



# General Aviation Element

## Draft Final report

Prepared by  
**ARIES CONSULTANTS LTD.**

Morgan Hill, California

January 2003

# **REGIONAL AIRPORT SYSTEM PLAN**

## **GENERAL AVIATION ELEMENT**

### **DRAFT FINAL REPORT**

Prepared for the  
**Regional Airport Planning Committee**  
of  
**ABAG, BCDC, MTC**

*The preparation of this report has been financed in part by grants from the Federal Aviation Administration, U.S. Department of Transportation. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.*

Prepared by  
**ARIES CONSULTANTS LTD.**  
Morgan Hill, California

January 2003

## TABLE OF CONTENTS

<u>Chapter</u>		<u>Page</u>
	<b><u>PART 1. REGIONAL INTERESTS AND PLAN RECOMMENDATIONS</u></b>	
<b>1</b>	<b>OVERVIEW .....</b>	<b>1-1</b>
	1.1 Introduction.....	1-1
	1.2 What is General Aviation.....	1-4
	1.3 Observations .....	1-4
	1.4 Defining a Regional Interest .....	1-6
	1.5 Recommendations.....	1-7
<b>2</b>	<b>GENERAL AVIATION TRENDS AND ISSUES .....</b>	<b>2-1</b>
	2.1 Introduction.....	2-1
	2.2 Airport System Requirements.....	2-1
	2.3 Airport System Planning Data .....	2-2
	2.4 Land Use Compatibility .....	2-10
	2.5 Airspace .....	2-13
	2.6 Ground Side Airport Access .....	2-15
	2.7 Environment.....	2-15
	2.8 Airport Funding .....	2-17
	2.9 Institutional Relationships .....	2-20
	2.10 Community Perceptions About General Aviation .....	2-21
	<b><u>PART 2. AIRPORT INVENTORY AND HIGHLIGHTS</u></b>	
<b>3</b>	<b>AIRPORT INVENTORY AND AVIATION DATA.....</b>	<b>3-1</b>
	3.1 Introduction.....	3-1
	3.2 Airport Roles and Capabilities.....	3-1
	3.3 Summary of Aircraft Owner Locations .....	3-10
<b>4</b>	<b>AIRPORT HIGHLIGHTS .....</b>	<b>4-1</b>
	4.1 Introduction.....	4-1
<b>5</b>	<b>GLOSSARY .....</b>	<b>5-1</b>
<b>6</b>	<b>BIBLIOGRAPHY.....</b>	<b>6-1</b>
	<b>APPENDIX (to be prepared)</b>	

## LIST OF TABLES

<u>Number</u>		<u>Page</u>
3-1	Airport Role, Based Aircraft and Annual Aircraft Operations .....	3-2
3-2	Airport Inventory .....	3-3
3-3	Aircraft Ownership Characteristics .....	3-11
4-1	Airport Highlights .....	4-2
4-2	Status of Planning Efforts.....	4-7

## LIST OF FIGURES

<u>Number</u>		<u>Page</u>
1-1	Location Map.....	1-2
2-1	Comparison of Aircraft Operations by County .....	2-7
2-2	Comparison of Based Aircraft by County .....	2-8

## Chapter 1

### OVERVIEW

#### 1.1 INTRODUCTION

General aviation refers to all the flying conducted by individuals and businesses that is not conducted by an air carrier, commuter/air taxi or the military. General aviation is by far the largest user of airports and airspace in terms of aircraft operations.

In the Bay Area the approximately 20 publicly owned and operated general aviation airports are the main facilities that provide services to personal and business aircraft owners and users (see Figure 1-1). There is also extensive general aviation activity at North Field of Metropolitan Oakland International Airport, considerable but declining general aviation activity at Norman Y. Mineta San Jose International Airport and limited (primarily business) general aviation activity at San Francisco International Airport. The general aviation airports also provide an important capacity valve for activity that would otherwise consume runway and airspace needed by the airlines using the three major commercial airports. In this regard, certain general aviation airports in the Bay Area are called “reliever” airports and have been formally designated by the Federal Aviation Administration (FAA) as such.

The purpose of the General Aviation Element of the Regional Airport System Plan (RASP) update was to take a fresh look at issues faced by general aviation users, and to attempt to better articulate a set of regional interests and recommendations that would apply to the general aviation airport system in the Bay Area.

This report addresses a number of issues that affect the Bay Area’s general aviation airports now and in the future. Interviews were conducted with various general aviation stakeholder groups to determine their thoughts and perceptions about the direction of the general aviation industry and the challenges ahead. Stakeholders included Bay Area Airport Managers, representatives of the Airport Land Use Commissions, Airport Advisory Commissions, Bay Area pilot groups, corporate aviation operators, commercial aviation/fixed base operators, representatives of Federal, State and local agencies, and interested individuals. The interviews covered two areas: general aviation industry trends and airport-specific issues. The interviews included all public use general aviation airports in the nine Bay Area counties with the focus on the publicly owned and operated airports.

The report is divided into two parts as described below:

Figure 1-1

**LOCATION MAP**







TRUE NO RTH  MAGNETIC NO RTH  
15°29'00" (2011)

NOTE:  
THIS DRAWING IS FOR PLANNING PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION OR NAVIGATIONAL PURPOSES.

NOT TO SCALE

**MTC  
SYSTEM PLAN**



LEGEND	
	AIR CARRIER AIRPORT
	GENERAL AVIATION AIRPORT
	MILITARY/FEDERAL AIRPORT

**LOCATION  
MAP**

**T** ARIES CONSULTANTS LTD.

MTC	FIGURE NO
BAY AREA, CALIFORNIA	<b>1-1</b>
NAME: MTC-01-LM NO: 4340-04	
DATE: 01-06-2003 PLOT SCALE: 1=300	



## **Part 1. Regional Interests and Recommendations**

The interviews provided basic information about important trends within the general aviation industry, including corporate and personal flying and factors affecting this flying, trends in the type of aircraft comprising the general aviation fleet, trends in the number of pilots and pilot skill levels, airspace/air traffic control issues as they affect general aviation, safety issues, security and financial concerns. This information was used to both identify regional interests in general aviation and to formulate recommendations that are relevant to the role of the Regional Airport Planning Committee.

## **Part 2. Airport Inventory and Highlights**

A second purpose of the study was to assemble an updated database of information about general aviation airport facilities and plans. This section of the report includes recommendations from the latest airport master plans; the airport's role, both short-term and long-term; activity trends at each airport; type of users on the airport; types of aircraft that would like to use the airport compared to available facilities; types of aircraft using the airport but not based at the airport; airport financial conditions; and ongoing airport/community issues.

The inventory further includes information for the individual airports on the status of airport master plans, airport layout plans, airport land use commission (ALUC) plans, and environmental documentation; space available for future growth; overall airport runway and aircraft storage capacities from airport master plan/airport layout plan documents; restrictions on airport use, either direct or indirect; types of needs and costs for major maintenance items; airport access; location of aircraft owners; and land use compatibility trends for areas around the airport.

A glossary of aviation terms referred to in the report is included, as well as a bibliography of relevant reports.

**Appendix.** Further information developed during the study can be found in the Appendix, which includes the following types of information:

- Airport Facilities
- Airspace
- Airport Access
- Aircraft Owner Locations
- Airport Land Use Compatibility Trends

## **1.2 WHAT IS GENERAL AVIATION?**

General aviation is defined by the Federal Aviation Administration (FAA) as all civil aviation not classified as air carrier, commuter/air taxi or military. It includes a multitude of diverse and growing uses of aircraft, ranging from flying for enjoyment and the transportation of personnel or cargo by business firms and individuals in privately-owned aircraft, to highly-specialized uses such as aerial advertising, crop dusting and pipeline patrol. It includes agricultural, industrial and business/corporate aviation; using an aircraft for flight training; the aviation of Federal, State and local governments; and miscellaneous other aviation uses.

## **1.3 OBSERVATIONS**

Based on the work performed for the Plan update, the following observations can be made:

### **Airport System Requirements**

1. The general aviation system as a whole, does not face immediate runway capacity issues. Many airports, however, are not able to meet the demand for enclosed hangar space.
2. One of the most discernable trends is the increase in corporate aircraft activity, particularly since September 11, 2001. Use of these aircraft are preferred because of their relative security and their ability to avoid congested airline hubs by using general aviation airports or general aviation facilities at air carrier airports. Airports likely to see more corporate activity are those that currently have the longer runways and navigational aids to accommodate these aircraft and provide the required facilities and services (e.g., hangars).
3. The air carrier airports are generally not actively supporting growth in general aviation activity due to the need to preserve runway and land side capacity for air carrier passenger and air cargo flights.
4. A few general aviation airports have been used from time to time for limited airline service, but with the current economic problems of the airline industry, it is unlikely that this type of use will grow much in the near-term future.

5. Pilot training needs are generally accommodated at existing airports, and there are no plans for major new personal or corporate flight training facilities in the Bay Area.
6. Consistent forecasts of future general aviation growth, required for development of airport master plans, are difficult to prepare due to the diverse types of flying that takes place and individual airport factors which influence the basing and use of aircraft at these airports. A regional picture of future activity cannot be developed by adding up the individual airport master plan forecasts. There is a need for greater regional consistency in preparing aviation forecasts.

### **Land Use Compatibility**

7. Economic forces in communities often dictate the types of land uses that are proposed around airports. Airports thus compete in a broader economic market place where their role in providing transportation services often comes into competition with a community's need for more sales tax revenues, housing, schools or other types of development. This situation is resulting in increased incompatibility of land uses around some airports based on State or Federal guidelines.
8. Incompatible urban development is even starting to affect airports in more rural areas (e.g., Napa County, Nut Tree and Petaluma Municipal Airports).
9. Many airport owners do not have adequate control or protection over development of land in their runway approach and departure zones.
10. Noise issues are a continuous concern to local communities near these airports, but noise impact areas for general aviation airports typically show a very small area within the 65 dB community noise equivalent level (CNEL) contour, the FAA's airport noise standard. Louder single event noise from individual aircraft operations is probably the most noticeable noise factor for most communities.
11. Airport Land Use Commissions only address land uses around airports that are not already incompatible and have had mixed results in ensuring compatibility with airport and aircraft operations.

### **Airport Funding**

12. Most airports rely extensively on Federal Aviation Administration dollars, and to a more limited extent, Caltrans Division of Aeronautics funding, for facility improvement, replacement and rehabilitation.
13. Airport improvement needs exceed the funding available as in other areas of transportation infrastructure.

#### **1.4 DEFINING THE REGIONAL INTEREST**

Most general aviation airport development decisions are local in nature; however, in large metropolitan areas such as the Bay Area, general aviation takes on a regional perspective because of competition between airports, airspace interactions, and the fact that aviation users have a choice of airports and airport services. While the system will continue to depend on local actions to maintain and enhance the existing airports, the broader regional interest of having a system of airports for business and personal flying activity that complements the air carrier airports in the Bay Area needs to become a greater part of local decision-making.

##### **Community Compatibility**

1. In order to continue to operate the general aviation airport system and ensure the continued viability of these airports, an acceptable living environment must be achieved for those who reside around airports through cooperation of airport owners, pilots, aircraft manufacturers, the FAA and the cities and counties responsible for land use decisions around airports. The highest regional interest is that of ensuring the safety of persons in the air and on the ground around general aviation airports.
2. Local governments must do their part to ensure general aviation airports can continue to function in a viable way by avoiding locating incompatible land uses and thereby placing people in areas expected to generate noise complaints or noise levels above State and Federal standards.

##### **Necessary Enhancements to the General Aviation System**

3. Topics of regional interest with regard to the future development of the Bay Area general aviation airports include:
  - Airport approach protection
  - Runway length and capacity

- New airspace procedures and navigational aids as they affect airport capacity, reliability of operations in all types of weather, and potential noise conditions on the ground.

### **Airport Funding**

4. Because airport funding decisions are made by others, RAPC encourages these agencies to clearly articulate their program and project funding priorities on an annual or multi year basis.
5. RAPC supports the concept that Bay Area airports should receive a “fair share” of available general aviation dollars available from Federal and state sources. In addition, RAPC would support increasing funding for general aviation airports at the Federal and State levels.

### **Institutional Relationships**

6. RAPC will remain involved in various Federal and State aviation system planning programs.
7. There should be continuing collaboration between air carrier airports and general aviation reliever airports to ensure an efficient Bay Area airport system.

### **Environmental**

8. Some airport improvement projects that may be desirable from a safety, operations, or capacity standpoint may affect the Bay or wetlands, and will therefore require San Francisco Bay Conservation and Development Commission (BCDC) approval. These projects should be identified early in the planning process to provide opportunities to define ways to avoid or mitigate any adverse environmental impacts.

## **1.5 RECOMMENDATIONS**

This section presents the recommendations for each of the issue areas discussed above.

## **Airport System Requirements**

Given the current funding process, whereby airport improvement decisions are made at the FAA/State/local level, RAPC sees its primary role as one aimed at achieving a broader consensus on the direction to take in planning how to serve future general aviation demand.

1. While this general aviation update did not endeavor to develop new regional aviation forecasts, there is a lack of reasonableness and consistency between the forecasts from various sources and for individual airports. This divergence can lead to questions about the veracity of the forecasts. The Metropolitan Transportation Commission (MTC), acting on behalf of the general aviation airports, would seek funding from the FAA to develop one set of regionally consistent forecasts for all the airports.
2. RAPC recognizes that the air carrier airports require an effective general aviation reliever airport system. Given the long lead time required for planning and implementing proposals for new runways at air carrier airports, the Bay Area's general aviation reliever airports should continue to be protected and upgraded to handle general aviation aircraft that would otherwise be using air carrier airports.
3. The Bay Area should increase services available for major corporate general aviation activity to anticipate future growth in this type of flying. Generally, the airports serving corporate users should be located as close as possible to the regional activity centers and have good land use compatibility for approach and departure areas.
4. In the event that a local jurisdiction proposes to close any general aviation airport (for economic, environmental, political, or other reasons), the impact of this closure on the rest of the air carrier and general aviation airport system should be assessed.
5. This Plan update did not specifically address the future role of Moffett Federal Airfield, but obviously one aspect of future use (if opened to the public) would be to serve general aviation. To meet the requirements of the BCDC Plan, a study of potential aviation uses should be accomplished in the next five years. This would facilitate any future process, which may allow general aviation or

other civil aviation uses of the airfield, and would be consistent with the BCDC Bay Plan requirements.

### **Land Use Compatibility**

To address ongoing airport and land use compatibility issues, the following actions are recommended:

1. Develop a brochure for locally elected officials and interested parties that presents the case for ensuring compatible land use around general aviation airports. This brochure would be of an educational nature and would be distributed throughout the Bay Area.
2. Encourage FAA to identify critical land acquisition projects in approach and departure areas of airports and make a commitment to fund these acquisitions as an immediate priority.
3. Conduct a study of current vacant land available around all general aviation airports that could be protected through acquisition or development easements and the cost of this acquisition. Use this inventory to advocate for increased funding from the FAA and Caltrans.
4. Explore methods to provide increased funding to ALUCs to assist in updating their plans (for example, through a regional set aside of Caltrans planning funds). Also, explore ways to help fund legal assistance, when needed.
5. For significant land use compatibility issues, RAPC should conduct its own review and make recommendations to the affected local government prior to a decision by the local government.
6. MTC, Association of Bay Area Governments (ABAG), or other aviation interest groups could establish an ALUC “watch” website as a way for the general aviation community to keep abreast of land use compatibility issues. This website would list important pending decisions on airport land use compatibility issues around the Bay Area.
7. Virtually all of the ALUCs have defined FAR Part 77, *Objects Affecting Navigable Airspace*, as the basis for height controls and these should be institutionalized through the Geographic Information Systems (GIS) where

available. MTC could assist local governments to incorporate FAR Part 77 criteria in all City/County GISs in the region.

### **Institutional Relationships**

1. RAPC will monitor the status of coordination between general aviation reliever airports and air carrier airports, and may encourage greater dialogue if the need arises.
2. There should be greater collaboration between the FAA, Caltrans, and RAPC on funding priorities for the Bay Area general aviation airports. The FAA should annually present the list of projects that they are considering for funding and solicit RAPC comments on this list as a group; RAPC may also wish to comment on specific projects through the more formal Intergovernmental Review Process.

### **Information Resources**

One way to keep the public informed about general aviation would be to use MTC's current website to display information on general aviation airports of potential interest to the public. The content of the website, to be defined through further dialog with the airport managers, could include such topics as:

1. Airport activity statistics, such as the number of based aircraft and annual aircraft operations, and other types of services that are of interest to the general public.
2. Key businesses and tenants on airport (including law enforcement, aerial firefighting, Medevac, etc.)
3. Taxes paid to county, cities and school districts.
4. Proposed improvements on airport's latest capital improvement program priorities list.

### **Ground Side Airport Access**

1. Request that the general aviation airports provide a list of local access improvements to MTC and their county Congestion Management Agency to



assist in prioritizing surface transportation projects in the Bay Area for future funding.

2. Consider publishing information on the MTC website (see earlier recommendation) on general aviation airport ground access services.

### **Airspace Issues**

1. Bay Area airports and the FAA should identify the list of new instrument approach procedures and navigational aids being considered for Bay Area general aviation airports and present to RAPC for information and possible comment.
2. Schedule periodic reports by the FAA on issues being discussed by the Northern California Airspace Users Working Group.

### **Airport Funding**

1. Advocate that revenues collected by the State from aviation taxes are spent on airports and not used to backfill shortfalls in the State General Fund.
2. Support the reauthorization of the Federal Airport Improvement Program and the general aviation airport entitlement grants beyond Fiscal Year 2003.
3. Support higher funding levels for general aviation in both Federal and State aeronautics programs, particularly if new security costs are to be incurred by general aviation airports.

## Chapter 2

### GENERAL AVIATION TRENDS AND ISSUES

#### 2.1 INTRODUCTION

This Chapter discusses in more detail the relevant trends and issues that are pertinent to this update of the Regional Airport System Plan. Much of the information presented was derived from stakeholder interviews which included Bay Area Airport Managers, representatives of the Airport Land Use Commissions, Airport Advisory Commissions, Bay Area pilot groups, corporate aviation operators, commercial aviation/fixed base operators, representatives of Federal, State and local agencies and interested individuals.

#### 2.2 AIRPORT SYSTEM REQUIREMENTS

##### 2.2.1 Background

The question of how general aviation airports should evolve to best meet the needs of the airport users and surrounding communities is the central question for the regional aviation planning process. Unlike the programming of funds for surface transportation improvements, priorities for investment in general aviation airports are largely determined by the airports in collaboration with the FAA and State. These decisions have incremental impacts, some small and some larger.

The following types of improvements have the greatest influence on evolving general aviation roles due to their effect on the types of activity that takes place at an airport:

- Runway extensions that would accommodate additional aircraft categories
- New runways that would provide for higher levels of aircraft operations
- New navigational aids which would allow operations in more adverse weather
- Presence of facilities and services for corporate aircraft
- Availability of aircraft parking/hangar space
- Presence of major maintenance and flight training services

In traditional planning, identification of future aviation system requirements flows from forecasts of the growth in the number of aircraft and takeoffs and landings expected at an airport. However, a number of relevant trends in general aviation use are becoming less and less susceptible to standard forecasting approaches. Indeed, current forecasts for airports prepared by different agencies show widely different projections in the future.

At this point in time, some trends can be surmised with varying degrees of confidence about their future direction:

1. Flight activity at most general aviation airports is holding constant or has declined somewhat, and there are no indications of a major upward trend in the near future. The ratio between business and personal recreational flying is changing somewhat, however, with more use of general aviation for business purposes.
2. Due to rising incomes during the dot.com era, more people decided to purchase private and corporate aircraft in the Bay Area. There is a continuing shortage of hangar space, which is preferred by aircraft owners to protect their investment in their aircraft.
3. Businesses are turning more and more to corporate aircraft for their flight needs, both for security reasons and to avoid delays at the major airline airports. A number of airports are contemplating developing new corporate aircraft infrastructure. The relevant question for Bay Area aviation planning is whether the corporate activity will be concentrated at the air carrier airports (like Norman Y. Mineta San Jose International and Metropolitan Oakland International Airport North Field) or be handled more by the Bay Area reliever airport system (e.g., Buchanan Field, Hayward Executive).
4. Pilot training activity is static and, together with the other trends, suggests that significant new runway capacity is not needed for this type of activity in the near term.
5. Itinerant aircraft operations (i.e., non local training flights) are becoming more prevalent, which indicates a greater use of general aviation aircraft for business and personal transportation between airports and other communities.

To elaborate on some of the above points, current general aviation airport capacity issues are generally not airfield related but are concerned more about the availability and type of aircraft parking spaces, in particular, the shortage of hangar spaces for both small propeller aircraft and large corporate business jets.

An increasing number of aircraft owners want hangar, rather than open tiedown, space because of their investment in the aircraft, as well as the cost of maintaining and operating the aircraft. There are significant waiting lists for hangar space for both small propeller and large corporate aircraft at most Bay Area airports. For example, Silicon Valley residents and businesses have been buying new aircraft and they desire new hangar space. At some airports, the airport may want to develop additional hangars, but they do not have sufficient revenues or alternative funding sources to do so (e.g., Healdsburg Municipal). At other airports, the private sector is considered to be the hangar developer. A related issue for corporate aviation is the lack of transient

aircraft parking space, both in hangars and on tiedowns (e.g., Norman Y. Mineta San Jose International, Reid-Hillview).

Overall, the adequacy of aircraft tiedown space for future expansion varies by airport. Some airports have land that could be used to expand aircraft storage parking space if needed in the future (e.g., Reid-Hillview, South County and Napa County Airports), whereas other airports are land-constrained (e.g., Palo Alto and San Carlos Airports). Still other airports have a large supply of currently unused tiedown spaces (e.g., Hayward Executive Airport, Buchanan Field and Napa County).

In terms of future airfield improvements, a number of airports have master plans that identify ultimate configurations that include lengthening an existing runway; e.g., at the Napa County, Gness Field, South County and Nut Tree Airports. Other airports are constrained from extending their runways; e.g., the Palo Alto, San Carlos and Reid-Hillview Airports. Current forecasts of slow growth of general aviation activity (except for the business/corporate aviation noted earlier) suggests the need for additional runway capacity may not emerge for a number of years.

The need for improved airport navigational aids and instrument approach procedures is another emerging system requirement, as newer aircraft come equipped with the latest navigational aides. This equipment will improve the all-weather operating capability of airports. Currently there are airports that do not have instrument approach procedures, including nonprecision Global Positioning System (GPS) approach procedures (e.g., San Carlos) and precision instrument approach procedures (e.g., Hayward Executive, Napa County). There is also a need for more automated weather observing systems (AWOS) and automated surface observing systems (ASOS) (e.g., Half Moon Bay, San Carlos and South County).

The limited air carrier service that has occurred in the recent past at primarily general aviation airports has been with small commercial jet and turboprop equipment. This has taken the form of direct service to Southern California from Sonoma County and Buchanan Field and smaller commuter-type aircraft service feeding the larger air carrier airports in the Bay Area. The level of service was usually determined through discussions with the local community and enforced through leases or other mechanisms. Given the airline industry conditions emerging before and escalating since September 11, 2001, there is likely to be a much greater focus on cost cutting than on service expansion, especially in the short term. Because any air carrier service at general aviation airports would create new costs, this type of service is unlikely to be attractive to existing airlines, particularly given the small markets that these services would benefit. Based on discussions with the Bay Area general aviation airport managers, they do not see the future role of their airports changing to accommodate any aviation activity beyond what currently exists; e.g., future scheduled commuter-type airline service.

Air carrier airports are reducing general aviation operations by smaller aircraft through reduction in facilities and services available; e.g., hangars, tiedowns and fixed base operator services and the increased costs of these facilities and services. In addition, existing space is being converted to air carrier, cargo and related activities; e.g., vehicular parking and rental car facilities. While business general aviation users in particular desire to retain access to air carrier airports, they are concerned about increased security requirements of operating in an air carrier security environment.

**General Aviation Business/Corporate Aviation.** The use of general aviation aircraft by business/corporate aviation has increased significantly following the events of September 11, 2001, due to the enhanced security of using business/corporate aircraft, as well as the diminished airline schedules and more rigorous and time-consuming security precautions now in effect at the air carrier airports. This segment of general aviation includes aircraft owned by corporations, private individuals and those aircraft that are fractionally owned and managed by fractional ownership companies. The impact of accommodating the increases in corporate/business aircraft has already been felt at several Bay Area general aviation airports that provide facilities for these types of aircraft operations, and the majority of the airports in the Bay Area have experienced more interest on the part of business/corporate aviation users. The Bay Area general aviation airports that seem to be in the best position to cater to corporate aircraft operations would include Oakland North Field, Hayward Executive, Livermore Municipal, Napa County and Buchanan Field, although none of these airports is ideal due to surrounding urban land development.

Fractional ownership occurs when several individuals or corporations jointly own an aircraft either for their own travel demands, or as an investment, or for both reasons. In addition to describing the ownership of aircraft, the concept of fractional ownership includes companies that manage fractionally- owned aircraft as a business. Fractional ownership is a contributing factor to the increased use of general aviation aircraft for business purposes. There is an important issue about whether the growth in fractional ownership will lead to more operations at the air carrier airports (and erode some of the commercial airline capacity at these airports) or be accommodated at the region's general aviation reliever airports.

**Basing Business Aircraft Outside the Bay Area Region.** During the planning inventory data collection process, several of the airport managers and other aviation leaders made note of the fact that several of the larger businesses in the region who routinely fly their management and employees to corporate destinations have begun basing their aircraft outside the Bay Area region due to the lack of facilities in the Bay Area. The decision for basing an aircraft considers cost, accessibility, space availability, and airport facilities and services, as well as other concerns. These aircraft are based at airports like Sacramento International, Fresno-Yosemite International and Modesto City-County Airports, as well as in other states. Aircraft

and crews fly from these bases into Bay Area airports, pick up passengers, depart for their ultimate destination and then reverse the process on the return flight. In addition to the loss of revenues and taxes to Bay Area cities and counties, the Bay Area airports incur a doubling of the associated aircraft operations, with particular impacts at the larger air carrier airports.

**Pilot Training.** Pilot training ideally would be accommodated away from populated areas and congested airports for safety, economic and noise reasons. While there are airports that do accommodate a high level of visual flight rule (VFR) training (primarily touch and go operations), there are fewer facilities where instrument flight rule (IFR) training, including precision instrument approaches with instrument landing systems (ILS), can be easily performed. There could be a more concerted effort to install equipment for IFR training where weather and training needs would support it. In particular, airports that are somewhat distant from the more crowded Bay Area airspace may be logical candidates (e.g., a North Bay airport such as Napa County or an East Bay airport such as Byron) where ILS training could be performed. Otherwise, pilots will have to fly longer distances to use airports outside the Bay Area such as Sacramento International, Stockton Metropolitan, or Monterey Peninsula or at potential new ILS airports; e.g., Watsonville Municipal or Hollister Municipal. In addition, the installation of GPS approaches to more Bay Area airports would benefit experienced pilots as well as student pilots.

**Sport Pilot and Light-Sport Aircraft.** The FAA Office of Public Affairs announced in January, 2002, the proposed new certification requirements for light-sport aircraft not currently addressed as a segment of general aviation. FAA estimates that nationwide about 10,000 existing aircraft will be certified and 10,000 people are expected to become certificated sport pilots and flight instructors. In addition, FAA estimates that 9,000 new pilots and 9,000 newly manufactured aircraft will be certificated over the next 10 years in this category.

The light-sport aircraft may include existing certificated aircraft in the single-engine aircraft category that meet the light-sport aircraft specifications as defined by the FAA. The light-sport aircraft is defined as a simple, low-performance, low-energy aircraft and is limited to 1,232 pounds maximum certificated gross weight and a single non-turbine engine among other criteria. It is assumed that a number of the currently registered single-engine aircraft in the Bay Area will be certified in the light-sport aircraft category and a number of ultralight vehicles, currently not required to be registered with the FAA, will also be certified in the light-sport aircraft category.

### **2.2.2 Findings/Issues**

In assessing the evolving uses of Bay Area general aviation airports, the information collected suggests some broad system needs:

1. Upgrade one or more airports to provide corporate aviation centers and to provide alternatives to the use of air carrier airports. These airports would generally be close to centers of business activity.
2. Identify select reliever airports that provide the greatest ability to relieve additional general aviation activity from air carrier airports. Focus investments on these airports, which will become more important as decisions about new runways at the existing air carrier airports get extended in time.
3. Identify one or more airports as key VFR/IFR flight training facilities; generally in areas where the operations will not impact large numbers of people.
4. Upgrade navigational equipment, generally focused on the reliever airports, to increase safety and increase the availability of general aviation airport runways in poor weather.
5. Anticipate that some general aviation airports may want to retain the ability to accommodate future airline service with appropriate airline equipment that limits community noise exposure and other impacts.

## **2.3 AIRPORT SYSTEM PLANNING DATA**

### **2.3.1 Background**

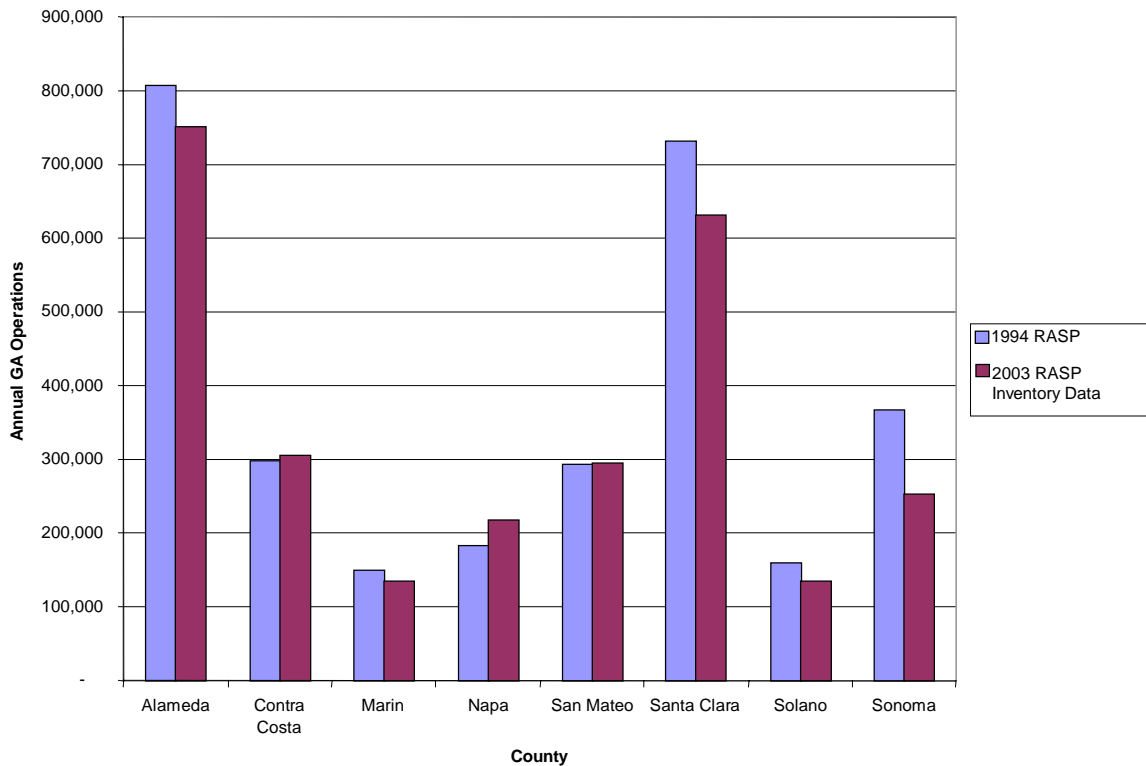
The previous section alluded to the central role of planning data in assessing future airport system requirements. General aviation by its nature encompasses a broad range of aviation activities, each of which are influenced by different factors. This broad scope of activities serves to compound the difficulty in forecasting an appropriate indicator of future behavior. Key planning data include trends in aircraft operations (takeoff and landings) and trends in based aircraft (primarily location of owners versus location where aircraft are based).

### **2.3.2 Findings/Issues**

**Trends in aircraft operations.** Information presented on observed trends in aircraft operations covers the period from the last RASP update in 1994 to the present. The review of forecast levels of operations uses information from the individual airport master plans, the California Aviation System Plan (CASP), and the Federal Aviation Administration's (FAA) Terminal Area Forecasts.

1. Total general aviation operations in the period since the 1994 RASP update declined in six counties and increased in two counties with an overall net decrease of about 264,000 operations region wide, or about 8.8 percent (see Figure 2-1).

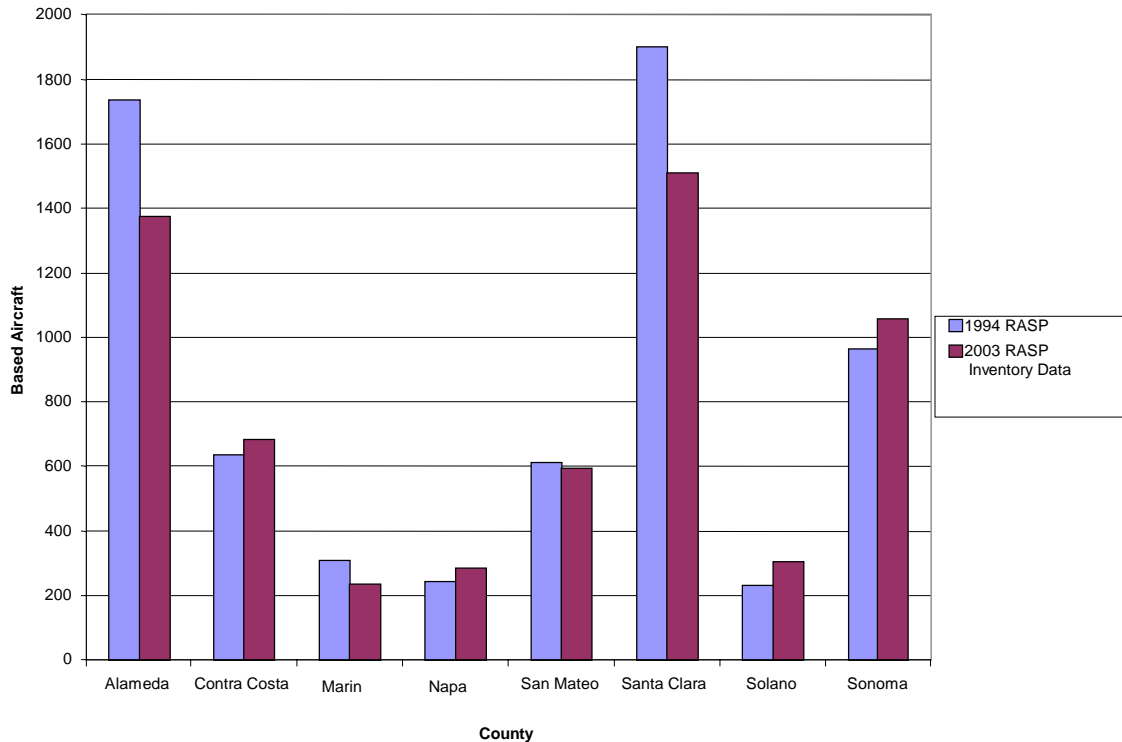
Figure 2-1  
 COMPARISON OF AIRCRAFT OPERATIONS BY COUNTY  
 (1994 RASP compared to 2003 RASP Inventory Data)



- Overall total based aircraft in the region declined by almost 600 aircraft, or about 8.9 percent (see Figure 2-2).
- Examining the ratio of operations to based aircraft indicates that overall utilization of general aviation aircraft from a regional perspective did not change significantly – increasing only 0.1 percent. At the county level, however, the changes were more significant. For example, data shows that while Alameda and Marin Counties declined in based aircraft and general aviation aircraft operations, the number of operations per based aircraft increased by about 18 percent. At the other extreme, Solano and Sonoma Counties increased their based aircraft but declined in general aviation operations with a net decrease of operations per based aircraft of more than 35 percent. The remaining counties had changes that varied between 1 and 9 percent and were not considered significant.



Figure 2-2  
**COMPARISON OF BASED AIRCRAFT BY COUNTY**  
 (1994 RASP compared to 2003 RASP Inventory Data)



4. A review of the different forecasts indicates wide differences in the forecasts for an individual airport. For example, the 2010 aircraft operations forecasts for Hayward Executive Airport range from 120,000 annual operations for the Airport Master Plan to 215,000 annual operations for the FAA Terminal Area Forecasts, and to 245,000 to 255,000 annual operations for the CASP/RAPC System Plans.

**Trends in Location of Aircraft Owners versus Where Aircraft are Based.** Of general interest in this study was the location (county) of the aircraft owner compared to the location (county) where the aircraft was actually based. This information was deemed important because it is indicative of the general convenience of the existing system and the degree to which individual counties serve the demand for aircraft parking generated within the county. County assessor’s office records were obtained to provide the information on where aircraft owners lived (based on their mailing address) and where they base their aircraft. Also of interest in this data was whether or not the owner was an individual, or a named organization or a corporation. (The reporting of corporate-owned aircraft is based purely upon the assessor’s data and does not take into account the possibility that privately-owned aircraft are used for

corporate purposes, or that corporate-owned aircraft might be used for non-corporate flying.)

- Based on the information reported in airport master plans or on FAA Form 5010-01, *Airport Master Record*, there are about 6,000 aircraft based in the region. However, the county assessor records show a total of only about 5,400 assessed aircraft, a difference of about 10 percent for the region as a whole. Part of this discrepancy can be explained by differences in the reporting time periods of the different data sources. There are other reasons for the discrepancies as well, legitimate and not, but further investigation was beyond the scope of the RASP update.
- The number of aircraft based and assessed in the same county was 76 percent of the total assessed aircraft reported. At the individual county level, this value ranged from 58 to 86 percent.
- The number of aircraft based and assessed in one county of the region, but whose owner lives in another Bay Area county was 19 percent of the total assessed aircraft in the region with individual counties varying from 9 to 26 percent of the total assessed.
- This analysis also showed that approximately 4 percent of the aircraft based and assessed in the region had owners who lived outside the Bay Area. A major proportion of these owners lived in counties adjacent to the Bay Area, while the rest were scattered throughout California. About another 4 percent of the total based aircraft had owners who lived outside California.

## **2.4 LAND USE COMPATIBILITY**

### **2.4.1 Background**

The most elemental requirement for a general aviation system is to ensure the long-term viability of the airports that comprise the system and are increasingly under pressure from surrounding development. The study has uncovered considerable concern from the general aviation community about the ability to sustain the existing system given the limited protection afforded under existing land use compatibility statutes. Increased residential development near airports will create political pressure to constrain operations. Tall structures near airports could compromise the safety and operational capacity of an airport. There are two main strategies to protect airports from incompatible land uses:

1. The first and most effective strategy for encroachment protection is if the airports own the land in the runway approach and departure zones. This provides

the strongest form of land use control and ensures that future decisions are based on projected airport needs.

2. The next level of protection occurs through the land use compatibility review process for new developments, which is largely administered by county level Airport Land Use Commissions (ALUCs). Here the effectiveness of ALUCs is seen as having mixed results to date.

Public Utility Code (PUC) Sections 21670 et seq. requires counties with public use airports to establish an Airport Land Use Commission (ALUC) whose purpose is to: “protect public health, safety, and welfare by ensuring the orderly expansion of airports and the adoption of land use measures that minimize the public’s exposure to excessive noise and safety hazards within areas around public airports to the extent that these areas are not already devoted to incompatible uses.” In developing such plans, the law requires that ALUCs be guided by information developed by Caltrans, who from time to time is required to publish such information in the Airport Land Use Planning Handbook. (The third edition of this Handbook was published in January 2002.)

To assess the problems and opportunities associated with ALUCs and protecting airport land use compatibility, RAPC sponsored an ALUC workshop on September 25, 2002. A summary of the workshop and tables documenting the results for each airport can be found in the appendices. (The City and County of San Francisco does not have an ALUC because there are no public airports within its jurisdiction.)

#### **2.4.2 Findings/Issues**

Relative to the functioning of ALUCs in the Bay Area, the following provides a summary of the findings:

- The makeup of ALUCs appears to be consistent with, or exceeds, State law requirements (see PUC Section 21670). In at least three counties, the Planning Commission, or similar body, also sits as the ALUC.
- The ALUCs all have regularly scheduled meetings (typically, monthly but some quarterly), but in fact only meet when there is a pending action. Some counties have gone months or years without a meeting. The reasons for such inactive periods vary. In those counties where the Airport Land Use Plan (ALUP) is adopted locally in zoning and plans, administrative functions are typically transferred to the local jurisdiction, and the ALUC is consulted only when a proposed project falls outside the normal review criteria or its special aviation expertise is required during review of the project. In several cases, local jurisdictions have acted administratively when they should have referred the proposed development to the ALUC.

- ALUC staffs are typically drawn from the planning, community development, or environmental management departments of the county. ALUC contact persons are designated to affect communication with the ALUC, but none are dedicated full time to ALUC matters. All have other responsibilities within their respective organizations. Staff time spent in support of ALUC matters varies based upon the kinds of actions pending before the ALUC. When ALUCs are considering changes or updates to their ALUPs, staff time increases to about the 30 or 40 percent commitment level. The rest of the time the staff commitment is closer to 5 or 10 percent of the time, or less.
- Each county has an adopted airport land use plan for each public use airport in accordance with State law. All of these address noise, safety and height control issues, albeit in widely different ways. Some have additionally recommended buyer awareness procedures and some require deed notices for new residential land uses. Buyer awareness procedures and deed notices have tended to be controversial and a source of rancor between the ALUC and local jurisdictions. Some plans require the dedication of aviation easements for all new residential land uses in selected impact zones. Recently passed AB2776 will require greater disclosure of the proximity of an airport in real estate transactions.
- Not all local jurisdictions have adopted the ALUP into local planning or zoning ordinances.
- ALUC plans for at least 10 of the region's airports were adopted in the late 1980s or early 1990s and are based upon the first edition of the Caltrans Airport Land Use Planning Handbook, published in 1983. Plans for three of these 10 airports are currently being updated. The remainder of the ALUPs were adopted in the period since then and are based upon the second edition of the Handbook, published in 1993. An exception is the relatively newly adopted ALUP for Travis Air Force Base, which was prepared with advance knowledge of the more recent 2002 edition of the Handbook. An ALUP has not yet been prepared for the Moffett Federal Airfield.
- It is important to note that the age of the plan, and the Handbook edition upon which it is based, does not suggest in and of itself that the plan does not provide the subject airport the necessary protections from encroachment. ALUCs that aggressively applied standards from the early editions of the Handbook may be providing greater protection than less active application efforts based on the newer editions. Unfortunately, this analysis did not attempt to address the adequacy of protection afforded by each ALUP. In fact, such an analysis may be impossible to achieve without agreement on the standards by which such judgments will be made. The current law leaves the question of adequacy up to each ALUC, and what is obvious when all the plans are reviewed is that there is no universal perspective on what is adequate.

- Each jurisdiction is so unique in its economics and politics that no general observation can be made regarding the value placed on its airports – at least as expressed through adopted ALUPs. As a consequence, there is no consistency in either the shape of airport influence areas or their area extent or in the size or shape of various safety areas. Perhaps the greatest level of consistency occurs in the area of height controls, which typically relies on the criteria found in Federal Aviation Regulations (FAR), Part 77, *Objects Affecting Navigable Airspace*.
- The long-term viability of only one general aviation airport in the region has been threatened by encroachment in recent years - Reid-Hillview Airport, where the Santa Clara County Board of Supervisors has previously considered actions to try to close the airport. Generally, it is not possible to single out an airport that is likely to close due to encroachment. In fact, the very definition of encroachment is subject to the same lack of universal perspective on what is adequate protection.
- With the exception of privately-owned public use airports, all of the ALUPs are supported by airport master plans. In several cases, the airport master plans were updated, but the ALUPs were not. Again, this condition is not necessarily an issue of concern because the ALUP protections may be just as valid as they were before the airport master plan was updated. This analysis did not look at this question to the depth of determining that a major change occurred to the airport layout that was not reflected in the ALUP – such as a proposed new runway or major runway extension.
- None of the counties is tracking incompatibilities. The State law limits ALUC actions to areas/situations not already incompatible. None of the ALUCs document those areas already incompatible, although some may have evaluated that question as part of the planning process. That is not to say that for a given situation they cannot determine compatibility, only that they do not track areas of incompatibility. For some airports, particularly the larger air carrier airports that have had FAR Part 150, *Airport Noise Compatibility Program*, studies, there is documentation of noise-impacted residences. In other jurisdictions, planning staff have attempted to count the number of houses within defined noise contours, typically as part of the ALUP development process, but there is no documentation of this in the plans or longer-term tracking. Of course, one of the situations peculiar to noise is that the “acceptable” standard varies considerably. FAR Part 150 standards are based on the Federal standard of 65 dB CNEL, and noise-impacted residential units above that level may be eligible for remediation. Counties that use the 55 or 60 dB CNEL standard have good reasons for setting those standards, and residential units that fall in the 60 dB CNEL noise level are incompatible when the standard is 55 dB CNEL, but not to extent that remediation under Federal or State standards is suggested. The point is that without the potential or need for remediation, there is no value in tracking such incompatible residential units.

## **2.5 AIRSPACE**

### **2.5.1 Background**

In the San Francisco Bay Area there are three air carrier airports, six reliever general aviation airports and one Federal airfield all within a 30-nautical-mile (NM) radius of the San Francisco International Airport. The airspace complexity is compounded by the fact that the core areas of the San Francisco Class B airspace and Oakland Class C airspace have no corridor for visual flight rule (VFR) aircraft wishing to traverse the area northbound or southbound.

To avoid all of the Class B and C airspace areas is often difficult for an inexperienced pilot and requires considerable preflight planning and attention to avoid penetration of these areas. Recommended corridors around these airspace areas are shown on the San Francisco VFR terminal area chart. To give an idea of the additional distance of travel, a pilot flying from San Carlos Airport to the Napa County Airport, a distance of 40 NM would have to travel approximately an additional 20 NM, or an additional 50 percent, to avoid penetrating Class B, C and D airspace.

General aviation users would like to see more instrument approach procedures for general aviation airports (e.g., global positioning system [GPS] approaches and potential instrument landing system [ILS] approaches) for both business and personal aviation. There can be, however, significant airspace interactions with these new facilities and procedures because of the impact on other nearby airports. For many years, instrument approach procedures to Hayward Executive Airport have affected Metropolitan Oakland International Airport, and a new instrument approach to San Carlos would affect San Francisco International. At this time, new instrument approach procedures to Palo Alto Airport affect Norman Y. Mineta San Jose International, and new instrument approach procedures for Reid-Hillview Airport affect Norman Y. Mineta San Jose International, Hayward Executive and Metropolitan Oakland International Airports.

Some existing instrument approach procedures to general aviation airports affect other general aviation airports both within and outside of the nine Bay Area counties. Napa County and Petaluma Municipal Airports affect each other. Rio Vista and Sacramento Executive Airports affect each other. Byron Airport and Tracy Municipal Airports affect each other. The Nut Tree Airport, Yolo County Airport and Travis Air Force Base affect each other.

### **2.5.2 Findings/Issues**

- The very complex airspace over the Bay Area creates difficulties and extra travel time for many general aviation pilots. General aviation pilots want the ability to traverse the very complex Bay Area airspace without excessive interaction with

Terminal Radar Approach Control (TRACON). To this end, they have used a format for ongoing communication with the FAA through the Northern California Airspace Users Working Group. One of the topics of discussion relates to the continuing need for convenient routes for operations into local airports as well as routes traversing the Bay Area airspace.

- There is a need for additional instrument training opportunities at Bay Area airports. Aircraft flight schools are currently using airports outside the Bay Area for instrument flight training, primarily due to the fact that these airports are outside the heavily controlled Class B airspace.
- Providing additional instrument approach training opportunities is not a simple task. What may appear as a good solution for one group of users or airport may be a problem for another group of users or airport. Airspace interactions between instrument approach procedures at general aviation and air carrier airports can cause delays to both air carrier and general aviation operations. An instrument flight rule (IFR) approach may be independent of other procedures, but finding a workable missed approach may be the most difficult part, and yet it is mandatory for a workable procedure. Many factors other than technical considerations may seem necessary and are often required. A subcommittee of the Northern California Airspace Users Working Group, in coordination with FAA, could start to identify usable IFR training opportunities.

## **2.6 GROUND SIDE AIRPORT ACCESS**

### **2.6.1 Background**

Ground access to general aviation airports is susceptible to the same types of commute and non-commute problems as experienced by the rest of Bay Area travelers; i.e., recurrent congestion, congestion due to incidents on the freeway system, special events traffic, etc. Whereas the larger air carrier airports have employment and passenger densities that warrant significant transit investments, the general aviation airports do not. Airport access is primarily by vehicle, and there may be only limited local bus service nearby, if it exists at all.

### **2.6.2 Findings/Issues**

While traffic volumes at most general aviation airports may not be large, there is no current list of prospective local circulation improvements for general aviation airports. This information would be helpful in discussing local and regional priorities for investment in surface transportation. While, limited in scope, it would be of some value to airport users to provide a centralized source of information on alternative modes of transportation that are available for travel to and from general aviation airports; such as public transportation, rental cars and courtesy vehicles.

Ground access conditions (distances and travel time) may also affect an aircraft owner's choice of airports at which an aircraft is based, along with other considerations, such as the availability of hangar space, proximity to home or business and the airport's rates and charges. For corporate aircraft owners and charter operators, the key consideration is proximity to the urban core where the jobs and the majority of activity destinations are located. For aircraft owners who use aircraft for recreational purposes, the distance to the airport may not be as important as the fact that the airport is located in a more rural area with relatively uncongested airspace.

## **2.7 ENVIRONMENT**

### **2.7.1 Background**

Generally, aircraft noise and to a lesser degree airport related air quality have been the principal environmental issues affecting most airports in the Bay Area. Certain other environmental issues, such as Bay fill, the use of wetlands and potential habitat destruction arise with specific airport projects.

Individual airports must prepare the environmental documentation and mitigation plan, either as part of the airport master planning process or as part of the approval process related to specific airport improvements. In either case, the environmental documentation is prepared in accordance with California Environmental Quality Act (CEQA) and, when applicable, National Environmental Policy Act (NEPA) rules and guidelines.

### **2.7.2 Findings/Issues**

Based on a review of Airport Master Plans and associated environmental documentation and discussions with airport managers, the following types of environmental issues exist for various Bay Area general aviation airports. (Additional details of these constraints can be found in the individual airport summaries presented in Chapter 4.)

- Hayward Executive (noise)
- Livermore Municipal (noise)
- Byron (environmental protection agreement)
- Gness Field (noise, wetlands/reclaimed tidelands)
- Half Moon Bay (noise)
- Metropolitan Oakland International-North Field (noise)
- Moffett Federal Airfield (noise, wetlands, air quality)
- Napa County (noise, wetlands)
- Petaluma Municipal (wildlife-bird strikes)
- San Carlos (noise, wetlands)
- Sonoma County (wildlife, wetlands)



**Aircraft Noise.** Noise impacts from general aviation operations are significantly different from those associated with the larger air carrier aircraft. One notable difference is that the typical piston engine general aviation aircraft sounds different from commercial jets. Another notable difference lies in the operational configuration of general aviation airports. Air carrier airports tend to have straight in and straight out approach paths at low approach angles. General aviation airports have straight-in and straight-out flight paths typically at a higher approach angle, as well as rectangular shaped flight tracks used primarily for pilot training and practice. The rectangular flight track is generally fixed to one or both sides of a runway. Aircraft using this rectangular shaped flight track typically generate noise at levels below established noise standards, but a single aircraft may use the same track many times during a one-hour practice session. Airports with a substantial level of pilot training activity have a high percentage of operations along these rectangular flight tracks.

Individual airports have attempted to mitigate noise impacts on surrounding communities by instigating various operational procedures to avoid the most noise-sensitive areas, to the extent permitted by FAA regulations (also see the Land Use Compatibility section for discussion of ALUC duties to control incompatible land uses).

**Air Quality.** General aviation aircraft produce varying levels of emissions that contribute to the formation of ozone at the regional level. The Bay Area is a non-attainment area for ozone on current Federal air quality standards. However, these aircraft emissions are a very small fraction of the total Bay Area emission inventory (about 0.15 percent in 2000 and 0.27 percent in 2005). The increasing percentage is not the result of the growth in activity, but the declining amount of pollution generated by other sources of emissions, which are subject to greater control. Any future reductions in emissions would depend largely on action by the Environmental Protection Agency (EPA) to improve the engine technology, which appears unlikely at present. This does not mean, however, that there are no control measures that may apply to general aviation airports and their activities. Future control strategies may begin to focus on episodic controls that affect emissions on the six or seven days a year when possible ozone limits could be exceeded. While these measures have not been defined, some could apply to general aviation airports, either directly or indirectly. In addition to pollutants that contribute to ozone, general aviation aircraft also produce carbon monoxide in the engine combustion process, but the Bay Area has been in attainment with the carbon monoxide standard since the early 1990s.

Like the air carrier airports, there is a continuing issue about how general aviation airport master plan improvements are addressed in the Federal air quality “conformity” process, which is the process defined in EPA’s regulations for showing that the future activity at the airports will not contribute to problems with the Federal ozone standard. The FAA is the lead on this issue.

**Other Environmental Impacts.** These include wetlands, loss of habitat, protection of critical biological species, and other similar environmental topics, which could be possible constraints to the physical development of airport infrastructure. These issues are addressed in the environmental documents prepared for CEQA and NEPA approval, as mentioned earlier.

## 2.8 AIRPORT FUNDING

### 2.8.1 Background

Stable and reliable funding sources for airport development projects are critical to the maintenance and betterment of general aviation airports in the Bay Area. General aviation airports obtain funding primarily through grants administered by the Federal Aviation Administration (FAA) and the State of California Department of Transportation (Caltrans). Other sources of revenues are through hangar rents and tiedowns, leases of airport property and fuel sales.

**Federal Aviation Administration.** The Airport and Airway Trust Fund, established by the Airport and Airway Revenue Act of 1970, provides the revenues used for airport development and planning projects for general aviation airports. Taxes or user fees are collected from the various segments of the aviation community and placed in the Trust Fund. Recent legislation provides for general aviation entitlement grants with a maximum of \$150,000 annually for fiscal years in which the total amount of FAA Airport Improvement Program (AIP) funding is \$3.2 billion or more (through Fiscal Year 2003). General aviation entitlement funds provide the airport sponsors with the ability to use these funds for local airport projects without having to compete for general aviation discretionary funds for projects that may not have a high priority for FAA AIP funding.

**State of California, Department of Transportation.** The State of California Division of Aeronautics provides grants and loans for safety, maintenance and capital improvement projects at airports throughout the State.

The State provides four financial assistance programs funded by taxes on general aviation fuel, which generate about \$7 million annually. The first is the Department of Transportation, Division of Aeronautics, annual grant of \$10,000; the second allows the California Transportation Commission (CTC) to allocate funds to match Federal Airport Improvement Program (AIP) grants for airport and aviation purposes; and the third is the acquisition and development grants funded through the State Transportation Improvement Program (STIP). The fourth financial assistance program is the Airport Loan Program.

The State provides annual non-matching \$10,000 grants to airports that have not been designated as a “reliever” or “commercial service” airport by the FAA that may be

used for both capital improvements and maintenance and operations. The annual grant may be accumulated for up to five years, or a maximum of \$50,000, and used as matching funds for an FAA Airport Improvement Program grant.

State funds can be allocated by the California Transportation Commission (CTC) to match an FAA Airport Improvement Program grant once an airport sponsor has accepted the Airport Improvement Program grant from the FAA. The State match is available to airports that have been designated as a general aviation or reliever airport by the FAA. Only those projects that are included in the State's Capital Improvement Program (CIP) are eligible to receive matching grants. The State match will be an amount equal to 5 percent of the Airport Improvement Program grant (or 4.5 percent of the total project cost).

Any publicly-owned, public use airport may apply for an Acquisition and Development (A&D) grant through a structured approval process. A&D projects are evaluated and prioritized by an evaluation matrix and an airport rating form with runway maintenance projects receives the highest priority for funding. An airport's request may range from a minimum of \$10,000 to a maximum of \$500,000 per fiscal year.

The State Airport Loan Program provides financial assistance in the form of loans, repayable over a period not to exceed 25 years. The interest rate is based on the most recent issue of State of California bonds sold prior to the issuance of a loan agreement. Loans can be obtained for matching funds (e.g., an FAA Airport Improvement Program grant) and for revenue-generating facilities (e.g., hangars and fuel facilities).

## **2.8.2 Findings/Issues**

- Only four airports in the Bay Area are eligible for the \$10,000 annual grant: Cloverdale Municipal, Healdsburg Municipal, Rio Vista Municipal and the Nut Tree Airports. These four airports have not been designated as reliever or commercial service airports by the FAA.
- The eligibility to receive the 5 percent matching grant for FAA Airport Improvement Program funds includes the FAA-designated reliever airports in the Bay Area. The State has provided matching grant funds totaling \$1 million to Bay Area airports since 1998 that have provided leverage for an estimated \$19 million in FAA Airport Improvement Program grants.
- The eligibility to receive A&D grants for development projects also includes the FAA-designated reliever airports. The State has provided \$300,000 in A&D grants to Bay Area airports since 1998.

- While new security requirements for general aviation airports are not known yet, FAA has recommended actions that can be taken to enhance general aviation airport security including fencing, apron lighting, reducing the number of vehicular and pedestrian access control gates, night lighting of access control gates with closed-circuit TV monitoring, flood lighting and additional signs on fences and gates. In addition, recommendations to establish procedures with local law enforcement agencies and to implement a number of airport management actions, including tenant vehicle registration and identifications badges, have been made. Assembly Bill 2630 *Airport Security: Airport Improvement Grants*, allows the State to pay the full 10 percent of the local match for an FAA Airport Improvement Program grant for a general aviation airport's (fewer than 80,000 annual operations) security projects. Funds would be allocated by the California Transportation Commission.
- Tax revenues from sales tax on general aviation fuel generate about \$7 million annually and fund the Aeronautics Fund. In addition, sales tax on jet fuel generates over \$100 million annually in revenues to the State's General Fund. Revenues from the sale of aviation fuel total \$107 million on an annual basis of which only 6 percent is allocated to develop and maintain California's aviation system and airports.
- Current (2003) State funding deficits portend significant impacts on aviation programs. In May 2002, \$6 million was transferred from the Aeronautics Account to the State General Fund. This \$6 million transfer placed A&D grants on hold for airports throughout the State, including \$800,000 in A&D grants for Bay Area airports. The State Administration, in the *December 2002 Mid Year Spending Reduction Proposals*, proposes that an additional \$5.2 million be transferred from the Aeronautics Account reserve to the General Fund. In addition to the \$800,000 currently on hold for A&D grants for Bay Area airports, the 5 percent local match funding for FAA Airport Improvement Program projects will not be available.

The transfer of these funds will affect airports Statewide, not only today, but into the foreseeable future and will effectively shift the funding responsibility for general aviation airport maintenance and improvements more to local cities and counties.

## **2.9 INSTITUTIONAL RELATIONSHIPS**

### **2.9.1 Background**

MTC's long-range Regional Transportation Plan must contain an airport element under State planning law. This provides the foundation for RAPC to undertake this update of the Regional Aviation System Plan (RASP). Regional aviation planning is a necessary joint effort involving local, State and Federal organizations, as well as

regional-level resources. Currently, periodic updates of portions of the RASP and specialized studies conducted either for or by RAPC together with locally prepared airport master plans and airport land use plans provide the fundamental information upon which the Regional Aviation System Plan is based. These airport specific plans and policies, together with the regional plan, in turn provide the basis for the California Aviation System Plan (CASP) and also provide information to the Federal Aviation Administration (FAA) in preparation of the National Plan of Integrated Airport Systems (NPIAS).

Beyond the basic planning process, various institutional questions arise concerning whether it would be advantageous to run various county general aviation airports under one department (as is done in Santa Clara and San Mateo Counties) or whether it would be beneficial to have a more explicit planning and funding relationship between air carrier airports and general aviation reliever airports. While it can be argued that the air carrier airports must rely substantially on the general aviation airports for needed runway capacity in the Bay Area, apparently there are few, if any, mechanisms available for air carrier airports to financially support nearby reliever airports.

In some cases it appears that the air carrier airports are limiting the expansion of facilities that serve general aviation aircraft, which then transfers responsibility for accommodating these aircraft to the local general aviation airport system (e.g., the situation with Norman Y. Mineta San Jose International and airports in Santa Clara County). At a minimum, these air carrier airports should be strongly encouraging the FAA to fund improvements at the general aviation airports receiving the additional demand.

## **2.9.2 Findings/Issues**

The following provides a summary of the findings:

- Aviation planning functions that RAPC is already involved with are addressed in a number of venues: the general aviation manager meetings, the Caltrans Regional Transportation Planning Agency (RTPA) Aviation System Planning Task Force, the California Transportation Commission Technical Advisory Committee on Aeronautics, and the Northern California Airspace Users Working Group, to name a few. These groups provide valuable forums for the review of issues affecting future development of the general aviation airport system, and are complementary in their work.
- The air carrier and general aviation airports have established informal working relationships to maintain coordination between these two airport groups.

## **2.10 COMMUNITY PERCEPTIONS ABOUT GENERAL AVIATION**

### **2.10.1 Background**

A positive community perception about the role that general aviation plays in the transportation and economic life of a community is essential to the airport's ability to continue to operate and, if required, to expand. Elected officials and citizens in communities around general aviation airports typically become engaged in airport issues in several ways: 1) when master plans are updated or specific improvements are proposed; 2) when there are noise issues or discussion of noise abatement procedures; or 3) when there are projects proposed around airports that raise the land use compatibility question.

Community participation is often colored by the perception that general aviation airports serve primarily recreational or other types of non-essential types of flying. In contrast, it is well known within the aviation community that general aviation serves a wide variety of purposes, including personal transportation, business activities of small and large businesses, and medevac, law enforcement and other government agency needs. General aviation airports also generate substantial possessory and personal property taxes that go to the local counties, cities and school districts and can be sizable depending on the number and type of aircraft at an airport.

### **2.10.2 Findings/Issues**

- There is a widespread interest in the general aviation community about ensuring that the public has access to factual information about the role of general aviation and their general aviation airports in the broader community context of public service and their economic contribution to education and the general fund of local jurisdictions, as well as the transportation role they fulfill.

## Chapter 3

### AIRPORT INVENTORY AND AVIATION DATA

#### 3.1 INTRODUCTION

This Chapter includes an inventory and review of available data from the previous Metropolitan Transportation Commission Regional Airport System Plan, California Aviation System Plan (CASP), FAA and other sources for the individual airports. Additional data was also obtained during the stakeholder interviews which has helped to characterize the existing general aviation airport system in the Bay Area.

#### 3.2 AIRPORT ROLES AND CAPABILITIES

The roles of individual airports as defined in both the FAA's National Plan of Integrated Systems (NPIAS) and Caltrans Division of Aeronautics' California Aviation System Plan (CASP) are presented in Table 3-1. A summary of based aircraft and annual aircraft operations data is also included in Table 3-1 using information from the latest FAA Form 5010-01, *Airport Master Record*, for the individual airports. FAA data are not available for Moffett Federal Airfield and Travis Air Force Base.

##### 3.2.1 Federal Aviation Administration

This section presents a summary of the existing public-use airport facilities located in the Bay Area. This study considered only publicly and privately-owned, public-use airports identified in the current FAA National Plan of Integrated Airport Systems (NPIAS), as identified on Figure 1-1. Private-use airports were not included in this study.

An inventory of the airport facilities was conducted by survey interviews with airport managers, airport sponsors and fixed base operators (FBOs). A preliminary database was collected from FAA Form 5010-1, *Airport Master Record*, data and the latest airport master plans and airport layout plans. This information was then compared to the interview data and revisions made as required. A listing of the public-use airports and their major facilities are presented in Table 3-2.

FAA and NPIAS airport classifications refer to the operational role of the airport within the system. This standard provides an indication of the types of aircraft and aviation activity that can be safely accommodated at each airport. Service levels

Table 3-1

**AIRPORT ROLE, BASED AIRCRAFT AND  
ANNUAL AIRCRAFT OPERATIONS**



**Table 3-1  
AIRPORT ROLE, BASED AIRCRAFT AND ANNUAL AIRCRAFT OPERATIONS  
Metropolitan Transportation Commission Regional Airport System Plan**

			AIRPORT ROLE		BASED AIRCRAFT								ANNUAL AIRCRAFT OPERATIONS								
FAA Site No	Airport No	AIRPORTS	FAA	CALTRANS	Single Engine	Multi Engine	Jet	Helicopter	Gliders	Military	Ultra - Light	Total	Itinerant				Local			Total Operations	
													Air Carrier	Commuter Air Taxi	General Aviation	Military	Subtotal	General Aviation	Military		Subtotal
<b>ALAMEDA COUNTY</b>																					
01651.*A	1	Hayward Executive	RL	M-B/C	430	15	5	6	0	0	0	456	0	2,983	78,117	0	81,100	79,720	342	80,062	161,162
01779.2*A	2	Livermore Municipal	RL	M-B/C	492	50	2	3	0	0	0	547	0	1,741	86,568	140	88,449	146,723	0	146,723	235,172
01971.*A	3	Metropolitan Oakland International	PR	P-MH-M-B/C	240	95	23	12	0	0	0	370	163,697	60,146	171,922	1,349	397,114	122,390	0	122,390	519,504
<b>Subtotal</b>					1,162	160	30	21	0	0	0	1,373	163,697	64,870	336,607	1,489	566,663	348,833	342	349,175	915,838
<b>CONTRA COSTA COUNTY</b>																					
01437.*A	4	Buchanan Field	RL	M-B/C	473	74	14	17	0	1	0	579	406	5,368	127,876	867	134,517	146,030	0	146,030	280,547
01356.5*A	5	Byron	RL	C-REC	62	2	2	0	26	0	13	105	0	0	6,500	0	6,500	19,500	0	19,500	26,000
<b>Subtotal</b>					535	76	16	17	26	1	13	684	406	5,368	134,376	867	141,017	165,530	0	165,530	306,547
<b>MARIN COUNTY</b>																					
01967.*A	6	Gross Field	RL	R-B/C	205	30	0	0	0	0	0	235	0	500	30,000	0	30,500	104,500	0	104,500	135,000
<b>Subtotal</b>					205	30	0	0	0	0	0	235	0	500	30,000	0	30,500	104,500	0	104,500	135,000
<b>NAPA COUNTY</b>																					
01933.*A	7	Napa County	RL	R-B/C	219	25	0	3	0	0	0	247	0	70	75,904	397	76,371	130,384	0	130,384	206,755
01244.8*A	8	Angwin-Parrett Field	GA	C	35	3	0	0	0	0	0	38	0	0	3,000	0	3,000	9,000	0	9,000	12,000
<b>Subtotal</b>					254	28	0	3	0	0	0	285	0	70	78,904	397	79,371	139,384	0	139,384	218,755
<b>SAN MATEO COUNTY</b>																					
01638.*A	9	Half Moon Bay	RL	R	65	5	0	0	0	0	0	70	0	150	35,000	0	35,150	25,000	0	25,000	60,150
02160.1*A	10	San Carlos	RL	M-B/C	435	60	0	3	0	0	0	498	0	0	57,245	0	57,245	62,429	0	62,429	119,674
02187.*A	11	San Francisco International	PR	P-LH-M-B/C	6	11	8	0	0	0	0	25	302,381	88,682	25,195	2,374	418,632	0	0	0	418,632
<b>Subtotal</b>					506	76	8	3	0	0	0	593	302,381	88,832	117,440	2,374	511,027	87,429	0	87,429	598,456
<b>SANTA CLARA COUNTY</b>																					
01927.*A	12	Moffett Federal Airfield	RL <sup>1</sup>		0	0	0	0	0	14	0	14	0	0	0	0	0	0	0	0	0
02389.1*A	13	Palo Alto	RL	M-B/C	414	35	0	5	1	0	0	455	0	1,460	130,121	8	131,589	75,754	0	75,754	207,343
02201.*A	14	Reid-Hillview	RL	M-B/C	496	52	0	0	0	6	0	554	0	1	69,810	0	69,811	118,669	0	118,669	188,480
02204.*A	15	San Jose International	PR	P-MH-M-B/C	298	78	31	10	0	0	0	417	136,192	7,597	91,576	403	235,768	82,268	0	82,268	318,036
02213.4*A	16	South County	RL	R	65	5	0	0	0	0	0	70	0	0	18,000	0	18,000	37,000	0	37,000	55,000
<b>Subtotal</b>					1,273	170	31	15	1	20	0	1,510	136,192	9,058	309,507	411	455,168	313,691	0	313,691	768,859
<b>SOLANO COUNTY</b>																					
02389.1*A	17	Nut Tree	GA	R-B/C	204	40	1	2	0	0	0	247	0	1,500	60,000	0	61,500	40,000	0	40,000	101,500
02110.9*A	18	Rio Vista Municipal	GA	R	51	5	0	0	0	0	1	57	0	0	17,500	0	17,500	17,500	0	17,500	35,000
01565.1*A	19	Travis Air Force Base	M		0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0
<b>Subtotal</b>					255	45	1	2	0	3	1	307	0	1,500	77,500	0	79,000	57,500	0	57,500	136,500
<b>SONOMA COUNTY</b>																					
01411.1*A	20	Cloverdale Municipal	GA	C	18	3	0	0	0	0	0	21	0	0	7,900	0	7,900	3,000	0	3,000	10,900
01651.7*A	21	Healdsburg Municipal	GA	C	61	2	0	0	0	0	0	63	0	0	6,400	0	6,400	25,000	0	25,000	31,400
02042.*A	22	Petaluma Municipal	RL	R-B/C	180	10	2	1	0	0	10	203	0	200	11,000	0	11,200	39,000	0	39,000	50,200
02260.*A	23	Sonoma County	PR	P-NH-R-B/C	325	49	2	0	1	0	0	377	0	7,620	80,356	693	88,669	49,876	0	49,876	138,545
02299.8*A	24	Sonoma Skypark	GA <sup>2</sup>	C	57	3	0	0	0	0	0	60	0	0	2,100	0	2,100	8,000	0	8,000	10,100
02281.6*A	25	Sonoma Valley	GA <sup>2</sup>	C	180	150	0	1	0	0	2	333	0	0	4,000	0	4,000	7,500	0	7,500	11,500
<b>Subtotal</b>					821	217	4	2	1	0	12	1,057	0	7,820	111,756	693	120,269	132,376	0	132,376	252,645
<b>TOTAL</b>					5,011	802	90	63	28	24	26	6,044	602,676	178,018	1,196,090	6,231	1,983,015	1,349,243	342	1,349,585	3,332,600

SOURCE: FAA National Plan of Integrated Airport Systems (NPIAS); California Aviation System Plan (CASP); and FAA Form 5010-01 Airport Master Record

PR = Commercial Service Airport with more than 10,000 annual enplaned passengers  
 RL = Reliever Airport  
 GA = General Aviation Airport  
 M = Military  
 1. Included as New Reliever Airport in NPIAS  
 2. Not included in NPIAS

P-LH-M-B/C = Primary-Large Hub-Metropolitan-Business/Corporate  
 P-MH-M-B/C = Primary-Medium Hub-Metropolitan-Business/Corporate  
 P-NH-R-B/C = Primary-Non Hub-Regional-Business/Corporate  
 M-B/C = Metropolitan-Business/Corporate  
 R-B/C = Regional-Business/Corporate  
 R = Regional  
 C-REC = Community-Recreation  
 C = Community

Table 3-2

**AIRPORT INVENTORY**

Table 3-2  
**AIRPORT INVENTORY**  
**Metropolitan Transportation Commission Regional Airport System Plan**

FAA Site no.	Airport No.	AIRPORTS	Owner	AIRFIELD CONFIGURATION					NAVIGATIONAL AIDS				
				Runway(s) Orientation	Length/width	Surface	Airfield Capacity	Design Aircraft	Approaches <sup>1</sup>	Navigational Aids	Control Tower	Runway Lighting	Weather Reporting Equipment
01651.*A	1	<b>ALAMEDA COUNTY</b> HAYWARD EXECUTIVE	CITY OF HAYWARD	10L/28R	3107X75	ASPH-G	490,000	B II	VOR/DME, GPS LOC/DME 28L, ILS RWY 25R CAT I	REIL, VASI PAPI, VASI, MALSR	YES	MIRL	ASOS
01779.2*A	2	LIVERMORE MUNICIPAL	CITY OF LIVERMORE	10R/28L 07L/25R 07R/25L	5024X150 5255X100 2699X75	ASPH-G ASPH-G ASPH-G	380,000	B II			YES	MIRL MIRL NO	ASOS, LAWRS
01971.*A	3	METROPOLITAN OAKLAND INTERNATIONAL	PORT OF OAKLAND	09L/27R 09R/27L  11/29 15/33	5453X150 6212X150  10000X150 3366X75	ASPH-G ASPH-G ASPH-G ASPH-G	230,000 (North Field)	D V			RNAV (GPS) RWY 9L, ILS RWY 27R  RNAV (GPS) RWY 9R, VOR/DME RWY 27L ILS RWY 29 CAT III, ILS RWY 11 CAT I	VASI, MALSR  VASI MALSR, ALSF2, TDZL	YES
01437.*A	4	<b>CONTRA COSTA COUNTY</b> BUCHANAN FIELD	CONTRA COSTA COUNTY	01L/19R 01R/19L 14L/32R 14R/32L	5010X150 2768X75 4601X150 2800X75	ASPH-CONC-G ASPH ASPH-CONC-PFC ASPH	355,000	B III	LDA RWY 19R	VASI, REIL, MALS  VASI, REIL	YES	HIRL NO MIRL NO	ASOS LAWRS
01356.5*A	5	BYRON	CONTRA COSTA COUNTY	05/23 12/30	3000X75 4500X100	ASPH-G ASPH-G	230,000	B III	GPS RWY 30	PAPI PAPI, REIL	NO	MIRL MIRL	NO
01967.*A	6	<b>MARIN COUNTY</b> GNOSS FIELD	MARIN COUNTY	13/31	3300X75	ASPH-G	250,000	B II	GPS RWY 13	VASI	NO	MIRL	AWOS-3
01933.*A	7	<b>NAPA COUNTY</b> NAPA COUNTY	NAPA COUNTY	06/24 18L/36R 18R/36L	5007X150 2500X75 5931X150	CONC-F ASPH-F CONC-F	360,000	C II	VOR or GPS RWY 6	REIL  PAPI, MALS	YES	MIRL NO MIRL	ASOS
01244.8*A	8	ANGWIN-PARRETT FIELD	PACIFIC UNION COLLEGE	16/34	3217X50	ASPH-F	230,000	A I	LOC RWY 36L		NO	LIRL	NO
01638.*A	9	<b>SAN MATEO COUNTY</b> HALF MOON BAY	SAN MATEO COUNTY	12/30	5000X150	ASPH-CONC-F	230,000	B II	GPS RWY 12/GPS RWY 30	REIL, VASI REIL, VASI	NO YES	MIRL MIRL	NO LAWRS
02160.1*A	10	SAN CARLOS	SAN MATEO COUNTY	12/30	2600X75	ASPH-G	280,000	B II					
02187.*A	11	SAN FRANCISCO INTERNATIONAL	CITY AND COUNTY OF SAN FRANCISCO	01L/19R 01R/19L 10L/28R 10R/28L	7001X200 8901X200 11870X200 10600X200	ASPH-G ASPH-G ASPH-G ASPH-G		D V	RNAV (GPS) Y RWY 19R  ILS RWY 19L CAT I RNAV (GPS) RWY 10L, ILS RWY 28R CAT III RNAV (GPS) Y RWY 10R, ILS RWY 28L CAT I	REIL, VASI  REIL, VASI REIL, PAPI, SSALS, TDZL REIL, PAPI, ALSF2, TDZL  VASI, SSALR, PAPI	YES	HIRL  HIRL CL HIRL CL  HIRL CL	ASOS, LAWRS  AWOS-1



reflect the type of public service provided to the community. These service levels also represent funding categories established by Congress to assist in airport development. These service roles are not intended to dictate what types of aircraft can be based or conduct operations at a specific airport. The airport service levels and other attributes of airports in the Bay Area are discussed below. The service levels as defined in the NPIAS are as follows:

- **Commercial Service Airports** – those airports receiving scheduled passenger service and having 2,500 or more annual enplanements. Primary Airports (PR) are those commercial service airports having 10,000 or more annual enplanements.

There are four commercial service airports located in the Bay Area that provide scheduled air carrier passenger service. These airports are:

- San Francisco International Airport
  - Metropolitan Oakland International Airport
  - Norman Y. Mineta San Jose International Airport
  - Sonoma County Airport
- **Reliever Airports** – general aviation airports in metropolitan areas which are intended to reduce congestion at large commercial service airports by providing general aviation pilots with alternative landing areas. They also provide the surrounding areas with access to air transportation.

Reliever airports are an integral part of the overall air transportation system. Reliever airports are airports designated as having the function of relieving congestion at commercial service airports. They do this by providing general aviation aircraft owners and pilots with alternative airports to base their aircraft at and fly into, thus providing more general aviation access to the overall community. The interaction of smaller and slower general aviation aircraft with larger and higher performance air carrier aircraft will use more airspace due to required aircraft spacing to avoid wake vortexes from lead aircraft, as well as different aircraft speeds. Therefore, from a runway capacity/airspace utilization perspective, reliever airports are critical to the functioning of the larger regional airport system. Increased air carrier and cargo activity at the major air carrier airports has resulted in increased activity at nearby general aviation airports (e.g., Reid-Hillview, Hayward Executive and Palo Alto). Because of general aviation activity relocating to these airports, this in turn has resulted in increased activity at other more distant general aviation airports (e.g.,

South County and Livermore Municipal). The NPIAS currently includes the following reliever airports in the Bay Area:

- Hayward Executive
- Livermore Municipal
- Buchanan Field
- Byron
- Gness Field
- Napa County
- Half Moon Bay
- San Carlos
- Palo Alto
- Reid-Hillview
- South County
- Petaluma Municipal

Moffett Federal Airfield is included as a new reliever airport in the NPIAS.

- **General Aviation Airports** – public-use airports that accommodate smaller general aviation aircraft and those that have scheduled service but are enplaning less than 2,500 passengers annually.

The following airports are included in the NPIAS as public-use general aviation airports:

- Angwin-Parrett Field
- Nut Tree
- Rio Vista Municipal
- Cloverdale Municipal
- Healdsburg Municipal

Sonoma Skypark and Sonoma Valley are two privately-owned public-use airports that are not included in the NPIAS but are included in the study.

### 3.2.2 Caltrans Division of Aeronautics

Caltrans has also developed an airport functional classification that categorizes airports based on how they function, the services they provide and the roles that they play as part of the aviation system. The Caltrans classifications of the Bay Area airports are also listed in Table 3-1. The classifications are as follows:

**Limited Use Airports (L)** – Airports that provide limited access; usually located in nonurban areas; may be used for a single purposes; have few or no based aircraft; and provide no services.

**Community Airports (C)** – Airports that provide access to other regions and states; located near small communities or in remote locations; serve, but are not limited to, recreation flying, training and local emergencies; accommodate predominately single

engine aircraft under 12,500 pounds; provide basic or limited services for pilots or aircraft.

**Regional Airports (R)** – Airports that provide the same access as Community airports, may provide international access; located in an area with a larger population base than Community airports while serving a number of cities or counties; serve the same activities as Community airports with a higher concentration of business and corporate flying; accommodate most business, multi-engine and jet aircraft; provide most services for pilots and aircraft including aviation fuel; has a published instrument approach, may have a control tower.

**Metropolitan Airports (M)** – Airports that serve the same activities as Regional airports; are located in urbanized areas; provide for the same flying activities as Regional airports with an emphasis on business, charter and corporate flying; accommodate all business jet and turboprop aircraft with a higher level of activity than Regional airports; provide full services for pilots and aircraft, including jet fuel; has a published instrument approach and a control tower; provides flight planning facilities.

**Agriculture (AG)** – The use of an airport by aircraft for fertilizer application, seed dispersal, pest control and crop-dusting. *Used as a subcategory to designate: (1) a service provided at a Limited Use airport, of (2) a prevalent activity at a Community airport.*

**Firefighting (FF)** – The use of an airport for aerial firefighting operations. *Used as a subcategory to designate: (1) a service provided at a Limited Use airport, of (2) a prevalent activity at a Community airport.*

**Recreational Access (RA)** – The use of an airport by pilots for recreational destination access. *Used as a subcategory to designate: (1) a service provided at a Limited Use airport.*

**Medical Emergency (ME)** – The use of an airport by fixed-wing air ambulance aircraft to transport medical patients, accident victims, transplant organs and vital supplies to hospitals; serves remote regions not practical to be served by helicopters. *Used as a subcategory to designate: (1) a service provided at a Limited Use airport.*

**Recreation (REC)** – The use of an airport by pilots not engaged in corporate or business flying or formal instruction; includes recreational and tourist destination

access. *Used as a subcategory to designate the prevalent service provided at a Community, Regional or Metropolitan airport.*

**Business/Corporate (B/C)** – The use of an airport by an individual flying aircraft for transportation required by a business in which the individual is engaged (the pilot is not compensated); or the use of an airport by aircraft owned or leased by a company to transport its employees and/or property (professional pilot is compensated). *Used as a subcategory to designate a prevalent service provided at a Regional or Metropolitan airport.*

**Cargo (CGO)** – The use of an airport for transporting freight, mail and/or packages over a specified route by air. *Used as a subcategory to designate the prevalent service provided at a Regional or Metropolitan airport.*

### **3.3 SUMMARY OF AIRCRAFT OWNER LOCATIONS**

Aircraft owner data have been provided by the individual County Tax Assessors and individual airport owners. A summary of the distribution of aircraft owner addresses, by County, based on the County Assessor data, is presented in Table 3-3. The distribution of based aircraft owner addresses for the individual airports is presented in the appendices.



Table 3-3

**AIRCRAFT OWNERSHIP CHARACTERISTICS**

Table 3-3  
**AIRCRAFT OWNERSHIP CHARACTERISTICS**  
**Metropolitan Transportation Commission Regional Airport System Plan**  
**2001**

COUNTY/AIRPORTS	Alameda County	Contra Costa County	Marin County	Napa County	San Mateo County	San Francisco County	Santa Clara County	Solano County	Sonoma County	Bay Area Subtotal	Other California	Outside California	Total	% Outside Bay Area	% Outside California
<b>ALAMEDA COUNTY</b>															
1 Hayward Executive	233	15	1	0	75	22	28	1	0	375	12	8	395	3.0	2.0
2 Livermore Municipal	278	97	0	0	6	6	22	3	1	413	14	14	441	3.2	3.2
3 Metropolitan Oakland International	157	13	9	0	5	35	1	0	0	220	37	51	308	12.0	16.6
<b>Alameda County Total</b>	<b>668</b>	<b>125</b>	<b>10</b>	<b>0</b>	<b>86</b>	<b>63</b>	<b>51</b>	<b>4</b>	<b>1</b>	<b>1008</b>	<b>63</b>	<b>73</b>	<b>1144</b>	<b>5.5</b>	<b>6.4</b>
<b>CONTRA COSTA COUNTY</b>															
4 Buchanan Field	37	356	3	1	6	7	2	10	1	423	4	6	433	0.9	1.4
5 Byron	6	57	0	0	2	1	4	0	0	70	4	3	77	5.2	3.9
<b>Contra Costa County Total</b>	<b>43</b>	<b>413</b>	<b>3</b>	<b>1</b>	<b>8</b>	<b>8</b>	<b>6</b>	<b>10</b>	<b>1</b>	<b>493</b>	<b>8</b>	<b>9</b>	<b>510</b>	<b>1.6</b>	<b>1.8</b>
<b>MARIN COUNTY</b>															
6 Gnossov Field	4	2	154	4	2	30	0	1	5	202	3	4	209	1.4	1.9
<b>Marin County Total</b>	<b>4</b>	<b>2</b>	<b>154</b>	<b>4</b>	<b>2</b>	<b>30</b>	<b>0</b>	<b>1</b>	<b>5</b>	<b>202</b>	<b>3</b>	<b>4</b>	<b>209</b>	<b>1.4</b>	<b>1.9</b>
<b>NAPA COUNTY</b>															
7 Napa County Airport	3	7	2	107	1	5	0	35	7	167	27	2	196	13.8	1.0
8 Angwin-Parrett Field	1	0	0	38	0	0	0	0	0	39	1	1	41	2.4	2.4
<b>Napa County Total</b>	<b>4</b>	<b>7</b>	<b>2</b>	<b>145</b>	<b>1</b>	<b>5</b>	<b>0</b>	<b>35</b>	<b>7</b>	<b>206</b>	<b>28</b>	<b>3</b>	<b>237</b>	<b>11.8</b>	<b>1.3</b>
<b>SAN MATEO COUNTY</b>															
9 Half Moon Bay	1	0	0	0	53	2	1	0	0	57	4	0	61	6.6	0.0
10 San Carlos	9	0	3	1	270	24	14	0	0	321	8	5	334	2.4	1.5
11 San Francisco International	0	0	1	0	3	10	0	0	0	14	0	3	17	0.0	17.6
<b>San Mateo County Total</b>	<b>10</b>	<b>0</b>	<b>4</b>	<b>1</b>	<b>326</b>	<b>36</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>392</b>	<b>12</b>	<b>8</b>	<b>412</b>	<b>2.9</b>	<b>1.9</b>

Table 3-3 continued

**AIRCRAFT OWNERSHIP CHARACTERISTICS****Metropolitan Transportation Commission Regional Airport System Plan, 2001**

COUNTY/AIRPORTS	Alameda County	Contra Costa County	Marin County	Napa County	San Mateo County	San Francisco County	Santa Clara County	Solano County	Sonoma County	Bay Area Subtotal	Other California	Outside California	Total	% Outside Bay Area	% Outside California
<b>SANTA CLARA COUNTY</b>															
12 Moffett Federal Airfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
13 Palo Alto	26	5	2	0	146	9	362	2	1	553	23	17	593	3.9	2.9
14 Reid-Hillview	25	1	0	0	15	2	548	0	0	591	38	21	650	5.8	3.2
15 San Jose International	14	1	0	0	39	2	431	1	0	488	27	28	543	5.0	5.2
16 South County	3	0	0	0	2	1	99	0	0	105	19	5	129	14.7	3.9
<b>Santa Clara County Total</b>	<b>68</b>	<b>7</b>	<b>2</b>	<b>0</b>	<b>202</b>	<b>14</b>	<b>1440</b>	<b>3</b>	<b>1</b>	<b>1737</b>	<b>107</b>	<b>71</b>	<b>1915</b>	<b>5.6</b>	<b>3.7</b>
<b>SOLANO COUNTY</b>															
17 Nut Tree	2	0	1	2	0	0	0	121	2	128	4	8	140	2.9	5.7
18 Rio Vista	1	10	0	0	0	0	0	18	0	29	4	0	33	12.1	0.0
19 Travis Air Force Base	0	0	0	0	0	0	0	7	0	7	0	0	7	0.0	0.0
<b>Solano County Total</b>	<b>3</b>	<b>10</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>146</b>	<b>2</b>	<b>164</b>	<b>8</b>	<b>8</b>	<b>180</b>	<b>4.4</b>	<b>4.4</b>
<b>SONOMA COUNTY</b>															
20 Cloverdale Municipal	0	0	1	0	0	0	0	0	15	16	0	0	16	0.0	0.0
21 Healdsburg Municipal	0	0	0	0	0	0	0	0	47	47	0	0	47	0.0	0.0
22 Petaluma Municipal	1	2	34	1	1	5	1	0	106	151	1	6	158	0.6	3.8
23 Sonoma County Airport	2	2	8	2	1	4	0	0	327	346	6	10	362	1.7	2.8
24 Sonoma Skypark	2	2	14	6	1	1	0	1	47	74	1	2	77	1.3	2.6
25 Sonoma Valley	5	10	33	3	1	8	1	3	47	111	4	1	116	3.4	0.9
<b>Sonoma County Total</b>	<b>10</b>	<b>16</b>	<b>90</b>	<b>12</b>	<b>4</b>	<b>18</b>	<b>2</b>	<b>4</b>	<b>589</b>	<b>745</b>	<b>12</b>	<b>19</b>	<b>776</b>	<b>1.5</b>	<b>2.4</b>
<b>Bay Area Total</b>	<b>810</b>	<b>580</b>	<b>266</b>	<b>165</b>	<b>629</b>	<b>174</b>	<b>1,514</b>	<b>203</b>	<b>606</b>	<b>4,947</b>	<b>241</b>	<b>195</b>	<b>5,383</b>	<b>4.5</b>	<b>3.6</b>

## Chapter 4

### **AIRPORT HIGHLIGHTS**

#### **4.1 INTRODUCTION**

A summary of the type of activity and issues at the individual airports, based on interviews with airport management and airport users, is presented in Table 4-1. The summary includes the type of activity occurring at the airport; safety concerns; maintenance and infrastructure conditions; future improvements; environmental/land use compatibility/noise issues; approach protection measures and other issues.

The status of planning efforts at the Bay Area airports is summarized in Table 4-2. This includes airport master plans, airport layout plans, airport land use plans, environmental documentation and FAR Part 150 Airport Noise Compatibility Plans.

Table 4-1

**AIRPORT HIGHLIGHTS**

Table 4-1  
**AIRPORT HIGHLIGHTS**

**Metropolitan Transportation Commission Regional Airport System Plan**

FAA Site No	Airport No	AIRPORTS	Activity	Safety	Maintenance and Infrastructure	Future Improvements	Environmental/Land Use Compatibility/Noise	Approach Protection	Other
01651.*A	1	<b>ALAMEDA COUNTY</b> <b>Hayward Executive</b>	60 percent itinerant and 40 percent local general aviation operations. Flight training, charter, rental, corporate aviation.	Entrance taxiway to Runway 28L will be widened to same width as Runway 10R-28L to enable the entrance taxiway to be designated as part of the runway for departures to the northwest	Pavement overlays included in Airport Master Plan and will be funded based on availabilities of FAA Airport Improvement Program grant funds.	Hangar waiting list Need terminal building Corporate aviation facilities Land available for development Need for ILS	No significant environmental issues. Noise complaints from touch-and-go operations City Noise Ordinance (very few aircraft operations exceed)	Portions of runway protection zones not owned by City Alameda County updating Comprehensive Land Use	Final approach to Metropolitan Oakland International overflies Airport and delays departures of IFR corporate aircraft out of Hayward
01779.2*A	2	<b>Livermore Municipal</b>	40 percent itinerant and 60 percent local general aviation operations. Flight training, charter, rental, corporate aviation. Airline training.	FAA Airport Improvement Program Project in 2003 to upgrade entire runway and taxiway sign system.	Infrastructure is in good condition.	Airport Master Plan and Business Plan in progress; proposed Runway 7R-25L extension from 2,700 feet to 4,000 feet and increase pavement strength from 12,500 pounds to 45,000 pounds (dual wheel); 150 on hangar waiting list. Will lease land for private development. Hangars needed for corporate aircraft.	EA/IS in progress Noise issues with people in Pleasanton. Real estate disclosures included for neighboring communities.	Alameda County updating Comprehensive Land Use Plan in 2002	City Council voted down potential for future scheduled commuter service. No full service fixed base operator. No ultralights are allowed.
01971.*A	3	<b>Metropolitan Oakland International</b>	60 percent itinerant and 40 percent local general aviation operations. General aviation 58 percent of total aircraft operations. Air carrier and cargo at South Field; cargo at North Field. Flight training, charter, rental, corporate aviation. Airline training.	May relocate ILS to Runway 27L, which is longer than Runway 27R. The future of Runway 15-33	Slowly upgrading infrastructure, utilities, drainage, roads and aircraft parking apron. Aircraft apron pavement strength. Repair runways (Runway 27L overlayed seven years ago; Runway 29 overlayed 09/01. Runway 27R overlay will be finished 09/02.) Condition of large hangars. Facilities outdated.	Expect same level of tiedowns and T-hangars for personal and recreational activity in future. Increase corporate aviation facilities. Property available to be developed. Waiting list for hangars.	Wetlands area released for development. Bird strikes. Noise abatement procedures. General aviation noise complaints. School and church complex approved by Alameda at west departure end of Runway 29. No jet departures on Runway 27L and 27R.	Alameda County updating Comprehensive Land Use Plan in 2002.	General aviation generates small percentage of total airport revenue. Potential migration of smaller aircraft to other airports. Airport generated tax revenue going to local communities. Public lack of awareness of value of corporate aviation.
01437.*A	4	<b>CONTRA COSTA COUNTY</b> <b>Buchanan Field</b>	55 percent itinerant and 45 percent local general aviation operations. Charter, flight training, corporate aviation,			Corporate jet activity continues to grow. Significant waiting list of general aviation hangars.	Community concerns regarding environmental issues. Completed Airport Land Use Plan Update in 2002.		Airport Master Plan and FAR Part 150 studies need updating. Airport maintains its FAR Part 139 certificate.
01356.5*A	5	<b>Byron</b>	25 percent itinerant and 75 percent local general aviation operations. Skydivers, ultralights, gliders and parachute jumping.		Existing electrical. Only have non-potable water and septic sewer.		Two-thirds of 1,400 acres on Airport are environmentally protected. Airport Land Use Plan Update in 2002.		Will be updating Airport Master Plan beginning in 2003.

Table 4-1 - continued

**AIRPORT HIGHLIGHTS, Metropolitan Transportation Commission Regional System Plan**

FAA Site No	Airport No	AIRPORTS	Activity	Safety	Maintenance and Infrastructure	Future Improvements	Environmental/Land Use Compatibility/Noise	Approach Protection	Other
01967.*A	6	<b>MARIN COUNTY</b> <b>Gnoss Field</b>	25 percent itinerant and 75 percent local general aviation operations. Charters, rentals, corporate aviation, flight training.		The recurring settlement of the airport land necessitates regular runway surface profile repairs.	Proposed runway extension from 3,300 feet to 4,400 feet. Hangar waiting list for small and corporate aircraft. Limited space for hangar development.	Airfield on reclaimed tidelands. Noise issues with airport operations and overflights to and from other Bay Area airports. Recently published noise abatement program. No land within the County Airport Land Use Plan's Airport Influence Area that can be developed.	Approaches are protected by environmentally-sensitive nature of surrounding land; e.g., wetlands/reclaimed tidelands. Agricultural lands to the south and open space/airport-owned land to the north.	Limited runway to taxiway separation (limits size of aircraft). Weight restrictions on some portions of the airfield. Limited aircraft parking apron capacity. Crosswinds. General Agreement that airport will not accommodate scheduled commercial flights.
01933.*A	7	<b>NAPA COUNTY</b> <b>Napa County</b>	45 percent itinerant and 55 percent local general aviation operations. Airline flight training (JAL, IASCO). Flight training, corporate aviation, charter, rental, California Highway Patrol.	Perceived need for longer runway; downgraded runway pavement strength; need for instrument landing system glideslope component. Operational restrictions on some aircraft. Need for on-airport radar. Restricted airspace to south.	Need new and replacement fencing; lot of runway repairs in recent years.	Updating Airport Master Plan; 130 on hangar waiting list; lack of corporate hangars.	Bird strike problems; wetlands; proposed luxury housing near Airport; noise abatement procedures.	Want to buy land for runway protection zone; aviation easements for permit around Airport.	Potential revenue to communities from corporate aircraft and hangar taxes, fuel sales. Cost and availability of insurance; cost of living to compete against flight schools in other areas and states.
01244.8*A	8	<b>Angwin-Parrett Field</b>							
01638.*A	9	<b>SAN MATEO COUNTY</b> <b>Half Moon Bay</b>	60 percent itinerant and 40 percent local general aviation operations. Flight training. Activity impacted by weather conditions.	Need ASOS for lower minimums for GPS approach.		Airport Master Plan accepted, but not adopted by County Board of Supervisors; environmental process to begin in 2003. Parallel and exit taxiways, ASOS and PAPI. Additional hangars. Long waiting list for hangars. Will eliminate older hangars. Fencing/security improvement.	Taxiway improvements to encourage full stop landings as noise benefit. Noise and over-flight issues. Will revise noise abatement procedures. Traffic pattern issues and may change traffic pattern. Voluntary noise abatement restrictions.		Generate more nonaviation than aviation revenue and want to increase nonaviation revenue; through-the-fence operations.
02160.1*A	10	<b>San Carlos</b>	45 percent itinerant and 40 percent local general aviation operations; flight training. Activity impacted by weather conditions.	Proposed runway extension changed to displaced threshold at north end. Concern over how it would affect the type of airport. Now only stopways (runway safety areas) at both ends. No instrument approach procedure as concern over potential interactions with San Francisco International Airport operations. Runway length and pavement strength limitations.		Airport Master Plan accepted but not adopted by Board of Supervisors-Draft EIR under review. Additional hangars to replace tiedowns; no net gain of aircraft spaces. Long waiting list for hangars. Install ASOS and PAPI. Limited space available for development. Fencing/security improvements	Land-locked regarding expansion; groups wanting to close the Airport. Comprehensive noise abatement program; voluntary nighttime restrictions (no evening flight training); voluntary noise abatement restrictions.	Land-locked and potentially physically constrained; looking at compatible development in approach area; residential development under flight tracks and only disclosure statement; some aviation easements.	Through-the-fence operations; insurance concerns.

Table 4-1 - continued

**AIRPORT HIGHLIGHTS, Metropolitan Transportation Commission Regional System Plan**

FAA Site No	Airport No	AIRPORTS	Activity	Safety	Maintenance and Infrastructure	Future Improvements	Environmental/Land Use Compatibility/Noise	Approach Protection	Other
02187.*A	11	<b>San Francisco International</b>							
01927.*A	12	<b>SANTA CLARA COUNTY Moffett Federal Airfield</b>	NASA, military and related contractor cargo activity; California Air National Guard; Military and U.S. Coast Guard training flights. Potential for practice ILS approaches; not available for public use.	Waiver on distance from end of runways to US 101 highway. Informal agreement to trade airspace with Palo Alto on weekends as Palo Alto instrument approach overflies Moffett. Do not have FAA signage and markings	California Air National Guard cost share on airfield maintenance/utilities, land, hangar space and airfield. California Air National Guard provides air traffic control tower and aircraft rescue and firefighting for aircraft and structural firefighting. Some minor pavement condition problems.	No proposed airport improvements.	Aircraft could operate over the Bay at night, weather permitting. Not included in County Comprehensive Airport Land Use Plan. Caltrans ALUC guidelines may apply to Airport; not protected from encroachment by FAR Part 77 regulations as it is considered a private airport. Noise contours in Research Park Plan are based on future NASA and California Air National Guard use only, but plan is compatible with air cargo and general aviation use alternatives.		New NASA Research Park Plan reduces future annual aircraft operations from 80,000 to 24,000 as part of air quality tradeoff.
02389.1*A	13	<b>Palo Alto</b>	35 percent itinerant and 65 percent local general aviation operations. Flight training, charter, rental, sales, avionics, fueling, restaurant.	Runway length constraint; no runway extension potential. Potential use of FAA declared distance concept to increase Runway 31 takeoff distance. GPS VOR/OME approach impacts San Jose International departures. Security.	Drainage/flooding issues	Ongoing Airport Master Plan Limited expansion capability Need for transient aircraft parking. Waiting list for tie-downs. Need facilities for turbo-prop twin-engine aircraft. Need for hangars.			Santa Clara County lease with City of Palo Alto expires in 2017. Tiedown waiting list. Political constraints.
02201.*A	14	<b>Reid-Hillview</b>	35 percent itinerant local general aviation operations. Flight training, charter, rental, sales, avionics, fueling.	Reliever airport, but no instrument approach procedures (FAA has not certified GPS approach scheduled to be published August 2002). Runway length constraint. Security	Subsurface water problems under hangars.	Ongoing Airport Master Plan Need for hangars Need for transient aircraft parking. Tiedowns full. Need facilities for turbo-prop twin-engine aircraft.	Proposed redevelopment of Eastridge Shopping Center to south. ALUC voted down plans to expand community center and library in safety area to north. Bank in safety area to south. ALUC voted down plans		Month-to-month agreements policy rather than long-term leases policy. Political constraints.
02204.*A	15	<b>San Jose International</b>	About 275 based aircraft from single-engine piston propeller aircraft up to large corporate jets. 75 percent itinerant and 25 percent local general aviation operations. General aviation operations 35 percent of total aircraft operations. Four fixed base operator leaseholds (two full-service) plus City-managed aircraft storage facilities. Corporate general aviation increasing and small aircraft general aviation decreasing. Flight schools and training leaving airport. Runway 11-29 (west side) is 4,600 feet long and used exclusively by general aviation. Corporate jets use the air carrier runways.	Airspace constraints and compatibility of small general aviation aircraft and large air carrier and cargo aircraft. Airspace incompatibility for flight training. Apron congestion for increasing number of large corporate jets.	Pavement maintenance projects.	Limited space for general aviation under Airport Master Plan (southwest side of airfield). Removal of east side T-hangars and fixed base operator leasehold. Reconfiguration of southwest side for general aviation plus new helipad. Taxiway improvements Based aircraft capacity of 320 by 2010.	Noise Control Program includes curfew on a few large Stage 2 corporate aircraft and no jet aircraft flight training. Increased operations by aircraft using Airport, but hangared at other airports. General aviation aircraft operations (helicopter and fixed wing) and curfew violations contribute to community noise complaints. Height limitations in vicinity per FAA Part 77.	Runway Protection Zone for Runway 11-29 entirely on-airport.	Current unmet storage demand for large aircraft means added cost to operators and sales tax and property tax revenue going to other jurisdictions if aircraft are based outside of County. General aviation is not the best use of land when air carrier facilities need to be expanded. Legal challenges to the Airport curfew could have implications for future corporate general aviation.



Table 4-1 - continued

**AIRPORT HIGHLIGHTS, Metropolitan Transportation Commission Regional System Plan**

FAA Site No	Airport No	AIRPORTS	Activity	Safety	Maintenance and Infrastructure	Future Improvements	Environmental/Land Use Compatibility/Noise	Approach Protection	Other
02213.4*A	16	Santa Clara County--continued  South County	35 percent itinerant and 65 percent local general aviation operations; flight training, charter, rental.	Has GPS approach Security	Slurry seal and pavement maintenance for runway, taxiway and apron. Overlay east parallel taxiway.	'106 new hangars will be constructed in 2003. Ongoing Airport Master Plan Need for ASOS or AWOS Potential runway extension Need for transient aircraft parking.	Revised flight tracks recently.		Ultralights
02389.1*A	17	SOLANO COUNTY  Nut Tree	'50 percent local general aviation operations; flight school, rental, corporate aviation. University of California-Davis Life Flight Helicopter.	Within military alert area for Travis Air Force Base, and Travis can close airspace to civil use.		37 on waiting list for hangars; Corporate jet center; Want to extend runway from 4,700 feet to 5,500 or 6,000 feet; 30 County hangars are planned; 15 corporate hangars	Very few noise complaints; concern about new development around the Airport.		
02110.9*A	18	Rio Vista Municipal	There are an estimated 56 based aircraft; 70 percent local and 30 percent itinerant general aviation operations. No fixed base operator or flight training. Terminal building leased for nonaviation purposes. Corporate hangar available for lease; have fuel island.	City staff maintains facility and grounds and check landing lights, etc.	Current FAA grant for slurry seal of both Runways 7-25 and 14-32.	Need fixed base operator/flight training/pilot's lounge/café' to attract additional users. Airport Master Plan Update to identify future capital improvement program, socio-economic issues and security issues.	Good Neighbor Program for take-offs and landings.	Pilots activate landing lights and take-offs automatically.	
01565.1*A	19	Travis Air Force Base							
01411.1*A	20	SONOMA COUNTY  Cloverdale Municipal							
01651.7*A	21	Healdsburg Municipal	25 percent itinerant and 75 percent local general aviation operations; flight training.		Maintenance at the Airport is limited due to lack of funding. Larger projects have been deferred due to lack of funding.	Airport Master Plan is the Airport Layout Plan prepared by the City. Airport has never received FAA funding.	No noise complaints. Limit touch-and-goes to three per aircraft per day for noise abatement.		Leases are an issue as City does not allow private hangar development on public property. The City may say no more investment on Airport property.

Table 4-1 - continued

**AIRPORT HIGHLIGHTS, Metropolitan Transportation Commission Regional System Plan**

FAA Site No	Airport No	AIRPORTS	Activity	Safety	Maintenance and Infrastructure	Future Improvements	Environmental/Land Use Compatibility/Noise	Approach Protection	Other
02042.*A	22	Sonoma County--continued  <b>Petaluma Municipal</b>	25 percent itinerant and 75 percent local general aviation operations; flight school, rental.	Transient parking full on weekends.		Will build 51 T-hangars and four corporate hangars; 99 people on hangar waiting list. Do not want to lengthen runway. Helicopter maintenance facility has been proposed but not approved yet.	Bird strikes; Canada geese attracted to golf course adjacent to the Airport. Use Border Collies to chase geese away; also use noise-making devices. Occasional noise complaints. Golf course abuts the Airport, serves as a green belt. Real estate encroachment-homes being built right next to airport. City has an aviation easement. Lighting problems with new Prince Park Fields sports complex on other side of golf course under ultralight pattern; lighting will be hooded.	The airport owns 50 acres in the approach to runway 29. Land was dedicated by the developer to the Airport and includes designated wetlands and vernal pools were developed.	City Council has promised no scheduled commercial service.
02260.*A	23	<b>Sonoma County</b>	60 percent itinerant and 40 percent local aircraft operations; three flight schools, Experimental Aircraft Association Chapter, life flights, CDF year-round facility, Sheriff helicopter, warbird restoration; flight training, charter, rental, corporate aviation; UPS and FEDEX one flight per day; scheduled charter six times per day Santa Rosa to Oakland. Hangar waiting lists by type of aircraft. About 377 based aircraft. Balloon and skydiving activities.		Water supply systems; repave roads, parking lots, aircraft parking aprons. ARFF station is inadequate. Replace fencing in some areas. Hangar maintenance; landscaping; airfield lighting and painting.	Runway extension alternatives looking at extending 5,100 feet to 6,000 feet (6,000 feet required for regional jets). County building 10 executive hangars and 11 T-hangars. Need utilities to open south end for facilities (corporate hangars, aircraft museums, small package carriers). New/expanded terminal building project on hold. Potential for Runway 1-19 lighting; potential for 3,000-foot general aviation parallel runway.	Airport is in salamander habitat; endangered fish are off airport but would affect runway safety area by needing to relocate road and affecting a creek. Vernal pools, wildflower preserve. Do not get many noise complaints. In the Bay Area, Air Quality Containment Area re painting. Windsor development to north is growing and subdivisions expanding to the south. County General Plan imposes noise limitations to 78 dB from 10 p.m. to 6 a.m. No noise abatement procedures at present but will recommend common-sense procedures in Airport Rules and Regulations.	Runway protection zone(s) not owned by County. Timeshares approved and under construction under approach. Portions of runway protection zones not owned by City.	Airport Master Plan updated in 1998; new Airport Layout Plan in 2002. Countywide Airport Land Use Plan.
02299.8*A	24	<b>Sonoma Skypark</b>							
02281.6*A	25	<b>Sonoma Valley</b>							

Source: Individual Airports

Table 4-2

**STATUS OF PLANNING EFFORTS**

Table 4-2  
**STATUS OF PLANNING EFFORTS**  
**Metropolitan Transportation Commission Regional Airport System Plan**

FAA Site No	Airport No	AIRPORTS	Airport Master Plan	Airport Layout Plan	Airport Land Use Plan	Environmental Documentation	FAR Part 150 Airport Noise Compatibility Plan
		<b>ALAMEDA COUNTY</b>		<u>updated 10/02/02</u>	Alameda County Airport Land Use Policy Plan, adopted July 16, 1986. Update in process.		
01651.*A	1	HAYWARD EXECUTIVE	Hayward Executive Airport Master Plan, April 2002	Hayward Executive Airport Layout Plan, approved by FAA June 7, 2002		Hayward Executive Airport Environmental Assessment/ Environmental Impact Report, adopted February 20, 2002	n.a.
01779.2*A	2	LIVERMORE MUNICIPAL	Livermore Municipal Airport Master Plan, Public Review, July 2002	Livermore Municipal Airport Layout Plan approved by FAA August 27, 2002 (Conditional)		Public Review, July 2002	n.a.
01971.*A	3	METROPOLITAN OAKLAND INTERNATIONAL		Metropolitan Oakland International Airport Layout Plan, approved by FAA December 21, 2000			
		<b>CONTRA COSTA COUNTY</b>			Contra Costa County Draft Airport Land Use Compatibility Plan, May 2000		
01437.*A	4	BUCHANAN FIELD	Buchanan Field Master Plan Study, Technical Report, Final Draft December 1988	Buchanan Field Airport Layout Plan, adopted by the County September 18, 1990, and approved by FAA October 8, 1996			Buchanan Airport FAR Part 150, Airport Noise Compatibility Program; Noise Exposure Map Report, Final Report August 1, 1988; and Airport Noise Compatibility Program, Phase II Final Report January 1992
01356.5*A	5	BYRON	East Contra Costa County Airport Master Plan, Byron, California, May 1986	Byron Airport Layout Plan, approved by FAA February 20, 1992	East Contra Costa County (Byron) Airport Comprehensive Land Use Plan, April 1991		n.a.
		<b>MARIN COUNTY</b>					
01967.*A	6	GNOSS FIELD	Marin County Airport (Gross Field) Master Plan July 31, 1989	Gross Field Airport Layout Plan, approved by FAA April 13, 2002 (Conditional)			
		<b>NAPA COUNTY</b>			Napa County Airport Land Use Compatibility Plan, adopted April 22, 1991, amended January 1994		
01933.*A	7	NAPA COUNTY	Napa County Airport Master Plan, adopted 1991	Napa County Airport Layout Plan, approved by FAA March 20, 2000 (Conditional)			

Table 4-2 - continued

**STATUS OF PLANNING EFFORTS, Metropolitan Transportation Commission Regional System Plan**

FAA Site No	Airport No	AIRPORTS	Airport Master Plan	Airport Layout Plan	Airport Land Use Plan	Environmental Documentation	FAR Part 150 Airport Noise Compatibility Plan
01244.8*A	8	Napa County--continued ANGWIN-PARRETT FIELD	n.a.				
		<b>SAN MATEO COUNTY</b>					
01638.*A	9	HALF MOON BAY	Half Moon Bay Airport Master Plan, accepted by the County Board of Supervisors on July 22, 1997	Half Moon Bay Airport Layout Plan, approved by FAA December 19, 1996			
02160.1*A	10	SAN CARLOS	San Carlos Airport Master Plan, accepted by the County Board of Supervisors on May 20, 1997	San Carlos Airport Layout Plan, approved by FAA December 19, 1996			
02187.*A	11	SAN FRANCISCO INTERNATIONAL		San Francisco International Airport Layout Plan, approved by FAA October 22, 2001			
		<b>SANTA CLARA COUNTY</b>					
01927.*A	12	MOFFETT FEDERAL AIRFIELD	Santa Clara County Airports Master Plan Report Executive Summary, for Palo Alto, Reid-Hillview and South County, adopted by Santa Clara County June 21, 1982. Update in process.		Santa Clara County Airport Land Use Commission, Land Use Plan for Areas Surrounding the County's Airports, adopted September 1992	Moffett Federal Airfield, Draft Environmental Assessment, June 17, 1996	
02389.1*A	13	PALO ALTO	June 21, 1982. Update in process.	Palo Alto Airport Layout Plan, approved by FAA July 25, 2001	Adopted September 1992		Palo Alto Airport FAR Part 150, Airport Noise Compatibility Program, Phase II Final Report January 1992
02201.*A	14	REID-HILLVIEW	June 21, 1982. Update in process	Reid-Hillview Airport Layout Plan, approved by FAA July 10, 2000	Adopted September 1992		Reid Hillview Airport FAR Part 150, Draft Airport Noise Compatibility Program September 2002
02204.*A	15	SAN JOSE INTERNATIONAL	San Jose Int'l Airport Master Plan Update, December 1999 (Executive Summary)	San Jose Int'l Airport Layout Plan, approved by FAA November 6, 2001	Adopted September 1992		

Table 4-2 - continued

**STATUS OF PLANNING EFFORTS, Metropolitan Transportation Commission Regional System Plan**

FAA Site No	Airport No	AIRPORTS	Airport Master Plan	Airport Layout Plan	Airport Land Use Plan	Environmental Documentation	FAR Part 150 Airport Noise Compatibility Plan
02213.4*A	16	Santa Clara County--continued SOUTH COUNTY	June 21, 1982. Update in process.	South County Airport Layout Plan, approved by FAA August 28, 1998	Adopted September 1992		
		<b>SOLANO COUNTY</b>			Solano County Airport Land Use Compatibility Plan, Nut Tree Airport, Vacaville Gliderport, May 1988; Solano County Airport Land Use Compatibility Review Procedures, adopted by Solano County Airport Land Use Commission June 13, 2002		
02389.1*A	17	NUT TREE	Nut Tree Airport Master Plan, March 1993	Nut Tree Airport Layout Plan, approved by FAA November 19, 2001			
02110.9*A	18	RIO VISTA MUNICIPAL		Rio Vista Municipal Airport Layout Plan, approved by FAA February 22, 1989			
01565.1*A	19	TRAVIS AIR FORCE BASE			Travis Air Force Base Land Use Compatibility Plan, adopted by Solano County Airport Land Use Commission June 13, 2002		
		<b>SONOMA COUNTY</b>					
01411.1*A	20	CLOVERDALE MUNICIPAL		Cloverdale Municipal Airport Layout Plan, approved by FAA September 11, 1990			
01651.7*A	21	HEALDSBURG MUNICIPAL		Healdsburg Municipal Airport Layout Plan, approved by FAA February 11, 2002			
02042.*A	22	PETALUMA MUNICIPAL	Petaluma Municipal Airport Master Plan/Final Environmental Impact Report, approved by the Petaluma City Council November 6, 1978	Petaluma Municipal Airport Layout Plan, approved by FAA December 16, 1997		Petaluma Municipal Airport Master Plan/Final Environmental Impact Report, approved by the Petaluma City Council November 6, 1978	
02260.*A	23	SONOMA COUNTY	Sonoma County Airport Master Plan December 15, 1998	Sonoma County Airport Layout Plan, approved by FAA September 3, 2002			
02299.8*A	24	SONOMA SKYPARK	n.a.				
02281.6*A	25	SONOMA VALLEY	n.a.				

SOURCE: FAA Airport Land Use Commissions and Individual Airports

Note: n.a. = not applicable

## Chapter 5

### GLOSSARY

**Air carrier (airline):** An air carrier certified under FAR Parts 121 or 127. Aircraft operated by an airline that holds a certificate of public convenience and necessity authorizing performance of scheduled air transportation. Air carrier airlines conduct scheduled services on specified air routes operating aircraft with more than 60 seats. These air carriers may also provide non-scheduled or chartered services as a secondary operation.

**Air taxi:** Aircraft operated by a company or individual that performs air transportation on a scheduled or non-scheduled basis over either designated or unspecified routes, with aircraft having less than 60 seats. An air carrier certified under FAR Part 135. Commuter airline flights are a special category of air taxi operations (see commuter airline).

**Air traffic control:** A term used to denote a number of different types of facilities which are operated by or under the auspices of the Federal Aviation Administration and which provide informational, navigational, and collision avoidance services to aircraft in flight. Air traffic control towers and air route traffic control centers are elements of the air traffic control system.

**Air traffic control tower (ATCT) (“tower”):** A facility located within the physical boundaries of certain airports and consisting of a tower which provides visual and/or radar tracking, ground-to-air radio communications, traffic management, and limited informational, navigational, and separation services to aircraft operating in the immediate vicinity of an airport.

**Air route traffic control center (ARTCC):** A facility which provides radar tracking and informational, navigational, and separation services to aircraft operating beyond the immediate vicinity of an airport.

**Aircraft Operation:** A take off or a landing.

**Angle of descent:** The angle, with respect to a horizontal plane, of the flight path of an aircraft descending from a higher altitude to a lower altitude (usually expressed in degrees or in feet per nautical mile). Also referred to as **descent slope**.

**Approach angle:** The angle, with respect to a horizontal plane, of the flight path of an aircraft descending to land at an airport (usually expressed in degrees or in feet per nautical mile). Also referred to as **approach slope**.

**Approach lighting system (ALS):** An airport lighting system which, by means of a standardized array of lights on the ground provides visual cues which enable pilots of aircraft approaching the runway in conditions of darkness or poor visibility, to align the flight path of the aircraft with the extended centerline of the runway.

**Base leg:** A segment of the standard airport traffic pattern which extends at right angles from the extended runway centerline at some distance from the approach end of the runway. The base leg extends from the downwind leg of the traffic pattern to the final approach course (extended runway centerline) and is flown in the direction toward the runway centerline. The altitude of aircraft flying the base leg is usually between 1,000 and 400 feet above ground level.

**Circle-to-Land Procedure:** A series of standardized aerial procedures which enable aircraft which have completed an instrument approach intended to culminate in a landing on a specified runway to maneuver for landing on a different runway than specified in the basic instrument approach while maintaining visual contact with the airport.

**Climb gradient:** The angle, with respect to a horizontal plane, of the flight path of an aircraft ascending from a lower altitude to a higher altitude (usually expressed in feet per nautical mile).

**Closed traffic:** An airborne maneuver by which an aircraft takes off from and lands at an airport without leaving the immediate airport vicinity (usually performed as a flight training or practice maneuver) or the airport traffic pattern flown by such an aircraft.

**Community noise equivalent level (CNEL):** A measure, in decibels, of the cumulative noise exposure at a given site. The CNEL mathematically increases the significance of noise events occurring during evening and nighttime hours, in response to the widely-held assumptions that such events are more intrusive than similar events occurring during daytime hours.

**Commuter airline:** Aircraft operated by an airline that performs scheduled air transportation over specified routes using aircraft with fewer than 60 seats. Commuter airlines provide at least five scheduled round trips per week between two or more points or carry mail.

**Compatible:** A designation employed within the Land Use Matrix to denote that a proposed land use is not prohibited or restricted by the Land Use Matrix within the specified zone.

**Consistent:** A determination made by the ALUC when a referral meets the conditions outlined in the ALUP.

**Crosswind departure:** A VFR departure procedure in which an aircraft exits the airport area by extension of the crosswind leg of the traffic pattern.

**Crosswind leg:** A segment of the standard airport traffic pattern which extends at right angles from the extended runway centerline at some distance from the departure end of the runway. The crosswind leg extends from the upwind leg of the traffic pattern to the downwind leg and is flown in the direction away from runway centerline.

**Decibel (dB):** A unit for expressing the relative intensity of sounds on a scale of zero for the average least perceptible sound to about 130 for the average pain level.



**Decision altitude (DA):** The minimum altitude above mean sea level to which an aircraft operating according to a precision instrument approach may descend without visual contact with the airport or the airport environs.

**Decision height (DH):** The minimum vertical distance above the height of the intended landing zone to which an aircraft operating according to a precision instrument approach may descend without visual contact with the airport or the airport environs.

**Density of Land Use:** The number of people a development can attract per acre.

**Density of Residential Development:** The number of dwelling units per acre in a development or proposed development.

**Departure Procedure (DP):** See **instrument departure procedure**.

**Descent slope:** The angle, with respect to a horizontal plane, of the flight path of an aircraft descending from a higher altitude to a lower altitude (usually expressed in degrees or in feet per nautical mile). Also referred to as **angle of descent**.

**Distance Measuring Equipment (DME):** An apparatus, consisting of a ground-based radio transmitter and a specialized airborne receiver, which provides information regarding the slant-range distance of an aircraft from the ground-based facility. Also, by extension, any airborne maneuver, course, or flight path which is determined through the application of DME information.

**Downwind departure:** A VFR departure procedure in which an aircraft exits the airport area by extension of the downwind leg of the traffic pattern.

**Downwind leg:** A segment of the standard airport traffic pattern which is parallel to the runway of intended landing, is usually between 1/2 and 1 1/2 miles lateral to the runway, and is flown in a direction opposite to the direction of intended landing. The downwind leg is, in most instances, is the initial leg of the traffic pattern for landing aircraft. The altitude of aircraft flying the base leg is usually between 1,000 and 800 feet above ground level.

**Enplaned passengers:** The total number of revenue-producing passengers boarding aircraft, including originating, stopover, and transfer passengers, in scheduled and nonscheduled services.

**Fixed base operator (FBO):** A provider of support services to users of an airport. Such services include fueling, hangaring, flight training, repair, maintenance, and other services.

**General aviation:** That portion of civil aviation which encompasses all facets of aviation except air carriers and air taxis. It includes a multitude of diverse and growing uses of aircraft, ranging from flying for enjoyment and the transportation of personnel or cargo by business firms and individuals in privately-owned aircraft, to highly specialized uses such as crop dusting, pipeline patrol and aerial advertising. It included agricultural,

industrial and business/corporate aviation, using an aircraft for flight training, the aviation of Federal, State and local governments, and miscellaneous other aviation uses.

**Glide slope:** An apparatus which provides, by means of radio signals or light signals, vertical guidance to aircraft approaching to land, or (by extension) the vertical flight path flown by aircraft receiving guidance from such a system.

**Global positioning system (GPS):** A navigational aid which determines the position, direction of flight, speed, and (to a limited extent) altitude of an aircraft by means of signals received from a constellation of earth-orbiting satellites.

**Global positioning system (GPS) approach:** A series of standardized, predetermined, and published aerial maneuvers which are based on navigational data received from earth-orbiting satellites and which enable aircraft to descend toward an airport with the intention of landing when meteorological conditions are such that a safe approach cannot be made solely through the use of visual information. A typical GPS approach permits aircraft to descend to within 400 to 500 feet of the surface solely on the basis of satellite navigation aids.

**Global positioning system (GPS) overlay:** An FAA designation applied to certain instrument approach procedures originally designed to be executed by reference to ground-based navigational aids which authorizes pilots to perform the approach solely by reference to navigational information provided by earth-orbiting GPS satellites.

**Inconsistent:** A determination made by the ALUC when a proposed local action does not meet the conditions outlined in the ALUP.

**Instrument approach:** A series of standardized, predetermined, and published aerial maneuvers which are based on navigational data received from ground-based navigational aids or satellites and which enable aircraft to descend toward an airport with the intention of landing when meteorological conditions are such that a safe approach cannot be made solely through the use of visual information.

**Instrument departure procedure (DP):** A series of standardized, predetermined, and published aerial maneuvers which are based on navigational data received from ground-based navigational aids or satellites and which enable aircraft to depart from an airport when meteorological conditions are such that a safe departure cannot be made solely through the use of visual information. Formerly known as a **standard instrument departure (SID)**.

**Instrument flight rules (IFR):** A set of FAA rules, regulations, and procedures which define flight operations under conditions which do not permit navigation by means of visual information alone. Also employed as an adjective to designate a flight plan which will enable an aircraft to operate under conditions which preclude navigation by means of visual information.

**Instrument landing system (ILS):** A precision instrument approach system which provides aircraft with both vertical (glideslope) and lateral guidance by means of radio signals transmitted from installations within the physical boundaries of the airport .

**Instrument landing system (ILS) approach:** A series of standardized, predetermined, and published aerial maneuvers which are based on vertical and lateral navigational data received from radio transmitters located within the physical boundaries of the airport and which enable aircraft to descend toward an airport with the intention of landing when meteorological conditions are such that a safe approach cannot be made solely through the use of visual information. A typical ILS approach permits aircraft to descend to within 200 feet of the surface.

**Instrument meteorological conditions (IMC):** Weather conditions specified in FAA regulations under which aircraft are not authorized to takeoff, land, or maneuver under visual flight rules and may operate only by reference to electronic aids to navigation. The visibility and cloud clearance requirements for IMC are determined by the airspace designation in which and aircraft is operating, by the aircraft's altitude above both sea level and ground level, and by whether the aircraft is operating in daylight or at night.

**Localizer (LOC):** An apparatus which provides, by means of radio signals from a transmitter located within the physical boundaries of an airport and a specialized airborne receiver, lateral course guidance for aircraft descending to land.

**Localizer approach:** A series of standardized, predetermined, and published aerial maneuvers which are based on lateral guidance information received by means of a localizer transmitter located within the physical boundaries of an airport and which enable aircraft to descend toward an airport with the intention of landing when meteorological conditions are such that a safe approach cannot be made solely through the use of visual information. Localizer approaches do not provide vertical guidance, but localizers are often coupled with glide slope transmitters. A typical localizer approach permits aircraft to descend to within 400 to 500 feet of the surface solely on the basis of radio navigation aids.

**Localizer-type directional array (LDA):** A type of apparatus which provides, by means of radio signals from a transmitter located within the physical boundaries of an airport and a specialized airborne receiver, lateral course guidance for aircraft descending to land. The primary distinction between an LOC and an LDA is that the final approach course provided by the LDA is not aligned with the runway centerline. Glide slope information is never provided in conjunction with an LDA.

**Localizer-type directional array (LDA) approach:** A series of standardized, predetermined, and published aerial maneuvers which are based on lateral guidance information received by means of an LDA transmitter located within the physical boundaries of an airport and which enable aircraft to descend toward an airport with the intention of landing when meteorological conditions are such that a safe approach cannot be made solely through the use of visual information.

**Minimum descent altitude (MDA):** The minimum altitude above mean sea level to which an aircraft operating according to a non-precision instrument approach may descend without visual contact with the airport or the airport environs.

**Minimum descent height (MDH):** The minimum vertical distance above the height of the intended landing zone to which an aircraft operating according to a non-precision instrument approach may descend without visual contact with the airport or the airport environs.

**Missed approach:** An instrument approach which does not terminate in a landing. Usual reasons for a missed approach include failure to establish visual contact with the airport environs at the completion of an instrument approach, loss of course guidance, or instructions from air traffic control.

**Missed approach course:** A standardized, predetermined, and published flight path to be flown in the event of a missed approach.

**Nautical mile (nm):** a measure of distance equal to 6076.115 feet (1852 meters).

**Non-directional beacon (NDB):** A radio beacon which transmits signals which do not contain encoded directional information, but which can be used for as a “homing” signal for aircraft tracking to or away from the transmitter.

**Non-directional beacon (NDB) approach:** A series of standardized, predetermined, and published aerial maneuvers which are based on lateral guidance information received by means of an NDB transmitter located either at or remote from an airport and which enable aircraft to descend with the intention of landing when meteorological conditions are such that a safe approach cannot be made solely through the use of visual information.

**Non-precision instrument approach procedure:** An instrument approach procedure for which vertical guidance is not provided. Common types of non-precision instrument approach procedures include VOR, GPS, localizer, NDB, and LDA.

**Operation:** A takeoff or landing.

**Precision approach path indicator (PAPI):** A navigational aid installed adjacent to an airport runway which provides, by means of colored light beams, vertical course guidance to aircraft approaching to land on that runway. The usual descent slope provided by PAPI installations is 3°.

**Precision instrument approach procedure:** An instrument approach procedure for which vertical guidance is provided. ILS is the only common type of precision instrument approach currently in use. In the near future, certain GPS approaches will be upgraded to provide vertical guidance information, as well.

**Prohibited:** A determination made by the ALUC when a proposed local action does not meet the criteria set forth in the Land Use Matrix.

**Rate of climb:** The vertical speed or rate of change in altitude of an aircraft ascending from a lower altitude to a higher altitude (usually expressed in feet per minute).

**Rate of descent:** The vertical speed or rate of change in altitude of an aircraft descending from a higher altitude to a lower altitude (usually expressed in feet per minute).

**Reliever Airport:** An airport to serve general aviation aircraft, which might otherwise use a congested air carrier served airport.

**Standard instrument departure (SID):** See **instrument departure procedure**.

**Standard Terminal Arrival Route (STAR):** A series of standardized, predetermined, and published routes, procedures and/or maneuvers which enable aircraft to transition safely from the en route environment to the terminal environment. A STAR does not culminate in a landing, but terminates at a point from which an instrument approach to landing may be initiated.

**Straight-out departure:** A VFR departure procedure in which an aircraft exits the airport area along the extended centerline of the departure runway by extension of the upwind leg of the traffic pattern.

**Tactical air navigation facility (TACAN):** A ground-based radio navigational aid which transmits encoded signals that enable aircraft equipped with appropriate receivers to determine both bearing and distance with respect to the facility. The information with respect to bearing is generally available only to military aircraft, while information regarding distance is usable by both military and civil aircraft. TACAN facilities are frequently co-located with VORs.

**Terminal Radar Approach Control (TRACON):** An FAA air traffic control service to aircraft arriving and departing or transiting airspace controlled by the facility. TRACONs control IFR and participating VFR flights. The TRACON for the Bay Area, Northern California TRACON, is now located at Mather Airport near Sacramento.

**Unobstructable Emergency Aircraft Landing Site:** Any emergency aircraft landing site which cannot be eliminated or reduced in size without a general plan amendment, specific plan or specific plan amendment, zoning ordinance, or other referring agency action which requires mandatory review by the ALUC.

**Upwind leg:** A segment of the airport traffic pattern which is coincident with the centerline of the departure runway. The upwind leg is the initial leg of the traffic pattern for departing aircraft and extends from takeoff to the crosswind leg or departure from the airport area.

**Very high frequency omnidirectional range (VOR):** A ground-based radio navigational aid which transmits encoded signals that enable aircraft equipped with appropriate receivers to determine their bearing with respect to the facility.

**Very high frequency omnidirectional range with distance-measuring equipment (VOR-DME):** A ground-based radio navigational aid which combines a VOR transmitter with a DME facility and which transmits encoded signals that enable aircraft equipped with appropriate receivers to determine both relative bearing and distance with respect to the facility.

**Very high frequency omnidirectional range with tactical air navigation (VORTAC):** A ground-based radio navigational aid which combines a VOR transmitter with a TACAN facility and which transmits encoded signals that enable both military and civilian aircraft equipped with appropriate receivers to determine both bearing and distance with respect to the facility.

**Visual approach:** A procedure whereby an aircraft which is operating in VMC according to an IFR flight plan and under control of an air traffic control facility with radar may proceed to the airport of destination with air traffic control approval and land using visual navigational cues.

**Visual flight rules (VFR):** A set of FAA rules, regulations, and procedures which define flight operations under conditions which allow navigation by means of visual information, pilotage, and dead reckoning alone. Also employed as an adjective to designate a flight plan which will enable an aircraft to operate under conditions which permit navigation by means of visual information alone. For takeoff and landing, operation under visual flight rules requires 3 statute miles visibility and a cloud ceiling of at least 1,000 feet at airports with controlled airspace from the ground up. A special VFR clearance may be obtained from ATC if visibility is 1 statute mile or greater and the pilot can maneuver to remain clear of clouds in the vicinity.

**Visual meteorological conditions (VMC):** Weather conditions specified in FAA regulations under which aircraft are authorized to takeoff, land, and maneuver under visual flight rules and by means of only visual navigational information. Electronic aids to navigation may be utilized by aircraft operating in VMC, but are not required. The visibility and cloud clearance requirements for VMC are determined by the airspace designation in which and aircraft is operating, by the aircraft's altitude above both sea level and ground level, and by whether the aircraft is operating in daylight or at night.

**VOR approach:** A series of standardized, predetermined, and published aerial maneuvers which are based on lateral guidance information received by means of a VOR transmitter and which enable aircraft to descend toward an airport with the intention of landing when meteorological conditions are such that a safe approach cannot be made solely through the use of visual information. The VOR facility may be located within the physical boundaries of the destination airport or at some distance from the airport. VOR approaches do not provide vertical guidance. A typical VOR approach permits aircraft to descend to within 400 to 500 feet of the surface solely on the basis of radio navigation aids.

## Chapter 7

### BIBLIOGRAPHY

*Alameda County Airport Land Use Policy Plan*, adopted July 16, 1986

Association of Bay Area Governments, *Airports and Bay Area Earthquakes, Don't Wing It*, December 2000

City of Hayward, *Final Environmental Assessment/Environmental Impact Report, Hayward Executive Airport Master Plan*, February 20, 2002

City of Hayward, *Mitigation Monitoring and Reporting Program*, Hayward Executive Airport Master Plan, no date

City of Healdsburg, *Healdsburg Municipal Airport Layout Plan*, November 2001

City of Petaluma, *Petaluma Municipal Airport Master Plan/Final Environmental Impact Report*, approved by the Petaluma City Council, November 6, 1978

City of San Jose, *San Jose International Airport Master Plan Update*, December 1999

Coffman Associates, Inc., *Airport Master Plan Final Technical Report, Hayward Executive Airport*, April 2002

Coffman Associates, Inc., *Comprehensive Airport Land Use Plan Update for Sonoma County, Final Report*, January 2001

Coffman Associates, Inc., *Airport Master Plan for Half Moon Bay Airport*, accepted by the County Board of Supervisors, July 22, 1997

Coffman Associates, Inc., *Airport Master Plan for San Carlos Airport*, accepted by the County Board of Supervisors, May 20, 1997

Cortright & Seibold, *Airport Master Plan for Marin County Airport (Gross Field)*, July 31, 1989

Federal Aviation Administration Form 5010-1, *Airport Master Record*, all airports

Hodges & Shutt; McClintock, Becker & Associates, ***Buchanan Field Airport Master Plan Study, Final Draft Technical Report***, December 1988

Hodges & Shutt, ***East Contra Costa County Airport Master Plan Report***, Byron, California, May 1986

Hodges & Shutt, ***East Contra Costa County (Byron) Airport Comprehensive Land Use Plan***, adopted April 1991

Hodges & Shutt, ***Napa County Airport Land Use Compatibility Plan***, adopted April 22, 1991, amended January 1994

Hodges & Shutt, ***Nut Tree Airport Master Plan Report***, March 1993

Hodges & Shutt, ***Nut Tree Airport Land Use Compatibility Plan***, May 1988

Hodges & Shutt, ***Santa Clara County Airports, Master Plan Report, Executive Summary, for Palo Alto, Reid-Hillview and South County***, June 1982

McClintock, Becker & Associates, ***Federal Aviation Regulations Part 150, Airport Noise Compatibility Program: Noise Exposure Map Report***, Buchanan Field Airport, Final Report, August 1, 1988

McClintock, Becker & Associates, ***Federal Aviation Regulations Part 150, Airport Noise Compatibility Program, Phase II Final Report, Buchanan Field Airport***, January 1992

Metropolitan Transportation Commission, ***Regional Airport System Plan Update 1994, San Francisco Bay Area***, November 1994

Metropolitan Transportation Commission, ***Regional Airport System Plan Update 2000, Vol. I, Executive Summary and Final Report***, February 2001

Metropolitan Transportation Commission, ***Regional Airport System Plan Update 2000, Vol. II, Aviation Forecasts***, February 2001

Metropolitan Transportation Commission, ***Regional Airport System Plan Update 2000, Vol. III, Alternatives to New Runways, Regional Airport Capacity and Delay, Traffic, Environment***, February 2001



Metropolitan Transportation Commission, *Regional Airport System Plan Update 2000, Vol. IV, Regional Airport Capacity and Delay*, January 2001

Napa County Airport, *Airport Layout Plan*, approved by FAA March 20, 2000

National Aeronautics and Space Administration, *Department of Defense's Civil Reserve Air Fleet (CRAF) Air Cargo Operations, Moffett Federal Airfield, Draft Environmental Assessment*, June 17, 1996

*Palo Alto Airport FAR Part 150, Airport Noise Compatibility Program, Phase II Final Report*, January 1992

Peat, Marwick, Mitchell & Company, *Travis Joint Use Feasibility Study, 1995 Development*, June 1976

Peat, Marwick, Mitchell & Company, *Travis Joint Use Feasibility Study, Airport Access Plan*, June 1976

*Reid-Hillview Airport FAR Part 150, Draft Airport Noise Compatibility Program*, September 2002

Santa Clara County Airport Land Use Commission, *Land Use Plan for Areas Surrounding Santa Clara County Airports*, adopted September 1992

Shutt Moen Associates, Santa Clara County Airports Master Plan, *Airport Roles and Forecasts*, Revised Public Review Draft, November 1, 2002

Shutt Moen Associates, *Solano County Airport Land Use Compatibility Review Procedures*, adopted June 13, 2002

Shutt Moen Associates, *Travis Air Force Base Land Use Compatibility Plan*, adopted by Solano County Airport Land Use Commission June 13, 2002

Shutt Moen Associates, *Contra Costa County Draft Airport Land Use Compatibility Plan*, May 2000

Shutt Moen Associates, *Nut Tree Airport Layout Plan*, Solano County, approved by FAA November 19, 2001

Shutt Moen Associates, *Petaluma Municipal Airport Layout Plan*, Sonoma County, approved by FAA December 16, 1997

Solano County Airport Land Use Commission, *Airport/Land Use Compatibility Plan, Nut Tree Airport, Vacaville Gliderport*, May 1988

Sonoma County Permit and Resource Management Department, Gail Davis, Environmental/Comprehensive Planning Division, *1998 Sonoma County Airport Master Plan*, December 15, 1998

Sonoma County Planning Department, *Air Transportation Element*, adopted by resolution of the Board of Supervisors, County of Sonoma, August 18, 1992

TRA-BV Airport Consulting, *San Jose International Airport Master Plan Update Executive Summary*, December 1999

TRA-BV Airport Consulting, *San Jose International Airport Layout Drawing* (Plan), approved by FAA, November 30, 1998