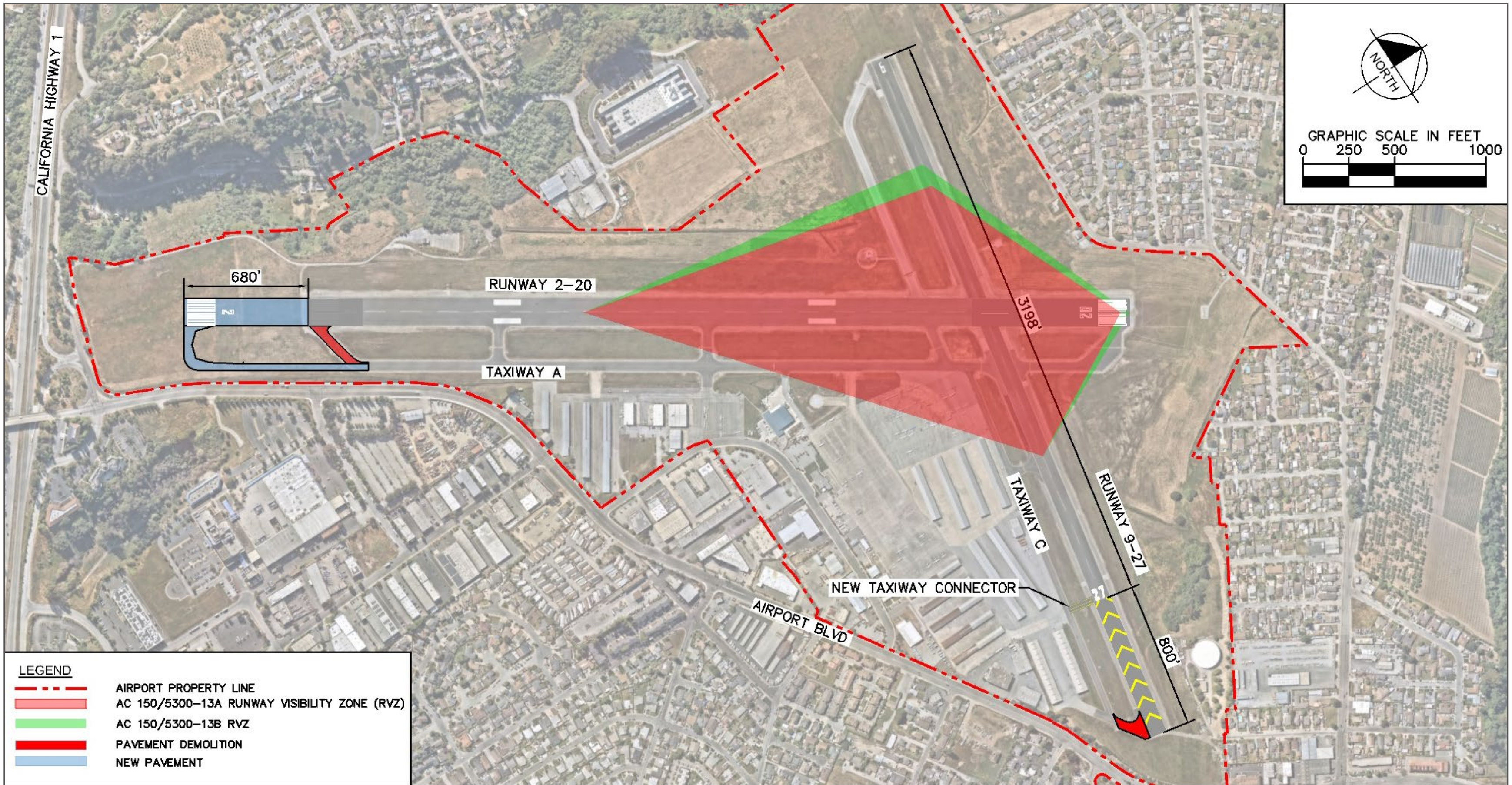
Figure 4-6: Alternative 4-A – Relocate Runway 27 Threshold 800 Feet West – No Hangar Impact



RUNWAY VISIBILITY ZONE ALTERNATIVE
RELOCATE RUNWAY 27 THRESHOLD 800 FEET WEST - NO HANGAR IMPACT
RUNWAY 2-20 ULTIMATE CONDITION

Kimley»Horn

RVZ Alternative 4-B: Relocate Runway 27 Threshold 1,993 Feet West – No Hangar or Tie Down Impact

Alternative 4-B reduces the size of the RVZ by relocating the end of Runway 27 1,993 feet west. As shown in **Figure 4-7**, this alternative would shrink the RVZ so that no existing hangars or tie downs are impacted by the RVZ. This would allow the Airport to regain full operational capabilities of both runways while not impacting the existing shortage of T-hangars at the Airport.

Alternative 4-B results in Runway 9-27 having a total length of 2,005 feet, 1,485 feet less than the length recommended by FAA AC 150/5325-4B. This alternative results in nearly a 50 percent reduction in runway length, limiting the runway's ability to support operations of larger jet and turboprop GA aircraft and making the runway available for use by mostly small GA aircraft in the national fleet. This length would meet the recommended length for the Beechcraft G58 Baron under planning circumstances but may cause operators to limit payload or stage lengths on hot or windy days. As noted under Alternative 4-A, the activity at other regional airports demonstrates that the current fleet mix and annual operations that take place at WVI could be conducted on a shortened Runway 9-27.

Alternative 4-B would shift the Runway 27 RPZ entirely onto existing Airport property, resolving any concerns of off-airport incompatible land uses. It would also clear approximately 7.0 acres of land on Airport property for development of future aeronautical facilities. The newly-cleared land falls within Caltrans Safety Zone 2 (Inner Approach/Departure Zone), which limits the allowed uses and facilities able to be developed in that area to low-intensity aeronautical facilities such as aircraft tie downs and single-story hangar units or industrial buildings. This new land could potentially be used to develop revenue-generating facilities, which could in turn offset some of the long-term maintenance costs of Runway 9-27.

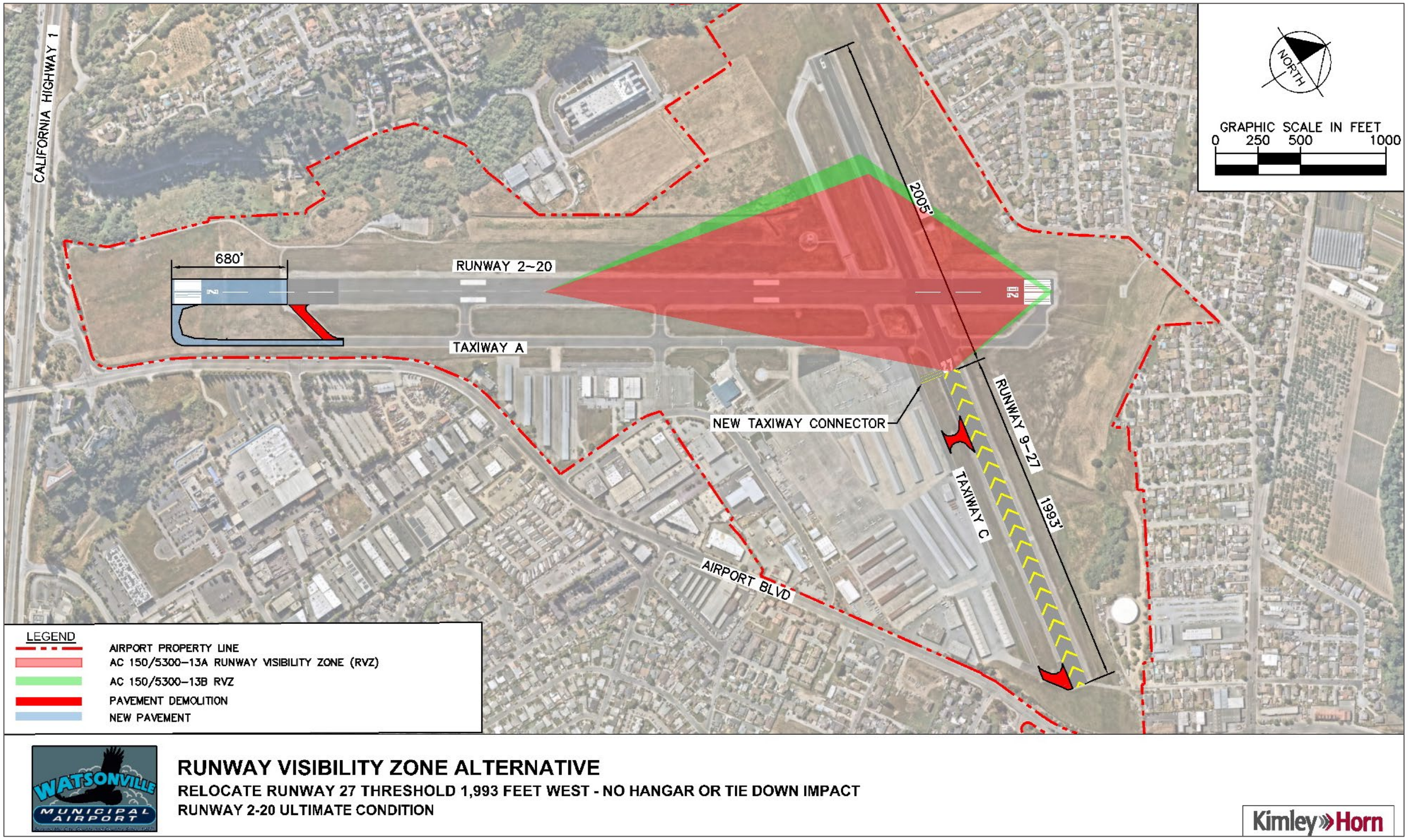
Benefits

- Enables full operational capability of both runways
- No impact to existing T-hangar deficiency
- Increases amount of land in the Runway 27 RPZ controlled by the Airport
- Clears approximately 7.0 acres of land for aircraft storage or aeronautical use development, potentially satisfying demand for aircraft storage

Impacts/Considerations

- Reduces Runway 9-27 length to 2,005 feet, 1,485 feet less than the length recommended for B-I-Small aircraft by FAA AC 150/5325-4B
- Airport would be responsible for maintenance of Runway 9-27

Figure 4-7: Alternative 4-B – Relocate Runway 27 Threshold 1,993 Feet West – No Hangar or Tie Down Impact



RVZ Alternative 4-C: Relocate Runway 9 End 1,858 Feet East – No Intersection

Alternative 4-C relocates the end of Runway 9 to a point 250 feet east of Runway 2-20, disconnecting the two runways and eliminating the RVZ design standard[6]. As depicted in **Figure 4-8**, shortening Runway 9-27 to eliminate the RVZ would reduce the usable length of Runway 9-27 to 2,140 feet, 1,350 feet less than the length recommended by FAA AC 150/5325-4B. This alternative would require Taxiway A to be shifted approximately 140 feet east to connect to Runway 9 at the relocated threshold. The runway pavement west of the relocated threshold that is unusable could potentially remain and be considered a paved overrun area.

While not as severe a reduction as Alternative 4-B, the utility and operational margin of safety of the airfield's primary runway would be diminished. Any reduction in length to Runway 9-27 is considered detrimental to the needs of Airport users. This alternative would relocate the Runway 9 RPZ entirely onto airport property, providing the Airport the ability to control land use beyond the runway end. Similar to Alternative 4-B, this alternative would clear approximately 7.0 acres of Airport Property beyond the Runway 9 RPZ for development of other aeronautical facilities within Caltrans Safety Zone 2. Again, development in these areas may generate revenue to offset long term maintenance costs for the remaining runway.

The following bullets summarize the benefits and impacts/considerations associated with relocating the Runway 9-27 end 1,858 feet east.

Benefits

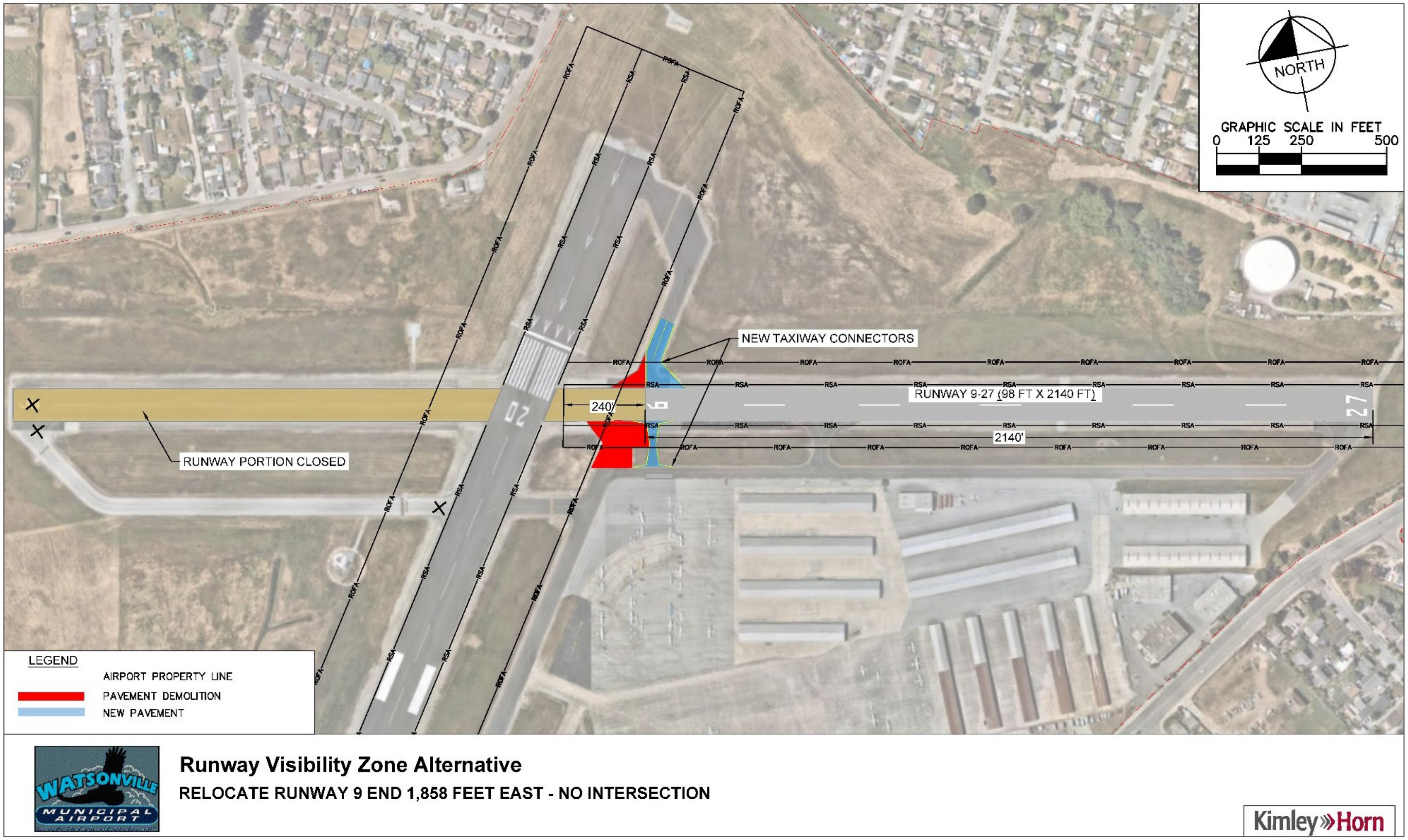
- Eliminates RVZ entirely
- Increases amount of land in the Runway 9 RPZ controlled by the Airport
- Clears approximately 7.0 acres of Airport property for low-intensity aeronautical facilities

Impacts/Considerations

- Reduces Runway 9-27 length to 2,140 feet, 1,350 feet less than the length recommended by FAA AC 150/5325-4B
- Airport would be responsible for maintenance of Runway 9-27

[6] The 2022 AC 150/5300-13B includes a new supplemental safety enhancement for converging, non-intersecting runways that includes a Line of Sight (LOS) analysis similar to an RVZ to ensure pilot situational awareness. This new guidance may reduce the benefit of this alternative.

Figure 4-8: Alternative 4-C – Relocate Runway 9 End 1,858 Feet East – No Intersection



RVZ Alternative 5: Shift Runway 9-27 1,993 Feet West

This alternative shifts Runway 9-27 1,993’ feet to the west to resolve the nonstandard RVZ conditions and adds 1,993 feet of new pavement west of the Runway 9 threshold, as shown in **Figure 4-9**. There are significant challenges associated with shifting the runway, making the alternative a highly unlikely. However, it has been evaluated as a potential development solution to fulfill National Environmental Protection Act (NEPA) of 1970 requirements for all potential alternatives to be considered.

Similar to Alternative 4-B, this alternative prevents the removal of existing hangars or tie downs at the Airport, although it allows the Airport to maintain the same length of the existing runway. Additionally, a runway shift would clear approximately 7.0 acres of Airport property for aircraft storage area development.

This alternative would require the purchase of a minimum 13.6 acres of land in the northwest side of the property. The land area needed to provide the standard 250-foot-long RSA and runway object free area (ROFA) includes approximately 22 residential properties and terrain that varies in elevation from approximately 10 feet above RSA end elevation to 30 feet below RSA elevation. As such, a shift of Runway 9-27, Taxiway C, and the necessary safety areas would require the removal of 19 homes and approximately 22 outbuildings. Additionally, a significant amount of land would have to be filled in to attain appropriate runway and safety area grading. The Airport would be fully responsible for the financial burden associated with the purchase of property, the fill and grading of the safety areas, and construction of the new pavement, as Runway 9-27 is not currently considered eligible for AIP funding.

As Alternative 5 only shifts Runway 9-27 rather than reducing its length, the size of the RVZ remains roughly the same. In this alternative, the RVZ shifts from the east side of Runway 2-20 to the west side, where it would impact the existing parachute landing area (PLA) and a small portion of the Nordic Naturals property. While the existing facilities in this area do not affect the integrity of the shifted RVZ, it would preclude the development of this area for aircraft storage facilities or other buildings. This alternative would shift the RPZ almost entirely outside of Airport property, limiting the ability of the Airport to control compatible land uses of the approach end of Runway 9. Furthermore, shifting the runway would shift the FAR Part 77 and TERPS surfaces, potentially introducing new obstructions to the approach surface, which may result in a displaced threshold. Given the significant financial, engineering, and construction challenges associated with Alternative 5, it is not considered a viable development alternative.

The following bullets summarize the benefits and impacts/considerations associated with shifting Runway 9-27 1,993 feet west.

Benefits

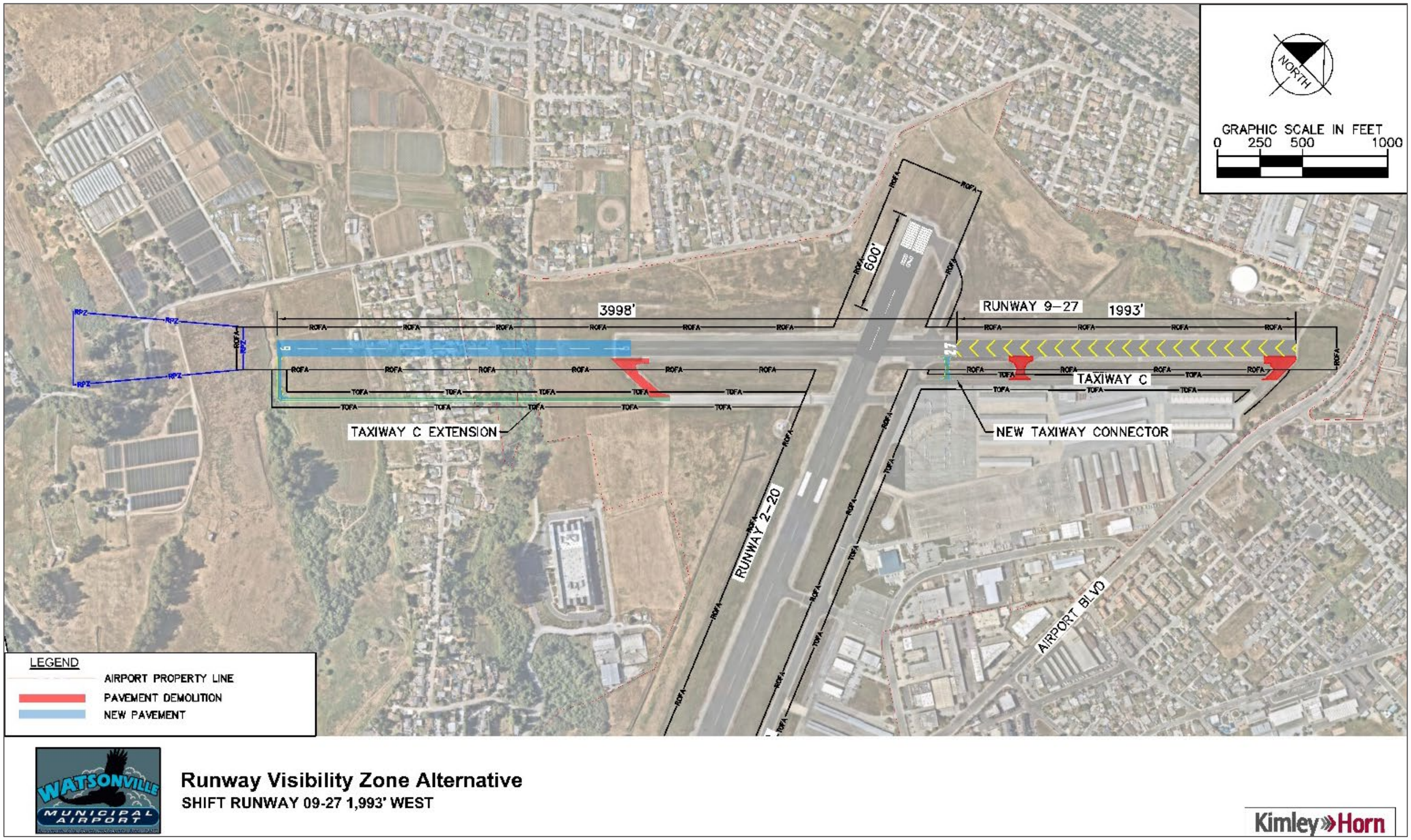
- Meets Runway 9-27 recommended length per FAA AC 150/5325-4B
- Does not require removal of existing tie downs and hangars
- Clears approximately 7.0 acres of land for aircraft storage development

Impacts/Considerations

- Requires purchase of a minimum 13.6 acres of land
- Requires substantial grading/drainage improvements
- Requires purchase and demolition of minimum of 19 homes and 22 residential outbuildings, bisecting an existing neighborhood
- Significant upfront design and construction costs with cost implications for Airport due to lack of AIP funding eligibility
- Extends RVZ to west of Runway 20, limiting development of Airport land west of Runway 20

- Increases amount of RPZ on land uncontrolled by Airport
- Shifts Part 77 & Threshold Siting Surfaces, potentially introducing new approach obstructions

Figure 4-9: Alternative 5 – Shift Runway 9-27 1,993 Feet West



RVZ Alternative 6: Close Runway 9-27

Alternative 6 entails the closure of Runway 9-27, eliminating the need for the FAA RVZ design standard by eliminating the intersection of two runways. In this alternative, the Airport would no longer be responsible for the long-term costs of runway maintenance. Additionally, closure of Runway 9-27 would clear approximately 37.6 acres of land for future development. The Airport would need to discuss the eligibility for the costs of demolition of the existing pavement prior to development of any new facilities. As the land within the existing runway footprint is already developed, it minimizes the environmental implications associated with developing the land for new facilities such as aircraft storage areas or a potential turf runway.

While the airfield capacity meets the existing and forecasted demand as determined by FAA AC 150/5060-5, Airport stakeholders indicated a desire for Runway 9-27 to remain operational. Runway 9-27 provides additional capability in crosswind conditions and when clouds or fog obstruct the Runway 2 approach. As such, closure of Runway 9-27 could limit the operational capabilities of the Airport during adverse wind or weather conditions. Both Airport stakeholders and staff have indicated closure of Runway 9-27 is the most undesirable alternative given the associated operational and environmental implications.

The following bullets summarize the benefits of Alternative 6, as well as the impacts or issues that would be associated with it.

Benefits:

- Eliminates RVZ design standard entirely
- Land could be utilized for alternative uses including new aeronautical facility development, new technologies, or a turf runway
- As the land is already developed, there is less environmental impact to endangered species habitats
- Airport is no longer financially responsible for maintenance and upkeep of Runway 9-27

Impacts/Considerations

- Reduced airfield capabilities during crosswind conditions and low visibility conditions along Runway 2 approach
- Airport may be financially responsible for demolition and removal of Runway 9-27 pavement
- Closure of runway is not desired by Airport stakeholders

RVZ Alternative 7: Extend Runway 9-27 255 Feet West

Alternative 7 extends Runway 9-27 255 feet west of the current threshold but does not address the RVZ issue by itself. Instead, Alternative 7 could be coupled with Alternative 4-A or 4-B to offset some of the runway length lost in those alternatives. Alternative 7 provides the maximum possible extension of Runway 9 and all necessary safety areas within the existing Airport property boundary. **Figure 4-10** depicts Alternative 7 coupled with Alternative 4-A, providing an ultimate Runway 9-27 length of 3,453 feet, just 37 feet less than the length recommended by FAA AC 150/5325-4B. When coupled with Alternative 4-B (not shown in a figure), Alternative 7 provides an ultimate length of only 2,260 feet, 1,230 feet less than what is recommended by FAA AC 150/5325-4B.

This alternative could be phased with Alternatives 4-A or 4-B to allow the Airport to regain RVZ compliance before the runway extension is designed and constructed, providing a longer ultimate length. The Airport would be responsible for the design, grading, and construction of the runway extension; as well as the ongoing maintenance and upkeep costs for Runway 9-27, including the new pavement.

Approximately 0.7 acres of land would have to be filled and graded to meet RSA grading requirements, as the land west of the Runway 9 threshold drops approximately 26 feet in elevation within the needed area for the extended runway's RSA. This would require modification of the critical tarplant habitat, which will require additional environmental mitigation efforts. The extension proposed in this alternative shifts the Runway 9 RPZ, Part 77 surfaces, and TERPS surfaces 255 feet west. As such, this alternative would increase the number of homes in the RPZ from 12 to 15 and increase the amount of land in the RPZ that is not controlled by the Airport. Shifting the Part 77 and TERPS surfaces may introduce new approach obstructions that could necessitate a displaced threshold on the Runway 9 end. Additionally, shifting the runway would bring approaching and departing aircraft closer to houses under the approach path, potentially increasing noise and risk of collision in the event of an accident.

The following bullets summarize the benefits, impacts, and issues associated with extending Runway 9-27 255 feet to the west.

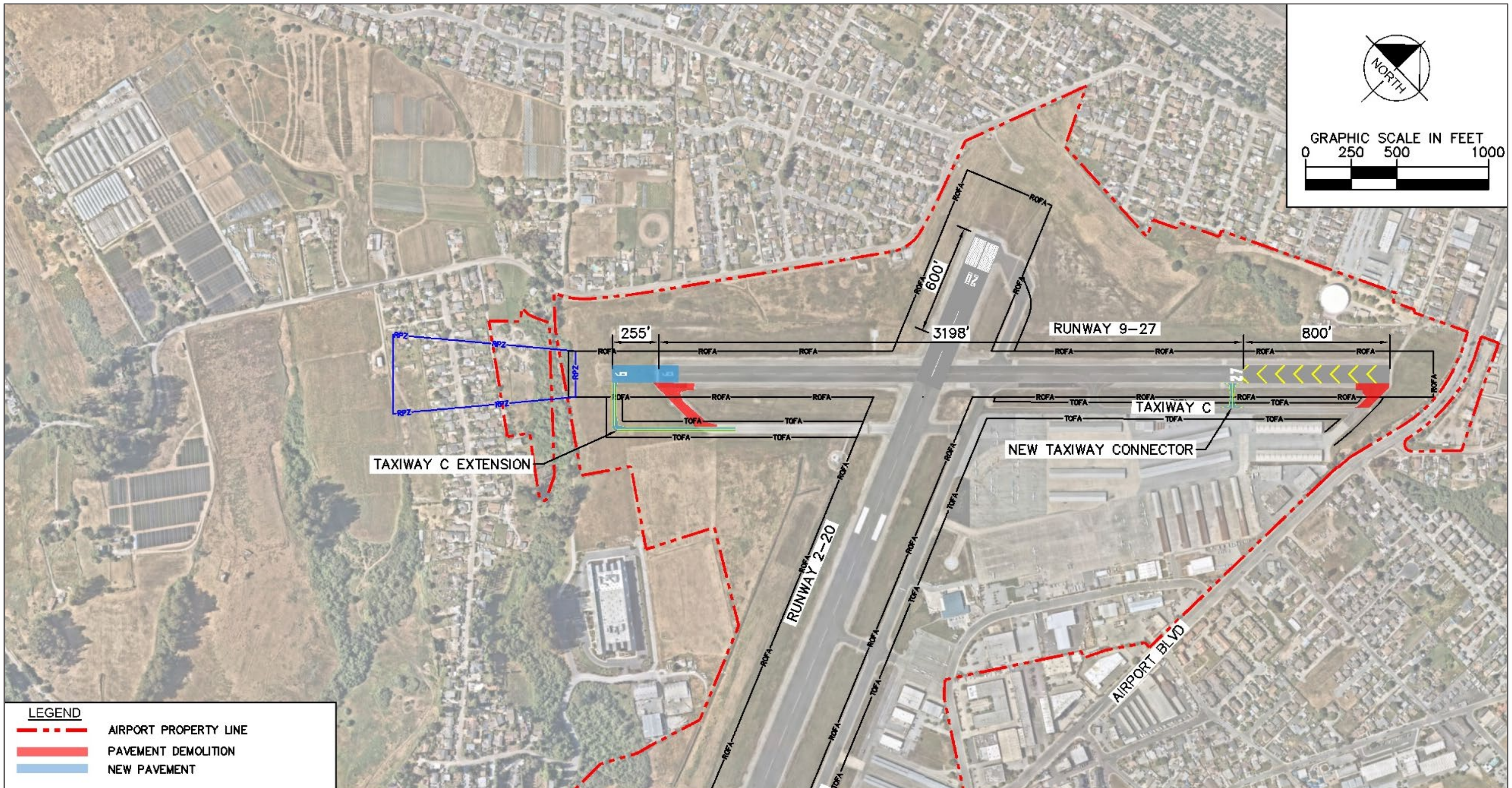
Benefits:

- Increases runway length without requiring purchase of additional land
- Meets FAA dimensional and separation standards within existing Airport property
- Can be completed in conjunction with Alternatives 4-A or 4-B

Impacts/Considerations

- Increases number of homes within RPZ from 12 to 15
- Airport would be responsible for full cost of extension and maintaining Runway 9-27
- Impacts critical tarplant habitat
- Even when coupled with Alternative 4-A or 4-B, runway length does not meet recommended length from FAA AC 150/5325-4B
- Shifts Part 77 & Threshold Siting Surfaces, potentially introducing new approach obstructions
- Requires grading/fill of approximately 0.7 acres of RSA
- Increase amount of RPZ on land uncontrolled by Airport

Figure 4-10: Alternative 7 – Extend Runway 9-27 255' West



Runway Visibility Zone Alternative
EXTEND RUNWAY 255 FEET
COUPLED WITH RUNWAY 27 THRESHOLD RELOCATED 800 FEET WEST

RVZ Alternative Evaluation

Resolving the non-compliant RVZ is a complex and costly project for which several alternatives have been identified. Some of the alternatives reduce airfield capabilities to achieve RVZ compliance while others sacrifice existing infrastructure to regain full use of the airfield. The alternatives were evaluated using several quantitative and qualitative aspects that are considered important to the Airport and its stakeholders. Due to the complexity of the RVZ issue and the higher number of alternatives compared to other items, the RVZ alternatives were scored on a scale of 1 to 5, with five being the best score for each evaluation criteria.

Relevant evaluation criteria selected for this evaluation include:

- **Satisfy Future Demand**: Accommodates future activity demand
- **Meet Design Standards**: Meets current FAA design standards
- **Airport User Preference:** Best suits Airport user and stakeholder preferences
- **Cost:** Capital development, operational, and maintenance costs
- **Environmental Considerations:** Environmental considerations on-airport and minimizes negative impacts to the community and natural environment

As shown in **Table 4-2**, Alternative 4-A has the highest overall score as it limits impacts to existing infrastructure while providing a runway length comparable to many other airports in the region. Construction of an ATCT would also provide great benefit although the costs of construction and operation of a control tower would be prohibitive. Alternatives 4-B, 4-C, and 6 all score very similarly as they solve the RVZ issue without impacting building infrastructure, but do not satisfy user preferences. Removal of infrastructure would meet user preferences but would exacerbate the existing hangar shortage on the airfield, thereby failing to satisfy future demand. Alternative 1 has a low score as it does not fix the nonstandard conditions and would require continued operational restrictions. Alternative 5 scores lower than all other alternatives as it has significant financial, operational, and environmental challenges associated. Alternative 7 scores well as it would help regain the lost runway length yet loses points as does not solve the issue on its own.

Given these scores, the preferred Alternative is 4-A in which the Airport shifts the Runway 27 threshold feet west and removes 27 aircraft tie downs to achieve RVZ compliance and opens Runway 27 to departures. It is also recommended the Airport consider extending Runway 9 255 feet to the west, providing an ultimate length of 3,453 feet after the Runway 27 end is relocated. Phasing of these improvements will be discussed in **Chapter 5.**

Table 4-2: RVZ Alternatives Evaluation

Alternative	Satisfy Future Demand	Meet FAA Design Standards	Airport User Preference	Environmental Considerations	Cost	Total Score
1: Maintain Current Conditions	3	1	3	5	3	15
2: Construct ATCT	4	5	4	4	1	18
3: Remove Infrastructure	3	5	3	3	2	16
4-A: Relocate Runway 27 Threshold 800 Feet West – No Hangar Impact	4	4	3	5	4	20
4-B: Relocate Runway 27 Threshold 1,993 Feet West – No Hangar or tie down impact	2	3	2	5	4	16
4-C: Relocate Runway 9 End 800 Feet West – No Intersection	3	3	2	5	4	17
5: Shift Runway 9-27 1,993' West	3	4	5	1	1	16
6: Close Runway 9-27	2	5	1	4	5	17
7: Extend Runway 9 by 255' (Must be paired with another alternative)	4	3	4	3	2	13

Source: Kimley-Horn

4.4.3 Parachute Landing Area (PLA)

As mentioned in **Chapter 3,** the Airport is coordinating with the City and a local business to complete a land swap to relocate a planned warehouse outside of the Caltrans Safety Zone 5. For the purposes of this MPU analysis, it is assumed that the proposed land swap does occur. As such, the future warehouse would sit on land currently occupied by the Parachute Landing Area (PLA), requiring the PLA to be moved to a different area on the airfield. If this area where the existing PLA is not developed, then a new location for the PLA would not be required.

As the area involved in the land swap include the PLA, three locations were reviewed on or near the area that the developer has proposed to transfer back to the Airport as fair compensation for the land to be occupied by the proposed development. In the event the areas below are considered insufficient at a later date or the Airport chooses not to pursue the land swap, other areas of the airfield could be considered for the relation of the PLA. Namely, the PLA could be placed on the undeveloped land directly east of the Runway 20 end, north of Runway 9-27. In this case, it would be recommended the Airport coordinate with the skydiving operator on the airfield to conduct an additional study to determine the best use of the land occupying the confines of the existing PLA and the most suitable PLA location outside of the three options presented below.

As previously discussed, the Airport is required to provide an operable space for skydiving in order to meet its grant assurances. While not explored as part of the MPU, the Airport may consider relocating the PLA to an off-site location. This is conducted very infrequently so the requirements and process would need to be discussed with several divisions of the FAA. A potential path forward would likely include the following steps:

- Determine applicable conditions and requirements to provide an off-site PLA
- Review suitable locations
- Determine cost and funding for land acquisition or lease, capital improvements, and on-going maintenance
- Discuss options with current operator and obtain better understanding of impacts to their business and operations

Consideration should be given to things such as the acceptable distance from the current airfield, operation within the existing airspace system, if existing City property could be utilized and how a lease or deed would need to be structured to meet FAA grant assurances.

Several pilots and Airport stakeholders indicated that parachuters often operate outside of the lateral boundaries of the PLA when freefalling or under canopy, increasing the risk of a possible collision between aircraft overflying the Airport and skydivers. As discussed in **Chapter 3**, the Airport is currently working with the FAA to alter the missed approach procedure to Runway 2 to shift the missed instrument approach path to the east of Runway 2-20 and further from the PLA. Pilots also reported needing to overfly the PLA when conducting visual missed approaches or go-around maneuvers. Due to the limited available space on Airport property, relocation of the PLA to a location ensuring total separation from both runways is not feasible. Instead, it is recommended the Airport work with the skydiving operator and pilots to establish operating procedures and designated approach paths (for aircraft and parachuters) when skydiving operations are occurring at the Airport.

In the following three alternatives, the future Nordic Naturals building is shown in the location and configuration preferred by the Airport and Nordic Naturals. As the building's configuration may change before the land swap is complete and the building is constructed, the final placement of the PLA should be reviewed again prior to implementation. Additionally, the PLA is depicted as a circle in these figures, as the U.S. Parachuters Association (USPA) Basic Safety Requirements (BSR) recommends the PLA be separated by a minimum radial distance of 165 feet from the nearest hazard.[7] When the proposed

[7] USPA BSRs are considered recommendations and are not a formally-adopted guidance for airport design. BSRs are discussed further in **Chapter 3.**

land swap occurs, the Airport may reconfigure the shape and size of the PLA to suit its needs so long as an adequate hazard clearance area is provided.

Location 1 – 366-foot PLA

Location 1 entails placing the PLA directly east of the existing Nordic Naturals facility, as depicted in **Figure 4-11**. This location would place the PLA within 170 feet from the existing Nordic Naturals building and 490 feet the centerline of Runway 2-20. Compared to the current PLA location, Location 1 is approximately 80 feet closer to the building and 49 feet closer to the nearest runway. The size of the PLA would remain 366 feet in diameter, which exceeds the minimum diameter recommended by the USPA of 330 feet.

Accessing Location 1 would require the Airport firing range service road to be extended approximately 1,500 feet along the western edge of airport property and across the existing drainage ditch. While the extension of the firing range service road would increase the distance that ground vehicles need to drive on the airfield compared to current conditions, this access road decreases the distance the skydiving operator's ground vehicles must travel to pick up parachuters compared to current conditions and other alternatives. This is preferred by the skydiving operator as it allows for a quicker response during times skydiving operations are conducted. The service road would require construction of a bridge or culvert over the ditch, increasing the coast of relocating the PLA. Prior to the finalization of the roadway design, a conversation with the adjacent property owners should take place about the continued use of that roadway.

In Location 1, a portion of the PLA would occupy land on which Nordic Naturals plans to construct a parking lot for the new development. As such, the Airport would have to coordinate with Nordic Naturals to alter the proposed land swap boundaries to ensure an equal number of acres are transferred. Additionally, the proposed parking lot would need to be reconfigured to ensure it does not penetrate the PLA or the pertinent safety and separation zones. If Nordic Naturals does not agree to alter the parking lot or land swap boundaries, the Airport could shift the PLA east. This would require the reconfiguration, either removal, relocation, or culverting of the draining ditch in this area to ensure an adequate space free of obstacles for skydivers. Shifting the PLA east would bring it within 400 feet of the runway, which increases the risk of aircraft and parachuters operating in close proximity to each other. As such, it is not recommended the PLA be installed in the area of the drainage ditch. The following bullets summarize the benefits and impacts/considerations of placing the PLA in Location 1.

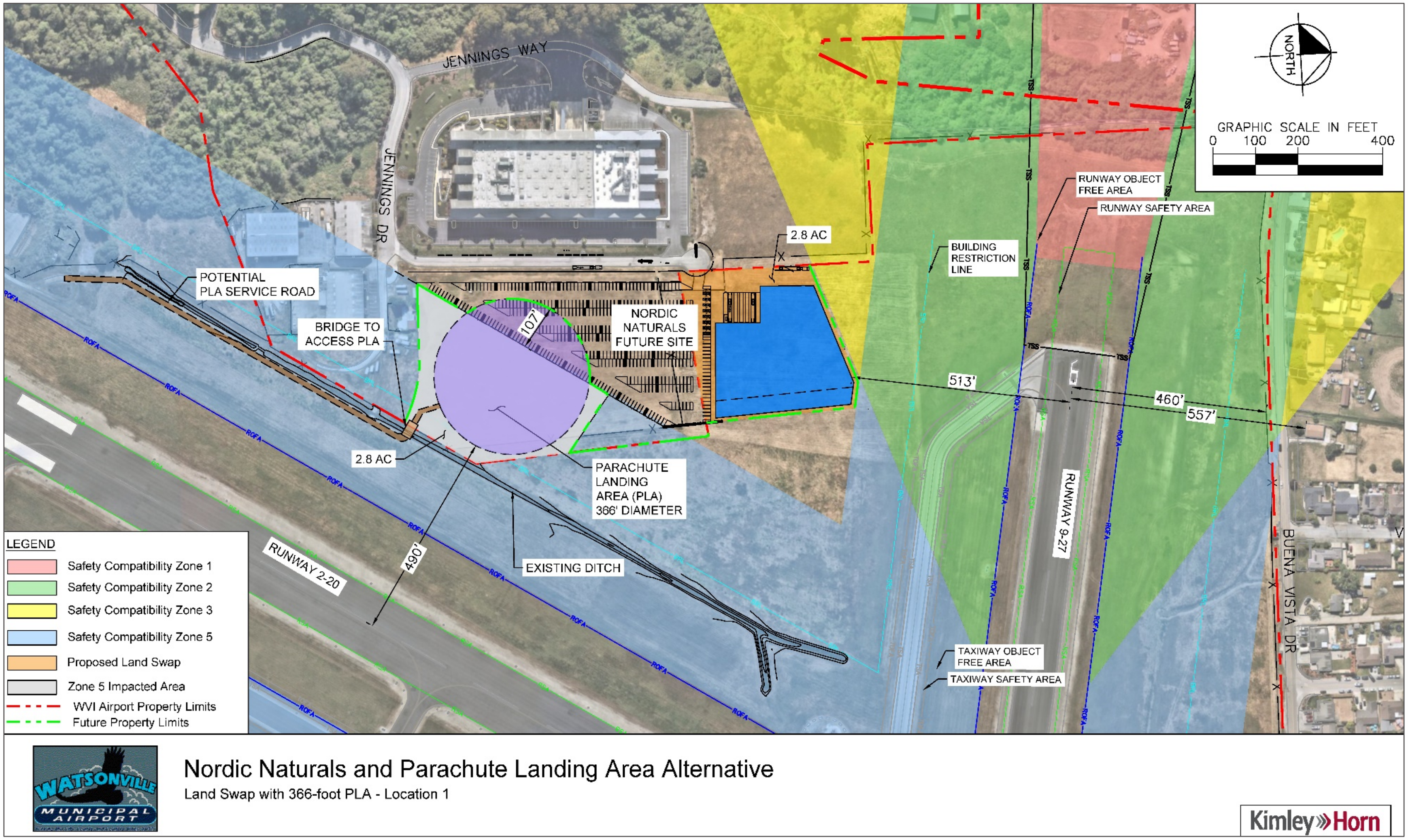
Benefits

- Provides shorter access road than existing route

Impacts/Considerations

- Requires construction of bridge or culvert over drainage ditch
- Requires reconfiguration of proposed Nordic Naturals parking lot; alternatively, the drainage ditch could be reconfigured, shifting the PLA closer to Runway 2-20
- Reduces distance between PLA and Nordic Naturals from 250 feet to 170 feet
- Reduces distance between PLA and nearest runway from 539 feet to 490 feet

Figure 4-11: PLA Location 1 – 366-foot PLA



Location 2 - 366-foot PLA

As depicted in **Figure 4-12**, Location 2 places the PLA directly east of the proposed Nordic Naturals development. The boundaries of the PLA would sit approximately 511 feet and 513 feet from Runway 2-20 and Runway 9-27, respectively. However, the northern edge of the PLA would only have 204 feet of separation from Taxiway C, 60 feet less than the existing PLA location. Location 2 would provide the greatest separation of any location from the nearest runway centerline but does place the PLA nearer to the runway intersection, increasing overall risk when either runway is in use. Similar to Location 1, this alternative would provide a 366-foot diameter PLA, which matches the size of the existing area and exceeds the minimum size recommended by the USPA. Unlike Location 1, Location 2 would not require the boundaries of the land swap to be adjusted nor the existing drainage ditch reconfigured. This configuration would require a much longer PLA access road from the Airport firing range, increasing the risk of unauthorized people or vehicles to enter the runway environment while trying to exit the PLA. It would also necessitate construction of bridge or culvert over drainage ditch. The aforementioned benefits, impacts, and considerations of placing the PLA in Location 2 are summarized below.

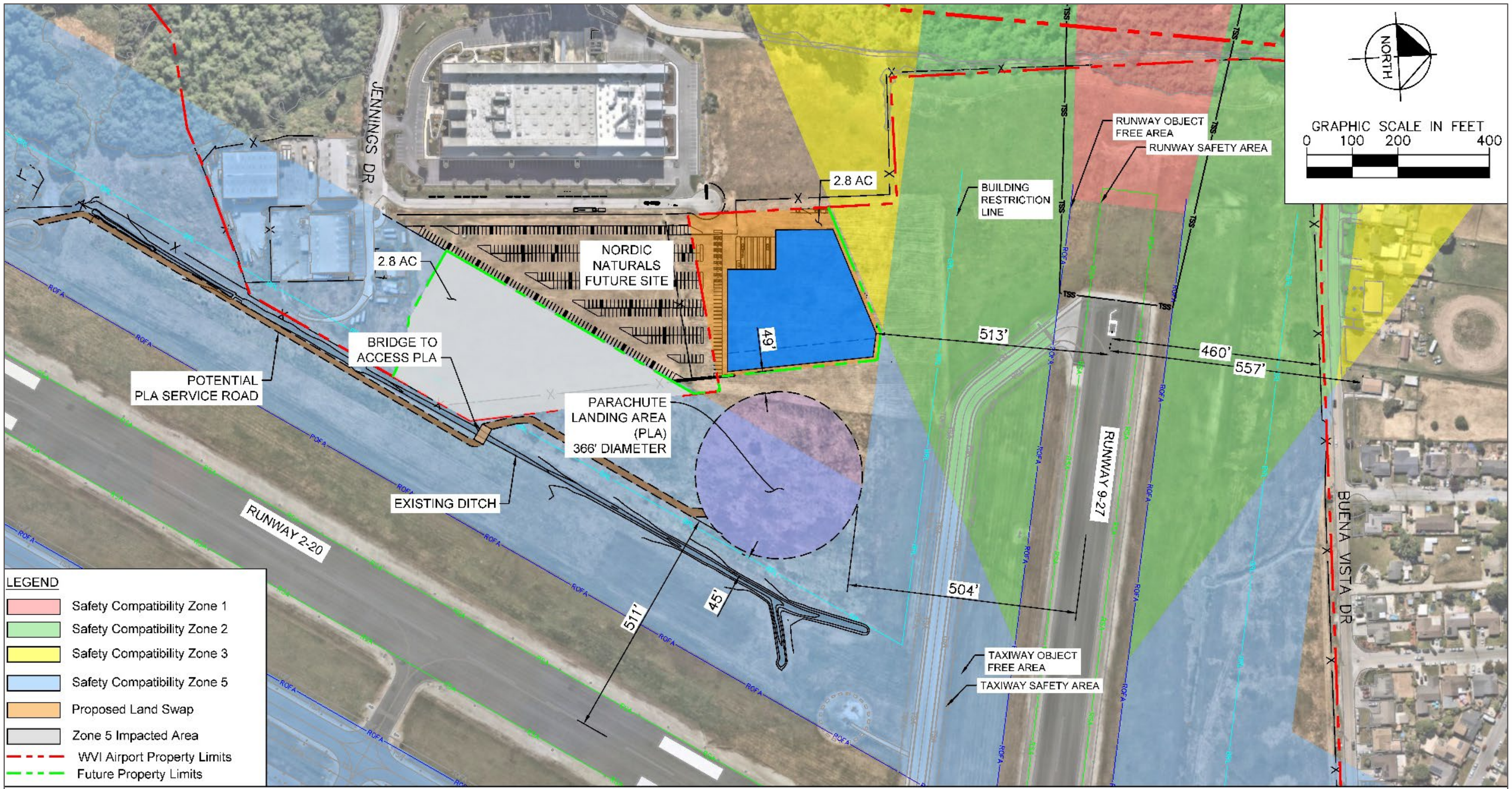
Benefits

- Does not require reconfiguration of land swap boundary or drainage ditch
- Provides greatest separation between PLA and nearest runway centerline

Impacts/Considerations

- Requires construction of bridge or culvert over drainage ditch
- Edge of PLA located only 49 feet from proposed Nordic Naturals Building
- PLA is located closer to the runway intersection and Taxiway C
- Requires longer PLA access road, increasing risk of incursions into runway environment

Figure 4-12: PLA Location 2 – 366-foot PLA



Nordic Naturals and Parachute Landing Area Alternative

Land Swap with 366-foot PLA - Location 2

Kimley»Horn

Location 3 – 300-foot PLA

Similar to Location 1, Location 3 places the PLA directly east of the existing Nordic Naturals building in the location of the proposed land swap. However, as depicted in **Figure 4-13**, the diameter of the PLA would be reduced to 300 feet. Location 3 would provide many of the same benefits as Location 1 but would likely not require the reconfiguration of the land swap boundary. The reduced diameter of the PLA does not meet USPA recommendations, as Location 3 would not provide the necessary 165 feet clearance distance from the property fence and the drainage ditch. However, the Airport could coordinate with the skydiving operator and the USPA to determine if the ditch and fence would be considered hazards to safe parachuting operations.[8] If these features are not considered hazards, the size of the PLA could be increased to meet USPA requirements. Location 3 places the PLA only 451 feet from the nearest runway centerline, 31 feet less than Location 1 and 110 feet less than the existing PLA.

Benefits

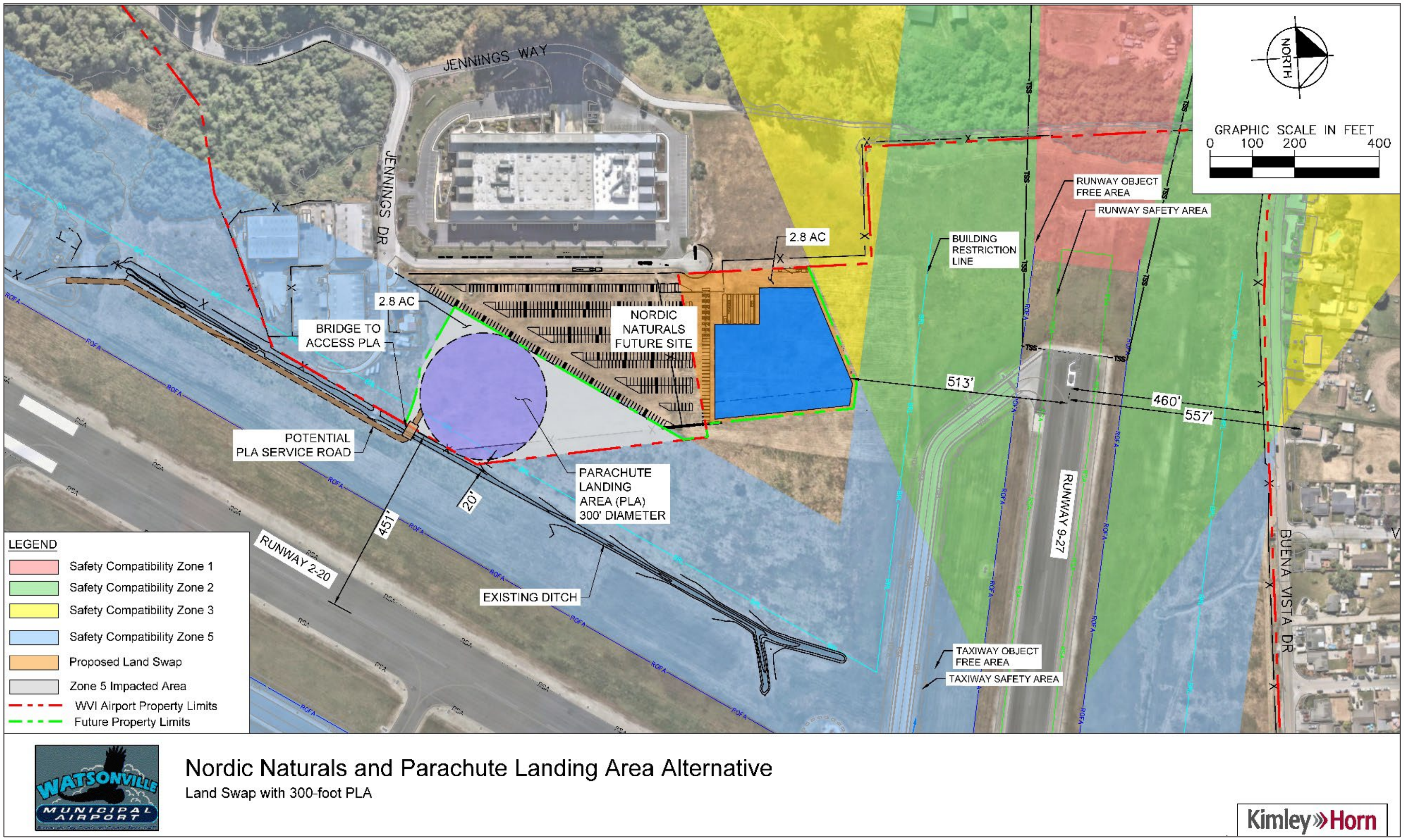
- Does not require reconfiguration of land swap boundaries

Impacts/Considerations

- Does not meet USPA recommendations for minimum PLA size/separation
- Smallest separation between PLA and nearest runway
- Requires construction of bridge or culvert over drainage ditch

[8] Hazards are defined by the USPA Skydiver's Information Manual as "telephone and power lines, towers, buildings, bodies of water, highways, vehicles, and trees. However, trees that will not interfere with parachute landings are not considered obstacles"

Figure 4-13: 300-foot PLA – Location 3



Parachute Landing Area Evaluation

Each alternative was scored for the potential impact related to development for each of the following four criteria:

- **Meet FAA Design Standards**: Meets current FAA and USPA design standards and recommendations
- **Minimize On-Airport Impacts:** Minimizes operational impacts and provides balanced use of Airport property
- **Environmental Considerations:** Minimizes negative impacts to the natural environment on-airport and the community
- **Airport User Preference:** Best suits Airport user and stakeholder preferences

A comparison of Locations 1, 2, and 3 with regard to the evaluation criteria is summarized in **Table 4-3**. Locations 2 and 3 receive similar overall scores, while Location 1 scores slightly lower. Location 2 scores high in design standards and environmental considerations as the PLA would meet FAA and USPA standards and recommendations and would not require the reconfiguration of the land swap boundary or the drainage ditch. While Location 2 would provide maximum separation from both runways, it is much closer to the runway intersection, so it scores lower in airport impacts and airport user preferences.

Location 3 scores lower in airport user preference and meeting design standards because the 300' PLA does not meet USPA recommendations and would be closest to Runway 2-20, which pilots have reported as undesirable. Conversely, Location 3 scores high in environmental considerations and on-airport impacts as it would not require reconfiguration of the drainage ditch and would not have significant impacts on the land swap.

It is therefore recommended the Airport relocate the PLA to Location 3 and reduce the size to 300 feet in diameter. Given the pending status of the land swap, it is recommended the Airport continue to coordinate with Nordic Naturals and the onsite skydiving operator to design a PLA that integrates best practices with the final design of the new Nordic Naturals facility and the needs of the Airport and aeronautical users.

Table 4-3: Parachute Landing Area Evaluation

Alternative	Meet FAA Design Standards	Environmental Considerations	Minimize On-Airport Impacts	Airport User Preferences	Total Score
1: 366-foot PLA	3	2	2	2	9
2: 366-foot PLA	3	3	2	2	10
3: 300-foot PLA	2	3	3	2	10
Source: Kimley-Horn					

4.4.4 Turf Runway

Airport staff reported some desire by aircraft owners to take off and land in the grass infield area adjacent to Runway 27, which is not marked or graded as an aircraft operating area. As such, Airport stakeholders requested the inclusion of a formal turf runway on the airfield.

General Design Considerations

As discussed in **Chapter 3**, a proposed turf runway would need to be designed as a regular runway which is expected to meet A-I(Small)-VIS safety and separation standards. It should be noted this analysis follows standards set in AC 150/5300-13A, which was the guidance in effect at the time of writing.

The FAA does not inherently approve regular operations from unpaved portions of the RSA and cannot guarantee airfield separation and airspace protection for aircraft operating from unpaved RSAs. AC 150/5300-13B recommends airports with a demonstrated need for turf operations develop an official turf runway using normal runway design and separation standards (which remain unchanged between AC 150/5300-13A and -13B). For airports that wish to allow aircraft operations from unpaved RSAs, the FAA requires a safety assessment to be conducted to ensure the airport remains compliant with AIP Sponsor Grant Assurances which require the operation of the airfield in a safe and serviceable condition.

The safety assessment is conducted through the FAA's Flight Standards District Office (FSDO) and requires the airport to provide data and documentation assessing potential safety implications and ensuring an acceptable level of safety for aircraft, vehicles, individuals and facilities on and surrounding the airport. If the safety assessment is accepted by the FSDO, the FAA recommends the airport consider factors including pilot education programs and chart supplement information, hold line and taxiway separation standards, enhanced inspections of unpaved RSAs, and other applicable state and federal guidelines.

The RSA does not extend beyond the paved width of Runway 2-20 or Runway 9-27, and as such no unpaved RSA is available to establish an unofficial turf runway. The unpaved areas adjacent to each runway are clear of obstructions as they are in the ROFA, but would not meet RSA grading, compaction, and drainage standards and may not be currently suitable for aircraft operations as acknowledged in the new AC. The Airport could coordinate with the FAA Flight Standards District Office (FSDO) to conduct a safety determine if an unofficial landing area would provide an acceptable level of safety if it was established in the ROFA.

Unofficial Turf Runways at Other California Airports

Implementation of a turf runway has been discussed by Airport staff with other airport operators in California following the request from Airport stakeholders. One such airport that has an air traffic control tower (ATCT), reported having established unofficial, unmarked landing areas on the airfield that are eligible for federal funding and have not been approved by the FAA ADO. This airport developed a written policy establishing standard operating procedures, restricting use to only landing aircraft whose pilots have completed checkout flights, and acknowledging that all aircraft operations are at the risk of the pilot-in-command (PIC). This airport has also stated that if the FAA or ATCT staff object to the use of the turf runway in the future they will cease its operation. While this method of establishing and operating a turf runway would allow WVI to satisfy user desires without having a significant impact on existing infrastructure, it has several potential issues and risks, opening the Airport to additional liability. Namely, as the turf runway would be considered an unofficial landing area, the Airport would not be able to use FAA funding to establish or maintain the runway.

Even if the Airport does not accept federal funds for establishing a turf runway, other portions of the airfield must meet FAA design standards as the Airport has previously accepted funding to construct and maintain those facilities. As such, construction of a turf runway that impacts other federally required safety areas may jeopardize the Airport's good standing with the FAA. If the FAA objects to an unofficial turf runway, the Airport would need to close the landing area or risk losing funding for future projects of other airfield facilities. Additionally, the Airport could be held liable in the event of an aircraft accident, regardless of whether the PIC signed an acknowledgement of risk waiver. As such, an unofficial turf runway would have significant risks that may impact the Airport's financial sustainability and does not guarantee continued use of the turf runway if the FAA objects to its construction and operation. As such, it is not recommended that an unofficial turf runway outside of the RSA be planned for or constructed at WVI at this time.

Potential Turf Runway Locations

Three potential locations for an official A-I(S)-VIS turf runway were identified on the airfield and are depicted in **Figure 4-14**. It is important to note Location #2 is only considered applicable if Runway 9-27 is closed to achieve RVZ compliance or if the Airport can no longer support the financial responsibilities associated with pavement maintenance for that runway. The following subsections discuss the benefits and drawbacks of each location.

Location 1: Parallel to Runway 2-20

Location 1 places the proposed turf runway parallel to the existing paved Runway 2-20, beginning approximately 940 feet from the Runway 2 threshold. The turf runway centerline and the paved runway centerline would be separated by approximately 175 feet. This separation is less than the minimum recommended separation according to FAA AC 150/5300-13A and -13B for simultaneous use of the two runways but ensures the RSA of both the paved runway and the turf runway do not overlap. As Location 1 does not meet FAA separation standards, a Modification of Standard (MOS) would be required to permit simultaneous operations on both runways.[9] It is unknown if the FAA would grant this MOS, which would then preclude the simultaneous use of the turf and paved runway. In this scenario, aircraft would have to wait for all other aircraft or vehicles to exit the paved runway environment prior to entering the turf runway. [10] Conversely, no aircraft or vehicles could enter or operate in the turf runway environment while an aircraft operates on the paved runway. As such, the runway occupancy time would likely increase, marginally reducing the overall runway capacity. While this may not be a barrier to Location 1, the FSDO would likely consider the proximity of the operations between these two runways as part of their safety assessment.

Regardless of whether simultaneous operations are approved, the turf runway's RSA will need to be graded and a drainage ditch constructed between the two runways to ensure both surfaces are appropriately drained. The Airport will then need to construct paved or unpaved connector taxiways between the paved runway and the turf runway to ensure safe crossing while minimizing surface erosion. This would limit the locations where aircraft could exit the turf runway and rejoin the pavement, further increasing runway occupancy time. Location 1 contains no known tarplant areas, minimizing the impact of turf runway construction and operation on the critical habitat. Location 1 would shift the flight path of arriving and departing aircraft approximately 180 feet closer to the existing PLA, potentially increasing the risk of a collision between an aircraft and skydiver. The preferred location of the PLA, mentioned in **Section 4.4.3**, would only be separated from the turf runway by approximately 280 feet, again presenting a risk for aircraft and skydiver collisions. The following bullets summarize the benefits and issues/impacts of placing a turf runway in Location 1.

Benefits

- Minimal impact to existing tarplant areas

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[9] The FAA requires airports to apply for a modification to standards (MOS) if any characteristic for the airport deviates from airport design, material, and construction standards. Airports must demonstrate that any deviation provides an acceptable level of safety, useful life, lower costs, greater efficiency, or the need to accommodate an unusual local condition on a specific project through approval on a case-by-case basis. MOS are required to be renewed every five years.

[10] Aircraft exiting the paved runway would be required to cross the hold line prior to the next aircraft entering the runway environment.

Impacts/Considerations

- Would require MOS for nonstandard runway separation for simultaneous operations OR would not allow for simultaneous operations on Runway 2-20
- Would increase runway occupancy time and may decrease capacity of Runway 2-20
- Requires construction of paved or unpaved connector taxiways
- Moves arriving and departing aircraft closer to existing and preferred PLA location

Location 2: Replace Paved Runway 9-27

Location 2 entails the placement of the turf runway at the existing paved Runway 9 threshold, extending 1,000 feet east towards Runway 2-20. Location 2 would only be applicable if Runway 9-27 is closed to resolve RVZ compliance issues or if the Airport can no longer financially support the long-term maintenance; the paved runway would not be closed solely for the purpose of constructing a turf runway. In Location 2, Taxiway C would provide access to the turf runway at the current Runway 9 threshold. An unpaved or paved connector taxiway could be constructed to link the east end of the turf runway, or a turnaround added to allow aircraft to back taxi. If Runway 9-27 is closed, the turf runway placed in Location 2 would effectively replace it as a fully designed and operational runway, with appropriate safety areas, RPZs, and airspace protection. Placement of a turf runway in Location 2 would likely not require any MOS as the existing safety areas and separation distances surrounding the location exceed the minimum requirements of an A-I(S)-VIS runway. Additionally, as the land has already been cleared and developed, Location 2 would have significantly fewer environmental implications than Locations 1 or 3. The following bullets summarize the benefits and issues/impacts of placing a turf runway in Location 2.

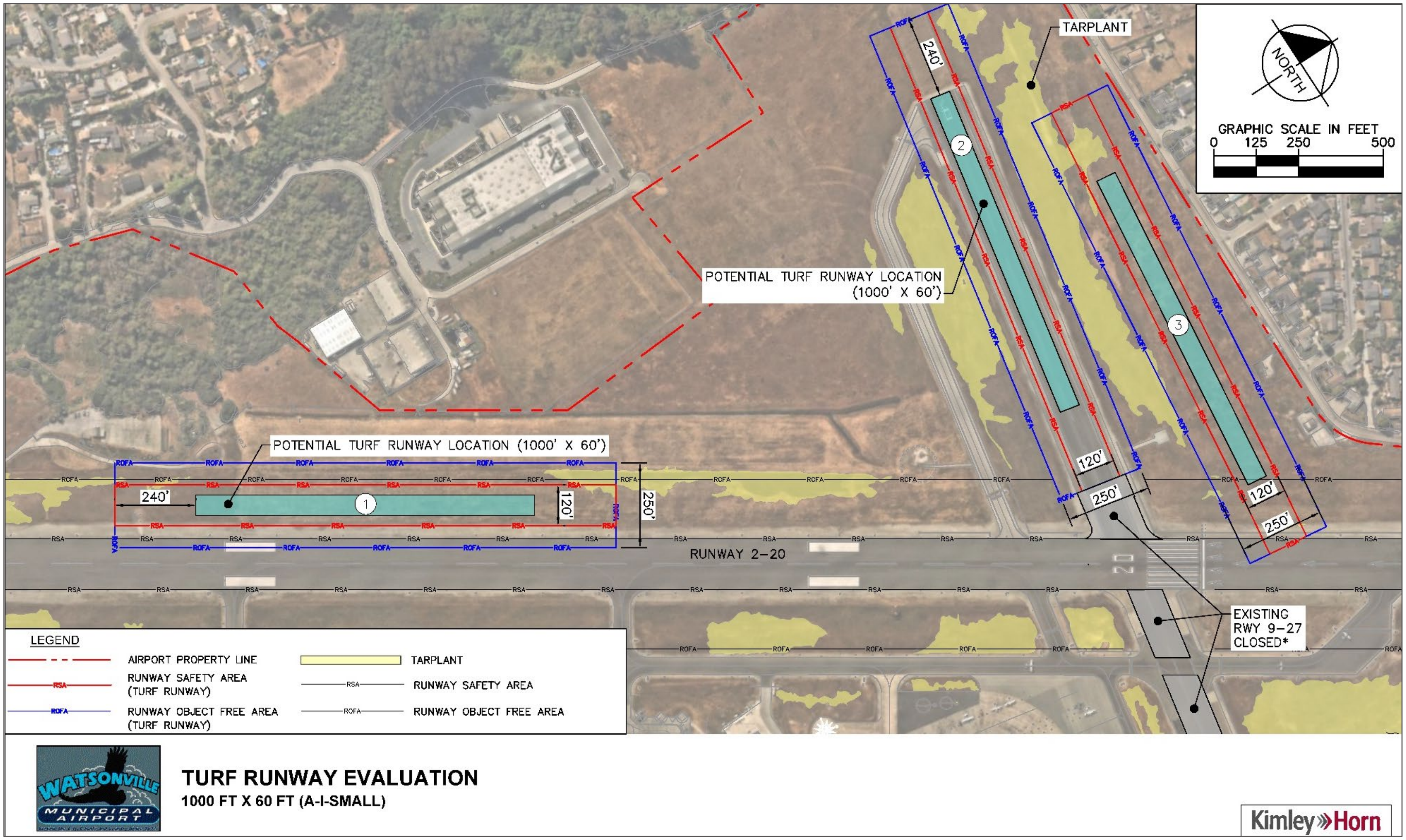
Benefits

- Taxiway C provides access to Location 1, reducing costs and impacts associated with construction of connector taxiway
- Does not require MOS
- Meets safety area, separation, and RPZ standards
- Land is already developed, reducing environmental implications

Impacts/Considerations

- Only viable if Runway 9-27 is closed

Figure 4-14: Turf Runway Location Alternatives



*Note: Turf location #2 would only be possible if Runway 9-27 were closed as a paved runway to resolve the RVZ compliance issues as discussed in **Section 4.4.2**. This MPU does not recommend the closure of the existing Runway 9-27 soley for the purpose of turf runway placement and construction.

Location 3: Parallel to Runway 9-27

In Location 3, the proposed turf runway would run parallel to the existing paved surface of Runway 9-27 northwest of the Runway 2-20/9-27 intersection. The turf runway would sit approximately 360 feet north of the paved runway centerline and would require a connector taxiway to be constructed to link the turf runway with Runway 9-27. Due to ROFA constraints in Location 3, the turf runway would have to be oriented approximately four degrees left of the current Runway 9 orientation.

In Location 3, the turf runway would not sit in an area identified as having tarplant, however, the safety areas and required connector taxiway would impact known tarplant areas. The Airport is required to mow the runway and taxiway safety areas to comply with FAA design standards, therefore, known tarplant areas would have to mitigated. Location 3 may require an MOS to permit simultaneous operations given the inadequate runway separation and the four-degree difference between runway orientations. Conversely, non-simultaneous operations would greatly increase runway occupancy time, similar to Location 1, decreasing runway capacity.

Given Location 3's proximity to Buena Vista Drive, the Airport would likely have to identify and mitigate obstructions to the western approach area. This may necessitate shortening of the turf runway, which would further limit its ability to serve aircraft. Location 3 would shift the close-in approach path nearer to houses along Buena Vista Drive. Aircraft landing and departing from the turf runway in Location 3 would be separated by approximately 210 feet from these houses. While this separation meets A-I(S)-VIS design standards, it would likely increase the noise levels for homes in the area. The following bullets summarize the benefits and issues/impacts of placing a turf runway in Location 3.

Benefits

- Provides turf runway

Impacts/Considerations

- Would require MOS for nonstandard runway separation or may not allow for simultaneous operations on Runway 09-27
- Would increase runway occupancy time and may decrease capacity of Runway 9-27
- Requires construction of paved or unpaved connector taxiways
- Impacts known tarplant areas
- Shifts close-in approach path nearer to homes on Buena Vista Drive

Turf Runway Evaluation

An evaluation of the three proposed turf runway locations is presented in **Table 4-4.** The relevant criteria included in this evaluation included the following:

- **Meet Design Standards:** Meets FAA runway length, safety area, and separation standards
- **Environmental Considerations:** Minimizes negative impacts to the environment on-airport and in the local community
- **Minimize On-Airport Impacts:** Minimizes operational impacts and provides balanced use of Airport property

As shown, Location 2 scores noticeably higher than Locations 1 or 3 as it has significantly fewer environmental and on-airport impacts. However, Location 2 is severely limited in its practicality as it assumes the paved Runway 9-27 has already been closed due to RVZ compliance issues. Locations 1 and 3 score very similarly as they both would require an MOS and would impact aircraft operations on the existing pavement.

Table 4-4: Proposed Turf Runway Evaluation

	Meet Design Standards	Environmental Considerations	Minimize On-Airport Impacts	Total Score
Location 1: Parallel to Runway 2-20	1	2	1	4
Location 2: Replace Runway 9-27	2	3	3	8
Location 3: Parallel to Runway 9-27	1	1	2	4
Source: Kimley-Horn				

Given the significant challenges associated with obtaining an MOS for Locations 1 and 3 and the limited applicability of Location 2, implementation of an official turf runway at WVI is not recommended as part of this MPU. Instead, it is recommended the Airport and its stakeholders coordinate with the FAA FSDO to conduct a safety assessment for an unofficial landing area in the unpaved portion of the ROFA adjacent to either runway.

4.4.5 Taxiway A – Wide Expanse of Pavement at Runway 20 Entrance

FAA design standards recommend avoiding wide expanses of pavement on an airfield, particularly at runway/taxiway intersections and entrances. Wide pavements shift signage and directional lights further from a pilot's view, reducing the conspicuity of signage and visual cues, potentially limiting the situational awareness of pilots and increasing risk of runway incursions. Currently, Taxiway A is approximately 150 feet wide at the hold short line of Runway 20 due to the presence of an unmarked run-up area.[11] It is recommended that Taxiway A be reconfigured at the Runway 20 entrance to narrow the width of the taxiway to 50 feet at the runway entrance, meeting the runway at a standard 90-degree angle.

Figure 4-15 shows two potential configurations to replace the existing taxiway and unmarked run-up area with a 50-foot-wide taxiway and a run-up area designed per FAA AC 150/5300-13A. These configurations also take into account the extensive tarplant in this area. It should be noted that prior to the final design, the configuration should be reviewed against current FAA design standards as well as the current operations of the airport users. This will ensure the current needs of this area, such as flight training preparation, standard aircraft run-ups, and holding for instrument procedures, are being met. There are configurations and locations beyond what is discussed in this MPU that can meet this need.

As shown, Location 1 includes a dual lane hold area consisting of approximately 11,000 square feet of new pavement. Location 1 allows up to three aircraft to simultaneously conduct pre-takeoff checks without blocking Taxiway A. Available space is limited in Location 1 due to runway and taxiway separation requirements, meaning that the runup area would likely be limited to use by aircraft in ADG I.

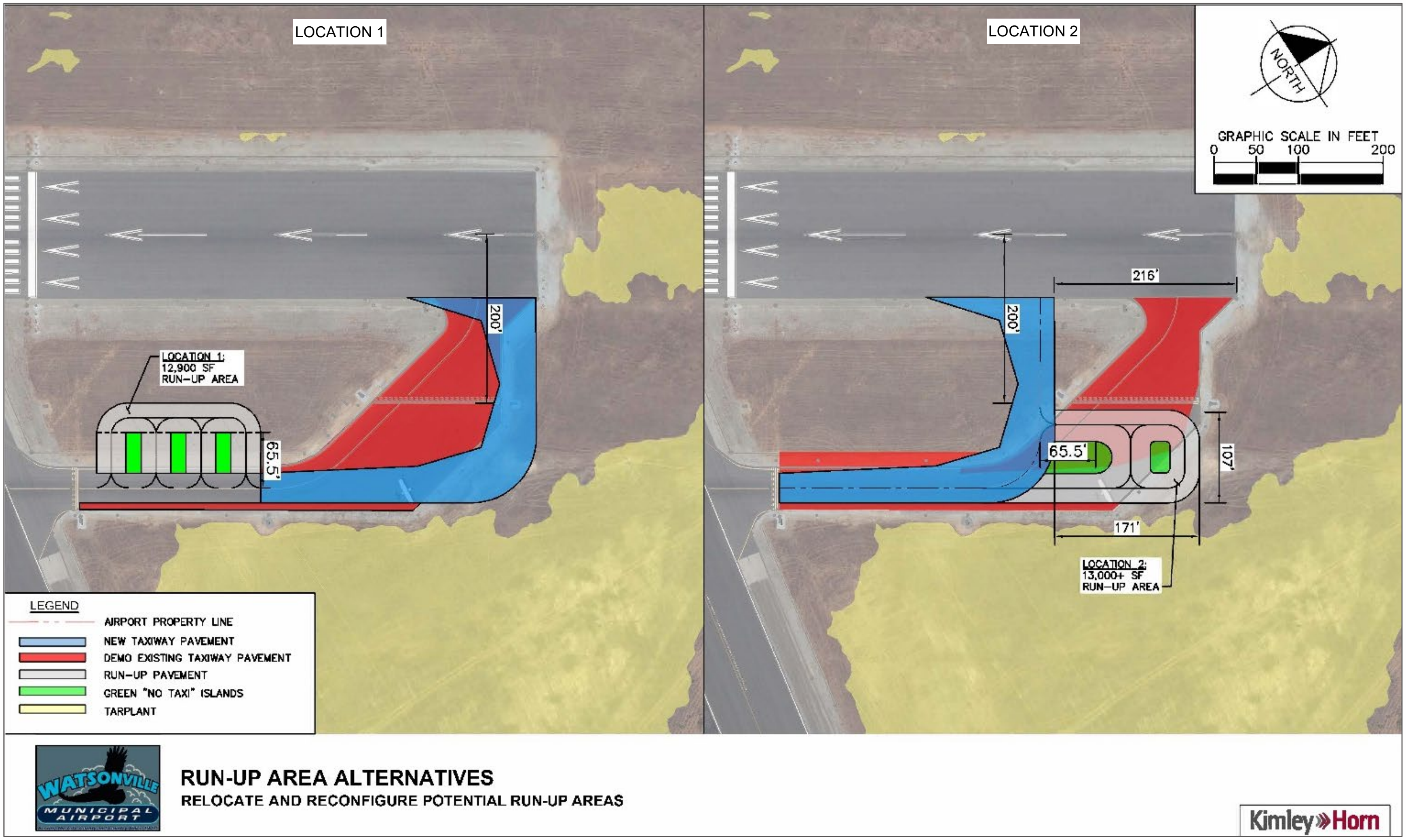
Location 2, meanwhile, consists of a dual lane holding area with approximately 13,000 square feet of new pavement. Location 2 would be less constrained by FAA design requirements but would require the entrance taxiway to Runway 20 to be shifted

[11] Taxiway A has since been marked with a movement-area boundary marking denoting the run-up area.

southwest by approximately 216 feet. This would require aircraft to back-taxi to the Runway 20 threshold to utilize the full length of the runway, increasing the runway occupancy time, thereby lowering airfield capacity, and increasing risk for runway incursions. As such, Location 1 is the preferred alternative for the replacement of the unmarked run-up area.

The configurations depicted in **Figure 4-15** are potential solutions for the existing non-standard configuration and do not indicate the potential ultimate layout. Similar to other taxiway configuration improvements, it is recommended the Airport complete this project in conjunction with the next scheduled taxiway reconstruction project. It is recommended that the Airport conduct an environmental survey at the time of implementation of this improvement to determine the exact location of tarplant as this will likely influence the configuration of the taxiway and run-up area and may require the taxiway to be configured in a manner not depicted in this MPU. The final configuration could be refined as part of the design effort when the reconfiguration is implemented.

Figure 4-15: Potential Taxiway A/Run-up Area Configurations



4.4.6 Instrument Approach Procedure (IAP)

An IAP provides pilots the ability to land at the Airport during inclement weather or low visibility conditions. As mentioned in **Chapter 1**, Runway 2 is served by a localizer (LOC) approach and an Area Navigation (RNAV) GPS approach capable of Lateral Navigation (LNAV), Vertical Navigation (VNAV), and Localizer Performance with Vertical Guidance (LPV). The current RNAV LPV approach to Runway 2 allows aircraft to approach the Airport in visibility conditions as low as 7/8 statute mile with a decision altitude (DA) of 448 feet mean sea level (MSL) or 296 feet above the runway threshold (HATh). The Airport is also served by a VOR IAP that gives aircraft the ability to circle to land on any runway but requires a greater minimum visibility and higher cloud ceiling.[12]

Runway 2

Airport stakeholders have expressed a desire for implementation of an IAP that provides greater capabilities in lower visibility and cloud conditions than the existing Runway 2 LPV approach. While this MPU does not preclude the future implementation of a higher-capability IAP, there are several potential implications that the Airport must consider when investigating the feasibility of a more capable IAP.

If the Airport chooses to pursue an IAP that has a lower DA and lower visibility minima than what is currently available, it is recommended that it coordinate with the FAA Aeronautical Information Services (AIS) Department to identify the obstructions and factors that result in the existing DA and visibility minima on the LPV approach. Once these obstructions or factors have been identified, the Airport can conduct a study to review the accuracy of the location and height of each obstacle compared to the information in the AIS database. This will provide an accurate list of airspace penetrations that currently affect the DA and visibility minima on the LNAV/VNAV and LPV approaches and may determine previously identified obstacles which do not actually penetrate the approach and departure surfaces from Runway 2. If obstacles do penetrate, the Airport will then have the option to remove or mitigate them so the FAA may implement a new IAP with lower minima.

FAA AC 150/5300-13A establishes certain requirements for runways supporting different levels of approach procedures. Currently, the Runway 2 LPV is classified as an Instrument Approach Procedure with Vertical Guidance (APV). APVs include both LPV and ILS approaches providing guidance down to a decision altitude of 250 feet HATh and ¾ mile visibility. ILS approaches with a DA lower than 250 feet HATh and ¾ mile visibility are considered Precision Approaches. Precision approaches require the highest design standards for any given critical aircraft classification (e.g., B-II) and have additional considerations regarding runway lighting and markings. A precision approach introduces the precision object free area (POFZ or ILS Critical Area). Runways supporting precision approaches must be at least 4,200 feet long and 75 feet wide, which is satisfied by the existing Runway 2-20. These runways are typically lighted by High Intensity Runway Lights (HIRL) and must have precision runway markings, which would require additional capital investment from the Airport.

Table 4-5 presents a comparison of the runway design standards for a B-II runway supporting an APV with minima not lower than ¾ mile visibility (B-II-4000) and a B-II runway supporting a precision approach with minima lower than ¾ mile visibility. Nearly all safety area and object-free area dimensions and runway separation distances increase dramatically. An increase in design standards would have a significant impact on WVI, as shown in **Figure 4-16.** The increased ROFA dimensions would require shifting of Airport Boulevard and Buena Vista Drive, removal of the Airport firing range, and acquisition and removal of at least 10 residential properties on the north side of the Airport. Furthermore, the decreased slope of the airspace surfaces

[12] Since the writing of this chapter the Airport has coordinated with the FAA Western Flight Procedures Office to reduce the minima of the LPV approach to 408 feet MSL and ¾ -mile visibility.

may limit the length of Runway 2-20 can be extended to and may require a displaced threshold. Given the potential implications to airfield design standards, it is recommended the Airport coordinate with the FAA to determine if a new IAP can be implemented to achieve a lower DA without reducing the visibility minima below ¾-mile.

Table 4-5: Comparison of B-II-2400 and B-II-4000 Runway Design Standards

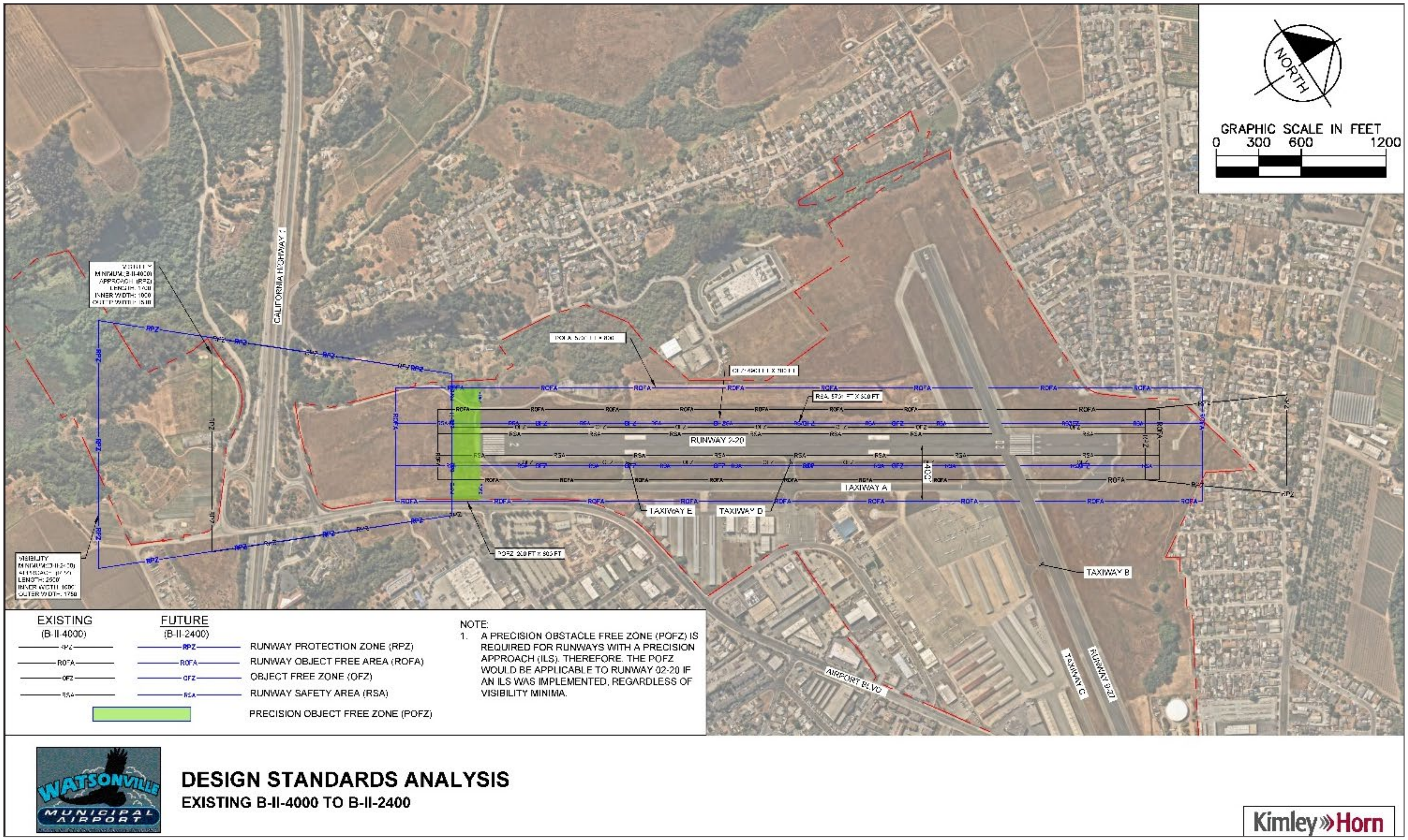
Design Criteria	Existing B-II-4000 Standards		B-II-2400 Standards		Change
	02	20	02	20	
Runway Protection:					
RSA Length (Beyond runway end)	300’		600’		300’
RSA Width	150’		300’		150’
ROFA Length (Beyond runway end)	300’		600’		300’
ROFA Width	500’		800’		300’
ROFZ Length (Beyond runway end)	200’		200’		None
ROFZ Width	250’		300’		50’
POFZ Length*	N/A		200’		200’
POFZ Width	N/A		800’		800’
Approach RPZ Length	1,700’/1,000’		2,500’/1,000’		800’/None
Approach RPZ Inner Width	1,000’/500’		1,000’/500’		None
Approach RPZ Outer Width	1,510’/700’		1,750’/700’		240’/None
Approach RPZ Area (Acres)	48.978/13.77		78.914/13.77		29.936/None
Departure RPZ Length	1,000’		1,000’		None
Departure RPZ Inner Width	500’		500’		None
Departure RPZ Outer Width	700’		700’		None
Departure RPZ Area (Acres)	13.77		13.77		None
Runway Separation:					
Aircraft Holding Position	200’		250’		50’
Aircraft Parking Edge	250’		400’		150’
Parallel Taxiway Centerline	240’		300’		60’

Design Criteria	Existing B-II-4000 Standards		B-II-2400 Standards		Change
	02	20	02	20	

A Precision Obstacle Free Zone (POFZ) is only required for runways with a precision approach with minimums of less than 250 feet AGL and ¾ Statute mile (RVR 4000). Therefore, the existing conditions of the POFZ are reported as "not applicable" (N/A) under B-II-4000 standards.

Sources: Kimley-Horn, FAA AC 150/5300-13A

Figure 4-16: B-II-2400 and B-II-4000 Design Standards Comparison



In addition to the request for lower visibility minimums, pilots have requested the construction and implementation of an instrument landing system (ILS) to provide at least similar performance as the existing LPV. An ILS provides vertical and horizontal guidance to approaching aircraft using a localizer antenna and glideslope antenna and indicates distance to the runway using either Low-Power Distance Measuring Equipment (LPDME) or marker beacons. Category I (CAT I) ILS procedures can have a minimum DA as low as 200 AGL and visibility as low as 1800 feet Runway Visual Range (RVR).[13] CAT-I ILS procedures can be flown using a Course Deviation indicator (CDI) or Horizontal Situation Indicator (HSI), which are usually installed as standard instruments on GA aircraft equipped with ILS-receivers.

The primary benefits of an ILS are the low cost and simplicity of the avionics needed for aircraft to use the ILS and the wide acceptance of the technology at airports world-wide. Drawbacks of the ILS primarily relate to the substantial costs associated with the installation and maintenance of necessary infrastructure on and near the Airport. As mentioned in **Chapter 1**, a localizer antenna is currently installed for the Runway 2 approach, so the Airport would only need to install a glideslope antenna and LPDME or marker beacons to attain the necessary equipment for an ILS. Even so, the costs of ILS infrastructure could be a significant challenge for the Airport. Additionally, the FAA has moved away from the implementation of these systems in favor of GPS-based procedures. Since 2009, the FAA has only funded installation of an ILS at one GA airport nationwide. In that time, the FAA AIS has implemented more than 2,700 LPV procedures.[14] As such, the Airport would likely be responsible for the full costs of the installation and lifetime maintenance of all ILS infrastructure.

LPV procedures are attractive to airports as they provide similar performance to ILS without the need for installation of significant infrastructure. However, LPV is a newer technology and is still restricted in its deployment and capability. LPV approaches meanwhile can normally only have a minimum DA of 250 feet HATh and not lower than ¾ mile visibility (4000 RVR), more than twice the distance as a CAT I ILS. Additionally, LPV approach procedures require aircraft to be equipped with a Wide Area Augmentation System (WAAS)-enabled GPS unit, which can cost several thousand dollars to install on GA aircraft. While the technology continues to improve and decrease in costs, WAAS is still limited in its deployment across the GA aircraft fleet.

Runway 20

In addition to requested improvements to the Runway 2 IAP, Airport stakeholders have requested the Airport investigate the feasibility of a similar GPS-based IAP to Runway 20. Runway 20 can only be accessed in IFR conditions by circling around from one of the Runway 2 approaches, which requires significantly higher visibility minima. The Airport has previously investigated a Runway 20 IAP with the FAA, who indicated it would be reluctant to support IAPs to both ends of runway 2-20 due to the Airport having insufficient operational needs. As such, the implementation of a GPS-based IAP to Runway 20 would require the removal of the existing RNAV approach to Runway 2. As such, the Airport would have to choose to replace the Runway 2 RNAV approach with a Runway 20 IAP. Airport stakeholders and staff have stated this would be detrimental to the Airport and it is not considered a viable development alternative for the Airport.

If the Airport were to choose to either replace or complement the existing Runway 2 RNAV IAP with a similarly capable IAP for Runway 20, a number of design and safety standards would change, creating additional challenges. Namely, the TERPS surfaces, discussed in **Chapter 3**, would increase in lateral size, and require a shallower gradient. This would likely introduce new obstructions to the approach and may require the displaced threshold distance to be increased for the runway or may

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[13] Category II (CAT II) and Category III (CAT III) ILS procedures may have minimums lower than 200 feet HATh DA and 1800 RVR. However, these procedures typically require use of a radio altimeter to determine height above threshold. Most small GA aircraft are not equipped with radio altimeters and are therefore not authorized to fly CAT II or III approach procedures.
[14] FAA AIS (October 2021). *Satellite Navigation — GPS/WAAS Approaches*

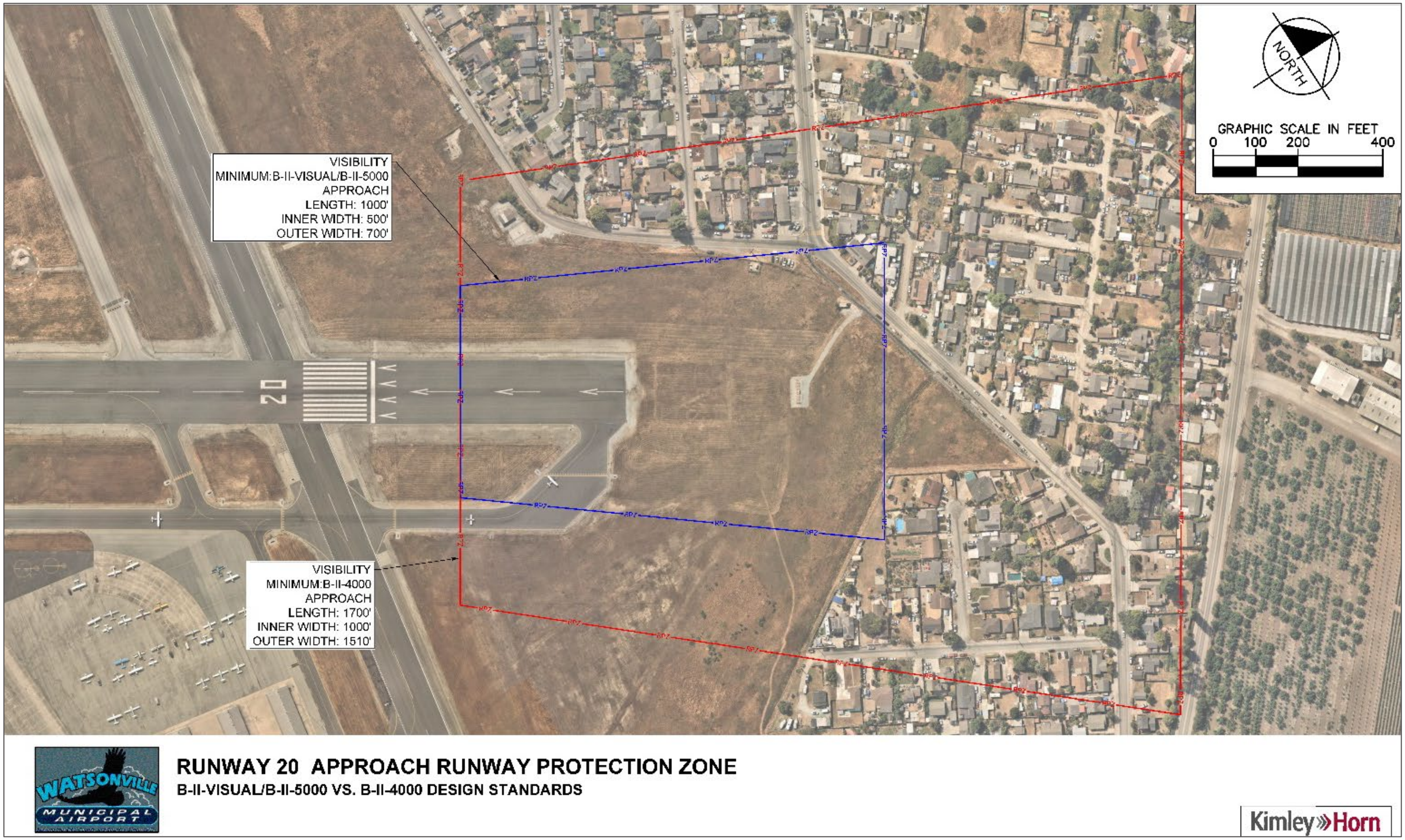
require the Airport to clear additional obstructions to remove the existing displaced threshold.[15] Additionally, the size of the approach RPZ would increase, reducing the amount of land within it that is currently controlled by the Airport. As shown in **Figure 4-17**, the RPZ for a B-II-4000 runway would include land occupied by approximately 90 residential properties, greatly increasing the amount of incompatible land uses present in the RPZ. If the FAA were to require the Airport to gain control of all land to ensure compatible land use within the RPZ, the Airport would face significant challenges that may result in the removal of such an approach.

Airport stakeholders are aware of the FAA's current position on this matter and have expressed an interest in implementing an IAP to Runway 20 with higher minima than the Runway 2 RNAV approach. The Airport could implement an IAP with minima not lower than one mile without affecting the existing RPZ or TERPS surfaces. In this case, it would still be prudent for the Airport to conduct an airspace study to accurately identify approach surface obstructions that could affect the DA and visibility minima of a Runway 20 IAP. At this time, the FAA is unlikely to fund such a study, so the full financial burden of conducting the study and then implementing an IAP would fall to the Airport.

Given the potential ramifications to the Runway 2 approach, this MPU does not recommend that the Airport develop a GPS-based IAP in the immediate future, regardless of the visibility minima. Instead, it is recommended that the Airport continue to coordinate with the FAA to determine if an IAP would be feasible if and when GPS navigation technologies become more widely available and cost effective. If it does, the Airport can choose to implement an approach with minima similar to the existing Runway 2 RNAV approach or one with minima higher than one mile visibility.

[15] Existing obstructions to Runway 20 are discussed further in *Airspace Obstructions*.

Figure 4-17: Runway 20 Approach RPZ – B-II-4000 Standards



4.4.7 Airspace Obstructions

As noted in **Chapter 3,** a number of imaginary surfaces extend outwards and upwards from the two runways at WVI. The dimensions and gradients of each of these surfaces are defined in FAR Part 77 and Order 8260.3, *United States Standards for Terminal Instrument Procedures* (TERPS). Any penetration of these imaginary surfaces, either natural or manmade, is identified as an obstruction and must be evaluated by the FAA to determine if the penetration presents a hazard to air navigation. If determined to be a hazard, the obstacle should be removed or altered to mitigate the penetration. At the current time, the FAA has identified obstructions along the Runway 20 approach path that require the runway threshold to be displaced 590 feet from the north end of the runway pavement. Potential strategies for mitigating the obstructions affecting Runway 20 and the general Part 77 airspace obstructions are discussed in the subsections below.

Runway 20 Displaced Threshold Obstructions

The close-in approach path to Runway 20 is obstructed by several objects, resulting in the 590-foot-long displacement of the runway threshold. An airspace analysis conducted for this MPU identified more than 30 objects that penetrate the Part 77 Approach Surface and should be mitigated appropriately. Five of these objects penetrate the 20:1 Threshold Siting Surface (TSS) on the Runway 20 end, which is the reason for the displaced threshold.

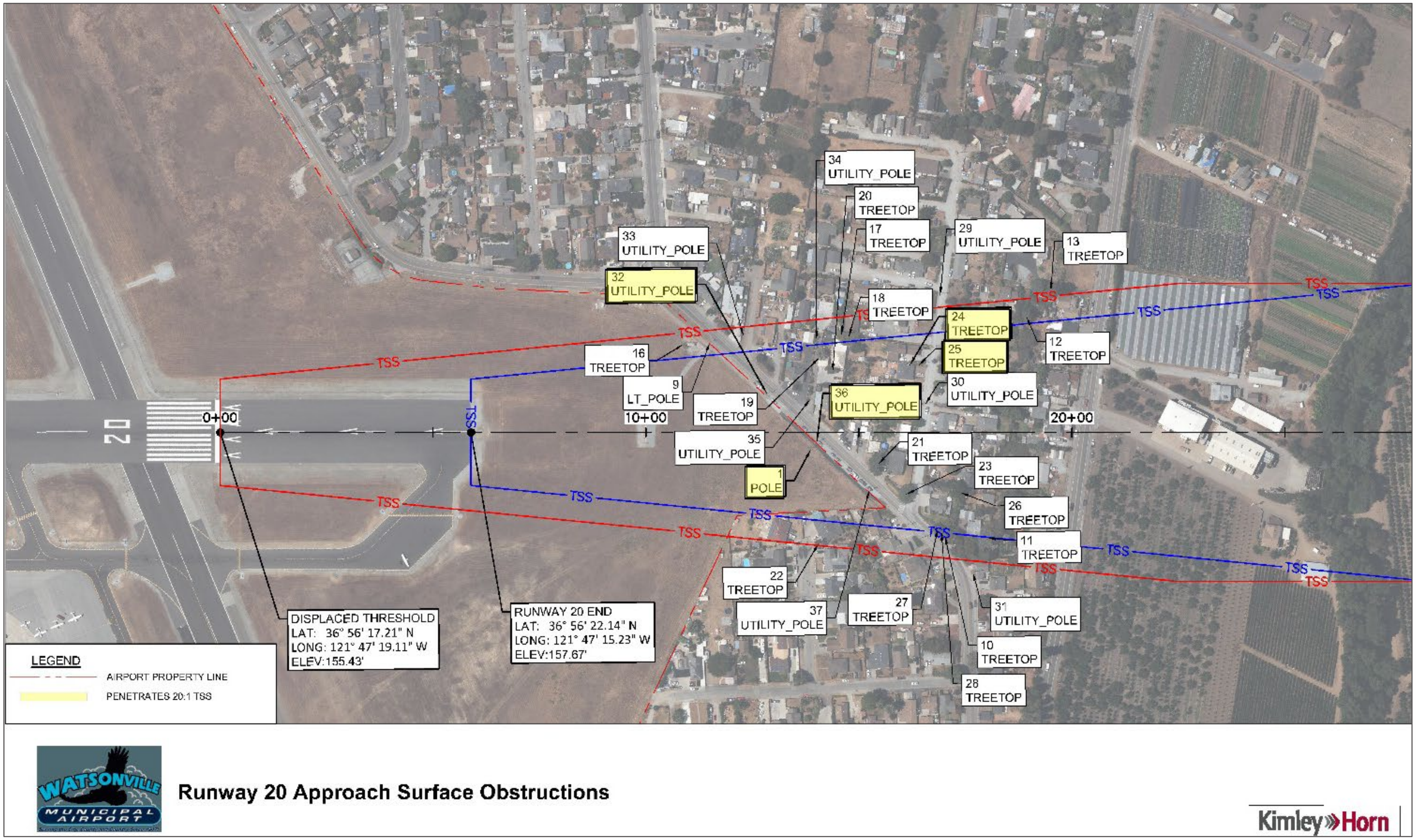
Figure 4-18 depicts these objects, with those obstructing the 20:1 TSS highlighted in yellow. **Table 4-6** summarizes the five obstacles that penetrate the TSS and require the displaced threshold. These consist of two trees (#24 and #25) and two utility poles off Airport property (#32 and #36), as well as one lighted pole (#1) on Airport property to warn pilots of the powerlines in the close-in approach path. Objects #24 and #25 have been flagged as the controlling obstructions as they penetrate the TSS by more than 30 feet.

Table 4-6: Runway 20 TSS Obstruction Summary

Object Number	Object Type	TSS Penetration Distance (Ft.)
1	Pole	18.0’
24	Tree	32.2’
25	Tree	36.5’
32	Utility Pole	9.9’
36	Utility Pole	10.1’
Source: Martinez Geospatial		

It is recommended the Airport mitigate these five obstructions to eliminate the displaced threshold, providing the maximum landing distance available for Runway 20. The Airport could remove all penetrating obstructions, then eliminate the displaced threshold; or remove the trees and relocate the threshold to intermediate location between the runway end and its current location. The benefits and impacts of each of these alternatives are discussed below.

Figure 4-18: Runway 20 Approach Surface and TSS Obstructions



Alternative 1: Remove All TSS Obstructions and Relocate Threshold to Runway End

Alternative 1 includes removing all TSS obstructions and subsequently relocating the runway threshold to the existing end of the pavement. According to aerial imagery, objects #24 and #25 are located on the same residential property one block north of Airport property. As such, it is recommended the Airport coordinate with this landowner to remove the palm trees and obtain an easement to trim other trees on the property if they grow above the slope of the TSS. The utility poles (#32 and #36) are owned by Pacific Gas and Electric (PG&E) and sit on City property along Buena Vista Drive. The powerlines split several times in this area, providing power to dozens of houses in the adjacent neighborhood. It is recommended the Airport coordinate with PG&E to move the powerlines underground and remove the utility poles along Buena Vista Drive. The Airport or PG&E will also have to coordinate with private landowners in the neighborhood, as the installation of underground powerlines will likely require landscaping and electrical work to be completed on each applicable building in the area. If the utility poles and powerlines are removed, the lighted pole (#1) on Airport property can be removed. Once all five obstructions are removed, the Airport can relocate the runway threshold to the pavement end, regaining 590 feet of available landing distance. The primary concern of this alternative is the potential pushback the Airport could receive from the adjacent property owners as aircraft would be flying over the houses at a lower altitude than if the threshold remained in its current location.

Alternative 2: Remove Objects #24 and #25, Relocate Threshold 215 feet from Runway 20 End

Alternative 2 would allow the Airport to increase the available landing distance for Runway 20 without removing all penetrating obstructions. In this scenario, the Airport would remove the trees (#24 and #25) and relocate the threshold 215 feet from the Runway 20 end. This would increase the available landing distance of Runway 20 by 375 feet, providing a total distance of 4,126 feet. This would allow the Airport to regain some of the landing distance if the powerlines are unable to be moved underground. In this alternative, the Airport would still have to coordinate with the private landowner to remove the trees, which is the same issue as Alternative 1. However, the Airport would not have to pay for the relocation of the powerlines, thus reducing the cost of the project when compared to Alternative 1.

Given that the Airport would have to remove the Objects #24 and #25 in both alternatives, it is recommended the Airport remove all obstructions and move the Runway 20 threshold to the end of the pavement as described in Alternative 1. Alternative 2 is only recommended if the Airport is unable to come to an agreement with PG&E and the private landowners to move the powerlines underground. If PG&E is willing to remove the aboveground powerlines but private landowners are not, it may be possible for the Airport and PG&E to replacing the existing poles with shorter poles that fall below the TSS. In this instance, it is recommended the Airport investigate state and local requirements for the minimum height for powerlines serving residential neighborhoods.

General Obstructions

In addition to the objects that impact the TERPS surfaces on the Runway 20 approach, there are obstructions within the Part 77 Imaginary Surfaces at WVI comprised mainly of terrain and trees, poles, and fences. This data and recommended disposition will be provided in the Airport Layout Plan (ALP) set on the Airport Airspace Drawing (Sheet 3) and Inner Approach Surface drawing sheets (Sheets 4 and 5). The recommended mitigation strategy for each type of airspace obstruction is presented below. It should be noted that it is sometimes impossible to achieve airspace completely devoid of obstructions due to excessive costs or other considerations. Obstructions that cannot be removed should be lighted with hazard beacons. It is recommended that an in-depth evaluation be conducted near the time of removal of airspace obstructions to confirm the number and locations of obstacles affecting Part 77 surfaces.

Ground – For ground obstructions found within the primary surface and inner approach surface on Airport property, the Airport should verify elevation with a field survey and grade as necessary to address the obstruction. Grading should be planned to be completed during the next runway or taxiway rehabilitation project.

Tree – Trees found on Airport property should be removed. For tree obstructions found off Airport property, arrangements will need to be made with the individual property owners. Removal is the preferred method over tree trimming as it ensures the trees will not regrow to be obstructions again in the future. If the owner is only willing to trim the tree, then an easement to return to trim the trees in the future should be obtained.

Building – Buildings that are obstructions should be lighted per FAA AC 70/7460-1L, *Obstruction Marking and Lighting.*

Road – For obstruction analysis purposes, it is assumed that a 15-foot truck is on the road. For roads within the primary surface, they will likely need to be relocated or lowered in the future.

Fence/Post/Utility Poles/Tank/Antenna – The Airport should coordinate with surrounding property owners to determine if manmade objects can be removed or relocated. If these items cannot be relocated or removed, they should be lighted per FAA AC 70/7460-1L. Depending on conditions, reflective markers may be used to reduced costs.

4.5 Landside Alternatives

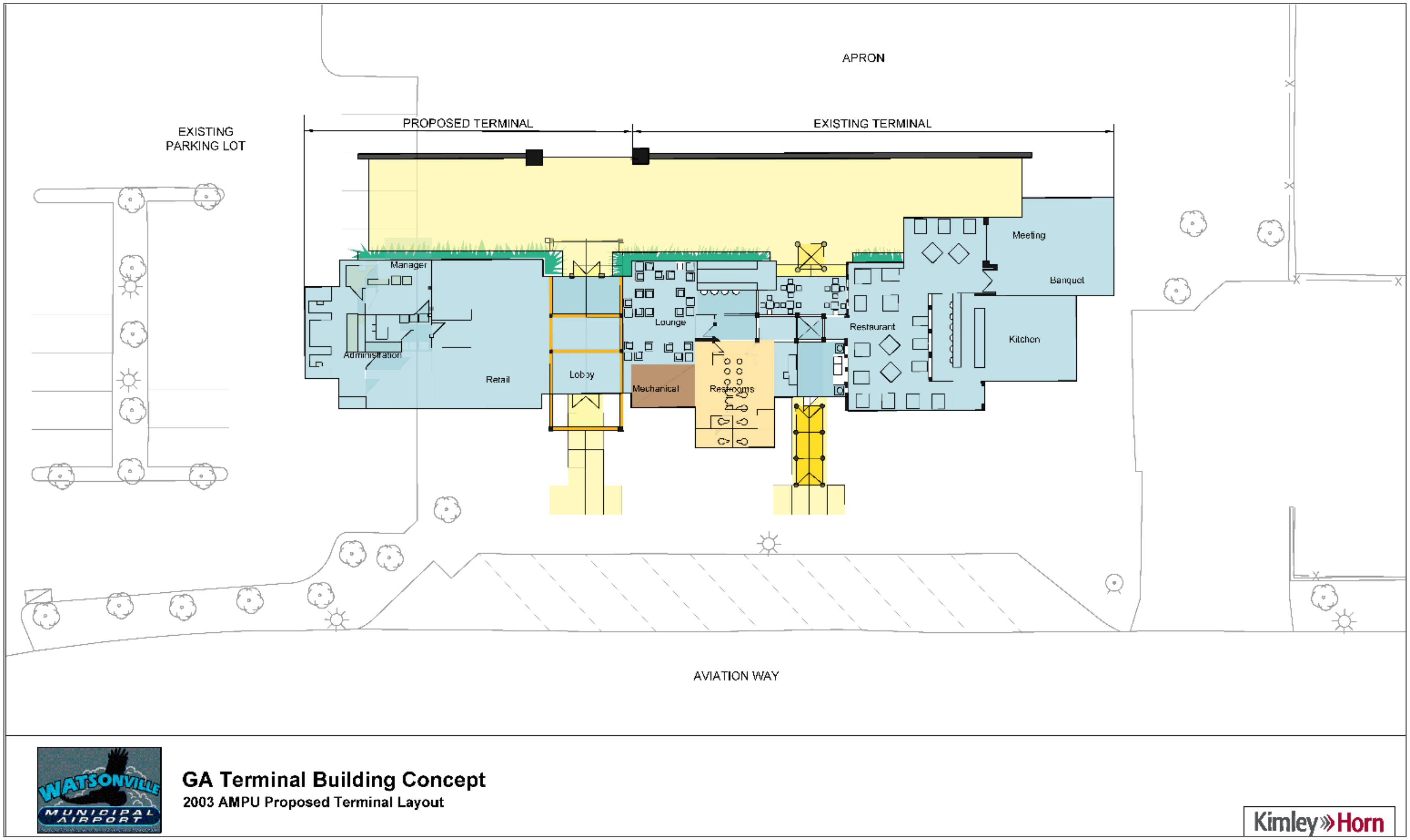
As described in **Chapter 5**, there is a need for the Airport to develop new landside facilities to meet forecast demand and recommended safety and design standards. Namely, an existing shortage of T-hangar units and projected need for conventional hangar space will require the Airport to construct new aircraft storage facilities. The Airport's GA terminal building was previously planned to be expanded and reconfigured to provide adequate space for the onsite restaurant. Additionally, the aviation fuel storage facilities at WVI are nearing the end of their useful life and need to be replaced to meet operational needs and environmental standards. As such, the existing fuel delivery system and fuel truck parking area must be modified or relocated to accommodate above-ground fuel storage tanks (AGTs). Finally, it is recommended the Airport construct an Airport Maintenance Equipment Storage (MES) building to protect trucks and equipment from the elements, thereby extending their useful life. The following sections present alternatives that address the considerations described above and provide for an optimized overall landside area.

4.5.1 General Aviation Terminal

ACRP Report 113: *Guidebook on General Aviation Facility Planning* recommends sizing of a GA terminal be based on the number of peak hour operations the airport is expected to accommodate during the forecast period. Using this formula, it is recommended the GA terminal have an ultimate size of 12,361 square feet (including approximately 3,500 square feet for the dedicated restaurant currently onsite) to provide amenities including a pilot and passenger lounge, restrooms, flight planning area, and food/beverage vending machines. However, Airport stakeholders and staff indicated that a portion of the traffic utilizes select services offered by the various SASOs on the airfield. As such, the GA terminal likely will not need to be expanded to the full size recommended by the ACRP report.

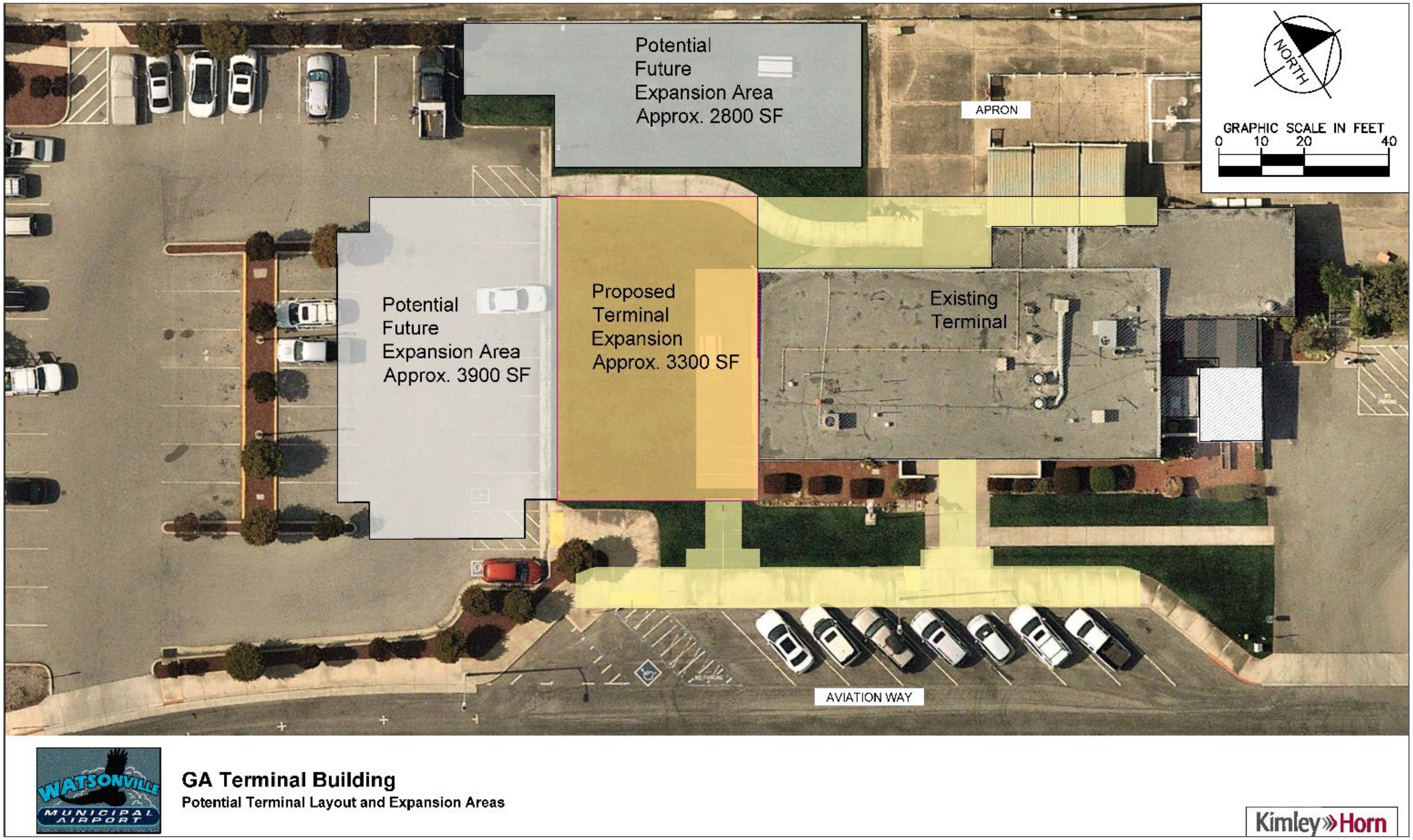
The Airport previously designed a terminal expansion in the 2003 AMPU. This layout, presented in **Figure 4-19,** would provide an ultimate building size of approximately 10,000 square feet, with 6,300 square feet dedicated to the terminal and 3,700 square feet dedicated to the restaurant. Although this configuration would offer adequate space for the desired amenities, it may be outgrown as transient traffic increases at the Airport. Additionally, this layout would require eight parking spaces in the parking lot west of the terminal to be partially removed. This would reduce off-street automobile parking in the terminal area, which, although the needs of the Airport are currently met, has very little surplus space to meet future demand.

Figure 4-19: 2003 AMPU Proposed Terminal Layout



If the Airport chooses to pursue an expansion using the layout proposed in the 2003 AMPU, it is recommended that a separate project be conducted to fully design the terminal building expansion and any necessary improvements to the terminal parking lot and surrounding area. However, if the Airport feels the 2003 AMPU layout cannot sufficiently meet its needs, it is recommended the Airport design a different terminal expansion or a complete building reconstruction. **Figure 4-20**depicts potential areas the terminal could be expanded into or where an entirely new building could be constructed. As shown, the existing terminal could be expanded in the grass area west of the current building up to approximately 3,300 square feet without impacting the parking lot, providing a total building size of approximately 9,800 square feet. Alternatively, a new building could be constructed in the grass area and existing parking lot, providing an ultimate building size of approximately 7,200 square feet with the land available to expand another 2,800 square feet. In this scenario, the west terminal parking lot could be relocated to the location of the existing terminal building and combined with the east terminal parking lot.

Figure 4-20: Potential GA Terminal Expansion Areas



4.5.2 Aircraft Storage

Table 4-7 presents a summary of the surpluses and needs for aircraft storage facilities at WVI. As shown, there is currently a surplus of conventional hangar space, although this is projected to decrease over the next 20 years until demand is projected to slightly exceed storage capacity in 2040. However, a portion of conventional hangar space is reserved for use by SASOs and is not always available for based or transient aircraft storage. As such, there may be a need for additional conventional aircraft storage to be constructed to accommodate demand. The Airport also has a T-hangar shortage that is projected to increase to 36 units in 2040. The apron tie downs currently available at the Airport are expected to meet demand through the forecast period, even if 41 tie downs are removed to comply with RVZ standards as discussed in **Section 4.4.2.**

Table 4-7: Aircraft Storage Needs Summary

Storage Type		2020	2021	2025	2030	2035	2040
Conventional Hangar (square footage)*	Surplus/(Deficit)	23,800	21,800	19,800	12,800	7,800	(200)
T-Hangar (units)	Surplus/(Deficit)	(5)	(6)	(13)	(20)	(29)	(36)
Apron Tie Downs	Surplus/(Deficit)	81	80	77	74	72	68
	Surplus/(Deficit) with 41 Tie Downs Removed	40	39	36	33	31	27
Helicopter Parking	Surplus/(Deficit)	3	3	3	3	3	2

* A portion of conventional hangar space is reserved for use by SASOs and is not always available for based or transient aircraft storage. As such, there may be a need for additional conventional aircraft storage to be constructed to accommodate demand.

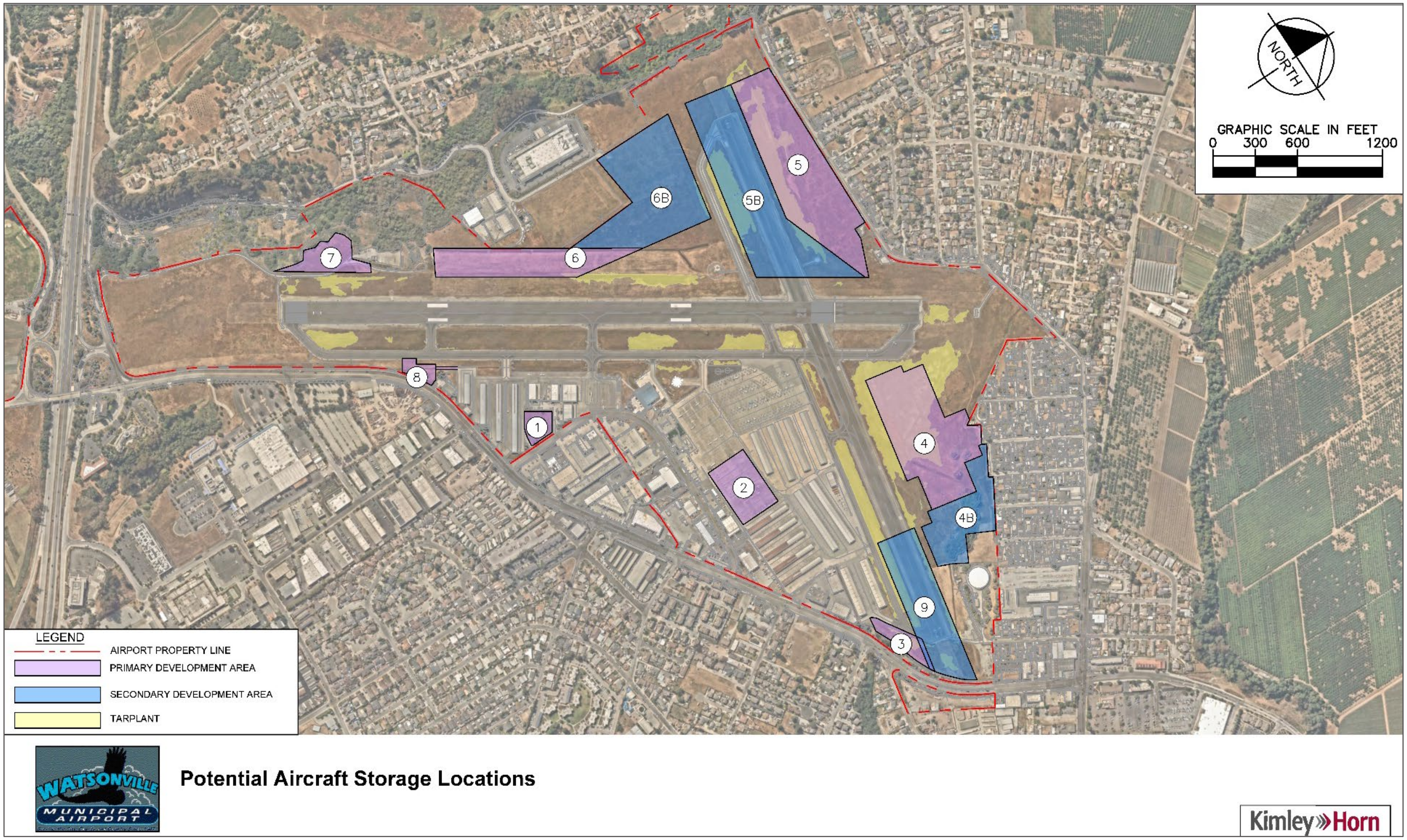
Sources: WVI, Kimley-Horn

It is recommended the Airport construct additional aircraft storage facilities to meet current and projected needs of the Airport. There are several areas on the airfield where storage facilities could be constructed or reconfigured to add aircraft storage capacity. There are several factors that need to be considered when determining the feasibility of each area to accommodate aircraft storage facilities. Namely, the areas must be large enough to contain the applicable storage facility while providing adequate safety buffers and clear areas between aircraft, vehicles, and buildings. Each potential location must be accessible for aircraft to taxi to and from other areas of the Airport and have sufficient roadway access to allow ground vehicles to reach each location without entering any aircraft movement areas. External roadway access must also be considered as the surrounding roads will likely be affected by the increase of vehicles traveling to or from the storage facilities on the Airport. Conventional and T-Hangar buildings will need appropriate utilities (e.g., electricity, sewer, water, and gas), while aprons and tie downs will need appropriate drainage infrastructure. Aircraft storage areas should also ideally be accessible to primary amenities (fueling facilities, restrooms, ground transportation) with as few runway crossings as possible to reduce the risk for runway incursions.

Aircraft Storage Facility Development Locations

Nine potential locations for aircraft storage facility development at WVI are depicted in **Figure 4-21.** The details of each potential location are discussed below. It is important to note Area 9 is only applicable if the Runway 27 is shifted 1,993 feet west to resolve RVZ compliance issues and overlaps a portion of Area 3, which could be constructed regardless of the status of Runway 9-27. If Runway 9-27 was closed for any reason, Areas 4 and 5 could be expanded to the south to include the land currently occupied by the runway and Taxiway C (shown as Area 5-B). Runway 9-27 is not recommended to be closed to increase land available for aircraft storage facilities. The yellow shading represents areas of known tarplant growth on the airfield. As discussed in **Appendix A** the Airport would need to coordinate with the California Fish and Wildlife Service (FWS) to develop a strategy to appropriately mitigate damage to critical habitats prior to development of any area with known tarplant growth.

Figure 4-21: Potential Aircraft Storage Facility Locations



Potential Aircraft Storage Facility Layouts

Figure 4-22 through **Figure 4-25** depict potential arrangements for aircraft storage areas 1, 2, 3, and 4. As shown, some of these areas have significant flexibility as they have the necessary space, accessibility, and utility availability to support either conventional hangars, T-hangars, or aircraft tie downs. Some locations, such as Area 4, have adequate space to accommodate a mix of uses. The exact use and configuration of each aircraft storage facility will largely depend on the desires and funding availability of the developer (Airport or private). As such, the actual layouts of these areas may vary from what is presented in the below figures and ALP. Regardless of the developer's needs, the layout of each location must meet all applicable FAA design standards unless specifically addressed as part of the tenant's lease with the Airport.

Table 4-8 summarizes the characteristics of the nine potential storage areas at WVI, including the size of the available area, the percent of the area affected by tarplant, and the recommended use for each area. In general, larger areas provide greater flexibility as one or more types of storage facilities can be accommodated. However, larger areas are predominantly undeveloped, which presents added challenges to address accessibility, utility availability, and environmental concerns, particularly relating to tarplant habitat. Some areas are limited in flexibility regardless of their size due to airspace and land use restrictions that may preclude certain buildings or facilities being built.

Table 4-8: Aircraft Storage Areas Summary

Storage Area Location	Available Land Area (Sq Ft)	Available Land Area (Acres)	Percent of Area Affected by Tarplant Habitat	Recommended Use
Area 1	49,229	1.1	None	Tie downs/Conventional Hangars
Area 2	132,645	3.0	None	T-hangars/Conventional Hangars
Area 3	53,630	1.2	21%	Tie downs
Area 4	460,354	10.6	53%	Mixed
Area 4-B	211,412	4.9	<1%	T-hangars/Conventional Hangars
Area 5	548,842	12.8	26%	Mixed
Area 5-B*	577,048	13.2	14%	Mixed
Area 6	254,014	5.8	1%	Mixed
Area 6-B	475,431	10.9	1%	Mixed
Area 7	93,870	2.2	None	Tie downs/Conventional Hangar
Area 8	31,236	0.7	None	Tie downs/Conventional Hangar
Area 9*	303,356	7.0	17%	Tie downs

*Areas 5B and 9 are only applicable if Runway 9-27 is closed.

**Area 6-B is only applicable if existing PLA is relocated and proposed land swap does not occur.

Source: Kimley-Horn

Figure 4-22: Aircraft Storage Area 1 - Potential Configurations

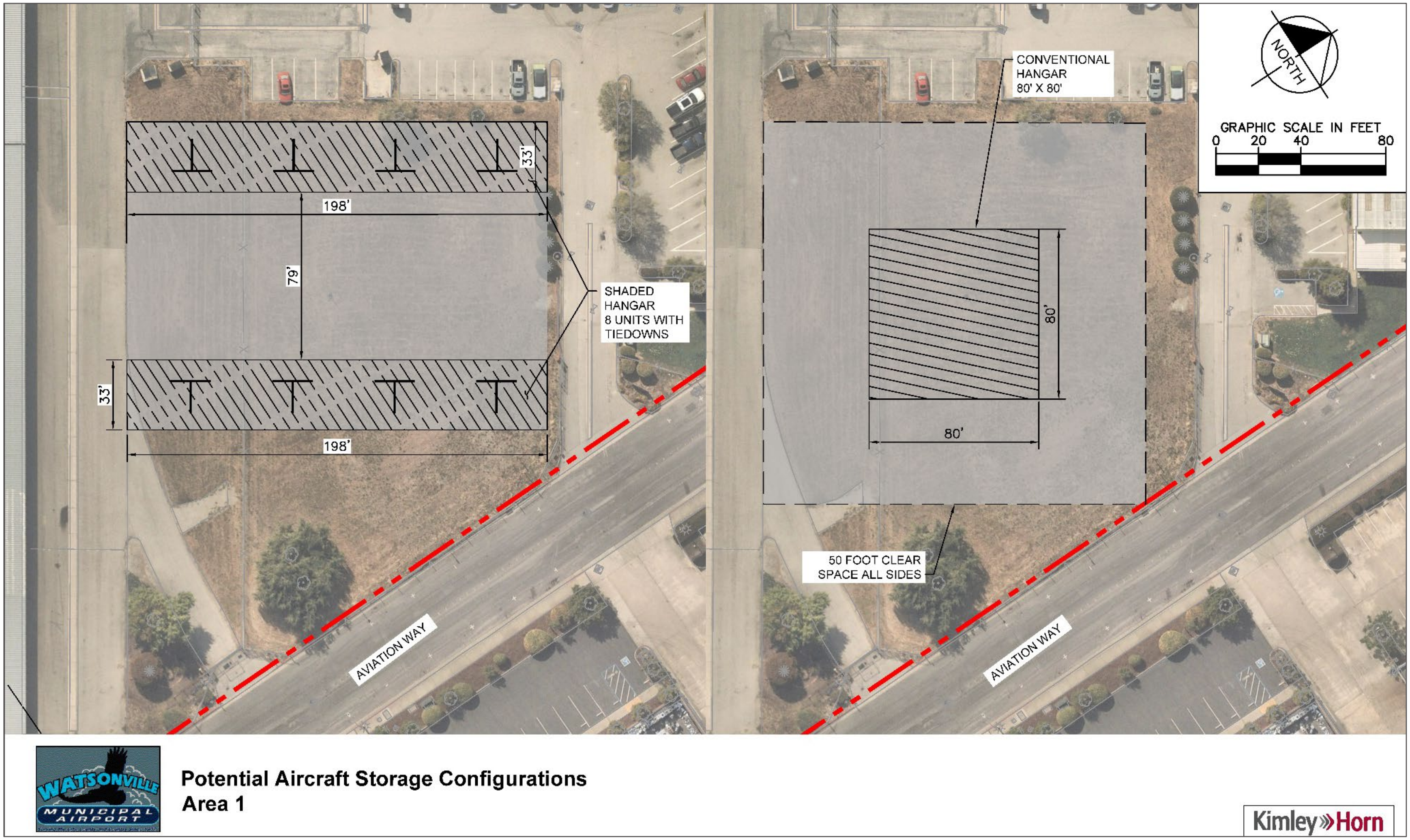


Figure 4-23: Aircraft Storage Area 2 - Potential Configuration

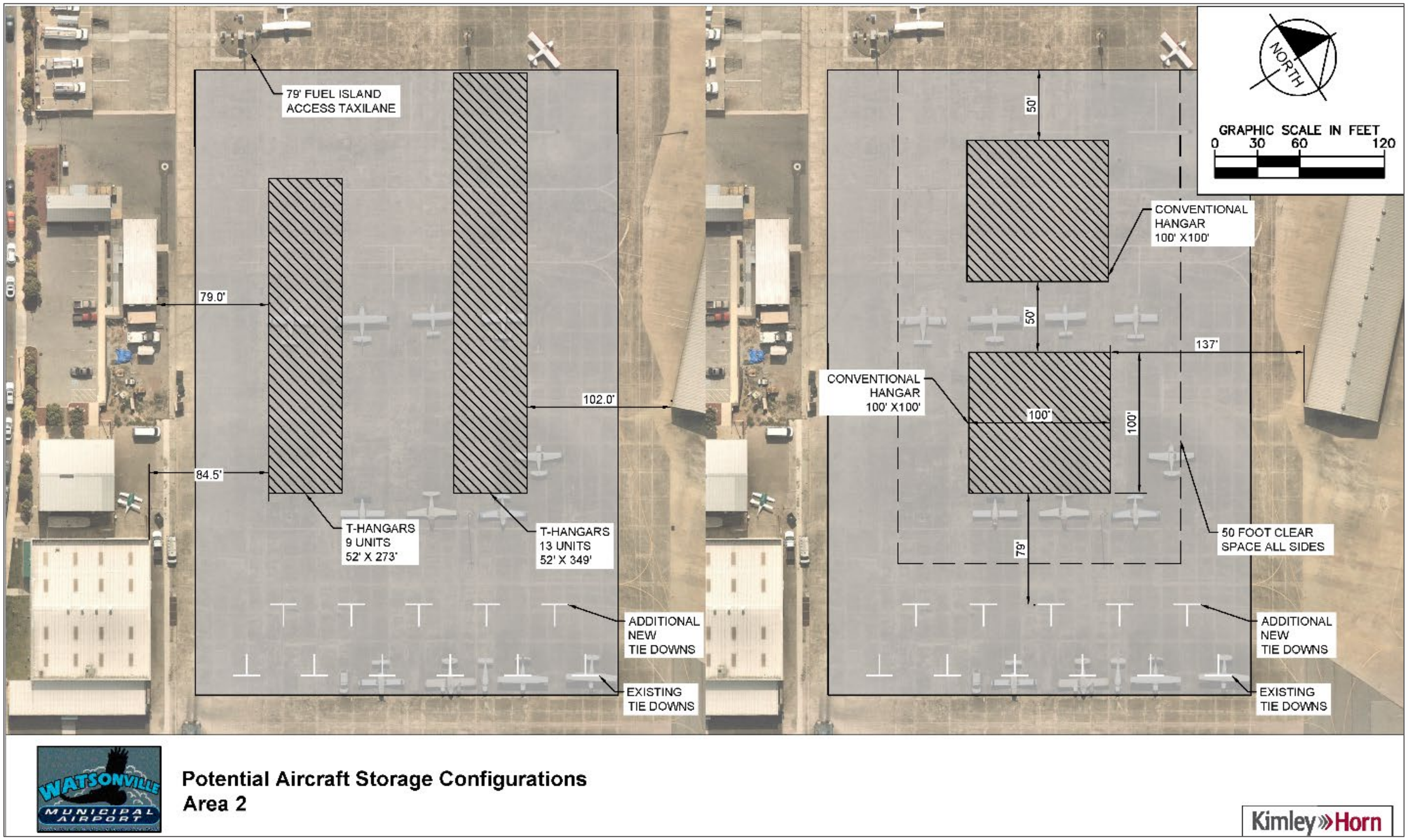
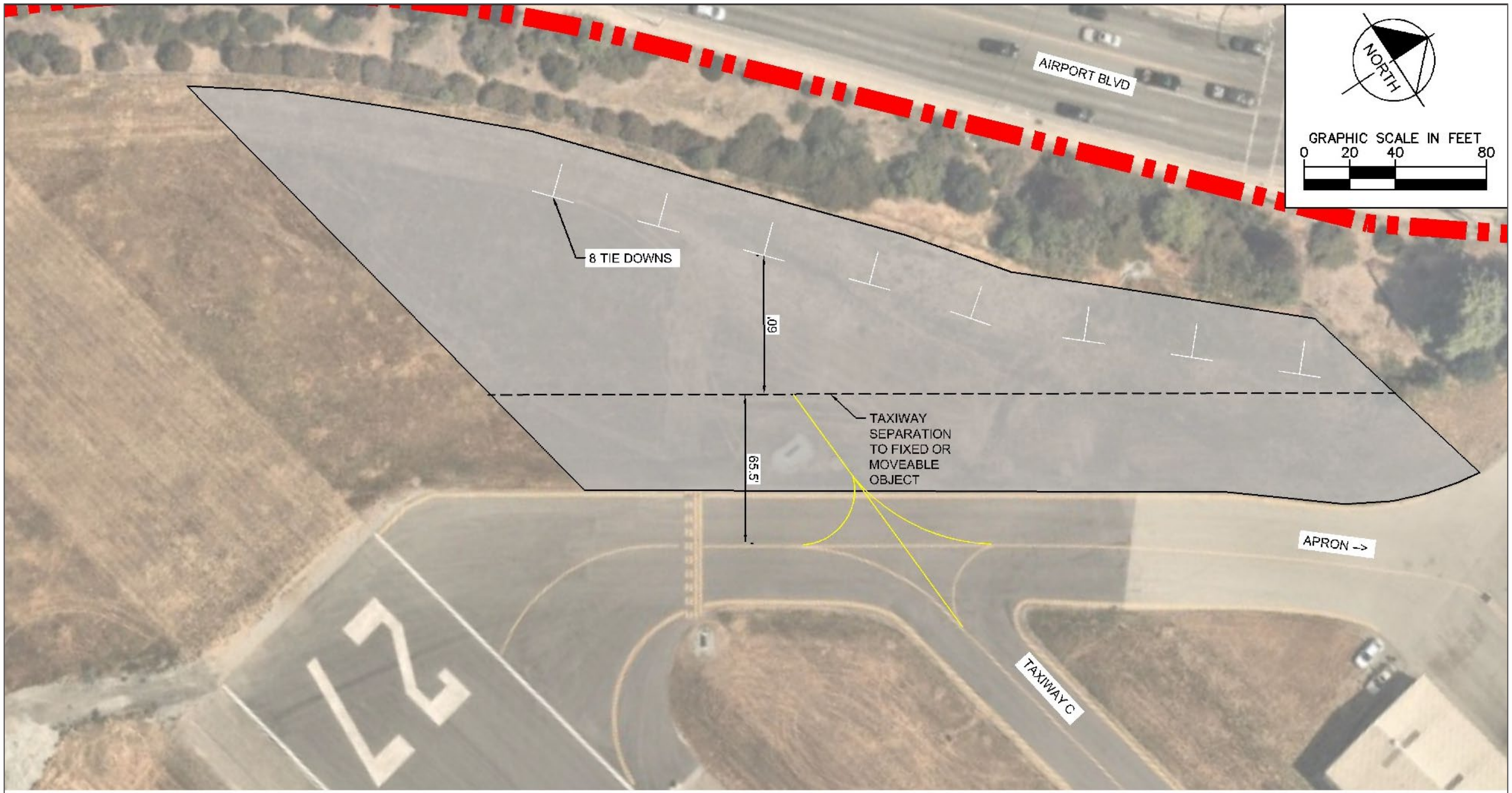


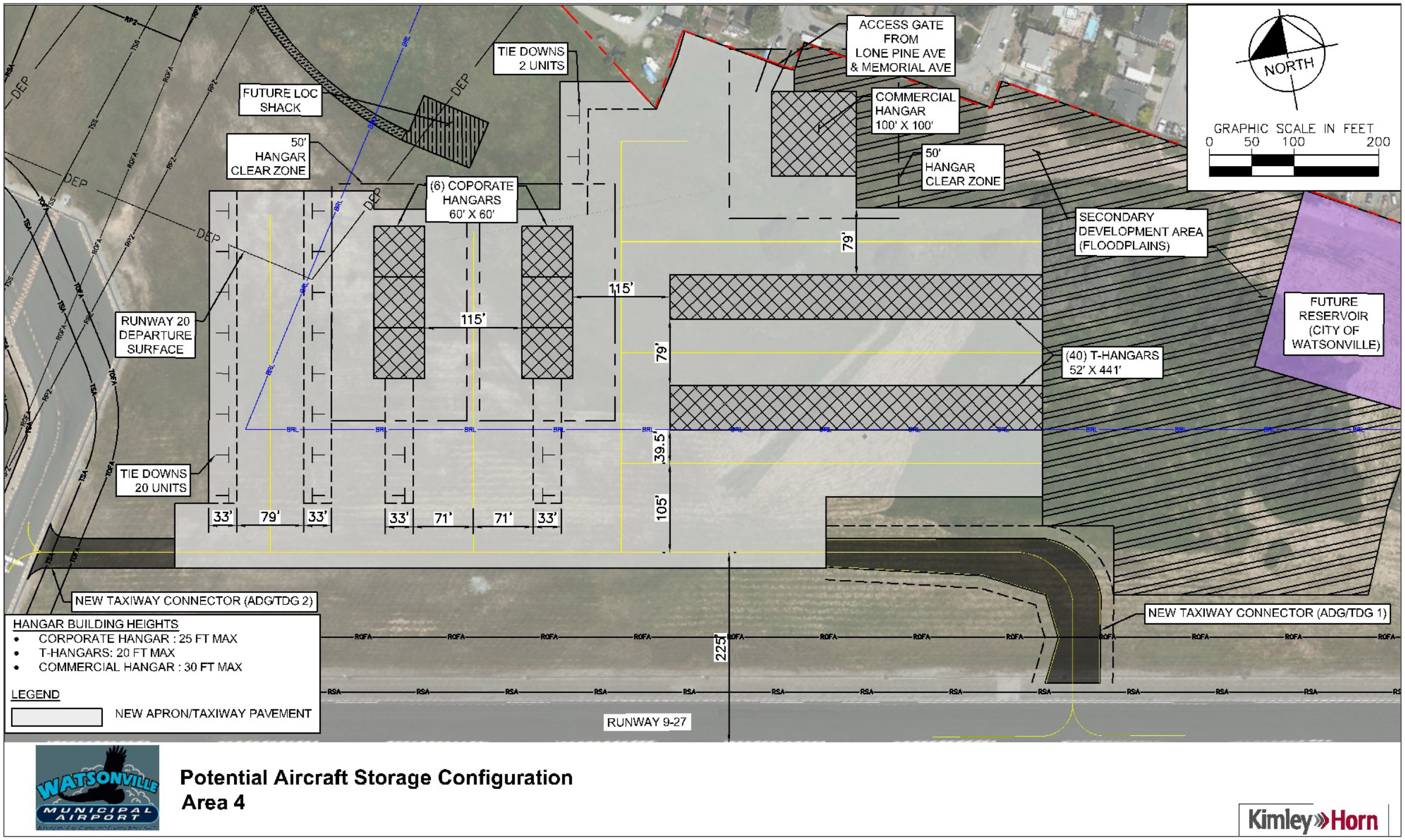
Figure 4-24: Aircraft Storage Area 3 - Potential Configuration



Potential Aircraft Storage Configurations
Area 3

Kimley»Horn

Figure 4-25: Aircraft Storage Area 4 - Potential Configuration



Areas 4 and 4-B is the largest potential development area that can be developed in the airfield's current configuration, with more than 15 acres available for a mixed development of aircraft storage facilities and other support facilities such as an aircraft fuel island and wash rack. However, development of Area 4 would face significant environmental challenges as more than half of the land has been identified as tarplant habitat. Tarplant primarily effects the undeveloped land in areas 3, 4, 5, 5-B, 6, and 9. The actual amount of developable land may be reduced if the Airport and California FWS cannot agree on a plan to allow development of known tarplant areas. In this event, Areas 3 and 4 would be infeasible as tarplant blocks access from the area to the existing airfield pavements. Areas 5, 5-B, and 6 would also need to be significantly modified to avoid all known tarplant. Areas 1 and 2, meanwhile, sit on previously-developed land and could be developed with little to no environmental impacts.

Although the land swap discussed in **Chapter 3** is currently planned to occur as an assumption of this MPU, if for any reason it does not, the area would become available for development of aircraft storage facilities. This area is noted as Area 6-B. According to the 2020 Tarplant Survey, the proposed land swap area does not contain known tarplant growth, making it a potential location for aircraft storage facilities without the environmental impacts of other areas on the airfield. However, development of this area for aircraft storage facilities would also require relocation of the PLA, which would impact the amount of available land in this area. Additionally, the ultimate condition of Runway 9-27 will impact the dimensions of the RVZ, which will also impact the amount of land available. It is recommended the Airport conduct an assessment at the time of a proposed development (if the land swap is not completed) to identify the location of tarplant and RVZ to determine if the area would be most suitable for the PLA or aircraft storage facilities. It should be noted that if Areas 6 and 6-B were both developed, another suitable location for the PLA would need to be identified. As Area 9 would replace the developed land of Runway 9-27, less of the available land is affected by tarplant habitat. Area 9 has sufficient space to accommodate a mix of storage facilities but would be limited to only aircraft tie downs or single-story structures as it sits within Caltrans Safety Zone 2 and below the Part 77 Approach Surface of the shortened Runway 9-27. Area 8 would also be limited in its flexibility due to the Part 77 Transitional Surface, which limits building height to approximately 21 feet. Area 3 can only be developed as aircraft tie downs due its small size and proximity to imaginary airspace surfaces at the runway end. Area 3 could also be developed as an open-air aircraft wash facility if the locations presented in the **Section 4.5.3** are deemed insufficient.

Area 2 would be suitable for T-hangars or conventional hangars but would require the removal of 23 tie downs from the east transient ramp. These tie downs would have to be replaced to meet demand if the tie downs are removed for RVZ compliance issues. Areas 1 and 8 could be initially developed as aircraft tie downs and then reconfigured to include T-hangars or a conventional hangar. Due to the small size, both of these spaces would not provide an adequate number of aircraft storage spots to satisfy projected demand.

Areas 4 through 7 would all require new vehicle access roads to be constructed, creating additional traffic impacts for surface streets on the north and west sides of the Airport. As the roads surrounding WVI are predominantly residential, any new access point may create adverse impacts for the local community. Areas 6 and 7 may have additional challenges due to steep terrain on the west side of Airport property. Development of Area 7 may also necessitate the demolition of the Airport firing range and the relocation of the perimeter access road. Areas 4-7 would also necessitate the development of new taxiways and utility connections to access runways and other airfield infrastructure. Conversely, areas 1-3, 8, and 9 would easily integrate into the existing network of pavement and utilities, reducing the cost and complexity of development.

Aircraft Storage Evaluation

An evaluation of the nine potential aircraft storage areas identified in the previous section is presented in **Table 4-9.** The nine areas were compared against the following four evaluation criteria:

- **Satisfy Future Demand:** Provides enough space to meet forecast storage needs

- **Environmental Considerations:** Minimizes negative impacts to the natural environment on-airport and the community
- **Flexibility:** Can be modified to suit developer needs
- **Integration:** Can be easily connected to existing roadway, utility, and airfield infrastructure

Areas 1 and 2 receive the highest overall scores as they are in previously-developed areas that can easily integrate with existing facilities. Area 9 scored third highest as it provides ample space to meet forecasted demand, however, it is only applicable if certain RVZ conditions are met. Areas 4, 5, and 6 all received similar overall scores (fourth most) as they could support a mix of facilities but have significant environmental and integrational challenges associated. Areas 3 and 8 also receive a similar overall score because of a lack of flexibility and small size. Area 7 receives the lowest overall score as it would require significant changes to existing infrastructure and access points to be developed while it does not have enough available space to meet forecast demand.

Table 4-9: Aircraft Storage Area Evaluation

Storage Area Location	Satisfy Future Demand	Environmental Considerations	Flexibility	Minimize On-airport Impacts	Total Score
Area 1	2	3	3	3	**11**
Area 2	3	3	3	2	**11**
Area 3	1	3	2	3	**9**
Area 4	3	1	3	2	**9**
Area 5	3	1	3	2	**9**
Area 6	3	2	2	2	**9**
Area 7	2	2	2	2	**8**
Area 8	1	3	2	3	**9**
Area 9*	3	2	2	3	**10**

*Location 9 is only applicable if the Runway 27 threshold is shifted 1,993 feet west

Source: Kimley-Horn

Given the results of the above evaluation, it is recommended the Airport pursue development of areas 1, 3, 4, and 8. The actual design and configuration of these areas will likely differ from those presented in **Figure 4-22** through **Figure 4-25.** Completion of these improvements will be phased to meet activity demand and may allow certain areas to be temporarily developed before reaching their ultimate configuration. The phasing and implementation plan for aircraft storage facilities in these locations are discussed in **Chapter 5.**

4.5.3 Support Facilities

Aviation support facilities help facilitate aeronautical activities and provide amenities for the continuous efficient operation of the Airport. **Chapter 3** identified the need for the development of three new types of support facilities. These include two new aboveground fuel tanks (AGTs) to replace the existing underground facilities, a new fuel truck parking area that integrates with the AGTs, and a new Airport MES building to house the Airport's Street Sweeper, tractor, mowing equipment, and maintenance vehicles. As described in the previous chapter, each of these facilities should be designed to meet size and characteristic recommendations derived from local requirements and industry best practices. The recommended sizes and configurations of the three support facilities are depicted in **Figure 4-26,** while the following subsections provide a description of the recommended attributes of each facility.

Aircraft Fuel Storage Tanks

As noted, WVI currently has adequate aviation fuel storage capacity to meet forecast demand during the planning period. The existing USTs are nearing the end of their useful life and will need to be replaced during the planning period. The FAA recommends all new fuel tanks be installed above ground for ease of construction, maintenance, and containment in the event of a fuel leak. Two 12,000-gallon AGTs would be installed to replace the USTs, each of which would measure 35 feet long by approximately 10 feet wide. ACRP Report 113 recommends AGTs be separated by 10 feet and sit in a containment area that extends five feet around beyond the AGT. With two collocated AGTs, the total dimensions of the containment pad would measure 40 feet by 45 feet. A 15-foot Hazard Clear Area would surround the pad to ensure appropriate separation between the tanks and other facilities, providing a total facility area size of 5,250 square feet (70 feet by 75 feet).

The Airport should consider several factors when developing and placing aircraft fuel storage facilities, including access to electrical and wastewater drainage utilities for self-service fueling and hazardous material containment. Fuel storage facilities must have sufficient roadway access for fueling delivery trucks, preferably without the trucks entering the aircraft operating area. The AGTs should also be located near fuel truck parking area and aircraft fueling island to minimize length for underground/aboveground fuel lines and/or minimize response times to fueling requests. The self-service fueling island should be accessible to aircraft, but the AGTs should be placed in an area that is accessible to not interfere with aircraft operating or safety areas.

Airport Fuel Truck Parking

The fuel truck parking area currently sits on top of the existing USTs and may have to be relocated when the USTs are decommissioned. The existing parking area measures approximately 90 feet wide by 40 feet deep. The area currently has curbs and wastewater drainage to ensure appropriate containment in the event of a hazardous material spill. It is recommended the parking area be fitted with similar features per federal, state, and local standards. The fuel truck parking area is recommended to be located near the fuel storage facility to allow trucks to be easily and quickly refilled. The Airport could install a separate fuel dispenser in the parking area and connect to the AGTs via underground fuel lines. Water and electric utilities could be extended to the parking area to provide nighttime lighting and allow for the area to be cleaned.

Airport Maintenance Equipment Storage (MES) Building

The Airport MES building is recommended to be 4,050 square feet according to ACRP Report 113 which is based on the overall land area occupied by the Airport. The building is recommended to have four 18-foot by 45-foot vehicle bays to hold large trucks and tractors and one 18-foot by 45-foot area to hold miscellaneous equipment and material and provide an office for Airport staff. When arranged linearly, the overall dimensions of the MES building measure 90 feet long by 45 feet wide. However, the vehicle bays, storage area and office could be configured in another fashion to fit within the available space and meet Airport needs. It is recommended the MES building be located near the Airport administrative building, fueling facilities, and major utility infrastructure to ensure rapid response to maintenance or operational requests. The MES building will need to be connected to utilities and may require climate control to store temperature-sensitive materials.

Potential Support Facility Development Areas

Three areas were identified on the terminal apron that would be suitable for the placement of the necessary support facilities. These locations are depicted in **Figure 4-27.**

Area 1 sits on the east of the GA terminal building and provides 6,192 square feet of space (86 feet by 72 feet). This would provide adequate space for any one of the three support facilities with limited changes to the area. Development of a support facility in Area 1 would likely require the parking area for airport operations vehicles to be moved, either to a different location within Area 1 or to a separate area depending on which facility is developed. Area 1 could hold the MES building or the fuel truck parking area in their proposed designs, but the fence between the terminal patio and the apron would need to be shifted approximately four feet west. Alternatively, the design of both facilities could be easily adjusted to fit into the existing available space.

Area 2 is located along Aviation Way south of the existing fuel island in the current location of the fuel truck parking. Area 2 is approximately 7,650 square feet in size, large enough to hold any of the three support facilities with little changes to the surrounding area. The area could be configured to hold both the MES building and the fuel truck parking but would likely necessitate a reconfiguration for the adjacent parking lot to allow Airport vehicles to access both sides of the facilities. Area 2 sits on top to the existing USTs. If the Airport is required to remove the USTs at the time of decommissioning, Area 2 may be temporarily unavailable for another support facility. The Airport could phase the improvements to remove the USTs prior to development of a support facility; however, if AGTs were placed in this area, there would be an overlapping period when the fuel would have to be stored in a separate temporary location.

Area 3 is the largest space available for support facilities (10,440 sq ft), but due to the irregular shape, its flexibility is limited. Area 3 would not be able to accommodate the fuel storage facility as the hazard clear area would not meet design standards. Depending on the facility type, development of Area 3 may necessitate relocation of the Airport Operation center and adjacent parking lot. The fuel truck parking area and the MES building could be placed on the west side of the existing Airport Operations Center, requiring removal of the equipment storage shed (which would be replaced by the MES building). The Airport Operations Center would need to be shifted to accommodate the support facilities without interfering with the leasehold at 60 Aviation Way.

Given the dimensions of the available areas and the location of existing facilities, it is recommended the Airport construct a fuel truck parking area in Area 1, two 12,000-gallon AGTs in Area 2, and a 4,000 square-foot MES Building on the west side of Area 3. Although this configuration is recommended, these facilities are relatively flexible and can be reconfigured during a later design study if the Airport wishes to relocate the GA terminal building, aircraft fuel island, or Airport Operations Center.

Figure 4-26: Support Facility Recommended Dimensions

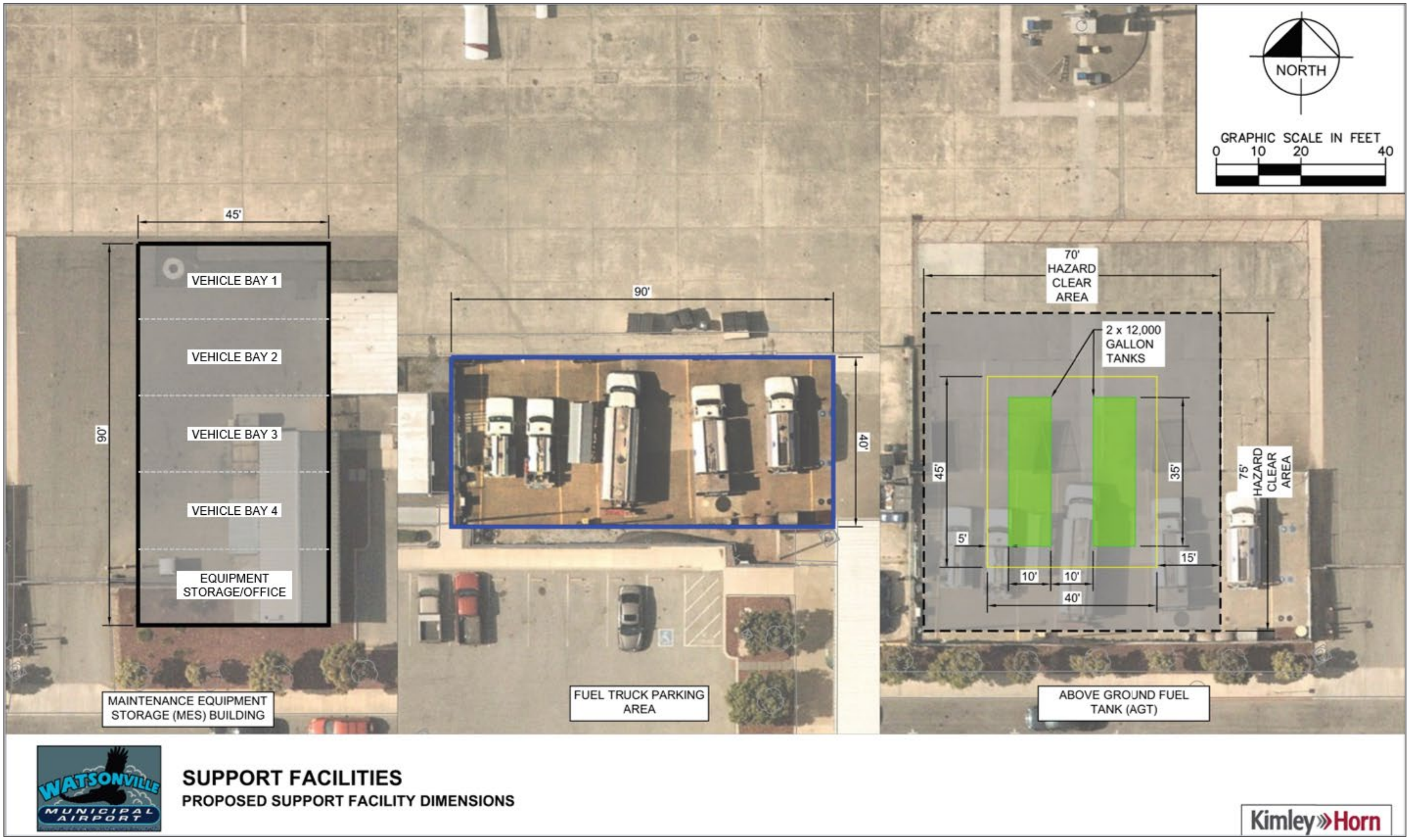


Figure 4-27: Potential Support Facility Development Areas

Aircraft Wash Facility

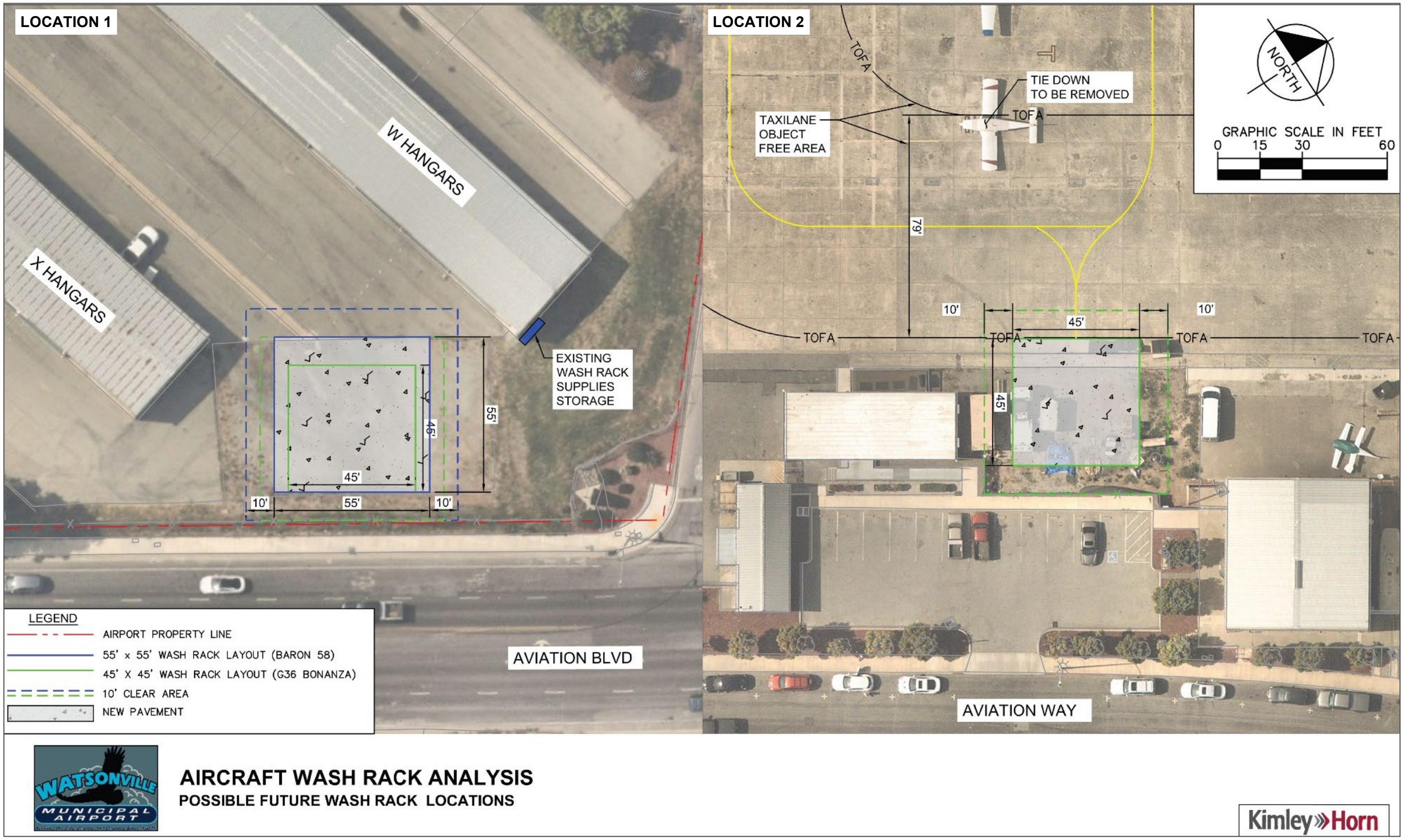
As noted in **Chapter 3,** ACRP Report 113 recommends a wash rack be built at WVI in one of the following three configurations: open-air with a valved drainage system that only opens during wash events, covered (roof with open sides), and enclosed (hangar with or without door). While a covered or enclosed facility would provide better containment of wastewater, an open-air aircraft wash facility with valved drainage meets the needs of the Airport and local environmental standards at a significantly lower cost. The recommended size of the wash rack is 70 feet by 70 feet with a 10-foot clear area on all sides to accommodate the Beechcraft King Air 350, the critical aircraft at WVI. However, Airport staff and stakeholders reported that smaller single- and multi-engine aircraft primarily use the existing unpaved wash area. As such, the wash rack may be smaller and still be able to serve the majority of aircraft that will use it. It is recommended the Airport determine the ideal size of the wash rack by surveying tenants to identify the types of aircraft that most commonly use the wash rack.

Airport stakeholders have also expressed a desire for a wash rack that aircraft can taxi into and out of without the need for aircraft tugs or towbars. This would require two entrance or exit points from the wash rack, whereas the existing unpaved facility only have one access point. A taxi-through wash rack would present additional design and operational challenges for containing wastewater as regulations require wastewater to be separated from stormwater and treated before being released. It would preclude the construction of an enclosed facility and would likely require a covered facility to be wider to ensure wingtip clearance. Furthermore, a taxi-through wash rack may be considered a taxilane, which would require the wash rack and entrance taxilanes to meet appropriate safety and obstacle clearance areas. This would require the wash rack to have a clear area width of at least 79 feet (ADG I standards).

Figure 4-28 depicts two potential locations for a paved wash rack facility designed to comply with ACRP recommendations within the existing layout of the airfield and associated infrastructure. It should be noted that during any future development or reconfiguration of an aircraft storage area the inclusion of a wash rack that allows aircraft to taxi in and out be considered. Location 1 sits in the spot currently occupied by the existing wash rack on the east side of T-hangar buildings “W” and “X”, while Location 2 would place the wash rack adjacent to the Airport operations building along the south side of the east transient apron. Location 1 is shown with a 45-foot by 45-foot wash rack (green) capable of serving small single-engine aircraft such as the Piper PA-28 Archer and a 55-foot by 55-foot wash rack (blue) able to serve larger aircraft such as the Cessna 340. There is limited space in Location 2, so it is shown with only a 45-foot by 45-foot wash rack. However, this size is still expected to be able to accommodate the majority of aircraft currently using the existing wash facility.

Both areas are able to accommodate a 45-foot by 45-foot wash rack facility with one entrance or exit taxiway. Location 1’s comparatively remote placement would lessen the potential for aircraft using the wash rack to interfere with other aircraft movements on the Airport, a trait recommended by the ACRP report. Conversely, Location 2 is situated near the fuel farm and the terminal apron, which is one of the busiest areas of the Airport. In either location, aircraft would not have the ability to taxi in and out of the area under their own power as there would not be room for aircraft to complete a turn inside the wash rack if the FAA design standards were utilized.

Figure 4-28: Potential Aircraft Wash Rack Configurations



Location 1 could utilize the existing water connection present in the area as it would replace the existing unpaved wash facility. Electricity could be extended from the W Hangar building to provide power for washers and vacuums. If the wash rack is built as an open facility with a valved drainage system, drainpipes could be connected from the wash rack to the stormwater drain lines along Airport Boulevard. Wastewater drainage could be connected from an open air, covered, or enclosed wash facility to existing sewer lines running under Aviation Way. However, the distance between Location 1 and other Airport facilities would require the Airport to implement a secondary stormwater collection point to meet state environmental requirements.

Location 2 sits above a sewer line and adjacent to water and electrical utilities, allowing appropriate utilities to be connected to a wash rack with minimal complexity. Additionally, Location 2's proximity to the existing Airport operations center would enable Airport staff to quickly access the wash rack if maintenance or service is needed for the facility. Location 2 is also close enough to the fuel farm that a secondary stormwater collection point would not be necessary. Construction of a wash rack in Location 2 would necessitate the addition of a taxilane to guide aircraft to and from the apron. As shown, the taxilane would require the removal of a tiedown on the east transient ramp to maintain taxilane object free area standards for ADG I aircraft. Location 2 also sits in the space proposed for Airport support facilities in the previous section of this analysis. As discussed, proposed support facility Area 3 overlaps with wash rack Location 2, and it is recommended the Airport construct the fuel truck parking facility in this area. If a wash rack was constructed in Location 2, the Airport would need to relocate the proposed fuel truck parking area to a different location at the Airport, which may be undesirable for Airport staff accessing the Airport Operations Center and the trucks to fuel aircraft.

Given the minimal impacts that construction of a wash rack in Location 1 would have on other existing and proposed Airport facilities compared to Location 2, it is recommended the Airport pursue construction of a paved, open-air wash rack with valved drainage and appropriate utilities in Location 1. It is important to note that the locations presented above could provide a temporary location for the wash rack until another suitable facility is developed. As mentioned in **Section 4.5.2,** some of the potential aircraft storage development areas are flexible in their configuration and could include an aircraft wash rack. It is recommended the Airport investigate the benefits of constructing a replacement or supplementary wash rack facility when it completes the design of future aircraft storage facilities.

4.6 Recommended Development Plan

The various preferred alternatives described in previous sections of this chapter were combined with the facility improvements that did not require in-depth analysis and the pavement rehabilitation and reconstruction projects from the Airport's 2021 pavement management and maintenance plan (PMMP)[16] into a Recommended Development Plan (RDP), shown in and listed in **Table 4-10**. Through the evaluation process, each preferred alternative was reviewed relative to how the alternative interacted with all other alternatives. This analysis resulted in minor tweaks to individual improvements to ensure that all standards were still met while confirming the selection of one preferred alternative did not create unintended consequences for another.

The RDP represents ultimate conditions of WVI for the 20-year planning period and beyond, which are also depicted on the ALP. As previously noted, the RDP is intended to identify solutions for the facility requirements outlined in **Chapter 3** to ensure that the Airport remains consistent with FAA guidelines and standards and achieves the short- and long-term goals of WVI. The need for long-term flexibility to be able to react to changing guidance and financial constraints was kept at the forefront as

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[16] It should be noted that project quantities and costs identified in the PMMP have been re-evaluated and updated as some of those projects are impacted by recommended improvements presented in this Master Plan Update.

the individual projects of the RDP were combined. The RDP also includes a number of improvements that are currently in progress (design or construction) and are scheduled to be completed in the next 12 to 24 months. These improvements are marked in **Table 4-10** with an asterisk.

A phased implementation plan for these improvements as well as cost estimates and potential funding sources are presented in **Chapter 5**. The RDP cannot and does not need to be implemented immediately, rather, improvements should be staggered over the short-, medium-, and long-term planning periods. This can be seen through the changes of the taxiways, where the change of the existing runway entrance taxiway angle and relocation of the direct access taxiways would be recommended as part of the next pavement rehabilitation project (short term), but those specific taxiway connectors may ultimately be removed and replaced with another connector as part of a future runway extension (long term). It will be important for WVI to discuss the latest FAA guidance as implementation planning is initiated for each project to confirm the recommendations made in this MPU are applicable at the time of implementation.

In addition to the individual projects listed in **Table 4-10,** there are several items the Airport should continue to investigate the feasibility of through coordination with the FAA as new technologies emerge and guidance changes. Many of these are discussed further in **Section 4.3** and includes such things as:

- Coordinate with Airport Stakeholders and FAA FSDO to conduct a safety assessment to determine feasibility of a turf landing area in the unpaved portion of the RSA
- Investigate feasibility and FAA eligibility of MALSF system for Runway 2
- Develop strategy for engaging in national policy discussion on FAA eligibility of non-primary runways
- Continue to coordinate with FAA regarding maintenance of the on-airport localizer and existing APV, VOR, and LOC approach procedures
- Continue to coordinate with FAA to investigate feasibility of GPS-based IAP to Runway 20 as technologies improve
- Continue to follow guidance in the Wildlife Hazard Management Plan to manage and monitor wildlife in the vicinity
- Improve ground handling services for jet aircraft (e.g., lavatory cart, catering cart, GPU)
- Coordinate with Airport users and tenants to mitigate excess dumping of non-aviation solid waste
- Conduct Airport rates and charges analysis for aeronautical and non-aeronautical land parcels and uses
- Extend Airport utilities as needed for future development
- Coordinate with USFWS and CDFW to designate critical tarplant habitat area

Table 4-10: Individual Projects of the Recommended Development Plan

Number	Individual Projects of the Recommended Development Plan
Runways	
1	Extend Runway 2-20 by 680 feet to achieve full length of 5,181 feet*
2	Acquire fee-simple property or avigation and land use easement for RPZs to Runway 2-20 and Runway 9-27
3	Relocate Runway 27 threshold 870 feet to the west to meet Runway Visibility Zone (RVZ) standards
3A	Extend Runway 9-27 255 feet west
Taxiways	
4	Reconfigure Fence line along Taxiway A to meet ADG-II taxiway separation to fixed or moveable object standards
5	Widen existing paved shoulders on Taxiway C to meet ADG-II design standards if continuing to provide paved shoulders
6	Reconfigure Taxiways A and C to address non-standard runway intersection angles and acute-angle runway entrance taxiways
7	Reconfigure Taxiway A to modify wide expanse of pavement at Runway 20 entrance
8	Reconfigure Taxiways B, C, and D to eliminate taxiways with direct access from apron to runways
9	Reconfigure apron and hangar area taxilanes to meet TDG-2 and ADG-II design and separation standards
10	Reconfigure apron for Specialized Helicopters**
11	Install traffic pattern indicators around segmented circle**
12	Update designations of Taxiways B, D, and E; and runway entrance Taxiways A and C
25	Construction new taxilane to existing hangar development
Parachute Landing Area (PLA)	
13	Continue to coordinate with Nordic Naturals on land swap agreement**
14	Coordinate relocation of PLA while maintaining USPA standards**
Airspace	
15	Remove on-airport FAR Part 77 obstacles and coordinate with adjacent property owners to remove or mitigate obstacles to the approach and transitional surfaces
16	Coordinate with adjacent property owners to remove obstacles from the Runway 20 Threshold Siting Surface (TSS) in order to remove 590-foot displaced threshold
General Aviation Facilities	
17	Expand GA Terminal Building to meet Airport and users' needs
18	Develop hangars as demand arises and financial conditions allow

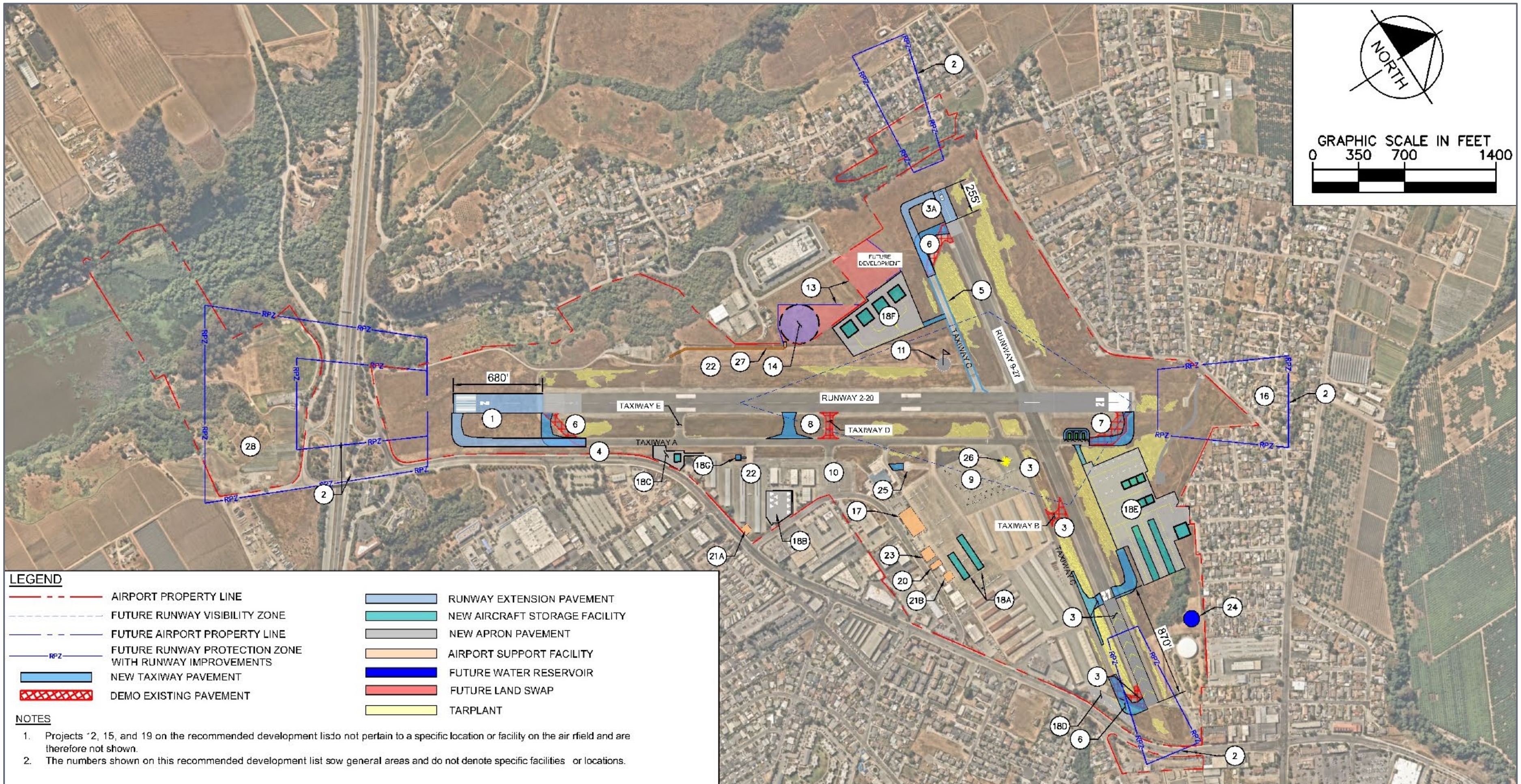
Number	Individual Projects of the Recommended Development Plan
Security	
19	Enhance restricted access gates**
Support Facilities	
20	Construct Maintenance Equipment Storage (MES) building based on guidance from ACRP Report 113
21	Construct aircraft wash rack based on guidance from ACRP Report 113
22	Improve airfield drainage based on findings of 2010 WVI Drainage and Utilities Master Plan
23	Install aboveground fuel facilities to replace underground tanks
24	Install aboveground water reservoir**
26	Relocate Compass Rose*
27	Vehicle Service Road (VSR) Extension
28	Future Tarplant Outplanting Location

** Improvement recommended to be completed outside 20-year planning period*

*** Improvement currently in progress and scheduled to be completed within 12-24 months; as of date of publication project may have been completed*

Source: Kimley-Horn

Figure 4-29: Recommended Development Plan



Recommended Development Plan

OCTOBER 2022

Kimley»Horn

5 Implementation Plan

The purpose of this chapter is to outline the project phasing and sources of funding for the Recommended Development Plan (RDP) presented in **Chapter 4**. The RDP represents ultimate conditions of WVI for the 20-year planning period and beyond. The RDP is intended to identify solutions for the facility requirements outlined in **Chapter 3** to ensure that the Airport remains consistent with the FAA guidelines and standards and achieve the short- and long-term goals of WVI. The need for long-term flexibility to be able to react to changing guidance and financial constraints was kept at the forefront as the RDP was developed. It should be noted that the Master Plan Update (MPU) effort began in 2020, with the Recommended Development Plan finalized in 2022, and the MPU published in 2023.

5.1 Introduction

All airports receiving federal Airport Improvement Program (AIP) funding are required to maintain a current Airport Capital Improvement Plan (ACIP) with the FAA. The ACIP identifies specific projects intended to be undertaken at an airport over a specified period of time – typically a 10-year horizon. This plan further estimates the order of implementation as well as total project costs and anticipated funding sources. The actual timing or phasing of specific projects, or project elements, will likely change in response to tenant/user demands, unforeseen business opportunities, changes in the regulatory environment and availability of federal, state, and local funds. Actual project costs may also vary from initial ACIP estimates as project designs progress and detailed engineering estimates are developed. For these reasons, airport sponsors coordinate updated five-year ACIPs with the FAA on an annual basis.

In developing the ACIP, care must also be taken to provide adequate lead-time for detailed planning, permitting, and construction to ensure that the proposed facilities are operational when warranted by the user demands. It is also important to minimize any disruptive scheduling where a portion of one facility may become inoperative due to construction of another, and to prevent extra costs resulting from improper project scheduling.

5.1.1 Sources of Funding

Potential funding sources for any proposed improvements at WVI primarily come in the form of federal and state grants, City funds and Airport revenue, and third-party investment. The amount of funding available from these sources will depend primarily on future levels of aviation activity at WVI and future federal and state funding reauthorizations. The following is a brief description of these sources.

Federal Programs

Airport Improvement Program (AIP)

AIP grants, administered by the FAA, are a critical capital funding source to implement the projects recommended in this MPU. Although the future status of the AIP is somewhat uncertain, for the purpose of this MPU, it is assumed that the AIP will continue to be authorized and appropriated at levels consistent with H.R. 302, the FAA Reauthorization Act of 2018.

As a public-use, general aviation airport in the FAA's National Plan of Integrated Airport Systems (NPIAS), WVI is eligible to receive AIP funding in the form of Non-Primary Entitlements (NPE) and Discretionary Grants. NPE are currently allocated to eligible airports at $150,000 per year. These can be accumulated, or saved, for up to three years in order to support a larger overall project.

WVI is also eligible to receive Discretionary AIP Grants based on a competitive priority rating system with most other airports in the NPIAS, with safety related projects receiving the highest priority. The FAA allocates certain discretionary funding to specific airport types and set-aside categories such as noise, reliever airports, military airport program and projects relating to capacity, safety, security, and noise. However, the FAA has some discretion in funding specific projects within these discretionary funding set-aside categories. The FAA approves discretionary funds for use on specific projects, after consideration of project priority and other selection criteria.

Under the current AIP formula, the Airport is able to receive up to 90 percent funding for AIP-eligible projects. AIP funds can be used for most Airport improvement needs, but not operating costs, and typically not for revenue-generating projects. Since 2006, WVI has received approximately $4.11 million in AIP funds for projects such as runway and taxiway improvements and planning studies. To be conservative and ensure the airport sponsor is prepared for future development costs, the following ACIP assumes an entitlement of $150,000 annually throughout the planning horizon.

Bipartisan Infrastructure Law (BIL)

The Bipartisan Infrastructure Law (BIL), signed into law on November 15, 2021, aims to modernize infrastructure through investment in a sustainable and equitable transportation system. The BIL allocated $25 billion in funds to be invested in the national air transportation system over the course of five years. Fifteen billion dollar of funds will be distributed to airports for infrastructure projects to improve airport safety and capacity ($3 billion per year) while $5 billion will be allocated for replacing outdated air traffic facilities (NAVAIDS) and the remaining $5 billion will be used to replace or improve aging airport terminals and control towers. The $15 billion Airport Infrastructure Program will be dispersed to all classified airports in the NPIAS. Of this, $500 million will be distributed annually to non-primary NPIAS airports such as WVI through Airport Infrastructure Grants with formula allocations (AIG Allocated) based on each airport's NPIAS Role (National, Regional, Local, Basic). [1]

Similar to AIP grants, the Airport can use AIG Allocated funds to cover up to 90 percent of eligible project costs. AIG Allocated funds can be used for most airport improvement projects under the same guidelines as AIP grants. As a Regional NPIAS airport, WVI is eligible to receive $295,000 in AIG Allocated funding annually starting in Fiscal Year (FY) 2022. AIG funding is expected to extend through FY 2026 and remain the same each year unless WVI's role is reclassified in a future version of the NPIAS. As such, the following ACIP assumes $295,000 annually throughout the first five years.

State Programs

California Department of Transportation's (Caltrans) mission in aviation is to foster and promote the development of a safe, efficient, dependable, and environmentally compatible air transportation system. As such, they provide funding through grants and loans as funds are available. The State funding programs are supported by the Aeronautics Account in the State Transportation Fund which is financed through taxes on fuel.

Annual Credit

Caltrans provides up to $10,000 annually for each eligible airport. Per Public Utilities Code (21682-21683.2), the Annual Credit is the first priority for distributing available funds. As a GA airport, WVI is eligible for and utilizes this annual credit.

State Matching Grant

Caltrans provides matching grants up to five percent of the FAA share of the project cost on a first come, first serve basis to the FAA AIP grants. Grant applications may be submitted once the FAA Grant Offer Letter has been received by the City. As a GA airport, WVI is eligible for this matching this grant.

Acquisition & Development (A&D) Grants

A&D Grants provide up to 90 percent for eligible safety, capacity, and security construction projects from $20,000 to $500,000. Airport Land Use Compatibility Plans (ALUCP) may also be funded through A&D grants. WVI would be eligible for this program. As this program is funded after state operations, annual credits, and AIP matching grants have been funded, it has not been considered

[1] The BIL Airport Infrastructure Program will also distribute $20 million to airports annually through a competitive Notice of Funding Opportunity process (AIG Competitive). However, AIG Competitive funds are only available to airports participating the Federal Contract Tower Program. As such, WVI is not eligible to receive AIG Competitive funds.

as a funding source in this ACIP. WVI may apply for inclusion for specific projects to assist with funding projects ahead of FAA funding or for projects that may not be eligible for FAA AIP funding.

California Airport Loan Program

Caltrans provides discretionary loans to eligible airports for construction and land acquisition projects that benefit an airport and/or improve its self-sufficiency. Projects may be a revenue-producing project. The amount of the loan will depend on the funds available and are required to be paid back within 17 years. The interest rate would be the same as State general obligation bonds.

Local City and Airport Funds

The Airport generates revenue primarily through ground and facility leases and fuel flowage fees as outlined in **Section 5.3**. While such revenues are used to cover operating and maintenance expenses, any surplus revenues can be applied directly to the ACIP. The Airport strives to be financially self-sufficient and is operated through an enterprise fund. While the historical political climate makes it unlikely, the City is able to also support Airport expenses with allocations from its General Fund as needed.

Bonds are another financial mechanism commonly used by municipalities to finance long-term capital projects. There are three main type of airports-related bonds:

- General Obligation (GO) – Backed by the creditworthiness and taxing power of the sponsor that usually require voter approval. GO bonds typically have lower interest rates due to their high level of security.
- General Airport Revenue Bonds (GARB) – These are typically used at larger or commercial service airports that have high activity levels and multiple revenue streams. The bond is based on the sponsor's revenues to repay the debt. GARBs are popular choices when revenue is available as they do not place debt on the taxpayers or affect the bonding capacity of the sponsor. Interest rates may be higher than GO bonds due to their higher risk.
- Special Facility Revenue Bonds (SFB) – Customarily issued for construction of a facility and backed by the future revenue generated at the facility. SFBs are useful in developing special use or revenue producing facilities that are typically not eligible for federal funding.

Third Party Investment

Many airports use private third-party investment when the planned improvements will be primarily used by a private business or other organization as such projects are not ordinarily eligible for or compete well for federal funding. Projects of this kind typically include hangars, fixed-based operator facilities, GA terminals, fuel storage, exclusive-use aircraft parking aprons, industrial aviation-use facilities, non-aviation office/commercial/industrial developments and other similar projects. Private development proposals or improvements made for specific tenants for WVI would be considered on a case-by-case basis. Often, airport funds for enabling infrastructure, preliminary site work and site access are required to facilitate private development projects on airport property. Even if the project is not funded by the FAA, the development must be in accordance with the approved Airport Layout Plan (ALP) and be consistent with FAA airport design and airspace protection criteria.

5.1.2 Proposed Airport Capital Improvement Plan (ACIP)

For WVI, the 20-year Master Plan ACIP includes projects resulting from the Recommended Development Plan (RDP) presented in **Chapter 4**. **Table 5-1** presents those projects in three time periods, short- (0 to 5 years), mid- (6 to 11 years), and long-term (12 to 20 years) with their anticipated funding sources. When appropriate, projects may be combined or shifted between years to maximize resources and minimize airfield disruptions.

The funding distribution assumes the maximum FAA and State participation which would be considered a "best case" funding scenario. This includes the eligibility of modifications made to Runway 09-27 as a solution to the non-standard RVZ. The cost estimates are in 2021 dollars and include contingencies and construction management costs as applicable. The ACIP does not include all expenditures the Airport may incur on other projects, routine maintenance and repair, or daily operating expenses.

As shown in **Table 5-1**, out of the 20-year, $163.9 million budget, approximately $107.0 million could be funded by the AIP and $6.3 million by State Grants. The remaining $50.5 million balance of needed funds would be provided by the Airport. Of this, $29.0 million would be directly funded by the Airport while $21.5 million would be initially provided by the California Local Airport Loan Program and repaid by the Airport. It should be noted that projects 10, 11, 13, 14, and 24 are not included in the overall project costs in the ACIP below as they are already in progress or will be completed by a third party rather than the Airport. Additionally, there are a number of recommendations discussed in **Section 4.6** related to policy rather than airport development which have been omitted from the ACIP as they have no associated cost.

The details of the Airport's 5-year ACIP including funding sources and the anticipated starting year for each project are presented in **Table 5-2**. While a 20-year ACIP identifies anticipated needs throughout the planning horizon, projects identified within a 5-year timeframe typically reflect more immediate airport needs or facilities where potential funding has already been secured. Approximately $3.2 million of capital projects are estimated to be completed within the short-term planning period. Of this, approximately $2.9 million is expected to be eligible for federal funding. The 5-year ACIP is anticipated to require $209,356 from the Airport, or the local share, beyond costs for routine maintenance and operating expenses of WVI.

When the Airport implements the ACIP it is important to review the individual projects for which of them could be completed or grouped as a single project. This is especially important when looking at eligibility and AIP funding obligations. A prime example of this is Taxiway A, which has five individual recommendations (#4, 6, 7, 8, and 12). Each of these projects could be completed separately, but ideally would be completed as a single project. The projects could be designed as a single project and depending on the overall cost and anticipated funding, the project would be phased into appropriate bid packages. General Aviation airports regularly design projects with a base bid that includes the primary components of the projects and several additive alternatives that would be completed if enough funding was received. Alternatively, the project could be designed to be constructed in multiple phases in separate years. For the case of Taxiway A signage (#12), the MPU recommends upgrading the individual connector taxiway designations to A1, A2, and A3. If the entire grouping of projects could not be completed as one construction project, then it would be recommended that the signage be completed for all three connectors with the initial phase. If the new signs needed to be relocated in a future phase as part of the taxiway reconfiguration, the stipulation that the new signage be salvaged and reinstalled in the new location can be placed into the construction documents in order to maximize funds and maintain compliance with AIP funding obligations.

It should also be noted that while projects in the proposed ACIP are programmed in the short-, medium, and long-term periods, some projects will likely be programmed when sufficient activity levels are achieved. Specifically, aircraft storage facility projects (Project 18 A-E) scheduled in the medium- and long-term periods may shift forward or backward in the ACIP depending on the actual and forecasted level of activity (based aircraft) near the time the projects are planned to be completed. The years listed in **Tables 5-1 and 5-2** are the fiscal years that the project is anticipated to be funded in, whether by the FAA, State, or Local, and the actual project may be completed within the subsequent calendar years.

Table 5-1: 20-year Airport Capital Improvement Plan (ACIP)

Term	Fiscal Year	Project Number	Project Description	Estimated Total Project Cost	FAA Grant	State Grant	State Loan	Airport Share
Short Term (Years 0-5)	2023	ACIP[1]	Zero Emission Vehicle and Infrastructure Pilot Program	$100,000	$90,000	$0	$0	$10,000
	2023	ACIP (19)	Upgrade Airport Vehicles and Pedestrian Security Gates	$495,000	$445,500	$0	$0	$49,500
	2024	3	Environmental - Relocate Runway 27 Threshold and reconfigure Apron markings and Taxiway B & C to meet Runway Visibility Zone (RVZ) standards (assumes NEPA EA)	$320,000	$288,000	$14,400	$0	$17,600
	2024	18B	Design South Tie downs	$110,000	$99,000	$4,950	$0	$6,050
	2025	18B	Construction South Side Tie downs	$860,000	$774,000	$38,700	$0	$47,300
	2026	3	Design - Relocate Runway 27 Threshold and reconfigure Apron markings and Taxiway B & C to meet Runway Visibility Zone (RVZ) standards	$110,000	$99,000	$0	$0	$11,000
	2026	22	Design - Rehabilitate Drainage Serving Existing East G.A. Apron and Hangars	$150,000	$135,000	$6,750	$0	$8,250
	2026	9	Design - Rehabilitate Apron A7 Pavements	$200,000	$180,000	$9,000	$0	$11,000
	2027	3	Construction - Relocate Runway 27 Threshold and reconfigure Apron markings and Taxiway B & C to meet Runway Visibility Zone (RVZ) standards	$884,650	$796,185	$39,809	$0	$48,656
			Total Short Term	***$3,229,650***	***$2,906,685***	***$113,609***	***$0***	***$209,356***
Mid Term (Years 6-11)		9	Construction - Rehabilitate Permanent Tie Down Apron (Area A7)	$2,320,500	$2,088,450	$104,423	$0	$127,628
		9/22	CATEX/Permitting - Apron A7 Pavements Rehabilitation and East G.A. Apron and Hangars Drainage	$150,000	$135,000	$6,750	$0	$8,250

Term	Fiscal Year	Project Number	Project Description	Estimated Total Project Cost	FAA Grant	State Grant	State Loan	Airport Share
Mid Term (Years 6-11)		22	Construction - East G.A.T-Hangar Drainage	$1,995,413	$1,795,872	$89,794	$0	$109,748
		PMMP[2]	Reconstruct Corporate Hangar Taxilane	$1,055,280	$105,528	$474,876	$0	$474,876
		23	Install above ground fuel facilities to replace underground tanks	$1,227,150	$0	$0	$613,575	$613,575
		21A	Construct aircraft wash rack in Location 1	$338,147	$0	$0	$169,074	$169,074
		16	Remove obstacles from the Runway 20 Threshold Siting Surface (TSS) in order to remove 590-foot displaced threshold	$4,278,000	$3,850,200	$192,510	$0	$235,290
		PMMP	Reconstruct Taxiway C (East)	$1,581,800	$1,423,620	$71,181	$0	$86,999
		18A	Design/Construct East T-hangars in Area 2	$1,503,285	$0	$0	$751,643	$751,643
		21B	Construct aircraft wash rack in Location 2	$338,147	$304,333	$15,217	$0	$18,598
		PMMP	Design/Reconstruct South T-hangar Taxilane	$1,940,000	$776,000	$582,000	$0	$582,000
		4	Reconfigure Fenceline along Taxiway A to meet ADG-II taxiway separation to fixed or moveable object standards	$469,400	$422,460	$21,123	$0	$25,817
		7	Reconfigure Taxiway A to modify wide expanse of pavement at Runway 20 entrance	$1,553,000	$1,397,700	$69,885	$0	$85,415
		6	Reconfigure Taxiways A & C to address non-standard runway intersection angles and runway entrance taxiways	$3,281,600	$2,953,440	$147,672	$0	$180,488
		5	Widen existing paved shoulders on Taxiway C to meet ADG-II design standards	$714,500	$643,050	$32,153	$0	$39,298

Term	Fiscal Year	Project Number	Project Description	Estimated Total Project Cost	FAA Grant	State Grant	State Loan	Airport Share
Mid Term		20	Construct Maintenance Equipment Storage (MES) building based on guidance from ACRP Report 113	$1,985,000	$0	$0	$992,500	$992,500
		15	Evaluate and design FAR Part 77 obstruction removal[3]	$50,000	$45,000	$2,250	$0	$2,750
			Total Medium Term	***$24,781,223***	***$15,940,652***	***$1,809,832***	***$2,526,791***	***$4,503,947***
Long Term (Year 12+)		8	Reconfigure Taxiway D to eliminate taxiways with direct access from apron to runways	$856,400	$770,760	$38,538	$0	$47,102
		12	Update designations of Taxiways B, D, and E and runway entrance Taxiways A and C	$134,000	$120,600	$6,030	$0	$7,370
		22	Area D & G Drainage	$2,049,500	$1,844,550	$92,228	$0	$112,723
		18C	Develop hangars Storage Area 8	$1,891,500	$0	$0	$945,750	$945,750
		17	Expand GA Terminal Building to meet Airport and users' needs	$4,894,000	$4,404,600	$220,230	$0	$269,170
		15	Remove on-airport FAR Part 77 obstacles	$8,067,500	$7,260,750	$363,038	$0	$443,712
		2	Acquire fee-simple property or avigation and land use easement for RPZs to Runway 2-20 and Runway 9-27	$74,558,534[4]	$67,102,681	$3,355,134	$0	$4,100,719
		18D	Develop hangars in Storage Area 3	$1,569,000	$0	$0	$784,500	$784,500
		18E	Develop hangars in Storage Area 4	$34,427,000	$0	$0	$17,213,500	$17,213,500
		1	Extend Runway 2-20 by 680' to achieve full length of 5,181'	$5,539,000	$4,985,100	$249,255	$0	$304,645
		3A	Extend Runway 9-27 by 255 feet	$1,891,500	$1,702,350	$85,118	$0	$104,033
			Total Long Term	***$135,877,934***	***$88,191,391***	***$4,409,570***	***$18,943,750***	***$24,333,224***
			Total 20-year Program	**$163,888,807**	**$107,038,728**	**$6,333,011**	**$21,470,541**	**$29,046,527**

Term	Fiscal Year	Project Number	Project Description	Estimated Total Project Cost	FAA Grant	State Grant	State Loan	Airport Share

[1] ACIP: Project included in 2022 version of Airport Capital Improvement Program and is not reevaluated as a part of AMPU

[2] PMMP: Project included in 2022 Pavement Maintenance / Management Plan. Project quantities and costs identified in the PMMP have been re-evaluated and updated as some of those projects are impacted by recommended improvements presented in this Master Plan Update.

[3] An in-depth evaluation of Part 77 obstructions will be completed as the first phase of Project 15, which recommends the removal of on-airport obstructions

[4] Costs assume fee-simple acquisition of all non-airport property in RPZs. Actual costs may be lower if avigation easements can be established.

Note: Totals may not sum due to rounding

Sources: Kimley-Horn, 2022 Pavement Maintenance / Management Plan

Table 5-2: Detailed 5-Year (Short-term) ACIP

Project Number	Project Description	Estimated Project Cost	FAA Grant			State Grant	Airport Share
			AIP Entitlement	AIP Discretionary	AIG Allocated		
2023							
ACIP[1]	Zero Emission Vehicle and Infrastructure Pilot Program	$100,000	$0	$0	$90,000	$0	$10,000
ACIP (!9)	Upgrade Airport Vehicles and Pedestrian Security Gates	$495,000	$0	$0	$445,500	$0	$49,500
	Total 2023	***$595,000***	***$0***	***$0***	***$535,500***	***$0***	***$59,500***
2024							
3	Environmental - Relocate Runway 27 Threshold and reconfigure Apron markings and Taxiway B & C to meet Runway Visibility Zone (RVZ) standards (assumes NEPA EA)	$320,000	$288,000	$0	$0	$14,400	$17,600
18B	Design South Tie-downs	$110,000	$0	$99,000	$0	$4,950	$6,050
	Total 2024	***$430,000***	***$288,000***	***$99,000***	***$0***	***$19,350***	***$23,650***
2025							
ACIP	Construction South Side Tie-downs	$860,000	$462,000	$312,000	$0	$47,300	$47,300
	Total 2025	***$860,000***	***$462,000***	***$312,000***	***$0***	***$38,700***	***$47,300***
2026							
9	Design - Relocate Runway 27 Threshold and reconfigure Apron markings and Taxiway B & C to meet Runway Visibility Zone (RVZ) standards	$110,000	$0	$0	$99,000	$0	$11,000

Project Number	Project Description	Estimated Project Cost	FAA Grant			State Grant	Airport Share
			AIP Entitlement	AIP Discretionary	AIG Allocated		
	Design - Rehabilitate Drainage Serving Existing East G.A. Apron and Hangars	$150,000	$0	$0	$135,000	$6,750	$8,250
9	Design - Rehabilitate Apron A7 Pavements	$200,000	$180,000	$0	$0	$9,000	$11,000
	Total 2026	***$460,000***	***$180,000***	***$0***	***$234,000***	***$15,750***	***$30,250***
	2027						
9	Construction - Relocate Runway 27 Threshold and reconfigure Apron markings and Taxiway B & C to meet Runway Visibility Zone (RVZ) standards	$884,650	$90,685	$0	$705,500	$39,809	$48,656
	Total 2027	***$884,650***	***$90,685***	***$0***	***$705,500***	***$39,809***	***$48,656***
	Total 5-Year Program 2023-2027	**$3,229,650**	**$1,020,685**	**$411,000**	**$1,475,000**	**$113,609**	**$209,356**

[1]ACIP: Project included in 2022 version of Airport Capital Improvement Program and is not reevaluated as a part of AMPU

Note: Totals may not sum due to rounding

Source: Kimley-Horn

5.1.3 Environmental Process

Due to the FAA's participation in airport planning and development projects, airport owners are obligated to incorporate the evaluation of environmental concerns affecting both the human and natural environments into their development programs. Before issuing funding for federal and state projects, various environmental analyses must be completed for the RDP to satisfy the requirements of the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). Appendix B of this MPU provides a desktop review of the existing environmental considerations for WVI, which was reviewed in conjunction with the ACIP outlined in **Table 5-1** to determine a long-term strategy for the subsequent environmental analyses required to implement each project component.

Santa Cruz Tarplant

As noted in Section B.1.7, the entire airport is currently designated as a critical habitat for the Santa Cruz Tarplant with one of the region's largest populations found on the airport. As part of the MPU, several discussions took place with the California Department of Fish and Wildlife (CDFW) and U.S. Fish and Wildlife Service (USFWS) to discuss the designation of the airport and potential mitigation strategies for the RDP.

There have been two projects that have involved the Santa Cruz Tarplant, including the 2012 Taxiway Reconstruction and the 2015 Precision Approach Path Indication (PAPIs). The taxiway project included mitigation measures such as confining the construction footprint, establishing a management and monitoring program, and designate areas within the airport that would be developed. It also included a replacement ratio of 1:1 if any impact were to take place as part of the project. The project also deemed that maintenance mowing is considered acceptable with the Tarplant. The PAPI project had more direct effects to the Tarplant that included trenching on unpaved surfaces with soil disturbance. The mitigation measures included replacing 64 square feet of reduced habitat at a 1:1 ratio and monitoring the restoration area to determine if the techniques utilized were successful. Documentation related to these past biological opinions and mitigation measures can be found in Appendix E.

There is limited information that has been compiled on the size and health of the population within the larger region, which could make a difference on the overall impact to the species if a portion of the Airport population were disturbed. It was noted by the USFWS that there are 19 populations in the Greater Bay Area with only 4 in good shape. While not conducted as part of this MPU, the regional population information could be obtained from other local organizations. By conducting field surveys from 2013 through 2018 and again starting in 2020, WVI has been able to successfully monitor the changes in the Tarplant population as well as the locations it is present on the airfield. In general, the Tarplant has continued to maintain its population within the same general areas on the airfield as shown in Exhibit B-8, in Appendix B.

It is expected that seven to eight acres of Tarplant would be impacted if the projects were developed as shown in the MPU Recommended Development Plan. This acreage is intended to account for grading and construction staging. During the July 2022 Tarplant survey these potential areas of impact were reviewed for plant abundance, what other species are growing within these areas, and if there were other suitable areas on-airport. Within this area the population density would be between 20,000 to 72,000 plants per an acre.

The CDFW would ideally like to establish an easement in perpetuity as part of any future mitigation. As the entire airport is federally obligated, this would need to be approved by the FAA to ensure WVI remains compliant with their grant assurances as the airport sponsor. Additionally, a pilot program for an outplanting of Tarplant to another location on airport property was discussed. If this were pursued the program would need to be developed in conjunction with the CDFW and USFWS to ensure the program was developed in such a way to obtain the information necessary for future outplanting. Approval for seed collection to start the pilot program would need to be obtained.

While both agencies believe the effort undertaken by the Airport to preserve the population is excellent considering its status as a threatened species, they would need to conduct more investigation prior to any disturbance taking place through the standard environmental process. Generally, it is recommended to:

- Better determine the overall regional population size of the Santa Cruz Tarplant by collecting data from local organizations.
- Review the soil conditions of on- and off-airport sites for potential mitigation locations.
- Research the lifespan of dormant, underground seeds to determine if currently uninhabited areas could be developed by the Airport as this may determine if the designated critical habitat could be reduced[2].
- Continue with existing monitoring and maintenance plan.
- Develop and conduct a pilot program for outplanting of seeds at an on-airport site such as the Runway 2 RPZ[3].
- Continue discussions with FAA, CFWS, and USFWS regarding easements on airport property for future mitigation measures.

California Environmental Quality Act (CEQA)

In order for the MPU to be adopted by the City of Watsonville, the plan must undergo CEQA environmental review. The prior Environmental Impact Report (EIR) for the last Master Plan was reviewed as part of the determination of the long-term strategy of this MPU. The majority of the projects listed in the RDP are covered under the certified 2003 Master Plan EIR. Of the projects not covered in the EIR, only one (i.e., the changes to Runway 9-27) would result in a change in the Airport's noise contours. The remainder are small projects that, by themselves, would likely be eligible for a Categorical Exemption (CE) under CEQA. The majority of the projects in the RDP are related to safety and bringing WVI up to current FAA design standards. As a result, the recommended CEQA approach is preparation of an Addendum to the 2003 Master Plan EIR to analyze the environmental impacts of the newly proposed projects which were not considered in the previous EIR. This approach would be consistent with CEQA Guidelines Section 15162.

In the future, if a new EIR is required because it can be demonstrated that there is new information of substantial importance that "was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified" (CEQA Guidelines Section 15162), or because one of the newly proposed projects would result in a significant unavoidable impact, there would need to be updated analysis on the proposed projects to reflect current conditions and requirements and include additional analysis for traffic, noise, air quality, energy, geology, visual, cultural, utilities, hydrology, paleontology, biology, and hazardous materials. Fieldwork, supplemented by recent studies undertaken by the Airport, would be required. Some fieldwork, such as determining the presence of certain flora, would require a survey at defined times of the year. It is important to note that many of the technical studies that may be required are only valid for a certain number of years. When they are no longer valid, they will need to be recompleted or updated depending on the specific study. Examples of this include cultural resources and hazardous materials, which generally need to be reviewed to ensure there is not new available information within the past five years.

National Environmental Protection Act (NEPA)

Unlike CEQA, NEPA is typically completed for individual projects, or grouped with similar projects or within a phase, just prior to the project design and construction. The environmental review under NEPA can involve three different levels of analysis:

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[2] It should be noted that the potential lifespan of dormant seeds should not be a final qualifier through environmental clearance for development in areas of the Airport that do not currently have Tarplant.

[3] If a pilot program is conducted, the Airport should receive agreement from the state and federal agencies that it would count towards any future mitigation requirements.

- Categorical Exclusion (CATEX) - A federal action may be "categorically excluded" from a detailed environmental analysis when the federal action normally does not have a significant effect on the human environment (40 CFR 1508.1(d)).
- Environmental Assessment (EA) / Finding of No Significant Impact (FONSI) - The EA determines whether or not a federal action has the potential to cause significant environmental effects. If the agency determines that the action will not have significant environmental impacts, the agency will issue a Finding of No Significant Impact (FONSI). A FONSI is a document that presents the reasons why the agency has concluded that there are no significant environmental impacts projected to occur upon implementation of the action.
- Environmental Impact Statement (EIS) – An EIS is prepared if a proposed major federal action is determined to significantly affect the quality of the human environment.

If an EA is required for a project, a similar level of analysis as noted for a CEQA EIR would need to be completed.

Table 5-3: Anticipated Environmental Approval Needed by Project

Term	Project Number	Project Description	CEQA	NEPA
Short Term (Years 0-5)	ACIP	Zero Emission Vehicle and Infrastructure Pilot Program	Categorical Exclusion	Categorical Exclusion
	ACIP	Upgrade Airport Vehicles and Pedestrian Security Gates	Categorical Exclusion	Categorical Exclusion
	ACIP	AMPU CEQA	-	-
	ACIP (22)	Rehabilitate Drainage Serving Existing East G.A. Apron and Hangars	Categorical Exclusion*	Categorical Exclusion*
	9	Rehabilitate Apron A7 Pavements	2022 EIR Amendment	Categorical Exclusion
	22	Rehabilitate East G.A.T-Hangar Drainage	Categorical Exclusion*	Categorical Exclusion*
	18B	Develop South Tie Downs	2022 EIR Amendment	Categorical Exclusion
Mid Term (Years 6-11)	23	Install above ground fuel facilities to replace underground tanks	2022 EIR Amendment	Categorical Exclusion
	21A	Construct aircraft wash rack in Location 1	2022 EIR Amendment	Categorical Exclusion
	16	Remove obstacles from the Runway 20 Threshold Siting Surface (TSS) in order to remove 590-foot displaced threshold	2022 EIR Amendment	Categorical Exclusion
	PMMP	Reconstruct Taxiway C (East)	2022 EIR Amendment	Categorical Exclusion
	18A	Design/Construct East T-hangars in Area 2	2022 EIR Amendment	Categorical Exclusion
	PMMP	Reconstruct Corporate Hangar Taxilane	2022 EIR Amendment	Categorical Exclusion
	21B	Construct aircraft wash rack in Location 2	2022 EIR Amendment	Categorical Exclusion
	PMMP	Reconstruct South T-hangar Taxilane	2022 EIR Amendment	Categorical Exclusion
	4	Reconfigure fence line near Taxiway A to meet ADG-II taxiway separation to fixed or moveable object standards	2022 EIR Amendment	Categorical Exclusion

Term	Project Number	Project Description	CEQA	NEPA
Mid Term (Years 6-11)	7	Reconfigure Taxiway A to modify wide expanse of pavement at Runway 20 entrance	2022 EIR Amendment	Categorical Exclusion
	6	Reconfigure Taxiways A & C to address non-standard runway intersection angles and runway entrance taxiways	2022 EIR Amendment	Categorical Exclusion
	5	Widen existing paved shoulders on Taxiway C to meet ADG-II design standards	2022 EIR Amendment	Categorical Exclusion
	20	Construct Maintenance Equipment Storage (MES) building based on guidance from ACRP Report 113	2022 EIR Amendment	Categorical Exclusion
	3	Relocated Runway 27 threshold 870 feet west and reconfigure Taxiway C to meet Runway Visibility Zone (RVZ) standards**	2022 EIR Amendment	Categorical Exclusion
Long Term (Year 12+)	8	Reconfigure Taxiways B, C, and D to eliminate taxiways with direct access from apron to runways	2022 EIR Amendment	Categorical Exclusion
	12	Update designations of Taxiways B, D, and E and runway entrance Taxiways A and C	2022 EIR Amendment	Categorical Exclusion
	22	Areas D & G Drainage per Drainage Master Plan	Categorical Exclusion*	Categorical Exclusion*
	18C	Develop hangars Storage Area 8	2022 EIR Amendment	Categorical Exclusion
	17	Expand GA Terminal Building to meet Airport and users' needs	2022 EIR Amendment	Categorical Exclusion
	15	Remove on-airport FAR Part 77 obstacles	2022 EIR Amendment	Categorical Exclusion
	2	Acquire fee-simple property or avigation and land use easement for RPZs to Runway 2-20 and Runway 9-27	2022 EIR Amendment	Categorical Exclusion
	18D	Develop hangars in Storage Area 3	2022 EIR Amendment	Environmental Assessment
	18E	Develop hangars in Storage Area 4	2022 EIR Amendment	Environmental Assessment
	1	Extend Runway 2-20 by 680' to achieve full length of 5,181'	2022 EIR Amendment	Environmental Assessment
	3A	Extend Runway 9-27 by 255 feet	2022 EIR Amendment	Environmental Assessment

*The application of a categorical exclusion for this project will need to be analyzed further based on the final project design and likely discussed with the FAA. This project is intended to be environmentally cleared through CEQA separate from the EIR Amendment.
** The impact of the new taxiway connector on the Santa Cruz Tarplant may not allow a portion of this project to be environmentally cleared through a Categorical Exclusion. This will need to be discussed with the FAA, CFWS, and USFWS.
Source: Kimley-Horn

5.2 Financial Projections

This section presents the anticipated funding plan for implementation of projects identified in the ACIP and assesses the Airport's ability to fund these projects. While an implementation schedule has been developed, the actual execution of specific projects and the resulting financial requirements may change based on local economic conditions, actual aviation-related activity, or other factors.

5.2.1 Airport Expenses and Revenues

The Airport Fund (730, Division 560), classified as an Enterprise fund, represents the activities at the Airport and the receipt of Federal and State Aviation Agency grants. The fund is supported by the fees the Airport collects from fuel sales, lease revenues, and facility use fees. This account, separate from the City's General Fund, allows for tracking of airport revenues to maintain compliance with federal obligations. The Airport's budget and recent record of revenues and expenses is included in the City's Biennial Final Budget.

The City classifies the airport fuel and hangars as enterprise revenues within the Airport Enterprise fund:

- Airport Fuel - Aviation fuel demand continues to be inelastic and seasonal. The Airport owns and maintains sole fuel concession (fuel farm, self-service island and refueler vehicles), supplying aviation grade fuel to the flying public. Aviation fuel is the second highest operational cost which fluctuates based on market condition. Given current and projected fuel prices fuel revenues are expected to slightly increase over the next fiscal year.
- Airport Hangar Leases - The Airport has a fixed number of hangars and has increased the rates charged for them over the past few years, commensurate with aviation storage unit fees in the area. Aviation Storage Unit (ASU) revenues are reviewed on a biennial basis and as such, revenues are expected to slightly increase over the next fiscal year aligned with regional airports. Aeronautical and non-aeronautical leases are captured under this Enterprise Fund.

The Airport also generates revenues through a variety of other sources including long term-vehicle parking fees, gate card fees, hangar waiting list reservations, and miscellaneous revenues. The Fiscal Year (FY) 2021-2023[4] Biennial Final Budget outlines a series of Performance Measures and Related Goals specific to the Airport as noted in **Table 5-4**. These reflect items such as the amount of revenue related to different sources such as the FAA, fuel, operations, and leases as well as the Fund balance and annual events or projects that take place at the Airport.

[4] July 1, 2021 -June 30, 2023

Table 5-4: Airport Performance Measures and Related Goals

Performance Measures and Related Goals	FY 2020 (Actual)	FY 21 (Budget)	FY 22 (Budget)	FY 23 (*projected*)
Financially Self-Sustaining operations, revenues and expenses of an enterprise fund resulting in a positive Fund Balance.	$565,192	$513,357	$500,000	$500,000
Federal Aviation Administration ACIP grant awards	$1,200,000 $397,753	$660,000	$120,000	$150,000
Total Flight Operations	60,000	50,500	55,000	61,000
Total Fuel Purchased / Sold	$589,590 / $1,083,967	$569,957 / $865,000	$695,000 / $920,000	$695,000 / $920,000
Total Leaseholds				
Aviation Storage Unit Leaseholds/Revenue	218 / $1.5m	218 / $967,559	218 / $1,072,872	218 / $1,072,872
Commercial Aviation Leaseholds/ Revenue	10 / $304,475	10 / 242,022	10 / $295,670	10/ $295,670
Non-Aviation Leaseholds/Revenue	21 / $920,601	21 / $856,663	21 / $869,988	21 / $869,988
Number of special projects completed: Such as: Open House, Car Show, Blood Drive, Model Rocketry, Kids Fly Free, Historical Aircraft Displays, Senior Citizens Tours, Organic Farming, 4th grade fieldtrips.	5	8	6	6
Source: 2021-2023 City of Watsonville Biennial Final Budget				

Table 5-5 provides a summary of the Airport's revenue and expenses, including the actual 2019-2020 costs and annual budgeted amount for 2020 through 2023. The total revenues in 2020 were $3.7 million with $1.2 million from leases (buildings, towers, and ground leases), $1.1 million from fuel sales, and $1.4 million from other sources.[5] The airport's budgeted revenues between 2021 and 2023 range from $2.9 million to $4.0 million based on anticipated increases in fuel sales and storage revenue. Annual expenses are made up of payroll, ranging between approximately $1.2 and $1.4 million, and operation expenses, approximately $1.7 to $2.2 million. Operation costs consist of services and commodities such as utilities, office supplies, training, maintenance equipment, special events, fees and permits. The current revenues and expenses result in a small annual surplus through the 2023 budget period.

[5] The FY 2021-2023 Biennial Final Budget included $714,413 of revenue from state and federal grants (including CARES Act funding) in FY2020. This analysis considers grant funding as an external source of funding and is therefore not included in the AMPU cashflow analysis.

Table 5-5: Actual and Budgeted Operated Revenues and Expenses

Category	Year*			
	Actual	Budgeted		
	2020	2021	2022	2023
Operating Revenues				
Lease Revenue	$1,245,062	$1,012,276	$1,290,737	$1,289,237
Fuel Revenues	$1,083,967	$846,000	$1,209,800	$1,234,800
Other Revenues	$1,395,658	$1,020,012	$1,450,939	$1,197,939
Total Revenues	**$3,724,687**	**$2,878,288**	**$3,951,476**	**$3,721,976**
Operating Expenses				
Operating Expenses	$2,181,696	$1,708,961	$2,127,456	$2,158,165
Payroll	$1,244,090	$1,154,417	$1,329,019	$1,398,566
Total Expenses	**$3,425,786**	**$2,863,378**	**$3,456,475**	**$3,556,731**
Operating Income/(Loss)	**$298,901**	**$14,910**	**$495,001**	**$165,245**

Fiscal Year (July 1-June 30)
Source: 2021-2023 City of Watsonville Biennial Final Budget

5.2.2 Cash Flow Analysis

The cash flow analysis compares existing and forecast Airport revenues and expenses based on the assumptions identified in the previous section and identifies projected net operating income or loss. The results of this analysis are presented in **Table 5-6**. The Airport is expected to earn an annual net operating income ranging between $14,910 and $1.5 million during the 20-year planning period, with an average annual income of $640,647.

In the short-term, the Airport is projected to earn an average annual net income of $268,074. Conversely, the local share of the planned capital improvements included in **Table 5-2** will require an average of $41,871 from the Airport Fund per year through between 2023 and 2027. As such, it is expected that the Airport will be able to fund all scheduled projects in the short-term planning period without having significant burden on the Airport Fund balance. Larger projects in the long-term planning period between 2035 and 2040 may exceed Airport annual net revenues due to large-scale projects to construct aircraft storage facilities with limited assistance from federal and state grants. However, the Airport may be able to pursue funding from alternate sources (third party investments or other state grants) or phase these projects to reduce the annual financial burden of the local cost of the project.

Table 5-6: Cashflow Analysis

Category	Year						
	Forecast						
	2024	2025	2026	2027	2030	2035	2040
Operating Revenues							
Lease Revenue	$1,268,283	$1,292,381	$1,316,936	$1,341,958	$1,542,910	$1,695,163	$2,222,662
Fuel Revenues	$1,230,648	$1,313,970	$1,402,934	$1,497,921	$1,822,858	$2,529,992	$3,510,348
Other Revenues	$1,206,500	$1,229,234	$1,252,399	$1,276,005	$1,349,547	$1,481,732	$1,626,034
Total Revenues	**$3,705,432**	**$3,835,585**	**$3,972,270**	**$4,115,884**	**$4,715,315**	**$5,706,887**	**$7,359,045**
Operating Expenses							
Operating Expenses	$2,136,944	$2,214,217	$2,295,442	$2,380,862	$2,688,104	$3,275,944	$4,081,531
Payroll	$1,318,587	$1,343,640	$1,369,169	$1,395,183	$1,476,229	$1,621,902	$1,726,881
Total Expenses	**$3,455,530**	**$3,557,857**	**$3,664,611**	**$3,776,045**	**$4,164,333**	**$4,897,847**	**$5,808,413**
Operating Income/ (Loss)	**$249,902**	**$277,728**	**$307,658**	**$339,839**	**$550,981**	**$809,040**	**$1,550,632**

***Fiscal Year (July 1-June 30)**
Note: Fuel revenues were projected over planning period using 20-year (2000-2019) historic fuel price growth rate (4.04%). Lease and other revenues, payroll, and operating expenses were projected using 20-year historic average inflation rate (1.9%)
Sources: Kimley-Horn

Cash Flow Scenario – No Federal Funding

When airport owners or sponsors, planning agencies, or other organizations accept funds from FAA-administered airport financial assistance programs, they must agree to certain obligations (or assurances). These obligations require the recipients to maintain and operate their facilities safely and efficiently and in accordance with specified conditions. As discussed throughout this MPU, it is vitally important that the Airport and its sponsor continue to adhere to its grant assurances in order to receive federal funding. Federal funding is only available to airport sponsors when they can demonstrate that they are making every effort available to adhere with the federal grant assurances. This scenario reviews the impact to the short-term ACIP if federal funding were not available due to lack of compliance with the federal grant assurances.

As shown in **Table 5-2,** the first five years of projects require $3.2 million to complete, with 90 percent or $2.9 million, being funded by the FAA. In a scenario where the FAA was to no longer provide funds, it is unlikely that WVI would be able to complete these anticipated projects. **Table 5-7** provides a simplified cashflow analysis that displays the anticipated funding shortfall for capital projects in just the short-term if federal funding and the associated state matching were not received. There would be funding shortfalls ranging from $152,000 to $582,000 depending on the year, thus requiring the Airport to find alternative sources of funding or resulting in projects not being completed.

Table 5-7: Anticipated Deficit without Federal Funding

Category	2023	2024	2025	2026	2027
Total WVI Revenues	$3,721,976	$3,705,432	$3,835,585	$3,972,270	$4,115,884
Total WVI Expenses	$3,556,731	$3,455,530	$3,557,857	$3,664,611	$3,776,045
Operating Income/(Loss)	$165,245	$249,902	$277,728	$307,658	$339,839
Capital Project Cost	$595,000	$430,000	$860,000	$460,000	$884,650
Anticipated Surplus/Deficit	-$429,755	-$180,098	-$582,272	-$152,342	-$544,811

Fiscal Year (ending June 30)
Sources: 2021-2023 City of Watsonville Biennial Final Budget, Kimley-Horn

Appendix A – Arrival and Departure Procedures

October 2022 | Final

Prepared for

City of Watsonville

Prepared by

Kimley»Horn

LOC RWY 2

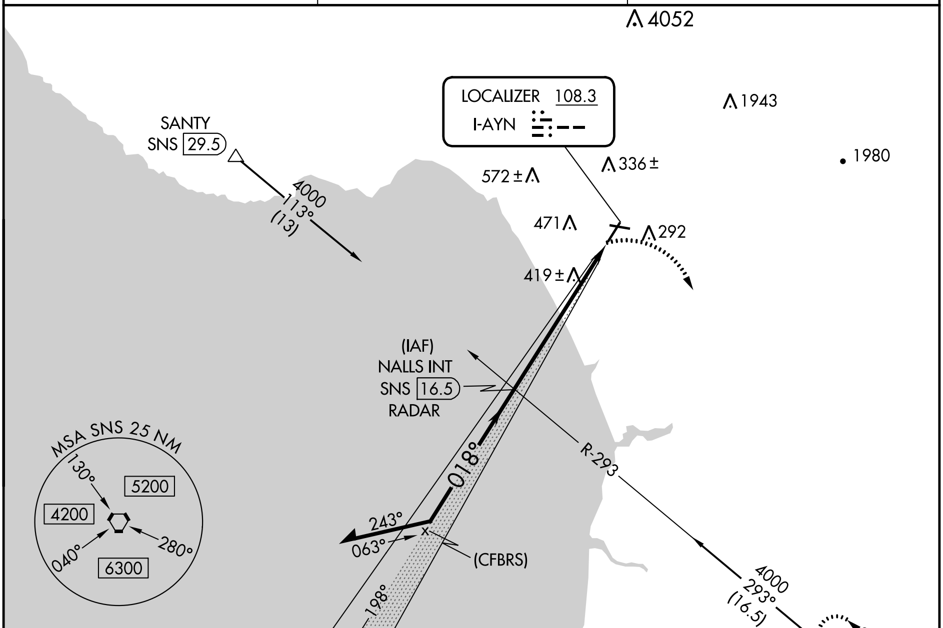
WATSONVILLE MUNI (WVI)

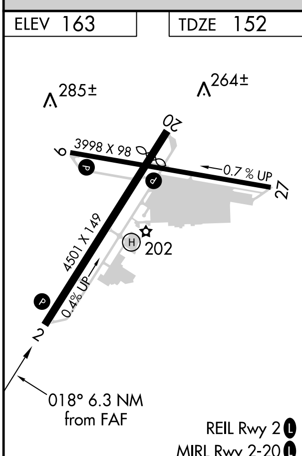
LOC I-AYN	APP CRS	Rwy ldg	4501
108.3	**018°**	TDZE	**152**
		Apt Elev	**163**

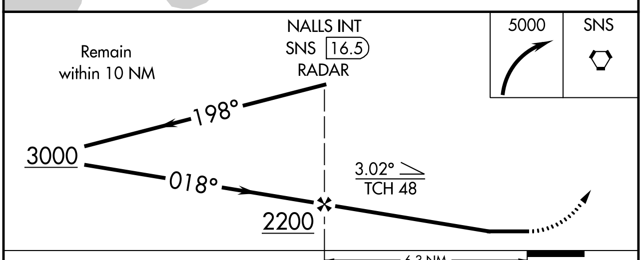
Circling Rwy 27 NA at night. When local altimeter setting not received, use Monterey altimeter setting and increase all MDAs 80 feet and visibility Cat C ⅛ SM and S-2 Cat D ⅛ SM. Circling NA west of Rwy 2-20. Rwy 2 helicopter visibility below ¾ SM NA.

MISSED APPROACH: Climbing right turn to 5000 direct SNS VORTAC and hold, continue climb-in-hold to 5000.

ASOS	NORCAL APP CON	UNICOM
132.275	**127.15 307.125**	**122.8** (CTAF)







CATEGORY	A	B	C	D
S-2	700-1 548 (600-1)		700-1⅝ 548 (600-1⅝)	
CIRCLING	700-1 537 (600-1)		700-1⅝ 537 (600-1⅝)	720-2 557 (600-2)

FAF to MAP 6.3 NM

Knots	60	90	120	150	180
Min:Sec	6:18	4:12	3:09	2:31	2:06

SW-2, 08 OCT 2020 to 05 NOV 2020

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RNAV (GPS) RWY 2
WATSONVILLE MUNI (WVI)

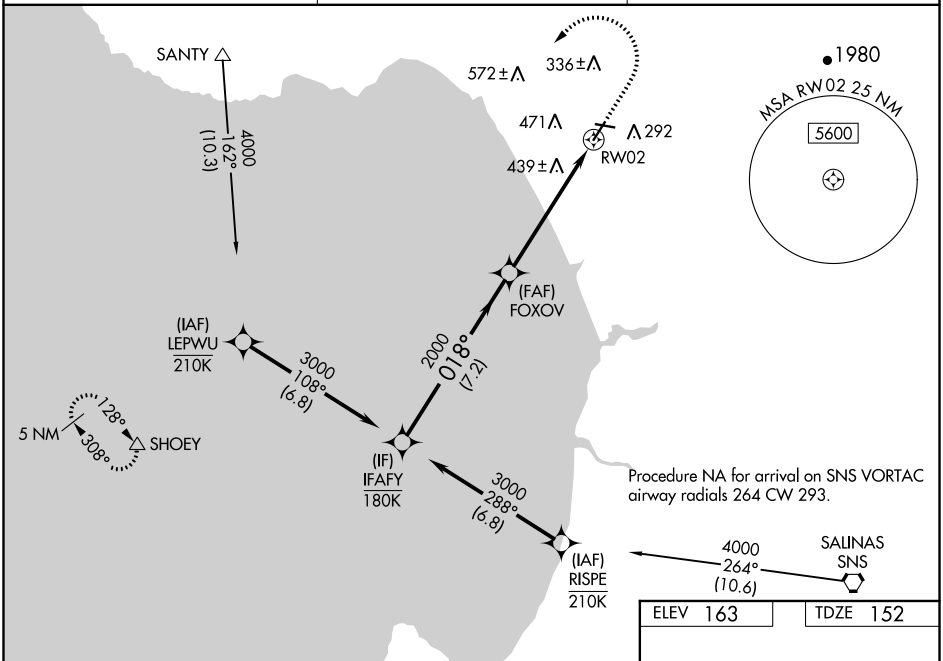
WAAS	APP CRS	Rwy ldg	4501
CH **50144**	**018°**	TDZE	**152**
W02A		Apt Elev	**163**

RNP APCH.

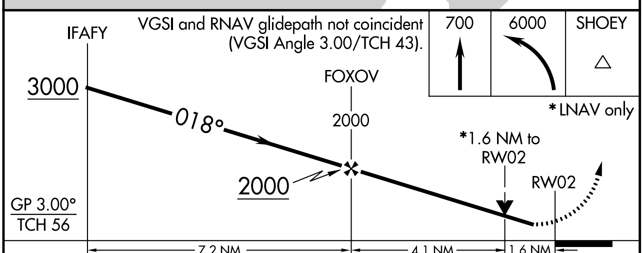
Circling Rwy 27 NA at night. Rwy 2 helicopter visibility reduction below ¾ SM NA. For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -2°C or above 54°C. Circling NA west of Rwy 2-20.

MISSED APPROACH: (Do not exceed 185K until SHOEY) Climb to 700 then climbing left turn to 6000 direct SHOEY and hold, continue climb-in-hold to 6000.

ASOS	NORCAL APP CON	UNICOM
132.275	**127.15 307.125**	**122.8** (CTAF) L

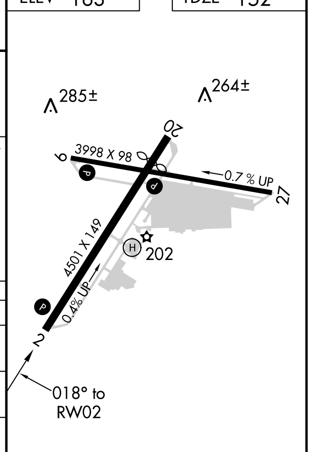


SW-2, 08 OCT 2020 to 05 NOV 2020
SW-2, 08 OCT 2020 to 05 NOV 2020



CATEGORY	A	B	C	D
LPV DA	448-⅞ 296 (300-⅞)			
LNAV/VNAV DA	772-1¾ 620 (700-1¾)			
LNAV MDA	700-1 548 (600-1)		700-1⅝ 548 (600-1⅝)	
C CIRCLING	700-1 537 (600-1)		700-1⅝ 537 (600-1⅝)	1100-3 937 (1000-3)

ELEV 163 TDZE 152



REIL Rwy 2 L
MIRL Rwy 2-20 L

VOR-A
WATSONVILLE MUNI (WVI)

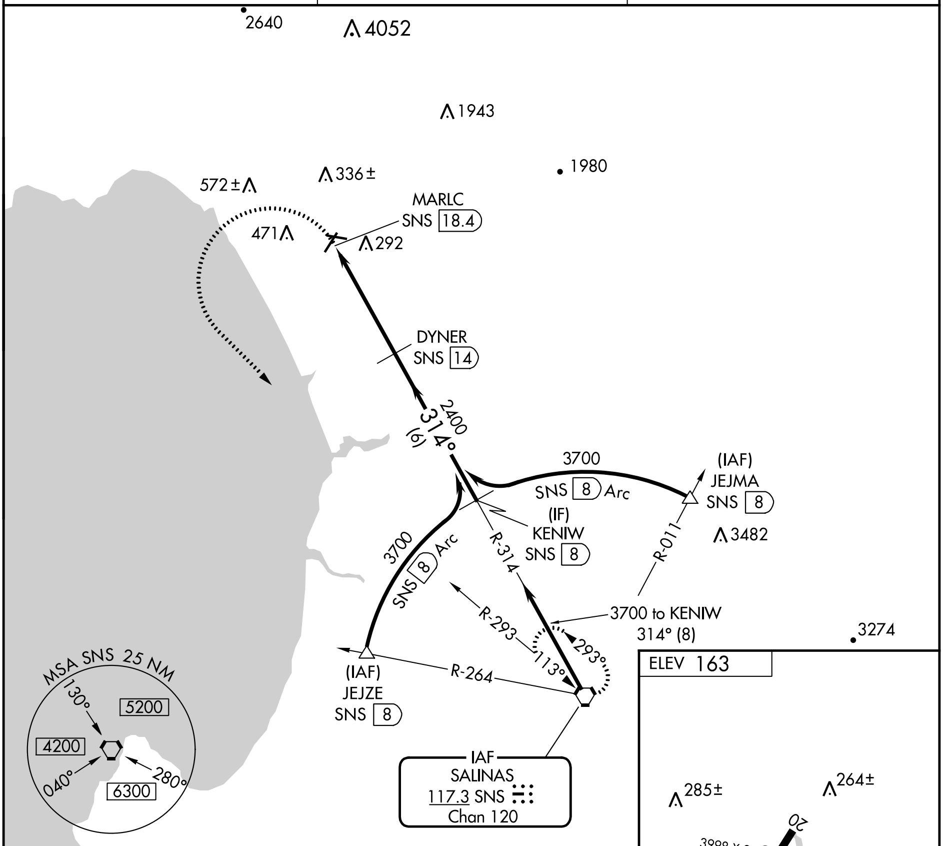
VORTAC SNS 117.3 Chan 120	APP CRS 314°	Rwy Idg N/A TDZE N/A Apt Elev 163

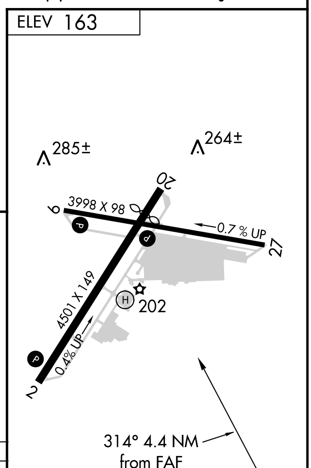
Circling NA west of Rwy 2-20. When local altimeter setting not received, use Monterey altimeter setting and increase all MDAs 80 feet. DME required. Circling Rwy 27 NA at night.

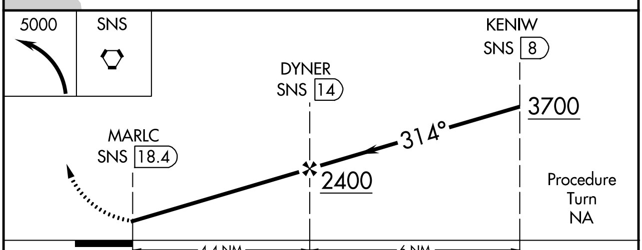
MISSED APPROACH: Climbing left turn to 5000 direct SNS VORTAC and hold, continue climb-in-hold to 5000.

ASOS	NORCAL APP CON	UNICOM
132.275	127.15 307.125	122.8 (CTAF) L

SW-2, 08 OCT 2020 to 05 NOV 2020







REIL Rwy 2 L
MIRL Rwy 2-20 L

CATEGORY	A	B	C	D
CIRCLING	1300-1¼ 1137 (1200-1¼)	1300-1½ 1137 (1200-1½)	1300-3 1137 (1200-3)	

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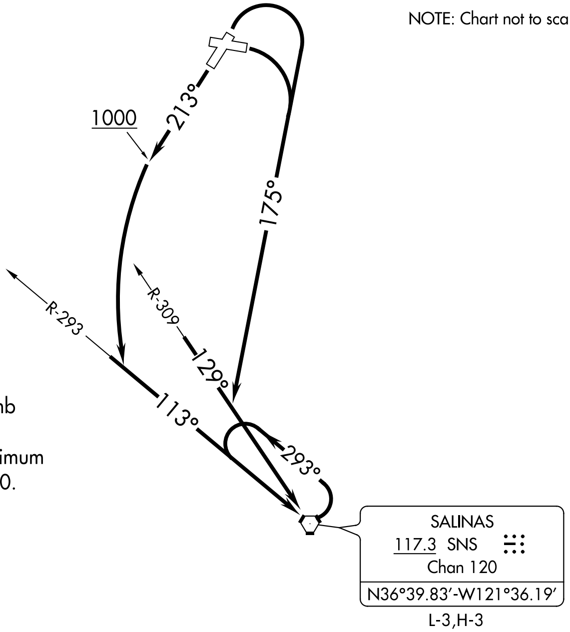
WATSONVILLE FOUR DEPARTURE (OBSTACLE)

WATSONVILLE MUNI (WVI)
WATSONVILLE, CALIFORNIA

ASOS
132.275
NORCAL DEP CON
127.15 307.125
CTAF
122.8

NOTE: Chart not to scale.



TAKEOFF MINIMUMS

Rwy 27: NA - Airport Obstacles.
Rwy 20: Standard.
Rwy 2: Standard with minimum climb of 500' per NM to 2600.
Rwy 9: 300-1 or standard with minimum climb of 270' per NM to 400.

TAKEOFF OBSTACLE NOTES

Rwy 2: Lighting 8' from DER, 84' left of centerline, 1' AGL/159' MSL. Lighting 9' from DER, 84' right of centerline, 158' MSL. Pole 14' from DER, 349' left of centerline, 205' MSL. Pole, building, vehicles on road, tree and fence beginning 15' from DER, 322' left of centerline, up to 50' AGL/213' MSL. Trees beginning 278' from DER, 414' right of centerline, up to 188' MSL. Pole, vehicles on road, stack, tree and building beginning 429' from DER, 157' left of centerline, up to 58' AGL/220' MSL. Pole, building and tree beginning 808' from DER, 22' right of centerline, up to 40' AGL/198' MSL. Tree and transmission line beginning 1021' from DER, 137' right of centerline, up to 222' MSL. Pole 1174' from DER, 328' right of centerline, 57' AGL/224' MSL. Trees beginning 1275' from DER, 298' right of centerline, up to 242' MSL. Tree 1345' from DER, 320' left of centerline, 236' MSL. Tree 2249' from DER, 371' left of centerline, 264' MSL.

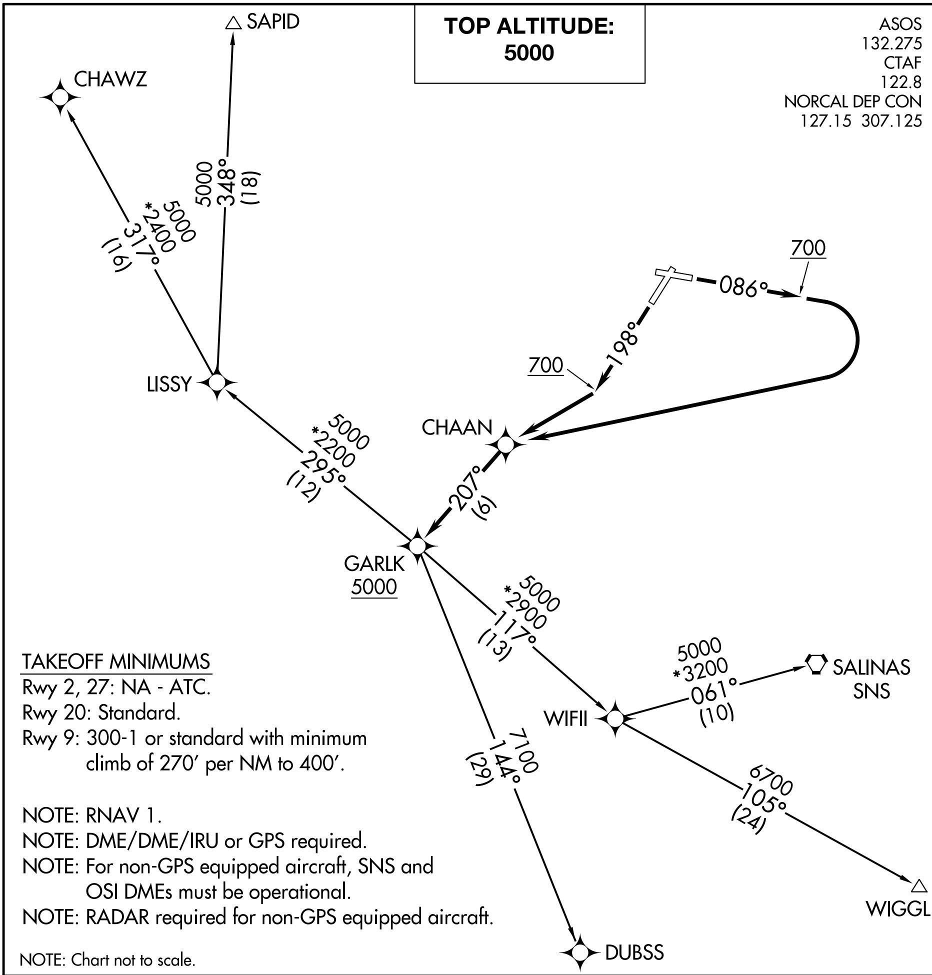
Rwy 9: Tree and pole beginning 1' from DER, 152' left of centerline, up to 157' MSL. Pole 65' from DER, 301' right of centerline, 31' AGL/148' MSL. Tree, fence, building, vehicles on road and pole beginning 74' from DER, 251' left of centerline, up to 160' MSL. Pole, tree, building, tank and stack beginning 210' from DER, 139' left of centerline, up to 177' MSL. Pole 231' from DER, 250' right of centerline, 32' AGL/153' MSL. Trees beginning 312' from DER, 560' right of centerline, up to 173' MSL. Tower, pole and tree beginning 828' from DER, 136' left of centerline, up to 52' AGL/181' MSL. Trees beginning 915' from DER, 146' right of centerline, up to 197' MSL. Tree 1815' from DER, 365' left of centerline, 215' MSL. Tower 4697' from DER, 1365' right of centerline, 189' AGL/292' MSL.

Rwy 20: Tree 57' from DER, 500' left of centerline, 153' MSL. Fence 57' from DER, 268' right of centerline, 7' AGL/143' MSL. Pole 95' from DER, 467' left of centerline, 175' MSL. Pole, vehicles on road and tree beginning 96' from DER, 377' left of centerline, up to 50' AGL/183' MSL. Transmission line 848' from DER, 505' left of centerline, 44' AGL/184' MSL. Tree and transmission line beginning 919' from DER, 520' left of centerline, up to 190' MSL. Tree 1153' from DER, 286' right of centerline, 169' MSL. Tree 1207' from DER, 615' left of centerline, 197' MSL. Tree, building and transmission line beginning 1267' from DER, 318' left of centerline, up to 203' MSL. Tree 1336' from DER, 7' right of centerline, 177' MSL. Tree 1337' from DER, 46' right of centerline, 192' MSL. Tree 2201' from DER, 776' right of centerline, 240' MSL.

DEPARTURE ROUTE DESCRIPTION

TAKEOFF RUNWAYS 2 and 9: Climbing right turn on heading 175° to intercept SNS VORTAC R-309 to SNS VORTAC, thence . . . .
TAKEOFF RUNWAY 20: Climb heading 213° to 1000, then climbing left turn to intercept SNS VORTAC R-293 to SNS VORTAC, thence . . . .
. . . . continue climb in SNS holding pattern to cross SNS VORTAC at or above MEA/MCA for route of flight.

SW-2, 08 OCT 2020 to 05 NOV 2020



TAKEOFF MINIMUMS
Rwy 2, 27: NA - ATC.
Rwy 20: Standard.
Rwy 9: 300-1 or standard with minimum climb of 270′ per NM to 400′.

NOTE: RNAV 1.
NOTE: DME/DME/IRU or GPS required.
NOTE: For non-GPS equipped aircraft, SNS and OSI DMEs must be operational.
NOTE: RADAR required for non-GPS equipped aircraft.

NOTE: Chart not to scale.

SW-2, 08 OCT 2020 to 05 NOV 2020

DEPARTURE ROUTE DESCRIPTION

TAKEOFF RUNWAY 9: Climb heading 086° to 700, then right turn direct CHAAN, thence. . . .

TAKEOFF RUNWAY 20: Climb heading 198° to 700, then direct CHAAN, thence. . . .

. . . . on track 207° to cross GARLK at or above 5000, then on (transition).

CHAWZ TRANSITION (GARLK1.CHAWZ)
DUBSS TRANSITION (GARLK1.DUBSS)
SALINAS TRANSITION (GARLK1.SNS)
SAPID TRANSITION (GARLK1.SAPID)
WIGGL TRANSITION (GARLK1.WIGGL)

INSTRUMENT APPROACH PROCEDURE CHARTS

IFR ALTERNATE AIRPORT MINIMUMS

Standard alternate minimums for non-precision approaches and approaches with vertical guidance [NDB, VOR, LOC, TACAN, LDA, SDF, VOR/DME, ASR, RNAV (GPS) or RNAV (RNP)] are 800-2. Standard alternate minimums for precision approaches (ILS, PAR, or GLS) are 600-2. Airports within this geographical area that require alternate minimums other than standard or alternate minimums with restrictions are listed below. NA - means alternate minimums are not authorized due to unmonitored facility, absence of weather reporting service, or lack of adequate navigation coverage. Civil pilots see FAR 91. IFR Alternate Minimums: Ceiling and Visibility Minimums not applicable to USA/USN/USAF. Pilots must review the IFR Alternate Minimums Notes for alternate airfield suitability.

NAME ALTERNATE MINIMUMS

ALTURAS, CA
ALTURAS MUNI (AAT)……………...........….**RNAV (GPS) Rwy 31**
Category B, 900-2.

ARCATA/EUREKA, CA
CALIFORNIA REDWOOD COAST-HUMBOLDT COUNTY (ACV)……………….**RNAV (GPS) Rwy 1**[1]
RNAV (GPS) Rwy 32[2]
[1]Categories A, B, 900-2; Category C, 900-2½; Category D, 900-2¾.
[2]Category D, 800-2¼.

ATWATER, CA
CASTLE (MER)……….…………**ILS or LOC Rwy 31**
NA when local weather not available.
NA when control tower closed.

AUBURN, CA
AUBURN MUNI (AUN)………....**RNAV (GPS) Rwy 7**
Category B, 900-2.

BISHOP, CA
BISHOP (BIH)…………………...…………**LDA Rwy 17**[1]
RNAV (GPS) Y Rwy 12[2]
RNAV (GPS) Z Rwy 12[3]
[1]Categories A, B, 2300-2; Categories C, D, 2300-3.
[2]Categories A, B 2500-2; Category C, 2500-3.
[3]Categories A, B, 2300-2; Category C, 2300-3.

BYRON, CA
BYRON (C83)……………..………**RNAV (GPS) Rwy 30**
Category D, 800-2½.

CHICO, CA
CHICO MUNI (CIC)…....………**ILS or LOC Rwy 13L**
RNAV (GPS) Rwy 13L
NA when local weather not available.

NAME ALTERNATE MINIMUMS

CONCORD, CA
BUCHANAN FIELD (CCR)….……………….....…….**LDA Rwy 19R**[12]
RNAV (GPS) Rwy 19R[3]
VOR Rwy 19R[3]
[1]NA when control tower closed.
[2]Category C, 1000-2¾; Category D, 1300-3.
[3]Categories A, B, 1000-2; Category C, 1000-3; Category D, 1300-3.

COLUMBIA, CA
COLUMBIA (O22)..…………**RNAV (GPS) Rwy 35**
NA when local weather not available.
Categories A, B, 1100-2; Category C, 1100-3.

CRESCENT CITY, CA
JACK MC NAMARA FIELD (CEC)…………………**RNAV (GPS) Rwy 12**
RNAV (GPS) Rwy 36
VOR Rwy 12
VOR/DME Rwy 12
VOR/DME Rwy 36
NA when local weather not available.

FRESNO, CA
FRESNO CHANDLER EXECUTIVE (FCH)…....…….**RNAV (GPS) Rwy 12**
NA when local weather not available.

FRESNO YOSEMITE INTL (FAT)…........………**ILS Y or LOC Y Rwy 29R**[1]
LOC Y Rwy 11L[2]
TACAN Rwy 11L[3]
TACAN Rwy 29R[2]
[1]LOC, Category E, 900-2¾.
[2]Category E, 900-2¾.
[3]Category E, 900-2.

GRASS VALLEY, CA
NEVADA COUNTY (GOO)..……………...…**RNAV (GPS) Rwy 7**
Category D, 800-2¼.

NAME | ALTERNATE MINIMUMS | NAME | ALTERNATE

TRUCKEE, CA
TRUCKEE-TAHOE
(TRK)..**RNAV (GPS)-A**[1]
RNAV (GPS) Rwy 11[2]
RNAV (GPS) Rwy 20[3]

NA when local weather not available.
[1]Categories A, B, 1600-2; Category C, 1800-3.
[2]Categories A, B, 1900-2; Category C, 1900-3.
[3]Category A, 1300-2; Category B, 1400-2; Category C, 1800-3.

UKIAH, CA
UKIAH MUNI (UKI)..............................**RNAV (GPS)-B**[1]
VOR-A[2]

[1]Categories A, B, 2000-2; Categories C, D, 2000-3.
[2]Categories A, B, 2800-2; Categories C, D, 2800-3.

VACAVILLE, CA
NUT TREE (VCB).............**RNAV (GPS) Rwy 20**[1]
VOR-A[2]

[1]Category C, 900-2½; Category D, 1300-3.
[2]Categories A, B, 900-2; Category C, 900-2½; Category D, 1300-3.

VISALIA, CA
VISALIA
MUNI (VIS)..................................**ILS or LOC Rwy 30**
RNAV (GPS) Rwy 12
RNAV (GPS) Rwy 30
VOR Rwy 12

NA when local weather not available.

WATSONVILLE, CA
WATSONVILLE
MUNI (WVI)......................**RNAV (GPS) Rwy 2**[1]
VOR-A[23]

[1]Category D, 1000-3.
[2]NA when local weather not available.
[3]Categories A, B, 1200-2; Categories C, D, 1200-3.

INSTRUMENT APPROACH PROCEDURE CHARTS

IFR TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

Civil Airports and Selected Military Airports

ALL USERS: Airports that have Departure Procedures (DPs) designed specifically to assist pilots in avoiding obstacles during the climb to the minimum enroute altitude, and/or airports that have civil IFR takeoff minimums other than standard, are listed below. Takeoff Minimums and Departure Procedures apply to all runways unless otherwise specified. An entry may also be listed that contains only Takeoff Obstacle Notes. Altitudes, unless otherwise indicated, are minimum altitudes in MSL.

DPs specifically designed for obstacle avoidance are referred to as Obstacle Departure Procedures (ODPs) and are textually described below, or published separately as a graphic procedure. If the ODP is published as a graphic procedure, its name will be listed below, and it can be found in either this volume (civil), or the applicable military volume, as appropriate. Users will recognize graphic obstacle DPs by the term "(OBSTACLE)" included in the procedure title; e.g., TETON TWO (OBSTACLE). If not specifically assigned an ODP, SID, or radar vector as part of an IFR clearance, an ODP may be required to be flown for obstacle clearance, even though not specifically stated in the IFR clearance. When doing so in this manner, ATC should be informed when the ODP being used contains a specified route to be flown, restrictions before turning, and/or altitude restrictions.

Some ODPs, which are established solely for obstacle avoidance, require a climb in visual conditions to cross the airport, a fix, or a NAVAID in a specified direction, at or above a specified altitude. These procedures are called Visual Climb Over Airport (VCOA). To ensure safe and efficient operations, the pilot must verbally request approval from ATC to fly the VCOA when requesting their IFR clearance.

At some locations where an ODP has been established, a diverse vector area (DVA) may be created to allow radar vectors to be used in lieu of an ODP. DVA information will state that headings will be as assigned by ATC and climb gradients, when applicable, will be published immediately following the specified departure procedure.

Graphic DPs designed by ATC to standardize traffic flows, ensure aircraft separation and enhance capacity are referred to as "Standard Instrument Departures (SIDs)". SIDs also provide obstacle clearance and are published under the appropriate airport section. ATC clearance must be received prior to flying a SID.

CIVIL USERS NOTE: Title 14 Code of Federal Regulations Part 91 prescribes standard takeoff rules and establishes takeoff minimums for certain operators as follows: (1) For aircraft, other than helicopters, having two engines or less – one statute mile visibility. (2) For aircraft having more than two engines – one-half statute mile visibility. (3) For helicopters – one-half statute mile visibility. These standard minima apply in the absence of any different minima listed below.

MILITARY USERS NOTE: Civil (nonstandard) takeoff minima are published below. For military takeoff minima, refer to appropriate service directives.

08 OCT 2020 to 05 NOV 2020

ALTURAS, CA

ALTURAS MUNI (AAT)
TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES
AMDT 2 10APR08 (08101) (FAA)
DEPARTURE PROCEDURE:
Use BACHS DEPARTURE.

AMEDEE AAF (KAHC)

HERLONG, CA
TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES
AMDT 2 30JAN20 (20030)
TAKEOFF MINIMUMS:
Rwy 9, std. w/min. climb of 350' per NM to 9500, or 4100-3 for VCOA.
Rwy 27, std. w/min. climb of 390' per NM to 8500, or 4100-3 for VCOA.
DEPARTURE PROCEDURE:
Rwy 9, climbing right turn on a heading between 086° CW to 266° from DER.
Rwy 27, climbing left turn on a heading between 086° CW 266° from DER.
VCOA:
All runways, obtain ATC approval for VCOA When requesting IFR clearance. Climb in visual Conditions to cross AMEDEE AAF at or above 8000 before proceeding on course.

WATSONVILLE, CA

WATSONVILLE MUNI (WVI)

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES
AMDT 5A 13SEP18 (18256) (FAA)

TAKEOFF MINIMUMS:
Rwy 27, NA - airport obstacles.

DEPARTURE PROCEDURE:
Rwys 2, 9, 20, use WATSONVILLE DEPARTURE.

TAKEOFF OBSTACLE NOTES:
Rwy 2, lighting 8’ from DER, 84’ left of centerline, 1’ AGL/159’ MSL.
Lighting 9’ from DER, 84’ right of centerline, 158’ MSL.
Pole 14’ from DER, 349’ left of centerline, 205’ MSL.
Pole, building, vehicles on road, tree and fence beginning 15’ from DER, 322’ left of centerline, up to 50’ AGL/213’ MSL.
Trees beginning 278’ from DER, 414’ right of centerline, up to 188’ MSL.
pole, vehicles on road, stack, tree and building beginning 429’ from DER, 157’ left of centerline, up to 58’ AGL/220’ MSL.
pole, building and tree beginning 808’ from DER, 22’ right of centerline, up to 40’ AGL/198’ MSL.
Tree and transmission line beginning 1021’ from DER, 137’ right of centerline, up to 222’ MSL.
Pole 1174’ from DER, 328’ right of centerline, 57’ AGL/224’ MSL.
Trees beginning 1275’ from DER, 298’ right of centerline, up to 242’ MSL.
Tree 1345’ from DER, 320’ left of centerline, 236’ MSL.
Tree 2249’ from DER, 371’ left of centerline, 264’ MSL.
Rwy 9, tree and pole beginning 1’ from DER, 152’ left of centerline, up to 157’ MSL.
Pole 65’ from DER, 301’ right of centerline, 31’ AGL/148’ MSL.
tree, fence, building, vehicles on road and pole beginning 74’ from DER, 251’ left of centerline, up to 160’ MSL.
Pole, tree, building, tank and stack beginning 210’ from DER, 139’ left of centerline, up to 177’ MSL.
Pole 231’ from DER, 250’ right of centerline, 32’ AGL/153’ MSL.
Trees beginning 312’ from DER, 560’ right of centerline, up to 173’ MSL.
Tower, pole and tree beginning 828’ from DER, 136’ left of centerline, up to 52’ AGL/181’ MSL.
Trees beginning 915’ from DER, 146’ right of centerline, up to 197’ MSL.
Tree 1815’ from DER, 365’ left of centerline, 215’ MSL.
Tower 4697’ from DER, 1365’ right of centerline, 189’ AGL/292’ MSL.
Rwy 20, tree 57’ from DER, 500’ left of centerline, 153’ MSL.
Fence 57’ from DER, 268’ right of centerline, 7’ AGL/143’ MSL.
Pole 95’ from DER, 467’ left of centerline, 175’ MSL.
pole, vehicles on road and tree beginning 96’ from DER, 377’ left of centerline, up to 50’ AGL/183’ MSL.
Transmission line 848’ from DER, 505’ left of centerline, 44’ AGL/184’ MSL.
Tree and transmission line beginning 919’ from DER, 520’ left of centerline, up to 190’ MSL.
Tree 1153’ from DER, 286’ right of centerline, 169’ MSL.
Tree 1207’ from DER, 615’ left of centerline, 197’ MSL.
Tree, building and transmission line beginning 1267’ from DER, 318’ left of centerline, up to 203’ MSL.
Tree 1336’ from DER, 7’ right of centerline, 177’ MSL.
Tree 1337’ from DER, 46’ right of centerline, 192’ MSL.
Tree 2201’ from DER, 776’ right of centerline, 240’ MSL.

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WEED, CA

WEED (O46)

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES
ORIG 22JUN17 (17173) (FAA)

DEPARTURE PROCEDURE:
Use FOBRO (RNAV) DEPARTURE.

WILLITS, CA

ELLS FIELD-WILLITS MUNI (O28)

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES
AMDT 1 05AUG04 (04218) (FAA)

DEPARTURE PROCEDURE:
Rwy 16, use MENDOCINO RNAV DEPARTURE.
Rwy 34, use FLUEN RNAV DEPARTURE.

B Environmental Overview

As noted in the Inventory of Existing Conditions (Section 1.10 Environmental Overview), due to the FAA's participation in airport planning and development projects, airport owners are obligated to incorporate the evaluation of environmental concerns affecting both the human and natural environments into their development programs. An environmental and land use inventory has been undertaken relative to Watsonville Municipal Airport (WVI) in concert with FAA Advisory Circular (AC) 150/5070-6B, Airport Master Plans. The information was gathered through desktop review of existing environmental documents, agency databases, and previous studies. The overview also considers the enabling legislation, the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

The appendix examines the local land use and environmental conditions to identify the applicable jurisdictional authorities and recognize environmental factors that could potentially be affected by future airport development. It is intended that the information is used to help guide and evaluate future facility development concepts. The research for this appendix was conducted in January 2021. Topics reviewed include:

- Land Use and Zoning
- Wildlife Hazard Attractants
- Water Resources
- Section 4(f) and 6(f) Resources
- Air Quality
- Biotic Resources and Endangered Species
- Coastal Resources
- Farmlands
- Hazardous Materials
- Underground Storage Tanks
- Historic and Cultural Resources
- Environmental Justice

B.1 WVI Environmental Overview

B.1.1 Land Use and Zoning

In accordance with FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, the compatibility of existing and planned land uses near an airport is focused primarily on noise in the community and the safety of persons and property both on the ground and in the air. The FAA requires that airport owners seek compatible uses for the land surrounding an airport through appropriate positive control (fee-simple property or easement acquisition) and coordinated zoning and municipal planning efforts. The following describes the existing land uses surrounding WVI and various planning and zoning programs applicable to the Airport.

B.1.1.1 Zoning

Per Title 14 of the Watsonville Municipal Code, the airfield of WVI lies within the Public Facilities (PF) zone with the non-aviation parcels zoned as Industrial Park (IP) (see **Figure B-1**). PF zones contain the public facilities owned and operated by the City or County government agencies with uses that are available to the public. IP zoning is intended for light, non-nuisance industry, business, service, and research work, to promote an industrial business, service, and research area, to foster and encourage the development of specialized manufacturing, business, service, and research institutions, and to protect the district and surrounding area and any adjacent residential or commercial property from noise, illumination, glare, and unsightliness.

1 To the south is Coastal Zone-A (CZ-A) and -B (CZ-B), which ensure any development in these areas adheres to the City's Local Coastal Land Use Plan and Local Coastal Implementation Program, as codified in Title 9, Chapter 5 of the Watsonville Municipal Code. To the east is a mix of Office (O), Institutional (N), Thoroughfare Commercial (CF). Additionally, to the east and northeast there are areas of residential properties across Airport Boulevard including Multiple Residential-Medium Density (RM-2) with some Mobile Home Parks (R-MP) overlay, and Single Family Residential-Low Density (R-1).

Property to the north and west lie within the unincorporated community of Freedom. This are is zoned through the County, with residential – single family immediately to the west of the airport. Agriculture and Agriculture-Commercial dominate the land beyond the residential property to the west.

B.1.1.2 City of Watsonville General Plan

The City's most current General Plan was developed in December 2005 (Watsonville 2005 General Plan, Adopted May 1994)[1]. The general plan looked to serve all of Watsonville's residents with an emphasis on planning for the future of the existing population. A key theme was to make it possible for the existing population to remain within Watsonville. The City's identity included its roles as:

- The center of agricultural support base of the Pajaro Valley
- A provider of affordable living, particularly in comparison to that of the County and the region
- A place with historic commitment to protection and management of wetlands, open space, and other environmental resources
- The evolving cultural center for the County's Hispanic population
- An employment center for the Pajaro Valley

The Airport is included within the City's transportation network, which had goals focusing on minimizing the transportation related impacts of growth and on developing transportation options for movement of people and commodities. There are several goals, policies, and implementation measures within the General Plan that support the continued operation and protection of the Airport, including:

- Goal 10.6 Aviation Facilities: Maintain, protect, and improve the facilities and services of the Watsonville Municipal Airport as part of the regional transportation network.
- Policy 10.Q Aviation Facilities: As the only general aviation airport in Santa Cruz County, the Watsonville Airport shall be protected from adjacent development which is incompatible with existing and future services as outlined in the Airport Master Plan and Regional Airport System Plan.
- Implementation Measures:
  - 10.Q.1 Cooperative Planning – The County of Santa Cruz and the City shall coordinate land use planning for parcels impacted by airport operations. The City shall encourage the County to revise the Pajaro Valley General Plan to be consistent with *Watsonville: 2005*.
  - 10.Q.2 Zoning for Safety – The City shall maintain strict zoning and land use controls within the Airport Operations Impact Area.
  - 10.Q.3 State Guidelines – The City shall use the State's guidelines to review and manage development within the airport's area of influence.

2) [1] In 2012, the City completed an update to the General Plan, *Watsonville VISTA 2030* and an associated Environmental Impact Report (EIR) that was challenged in court and ultimately not approved. As such, the 2005 General Plan was referenced for this Master Plan Update.

- Policy 10.R Airport Operations: The City shall continue to emphasize the economic important of airport operations to the Watsonville Planning Area and to the regional transportation system
- Implementation Measures:
  - 10.R.1 Airport Improvements – The City shall continue to seek available funding sources and make appropriate capital improvements consistent with the recommendations of the Airport Master Plan.
  - 10.R.2 Project Funding - The City shall work with the local transportation commissions, California Department of Transportation, and State Transportation Commission to ensure that projects at the Watsonville Airport are given funding priority in the State Transportation Improvement Program.
  - 10.R.3 Master Plan Update – The City shall review the Airport Master Plan at least every five years, beginning with the 1994 update, to determine the need for additional updating.

The Airport, as shown in **Figure B-2,** is primarily considered Transportation, Communication, and Utilities, which includes streets and roads, rail transportation; and other fixed guideway types of transportation corridors; and airports primarily intended for the transportation of people, goods and materials, liver stock, and agricultural products by pubic, quasi-public and/or private entities. Certain parcels on the east and west that are currently utilized by non-aviation uses are denoted as industrial. The north and west are low density residential. To the south is primarily agriculture use.

Figure B-1: Existing Zoning

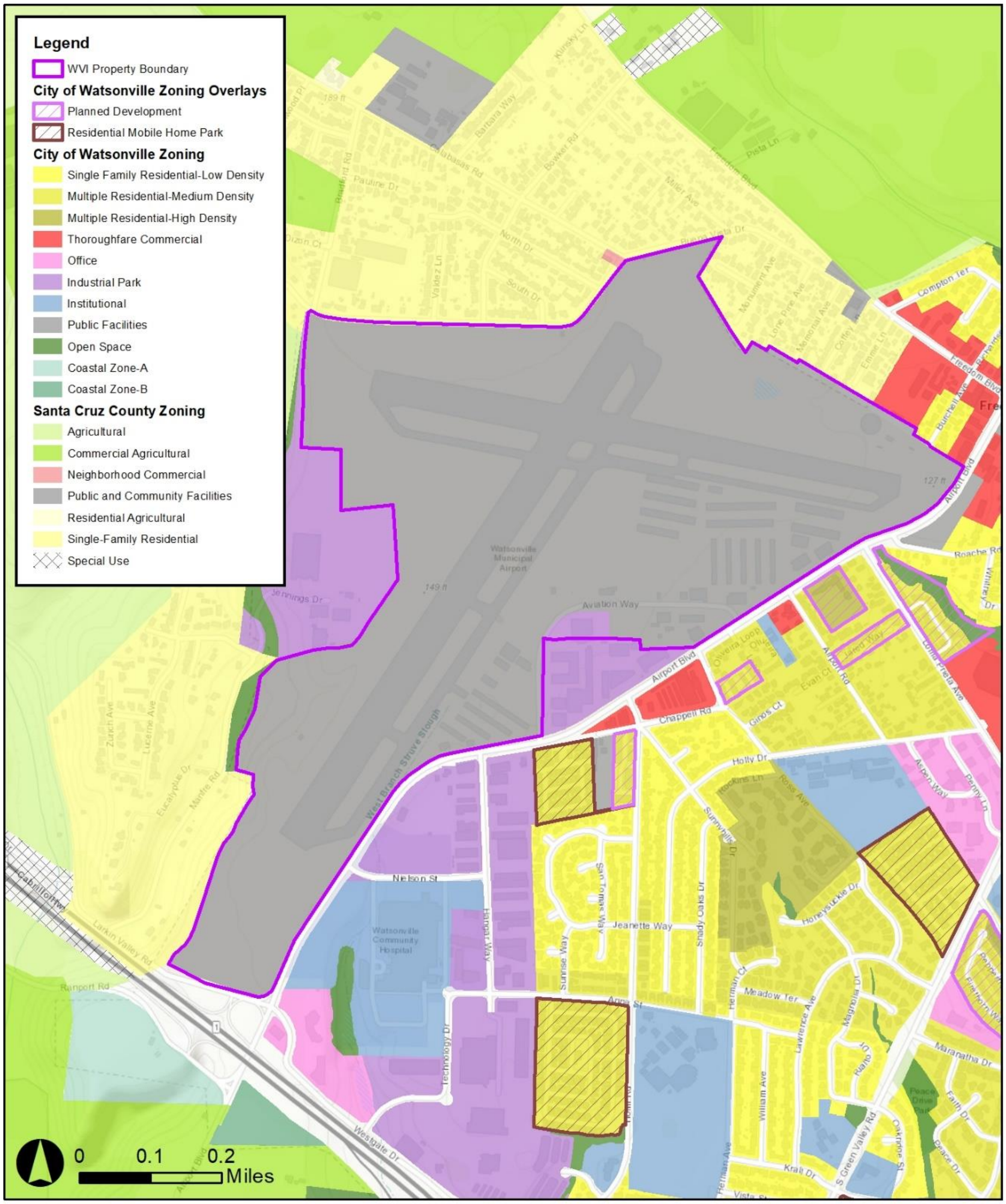

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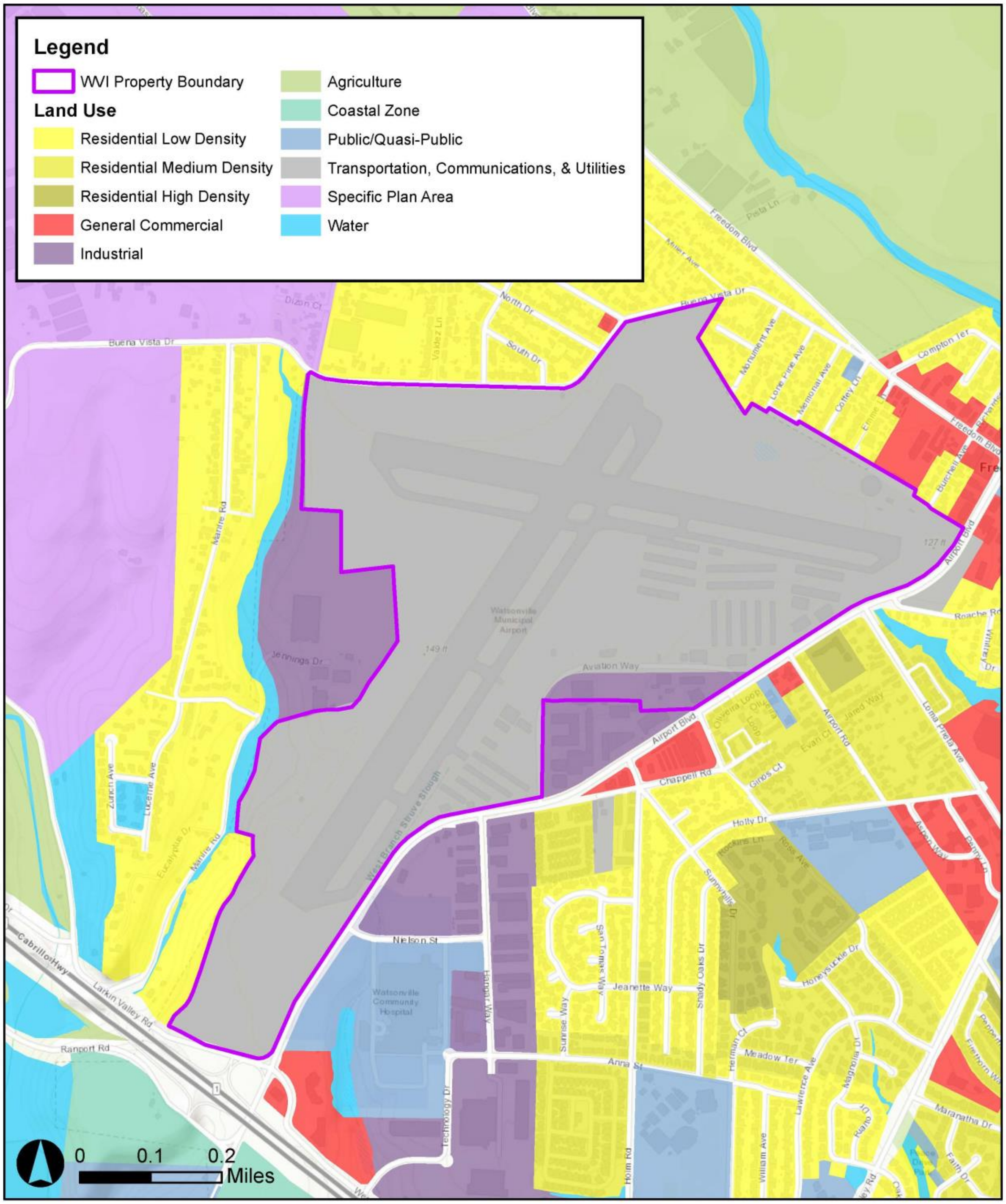
Figure B-2: Existing Land Use



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B.1.1.3 Airport Land Use Compatibility

Airport land use planning attempts to reconcile how land can be developed with consideration to the safety of those on the ground and onboard aircraft, as well as the noise tolerance of the surrounding community. Compatibility issues are generally defined as "any airport impact that adversely affects the livability of a surrounding community, as well as any community characteristic that can adversely affect the viability of an airport" (Shalk and Ward 2010, 39). The California Department of Transportation (Caltrans), Division of Aeronautics developed the *California Airport Land Use Planning Handbook* (Caltrans Handbook) to provide regulatory guidance and best practices for state-compliant and effective airport land use planning (Caltrans 2011). An Airport Land Use Plan (ALUP) is intended to focus on the area outside of the airport property that is within its Airport Influence Area (AIA), while an airport master plan focuses on airport operations and the area under the control of the airport. There is a correlation between an ALUP and an airport master plan as ALUPs rely on the results of either an airport master plan or an airport layout plan that reflects the anticipated growth of the airport boundaries over a likely 20-year horizon. Changes to airport boundaries can impact an ALUP, however, not every airport master plan recommends expansion of an airport's property. The City drafted a 2016 Administrative Draft of the ALUP, which is currently under review.

A key component of the Caltrans Handbook is the safety compatibility zones, as shown in **Figure B-3** for WVI. The safety compatibility zones are intended to promote land use safety and compatibility beyond the FAA safety and protection zones. There are two components to safety compatibility policies: identification of the locations where safety—that is, the risk of aircraft accidents—is a concern; and definition of appropriate land use measures addressing those risks. **Table B-1** displays the allowable land use compatibility by zone including the population density, residential land use, and any special functions based on the 2016 Administrative Draft of the ALUP. As this document has not yet been approved it is shown as reference for the direction the City intends to take. Generally, the densities are the most restrictive based on the ranges from the *Caltrans Airport Land Use Planning Handbook*, which are shown in **Table B-2**.

In 1970, the City adopted Title 9, Chapter 4, Airport Zoning: Height of Structures and Use of Airspace "…to regulate the use of airspace for the purpose of promoting the health, safety, and general welfare of the inhabitants of the City and the County by preventing the creation or establishment of airport hazards, thereby protecting the lives and property of the uses of the WVI and of the occupants of the land in its vicinity and preventing destruction and impairment of the utility of the airport and the public investment therein." This zoning protects for the Federal Aviation Regulation (FAR) Part 77 surfaces as further described in subsequent chapters of this MPU.

An additional land use protection is in place south of WVI within Zone 3 through the Settlement Agreement and Conditional Release from September 13, 2017 between the Pajaro Valley Unified School District (PVUSD) and Watsonville Pilots Association (WPA). A non-development agreement was established which allowed PVUSD the ability to construct a new auditorium and athletic field without lighting, but not allow any construction within a 10-acre site closer to the airport. The Airport was granted an avigation easement over the high school and funds to reduce vertical obstructions (i.e., trees, poles, and other similar objects), install additional approach lighting, or any other purpose which would enhance the lowering the current visibility minimums.

Table B-1: WVI 2016 Administration Draft ALUP Safety Compatibility Zones

Zone Number	Location	Maximum Densities Residential (du/acre)	Maximum Intensities Other Uses (people/acre) Average	Maximum Intensities Other Users (people/acre) Single-Acre	Required Open Land	Other Development Conditions
1	Runway Protection Zone and within Building Restriction Line	0	0	0	All Remaining	Avigation easement dedication
2	Inner Approach/Departure Zone	Rural: Maintain Zoning Suburban: 0.1 (1 du/20.0 ac.)	Rural: 10 Suburban: 40	Rural: 50 Suburban: 80	30%	Avigation easement dedication FAA “No Hazard” airspace determination required
3	Inner Turning Zone	Rural: Maintain Zoning Suburban: 0.2 (1 du/5.0 ac.)	Rural: 50 Suburban: 70	Rural: 150 Suburban: 210	20%	Avigation easement dedication FAA “No Hazard” airspace determination required
4	Outer Approach/Departure Zone	Rural: Maintain Zoning Suburban: 0.2 (1 du/5.0 ac.)	Rural: 70 Suburban: 100	Rural: 210 Suburban: 300	20%	Avigation easement dedication FAA “No Hazard” airspace determination required
5	Sideline Zone	Rural: Maintain Zoning Suburban: 0.5 (1 du/2.0 ac.)	Rural: 50 Suburban: 70	Rural: 150 Suburban: 210	30%	Avigation easement dedication FAA “No Hazard” airspace determination required
6	Traffic Pattern Zone	No Limit	Rural: 150 Suburban: 200	Rural: 600 Suburban: 800	15%	Avigation easement dedication FAA “No Hazard” airspace determination required

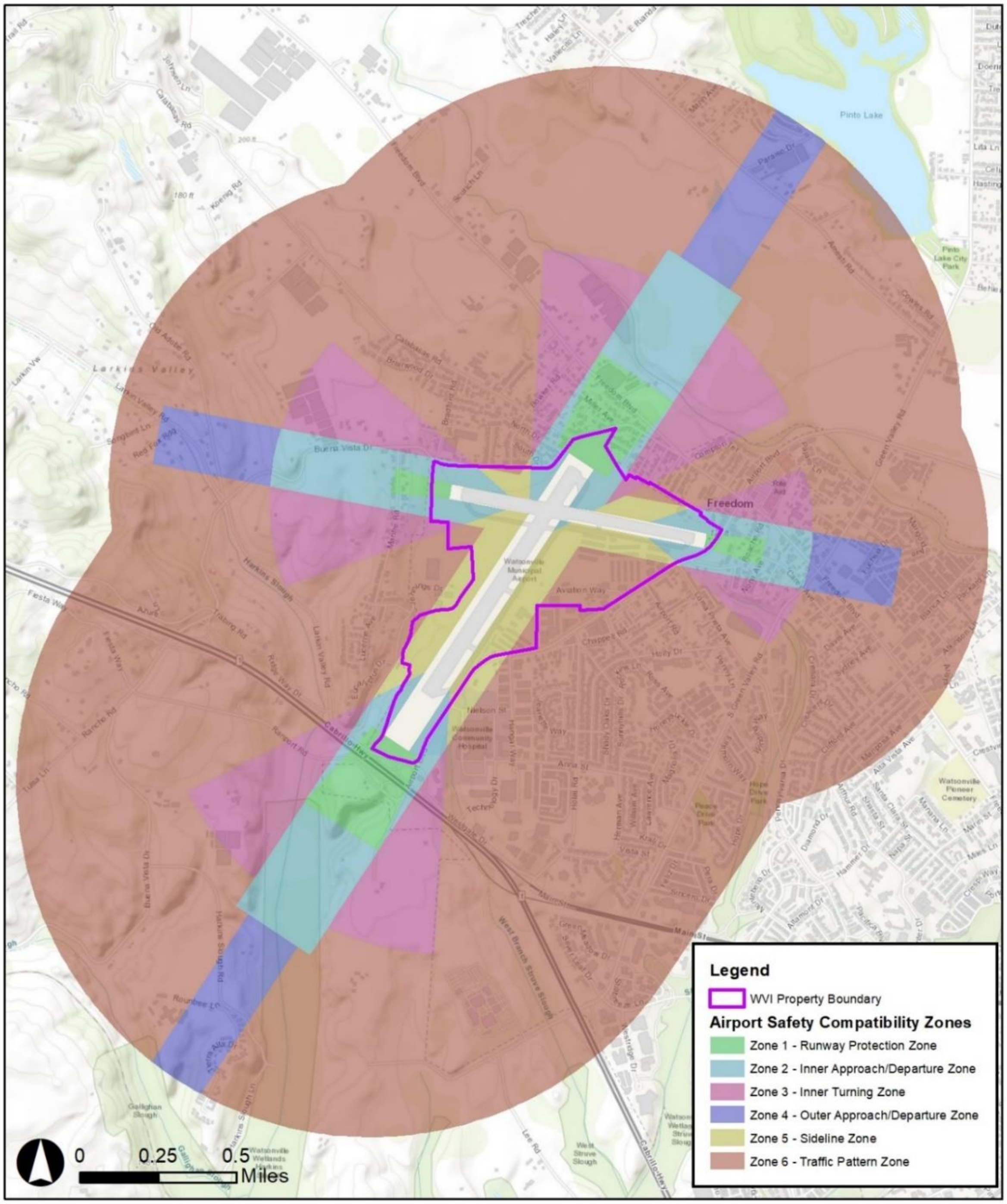
Note: This information is currently in draft format and still under review.

Source: Watsonville Municipal Airport Land Use Plan, 2016 Administrative Draft

Table B-2: Caltrans Land Use Handbook Safety Compatibility Zones

Zone Number	Location	Population Density of Use	Residential Land Use	Special Functions	Normally Allowed Uses
1	Runway protection zone and within runway object free area adjacent to the runway	0-10/acre	Prohibited	Prohibited	None
2	Inner approach/departure zone	40-60/acre	10 Acres/dwelling	Prohibited	Agricultural, storage, light industrial
3	Inner turning zone	40-60/acre	2-10 Acres/dwelling	Prohibited	Agricultural, storage, light industrial
4	Outer approach/departure zone	60-100/acre	2-5 Acres/dwelling	Avoided	Zone 3 plus restaurants, retail, and industrial
5	Sideline zone	40-60/acre	2-5 Acres/dwelling	Avoid assemblies over 60/acre	Zone 4 plus aviation-related activities
6	Traffic pattern zone	150/acre	4-6 Acres/dwelling	Avoid assemblies over 150/acre	Zone 5 plus residential uses
Source: California Airport Land Use Planning Handbook, Caltrans, 2011					

Figure B-3: Watsonville Municipal Airport Influence Area and Safety Zones



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B.1.1.4 Noise

Aircraft noise is generally one of the most prominent and controversial environmental issues associated with airport development and operation. Traditionally, the FAA requires uses a decibel (dB) based measure of noise exposure called the day-night average sound level (DNL) to describe community exposure to airport-related noise when conducting any federal planning or environmental study. In California, the FAA accepts the use of the Community Noise Equivalent Level (CNEL) in place of DNL. In simple terms, both CNEL and DNL represents the average noise level evaluated over a 24-hour period. For airport projects, the DNL/CNEL noise level is used to describe the noise from aircraft operations in the vicinity of the airport. It includes both peak aircraft noise events, as well as the times with no aircraft activity, averaged over a full day. In both metrics, a 10 dB penalty is added to each aircraft operation that occurs during the nighttime hours (10:00 PM to 7:00 AM) to account for people's increased sensitivity to noise while they are sleeping. Additionally, CNEL adds a three-times (approximately 5-dB) penalty for each aircraft operation occurring in the evening between 7:00 PM and 10:00 PM.

The FAA's Part 150 Airport Noise Compatibility Planning Program is the primary Federal regulation guiding and controlling planning for aviation noise compatibility around airports. Per Part 150 requirements, the extents of noise exposure have historically been modeled using a computer-based program called the integrated noise model (INM) to develop noise contours (Noise Exposure Maps – NEM). In 2015, the FAA replaced INM with new noise modeling software called the airport environmental design tool (AEDT). Using aircraft operation counts as well as the flight paths and profiles, and noise and performance information, the AEDT software identifies contours of the forecasted daily sound levels around the airfield.

CNEL has established 65 dB as the threshold above which aircraft noise is considered to be incompatible with residential areas. For residential areas that exceed 65 CNEL noise impact level, the Part 150 Program establishes procedures and criteria for making projects eligible for Federal funding for residential sound insulation programs to reduce indoor noise levels from aircraft operations. Generally speaking, all land uses are acceptable in areas with noise exposure less than 65 CNEL (i.e., beyond the limits of the 65 CNEL contour). Residences, schools, churches, and other noise-sensitive land uses are considered incompatible within the 65 and greater CNEL contours. Voluntary noise abatement procedures have been established at the Airport to minimize aircraft noise disturbances over the surrounding communities as outlined in **Chapter 1**.

For the noise contour analysis, the data from this MPU, **Chapter 2**, was utilized including existing and forecasted annual operations, aircraft fleet mix, runway utilization, peak operations, and times of day. WVI previously conducted noise studies in 2013, 2015, and 2017.

Base Year and Future Conditions Noise Contours

A noise assessment was performed to determine the CNEL noise contours at WVI for the 2020 Base Year as well as for the 2040 Recommended Development Plan (RDP) as depicted in **Chapter 4**. The RDP includes plan for the removal of the Runway 20 displaced threshold and shortening of Runway 27 by 870 feet but does not account for the extensions of Runway 2 or Runway 9 as they are planned to be completed beyond the 20-year planning period.

The 2020 65 CNEL noise contours generally reside on airport property, with minor extensions over the industrial area along Aviation Way. **Table B-3** displays the acreage for the 65 and 70 CNEL contours along with the population and schools, churches, and hospitals located within each. Error! Reference source not found. depicts the 55, 60, 65, and 70 CNEL contours for the Airport's current configuration and operations. The 55 and 60 CNEL contours are shown for informational purposes and do not affect the determination of compatible land use surrounding the Airport. As shown, no 65 CNEL noise contours extend beyond airport property and the industrial area immediately adjacent to Aviation Way, so no incompatible land uses have been identified around WVI for the base year.

Table B-3: 2020 Noise Contour Information

Noise Contour	Total Acreage	Off-Airport Acreage	Population	Residential Properties	Schools	Churches	Hospitals
65	41.89	1.79	0	0	0	0	0
70	11.74	0.59	0	0	0	0	0
Sources: Kimley-Horn, AEDT Modeling, ERSI							

The 2040 65 CNEL noise contours are also mostly confined to airport property, though they extend into the industrial area east of the airport and into the residential area along Buena Vista Drive. Error! Reference source not found. displays the acreage for each noise contour along with the population and schools, churches, and hospitals located within each. As shown in Error! Reference source not found., the 65 CNEL contours extend to three residential properties along Buena Vista Drive but do not reach the homes on each property. As such, it is recommended the Airport continue to monitor noise in this area through the planning period in the event that the fleet mix and operational growth beyond 2040 places residential properties within the 65 CNEL contours.

Table B-4: 2040 Noise Contour Information

Noise Contour	Acreage	Off-Airport Acreage	Population*	Residential Property	Schools	Churches	Hospitals
65	62.38	3.49	11	3	0	0	0
70	22.81	1.09	11	3	0	0	0
****Note: Estimated population calculated using average 2016-2020 persons per household for Watsonville City as determined by the 2020 U.S. Census*** ***Sources: Kimley-Horn, AEDT Modeling, ERSI, U.S. Census Bureau***							

Figure B-4: 2020 Noise Contours

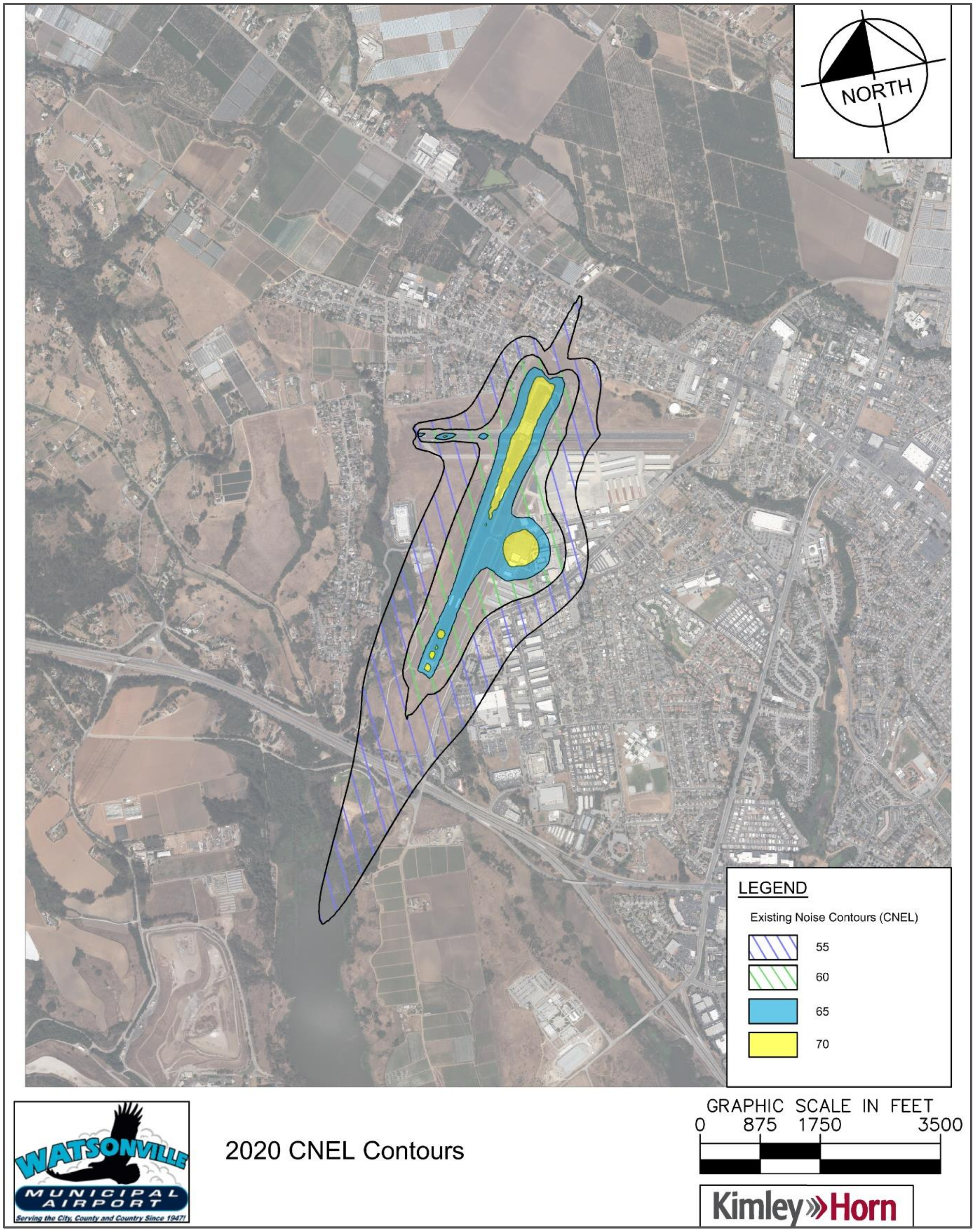
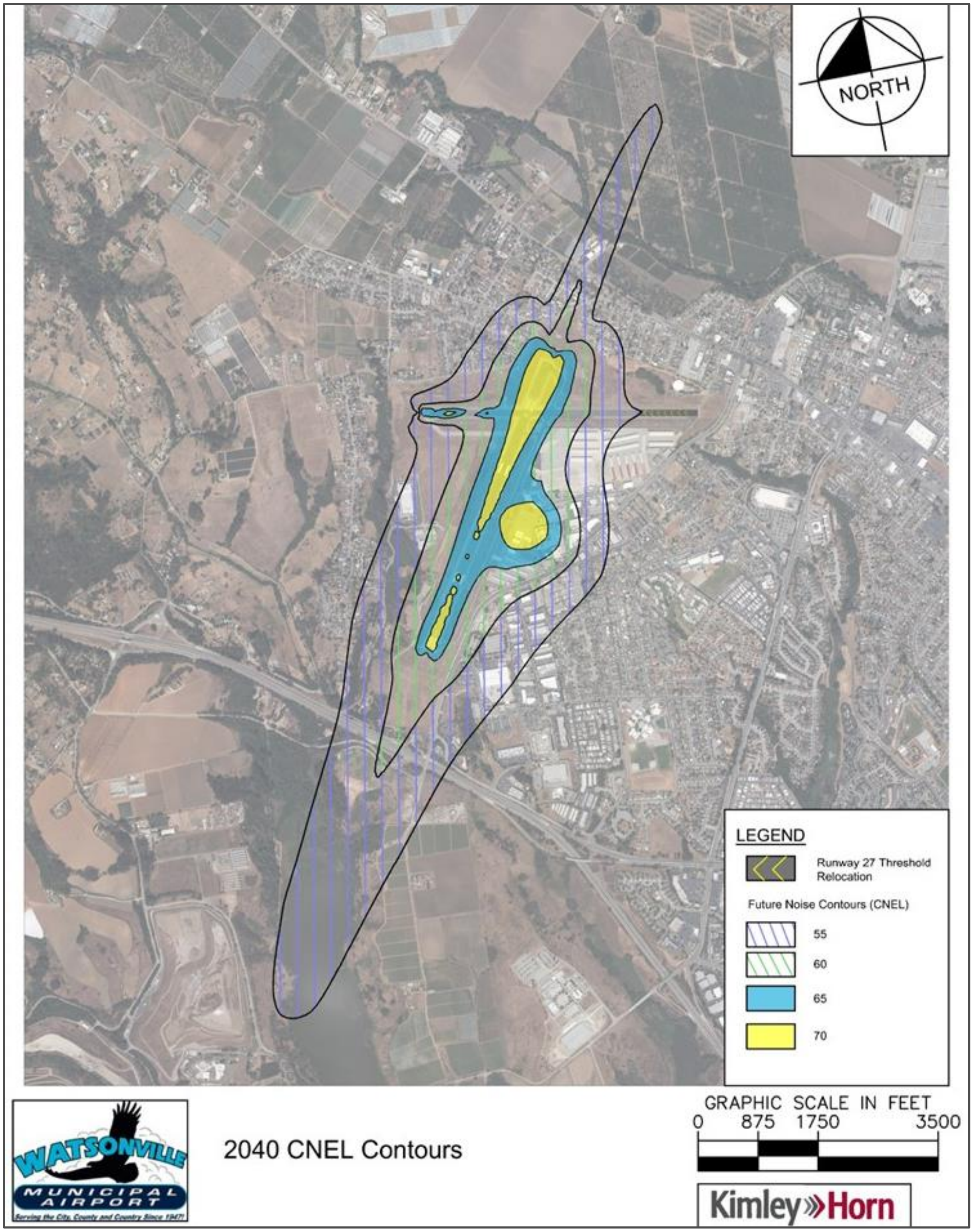


Figure B-5: 2040 Noise Contours



B.1.2 Wildlife Hazard Attractants

Airport owners have a legal responsibility to ensure that airports maintain a safe operating environment. To address these federal mandates, the FAA has released a series of ACs to provide guidance and standards for airport owners. Key ACs utilized in the review for the MPU include:

- 150/5200-32B, Reporting Wildlife Aircraft Strikes
- 150/5200-33B, Hazardous Wildlife Attractants on or Near Airports
- 150/5200-34A, Construction or Establishment of Landfills near Public Airports
- 150/5200-36A, Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports (Change 1)
- 150/5220-25, Airport Avian Radar Systems (Change 1)

Based on the guidance described above, land use practices and habitats are the key factors in determining the wildlife species and populations that are attracted to airport environments. The FAA recommends a minimum separation distance of five statute miles between the farthest edge of an airport's air operations area (AOA) and known hazardous wildlife attractants.

Land use practices that present the most acute threat to aircraft safety include waste disposal operations, water management facilities (including stormwater management facilities and wastewater treatment facilities), wetlands, and dredge spoil containment areas (if those areas include standing water or the spoils contain materials attractive to wildlife), agricultural activity, and golf courses (Clear & Dolbeer, 2005). While the FAA guidance states "*even small facilities, such as fast food restaurants, taxicab staging areas, rental car facilities, aircraft viewing areas, and public parks, can produce substantial attractions for hazardous wildlife*" different facilities may be more likely to contribute than others depending on the unique factors of the area. For WVI, pilots have reported that the landfills, slough, and Pinto Lake are the primarily attractant for birds within the traffic pattern at the Airport. It should be noted that the FAA Wildlife Strike Database lists 11 bird strikes since 1998 (accessed January 26, 2021). **Table B-5** lists potential wildlife hazard attractants adjacent to the Airport.

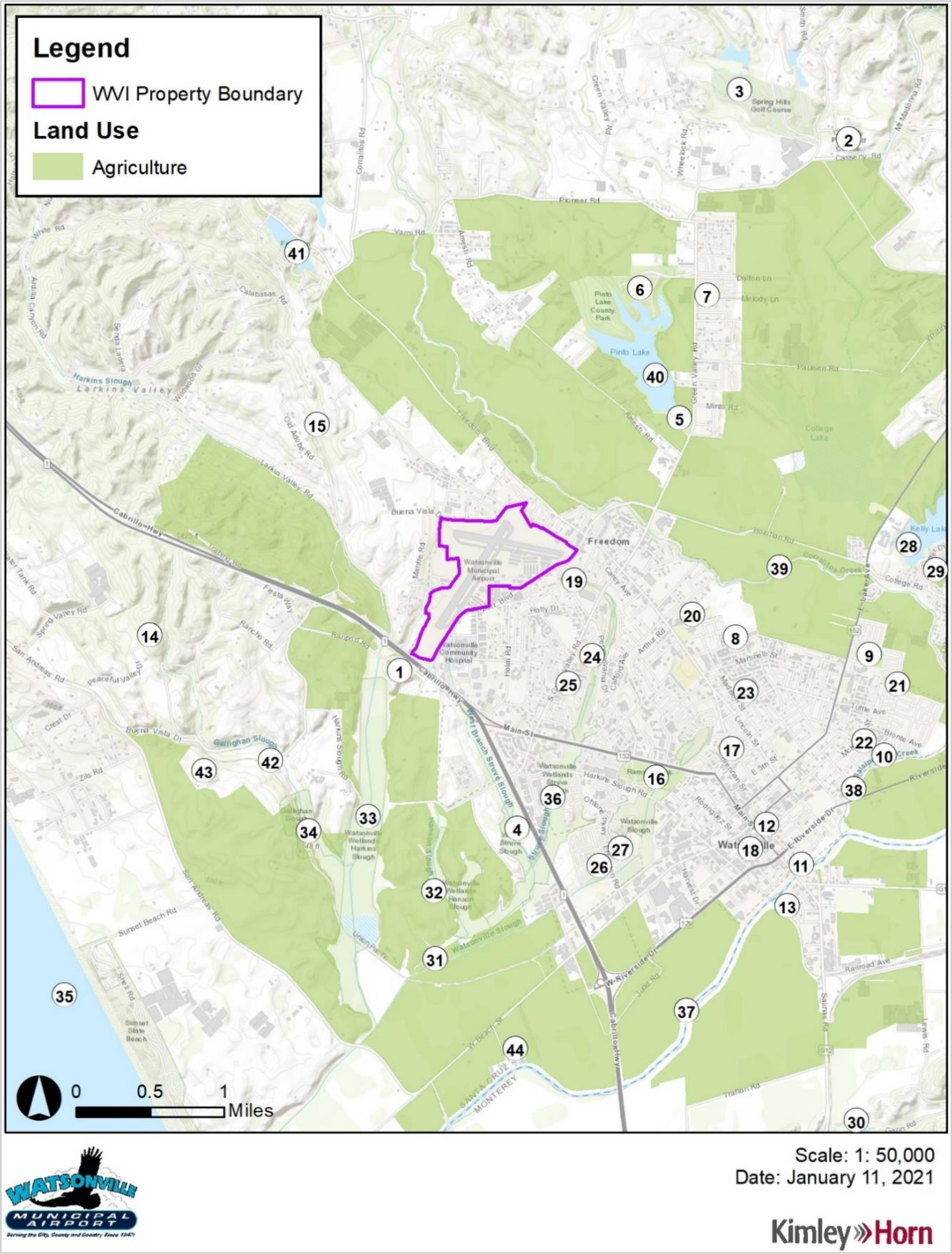
Table B-5: Potential Wildlife Hazard Attractants Adjacent to WVI

Map ID	Wildlife Hazard	Type	Location
1	Pacific Golf Centers	Golf Course	101 Ranport Rd
2	Casserly Par 3 Golf Course	Golf Course	626 Casserly Rd
3	Spring Hills Golf Course	Golf Course	501 Spring Hills Dr
4	Watsonville State Wildlife Area	Park	Lee Rd and Harkins Slough Rd
5	Pinto Lake City Park	Park	451 Green Valley Rd
6	Pinto Lake County Park	Park	757 Green Valley Rd
7	Mesa Village Park	Park	790 Green Valley Road
8	Crestview Park	Park	Crestview Dr and Brewington Ave
9	Franich Park	Park	Vista Montana Dr and Menasco Dr
10	Atri Park	Park	Atri Ct and Delta Way
11	Linear Park	Park	E. Front St between Union St and Marchant St
12	Watsonville Plaza	Park	358 Main St
13	Pajaro Park	Park	24 San Juan Rd
14	Santa Cruz Long-Toed Salamander Ecological Reserve	Park	Peaceful Valley Dr

Map ID	Wildlife Hazard	Type	Location
15	Castro Adobe State Historic Park	Park	184 Old Adobe Rd
16	Ramsay Park	Park	1301 Main St
17	Callaghan Park and Cultural Center	Park	225 Sudden St
18	Marinovich Park	Park	120 2nd St
19	Cherry Blossom Park	Park	41 Loma Prieta Ave
20	Arista Park	Park	52 Artisa Ct
21	Joyce-McKenzie Park	Park	500 Joyce Dr
22	Bronte Park	Park	615 Bronte Ave
23	Flodberg Park	Park	Between Alvarado St and Montecito St
24	Hope Drive Park	Park	76 Hope Dr
25	Peace Drive Park	Park	62 Peace Dr
26	Seaview Ranch Park	Park	105 Lighthouse Dr
27	Las Brisas Park	Park	1028 Nueva Vista Ave
28	Kelly Lake	Water Body	Between Cutter Dr and E. Lake Ave
29	Drew Lake	Water Body	Between Cutter Drive and Lakeview Rd
30	Warner Lake	Water Body	Between Salinas Rd and Garin Rd
31	Watsonville Slough	Water Body	Adjacent to W Beach St
32	Hanson Slough	Water Body	Adjacent to Lee Rd
33	Harkins Slough	Water Body	Adjacent to Larkin Valley Rd and Harkins Slough Rd
34	Galligan Slough	Water Body	Between Buena Vista Dr and Harkins Slough
35	Monterey Bay	Water Body	Approximately 3 miles southwest of Airport
36	Struve Slough & West Branch	Water Body	From Whitney Dr to Watsonville Slough
37	Pajaro River	Water Body	Approximately 2.75 miles southeast of Airport
38	Salsipuedes Creek	Water Body	Approximately 2.5 miles southeast of Airport
39	Corralitos Creek	Water Body	Approximately 0.25 miles north of Airport
40	Pinto Lake	Water Body	Approximately 1.1 miles northeast of Airport
41	Corralitos Lagoon	Water Body	Approximately 2 miles northwest of Airport
42	Santa Cruz County Disposal Center (Slated for closure by 2034)	Landfill	1231 Buena Vista Drive
43	City of Watsonville Landfill	Landfill	730 San Andreas Road
44	City of Watsonville Wastewater Plant	Wastewater	500 Clearwater Lane
	Agricultural Land	Agriculture	North, east, south, and west of Airport

Source: Google Earth, City of Watsonville Parks and Recreation Facilities Finder (accessed on August 12, 2020)

Figure 6: Potential Wildlife Hazard Attractants Adjacent to WVI



WVI conducted a Wildlife Hazard Assessment (WHA), which was reviewed by the FAA in 2015. Based on the WHA, the FAA determined that there was enough wildlife activity in the area to warrant the development of a Wildlife Hazard Management Plan (WHMP). As part of their review, the FAA want to highlight a few items they saw as well as recommend that WVI begin the process of obtaining the necessary permits to harass (non-lethal methods) and/or take (lethal methods) wildlife and complete the necessary training for that effort. Items noted by the FAA include:

- The Airport should begin improving and completing a proper perimeter fence.
- The Airport needs to prevent the creation of new permanent water basins.
- The Airport should inspect and maintain property/structures better to discourage loafing and nesting by birds.

The WHMP was completed in 2016 and include several actions for staff to following, including:

- Identifying staff for an Airport Wildlife Hazard Management Team
- Wildlife Observation and Reporting Procedures
- Obtain the supplies necessary to control wildlife including permits, baits, pistol launchers, screamers, personal safety equipment, binoculars, identification guides, logbook, and cages
- Modify habitats to make them less attractant to hazardous wildlife
  - Maintain height of grass and turf areas
  - Remove trees and shrubs near northern airport boundary
  - Identify appropriate methods of stormwater management in new development area to avoid open water
- Provide ongoing maintenance and inspection of perimeter fence
- Install remaining perimeter fence on west fence
- Continue harassment methods including using vehicles, aerial pyrotechnics, whistlers, and squawk boxes

B.1.3 Water Resources

Water resources on or near airport property have several implications for airport operations and development. In addition to the wildlife hazard risks associated with open sources of water, airport development can affect floodplains and the potential for flooding in a project's vicinity; this includes federally protected waters of the U.S., wetlands, wild and scenic rivers, and groundwater/stormwater management. Airport owners are thus obligated to evaluate how projects could impact regional hydrology and implement the appropriate measures to reduce or eliminate adverse impacts to water resources.

B.1.3.1 Floodplains

Executive Order 11988, *Floodplain Management*, defines a floodplain as an "area subject to a one percent or greater chance of flooding in a given year." Federal agencies must "take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health and welfare, and restore and preserve the natural and beneficial values served by floodplains" (FEMA, 2015). The U.S. Department of Transportation (U.S. DOT) Order 5650.2, *Floodplain Management and Protection*, provides the policies and procedures for implementing the Executive Order. The guidance is designed to minimize or mitigate any adverse impacts associated with floods and to avoid encroaching on the 100-year floodplain.

The Federal Emergency Management Agency (FEMA) is the federal agency charged with floodplain management. To support the National Flood Insurance Program, FEMA has published Flood Insurance Rate Maps (FIRM) to delineate floodplains and show an area's base flood elevations and floodplain boundaries. The California Department of Water Resources Floodplain Management Branch coordinates the state's participation in and compliance with the National Flood Insurance Program.

The Airport is located on FEMA flood insurance rate map (FIRM) 06087C0391E, effective May 16, 2012, and (FIRM) 06087C0383E, effective May 16, 2012. As seen in **Figure B-5**, the FIRMs indicate that the Airport and the immediate surroundings are in an area of minimal flood hazard.

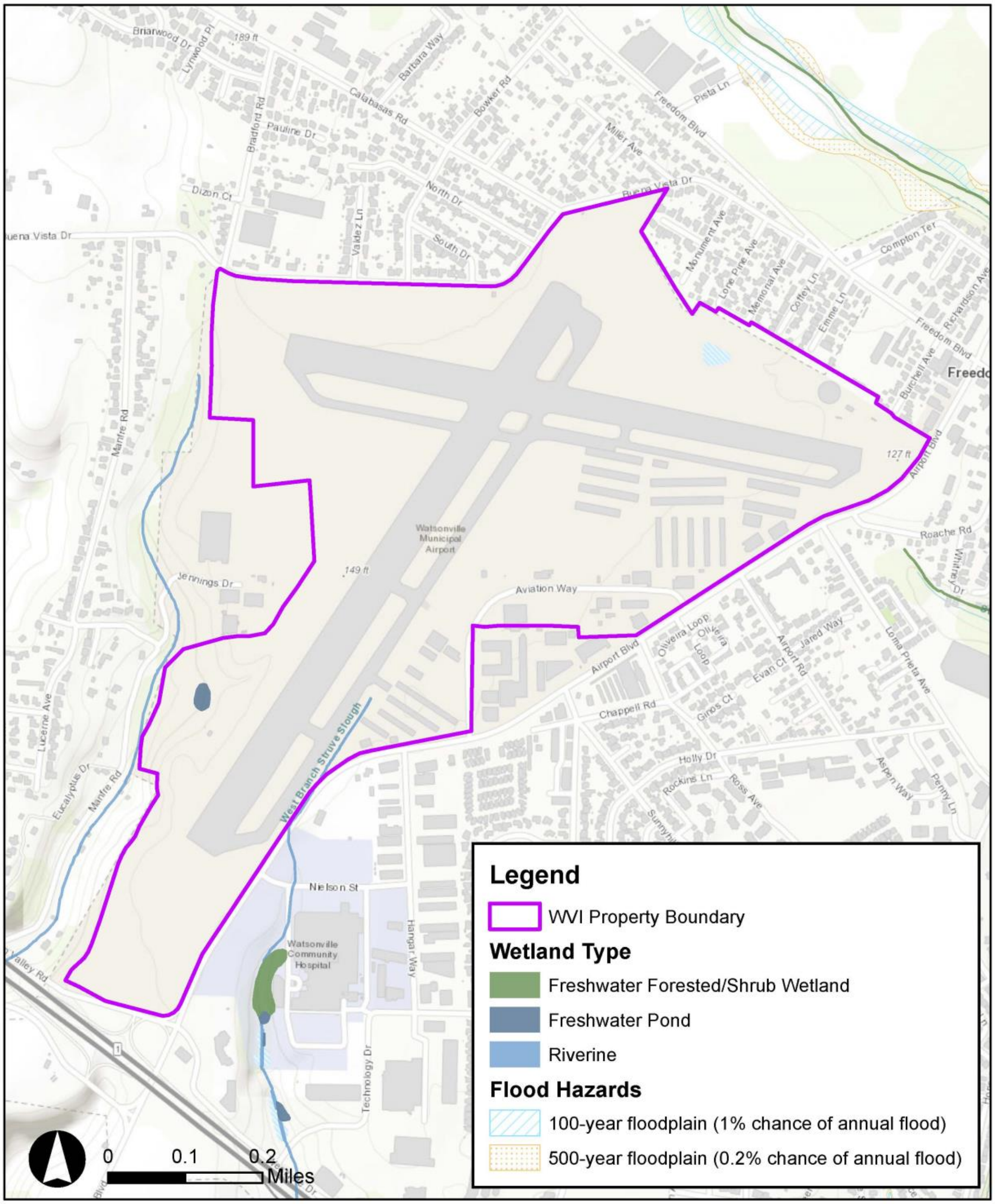
B.1.3.2 Wetlands/Waters of the U.S.

Wetlands and jurisdictional "waters of the U.S." are protected under Sections 401 and 404 of the Clean Water Act (33 U.S.C. 1251, et seq. [CWA]) and Executive Order 11990, *Protection of Wetlands*. The U.S. DOT developed Order 5660.1A, *Preservation of the Nation's Wetlands*, to provide additional guidance to transportation agencies regarding wetlands. These mandates require that Federal agencies avoid impacts to wetlands to the greatest extent possible. If impacts are unavoidable, the agencies must explain that no practical alternative exists and provide measures to mitigate the proposed development's unavoidable impacts.

The U.S. Army Corp of Engineers (U.S. ACE) is primarily responsible for protection, with additional jurisdictional authority provided by the U.S. Fish and Wildlife Service (U.S. FWS), National Marine Fisheries Service (NMFS), Natural Resource Conservation Service (NRCS), and U.S. Environmental Protection Agency (U.S. EPA). Several state agencies, most notably the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCB) operating under the California Environmental Protection Agency (California EPA) also have authority over California's wetland resources.

Figure B-5 illustrates wetlands on or near Airport property. As shown, there is a small area on the northeast corner of Airport property that is considered part of a 100-year floodplain, and a portion of the West branch Struve Slough runs into Airport property near the southern boundary. Along the slough, on the outside of southern boundary of the Airport property, there is a wetland area and a freshwater pond. There is another freshwater pond and riverine that runs outside of the western boundary of the Airport property. As a matter of note, this cursory inventory of wetlands has an inherent margin of error due to the nature of aerial imagery. A detailed ground inspection would be needed to confirm the presence and extent of any wetlands on or near the Airport.

Figure B-7: Floodplains and Wetlands at WVI



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B.1.3.3 Groundwater and Stormwater Management

The California Water Boards (collectively referring to the SWRCB and the RWQCBs) and the U.S. EPA regulate runoff and the treatment of stormwater in California. The U.S. EPA delegated authority to the California Water Boards for the implementation of the CWA. Most notably, the California Water Boards are responsible for regulating stormwater discharges under the National Pollutant Discharge Elimination System (NPDES) Permitting Program. Additionally, California agencies, including the City of Watsonville Airport Department, are subject to the provisions of the California Water Code and Porter-Cologne Water Quality Control Act.

The Airport presently complies with the State of California's NPDES General Permit for Storm Water Discharges associated with Industrial Activities (Order 2014-0057-DWQ as amended by Order 2015-0122-DWQ) (US EPA, 2020). The General Industrial Permit requires the implementation of management measures that will achieve the performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT). The General Industrial Permit also requires the development of a Stormwater Pollution Prevention Plan (SWPPP) and a monitoring plan. Through the SWPPP, sources of pollutants are to be identified and the means to manage the sources to reduce stormwater pollution are described.

There are four offsite drainage inlets onto the Airport property. None of these offsite drainage inlets contributes water to the Airport's industrial storm water monitored drainage area. All these offsite waters flow across non-industrial areas of the Airport. There are seven drain outlets that discharge from the Airport. These outlets handle the majority of the storm water discharge from the Airport. There is a very small amount of storm water that sheets onto Aviation Way and into Harkins Slough. The only storm water exposed to industrial activity, Drainage Area L, discharges the Airport at Storm Water Sample Point KWVI 01 (City of Watsonville, 2020).

Industrial materials and activities at WVI that could contribute pollutants to stormwater runoff include aviation fuels, oil, grease, solvents, and coolant used for airplane maintenance; waste oil; batteries; and aircraft tires. The SWPPP does include Best Management Practices (BMPs) to mitigate the risk of stormwater pollution. BMPs include sweeping impervious surfaces with a regenerative air street sweeper once per month during the dry season and twice per month during the wet season, biannual stormwater presentations at monthly staff meetings, and vehicle inspections for leakage.

Water supply demands in the region are met by a "conjunctive use" system, where surface water and groundwater storage are used jointly. Groundwater is sourced from the Pajaro Valley Basin and is the primary water source. When available, surface water is used from the Corralitos and Browns Creeks. The City of Watsonville does not purchase or import water (City of Watsonville, 2016). The Pajaro Valley Water Management Agency maintains active groundwater recharge programs, like the Harkins Slough Facility (Pajaro Valley Water Management Agency, 2019).

Sewage is conveyed from the Airport to the Watsonville Wastewater Treatment Facility operated by the City of Watsonville. Located in southwest Watsonville, this wastewater treatment facility treats approximately 6.7 million gallons per day. It has the permits to treat up to 12 million gallons per day (City of Watsonville, 2016).

According to the State Water Resource Control Board (SWRCB) water quality website, the area surrounding the Airport does contain waters listed in the CWA, Section 303(d) list (i.e., Impaired Waters List). The nearest body of water included on the Impaired Waters List is the Corralitos/Salsipuedes Creek, approximately 0.25 miles northeast of the Airport. A Total Maximum Daily Load (TMDL) for fecal coliform concentrations was adopted by the U.S. EPA in 2012. A TMDL for nitrogen compounds and orthophosphate was adopted in 2016 (US EPA, 2016). The City of Watsonville and County of Santa Cruz are the responsible parties for revising their Stormwater Management Plans and monitoring receiving water and stormwater outfalls. The Watsonville Slough, approximately 1.5 miles southeast of the Airport and its tributaries also have a TMDL for nitrate and orthophosphate (US EPA, 2016). In addition, the entire Pajaro River, approximately 2.75 miles southeast of the Airport, has a TMDL for additive toxicity, chlorpyrifos, diazinon, dissolved oxygen, fecal coliform concentrations, nitrate, and orthophosphate, and sediment toxicity (US EPA, 2016).

B.1.3.4 Wild and Scenic Rivers

Wild and scenic rivers are defined as having "remarkable scenic, recreational, geologic, fish, wildlife, historic or cultural value." The U.S. Department of the Interior (DOI) and U.S. Department of Agriculture (USDA) implement the Wild and Scenic Rivers Act (16 U.S.C. Sections 1271-1287), which strives to balance river development with permanent protection of the country's most outstanding, free-flowing rivers. In conjunction with the National Park Service (NPS), these agencies manage the Wild and Scenic Rivers System (WSRS) and the National River Inventory (NRI).

A segment of the Big Sur River, located within Pfeiffer Big Sur State Park approximately 45 miles south of the Airport, is designated as a wild and scenic river (National Wild and Scenic Rivers System, n.d.). However, this river is not located within proximity of the Airport and would therefore not be at risk from Airport development.

B.1.4 Section 4(f) and 6(f) Resources

Section 4(f) of the U.S. DOT Act of 1966 (Title 49, U.S.C. Section 1653(f); amended and recodified in 49 U.S.C. Section 303) states that the Secretary of Transportation will not approve any program or project that requires the use of publicly-owned land from a park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land from a historic site of national, state, or local significance unless there is no feasible alternative that would avoid such use and the program includes all possible planning efforts to minimize resultant harm.

Section 6(f) of the Land and Water Conservation Fund Act (L&WCFA) (16 U.S.C. Section 4601 et. seq.; Title 36 C.F.R. Part 59) prohibits the conversion of lands purchased with L&WCFA funds to non-recreational uses without the explicit approval of the Secretary of the DOI through the NPS and the replacement of those lands with a reasonable equivalent. There are several public parks and recreation areas surrounding the Airport, including:

- Cherry Blossom Park, between Loma Prieta Avenue and Cherry Blossom Drive
- Hope Drive Park, on Hope Drive
- Peace Drive Park, between Green Valley Road and Peace Drive
- Arista Park, off Arista Lane
- Crestview Park, at the corner of Brewington Avenue and Crestview Drive
- Flodberg Park, between Alvarado Street and Montecito Avenue
- Pinto Lake City Park, off Green Valley Road between Dick Phelps Road and Behler Road
- Pinto Lake County Park, between Green Valley Road and Kilewer Lane
- Mesa Village Park, between Hathaway Avenue and Arroyo Drive on Green Valley Road
- Franich Park, at the corner of Franich Drive and Vista Montana Drive
- Joyce-McKenzie Park, between Joyce Drive and Secoya Street
- Callaghan Park, between Sudden Street and Brennan Street on Freedom Boulevard
- Marinovich Park, on 2nd Street
- Muzzio Park, at the corner of Rodriguez Street and Front Street
- Linear Park, between Front Street and the Pajaro River
- Pajaro Park, at the end of San Juan Road
- Berlanga Park, at the end of Stender Avenue
- Cayetano Park, at the corner of Florence Avenue and Cayetano Street
- Seaview Ranch Park, between Bree Lane and Lighthouse Drive
- Las Brisas Park, at the corner of Lighthouse Drive and Nueva Vista Avenue
- Watsonville State Wildlife Area, at the corner of Harkins Slough Road and Cabrillo Highway
- Castro Adobe State Historic Park, at the end of Old Adobe Road

Additional future research would be needed to determine if any L&WCFA funds were used in the development of these or other nearby recreational facilities. Future Airport development actions must consider the potential for direct and constructive-use impacts to any local Section 4(f) or Section 6(f) resources.

B.1.5 Air Quality

The U.S. EPA is the federal agency that has jurisdiction over air quality issues and regulations. The federal Clean Air Act (CAA) (42 U.S.C. Sections 7401-7671q) established National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants. These six pollutants are carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter (PM), and sulfur dioxide. NAAQS compliance means that ambient outdoor levels of these pollutants are safe for public health and the environment. States with pollutant levels exceeding the NAAQS must prepare a State Implementation Plan (SIP) to improve air quality.

In accordance with the 1989 Health and Safety Code (HSC) section 39607(e), the Air Resource Board (ARB) is responsible for California's compliance with the CAA. In conjunction with the six pollutants regulated by the NAAQS, the ARB has established additional pollution standards for visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. In general, the state standards established for California by the ARB are more rigorous than the NAAQS. These state-specific standards are known as the California Ambient Air Quality Standards (CAAQS).

WVI is within the North Central Coast Air Basin, which encompasses the counties of Monterey, San Benito, and Santa Cruz. The Monterey Bay Air Resources District (MBARD) is responsible for air quality in the North Central Coast Air Basin and is required to develop an attainment plan. **Table B-6** provides the federal and state attainment status of the North Central Coast Air Basin, with all pollutants identified as within attainment for federal status but many are in nonattainment regarding state designation. It should be noted that although the North Central Coast Air Basin meets Attainment standards for lead emissions, the Airport sells unleaded AvGas (UL94) to further reduce the lead emissions related to aviation activity. WVI received a letter of endorsement from the EPA's regional office supporting the Airport's efforts.

Table B-6: Attainment Status for the North Central Coast Air Basin

Pollutant	State Designation	Federal Designation
Ozone (O_3)	Nonattainment-Transitional	Attainment
Inhalable Particulates (PM_{10})	Nonattainment	Attainment
Fine Particulates ($PM_{2.5}$)	Attainment	Attainment
Carbon Monoxide (CO)	Monterey County – Attainment	Attainment
	San Benito County – Unclassified	Attainment
	Santa Cruz County – Unclassified	Attainment
Nitrogen Dioxide (NO_2)	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Lead	Attainment	Attainment

Source: MBARD Air Quality Management Plan 2012-2015 (Accessed on August 20, 2020)

Note: Attainment = Meets federal/state standards; Nonattainment = Does not meet federal/state standards; Unclassified = no data available

Air quality regulations also focus on toxic air contaminants (TACs). In general, air toxics that may cause cancer have no threshold concentration below which risks do not occur. However, standards for carcinogenic air toxics are established to reflect increased risks of one-in-one million to one in 10,000, which are the values identified as de minimis by regulatory agencies. Both the U.S. EPA's and California Air Resources Board's (CARB) regulation of hazardous air pollutants (HAPs) and TACs typically reflect the de minimis risk levels noted above, while also generally requiring the use of either the maximum available control technology or best available control technology (BACT) to limit emissions (note: when BACT is applied to TACs, it is known as T-BACT).

At the federal level, Title III of the CAA amendments requires the U.S. EPA to circulate National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for the regulation of HAPs from stationary sources. Currently, there are over 125 different stationary sources types regulated under NESHAPs. The CAA amendments also required the U.S. EPA to issue vehicle or fuel standards containing reasonable requirements to control HAP emissions, applying at a minimum to benzene and formaldehyde. Performance criteria were established to limit HAPs mobile source emissions, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 of the CAA amendments also required the use of reformulated gasoline in selected U.S. cities (those with the most severe ozone nonattainment conditions) to further reduce mobile-source emissions, including air toxics emissions.

TACs in California are primarily regulated through the Tanner Air Toxics Act and the Air Toxics Hot Spots Information and Assessment Act of 1987, also known as the Hot Spots Act. The Tanner Act sets a formal procedure for CARB to designate substances as TACs. To date, CARB has adopted the U.S. EPA's list of HAPs as TACs, as well as identified more than 21 additional TACs. Once a TAC is identified, CARB adopts an Airborne Toxic Control Measure (ATCM) for sources that emit that particular TAC. If there is a concentration below which health effects are not likely to occur, the ATCM must reduce exposure below that threshold. If there is no safe concentration below which adverse health effects are not likely to occur, the measure must incorporate T-BACT to minimize emissions. The Hot Spots Act requires existing facilities that emit toxic substances above a specified level to prepare a toxic emissions inventory; conduct a risk assessment if emissions are significant; notify the public of significant risk levels; and prepare and implement risk reduction measures. CARB adopted a comprehensive Risk Reduction Plan in 2000 after identifying DPM as a TAC. Pursuant to this plan, CARB adopted diesel-exhaust control measures and stringent emissions standards for various on-road and off-road sources of diesel emissions. Rules include the Public Transit Bus Fleet Rule and Emissions Standards for New Urban Buses, the California Diesel Fuel Regulations, On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation, and the In-Use Off-Road Diesel Vehicle Regulation.

B.1.6 Greenhouse Gas Emissions

The following discussion highlights and summarizes key policies and regulations regarding the reduction of greenhouse gas (GHG) emissions that have been adopted at the international, federal, and state levels.

B.1.6.1 National and International Regulations

B.1.6.1.1 International Civil Aviation Organization

The International Civil Aviation Organization (ICAO) was created in 1944 to promote the safe and orderly development of international civil aviation. It sets standards and regulations necessary for aviation safety, security, efficiency and regularity, as well as for aviation environmental protection. ICAO serves as the forum for cooperation in all fields of civil aviation among its 193 Member States.

In October 2016, a global agreement reached by the 39th Session of the ICAO Assembly established the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). This agreement set an international aviation GHG emissions reduction target of 50% by 2050, relative to 2005 levels, with an overall goal of carbon-neutral growth from 2020 onwards. Under CORSIA, and subject to phased implementation, airlines will be required to buy carbon offsets to compensate for their growth in CO_2 emissions associated with international air travel.

B.1.6.1.2 U.S. Aviation Greenhouse Gas Emissions Reduction Plan

The United States is committed to addressing the climate change impacts of commercial aviation and is pursuing a multi-pronged approach to achieve GHG emissions reductions.[2] The Aviation Greenhouse Gas Emissions Reduction Plan,[3,4] which was submitted to ICAO as the U.S. Action Plan, identifies actions and progress toward GHG emission reductions in each of the following areas:

- Aircraft and Engine Technology Improvement: There are multiple technology initiatives dedicated to developing technology with significantly improved fuel burn and lower GHG emissions. These include the FAA CLEEN program described below, the National Aeronautics and Space Administration (NASA) Environmentally Responsible Aviation and Advanced Air Transport Technology projects, and U.S. Air Force research and testing on vehicle efficiency improvements (e.g., through the Adaptive Engine Technology Development program) that can often transition into development of commercial products that are utilized by the civil fleet.
- Operational Improvements: Implementation of the FAA's NextGen plan will allow for more efficient aircraft operations and reduced GHG emissions through operational improvements. Many foundational and infrastructure elements are expected to be in place in the near-term, providing critical NextGen capabilities or infrastructure upon which future NextGen capabilities will be built.
- Alternative Fuels Development and Deployment: The United States is actively supporting and facilitating the development and deployment of sustainable alternative jet fuels with lower life-cycle GHG emissions than conventional petroleum fuel. Thus far, the standard setting organization ASTM International has approved three alternative jet fuels for use in aviation. Research is ongoing to pursue additional approvals and also examine the viability of regional supply chains and chart a path for overcoming barriers to production.
- Policies, Standards, and Measures: The United States is pursuing a variety of policies, standards, and measures that will supplement efforts on technology, operations and fuels to further reduce aviation emissions. The United States is focused on two items: (1) The development of a meaningful CO_2 standard in ICAO for implementation in the United States, and (2) working with ICAO on the development of a proposal for a Global Market-Based Measure (GMBM) to serve as a gap filler to address international aviation GHG emissions.
- Scientific Understanding and Modeling/Analysis: The FAA is continually improving its modeling and analysis tools to better understand and assess the environmental impacts of aviation.

B.1.6.1.3 Federal Aviation Administration

According to the 2014 United States Climate Action Report, the FAA is pursuing a comprehensive approach to reduce GHG emissions from commercial aviation through aircraft and engine technology development, operational improvements, development and deployment of sustainable alternative jet fuels, and additional policies and measures.[5] FAA's Next Generation Air Transportation System Plan, or NextGen, focuses its efforts on increasing efficient aircraft operations and reducing GHG emissions through airspace, operational, and infrastructure improvements. FAA funds diverse programs to

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[2] United States of America. 2012. U.S. Aviation Greenhouse Gas Emissions Reduction Plan (2012) Submitted to the International Civil Aviation Organization, June 2012. Available at: https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/media/Aviation_Greenhouse_Gas_Emissions_Reduction_Plan.pdf. Accessed: April 2019.

[3] Ibid.

[4] United States of America. 2015. U.S. Aviation Greenhouse Gas Emissions Reduction Plan (2015) Submitted to the International Civil Aviation Organization, June 2015. Available at: https://crp.trb.org/acrp0267/united-states-aviation-greenhouse-gas-emissions-reduction-plan/. Accessed: April 2019.

[5] United States of America. 2014 United States Climate Action Report. Available at: https://www.globalchange.gov/browse/reports/us-climate-action-report-2014. Accessed: April 2019.

improve aviation energy and emissions performance, and coordinates with other agencies as appropriate, including NASA The following are some examples of FAA programs:

- The Continuous Lower Energy, Emissions, and Noise (CLEEN) program is a collaborative partnership between the FAA and aviation manufacturers to develop technologies that will reduce emissions and fuel burn, as well as expedite the integration of these technologies into current aircraft.
- The Aviation Climate Change Research Initiative (ACCRI) is an FAA program that provides guidance to develop mitigation solutions based on state-of-the-art science results. ACCRI results are key to quantifying cost–benefit analyses of various policy options. ACCRI has reduced uncertainties, leading to overall improvement in understanding of aviation's climate impacts. While ACCRI does not provide mitigation solutions on its own, recently completed ACCRI Phase II results can be used to help identify effective mitigation options.
- The Voluntary Airport Low Emissions Program (VALE) is a grant program that encourages airport sponsors to use Airport Improvement Program funds and Passenger Facility Charges to finance low-emission vehicles, refueling and recharging stations, gate electrification, and other airport air quality improvements. Under FAA's most recent reauthorization, VALE's work is supplemented by new programs that reduce airport emissions. The FAA is creating a program where, following an assessment of airport energy requirements, the FAA may make capital grants for airports to increase energy efficiency. The FAA has also established a pilot program under which certain airports may acquire and operate zero-emission vehicles.

In addition, the FAA is a founding member of the Commercial Aviation Alternative Fuels Initiative (CAAFI). CAAFI is a public–private partnership established in 2006 with the objective of advancing alternative jet fuels with equivalent safety/performance (drop-in) and comparable cost, environmental improvement, and security of energy supply for aviation. Work through CAAFI has also expanded internationally. Fuel production capability is beginning to emerge, including a recently announced airline and fuel producer agreement.

B.1.6.2 State of California Regulations

Global Warming Solutions Act

Under the California Global Warming Solutions Act, also known as Assembly Bill (AB) 32, CARB established a statewide GHG emissions cap for 2020 and adopted mandatory reporting rules for significant sources of GHG and a comprehensive plan, known as the Climate Change Scoping Plan, identifying how emission reductions would be achieved from significant GHG sources.

In 2016, Senate Bill (SB) 32 was signed into law, amending the California Global Warming Solution Act. SB 32, and accompanying Executive Order B-30-15, require CARB to ensure statewide GHG emissions are reduced to 40 percent below the 1990 level by 2030. CARB updated its Climate Change Scoping Plan in December of 2017 to express the 2030 statewide target in terms of million metric tons of carbon dioxide equivalent ($MMTCO_2e$). Based on the emissions reductions directed by SB 32, the annual 2030 statewide target emissions level for California is 260 $MMTCO_2e$.

The Scoping Plan does not contain any language, targets, or measures related to aircraft emissions. However, the California Greenhouse Gas Inventory, upon which CARB relies for establishing baseline GHG emissions and tracking progress toward emissions targets, includes emissions from intrastate aircraft operations. The baseline emissions levels and 2030 emissions target addressed in the Scoping Plan, therefore, account for intrastate flights using the Airport but not interstate or international flights.[6]

[6] CARB. California Greenhouse Gas Inventory for 2000-2017 - by Category as Defined in the 2008 Scoping Plan, Available at: https://ww3.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_sum_2000-17.pdf. Accessed August 25, 2019.

California Cap-and-Trade Program

AB 32 allowed, but did not require, CARB to include among the mechanisms intended to reduce GHG emissions a "system of market-based declining annual aggregate emission limits." The legislation required CARB to develop a Scoping Plan to describe the various mechanisms that would be used. In turn, the Scoping Plan, approved by CARB on December 11, 2008, directed CARB staff to develop, among other programs, a cap-and-trade mechanism that would apply a declining aggregate cap on GHG emissions and provide a flexible compliance system using tradable instruments.

On October 20, 2011, CARB adopted the final cap-and-trade regulation. The program started on January 1, 2012 and will proceed in "compliance phases," the first of which began on January 1, 2013. The program imposes a "cap" on the total GHG emissions from covered entities in the state and the quantity of emissions allowed under the cap decreases each year, ultimately reaching the goal of returning state-wide GHG emissions to 1990 levels by 2020.

To encourage emission sources to emit less as the cap decreases, "allowances," or permission to emit GHGs, are made available in decreasing quantities. Allowances are both freely allocated and auctioned off. The amount of freely given allowances decreases over time, and the severity of the decrease varies by industrial sector, with those thought to be less vulnerable to out-of-state competition receiving fewer allowances more quickly. Similarly, the amount of allowances available for purchase at auction decreases. The intent is to make reducing GHG emissions more financially attractive as the number of available allowances decreases, making each allowance more costly.

Senate Bill 375

SB 375, known as the Sustainable Communities Strategy and Climate Protection Act, was signed into law in September 2008. SB 375 builds upon AB 32 by requiring CARB to develop regional GHG reduction targets for automobile and light truck sectors for 2020 and 2035, as compared to 2005 emissions levels. The per-capita GHG emissions reduction targets for passenger vehicles in the San Francisco Bay Area, which were updated by CARB in 2018, include a 10 percent reduction by 2020 and a 19 percent reduction by 2035.[7]

Consistent with the requirements of SB 375, the Metropolitan Transportation Commission partnered with the Association of Bay Area Governments, Bay Area Air Quality Management District, and Bay Conservation and Development Commission to prepare the region's Sustainable Communities Strategy (SCS) as part of the Regional Transportation Plan process. The SCS is referred to as Plan Bay Area. Plan Bay Area establishes a course for reducing per-capita GHG emissions through the promotion of compact, high-density, mixed-use neighborhoods near transit.

Executive Order B-55-18

In September 2018, Governor Brown signed EO B-55-18, which established a new statewide goal "to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter."

B.1.7 Biotic Resources and Endangered Species

Biotic resources include the various types of flora (plants) and fauna (fish, birds, reptiles, amphibians, marine mammals, coral reefs, etc.) in a particular area. Biotic resources also include rivers, lakes, wetlands, forests, upland communities, and other habitat types supporting the identified flora and fauna.

Several statutes protect fish, wildlife, and plant resources of the U.S., including the Fish and Wildlife Coordination Act of 1958 (16 U.S.C. Section 661-667e), Fish and Wildlife Conservation Act of 1980 (16 U.S.C. Section 2901-2911), Migratory Bird Treaty Act of 1918 (16 U.S.C. Section 703-712), Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. Section 668-668c), and Endangered Species Act (ESA) of 1973 (16 U.S.C. Section 1531, et seq.). The ESA, as amended, was enacted to provide a program for the preservation of endangered and threatened species and the ecosystems upon which they depend for survival. The ESA requires federal agencies, including the FAA, to implement protection programs for listed species and to use their authorities to further the purposes of the Act. In California, agencies are also subject to the provisions of the

[7] CARB, SB 375 Regional Plan Climate Targets, Available at: https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets, Accessed October 13, 2019.

California Endangered Species Act of 1984 (Fish and Game Code Section 2050, et seq.) and the California Native Plan Protection Act of 1977 (Fish and Game Code Section 1900, et seq).

In March 2015, the USFWS entered into a cooperative agreement with the California Department of Fish and Wildlife (CDFW) to carry out the duties of the ESA for the endangered, threatened, and candidate fish, wildlife, and plants in the state. Under this agreement, the USFWS and CDFW agree to cooperatively enforce the mandates of the ESA and related state statutes, including law enforcement activities, funding applications, listing processes, and the provision of scientific or technical expertise.

In total, the CDFW California Natural Diversity Database reports 222 state-listed and 186 federally listed plants in the state (California Department of Fish and Wildlife, 2020). The CDFW California Natural Diversity Database reports 94 state-listed and 128 federally listed animals in the state (California Department of Fish and Wildlife, 2020). Twenty-eight federally listed threatened or endangered species are known or believed to occur in Santa Cruz County. Within WVI property, there are an estimated 18 migratory birds of concern and nine endangered species. These are listed in **Table B-7**.

Table B-7: Protected Species Potentially Within the Airport Environs

Common Name	Scientific Name	Status
Migratory Birds		
Allen's Hummingbird	Selasphorus sasin	Birds of Conservation Concern
Black Turnstone	Arenaria melanocephala	
Burrowing Owl	Athene cunicularia	
Clark's Grebe	Aechmophorus clarkia	
Common Yellowthroat	Geothlypis trichas sinuosa	
Lawrence's Goldfinch	Carduelis lawrencei	
Long-billed Curlew	Numenius americanus	
Marbled Godwit	Limosa fedoa	
Nuttall's Woodpecker	Picoides nuttallii	
Oak Titmouse	Baeolophus inornatus	
Rufous Hummingbird	Selasphorus rufus	
Short-billed Dowitcher	Limnodromus griseus	
Song Sparrow	Melospiza melodia	
Spotted Towhee	Pipilo maculatus clementae	
Tricolored Blackbird	Agelaius tricolor	
Whimbrel	Numenius phaeopus	
Willet	Tringa semipalmata	
Wrentit	Chamaea fasciata	
Amphibians		
California Red-Legged Frog	Rana draytonii	Threatened
California Tiger Salamander	Ambystoma californiense	Threatened

Common Name	Scientific Name	Status
Santa Cruz Long-Toed Salamander	Ambystoma macrodactylum croceum	Endangered
Bird		
California Least Tern	Sterna antillarum browni	Endangered
Least Bell's Vireo	Vireo bellii pusillus	Endangered
Marbled Murrelet	Brachyramphus marmoratus	Threatened
Southwestern Willow Flycatcher	Empidonax trailii extimus	Endangered
Western Snowy Plover	Charadrius nivosus	Threatened
Fish		
Tidewater Goby	Eucyclogobius newberryi	Endangered
Crustaceans		
Vernal Pool Fairy Shrimp	Branchinecta lynchi	Threatened
Mammals		
San Joaquin Kit Fox	Vulpes macrotis mutica	Endangered
Reptiles		
San Francisco Garter Snake	Thamnophis sirtalis tetrataenia	Endangered
Plants		
Marsh Sandwort	Arenaria paludicola	Endangered
Monterey Gilia	Gilia tenuiflora ssp. arenaria	Endangered
Monterey Spineflower	Chorizanthe pungens var. pungens	Threatened
Santa Cruz Tarplant	Holocarpha macradenia	Threatened
Source: USFWS IPaC Information for Planning and Conservation (accessed August 20, 2020)		

Critical habitat is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species but will be needed for its recovery. Critical habitat are areas considered essential for the conservation of a listed species. Federal agencies are required to consult with the USFWS on actions they carry out, fund, or authorize to ensure that their actions will not destroy or adversely modify critical habitat. These areas provide notice to the public and land managers of the importance of these areas to the conservation of a listed species. Special protections and/or restrictions are possible in areas where Federal funding, permits, licenses, authorizations, or actions occur or are required. Of these endangered and threatened species, there are two critical habitats on and near the Airport which contain features essential for the conservation of two threatened species: the Santa Cruz tarplant and the California red-legged frog, as seen in **Figure B-8**. **Figure B-9** displays the location of tarplant in 2013, 2016, and 2020. The Airport has worked extensively with California FWS on management of the tarplant located on the airfield and will continue to do as part of future development.

Figure B-8: Critical Habitats, including Santa Cruz Tarplant

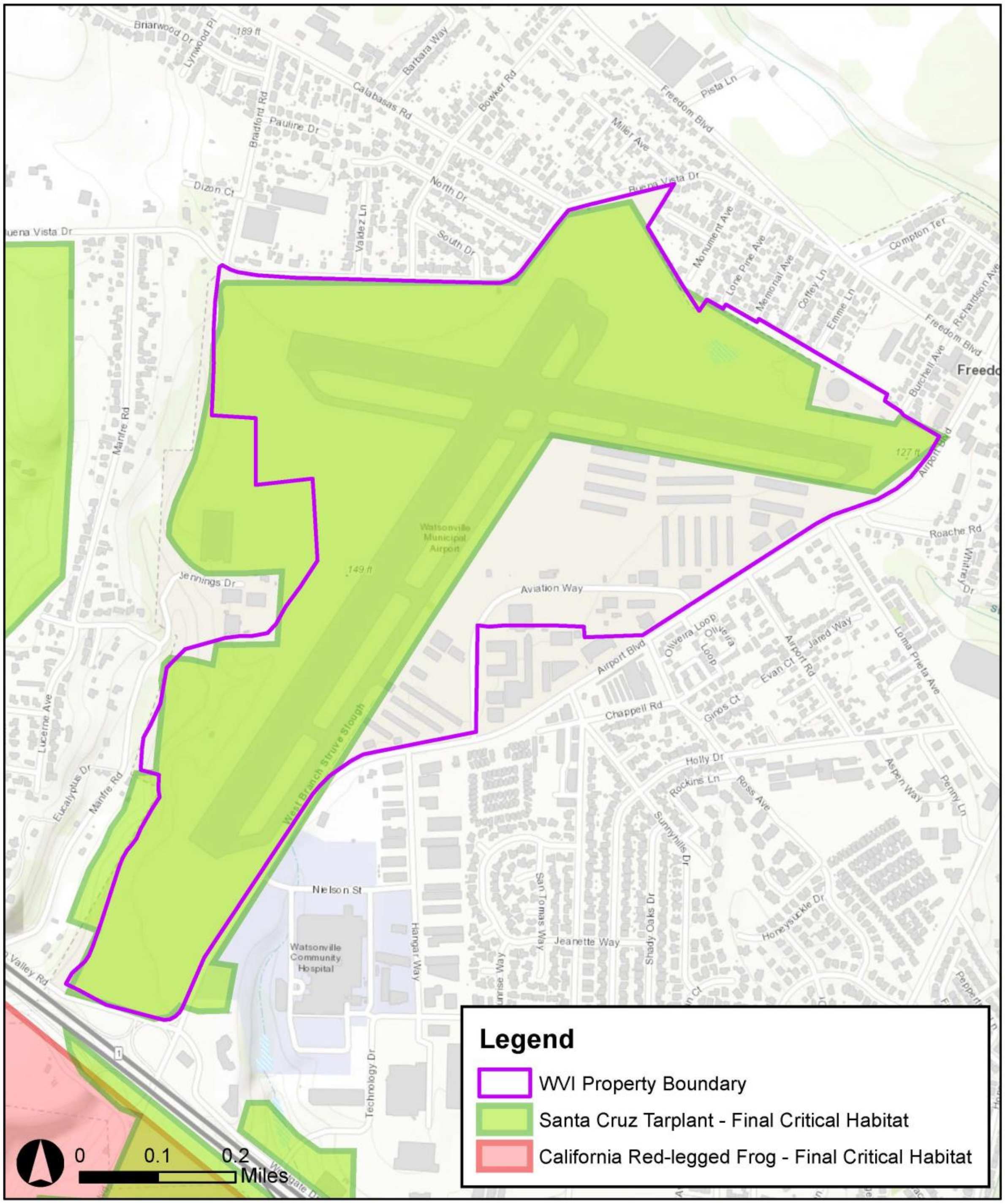

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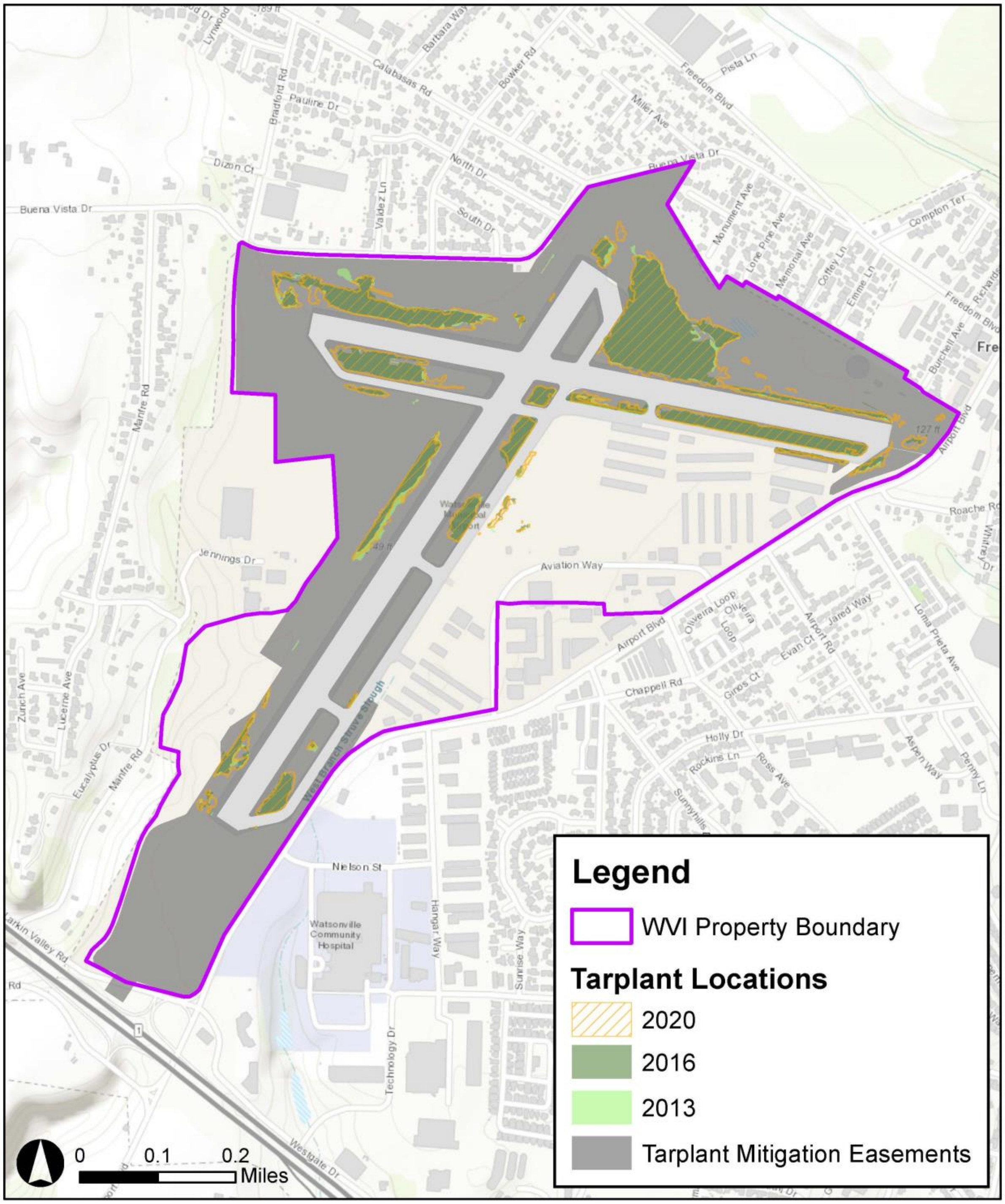
Figure B-9: Santa Cruz Tarplant Mapping from 2013 to 2020



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B.1.8 Coastal Resources

The Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. Section 1451 – 1464) provides for the management of the country's coastal resources. The CZMA is managed by NOAA Office of Coastal Zone Management. As a state-specific compendium of the CZMA, California passed the California Coastal Act (CCA) in 1976. Together, the CZMA and CCA manage and regulate all land and water in California's coastal zone. Under the state's federally approved Coastal Management Program, the California Coastal Commission manages development along the entire coast except the San Francisco Bay.

With few exceptions in urban and very rural areas, the California coastal zone is principally defined as 1,000 yards inland from the mean high-tide line (National Oceanic and Atmospheric Administration Office for Coastal Management 2016). WVI is not located within the limits of the California coastal zone[8].

B.1.9 Farmlands

The Farmland Protection Policy Act (FPPA) of 1981 (PL 90-542) authorizes the USDA to minimize federal programs' contribution to unnecessary and irreversible conversion of farmland to nonagricultural uses. Prime farmland, as defined by the USDA, is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor and without intolerable soil erosion.

FPPA guidelines apply to farmland classified as prime or unique, or of state or local importance as determined by the appropriate government agency with concurrence by the Secretary of Agriculture. Lands already committed to urban development or water storage do not meet the definition of prime or unique farmland. According to the California Department of Conservation's Important Farmland Finder, the Airport is considered Urban and Built-Up Land.

The majority of the soil on Airport property is classified by the USDA as 'prime farmland if irrigated.' However, because much of the land is already committed to urban development, the soil types are not able to meet the definition of prime or unique farmland. **Figure B-10** illustrates the soils content within the vicinity of the Airport while **Table B-8** describes the soil types and FPPA classifications.

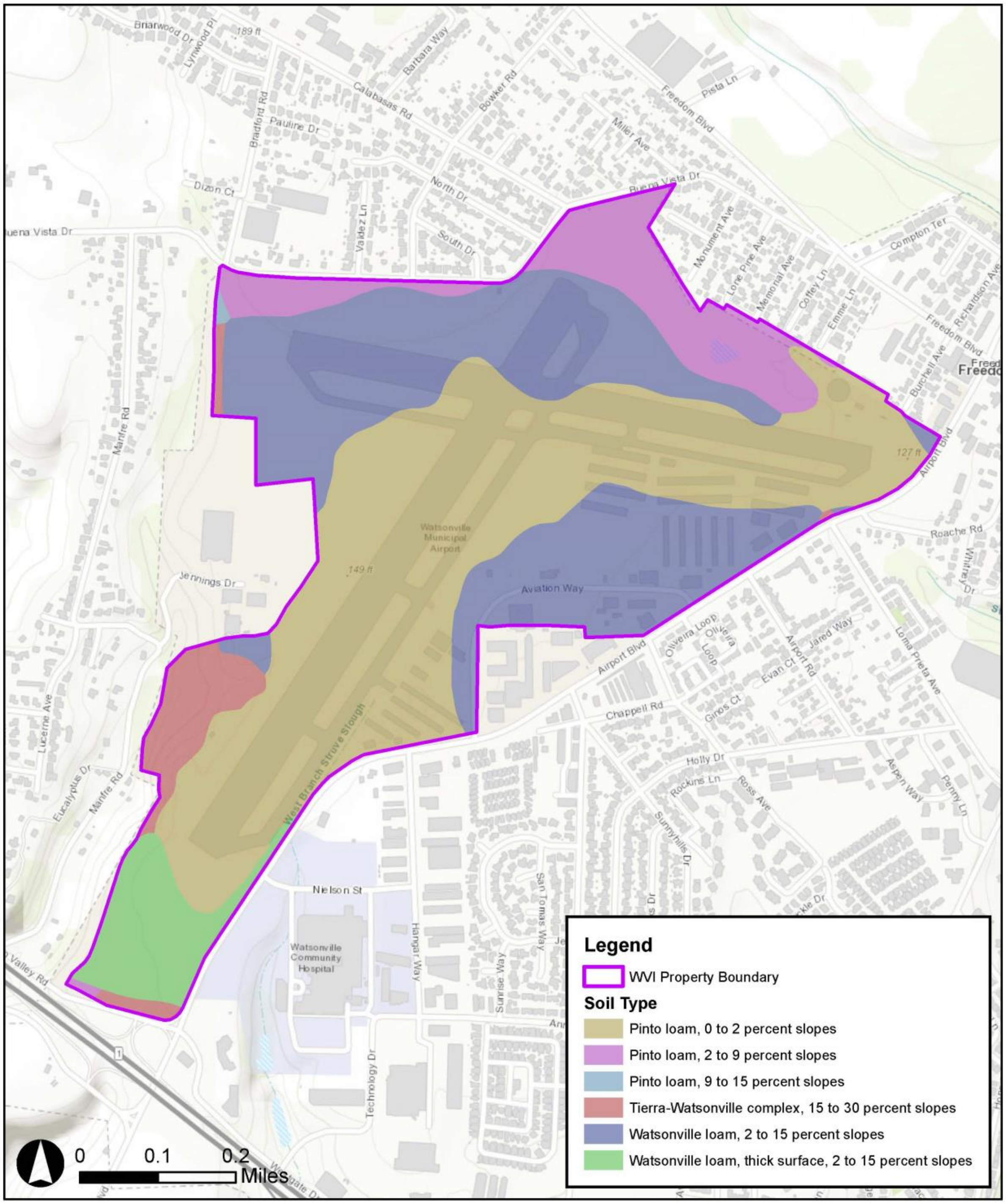
[8] *The Airport Desk Reference* notes that the agency responsible for the CZMA (i.e., California Coastal Commission and Bay Conservation and Development Commission) can determine that actions outside of the coastal zone can nonetheless impact it. Thus, the FAA recommends consultation with the CZMA agency prior to any airport actions to ensure compliance.

Table B-8: WVI Soils Inventory Data

Soil Type	Rating (FPPA)	Area in Map (Acres)	Area in Map (%)
Pinto loam, 0 to 2 percent slopes	Prime farmland if irrigated	134.4	46.3%
Pinto loam, 2 to 9 percent slopes	Prime farmland if irrigated	29.2	10.1%
Pinto loam, 9 to 15 percent slopes	Not prime farmland	0.4	0.1%
Tierra-Watsonville complex, 15 to 30 percent slopes	Not prime farmland	12.5	4.3%
Watsonville loam, 2 to 15 percent slopes	Farmland of Statewide Importance	97.3	33.6%
Watsonville loam, thick surface, 2 to 15 percent slopes	Farmland of Statewide Importance	16.3	5.6%

Source: United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey (accessed August 31, 2020)

Figure B-10: WVI Soil Types



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B.1.10 Hazardous Materials

The term 'hazardous material' is generally associated with industrial wastes, petroleum products, dangerous goods or other contaminated substances. The statutory framework regarding hazardous materials in FAA actions is provided by the Resource Conservation and Recovery Act (42 U.S.C. Section 6901, et seq. [RCRA]), the Comprehensive Environmental Response Compensation and Liability Act (42 U.S.C. Section 9601 [CERCLA]), and the Community Environmental Response Facilitation Act (Public Law [P.L.] 102-426). These statutes address the use, storage, and disposal of hazardous materials and the environmental threats caused by mishandling these materials.

Additionally, California entities that handle hazardous materials in quantities equal to or greater than 55 gallons of a liquid, 500 pounds of a solid, or 200 cubic feet of a compressed gas; extremely hazardous substances above the threshold planning quantity defined by federal statutes; or certain radioactive materials are required to comply with the Hazardous Materials Business Plan (Business Plan) program of the California HSC (Section 2550 – 25519). The Santa Cruz County Environmental Health Division administers the Business Plan Program in Santa Cruz County.

As a separate provision of the HSC (Sections 25531-25543.3), an owner or operator of a stationary source that has more than a threshold quantity of a regulated substance as defined by California Code of Regulations, Title 19 (Section 2770.5, **Tables B-3**) is also required to comply with the California Accidental Release Prevention (CalARP) program. The CalARP requires covered entities to prepare a Risk Management Plan. This plan provides first responders with the information needed to prevent or mitigate damage to public health and safety and the environment from the release of hazardous materials while satisfying community right-to-know laws.

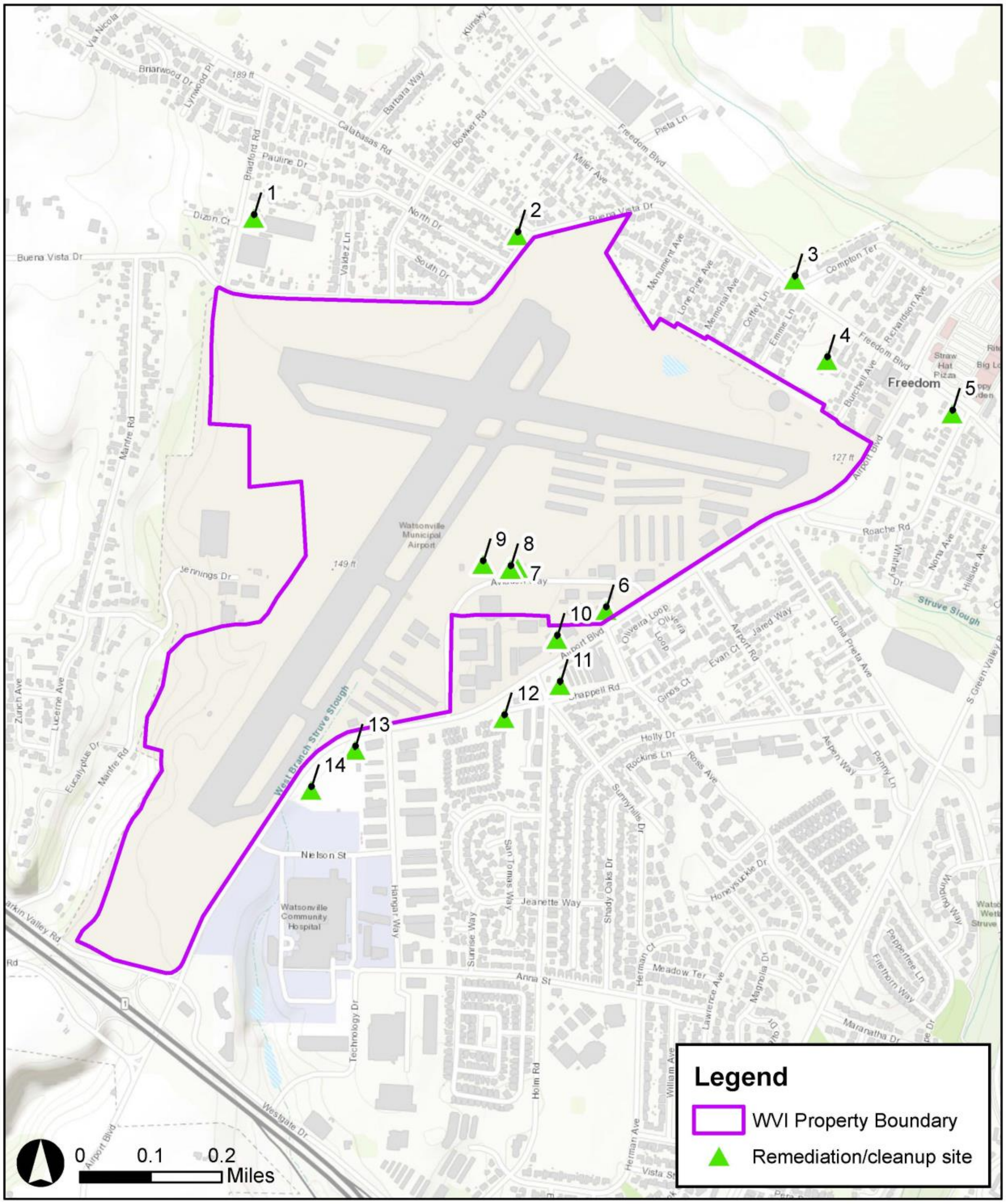
Hazardous substances in regular use at WVI include aircraft and vehicle fuels. Smaller amounts of hazardous substances are also stored on the Airport, including lubricants and solvents, used oils, filters, cleaning residues, and spent batteries, herbicides, fertilizers, paints, and de-icing fluids. Per the Airport's Minimum Commercial Standards, SASOs are responsible for storage compliance, disposal, and care of fluids or spills. Further analyses would be needed to determine if the Airport or its tenants possess a threshold quantity of the regulated substances under the Hazardous Materials Business Plan or CalARP programs.

One of the primary facets of CERCLA was to establish a trust fund to finance emergency responses and site clean-ups for significant hazardous waste sites known as the Superfund. According to the EPA's search tool[9], there are no locations on and near WVI that are Superfund sites.

The U.S. EPA also requires several additional types of hazardous sites to be reported to the agency for monitoring. The SWRCB's GeoTracker tool records sites that require remediation, U.S. Department of Defense sites, and other potentially hazardous locations. **Figure B-11** depicts the existing and historical environmental remediation sites at and near WVI; site descriptions are provided in **Table B-9.** As shown, there are five environmental remediation sites on Airport property and six that are located off Airport property. Of the 11 remediation sites included in **Figure B-11**, only one of them is still open and it is not on Airport property.

[9] USEPA Superfund Site Search, https://www.epa.gov/superfund/search-superfund-sites-where-you-live, Accessed August 31, 2020.

Figure B-11: WVI Remediation / Cleanup Sites



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Date: December 28, 2020

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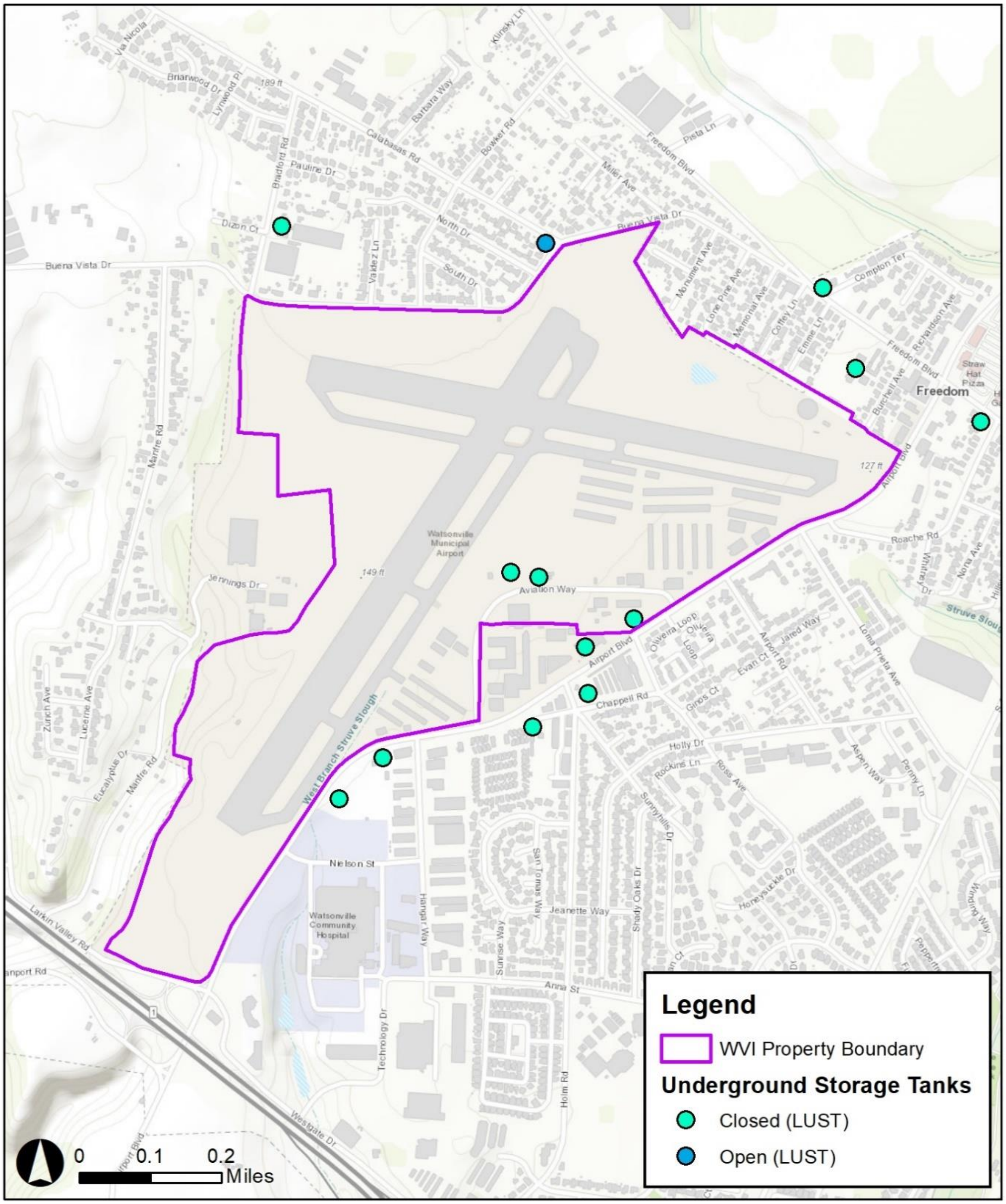
Table B-9: Existing and Historical Environmental Remediation Sites near WVI

Site Identification		Location	Potential Contaminants of Concern	Cleanup Status
1	Sakimoto Nursery	30 Bradford Rd	Gasoline	Completed (Closed as of 11/18/2011)
2	Brothers Country Corner Market	202 Buena Vista Dr	Benzene, ethylbenzene, gasoline, MTBE/TBA/Other fuel oxygenates, toluene, xylene	Open (Eligible for closure as of 03/12/2020)
3	Quik Stop Market #41	2140 Freedom Blvd	Gasoline	Completed (Closed as of 01/28/2009)
4	Monument Lumber Co. Inc.	2111 Freedom Blvd	Gasoline	Completed (Closed as of 07/6/1988)
5	Schiavon Unlocal Station	2001 Freedom Blvd	Gasoline	Completed (Closed as of 04/07/2015)
6	Watsonville Fire Department Stat #2	370 Airport Blvd	Heating oil/fuel oil	Completed (Closed as of 07/23/1987)
7	Naval Auxiliary Airfield	100 Aviation Way	Aviation related fuel	Completed (Closed as of 04/07/2015)
8	Watsonville Airport	100 Aviation Way	Aviation related fuel	Completed (Closed as of 11/14/2005)
9	Former Exxon 7159	120 Aviation Way	Gasoline	Completed (Closed as of 10/3/2014)
10	City Building Maintenance	432 Airport Blvd	Not listed	Completed (Closed as of 01/27/1992)
11	7-Eleven Store #20608	455 Airport Blvd	Gasoline	Completed (Closed as of 06/14/2013)
12	Pacific Bell	515 Chappel Rd	Gasoline	Completed (Closed as of 12/2/1999)
13	Shikuma Farm	581 Airport Blvd	Gasoline	Completed (Closed as of 09/09/2004)
14	Maggiora Bros Drilling Inc.	595 Airport Blvd	Gasoline	Completed (Closed as of 07/24/2015)
Source: State Water Resources Control Boards "GeoTracker" database https://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=WatsonvilleMuniAirport (Accessed November 6 2020)				

B.1.11 Underground Storage Tanks

On July 15, 2015, the U.S. EPA issued revised underground storage tank (UST) regulations with specific provisions regarding field-constructed tanks and airport hydrant fuel distribution systems (40 C.F.R. Section 280). As WVI does have an underground aircraft fuel storage tank fueling system (City of Watsonville, 2020), the Airport and its tenants are also subject to California's UST Regulations (CCR Title 23, Division 3, Chapter 16), UST Cleanup Fund Regulations (CCR Title 23, Division 3, Chapter 18), and the Unified Program Regulations (CCR Title 27, Division 1, Subdivision 4, Chapter 1, Sections 15100 - 15620).

Figure B-12: WVI Underground Storage Tank Locations



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Date: December 28, 2020

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The Santa Cruz County Division of Environmental Health administers the UST program for WVI. This program is responsible for ensuring UST operators comply with applicable laws and regulations so hazardous materials are not released into the groundwater and the surrounding environment. Operators are required to obtain a Permit to Operate and have annual inspections conducted by a third-party technician.

Permitted USTs and leaking UST (LUST) cleanup program sites at and near WVI are depicted in **Figure B-12**. Known subsurface contamination or threat to groundwater quality resulting from the release of petroleum hydrocarbons at 12 of these LUST sites has been cleaned up through soil removal and remediation and are now closed. One site is eligible for closure.

B.1.12 Historic and Cultural Resources

The National Historic Preservation Act (36 C.R.F. Part 800 [NHPA]), as amended, provides for the preservation of cultural resources eligible for inclusion in the National Register of Historic Places (NRHP). Section 106 of the NHPA directs heads of Federal or independent agencies that have direct or indirect jurisdiction over a Federal or federally-assisted undertaking to "take into account the effect on any district, site, building, structure, or object that is included in or eligible for the inclusion in the National Register."

Additionally, the State Historical Preservation Officer (SHPO) defines three types of state-listed historical resources considered during a CEQA evaluation in accordance with Section 15064.5:

- California Historical Landmark (Landmark). Buildings, sites, features, or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other historical value.
- California Points of Historical Interest (Points). Buildings, sites, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other historical value.
- California Register of Historical Resources (Register). Buildings, sites, structures, objects and districts significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural records of California.

Public agencies are also required to comply with Sections 5024 and 5024.5 of the California Public Resources Code (PRC), which mandates specific requirements for state-owned NRHP and Landmark sites. This mandate requires state agencies to act to ensure the preservation of state-owned historical resources, including evaluating resources for NRHP and Landmark eligibility, maintaining an inventory of eligible and listed resources, and managing those resources to retain their historical characteristics.

The NRHP does not currently include any listed sites on or near Airport property (National Park Service, 2020). A cursory search of available state resources did not reveal any California-designated historical resources at WVI. However, the state does not maintain a publicly available database of designated sites. Instead, data can be obtained by conducting a record search of the California Historical Resources Information System (CHRIS) Inventory. A records search can be conducted by state staff members, third-party consultants, or by physically visiting an Information Center with prior approval and by appointment.

Because no comprehensive and current data are available about existing or potential historical sites at WVI, the Airport may need to conduct additional research, prior to development, to confirm that no state-regulated sites are located on the property.

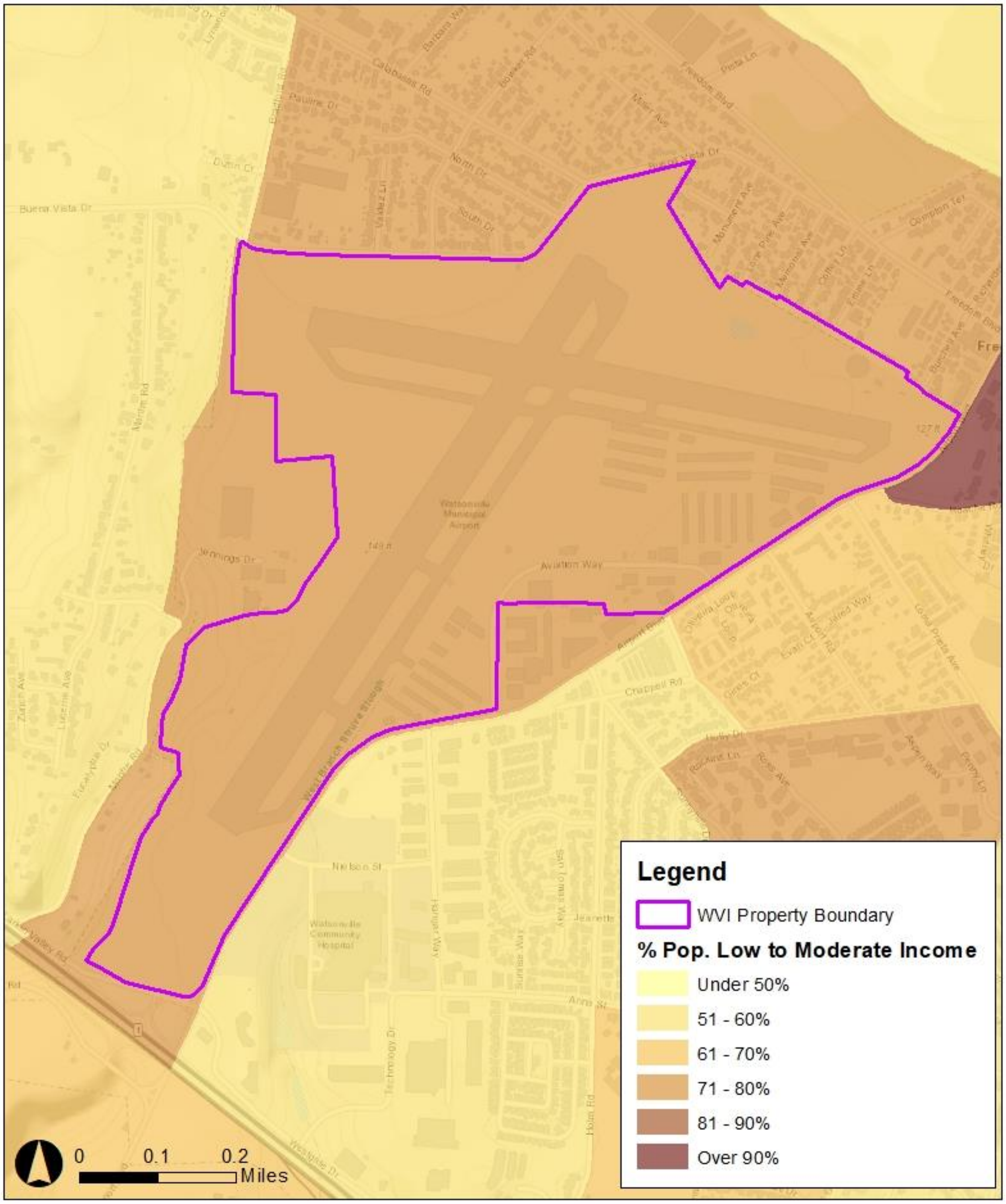
The City of Watsonville also maintains a local Register of Historic Resources that includes buildings, structures, objects, sites and districts that have sufficient integrity and are significant in Watsonville's history. No sites at WVI are included on the Local Register of Historic Resources (City of Watsonville, 2003).

B.1.13 Environmental Justice

Environmental justice (EJ) is the fair treatment and meaningful involve of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. This goal is considered to be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work.

Created in 1992, the EPA's Office of Environmental Justice (OEJ) coordinates Agency efforts to address the needs of vulnerable populations by decreasing environmental burdens, increasing environmental benefits, and working collaboratively to build healthy, sustainable communities. For this MPU, the low to moderate income population by block group as developed by the Department of Housing and Urban Development (HUD) was utilized. This identifies the U.S. Census Block Groups in which 51% or more of the households earn less than 80 percent of the area median income (AMI). As shown in **Figure B-13**, the Airport is primarily surrounded by a variety of income levels. Directly to the north there are communities where 71 to 80 percent of the population is classified as low to moderate income. To the northeast off the Runway 27 end, more than 90 percent of the population is considered low to moderate income. East of the Airport varies from less than 50 to up to 80 percent. The west and southeast, less than 50 percent of the population is classified as low to moderate income.

Figure B-13: Percentage of Population Earning Less than 80% of AMI



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C Public Outreach

The success of a Master Plan Update (MPU) is largely dependent on input from Airport stakeholders as they often have first-hand experience and can easily identify and relay the strengths, challenges, and needs of the Airport to planning staff. The Watsonville Municipal Airport (WVI) MPU included several rounds of public outreach to different groups of stakeholders and public citizens, including the following:

- **Planning Review Committee (PRC) Meetings -** Four meetings
- **Public Meetings** – Two meetings
- **Watsonville Airport Advisory Committee (WAAC) Meetings** – Planning staff provided status updates to WAAC members throughout the MPU process.
- **City Council Meeting** – The Airport will submit the final MPU technical report to the Watsonville City Council for adoption into the City's official planning documents.

The following sections include meeting summaries or agendas, presentation and display materials, outreach materials, public survey results, and other documentation for the aforementioned meetings. Please note that, due to project scheduling, this report will be finalized prior to the completion of the City Council Meeting and will therefore not include documentation from the meeting.

C.1 Planning Review Committee (PRC) Meetings

The development of the MPU was guided by the Planning Review Committee (PRC), a non-voting body which reviewed the content of the MPU and provided input through additional insight, questions, and comments. The PRC was comprised of four members, listed below, representing a number of constituencies. Three of the PRC members also served on the Watsonville Airport Advisory Committee (WAAC) and were charged with conveying information about the MPU to other members of the WAAC.

PRC Members

- Rayvon Williams: Watsonville Municipal Airport Manager
- Marjorie Bachman: WAAC Chair representing Monterey Bay Ninety-Nines chapter
- Justin Meek: City of Watsonville Community Development Planner
- Joe Shelton: WAAC member representing Airport Influence Area residents residing in City of Watsonville
- Scott Randolph: WAAC Member representing Experimental Aircraft Association (EAA)

Four virtual PRC meetings were held during the completion of the WVI MPU. The following subsections discuss the timing, attendees, and topics discussed at each of the four meetings.

C.1.1 PRC Meeting #1

The first PRC meeting was held on Thursday, January 28, 2021. At the time of the meeting, planning staff had completed the initial draft of **Chapter 1: Inventory of Existing Conditions** and were working to develop the Activity Forecasts. The following stakeholders and staff attended PRC Meeting #1:

- Rayvon Williams – Watsonville Municipal Airport/PRC
- Robert Roberston – Watsonville Municipal Airport
- Alexander Aguado – Watsonville Municipal Airport
- Marjorie Bachman – PRC
- Justin Meek - PRC
- Scott Randolph - PRC
- Joe Shelton - PRC

Several topics related to the MPU were discussed during PRC Meeting #1, the most significant of which are summarized below:

- Purpose of an MPU – Highlighted the importance of a 20-year development strategy that must be updated regularly.
- Update on Progress – Described ongoing effort related to Activity Forecasts and initiation of Facility Requirements analysis
- PRC Comments – Addressed stakeholder comments on Inventory of Existing Conditions draft chapter.
- Activity Forecasts – Outlined forecast development process, factors that influence forecasts and next steps for completion and approval of forecasts.
- Facility Requirements Primer – Introduced Facility Requirements analysis process, FAA design standards, and other planning considerations
- Major Study Components - engaged PRC members to identify other issues at the airport that should be addressed in the MPU, including aircraft storage, instrument approaches, and RVZ standards.

C.1.2 PRC Meeting #2

The second PRC meeting was held virtually on Wednesday, May 19, 2021 to discuss progress made on the MPU. PRC Meeting #2 attendees included the following stakeholders and stakeholders:

- Rayvon Williams – Watsonville Municipal Airport/PRC
- Alexander Aguado – Watsonville Municipal Airport
- Marjorie Bachman – PRC
- Justin Meek - PRC
- Scott Randolph - PRC

The main topics discussed during PRC meeting #2 are summarized in the bullets below:

- Update on Progress – Noted that the Activity Forecasts had been submitted for FAA approval and outlined ongoing work on Facility Requirements Analysis
- Public Meeting – Discussed Airport and planning staff's plan to host in-person public meeting (See **Section C.2.1**). PRC members offered suggestions for meeting topics and format.
- Activity Forecasts – Reiterated results of the Activity Forecasts and the process of FAA approval .
- Critical Aircraft – Defined what a critical aircraft is and identified critical aircraft type for each runway. Explained the critical aircraft's influence on Facility Requirements analysis.
- Facility Requirements – Described process of how Facility Requirements are determined and how airport needs are identified. Summarized results of Facility Requirements related to major study components including the Runway 2-20 and 9-27 design standards, RVZ, PLA and Nordic Naturals land swap, and other miscellaneous airfield items. PRC members provided comments and input on results.
- Introduction to Alternatives Development – introduced evaluation criteria and process for analyzing alternatives.

C.1.3 PRC Meeting #3

PRC Meeting #3 was held on Thursday, November 4, 2021, to discuss the results of the Alternatives Development Analysis. The following Airport stakeholders and staff attended the virtual meeting:

- Rayvon Williams – Watsonville Municipal Airport/PRC
- Alexander Aguado – Watsonville Municipal Airport
- Marjorie Bachman – PRC
- Justin Meek - PRC
- Joe Shelton - PRC
- Scott Randolph – PRC

The major topics covered in the meeting include:

- Update on Progress – Described results of Public Meeting #1 and introduced plan and topics for Public Meeting #2 (see **Section C.2.2**).
- Alternatives Analysis – Refreshed alternatives analysis process, evaluation criteria, and scoring system. Introduced development alternatives for major study components including runway 2-20 extension, RVZ, turf runway, Nordic Naturals land swap and PLA, aircraft storage, instrument approach procedures, taxiway modifications, support facilities, and no-analysis alternatives. PRC members provided feedback on each topic and alternatives.

C.1.4 PRC Meeting #4

The fourth PRC meeting was held virtually on Thursday, June 23, 2022. At the time of the meeting the project team had completed a draft of the Recommended Development Plan (RDP) and the Implementation Plan. Meeting attendees included the following:

- Rayvon Williams – Watsonville Municipal Airport/PRC
- Alexander Aguado – Watsonville Municipal Airport
- Marjorie Bachman – PRC
- Justin Meek - PRC
- Scott Randolph – PRC

The following bullets summarize the main topics discussed during PRC Meeting #4

- Update on Progress – Summarized work done on the RDP, Implementation Plan, and the draft Airport Layout Plan (ALP) set. Presented results of Public Meeting #2 survey and highlighted key takeaways from the project team and Airport's discussions with FAA and state staff regarding MPU completion.
- Alternatives Analysis - Familiarized stakeholders with alternatives analysis process, evaluation criteria, and scoring.
- Recommended Development Plan – Presented airport development recommendations based on findings from the Alternatives Development analysis including list of recommended projects and policy discussions.
- Implementation Plan – Described main components of Airport Capital Improvement Program (ACIP) including project phasing, cost estimates, and environmental strategy. Presented 20-year WVI ACIP and detailed 5-year ACIP with anticipated funding sources.
- Environmental Strategy – Explained the process for obtaining California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) approval for the MPU. Outlined initial airport strategy for Santa Cruz Tarplant mitigation.
- Cash Flow Analysis – Presented results of analysis to project future Airport revenues and expenses (cash flow) in both a "best-case' (full FAA funding) and 'worst-case' (no FAA funding) scenario.

C.2 Public Meetings

Public Meetings are the primary avenue for members of the public to provide comments to the Airport regarding the development of the MPU. The Airport hosted two public meetings during the completion of the MPU. The following sections describe the details of each gathering.

C.2.1 Public Meeting #1

The first public meeting for the WVI MPU was held on Wednesday, August 11 at the Watsonville Aviation Education Center on the grounds of WVI. The WVI MPU Public Meeting #1 included several different components meant to maximize the input received from Airport stakeholders. The following subsections will provide an overview of the following components:

- Public Outreach
- Meeting Presentation and Display Materials
- Meeting Attendee List

- Public Survey Results
- SWOT Analysis
- Airport Development Desires

C.2.1.1 Public Outreach

The Airport and planning staff notified stakeholders and members of the public of the meeting through several forms of public outreach. An informational flyer was posted on the Airport website one month prior to the meeting and distributed to subscribers to the Airport's Email Alert List, special interest groups such as the Watsonville Pilots Association (WPA), EAA, and Monterey Bay Ninety-Nines; and representatives of on-airport businesses. The Airport also posted the flyer shown in **Figure C-1** on the City's social media outlets and placed an advertisement in the local newspaper one week prior to the meeting. An online public survey was also distributed to gather public input regarding the priorities and goals of the MPU. The results of this survey are summarized in **Section C.2.1.3**.

Figure C-1. Public Meeting #1 Online Flyer

Source: Kimley-Horn

C.2.1.2 Meeting Attendance List

Table C-1 summarizes the lists of attendees and their affiliation to the Airport.

Table C-1: Public Meeting #1 Attendance

Name	Airport Affiliation	Name	Airport Affiliation
Jamn Hamllesh	On-Airport Business	Michael Baker	Tenant
Tom Hail	Tenant	Sarah Chauvet	Tenant
Derek T Brutle	NP	Tracy Laws	Tenant/EAA
Jacob Boracca	EAA/PVAA	Scott Randolph	PRC/EAA/Tenant
Marjorie Bachman	PRC/99s/WPA/Tenant	Ryan Ramirez	Tenant/WPA

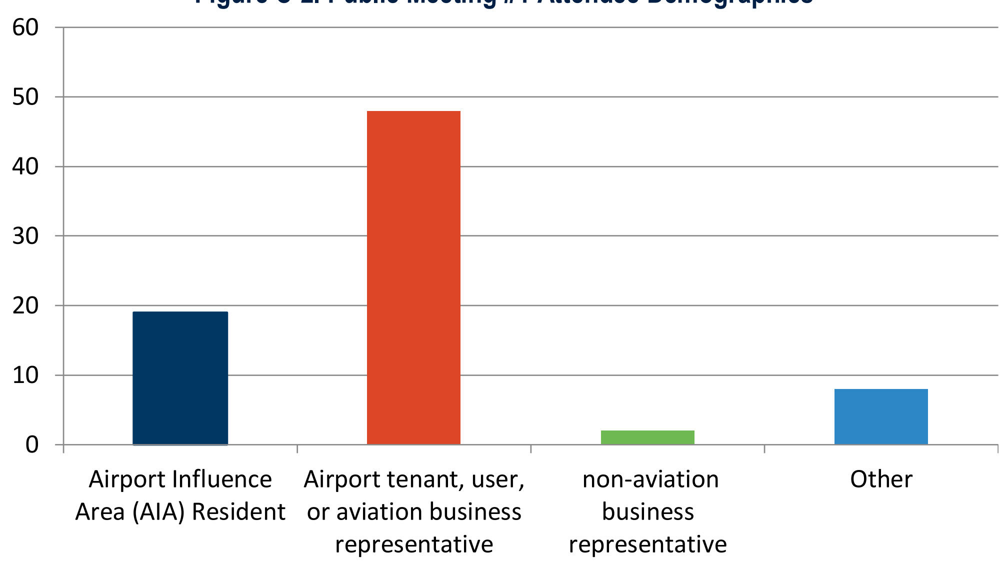
Bonifacio Gomez	Freedom Resident/ Sandy Sanchez	David Lombard	Tenant
John Supan	Tenant	Scott Williams	NP
Kirk Schnittger	NP	Bravlio Peralta	NP
Kimberly Schnittger	NP	Jeffrey Cherin	AIA Resident
Ron Thompson	AIA Resident	Kevni Dueck	Tenant
Roger Repp	NP	Glen Ceresa	WAAC
Justin Meek	City of Watsonville	Phil Stotts	NP
Jill Sweeney	NP	Alan Grantz	Tenant
Anne Robinson	NP	Orry Korb	Tenant/WPA
Dave Guerrieri	On-Airport Business	Kenneth Paddon	Tenant
David French	On-Airport Business	Lowell Hurst	AIA Resident

Source: Kimley-Horn

C.2.1.3 Public Survey Results

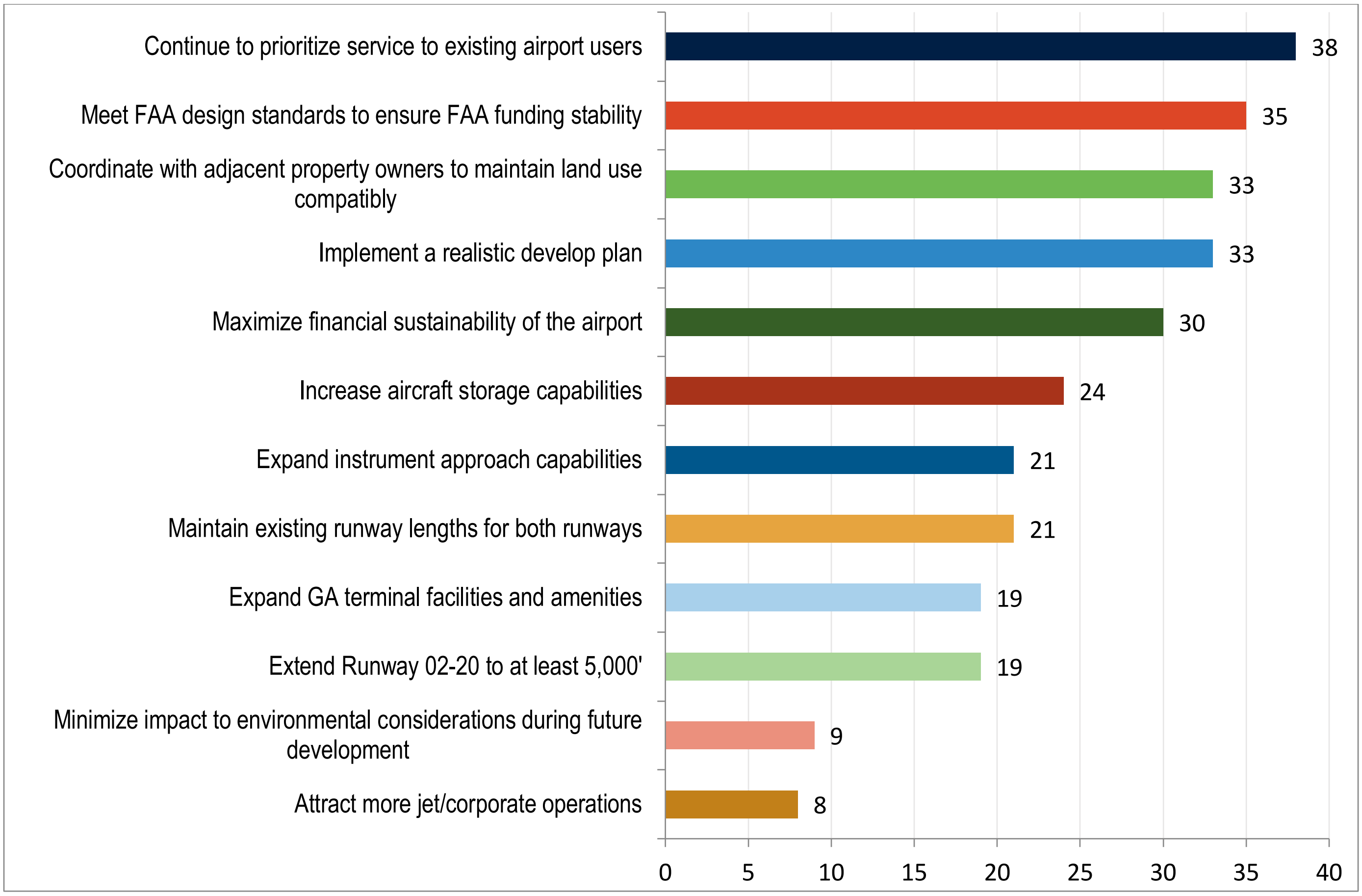
The following figures present the results of the public survey disseminated prior to the meeting. It is important to note that some respondents registered for the meeting but did not attend the in-person meeting, therefore, the number of survey respondents exceeds the number of meeting attendees listed in the section above. **Figure C-2** presents the breakdown of the registered attendees of the public meeting. Respondents were asked to indicate whether they lived in the Airport Influence Area (AIA), leased a hangar, based an aircraft at WVI, represented an on-airport aviation business, represented a non-aviation business on or near the airport, or had another affiliation to the airport. **Figure C-3** presents the list of MPU priorities selected by Airport stakeholders. Stakeholders were asked to rank the top five items from a list of 12 that they would like the Airport and planning staff to prioritize during the MPU. **Figure C-4** shows breakdown of stakeholder preferences related to federal funding expenditures at the Airport. Respondents were asked to indicate if they would prefer that the Airport use federal grant funding to expand facilities such as Runway 02-20 and ramp area, if they would prefer to use the funds on maintenance of existing airfield pavements and facilities, or if they had no preference.

Figure C-2. Public Meeting #1 Attendee Demographics



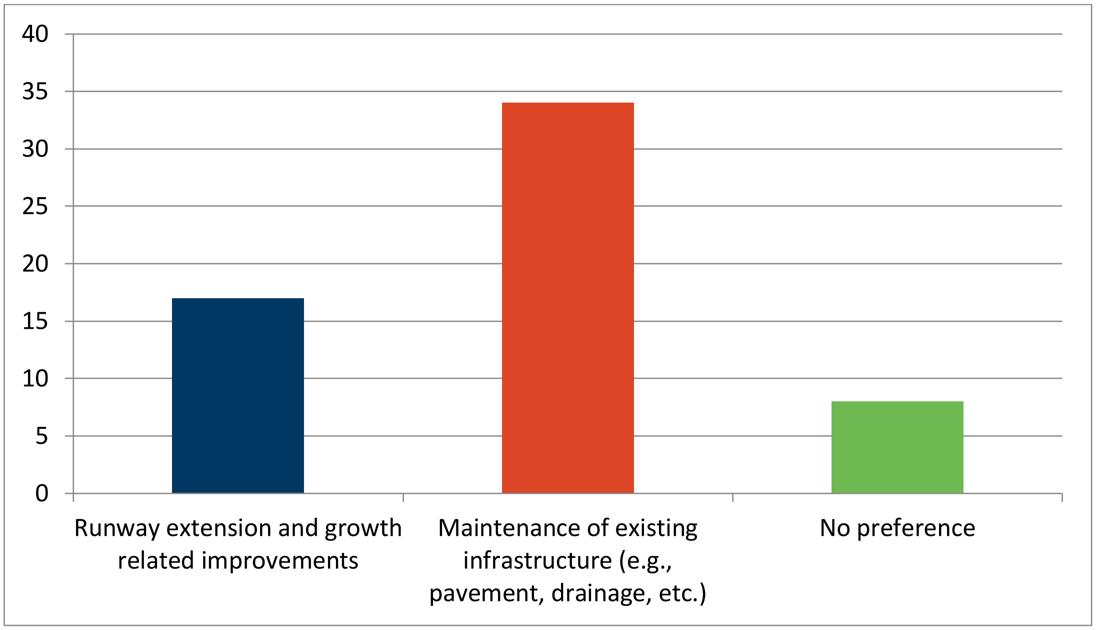
Sources: Survey Monkey, Kimley-Horn

Figure C-3: Top Priorities of WVI Airport Stakeholders



Sources: Survey Monkey, Kimley-Horn

Figure C-4: Airport Stakeholder Federal Spending Preferences



Sources: Survey Monkey, Kimley-Horn

C.2.1.4 SWOT Analysis

Participants at the Public Meeting were asked to identify the **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats (SWOT) present at the airport. The results of the evaluation are presented in **Figure C-5** while the individual written responses are documented in **Table C-2.**

Figure C-5: SWOT Analysis

Source: Kimley-Horn

Table C-2 SWOT Analysis Written Responses

Strengths	Weaknesses
• Aviation Organizations • Location in City • Good opportunity to grow that education and interest • Relative absence of conflicting land development. Active Pilot community working to save airport. • Youth Programs: Young Eagles, Civil Air Patrol (CAP), Aircraft Owners and Pilots Association (AOPA)	• Jet noise for neighbors • City Efforts to approve land development without strict adherence to court rulings in Watsonville Pilot's Association (WPA) litigation • Noise Impacts to community – Educate Pilots • Helicopters fly over houses at 100-150 feet towards hospital • Noise from planes turning at/or before the end of the runway and pilots that circle around 6-8 times, usually very low
Opportunities	**Threats**

• Hotel/hospitality • Events • More community • Increase business development around airport • Bring back air show • Public safety lighting • More retail services • What happened to the fly-in? Car week in Monterey continues to draw money to airport. A classic fly-in would do the same	• Gentrification: Outpricing current tenants with new tenants • Accident in housing area – bad relation to community • Noise Complaints: Would hangars on far side of Runway 27 block some noise? Other mitigations?

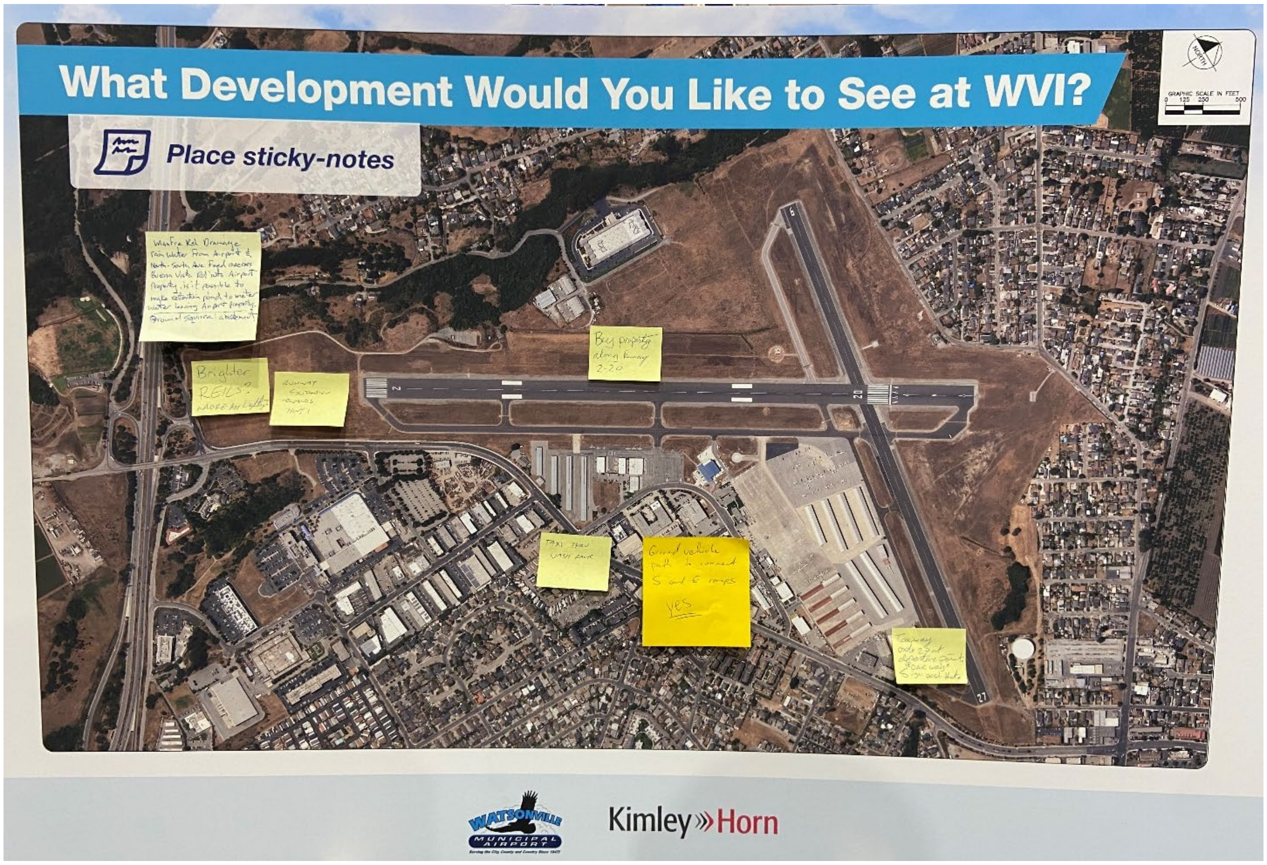
Source: Kimley-Horn

C.2.1.5 Development Desires

Airport stakeholders were asked to place sticky-notes on an aerial image of the airport to indicate their desires for future Airport development. **Figure C-6** presents the results of the exercise while the individual stakeholder responses are summarized below.

- Make a deal with these landowners to swap land to aeronautical use land to airport
- City should buy or swap for lumber yard land and expand water reservoirs there rather than give up aeronautical use property
- Shift Runway 09-27 west. Fill/extend Runway Safety Area (RSA)
- Manfre Road drainage – rainwater from Airport and north-south avenue feed across airport. Is it possible to make retention pond to meter water leaving Airport property?
- Ground squirrel abatement
- Taxi-thru aircraft wash rack
- Runway extension towards Highway 1
- Taxiway onto 27 at departure point. “One-way” sign past that
- Buy property along Runway 02-20

Figure C-6. Airport Development Desires Analysis



Source: Kimley-Horn

C.2.1.6 Public Comments

Airport Stakeholders were asked to provide any additional comments regarding the MPU. Four comments were received and are included in this appendix.

C.2.2 Public Meeting #2

The second public meeting for the Watsonville Municipal Airport MPU was held virtually The WVI MPU Public Meeting #1 included several different components meant to maximize the input received from Airport stakeholders. The following section will provide an overview of the following components:

- Public Outreach
- Meeting Summary and Comments
- Post Meeting Survey Results

C.2.2.1 Public Outreach

Similar to Public Meeting #1, the Airport and the project team notified stakeholders and members of the public of the meeting through several forms of public outreach. An informational flyer was posted on the Airport website and Facebook page two weeks prior to the meeting and distributed to subscribers to the Airport's Email Alert List, special interest groups such as the Watsonville Pilots Association (WPA), Experimental Aircraft Association (EAA), and Monterey Bay Ninety-Nines; and representatives of on-airport businesses. An online public survey was also distributed with the flyer to gather public input regarding the development alternatives analysis. The results of this survey are summarized in

C.2.2.2 Meeting Summary and Comments

The meeting was held as a Zoom teleconference, with planning staff presenting on various topics related to development alternatives. The meeting was split into several segments that focused on specific topics and allowed members of the public to ask questions or provide comments on development alternatives. Topics covered in the meeting consisted of the following:

- Project status update
- Introduction to alternatives analysis
- Runway 2-20 extension
- Runway Visibility Zone (RVZ)
- Potential turf runway
- Nordic Naturals land swap
- Instrument approach procedures
- Next steps

The entirety of the virtual meeting was recorded and posted to the Airport website, allowing stakeholders who were unable to attend the meeting to learn about development alternatives and provide feedback. Airport stakeholders provided questions and comments during the meeting which are summarized in **Table C-3**. Questions and comments are divided into the meeting segments in which they were presented, as noted in the grey subtitle rows.

Table C-3: Public Meeting #2 Stakeholder Comments/Questions

Stakeholder Question/Comment
Runway 2-20 Extension
Based on the King Air, is any runway extension indicated?
Would this increase safety and reduce residential noise?
What constitutes a "safety zone" There were houses in the other graphic
Granite Construction and Driscoll's have both bought Falcon 2000LX aircraft. Why doesn't the airport committee include business interest?
When do you estimate that the updates to the ALP be final /approved?
Based on the King Air, is any runway extension indicated?
Would this increase safety and reduce residential noise?
What constitutes a "safety zone" There were houses in the other graphic
Is there any concern that extending the runway would extend protection zone 3 into the high school? (zone 3 is the inner turning zone).
When will the ALP Drawing Set (Draft) be completed before going to the FAA for review? Can we see it before it goes for review?
Runway Visibility Zone
Runway 09/27 is critical because of the local fog pattern that affects runway 20. Restricting runway 27 has decreased safety in this regard. This needs to be reversed. The FAA is wrong by viewing this through their myopic view.

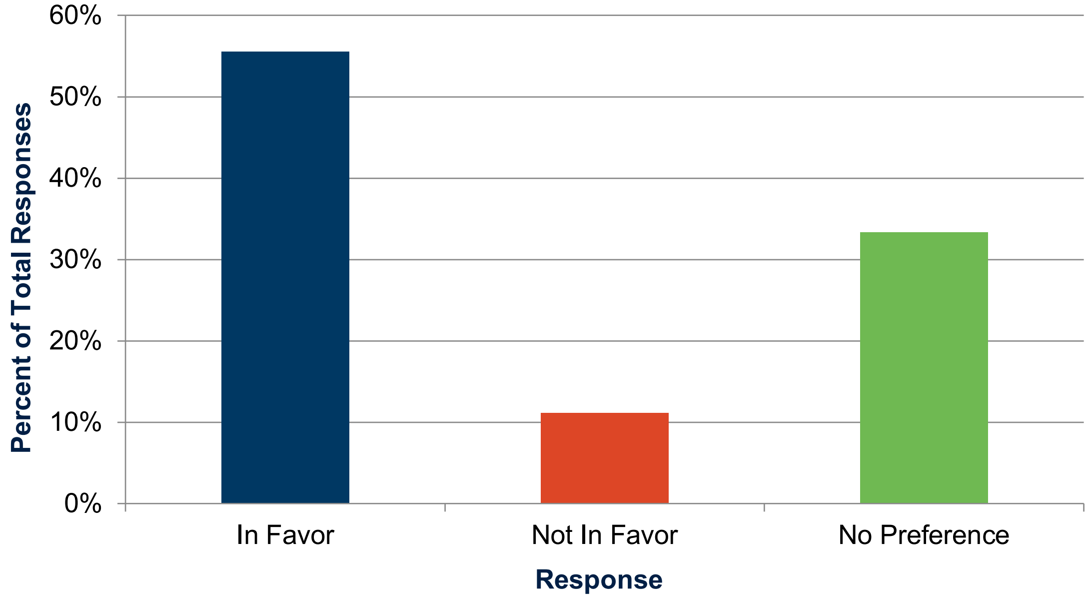
Do you have any other details regarding why the FAA is not considering fog/marine layers in their calculation? WVI is very unique compared to the other airports you've shown in because of its location near the ocean.
Did I understand that there is an MOS in place that prohibits departures in the first 800 feet of 27 in the current condition? Or are ALL departures prohibited?
Just wanted to make sure I heard correctly, the red visibility zones need to be clear of hangars AND tiedowns?
Just want to clarify there is not an abundance of tie downs, there is a waiting list for tie downs.
I do like the option of shortening 27 so that it doesn't intersect with 02/20. How long would that make 27 and would that free up land on the north side for new hangars/other airport uses?
Turf Runway
Have you contacted the multitude of airports around the state and country that allow these operations without having a dedicated runway? These operations occur routinely. We are really talking about big tired STOL aircraft here.
Meeting the design criteria of the FAA is so that WVI can get AIP funds. Not required if not seeking FAA funds?
Nordic Naturals Land Swap
Why does the 35' building restriction line look closer to 20 than to 9?
Have you considered shifting the PLA farther north, perhaps north of the shooting range?
Were there any deed restrictions established when the airport was transferred to the City?
I just want to go on record that the parachute operator is requesting to be asked for input on the PLA relocation. There are other things like turbulence, obstacles, parachute landing safety etc. etc. that need to be considered. I have no reason to believe that this will not happen, and I do believe that a relocation can accomplished that is as safe and as efficient as the current location. We have proposals.
By not owning all of Zone 5, the developer is still controlled by Part 77, so why consider allowing a building so close to the approach end of Runway 9 with a land swap and moving the PLA closer to Runway 20? If the building was built in Zone 5, there are controls by Part 77.
Reid Hillview is not taking FAA funds anymore and continues to operate. Why shouldn't WVI?
Instrument Approach Procedures
The instrument approaches should be taken into consideration in reference to the PLA and Nordic Naturals land swap. Is this being considered? Often aircraft are flying according to IFR rules.
Project Next Steps
The instrument approaches should be taken into consideration in reference to the PLA and Nordic Naturals land swap. Is this being considered? Often aircraft are flying according to IFR rules.
If a sponsor of an airport mismanages an airport, can an authority such as Caltrans or FAA or the County require the sponsor to give up the airport to another entity to manage it? Or does the City "own" the airport so it can't be taken away from it?
As the Chief Pilot for Granite Construction, public/private options were rejected by airport administration.
Will the FAA accept public input after Kimley-Horn submits the master plan update?
Source: Kimley-Horn

C.2.2.3 Post-meeting Survey Results

An online survey was disseminated to stakeholders via email and the Airport website two weeks prior to the meeting. The survey offered meeting attendees and those who watched the meeting recording to provide input on the airport development alternatives presented in the meeting. The survey asked stakeholder to indicate their preferred alternative for each development topic and to provide thoughts or reasoning for their selection. The summarized results of the survey are presented in the tables below. The individual written responses in the survey were recorded and addressed by the project team, however, they are not included in this appendix. Further information on each of the following topics is presented in **Chapter 4: Alternatives Analysis.**

Figure C-7 presents the result of the survey question regarding a potential extension of Runway 2-20. As shown, the majority of stakeholders are in favor of extending the runway by either 619 or 680 feet to the south, while only 11 percent of respondents indicated they are not in favor of an extension.

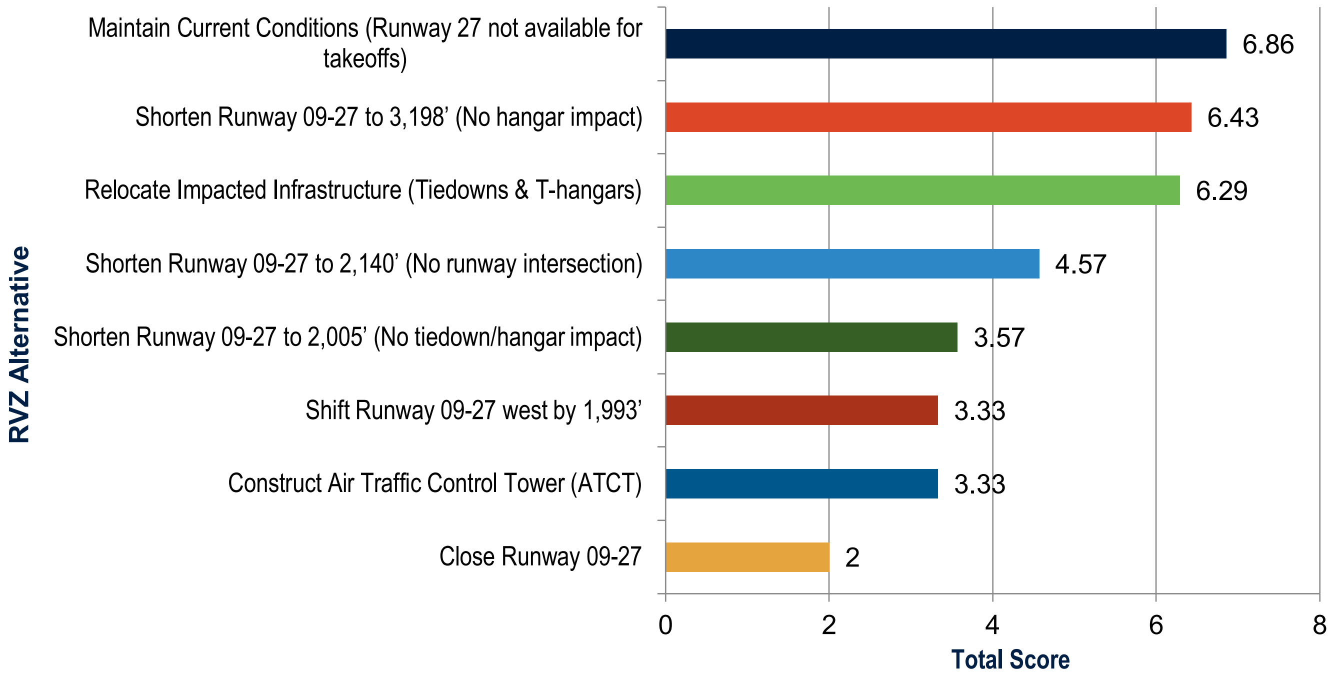
Figure C-7: Airport Stakeholder Preference – Runway 2-20 Extension



Source: Survey Monkey, Kimley-Horn

Figure C-8 presents the survey results relating to the eight alternatives for solving the nonstandard RVZ at the airport. Maintaining current conditions scored as the most preferential alternative while closure of Runway 9-27 scored as the least favorable.

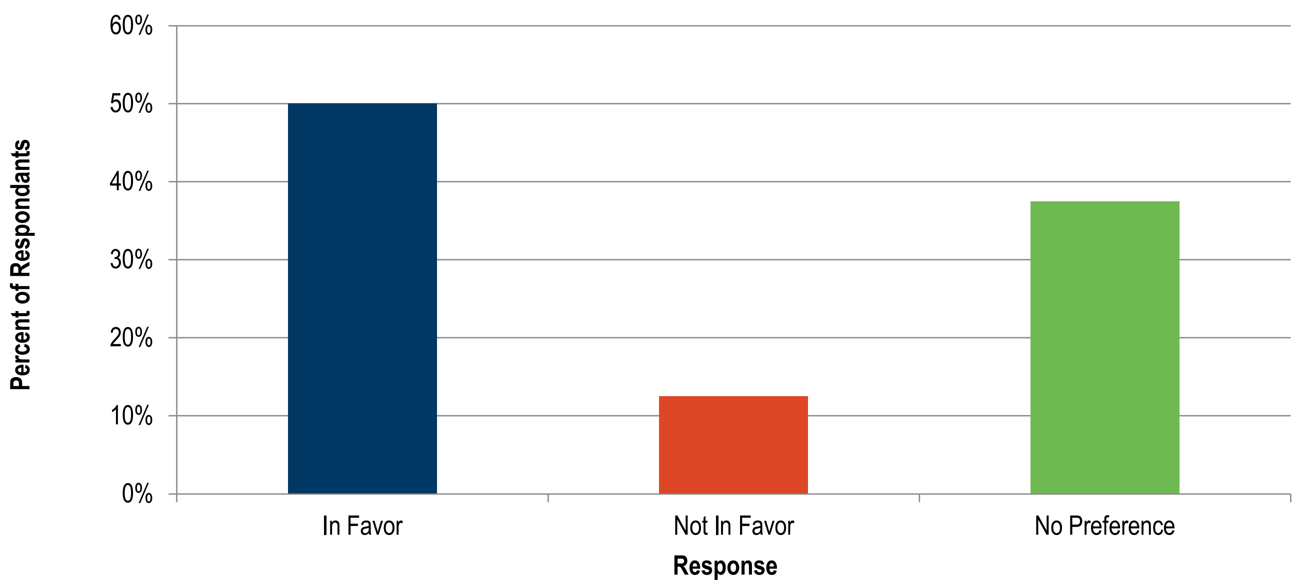
Figure C-8: Airport Stakeholder Preferences - RVZ Alternatives



Source: Survey Monkey, Kimley-Horn

Figure C-9 presents the results of the question asking if stakeholders would be in favor of the Airport deferring other airfield maintenance to complete an extension of Runway 9 by 255 feet if Runway 9-27 must be shortened to meet FAA RVZ Standards. Half of the respondents indicated they are in favor of the extension, while roughly 10 percent of respondents are not in favor and 40 percent have no preference.

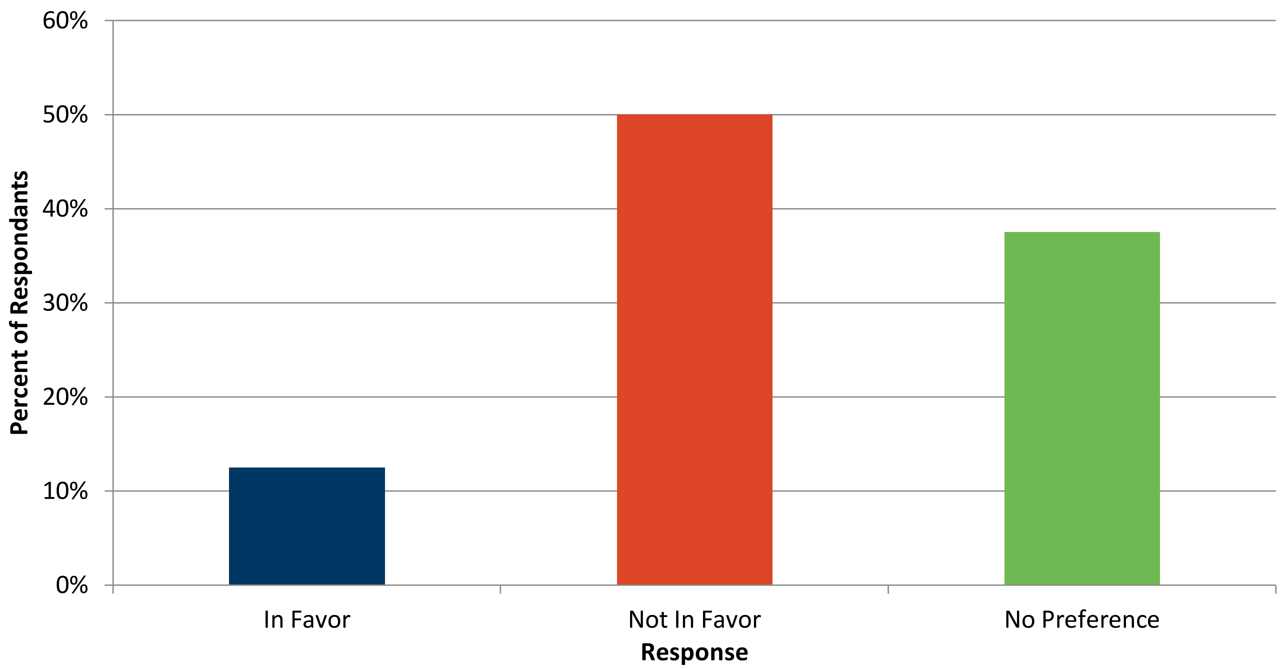
Figure C-9: Airport Stakeholder Preference - Airport Deferring Other Airfield Maintenance to Extend Runway 9 by 255 feet in the Event of RVZ-related Runway Shortening



Source: Survey Monkey, Kimley-Horn

Figure C-10 presents the preferences of stakeholders regarding the proposed land swap with Nordic Naturals to ensure a building is not constructed in Caltrans Safety Zone 5. Only 12 percent of stakeholders indicated they are in favor of completing the land swap while half of the respondents were not in favor. Approximately 35 percent of respondents have no preference.

Figure C-10: Airport Stakeholder Preference – Land Swap with Nordic Naturals



Source: Survey Monkey, Kimley-Horn

C.3 Watsonville Airport Advisory Committee (WAAC) Meetings

Planning staff and PRC members provided updates to the WAAC throughout the completion of the MPU. Planning staff participated in three WAAC meetings during completion of the MPU to provide general information about the MPU and project progress. The following bullets summarize the key points from each WAAC meeting.

- The first WAAC meeting with MPU participation was held on Wednesday, July 29, 2020, prior top the kickoff of the MPU. Planning staff provided an overview of the project team, explained the MMPU process and presented the planned project schedule.
- The second WAAC meeting planning staff participated in was held on Wednesday, October 28, 2020. Planning staff provided an update on progress and summarized the contents of the draft of Chapter 1: Inventory of Existing Conditions.
- At the time of this writing, the third WAAC meeting has not been completed. Airport and planning staff plan to present the final draft of the MPU and ALP to the WAAC as an informational item. It is expected this meeting will take place in Fall 2022.

C.4 Summary

As shown, the Watsonville Municipal Airport MPU included several avenues for airport stakeholders and members of the public to provide input and guidance for the long-term development of the airport. Public input was an integral factor in the successful completion of the MPU and will continue to play a role in the future development of the Airport.

Kimley»Horn

10 S. Almaden Blvd
Suite 1250
San Jose, CA 95113
669.800.4130 | www.kimley-horn.com