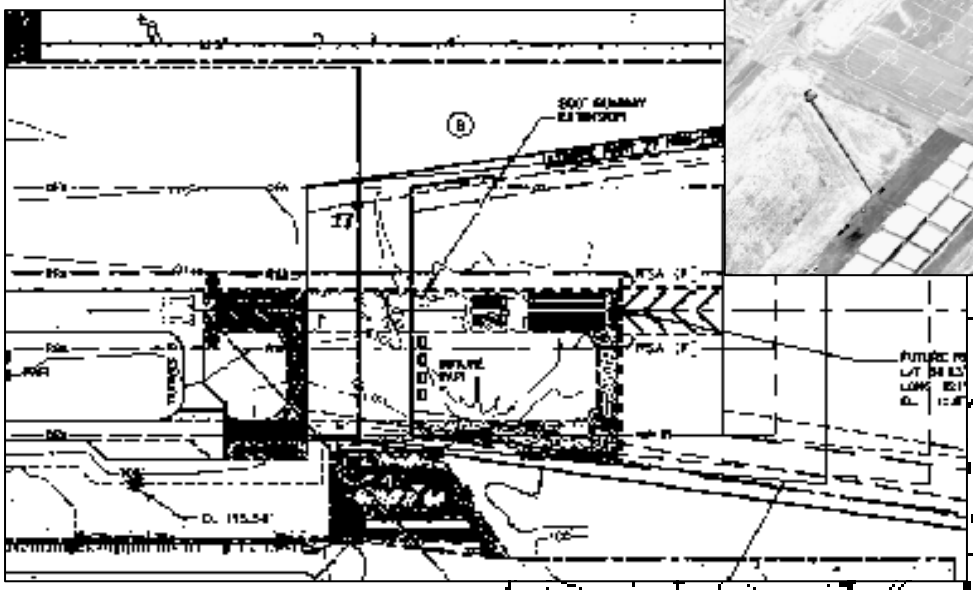
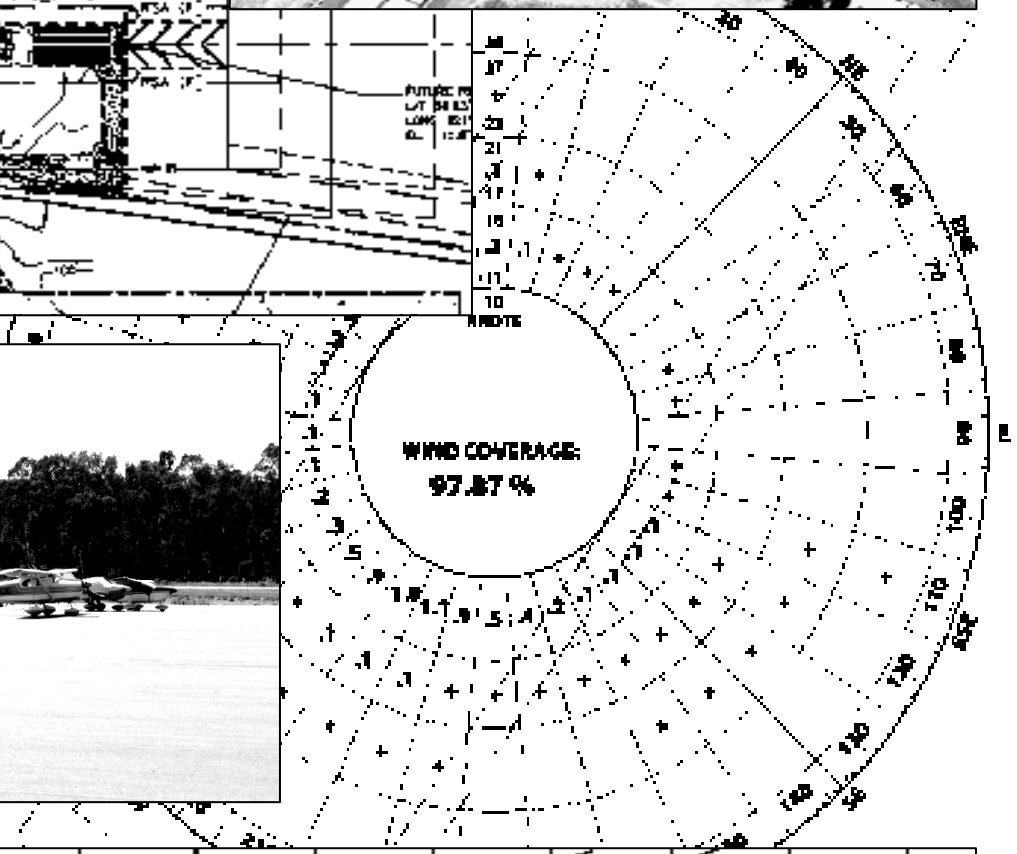
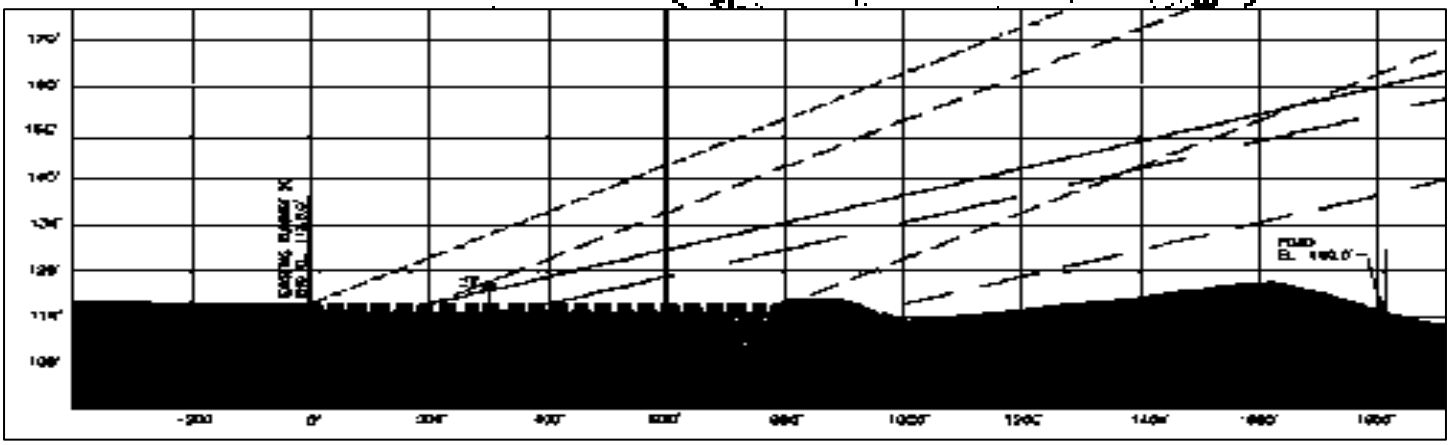
NUT TREE AIRPORT

2012 Master Plan







NUT TREE AIRPORT
2012 Master Plan

Prepared for

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Nut Tree Airport
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Nut Tree Airport 2012 Master Plan

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Executive Summary

The 2012 Master Plan for Nut Tree Airport (VCB) establishes guidelines for improving the Airport's facilities over the next 20 years. The 2012 Airport Master Plan is comprehensive and is the first full-scale master planning effort to be undertaken for the Airport since 1993. This Airport Master Plan was prepared by Solano County (the County), which owns and operates the Airport, and was primarily funded by a grant from the Federal Aviation Administration (FAA).

The 2012 Master Plan identifies the type and extent of facilities that are required to meet forecast aviation demand at the Airport and evaluates a full range of alternatives for improving facilities consistent with forecast requirements. The 2012 Master Plan concentrates primarily on the physical aspects of the Airport and the associated development requirements to meet its intended future.

An expanded summary of the master plan preparation and public involvement process, the various alternatives considered and evaluated, and the resolution of issues through selection of a future airport layout are reflected in this 2012 Airport Master Plan.

Vision Themes for Nut Tree Airport

Seven vision themes guide the development of a 20-year plan for improving facilities at Nut Tree Airport. *The vision themes are expressed in present tense and represent a "desired end state" that should be supported by the Master Plan's recommended physical development.* The visions for Nut Tree Airport's future are based on information gathered during the Master Plan's preparation and public review process.

VCB is designated as a general aviation airport in the National Plan of Integrated Airport Systems (NPIAS). In this important role, the Airport accommodates general aviation activity in the busy I-80 corridor between the East Bay and Sacramento. The following vision themes affirm the Airport's continued designation in the NPIAS as an airport of significance. Nut Tree Airport has seen the highs and lows of this segment of the aviation market and is a reflection of the

transformations that have taken place in general aviation over the past 30 years.

Nut Tree Airport is Strategically Located

Perhaps the most significant asset for Nut Tree Airport is its location. Roughly equal distant to the Bay Area and Sacramento, Solano County is a great location for both corporate and residential value in a more relaxed atmosphere than found in San Francisco or the State Capitol. Both metropolitan areas are within an easy drive. This vision theme recognizes the value of the Airport's geographic location and states that the planning effort should incorporate this feature as a positive attribution of the Airport.

In addition, a locally-known benefit to this location is that Nut Tree Airport resides within an area that enjoys considerably more fair weather days than either the Bay Area or Sacramento. This is most noticeable in the number of Visual Flight Rules (VFR) days experienced annually. This metrological condition is a significant benefit for flight training activity, as well as corporate aviation.

Nut Tree Airport is a Full-Service General Aviation Airport

Nut Tree Airport is a full-service aviation facility offering a wide range of services with room to grow, both in services provided and facilities to accommodate demand. Airside needs are met with adequate runway length to meet present and future needs. The Airport is supported by instrument approach capabilities for use during periods of inclement weather and landside development is provided by a full range of service providers. The Airport's tenants are a diverse group, offering aircraft fueling, aircraft maintenance and refurbishment, avionics repair, pilot training, aircraft storage, and aircraft rental.

This vision theme asserts that Nut Tree Airport will continue to offer an increasing range of general aviation services. The Master Plan should strive to ensure that this vision theme can be advanced by providing a development program that meets the needs of the Airport's diverse tenants and users.

Nut Tree Airport is a Gateway to the Area

The Airport is a direct link to the community it serves, providing access to area restaurants, shopping, businesses, and attractions. This vision theme addresses the need for positioning Nut Tree Airport as a vital and supporting transportation link connecting Solano County, Travis AFB, and the cities of Vacaville, Fairfield, and Dixon to the region and beyond.

This theme asserts the Airport as a portal to the community. Physically, it suggests an ease of access to and from the Airport and retail centers, as well as other points of interest in the immediate area. Historically, Nut Tree Airport was directly linked to the Nut Tree via a small

rail line that carried visitors back and forth between the two developments as an item of convenience and a recreational novelty. Implementation of this theme will necessitate development that considers this linkage and facilitates this use.

Nut Tree Airport has a Storied History and is Part of the Local Community

One of the important values of Nut Tree Airport is that it has "roots" in the community; seemingly, every area resident has a fond memory of visiting the Nut Tree during their youth. Moreover, Nut Tree Airport has notable name recognition outside of Solano County. This storied history and strong connection to the community can be for a stronger and more viable airport to emerge from this planning program.

Many airports struggle for market branding and name recognition. Nut Tree Airport still possesses this historical branding, but has lost much of its focus and linkage to area attractions over time. This vision theme seeks to recapture or improve this linkage and to help the Airport re-establish an important market niche access. In so doing the planning program may well serve to enhance community support and a sense of "ownership" by residents and business owners in Vacaville and Solano County.

Nut Tree Airport is Sustained by Supportive Intergovernmental Relationships

Establishing positive and supportive relationships between the City of Vacaville and the County is a high priority. The purpose of this vision theme is to build these positive relationships and strong communications as the Airport moves into the future as reflected in this 2012 Airport Master Plan, and as an economic development aspect for the City and the County.

Nut Tree Airport is Compatible with and Valued by the Surrounding Community

Nut Tree Airport is valued by its neighbors and recognized as a significant contributor to the local economy. The compatibility of Nut Tree Airport with its surroundings is an important concern of the Master Plan. The need to safely and efficiently accommodate future growth in aviation activity must be balanced with the need to minimize aircraft noise and traffic congestion concerns for the Airport's neighbors. This vision theme recognizes the importance of maintaining compatibility between the Airport and its surroundings.

Inventory of Existing Conditions

INTRODUCTION. Nut Tree Airport (the Airport or VCB) is located in the City of Vacaville, California. Situated 117 feet above sea level in Northern California, the Airport serves Solano County and multiple communities within the Sacramento Valley and East Bay regions. Nut Tree Airport is a public use airport, owned and operated by Solano County, which is open to the general public and to visiting aircraft. Although the Airport does not have any commercial passenger activity, it does provide services such as aircraft maintenance, aircraft mechanics training, fuel service, aircraft rentals, and flight training. The Airport has been in continuous operation at this site since 1955 and is an important element of the national airport system.

Nut Tree Airport is located in Northern California, within the City of Vacaville, 32 miles southwest of Sacramento and approximately 56 miles northeast of San Francisco, California. The Airport provides a safe operating environment for general aviation aircraft, ranging from light sport aircraft to small corporate jets. The Airport's relative location within the region is illustrated in the following figure entitled *AIRPORT LOCATION MAP.*

Vacaville is surrounded by several cities, including Dixon, Fairfield, and Winters. Although Vacaville has not grown significantly in the last ten years, the moderate growth of the surrounding communities has influenced Vacaville and the regional transportation system.

The most recent master planning study for Nut Tree Airport was completed in 1993 with the Airport Master Plan, and the last Airport Layout Plan (ALP) Update was completed in 2007. Since that time, aviation issues on the local, regional, and national levels have changed. The FAA typically requires a Master Plan and associated Airport Layout Plan (ALP) to be on file prior to receiving federal aid. The FAA also recommends that an Airport Master Plan be updated every five to ten years.

This 2012 Airport Master Plan is intended to provide a comprehensive evaluation of the Airport, and result in a well-conceived long-term capital facilities plan for the Airport. This initial *Inventory of Existing Conditions* chapter examines three basic elements involved with the existing and future development of Nut Tree Airport. These elements are:

- **Airport facilities** (runways, taxiways, aircraft parking aprons, hangars, ground access, etc.)
- **Relationship of the Airport to the airspace system**
- **The airport environs**

Subsequent chapters will detail the Airport's forecasts of aviation activity, the ability of airport facilities to safely and efficiently meet the needs associated with the projected aviation activity, the compatibility of the Airport with surrounding land uses, and recommended future development within and around airport property.

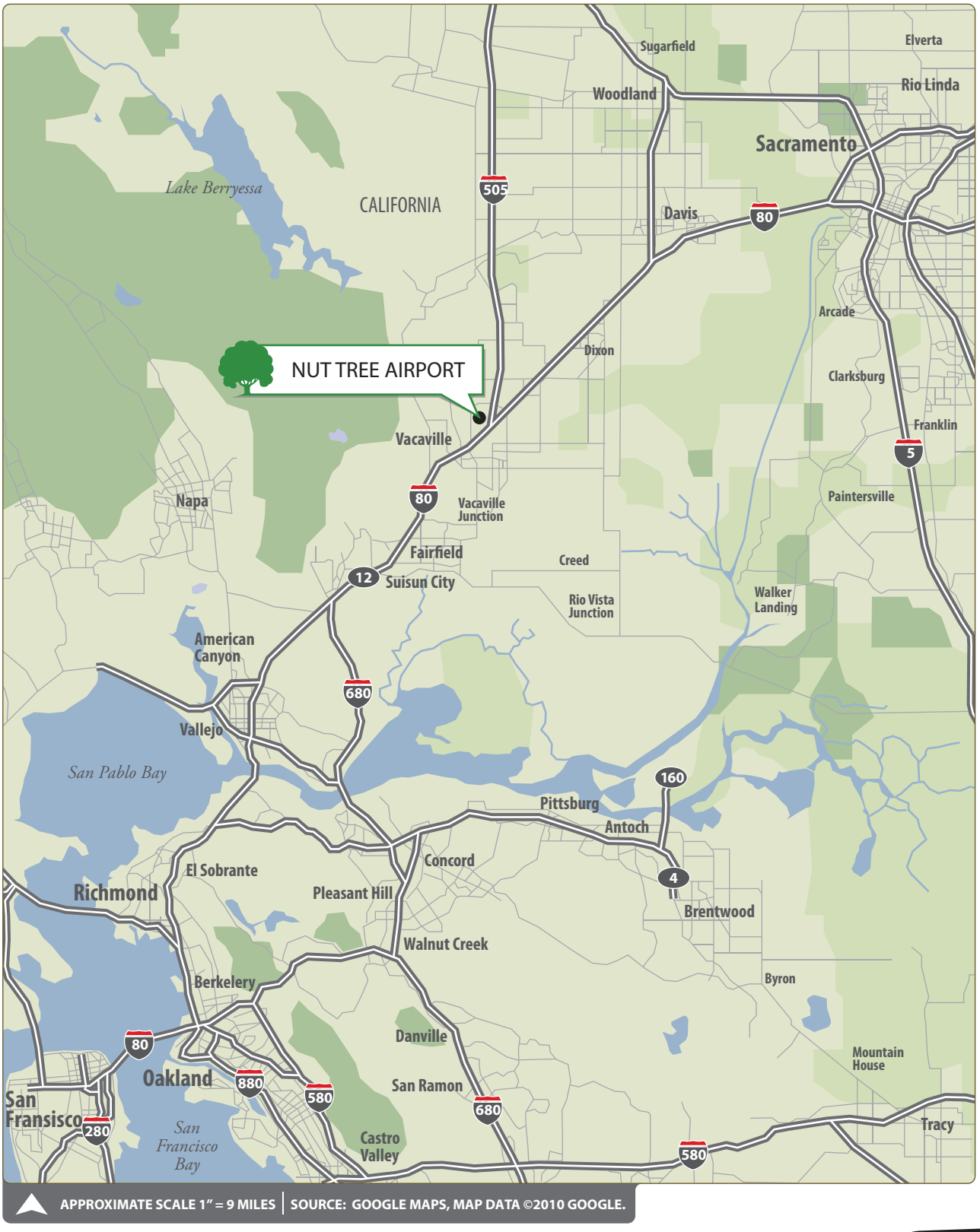

FIGURE B1 Airport Location Map

Airport Role and Facilities

Nut Tree Airport is owned and operated by the County of Solano, and is a division of the Solano County General Services Department. The Solano County Airport Advisory Committee consists of five members and provides counsel to the Solano County Board of Supervisors and Solano County officials in regard to policy matters for airport operations and management concerns. The Nut Tree Airport Land Use Commission is responsible for review and approval of all off airport land use proposals.

The Airport is classified as a general aviation (GA) airport by the FAA's National Plan of Integrated Airport Systems (NPIAS). As shown in the previous illustration, entitled *AIRPORT LOCATION MAP*, Nut Tree Airport is located west of Interstate 505 (I-505) and north of Interstate 80 (I-80), on the northeastern edge of Vacaville. More detail is depicted, along with the Airport's more immediate surroundings, in the following figure entitled *AIRPORT VICINITY MAP*.

According to an article in Vacaville Magazine[1], the first aircraft operation in Vacaville took place in 1929 when Barnstormer, Ernie Smith, made a forced landing in a field behind a small fruit stand along Old Highway 40. Years later in 1955, Ed Power (the son of the owners of that small fruit stand) scraped out a 1,900-foot dirt strip behind the family restaurant. Two years after the dirt strip was constructed, the newly formed Solano County Irrigation District was looking for land to purchase for one of its major water canals. A portion of the land where the dirt strip lay was sold to the irrigation district and the money was used to re-align and pave the runway. Since that time, Nut Tree Airport has grown continually and, in 1969, the Airport was officially donated to Solano County.

Nut Tree Airport historically served as a tourist destination. Those traveling along I-80 in between Sacramento and the San Francisco Bay area would stop at the popular "Nut Tree" (including its restaurants, shops, orchards, gardens, etc.) in Vacaville. A ¼-mile small gauge railroad track was constructed in 1955 running from the Nut Tree Restaurant to the Airport, to provide direct access for pilots visiting the area[2]. The railroad track has since been relocated to the Nut Tree Amusement area for use by new development. Nut Tree Airport now serves the general aviation needs of Solano County by providing many aviation-related services, including: business-related flying, recreational flying, flight training, and other aviation-related activities.

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[1] Vacaville Magazine November/December 2009.

[2] Sources: http://www.alamedainfo.com/nut_tree_CA.htm, http://www.nuttreeusa.com/.

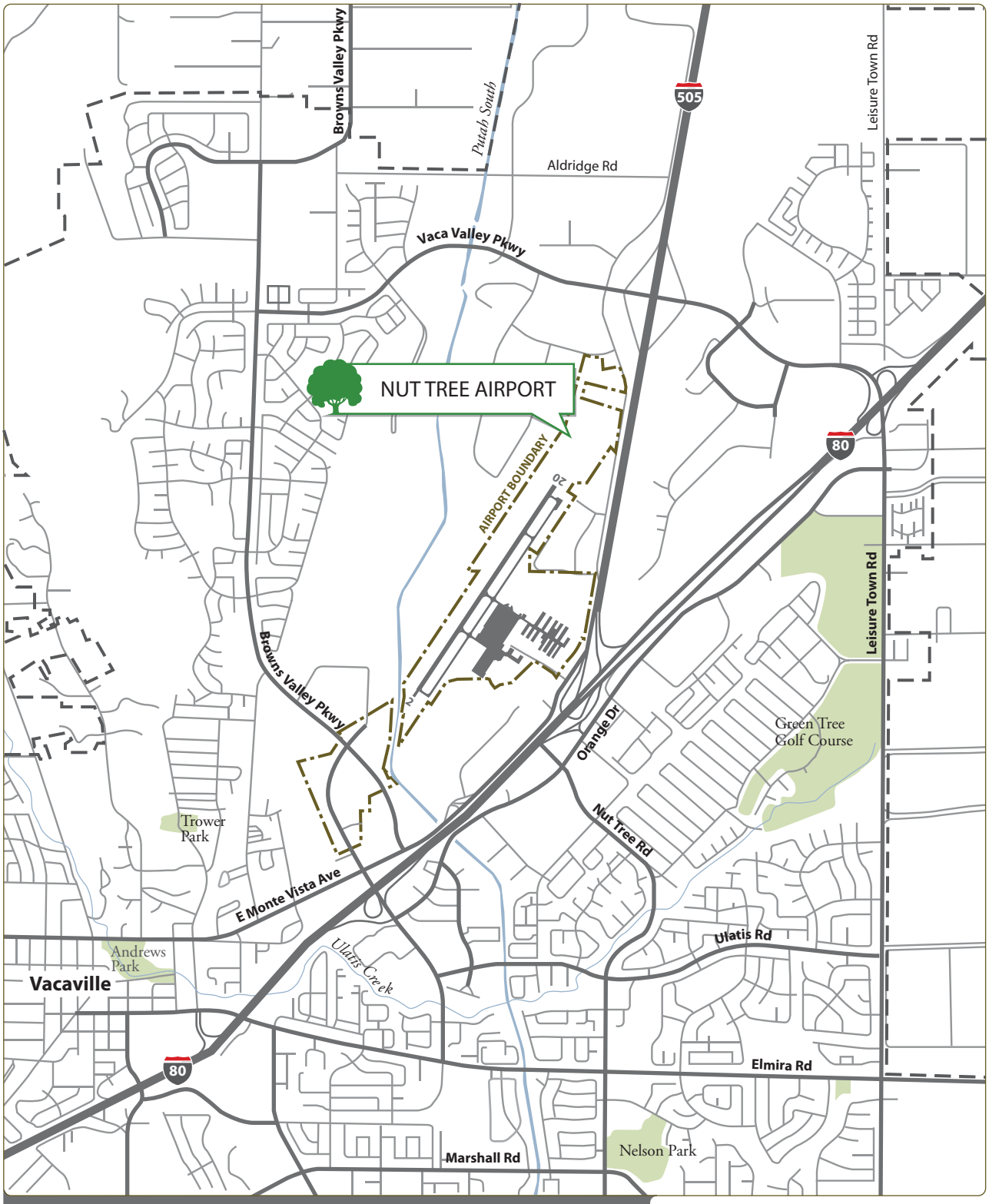

FIGURE B2 Airport Vicinity Map

Airside Facilities

Nut Tree Airport is operated with one primary runway, oriented in a northeast-southwest direction. One parallel taxiway provides access to the runway from the general aviation development areas. The following figure, entitled *EXISTING AIRPORT LAYOUT*, provides a graphic presentation of the existing airport facilities.

The Airport Reference Point (ARP) for Nut Tree Airport is located at Latitude 38° 22' 40.0000" N and Longitude 121° 57' 41.7000" W. The Airport has an elevation of 117 feet above mean sea level (AMSL) and encompasses approximately 262 acres.

Runway. The primary runway at the Airport has a designation of 02/20. It is 4,700 feet in length and 75 feet in width. The runway is constructed of asphalt and has a gross weight bearing capacity of 30,000 pounds single wheel main landing gear configuration, and the runway pavement is currently in good condition. The runway is equipped with Medium Intensity Runway Lights (MIRLs), a two-light Precision Approach Path Indicator system (PAPI) and Runway End Identifier Lights (REILs) to each runway end, and is marked with standard/basic non-precision markings on each end.

In addition, Runway 02 has a published left-hand traffic pattern, with Runway 20 having a non-standard right-hand pattern.

Taxiway. In addition to the runway, the airside facilities at Nut Tree Airport consist of a taxiway system that provides access between the runway surface and the landside aviation use areas.

A full-length parallel taxiway serves Runway 02/20 (Taxiway "A"), located on the east side of Runway 02/20 and is separated by 240 feet (runway centerline to taxiway centerline). Taxiway "A" is constructed of asphalt and has five connector taxiways that connect to the runway. Taxiway "A" is 40 feet wide and is also constructed of asphalt. Additionally, an aircraft run-up area/holding bay is located on both the northeast and southwest end of Taxiway "A". For night use, the taxiway system is equipped with a Medium Intensity Taxiway Lighting system (MITL).

Five connecting taxiways link access between Runway 02/20, Taxiway "A", and the main aircraft parking apron. Two 40-foot wide taxiways connect the Runway 02 and 20 thresholds to Taxiway "A", and an additional 40-foot wide taxiway located approximately 900 feet southeast of the Runway 20 connecting taxiway also provides access to Taxiway "A".

Two connecting taxiways provide access to the main aircraft parking apron. The taxiway located

on the southern end of the apron is 42 feet wide, and the connecting taxiway located on the northern end of the apron is 46 feet wide.

Landside Facilities

The primary landside development area at the Airport is located on the east side of airport property. These facilities include an Airport Administration Building, aircraft parking aprons, Fixed Base Operator (FBO) facilities, general aviation aircraft storage hangars, fuel storage facilities, an aircraft maintenance facility, aircraft wash rack, access roadways, and auto parking.

Airport Administration Building. The existing Airport Administration Building is a two-story building consisting of 10,000 square feet in total floor area. The existing building contains airport administration, Solano Sheriff Resident Deputy office, public meeting space, public restrooms, a flight school, and other various aviation businesses.

Aprons. The main aircraft parking apron at Nut Tree Airport is located east of Taxiway "A". This apron consists of approximately 460,000 square feet of aircraft parking and movement space (including taxilanes), providing approximately 75 aircraft tie-down positions, four large aircraft parking positions and three helicopter parking positions.

Hangars and Aircraft Storage. The layout and location of the various hangar types are illustrated in Figure B3 entitled *EXISTING AIRPORT LAYOUT.* The Airport has approximately 107 hangar units in 25 separate buildings. The Airport leases approximately 61 T-hangars and end hangars and six large box hangars, and the remaining hangars (box and corporate) are privately owned. According to airport staff, there are approximately 24 aircraft owners on the hangar waiting list. Additionally, the Airport has two maintenance facilities, located southeast of the T-hangar apron area.

Fixed Based Operator (FBO). An FBO has taken over the fuel concession. The FBO is located in Building #2, which is on the eastern edge of the aircraft parking apron, south of the Airport Administration Building.

Flight School. A flight school offers flight instruction and is located at Nut Tree Airport on the northeast area of the apron. The flight school services include flight training, aircraft rental and sales, sightseeing tour flights, and aerial photography services.

FIGURE B3 Existing Airport Layout

Fuel Storage Facility. The Airport's fuel storage facility, which is owned by Solano County and operated by a contract FBO, is located on the southeast side of the aircraft parking apron. Currently, aviation fuels are stored in two underground storage tanks: one 10,000-gallon 100LL AvGas tank and one 10,000-gallon Jet-A tank. AvGas is delivered by a 500-gallon truck, and Jet A fuel is delivered by a 3,000-gallon truck. Solano County is responsible for maintaining the storage tanks to current Environmental Protection Agency (EPA) standards. The fuel sales records for the past four years are presented in the following table entitled *AIRPORT FUEL SALES, 2006-2009.*

Table B1
AIRPORT FUEL SALES, 2006-2009

Year[1]	AvGas (gallons)	Jet A (gallons)	Total (gallons)	Total Net Sales ($)
2006	82,051	88,086	170,137	$607,141.60
2007	72,885	90,798	163,683	$610,073.10
2008	66,221	121,328	187,549	$878,783.50
2009	73,383	151,905	225,287	$761,062.90

Source: Nut Tree Airport management records.

[1] Fuel sales are based on from January 1st to December 31st of the Fiscal Year.

Automated Surface Observing System (ASOS). The Airport is served by an Automated Surface Observing System (ASOS), which is located approximately 1,150 feet north of the aircraft parking apron and 778 feet east of the runway centerline. This facility measures the following weather parameters: sky condition, visibility, wind, temperature, dew point, relative humidity, pressure, and obstructions to vision (i.e., fog, haze). The ASOS provides up to 12 data updates each hour to airborne pilots via VHF radio frequency. The radio frequency for the Nut Tree Airport ASOS is 134.75 MHz. ASOS data is also available via telephone at (707) 448-1594.

Aircraft Rescue and Firefighting (ARFF). The Airport does not presently have an Aircraft Rescue and Fire Fighting (ARFF) facility on the field; however, fire protection services for the Airport are provided by the Vacaville Fire Department Station No. 73, located approximately one mile northwest of the north end of the Airport.

Existing Ground Access and Parking Facilities

Ground Access. From a regional perspective, ground access to the Airport Administration Building and main entrance to Nut Tree Airport is provided by County Airport Road, by way of East Monte Vista Avenue, which is located on the east side of the Airport. East Monte Vista Avenue can be accessed directly from I-505 and I-80.

Parking Facilities. The main public automobile parking area associated with airport facilities is located directly east of the Airport Administration Building, off County Airport Road. An additional automobile parking area associated with a private corporate hangar is located southeast of the main parking area.

Existing Airport Utilities and Services

Nut Tree Airport is serviced by most essential utilities, including water, wastewater (sewer), electric, and telecommunication. The following provides a brief description of current utility services and providers to Nut Tree Airport.

Electricity. Pacific Gas & Electric (PG&E) provides electrical service to northern and central California, including Solano County. PG&E power lines are located southeast of airport property.

Water. Water is provided to the Airport by the City of Vacaville. A 12-inch water line runs along the east, southeast, north, and northeast sides of airport property. A 12-inch water line is proposed to run along the west and southwest areas of airport property, as identified in the 2007 City of Vacaville *General Plan*[3]. A layout of the current Nut Tree Airport Water Master Plan can be found in Appendix B.

Wastewater. Wastewater (sewer) service to the Airport is provided by the City of Vacaville with a small portion of the Airport still on a septic system. A City-owned wastewater lift station is located on the east/southeast area of airport property, and a sewer line runs through the southwest portion of airport property. A layout of the current Nut Tree Airport Sewer Master Plan can be found in Appendix B.

Storm Water. The Putah South Canal, which intersects the south/southwest area of airport property, originates from the Putah Diversion Dam located at Lake Solano, located

[3] City of Vacaville *General Plan*, Chapter 5, *Public Facilities, Institutions and Utilities*, Figure 5-1 *Conceptual Water System Improvements*, 2007.

approximately nine miles northwest of Nut Tree Airport. One of the Putah South Canal detention basins for storm water is located on the west/southwest area of airport property[4]. Several other storm water drainage areas are located on airport property, four of which are located along the west, northwest, and northeast sides of airport property, and an additional storm water drainage area is located southeast of the Runway 02 threshold.

Telephone. Telephone service to Nut Tree Airport and Vacaville is provided by AT&T. In addition to telephone service, AT&T also provides DSL service and internet services, including private dedicated services to customers throughout the City and County. It is estimated that current telephone services are sufficient to meet the projected growth of the region.

Existing cellular communications' providers to Nut Tree Airport and the City of Vacaville include AT&T Wireless, Verizon Wireless, T-Mobile, and many others. It should be noted that the FAA regulates the siting of towers that exceed 200 feet in height and smaller towers within 20,000 feet of a 3,200-foot runway or longer (i.e., Nut Tree Airport) at a 100:1 slope with filing requirements for FAA Form 7460-1 "Notice of Proposed Construction or Alteration."

Wi-Fi is currently available within the Airport Administration Building and is in the process of expansion to provide wi-fi services to all aircraft hangars on the Airport.

Airspace System/Navigation and Communication Aids

As with all airports, Nut Tree Airport functions within the local, regional, and national system of airports and airspace. The following narrative provides a brief description of Nut Tree Airport's role as an element within these systems.

Air Traffic Service Areas and Aviation Communications

Within the continental United States, there are some 22 geographic areas that are under Air Traffic Control (ATC) jurisdiction. Air traffic services within each area are provided by air traffic controllers in Air Route Traffic Control Centers (ARTCC). The airspace overlying Nut Tree Airport is contained within the Oakland ARTCC jurisdiction. The Oakland ARTCC includes the airspace in portions of northern and central California and portions of western/central Nevada. Nut Tree Airport can be found on the San Francisco sectional chart. Aviation communication facilities at the Airport include the Common Traffic Advisory Frequency (CTAF)/Aeronautical Advisory Station (UNICOM) on frequency 122.7 (San Francisco Airport District). Clearance delivery is provided by Travis AFB, Air Traffic Control (ATC). Ground to

[4] City of Vacaville *General Plan*, Chapter 9, *Safety Element*, Figure 9-3, *Vacaville – Flood Hazard*, 2007.

ground radio communications are not currently possible between aircraft awaiting to depart Nut Tree Airport under instrument flight and Travis ATC. Additional radio equipment should be sought by Solano County to enable ground to ATC communications. Additional communications associated with Nut Tree Airport include:

- **Oakland Center [Travis Air Force Base (SUU) Approach/Departure Control]** – Frequency 128.4.
- **University Airport (EDU) Automated Weather Observing System (AWOS)** – Frequency 119.025 or (530) 754-6839.
- **Yolo County Airport (DWA) AWOS** – Frequency 125.775 or (530) 750-2759.
- **Napa County Airport (APC) ASOS** – (707) 252-7916.

Nut Tree Airport does not have an airport traffic control tower (ATCT).

Surrounding Terrain Description

The airfield property is located in the northeastern portion of Vacaville, within the Sacramento Valley. Rapidly rising terrain associated with the Vaca Mountain Range is located to the west, northwest of Nut Tree Airport. Terrain is relatively flat south and east of the Airport.

Airspace

Local airspace surrounding the Airport consists of Class E airspace. The Class E Surface Airspace is typically represented as a five-statute mile radius circular area around the Airport and includes any extension necessary to include instrument approach and departure paths. Class E Airspace includes the controlled airspace extending upward from 700 to 1,200 feet above the airport elevation. These areas are generally designated at outlying airports with low activity and with non-precision instrument approach procedures providing high minimum descent altitudes. Radio communications and transponders are not required to operate within these airspace areas under visual flight rule (VFR) conditions; however, Instrument Flight Rule (IFR) flights must be capable of communicating with air traffic control (ATC), which is currently available through Travis Approach and Departure Control on frequency 128.4.

Military air bases, Military Operations Areas (MOAs), and restricted areas can also impact airspace use in the vicinity of a civil airport. There is one military air base located within a 35-NM radius of Nut Tree Airport; Travis Air Force Base (KSUU) is located approximately seven NMs south of Nut Tree Airport. There are no MOAs or restricted areas in the vicinity of the Airport.

Travis Air Force Base (AFB) Mid-Air Collision Avoidance (MACA) Program. The Travis AFB MACA Program was developed to promote flight safety by informing pilots of the midair collision potential between civilian and military aircraft within the vicinity of Travis AFB. Travis AFB has several based large or "heavy" military aircraft, including the KC-10, C-5, and the C-17, which are frequently flown for training operations. In addition to these local military aircraft, heavy transient military aircraft also frequently operate within the Travis AFB Alert Area (A-682), which contains the Travis VHR overhead and IFR radar patterns.

Travis Approach/Departure Control is used by IFR and VFR aircraft from local airports in the vicinity, which includes Nut Tree Airport. Military aircraft in this area frequently fly approaches into Travis AFB from a variety of different altitudes (from 1,800 feet to 10,000 feet AMSL), airspeeds, and directions. The MACA Program stresses extreme caution to pilots flying in the Alert Area due to the wake turbulence generated by these heavy military aircraft, as well as high rate climbs and descents, and random maneuvering by heavy aircraft over the top and within the vicinity of the Alert Area from 1,600 feet to 10,000 feet AMSL. The Alert Area vertical limits extend to 6,000 feet AMSL to the north (of the extended runway centerline), and 3,000 feet to the south.

Navigational Aids

A variety of navigational facilities is currently available to pilots around Nut Tree Airport, whether located at the field or at other locations in the region. Many of these navigational aids are available to en-route air traffic as well. The navigational aids (NAVAIDS) available for use by pilots in the vicinity of the Airport are VOR/DME, VORTAC, and NDB facilities.

A VOR/DME system is a Very High Frequency Omnidirectional Range Station with Distance Measuring Equipment transmitting very high frequency signals, 360 degrees in azimuth oriented from magnetic north. This DME equipment is used to measure, in nautical miles, the slant range distance of an aircraft from the navigation aid.

A non-directional beacon (NDB) is an L/MF radio beacon transmitting non-directional signals, whereby the pilot of an aircraft equipped with direction finding equipment can determine his bearing to or from the radio beacon and track to or from the station. The operation of the NDB is very simple; however, precisely flying an NDB approach can be difficult. Therefore, NDB approach minimums are typically specified higher than other types of non-precision approaches. There are no NDB facilities located within the airport vicinity. The following table presents navigational facilities located within the vicinity (within a 35-NM radius) of VCB.

Table B2
NAVIGATIONAL FACILITIES

Navigational Facility	Associated Airport	Frequency	Distance to VCB
Travis VOR	Travis Air Force Base (SUU)	116.40 MHz	7.1 NMs S
Sacramento VORTAC	Sacramento Executive Airport (SAC)	115.20 MHz	23.4 NMs E
Concord VOR/DME	Buchanan Field Airport (CCR)	117.00 MHz	23.7 NMs S
Scaggs Island VORTAC	Napa Valley, CA[1]	112.10 MHz	22.8 NMs SW
McClellan VOR/DME	McClellan Airfield (MCC)	109.20 MHz	31.6 NMs NE

Source: Airnav.com www.airnav.com.

Notes: NM = nautical miles.

[1] Not located at an airport.

In addition, several existing visual navigational aids are located on the Airport and available to pilots. These include a rotating beacon and a lighted wind cone with a segmented circle. The beacon is located north of County Airport Road, adjacent to the T-hangar area. The lighted wind cone with a segmented circle is located approximately 1,317 feet northwest of the Runway 02 threshold. Two additional supplemental wind cones are located in the vicinity of the southwest and northwest of Runway 02/20. In addition, both runway ends are equipped with Precision Approach Path Indicators (PAPIs), which provide descent guidance for the visual segment of the approach and Runway End Identifier Lights (REILs), which help pilots positively identify the runway ends.

There is also a network of low-altitude published federal airways (i.e., Victor airways) in the vicinity of Nut Tree Airport, which traverses the area and span between the regional ground-based VOR/DME and VORTAC equipment. Victor airways include the airspace within parallel lines located four NMs on either side of the airway and extend 1,200 feet above the terrain to, but not including, 18,000 feet AMSL. When an aircraft is flying on a federal airway below 18,000 feet AMSL, the aircraft is operating within Class E airspace.

Nut Tree Airport currently has three published instrument approaches to the Airport, as shown in the following table. Runway 20 is equipped with an RNAV Global Positioning System (GPS) approach. The FAA is in the process of certifying and implementing new Global Positioning System (GPS) instrument approach technology [i.e., both Wide Area Augmentation Systems (WAAS) and Local Area Augmentation Systems (LAAS)], and the cost of establishing new or improved instrument approaches at airports will be significantly reduced.

Table B3
INSTRUMENT APPROACH PROCEDURES

Approach	Designated Runway(s)	Ceiling Minimum (AGL)	Visibility Minimums	Aircraft Category
RNAV (GPS) Y L	Straight-in/Runway 20	497′ AGL	1¾-mile	A, B, C, D
RNAV (GPS) Z	Straight-in/Runway 20	403′ AGL	1-mile 1 ¼-mile	A, B C
RNAV (GPS) Z	Circling	443′ AGL 463′ AGL 463′ AGL	1-mile 1-mile 1 ½-mile	A B C
VOR/DME-A	Circling	643′ AGL	1-mile 1 ¾-mile	A, B C

Source: U.S. Terminal Procedures, Southwest (SW), Vol. 2, 11 March 2010 – 8 April, 2010.

Noise Abatement Procedures

The only published voluntary Noise Abatement Procedures at Nut Tree Airport are included in the remarks section of the Airport's FAA 5010 Form and are also listed in on airnav.com/airport/KVCB. These remarks state "no turns to crosswind below 800 feet MSL; noise sensitive area west of the Airport". The Airport also has a published non-standard right-hand traffic pattern to Runway 20 in an effort to reduce overflights of noise sensitive land uses located south of the Airport and Interstate 80, and sensitive land uses located to the west of the Airport.

Airport Environs

An understanding of the existing land uses, zoning patterns, and the various land use planning and control documents used to guide development of property surrounding the Airport is an important element in the airport planning process.

Nut Tree Airport is located in the northwest portion of Solano County, within the City of Vacaville. The land uses associated with the immediate areas surrounding the Airport are generally industrial, business park, commercial, and public park/recreational land uses. Because the operation of an airport influences surrounding land use and surrounding land use has an influence on the operation of an airport, it is critical in any airport planning study to gain an understanding of existing and proposed land use types in the area near that airport. The following text and illustrations describe zoning and land use in the airport environs.

Zoning

Zoning is the public regulation of the use of land. It involves the adoption of ordinances that divide a community into various districts or zones. Each district will allow a certain use of land within that zone, such as residential, commercial, and industrial (and many others). Typical zoning regulations address things such as the height of a building, number of people that can occupy a building, a lot area, setbacks, parking, signage, and density.

The City of Vacaville 2008 *Zoning Map*, developed by the Community Development Department, classified areas to the west of the Airport as Community Facilities and Open Space; Industrial Park and Community Facilities to the north; Business Park and General Commercial to the east; and, General Commercial and General Commercial with a Residential Overlay district to the south of the Airport. The City of Vacaville *Zoning Map* also classifies the Airport as Community Facility. Existing zoning within the vicinity of the Airport is illustrated below on the following figure entitled *GENERALIZED EXISTING ZONING*.

Land Use

Nut Tree Airport currently occupies 285 acres of land within the city limits of Vacaville. The Airport, in its entirety, is owned by Solano County. According to the *Land Use Plan Element* (Chapter 2) in the City of Vacaville's 2007 *General Plan*, the Airport is bordered to the west by a local public park, open space, and a small portion of industrial park land uses; to the north by mostly industrial park development; to the east by I-505, business park, and commercial development; and, to the south by I-80, commercial/highway, and commercial development land uses. Airport property is designated public/institutional. Similarly, the Airport is designated as a public/quasi-public land use in the 2008 Solano County *General Plan Land Use Diagram*[5].

Guiding land use policies, described in the 2007 City of Vacaville *General Plan* and in the *Draft 2012 General Plan,* focus on Urban Service Area development within an established "Growth Boundary". Nut Tree Airport is located within the City of Vacaville's 20-year Urban Service Area Boundary[6]. Further, the 2007 *General Plan* indicates that areas within the City where significant land use changes or major projects may be considered will have required policy plans. Nut Tree Airport falls under the Airport Business Area Policy Plan within the 20-year Urban Service Area Boundary. As stated in the 2007 City of Vacaville *General Plan*, *"land use changes and development proposals within the Vacaville planning area shall be consistent with the*

[5] The Solano County Land Use Plan (as depicted on the *Land Use Diagram*) provides guidance for future County growth and the resources conserved through 2030.

[6] City of Vacaville *General Plan*, Chapter 2, *Land Use Element*, 2007.

Nut Tree Airport Land Use Plan", and *"are subject to review per the Solano County Airport Land Use Compatibility Review Procedures"*. Nut Tree Airport land use compatibility requirements are described in the following sections.

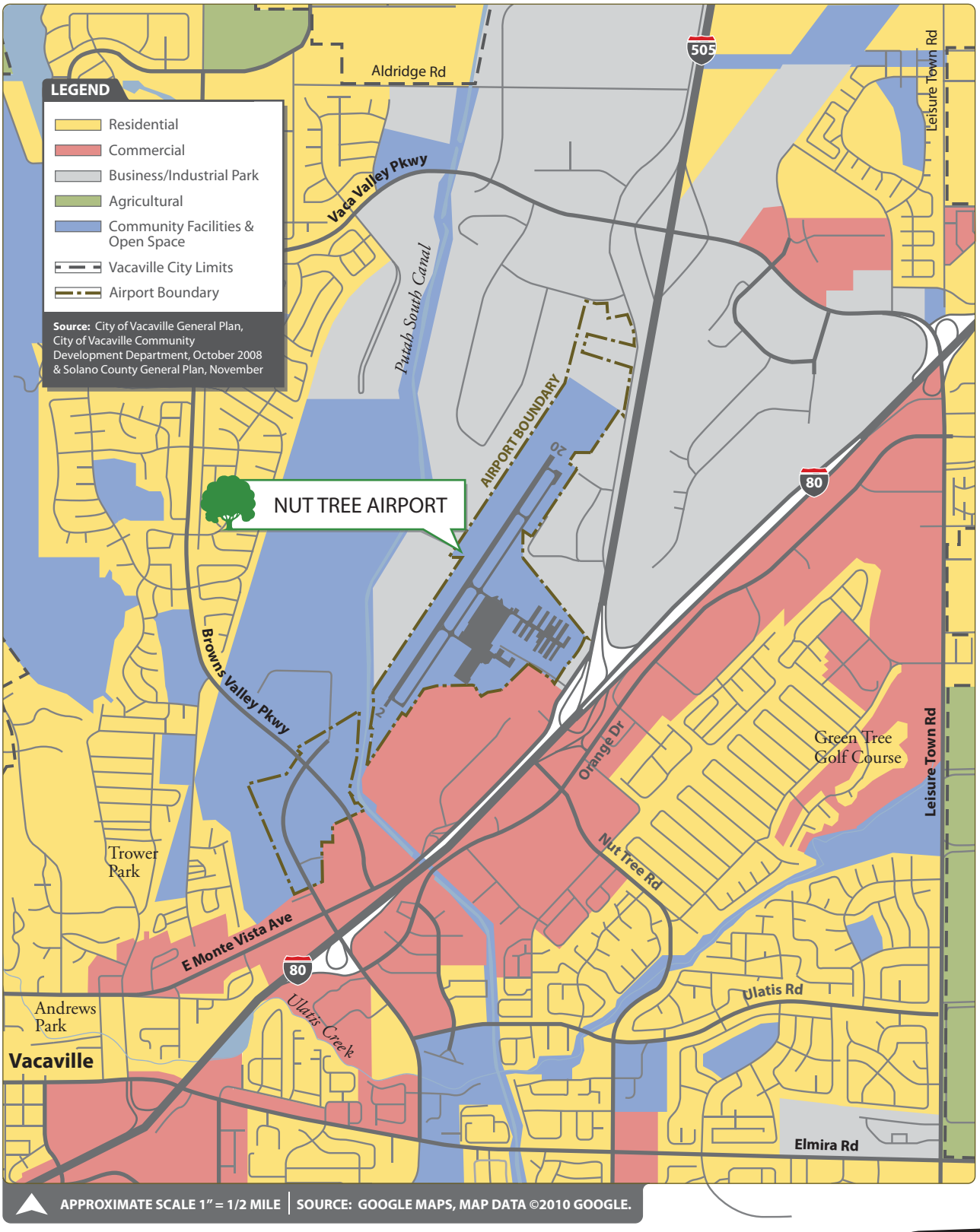

FIGURE B4 Generalized Existing Zoning

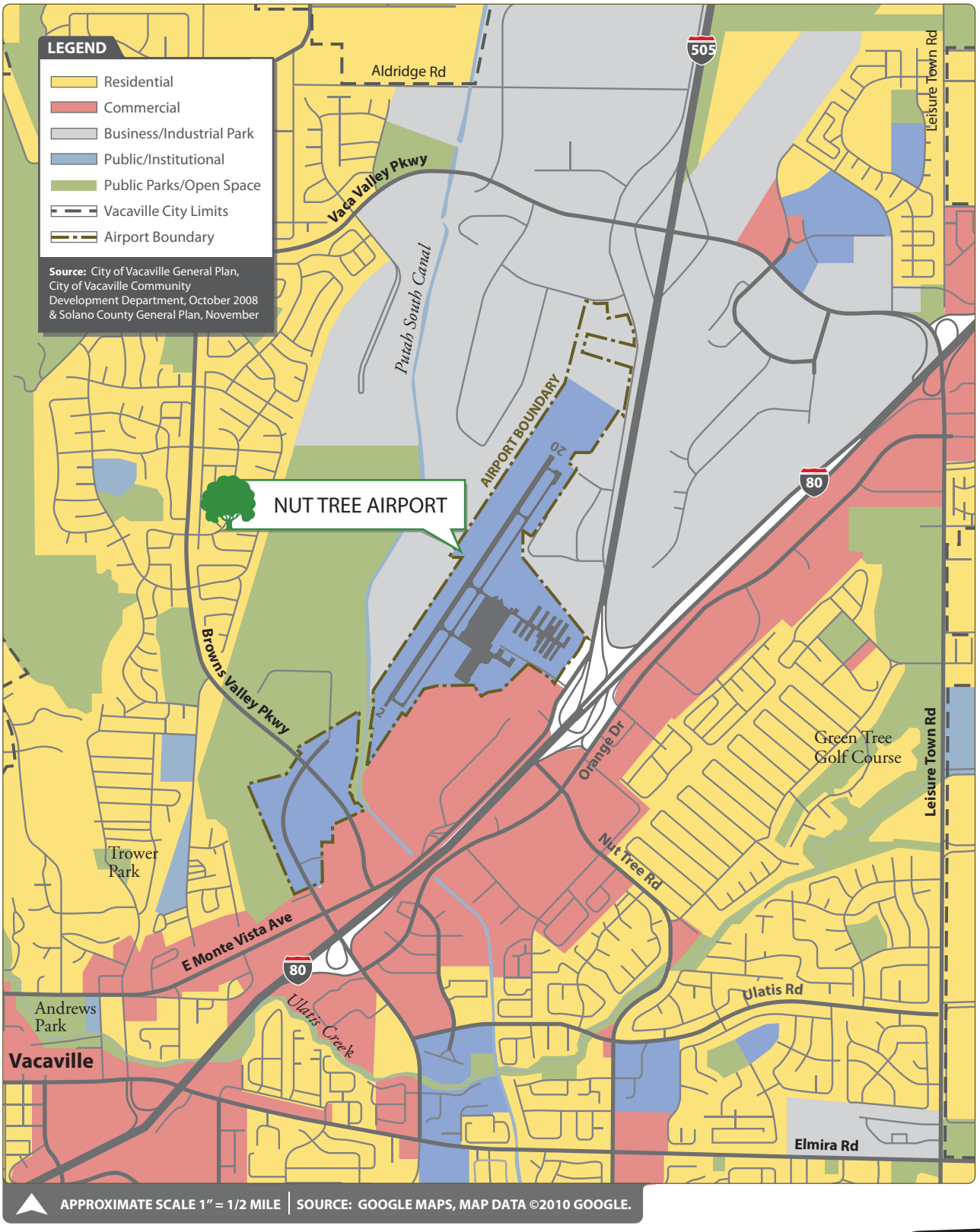

FIGURE B5 Generalized Land Use

Nut Tree Airport/Land Use Compatibility Plan

The State of California Public Utilities Code (under the California *State Aeronautics Act*) requires the creation of an Airport Land Use Commission (ALUC), which is responsible for developing a land use compatibility plan for each county's public use airport. The Solano County ALUC oversees and adopts land use compatibility planning standards to prevent land use conflicts and facilitate compatible development within the airport environs. Solano County airport land use compatibility plans address current airport facilities throughout the County, which include Nut Tree Airport, Rio Vista Municipal Airport, and Travis AFB.

The purpose of the 1988 *Airport/Land Use Compatibility Plan* (ALUCP) for Nut Tree Airport is to set forth the criteria that the ALUC will use in evaluating land use plans and proposed development in the vicinity of Nut Tree Airport[7]. It is the purpose of the ALUC's review to assure that future action involving land uses in the environs of the Airport take into account the need for compatibility with airport activities. The ALUC has no authority over existing land uses, even if such uses are considered incompatible with airport activity. Also, the ALUC has no authority over the operation of the Airport and the ALUC is concerned only with the safety, overflight impacts, and airspace protection requirements of the Airport. Other impacts sometimes created by the operation of an airport (e.g., air pollutants, automobile traffic, etc.) are not topics of concern.

The 1988 ALUCP defines the airport compatible land use zones[8] around the Airport, as shown in the following figure entitled *AIRPORT LAND USE COMPATIBILITY ZONES*. New development in these zones must be compatible with the plan. The six compatibility zones, the associated impact element, maximum densities, and required percentage are provided for by the 1988 ALUCP including supporting policies related to aircraft noise, airspace protection, and aircraft overflights[9].

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[7] *Nut Tree Airport/Land Use Compatibility Plan*, May 1988.

[8] Identified as the "Compatibility District Boundary" in the City of Vacaville *General Plan* (Figure 6-4, *Airport Land Use Compatibility Districts*, 2007), and as the "Airport Influence Area" in the Solano County *General Plan* (Figure LU-6, *Airport Influence Areas*).

[9] Overflights are defined by the FAA as a terminal instrument flight rules (IFR) that originated outside the TRACON/RAPCON/Radar Airport Traffic Control Tower's area, passing through the area without landing. http://aspmhelp.faa.gov/index.php/Glossary.

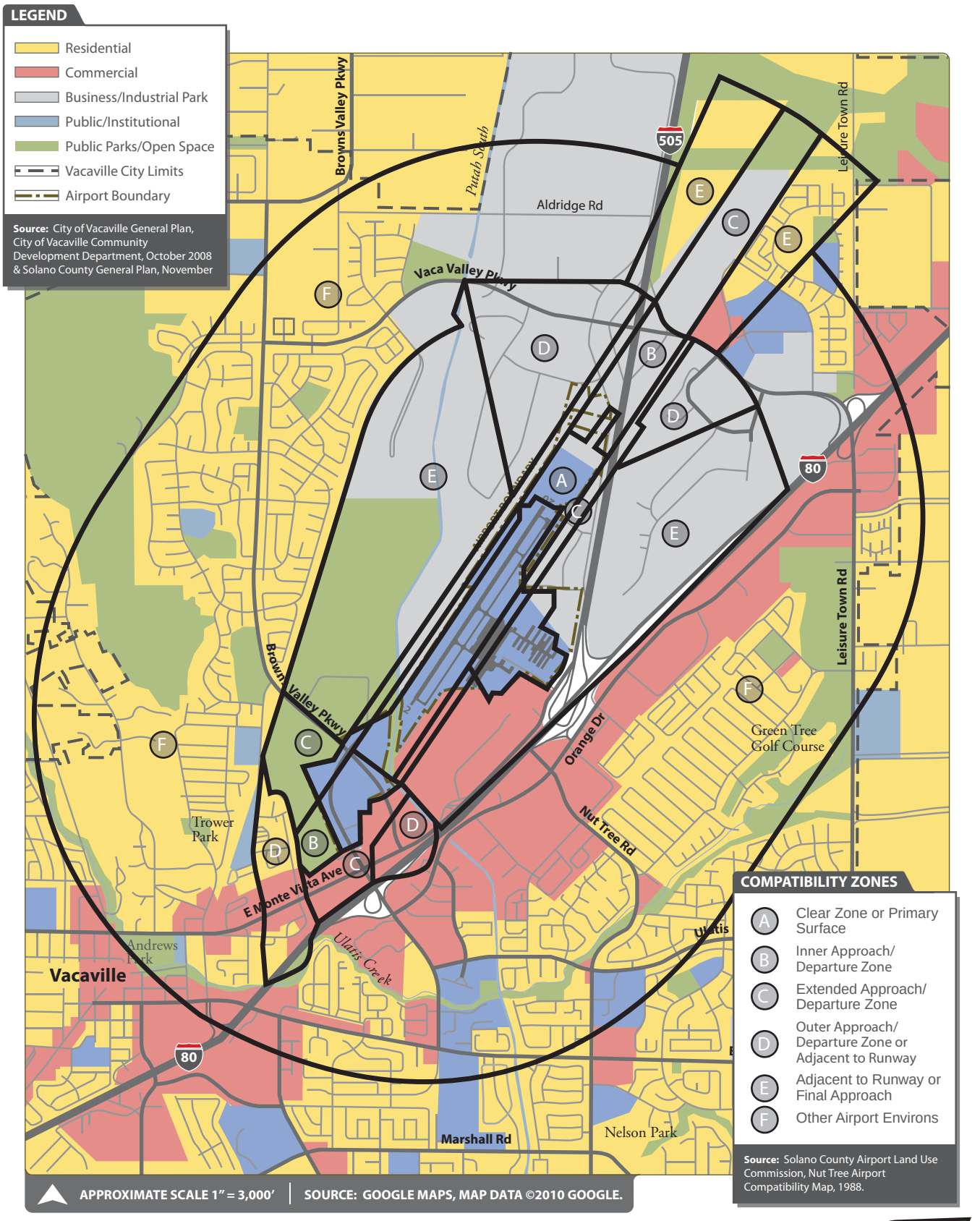


FIGURE B6 Airport Land Use Compatibility Zones

Forecasts of Aviation Activity

INTRODUCTION. Forecasting is a key element in the master planning process. The forecasts are essential for analyzing existing airport facilities and identifying future needs and requirements of the facilities. Forecasting, by its very nature, is not exact, but it does establish some general estimates for future aviation activity levels and provides a defined rationale for potential changes at airports as demands increase. The amount and kind of aviation activity occurring at an airport are dependent upon many factors, but are usually reflective of the services available to aircraft operators, the meteorological conditions under which the airport operates (daily and seasonally), the businesses located on the airport or within the community the airport serves, and the general economic conditions prevalent within the surrounding area.

Aviation activity forecasting generally commences by utilizing the present time as an initial point and baseline, supplemented with historical trends obtained from previous years' activity and recorded information. This data has evolved from a comprehensive examination of

historical airport records from airport personnel, FAA Form 5010-1, *Airport Master Record* data, FAA Terminal Area Forecasts (TAF), and the *FAA Aerospace, Forecasts Fiscal Years 2010-2030*. These documents were assembled in different years, making the base year data quite variable, and emphasizing the need for establishing a well-defined and well-documented set of base information from which to project future aviation activity trends.

Prior to an examination of current and future activity levels at the Airport, there are conditions and assumptions that should be noted that form the basis or foundation for the development of the forecasts contained here. These variables represent a variety of physical, operational, and socioeconomic considerations, and, to varying degrees, relate to and affect aviation activity at Nut Tree Airport.

Socioeconomic Conditions

Historically, the socioeconomic conditions of a particular area affect aviation activity within that region. It is usually helpful to incorporate an analysis of local and regional socioeconomic data into the forecast for future aviation demands at an airport. Typically, the most often analyzed indicators are population, employment, and income. Socioeconomic data was obtained from recognized sources, including local, regional, state, and federal planning organizations.

Population. The existing socioeconomic condition of a particular region has historically impacted aviation activity within that area. The two primary socioeconomic indicators, which are often analyzed in the forecast of aviation activity, are population and employment statistics. Solano County is strategically located 45 miles from San Francisco and 45 miles from the state capital of Sacramento. The County covers 909.4 square miles, including 84.2 square miles of water area and 675.4 square miles of rural land area. According to the *California Department of Finance*, the average population increase for the cities of Vacaville and Fairfield from 2000 to 2009 was 0.95 percent per year and 1.14 percent per year respectively. During this same time period, the population of Solano County is estimated to have increased from 394,930 to 426,729, an average of 0.87 percent per year. However, the rate of population growth in the area has slowed in recent years in response to the 2008 economic recession. From 2005 through 2009, the cities of Vacaville and Fairfield increased at the rate of 0.28 percent per year and 0.60 percent per year, respectively, while Solano County's population increased at a rate of 0.50 percent per year.

Table C1
HISTORICAL AND FORECAST POPULATION, 2000-2030

	City of Vacaville	City of Fairfield	Solano County
2000	88,642	96,178	394,930
2005	96,195	104,079	418,876
2009	96,450	106,440	426,729
2010	---	---	441,061
2020	---	---	503,248
2030	---	---	590,166

Sources: State of California, Department of Finance, E-4 Population Estimates for Cities, Counties and the State, 2001-2009, with 2000 Benchmark. Sacramento, California, May 2009. State of California, Department of Finance, Population Projections for California and Its Counties 2000-2050, by Age, Gender and Race/Ethnicity, Sacramento, California, July 2007.

Employment and Income. According to the U.S. Census Bureau, Solano County median household income (in 2008 inflation adjusted dollars) was $68,603, while median family income was $77,162. There were approximately 204,561 persons in the County's labor force in 2008, and the mean travel time to work was estimated at 29.8 minutes. A large portion of the County's employment force commutes outside of County lines to work. However, due to the declining economy in 2008 and 2009, as of March 2010, the County's unemployment rate has climbed to 9.7 percent, according to the California Employment Development Department.

Community Support. Nut Tree Airport benefits from the support of the surrounding communities, as well as local industry and residents. The Airport is recognized as a vital county asset, which contributes to the stability and the future of the area's economy. The overall position of the County is one of continued growth and development, with a recognized focus that Nut Tree Airport assists in maintaining and attracting additional economic and aviation-related development to the area.

Economy. Solano County has suffered job losses, but it has done so at a slightly lower rate than the state as a whole. The area's diversified economy has helped buffer the region. While some industries, such as construction, have been hit hard, others, such as health services, have grown. California's two-year recession ended in the fourth quarter of 2009 - lagging several months behind the U.S., according to the Business Forecasting Center at the University of the Pacific.

Historical Airport Activity Summary

With no on-site air traffic control tower facilities, there are limited historical records that provide accurate information concerning the historical aviation activity present at Nut Tree Airport. Historical FAA Form 5010-1's for the Airport show operations estimates as high as 144,000 per year in the 1980s and 1990s. However, recent operations levels are estimated to have remained fairly steady at just over 100,000 per year as reported in the FAA Terminal Area Forecast (TAF) for the Airport. The TAF system is the official forecast of aviation activity at FAA facilities. The TAF is prepared to meet the budget and planning needs of FAA and provide information for use by state and local authorities, the aviation industry, and the public. The TAF includes forecasts for:

- **FAA towered airports**
- **Federally contracted towered airports**
- **Nonfederal towered airports**
- **Non-towered airports**

For non-towered general aviation airports like Nut Tree Airport, the FAA uses data from the 5010-1 form to develop baseline levels of aircraft operations. FAA has less confidence in operations data from 5010-1 reports, as opposed to counting of operations by a staffed control tower or an activity counter. Consequently, lacking better baseline data, the TAF often assumes a zero percent growth rate when forecasting future operations at non-towered general aviation airports. A tabulation of the best available historical aviation activity information since 2000 is presented in the following table, entitled *HISTORICAL AVIATION ACTIVITY, 2000-2011*.

Table C2
HISTORICAL AVIATION ACTIVITY, 2000-2011

Year	Total Aircraft Operations[1]	Based Aircraft				
		Single Engine[2]	Multi-Engine[2]	Jet[2]	Helicopter[2]	Total Aircraft
2000	101,500	237	11	1	1	250[1]
2001	101,500	234	11	1	1	247[1]
2002	101,500	233	11	2	1	247[1]
2003	101,500	231	12	3	1	247[1]
2004	101,500	231	12	3	1	247[1]
2005	101,500	187	12	6	1	206[2]
2006	101,500	184	12	7	2	205[2]
2007	101,500	192	14	5	2	213[2]
2008	101,500	175	14	5	3	197[2]
2009	101,500	179	14	5	3	201[2]
2010	101,500	179	14	5	3	201[2]
2011	101,500	176	11	1	1	189[3]

Sources: [1] FAA *Terminal Area Forecast Detail Report*, January 2012.
[2] FAA Form 5010-1, *Airport Master Record*, and Solano County Assessor Records.
[3] 2012 Based Aircraft Count by Nut Tree Airport personnel.

Existing Operations by Aircraft Type

According to airport personnel, over 97 percent of all airport operations are conducted by single engine, piston driven aircraft. The following table, entitled *EXISTING OPERATIONS BY AIRCRAFT TYPE, 2011*, indicates the percentage of operations for each aircraft type.

Also, according to the FAA TAF, less than one percent of the total operations at Nut Tree Airport are classified as air taxi operations. An air taxi operation, as defined by FAA, is an operation by an aircraft designed to have a maximum seating capacity of 60 seats or less or a maximum payload capacity of 18,000 pounds or less carrying passengers or cargo for hire or compensation on demand (i.e. no schedule). Air taxi operations are regulated by Federal Aviation Regulations (FAR) Part 135. Section 135.385 of this regulation requires turbine engine-powered large transport category airplanes (aircraft weighing over 12,500 pounds) be able to make a full stop landing within 60 percent of the effective length of each runway. This restriction on air taxi use by large aircraft likely limits most of the estimated 1,500 annual air taxi operations to smaller single and multi-engine piston and turbo-prop type aircraft at Nut Tree Airport. The critical aircraft identified during the previous planning effort is the Beech Super King Air B-200. The currently and projected critical aircraft for the Nut Tree Airport are further discussed in the following chapter.

The existing aircraft operations at Nut Tree Airport are conducted for a wide variety of purposes including, but not limited to, business travel, government agency travel, personal flying, recreational flying, flight training, prisoner transport, drug enforcement activity, and medical transport.

Table C3
EXISTING OPERATIONS BY AIRCRAFT TYPE, 2011

Aircraft Type	Operations	Percentage[1]
Single Engine	98,605	97.15%
Multi-Engine Piston	1,095	1.08%
Turboprop	290	0.29%
Business Jet	260	0.26%
Helicopter	1,250	1.23%
Military	0	0.00%
Total Operations	**101,500**	**100%**

Source: [1] Nut Tree Airport personnel.

Notes: Represents the approximate total percentage of operations at Nut Tree Airport.

Aviation Activity Forecasts

Prior to the development of aviation activity forecasts, several factors that have an influence on the aviation industry, either positive or negative, should be considered in the planning process.

Factors and Conditions

Despite recent economic challenges in Solano County and the region, activity at Nut Tree Airport has remained fairly consistent. A large percentage of both itinerant and local operations at the Airport are attributable to the Japan Air Lines (JAL) flight crew training center at the Napa County Airport. JAL uses Nut Tree Airport for flight training utilizing a variety of single and multi-engine piston aircraft. However, in January of 2010, JAL filed for bankruptcy protection under a $10 billion turnaround plan after four Japanese government bailouts failed to revive the airline. JAL has stated publicly that the airline will continue operations but shed staff, cut unprofitable routes and retire older aircraft. It is currently unknown how the bankruptcy will change how the airline trains pilots or if they will continue to operate at the Napa County Airport and Nut Tree Airport.

It is also important to note that the overall condition of the general aviation industry in the United States, since 1978, has been in significant decline. The FAA identified several factors that have contributed to this prolonged downturn. These factors include three economic recessions, two fuel crises, the enactment of the *Airline Deregulation Act of 1978*, the expiration of the GI Bill, and the repeal of the investment tax credit.

Other causes of this downturn include the expense of owning and operating aircraft (i.e., the cost of insurance, fuel, and maintenance), competition from commuter airlines in the more open aviation market since airline deregulation, changes in disposable discretionary income, increases in airspace restrictions affecting fair-weather flying, reductions in personal leisure time, and shifts in personal preference as to how leisure time is spent. In particular, these factors have severely restricted the single engine light aircraft segment of the industry. In response to this downturn, the general aviation industry has been focusing more on the business aircraft operator and less on the recreational operator.

According to the *FAA Aerospace Forecast, Fiscal Years 2010-2030*, the business jet component of general aviation is growing at a much faster rate nationally than other aspects of the industry. The growth of this sector, which was statistically significant to begin with, was advanced even more by the events of September 11, 2001. In the post-9/11 environment, the speed and efficiency of business jet travel has created large dividends for the corporate community in terms of offering greater schedule flexibility over the commercial air carriers and less aggravated security considerations.

The growth in the amateur-built aircraft market and the strength of the used aircraft market indicate that demand for inexpensive personal aircraft is still strong. Also, the FAA's recent sport pilot rule and light sport aircraft (LSA) category has generated renewed interest in recreational flying. According to the *FAA Aerospace Forecast, Fiscal Years 2010-2030*, the FAA is projecting LSA sales to grow by 825 through 2013.

Increased general aviation instrument operations at FAA towered airports, and general aviation aircraft handled at FAA en route centers point to continued growth of the more sophisticated general aviation users. Additionally, operations at non-towered U.S. airports have increased, supporting the belief held by many that much of general aviation is being forced out of many towered airports because of increased commercial air carrier or business jet activity.

General Aviation Operations Forecast

General information regarding expectations for Nut Tree Airport is included in the FAA *Terminal Area Forecast* (TAF) *Detail Report*. However, as stated previously, due to the lack of either historical tower recorded operations or operations recorded by an activity counter at the Airport, the TAF assumes zero-growth in aircraft operations. This zero-growth assumption is considered overly conservative considering that the Airport maintains a paid deposit, hangar wait list, and that as this latent hangar demand is satisfied, operations are expected to increase over the planning period. In developing the general aviation activity forecasts, local, state, and national trends were reviewed. Included in this assessment, and, as presented in the following table, entitled *GENERAL AVIATION OPERATIONS FORECAST SCENARIOS, 2011-2031*, are the forecasts contained in the FAA *Terminal Area Forecast Detail Report* (January 2012), and four separate forecast scenarios developed for this study.

- **TAF:** FAA's *Terminal Area Forecast Detail Report*, January 2012.
- ***Scenario One:*** Projects an annual average growth rate of 1.69%, which is equal to the estimated annual population growth rate for Solano County through the year 2030.
- ***Scenario Two:*** Illustrates an average annual growth rate of approximately 0.50%, which is equal to the historical annual population growth rate for Solano County from 2005 through 2009.
- ***Scenario Three:*** Calculates an average annual growth rate of approximately 1.1%, which is the growth rate from the *FAA Aerospace Forecast, Fiscal Years 2010-2030* for general aviation hours flown by piston driven aircraft. This growth rate is also very similar to the FAA TAF growth rate for the entire Western Pacific Region through 2030 of 0.99%. **This is the recommended operations forecast for this study.**
- ***Scenario Four:*** Calculates an average annual growth rate of approximately 2.50%, which is the growth rate form the *FAA Aerospace Forecast 2010-2030* for total GA hours flown by all aircraft types.

By selecting Scenario Three as the recommended forecast scenario, it is recognized that the conditions in Fairfield, Vacaville and Solano County in general will mirror aviation-related influences in the nation. It also recognizes an assumption that there are no identified significant local influences that are expected to either negatively or positively impact the current level of aviation activity at the Airport.

Table C4
GENERAL AVIATION OPERATIONS FORECAST SCENARIOS, 2011-2031[1]

Year	TAF	Scenario One 1.69%	Scenario Two 0.50%	Scenario Three 1.10%[2]	Scenario Four 2.50%
2011	101,500	101,500	101,500	101,500	101,500
2016	101,500	112,078	104,539	108,275	117,470
2021	101,500	121,742	107,140	114,279	132,710
2026	101,500	132,253	109,807	120,619	149,951
2031	101,500	143,681	112,543	127,316	169,460

Source: *from consultant.*

[1] Includes military operations
[2] Recommended Forecast.

Operations Forecast by Aircraft Type

The knowledge of the types of aircraft expected to use Nut Tree Airport will assist in determining the amount and type of facilities needed to meet the aviation demand. The following table, entitled *SUMMARY OF OPERATIONS FORECAST BY AIRCRAFT TYPE, 2012-2031*, depicts the approximate level of use by aircraft types that are projected to use the Airport. It is assumed that the percentages of operations by aircraft type will remain relatively constant over the 20-year planning period.

It is assumed that the majority of existing and forecast jet aircraft operations at Nut Tree Airport are conducted by FAA approach category B aircraft (aircraft with approach speeds of 91 knots or more but less than 121 knots). FAA approach categories as a component of FAA's airport classification system known as the Airport Reference Code (ARC) is discussed in more detail in the following chapter.

In an effort to confirm this assumption, instrument flight plan data by aircraft type was acquired from the FAA's Aircraft Situational Display to Industry (ASDI) system. This system showed only an average of approximately 15 aircraft operations by aircraft with approach speeds of more than 121 knots over the last four years. An example of business jet operations in aircraft approach category B is the Dassault Aviation, Falcon 50B and Falcon 900, both of which are permanently based at Nut Tree Airport.

Table C5
SUMMARY OF OPERATIONS FORECAST BY AIRCRAFT TYPE, 2011-2031

Aircraft Type	2012[1]	2016	2021	2026	2031
Single Engine Piston	98,605 *(97.15%)*	105,197 *(97.15%)*	111,030 *(97.15%)*	117,190 *(97.15%)*	123,697 *(97.15%)*
Multi-Engine Piston	1,095 *(1.08%)*	1,168 *(1.08%)*	1,233 *(1.08%)*	1,301 *(1.08%)*	1,374 *(1.08%)*
Turbo-Prop	290 *(0.29%)*	309 *(0.29%)*	327 *(0.29%)*	345 *(0.29%)*	364 *(0.29%)*
Business Jet	260 *(0.26%)*	277 *(0.26%)*	293 *(0.26%)*	309 *(0.26%)*	326 *(0.26%)*
Helicopter	1,250 *(1.23%)*	1,334 *(1.23%)*	1,408 *(1.23%)*	1,486 *(1.23%)*	1,568 *(1.23%)*
Military	0 *(0.00%)*	0 *(0.00%)*	0 *(0.00%)*	0 *(0.00%)*	0 *(0.00%)*
Total Operations	**101,500** ***(100%)***	**108,286** ***(100%)***	**114,290** ***(100%)***	**120,631** ***(100%)***	**127,329** ***(100%)***

Source: [1]Estimates from Nut Tree Airport personnel.

Local and Itinerant Operations Forecast

As can be seen in the following table, entitled *SUMMARY OF LOCAL AND ITINERANT OPERATIONS FORECAST 2012-2031*, itinerant operations at Nut Tree Airport are expected to increase slightly over local operations, as more and more general aviation aircraft are increasingly utilized for business-related purposes. Also, as mentioned previously, the impact of the JAL bankruptcy on the training center in Napa is currently unknown. The continued success and/or closure of this training center will also have an impact on the breakdown of local versus itinerant operations as most of the JAL operations are touch-and-go operations which are classified as local operations.

Table C6
SUMMARY OF LOCAL AND ITINERANT OPERATIONS FORECAST, 2011-2031

Year	Local	Itinerant	Total
2011	40,000 *(39.0%)*	61,500 *(61.0%)*	101,500 *(100%)*
2016	41,149 *(38.0%)*	67,137 *(62.0%)*	108,286 *(100%)*
2021	42,287 *(37.0%)*	72,003 *(63.0%)*	114,290 *(100%)*
2026	43,427 *(36.0%)*	77,204 *(64.0%)*	120,631 *(100%)*
2031	44,565 *(35.0%)*	82,764 *(65.0%)*	127,329 *(100%)*

Source: *from consultant.*

Based Aircraft Forecast

The number and type of aircraft anticipated to be based at an airport are vital components in developing a plan for that airport. Generally, there is a relationship between aviation activity and based aircraft, stated in terms of operations per based aircraft (OPBA). Sometimes, a trend can be established from historical information of operations and based aircraft. The national trend has been changing with more aircraft being used for business purposes and less for pleasure flying. This impacts the OPBA in that business aircraft are usually flown more often than pleasure aircraft.

Several based aircraft forecast scenarios are presented in the following table, entitled *BASED AIRCRAFT FORECAST SCENARIOS, 2011-2031*. These include the *Terminal Area Forecast Detail Report*, and three forecast scenarios developed for this study.

- **TAF:** FAA's *Terminal Area Forecast Detail Report*, January 2012. As the following table illustrates, the TAF does not project any increase in based aircraft for the Airport. It is also important to note that the current based aircraft count of 189 is approximately 5% higher than the 180 based aircraft listed in the FAA TAF.
- ***Scenario One:*** Projects an average annual growth rate of 0.90%, which is equal to the nationwide active general aviation fleet forecast for based aircraft contained in the *FAA*

Aerospace Forecasts, Fiscal Years 2010-2030.

- ***Scenario Two:*** The current estimate of 101,500 annual operations divided by the current count of 201 based aircraft at the Airport produces an OPBA of 537. This scenario assumes that the level of 537 OPBA is maintained throughout the planning period and projects based aircraft to increase in accordance with the selected operations forecast from Table C4.
- ***Scenario Three:*** This scenario assumes the existing hangar wait list is accommodated in 2010 and 2011 and then projects based aircraft to increase at the FAA Aerospace AAGR of 0.90%.

Table C7
BASED AIRCRAFT FORECAST SCENARIOS, 2011-2031

Year	TAF	Scenario One 0.90%	Scenario Two 537 OPBA	Scenario Three Satisfy Hangar Demand, then 0.90%[2]
2011	180	189[1]	189[1]	189[1]
2016	180	199	202	233
2021	180	209	213	244
2026	180	218	225	255
2031	180	228	237	267

Source: *from consultant.*

[1] Actual.
[2] Selected Forecast.

Based Aircraft Forecast by Aircraft Type

The mix of based aircraft is shown on the following table, entitled *BASED AIRCRAFT FORECAST BY TYPE, 2011-2031*. It is expected that single engine aircraft will continue to be the dominant aircraft type based at Nut Tree Airport; although, increases in based single and multi-engine turbine, jet, and helicopters are anticipated.

Table C8
BASED AIRCRAFT FORECAST BY TYPE, 2011-2031

Aircraft Type	2011	2016	2021	2026	2031
Single Engine Piston & Turbo-prop	176 *(93.0%)*	205 *(88.0%)*	212 *(87.0%)*	219 *(86.0%)*	227 *(85.0%)*
Multi-Engine Piston & Turbo-prop	11 *(6.0%)*	16 *(7.0%)*	17 *(7.0%)*	18 *(7.0%)*	19 *(7.0%)*
Jet	1 *(0.5%)*	7 *(3.0%)*	9 *(3.5%)*	10 *(4.0%)*	12 *(4.5%)*
Helicopter	1 *(0.5%)*	5 *(2.0%)*	6 *(2.5%)*	8 *(3.0%)*	9 *(3.5%)*
TOTAL	**189** ***(100%)***	**233** ***(100%)***	**244** ***(100%)***	**255** ***(100%)***	**267** ***(100%)***

Source: *from consultant.*

Summary

A summary of the aviation forecasts prepared for this study is presented in the following table, entitled *SUMMARY OF AVIATION ACTIVITY FORECASTS, 2011-2031*. This information will be used in the following chapters to analyze facility requirements, to aid development of alternatives, and to guide the preparation of the plan and program of future airport facilities. In other words, the aviation activity forecasts are the foundation from which future plans will be developed and implementation decisions will be made.

Table C9
SUMMARY OF AVIATION ACTIVITY FORECASTS, 2011-2031

Operations	2011	2016	2021	2026	2031
Single Engine Piston	98,605	105,197	111,030	117,190	123,697
Multi-Engine Piston	1,095	1,168	1,233	1,301	1,374
Turbo-Prop	290	309	327	345	364
Business Jet	260	277	293	309	326
Helicopter	1,250	1,334	1,408	1,486	1,568
TOTAL OPERATIONS	**101,500**	**108,286**	**114,290**	**120,631**	**127,329**
Local Operations	40,000	41,149	42,287	43,427	44,565
Itinerant Operations	61,500	67,137	72,003	77,204	82,764
Based Aircraft by Type					
Single Engine Piston & Turbo-prop	176	205	212	219	227
Multi-Engine Piston & Turbo-prop	11	16	17	18	19
Jet	1	7	9	10	12
Helicopter	1	5	6	8	9
TOTAL BASED AIRCRAFT	**189**	**233**	**244**	**255**	**267**

Source: *from consultant.*

Capacity Analysis and Facility Requirements

INTRODUCTION. The capacity of an airfield is primarily a function of the major aircraft operating surfaces that compose the facility and the configuration of those surfaces (runways and taxiways). However, it is also related to, and considered in conjunction with, wind coverage, airspace utilization, and the availability and type of navigational aids. Capacity refers to the number of aircraft operations that a facility can accommodate on either an hourly or yearly basis. It does not refer to the size or weight of aircraft. Facility requirements are analyzed to determine those facilities needed to meet the forecast demand and aircraft fleet provided they are consistent with the established role and goals of the airport. Evaluation procedures will focus on the airport's appropriate Airport Reference Code (ARC)/ dimensional criteria, runway length, pavement strength, instrument approach capability, and layout of aircraft storage facilities.

Knowledge of the types of aircraft currently using, and those aircraft expected to use, the Nut Tree Airport provides information concerning the appropriate Airport Reference Code (ARC) designation for the facility. FAA Advisory Circular 150/5300-13, *Airport Design*, provides guidelines for this ARC determination, which is based on the "Design Aircraft" that is judged the most critical aircraft using, or projected to use, the airport. The ARC relates aircraft operational and physical characteristics to design criteria that are applied to various airport components. Under this methodology, safety margins are provided in the physical design of airport facilities.

There are two components in determining the ARC for an airport, an operational component and a physical component. The first component, depicted by a capital letter, is the Aircraft Approach Category and relates to aircraft approach speed (operational component). The second component, depicted by a Roman numeral, is the Airplane Design Group (ADG) and relates to airplane wingspan (physical component).

Currently, a large number of single engine training aircraft utilize the Airport on a regular basis; however, this traffic is supplemented by a fair number of multi-engine, turbo-prop, and jet aircraft that are operated for both business and recreational purposes.

Runway 2/20

All aircraft, including both fixed wing and helicopters, operating at Nut Tree Airport utilize Runway 2/20 for landings and takeoffs. The Airport's current Airport Layout Plan identifies the Beech Super King Air B200 as the "Critical Aircraft" for this runway, which specifies an ARC of B-II. The King Air B200 is a medium size twin-engine general aviation turbo-prop aircraft that has an approach speed of 103 knots and a wingspan of 54.5 feet. According to current operational estimates, approximately 290 turbo-prop operations were conducted at the Airport in 2011, in addition to approximately 260 business jet operations. It is assumed that the majority of existing and forecast jet aircraft operations at the Nut Tree Airport are conducted by FAA approach category B aircraft (aircraft with approach speeds of 91 knots or more but less than 121 knots).

FAA guidance defines a "substantial use threshold" on federally funded projects for critical design airplanes (i.e., the design aircraft) to have at least 500 or more annual itinerant operations at the Airport. According to instrument approach data acquired from the FAA's Aircraft Situational Display to Industry (ASDI) system, only an average of 15 aircraft operations were conducted at the Nut Tree Airport by aircraft with approach speeds of more than 121 knots over the last four years. However, the reliability of the ASDI system is low due to the National Business Aviation Association (NBAA) program that allows member aircraft operators to block tail numbers from the system. However, based on airport

management estimates, there are a very small number of jet operations by aircraft in approach category C (more than 121 knots approach speed) and unless an operator of an approach category C aircraft decides to base at the Nut Tree Airport, Approach Category B is likely appropriate for the foreseeable future. Approach category B also includes a large number of small and medium size business jets. An example of business jet operations in aircraft approach category B is the Dassault Aviation, Falcon 50B and Falcon 900, both of which are permanently based at the Nut Tree Airport.

Airfield Capacity Methodology

This section addresses the evaluation method used to determine the capability of the airside facilities to accommodate aviation operational demand. Evaluation of this capability is expressed in terms of potential excesses and deficiencies in capacity. The methodology utilized for the measurement of airfield capacity in this study is described in FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*. From this methodology, airfield capacity is defined in the following terms:

- **Hourly Capacity of Runways:** The maximum number of aircraft that can be accommodated under conditions of continuous demand during a one-hour period.
- **Annual Service Volume (ASV):** A reasonable estimate of an airport's annual capacity (i.e., the level of annual aircraft operations that will result in an average annual aircraft delay of approximately one to four minutes).

The capacity of an airport's airside facilities is a function of several factors. These include the layout of the airfield, local environmental conditions, specific characteristics of local aviation demand, and air traffic control requirements. The relationship of these factors and their cumulative impact on airfield capacity are examined in the following paragraphs.

Airfield Layout

The layout or "design" of the airfield refers to the arrangement and interaction of the airfield components, which include the runway system, taxiways, and ramp entrances. As previously described, Nut Tree Airport operates around a single runway (i.e., Runway 2/20). This runway is served by a full-length parallel taxiway system (i.e., Taxiway "A") with five connector taxiways. There are also aircraft run-up areas or holding bays located near the end of each runway.

All of the Airport's existing hangar facilities are located on the southeast side of the runway adjacent to the primary aircraft parking apron. These facilities include various T-hangars, and individual clear span hangars located adjacent to a taxilane that extends from the north side of

the aircraft parking apron. There are also a number of larger executive/corporate hangars located adjacent to taxilanes that extend from the south side of the aircraft parking apron.

Environmental Conditions

Climatological conditions specific to the location of an airport not only influence the layout of the airfield, but also impact the utilization of the runway system. Variations in the weather, resulting in limited cloud ceilings and reduced visibility typically lower airfield capacity, while changes in wind direction and velocity typically dictate runway usage and influence runway capacity. Meteorological data from the Nut Tree Airport Automated Surface Observing System (ASOS) was ordered from the National Climatic Data Center for use in this Airport Master Plan.

Wind Coverage. Surface wind conditions (i.e., direction and speed) generally determine the desired alignment and configuration of the runway system. Runways, which are not oriented to take advantage of prevailing winds, will restrict the capacity of the Airport. Wind conditions affect all airplanes in varying degrees; however, the ability to land and takeoff in crosswind conditions varies according to pilot proficiency and aircraft type. Generally, the smaller the aircraft, the more it is affected by the crosswind component.

As mentioned previously, wind data for Nut Tree Airport was available for analysis from 2001 through 2009. There were approximately 62,056 observations available for analysis. The allowable crosswind component is dependent upon the Airport Reference Code (ARC) for the type of aircraft that utilize the Airport on a regular basis. According to the existing Airport Layout Plan, the current Airport Reference Code (ARC) for Runway 2/20 is ARC B-II and based on data presented in the previous chapter, ARC B-II is still considered the appropriate ARC for Nut Tree Airport. The ARC system is discussed in more detail later in this chapter on page D.12. For ARC B-II classifications, the standards specify that the 10.5-knot and 13-knot crosswind components be utilized for analysis. Therefore, the 10.5-knot and 13-knot crosswind components have been analyzed for Nut Tree Airport. The following illustration, entitled *NUT TREE AIPPORT ALL WEATHER WIND ROSE: 13- & 10.5-KNOT CROSSWIND COMPONENTS*, illustrates a comparative analysis of the all weather wind coverage provided at the Airport.

The desirable wind coverage for an airport's runway system is 95 percent. This means that the runway orientation and configuration should be developed so that the maximum crosswind component is not exceeded more than 5 percent of the time annually. The following table, entitled *NUT TREE AIRPORT ALL WEATHER WIND COVERAGE SUMMARY*, quantifies the wind coverage offered by the airport's existing runway system, including the coverage for each runway end. Based on the comparative all weather wind analysis for the Airport, utilizing the FAA Airport Design Software supplied with AC 150/5300-13, the existing single

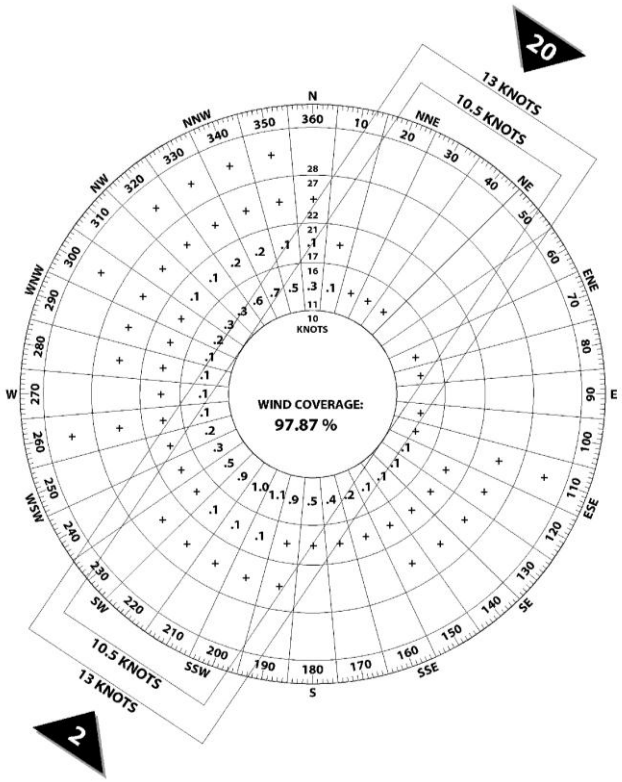
runway configuration provides adequate wind coverage (i.e., in excess of 95 percent) for both the 10.5- and the 13-knot crosswind components. Therefore, no additional runways are required from a *wind coverage* standpoint.

Table D1
NUT TREE AIRPORT ALL WEATHER WIND COVERAGE SUMMARY

Runway Designation	13-Knot Crosswind Component w/ 5-Knot Tailwind	10.5-Knot Crosswind Component w/ 5-Knot Tailwind
Runway 2/20	97.87%	96.13%
Runway 2	66.86%	66.50%
Runway 20	92.15%	91.20%

Source: National Oceanic and Atmospheric Administration, National Climatic Data Center, Station #72482. Vacaville, California.
Notes: Wind analysis tabulation provided by consultant utilizing the FAA Airport Design Software supplied with AC 150/5300-13.

Figure D1
NUT TREE AIRPORT ALL WEATHER WIND ROSE: 13-, & 10.5-KNOT CROSSWIND COMPONENTS



Source: National Oceanic and Atmospheric Administration, National Climatic Data Center. Station #72482 - Vacaville, California. Period of Record – August 2001-December 2009. Total Observations: 62,056.

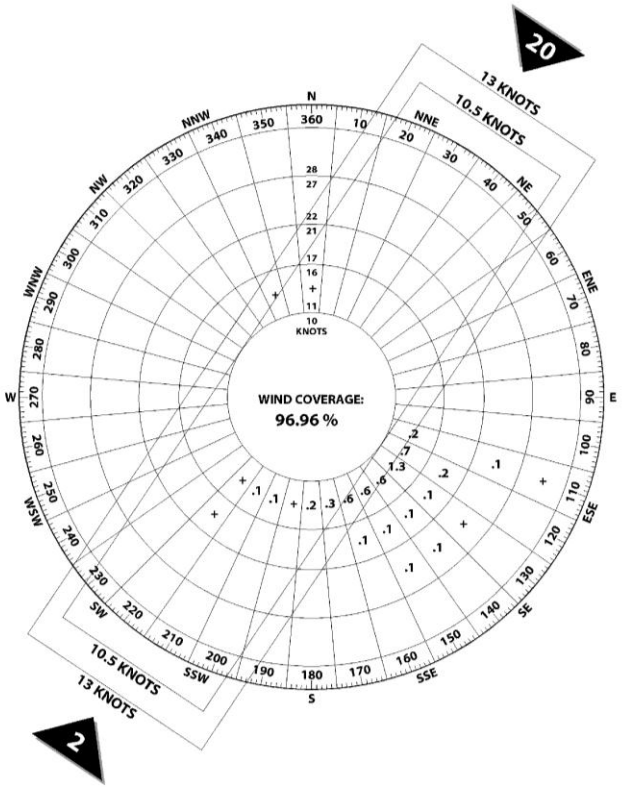
The Airport is currently served two straight-in RNAV (GPS) approaches to Runway 20 and one circling VOR/DME approach. In an effort to evaluate the effectiveness of these approaches, and analyze the potential benefits of implementing lower approach visibility minimums, an Instrument Flight Rules (IFR) wind rose has been constructed. The following table and illustration quantify the wind coverage offered by each runway end in consideration of the lowest potential approach minimums (ceiling equal to or greater than 200 feet and/or visibility equal to or greater than 1/2 statute mile).

Table D2
NUT TREE AIRPORT IFR WEATHER WIND COVERAGE SUMMARY

Runway Designation	13-Knot Crosswind Component w/ 5-Knot Tailwind	10.5-Knot Crosswind Component w/ 5-Knot Tailwind
Runway 2/20	96.96%	95.21%
Runway 2	90.50%	89.37%
Runway 20	94.42%	92.70%

Source: National Oceanic and Atmospheric Administration, National Climatic Data Center, Station #72482. Vacaville, California.
Notes: Wind analysis tabulation provided by consultant utilizing the FAA Airport Design Software supplied with AC 150/5300-13.

Figure D2
NUT TREE AIRPORT IFR WEATHER WIND ROSE: 13-, & 10.5-KNOT CROSSWIND COMPONENTS



Source: National Oceanic and Atmospheric Administration, National Climatic Data Center. Station #72482 - Vacaville, California. Period of Record – August 2001-December 2009. Total Observations: 2,476.

Characteristics of Demand

Certain site-specific characteristics related to aviation use and aircraft fleet makeup impact the capacity of the airfield. These characteristics include runway use, aircraft mix, percent arrivals, touch-and-go operations, and exit taxiways.

Aircraft Mix. The capacity of a runway is dependent on the type and size of the aircraft that utilize the facility. Aircraft are categorized into four classes: Classes A and B consist of small single engine and twin-engine aircraft (both prop and jet), weighing 12,500 pounds or less, which are representative of the general aviation fleet. Class C and D aircraft are larger jet and propeller aircraft typical of those utilized by some of the larger corporations, the airline industry, and the military. Aircraft mix is defined as the relative percentage of operations conducted by each of these four classes of aircraft. In consideration of the forecasts presented in the previous chapter, an aircraft mix table has been generated. Nut Tree Airport has no operations by Class D aircraft (over 300,000 pounds), nor are any expected to occur in the future. Because no records are kept with regard to classification of aircraft by weight at Nut Tree Airport, it has been assumed that the number of Class C aircraft operations at the Airport is a very small percentage of total operations. Some aircraft meeting the Class C weight designation known to use the Airport include the Dassault Falcon 50, the Dassault Falcon 900 and some of the larger Cessna Citation business jet aircraft. The following table, entitled *AIRCRAFT CLASS MIX FORECAST, 2011-2031*, presents the projected operational mix for the selected forecasts.

Table D3
AIRCRAFT CLASS MIX FORECAST, 2011-2031

	VFR Conditions			IFR Conditions		
Year	**Class A & B**	**Class C**	**Class D**	**Class A & B**	**Class C**	**Class D**
2011[(1)]	99.5%	0.5%	---	88.0%	12.0%	---
2016	99.4%	0.6%	---	87.0%	13.0%	---
2021	99.3%	0.7%	---	86.0%	14.0%	---
2026	99.2%	0.8%	---	85.0%	15.0%	---
2031	99.1%	0.9%	---	84.0%	16.0%	---

Class A - Small Single Engine, < 12,500 pounds **Class B** - Small Twin-Engine, < 12,500 pounds
Class C - 12,500 - 300,000 pounds **Class D** - > 300,000 pounds
[(1)] Existing percentage breakdown was estimated by *consultant.*

Percent Arrivals. Runway capacity is also significantly influenced by the percentage of all operations that are arrivals. Because aircraft on final approach are typically given absolute priority over departures, higher percentages of arrivals during peak periods of operations will reduce the Annual Service Volume (ASV). The operations mix occurring on the runway at

Nut Tree Airport reflects a general balance of arrivals to departures; therefore, it will be assumed in the capacity calculations that arrivals equal departures during the peak period.

Touch-and-Go Operations. A touch-and-go operation refers to an aircraft maneuver in which the aircraft performs a normal landing touchdown followed by an immediate takeoff, without stopping or taxiing clear of the runway. These operations are normally associated with training activity and are included in local operations figures when reported by an airport traffic control tower. According to airport management, local operations are estimated to represent approximately 39 percent of the total annual operations being conducted at the Airport, and flight training represents a majority of this activity. It is anticipated that the existing level of flight training will continue through the planning period. However, the Airport will likely accommodate an increasing percentage of business-related itinerant general aviation operations in the future; thus, the overall percentage of touch-and-go operations is projected to decrease slightly as a percentage of the total through the planning period.

Runway Use. The use configuration of the runway system is defined by the number, location, and orientation of the active runway(s) and relates to the distribution and frequency of aircraft operations to those facilities. Both the prevailing winds in the region and the existing runway facility at Nut Tree Airport combine to dictate the utilization of the existing runway system. According to airport management observations, which are generally supported by the all weather wind coverage data, Runway 20 is utilized 60 percent of the time annually. As identified previously, the wind coverage also typically favors Runway 20 during IFR conditions, which is supported by the airport's existing instrument approach procedure.

Exit Taxiways. The capacity of a runway system is greatly influenced by the ability of an aircraft to exit the runway as quickly and safely as possible. Therefore, the quantity and design of the exit taxiways can directly influence aircraft runway occupancy time and the capacity of the runway system.

Due to the location of the existing exit taxiways serving the runway system at Nut Tree Airport, the number of available exit taxiways for use in the capacity calculation is adequate. Based upon the mix index of aircraft operating at the Airport under VFR conditions, the capacity analysis, as described in the FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, gives credit to only those runway exit taxiways located between 2,000 and 4,000 feet from the landing threshold. Therefore, landings to both Runway 2 and Runway 20 each received an exit rating of two. A taxiway exit rating of four is the maximum rating that can be received, and no credit given for an exit within 750 feet of another exit. Based upon the location of the existing exit taxiways, only one additional exit taxiway could be added to the midfield area in consideration of the specified design criteria. However, given the airport's existing and projected operational levels, the location of future taxiway improvements (if any) will be evaluated in conjunction with the formulation of airside development alternatives.

Airfield Capacity Analysis

As previously described, the determination of capacity for Nut Tree Airport uses the methodology described in the FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, along with the Airport Design Computer Program that accompanies AC 150/5300-13. Unfortunately, the FAA's methodology for calculating capacity incorporates numerous assumptions, some of which do not apply to Nut Tree Airport. The assumptions that are incorporated into the FAA's capacity calculations are: arrivals equal departures; the percent of touch-and-go operations is between 0-50 percent of total operations; there is a full-length parallel taxiway with ample exits and no taxiway crossing problems; there are no airspace limitations; the Airport has at least one runway equipped with an ILS and the necessary air traffic control facilities to carry out operations in a radar environment; IFR weather conditions occur roughly 5 percent of the time; and, approximately 80 percent of the time, the Airport is operated with the runway use configuration that produces the greatest hourly capacity. Since Nut Tree Airport does not have an ILS or an ATCT, the capacity calculations using the FAA methodology would be overstated, and the capacity would be less than that stated in the Advisory Circular in consideration of existing conditions.

Applying information generated from the preceding analyses, capacity and demand are formulated in terms of the following results:

- **Hourly Capacity of Runways (VFR and IFR)**
- **Annual Service Volume (ASV)**

The FAA's methodology to estimate hourly capacity and ASV for long-range planning purposes is presented in FAA Advisory Circular 150/5060-5. Based on a single runway use configuration with a specified mix index ranging from 0- 20, the maximum possible VFR and IFR hourly capacities at Nut Tree Airport would be at 98 and 59 operations, respectively, with a projected ASV of less than 230,000 operations per year. However, because Nut Tree Airport does not conform to several of the assumptions listed above (i.e., the Airport does not have an ATCT or precision instrument approach), this means that the existing operational capacity at Nut Tree Airport would be less than the figures presented above. General planning principles suggest that airport operators should begin to consider future capacity enhancements when an airport reaches 60 percent of its ASV. For Nut Tree Airport, this planning threshold would not be reached until traffic volumes approach 138,000 operations (60 percent of 230,000 ASV). Since existing traffic levels are estimated at 101,500 operations and forecast traffic levels by the end of the planning period are just over 127,000 operations, it is not anticipated that operational capacity will be an issue at the Airport within the 20-year planning period of this study. Furthermore, given the existing development constraints on,

and in the vicinity of, the Airport, it is unlikely that additional runways could ever be constructed to accommodate significant gains in operational capacity demands.

Capacity Summary

This section has analyzed the capacity of existing facilities at Nut Tree Airport. Both adequate airfield and ground access facilities are critical components in the ability of the Airport as a whole to efficiently serve the public. Capacity deficiencies that cause delays associated within one area will often be reflected in the ability or inability of the entire facility to function properly.

The following Facility Requirements section will delineate the various facilities required to properly accommodate future demand. That information, in addition to the capacity analysis, will provide the basis for formulating the alternative development scenarios for Nut Tree Airport, ensuring that the new Recommended Development Plan can adequately accommodate the long-term aviation development requirements of the region.

Facility Requirements

This section presents the analysis of requirements for airside and landside facilities necessary to meet aviation demand at Nut Tree Airport. For those components determined to be deficient, the type and size of facilities required to meet future demand is identified. Airside facilities examined include the runways, taxiways, runway protection zones, thresholds, and navigational aids. For the purposes of this analysis, landside facilities include such facilities as hangars, aircraft apron areas and airport support facilities.

This analysis uses the growth scenario set forth in the forecast of demand for establishing future development needs at the Airport. This is not intended to dismiss the possibility that, due to the unique circumstances in the region, either accelerated growth or consistently higher or lower levels of activity may occur. Aviation activity levels should be monitored for consistency with the forecasts. In the event of changes, the schedule of development should be adjusted to correspond to the demand for facilities rather than be set to predetermined dates of development. By doing this, over-building or under-building can be avoided.

Airside Requirements

In efforts to identify future demand at Nut Tree Airport for those facilities required to adequately serve future needs, it is necessary to translate the forecast aviation activity into specific types and quantities. This section addresses the actual physical facilities and/or improvements to existing facilities needed to safely and efficiently accommodate the projected demand that will be placed on the Airport. This section consists of two separate analyses: those requirements dealing with *airside* facilities and those dealing with *landside* facilities.

Airport Reference Code (ARC)/Design Aircraft Analysis

The types of aircraft presently utilizing an airport and those projected to utilize the facility in the future are important considerations for planning airport facilities. An airport should be designed in accordance with the Airport Reference Code (ARC) standards that are described in AC 150/5300-13, *Airport Design.* The ARC is a coding system used to relate and compare airport design criteria to the operational and physical characteristics of the aircraft intended to operate at the Airport.

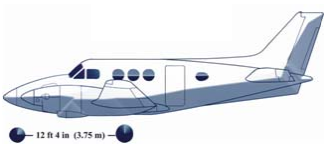
The ARC has two components that relate to the Airport's "Design Aircraft" (often referred to as the critical aircraft). The first component, depicted by a letter (i.e., A, B, C, D, or E), is the aircraft approach category, and relates to aircraft approach speed based upon operational characteristics. The second component, depicted by a Roman numeral (i.e., I, II, III, IV, or V), is the aircraft design group and relates to aircraft wingspan (physical characteristic).

Generally speaking, aircraft approach speed applies to runways and runway-related facilities, while aircraft wingspan is primarily related to separation criteria associated with taxiways and taxilanes. Examples of aircraft by ARC are illustrated in the following figure entitled *REPRESENTATIVE AIRCRAFT BY AIRPORT REFERENCE CODE (ARC) DESIGNATION.*

The 2007 Airport Layout Plan identified the Beech Super King Air 200 (ARC B-II) as the existing "Design Aircraft" for the Airport, and identified the Citation V (ARC B-II) as the future "Design Aircraft."

Runway 2/20 is currently designed to accommodate ARC B-II aircraft. As presented in the *Forecasts of Aviation Activity* chapter, multi-engine turboprop and business jet operations are anticipated to steadily increase throughout the 20-year planning period. However, the majority of these operations are expected to be conducted by ARC B-I and B-II aircraft and therefore, B-II is considered the appropriate ARC through the planning period.

ARC A-I
Single-Engine Aircraft - 2 to 6 seats
Beech Bonanza
Beech Baron B55
Cessna-150



ARC B-I
Twin-Piston Aircraft - 4 to 10 seats
Beech King Air B100
Piper 31-310 Navajo
Beech Baron 58

ARC B-I
Very Light Jet/Small Cabin 4-6 seats
Eclipse 500
Citation Mustang
Adam Aircraft A700

ARC B-II
Twin-Turboprop Aircraft - 6 to 10 seats
Includes most commercial turboprop aircraft.
Beech Super King Air B200
Cessna 441 Conquest
Grumman Gulfstream I

ARC B-II
Business Jet/Small Cabin - 6 to 12 seats
Dassault Falcon 900
Dassault Falcon 50
Cessna Citation II/III/VII

Source: Aircraft Ground Service Guide, 2002 and Aircraft Manufacturer.
Note: Representative Aircraft not to scale.

FIGURE D3 Representative Aircraft By Airport Reference Code (ARC) Designation

Airfield Dimensional Criteria

FAA Advisory Circular 150/5300-13, *Airport Design*, recommends standard widths, minimum clearances, and other dimensional criteria for runways, taxiways, safety areas, aprons, and other physical airport features based on the previously determined "Design Aircraft" and it's associated ARC (Beech Super King Air 200 and B-II). However, it is important to note that the "Design Aircraft" is to be used for ARC determination only and is not intended to be used dictate runway length requirements. This is explained in more detail in the following section entitled Runways.

The following table entitled *ARC B-II DIMENSIONAL STANDARDS FOR RUNWAY 2/20 (In Feet)*, compare existing conditions against the dimensional design requirements that would apply to Nut Tree Airport depending on the Airport Reference Code and the existing and potential future approach visibility minimums.

As can be noted in the following table and delineated in the following illustration, Runway 2/20 at Nut Tree Airport is, for the most part, in compliance with FAA specified ARC B-II design standards. However, there are a couple of exceptions in considerations of FAA specified ARC B-II, greater than ¾ mile visibility minimums, dimensional criteria. These non-standard conditions include runway object free area width, runway object free area length beyond runway end, and taxiway object free area width. Various alternatives will be evaluated in the following *Alternatives Analysis* chapter of this Airport Master Plan to determine the preferred solutions to meet all FAA design standards.

Table D4
ARC B-II DIMENSIONAL STANDARDS FOR RUNWAY 2/20 (In Feet)

Item	Existing Dimension	ARC B-II with ≥ ¾ Mile Visibility Minimums [1]	ARC B-II with < ¾ Mile Visibility Minimums
Runway Width	75	75	100
Runway Centerline to Parallel Taxiway Centerline (Taxiway "A")	240	240	300
Runway Centerline to Aircraft Parking Area	355	250	400
Runway Centerline to Holdline	200	200	250
Runway Safety Area Width	150	150	300
Runway Safety Area Length Beyond Runway End			
Runway 2	300	300	600
Runway 20	300	300	600
Runway Safety Area Length Prior to Landing Threshold			
Runway 2	300	300	600
Runway 20	300	300	600
Runway Object Free Area Width	500	500	800
Runway Object Free Area Length Beyond RW End			
Runway 2	**135** [2]	300	600
Runway 20	300	300	600
Runway Obstacle Free Zone Width	400	400	400
Runway Obstacle Free Zone Length Beyond Runway End	200	200	200
Taxiway Width	40	35	35
Taxiway Centerline to Parallel Taxilane Centerline	145	97	97
Taxiway Safety Area Width	79	79	79
Taxiway Object Free Area Width	**110.5** [3]	131	131
Threshold Siting Surface Criteria			
Runway 2 [4]	---	Obstructions[6]	Obstructions[6]
Runway 20 [5]	---	Criteria Met	Criteria Met

Source: AC 150/5300-13, Federal Aviation Administration. Existing dimensions delineated in **bold** text reflect potential non-standard criteria. [1] Existing runway approach visibility minimums. [2] OFA off the end of the approach end of Runway 2 is penetrated by canal. [3] Taxiway OFA is penetrated by a light pole and the perimeter fence near the approach end to Runway 20. [4] Applies existing runway type 4 criteria for Appendix 2, AC 150/5300-13 Change 9. [5] Applies existing runway type 6 criteria for Appendix 2, AC 150/5300-13 Change 9. [6] Obstructions include two trees, scheduled to either be removed or topped and the fence that runs along Putah South Canal, scheduled to be obstruction lighted.

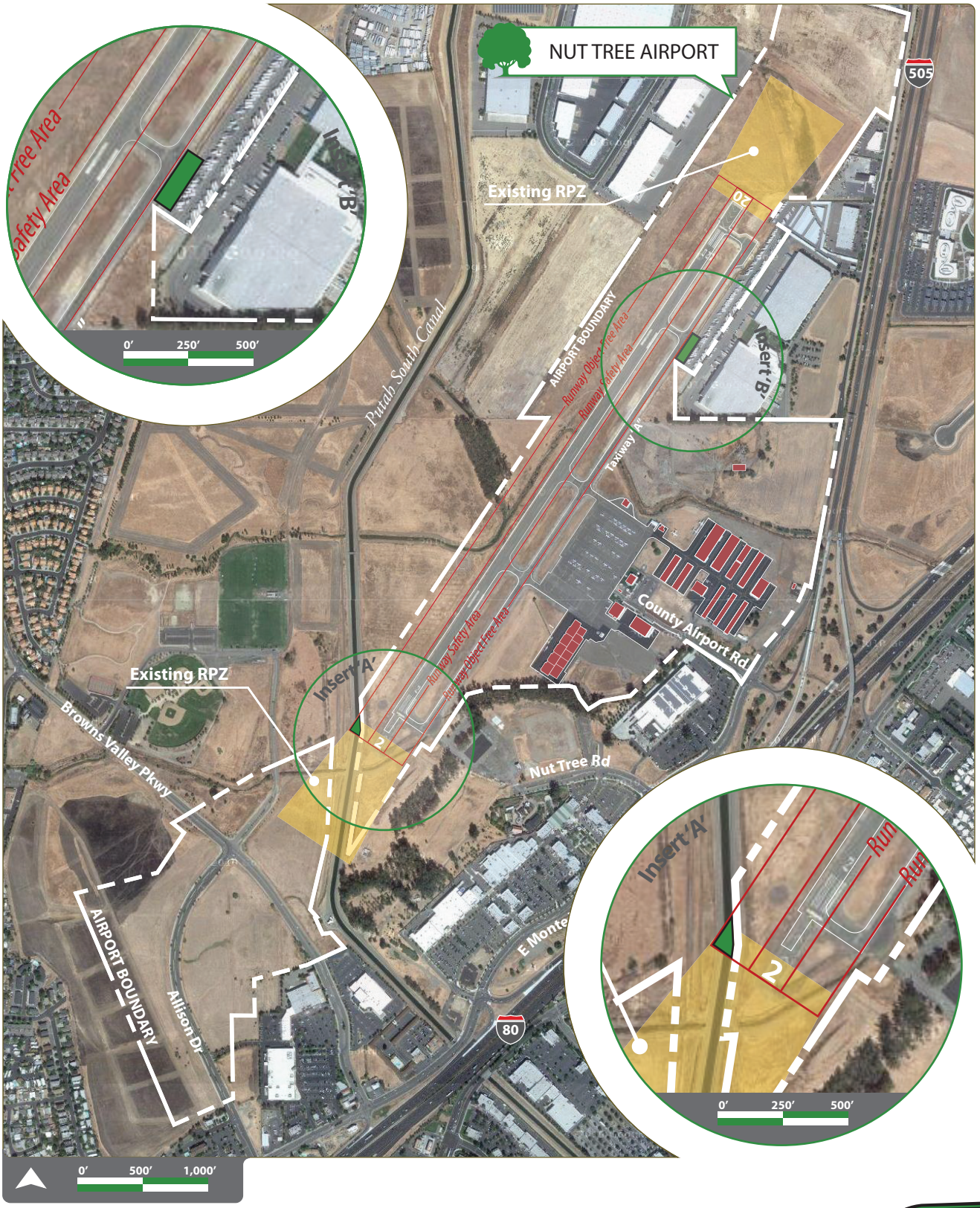


FIGURE D4 ARC B-II Dimensional Criteria
(Not Lower Than 3/4 Mile Visibility Minimums)

Objects Affecting Navigable Airspace. The criteria contained in Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace*, apply to existing and proposed manmade objects and/or objects of natural growth and terrain (i.e., obstructions). These guidelines define the critical areas in the vicinity of airports that should be kept free of obstructions. Secondary areas may contain obstructions if they are determined to be non-hazardous by an aeronautical study and/or if they are marked and lighted as specified in the aeronautical study determination. Airfield navigational aids, as well as lighting and visual aids, by nature of their location, may constitute obstructions. However, these objects do not violate FAR Part 77 requirements, as they are essential to the operation of the Airport.

Existing obstructions to the FAR Part 77 primary surface at Nut Tree Airport include high terrain to the west of the Airport and various poles, trees, bushes, transmission towers, ball field lights, and other light poles. Proposed Disposition of many of these obstruction is listed on the Airspace Plan from the 2007 ALP Update and include trimming/removal of some bushes and trees and the lighting and marking of other obstructions. It should also be noted that all existing objects will be evaluated in consideration of the ultimate planned approaches and associated FAR Part 77 surfaces during this Airport Master Plan process.

Runways

In consideration of the forecasts of future aviation activity, the adequacy of the runway system must be analyzed from several perspectives. These include runway orientation and airfield capacity, which were analyzed in the previous sections, as well as runway length, pavement strength, and runway visibility, which will be evaluated in the following sections. The analysis of these various aspects pertaining to the runway system will provide a basis for recommendations of future improvements.

Runway Orientation. Nut Tree Airport currently operates with a single runway system, Runway 2/20, which provides a generally north/south orientation. As presented in a previous section, according to both comparative wind roses, the existing runway configuration provides excellent wind coverage (i.e., in excess of 96 percent for the 10.5-knot crosswind component and 97 percent for the 13-knot crosswind component) according to the Airport's ASOS data. Therefore, no additional runways need to be evaluated from a *wind coverage* standpoint.

Airfield Capacity. The evaluation of airfield capacity, as presented in previous sections, indicates that the Airport will not exceed the capacity of the existing runway/taxiway system before the end of the planning period.

Runway Length. The determination of runway length recommendations for Nut Tree Airport is based on several factors. These factors include:

- **Airport elevation;**
- **Mean maximum daily temperature of the hottest month;**
- **Runway gradient;**
- **Family grouping of critical aircraft for runway length purposes; and,**
- **Stage length of the longest nonstop trip destination.**

The runway length operational requirements for aircraft are greatly affected by elevation, temperature, and runway gradient. The calculations for runway length requirements at Nut Tree Airport are based on an elevation of 116 feet AMSL, 95.0 degrees Fahrenheit NMT (mean normal maximum temperature of the hottest month), and a maximum difference in runway elevation at the centerline of approximately three feet.

Generally, for design purposes, runway length recommendations at general aviation airports are premised upon a combination of the most demanding aircraft or family grouping of aircraft within the general aviation fleet that are operating, or are projected to operate, at the airport in the future. For Nut Tree Airport, this fleet is dominated by small aircraft weighing 12,500 pounds maximum takeoff weight (MTOW) or less, with a few larger aircraft (i.e., some of the business jets that are based at the Airport) weighing more than 12,500 pounds but less than 60,000 pounds MTOW. As can be seen in the following table, entitled *RUNWAY 2/20 TAKEOFF LENGTH RECOMMENDATIONS* there are four runway lengths shown for small aircraft (i.e., less than ten passenger seats) type runways. This table is derived from the computer-based FAA Airport Design Software supplied in conjunction with FAA AC 150/5300-13, *Airport Design*. Each of these provides the required length to accommodate a certain type of aircraft that will utilize the runway. The lengths range from 2,590 to 4,370 feet in length.

There are also four different lengths given for large aircraft (i.e., aircraft weighing between 12,500-60,000 pounds). The runway length recommendations for large aircraft range between 4,750 to 9,060 feet for Nut Tree Airport. Currently, this family of aircraft is restricted at times from operating at the Airport at the longer stage lengths or with maximum fuel loads, due to the existing runway length of only 4,700 feet. The runway length recommendations shown in the following table are dependent on meeting the operational requirements of a certain percentage of the fleet at a certain percentage of the useful load, (e.g., 75 percent of the fleet at 60 percent useful load). The useful load of an aircraft is defined as the difference between the maximum allowable structural gross weight and the operating weight empty. In other words, it is the load that can be carried by the aircraft composed of passengers, fuel, and cargo. Generally speaking, the following family grouping of business jet aircraft comprise 75 percent of the large aircraft fleet weighing less than

60,000 pounds: Learjets, Sabreliners, Challengers, Citations, Falcons, Hawkers, and the Westwind.

Table D5
RUNWAY 2/20 TAKEOFF LENGTH RECOMMENDATIONS

	Runway Takeoff Length (Feet)	
	Dry Pavement	**Wet Pavement**
Existing Condition		
Runway 02/20	4,700	4,700
Small Aircraft with less than 10 seats [1]		
75% of Small Aircraft	2,590	2,590
95% of Small Aircraft	3,160	3,160
100% of Small Aircraft	3,750	3,750
Small Aircraft with more than 10 seats	4,370	4,370
Large Aircraft less than 60,000 pounds		
75% of fleet/60% useful load	4,750	5,430
100% of fleet/60% useful load	5,680	5,680
75% of fleet/90% useful load	7,140	7,140
100% of fleet/90% useful load	9,060	9,060

Notes: Runway lengths based on 116 feet AMSL, 95.0˚F NMT, and maximum difference in runway end elevation of three feet. [1] The majority of aircraft operating at the Airport are contained within the Small Aircraft Category (i.e., ≤12,500 lbs.).

An important factor to note when considering the generalized large aircraft runway takeoff length requirements presented in the previous table is that the actual length necessary for a runway is a function of elevation, temperature, and aircraft stage length. As temperatures change on a daily basis, the runway length requirements change accordingly. The cooler the temperature, the shorter the runway necessary; therefore, for example, if an airport is designed to accommodate 75 percent of the fleet at 90 percent useful load, this does not mean that, at certain times a larger aircraft cannot use the airport or that aircraft cannot use it with heavier loadings than that represented by 90 percent of the maximum useful load. Following an examination of the various runway lengths provided in the previous table, it should be noted that Runway 2/20, with an existing length of 4,700 feet, could accommodate the entire small aircraft fleet and very close to 75 percent of the large aircraft fleet at 60 percent useful load (under dry pavement conditions).

As mentioned previously, pilots operating from Nut Tree Airport can adjust the operating weight of their aircraft based upon the specific payload requirements of their flight and the runway length available for takeoff. In addition, the specific performance capabilities of

general aviation aircraft are documented through the aircraft certification process and defined by Federal Aviation Regulations (FAR) Part 23. Therefore, both takeoff and landing procedures conducted at Nut Tree Airport must comply with these regulations to ensure the safety of these operations.

In 2005, FAA published AC 150/5325-4B entitled Runway Length Requirements for Airport Design. This AC provides standards and guidelines recommended by FAA strictly for use in the design of civil airports and includes airplane performance data curves and tables for use in airport planning and runway length analysis. Experience has shown that these performance data curves and tables produce recommended runway lengths very similar to the output produced by the Airport Design Program and included in the previous table.

AC 150/5325-4B uses a five-step procedure to determine recommended runway lengths for airport planning purposes. The information derived from this five-step procedure is for airport design only and is not to be used for flight operations. The five steps are paraphrased below with a paragraph following that discusses how the step was followed for this particular runway length analysis for Nut Tree Airport.

Step #1. Identify the list of critical design airplanes that will make regular use of the proposed runway for an established planning period of at least five years. For Federally funded projects, the definition of the term "substantial use" quantifies the term "regular use" (i.e. 500 annual operations).

> This list of critical design airplanes for the Nut Tree Airport includes a number of business jet aircraft that are regular users of the Airport. This list includes a Dassault Falcon 50, a Dassault Falcon 900, a Cessna Citation 501 and a Beechcraft Premier 1. The combined number of annual operations by these aircraft at Nut Tree Airport exceed the FAA's substantial use threshold of 500 operations and are projected to continue to do so over the next five years.

(2) Step #2. Identify the airplanes that will require the longest runway lengths at maximum certificated takeoff weight (MTOW). This will be used to determine the method for establishing the recommended runway length. When the MTOW of listed airplanes is 60,000 pounds (27,200 kg) or less, the recommended runway length is determined according to a family grouping of airplanes having similar performance characteristics and operating weights. When the MTOW of listed airplanes is over 60,000 pounds (27,200 kg), the recommended runway length is determined according to individual airplanes.

> Again, as stated previously, the airplanes that will require the longest runway lengths at MTOW include the list of business jet aircraft that are regular users of Nut Tree Airport with MTOWs of more than 12,500 pounds but less than 60,000 pounds.

(3) Step #3. Use table 1-1 (Appendix A) and the airplanes identified in step #2 to determine the method that will be used for establishing the recommended runway length. Table 1-1 categorizes potential design airplanes according to their MTOWs. MTOW is used because of the significant role played by airplane operating weights in determining runway lengths. The first column in Table 1-1 separates the various airplanes into one of three weight categories. The second column identifies the applicable airport design approach (by airplane family group or by individual airplanes) as noted previously in step #2. The third column directs the airport designer to the appropriate chapter for design guidelines and whether to use the referenced tables contained in the AC or to obtain airplane manufacturers' airport planning manuals (APM) for each individual airplane under evaluation.

The airplanes that require the longest runway length at Nut Tree Airport are in the *Over 12,500 pounds but less than 60,000 pounds* category and as such, Chapter 3 is the appropriate location of design guidelines. Chapter 3 directs the airport designer to Tables 3-1 and 3-2 (Appendix A). Table 3-1 provides the list of those airplanes that comprise the "75 percent of the fleet" category and therefore can be accommodated by the runway lengths resulting from Figure 3-1. All four of the previously mentioned business jets known to be regular users of Nut Tree Airport are included in Table 3-1, meaning that the design curves in Figure 3-1 (Appendix A) are appropriate for use in runway length determinations for Nut Tree Airport. Figure 3-1 Appendix A includes two design curves, one for 75 percent of the fleet at 60 percent useful load, and one for 75 percent of the fleet at 90 percent useful load. Using the mean daily maximum temperature of the hottest month and the airport elevation for Nut Tree Airport, the first curve produces a recommended runway length of approximately 4,950 feet while the second curve produces a recommended runway length of approximately 7,100 feet.

Furthermore, paragraph 306 of Chapter 3 states that *General aviation (GA) airports have witnessed an increase use of their primary runway by scheduled airline service and privately owned business jets. Over the years business jets have proved themselves to be a tremendous asset to corporations by satisfying their executive needs for flexibility in scheduling, speed, and privacy. In response to these types of needs, GA airports that receive regular usage by large airplanes over 12,500 pounds (5,670 kg) MTOW, in addition to business jets, should provide a runway length comparable to non-GA airports. That is, the extension of an existing runway can be justified at an existing GA airport that has a need to accommodate heavier airplanes on a frequent basis.*

(4) Step #4. Select the recommended runway length from among the various runway lengths generated by step #3 per the process identified in chapters 2, 3, or 4, as applicable.

Paragraph 302 of Chapter 3 instructs the airport designer to then select either the "60 percent useful load" curves or the "90 percent useful load" curves on the basis of the haul length and service needs of the critical design airplanes. According to information provided by the operator of the Dassault Falcon 50 and Falcon 900 aircraft, the operator is often forced to stop in Oakland or Sacramento for fuel for long haul trips departing Nut Tree Airport in the summer months. Therefore, the 90 percent useful load curve was selected in an effort to allow the aircraft operators to maximize fueling and load capabilities.

(5) Step #5. Apply any necessary adjustment to the obtained runway length, when instructed by the applicable chapter of this AC, to the runway length generated by step #4 to obtain a final recommended runway length. For instance, an adjustment to the length may be necessary for runways with non-zero effective gradients. Chapter 5 provides the rationale for these length adjustments.

The recommended runway length from Figure 3-1 must be adjusted at the rate of 10 feet for each foot of elevation difference between the high and low points of the runway centerline. Given that the elevation difference at Nut Tree Airport is only three feet, the adjustment is 30 additional feet, or a recommended runway length of 7,130 feet.

A third method for determining runway length recommendations for airport design involves analyzing FAA published takeoff lengths for specific aircraft types. In this case, the specific aircraft types being the two most critical business jet aircraft based at the Nut Tree Airport, the Dassault Falcon 50, the Dassault Falcon 900. FAA landing field length data at sea level for each of these aircraft was obtained from the Aviation Week & Space Technology Aerospace Source Book and then adjusted based on the elevation (116 feet MSL), mean maximum temperature of the hottest month (95.0 degrees Fahrenheit) and gradient difference (3 feet). The runway length recommendations for each specific aircraft are listed in the following table entitled *GENERAL RUNWAY LENGTH RECOMMENDATIONS FOR "CRITICAL" AIRCRAFT TYPES.*

Table D6
GENERAL RUNWAY LENGTH RECOMMENDATIONS FOR "CRITICAL" AIRCRAFT TYPES

	FAA Takeoff Field Length (ft.) At Sea Level	FAA Takeoff Field Length (ft.) [1] Adjusted
Airplanes greater than 12,500 lbs. and less than 60,000 pounds.		
Dassault Falcon 50EX	4,890	5,857
Dassault Falcon 900DX	4,890	5,857

Source: Aviation Week & Space Technology, Aerospace Source Book 2009.

Notes: Runway lengths based on takeoff distance over a 50 ft. obstacle. [1] Adjusted runway lengths consider airport elevation, temperature and runway gradient (116 feet AMSL, 95.0˚F NMT, and maximum difference in runway end elevation of three feet).

From this analysis and based on the airport's existing and projected operational activity, it appears that operators of larger general aviation aircraft would benefit from a longer runway at Nut Tree Airport. The question then becomes, do the physical constraints present at the Airport allow for a longer runway and if so, how much longer? This question and the existing runway deficiency will be evaluated in the following *Alternatives Analysis and Development Concepts* chapter and will be examined in conjunction with the previously identified dimensional criteria deficiencies to identify potential alternative airfield development recommendations.

Runway Pavement Strength. As identified in the *Inventory of Existing Conditions* chapter of this document, Runway 2/20 is rated in good condition, with an existing gross weight bearing capacity of 30,000 pounds single wheel main gear configuration. The existing gross weight bearing capacity of the runway also suggests that the Nut Tree Airport was likely designed for the family grouping of aircraft weighing between 12,500 and 60,000 pounds as described in the previous section. Based on the projected operational fleet mix, the runway will not likely require a strengthening project within the planning period of this study. In addition, all existing airfield pavement should be tested periodically to properly ascertain existing pavement strengths.

Runway Line-of-Sight. According to existing runway line-of-sight standards, any two points located five feet above the runway centerline must be mutually visible for the entire length of the runway. If the runway has a full-length parallel taxiway, the visibility requirement is reduced to a distance of one-half the runway length. Nut Tree Airport does have a full length parallel taxiway and does comply with the runway line-of-sight standards for the entire length of the runway.

Taxiways

Taxiways are constructed primarily to enable the movement of aircraft between the various functional areas on the airport and the runway system. Some taxiways are necessary simply to provide access between aircraft parking aprons and runways; whereas, other taxiways become necessary to provide more efficient and safer use of the airfield.

The parallel taxiway at Nut Tree Airport currently meets separation standards centerline to centerline with Runway 2/20; however, a section of the taxiway near the approach end of Runway 20 does not meet taxiway object free area standards due to the presence of a light pole and the airport perimeter fence in this area. Options for correcting this non-standard condition will be considered in the *Alternatives Analysis sand Development Concepts* chapter.

Additional taxiway improvements to be analyzed include the potential future extension of access taxiways and/or taxilanes to serve additional hangar development and expansion areas on the Airport. In the *Alternatives Analysis and Development Concepts* chapter, the existing access taxiway system will be evaluated with respect to existing and future departure ends of the runway, and every effort will be made to physically separate the airport roadways from taxiways to prohibit unauthorized vehicles from accessing the Airport's aircraft movement areas, and to assist in the safety and security monitoring of the Airport.

Instrumentation and Lighting

Electronic landing aids, including instrument approach capabilities and associated equipment, airport lighting, and weather/airspace services, were detailed in the *Inventory of Existing Conditions* chapter of this document. The Airport is equipped with two existing RNAV (GPS) instrument approaches to Runway 20, which offer visibility minimums ranging from 1-¾ to 1-mile, depending upon the category of aircraft.

At present, GPS approaches (LPV, LNAV/VNAV and LNAV) are anticipated to be the FAA's standard approach technology. With GPS, the cost of establishing new or improved instrument approaches at many airports can be significantly reduced due to the lack of required ground instrumentation. Because of the expected continued use of sophisticated general aviation and corporate aircraft at Nut Tree Airport, the ability to implement improved instrument approaches should be considered, including an identification of the potential impacts on the airport's design (i.e., the configuration of the safety and object clearing standards surrounding the runway system and FAR Part 77 airspace criteria).

Visual Landing Aids (Lights). Presently, the runway at Nut Tree Airport is equipped with Medium Intensity Runway Lights (MIRLs), Precision Approach Path Indicators (PAPIs) located on the left side of each runway end and Runway End Identifier Light (REILs). Based upon the previous discussion regarding the potential for improved instrument approach capabilities and visibility minimums, it is recommended that the existing MIRLs, PAPIs and REILs should be retained at the Airport. Also, consideration should be given to the installation of an Approach Lighting System (ALS) to improve the approach capabilities and visibility minimums to Runway 20.

Runway Protection Zones (RPZs). The function of the RPZ is to enhance the protection of people and property on the ground off the end of runways. This is achieved through airport control of the property within the RPZ area. This control can be exercised through either fee simple ownership or the purchase of an RPZ easement. The RPZ is trapezoidal in shape and centered about the extended runway centerline. Its inner boundary begins 200 feet beyond the end of the area usable for takeoff or landing. The dimensions of the RPZ are functions of the type of

aircraft that regularly operate at the airport, in conjunction with the specified visibility minimums of the approach (if applicable).

The RPZs, as shown on the existing airport layout plan, are based on dimensional standards for ARC B-II. Any potential runway extension and/or improved instrument approach minimums may necessitate additional RPZ easement or property acquisition at both runway ends with the required acreage being dependent upon the ultimate location of the runway thresholds. The following table entitled *RUNWAY PROTECTION ZONE DIMENSIONS*, lists existing RPZ dimensional requirements, along with the requirements for improved approach capabilities and/or more demanding approach category aircraft.

Table D7
RUNWAY PROTECTION ZONE DIMENSIONS

Item	Width at Runway End (feet)	Width at Outer End (feet)	Length (feet)
Existing RPZ Dimensions:			
Runway 2	500	700	1,000
Runway 20	500	700	1,000
Required RPZ Dimensions for Various Visibility Minimums:			
Visual and not lower than One mile (Statute), Small Aircraft Exclusively	250	450	1,000
Not lower than One Mile (Statute), Approach Categories A & B[1]	500	700	1,000
Not lower than One Mile (Statute), Approach Categories C & D	1,010	1,010	1,700
Not lower than ¾-Mile (Statute), All Aircraft	1,000	1,510	1,700
Lower than ¾-Mile (Statute), All Aircraft	1,000	1,750	2,500

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

Future Lighting. As mentioned previously, Runway 2/20 is equipped with Medium Intensity Runway Lights (MIRLs). These lights should be maintained in conjunction with the existing/proposed instrument approach procedures. In addition, Medium Intensity Taxiway Lights (MITLs), which are presently in place on Taxiway "A", should be maintained.

Glide path indicator lights are a system of lights that provide visual vertical approach slope guidance to aircraft during an approach to the runway. Precision Approach Path Indicators (PAPIs) or Visual Approach Slope Indicators (VASIs) are designed for day and nighttime use during VFR (i.e., good weather) conditions. The existing PAPIs are recommended to be retained at each runway end. Runway End Identifier Lights (REILs) are a system of lights that provides an approaching aircraft a rapid and positive identification of the approach end of the runway. The existing REILs at both runway ends are recommended to be retained. The

need for a future Approach Lighting System (ALS) would be contingent on the installation of a lower visibility minimum approach into the Airport.

Landside Requirements

Landside facilities are those facilities that support the airside facilities, but are not actually a part of the normal aircraft operating surfaces. These consist of such facilities as terminal buildings, hangars, aprons, access roads and support facilities. Following a detailed analysis of these facilities, current deficiencies can be noted in terms of accommodating both existing and future aviation needs at the Airport.

General Aviation Requirements

The aircraft based at Nut Tree Airport are stored in one of four areas: T-hangars, clear span hangars, large corporate hangars, or apron tiedowns. Currently, there are 201 aircraft based at the Airport. Over half of these aircraft are stored in approximately 107 hangar units, in 25 separate buildings. Over the course of the 20-year planning period, the number of based aircraft is forecast to increase to 267, indicating that an increase in storage facilities to accommodate approximately 66 new aircraft will be required. It is assumed that future storage spaces will reflect an increase in the percentage of based aircraft stored in hangars.

Tiedown Storage Requirements/Based Aircraft. Aircraft tiedowns are provided for those aircraft that do not require hangar storage, do not desire to pay the cost for hangar storage or are on the Airport's hangar wait list. Space calculations for these areas are typically based on 300 square yards of apron for each aircraft tiedown. This amount of space allows for aircraft parking and circulation between the rows of parked aircraft. Based upon existing aircraft storage practices and demand for new hangar facilities, it is projected that a significant number of new aircraft, as well as existing based aircraft that are currently stored on the apron, would prefer to have enclosed hangar storage. As a result, it is projected that the based aircraft apron requirements will increase at a much slower rate than itinerant aircraft apron requirements throughout the planning period as additional hangar storage facilities are constructed at the Airport.

Tiedown Storage Requirements/Itinerant Aircraft. In addition to the needs of the based aircraft tiedown areas addressed in the preceding section, transient aircraft also require apron parking areas at Nut Tree Airport. This storage is provided in the form of transient aircraft tiedown space. In calculating the area requirements for these tiedowns, an area of 400 square yards per aircraft has been used. As previously described, it is projected that demand for based aircraft apron space will increase over the planning period. This means that all demand for additional transient aircraft apron space will have to be met with newly constructed aircraft parking apron. Consequently, the development plan for the Airport will designate adequate areas for future apron development to satisfy the additional demand.

The following table shows the type of facilities and the number of units or square feet needed for that facility in order to meet the forecast demand for each development phase. It is expected that the majority of the owners of aircraft that will be newly based at the Airport will

desire some type of indoor storage facility. The actual type of hangar storage facility to accommodate based aircraft has been identified as T-hangars, clear span hangars, and larger corporate and/or FBO-type hangars; although, the actual number, size, and location of the larger hangar types will depend on user needs and financial feasibility. In addition, access and perimeter roadway locations and auto parking requirements are not included in this tabulation because the amount of land necessary for these facilities will be a function of the location of other facilities, as well as the most effective routing of access roadways. The following table, entitled *GENERAL AVIATION FACILITY REQUIREMENTS, 2011-2031*, depicts the area required for general aviation landside facilities during all stages of development. This will assist in the development of detailed facility staging discussed in later chapters of this document.

Table D8
GENERAL AVIATION FACILITY REQUIREMENTS, 2011-2031

	Total Number Required (In yd²)				
Facility	**2011** [1]	**2016**	**2021**	**2026**	**2031**
Itinerant/GA Apron	---[2]	36,925	39,602	42,462	45,520
Based A/C GA Apron	---[2]	31,800	32,700	33,900	34,500
Total Apron (yd²) [1]	52,500	68,725	72,302	76,362	80,020
Hangar Space					
T-hangars/Clear Span (no./yd²)	94/49,611	113/59,011	118/61,622	124/64,756	132/68,933
Exec./Corp. (no./yd²)	12/11,667	14/13,611	17/16,528	18/17,500	20/19,444
Total	**113,778**	**141,347**	**150,452**	**158,618**	**168,397**

Source: BD&Co. Projections based on FAA AC 150/5300-13. [1] Actual. [2] The existing aircraft parking apron is not specifically designated as parking for either based or itinerant aircraft.

Support Facilities Requirements

In addition to the aviation and airport access facilities described above, there are several airport support facilities that have quantifiable requirements and that are vital to the efficient and safe operation of the Airport. The support facilities at Nut Tree Airport that require further evaluation include the fuel storage facility, the adjacent access roadway system, and airport infrastructure development.

Access Roadway Development. Due to the close proximity of the terminal area to Monte Vista Avenue and I-505, roadway access to the Airport is very good. The Airport is currently accessed via County Airport Road via Monte Vista Avenue which runs parallel to I-505 near Nut Tree Airport. However, should apron and hangars development areas separate from the main terminal area be considered, additional access roadway development may be required. The Airport terminal area can also be accessed from the new Nut Tree commercial development via a recently constructed pedestrian walkway and bridge over Pine Tree Creek.

Potential Land Acquisition and Westside Development. In 2008, Solano County prepared an Environmental Assessment (EA) for the fee simple acquisition of 141 acres of land in the vicinity of Nut Tree Airport. The 141 acres consisted of various parcels of land in three separate areas around the Airport. The first of these three areas being a 16 acre area adjacent to Monte Vista Avenue and the existing hangars that has since been acquired. The other two acquisition areas that have not yet been acquired include a 32 acre area off the approach end of Runway 20, also adjacent to Monte Vista Avenue, and a 93 acre undeveloped area located adjacent to the western boundary of airport property.

The purpose and need for the acquisition of each of these areas was primarily to provide protection of the approach to Runway 20 and to provide a buffer between aviation uses and adjacent development. The acquisition of the area under the approach to Runway 20 will also allow for the potential extension or shift of the runway and potential improvement to the instrument approach capabilities of Runway 20. The acquisition of the area located west of the Airport will also permit the expansion of airport facilities to accommodate potential growth in both based and transient aircraft as identified in the previous chapter of the *Airport Master Plan*. Options for expansion of aviation and/or aviation-related facilities in order to accommodate this forecast growth will be examined in the following chapter.

Summary

The need for facilities, which has been identified in this chapter, can now be utilized to formulate the overall future Development Plan for Nut Tree Airport. The formulation of this plan will begin by establishing goals for future airport development and an analysis of development alternatives, whereby demand for future airport facilities can be accommodated. These alternatives will be presented in the following chapter, entitled *Alternatives Analysis and Development Concepts*. The following list is a summary of the major airport improvement considerations that are indicated in the *Facility Requirements* section.

- **Correct non-standard Runway Object Free Area (OFA) penetration by the airport perimeter fence and the Putah South Canal berm**
- **Correct non-standard Taxiway Object Free Area (OFA) near the approach end of Runway 20**
- **Programming for the ultimate runway system (runway length, width and strength)**

- **Programming for instrument approach improvements**
- **Programming for land acquisition to support a potential runway shift, a potential runway extension and/or potential instrument approach improvements**
- **Additional aircraft parking apron for based and transient aircraft**
- **Additional hangar area in accordance with based aircraft demand**
- **Programming for land acquisition to support aviation and/or aviation related development**
- **Additional access roadways for future aircraft parking and hangar development areas**

It is important to note that the recommendations in this *Airport Master Plan* are provided to best understand what facility improvements might be needed at the Nut Tree Airport, and where those facilities might best be placed. In other words, the *Airport Master Plan* provides recommendations on how various parcels of the Airport might best be developed in consideration of potential demand and community/environmental influences. One of the basic assumptions of this *Airport Master Plan* is that if a future improvement is identified on the recommended development plan; it will only be built if there is actual demand, if the project is financially feasible, and if environmental impacts are insignificant or can be appropriately mitigated.

Airport Plans

INTRODUCTION. The preferred development plan (Airport Layout Plan) for Nut Tree Airport has evolved from various factors and considerations. Among these are existing and future aviation demand, aircraft operational characteristics, facility requirements, and environmental considerations. Additionally, the general direction or thrust of future airport development, as expressed by Solano County, airport staff, airport users, and other interested parties, served as a basis for the airport planning process. Five alternative concepts were analyzed and discussed as part of an extensive public review process involving five interactive public workshops and a number of meetings with interested groups and stakeholders. As a result, a preferred Airport Layout Plan (ALP) was developed.

Because previous chapters have established and quantified the future development needs of the Airport, the resulting elements of the recommended Airport Layout Plan are categorically

reviewed and detailed here in a narrative and graphic format. A brief written description of the individual elements represented in the set of *Airport Plans* is accompanied by a graphic description presented in the form of the *Airport Layout Plan*, the *Airport Airspace Plan*, the *Inner Portion of the Approach Surface Plans*, the *Land Use Plan*, and the *Airport Property Map*.

Airport Layout Plan (ALP)

The Airport Layout Plan is a graphic depiction of ultimate airport facilities, representing the unified, long-range development scheme required to enable the Airport to accommodate the forecast future demand. However, it is recognized that future demand for facilities cannot be accurately predicted, particularly during the latter stages of the 20-year planning period. Therefore, development flexibility is provided in the plan and emphasis is placed on the initial five-year planning period, where the projections are more definable and the magnitude of program accomplishments are more pronounced. Furthermore, carefully guided development and continued maintenance during the initial years of the planning period is essential to the proper expansion of the facility and the continued enhancement of aviation development. The plan provides detailed information on airport and runway design criteria that is necessary to define relationships with applicable standards. The following illustration, entitled *AIRPORT LAYOUT PLAN*, and the following paragraphs describe the major components of the future Airport development plan presented in the Airport Layout Plan (ALP).

Runway/Taxiway System

Runway. A 200-foot runway shift is recommended in what is termed the "initial phase" in order to correct the non-standard Runway Object Free Area (ROFA). This project will relocate the Runway 2 threshold 200 feet to the north and add an additional 200 feet of runway in order to maintain the existing length of 4,700 feet.

In the "future phase", it is recommended that the runway be extended by approximately 600 feet providing a future runway length of 5,300 feet. This project is intended to meet the runway length requirements of the more sophisticated aircraft (turboprop and business jet) currently using and expected to use the Nut Tree Airport in the future.

Taxiway. The parallel taxiway on the east side of Runway 2/20 (Taxiway "A") will be maintained and extended in accordance with the proposed runway shift and future extension. Additionally, a non-standard Taxiway Object Free Area (TOFA) will be corrected by acquiring property and relocating the fence in the affected area. It is also recommended that additional

connector taxiways be constructed in accordance with both the runway shift project and the runway extension project.

Approaches. The instrument approach visibility minimums will remain at 1-mile for Runway 20 and are programmed to improve from visual to 1-mile for Runway2.

Lighting. It is recommended that the Medium Intensity Runway Lights (MIRLs), the Medium Intensity Taxiway Light (MITLs) and the existing Precision Approach Path Indicator (PAPI) lights that serve each runway end be maintained.

Design Standards. The airport will continue to be maintained to Airport Reference Code (ARC) B-II.

Property Acquisition. To help insure land use compatibility and to provide additional development areas for aircraft storage facilities, several parcels adjacent to airport property are recommended for acquisition as indicated on the *ALP*.

BUILDINGS

NO.	DESCRIPTION	TOP EL. (AMSL) IN FT.
1	AIRPORT ADMINISTRATION/AVIATION MULTI-USE FACILITY	137.1'
2	LARGE BOX HANGAR	135.0'
3	AIRPORT BEACON	238.0'
4	BOX HANGARS	134.0'–145.0'
5	FUEL FARM (TO BE RELOCATED)	118.0'
6	ELECTRIC VAULT	
7	T-HANGARS	125.0'–132.0'
8	PRIVATE BOX HANGARS	125.0'–131.0'
9	MAINTENANCE SHED	137.1'
10	ASOS (TO BE RELOCATED)	141.0'
11	PAPI	N/A
12	OBSTRUCTION LIGHTING	SEE DWG
13	SEG. CIRCLE AND LTD WIND CONE	N/A
14	POLLUTION CONTROL FACILITY/WASHRACK	130.0'
15	AWOS/ASOS SITE (RELOCATED)	145.0'
16	FUTURE APRON EXPANSION	130.0'
17	FUTURE HANGAR DEVELOPMENT	140.0'
18	FUTURE SHADE HANGAR DEVELOPMENT	
19	MODULAR BUILDING	
20	FUTURE FUEL ISLAND (ABOVE GROUND)	

NON-STANDARD CONDITIONS

DESCRIPTION	AIRPORT REFERENCE CODE	EXISTING CONDITIONS	FUTURE CONDITIONS	PROPOSED CORRECTION
RUNWAY OBJECT FREE AREA LENGTH BEYOND RW 2 END	B-II	150'	300'	200' SHIFT OF RUNWAY 2/20
LIGHT POLE AND FENCE PENETRATE GROUP II TAXIWAY OBJECT FREE AREA	B-II	<65.5'	65.5'	ACQUIRE PROPERTY AND RELOCATE LIGHT POLE AND FENCE
NON-PRECISION RUNWAY THRESHOLD STRIPES	B-II	3	4	RE-MARK RUNWAY AFTER 200' SHIFT

THRESHOLD SITING SURFACE PENETRATIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
7	TREE	221.0	32.1'	RWY 2 THRESHOLD SITING SURFACE	REMOVE / TOP
8	TREE	191.6	7.2'	RWY 2 THRESHOLD SITING SURFACE	REMOVE / TOP
9	TREE	202.0	20.9'	RWY 2 THRESHOLD SITING SURFACE	REMOVE / TOP
10	TREE	219.0	38.5'	RWY 2 THRESHOLD SITING SURFACE	REMOVE / TOP

OBSTRUCTION SOURCE: NOAA LPV SURVEY 03-26-05.

AIRPORT DATA

	EXISTING	*INITIAL*	*FUTURE*
AIRPORT ELEVATION (AMSL)	116.8'	*SAME*	*SAME*
AIRPORT REFERENCE POINT (ARP)	LAT.38°22'40.00"N LON.121°57'41.70"W	*LAT.38°22'41.64"N LON.121°57'40.31"W*	*LAT.38°22'44.38"N LON.121°57'38.21"W*
AIRPORT REFERENCE CODE	B-II	*SAME*	*SAME*
NPIAS CATEGORY	PRIMARY COMM. SERVICE	*SAME*	*SAME*
MEAN MAX. TEMPERATURE (HOTTEST MONTH)°F	95°	*SAME*	*SAME*
TERMINAL NAVAIDS	SEG CIRCLE, BEACON	*SAME*	*SAME*
AIRPORT ACREAGE	286	*375.8*	*375.8*

SPONSOR APPROVAL

SIGNATURE DATE

True North

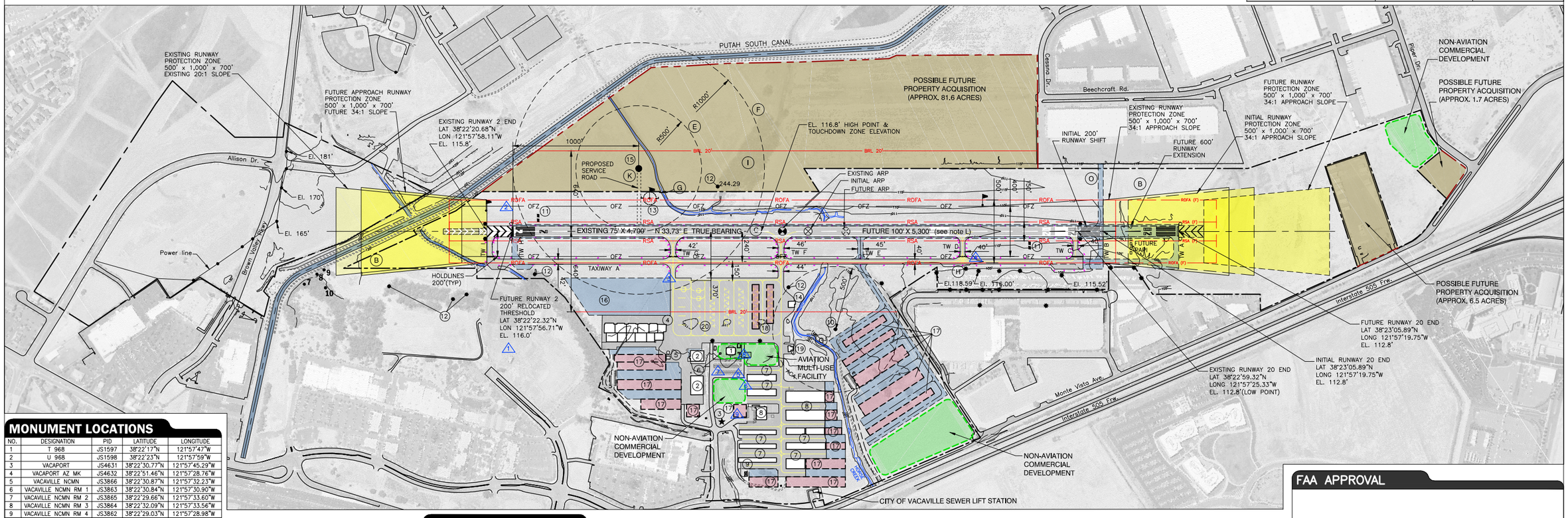
14° 12.0' E MAG. DEC. DECEMBER 2011 -0°6.0'W ANNUAL CHANGE

0 200' 400' 800' 1200'

GRAPHIC SCALE IN FEET

DRAWING LEGEND

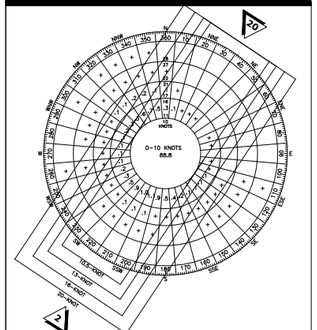
	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY 6' CHAIN LINK FENCE		
AIRPORT SECURITY BARBED WIRE FENCE		
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
UNPAVED ROADS		
AVIATION EASEMENT		
RUNWAY PROTECTION ZONE		
BUILDING RESTRICTION LINE		
RUNWAY SAFETY AREA	RSA	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA	ROFA (F)
AIRPORT BEACON		
LIGHTED WIND CONE & SEGMENTED CIRCLE		
WIND CONE		
PRECISION APPROACH PATH INDICATOR (PAPI)		
HOLDLINES		
AIRPORT REFERENCE POINT		
RUNWAY END IDENTIFIER LIGHTS		
LIGHT POLE		
MONUMENTS	4	



MONUMENT LOCATIONS

NO.	DESIGNATION	PID	LATITUDE	LONGITUDE
1	T 968	JS1597	38°22'17"N	121°57'47"W
2	U 968	JS1598	38°22'23"N	121°57'59"W
3	VACAPORT	JS4631	38°22'30.77"N	121°57'45.29"W
4	VACAPORT AZ MK	JS4632	38°22'51.46"N	121°57'28.76"W
5	VACAVILLE NCMN	JS3866	38°22'30.87"N	121°57'32.23"W
6	VACAVILLE NCMN RM 1	JS3863	38°22'30.84"N	121°57'30.90"W
7	VACAVILLE NCMN RM 2	JS3865	38°22'29.66"N	121°57'33.60"W
8	VACAVILLE NCMN RM 3	JS3864	38°22'32.09"N	121°57'33.56"W
9	VACAVILLE NCMN RM 4	JS3862	38°22'29.03"N	121°57'28.98"W

ALL WEATHER WINDROSE

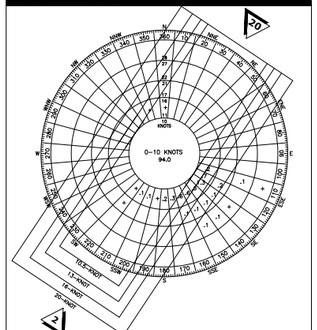


RUNWAY	10.5-KNOT	13-KNOT	16-KNOT	20-KNOT
2/20	96.13%	97.87%	96.27%	99.81%
2	66.50%	66.86%	69.09%	69.58%
20	91.20%	92.14%	91.98%	93.14%

SOURCE: National Oceanic and Atmospheric Administration, National Climatic Data Center, Station 72482, Vacaville, California. Total Observations: 62,056. Period of Record: August 2001-December 2009.

NOTE: Wind analysis tabulated utilizing the FAA Airport Design Software supplied with FAA AC 150/5300-13.

IFR WINDROSE



RUNWAY	10.5-KNOT	13-KNOT	16-KNOT	20-KNOT
2/20	95.21%	96.96%	98.89%	99.52%
2	89.37%	90.50%	91.97%	92.42%
20	92.70%	94.42%	96.35%	96.98%

SOURCE: National Oceanic and Atmospheric Administration, National Climatic Data Center, Station 72482, Vacaville, California. Total Observations: 2,476. Period of Record: August 2001-December 2009.

NOTE: Wind analysis tabulated utilizing the FAA Airport Design Software supplied with FAA AC 150/5300-13.

RUNWAY DATA

ITEM	EXISTING RUNWAY 2/20	*INITIAL RUNWAY 2/20*	*FUTURE RUNWAY 2/20*
APPROACH VISIBILITY MINIMUMS	VISUAL/1-MILE	*1-MILE/1-MILE*	*SAME/SAME*
FAR PART 77 APPROACH CATEGORY	B/NP	*NP/NP*	*SAME/SAME*
FAR PART 77 APPROACH SLOPE	20:1/34:1	*34:1/34:1*	*SAME/SAME*
RUNWAY WIDTH AND LENGTH	75' X 4,700'	*SAME*	*100' X 5,300' (see note L)*
PAVEMENT SURFACE TYPE	ASPHALT	*SAME*	*SAME*
PAVEMENT STRENGTH (IN 1000 LBS.)	30S	*SAME*	*SAME*
TAXIWAY SURFACE TYPE	ASPHALT	*SAME*	*SAME*
RUNWAY LIGHTING	HIRL	*SAME*	*SAME*
RUNWAY MARKING	NP, RCL, EDGE	*SAME*	*SAME*
TAXIWAY LIGHTING	MITL	*SAME*	*SAME*
EFFECTIVE RUNWAY GRADIENT %	0.06	*0.07*	*0.06*
MAXIMUM RUNWAY GRADIENT %	0.16	*0.15*	*0.13*
RUNWAY LINE-OF-SIGHT	CRITERIA MET		
VISUAL APPROACH AIDS	PAPI, REIL	*SAME*	*SAME*
INSTRUMENT APPROACH AIDS	VOR, GPS	*SAME*	*SAME*
AIRPORT REFERENCE CODE	B-II	*SAME*	*SAME*
CRITICAL AIRCRAFT	DASSAULT FALCON 50	*SAME*	*DASSAULT FALCON 50*
WING SPAN	54.5'	*SAME*	*61'11"*
UNDER CARRIAGE WIDTH	17'2"	*SAME*	13'
APPROACH SPEED (KNOTS)	100	*SAME*	*113*
MAXIMUM TAKEOFF WEIGHT (LBS.)	12,500	*SAME*	38,800
RUNWAY SAFETY AREA WIDTH	150'	*SAME*	*SAME*
RUNWAY SAFETY AREA BEYOND R/W END	300'/300'	*SAME/SAME*	*SAME/SAME*
RUNWAY OBJECT FREE AREA WIDTH	500'	*SAME*	*SAME*
RUNWAY OBJECT FREE AREA BEYOND R/W END	300'/300'	*SAME/SAME*	*SAME/SAME*
OBSTACLE FREE ZONE WIDTH	400'	*SAME*	*SAME*
OBSTACLE FREE ZONE BEYOND R/W END	200'/200'	*SAME/SAME*	*SAME/SAME*
OBSTACLE FREE ZONE CRITERIA	NO OFZ OBJECT PENETRATIONS		
RUNWAY CL TO TAXIWAY CL	240'	*SAME*	*SAME*
TAXIWAY CL TO FIXED OR MOVEABLE OBJECT	250'	*SAME*	*SAME*
TAXIWAY OBJECT FREE AREA WIDTH	131'	*SAME*	*SAME*
TAXIWAY SAFETY AREA WIDTH	79'	*SAME*	*SAME*
TAXIWAY WINGTIP CLEARANCE	26'	*SAME*	26'
TAXIWAY CENTERLINE TO FIXED/MOVEABLE OBJECT	370'	*SAME*	*SAME*
THRESHOLD SITING CRITERIA	SEE TABLE		

REVISIONS

NO.	DESCRIPTION	DATE
1	'AIRPORT LAYOUT PLAN' DRAWING, BY MEAD & HUNT, INC., SANTA ROSA, CALIFORNIA	6/2007

RUNWAY COORDINATES & ELEVATIONS

ITEM	RUNWAY 2/20 EXISTING	*INITIAL*	*FUTURE*
RUNWAY END COORDINATES	LAT.38°22'20.68"N / LAT.38°22'59.32"N LON.121°57'58.11"W / LON.121°57'25.33"W	*LAT.38°22'22.32"N / LAT.38°23'0.96"N LON.121°57'56.71"W / LON.121°57'23.94"W*	*LAT.38°22'22.32"N / LAT.38°23'05.89"N LON.121°57'56.71"W / LON.121°57'19.75"W*
RUNWAY END ELEVATION	115.8'/112.8'	*116.0'/SAME*	*SAME/SAME*
RUNWAY HIGH/LOW POINT ELEVATION	112.8'/116.8''	*SAME/SAME*	*SAME/SAME*
TOUCHDOWN ZONE ELEVATION (TDZE)	116.8'/116.7'	*SAME/SAME*	*SAME/SAME*

NOTES

A. This drawing reflects planning standards specific to this airport, and is not a product of detailed engineering design analysis. It is not intended to be used for construction documentation or navigation.
B. Coordinates and elevations taken from FAA website, http://www.jcss.gov/pls/datasheet_prd/pkg_airport.PRO_AIRPORT_RUNWAY?v_cntl_num=3153 All elevations and coordinates are based on NAVD 88 and NAD 83 datum.
C. Forward azimuth reckoned from north. Source: FAA Inverse 3D.
D. Section Corners-The Nut Tree Airport is located in Rancho Los Putos. The original Government Land Office surveys did not survey (set Section Corner Locations) within boundary of Rancho Los Putos.
E. ASOS Zone 1 – Objects restricted to 15' below future wind sensor elevation.
F. ASOS Zone 2 – Objects restricted to 10' above future wind sensor elevation.
G. Creek disposition to be determined.
H. Light pole and fence to be relocated clear of taxiway OFA (65.5 feet from centerline).
I. Eucalyptus trees to be removed.
J. Replace/relocate barbed wire fencing with 6' chain link.
K. Future AWOS/ASOS location does not meet siting criteria per FAA Order 6560.20B. FAA confirmation pending.
L. For runway width space reservation purposes only: Future Runway 2/20 width to remain B-II throughout planning horizon. Project eligibility not factored.
M. Please see Airport Capital Improvement Plan (ACIP) for a complete list of planned development projects.
N. Property lies in a portion of Section 10 & 15, T.6 N, R.1 W, M.D.M. Solano County , CA. No identified section corners appear in the airport layout plan view.
O. Possible Taxiway funded by others concurrent with, or subsequent to, initial 200 foot runway threshold shift.

FAA APPROVAL

The preparation of this document may have been supported, in part, through the Airport Improvement Program financial assistance from the Federal Aviation Administration as provided under Title 49, United States Code, section 47104. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this plan by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public laws.

Solano County
General Services Department
Vacaville, CA (707)469-4600

Nut Tree Airport
Vacaville, California

Airport Layout Plan

SCALE	DATE	SHEET NO.
1" = 400'	DECEMBER 2012	1 of 7

Figure E1 **Airport Layout Plan**

Landside Development Area

As illustrated on the ALP, various development areas for landside facilities are also allocated. It is recognized that the development of these areas will be demand driven and, where appropriate, options have been provided for the type of facilities that could be developed in a certain area.

Aircraft Storage Facilities. The future development of aircraft storage facilities (i.e., T-hangars, individual hangars, or large storage hangars) at the Nut Tree Airport will be demand driven. Therefore, the number, size, and location of these hangars will vary depending upon the demand for the particular type. There are a number of T-hangar and box hangar expansion areas in the existing hangar area. These areas will be referred to in the Capital Improvement Program as the South and East hangar development areas. Once these two areas have been completely built out, it is recommended that Solano County consider additional hangar development on the north side of Horse Creek. This potential development area will be referred to as the North hangar development area and could accommodate a mix of T-hangars and box hangars.

Access and Parking. The existing access route to the Nut Tree Airport terminal area is via County Airport Road off of Monte Vista Ave. It is recommended that this access be maintained and an additional access road off of Monte Vista Ave. be considered if hangars are constructed north of Horse Creek. Additionally, consideration should be given to access road expansion near the airport property lines along the south/southwest side of the aircraft apron/hangar area.

Other Landside Facilities. Additional recommended landside facilities shown on the ALP include solarized shade structures on the exiting aircraft parking apron, expansion of the existing Airport Administration Building to a Multi-use facility, various non-aviation related (commercial/industrial) development, and the relocation of the airport fuel farm.

Airport Airspace Plan

In order to protect airspace and approaches from hazards that could affect the safe and efficient operation of aircraft, federal criteria contained in Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace*, have been established to provide guidance in controlling the height of objects in close proximity to airports. FAR Part 77 criteria specify a set of imaginary surfaces that, when penetrated by an object (structure, tree, or terrain), designate the object as being an obstruction.

The *AIRPORT AIRSPACE PLAN*, illustrated in the following figure, is based on FAR Part 77 criteria and provides plan and profile views of the imaginary surfaces as they relate to the Nut Tree Airport. The drawing is based on the ultimate runway length, the ultimate planned approaches to each runway end, and the ultimate airport elevation. Therefore, Runway 2/20 is based on other than utility runway criteria (i.e., designated for aircraft weighing more than 12,500 pounds, gross weight) with non-precision instrument approaches to both runway ends. Based on these criteria, a brief description of each imaginary surface, and the appropriate dimensions and slopes, are described in the following narrative.

The primary surface, a surface longitudinally centered on the runway, is 500 feet in width and extends 200 feet beyond each runway end. The elevation of any point on the primary surface is the same as the elevation on the nearest point on the runway centerline. Transitional surfaces extend upward and outward at right angles to the runway centerline, and the runway centerline extended, at the edges of the primary surface with a slope of 7 to 1. The horizontal surface is a horizontal plane established at 150 feet above the airport elevation. Swinging arcs with radii of 5,000 feet from the center of each end of the primary surface, and connecting the arcs by lines tangent to these arcs, establish the perimeter of the horizontal surface.

At the periphery of the horizontal surface, the conical surface extends outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet. Finally, approach surfaces are longitudinally centered on the extended runway centerlines, extending outward and upward from each end of the primary surface. The inner edge of the approach surface is 500 feet in width and expands uniformly to a width of 2,000 feet at the outer edge. The approach surfaces extend for a horizontal distance of 5,000 feet at a slope of 20 to one. As illustrated in Figure E2, the previously described imaginary surfaces at the Nut Tree Airport are penetrated by either terrain, trees or fixed objects, many of which are obstruction lighted.

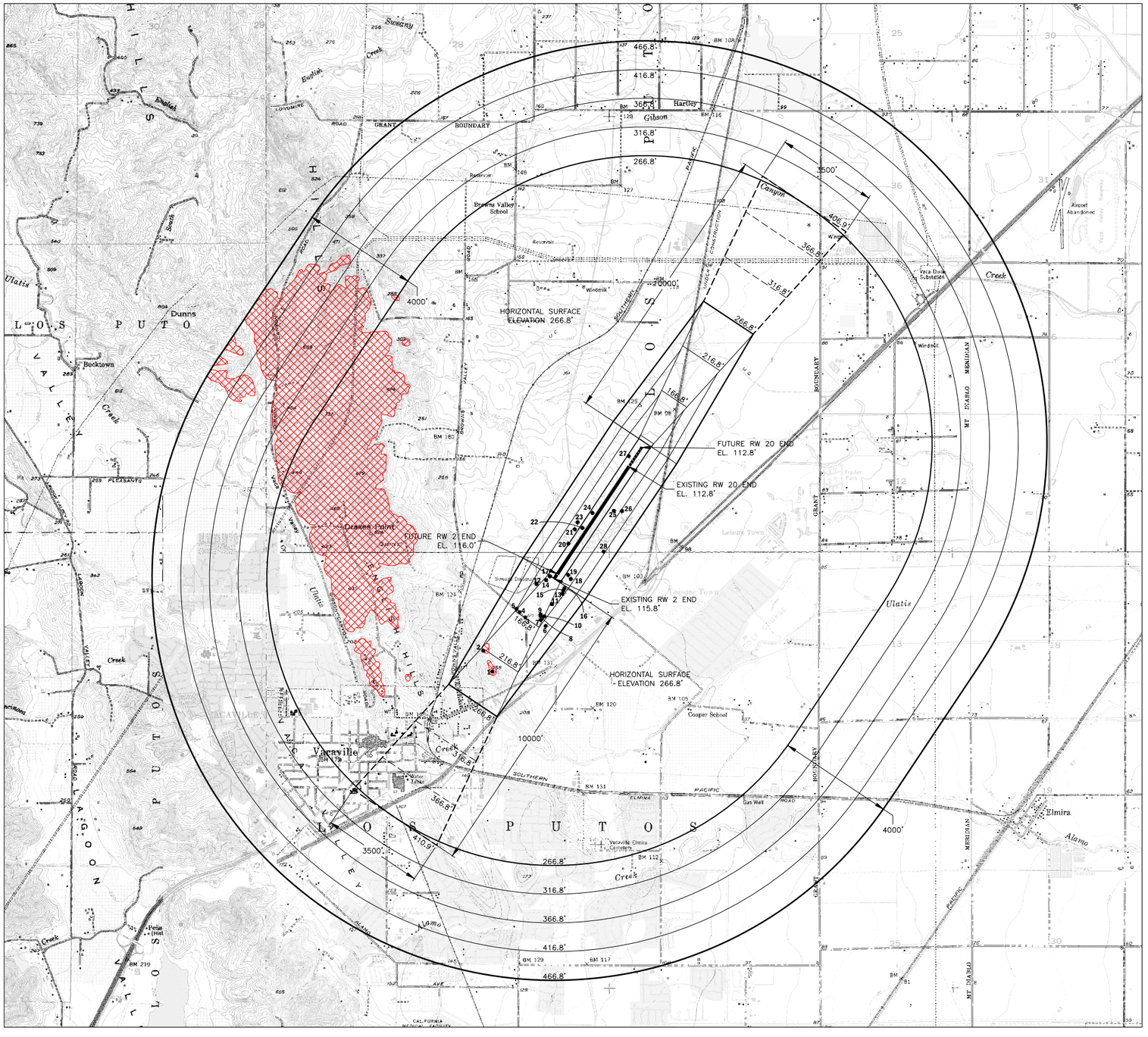
Inner Portion of the Approach Surface Plans

To provide a more detailed view of the inner portions of the Part 77 imaginary approach surfaces and the Runway Protection Zones (RPZs), detailed drawings have been prepared. As mentioned in previous chapters, the RPZs are trapezoidal in shape, centered about the extended runway centerline, and typically begin 200 feet beyond the end of the runway.

These drawings also illustrate the inner portion of the FAR Part 77 approach surfaces associated with each runway end. The *INNER PORTION OF THE APPROACH SURFACE PLANS* provide large-scale drawings with both plan and profile delineation. They are intended to

facilitate identification of roadways, utility lines, railroads, structures, and other possible obstructions that may lie within the confines of, or near the specified approach surfaces.

As with the *AIRPORT AIRSPACE PLAN*, the *INNER PORTION OF THE APPROACH SURFACE PLAN* are based upon the ultimate planned runway configuration and length, the ultimate planned approaches to each runway end, and the ultimate runway end elevation. Again, Runway 2/20 is based on utility runway criteria with both visual and non-precision instrument approaches with visibility minimums not lower-than one-mile. Base upon these parameters, the specified approach surface slope gradient to each runway end is 20 to 1.



OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
1	BUSH	265.0	28.8	RWY 2 APPROACH	REMOVE / TOP
2	BUSH	247.0	28.4	RWY 2 APPROACH	REMOVE / TOP
3	POLE	165.0	0	RWY 2 APPROACH	MODIFY / OBST. LIGHT
4	POLE	170.0	5.1	RWY 2 APPROACH	MODIFY / OBST. LIGHT
5	POLE	167.0	0.2	TRANSITIONAL	MODIFY / OBST. LIGHT
6	TREE	237.0	48.7	TRANSITIONAL	REMOVE / TOP
7	TREE	221.0	61.4	RWY 2 APPROACH	REMOVE / TOP
8	TREE	191.6	34.4	RWY 2 APPROACH	REMOVE / TOP
9	TREE	202.0	47.0	RWY 2 APPROACH	REMOVE / TOP
10	TREE	219.0	64.3	TRANSITIONAL	REMOVE / TOP
11	OL ON POLE	240.6	92.1	TRANSITIONAL	REMOVE
12	TREE	161.0	17.1	TRANSITIONAL	REMOVE / TOP
13	TREE	236.0	76.9	TRANSITIONAL	REMOVE / TOP
14	FENCE	129.6	7.2	RWY 2 APPROACH	MODIFY / OBST. LIGHT
15	OL ON POLE	238.6	80.1	TRANSITIONAL	REMOVE
16	TREE	194.0	37.0	TRANSITIONAL	REMOVE / TOP
17	WINDSOCK	129.6	13.8	PRIMARY	NO ACTION
18	TREE	250.0	99.5	TRANSITIONAL	REMOVE
19	OL ON POLE	236.6	108.3	TRANSITIONAL	REMOVE
20	WTEE	123.6	5.3	TRANSITIONAL	REMOVE
21	OL ON POLE	241.6	110.8	TRANSITIONAL	REMOVE
22	TREE	154.6	37.8	PRIMARY	REMOVE
23	TREE	214.6	76.3	TRANSITIONAL	REMOVE
24	TREE	153.6	37.8	PRIMARY	REMOVE
25	OL ON POLE	238.6	100.4	TRANSITIONAL	REMOVE
26	TREE	209.6	36.9	TRANSITIONAL	REMOVE
27	FENCE	117.0	4.1	PRIMARY	REMOVE
28	LT POLE	213.6	4.3	TRANSITIONAL	NO ACTION

OBSTRUCTION SOURCE: NOAA LPV SURVEY 03-26-05.

True North

14° 12.0' E MAG. DEC.
DECEMBER 2011
-0°6.0'W ANNUAL CHANGE

0 1000' 2000' 4000' 6000'
GRAPHIC SCALE IN FEET

REVISIONS & NOTES

NO.	DESCRIPTION	DATE

NOTES:

1. This drawing reflects planning standards specific to this airport and is not a product of detailed engineering design analysis. It is not intended to be used for construction documentation of navigation.
2. Horizontal coordinate data in NAD83, vertical data is NAVD88.

Solano County
General Services Department
Vacaville, CA (707)455-4600

Nut Tree Airport

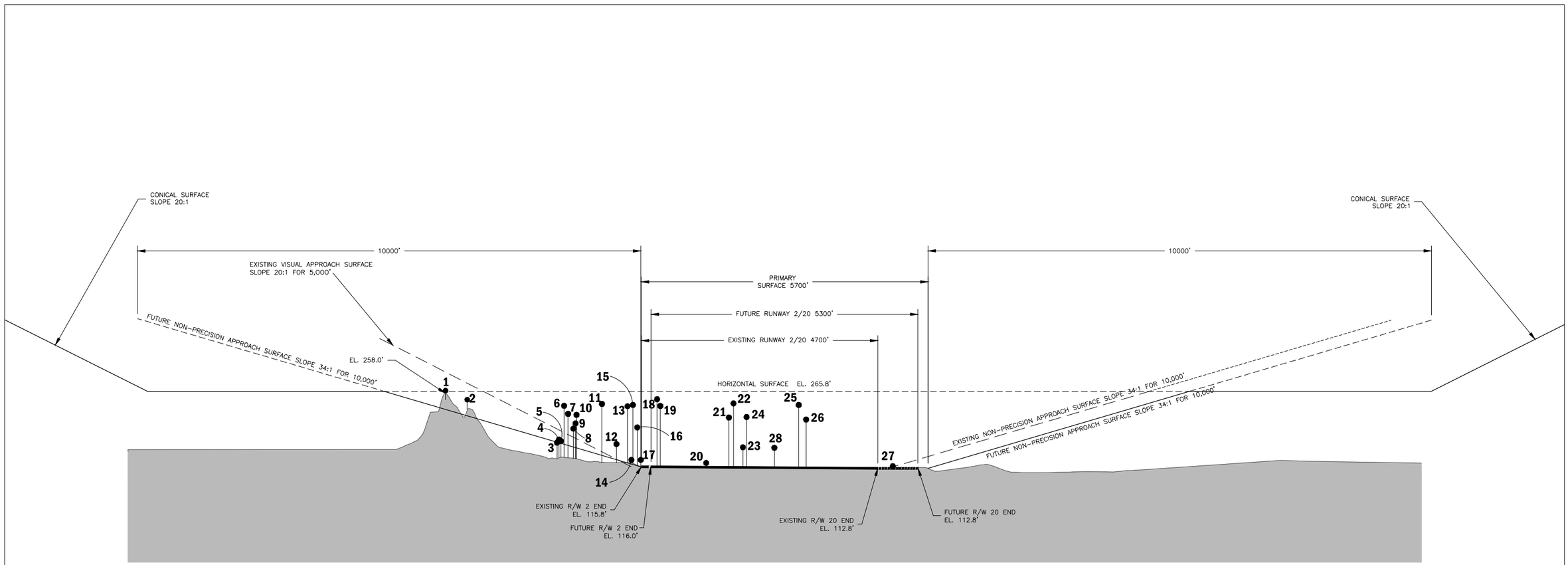
Vacaville, California

AIRPORT AIRSPACE PLAN

CONICAL SURFACE PLAN VIEW

SCALE	DATE	SHEET NO.
1" = 2000'	DECEMBER 2012	2 of 7

Figure E2 Airport Airspace Plan



NOTE: TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE APPROACH SURFACE.

Runway 2/20 - Approach Profile View

1" = 1000' HORIZONTALLY
1" = 100' VERTICALLY

OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
1	BUSH	265.0	28.8	RWY 2 APPROACH	REMOVE / TOP
2	BUSH	247.0	28.4	RWY 2 APPROACH	REMOVE / TOP
3	POLE	165.0	0	RWY 2 APPROACH	MODIFY / OBST. LIGHT
4	POLE	170.0	5.1	RWY 2 APPROACH	MODIFY / OBST. LIGHT
5	POLE	167.0	0.2	TRANSITIONAL	MODIFY / OBST. LIGHT
6	TREE	237.0	48.7	TRANSITIONAL	REMOVE / TOP
7	TREE	221.0	61.4	RWY 2 APPROACH	REMOVE / TOP
8	TREE	191.6	34.4	RWY 2 APPROACH	REMOVE / TOP
9	TREE	202.0	47.0	RWY 2 APPROACH	REMOVE / TOP
10	TREE	219.0	64.3	TRANSITIONAL	REMOVE / TOP
11	OL ON POLE	240.6	92.1	TRANSITIONAL	REMOVE
12	TREE	161.0	17.1	TRANSITIONAL	REMOVE / TOP
13	TREE	236.0	76.9	TRANSITIONAL	REMOVE / TOP
14	FENCE	129.6	7.2	RWY 2 APPROACH	MODIFY / OBST. LIGHT
15	OL ON POLE	238.6	80.1	TRANSITIONAL	REMOVE
16	TREE	194.0	37.0	TRANSITIONAL	REMOVE / TOP
17	WINDSOCK	129.6	13.8	PRIMARY	NO ACTION
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19	OL ON POLE	236.6	108.3	TRANSITIONAL	REMOVE
20	WTEE	123.6	5.3	TRANSITIONAL	REMOVE
21	OL ON POLE	241.6	110.8	TRANSITIONAL	REMOVE
22	TREE	154.6	37.8	PRIMARY	REMOVE
23	TREE	214.6	76.3	TRANSITIONAL	REMOVE
24	TREE	153.6	37.8	PRIMARY	REMOVE
25	OL ON POLE	238.6	100.4	TRANSITIONAL	REMOVE
26	TREE	209.6	36.9	TRANSITIONAL	REMOVE
27	FENCE	117.0	4.1	PRIMARY	REMOVE
28	LT POLE	213.6	4.3	TRANSITIONAL	NO ACTION

OBSTRUCTION SOURCE: NOAA LPV SURVEY 03-26-05.

REVISIONS & NOTES

NO.	DESCRIPTION	DATE

NOTES:

1. This drawing reflects planning standards specific to this airport and is not a product of detailed engineering design analysis. It is not intended to be used for construction documentation of navigation.
2. Horizontal coordinate data in NAD83, vertical data is NAVD88.

Solano County
General Services Department
Vacaville, CA (707)469-4600

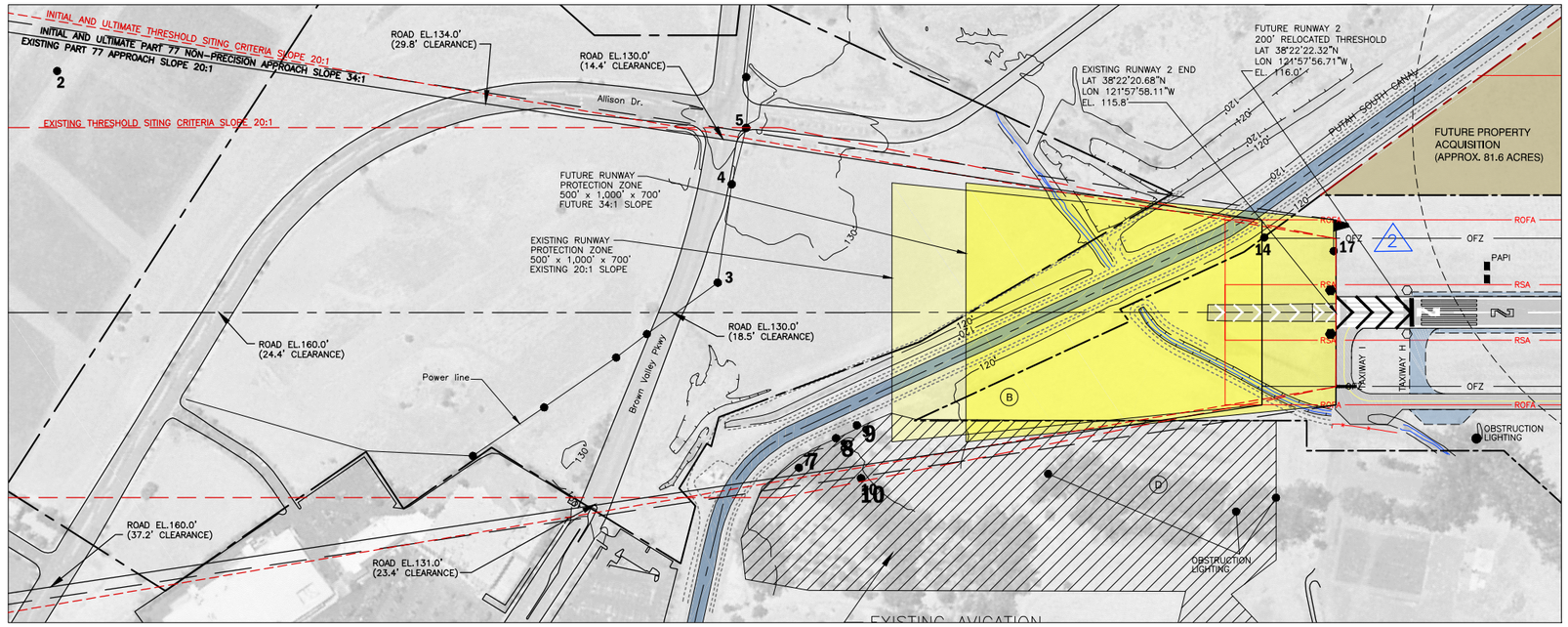
Nut Tree Airport

Vacaville, California

AIRPORT AIRSPACE PLAN

EXTENDED APPROACH PROFILES

SCALE	DATE	SHEET NO.
AS NOTED	DECEMBER 2012	3 of 7



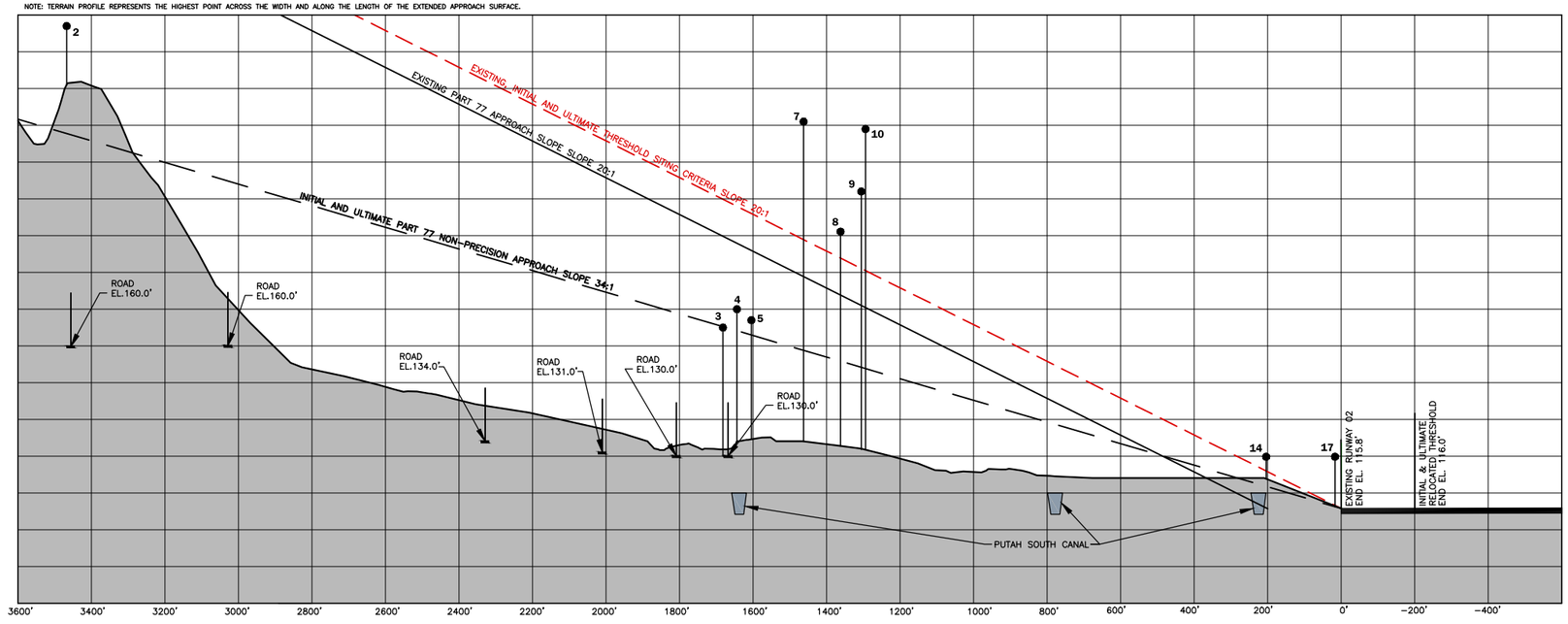
Existing, Initial & Ultimate Runway 2 - Plan View

1" = 200'

True North

14° 12.0' E MAG. DEC. DECEMBER 2011 -0°6.0'W ANNUAL CHANGE

NOTE: TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE EXTENDED APPROACH SURFACE.



Existing, Initial & Ultimate Runway 2 - Profile View

1" = 200' HORIZONTALLY
1" = 20' VERTICALLY

RUNWAY COORDINATES & ELEVATIONS

ITEM	RUNWAY 2/20		
	EXISTING	*INITIAL*	*FUTURE*
RUNWAY END COORDINATES	LAT.38°22'20.68"N / LAT.38°22'59.32"N LON.121°57'58.11"W / LON.121°57'25.33"W	*LAT.38°22'22.32"N / LAT.38°23'0.96"N LON.121°57'56.71"W / LON.121°57'23.94"W*	*LAT.38°22'22.32"N / LAT.38°23'05.89"N LON.121°57'56.71"W / LON.121°57'19.75"W*
RUNWAY END ELEVATION	115.8'/112.8'	*116.0'/SAME*	*SAME/SAME*
RUNWAY HIGH/LOW POINT ELEVATION	112.8'/116.8''	*SAME/SAME*	*SAME/SAME*
TOUCHDOWN ZONE ELEVATION (TDZE)	116.8'/116.7'	*SAME/SAME*	*SAME/SAME*

OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
2	BUSH	247.0	28.4	RWY 2 APPROACH	REMOVE / TOP
3	POLE	165.0	0	RWY 2 APPROACH	MODIFY / OBST. LIGHT
4	POLE	170.0	5.1	RWY 2 APPROACH	MODIFY / OBST. LIGHT
5	POLE	167.0	0.2	TRANSITIONAL	MODIFY / OBST. LIGHT
7	TREE	221.0	61.4	RWY 2 APPROACH	REMOVE / TOP
8	TREE	191.6	34.4	RWY 2 APPROACH	REMOVE / TOP
9	TREE	202.0	47.0	RWY 2 APPROACH	REMOVE / TOP
10	TREE	219.0	64.3	TRANSITIONAL	REMOVE / TOP
14	FENCE	129.6	7.2	RWY 2 APPROACH	MODIFY / OBST. LIGHT
17	WINDSOCK	129.6	13.8	PRIMARY	NO ACTION

OBSTRUCTION SOURCE: NOAA LPV SURVEY 03-26-05.

RUNWAY DATA

ITEM	EXISTING RUNWAY 2/20	*INITIAL RUNWAY 2/20*	*FUTURE RUNWAY 2/20*
APPROACH VISIBILITY MINIMUMS	VISUAL/1-MILE	*1-MILE/1-MILE*	*SAME/SAME*
FAR PART 77 APPROACH CATEGORY	B/NP	*NP/NP*	*SAME/SAME*
FAR PART 77 APPROACH SLOPE	20:1/34:1	*34:1/34:1*	*SAME/SAME*
RUNWAY WIDTH AND LENGTH	75' X 4,700'	*SAME*	*100' X 5,300' (see note 1.)*
PAVEMENT SURFACE TYPE	ASPHALT	*SAME*	*SAME*
PAVEMENT STRENGTH (IN 1000 LBS.)	30S	*SAME*	*SAME*
TAXIWAY SURFACE TYPE	ASPHALT	*SAME*	*SAME*
RUNWAY LIGHTING	HIRL	*SAME*	*SAME*
RUNWAY MARKING	NP, RCL, EDGE	*SAME*	*SAME*
TAXIWAY LIGHTING	MITL	*SAME*	*SAME*
EFFECTIVE RUNWAY GRADIENT %	0.06	*0.07*	*0.06*
MAXIMUM RUNWAY GRADIENT %	0.16	*0.15*	*0.13*
RUNWAY LINE-OF-SIGHT	CRITERIA MET		
VISUAL APPROACH AIDS	PAPI, REIL	*SAME*	*SAME*
INSTRUMENT APPROACH AIDS	VOR, GPS	*SAME*	*SAME*
AIRPORT REFERENCE CODE	B-II	*SAME*	*SAME*
CRITICAL AIRCRAFT	BEECH SUPER KING AIR	*SAME*	*DASSAULT FALCON 50*
WING SPAN	54.5'	*SAME*	*61'11'*
UNDER CARRIAGE WIDTH	172"	*SAME*	*13'*
APPROACH SPEED (KNOTS)	100	*SAME*	*113*
MAXIMUM TAKEOFF WEIGHT (LBS.)	12,500	*SAME*	*38,800*
RUNWAY SAFETY AREA WIDTH	150'	*SAME*	*SAME*
RUNWAY SAFETY AREA BEYOND R/W END	300'/300'	*SAME/SAME*	*SAME/SAME*
RUNWAY OBJECT FREE AREA WIDTH	500'	*SAME*	*SAME*
RUNWAY OBJECT FREE AREA BEYOND R/W END	300'/300'	*SAME/SAME*	*SAME/SAME*
OBSTACLE FREE ZONE WIDTH	400'	*SAME*	*SAME*
OBSTACLE FREE ZONE BEYOND R/W END	200'/200'	*SAME/SAME*	*SAME/SAME*
OBSTACLE FREE ZONE CRITERIA	NO OFZ OBJECT PENETRATIONS		
RUNWAY CL TO TAXIWAY CL	240'	*SAME*	*SAME*
TAXIWAY CL TO FIXED OR MOVEABLE OBJECT	250'	*SAME*	*SAME*
TAXIWAY OBJECT FREE AREA WIDTH	131'	*SAME*	*SAME*
TAXIWAY SAFETY AREA WIDTH	79'	*SAME*	*SAME*
TAXIWAY WINGTIP CLEARANCE	26'	*SAME*	*26'*
TAXIWAY CENTERLINE TO FIXED/MOVEABLE OBJECT	370'	*SAME*	*SAME*
THRESHOLD SITING CRITERIA	SEE TABLE		

DRAWING LEGEND

	EXISTING	*FUTURE*
AIRPORT PROPERTY LINE		
AIRPORT SECURITY 6' CHAIN LINK FENCE		
AIRPORT SECURITY BARBED WIRE FENCE		
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
UNPAVED ROADS		
AVIGATION EASEMENT		
RUNWAY PROTECTION ZONE		
BUILDING RESTRICTION LINE		
RUNWAY SAFETY AREA	RSA	*RSA (F)*
RUNWAY OBJECT FREE AREA	ROFA	*ROFA (F)*
AIRPORT BEACON		
LIGHTED WIND CONE & SEGMENTED CIRCLE		
WIND CONE		
PRECISION APPROACH PATH INDICATOR (PAPI)		
HOLDLINES		
AIRPORT REFERENCE POINT		
RUNWAY END IDENTIFIER LIGHTS		
LIGHT POLE		
MONUMENTS		

REVISIONS

NO.	DESCRIPTION	DATE

NOTES

1. This drawing reflects planning standards specific to this airport, and is not a product of detailed engineering design analysis. It is not intended to be used for construction documentation or navigation.
2. Coordinates and elevations taken from FAA website, http://oxmaps.jcsbi.gov/pls/datasheet_prd/pkg_airport.PRO_AIRPORT_RUNWAY?v_cntl_num=3153 All elevations and coordinates are based on NAVD 88 and NAD 83 datum.

Solano County
General Services Department
Vacaville, CA (707)469-4600

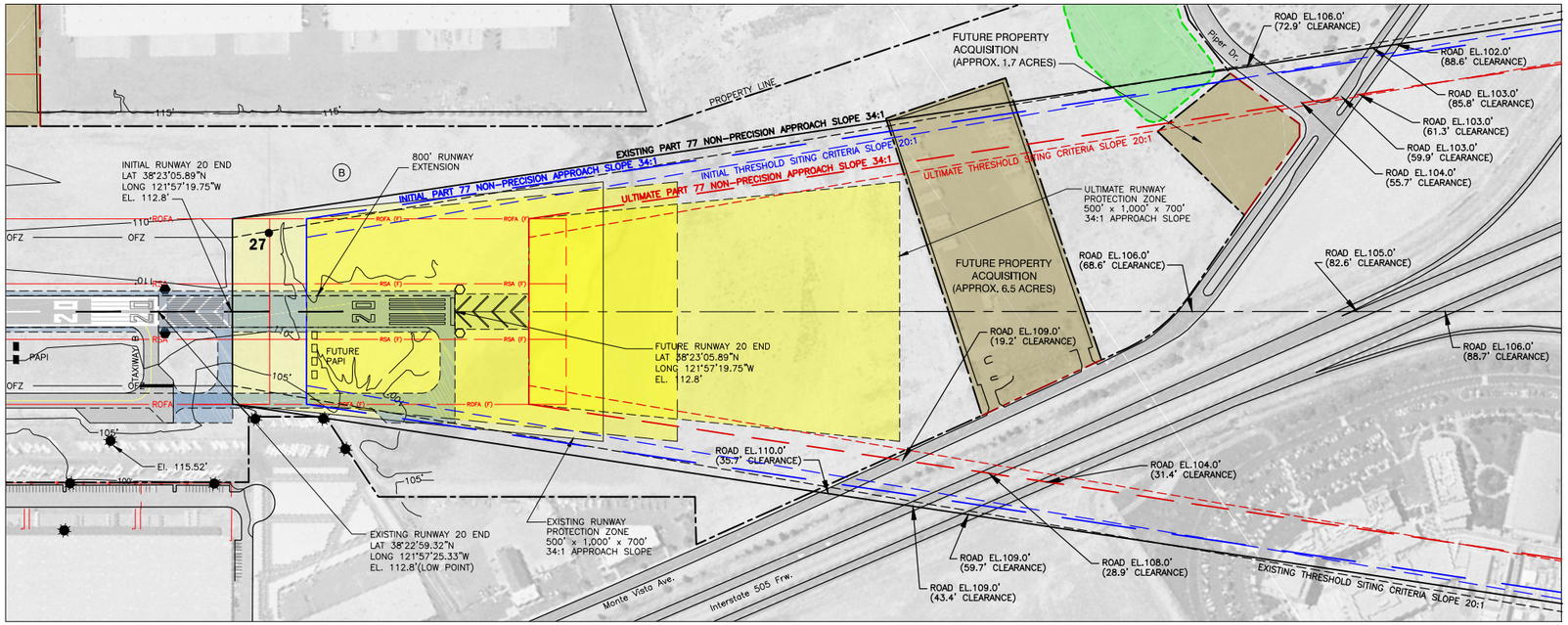
Nut Tree Airport

Vacaville, California

Inner Portion of the Approach Surface Plan - Runway 2 (Plan & Profile)

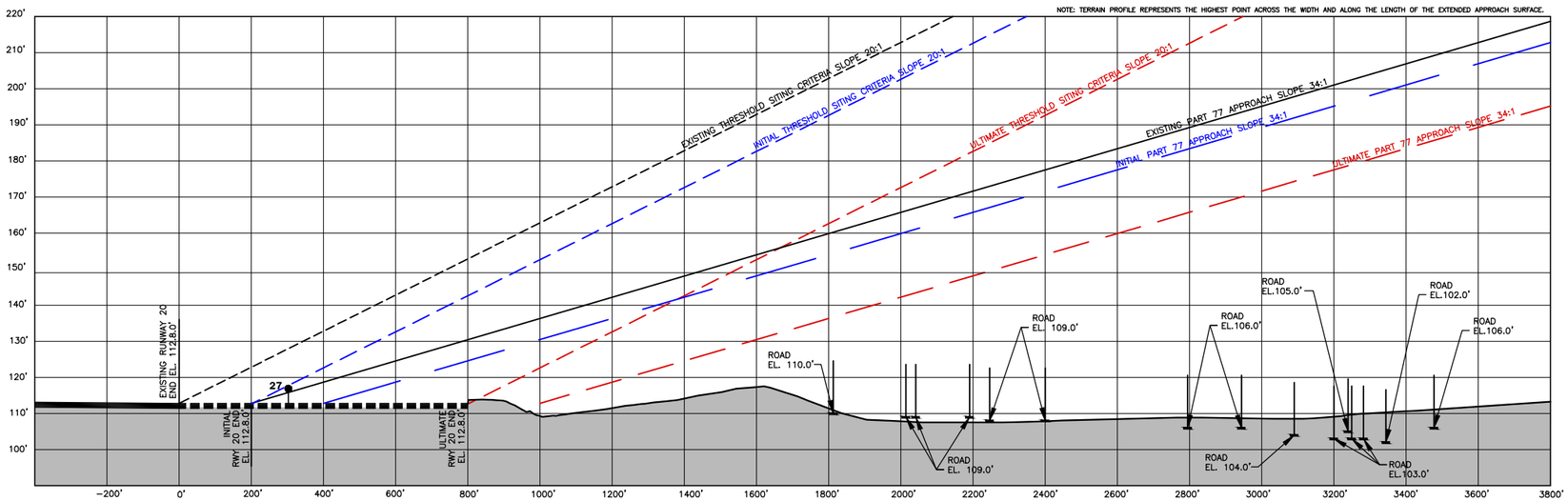
SCALE	DATE	SHEET NO.
AS NOTED	NOVEMBER 2012	4 of 7

Figure E4 **Inner Portion of the Approach Surface Plan, Runway 2 (Plan & Profile Views)**



Existing, Initial & Ultimate Runway 20 - Plan View

1" = 200'



Existing, Initial & Ultimate Runway 20 - Profile View

1" = 200' HORIZONTALLY
1" = 20' VERTICALLY

RUNWAY COORDINATES & ELEVATIONS

ITEM	RUNWAY 2/20		
	EXISTING	*INITIAL*	*FUTURE*
RUNWAY END COORDINATES	LAT.38°22'20.68"N / LAT.38°22'59.32"N LON.121°57'58.11"W / LON.121°57'25.33"W	*LAT.38°22'22.32"N / LAT.38°23'0.96"N* *LON.121°57'56.71"W / LON.121°57'23.94"W*	*LAT.38°22'22.32"N / LAT.38°23'05.89"N* *LON.121°57'56.71"W/LON.121°57'19.75"W*
RUNWAY END ELEVATION	115.8'/112.8'	*116.0'/SAME*	*SAME/SAME*
RUNWAY HIGH/LOW POINT ELEVATION	112.8'/116.8''	*SAME/SAME*	*SAME/SAME*
TOUCHDOWN ZONE ELEVATION (TDZE)	116.8'/116.7'	*SAME/SAME*	*SAME/SAME*

OBSTRUCTIONS

NO.	DESCRIPTION	ELEVATION	PENETRATION	SURFACE	DISPOSITION
27	FENCE	117.0	4.1	PRIMARY	REMOVE

OBSTRUCTION SOURCE: NOAA LPV SURVEY 03-26-05.

RUNWAY DATA

ITEM	EXISTING RUNWAY 2/20	*INITIAL RUNWAY 2/20*	*FUTURE RUNWAY 2/20*
APPROACH VISIBILITY MINIMUMS	VISUAL/1-MILE	*1-MILE/1-MILE*	*SAME/SAME*
FAR PART 77 APPROACH CATEGORY	B/NP	*NP/NP*	*SAME/SAME*
FAR PART 77 APPROACH SLOPE	20:1/34:1	*34:1/34:1*	*SAME/SAME*
RUNWAY WIDTH AND LENGTH	75' X 4,700'	*SAME*	*100' X 5,300' (see note L)*
PAVEMENT SURFACE TYPE	ASPHALT	*SAME*	*SAME*
PAVEMENT STRENGTH (IN 1000 LBS.)	30S	*SAME*	*SAME*
TAXIWAY SURFACE TYPE	ASPHALT	*SAME*	*SAME*
RUNWAY LIGHTING	HIRL	*SAME*	*SAME*
RUNWAY MARKING	NP, RCL, EDGE	*SAME*	*SAME*
TAXIWAY LIGHTING	MITL	*SAME*	*SAME*
EFFECTIVE RUNWAY GRADIENT %	0.06	*0.07*	*0.06*
MAXIMUM RUNWAY GRADIENT %	0.16	*0.15*	*0.13*
RUNWAY LINE-OF-SIGHT	CRITERIA MET		
VISUAL APPROACH AIDS	PAPI, REIL	*SAME*	*SAME*
INSTRUMENT APPROACH AIDS	VOR, GPS	*SAME*	*SAME*
AIRPORT REFERENCE CODE	B-II	*SAME*	*SAME*
CRITICAL AIRCRAFT	BEECH SUPER KING AIR	*SAME*	*DASSAULT FALCON 50*
WING SPAN	54.5'	*SAME*	*61'11"*
UNDER CARRIAGE WIDTH	17'2"	*SAME*	*13'*
APPROACH SPEED (KNOTS)	100	*SAME*	*113*
MAXIMUM TAKEOFF WEIGHT (LBS.)	12,500	*SAME*	38,800
RUNWAY SAFETY AREA WIDTH	150'	*SAME*	*SAME*
RUNWAY SAFETY AREA BEYOND R/W END	300'/300'	*SAME/SAME*	*SAME/SAME*
RUNWAY OBJECT FREE AREA WIDTH	500'	*SAME*	*SAME*
RUNWAY OBJECT FREE AREA BEYOND R/W END	300'/300'	*SAME/SAME*	*SAME/SAME*
OBSTACLE FREE ZONE WIDTH	400'	*SAME*	*SAME*
OBSTACLE FREE ZONE BEYOND R/W END	200'/200'	*SAME/SAME*	*SAME/SAME*
OBSTACLE FREE ZONE CRITERIA	NO OFZ OBJECT PENETRATIONS		
RUNWAY CL TO TAXIWAY CL	240'	*SAME*	*SAME*
TAXIWAY CL TO FIXED OR MOVEABLE OBJECT	250'	*SAME*	*SAME*
TAXIWAY OBJECT FREE AREA WIDTH	131'	*SAME*	*SAME*
TAXIWAY SAFETY AREA WIDTH	79'	*SAME*	*SAME*
TAXIWAY WINGTIP CLEARANCE	26'	*SAME*	26'
TAXIWAY CENTERLINE TO FIXED/MOVEABLE OBJECT	370'	*SAME*	*SAME*
THRESHOLD SITING CRITERIA	SEE TABLE		

DRAWING LEGEND

	EXISTING	*FUTURE*
AIRPORT PROPERTY LINE		
AIRPORT SECURITY 6' CHAIN LINK FENCE		
AIRPORT SECURITY BARBED WIRE FENCE		
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
UNPAVED ROADS		
AVIGATION EASEMENT		
RUNWAY PROTECTION ZONE		
BUILDING RESTRICTION LINE		
RUNWAY SAFETY AREA	RSA	RSA (F)
RUNWAY OBJECT FREE AREA	ROFA	ROFA (F)
AIRPORT BEACON		
LIGHTED WIND CONE & SEGMENTED CIRCLE		
WIND CONE		
PRECISION APPROACH PATH INDICATOR (PAPI)		
HOLDLINES		
AIRPORT REFERENCE POINT		
RUNWAY END IDENTIFIER LIGHTS		
LIGHT POLE		
MONUMENTS		

REVISIONS

NO.	DESCRIPTION	DATE

NOTES

1. This drawing reflects planning standards specific to this airport, and is not a product of detailed engineering design analysis. It is not intended to be used for construction documentation or navigation.
2. Coordinates and elevations taken from FAA website, http://ovnaww.jccbi.gov/pls/datasheet_prd/pkg_airport.PRO_AIRPORT_RUNWAY?v_cntl_num=3153 All elevations and coordinates are based on NAVD 88 and NAD 83 datum.

Solano County
General Services Department
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Nut Tree Airport

Vacaville, California

Inner Portion of the Approach Surface Plan - Runway 20 (Plan & Profile)

SCALE	DATE	SHEET NO.
AS NOTED	NOVEMBER 2012	5 of 7

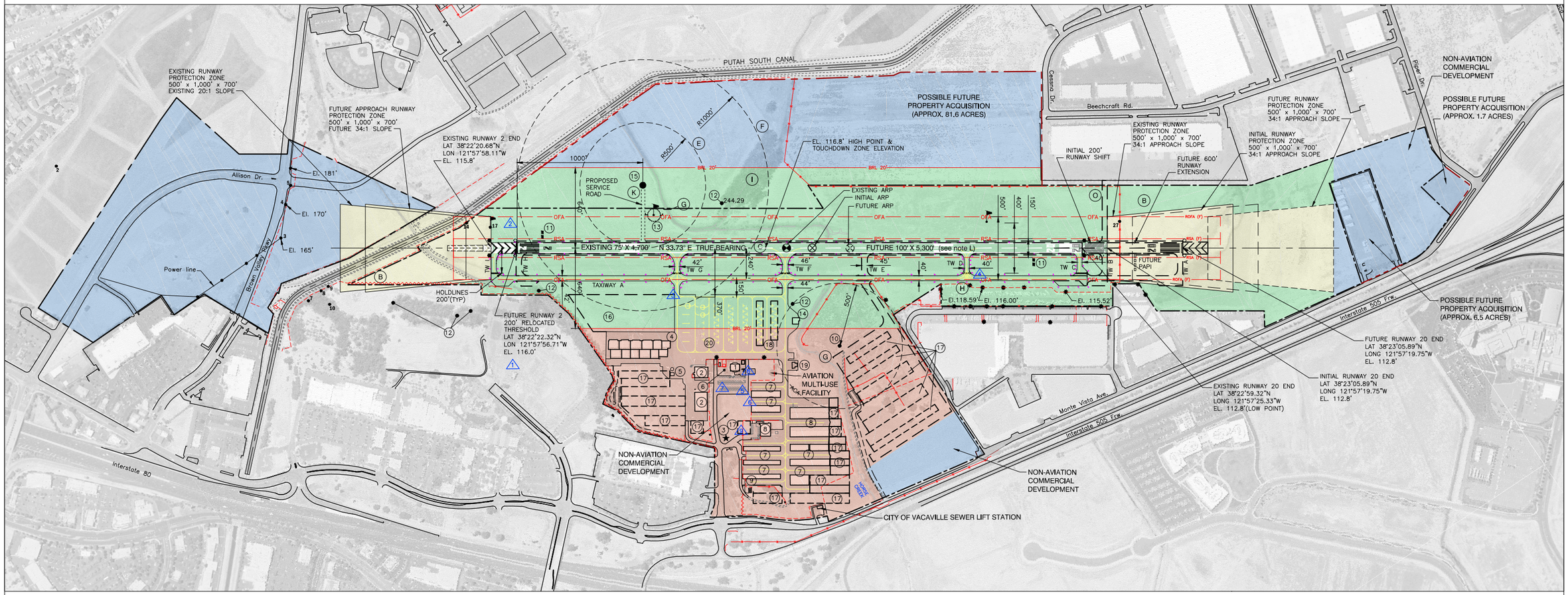
Figure E5 **Inner Portion of the Approach Surface Plan, Runway 20 (Plan & Profile Views)**

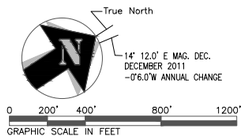
Land Use Plan

The *LAND USE PLAN*, presented in the following figure, depicts existing and recommended use of all land within the ultimate airport property line and near the Nut Tree Airport. The purpose of the *LAND USE PLAN* is to provide airport management a plan for leasing revenue-producing areas on the Airport and guidance to local authorities for establishing appropriate land use zoning in the vicinity of the Airport.

Airport Property Map

The *AIRPORT PROPERTY MAP*, which is presented in the following illustration, indicates how various tracts of land within the airport boundaries were acquired (e.g., federal funds, surplus property, local funds, etc.). The purpose of this drawing is to provide information for analyzing the current and future aeronautical use of land acquired with Federal funds.





ON-AIRPORT LAND USE LEGEND

- **Runway/Taxiway System** (Including Objects Clearing Considerations)
- **Aviation Facility Development Area**
- **Non-Aviation/Airport Support & Protection**
- **Runway Protection Zone**

DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
AIRPORT SECURITY 6' CHAIN LINK FENCE		
AIRPORT SECURITY BARBED WIRE FENCE		
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
PAVED ROADS		
UNPAVED ROADS		
AVIGATION EASEMENT		
RUNWAY PROTECTION ZONE		
BUILDING RESTRICTION LINE		
RUNWAY SAFETY AREA	RSA	RSA (F)
RUNWAY OBJECT FREE AREA	OFA	ROFA (F)
AIRPORT BEACON		
LIGHTED WIND CONE & SEGMENTED CIRCLE		
WIND CONE		
PRECISION APPROACH PATH INDICATOR (PAPI)		
HOLDLINES		
AIRPORT REFERENCE POINT		
RUNWAY END IDENTIFIER LIGHTS		
LIGHT POLE		
MONUMENTS		

REVISIONS

NO.	DESCRIPTION	DATE

Solano County
General Services Department
Vacaville, CA (707)469-4600

Nut Tree Airport
Vacaville, California

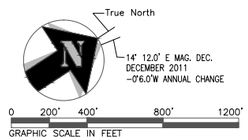
Land Use Plan

SCALE	DATE	SHEET NO.
1" = 400'	DECEMBER 2012	6 of 7

Figure E6 **Land Use Plan**

EXISTING PROPERTY

PARCEL NO.	APN	ACREAGE	GRANTOR – GRANTEE	VESTING DOCUMENT	RECORDING DATE
1	0129–210–020	30.91± AC	T.I.CORP. – SOLANO COUNTY	1972–006483	MARCH 24, 1972
2	0129–210–050	24.99± AC	POWERLAND INC. – SOLANO COUNTY	1970–19418	OCTOBER 27, 1970
3	0129–210–060	0.62± AC	NUT TREE, LLC – SOLANO COUNTY	2000–030090	APRIL 19, 2000
4	0129–210–070	11.00± AC	POWERLAND INC. – SOLANO COUNTY	1970–19418	OCTOBER 27, 1970
5	0129–210–040	2.15± AC	STEINER, ET UX – SOLANO COUNTY	1972–008265	APRIL 18, 1972
6	0129–210–100	15.66± AC	WHITNEY & MONTE VISTA ASS., LLC – SOLANO COUNTY	2005–110420	JULY 22, 2005
7	0129–210–110	22.06± AC	STEINER, ET UX – SOLANO COUNTY	1976–062185	NOVEMBER 2, 1976
8	0129–210–130	0.75± AC	MONTE VISTA BUS. CEN., LTD – SOLANO COUNTY	1982–046730	JULY 22, 1982
9	0129–210–160	5.59± AC	MARK III ENG. CONTRACTORS – SOLANO COUNTY	2001–014558	FEBRUARY 1, 2001
10	0129–220–060	4.37± AC	POWERLAND INC. – SOLANO COUNTY	1970–19418	OCTOBER 27, 1970
11	0129–220–080	0.25± AC	POWER LAND, INC. – SOLANO COUNTY	1980–00111	JANUARY 2, 1980
12	0129–220–170	1.94± AC	POWER LAND, INC. – SOLANO COUNTY	1978–21006	FEBRUARY 23, 1978
	0129–220–180	9.29± AC	POWER LAND, INC. – SOLANO COUNTY	1978–21006	FEBRUARY 23, 1978
13	0129–240–010	2.86± AC	ADIEGO – SOLANO COUNTY	1972–08627	APRIL 2, 1972
14	0129–240–020	22.46± AC	ADIEGO – SOLANO COUNTY	1972–08627	APRIL 2, 1972
15	0129–240–040	0.69± AC	ADIEGO – SOLANO COUNTY	1972–08627	APRIL 2, 1972
16	0129–240–070	22.04± AC	POWERLAND, INC. – SOLANO COUNTY	1970–19418	OCTOBER 27, 1970
17	0129–240–160	6.24± AC	NUT TREE, CALIF. LP – SOLANO COUNTY	2000–30090	APRIL 19, 2000
18	0129–240–090	17.06± AC	WHITFIELD – SOLANO COUNTY	1742–16	APRIL 3, 1972
19	0129–261–070	0.02± AC	STATE OF CALIF. – SOLANO COUNTY	1977–54725	DECEMBER 5, 1977
20	0129–280–031	0.77± AC	ALLISON LAND – SOLANO COUNTY	1978–21002	FEBRUARY 28, 1978
21	0129–280–038	2.30± AC	SEGHETTI TO SOLANO COUNTY	1981–28087	APRIL 22, 1981
	0129–280–049	1.29± AC	SEGHETTI TO SOLANO COUNTY	1981–28087	APRIL 22, 1981
22	0129–280–040	5.29± AC	VACAVILLE DEVELOPERS, INC. – SOLANO COUNTY	1977–95647	NOVEMBER 23, 1977
	0129–280–041	3.76± AC	VACAVILLE DEVELOPERS, INC. – SOLANO COUNTY	1977–95647	NOVEMBER 23, 1977
23	0129–280–042	11.95± AC	EMMA MARTINEZ, ET AL TO SOLANO COUNTY	1978–19605	MARCH 15, 1978
	0129–280–043	6.41± AC	EMMA MARTINEZ, ET AL TO SOLANO COUNTY	1978–19605	MARCH 15, 1978
24	0129–280–044	3.53± AC	GINO CASTAGNOLI – SOLANO COUNTY	1978–47325	JUNE 14, 1978
	0129–280–045	4.66± AC	GINO CASTAGNOLI – SOLANO COUNTY	1978–47325	JUNE 14, 1978
25	0133–220–040	26.13± AC	FIVE STAR INVESTMENTS – SOLANO COUNTY	1990–26700	APRIL 10, 1990
26	0133–220–070	9.05± AC	FIVE STAR INVESTMENTS – SOLANO COUNTY	1990–26700	APRIL 10, 1990
27		26.9± AC			

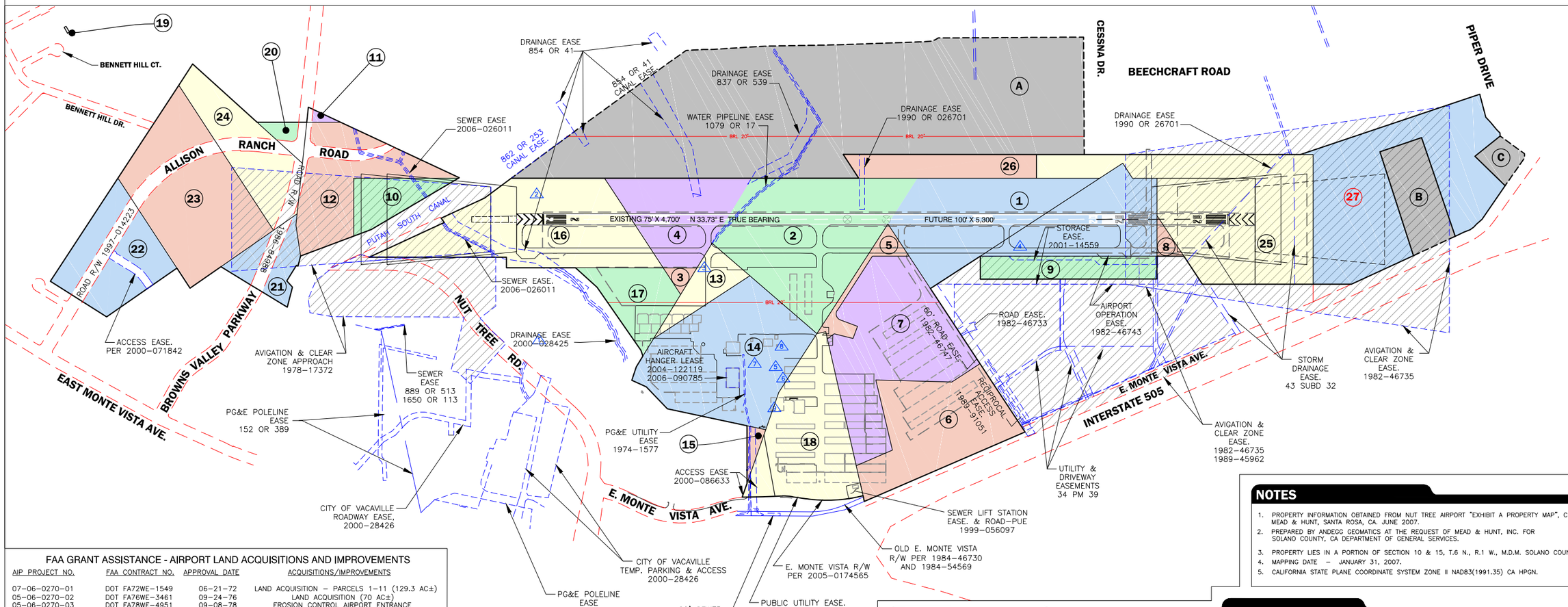


EASEMENTS

PARCEL NO.	APN	EASEMENTS	EASEMENT PURPOSE
1	0129–210–020	837 OR 539	STORM DRAINAGE EASEMENT
2	0129–210–050	854 OR 41	STORM DRAINAGE – PUTAH SO. CANAL
3	0129–210–060	1079 OR 17	WATER PIPELINE EASEMENT
4	0129–210–070	1978 OR 102603	BRIDGE ACCESS– PUTAH SO. CANAL
		1982 OR 46735	AVIGATION – N. APPROACH, CLEAR ZONE & TRANSITIONAL SURFACE
		1982 OR 46743	AVIGATION – N. APPROACH, CLEAR ZONE & TRANSITIONAL SURFACE
		43 SUBD. 32	STORM DRAINAGE PER SUBDIVISION MAP
		1990 OR 026701	STORM DRAINAGE EASEMENTS
5	0129–210–040	1989 OR 091051	PEDESTRIAN & VEHICULAR INGRESS AND EGRESS
6	0129–210–100		
7	0129–210–110		
8	0129–210–130	1982 OR 46735	AVIGATION – N. APPROACH, CLEAR ZONE & TRANSITIONAL SURFACE
		1982 OR 46743	AIRCRAFT NAVIGATION AND AIRPORT OPERATION
9	0129–210–160	34 SUBD 39	DRAINAGE EASEMENTS PER PARCEL MAP
		1982 OR 46735	AVIGATION – N. APPROACH, CLEAR ZONE & TRANSITIONAL SURFACE
		1982 OR 46743	AIRCRAFT NAVIGATION AND AIRPORT OPERATION
		1989 OR 45962	AVIGATION – N. APPROACH, CLEAR ZONE & TRANSITIONAL SURFACE
		2001 OR 14559	STORAGE EASEMENT – VEHICLES, RV'S, BOATS, ETC.
10	0129–220–060	1978 OR 17372	AVIGATION – S. APPROACH, CLEAR ZONE & TRANSITIONAL SURFACE
		2006 OR 26011	SEWER EASEMENT & RIGHT OF ENTRY – CITY OF VACAVILLE
11	0129–220–080	1978 OR 17372	AVIGATION – S. APPROACH, CLEAR ZONE & TRANSITIONAL SURFACE
12	0129–220–170	1986 OR 84988	ROAD AND PUBLIC UTILITY EASEMENT TO CITY OF VACAVILLE
	0129–220–180	1986 OR 84988	ROAD AND PUBLIC UTILITY EASEMENT TO CITY OF VACAVILLE
		2006 OR 026011	SEWER EASEMENT & RIGHT OF ENTRY – CITY OF VACAVILLE

EASEMENTS

PARCEL NO.	APN	EASEMENTS	EASEMENT PURPOSE
13	0129–240–010	1974 OR 01577	PG&E UTILITY EASEMENT
14	0129–240–020	2000 OR 86633	AIRPORT ACCESS EASEMENT
15	0129–240–040	2002 OR 87300	CORPORATE AIRCRAFT HANGAR LEASE AGREEMENT
		2004 OR 133119	CORPORATE AIRCRAFT HANGAR LEASE AGREEMENT
		2006 OR 90785	GROUND LEASE AGREEMENT
16	0129–240–070	854 OR 41	STORM DRAINAGE – PUTAH SO. CANAL
17	0129–240–160	1978 OR 17372	AVIGATION – S. APPROACH, CLEAR ZONE & TRANSITIONAL SURFACE
		1987 OR 146430	AVIGATION – AIRPORT OPERATION & NOISE
		2006 OR 26011	SEWER EASEMENT & RIGHT OF ENTRY – CITY OF VACAVILLE
18	0129–240–090	1979 OR 84228	20' SEWER PUMP STATION EASEMENT
		1987 OR 146430	AVIGATION – AIRPORT OPERATION & NOISE
		2000 OR 086633	ACCESS EASEMENT – INGRESS/EGRESS
		2005 OR 174567	EASE MONTE VISTA RIGHT OF WAY
		2005 OR 174567	PUBLIC UTILITY EASEMENT
19	0129–261–070		
20	0129–280–031	1986 OR 84988	ROAD AND PUBLIC UTILITY EASEMENT TO CITY OF VACAVILLE
21	0129–280–380	1978 OR 17372	AVIGATION – S. APPROACH, CLEAR ZONE & TRANSITIONAL SURFACE
	0129–280–390	1986 OR 84988	ROAD AND PUBLIC UTILITY EASEMENT TO CITY OF VACAVILLE
22	0129–280–400	2000 OR 071843	ACCESS EASEMENT – INGRESS/EGRESS
	0129–280–410		
23	0129–280–420	1978 OR 17372	AVIGATION – S. APPROACH, CLEAR ZONE & TRANSITIONAL (APN 420)
	0129–280–430		
24	0129–280–440	1978 OR 17372	AVIGATION – S. APPROACH, CLEAR ZONE & TRANSITIONAL (APN 440)
	0129–280–450	1986 OR 84988	ROAD AND PUBLIC UTILITY EASEMENT TO CITY OF VACAVILLE
25	0133–220–040	1982 OR 46735	AVIGATION – N. APPROACH, CLEAR ZONE & TRANSITIONAL SURFACE
			STORM WATER PIPELINE EASEMENTS
26	0133–220–070	1990 OR 26701	



FAA GRANT ASSISTANCE - AIRPORT LAND ACQUISITIONS AND IMPROVEMENTS

AIP PROJECT NO.	FAA CONTRACT NO.	APPROVAL DATE	ACQUISITIONS/IMPROVEMENTS
07–06–0270–01	DOT FA72WE–1549	06–21–72	LAND ACQUISITION – PARCELS 1–11 (129.3 AC±)
05–06–0270–02	DOT FA76WE–3461	09–24–76	LAND ACQUISITION (70 AC±)
05–06–0270–03	DOT FA78WE–4951	09–08–78	EROSION CONTROL AIRPORT ENTRANCE
05–06–0270–04	DOT FA80WE–05792	07–07–80	LAND ACQUISITION (36.5 AC±)
05–06–0270–05	DOT FA80WE–05816	09–22–80	LAND ACQUISITION (6 AC±)
A–06–0270–02	DOT FA80WE–05779	06–02–80	AIRPORT MASTER PLAN
03–06–0270–01	DT FA08–87–C–30268	07–07–87	LAND ACQUISITION (17.04 AC±)
03–06–0270–04	DT FA08–97–C–30858	09–21–97	LAND ACQUISITION (15.9 AC±)
03–06–0270–05	DT FA08–99–C–30952	09–05–2000	AIRPORT CONSTRUCTION PROJECT
03–06–0270–06	DT FA08–01–C–31171	09–21–2001	TAXIWAY RECONSTRUCTION

FAA AIRPORT PROPERTY RELEASE

AIP PROJECT NO.	APPROVAL DATE	ACQUISITIONS/IMPROVEMENTS
05–06–0270–02, 05–06–0270–03, 05–06–0270–04, 05–06–0270–05	07–25–86	BROWNS VALLEY PARKWAY – PROPERTY RELEASE TO CITY OF VACAVILLE – RIGHT OF WAY PURPOSES

FUTURE PROPERTY

PARCEL NO.	APN	ACREAGE	DATE
A	N/A	81.6± AC	TO BE ACQUIRED
B	N/A	6.5± AC	TO BE ACQUIRED
C	N/A	1.7± AC	TO BE ACQUIRED

DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
EXISTING AIRPORT INTERIOR PARCEL LINE		
RIGHT OF WAY LINE (R.O.W.)		
EASMENT LINE		
AVIGATION EASEMENT/CLEAR ZONE		
RUNWAY PROTECTION ZONE		
AIRFIELD PAVEMENT		
PAVED ROADS		
BUILDING RESTRICTION LINE	BRL 20'	
AIRPORT BUILDINGS		
MONUMENTS	4	

NOTES

1. PROPERTY INFORMATION OBTAINED FROM NUT TREE AIRPORT "EXHIBIT A PROPERTY MAP", CREATED BY MEAD & HUNT, SANTA ROSA, CA. JUNE 2007.
2. PREPARED BY ANDEGG GEOMATICS AT THE REQUEST OF MEAD & HUNT, INC. FOR SOLANO COUNTY, CA DEPARTMENT OF GENERAL SERVICES.
3. PROPERTY LIES IN A PORTION OF SECTION 10 & 15, T.6 N., R.1 W., M.D.M. SOLANO COUNTY, CA.
4. MAPPING DATE – JANUARY 31, 2007.
5. CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE II NAD83(1991.35) CA HPGN.

Solano County
General Services Department
Vacaville, CA (707)469-4600

Nut Tree Airport
Vacaville, California

Exhibit 'A' Property Map

SCALE	DATE	SHEET NO.
1" = 400'	DECEMBER 2012	7 of 7

Figure E7 **Airport Property Map**

Implementation Plan

INTRODUCTION. This chapter provides an agenda for continued development at Nut Tree Airport by presenting recommendations for project phasing associated with the 20-year improvement program. The improvements necessary to efficiently accommodate the potential aviation demand have been organized into three phases: Phase I is the initial time frame (1-5 years), Phase II is the intermediate time frame (6-10 years), and Phase III is the long-term time frame (11-20 years). The proposed improvements are also illustrated graphically by time period.

Project List and Cost Estimates

A list of capital improvement projects has been assembled based on the Development Plan previously presented. The project list has been coordinated with the Airport Layout Plan (ALP) drawing set and the Airport Capital Improvement Program (CIP) that is continuously updated by airport management and the Federal Aviation Administration (FAA). For the purposes of

planning, the project list and cost estimates are not limited to public or FAA eligible projects. Other projects are also identified including private hangar projects, and public/private partnership projects.

Following review of the project phasing recommendations by airport staff and the FAA, cost estimates for the individual projects based on current dollars were prepared. Facility costs were formulated using unit prices extended by the size of the particular facility and tempered with specific considerations related to Solano County and the surrounding area, and California in general. This data was reviewed and analyzed at a planning level for specific factors that may influence costs, such as operational constraints, project schedule, utility locations, and other special project requirements. That being said, *these estimates are intended to be used for planning purposes only and should not be construed as detailed construction cost estimates*, which can only be compiled following the preparation of detailed design documentation.

Implementation Schedule

The following tables entitled *DEVELOPMENT PLAN PROJECT COSTS* provide the suggested phasing for improvement projects throughout the 20-year planning period. The projects in Phase I are listed by fiscal year to make them easily translatable into the FAA's Capital Improvement Plan format. The projects listed in Phases II and III are listed in generalized priority order without specific year designators. With the best facts and assumptions available today, the tables provide information related to what projects will be needed, when those projects are likely to be constructed, and how the improvements are likely to be funded.

Table F1
PHASE I (1-5 YEARS) DEVELOPMENT PLAN PROJECT COSTS

	Project Description	Total Costs	Federal (a	Local (b	Other (c
2013 Projects					
1	Airport Pavement Management System (APMS)	$15,000	$14,250	$750	$0
2	Runway Safety Area (RSA) Stabilization – Runway 20 [*Design/Construction*]	$50,000	$47,500	$2,500	$0
3	Shade Hangars 36,000 sf (Solarized) [*Design/Construction*]	$1,300,000	$0	$0	$1,300,000
4	RW 2/20 Shift 200' North; Runway Pavement Rehab, Phase I; Relocate Edge Lighting, Signs & Markings; Purchase New PAPIs [*Environmental/Design*]	$225,000	$213,750	$11,250	$0
	Sub-Total/2013 Projects	**$1,590,000**	**$275,500**	**$14,500**	**$1,300,000**
2014 Projects					
5	RW 2/20 Shift 200' North; Runway Pavement Rehab, Phase I; Relocate Edge Lighting, Signs & Markings; Purchase New PAPIs [*Construction*]	$1,400,000	$1,330,000	$70,000	$0
6	Relocation of ASOS/AWOS (*Design/Construction*)	$160,000	$152,000	$8,000	$0
7	Relocation of Fence, Light Poles, & Other Obstructions [*Design/Construction*]	$200,000	$190,000	$10,000	$0
8	South Corporate Hangar Development – 100,000sf (Private) [*Environmental*]	$80,000	$0	$0	$80,000
9	South Corporate Hangar Development – 100,000sf (Private) [*Design*]	$1,600,000	$0	$0	$1,600,000
10	South Corporate Hangar Development – 100,000sf (Private) [*Construction*]	$16,000,000	$0	$0	$16,000,000
	Sub-Total/2014 Projects	**$19,440,000**	**$1,672,000**	**$88,000**	**$17,680,000**
2015 Projects					
11	Taxiway & Taxilane Pavement Rehabilitation [*Construction*]	$300,000	$285,000	$15,000	$0
12	Apron Lighting Refurbishment & New Rotating Beacon [*Design/Construction*]	$170,000	$161,500	$8,500	$0
	Sub-Total/2015 Projects	**$470,000**	**$446,500**	**$23,500**	**$0**
2016 Projects					
13	Airfield Lights Replacement (RWY & TWY) [Design/*Construction*]	$500,000	$475,000	$25,000	$0
14	Airfield Perimeter Fencing & Gates [*Design/Construction*]	$650,000	$617,500	$32,500	$0
15	North T-Hangar Development - (incl. utilities) Project #: 19, 20, 26, 28, & 29, below [*Environmental/Hydrology/Prelim Design*]	$200,000	$190,000	$10,000	$0
	Sub-Total/2016 Projects	**$1,350,000**	**$1,282,500**	**$67,500**	**$0**
2017 Projects					
16	Expand Multi-Use Arrival/Departure Facility – 13,000 sf [*Design*] (Public/Private)	$400,000	$0	$0	$400,000
17	South Apron Expansion – 221,000 sf [*Construction*]	$2,750,000	$2,612,500	$137,500	$0
18	Hangar Refurbishment (Units #1-9) [*Design/Construction*]	$1,000,000	$0	$1,000,000	$0

19	North T-Hangar Development - (incl. utilities) Project #: 20, 26, 28, & 29, below [*Design*]	$500,000	$80,000	$420,000	$0
	Sub-Total/2017 Projects	**$4,650,000**	**$2,692.500**	**$1,557,500**	**$400,000**
	Total Phase I Projects	**$27,500,000**	**$6,369,000**	**$1,751,000**	**$19,380,000**

Notes:

(a *Federal*– FAA Airport Improvement Program (AIP) Entitlement & Discretionary Grants
(b *Local* – Airport Net Revenues or Cash Reserves
(c *Other*- Unidentified or Private Third-Party Funding

Table F2

PHASE II (6-10 YEARS) DEVELOPMENT PLAN PROJECT COSTS

	Project Description	Total Costs	Federal (a	Local (b	Other (c
Phase II Projects (6-10 Years)					
20	North T-Hangar Development – Phase I: Utilities & Access [*Construction*]	$3,400,000	$3,230,000	$170,000	$0
21	Expand Multi-Use Arrival/Departure Facility – 13,000 sf [*Construction*] (public/private)	$4,000,000	$0	$0	$4,000,000
22	East Corporate Hangars - 20,000 sf (Private) [*Environmental*]	$10,000	$0	$0	$10,000
23	East Corporate Hangars - 20,000 sf (Private) [*Design*]	$300,000	$0	$0	$300,000
24	East Corporate Hangars - 20,000 sf (Private) [*Construction*]	$3,000,000	$0	$0	$3,000,000
25	Airfield Pavement Rehabilitation [*Design*]	$75,000	$71,250	$3,750	$0
26	North T-Hangar Development – Phase II, *West*: 46,500 sf T-hangar space [*Construction*]	$2,700,000	$0	$2,700,000	$0
27	Airfield Pavement Rehabilitation [*Construction*]	$1,000,000	$950,000	$50,000	$0
28	North T-Hangar Development– Phase III, *Middle*: 47,500 sf box hangars [*Construction*]	$6,000,000	$0	$6,000,000	$0
29	North T-Hangar Development– Phase IV, *East*: 33,000 sf T-hangars, 56,0000 sf box hangars [*Construction*]	$8,900,000	$0	$8,900,000	$0
	Total Phase II Projects	**$29,385,000**	**$4,251,250**	**$17,823,750**	**$7,310,000**
	PHASE I & II TOTALS	**$56,885,000**	**$10,620,250**	**$19,574,750**	**$26,690,000**

Notes:

(a *Federal*– FAA Airport Improvement Program (AIP) Entitlement & Discretionary Grants
(b *Local* – Airport Net Revenues or Cash Reserves
(c *Other*- Unidentified or Private Third-Party Funding

Table F3
PHASE III (11-20 YEARS) DEVELOPMENT PLAN PROJECT COSTS

	Project Description	Total Costs	Federal (a	Local (b	Other (c
Phase III Projects(11-20 Years)					
30	North Land Acquisition for RW 20 Approach Protection (± 10 acres) [*NEPA Environmental Assessment*]	$200,000	$190,000	$10,000	$0
31	North Land Acquisition for RW 20 Approach Protection (± 10 acres) [*Reimbursement for Land Purchase*]	$2,000,000	$1,900,000	$100,000	$0
32	Airfield Pavement Rehabilitation [*Design/Construction*]	$1,100,000	$1,045,000	$55,000	$0
33	West Side Land Acquisition (± 82 acres) [*Reimbursement for Remaining Land Purchase*]	$9,500,000	$9,025,000	$475,000	$0
34	East Hangar Area Expansion (Private/County) [*Environmental*]	$60,000	$0	$0	$60,000
35	East Hangar Area Expansion (Private/County) [*Design*]	$1,400,000	$0	$0	$1,400,000
36	East Hangar Area Expansion – 16,000 sf T-hangars, 100,000 sf box hangars (Private/County) [*Construction*]	$14,000,000	$0	$0	$14,000,000
37	Runway 20 Extension to 5,300 ft (600 ft x 75 ft) [*NEPA Environmental Assessment*]	$500,000	$475,000	$25,000	$0
38	Runway 20 Extension to 5,300 ft (600 ft x 75 ft) [*Design*]	$400,000	$380,000	$20,000	$0
39	Runway 20 Extension to 5,300 ft (600 ft x 75 ft) [*Construction*]	$5,000,000	$4,750,000	$250,000	$0
	Total Phase III Projects	**$34,160,000**	**$17,765,000**	**$935,000**	**$15,460,000**
	GRAND TOTALS	**$91,045,000**	**$28,385,250**	**$20,509,750**	**$42,150,000**

Notes:

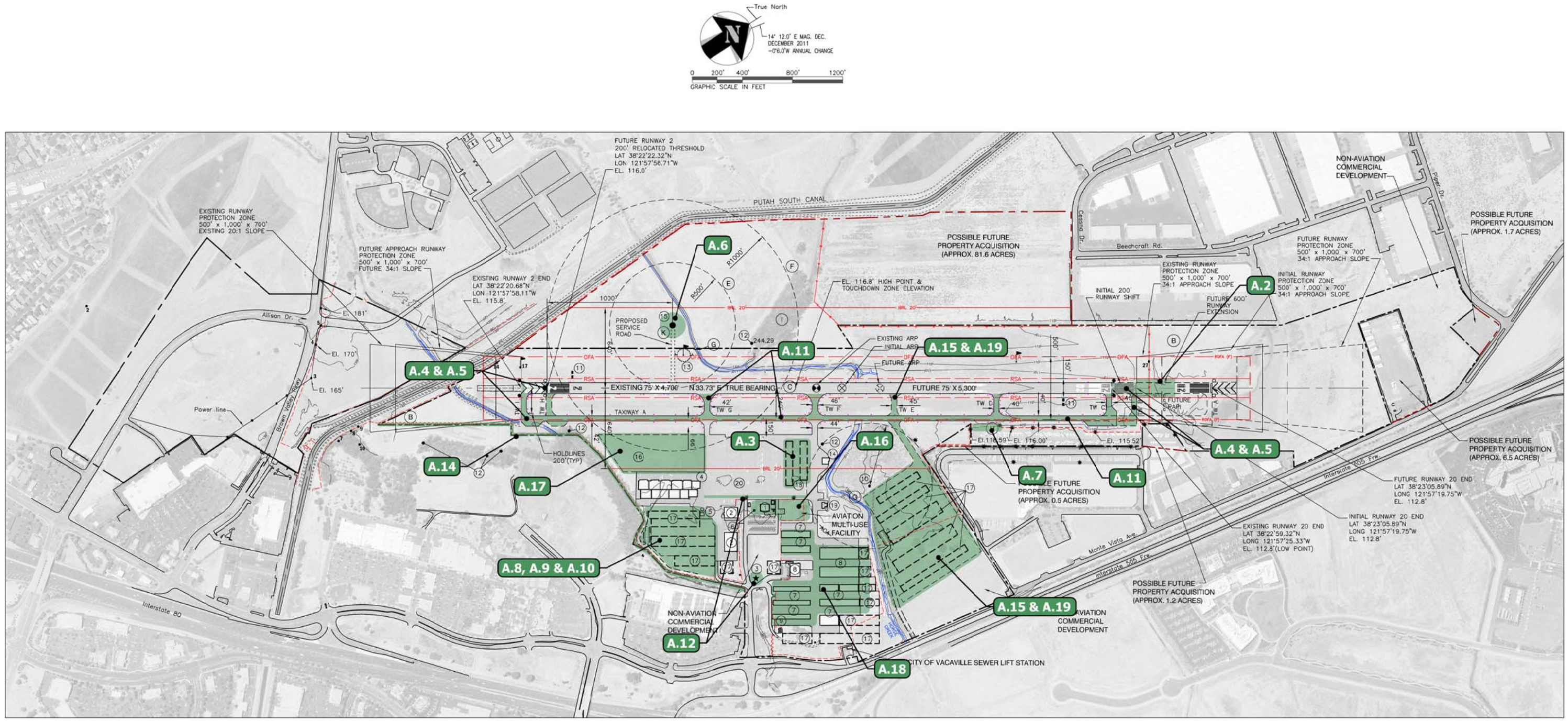
(a *Federal*– FAA Airport Improvement Program (AIP) Entitlement & Discretionary Grants
(b Local – Airport Net Revenues or Cash Reserves
(c Other- Unidentified or Private Third-Party Funding

Phasing Plan

The following illustration entitled *PHASING PLAN* indicates the suggested phasing for projects in a graphic format. As with the Implementation Schedule, these are suggested schedules and variance from them may be necessary, especially during the latter time periods. Particular attention has been given to the first five years, as they are the most critical and the scheduled projects outlined in that time frame include key projects. The demand for certain facilities and the economic feasibility of their development, are to be the prime factors influencing the timing of individual project construction. Care must be taken to provide for adequate lead-time for detailed planning (*inclusive of environmental review*) and construction of facilities in order to meet aviation demands. It is also important to minimize the disruptive scheduling where a portion of the facility may become inoperative due to construction, and to prevent extra costs resulting from improper project scheduling.

Capital Improvement Plan

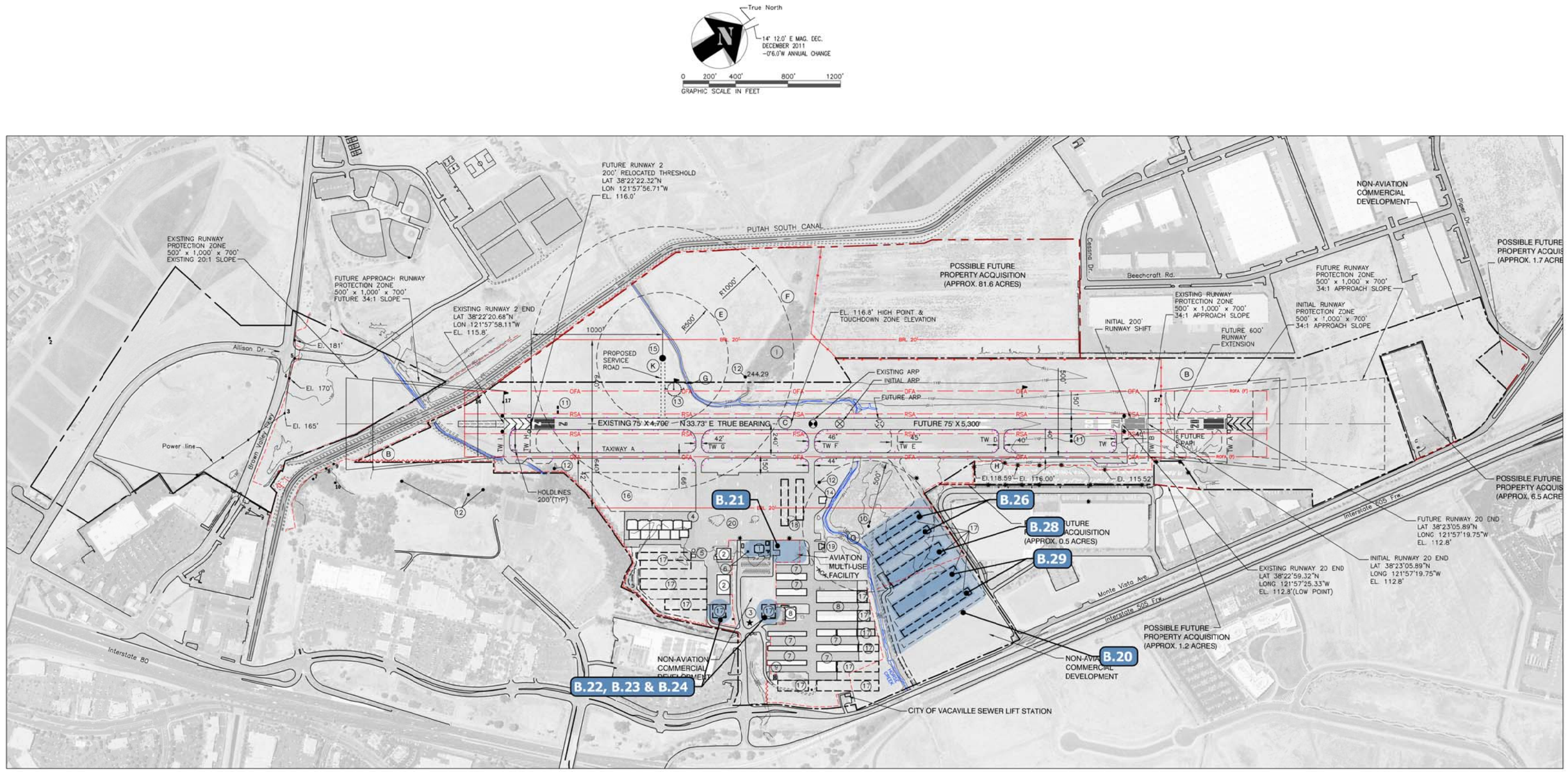
The projects, phasing, and costs that are presented in this 2012 Airport Master Plan are the best program level projections that can be made at the time of formulation. The purpose is to provide a reasonable projection of capital needs, which can then be used in fiscal programming to test for financial feasibility. To assist in the preparation of the Airport's CIP that the Airport keeps on file and updates annually with the FAA, the first phase of the projects list and cost estimates are organized in a format similar to that used by the FAA.



PHASE I (1-5 Years)

FIGURE F1

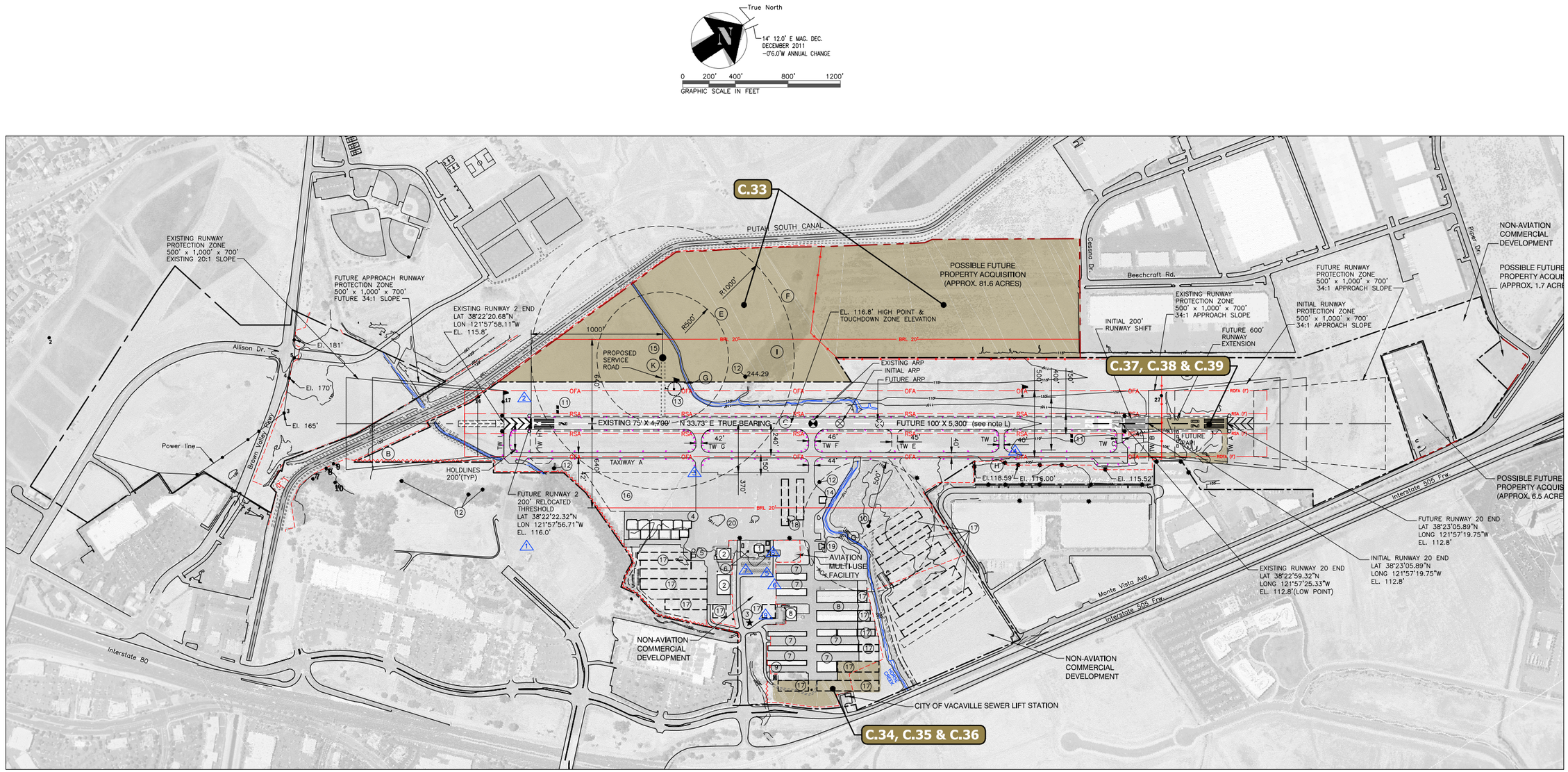
PHASING PLAN – PHASE I



PHASE II (6-10 Years)

FIGURE F2

PHASING PLAN – PHASE II



PHASE III (11-20 Years)

FIGURE F3

PHASING PLAN – PHASE III

Financial Plan and Implementation Strategy

Funding sources for the capital improvement program depend on many factors, including Airport Improvement Program (AIP) grant eligibility, the ultimate type and use of facilities to be developed, debt capacity of Solano County, the availability of other financing sources, and the priorities for scheduling project completion. For planning purposes, assumptions were made related to the funding source of each capital improvement. The project costs provided in the previous tables have been identified with likely funding sources.

Sources of Capital Funding

Following is a short description of potential capital improvement funding sources.

Federal Airport Improvement Program (AIP) Grants. The FAA is expected to provide grants on a 90%/10% basis to airports similar to the Nut Tree Airport for public-use improvement projects. On an entitlement grant basis, under new funding guidelines, the Airport should receive $150,000 in AIP Non-Primary Entitlement (NPE) funds annually from 2012-2016 under new congressional reauthorization. There are also discretionary funds available through the AIP. Discretionary grants are over and above entitlement funding, and are provided to airports for projects that have a high federal priority for enhancing safety, security, and capacity of the Airport, and would be difficult to fund otherwise. The dollar amounts of individual grants vary and can be significant in comparison to entitlement funding. Discretionary grants are awarded at the FAA's sole prerogative. Discretionary grant applications are evaluated based on need, the FAA's project priority ranking system, and the FAA's assessment of a project's significance within the national airport and airway system.

FAA Facility and Equipment Funds. Within the FAA's budget appropriation, money is available in the Facilities and Equipment (F&E) Fund to purchase navigational aids and air safety-related technical equipment, including Airport Traffic Control Towers (ATCTs) equipment. Each F&E development project is evaluated independently through a cost/benefit analysis to determine funding eligibility and priority ranking. The qualified projects are totally funded (i.e., 100%) by the FAA, with the remaining projects likely being AIP. In addition, the Airport can apply for NAVAIDS maintenance funding through the F&E Program for those facilities that are not F&E funded.

California Department of Transportation (Caltrans) Division of Aeronautics. The following discussion regarding Caltrans funding is appropriate to describe as it can be a favorable factor in for long-term capital planning; however, Caltrans funding is more supportive in nature, rather

than sustaining as is the case with FAA funding. Therefore, Solano County will pursue State funding on a case-by-case basis.

The Division of Aeronautics administers three state aid programs for airports: (1) Annual Grants, (2) AIP Matching, and (3) Acquisition and Development (A&D) Grants. The sole funding source for these grants is the excise tax revenue on general aviation (GA) gasoline ($0.18 per gallon) and for jet fuel ($0.02 per gallon) which generates approximately $7 million per year to support state-wide airport funding programs.

In addition, the Division administers the Local Airport Loan Program.

Caltrans Annual Credit Grants. These are State grants ($10,000 annually) to eligible airports for use at the sponsor's discretion subject to applicable laws and regulations, with prior approval from the Division.

The Annual Credit Grants (Annual Grants) fund projects for "airport and aviation purposes" as defined in Section 21681(f) of the State Aeronautics Act. Also, the Annual Grant can fund fueling facilities, restrooms, showers, and wash racks, including operation and maintenance expenses. The Annual Grant can provide part of the sponsor's match for projects that are funded by FAA grants as long as the project is otherwise eligible for state funding. To receive the Annual Grant the airport cannot be an FAA designated Reliever or Commercial Service Airport. Nut Tree Airport is eligible to receive the Annual Grant.

Caltrans AIP Matching Grants. These are state grants to eligible airports for eligible projects subject to programming and allocation by the California Transportation Commission (CTC). This grant assists the sponsor in meeting the local match for Airport Improvement Program (AIP) grants from the FAA. The state grant assists in the local 10% share of the Federal AIP amount. Generally, state matching is limited to projects that primarily benefit general aviation and matching grants are limited to non-commercial service airports.

Caltrans Acquisition and Development (A&D) Grants. In general, the sponsor must meet the same eligibility requirements as for the Annual Grant. An A&D grant cannot be used as local match for an FAA grant. The minimum amount of an A&D grant is $20,000. The maximum amount that can be allocated to an airport in a single fiscal year is $500,000.

The amount available for A&D grants is what is left in the Aeronautics Account after funding Annual Grants and AIP Matching. The local match can vary from 10% to 50% of the project's cost. The match rate is set annually by the CTC. (A 10% rate has been utilized for the past 15+ years.) Again, the Annual Grant may not be used for the local match to an A&D grant.

Caltrans Local Airport Loan Program. The Local Airport Loan Account is a revolving fund that was initiated with seed money from the Aeronautics Account. As principal and interest payments are returned to the Loan Account, additional loans can be provided to airports. Loans are available for revenue generation projects such as hangars and fueling facilities. Loans can be made for airport development projects also and can be made to assist the sponsor with the local match for an AIP project.

No limit on the size of a loan has been established. The Division determines the amount for each individual loan in accordance with the feasibility of the project and the sponsor's financial status.

Private Third Party Financing. Many airports use private third party financing when the planned improvements will be primarily used or managed by a private business or other organization. Many such projects are not ordinarily eligible for federal funding. Projects of this kind typically include hangars[1], fixed based operator (FBO) facilities, fuel storage, exclusive aircraft parking aprons, industrial aviation use facilities, non-aviation office/commercial/industrial developments, and various other projects. Private development proposals are considered on a case-by-case basis.

Airport Revenues. The Nut Tree Airport generates revenue through the facility leases, commercial activity fees, fuel fees, etc. At many airports, including the Nut Tree Airport, generating the necessary cash flow to balance the operations and maintenance can be a difficult task and generation of money to adequately fund capital costs associated with the development of an airport is even more of a challenge. Many general aviation airports rely on supplemental money from its Sponsor to assist with funding major projects. The Sponsor for the Nut Tree Airport is the Solano County. As with most counties in California, the need for county-wide capital improvement funding is almost always greater than the money on hand, and careful planning is required to ensure that the critical capital needs are met with the scarce dollars that are available.

[1] Under certain conditions of FAA's Non-Primary Airport Entitlement Program, airports may use AIP funds in support of non-commercial hangar development, on a case-by-case basis, so long as all essential airside funding needs have been met for a 3-5 year period.

Summary - Airport Master Plan Capital Improvement Program Financial Implications

If aviation demands continue to indicate that improvements are needed, the capital improvement financial implications discussed above may be acceptable for the FAA and Solano County. However, it must be recognized that this is only a programming analysis and not a commitment on the part of the FAA or the Airport Sponsor. If the cost of an improvement project is not financially feasible, it will not be initiated. In addition, this capital improvement program may well be further shaped by policy direction of the County as it relates to operating initiatives that could include capital costs.

Before detailed planning on a particular project is developed, the funding structures and requirements should be identified and determined to reflect the current funding policies by the various funding entities.

Appendix A – Runway Length Data Tables

Table 1-1. Airplane Weight Categorization for Runway Length Requirements

Airplane Weight Category Maximum Certificated Takeoff Weight (MTOW)			Design Approach	Location of Design Guidelines
12,500 pounds (5,670 kg) or less	Approach Speeds less than 30 knots		Family grouping of small airplanes	Chapter 2; Paragraph 203
	Approach Speeds of at least 30 knots but less than 50 knots		Family grouping of small airplanes	Chapter 2; Paragraph 204
	Approach Speeds of 50 knots or more	With Less than 10 Passengers	Family grouping of small airplanes	Chapter 2; Paragraph 205 Figure 2-1
		With 10 or more Passengers	Family grouping of small airplanes	Chapter 2; Paragraph 205 Figure 2-2
Over 12,500 pounds (5,670 kg) but less than 60,000 pounds (27,200 kg)			Family grouping of large airplanes	Chapter 3; Figures 3-1 or 3-2 [1] and Tables 3-1 or 3-2
60,000 pounds (27,200 kg) or more or Regional Jets [2]			Individual large airplane	Chapter 4; Airplane Manufacturer Websites (Appendix 1)

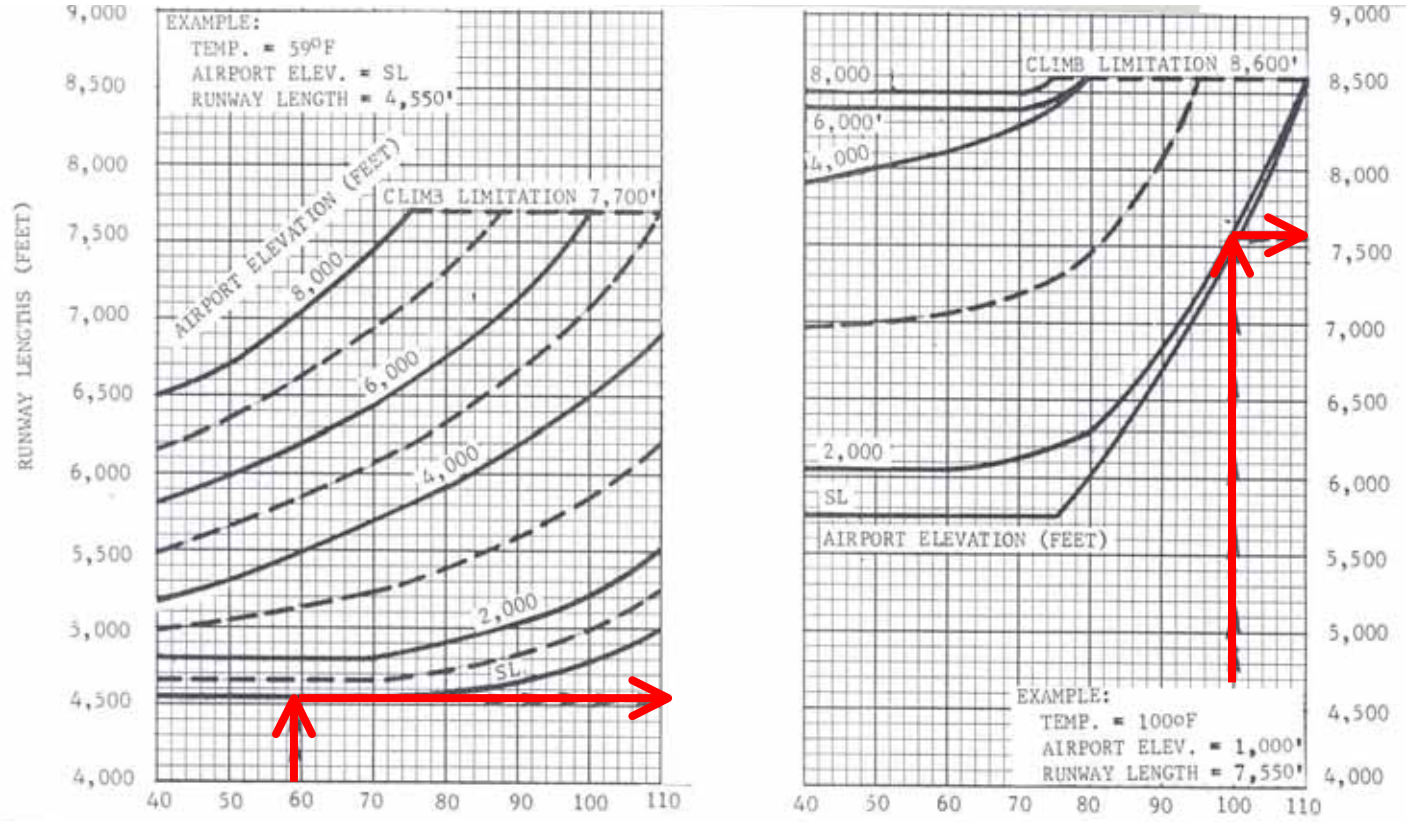
Note [1]: When the design airplane's APM shows a longer runway length than what is shown in figure 3-2, use the airplane manufacturer's APM. However, users of an APM are to adhere to the design guidelines found in Chapter 4.

Note [2]: All regional jets regardless of their MTOW are assigned to the 60,000 pounds (27,200 kg) or more weight category.

103. PRIMARY RUNWAYS. The majority of airports provide a single primary runway. Airport authorities, in certain cases, require two or more primary runways as a means of achieving specific airport operational objectives. The most common operational objectives are to (1) better manage the existing traffic volume that exceed the capacity capabilities of the existing primary runway, (2) accommodate forecasted growth that will exceed the current capacity capabilities of the existing primary runway, and (3) mitigate noise impacts associated with the existing primary runway. Additional primary runways for capacity justification are parallel to and equal in length to the existing primary runway, unless they are intended for smaller airplanes. Refer to AC 150/5060-5, *Airport Capacity and Delay*, for additional discussion on runway usage for capacity gains. Another common practice is to assign individual primary runways to different airplane classes, such as, separating general aviation from non-general aviation customers, as a means to increase the airport's efficiency. The design objective for the main primary runway is to provide a runway length for all airplanes that will regularly use it without causing operational weight restrictions. For Federally funded projects, the criterion for substantial use applies (see paragraph 102a(8).) The design objective for additional primary runways is shown in table 1-2. The table takes into account the separation of airplane classes into distinct airplane groups to achieve greater airport utilization. Procedurally, follow the guidelines found in subparagraph 102(b) for determining recommended runway lengths for primary runways, and, for additional primary runways, apply table 1-2.

104. CROSSWIND RUNWAYS. The design objective to orient primary runways to capture 95 percent of the crosswind component perpendicular to the runway centerline for any airplane forecast to use the airport is not always achievable. In cases where this cannot be done, a crosswind runway is recommended to achieve the design standard provided in AC 150/5300-13, *Airport Design*, for allowable crosswind components according to airplane design groups. Even when the 95-percentage crosswind coverage standard is achieved for the design airplane or airplane design group, cases arise where certain airplanes with lower crosswind capabilities are unable to utilize the primary runway. For airplanes with lesser crosswind capabilities, a crosswind runway may be built, provided there is regular usage. For Federally funded projects, the criterion for substantial use applies to the airplane used as the design airplane needing the crosswind runway (see paragraph 102a(8).) The design objective for the length of crosswind runways is shown in table 1-3. Procedurally, follow the guidelines found in subparagraph 102(b) for determining recommended runway lengths for crosswind runways, and, for additional crosswind runways, apply table 1-3.

Figure 3-1. 75 Percent of Fleet at 60 or 90 Percent Useful Load



Mean Daily Maximum Temperature of Hottest Month of the Year in Degrees Fahrenheit

75 percent of feet at 60 percent useful load **75 percent of feet at 90 percent useful load**

Table 3-1. Airplanes that Make Up 75 Percent of the Fleet

Manufacturer	Model	Manufacturer	Model
Aerospatiale	Sn-601 Corvette	Dassault	Falcon 10
Bae	125-700	Dassault	Falcon 20
Beech Jet	400A	Dassault	Falcon 50/50 EX
Beech Jet	Premier I	Dassault	Falcon 900/900B
Beech Jet	2000 Starship	Israel Aircraft Industries (IAI)	Jet Commander 1121
Bombardier	Challenger 300	IAI	Westwind 1123/1124
Cessna	500 Citation/501Citation Sp	Learjet	20 Series
Cessna	Citation I/II/III	Learjet	31/31A/31A ER
Cessna	525A Citation II (CJ-2)	Learjet	35/35A/36/36A
Cessna	550 Citation Bravo	Learjet	40/45
Cessna	550 Citation II	Mitsubishi	Mu-300 Diamond
Cessna	551 Citation II/Special	Raytheon	390 Premier
Cessna	552 Citation	Raytheon Hawker	400/400 XP
Cessna	560 Citation Encore	Raytheon Hawker	600
Cessna	560/560 XL Citation Excel	Sabreliner	40/60
Cessna	560 Citation V Ultra	Sabreliner	75A
Cessna	650 Citation VII	Sabreliner	80
Cessna	680 Citation Sovereign	Sabreliner	T-39

Appendix B – Water and Sewer Master Plans

SOUTH T-HANGAR AREA

A

B

C

D

MID-NORTH T-HANGAR AREA

NORTH T-HANGAR AREA

IND. PARK

LOWE'S

HORSE CREEK

PINE TREE CREEK

COUNTY AIRPORT ROAD

FAIRWIND PLACE

LEGEND

1	ASSUMED EXISTING WATER MAIN
2	PROPOSED 8" WATER MAIN
3	EXISTING 12" WATER
4	REPLACE EXISTING WITH 12" WATER MAIN
5	PROPOSED 12" WATER MAIN
6	EXISTING 18" WATER
7	FUTURE 18" WATER/FIRE EXTENSION
	FIRE HYDRANT
	BOUNDARY LINE
	EXISTING BUILDING
	FUTURE BUILDING

BUILDING A — COUNTY ADMIN
BUILDING B — FIXED BASE OPERATER
BUILDING C — SPECIALTY SHOP
BUILDING D — SOLANO COMMUNITY COLLEGE

0 100 200

(SCALE IN FEET)

1 inch = 200 ft.

EXHIBIT-4A
NUT TREE AIRPORT
COUNTY OF SOLANO CALIFORNIA

PM.: MARIE SILVEIRA DATE: AUG 2008
DRWN: ELIAS KARAM
WORK ORDER: 333446 TAB:
SCALE: HORIZONTAL: 1"=200' VERT:

JACOBS
Carter Burgess
180 PROMENADE CIRCLE, SUITE 300
SACRAMENTO, CA 95834
PHONE (916) 929-3323 FAX (916) 929-1772

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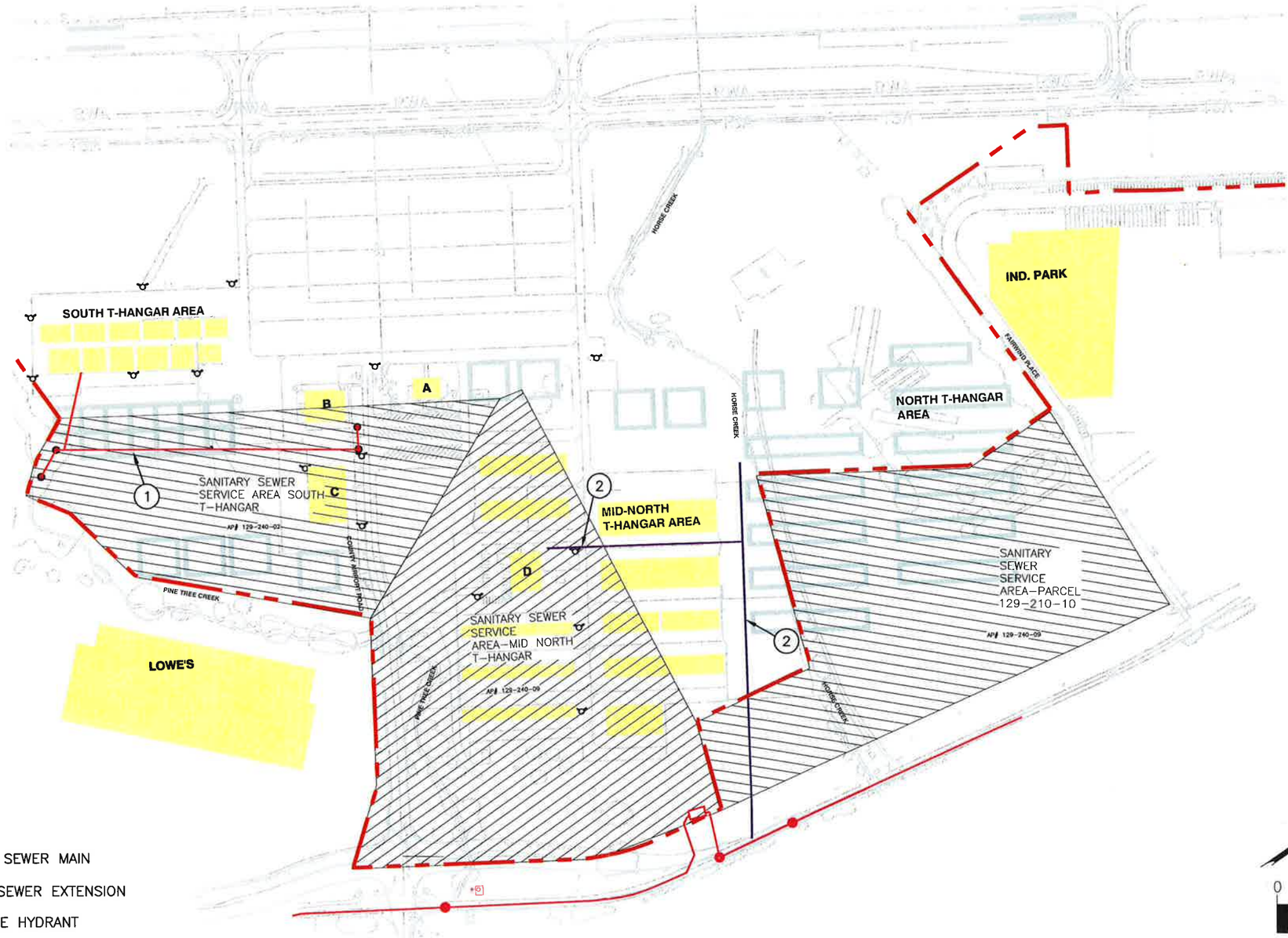
NUT TREE AIRPORT
WATER MASTER PLAN
CALIFORNIA
COUNTY OF SOLANO

SHEET 1 OF 1



LEGEND

(1)	EXISTING 8" SEWER MAIN
(2)	FUTURE 8" SEWER EXTENSION
	EXISTING FIRE HYDRANT
	BOUNDARY LINE
	EXISTING BUILDING
	FUTURE BUILDING
BUILDING A	COUNTY ADMIN
BUILDING B	FIXED BASE OPERATER
BUILDING C	SPECIALTY SHOP
BUILDING D	SOLANO COMMUNITY COLLEGE

EXHIBIT-4C
NUT TREE AIRPORT
COUNTY OF SOLANO CALIFORNIA

JACOBS Carter Burgess
180 PROMENADE CIRCLE, SUITE 300
SACRAMENTO, CA 95834
PHONE (916) 929-3323 FAX (916) 929-1772

PM.: MARIE SILVEIRA DATE: AUG 2008
DRWN: ELIAS KARAM
WORK ORDER: 333446 TAB:
SCALE: HORIZONTAL: 1"=300' VERT:

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NUT TREE AIRPORT
SEWER MASTER PLAN
CALIFORNIA
COUNTY OF SOLANO

SHEET 1 OF 1