

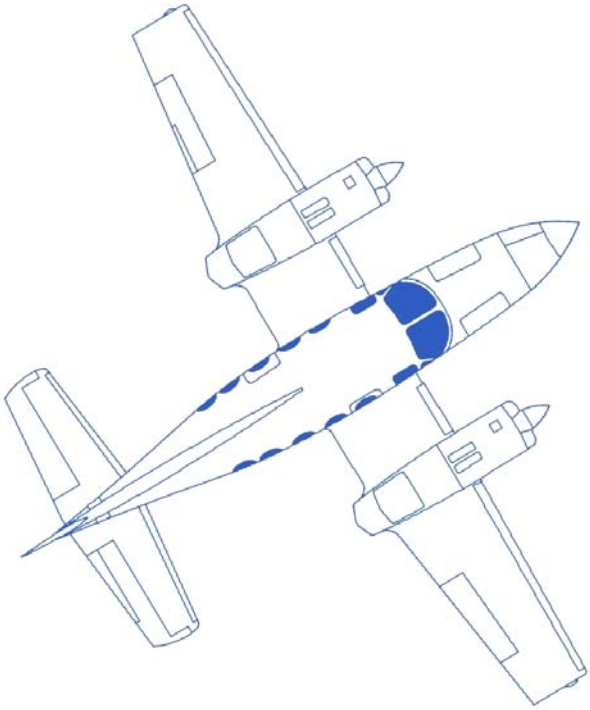



Auburn Municipal Airport Master Plan Report

Prepared for the
City of Auburn, California

Adopted July 23, 2007

City of Auburn

CITY COUNCIL

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for the
City of Auburn, California

Prepared by

MEAD & HUNT

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Table of Contents

Summary

Summary

OVERVIEW

The *Auburn Municipal Airport Master Plan* is a comprehensive examination of the current status, anticipated future use, and proposed course of development of Auburn Municipal Airport. This report presents the findings and recommendations of the *Master Plan* study.

- **Function of the Master Plan**—The *Master Plan* serves as a framework within which individual projects can be implemented. By examining not only all components of the airport, but also the potential facility needs over a time frame of at least 20 years, the Master Plan helps to assure that individual improvements will properly function with other development, both existing and future.

- **Major Issues**—Although the overall approach to the *Master Plan* study has been comprehensive in scope, the study has nonetheless focused on several major issues:
  - The feasibility of further increasing the runway length.
  - Redevelopment of the airport's south-side core area, including construction of a new administration building.
  - Providing space for additional fixed base operations facilities and aircraft storage to accommodate projected demand.
  - Evaluation of the need for initiating development of the airport's north side, including the need for a parallel taxiway to serve aviation facilities in that area.

- **Plan Adoption**—The draft report received thorough public review prior to being considered for adoption by the Auburn City Council. Related actions include:

- *Environmental Document Preparation:* An Initial Study assessing the environmental impacts associated with adoption and implementation of the *Master Plan* was prepared and circulated for public and agency review.
- *ALUC Review:* As required by state law, prior to adoption by the City of Auburn, the Master Plan must be reviewed by the Placer County Airport Land Commission for consistency with the commission's compatibility plan.
- *FAA Review:* Copies of the draft *Master Plan Report* and associated Airport Layout Plan (ALP) drawings have been submitted to the Federal Aviation Administration for review and comment. Following county adoption of the *Master Plan*, the FAA will conduct a formal internal review of the ALP. FAA approval of the ALP is a prerequisite to federal funding of airport improvements under the Airport Improvement Program.

- **Plan Revisions**—The airport plan drawings should be reviewed as necessary to assure that they continue to represent newly arising conditions and facility needs. The drawings also should be updated periodically to reflect new construction. A thorough review and updating of the Airport Master Plan should be accomplished within seven to ten years.

PLAN DRAWINGS

For easy reference, copies of the Auburn Municipal Airport plan drawings are located at the back of this *Airport Master Plan Report.*

The existing configuration and recommended future development of Auburn Municipal Airport are graphically portrayed in two drawings:

- **Airport Layout Plan**—The *Airport Layout Plan* (ALP) is the most important of the airport plan drawings for Auburn Municipal Airport. The drawing depicts both the existing and proposed layout of airport facilities. Included on the ALP sheet are various data blocks which provide additional details not indicated in the plan view.

- **Airspace Plan**—The purpose of the *Airspace Plan* is to define and help protect the airspace essential to the safe operation of aircraft in the vicinity of the airport. The criteria which define the limits of this airspace are established in Federal Aviation Regulations (FAR), Part 77, Objects Affecting Navigable Airspace. Of particular importance on this drawing are the locations of remaining obstructions to the runway approach surfaces.

AIRPORT ROLE AND ACTIVITY

Airport Role

For a full discussion of airport role and activity issues, see Chapter 2.

- **Existing**—The key aviation roles served by Auburn Municipal Airport are as follows:
  - A base for area pilots and aircraft owners;
  - A point of air access for visitors to the area;
  - A place to conduct aviation-related business;
  - A base for aviation-related community emergency services; and
  - A commercial/industrial base for the community.
- **Future**—The role of Auburn Municipal Airport is expected to remain the same as at present over the 20-year planning period examined in the *Master Plan*. The focus of the *Master Plan* is on continuing and enhancing general aviation uses and development of facilities to accommodate general aviation demand, particularly business/corporate and personal/recreational uses.

Airport Activity

- **Based Aircraft**—The number of aircraft based at Auburn Municipal Airport is forecast to increase from 210 as of 2004 to 290 in about 20 years.
- **Transient Aircraft**—Demand for transient parking spaces will increase in the future as both personal/recreational uses and business/corporate activity increases in the vicinity of the airport. The *Master Plan* estimates current peak demand of transient parking positions at 12. The forecast anticipates peak daytime demand for transient aircraft parking places to increase to 18 transient parking positions by 2025.
- **Aircraft Operations**—Total aircraft operations (an operation is one takeoff or one landing) are projected to increase from 70,000 in 2004 to 104,000 by 2025.

PROPOSED AIRFIELD IMPROVEMENTS

Basic Airfield Design Factors

Chapter 3 contains an expanded discussion of these topics.

- **Design Aircraft**—Over 95% of operations at Auburn Municipal Airport are generated by single-engine piston-powered air-

craft, with the most demanding class of aircraft being medium-sized, twin-engine, piston-powered aircraft. Representative of this class of aircraft is the Cessna Chancellor 414 (6,785 pounds maximum takeoff weight, 44.1-foot wingspan, 94-knot approach speed).

- **Operational Capacity**—The annual capacity of the airport's runway system is approximately 150,000 annual operations. This capacity is well in excess of the annual demand.

- **Wind Coverage**—With a 10.5-knots crosswind component, the wind coverage of Runway 7-25 is 92%, 3% below the FAA guidelines of 95% wind coverage. At 13.0-knots the wind coverage increases to 96.7%. A runway width greater than the minimum requirement compensates for the limited wind coverage.

- **Development Constraints**—A variety of factors including on-site terrain, airspace obstructions, and surrounding land uses essentially preclude any significant changes to the basic configuration of the airfield.

Primary Runway

- **Classification**—Runway 7-25 is classified as an Airport Reference Code (ARC) B-I (Small) facility. This designation is determined both by the runway's physical configuration and the characteristics of nearly all of the aircraft which operate on it.
  - The ARC B-I (Small) classification is intended to accommodate aircraft with approach speeds less than 121 knots, wingspans less than 49 feet, and maximum takeoff weights up to 12,500 pounds.
  - Key features of the runway (specifically, the runway pavement and safety area width) are consistent with the design standards associated with the type of aircraft operating at the airport.

- **Length and Width**—The existing length of Runway 7-25 is 3,700-feet and its width is 75-feet. The potential for a runway extension was examined in the *Master Plan* and determined to be excessively costly for even a small extension. Therefore, no runway length change is proposed.

- **Instrument Approach Procedures**—The only existing instrument approach at Auburn Municipal Airport is a GPS-based nonprecision approach into Runway 7. This procedure provides straight-in approaches to Runway 7 and circle-to-land

to Runway 25. No significant changes to the approach procedures are anticipated.

Other Airfield Elements

- **Taxiways**—There is one full-length parallel taxiway along the south side of Runway 7-25 with six connections from the runway to the taxiway.
  - No modifications or changes are recommended to the existing parallel taxiway or exits.
  - The *Master Plan* recommends the construction of a north side parallel taxiway which, in the future, will serve potential aircraft parking and other aircraft related uses on the north side of the airport.
- **Helicopter Takeoff and Landing Area**—There are no designated helicopter takeoff or landing areas at the airport. Due to the infrequent use of the airport by helicopters, the *Master Plan* does not propose construction of a helicopter takeoff or landing pad within the 20-year planning period.

PROPOSED BUILDING AREA IMPROVEMENTS

Aircraft Parking

See Chapter 4 for details on building area improvement recommendations.

Aircraft parking constitutes the most extensive aviation-related use of building area land at Auburn Municipal Airport. Based aircraft and transient aircraft parking demand are both expected to increase moderately within the 20-year planning period. Specific types of facilities needed to accommodate this demand include:

- **Aircraft Hangars**—Various types of aircraft storage hangars are needed to accommodate the increase in based aircraft. Hangar types will vary in size, quality, and location on the airport.
- **Aircraft Apron**—Three aircraft parking aprons provide a total of 134 aircraft parking tiedowns. Of the 134 aircraft parking positions, 16 tiedowns are currently devoted to transient aircraft use.

Aviation Support Facilities

Essential to the operations at Auburn Municipal Airport are the support facilities which include:

- **Airport Administration Building**—The current airport administration building is located adjacent to the airport's central apron. The building contains a flight briefing facility, lounge areas, and rest room. A coffee shop is also located near the administration building, but is not part of the building itself. Construction of a multi-functional administration building is proposed as a replacement for these facilities and as a centerpiece of a redeveloped airport core area.

- **Fixed Based Operators (FBOs)**—-FBOs are aviation businesses which provide goods and services to the public. This does not include airlines. Existing FBOs at Auburn Municipal Airport offer a variety of services and functions to the airport and the community. Lease agreements for land and facility space make up a large portion of airport-generated revenues. The *Master Plan* provides space for the existing businesses to grow and for similar new businesses to locate at the airport.

- **Other Support Facilities**
  - *Aircraft Fueling Facilities:* A fuel island, located on the airport's central apron, consists of three 12,000-gallon underground tanks providing both 100LL and Jet A aviation fuel. Although replacement of some components of the fueling facilities may be necessary over the 20-year planning period, no major changes in the size, location, or function of the system appear to be necessary.
  - *Aircraft Wash Rack*: The existing aircraft wash rack can be accessed along Rickenbacker Way. The facility meets current and projected needs, therefore, no changes to the aircraft wash rack are recommended.

- **Industrial Developmen**t—Approximately 40 acres of the airport's south side plus an additional 40 acres of city-owned, non-airport property are developed with non-aviation industrial areas. The *Master Plan* also identifies an undeveloped area of approximately 10 acres in the airport's northwest corner for future industrial development.

- **"Through-the-Fence" Access**—The city conceptually supports "through-the-fence" (TTF) aircraft access to the airport from adjacent property for private, noncommercial purposes provided that all FAA and other applicable conditions are met. A proposal for a residential air park with TTF access on property within unincorporated Placer County adjacent to the airport's northern boundary is under consideration by the city and the county.

ENVIRONMENTAL AND FINANCIAL ISSUES

Environmental Issues

The full discussion of these topics can be found in Chapter 5. Also see the separate environmental *Initial Study* for additional examination of environmental issues.

- **Natural Resources**—Baseline studies of biological, water, and cultural resources present on the airport property were conducted in 2005 as part of the *Master Plan* study. The findings of these studies were used to refine the proposed facility improvement recommendations and to avoid impacts to the greatest extent feasible. Only limited wetlands and sensitive plant and animal species were found on the airport and no significant archaeological or cultural resources. No major adjustments to proposed development plans were concluded to be necessary.

- **Land Use Compatibility**—The land use compatibility analysis in the *Master Plan* study focused on noise impacts. The projected growth in airport activity over the 20-year time horizon of the plan results in a slight expansion of the Community Noise Equivalent Level (CNEL) contours. On average, the increase is about 1.5 to 2.0 dB. However, the plan anticipates no changes in the types of aircraft capable of operating at the airport. The noise levels of typical individual aircraft operations therefore will not significantly change.

Financial Issues

- **Funding Sources**—Funding for the majority of the improvements recommended in the *Master Plan* is expected to come from Federal Aviation Administration Airport Improvement Program (AIP) grants. California State Aviation Program grants or loans may be available for certain development that is not AIP eligible. City of Auburn Airport Enterprise funds will be required as matches to these grants. Private funding will be necessary for FBO facility development and other non-municipal facilities.

- **Capital Improvement Program**—A 20-year Capital Improvement Program listing all the projects recommended in the *Master Plan* is shown in the Table 5A of Chapter 5 and the locations are depicted in Figure 5C.
  - The complete program totals approximately $17.5 million (in 2005 dollars) over the 20-year period.
  - Costs are spread roughly equally over the short-range (within 5 years), mid-range (6 to 10 years), and long-range (11 to 20 years) time frames. Two projects are identified as not proceeding until beyond 20 years.

- Most of the money will be used for construction of additional hangars, the administration building, and pavement construction and maintenance of taxiways/taxilanes.

Chapter 1

Background and Inventory

1

Background and Inventory

AUBURN MUNICIPAL AIRPORT

Auburn Municipal Airport is a 253-acre general aviation facility serving the city of Auburn and surrounding areas in the counties of El Dorado, Nevada, Sacramento, and Placer. The airport is owned and operated by the City of Auburn (Figure 1A).

Location and Environs

The city of Auburn is situated in the foothills of the Sierra Nevada Mountains approximately 35 miles northeast of Sacramento. Auburn Municipal Airport is situated 3.5 miles north of the city center in a noncontiguous incorporated island surrounded by Placer County. The airport elevation is 1,536 feet above mean sea level (MSL).

Surrounding lands contain a mixture of residential, industrial, and commercial uses and open space. The most intensive development is to the west along Grass Valley Highway (State Highway 49), three-quarters of a mile west of the runway end. Various commercial uses and a mobile home park lie along the highway. Major uses to the south include a reservoir and a golf course. Areas to the north and east consist mostly of rural residential uses and some undeveloped land. An aqueduct, owned and operated by Pacific Gas and Electric Company, traverses the eastern side of the airport property.

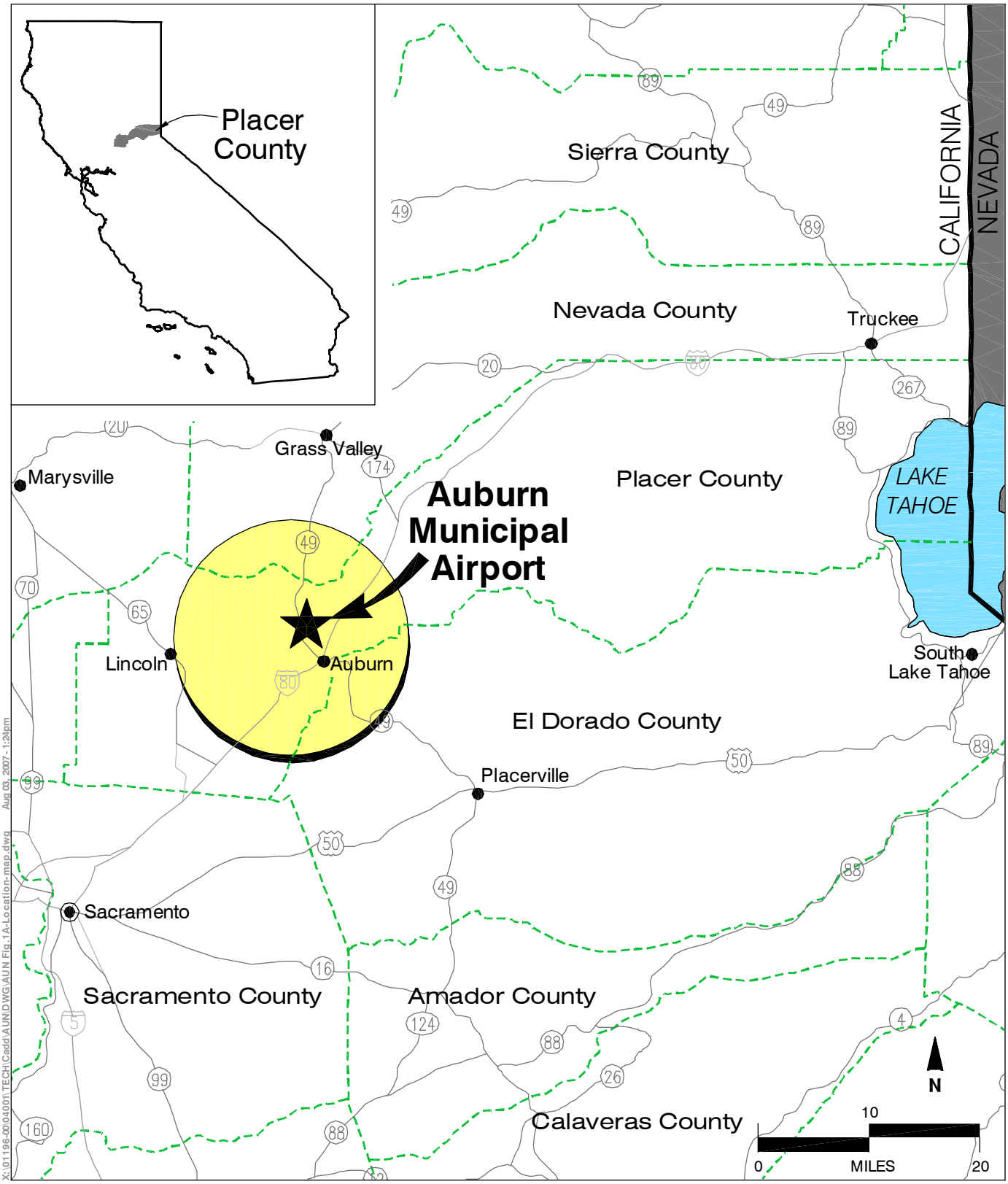


Figure 1A

Location Map

Auburn Municipal Airport

Airport Development and Facilities

History

What is now Auburn Municipal Airport began in the early 1930s when the Civil Aviation Authority leased 160 acres of land from local ranchers to develop a refueling stop for planes flying mail on the Salt Lake City to San Francisco Airway. During World War II, the airport was closed for public use. In 1946, the federal government notified the local community that the airfield was no longer needed and the lease for the land would not be renewed.

After the war, a group of local officials, pilots, and interested citizens developed a plan to avoid closing the airport. By requesting public subscriptions to raise money, the group purchased the 160 acres and donated it to the City of Auburn. The city acquired title to the airport in November 1946. In 1950, the city received a $3,000 federal grant land for acquisition reimbursement and drainage improvements.

Little more happened at the airport until the early 1970s. At that time, an additional 75 acres of land was acquired, the runway was shifted slightly northward, remaining 3,100 feet in length, a parallel taxiway was built, and the aircraft parking apron expanded. A northeast/southwest crosswind runway—running diagonally across what is now Rickenbacker Way—that had existed since the airport's early days was abandoned during that period as well. Almost 40 acres of land made available by closure of the crosswind runway was designated as an industrial park. In the late 1970s, the city acquired an additional 40 acres of property from Pacific Gas & Electric Company allowing the planned industrial park to expand westward.


Airport Industrial Park

Several of the buildings in the airport core area, as well as the first buildings in the industrial park, date from the 1970s. Most of the facilities that give the airport its present character were constructed during the 1980s and 1990s. The industrial park was largely built during those years as well. A more recent major change at the airport was the 2001 completion of extensions to both ends of the runway, bringing it to its present length of 3,700 feet. This project also added 15 feet to the north side of the runway, bringing the width to 75 feet. The latest large project was the extensive grading for a future new east hangar area. This work was completed in 2003.

(Source: Most of the preceding historical data is from the 1979 *Auburn Airport Master Plan*.)

Current Airport Property and Facilities

The present airport property consists of approximately 253 acres. The most recent acquisition was 8.3 acres in 2004. This property southeast of the airport core area contains several hangar buildings from which aircraft had long gained access to the airport on a "through-the-fence" basis. All airport property except for this latest acquisition is within the Auburn city limits and the latter will be annexed in the near future. The western 40 acres of the industrial park is also owned by the city of Auburn and is within the city limits, but is not part of the airport property. The total incorporated island of city property thus presently equals approximately 283 acres.

The central physical feature of the Auburn Municipal Airport today is the single 3,700-foot east/west paved runway designated Runway 7-25. The runway is 75 feet wide and has an effective upward gradient of 1.24% rising to the east. The pavement is asphalt and the surface has a weight bearing capacity rated at 30,000 pounds for single-wheel landing gear aircraft according to the FAA Form 5010-1, "Airport Master Record." The pavement condition is good as a result of a resurfacing completed in 2001 when the runway was extended. Runway makings are "Basic" and are in good condition.

A summary of the airport's facilities is presented in Table 1A.

Medium intensity runway lights (MIRL) and threshold lights were installed in 1992. Precision approach path indicator lights (PAPIs) are located on the left side of each runway end. The PAPI glide angle for Runways 7 and 25 is 3.0°.

A full-length taxiway (Taxiway A) parallels the runway on the south side. The taxiway is located 150 feet from the runway. In addition to the connections at each end of the runway, there are four midfield exit taxiways (Taxiways B, C, D and E). All of these taxiways have medium-intensity edge lights (MITL).

The airport building area stretches along most of the south side of the runway. The core area, including transient tiedowns, fuel island, the primary fixed base operations (FBOs), and a restaurant, is situated midfield. New Airport Road and Rickenbacker Way provide vehicle access to this area. The northern portion of Rickenbacker Way also functions as a taxilane serving three hangars, two of which house aviation-related businesses.

MAJOR FEATURES

Property
- Airport acreage: 253
- No easements

Airfield
- Airport Elevation: 1,536 ft. MSL
- Runway 7-25
  - 3,700 ft. long, 75 ft. wide; asphalt
  - Medium Intensity Runway Lights (MIRL)

Visual Navigational Aids
- Airport: Rotating beacon; segmented circle with lighted wind cone
- Runways 7 and 25: APAPI-L (3.0°)

Building Area
- Building area south of runway; all aviation or related uses on airport property
- Aircraft Parking Capacity
  - Hangar Spaces: 97 (approximate capacity – many spaces are in hangar units capable of accommodating multiple aircraft)
  - Tiedowns (transient and based): 141
- Other Aviation-Related Facilities
  - Fuel island; three 12,000 gallon underground tanks (city owned)
  - Airport administration building
  - Restaurant
- Industrial Park:
  - 30+ acre area on airport south of building area
  - Additional 40 acres of adjacent city-owned land, off-airport
  - Some buildings have taxiway access

MANAGEMENT AND SERVICES

Management
- Airport management and maintenance: City of Auburn

Fixed Base Operation Services
- Fuel: AvGas 100LL and Jet A
  - Dispensed from island and by truck
  - Fuel storage in city-owned tanks
- Other:
  - Major airframe and powerplant repairs
  - Avionics service
  - Flight training, aircraft rental, pilot supplies

Emergency and Security
- Fire Protection: Placer Consolidated Fire Protection District
- Police: periodic patrols by City of Auburn, California Highway Patrol, and Placer County Sheriff

AIRPORT SITE AND ENVIRONS

Topography
- Airport land and nearby areas consist of rolling hills, generally ranging from 1,400 ft. to 1,600+ ft. MSL

Access
- Via New Airport Road from Bell Road to south
- Via Earhart Avenue and Locksley Lane to west
- Grass Valley Highway (State Route 49) 1 mile west

Jurisdictions
- Airport within unincorporated island of City of Auburn
- Light industrial area adjoining southwest side of airport also within city limits, but not on airport
- Other nearby area all within unincorporated Placer County jurisdiction
- Other nearby jurisdictions
  - El Dorado County line: 4 miles southeast
  - Nevada County line: 3 miles north

Nearby Land Uses
- North: Rural residential; some undeveloped land
- South: Industrial park; Rock Creek Reservoir; The Ridge Golf Course; Pine Hills Junior High School
- West: Waste Transfer and Recycling Facility operated by Placer Disposal; Hilltop Manor Convalescent Hospital; Rock Creek Mobile Home Park; commercial; uses along Hwy 49; Auburn Faith Community Hospital 1.0 mile SW; DeWitt Center (County offices) 1.5 miles SW
- East: Rural residential; some undeveloped land

AIR TRAFFIC PROCEDURES

Traffic Patterns
- Runway 7: left traffic; right traffic for helicopters
- Runway 25: left traffic
- Typical Pattern Altitudes
  - Aircraft: 2,531 ft. MSL (1,000 ft. AGL)
  - Helicopters: 2,111 ft. MSL (580 ft. AGL)

Instrument Approach Procedures
(best visibility and descent height minimums)
- Runway 7 GPS
  - Straight-in (1 mile; 449 ft. AGL)
  - Circle-to-land on Runway 25 (1 mile; 664 ft. AGL)

Communications
- CTAF/UNICOM: 122.7 MHz; UNICOM operated by city
- AWOS-3: 119.375 MHz
- Rancho Murieta FSS: 122.3/122.6 MHz
- NORCAL Approach/Departure Control: 119.1 MHz

Operational Restrictions / Noise Abatement Procedures
- Noise Abatement for Runway 25: after takeoff speed and altitude permitting, make 20° left turn at end of runway to avoid mobile home park and convalescent hospital
- Noise Abatement for Runway 7: straight-out departure preferred

Table 1A

Airport Profile

Auburn Municipal Airport

Aircraft parking is located in the central core area, as well as at west, east, and small southeast apron areas. The central apron contains about a third of the aircraft tiedowns including the transient aircraft parking. Most of the remaining tiedowns are on the east apron. The west apron is devoted primarily to aircraft hangars. Additional hangars are situated along the perimeter of the east apron and at the southeast apron.

A total of 138 tiedown spots currently exist at the airport as of 2005, including 16 designated for transient use. All but 6 of these spots are airport controlled, with the others being on FBO leases. In addition to these airplane parking spots, three parking positions for helicopters are provided. These are located on two pads adjacent to Taxiway D, just south of Taxiway A.

Hangar facilities consist of a mixture of sizes and shapes. Most common are single- or multiple-unit box hangars and T-shaped portable units. The airport has only one typical T-hangar structure—in the southeast apron area—and it is old and scheduled for removal. There are a total of 80 individual hangar units, but many of the box hangars can accommodate a second aircraft or, in a few cases, even more. At least 100, and perhaps as many as 130, aircraft could be sheltered in the existing hangar facilities. Additionally, work has begun on development of a new east hangar area. Grading was completed in 2003, but as of late 2005 the site has not yet paved and no buildings have been erected. The area is designed to accommodate various sizes and types of hangar units and have a potential capacity of about 90 aircraft.

Management and Services

See Table 1B for a listing of the commercial aviation businesses at Auburn Municipal Airport as of December 2005. Table 1A, Airport Profile, also contains information on airport services.

Auburn Municipal Airport is owned and operated by the City of Auburn. Policy decisions are made by the Auburn City Council. An advisory committee provides input to the Airport Manager. On-site daily operation and airport maintenance are responsibilities of the Airport Manager.

Aviation services at the airport are provided by both the city and commercial aviation businesses typically known as fixed base operators or FBOs. In addition to leasing land to the FBOs, the city rents aircraft hangar and tiedown spaces to individual based aircraft owners. Collectively, the FBOs provide all of the primary aviation services normally found at mid-sized general aviation airports. None, though, can be considered a full-service FBO. Rather, each provides a limited range of specialty services. This type of FBO is sometimes referred to as a specialty aeronautical service organization or SASO.

COMMERCIAL AVIATION-RELATED SERVICES:
Fixed Base Operations (FBOs) and Specialty Aeronautical Service Organizations (SASOs)

Name	Fuel Sales		Flight Instr'n		Aircraft Rental		Aircraft Parts & Maintenance				Aircraft Storage			Miscellaneous				
	100 / 100LL	Jet-A	Fixed Wing	Helicopter	Fixed Wing	Helicopter	Engine	Airframe	Avionics	Other	Based Tiedowns	Hangars	Transient Ramp	Pilots' Lounge	Pilots' Supplies	Charter (FAR 135)	Aircraft Sales	Other
Auburn Avionics									✓									
AU Country Aviation							✓	✓										
Auburn Hangar Leasing Assoc.												✓						
Classic Aviation							✓	✓										
Gold Country Aviation	✓	✓											✓	✓				
Gyro House									✓	1								
Horizon Aviation			✓		✓										✓			2
Power Aviation Services							✓	✓										

1. Oxygen service
2. Scenic flights

AVIATION-SUPPORT BUSINESSES

Name	Type of Business
Wings Grill and Flight Line	Restaurant

Note:
All data as of December 2005

Table 1B

Airport Tenants

Auburn Municipal Airport

AERONAUTICAL SETTING

Area Airports

Nearby airports interact slightly with Auburn Municipal Airport in terms of both airspace, as described below, and shared service areas. Among the half dozen other airports within a 20-mile radius, Nevada County Airport, 17 miles north-northeast, is most comparable, having a similar length runway and similar services. The nearest airline service airport is Sacramento International, 28 miles west-southwest. Beale Air Force Base is 20 miles west-northwest from Auburn Municipal Airport. Table 1C summarizes selected major features of each of these airports and Figure 1B shows their location.

Area Airspace

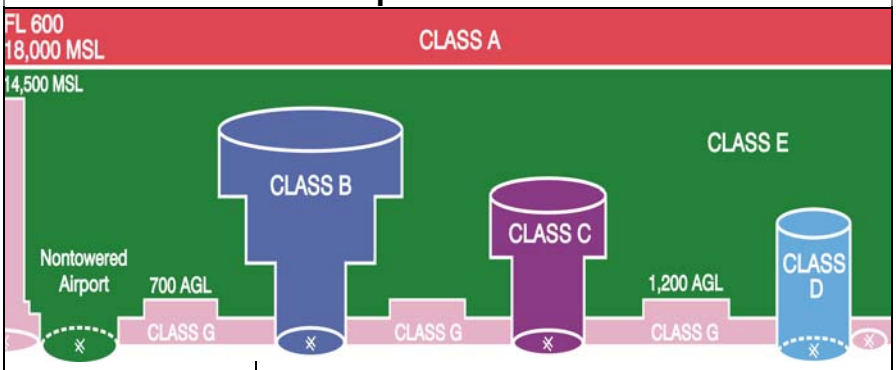
Federal regulations define various categories of airspace with distinct operating requirements for each type (see below).

Controlled Airspace: Any of several types of airspace in which some or all aircraft may be subject to air traffic control.

Class E Airspace: Limited separation surfaces provided to aircraft on instrument flight plans.

The airspace over Auburn Municipal Airport is identified as Class E "controlled" airspace with a floor of 700 feet above the airport elevation. Class G "uncontrolled" airspace exists from the ground to the base of the overlying Class E airspace. Nine miles northwest of the airport is the Class C airspace associated with Beale Air Force Base. Approximately 18 miles to the southwest is the Class C airspace associated with Sacramento International Airport. Three low altitude federal airways (Victor Airways 392, 332 and 494) pass overhead in the vicinity of Auburn Municipal Airport.

Airspace Classes



AGL – above ground | FL – flight level | MSL – mean sea level

Class	Communications	Entry Requirements	Separation	Special VFR in Surface Area
A	Required	ATC clearance	All	N/A
B	Required	ATC clearance	All	Yes
C	Required	Two-way communications prior to entry	VFR / IFR	Yes
D	Required	Two-way communications prior to entry	Runway operations	Yes
E	Not Required for VFR	None for VFR	None for VFR	Yes
F	Not Required	None	None	N/A

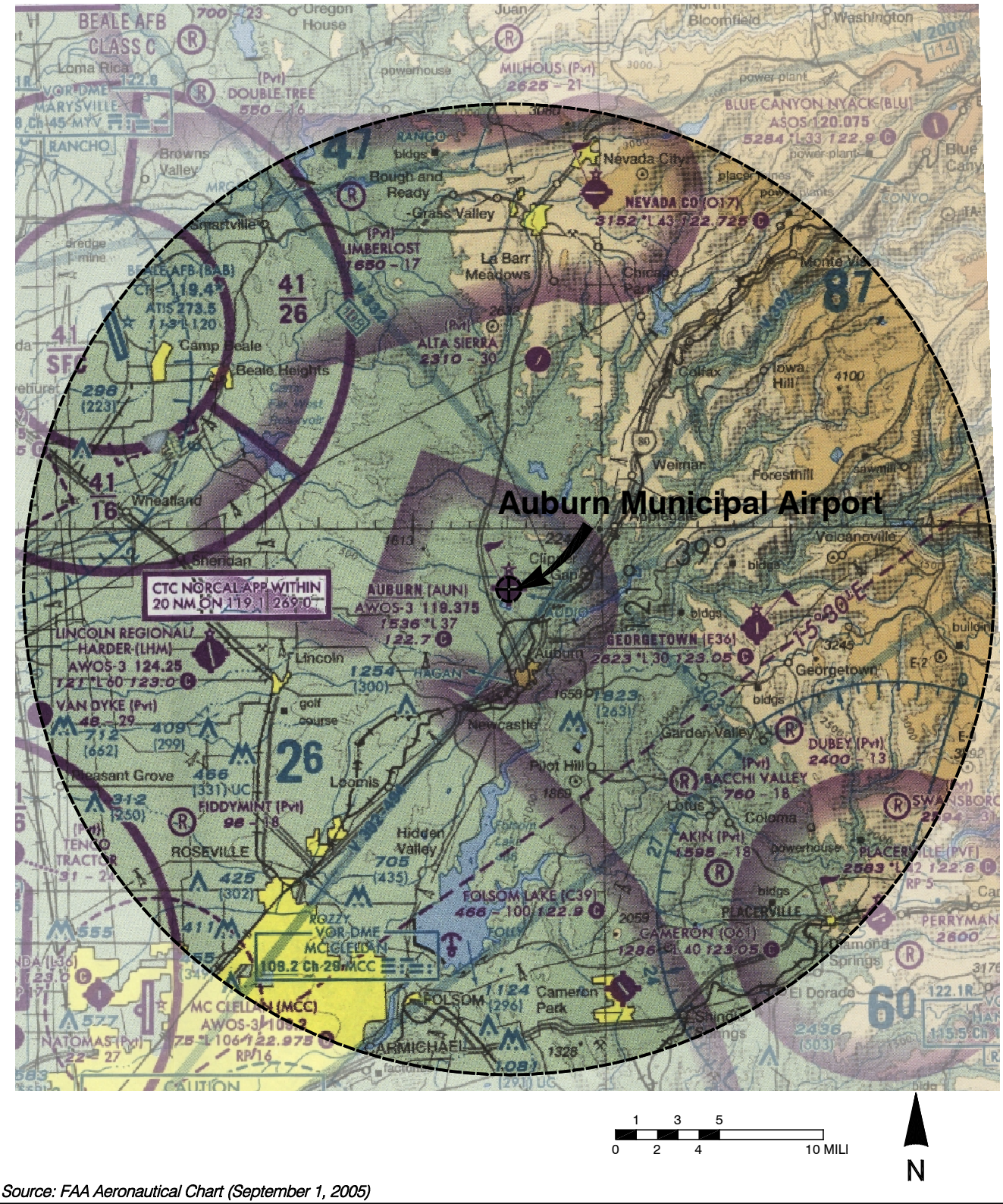
		Location		Facilities						Services						
Airport Name [1]	**Owner**	**Associated City (County)**	**Distance/Direction** [2]	**Based Aircraft** [3]	**Number of Runways**	**Longest Runway (ft.)**	**Surface** [4]	**Lighting Intensity** [5]	**Approach Visibility** [6]	**Control Tower**	**Airline Service**	**AvGas**	**Jet Fuel**	**Maintenance**	**Automobile Rentals**	**Food**
Public-Use Airports																
Auburn Municipal	*City of Auburn*	*Auburn (Placer)*	–	*210*	*1*	*3,700*	*asph*	*M*	*1*	*No*	*No*	*X*	*X*	*X*	*X*	*X*
Cameron Airpark	Cameron Park Airport District	Cameron Park (El Dorado)	17 SSE	179	1	4,051	asph	M	–	No	No	X	–	X	X	X
Georgetown	County of El Dorado	Georgetown (El Dorado)	10 ESE	35	1	2,980	asph	M	–	No	No	X	–	X	X	–
Lincoln Regional/ Karl Harder Field	City of Lincoln	Lincoln (Placer)	13 WSW	207	1	6,001	asph	M	½	No	No	X	X	X	X	–
Nevada County	County of Nevada	Grass Valley (Nevada)	17 NNE	128	1	4,350	asph	M	1	No	No	X	X	X	X	X
Military Airport																
Beale AFB	USAF (Military)	Marysville (Yuba)	20 WNW	–	1	11,300	conc	H	1	Not open to public						

[1] Airports within 20 nautical miles of Auburn Municipal Airport
[2] Relative to Auburn Municipal Airport; distances in nautical miles
[3] FAA Airport Master Record data as of March 2005; totals exclude ultralights
[4] ASPH=asphalt; CONC=concrete
[5] L=low; M=medium; H=high
[6] Lowest visibility minimums for instrument approach procedures; distance in statute miles

Table 1C

Area Airports

Vicinity of Auburn Municipal Airport



Source: FAA Aeronautical Chart (September 1, 2005)

Figure 1B

Area Airspace

Auburn Municipal Airport

COMMUNITY PROFILE

As further detailed in Chapter 2, the communities served by the City of Auburn Municipal Airport consist not just of Auburn and surrounding areas of Placer County, but also Nevada County and, to a lesser extent, portions of other adjacent counties including Sacramento and El Dorado Counties. Most of the employment in Auburn is related to either manufacturing or retail industries. A majority of the employment in Auburn is based in management, professional, technical, sales and administrative support sectors, while to a lesser extent service, precision production, craft and repair make-up around 25% of the local work force.

Population growth in Placer County is projected to be strong. Having already increased 44% from 1990 to 2000, Placer County is expected to grow from a projected 292,640 in 2005 to 415,335 people in 2025. Additional information is provided in Table 1D.

PREVIOUS AIRPORT PLANS AND STUDIES

Several comprehensive master plan studies and numerous updates of the airport layout plan drawing have been prepared for Auburn Municipal Airport and influence the formulation of the current Airport Master Plan.

- *Auburn Municipal Airport Master Plan* (Robert E. Gray Associates, 1979)—The focus of this plan was on the ultimate development potential of the airport land. Included in this study were plans for hangar and industrial development as well as a terminal.
- *Auburn Municipal Airport Master Plan* (Quad Consultants, 1989)—This plan recommended extensions to both ends of the primary runway, construction of a north-side parallel taxiway, a new terminal and additional hangars to accommodate growth in based aircraft at the airport.
- *Auburn Municipal Airport Master Plan* (City of Auburn, 1993)—Like the 1989 plan, the recommendations of this plan included eastward and westward extensions to the primary runway and the construction of a north-side parallel taxiway for general aviation use. Major redevelopment of the core building area was proposed as well.
- *Auburn Municipal Airport Master Plan / 2015* (Waddell Engineering Corporation, 1996)—This document is the most recent master plan study and focused primarily on updating the forecasts, facility changes and proposed improvements, runway extension alternatives. An updated airport layout plan drawing was included.

GEOGRAPHY

Location

- City of Auburn:
  - Incorporated 1849
  - 32 miles from Sacramento area (southwest) and 132 miles to San Francisco (southwest)
  - City center 5-miles south southeast of Auburn Municipal Airport
  - Placer County seat

Topography

- City of Auburn elevation: 1,300 ft. MSL
- Immediate vicinity of airport rolling terrain, ranging generally between 1,425 ft. and 1,625 ft. MSL

SURFACE TRANSPORTATION

Major Highways

- Two state highways serve the City of Auburn area:
  - Grass Valley Highway 49 (north-south) connects through Auburn, intersects at Highway 193/Interstate 80 (northeast-southwest) at Auburn
  - Interstate 80/Highway 193 bisects the city from the middle southwestern edge to the middle northeastern edge of the municipal boundary

Railroads

- Union Pacific Railroad main and secondary lines

Public Transportation

- Bus Service:
  - Auburn Transit and Placer County Transit combined offers countywide service
  - Auburn Station provides local access to Amtrak Capitol Corridor and local bus transportation
- Train:
  - Amtrak: daily departures to Rocklin, Roseville, Sacramento, Davis, Suisun, Martinez, Richmond, Berkeley, Emeryville, Oakland, Hayward, Fremont-San Joaquin buses, Santa Clara Bus Stop and San Jose

POPULATION AND ECONOMY

Current/Historical Population

	1990	*2000*	*Change*
Placer County	172,796	248,399	44%
City of Auburn	10,592	12,462	18%

(Source: 1990 and 2000 Census)

Projected Population

	2005	*2010*	*2020*	*2025*
Placer County	292,640	336,805	396,785	415,335
City of Auburn	13,000	14,090	16,240	17,350

(Source: SACOG Projections 2001)

Basis of Economy

- Most of the employment in Placer County is related to either manufacturing or retail industries
- Major employment by industry in Auburn:
  - Management, Professional 36%
  - Technical, Sales, Admin. Support 28%
  - Service 17%
  - Precision Production, Craft, Repair 8%
  - Other 11%

(Source: 2000 Census)

CLIMATE

Temperature

	Avg. High	*Avg. Low*
Hottest month (July)	92.5°F	61.9°F
Coldest month (January)	36.3°F	53.9°F

Precipitation and Fog

- Average annual rainfall in Auburn: 35.91 inches

Winds

- Prevailing winds from the west

Table 1D

Community Profile

Auburn Municipal Airport

MAJOR FEATURES

Property
- Airport acreage: 253
- No easements

Airfield
- Airport Elevation: 1,536 ft. MSL
- Runway 7-25
  - 3,700 ft. long, 75 ft. wide; asphalt
  - Medium Intensity Runway Lights (MIRL)

Visual Navigational Aids
- Airport: Rotating beacon; segmented circle with lighted wind cone
- Runways 7 and 25: APAPI-L (3.0°)

Building Area
- Building area south of runway; all aviation or related uses on airport property
- Aircraft Parking Capacity
  - Hangar Spaces: 97 (approximate capacity – many spaces are in hangar units capable of accommodating multiple aircraft)
  - Tiedowns (transient and based): 141
- Other Aviation-Related Facilities
  - Fuel island; three 12,000 gallon underground tanks (city owned)
  - Airport administration building
  - Restaurant
- Industrial Park:
  - 30+ acre area on airport south of building area
  - Additional 40 acres of adjacent city-owned land, off-airport
  - Some buildings have taxiway access

MANAGEMENT AND SERVICES

Management
- Airport management and maintenance: City of Auburn

Fixed Base Operation Services
- Fuel: AvGas 100LL and Jet A
  - Dispensed from island and by truck
  - Fuel storage in city-owned tanks
- Other:
  - Major airframe and powerplant repairs
  - Avionics service
  - Flight training, aircraft rental, pilot supplies

Emergency and Security
- Fire Protection: Placer Consolidated Fire Protection District
- Police: periodic patrols by City of Auburn, California Highway Patrol, and Placer County Sheriff

AIRPORT SITE AND ENVIRONS

Topography
- Airport land and nearby areas consist of rolling hills, generally ranging from 1,400 ft. to 1,600+ ft. MSL

Access
- Via New Airport Road from Bell Road to south
- Via Earhart Avenue and Locksley Lane to west
- Grass Valley Highway (State Route 49) 1 mile west

Jurisdictions
- Airport within unincorporated island of City of Auburn
- Light industrial area adjoining southwest side of airport also within city limits, but not on airport
- Other nearby area all within unincorporated Placer County jurisdiction
- Other nearby jurisdictions
  - El Dorado County line: 4 miles southeast
  - Nevada County line: 3 miles north

Nearby Land Uses
- North: Rural residential; some undeveloped land
- South: Industrial park; Rock Creek Reservoir; The Ridge Golf Course; Pine Hills Junior High School
- West: Waste Transfer and Recycling Facility operated by Placer Disposal; Hilltop Manor Convalescent Hospital; Rock Creek Mobile Home Park; commercial; uses along Hwy 49; Auburn Faith Community Hospital 1.0 mile SW; DeWitt Center (County offices) 1.5 miles SW
- East: Rural residential; some undeveloped land

AIR TRAFFIC PROCEDURES

Traffic Patterns
- Runway 7: left traffic; right traffic for helicopters
- Runway 25: left traffic
- Typical Pattern Altitudes
  - Aircraft: 2,531 ft. MSL (1,000 ft. AGL)
  - Helicopters: 2,111 ft. MSL (580 ft. AGL)

Instrument Approach Procedures
(best visibility and descent height minimums)
- Runway 7 GPS
  - Straight-in (1 mile; 449 ft. AGL)
  - Circle-to-land on Runway 25 (1 mile; 664 ft. AGL)

Communications
- CTAF/UNICOM: 122.7 MHz; UNICOM operated by city
- AWOS-3: 119.375 MHz
- Rancho Murieta FSS: 122.3/122.6 MHz
- NORCAL Approach/Departure Control: 119.1 MHz

Operational Restrictions / Noise Abatement Procedures
- Noise Abatement for Runway 25: after takeoff speed and altitude permitting, make 20° left turn at end of runway to avoid mobile home park and convalescent hospital
- Noise Abatement for Runway 7: straight-out departure preferred

Table 1A

Airport Profile

Auburn Municipal Airport

COMMERCIAL AVIATION-RELATED SERVICES:
Fixed Base Operations (FBOs) and Specialty Aeronautical Service Organizations (SASOs)

Name	Fuel Sales		Flight Instr'n		Aircraft Rental		Aircraft Parts & Maintenance				Aircraft Storage			Miscellaneous				
	100 / 100LL	Jet-A	Fixed Wing	Helicopter	Fixed Wing	Helicopter	Engine	Airframe	Avionics	Other	Based Tiedowns	Hangars	Transient Ramp	Pilots' Lounge	Pilots' Supplies	Charter (FAR 135)	Aircraft Sales	Other
Auburn Avionics									✓									
AU Country Aviation							✓	✓										
Auburn Hangar Leasing Assoc.												✓						
Classic Aviation							✓	✓										
Gold Country Aviation	✓	✓											✓	✓				
Gyro House									✓	1								
Horizon Aviation			✓		✓										✓			2
Power Aviation Services							✓	✓										

1. Oxygen service
2. Scenic flights

AVIATION-SUPPORT BUSINESSES

Name	Type of Business
Wings Grill and Flight Line	Restaurant

Note:
All data as of December 2005

Table 1B

Airport Tenants

Auburn Municipal Airport

		Location		Facilities						Services						
Airport Name [1]	**Owner**	**Associated City (County)**	**Distance/Direction** [2]	**Based Aircraft** [3]	**Number of Runways**	**Longest Runway (ft.)**	**Surface** [4]	**Lighting Intensity** [5]	**Approach Visibility** [6]	**Control Tower**	**Airline Service**	**AvGas**	**Jet Fuel**	**Maintenance**	**Automobile Rentals**	**Food**
Public-Use Airports																
Auburn Municipal	*City of Auburn*	*Auburn (Placer)*	–	*210*	*1*	*3,700*	*asph*	*M*	*1*	*No*	*No*	*X*	*X*	*X*	*X*	*X*
Cameron Airpark	Cameron Park Airport District	Cameron Park (El Dorado)	17 SSE	179	1	4,051	asph	M	–	No	No	X	–	X	X	X
Georgetown	County of El Dorado	Georgetown (El Dorado)	10 ESE	35	1	2,980	asph	M	–	No	No	X	–	X	X	–
Lincoln Regional/ Karl Harder Field	City of Lincoln	Lincoln (Placer)	13 WSW	207	1	6,001	asph	M	½	No	No	X	X	X	X	–
Nevada County	County of Nevada	Grass Valley (Nevada)	17 NNE	128	1	4,350	asph	M	1	No	No	X	X	X	X	X
Military Airport																
Beale AFB	USAF (Military)	Marysville (Yuba)	20 WNW	–	1	11,300	conc	H	1	Not open to public						

[1] Airports within 20 nautical miles of Auburn Municipal Airport
[2] Relative to Auburn Municipal Airport; distances in nautical miles
[3] FAA Airport Master Record data as of March 2005; totals exclude ultralights
[4] ASPH=asphalt; CONC=concrete
[5] L=low; M=medium; H=high
[6] Lowest visibility minimums for instrument approach procedures; distance in statute miles

Table 1C

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Community Profile

Auburn Municipal Airport

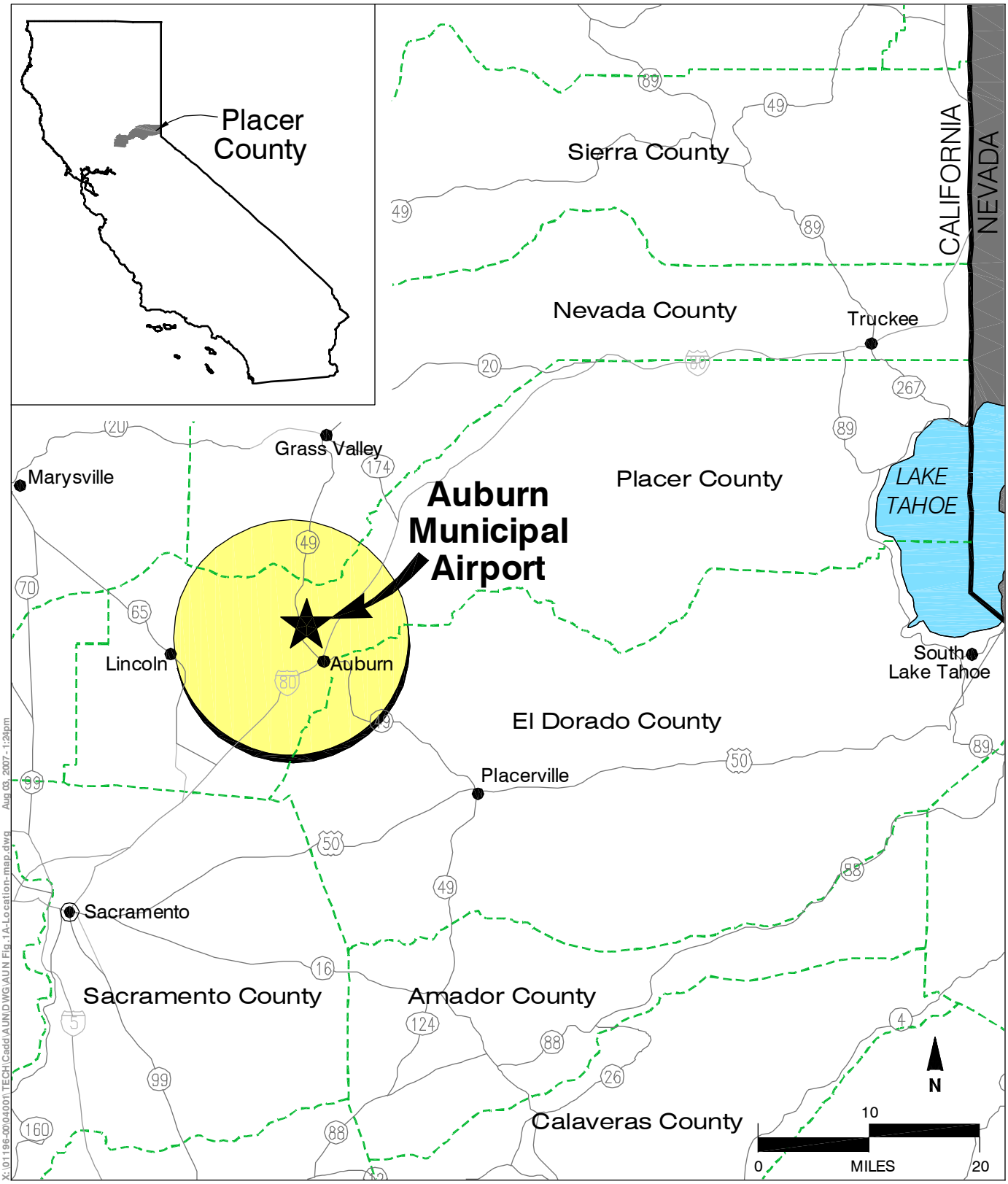
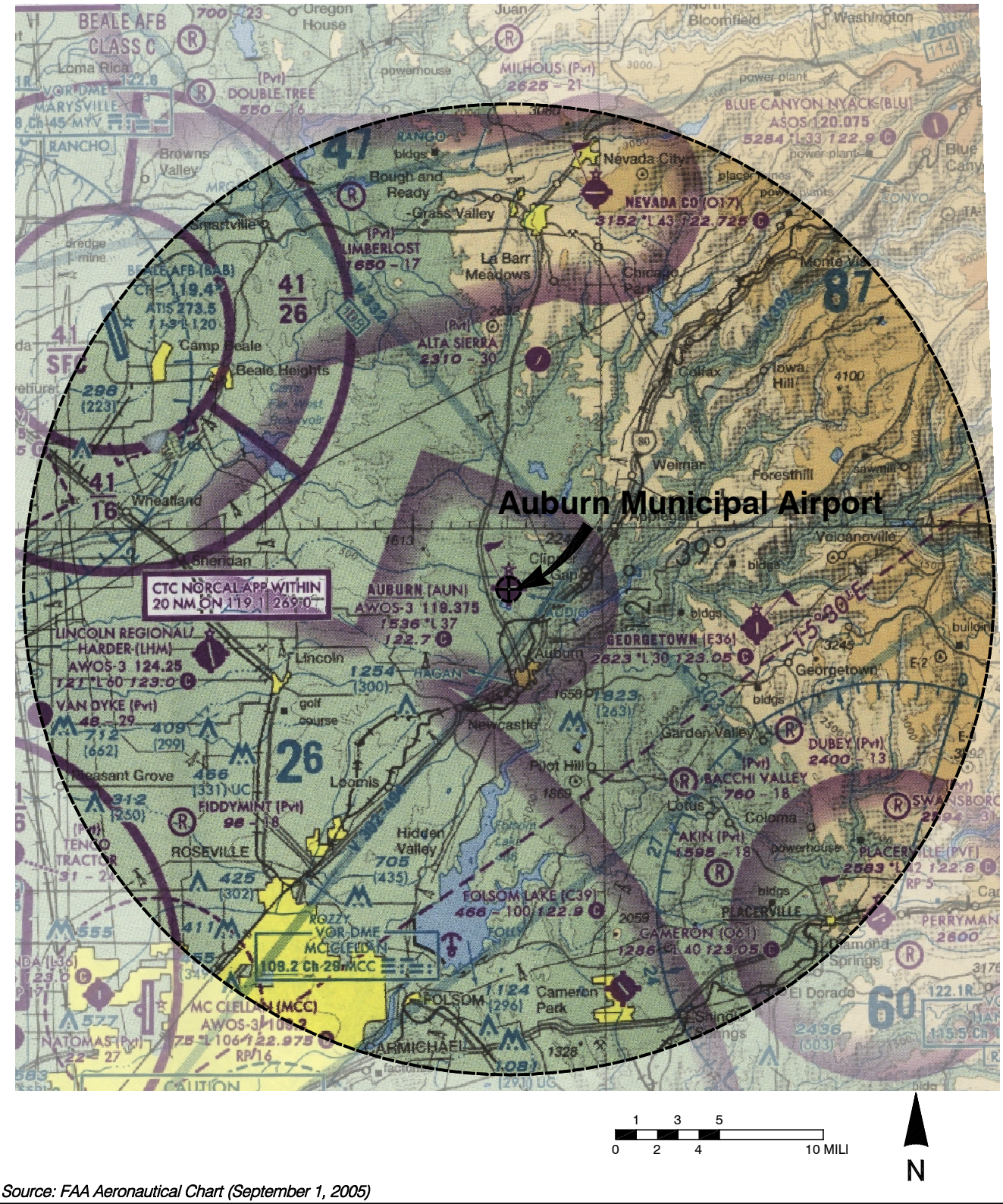


Figure 1A

Location Map

Auburn Municipal Airport



Source: FAA Aeronautical Chart (September 1, 2005)

Figure 1B

Area Airspace

Auburn Municipal Airport

Chapter 2

Airport Role and Activity Forecasts

2

Airport Role and Activity Forecasts

AIRPORT ROLE

Present

Auburn Municipal Airport is one of three public-use airports located in Placer County. It is the principal general aviation airport serving the city of Auburn as well as Placer County and neighboring portions of Nevada, Yuba, El Dorado, Sutter and Sacramento and counties. In this capacity, the airport is an essential component of the region's air transportation system. The key role played by Auburn Municipal Airport is documented in both the federal and state airport system plans.

The Federal Aviation Administration's (FAA) *National Plan of Integrated Airport Systems* (NPIAS) categorizes Auburn Municipal Airport as a "General Aviation Airport." The NPIAS defines a General Aviation Airport as an airport that does not have scheduled commercial passenger service and is not located in a major metropolitan area. These airports accommodate the general aviation needs of communities located outside major metropolitan areas. They are particularly important in providing for air transportation access in more rural areas. According to the NPIAS, general aviation airports are the most convenient source of air transportation for approximately 19% of the United States population.

The NPIAS identifies existing and proposed airports that are significant to the national air transportation system. It contains estimates of costs of airport development projects eligible for federal aid that are needed to meet aviation demand over the next five years. The latest NPIAS available during preparation of the *Auburn Municipal Airport Master Plan* covers the 2005-2009 period.

The Auburn Municipal Airport is also included in the *California Aviation System Plan* (CASP). The December 2003 CASP System Requirements Element classifies Auburn Municipal Airport as a Regional General Aviation Airport. The CASP defines the functional classification of airports as follows:

- **Community General Aviation Airports**—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; and provide basic or limited services for pilots or aircraft.

- **Regional General Aviation Airports**—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; have a published instrument approach; and may have a control tower.

- **Metropolitan General Aviation Airports**—Airports that serve the same activity 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; and provides flight planning facilities.

The CASP describes Auburn Municipal Airport as one of central California's highest priority facilities in terms of system capacity and safety enhancement. The CASP goes on to indicate that, with improvements, the airport is potentially worthy of reclassification to the Metropolitan General Aviation Airports category.

Particular characteristics of Auburn Municipal Airport's NPIAS and CASP roles include:

Figure 2A depicts the local service area of Auburn Municipal Airport as represented by the distribution of addresses of the airport's based aircraft owners. As can be seen, 78% of the aircraft are registered to owners with Auburn or other Placer County addresses. Most of the remainder are distributed among owners from adjacent counties.

- **A Base for Area Pilots and Aircraft Owners**—For many pilots who live and work in the area, the Auburn Municipal Airport is the closest and most convenient airport from which to fly. Additionally, many pilots located in adjacent counties choose to base their aircraft at Auburn Municipal Airport, rather than at nearby alternative airports, because of Auburn's desirable facilities and amenities. Corporate/business, personal business, pleasure/recreational, and flight training are the predominant aviation uses of the airport.

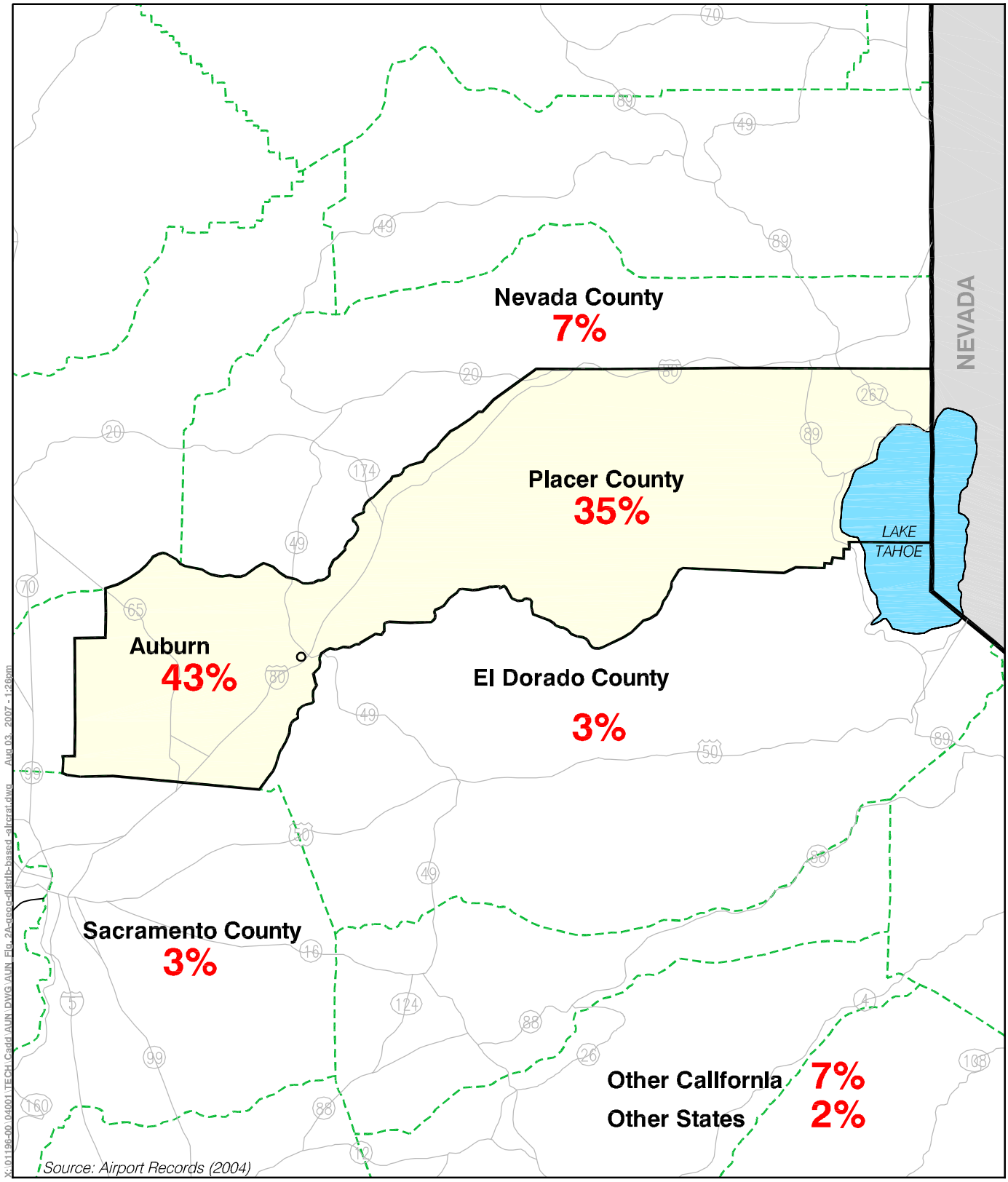


Figure 2A

Geographical Distribution of Based Aircraft

Auburn Municipal Airport

- **A Point of Air Access for Visitors to the Area**—Placer County and the Auburn area offer numerous cultural and recreational opportunities. The area encompasses California's famous Gold Country with its many historic mining sites and tourism facilities. In addition, portions of California's High Country featuring numerous mountain hiking trails, water sport venues, camping/recreational facilities, and world-class skiing resorts are located in Placer County. The airport provides access to these opportunities for visitors choosing to travel using general aviation aircraft.

- **A Place to Conduct Aviation Related Business**—Auburn Municipal Airport is an important place of business. Numerous aviation-related businesses are located on the airport. These businesses offer a wide range of general aviation services to based and transient aircraft owners and pilots. In addition, the airport's restaurant is a well known destination and gathering point for local and transient pilots as well as for local citizens and businesses.

- **A Base for Aviation-Related Community Emergency Services**—The airport is critically important for access for emergency medical transportation, search and rescue operations, law enforcement operations, and other emergency services.

- **A Commercial/Industrial Base for the Community**—Part of the Auburn Municipal Airport property, as well as adjacent non-airport, city-owned lands, consists of a substantial commercial/industrial park. In addition, significant commercial/industrial development is occurring adjacent to the airport. Combined, this business activity yields significant economic activity, including increased employment and revenue generation.

Future

The current nationwide trend in general aviation is toward slow, sustained overall growth. The number of active single-engine, piston-powered airplanes, the predominant users of Auburn Municipal Airport, is projected to increase nationally at 0.3% annually. This rate includes the addition of the newly recognized "sport aircraft" category. An exception to this trend is in business/corporate aviation. The FAA expects this sector to grow strongly over the next decade and beyond. With the increased time and difficulty of traveling on commercial air carriers due in part to increased security measures, many businesses are turning to general aviation to meet their business travel needs. The FAA and National Business Aviation Association (NBAA) anticipate that fractional ownership use of business aircraft will substantially increase in the years ahead. In addition, the introduction of new, small, twin-engine,

Fractional Ownership*:* A program in which a company or individual buys or leases a partial interest in an aircraft. The partial owner/lessee can use the aircraft for a certain number of days or weeks per year.

turbofan powered aircraft (i.e., Very Light Jets) suitable for both business and personal use will likely result in increased operations by this type of aircraft.

Auburn Municipal Airport can be expected to attract an above-average portion of this projected growth in business/corporate aviation. Situated on the northeastern edge of the expanding Sacramento metropolitan area, the airport's service area is experiencing rapid growth in population and economic development.

Other segments of general aviation will also continue to do well at Auburn Municipal Airport. Population and economic growth rates above the national average will be one contributing factor to this trend. Additionally, the airport has adequate land to accommodate growth in based aircraft parking, supporting commercial aviation services, and other general aviation functions that are part of the airport's present roles.

In summary, this *Master Plan* anticipates that the operational roles of Auburn Municipal Airport will remain much the same over the 20-year planning period. The emphasis will continue to be on general aviation and the development of facilities to accommodate general aviation demand, particularly business/corporate and personal/ recreational uses. This view of the airport's future roles is consistent with that indicated in both the NPIAS and CASP.

Because of the proximity of Sacramento International Airport to the southwest, scheduled commercial air carrier passenger service is fairly convenient to area residents. For this reason, scheduled passenger service is not anticipated at the Auburn Municipal Airport within the planning period. Similarly, substantial growth of air cargo activity at the airport is not anticipated within the planning period. However, modest activity by operators of small air cargo aircraft should be anticipated. Such activity can be readily accommodated within the airport's existing and planned infrastructure.

HISTORICAL AIRCRAFT ACTIVITY

Based Aircraft

Although historical data on the number of aircraft based at Auburn Municipal Airport is incomplete, the available data suggests that the based aircraft count has remained fairly constant since the mid-1980s. There were approximately 206 based aircraft in 1986 compared to 212 at the end of 1996. A count conducted at the end of 2004 as part of this *Master Plan* study found 210 aircraft to be based at the airport.

Of these 210 based aircraft, 197 (94%) are single-engine, piston-powered, propeller airplanes. There are also 10 (5%) twin-engine propeller airplanes, 3 (1%) helicopters, and no turbine-powered airplanes.

As depicted in Figure 2A earlier in this chapter, residents and businesses having Auburn addresses represent the largest group (43%) of based aircraft owners. Another sizable group, approximately 35%, are residents of other places in Placer County.

Transient Aircraft Parking

The demand for transient aircraft parking varies significantly on a day-to-day basis. An estimate derived from tiedown fee data and observations by airport staff indicates that up to 12 aircraft may be on the transient ramp at one time on peak days. Much of this peak demand is associated with short-term transient users of the on-airport restaurant.

Airport staff observations of transient aircraft activity indicate that business/corporate aircraft activity has been increasing recently. Airport staff estimates that, in a typical week, one to two small business/corporate jets visit the airport. This number tends to increase somewhat during the summer months.

Aircraft Operations

An "operation" is defined as either a takeoff or landing.

As is the case for almost all airports without an air traffic control tower, aircraft operations at the Auburn Municipal Airport are not routinely counted. Estimates of current aircraft operations therefore must be developed from other types of data together with any sample counts that might be available.

For the purposes of this *Master Plan* study, the Auburn Municipal Airport is estimated to have generated approximately 70,000 annual aircraft operations during 2004. This estimate has been derived from various sources of information described below.

- **Sample Counts**—The California Division of Aeronautics operates a program wherein they conduct counts of aircraft operations at many airports throughout the state. These counts are made using an acoustical counter set up at the airport, typically for three separate two-week periods representing different seasons of the year. These sample counts are then extrapolated to produce an estimated annual operations count. The Division conducted acoustical counts at Auburn Municipal Airport for two-week periods in September 1997, December 1997, and June 1998. These counts resulted in an estimated annual operations level of approximately 50,000. This estimated level of operations seems low when compared to all other sources of

operations data. California Division of Aeronautics personnel state that, while the acoustical counters may not account for all aircraft operations, they are a fairly accurate method of estimating annual operations. In the case of Auburn Municipal Airport, the state's counts do not include helicopter activity or low approaches by aircraft practicing instrument procedures.

- **FAA Terminal Area Forecast (TAF)**—The 2003 TAF shows a total of 68,770 operations in 2002. This number, also reflected in the FAA's Master Record (FAA Form 5010) data for the airport, is an estimate made by FAA and/or airport personnel and appears to have been carried forward for the past ten years with little adjustment.

- **California Aviation System Plan (CASP)**—The September 1999 CASP Statewide Forecast Element assumes a total of 81,076 operations in 2000 and 95,760 operations in 2005.

- **FAA Airport Master Record (Form 5010)**—Historic annual operations counts range from 68,000 in 1986 to 68,770 in 2003.

- **Previous Airport Master Plan (1996)**—The previous master plan for Auburn Municipal Airport, conducted in 1996, estimated some 69,270 operations for 1995 and projected 71,560 operations for 2000.

- **Airport Personnel Observations**—The Airport Manager and Operations Supervisor are located in facilities on the airport that overlook the transient aircraft apron and runway. It is relatively easy for them to observe aircraft operations from these locations. These airport personnel estimated the following aircraft activity levels:
  - 230 average daily operations during the summer;
  - 150 average daily operations during the winter.

FAA TAF and Airport Master Records appear to be carrying forward the operations numbers that may have been accurate in the past, but no longer reflect the current situation. The same applies to the CASP data.

Using the average daily operations levels estimated by airport personnel and other available information, the current aircraft activity level for Auburn Municipal Airport is estimated to be approximately 70,000 annual operations. This conclusion is supported by airport personnel and the on-site observations by members of the consulting team.

Activity Distribution

The historical distribution of aircraft operations (i.e., day/night, local/itinerant) at Auburn Municipal Airport can only be estimated from discussions with those familiar with the airport, such as FBO and airport employees. These sources indicate that the vast majority of aircraft operations (approximately 85%) occur during the day (7 a.m. to 7 p.m.). Evening (7 p.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) periods are estimated to account for only 10% and 5% of the operations, respectively. Some 25% of operations are estimated to be local (primarily touch-and-go training flights) and 75% are itinerant (to or from points beyond the immediate airport area).

Instrument Operations

Auburn Municipal Airport can be accessed during periods of inclement weather via an instrument approach procedure based on the global positioning satellite system (GPS). This nonprecision instrument approach (GPS Runway 7) offers approach minimums as low as 449 feet above the airport elevation and one statute mile visibility. In addition, this instrument approach procedure provides the capability for instrument training operations. Although these operations cannot be quantified because there is no air traffic control tower, airport staff have observed that instrument training operations occur on an occasional basis. These operations are not recorded by the FAA. FAA personnel report that the Northern California TRACON only counts instrument approaches at airports when the weather is below 1,500-foot ceiling and/or three miles visibility and does not segregate practice approaches from actual instrument landings. Airport personnel estimate that instrument approaches at the airport average about five or six per week. Activity during actual instrument conditions represents a very small portion of airport operations (maybe 1%), but such activity is expected to increase somewhat as more sophisticated and better equipped aircraft utilize the airport.

Aircraft Accident Record

National Transportation Safety Board (NTSB) records, reflecting the past ten years' data, list a total of 11 aircraft accidents as having occurred on the Auburn Municipal Airport (1994 through 2004). NTSB data does not include lesser incidents (i.e., mishaps that do not result in serious personal injury or major aircraft damage).

The majority of these accidents (eight out of eleven) involve major aircraft damage and/or serious personal injury sustained during the "landing" phase of aircraft operations (e.g., loss of directional control/ground loops, hard landings, brake failures, and gear up landing). The remaining three accidents occurred on departure/takeoff

from the airport (e.g., engine failures and loss of directional control).

None of the NTSB reports suggest that any airport design or safety conditions contributed to any of the accidents.

AVIATION ACTIVITY FORECASTS

In accordance with FAA guidelines, the time horizon of the forecasts in this *Airport Master Plan* is 20 years. However, the many factors and uncertainties impacting the future of the general aviation industry make forecasting of airport activity an inexact science. In recognition of these many factors and uncertainties, the 5-, 10-, and 20-year forecast intervals in this *Master Plan* are considered to be approximate time frames for reaching the stated activity levels. The focus is thus placed on increments of potential growth rather than on specific years. Planning for new facility needs can then be tied to these increments. In other words, the plans show what facilities will be needed to accommodate the specific activity levels, regardless of when those levels are reached. This is the way development usually occurs. Construction takes place as the demand becomes apparent, largely irrespective of the time frame that might initially have been anticipated.

The *Master Plan* forecasts of future aviation activity at Auburn Municipal Airport are summarized in Table 2A and depicted in Figures 2B and 2C together with estimates of current activity levels. Projections have been developed for based aircraft, transient aircraft parking, and annual aircraft operations. These forecasts, as outlined in the following sections, have been developed by:

- Considering the previously described historical activity levels at the Auburn Municipal Airport;
- Assessing the national, state, and local trends and other factors that influence the airport's activity;
- Reviewing FAA and California Division of Aeronautics forecasts of activity at the airport;
- Reviewing previous local forecasts;
- Drawing conclusions from the data

	CURRENT	PROJECTED		
	2004 / 2005	5+ Years (2010)	10+Years (2015)	20+Years (2025)
BASED AIRCRAFT				
Aircraft Types				
Single-Engine	197	214	228	261
Twin-Engine	10	12	15	20
Business Jet (Very Light)	0	2	4	8
Helicopters	3	4	5	5
Total Aircraft	210	230	250	290
TRANSIENT AIRCRAFT				
Peak Daytime Parking Demand (excluding major events)	12	13	15	18
ANNUAL AIRCRAFT OPERATIONS				
Aircraft Mix				
Single-Engine, Piston	61,850	66,550	71,630	85,850
Twin-Engine, Piston	6,000	8,500	9,500	12,000
Twin-Engine, Turboprop	1,000	1,500	2,000	3,000
Business Jet (Small or Very Light)	150	200	270	500
Helicopters	1,000	1,250	1,600	2,650
Total Aircraft	70,000	78,000	85,000	104,000
Types of Operation				
Local (Touch-and-Goes)	17,000	19,000	21,000	26,000
Itinerant	53,000	58,000	64,000	78,000
Total	70,000	77,000	85,000	104,000
Average Operations per Based Aircraft				
Total	333	335	340	360

Table 2A

Master Plan Activity Forecasts

Auburn Municipal Airport

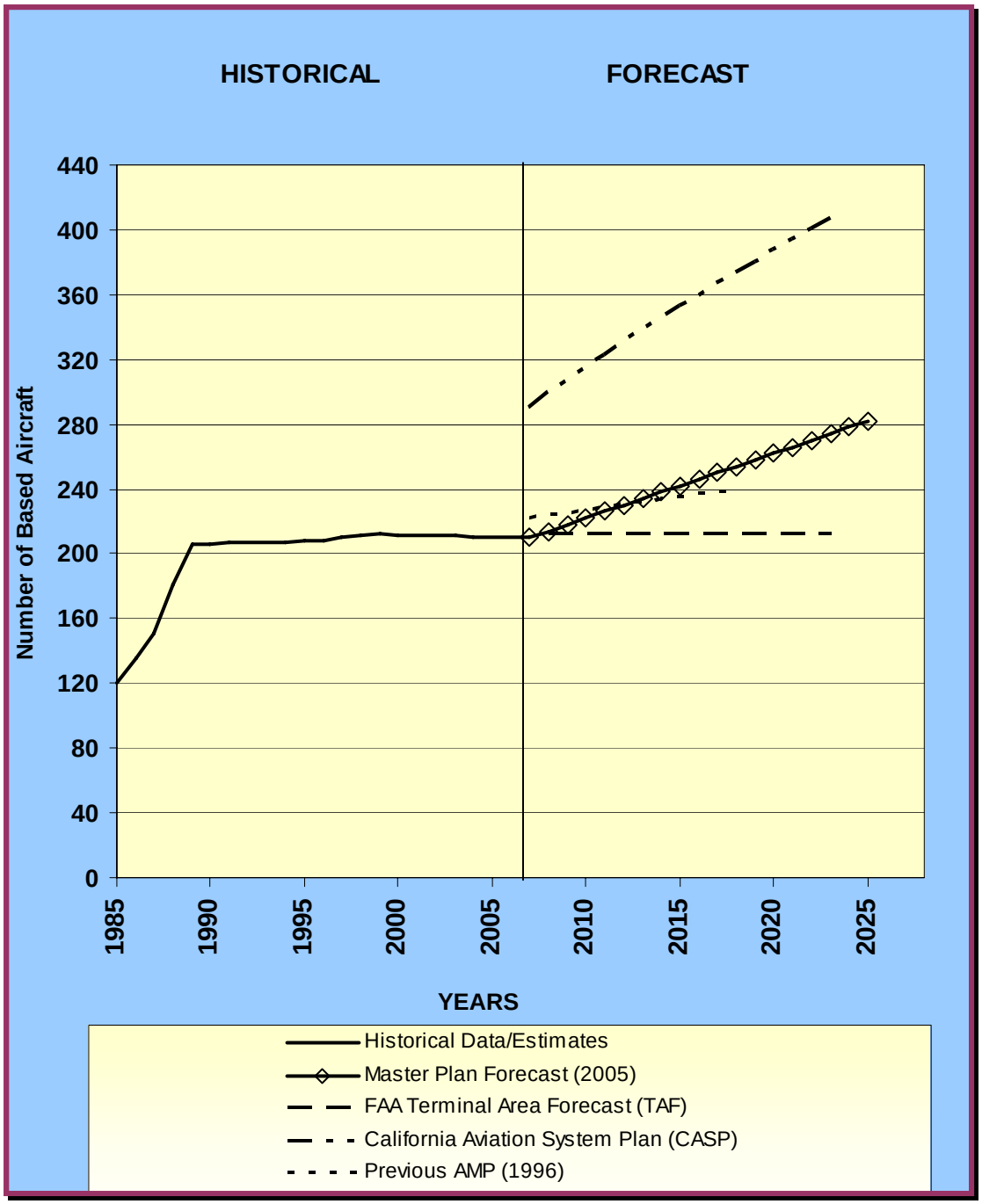


Figure 2B

Master Plan Activity Forecasts – Based Aircraft

Auburn Municipal Airport

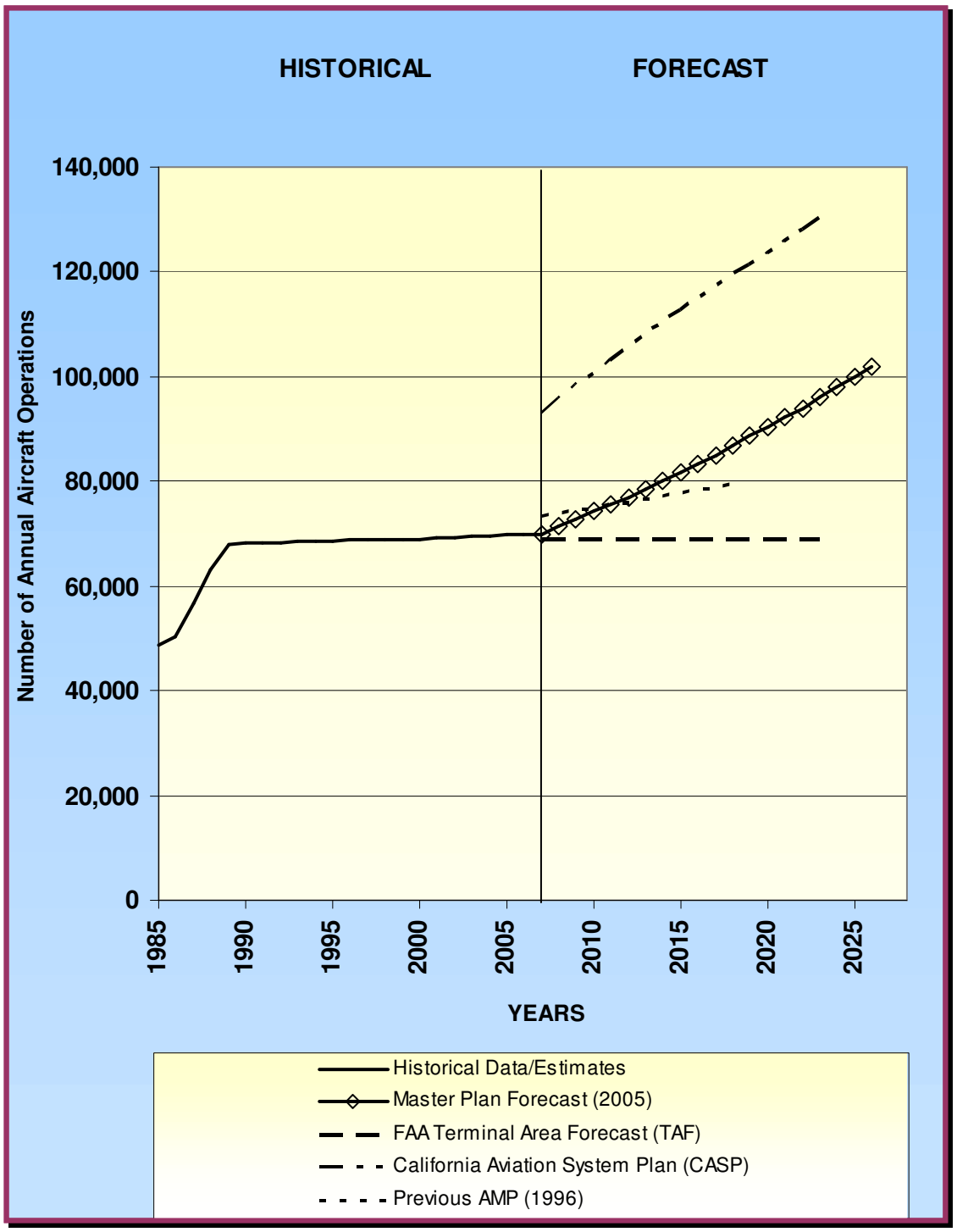


Figure 2C

Master Plan Activity Forecasts – Annual Aircraft Operations

Auburn Municipal Airport

Forecast Influences

Aviation activity at any airport is influenced by a variety of factors, some locally derived and others determined by external forces. The following are among the factors that will affect based aircraft numbers, transient aircraft parking demand, and aircraft operations at Auburn Municipal Airport.

Hangar Capacity

At least for the short term, a major factor affecting aircraft activity at the airport is the apparent shortage of aircraft hangar space. At the end of 2004, the hangar waiting list contained 130 names. Many of the names on the list are associated with aircraft that are not already at the airport, but would base there if hangars were available. Experience at other airports has found that some people will drop from hangar waiting lists if asked to place a significant deposit or when they learn what the monthly rental fees for new hangar units will be. Nevertheless, unmet demand for numerous hangar spaces appears to exist.

Local Socio-Economic Factors

Over the longer term, the major local influences on aviation demand at Auburn Municipal Airport involve such factors as the local economy and demographics and the community's proximity to other airports. Perhaps the most relevant is the comparatively robust population and economic growth projected for Placer County and the city of Auburn.

County of Placer's Office of Economic Development projections indicate that the population in the County is expected to increase by about 60% between 2000 and 2020. Similar to more recent trends, Placer County's population is expected to exceed the growth rates of the state, the Bay Area, and the Greater Sacramento Area. The city of Auburn's population is projected to increase by some 25% over this same 20-year period. This view is supported by the Sacramento Area Council of Governments (SACOG), which expects the area population to increase by 56% from 2000 through 2020 and by 73% through 2025. SACOG also projects a 61% increase in employment over the 25-year period.

The commercial/industrial parks both on the airport and in the immediate area are experiencing rapid growth in tenants due in part to the low cost of land and in part to the proximity of the airport. Both the airport staff and local economic development organizations have been actively marketing the airport and surrounding commercial/industrial parks.

Local marketing efforts, land prices that are lower than the nearby Sacramento metropolitan area, tax advantages of having the airport in an enterprise zone, and recently increased interest in the commercial/industrial parks, all point to substantial future growth of aviation activity in the area.

Light Business Jets

Cessna Citation Mustang

Adam Aircraft A700

Light jets are the most economical choice for short- to mid-range trips certificated for single pilot operations. A light jet can travel farther and faster than non-jet aircraft while operating in and out of airports not accessible to the major airlines. As many as eight companies have begun designing this new generation of business jet.

Eclipse 500

The Eclipse 500 carries a pilot and up to 5 passengers. The aircraft is 33 feet long and has a wingspan of 37 feet. Maximum takeoff weight (MTOW) is 5,600 pounds.

National Trends

The major external influence on future Auburn Municipal Airport activity is the growth of general aviation nationally. During the 1990s, the general aviation fleet was declining with accompanying declines in aircraft operations. However, with the improving national economy and renewed production of general aviation aircraft (including very light jets and sport aircraft), general aviation activity is rebounding.

FAA Aerospace Forecasts FY 2004-2015 is a document that has been prepared to meet the budget and planning needs of constituent units of the FAA and to provide information that can be used by State and local authorities, the aviation industry, and the general public. The report discusses three major areas: (1) the assumptions and other forecasts that were used in preparing the forecasts; (2) historical data and forecasts of future aviation demand and activity for commercial air carriers, regional/commuter airlines, and general aviation; (3) workload measures for FAA activities. The report predicts an average annual growth rate of the general aviation fleet of 1.3% over the 13-year forecast period, with the largest growth rate coming in turbine-powered, business/corporate use aircraft. The report also predicts an average annual growth rate in hours flown of 1.5%, again with the largest growth rate in turbine-powered, business/corporate use aircraft. Another source of FAA forecasts, the *2005-2009 NPIAS*, indicates that general aviation aircraft operations nationwide will grow at an average annual rate of 1.7% from 2004 through 2015.

An additional influence since the terrorist attacks of September 11, 2002, is the transition from commercial passenger service to use of business/corporate aircraft by many business travelers. The National Aeronautics and Space Administration (NASA) continues to pursue its proposed Small Aircraft Transportation System. The purpose of the system is to demonstrate the viability of small aircraft as an alternative to scheduled commercial airlines for trips of between 200 and 1,000 miles. The heart of the program will be small, efficient jet aircraft that can transport travelers to and from general aviation airports at a cost similar to an airline ticket. According to NASA, approximately 10 companies are in the process of developing small business jets (i.e., Very Light Jets) or are contemplating doing so. As an example, Eclipse Aviation Corp. is developing a six-seat very light jet (VLJ) that will cost around $1 million and fly 1,300 miles at a cruising speed of 400 miles per hour. More than 1,500 of these aircraft, which the company hopes to be available in 2006, have already been ordered.

Existing Forecasts

Figure 2B graphically presents historical based aircraft data for the Auburn Municipal Airport together with existing forecasts from the FAA, California Division of Aeronautics, and prior local studies. Figure 2C portrays similar data for aircraft operations. As noted earlier in this chapter, data for the earlier years is spotty and not considered very reliable. Data obtained and evaluated as part of this *Master Plan* study point to a current count of 210 based aircraft and estimated current total of 70,000 annual operations.

FAA Forecasts

The FAA forecasts levels of aviation activity at Auburn Municipal Airport in the NPIAS and in the TAF. The *2005-2009 NPIAS* forecasts 212 based aircraft at the Auburn Municipal Airport in 2009. This forecast implies no growth in based aircraft at the airport in the near term. Similarly, the TAF forecasts based aircraft to remain level at 212 through 2020.

The TAF also forecasts aircraft operations at the airport to remain unchanged at 68,770 per year throughout the forecast period. This TAF forecast, while consistent with the current level (2004) of annual operations, does not adequately reflect a reasonable measure of anticipated growth specifically for Auburn Municipal Airport.

Contrary to the TAF no-growth forecasts, the *NPIAS* predicts annual growth of 1.7% in national general aviation operations and 0.4% in national general aviation hours flown through 2015.

State Forecasts

The California Division of Aeronautics provides statewide forecasts of based aircraft and aircraft operations as part of the California Aviation System Plan (CASP). The most recent (September 1999) CASP Statewide Forecasts Element predicts that based aircraft at the Auburn Municipal Airport will grow from 254 in 2000 to 408 in 2020, an average annual increase of about 2.5%. The CASP predicts operations increasing from 81,076 in 2000 (higher than apparently occurred) to 130,233 in 2020, or an approximate 2.5% average annual growth rate. This growth rate is somewhat high when compared to the abovementioned FAA projection of a 1.7% average annual increase in hours flown nationally.

Local Forecasts

The previous master plan for Auburn Municipal Airport, prepared in December 1996, projected modest increases in airport activity.

From a base level of 195 in 1995, the based aircraft count was projected to reach 219 in 2015. Likewise, aircraft operations were expected to grow from 69,270 in 1995 to 79,340 in 2015. Both of these forecasts reflect a 0.7% average annual growth rate. These forecasts assume growth rates that are slightly higher than the growth actually experienced at the airport.

Forecast Scenarios

Based Aircraft

Three based aircraft forecast scenarios can be envisioned for Auburn Municipal Airport.

- **Constrained**—The number of based aircraft at the airport has been fairly consistent over the past ten years. One prospect is that this trend will continue. A lack of suitable hangars and corporate aircraft parking space and a relatively short runway could cause prospective users and tenants, particularly those operating larger/faster business/corporate aircraft, to base their aircraft at other airports in the region.

- **National and Regional Trends**—As stated earlier, the FAA projects an annual average growth in the general aviation fleet of about 1.3% through 2015. This growth rate is reflective of the growing number of newly manufactured general aviation aircraft moderated by the continuing retirement of older aircraft. The newly manufactured general aviation aircraft include very light jets and sport/experimental aircraft. Given the robust economic development and population growth projected for the Auburn region, it is reasonable to anticipate that this national trend could lead to increased based aircraft at Auburn Municipal Airport. If the airport matches the national growth rate of the general aviation fleet and continues this trend through 2024, some 272 aircraft would be based there in that year.

- **Expanded Activity Projection**—A good argument can be made that the rapid growth in population and employment in the area served by Auburn Municipal Airport will result in a growth rate of based aircraft that will be higher than the national general aviation fleet growth. SACOG projects population within Placer County to increase at an average annual rate of 2.5% between 2000 and 2025. Employment growth is projected at 3.2% per year on average over this same period. If based aircraft at Auburn Municipal Airport were to increase at a similar rate, say 3.0%, then the airport would have 380 based aircraft in 2024.

Transient Aircraft

Demand for transient aircraft parking at Auburn Municipal Airport is anticipated to continue growing along with the development of the airport and the surrounding commercial/industrial parks. A growth rate of approximately 1.8%, slightly greater than the forecast growth in based aircraft, is considered reasonable for planning purposes. Applying this to a current average weekly peak of 12 transient aircraft results in a forecast peak of 18 transient aircraft at the end of the 20-year planning period.

Most of the transient aircraft parking demand is expected to continue to be generated by single-engine airplanes. Corresponding to the growth in the national general aviation aircraft fleet, usage of the airport by transient twin-engine airplanes, helicopters, and small business jets is expected to increase slightly more than single-engine airplanes. Provisions will need to be made for parking these aircraft, if not on the regular transient ramp, then on a paved overflow area.

Aircraft Operations

The same three forecast scenarios outlined above with respect to based aircraft apply to aircraft operations.

- **Constrained**—Various factors could contribute to minimal growth in aircraft operations. These include a long-term slow economy, lack of growth in the surrounding commercial/industrial parks, population growth slower than currently projected, and failure to add new hangars and other facilities and services at the airport. Under this scenario, aircraft operations would remain at about the current 70,000 level.

- **National and Regional Trends**—As stated earlier, the FAA projects an annual growth in general aviation operations of 1.7% through 2015. Applying this growth rate to Auburn Municipal Airport and extending it through 2024 results in approximately 98,000 aircraft operations by the end of the 20-year *Master Plan* time frame.

- **Expanded Activity Projection**—Given the growing population and economy of the region, it is reasonable to anticipate aircraft operations at Auburn Municipal Airport could exceed the national average. Increasing area population and economic development in conjunction with construction of additional hangars could contribute to an expanded activity projection. An average annual growth rate of 2.0%—comparable to the expanded based aircraft projection relative to the national trends—would bring aircraft operations to 104,000 in 2024.

Conclusions

The high growth rates of aviation activity forecasted for Auburn Municipal Airport in the 1996 master plan relied upon certain assumptions that, to date, have not occurred. On the other hand, the virtual no-growth scenario represented by FAA forecasts reflects the actual experience over the last 20 years, but is unsuitable for long-range planning purposes. It also overlooks the apparent unmet current demand resulting from the shortage of aircraft hangar capacity and projected growth of the Auburn community.

Activity forecasts for Auburn Municipal Airport are summarized in Table 2A. The *Master Plan* projects based aircraft to increase from 210 in 2004 to 290 by about 2024, an average annual increase of 1.6%. If additional hangars are built in the near term, a substantial portion of this increase could occur within this time frame. The projected demand for transient aircraft parking is 18 airplane parking positions in 2024. This number is exclusive of overflow needs during special nearby events and the annual fly-in.

More of a middle ground can be found by considering scenarios keyed to nationwide general aviation growth and regional socioeconomic projections. All of these forecasts would result in somewhere between 280 and 300 based aircraft at Auburn Municipal Airport in 2024. Since the purpose of this *Master Plan* is to guide the long-term development of the airport to meet the aviation needs of the community, a forecast in this range is considered the most reasonable. Specifically, a planning forecast of 290 based aircraft by about 2024 is utilized herein.

Single-engine, piston-powered, propeller airplanes will continue to comprise the bulk of the airport's based aircraft fleet. However, consistent with national trends, business/corporate aircraft—twin-engine piston and turboprop airplanes, business/corporate jets (primarily very light jets), and helicopters—will be more strongly represented at the airport in the future than they are today.

Projections of future levels of aircraft operations are not a major factor in the planning and design of improvements at Auburn Municipal Airport. As noted in Chapter 3, any foreseeable aircraft operations level is below the operational capacity of the runway system. Brief operational delays may occasionally occur during peak periods, but these delays would not warrant major runway improvements in the near term. Operational forecasts are also used in the assessment of the potential noise impacts of airport activity. The cumulative noise impact, as defined by Community Noise Exposure Level (CNEL) contours, is not expected to be a major concern at Auburn Municipal Airport even if total operations exceed those projected in this *Master Plan.* Current and projected noise impact contours are depicted in Chapter 5.

Utilizing similar rationale with respect to aircraft operations, an average annual increase of about 2.0% is projected for the purposes of the *Master Plan*. The resulting forecast is for some 104,000 aircraft operations in approximately 2024. A significant portion of this growth is attributable to the growth of based aircraft at the airport and increased transient use, especially for business/corporate purposes. Some increase in aircraft utilization (operations per based aircraft) is assumed as well. Consistent with both based aircraft projections and national trends, twin-engine airplane, business/corporate jet, and helicopter activity is expected to increase more rapidly than single-engine airplane operations. Because of the historic high percentage of transient aircraft operations, the percentage of transient and local operations is expected to remain fairly constant.

	CURRENT	PROJECTED		
	2004 / 2005	5+ Years (2010)	10+Years (2015)	20+Years (2025)
BASED AIRCRAFT				
Aircraft Types				
Single-Engine	197	214	228	261
Twin-Engine	10	12	15	20
Business Jet (Very Light)	0	2	4	8
Helicopters	3	4	5	5
Total Aircraft	210	230	250	290
TRANSIENT AIRCRAFT				
Peak Daytime Parking Demand (excluding major events)	12	13	15	18
ANNUAL AIRCRAFT OPERATIONS				
Aircraft Mix				
Single-Engine, Piston	61,850	66,550	71,630	85,850
Twin-Engine, Piston	6,000	8,500	9,500	12,000
Twin-Engine, Turboprop	1,000	1,500	2,000	3,000
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Helicopters	1,000	1,250	1,600	2,650
Total Aircraft	70,000	78,000	85,000	104,000
Types of Operation				
Local (Touch-and-Goes)	17,000	19,000	21,000	26,000
Itinerant	53,000	58,000	64,000	78,000
Total	70,000	77,000	85,000	104,000
Average Operations per Based Aircraft				
Total	333	335	340	360

Table 2A

Master Plan Activity Forecasts

Auburn Municipal Airport

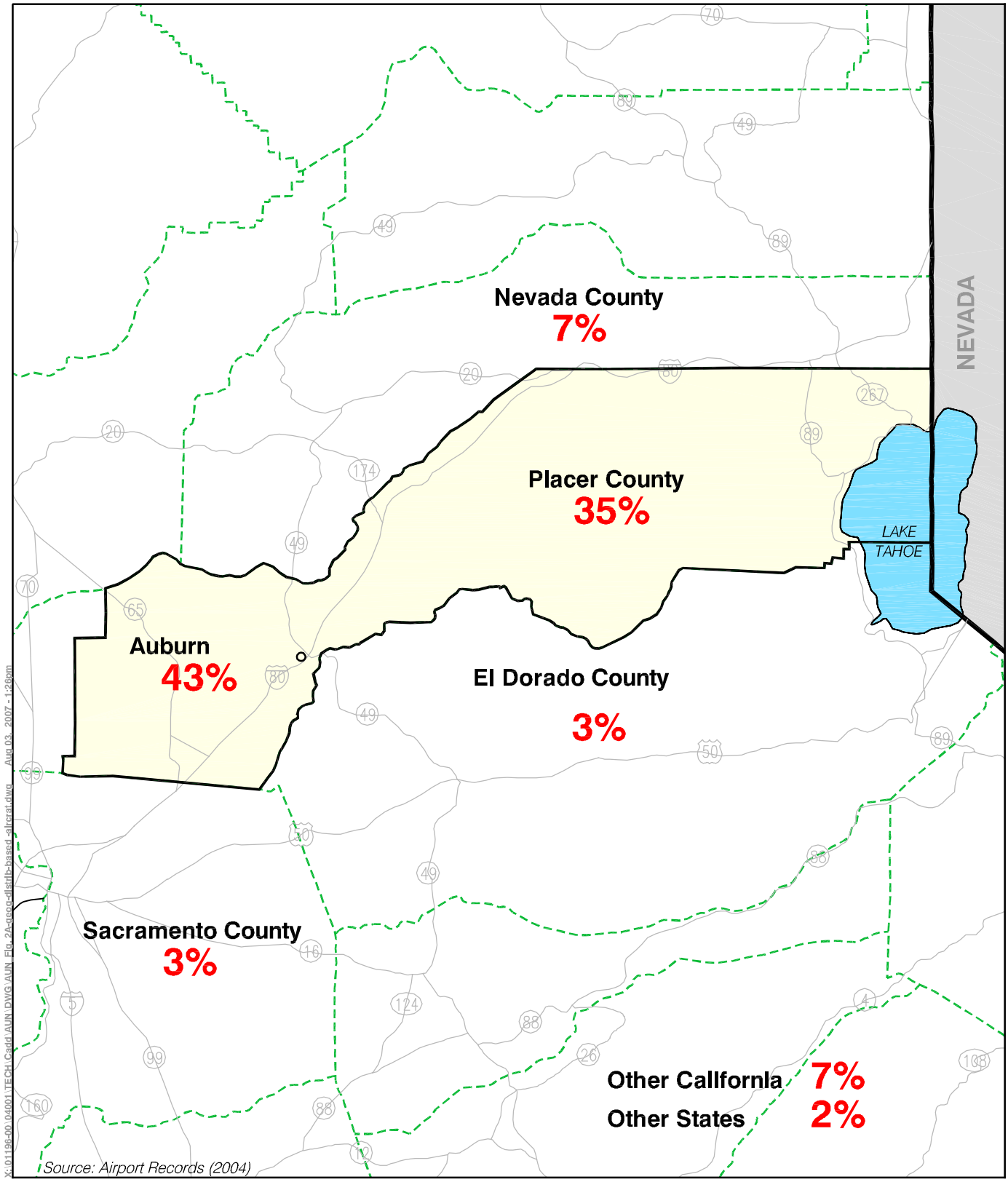


Figure 2A

Geographical Distribution of Based Aircraft

Auburn Municipal Airport

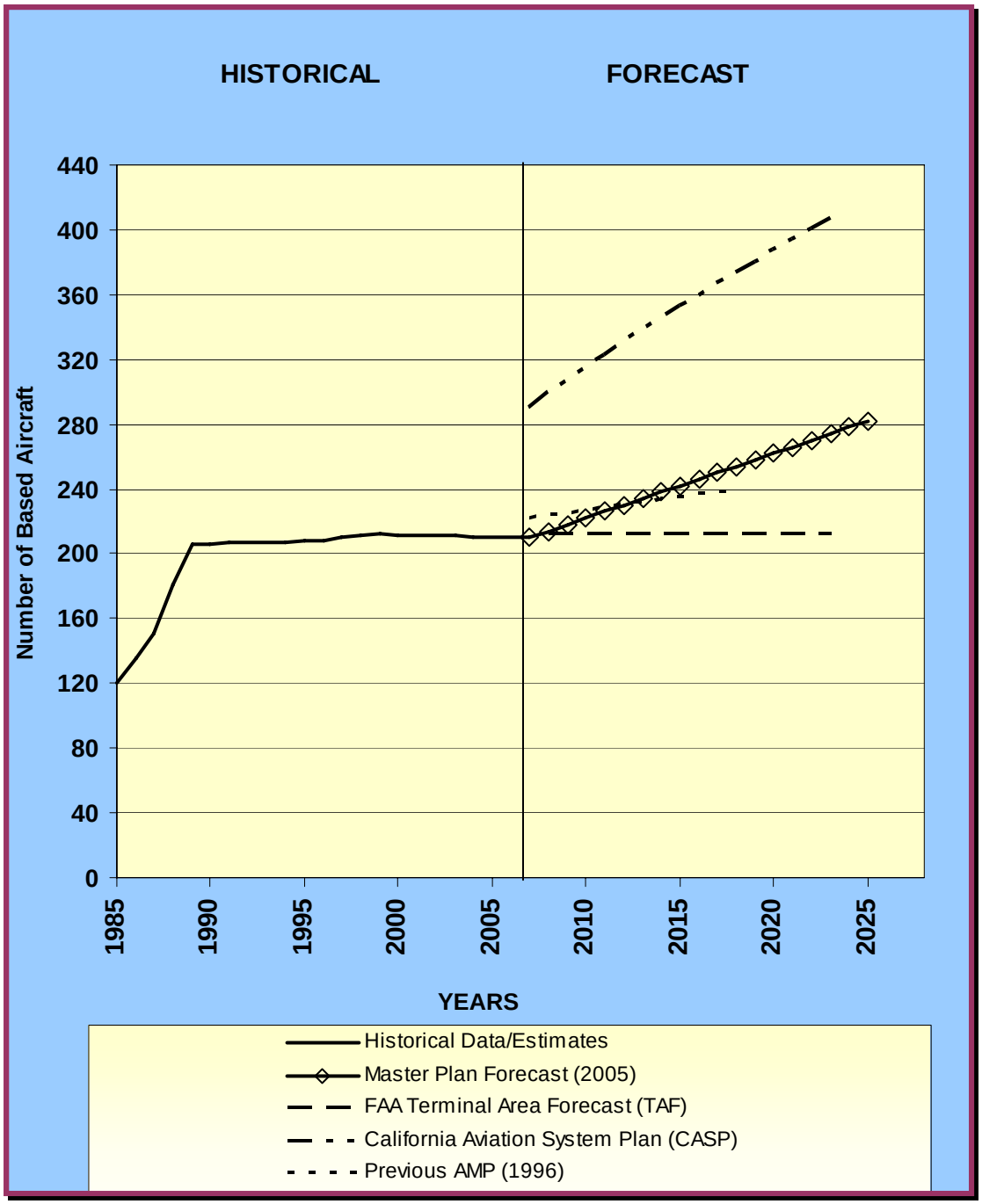


Figure 2B

Master Plan Activity Forecasts – Based Aircraft

Auburn Municipal Airport

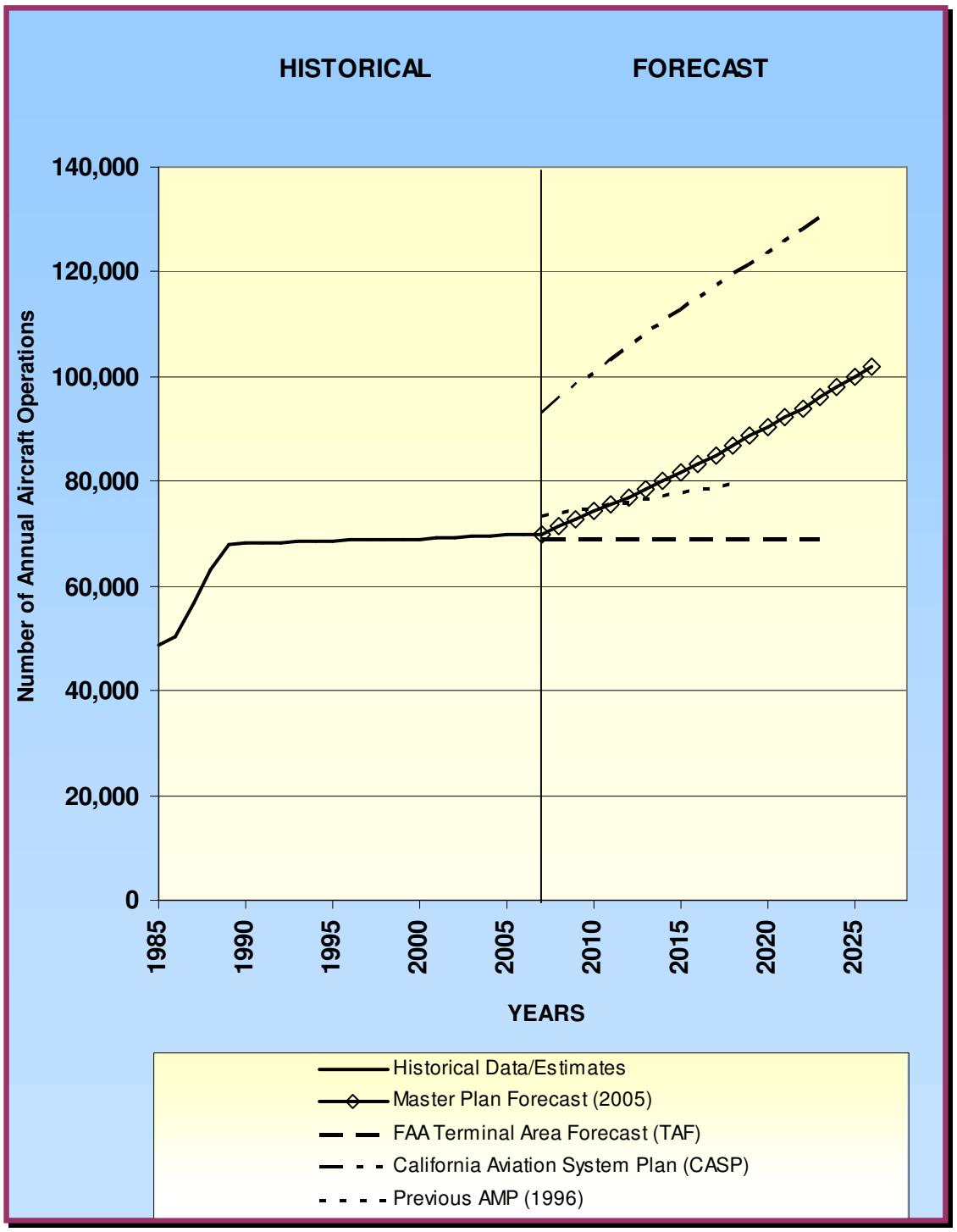


Figure 2C

Master Plan Activity Forecasts – Annual Aircraft Operations

Auburn Municipal Airport

Chapter 3

Airport Design

3

Airfield Design

INTRODUCTION

The configuration of the runway and taxiway system at Auburn Municipal Airport has undergone significant changes since the airport's opening in 1934. As discussed in Chapter 2, many of these changes occurred as the airport grew. In the early 1970s, the airport closed its crosswind runway; later this area was redeveloped and utilized for a large tiedown apron and an industrial park. In 2001, a 400-foot extension to the east end and a 200-foot extension to the west end of the runway were completed, bringing the current runway length to 3,700 feet. At the same time, the runway width was increased to 75 feet and a more uniform longitudinal profile was created.

This chapter contains a comprehensive assessment of future airfield development needs. With a major runway improvement project having only recently been completed, no major deficiencies in the runway design are identified. Nevertheless, the feasibility of an additional extension of the runway length is investigated. Also examined is the potential need for a parallel taxiway to serve future development on the north side of the runway.

BASIC DESIGN FACTORS

The overall design of an airport's airfield is shaped by a set of key factors established by the FAA This section looks first at the external influences on airfield design—the demand determinants—and then at the fundamental needs that result from these demands.

Demand Determinants

In simple terms, the demand placed on an airport's airfield facilities can be defined in terms of three key parameters:

- The total volume of aircraft operations;
- The types of aircraft seeking to operate at the airport; and
- The weather conditions that affect those operations.

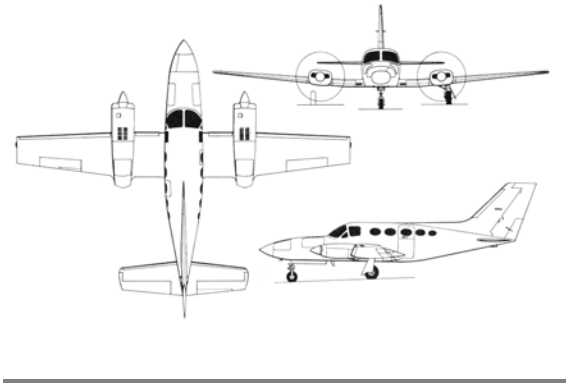
For Auburn Municipal Airport, the specific demand determinants are as outlined below.

Aircraft Activity Volume

The *Master Plan* activity forecasts (see Chapter 2) anticipate that total annual aircraft operations at Auburn Municipal Airport will reach approximately 104,000 annually in 20 years, compared to approximately 70,000 annual operations at present.

Design Aircraft

Currently, over 95% of operations at Auburn Municipal Airport are generated by single-engine piston-powered aircraft. Regular use by other aircraft occurs to a lesser extent and includes twin-engine piston and twin-engine turboprop aircraft. Helicopters regularly use the airport, however they account for less than 500 annual operations. The airport experiences occasional use by small to medium-sized business jets. The most demanding class of aircraft regularly using the airport (defined by the FAA as more than 500 annual operations) is medium-sized, twin-engine, piston-powered aircraft, such as the Cessna 414 Chancellor (6,785 pounds maximum takeoff weight, 44.1-foot wingspan, 94-knot approach speed).



Cessna Chancellor 414

The forecasts described in Chapter 2 indicate that the smaller aircraft will continue to dominate the airport's usage, but that business/corporate aircraft activity will have the most rapid growth. This growth of business/corporate aircraft will be represented by slightly higher percentages of twin-engine airplanes, especially turboprops, and as well as by small jets. Turboprops, although more demanding in terms of runway design features, are not expected to operate at the airport frequently enough to become the design aircraft.

The new, small jets—known collectively as very light jets or VLJs—represent a different prospect. As of late 2005, none of have yet to be introduced into the U.S. market. A variety of models are under development, however, and some are expected to be-

gin entering the U.S. fleet by late 2006. If these aircraft prove successful, they could operate sufficiently often at Auburn Municipal Airport to potentially be considered as the critical design aircraft within the 20-year time horizon of the *Master Plan*. Operationally, though, the VLJs are not much different than the current light twin design aircraft represented by the Cessna 414. The VLJs soon to enter the fleet weigh 10,000 pounds or less, have wingspans mostly in the 37-to-45-foot range, and approach speeds of approximately 85 to 100 knots. Also, they are intended to operate from 3,000-foot runways. Given the similarity of characteristics between these two aircraft classes, the Cessna 414 or its equivalent is deemed to remain the design aircraft at Auburn Municipal Airport because of its anticipated higher usage level.

Weather Conditions

The two facets of local weather conditions that most directly affect the design of an airport's airfield are wind and visibility. Wind conditions—specifically speed and direction—determine the optimum alignment of the runway or runways. Visibility conditions, both horizontally and the height of cloud ceilings, are key factors with respect to whether instrument approach capability needed.

Current weather data for Auburn Municipal Airport is recorded by means of an Automated Weather Observation Systems (AWOS) located on the airport. This data is not compiled, however, and thus has not been available for the present study. Earlier data for an undetermined five-year period is included in the 1989 Airport Master Plan report. This data reveals that winds at the airport blow from almost every direction, but are seldom very strong. Light winds from the east are indicated as being the most common. Winds above 15 miles per hour (13 knots) occur only 5.5% of the time.

A wind rose is included on the Airport Layout Plan drawing included at the back of this report.

Needs Assessment

For the purpose of airfield design, the operational demands described above must be translated into facility needs. In basic terms, these needs can be assessed with respect to four design factors:

- The runway length needed to serve the design aircraft;
- The classification of the runways and taxiways for design purposes;
- The adequacy of the runway/taxiway system capacity; and
- The adequacy of the runway system wind coverage.

Runway Length

The length of the runway required to accommodate the most demanding airplanes anticipated to use the airport is a fundamental airfield design factor. Runway length requirements for specific aircraft are dependent upon airfield elevation and design temperature (the average high temperature for the hottest month). For several categories of small aircraft, the FAA has established formulas indicating the desirable runway length. For large aircraft, this data is available in performance charts provided by aircraft manufacturers.

The specific length requirement for Auburn Municipal Airport is analyzed in subsequent sections of this chapter.

Airport Classification / Design Standards

Another basic airfield design requirement which must be assessed is the capability of the facilities to safely accommodate the types of aircraft that seek to operate at the airport. Runway length is a key component of this assessment, but other facility dimensions, such as pavement widths and lateral clearances, are also very important.

FAA design standards for these features are set in accordance with the Airport Reference Code (ARC) applicable to the airport as a whole or, in many cases, to individual runways or taxiways (Advisory Circular AC 150/5300-13, *Airport Design*). The primary determinants of airport reference code classifications are the approach speed and wingspan of the most demanding types of aircraft expected to regularly operate at the airport, together with the type of instrument approach capability the runway has or will have.

Instrument approach capabilities consist of a GPS straight-in non-precision approach to Runway 7. This approach procedure has a 1-mile visibility minimum which, for the purposes of most airport design standards, is considered the same as a visual approach

Table 3A summarizes the FAA design standards associated with the Airport Reference Codes that are currently applicable or potentially relevant to future development of Auburn Municipal Airport. Later sections of this chapter examine the significance of these standards with respect to individual components of the airfield design.

Airport Reference Code Criteria

Approach Category	*Approach Speed Range*	
A		<91 kts
B	≥91 kts	<121 kts
C	≥121 kts	<141 kts
D	≥141 kts	<166 kts
E	≥166 kts	
Design Group	*Wingspan Range*	
I		<49 feet
II	≥49 feet	<79 feet
III	≥79 feet	<118 feet
IV	≥118 feet	<171 feet
V	≥171 feet	<214 feet
VI	≥214 feet	<262 feet

Item	FAA Airport Design Standards [1]		Existing Dimensions
			Runway 7-25
Airport Reference Code	B-I (small)	B-II	
Aircraft Approach Speed	<121 kts	<121 kts	<121 kts
Aircraft Wingspan	<49 ft.	<79 ft.	<49 ft.
Aircraft Weight Group (lbs)	≤12,500	>12,500	≤12,500
Approach Visibility Minimums	Visual or ≥¾ mile	Visual or ≥¾ mile	1 mile
Runway Design			
Width	60 ft.	75 ft.	75 ft.
Safety Area (RSA)			
Width	120 ft.	150 ft.	120 ft.
Length beyond Runway End	240 ft.	300 ft.	Rwy 7: >240 ft. Rwy 25: 240 ft.
Obstacle Free Zone (OFZ)[2]			
Width (W)	250 ft.	400 ft.	250 ft.
Object Free Area (OFA)			
Width	250 ft.	500 ft.	250 ft.
Length beyond Runway End	240 ft.	300 ft.	Rwy 7: >240 ft. Rwy 25: 240 ft.
Gradient (maximum)	2.0%	2.0%	2.01%
Runway Setbacks			
From Runway Centerline to:			
Hold Line	125 ft.	200 ft.	125 ft.
Parallel Taxiway	150 ft.	240 ft.	>150 ft.
Aircraft Parking Line (APL)	125 ft.	250 ft.	202 ft.
Building Restriction Line (BRL)[3]	370 ft.	495 ft.	297 ft.
Taxiway Design			
Width	25 ft.	35 ft.	30 ft.[4]
Safety Area Width	49 ft.	79 ft.	>49 ft.
Taxiway and Taxilane Setbacks			
From Taxiway Centerline to:			
Fixed or Movable Object	45 ft.	66 ft.	45 ft.
From Taxilane Centerline to:			
Fixed or Movable Object	40 ft.	58 ft.	25 – 40 ft.

Notes:

1 Source: FAA Advisory Circular 150/5300-13, Change 9, *Airport Design* (September 2005).

2 OFZ extends 200 feet beyond end of runway.

3 The FAA no longer has fixed distance standards for the BRL location. The indicated setback distances are based on providing 7:1 transitional slope clearance over a 35-foot building situated at the same base elevation as the adjacent runway and can be adjusted in accordance with local conditions.

Table 3A

Airfield Design Standards

Auburn Municipal Airport

Operational Capacity

An airport's operational capacity is generally measured in terms of the number of aircraft operations the runway and taxiway system can accommodate in an hour or over a year without incurring unacceptable delay. Calculation of airfield capacity, particularly annual capacity, is dependant upon various physical and operational factors. At very busy airports, airfield capacity can be the major determinant of future runway/taxiway system improvement requirements.

Based on FAA methods for estimating capacity and delay for long range planning (Advisory Circular 150/5060-5, Airport Capacity and Delay), Auburn Municipal Airport's theoretical operational capacities are:

- Hourly VFR capacity: 98 operations;
- Hourly IFR capacity: 59 operations;
- Annual Service Volume: 230,000 operations.

In reality, the runway capacities are less than these numbers. The hourly VFR capacity is closer to 60 (1 per minute) unless most of the activity is comprised of touch-and-go operations. Hourly IFR capacity is substantially lower given the type of approach and lack of a control tower and radar. The maximum under present conditions is 5 to 10 per hour. Finally, reaching the indicated annual capacity would mean both a high volume of touch-and-go operations and considerable nighttime activity, neither of which condition presently happens or is expected in the future at Auburn Municipal Airport. A more realistic figure is around 150,000 annual operations. Even with these reduced numbers, the projected airport activity as outlined in Chapter 2 is well below the capacity limits.

Wind Coverage

Strong winds at an airport can represent additional airfield design concerns. FAA guidelines establish that the orientation of an airport's runways should enable the airport to be usable, with crosswinds at an acceptable velocity, during at least 95% of the year. Airports with lower annual wind coverage qualify for FAA funding for a crosswind runway. The criteria for an acceptable crosswind velocity are tied to the runway's ARC and thus to the type of aircraft using the runway. Small, light aircraft are more affected by strong crosswinds than are larger, heavier planes. For small planes, the FAA considers a 10.5 knot direct crosswind to be the maximum acceptable, whereas heavy jets can tolerate as much as 20 knots.

Analysis of the previously cited Auburn Municipal Airport wind data indicates that, at the 10.5-knot crosswind component applicable to light aircraft, Runway 7-25 has a wind coverage of only 92.0%. At 13.0 knots, the coverage increases to a more acceptable 96.7%. Even so, the relatively low coverage indicates a potential need for a crosswind runway. Indeed, as described in Chapter 1, the airport once had a crosswind runway. It was oriented in a northeast/southwest direction, but was closed in the 1970s. Recreation of any similar configuration is no longer possible because of the extent of existing development on and around the airport. Nevertheless, even though no change in runway alignment is feasible, the crosswind conditions at the airport warrant continued consideration in other runway design features. For example, the safety of aircraft operations during crosswind conditions can be enhanced by providing a wide runway and by keeping obstacles and ditches as far from the runway edges as practical.

RUNWAY

Classification

Two factors play a part in determining the appropriate airport reference code for airport runways. Ideally, the runway classification should be based solely upon the design aircraft for which a demand for use of the runway can be identified. Often, though, a runway's existing dimensions and the extent to which it can reasonably be upgraded are significant considerations.

As discussed earlier in this chapter, piston twin-engine propeller aircraft such as the Cessna 414 Chancellor represent the current and future critical design aircraft using Auburn Municipal Airport. These aircraft are classified as ARC B-I (small) aircraft—that is, they have approach speeds less than 121 knots, wingspans less than 49 feet, and maximum takeoff weights of 12,500 pounds or less. The soon to be introduced very light jets (VLJs) also fall within the B-I (small) classification.

Larger twin-engine propeller aircraft including turboprops, as well as contemporary types of small to medium jets will continue to see occasional usage at Auburn Municipal Airport. Some of these aircraft edge into the ARC B-II category because of their longer wingspans. The Beechcraft Super King Air 200, for example, weighs in at 12,500 pounds maximum takeoff weight—the limit for a "small" aircraft"—but has a wingspan of 54.5 feet.

A review of Table 3A shows that the existing Auburn Municipal Airport airfield design features fully comply with the ARC B-I (small) design standards. Most of the dimensions, though, to not

measure up to the B-II standards. Major, costly upgrading would be required to meet the latter criteria. Increasing the runway safety area dimensions and the runway-to-taxiway separation would be particularly difficult.

Given both the projected usage and the physical limitations of the airfield, the only realistic option for Runway 7-25 and its associated taxiways is to continue to be designed to ARC B-I (small) standards. In reaching this conclusion, it is important to recognize that designing airfield facilities to comply with the standards for a particular ARC does not restrict the airport to usage only by corresponding-sized aircraft. Larger aircraft can use an airport provided that, at the determination of the pilot, they can do so safely. Moreover, the airport need not be designed with respect to the standards for these larger aircraft provided that they will operate less often than the threshold level of 500 annual operations. In addition to wingtip clearances and other dimensional considerations, pavement strength is often a major determinant of how large of an aircraft an airport can safely accommodate even on a rare basis.

Length

Runway Length Requirements for Airplanes Weighing 12,500 lbs. or Less

# of Pass. Seats	% of Fleet		
	75%	95%	100%
<10	3,050 ft.	3,630 ft.	4,280 ft.
≥10	—	—	4,600 ft.

There are two tools available to help assess Auburn Municipal Airport's future runway length requirements. One is an FAA computer program (derived from data in Advisory Circular 150/5325-4A, *Runway Length Requirements*) which calculates the runway length needed to accommodate certain percentages of the nation's small and large airplane fleets. The second useful tool is the performance data supplied by the manufacturers of individual aircraft models.

The adjacent tabulation shows the runway length requirements for Auburn Municipal Airport as calculated by the FAA computer program. The calculations are predicated on the airport's elevation of 1,536 feet MSL and average daily high temperature of 92°F for the hottest month of the year. The results indicate that the existing 3,700-foot runway length can accommodate more than 95% of the small aircraft fleet even on moderately hot days. Under these temperature conditions, accommodating all small aircraft with fewer than 10 passenger seats would require increasing the runway length to 4,280 feet.

The preceding runway length requirements are based upon a generic fleet mix of small aircraft. Looking at the takeoff and landing distance requirements for the design aircraft and selected airplanes that sometimes operate at Auburn Municipal Airport reveals the following:

- The downhill slope of the runway to the west is a benefit to the aircraft takeoffs that take place on Runway 25, the direction that represents over 90% of the takeoffs. However, the slope can increase landing distance requirements for aircraft operating in this direction.
- The existing 3,700-foot runway length is adequate for takeoffs by typical piston twin-engine propeller aircraft. However, on hot days, some aircraft may be constrained to taking off with less than a full load of passengers, cargo, or fuel.
- Twin-engine turboprop aircraft are generally less demanding of runway length than piston twins. The Super King Air 200, for example, requires only 2,400 feet of runway for takeoff at Auburn's elevation on a 90° day.
- Small jets may be weight constrained on hot-day takeoffs. A Cessna Citation II nominally needs 4,230 feet of runway for takeoff at maximum weight when the temperature is 86° at the Auburn elevation, but the downhill gradient on Runway 25 reduces this requirement to approximately the 3,700-foot length of the runway.

The feasibility of extending the runway is examined at the end of this section on runway design.

Width

FAA standards for runway width relate directly to the runway's Airport Reference Code. As an ARC B-I (small) runway with visibility minimums of 1 mile, the FAA standard is a 60-foot width. This was the Runway 7-25 width prior to the 2001 runway improvement project when 15 feet was added to the north side of the pavement, bringing the width to the current 75 feet wide. As noted earlier in this chapter, the extra width provides enhanced safety during the crosswind conditions that are common at the airport. No further width increases are proposed.

Pavement Strength

The FAA Airport Master Record for Auburn Municipal Airport provides the source of runway pavement strength data. No independent investigations were conducted as part of this *Master Plan* study.

The runway is rated at 30,000 pounds for aircraft with single-wheel gear. The runway strength is adequate to accommodate medium-size business single- or twin-engine aircraft and occasional use by heavier aircraft. The pavement strength is well above the needed 12,500 pounds standard for the small aircraft primarily using the

runway. No change to the present pavement strength is recommended. Routine pavement maintenance will be an on-going necessity, however.

Approaches

Traffic Patterns

For fixed-wing aircraft, Runways 7 and 25 both have a standard left-hand pattern, thus creating traffic patterns both north and south of the runway. However, because over 90% of aircraft operations are on Runway 25 (east to west), the predominant traffic pattern is the one on the south. Helicopters make right-hand turns for Runway 7, thus remaining south of the airport when in the traffic pattern.

The pattern altitude is 2,536 feet MSL, 1,000 feet above the airport elevation for light aircraft. For helicopters, it is 2,116 feet MSL or 580 feet above airport elevation. No changes are recommended.

For noise abatement purposes, aircraft departing on Runway 25 are requested, if speed and altitude permit, to make a 20° left turn at the end of the runway to avoid the mobile home park and convalescent home.

Instrument Approach Procedures

As noted in Chapter 1, one GPS-based nonprecision (i.e. GPS Runway 7) instrument approach procedure serves Auburn Municipal Airport. This procedure provides straight-in approaches to Runway 7 and circle-to-land to Runway 25. The lowest approach minimums are associated with straight-in approach to Runway 7. This approach has visibility minimums as low as 1 statute mile with a decision height of 449 feet above the runway touchdown zone elevation.

The established procedure serves the airport well. Given current technologies and the presence of higher terrain to the north and east of the airport, no significant changes are feasible or anticipated.

Runway Protection Zones

The size for the existing runway protection zone (RPZ) at each runway end is set in accordance with the respective types of runway approaches:

- *Runway 7:* Nonprecision with 1-mile visibility minimums; and
- *Runway 25:* Visual

Because the Runway 7 approach procedure does not provide visibility minimums of less than one mile, current FAA standards treat it as a visual runway for RPZ size purposes. Both runway ends thus have the same RPZ dimensions. As a runway designed only for small aircraft, the standard RPZ dimensions are 250 feet and 450 feet, respectively, at the inner and outer ends and a length of 1,000 feet.

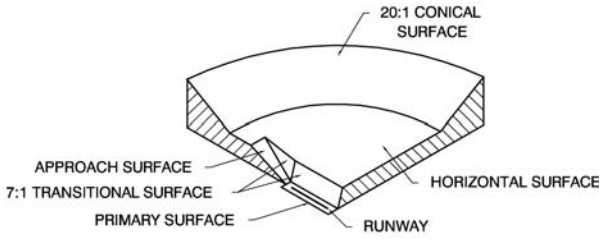
Prior Auburn Municipal Airport master plans showed larger RPZs based on earlier FAA standards. In recognition of this precedence, the present plan recommends utilizing the standards associated with a runway that is designed for large aircraft. This RPZ has the same length, 1,000 feet, but is slightly wider: 500 feet at the inner end and 700 feet at the outer end.

The function of RPZs is to enhance the protection of people and property on the ground near the ends of runways. FAA standards call for RPZs to be under control of the airport through fee title ownership or other acceptable means. RPZs ideally should be clear of all objects. However, certain low-intensity uses are generally considered acceptable on lands determined to be impracticable for the airport to acquire. Both existing RPZs at Auburn Municipal Airport are entirely on airport property even with application of the wider dimensions.

Approach Obstructions

Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace,* establishes standards for determining obstructions to navigable airspace near airports. This airspace is defined for each airport by a series of imaginary surfaces. The dimensions and slopes of these surfaces depend on the configuration and approach categories of each airport's runways.

The runway and area immediately around it constitute the primary surface. This surface extends 200 feet beyond the runway ends. Auburn Municipal Airport's runway is classified as a utility runway—that is, it is designed for airplanes weighing 12,500 pounds or less—with a nonprecision approach which results in a primary surface width of 500 feet. For FAR Part 77 purposes, the fact that the approach procedure has 1-mile minimums is not considered as it is with RPZ standards—the approach merely needs to be straight in.



Typical FAR Part 77 Surfaces

Generally, most critical among FAR Part 77 surfaces are the approach surfaces extending outward and upward from the ends of the primary surface. As a utility category runway, the approach surface for both of the Auburn runway ends has a slope of 20:1

(1 foot vertically per 20 feet horizontally) even though the Runway 7 end is nonprecision. The approach surfaces extend 5,000 feet beyond the ends of the primary surface.

The only obstructions to the 20:1 approach surface at either runway end are close-in ones at the Runway 7 end. The fence around the landfill is 300 feet beyond the runway end and penetrates the north edge of the approach surface by about 10 feet. Obstruction lights are installed along this fence. Also, the runway landing threshold is displaced 200 feet as a result.

In most other locations, the terrain is well below the approach surfaces. One exception is the south side of the Runway 25 approach where the ground at one point is only about 20 feet below the approach surface. Tall trees on this hill could become obstructions. In general, it is incumbent upon the City of Auburn to make certain that the runway approach surfaces are kept clear. Trees need to be checked to make sure that they have not grown to an unacceptable height. If trees or other obstructions are situated on private property, the city should take abatement actions when needed to remove or reduce the height of these objects.

Critical Areas and Setback Requirements

Runway Safety Area

Runway safety areas (RSAs) are described in *FAA Advisory Circular 150/5300-13* as "defined surface(s) surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway." The Advisory Circular prescribes that the RSA shall be:

- Cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations;
- Drained by grading or storm sewers to prevent water accumulation;
- Capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft; and
- Free of objects, except for objects that need to be located in the runway safety area because of their function. To the extent practical, objects higher than 3 inches above grade should be constructed on frangible supports (minimally resistant to impact) of the lowest practical height with the frangible point no higher than 3 inches above grade. Other objects, such as manholes, should be constructed at grade. In no case should their height exceed 3 inches above grade.

Additionally, beyond the runway ends, the RSA must be meet certain slope requirements. The first 200 feet cannot rise higher than the runway end elevation, but can slope downward at up to a 3.0% slope. The remainder of the RSA can slope upward as long as the resulting ground level does not penetrate the runway approach surface. The maximum negative slope in this outer segment is 5.0%.

For the ARC B-I (small) nonprecision runway classification applicable to Runway 7-25, the RSA is required to be 120 feet wide for the length of the runway and extend 240 feet beyond the runway ends. Except for occasional erosion or growth of shrubbery requiring routine maintenance, the RSA for Runway 7-25 meets these dimensional standards. Longitudinal gradient standards are also met: at the western end of the runway, the RSA slope is flat and at the eastern end it slopes downward at the 3.0% maximum allowable.

Object Free Area

Like RSAs, object free areas (OFAs) also surround runways and are required to be clear of nonessential objects including parked airplanes. The major difference between these two critical areas is that the grading criteria for RSAs do not apply to OFAs. Ditches, for example, can be located in an OFA. Also, aircraft may taxi or hold within an OFA, but not an RSA.

For Runway 7-25, the required OFA dimensions are a width of 250 feet and a length of 240 feet beyond the runway ends. The existing OFA meets applicable criteria.

Obstacle Free Zone

A third critical area surrounding a runway is the obstacle free zone (OFZ). OFZs are three-dimensional—consequently, for some types of runways, short objects may be acceptable in places where taller objects may not be. Only frangibly mounted navigational aids are allowed to penetrate an OFZ. Other objects, including taxiing or parked airplanes, are not permitted.

As a runway serving only small airplanes, the required OFZ for Runway 7-25 is 250 feet wide with sides that rise vertically. The OFZ extends 200 feet beyond the runway ends. The existing OFZ at the airport meets the FAA standards.

Building Restriction Line

The building restriction line (BRL) establishes the closest location that buildings should be placed relative to a nearby runway or, in some cases, a primary taxiway. The FAA no longer defines a specific BRL setback distance standard, but rather provides guidance on factors to be considered in determining the BRL location.

At Auburn Municipal Airport, the BRL for Runway 7-25 is established at 300 feet from the runway centerline. This distance is based upon providing clearance beneath the Part 77 transitional surface which begins 250 feet from the runway centerline and slopes upward at 7:1 (horizontal to vertical). At this distance, an object that is less than 7-foot higher than the elevation of the adjacent point on the runway centerline would not be a penetration. Because nearby buildings are on ground that is lower than the runway, they do not penetrate the transitional surface even though they are taller than 7 feet. Continued application of the established 300-foot BRL location for the south side of Runway 7-25 is recommended.

North of the runway, the ground elevations are generally higher than the runway. Establishing the BRL at 370 feet from the runway centerline is therefore recommended. At this distance, buildings will be less likely to become transitional surface penetrations.

Other Runway Features

Runway Slope and Line of Sight

FAA standards limit the maximum slope of a runway to 2.0%. Additionally, the vertical curvature of a runway should be such that any two points 5 feet above the runway surface are mutually visible over the full length of the runway. Although discouraged, the line-of-sight requirement can be reduced to half the runway length where a full-length parallel taxiway is provided.

Upon completion of improvements in 2001, Runway 7-25 now features a flat grade along the western third of the runway length and a rising grade of 2.0% on the eastern two-thirds. The existing runway configuration complies with FAA slope and line-of-sight standards.

Blast Pads

Blast pads are situated beyond the ends of runways and are intended to support the occasional passage of the most demanding airplane as well as the heaviest existing or future emergency or maintenance vehicle. They serve to minimize erosion and the blowing of dirt and debris from unprotected ground that result when aircraft, particularly jets, apply full power to initiate their takeoffs. Although paved, blast pads are not usable by aircraft under normal circumstances and are not included in the runway length.

Both ends of Runway 7-25 currently have blast pads. With increased activity by small jet expected in the future, these blast pads will help minimize dirt and debris from causing damage or erosion.

Marking

The runway is marked with visual runway markings. The threshold bars, chevrons, and edge striping serve to delineate the usable length and width of the runway. The current markings are in good condition; however they should be upgraded to nonprecision instrument markings in order to meet the design standard for this class of runway.

Lighting

The runway is equipped with a pilot-controlled (via radio) medium-intensity runway edge lighting system (MIRL), as well as runway end identifier lights (REILs) at both runway ends. No improvement needs have been identified.

Visual Approach Aids

Both ends of the runway have two-box precision approach path indicator lights (PAPI-2L) with approach slopes set at 3.0°.

A standard green-and-white beacon, located atop a hill south of the Runway 25 threshold, helps pilots to find the airport at night.

No improvement needs have been identified.

Runway Extension Feasibility

As indicated in the needs assessment earlier in this chapter, the standardized FAA runway length requirements analysis indicates that Auburn Municipal Airport would need a 4,280-foot runway—580 feet longer than presently exists—in order to accommodate 100% of the small, under 10-seat, airplane fleet during hot days. Even the 95% of the fleet that can be accommodated with the present runway length could benefit from some additional runway length because of the enhanced safety that would be provided. This section therefore examines the feasibility of extending the runway.

In evaluating runway extension options, several design and environmental impact considerations must be taken into account. Chief among these are:

- Terrain conditions within the area where construction would be required;
- Line-of-sight requirements along the runway length;
- Obstacles within the approach to the extended runway end;
- Airport ownership of the necessary property, including runway protection zones, or the ability to acquire it; and

- Changes in noise impacts resulting from different aircraft overflight altitudes (lower on landing at the extended end, higher on takeoff at the opposite end) as well as from potential changes in the mix of aircraft that can use the airport.

Figure 3A shows existing plan and profile views of the runway and the areas immediately beyond the runway ends. Cross sections through the areas beyond each end are shown as well. Each view includes a schematic design of an approximately 600-foot extension.

Both ends of the runway have been investigated to assess the prospects for a pavement extension. The manner in which the above considerations affect each option is described in the following paragraphs. Specific factors pertaining to one of the runway ends, but not the other, are discussed as well.

West Extension Option

For about a 1,000 feet west of the approach end of Runway 7, the terrain remains relatively level before beginning a rapid downward slope. The runway end elevation is 1,490 feet MSL; at Highway 49, 3,500 feet beyond the runway end, the elevation is approximately 1,350 feet MSL. These conditions would appear to be physically ideal for extension of the runway. However, a closed sanitary landfill lying between 150 and 1,000 feet beyond the existing runway end creates a major impediment to an extension in this direction.

Constraints imposed by the landfill were investigated as part of the engineering studies preceding the 2001 runway extension project. The prospects of either cutting into the clay cap of the landfill or building over the top of it were both pursued. Cutting into the cap would require removal of a portion of the refuse to an approved site elsewhere, then reconstructing the cap to current Placer County and the California state regulatory standards. Placement of fill over the top of the cap would not require these actions if the cap is not disturbed. The latter option, though, would necessitate an on-going maintenance program to correct pavement irregularities and drainage problems expected to arise from uneven settlement of the fill as the refuse decays over time. The weight of the fill material over the top of the cap would likely increase the settling of the surface, at least initially. Installation of additional landfill gas monitoring probes would be another requirement. At the time of the earlier design studies, the decision reached was to avoid extending the runway into the landfill site. However, of the two choices affecting the landfill, filling over the top of the cap was judged to be the more feasible. The current analysis therefore assumes that earthwork for an extension can be placed on top of the landfill cap, but not cut into it.

Although the landfill cap appears to be nearly level with the runway end elevation, closer examination of the profile in Figure 3A-1 reveals that it is actually about 5 feet higher along the runway centerline and rises to the north. The pavement section of the extension adds to this difference. The critical determinant of the runway extension elevation, though, is FAR Part 77. To keep the primary

and transitional surfaces from being obstructions, the pavement would need to slope upward from the existing runway end at nearly a 2.0% slope. This profile would leave the existing runway pavement intact, but would remove and regrade the safety area. The depth of fill would be up to 10 feet in places. Requirements for full-length line-of-sight, as described below with respect to the east extension option, would be met.

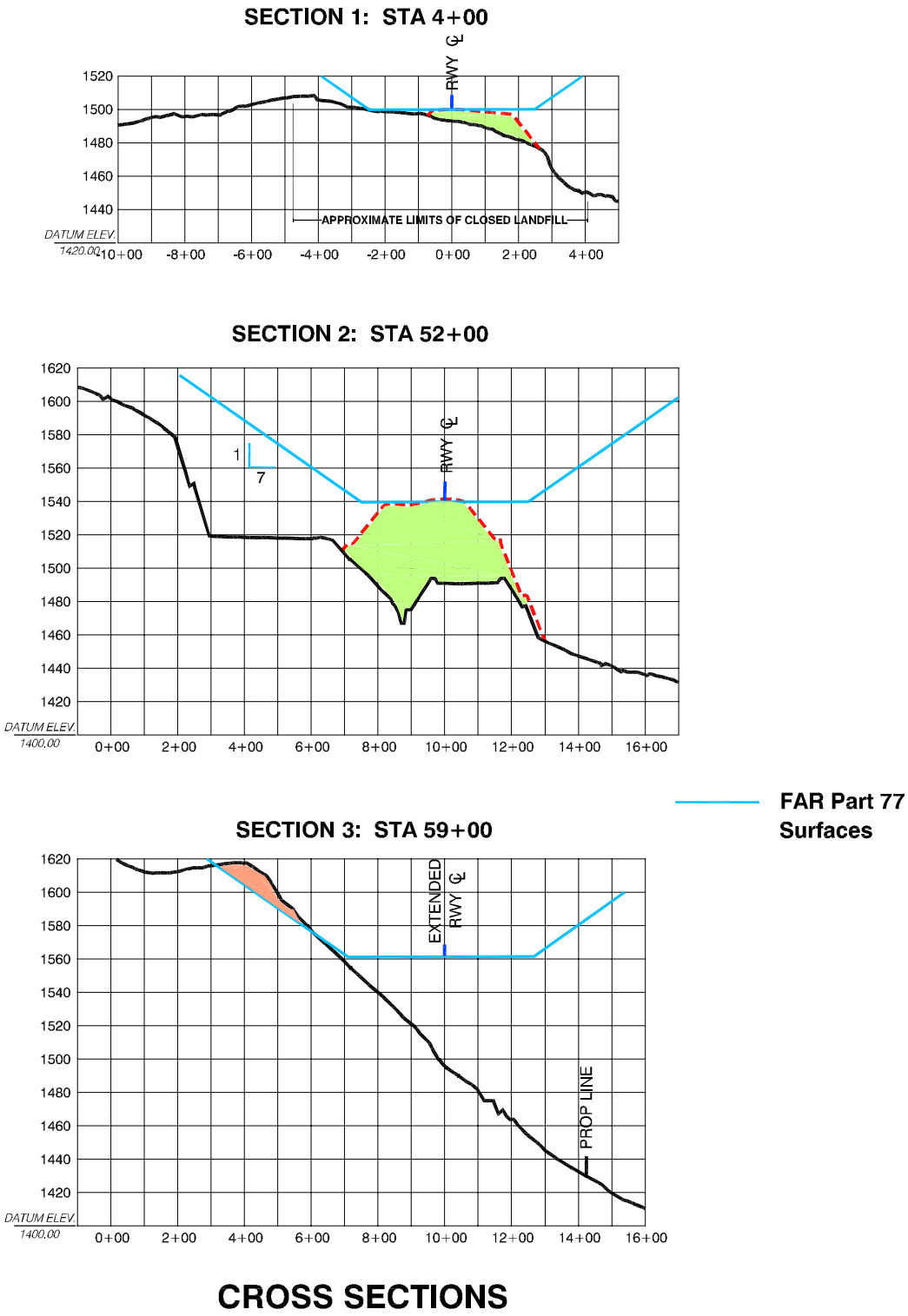
For a 600-foot extension of the runway and south parallel taxiway (Taxiway A), approximately 80,000 cubic yards of fill material is estimated to be needed. An extension of more than this distance raises the fill quantities substantially. Additionally, with a longer extension, a retaining wall would be required near the south property line to contain the fill supporting the extended parallel taxiway within airport property.

From the perspective of land use compatibility, a westward extension would move the runway end closer to existing development. Any resulting increases in noise impacts could be mitigated by leaving the landing threshold in its present position. Nevertheless, a 600-foot extension is the maximum that can be attained without shifting the runway protection zone beyond the present airport property line and encompassing the existing convalescent home situated there.

The cost estimate for a 600-foot westward runway and taxiway extension is approximately $2.5 million at 2005 prices.

East Extension Option

As a glance at Figure 3A-2 indicates, the challenge to an eastward extension of the runway is the severe downward slope of the terrain beyond the existing pavement end. With an elevation of 1,536 feet MSL, the approach end of Runway 25 constitutes the high point of the runway. Eastward from there, however, the 240-foot long RSA slopes downward by 7 feet (a 3.0% slope). Then, over the next 150 feet, the ground drops almost 40 feet more. The detention basin constructed as part of the 2001 project is situated at the toe of the slope at an elevation of approximately 1,490 feet. Past this basin, the terrain again drops to the PG&E's Wise Canal at an elevation of 1,475 feet MSL. Thus, within a distance of 800 feet beyond the east end of the runway, the terrain along the extended runway centerline drops approximately 60 feet. To either side of the extended centerline, the terrain differs significantly as shown in Figure 3A-1. To the north, the ground continues to drop, but to the south, it rises above the runway end elevation.



Source: Mead & Hunt, Inc. (December 2005)

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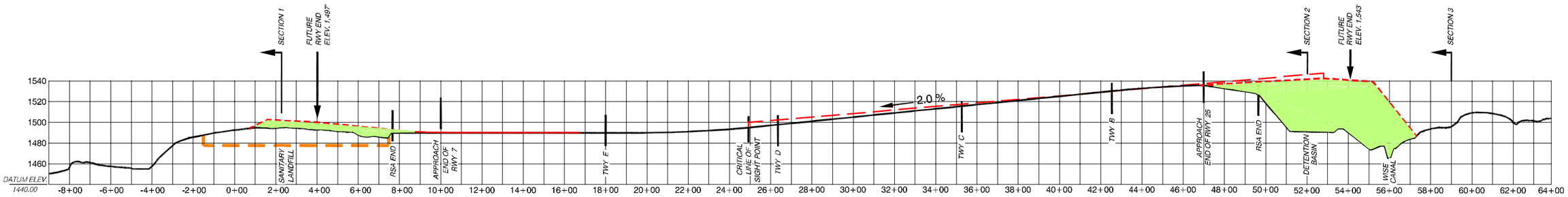
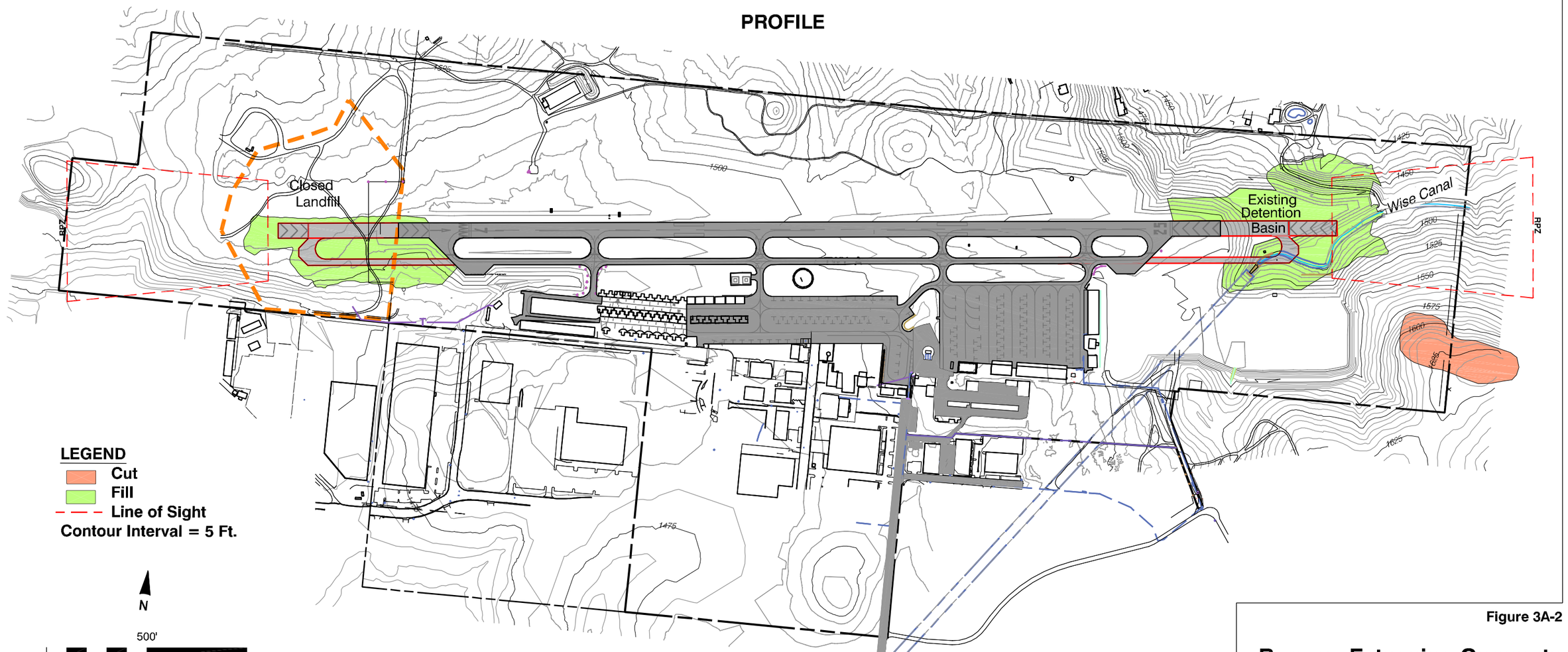
Figure 3A-1

Runway Extension Concepts

Auburn Municipal Airport



PROFILE



PLAN

Source: Mead & Hunt, Inc. (December 2005)

Figure 3A-2

Runway Extension Concepts

Auburn Municipal Airport

The present design analysis for an east extension of the runway and Taxiway A indicates that virtually any addition to the runway length would require extending the tunnel into which the canal flows just south of the runway alignment. Construction of a tunnel while maintaining water flow through the canal would be a major design challenge. The only alternative to extension of the tunnel is judged unacceptable in that it would entail construction of a tall retaining wall adjacent to the canal which, even if it could technically meet FAA design standards, would clearly detract from the safety of landing aircraft.

Another complication to eastward extension of the runway is the difficulty of continuing to meet FAA design criteria for runway line-of-sight. These standards call for any two points 5 feet above the runway centerline to be mutually visible over the entire length of the runway. In instances where a full-length parallel taxiway exists—as is the case at Auburn—the required line-of-sight distance can be reduced to half of the runway length. The FAA discourages application of this exception for any new runway construction. In any case, the exception would not make a significant difference to the design challenge at Auburn Municipal Airport in that the critical point for line-of-sight is near where the runway slope flattens out at about two-thirds of the way along the runway length. Also investigated was the alternative of lowering the grade of a portion of the east end of the runway. However, almost half of the runway would have to be rebuilt to appreciably reduce the amount of fill an extension would require.

Included in Figure 3A is the schematic design for a 600-foot eastward extension of the runway and taxiway. Over 200,000 cubic yards of fill would be required. The material could be obtained by excavation of the hill east of the recently graded area for the future east hangar area. Lowering of the hill would be necessary in order to provide FAR Part 77 transitional surface clearance as the cross-section in Figure 3A-1 shows. On the north side of the extension, a retaining wall would be required on the lower part of the fill slope to prevent the fill extending beyond the airport property line. If a north-side parallel taxiway connection is to be provided to an extended runway end, containment of the fill would be even more complicated. One additional earthwork requirement would be to replace the detention basin that lies in the path of the extension.

Land use compatibility associated with an eastward extension appears to be less of a concern than to the west. The land immediately to the east of the airport property is undeveloped. The new runway protection zone would extend onto this property, however, and acquisition would be essential. Part of the hill that would need to be lowered to satisfy FAR Part 77 clearance criteria lies within this property as well.

The cost estimate for a 600-foot eastward extension is $10 million at 2005 prices. Even if the length of the extension is reduced to 300 feet, many of the same design issues would need to be resolved. Consequently, the cost would still be nearly $8 million.

Conclusions

The fundamental conclusion derived from this analysis is that, while an extension of the runway in either direction could be built, doing so does not appear to be financially feasible. Of the two options, a westward extension would be substantially less costly to construct. The subsequent continuing costs of resolving problems caused by settlement of the landfill are unknown, however. Also, mitigation of land use compatibility concerns could necessitate acquisition of property beyond the runway protection zone and drive up the cost.

TAXIWAYS

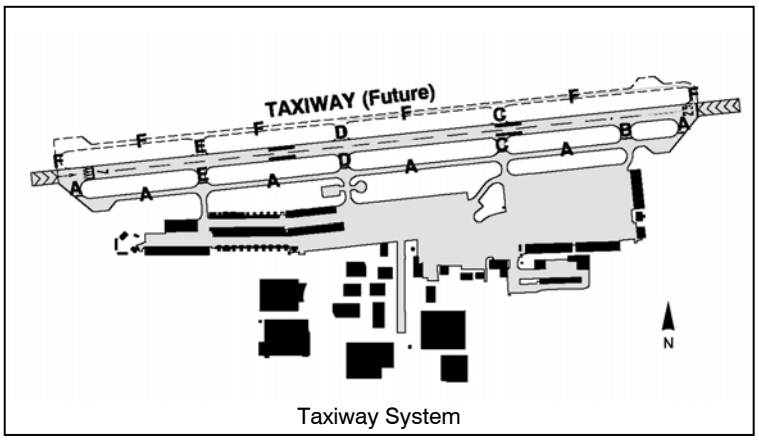
Taxiways provide the linkages by which aircraft travel between runways and parking facilities in the airport building area. At Auburn Municipal Airport, the primary component of the taxiway system is a full-length parallel taxiway along the south side of Runway 7-25, designated Taxiway A. The existing distance between the centerlines of Runway 7-25 and Taxiway A is 157 feet. This separation is slightly greater than the minimum 150-foot distance required for an ARC B-I (small) runway and taxiway and resulted from the 2001 runway improvement project which added 15 feet to the north side of the pavement. The 30-foot width of the taxiway exceeds the ARC B-I design criteria by 5 feet, but is appropriate given the taxiway slope, crosswind conditions, and occasional usage by larger aircraft. No changes to these features are recommended.

Connections between the runway and parallel taxiway occur at six points as shown in the diagram below: at each end of the runway plus via four mid-field exit taxiways designated Taxiways B (closest to the east end of the runway), C, D, and E. A holding bay is provided at each end of the parallel taxiway so that pre-flight checks can be performed without the aircraft blocking access to the runway for other aircraft. This configuration is satisfactory and requires no changes. However, modifications would be necessary if the runway should eventually be extended.

Other Taxiway System Components

A review of other components of the existing taxiway system indicates that they all meet or surpass FAA standards:

- **Taxiway Object Free Area**—For safe wingtip clearance by ARC B-I category aircraft, the minimum distance between taxiways and adjacent buildings, parked aircraft, and other objects must be at least 45 feet. The closest facilities to the major taxiways at Auburn Municipal Airport are the helicopter parking pads. The clearance to a parked helicopter is at least 60 feet.



Taxiway System

- **Exit Taxiway Widths**—All exits meet or exceed the 25-foot minimum width requirement.

- **Taxiway Fillets**—Each of the exit taxiway segments intersect the full-length parallel taxiway, runway and apron areas at a perpendicular angle with curved fillet sections that are sufficient for the type of aircraft currently using and projected to use Auburn Municipal Airport.

- **Lighting**—The full length of Taxiway A, including its connections to each end of Runway 7-25, is equipped with medium-intensity taxiway lighting (MITL). Also, each of the midfield exit taxiways are lighted.

- **Marking and Hold Lines**—Taxiway A and the Runway 7-25 exit taxiways are marked with centerline and edge stripes in accordance with FAA standards. Hold lines, as required by FAA standards, are marked on each of the six locations where a taxiway intersects with the runway. The hold lines are positioned 125 feet from the runway centerline consistent with the standards applicable to Runway 7-25.

North-Side Parallel Taxiway

The one significant modification to the taxiway system which this *Master Plan* recommends is construction of a north-side parallel taxiway. This taxiway, proposed to be designated Taxiway F, will be needed to serve potential future aircraft parking and other aircraft-related uses on the north side of the airport as discussed in Chapter 4. The timing of Taxiway F's construction is almost totally dependent upon when demand arises for north-side building area development and is currently envisioned as a long-term project.

The basic design configuration of a north-side parallel taxiway is dictated by FAA ARC B-I design standards. Taxiway F would essentially be a mirror image of Taxiway A on the south side of the runway. A setback of 150 feet from the runway centerline is proposed. The taxiway system diagram earlier in this section shows the recommended layout.

One key design concern associated with a north-side parallel taxiway is the terrain that it must traverse. Subterranean rock and rock outcroppings are evident, especially along the eastern segment of the taxiway alignment. These features could add substantially to the construction cost. Also, because of the substantial fill necessary at the easternmost end, angling of the connection to the runway and shifting the holding bay westward are suggested as cost-reduction measures.

Because of the cost factors, an option to be considered is construction of the taxiway in phases. From the perspectives of safety and ease of circulation, a full-length parallel taxiway connecting with both ends of the runway is preferable. However, if initial development on the north side generates only limited aircraft traffic, a partial parallel could be acceptable. Any such taxiway segment would need to connect with one end of the runway, presumably the west. Both the FAA and the California Division of Aeronautics oppose taxiway system configurations that provide runway access only at a mid-point on the runway. The potential for runway incursions and possible collision between a taxiing aircraft and one taking off or landing is judged to be significant with layouts of this type.

OTHER AIRFIELD COMPONENTS

Signage

FAA standards for airfield signage are set forth in Advisory Circular 150/5340-18C, *Standards for Airport Sign Systems*. Runway and taxiway signs are considered essential for airport safety. The types of signs required varies depending upon the type of airport. Airports operating under Federal Aviation Regulations Part 139—those that serve air carrier aircraft having a seating capacity of more than 30 passengers—have more extensive sign requirements than most general aviation airports. Auburn Municipal Airport is not a Part 139 facility.

For a non-Part 139, single-runway airport such as Auburn Municipal, the only required signs are holding position signs at taxiway intersections with runways. Optional, but desirable, at busy general aviation airports are runway exit signs showing taxiway designa-

tions. Both of these types of signs have been installed at Auburn Municipal Airport. All are lighted.

Helicopter Takeoff and Landing Area

Currently, there are no helicopter takeoff or landing areas (helipads) established at the airport. Helicopters make an approach to the runway, and then hover taxi to one of three parking positions located midfield. Helicopter activity at Auburn Municipal Airport is expected to remain low throughout the forecast period. No need for a designated helipad enabling helicopters to operate independently of airplanes using the runway is presently envisioned.

Supporting Facilities

- **Wind Indicators**—Two wind cones are located at the airport. The primary wind cone is collocated with the segmented circle, near midfield at the intersection of Taxiways C and D. The other is located near the approach end of Runway 25. The wind cone at the segmented circle is lighted.

- **Radio Communications**—Pilots using the airport have the ability to communicate directly with each other via a common traffic advisory frequency (CTAF) operating on a frequency of 122.7 MHz). UNICOM shares this frequency and provides advisory information to pilots approaching the airport.

- **Automated Weather Observing System (AWOS)**—The Auburn Municipal Airport AWOS provides real-time weather observations including temperature, dew point, wind speed and direction, altimeter setting, visibility condition, and precipitation. This data is communicated to pilots by an automated, continually updated, radio broadcast and also is available by telephone. Most of the sensor equipment used to gather the weather data is located in the airport's northwest corner.

- **Compass Rose**—Consisting of a symbol painted on airfield pavement, a compass rose is used by aircraft maintenance personnel to verify the accuracy of the magnetic compass in aircraft. The compass rose is painted on the holding bay at the approach end of Runway 7.

Item	FAA Airport Design Standards [1]		Existing Dimensions
			Runway 7-25
Airport Reference Code	B-I (small)	B-II	
Aircraft Approach Speed	<121 kts	<121 kts	<121 kts
Aircraft Wingspan	<49 ft.	<79 ft.	<49 ft.
Aircraft Weight Group (lbs)	≤12,500	>12,500	≤12,500
Approach Visibility Minimums	Visual or ≥¾ mile	Visual or ≥¾ mile	1 mile
Runway Design			
Width	60 ft.	75 ft.	75 ft.
Safety Area (RSA)			
Width	120 ft.	150 ft.	120 ft.
Length beyond Runway End	240 ft.	300 ft.	Rwy 7: >240 ft. Rwy 25: 240 ft.
Obstacle Free Zone (OFZ)[2]			
Width (W)	250 ft.	400 ft.	250 ft.
Object Free Area (OFA)			
Width	250 ft.	500 ft.	250 ft.
Length beyond Runway End	240 ft.	300 ft.	Rwy 7: >240 ft. Rwy 25: 240 ft.
Gradient (maximum)	2.0%	2.0%	2.01%
Runway Setbacks			
From Runway Centerline to:			
Hold Line	125 ft.	200 ft.	125 ft.
Parallel Taxiway	150 ft.	240 ft.	>150 ft.
Aircraft Parking Line (APL)	125 ft.	250 ft.	202 ft.
Building Restriction Line (BRL)[3]	370 ft.	495 ft.	297 ft.
Taxiway Design			
Width	25 ft.	35 ft.	30 ft.[4]
Safety Area Width	49 ft.	79 ft.	>49 ft.
Taxiway and Taxilane Setbacks			
From Taxiway Centerline to:			
Fixed or Movable Object	45 ft.	66 ft.	45 ft.
From Taxilane Centerline to:			
Fixed or Movable Object	40 ft.	58 ft.	25 – 40 ft.

Notes:

1 Source: FAA Advisory Circular 150/5300-13, Change 9, *Airport Design* (September 2005).

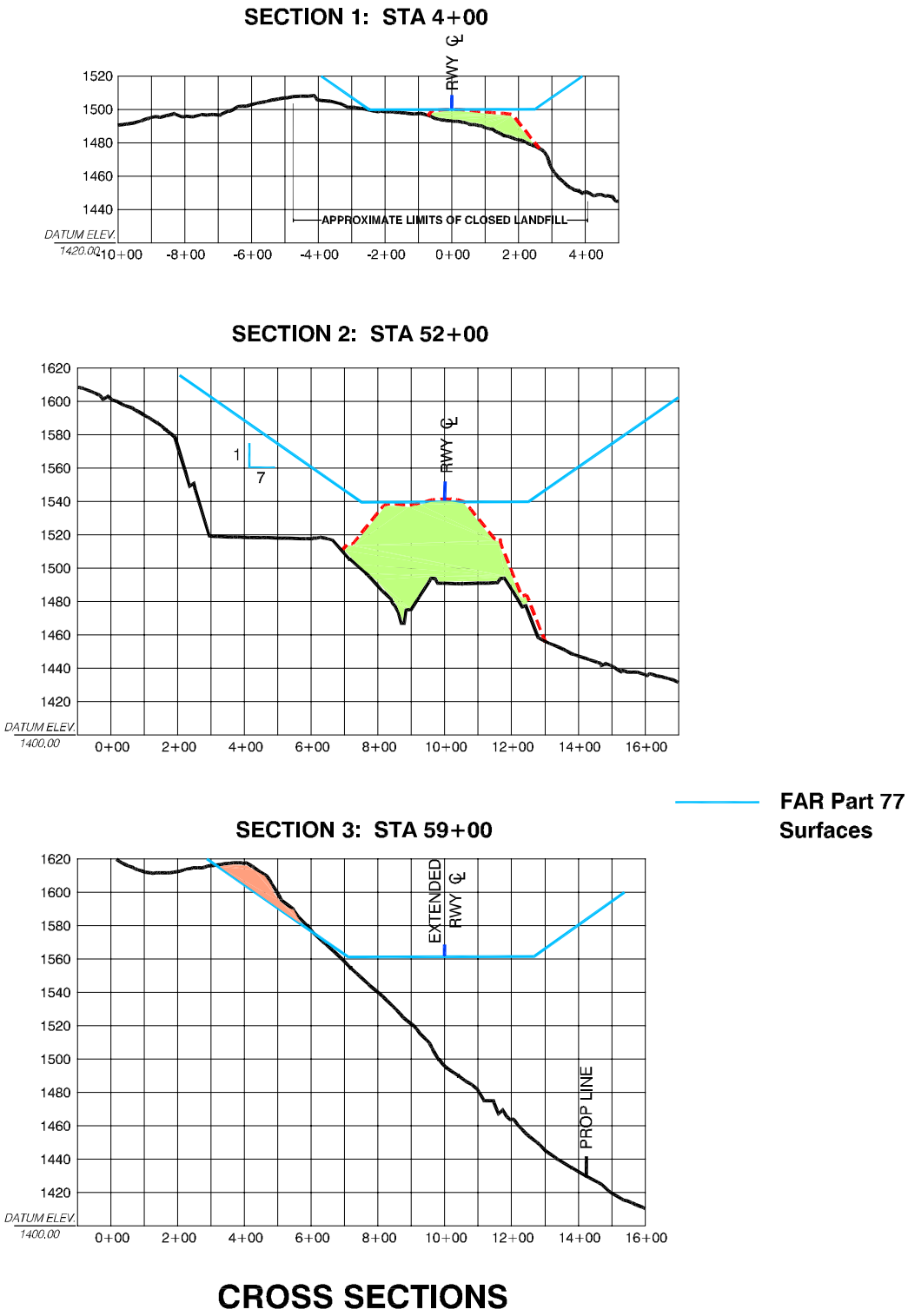
2 OFZ extends 200 feet beyond end of runway.

3 The FAA no longer has fixed distance standards for the BRL location. The indicated setback distances are based on providing 7:1 transitional slope clearance over a 35-foot building situated at the same base elevation as the adjacent runway and can be adjusted in accordance with local conditions.

Table 3A

Airfield Design Standards

Auburn Municipal Airport



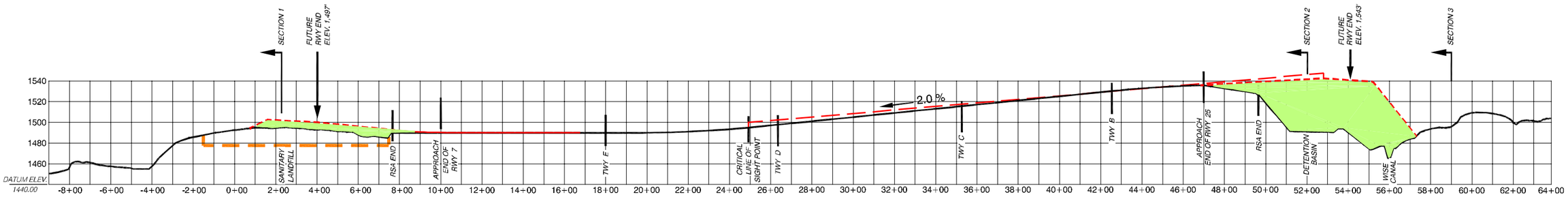
Source: Mead & Hunt, Inc. (December 2005)

X:\01196-00.04001.TECH\Cadd\AUN\DWG\AUN 05-Rwy-Profile-graphic.dwg Aug 03, 2007 - 2:05pm

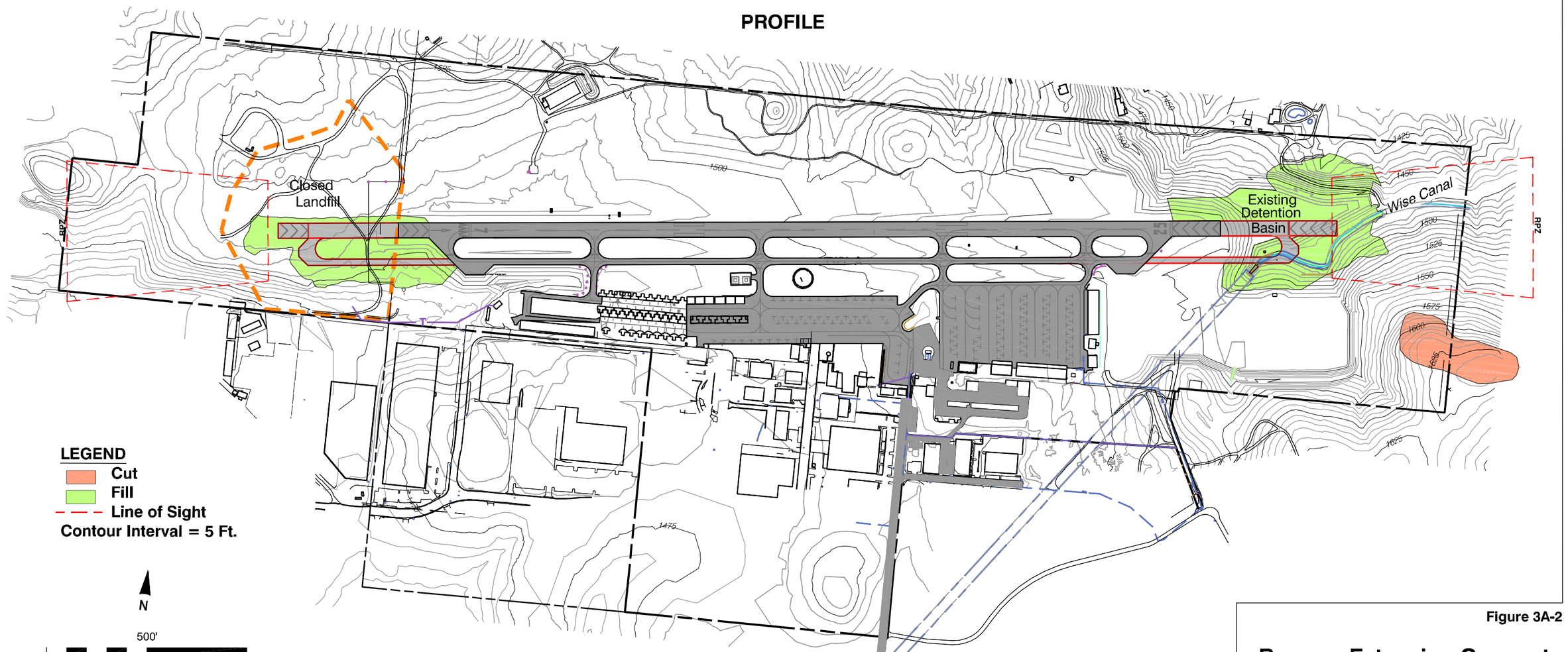
Figure 3A-1

Runway Extension Concepts

Auburn Municipal Airport



PROFILE



PLAN

Source: Mead & Hunt, Inc. (December 2005)

Figure 3A-2

Runway Extension Concepts

Auburn Municipal Airport

Chapter 4

Building Area Development

4

Building Area Development

OVERVIEW

The building area of an airport encompasses all of the airport property not devoted to runways, major taxiways, required clear areas, and other airfield-related functions. Undeveloped non-airfield land is included together with built-up areas. Common uses of building area land at general aviation airports similar to Auburn Municipal Airport are listed in the box to the right.

This chapter first examines the demand for the various types of building area facilities at Auburn Municipal Airport. Factors that affect the siting and development of these facilities are assessed next. The final section then outlines the opportunities and options for meeting the identified facility requirements. Development recommendations are described in this final section as well.

Figure 4A depicts the existing layout of the airport building area. The map divides the area into a series of individual sites, each of which has relatively uniform existing characteristics and development potential. Much of the discussion and analysis in this chapter is keyed to these sites.

Typical Building Area Functions at General Aviation Airports

Facilities Normally Found at Most Mid-Sized General Aviation Airports:

- Based aircraft tie downs and storage hangars
- Transient aircraft parking
- Administration building or airport office
- Pilots' lounge / flight preparation room
- Public rest rooms / public telephones
- Fixed base operations facilities
- Fuel storage and dispensing equipment
- Aircraft washing area
- Security/perimeter fencing and access gates
- Access roads and automobile parking

Other Facilities Common at Major Metropolitan General Aviation Airports:

- Corporate aircraft storage hangars and offices
- Air traffic control tower
- Emergency response equipment and storage facility
- Coffee shop or restaurant
- Rental car facilities
- Air freight handling facilities
- Commercial/industrial buildings

FACILITY REQUIREMENTS

Numerous facilities are essential to accommodation of future demands for both aviation-related and nonaviation use of the airport building area. Identifying these needs is an essential component of facility planning. City staff, airport businesses, pilots, and other airport users provided input to this assessment of the future facility requirements at Auburn Municipal Airport.

Aircraft Parking

This section outlines specific facility requirements and development needs. Alternatives for fulfillment of these needs and the recommendations of the *Master Plan* are found in the final section of this chapter.

Aircraft parking constitutes the most extensive aviation-related use of building area land at Auburn Municipal Airport. As of 2005, there are about 210 aircraft based at the airport. The *Master Plan* forecasts expect at least 80 more aircraft by the end of the 20-year planning period. Additionally, peak-period transient aircraft parking demand is projected to increase from 12 to about 18 during this period. Several types of facilities will be needed to accommodate this demand.

Aircraft Hangars

As is the case at most general aviation airports, the demand for aircraft parking space at Auburn Municipal Airport is primarily for hangars. Aircraft storage hangars can be grouped into six general categories, of which four are currently found at the airport:

T-Hangar

- **T-Hangars**—T-hangars are the most common form of aircraft storage at most general aviation airports. The back-to-back arrangement of the individual T-shaped bays is efficient from a structure-size standpoint, but requires taxilane access on both sides of the building. For reasonable economy of construction, T-hangar buildings preferably should contain at least 10 aircraft bays. In part because of terrain factors, only one such building, an old structure situated in the southeast part of the building area, remains at Auburn and its removal is proposed.

- **"Box" Hangars**—These small, normally single-aircraft, hangars have similar overall dimensions to that of T-hangars, but are rectangular rather than T-shaped. They are well-suited to locations where aircraft access is practical only on one side of the building. Box hangars may be single, free-standing units or combined into buildings with multiple bays. This hangar type is among the most common at Auburn Municipal Airport.

Executive Hangar

- **"Executive" Hangars**—Executive hangars are a common name for a somewhat larger version of box hangars. They typically are designed to accommodate twin-engine airplanes or small business jets. Alternatively, they can be used for storage of two or three smaller aircraft. Some executive hangars have small office areas attached. The buildings may consist of either single or multiple bays. Several of the hangars at Auburn Municipal Airport can be considered executive hangars in that they are large enough to accommodate two or more aircraft.

- **Conventional "Corporate" Hangars**—Corporate hangars are large, free-standing structures intended to house large business jets or multiple smaller aircraft. They are most common at major general aviation airports capable of accommodating large aircraft. A size of 100-by-100 feet is typical, although the buildings can be somewhat smaller or considerably larger. Office and pilots' lounge areas typically are attached. Also, corporate hangars usually have an adjacent parking area that vehicles can access without the need to pass through a security gate. None of the hangars presently situated at Auburn fit the typical corporate hangar configuration.


Corporate Hangar

- **Shade Hangars**—Shade hangars are similar to T-hangars except that they do not have doors or interior partitions. They help keep the sun and rain off the aircraft, but do not provide the security afforded by an enclosed T-hangar. Shade hangars can be constructed advantageously on existing apron pavement in that water drainage through the building is not a concern. Compared to T-hangar construction where existing pavement must be removed and the site regraded, shade hangars may cost only half as much. On raw ground, the differential between the two types is only about 20%. Another good application of shade hangars is in locations where the mass of an enclosed building would act as a visual barrier. Auburn Municipal Airport does not have hangars of this type at present.


Shade Hangar

- **Individual "Portable" Hangars**—Portables are small, individual hangars designed to be constructed elsewhere and hauled to an airport. They typically are T-shaped, but can be rectangular. Portables have the advantage of being capable of installation almost anywhere on an airport, including on existing apron pavement or on unpaved areas. Another advantage is that they can economically be added in increments of just one unit at a time. Consequently, they often are individually owned. Disadvantages of portables include their high per-unit cost and frequently unattractive appearance. Per-unit costs are typically comparable to or even higher than the cost of similarly sized, built-in-place, hangar space such as single-unit prefab buildings and especially individual units in a multiple-unit T-hangar building. Inconsistency of design together with maintenance that is often poor contribute to their unattractiveness. In recent years, these disadvantages have come to outweigh their advantages. None of the former major manufacturers of portable units any longer market them. Auburn Municipal Airport has a cluster of 41 portable hangar units situated in the west hangar area. These units are owned by a commercial aviation business which rents them to individual aircraft owners.


Portable Hangars

The overall capacity of the existing hangar facilities at Auburn Municipal Airport is difficult to determine because many of the larger units can hold two or three planes, but are not necessarily used in that manner. As of 2005, though, all hangars are occupied and they hold slightly over half of the 210 aircraft based at the airport.

Approximately 130 aircraft are currently on the hangar waiting list. Although the real unmet demand is undoubtedly less—aircraft owners often add their names to the list at several airports—a significant near-term need for additional hangar capacity is apparent. If even half of the waiting list represents real demand, then 65 additional hangar spaces could be filled as soon as facilities are built. While this demand appears large, it reflects the fact that the proportion of aircraft stored on the open tiedown apron is much greater than at most airports in the region.

A safe assumption is that a great majority, say 50, of the 65 hangar spaces would be occupied by aircraft already at the airport. Additionally, the forecasts presented in Chapter 2 indicate that approximately 80 more aircraft will be based at the airport 20 years hence. For planning purposes, essentially all of these aircraft should be assumed to seek hangar space. Combining the two numbers, the demand for additional hangar spaces over the next 20 years can be conservatively estimated at approximately 130.

The new eastern hangar area is planned to provide space for nearly 100 aircraft when completed. This additional capacity will be sufficient to meet the projected 20-year growth in based aircraft. However, if covered storage is to be provided for the majority of aircraft currently parked outdoors, then approximately 30 more spaces beyond what the eastern hangar area can accommodate will be need to be constructed.

Aircraft Apron

Tiedown Apron

Spaces for based and smaller transient aircraft are normally equipped with tiedown anchors and chains or ropes to prevent the aircraft from being blown around by strong winds.

Airports need paved apron areas for parking the portion of their based aircraft fleet that is not hangared, as well as for short-term usage by transient aircraft visiting the airport. The Auburn Municipal Airport east apron occupies about 7 acres and, as currently configured, can accommodate approximately 81 tied-down aircraft. The central apron and west hangar area have 53 spaces, excluding those on FBO leaseholds. Of these, 16 are intended for transient aircraft usage. Roughly half of the aircraft based at the airport are parked on the three tiedown aprons.

As noted in the above discussion of hangar demand, the majority of based aircraft currently utilizing apron parking can reasonably be expected to move to covered storage if the facilities are provided. The 20-year forecast indicates that only six more transient spaces

will be needed for normal peak demand. Except during special events, over half of the present apron capacity is not expected to be needed by the end of the forecast period. Alternative uses, such as shade hangars, that can efficiently be developed on apron pavement may be worth consideration for a portion of the area.

Aviation Support Facilities

Although aircraft parking occupies the majority of aviation-related building area land at general aviation airports including Auburn, various other facilities serve essential supporting functions. Among the aviation support facilities that exist and/or may be necessary at Auburn Municipal Airport are the following.

Airport Administration Building

Many general aviation airports have an administration building that houses not only the airport management offices, but also a pilots' lounge, 24-hour rest rooms, and other facilities for pilots and the general public. Sometimes a coffee shop or restaurant is included.

Auburn Municipal Airport has each of these facilities, although not in the same building. After renting space in an FBO hangar, the airport manager's office moved in 2005 to a former FBO (Auburn Flying Service), now airport-owned, building adjacent to the central apron. The structure is one of the oldest on the airport, but has been extensively remodeled. Flight briefing facilities, lounge area, and rest rooms are available in a nearby small, manufactured building that houses the fuel service FBO. A coffee shop, with outdoor dining patio facing the apron, is located in its own small building in the same area.

Although a multi-function administration building is not a necessity, such a building would be an appropriate centerpiece of a redeveloped airport core area as described later in this chapter. It would replace the individual facilities that all are anticipated to require major renovation or replacement during the 20-year time horizon covered by this *Master Plan*. Inclusion of a new administration building in the plan is recommended.

Fixed Base Operations (FBO) Facilities

Fixed base operators constitute the commercial side of general aviation business. They provide a wide variety of facilities and services for pilots and their aircraft (see adjacent box). Busy airports usually have multiple FBOs, while smaller ones may have only one or none. The primary FBOs at an airport commonly offer many of these facilities and services; specialized FBOs—sometimes referred to as specialty aeronautical service organizations or SASOs—may supply just one. Also, at many

Examples of FBO Facilities and Services

- Aircraft rental and charter
- Flight instruction
- Flight preparation room, pilots' lounge, and rest rooms
- Pilots' supplies
- Aircraft and avionics maintenance and repair
- Aircraft fueling
- Based aircraft hangar and tiedown space rental
- Transient aircraft parking

Facilities and services provided by the FBOs at Auburn Municipal Airport are listed in Chapter 1, Table 1B.

airports, the airport operator provides some or all of the hangar facilities and fueling services. FBOs often develop and own their facilities on land leased from the airport, but in many cases both the facilities and the land are leased. Sites for primary FBOs should be situated where they are easily visible and accessible both from the airport's airside and from adjacent roads. Specialty FBO sites can be in more isolated locations, although vehicle access without the need to go through a security gate is desirable.

As noted in Chapter 1, the FBOs at Auburn Municipal Airport collectively provide a wide range of services essential to mid-sized general aviation airports. None of the airport's FBOs can be considered a full-service business, however. Each provides limited specialty services. Plans for long-term development of the airport should allow for maximum flexibility in the expansion of FBO facilities. Space should be available not only for the existing businesses to grow, but also for similar new businesses to locate at the airport or even for a full-service facility to be established.

Other Support Facilities

- **Aircraft Fueling Facilities**—Fueling facilities at Auburn consist of a fuel island located on the central apron plus three 12,000-gallon underground tanks constructed in the late 1990s. These facilities are owned by the city of Auburn. The fuel service is provided by one of the specialty FBOs. Aircraft can obtain fuel either at the island or by truck. Jet-A as well as 100LL are available by both means. Although replacement of some components of the fueling facilities may be necessary over the 20-year planning time frame, no major changes in the size, location, or function of the system appears to be necessary. The one exception could be if the present fuel island location is found to interfere with the best long-term reconfiguration of the airport core area.

- **Aircraft Wash Rack**—The airport washing facility is located at the end of Rickenbacker Way in front of an existing hangar. The facility meets today's standards for run-off pollution control and its location does not appear to conflict with other potential development in the area.

Security

Fencing and Gates

The principal forms of security at most general aviation airports are perimeter fencing and controlled-access gates. For security purposes and for safety as well, fencing should keep unauthorized individuals and, especially, vehicles from accessing the aircraft

operating areas of the airfield and building areas. Entry should be possible only with an access code, card, or remote control or by passing through a monitored area such as the airport administration building or a fixed based operations facility. Determining appropriate locations for fencing and gates in an airport building area can be complex in that public access to certain facilities needs to be maintained.

Fencing at Auburn Municipal Airport exists around much of the airfield, but is incomplete within the building area. Vehicles and pedestrians have direct access to aircraft operating areas at several locations. The core building area is particularly deficient due in large part to the dual functionality of Rickenbacker Way as both a road and a taxilane. The pavement is marked as a taxilane and is regularly (several times per week) used for aircraft access to three FBO facilities and one private hangar. However, functioning as a road, the pavement also is the primary vehicle access route to these and three other buildings. No gate or other barrier keeps vehicles from being driven onto the aircraft apron. Even signage intended to discourage inadvertent entry onto the airport is minimal.

Other Security Requirements

In addition to fencing and gates, other security features are becoming more widespread at general aviation airports in the future. In May of 2004, the Transportation Security Administration, in conjunction with a wide group of general aviation industry representatives, developed and disseminated a series of security recommendations—entitled "Security Guidelines for General Aviation Airports" (IP A-001)—for consideration by general aviation airport operators, tenants, and users. Among the recommendations concerning airport facilities are the following:

- Storage of aircraft in locked hangars to the full extent practical.
- Installation of outdoor lighting at aircraft aprons, hangar areas, fuel storage areas, airport access points, and other key locations.
- Installation of signs warning against trespassing, giving notification of the consequences of violation, and listing emergency phone numbers.
- Issuance of identification cards for people authorized to be in secured areas.
- Installation of surveillance cameras.

These recommendations, while not regulatory, should be carefully considered for application at Auburn Municipal Airport to the extent that they are not already in place.

Industrial Development

As a means of generating additional revenues to help support aviation-related activities, many general aviation airports have turned to selling or leasing some of their land for nonaviation, commercial or industrial development. Only those lands deemed excess to long-term aviation needs should be considered for use in this manner. This caveat is a requirement when the FAA has participated in the acquisition of the property or the airport was a former U.S. military facility. The FAA must formally "release" the property to enable it to be used for nonaviation purposes and the locations must be indicated on airport plan drawings.

Beginning in the late 1970s, the City of Auburn has acted to create a nearly 80-acre industrial park on city property along the south side of the airport. The eastern portion of the site is within the airport boundary, having once been part of the former crosswind runway. The western 40 acres is city owned and within the city limits, but not part of the airport. All parcels within the industrial park are under lease and most are fully built out.

Several parts of the airport currently designated for aviation uses remain undeveloped. For reasons of airfield accessibility and other factors, some of this area may be better suited to nonaviation development. Oppositely, certain locations currently in use for nonaviation purposes might be better devoted to aviation functions in the long term. These prospects are examined in the final section of this chapter.

DESIGN FACTORS

Many factors must be considered in planning for future development of the Auburn Municipal Airport building areas. Some of these factors are specific to airports. Others, though, are similar to ones that affect any long-term development planning decisions.

Existing Property and Facilities

- **Airport Property**—The current airport property consists of approximately 262 acres. The runway and taxiway system, including runway approaches and between the aircraft parking limit lines, occupies about 73 acres of this total. This leaves some 189 acres as building area of which approximately 76 acres is part of the industrial park. Much of the remaining 113 acres has limited development potential because it lies within the building restriction lines or the AWOS critical area or consists of steep terrain. Even so, the entire east hangar area

remains to be built upon and several smaller areas on the south side have potential for development or redevelopment. Furthermore, as much as 44 acres of land on the north side of the runway could be used for building area expansion. These combined areas are more than sufficient to meet the aviation-related demands expected to arise over at least the next 20 years. Land availability is thus not a constraint to meeting future airport development needs.

- **Leaseholds**—Much of the property within the airport building area is leased to private parties. The industrial park is fully leased. Each of the aviation-related businesses also leases property and, in some cases, buildings, either directly from the airport or as a sublessee of a master lessee. Although modifying leasehold boundaries would represent a cost to the city, such actions may be essential to the long-term best development of airport facilities, especially within the central core area.

- **Existing Facilities**—Essentially all of the airport's aviation-related buildings and facilities parallel the runway on the south side of the airfield. The age and physical condition of these structures and other facilities varies. Most buildings were built in the 1980s or later, but some date back to the 1940s. With the exception of the southeast apron area T -hangar building which is planned for near-term removal, most buildings are reasonably sound and could continue in use. Several, though, would require major renovation to remain serviceable through the full 20-year time horizon of this *Master Plan*. Particularly within the central core area, removal and replacement of selected facilities so as to enable a more efficient layout warrants thorough consideration.

- **Airfield Setback Distances**—A uniquely aviation-related design factor is the requirement that buildings, aircraft parking, and other building area development be set back a safe distance from the airport runways and taxiways. These setbacks therefore form the interior boundary of the airport building area. As discussed in the preceding chapter, the following design criteria are recommended:
  - A minimum of 300 feet from the centerline of Runway 7-25 to any future buildings.
  - A minimum of 45 feet from the centerlines of Taxiway A on the south and the future parallel taxiway on the north to parked aircraft or other obstacles.
  - A minimum of 370 feet to future buildings on the north side of the runway (the additional setback is recommended because of the rising terrain in this area).

- No buildings within runway protection zones (although certain low-intensity uses may be acceptable on the RPZ edges).

Accessibility and Infrastructure

- **Airfield Accessibility**—Existence or the potential for construction of taxiway access to the remainder of the airport is an important determinant of whether a particular piece of land within the building area is suitable for aviation-related development. All areas contemplated for aviation-related uses on the south side of the airport have either existing or planned airfield access. As noted earlier, access to four private hangars is via the dual use of Rickenbacker Way as a taxilane and road. Any aircraft use of lands north of the runway will require new taxiway construction.

- **Road Accessibility**— Although most of the existing and potential uses of the airport building areas generate only low volumes of traffic, good access to the surrounding road network is essential. Facilities used by the general public especially need convenient road access.

  In general, all building area property on the south side of the airport has good access via New Airport Road, Rickenbacker Way, Lindbergh Street, and/or Bill Clark Way. The dual use of Rickenbacker Way is a concern as previously described. Access to the new east hangar area is planned to be by way of a new road extending from Old Airport Road. No paved road access to the north side currently exists.

  The primary access to the airport is via New Airport Road from Bell Road on the south. Locksley Lane and Earhart Avenue provide access from Grass Valley Highway on the west. A connection between Shale Ridge Lane and Bill Clark Way would enhance access from the west. This connection also would be needed to enable vehicles to get from the south side of the airport to any future north side development without the necessity of traveling down to Grass Valley Highway.

- **Utilities**—Water, power, and telephone services are the most essential utilities for general aviation functions. Sewer service is desirable and, for many industrial uses, essential. All of these utilities are available within the south-side building area. The north side does not have sewer service. Also, water supply for lands north of the airport is provided by the Nevada Irrigation District, whereas, the south side of the airport is served by the Placer County Water Agency.

Environmental Constraints

- **Terrain**—Terrain is a significant factor in the design of existing facilities in the building area at Auburn Municipal Airport. From west to east, ground levels within the existing building area rise by over 40 feet. Several breaks in grade throughout this area limit aircraft circulation routes.

  Future development will potentially be affected to an even greater degree. Several large rock outcrops occur south of the approach end of Runway 7, just beyond the western extents of the building area. Within the southeast apron area, slopes are a factor in potential future airfield access enhancements as well as in expansion of the site. The new east hangar area is limited by a hill rising more than 100 feet on the eastern edge of the site. To the north, the terrain is generally somewhat higher than the adjacent runway elevation. It is moderately hilly and, particularly on the east end, contains numerous rock outcrops.

- **Drainage**—Because of the sloping character of the site, poor drainage is not a development constraint.

- **Biological Features**—A field reconnaissance of potential building area expansion sites was conducted in the Summer of 2005. The survey looked for special-status plant and animal species, wetlands and federal jurisdictional waters, and sensitive vegetation communities or wildlife habitats. The extent of significant biological features found in the survey was small. Freshwater emergent wetlands were noted west of the present building area and along the eastern edge of the southeast apron area. Several small stands of blue oak woodland exist along the edges of existing south side development and near the north property line. No special-status plant or animal species were noted during the survey.

Additional details of the biological features survey are presented in Chapter 5.

Financial Factors

- **Development Costs**—Whatever development occurs within the airport building area must be financially sound. The relative cost of one development alternative versus another clearly is a major factor in the planning process. Cost calculations must consider not just construction costs, but also the revenues that would be lost—even if only temporarily—if new development eliminates existing revenue-producing uses.

- **Development Increments**—One means to help ensure financially sound development is to avoid constructing facilities too far in advance of the demand. As noted in Chapter 2, the growth in numbers of based and transient aircraft at Auburn

Municipal Airport is expected to be moderate over the 20-year time horizon of the Master Plan. The growth rate for the principal measure of demand—the size of the airport's based aircraft fleet—is expected to average approximately 1.6% per year. The reality, though, is that increases in the fleet size are more likely to occur in larger increments than the three to five per year that this average growth rate would suggest. For example, at present an existing unmet demand for at least 65 additional hangar units appears to exist.

- **Development Staging**—The challenges to staging of development over an extended time period are twofold. One challenge is to minimize costly "phase one" construction that may not be fully utilized for many years. Balanced against this objective is the need to ensure that early development is not located in a manner that, while perhaps less expensive initially, hinders later phases of development. The goal is to have a plan that is flexible enough to adapt to changes in type and pace of facility demands, is cost-effective, and also is functional at each stage of development.

DEVELOPMENT OPPORTUNITIES AND OPTIONS

Examination of the airport property, together with consideration of the preceding design factors, suggests several distinct areas as having potential for development or redevelopment to meet the identified building area facility requirements. The locations of these sites are shown in Figure 4A at the beginning of this chapter. The following discussion highlights the development opportunities and options that are apparent for each of these sites. Specific design factors that influence or limit the development potential are noted as well. Finally, development recommendations are outlined—specific designs in some instances, general concepts in others.

East Hangar Area

As noted elsewhere, extensive earthwork for the 14-acre east hangar area was completed in 2003. Drainage lines, utilities, and pavement have been fully designed, but as of late 2005 no construction beyond the finish grading has taken place. This work is anticipated to move forward in the near term.

Figure 4B illustrates the planned layout of the east hangar area. The overall configuration provides for two essentially level segments separated by a 7-foot elevation difference. The layout is intended to accommodate a variety of different types and sizes of

hangars. No building can be placed above the Wise Canal underground aqueduct that traverses the middle of the area. As now configured, space for at least 100 aircraft is provided. This capacity is expected to be sufficient to meet hangar demands for most of the 20-year planning period. The city intends to build about half of the hangars itself and to lease the remaining pads to private parties which would erect the buildings. How quickly the site will be fully built out will depend upon actual demand and funding availability.

Only limited flexibility remains with regard to the final layout of facilities unless the site is to be redesigned. Any change in the placement of the taxilanes would necessitate redoing the finish grading. Greater flexibility can readily be provided with respect to the design of individual buildings. For example, a multiple-unit hangar could be built in the place of several individual units or vice versa.

Access to the east hangar area will be via a new road intersecting with Old Airport Road to the south. A small amount of land acquisition (under 1.0 acre) will be required for the road right-of-way. A temporary dirt road currently runs through this general location.

Expansion of the east hangar area beyond the currently planned limits is impractical because of the steep slopes in the edges of the site. The east and south sides are bordered by 2:1 cut slopes. To the southeast, the ground continues to rise to a hilltop more than 100 feet above the hangar area elevation.

Core Area / Central Apron

A general aviation airport's core area is typically the area that is most visible and accessible both from airport access roads and from the airfield. It usually includes the facilities most visited by the general public and transient aircraft pilots. An administration (arrival/departure) building, public parking, transient aircraft apron, and fueling facilities can be expected to be found in the core area of mid-sized general aviation airports.

Auburn Municipal Airport's core area extends from the uses along Rickenbacker Way on the west to those at the end of New Airport Road on the east. The transient aircraft apron and fuel island occupy the northern portion of the area. The current airport administration building and a restaurant are also among the facilities found there. These functions are all appropriate for the core area and should continue to be provided among future improvements.

Several significant deficiencies are evident with the present configuration of the core area. Among these are:

- Lack of a central focus that provides the initial point of contact for airport visitors.
- Limited facilities for transient pilots (e.g. pilots' lounge, flight briefing room, etc.).
- Restricted aircraft circulation because of several grade breaks within the apron area.
- Use of Rickenbacker Way as both a taxilane and road.
- Lack of barriers to vehicle access onto aircraft operating areas.

Options for remedying these deficiencies can largely be grouped into two sets: those concerning Rickenbacker Lane and those involving the administration building and other uses at the end of New Airport Road.

Rickenbacker Way

The present combined taxilane plus roadway usage of Rickenbacker Way has existed for some 20 years. Deliberate or inadvertent vehicle access onto the central apron and other aircraft operating areas has not posed a significant safety or security problem. The businesses along the road, as well as other airport users, seem satisfied with the current arrangement. Given this perspective, an interim solution would be simply to install highly conspicuous signs both at the south end of the taxilane and at the north end where it enters the apron area. The first sign would alert motorists to watch for aircraft, but would not restrict access. The sign at the north end would indicate that only authorized users are permitted to enter. Everywhere else in the building area, perimeter fencing and gates should be installed as needed to prevent or control vehicle and pedestrian access.

Eventually—and perhaps sooner rather than later—a more permanent solution to the dual usage will become necessary. This need could be dictated by new FAA or TSA regulations, state laws, or simply City of Auburn concerns over liability. The timing of any such requirements would largely determine the response. The best long-term solution would be to eliminate aircraft access. The two remaining FBOs (Auburn Avionics and the Gyro House) could be encouraged to move to new facilities in the southeast hangar area. The nonaviation business (Nella Oil Company) also could relocate to that area or at least park its aircraft there.

If a change becomes imperative within the next few years, then a solution that allows continued aircraft access will no doubt be necessary. Preventing existing businesses from accessing their

hangars is presumed not to be a viable option. Installation of a security gate would be required. As shown in Figure 4C, the gate could be placed at either the south or the north end of the taxilane.

- **Option 1, South-End Gate**—A controlled access vehicle gate at the south end of the taxilane (just beyond the Nella Oil building) would allow unimpaired aircraft access to each of the present businesses, but would restrict public access to those businesses as well as those on the north side of the taxilane (DDI Manufacturing, Horizon Aviation, and Power Aviation). Although vehicles and aircraft would still both use the same pavement, the interaction would be similar to other hangar and apron areas where only authorized vehicles are permitted. For these latter businesses, their parking lots and only street access is from Rickenbacker Way. The businesses on the south side all have access from behind via Lindbergh Street. To maintain unrestricted public access to the north-side businesses, driveway connections from New Airport Road would need to be established. Modification to leasehold boundaries would potentially be necessary.

- **Option 2, North-End Gate**—This option would place a gate at the point where the taxilane joins the central apron. A very wide gate would be required in order to allow aircraft to pass through. Such gates tend to be difficult to maintain, especially if operated mechanically rather than manually. They also pose a major inconvenience to pilots who would either need to have someone else open the gate or would need to get out of their planes to do so themselves. The capability for vehicles to access the apron at that point would also need to be provided unless a separate vehicle gate were to be installed elsewhere nearby. With a gate at the north end, the general public would have unrestricted vehicular access to businesses along both sides of Rickenbacker Way. The potential for conflict with the occasional aircraft using the road as a taxilane would continue, however. Safety could be enhanced by requiring that aircraft be towed along the route rather than operated under their own power, but such a requirement would be a further inconvenience to the aircraft operators.

  A variation on the north-end concept, although only a partial solution to the problem, would be to install a manual gate and allow it to remain open during normal business hours when aircraft would most need to pass through.

Of these two short-term choices, the south-end option is preferable providing that alternative vehicle access and/or parking space can be established for the businesses on the north side of the road. Ultimately, once businesses requiring aircraft access are no

longer in the area, a vehicle-only gate should be located either at the north end of the road or near the future administration building.

Administration Building

The layout and age of the existing administration building make it ill suited to meeting the facility requirements outlined earlier in this chapter other than on an interim basis. Moreover, removal of the building together with the two small, similarly old, FBO buildings (not presently occupied by an FBO) and existing restaurant to the west would enable development of a more efficient and more attractive focal point for the airport.

Figures 4D and 4E depict two alternative site plans for the administration building together with the adjacent apron area on one side and automobile parking lot on the other. Numerous other plans are also possible and a final design will require more comprehensive study. However, among the features considered important and included in both concepts shown here are the following:

- Development of the site should be phased so as to disrupt existing services as little as possible. Both schemes propose location of the new administration building where the two small FBO buildings are now located in the space between the existing administration and restaurant buildings. Any interim users of the FBO buildings could relocate to the southeast hangar area, as described next. The existing administration and restaurant buildings could then be eliminated and the functions moved to the new building when the first phase of construction is completed.
- The administration building should be a multi-function facility providing airport offices, pilots' flight briefing area and lounge space, 24-hour rest rooms, meeting rooms, a restaurant, and perhaps rental office space. The building design should incorporate architectural features that will make it stand out as the airport's focal point.
- Short-term, passenger drop-off, taxi-through, parking spots for two or three aircraft should be provided in front of the building and tiedowns for transient aircraft staying longer should be close by.
- The existing, relatively new, fuel island is assumed to remain in place.
- The apron area from the fuel island westward should be reconstructed to eliminate the existing sharp grade breaks. The slopes and elevation of the regraded apron will need to

be taken into account in the setting the floor elevation of the new administration building.

- The existing parking lot on the south side of the site should be completely reconfigured. Creation of a roadway loop with most of the automobile parking in the center is envisioned. Places for landscaping should be incorporated into the design.

Southeast Hangar Area

The southeast hangar area constitutes one of the oldest parts of the airport, but was private property until acquired by the city of Auburn in 2004. The city has already removed one of the hangar buildings on the property. Of the remaining three buildings, the only one in fair condition is a hangar used for auto repair, not aviation uses. The eastern two-thirds of the site has never been developed.

Proximity to the airport core area and the fact that it is already partially in aviation use are among the chief advantages of this site. Construction of a road along the south edge could enable vehicle access to the site along a public route that would be outside of the airport perimeter fence. This accessibility makes the site well suited for establishment of specialty FBO facilities.

The long, narrow shape is one of the site's limitations. Others are its lack of visibility from the airfield and marginal aircraft accessibility. At present, only one taxilane enters the area and it runs tightly between the existing airport administration building and a large oak tree. This and another large oak at the western end of the site are essential to preserve, but removal of the building is an option as described in the previous section. The eastern, undeveloped portion of the site is relatively level almost to where the underground aqueduct crosses it, then rises about 15 feet. A small drainage swale passes through the area just beyond the eastern edge of the existing development. The initial biological reconnaissance deems this feature to be a freshwater emergent wetland. The eastern part of the site also contains a small seasonal wetland and several additional oak trees that may be factors in future development.

Figures 4F and 4G depict two potential configurations for future development of the southeast hangar area. The two schemes are similar in many respects. Both have a central taxiway running the length of the site along with an upward sloping connection to the new east hangar area. Removal of the remaining old T-hangar building is essential in both alternatives. A new public road would run along the southern edge of the site extending between the airport core area at New Airport Road on the west and the

proposed east hangar area access road on the east. Assuming that construction of the southeast hangar area takes place ahead of the core area redevelopment, an interim road alignment at the west end may be necessary.

The two layouts are also similar in terms of the mix of uses accommodated: a collection of small box hangars and larger executive hangars that could serve as specialty FBO facilities. The site's shape, plus its airfield visibility and accessibility limitations make it a poor prospect for a full-service FBO.

The arrangement of the hangars is the difference between the two alternatives. Alternative 1 places the larger hangars on the north edge of the site adjacent to the two existing buildings, thus allowing them to remain. However, these hangars would then not have direct external road access as would be highly desirable if they are to be occupied by FBOs. Alternative 2 reverses the arrangement, placing the large hangars along the road with automobile parking in between the buildings. This second configuration is the recommended alternative. By staging of development, the two existing buildings could remain temporarily in place. Eventually, their removal is essential because of the circulation bottlenecks they would create.

East Apron

If additional hangars are constructed as currently planned or proposed elsewhere on the airport, much of the east apron tiedown space is likely to become unutilized. Although no changes are recommended at this time, converting one or two tiedown rows along the eastern side of the apron to hangars may warrant future consideration.

West Hangar Area

One other area of the airport's south side that has some potential for further development is the west hangar area. The existing taxilane could be extended about 200 feet westward into the area now occupied by several portable office buildings. Extension beyond that distance is restricted by rock outcrops and large oak trees. Several small hangars could be constructed on the available land, however.

Another factor in the design of the west hangar area is the need to connect Shale Ridge Lane with Bill Clark Way. As previously noted, this connection is essential both to enhance airport access from Grass Valley Highway and to enable airport users to reach future north-side facilities without having to go via the highway.

The recommended alignment loops around the rocks and trees, thus cutting into the potential development area.

A final consideration concerning the west hangar area is the age of the existing portable T-hangars in the eastern part of this site. Most of these hangars are already nearly 30 years old and are not likely to last through the 20-year time frame of the *Master Plan*. Their replacement with small T-hangars or box hangars should be anticipated. Because of the substandard width of the two taxilanes between present hangar rows, the replacement development may not be able to contain as many hangar units as at present.

North Side

The long, narrow strip of land between the runway and the northern boundary of the airport is currently undeveloped except for the wind sensor mast (an AWOS component) and an Auburn Police Department firing range. Lack of infrastructure—including taxiway access, paved roads, and water and sewer lines—has been a deterrent to development. Appropriately, with adequate land available on the south side to accommodate the airport's aviation-related needs to date, all development has taken place there. As described in this chapter, several opportunities for continued expansion as well as redevelopment of the south side remain. Even so, if the forecasts in Chapter 2 prove accurate, the capacity of the south side to accommodate additional demand for aircraft parking and other aviation-related functions will be fully utilized before the end of the 20-year *Master Plan* time frame.

Potentially, up to 27 acres of land along the north side of the runway could be made available for building area development. The size of this area is limited by existing features and characteristics of the site.

- Along the south edge, clearance must be provided for the FAR Part 77 transitional surface. Nominally, 7:1 transitional surface clearance over a 15-foot tall hangar building would require a setback of 355 feet (250 + 7x15) from the runway centerline. However, the elevations of the site are generally higher than those of the runway, thus requiring a greater setback. For planning purposes, a 370-foot building restriction line (BRL) offset from the runway is recommended, although exceptions in either direction could be appropriate depending upon the ultimate grading of the site and height of structures.
- A minimum setback of 45 feet will be required between the centerline of the future parallel taxiway and any parked aircraft. With the taxiway proposed to be aligned 150 feet from the runway, this leaves a 175-foot wide strip between

the aircraft parking limit line (APL) and the BRL that could be used for aircraft or auto parking, but not for structures. Given the lack of demand for aircraft parking apron, most of this strip is likely to remain unused, thus reducing the developable area by some 10 acres.

- The rising terrain presumably will require some excavation along the northern part of the site. To accommodate the cut slope, a setback from the property line will be necessary.
- Development at the eastern end of the site is constrained by the irregular terrain. The ground first rises slightly, then drops nearly 100 feet in elevation adjacent to the eastern 500 feet of the runway. Also, the ground in this area contains extensive subterranean rock plus numerous rocky outcroppings which would increase the cost of earthwork.
- The western edge of the developable area is defined by the existing AWOS wind-sensor mast and the firing range, both of which are expected to remain. Within a 500-foot radius of the mast, structures must be at least 15 feet lower than the top of the approximately 33-foot tall mast. Because the ground level east of the mast is higher than at the mast site, buildings are effectively precluded. Also, no structures, pavement, or other objects are allowed within 100 feet of the mast.

Extension of a paved access road to the site will be one of the primary prerequisites for development of the north side. Private land holdings limit the potential for access from Dry Creek Road a half mile to the north. The most feasible alignment would run from Shale Ridge Road via an existing unnamed road along the airport's western property line, then around the landfill and eastward along the north property line. The total length of this new road will be approximately 3,000 feet.

The specific configuration and mix of uses that the north side will need to accommodate cannot be accurately predicted at this time. Looking beyond the 20-year planning time horizon, though, the potential aviation-related demand is sufficiently high to warrant reserving the land for this purpose. Additional hangar space is the most likely need. Aviation-related uses requiring frequent public access either by aircraft or vehicles should be avoided as these functions are better concentrated on the south side. One exception might be if an aviation-related business seeking to locate at the airport requires a larger block of land than is available on the south side.

To maintain development flexibility, site preparation should be limited to rough grading of building pads. More significantly, construction of at least a partial north-side parallel taxiway will be

required as described in Chapter 3. Extension of the access road and utilities to the site will be another essential initial investment.

Northwest Corner

One final area of the airport property that has development potential is in the northwest corner. The closed landfill and the runway protection zone mark the southern edge of the site and the critical area for the AWOS is on the east. Approximately 17 acres could be developed, not counting the limited use of the outer portion of the AWOS critical area.

The proposed north-side access road would serve the site. Connection to the airfield could be provided with a taxiway from the approach end of Runway 7. The site, though, appears better suited to a nonaviation, light industrial use. Any such use would have to be low intensity (few people) in order to be consistent with the land use compatibility criteria established by the Placer County Airport Land Use Commission.

"Through-the-Fence" Access

"Through-the-Fence" Access: Aircraft access to a publicly owned airport from adjacent, privately owned property. The imaginary "fence" is the boundary line separating the public and private properties.

As of early 2007, no private property adjacent to Auburn Municipal Airport has "through-the-fence" (TTF) access to the airport. However, a developer has proposed constructing a residential air park with TTF access on a site within unincorporated Placer County adjacent to the airport's northern boundary. The majority of the approximately 60-parcels would have on-site aircraft storage hangars. A supporting access taxilane system would connect the individual air park residence/hangar sites with the north-side parallel taxiway described in Chapter 3 and earlier in this chapter.

As an off-airport operation, residents of the air park would need the city's formal permission to taxi from the privately owned air park property to the publicly owned airport property. This formal permission would take the form of a TTF operating permit issued by the city to the users desiring TTF access. The developer presented a conceptual plan of the residential air park to the Auburn City Council in November 2006 and the Council concluded that the project would be a benefit to the airport.

Details of a TTF access agreement remain to be worked out. The following are among the factors that should be considered in drafting of this agreement.

1. Parties to the TTF agreement should understand that TTF access is a user privilege that can be granted to complying off-

airport operators at the option of the city and is not an off-airport property owner's right.

2. The city should allow TTF access solely for the personal use of adjacent residential property owners or renters. TTF access for the purpose of any commercial aviation-related business to be conducted on the private property should be prohibited.

3. TTF access and its associated use must be reviewed and approved by the Federal Aviation Administration (FAA) both initially and on a continuing basis.

4. The FAA requires that airports receiving federal grant funds (e.g., Auburn Municipal Airport) must comply with applicable safety, security, operational, and financial guidelines, requirements, and regulations. This airport-wide compliance extends to off-airport users who are permitted TTF access to the airport.

5. The TTF users must comply with all applicable city and airport rules, regulations, and requirements.

6. The city must establish a rates and fees schedule and permitting process for the TTF users that adequately reflects the TTF users' contribution to the costs of providing, operating, maintaining, and developing the Airport facilities and services.

7. The city should determine whether or not it desires to formally interact with the air park property owners on an individual basis or through a combined homeowners association arrangement

8. The city must reserve its right to prohibit or otherwise restrict TTF access for any user violation of any applicable rule, regulation, ordinance, requirement, etc.

9. The city should establish and ensure that adequate CC&Rs are applied to the air park properties to address the following subject areas:
   - Limits on the size and type of aircraft permitted
   - Limits on the noise produced by aircraft on site
   - Limits on the hours of aircraft operation
   - Prohibition of aircraft maintenance run-ups
   - Limits on the outdoors presence of derelict and/or nonairworthy aircraft on site
   - Prohibition of commercial aviation-related activities.

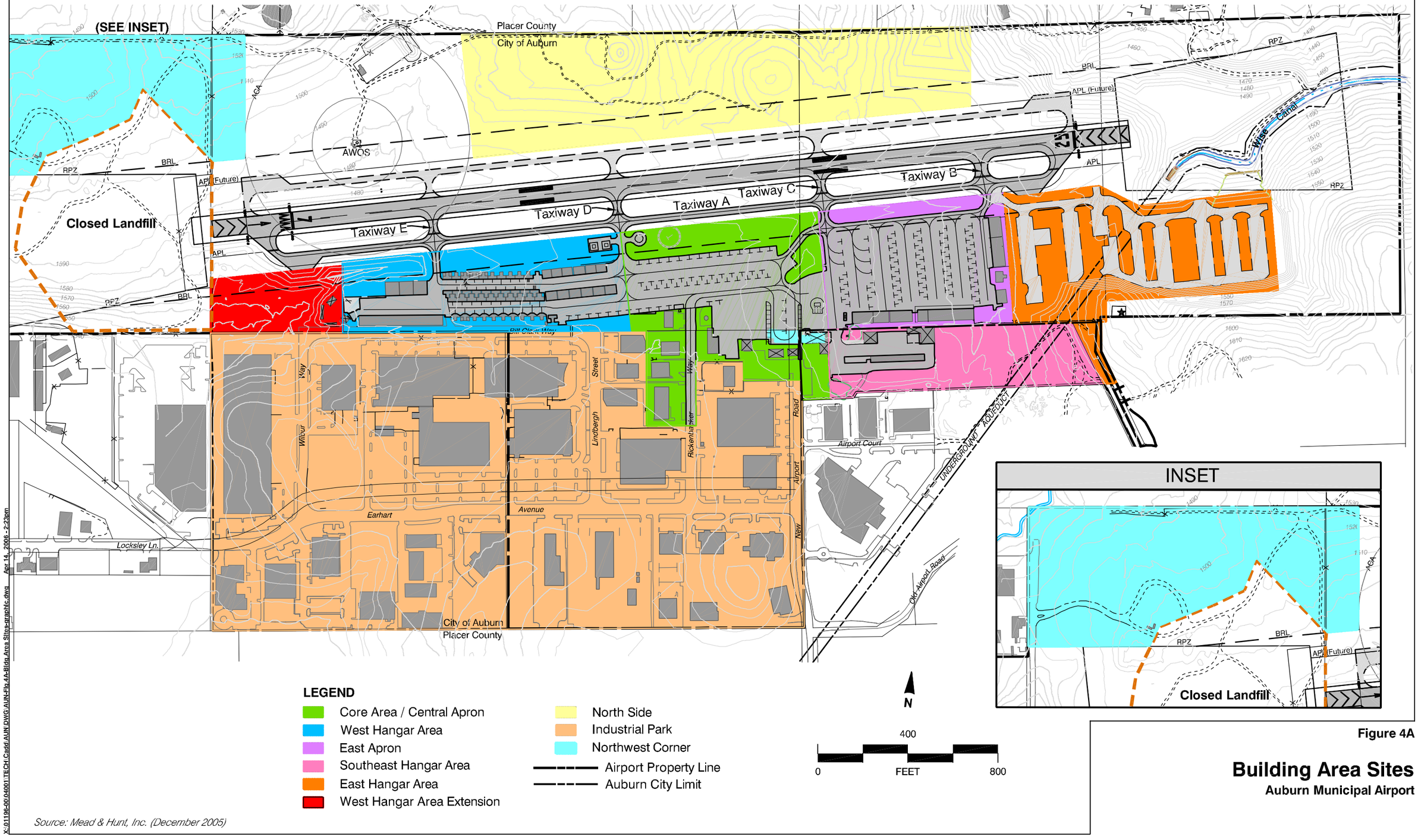
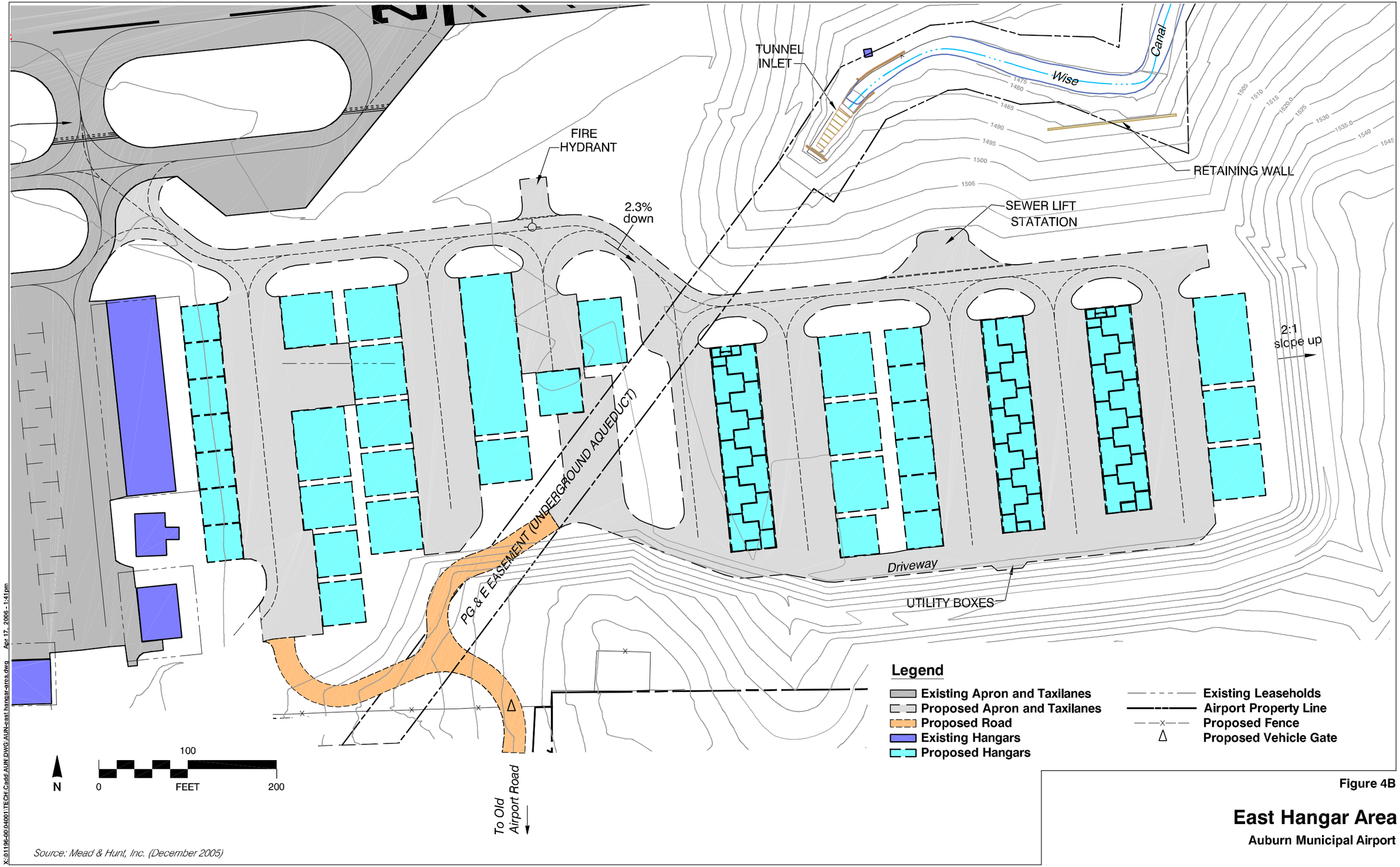


Figure 4A

Building Area Sites

Auburn Municipal Airport



Source: Mead & Hunt, Inc. (December 2005)

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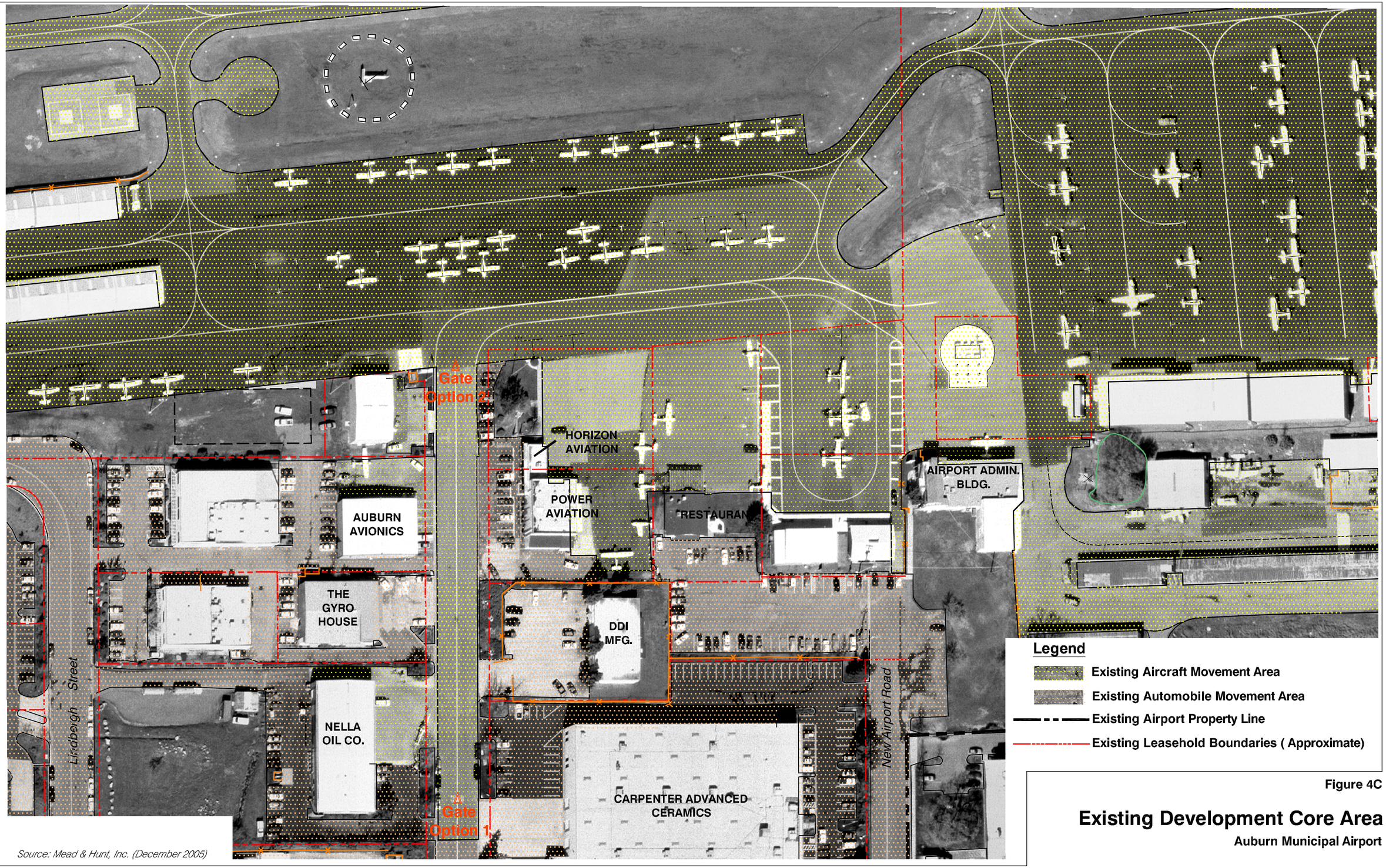
Figure 4B

East Hangar Area

Auburn Municipal Airport



Source: Mead & Hunt, Inc. (December 2005)

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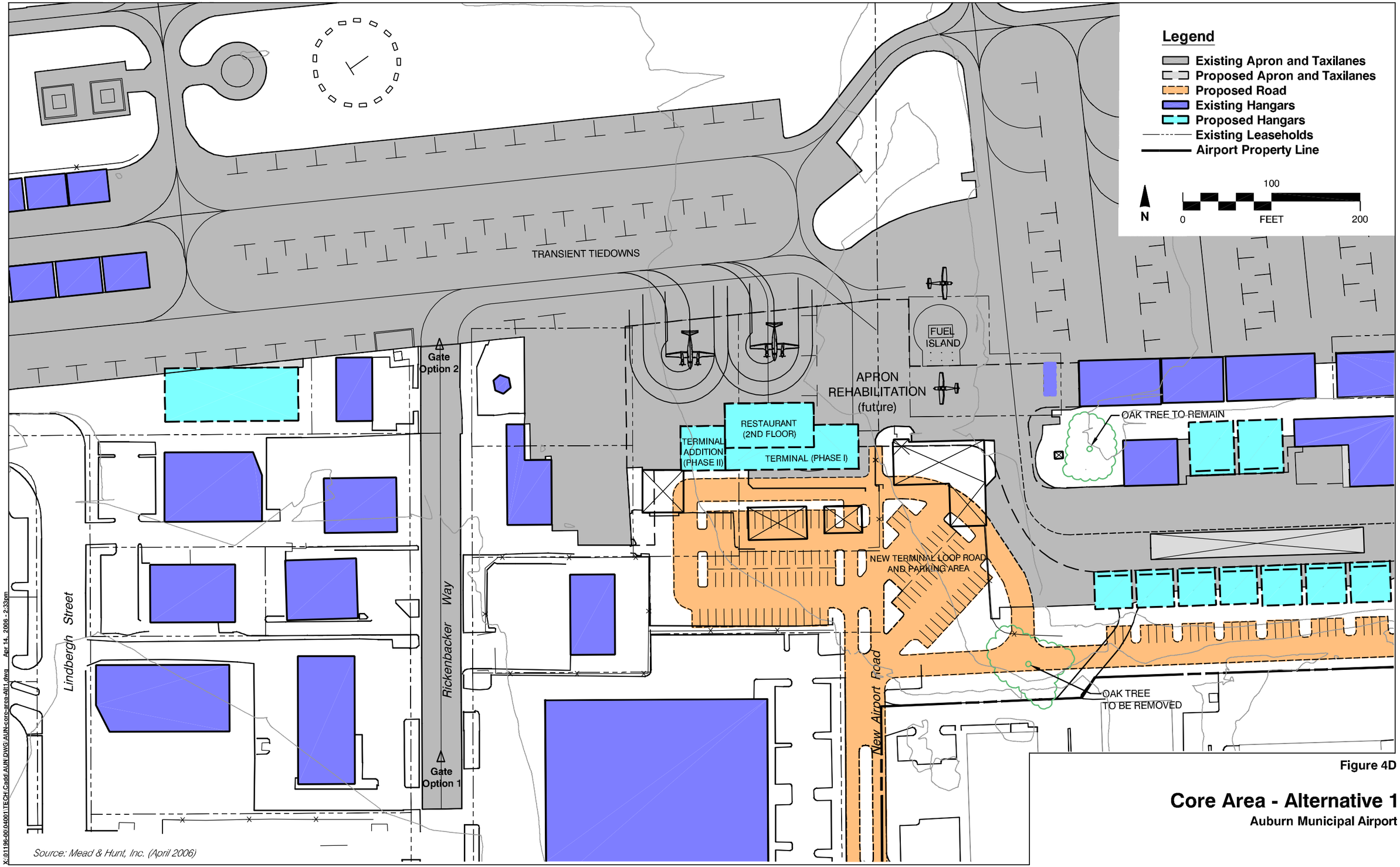
Figure 4C

Existing Development Core Area

Auburn Municipal Airport



Source: Mead & Hunt, Inc. (April 2006)

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Figure 4D

Core Area - Alternative 1

Auburn Municipal Airport

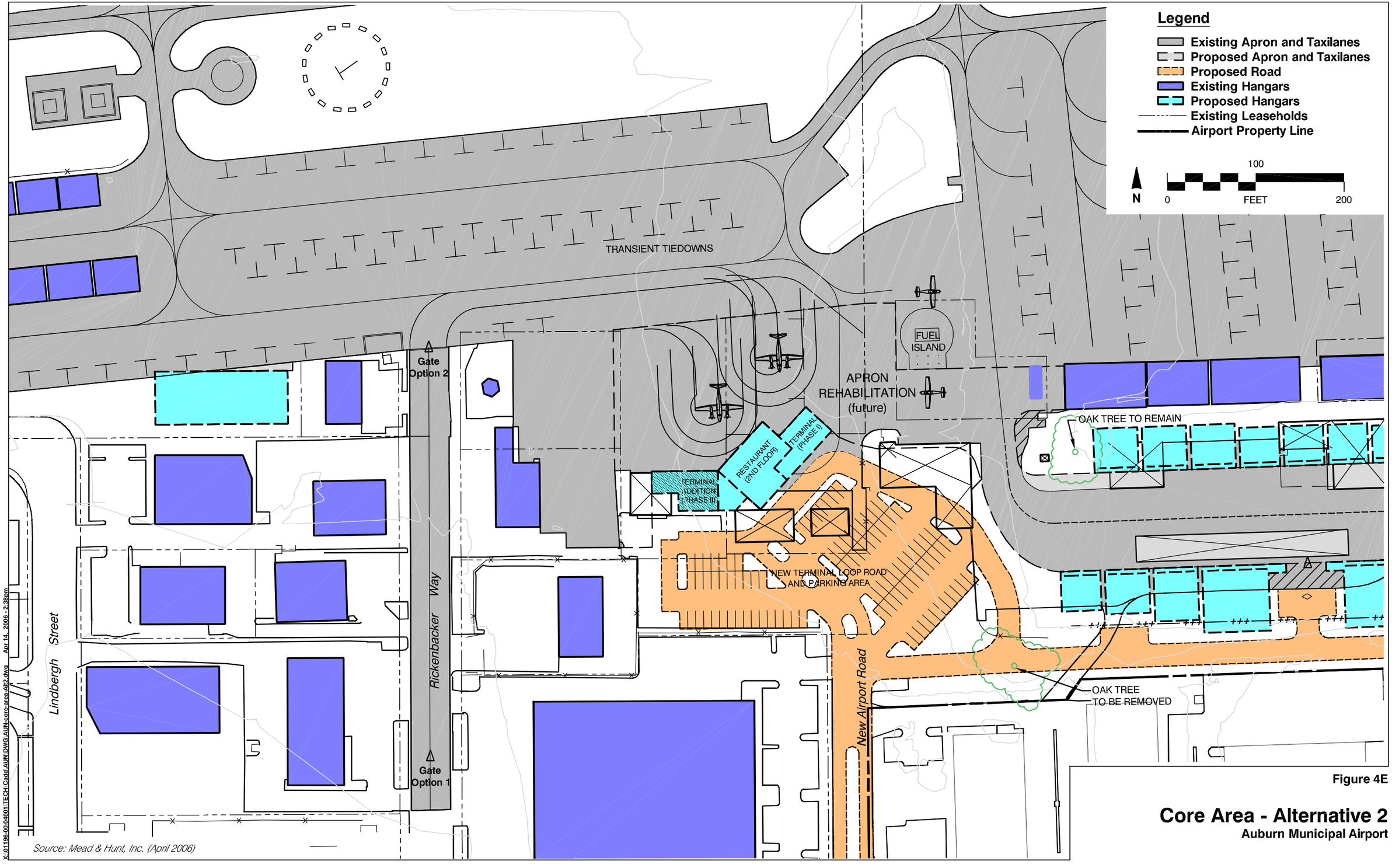
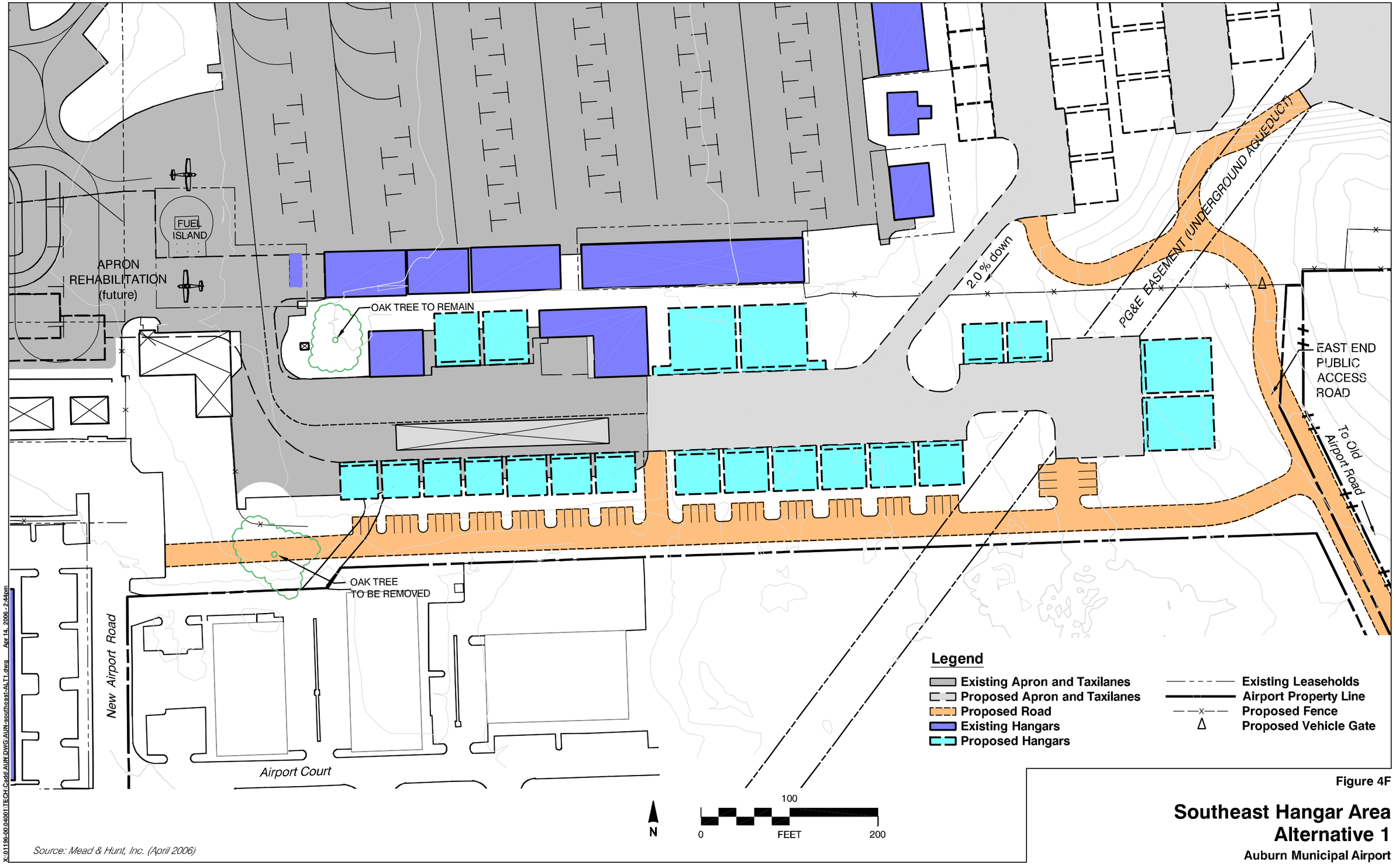


Figure 4E

Core Area - Alternative 2

Auburn Municipal Airport



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Source: Mead & Hunt, Inc. (April 2006)

Figure 4F

Southeast Hangar Area Alternative 1

Auburn Municipal Airport

FUEL ISLAND

OAK TREE TO REMAIN

OPTIONAL REMOVAL

2.0 % down

PG&E EASEMENT (UNDERGROUND AQUEDUCT)

EAST END PUBLIC ACCESS ROAD

To Old Airport Road

OAK TREE TO BE REMOVED

New Airport Road

Airport Court

Legend

- Existing Apron and Taxilanes
- Proposed Apron and Taxilanes
- Proposed Road
- Existing Hangars
- Proposed Hangars
- Existing Leaseholds
- Airport Property Line
- Proposed Fence
- Proposed Vehicle Gate

N

0 100 200 FEET

Source: Mead & Hunt, Inc. (April 2006)

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Figure 4G

Southeast Hangar Area Alternative 2

Auburn Municipal Airport

Chapter 5

Environmental and Financial Issues

5

Environmental and Financial Issues

ENVIRONMENTAL ISSUES

Development projects for Auburn Municipal Airport will occur within the regulatory structure of the State of California and the United States federal government. Both levels of government have environmental regulations that must be considered. This section is intended to identify potential constraints to implementation of the projects identified in this *Master Plan*. Only those factors that might potentially limit proposed development are presented.

Biological Resources

A biological survey of potential development sites at Auburn Municipal Airport was conducted in July 2005. The objective of this reconnaissance-level survey was to look for special status species of plants and animals, delineate probable areas of wetlands and federal jurisdictional waters, and identify other high-value vegetation communities and wildlife habitats.

See Appendix B for the complete biological study.

As detailed in the following paragraphs, very few biological resources for which avoidance or mitigation would be necessary were found on the airport. Perhaps most significant are several large blue oaks which should be preserved if possible. Minor amounts of wetlands also were identified. The locations of these features were taken into account in the building area development planning discussed in the preceding chapter.

Biotic Communities

Plant communities are assemblages of plant species that occur together in the same area. They are defined by species composition and relative abundance. The study areas include several vegetation

habitat types, but are dominated by two types: California annual grassland and blue oak woodland. Other plant communities in the study area include cattail series in a swale and deerbrush series in the chaparral. These plant communities can be generally correlated to habitats for wildlife.


black-tailed jackrabbit

- **California Annual Grassland**—Valley and foothill grassland include areas are dominated mostly by non-native Mediterranean annual grasses. The study areas' grasslands show signs of having been previously disturbed and are primarily composed of ruderal, nonnative species. The annual grassland community occurs in the underdeveloped study areas just south of the airfield on the east side of the airport, in a large area west of the runway, along the runway to the north, and in small patches surrounded by developed areas.

  California annual grassland provides foraging and breeding habitat for many wildlife species. Grasslands are important foraging grounds for insectivores and seed-collecting mammals. Only the black-tailed jackrabbit was observed during the site reconnaissance. Very few burrows were observed in the study areas. A variety of birds may also use the annual grasslands for foraging, including aerial insect foragers, seed foragers, and raptors preying on small rodents. Because this plant community is relatively dry, few amphibian species are likely to inhabit it during the summer. The grassland also may provide suitable shelter, basking sites, and foraging habitat for small snakes and lizards.

- **Blue Oak Woodland**—Blue oak woodland is dominated mostly by blue oak, although the structure, associated species, and understory composition may vary. Herbaceous species on the ground are mostly annual grasses and forbs. The blue oak woodlands in the study area are mixed with some interior live oak and foothill pine in the canopy and an understory of various shrubs. Blue oak woodland occurs in several places in the study areas, the largest at the northwest corner of the airport. Other small stands of blue oak woodland occur in clumps with valley oak along the southeast boundary and with live oak and foothill pine along the southwest boundary of the airport. There are several large oak trees in the study areas, some with a trunk diameter greater than 30 inches and several valley oak measuring nearly 60 inches.

  Oak woodlands provide foraging and breeding habitat for many wildlife species. Detailed information on wildlife and habitat relationships specific to blue oak woodland is limited, but one study shows that blue oak savannahs are used mostly by bird species, then amphibians and reptiles, and finally by mammals.

During the site reconnaissance, several signs of wild turkey were noted.

- **Deerbrush Chaparral**—Deerbrush chaparral occurs on low- to mid-elevation slopes below various types of woodland or forest. At Auburn Municipal Airport, deerbrush chaparral is limited to a portion of the northern study area of the airport. Chaparral is characterized by shrubs with thick, stiff, waxy evergreen leaves. The chaparral around the airport is dominated by sparsely distributed deerbrush and a ground cover of annual grasses and forbs. There are no wildlife species that are restricted to this plant community. The deerbrush chaparral may provide limited cover for some lizards, snakes, jackrabbits, and various birds that also use the adjacent grassland or oak woodland.

Wetlands

Wetlands are ecologically complex habitats that support a variety of both plant and animal life. Examples of wetlands include salt marsh, seasonal wetlands, and brackish marsh complexes that have a hydrological link to other waters of the U.S. Examples of other waters in the U.S. include rivers, creeks, intermittent and ephemeral channels, ponds, and lakes.

A formal wetland delineation was not performed for this report. All conclusions presented are the results of the preliminary delineation and are subject to change, pending a formal wetland delineation of the site and the Corps' official review and final determination.

Potential wetlands within the project site are characterized as seasonal wetlands, vernal swale, and freshwater emergent wetland.

- A seasonal wetland lies against an earthen berm in a low area in the annual grassland on the east side of the airport. Water likely drains from the upland grassland areas, flows along this berm, and collects in the low spot, forming the seasonal wetland. Although no water was observed at the time of the survey, remnants of wetland vegetation were identified.
- Two vernal swales are in the study area north of the runways. One swale runs almost north-south along a natural contour and collects water from the surrounding uplands. The other runs east-west along a slope that drains the runway. Both swales support vegetation associated with wet areas.
- Finally, freshwater emergent wetlands occur in parts of the drainage channel in the southeastern part of the airport.

Endangered and Threatened Species of Flora and Fauna

Special-status species are those plants and animals recognized by federal, state, or other agencies because of their recognized rarity or vulnerability to various causes of habitat loss or population decline. A list of special-status species that may occur in the vicinity of Auburn Municipal Airport was complied based on data in the California Natural Diversity Database (CNDDB), the CNPS Inventory of Rare and Endangered Plants database, and the USFWS list of federal endangered and threatened species that may be affected by projects in the Auburn, California 7½-minute quad.

Conclusions regarding habitat sustainability and species occurrence are based on a reconnaissance-level area assessment as well as information from the CNDDB. Focused surveys for special-status species were not conducted. A dozen plant and animal species (see Appendix B for list) have medium to high potential to occur with the project area; however, no special-status species were observed during the site visit:

Water Resources

Floodplain

According to the 1998 FEMA *Flood Insurance Rate Map for Placer County, California and Incorporated Areas*, all of the airport and proposed additions are located outside of the 100-year and 500-year floodplains. The nearest area designated as subject to flooding is adjacent to Dry Creek, which runs along to Dry Creek Road, approximately 4,000 feet north of the Airport and considerably lower in elevation (approximately 200 feet). However, the drainage for the project should be designed so as not to worsen the flood-prone area along Dry Creek Road.

Drainage

Alongside a road perpendicular to Shale Ridge Lane (west end of airport) is a ditch that runs north from Shale Ridge Lane and briefly turns east into the blue oak woodland. Another roadside ditch follows along the northern edge of the airport property. The two ditches remain relatively dry during the summer months. When visited in July 2005, neither ditch contained water. Upland species dominated the vegetation in the ditches. Near the intersection of Bill Clark Way and Wilbur Way is a drainage channel that runs westward to a rock-lined channel where there is a pipe drain. This drainage, which held standing water during the reconnaissance survey, is likely a modified channel of what was once a historical natural drain. The drainage channel is vegetated at Wilbur Way and near the drain but may be considered "other waters" where it

flows through blue oak woodland. The source of water is likely runoff from the airfields and airport property. Finally, a ditch on the east side following the edge of the annual grasslands was likely created to drain the airport property. This drainage ditch continues south out of the study area.

Increased runoff as a result of the addition of impervious surfaces at the airport has the potential to increase downstream flow and scouring. Construction and other operations associated with airport projects could potentially affect downstream water quality. To the extent feasible, the effects of increased runoff should be mitigated. All applicable Storm Water Pollution Prevention Plans should be observed to reduce short-term and long-term impacts to water quality and hydrology.

Cultural Resources

Historical, Architectural, Archaeological, and Cultural Resources

A records search was conducted by the North Central Information Center of the California Historical Resources Information System. The results of the search were summarized in a response letter dated March 18, 2005.

The report stated that three archaeological studies have been conducted on or adjacent to the airport property and that the airport contained three sites listed with the California Historical Resources Information System, a recorded Native American archaeological resource, and two historic-period cultural sites including a ditch and areas of mining refuse, tailing piles, and exploratory mining pits. No historic buildings or structures were documented within the airport property, however buildings, structures, and objects 45 years or older may be of historical value.

The report further states that Native Americans, identified as the Nisenan, inhabited Placer County prior to the arrival of foreign explorers and two contact-period villages have been reported just north of Auburn. Additionally, an 1865 GLO plot shows the "Road from Auburn" extending through what is now the southeastern corner of the airport property and a ditch through what is now the northern edge of the airport; this ditch is likely the same ditch that has been recorded.

The report concluded that:

> "Given the environmental setting, degree of development, and presence of known sites in the vicinity, there is a low-to-moderate potential for Native American sites in the project area.

> "Given the presence of these resources and the cultural features shown on the GLO plat, there is a moderate possibility of identifying historic-period archaeological deposits in the project area."

The proposed development projects included in the *Master Plan* will need to address cultural resources. The North Central Information Center recommends further archival and/or field studies to assess the potential for adverse impacts to cultural resources and they recommend that an architectural historian assess any properties over 45 years in age that will be affected by the projects. Additionally, should any cultural resources be encountered during project excavation or construction, the materials and their location should not be altered or moved until a cultural resource consultant has evaluated the situation.

Farmland

There are no expected impacts on local farm land.

Section 4(f) Lands

Section 4 (f) lands are those lands which are up for acquisition and which may consist of publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance. Since there is no land acquisition proposed in the *Master Plan*, Section 4 (f) is not of concern.

Land Use Compatibility

The primary policies defining criteria for land use compatibility around Auburn Municipal Airport are ones adopted by the Placer County Airport Land Use Commission (ALUC). These policies are set forth the ALUC's 2000 *Placer County Airport Land Use Compatibility Plan*.

CNEL Contour Calculations Inputs

- The number of operations by aircraft type or group.
- The distribution of operations by time of day for each aircraft type.
- The average takeoff profile and standard approach slope used by each aircraft type.
- The amount of noise transmitted by each aircraft type, measured at various distances from the aircraft.
- The runway system configuration and runway lengths.
- Runway utilization distribution by aircraft type and time of day.
- The geometry of common aircraft flight tracks.
- The distribution of operations for each flight track.

Noise

Noise is often described as unwanted or disruptive sound. Because of its routine, everyday occurrences, it is usually perceived as the most significant adverse impact of airport activity. This section evaluates the noise effects of implementation of the *Master Plan*.

In an attempt to provide a single measure of airport noise impacts, various cumulative noise level metric have been devised. The metric most commonly used in California is the Community Noise Equivalent Level (CNEL). The results of CNEL calculations are normally depicted by a series of contours representing points of equal noise exposure in 5 dB increments. Key factors involved in calculation CNEL contours are noted to the left.

Noise contours were prepared using the FAA's Integrated Noise Model (Version 6.1). The results are presented in Figures 5A and 5B. Figure 5A presents the noise contours for the current activity levels. Noise contours for 2025 are presented in Figure 5B. These contours assume that Runway 7-25 will not change. Noise model inputs are presented in Appendix A.

Federal guidelines suggest that all land uses are acceptable outside of the 65 dB CNEL contour. However, this standard was established with major metropolitan areas in mind. With Auburn's and Placer County's lower ambient noise levels, it is appropriate to consider noise effects outside of the 65 dB CNEL contour. Given its location in a suburban-rural setting, a 60 dB CNEL contour has been used. Also, this is the criterion established by the Placer County ALUC as the maximum noise exposure normally acceptable for new residential development near airports in the county.

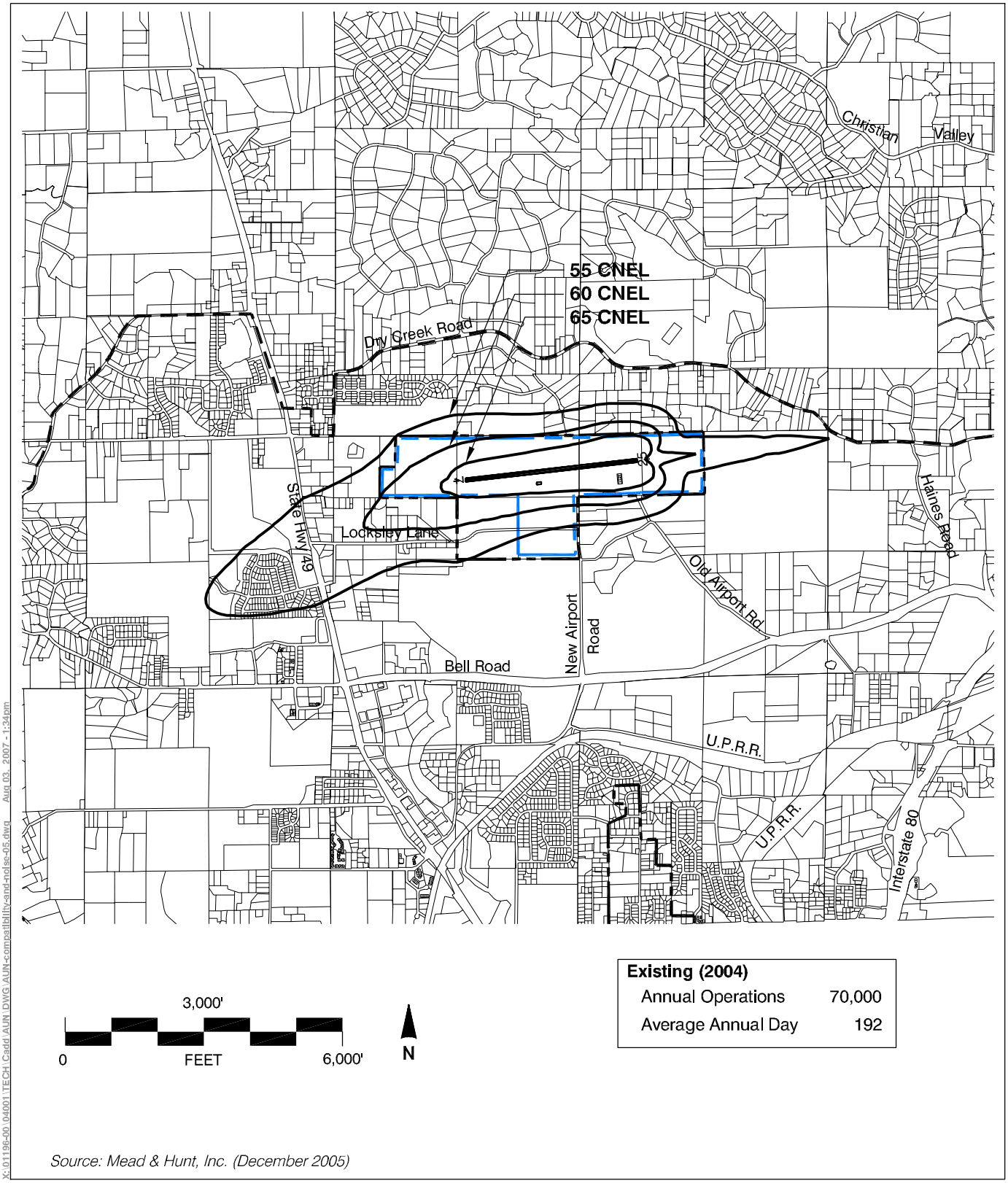
Currently all of the 65 dB CNEL contour and most of the 60 dB CNEL contour fall within airport property. There is a small segment of the 60 dB CNEL contour that extends about 1,200 feet outside of airport property southwest of the end of Runway 7.

Under the forecast assumption for 2025, the noise contours show modest expansion to the west and southwest. Most of the 60 and 65 dB CNEL contours remain within airport property. However, the forecast 60 dB CNEL contour will extend south across Locksley Lane and a small portion of State Highway 49 to the southwest. Several rural residential parcels will be encompassed by the 60 dB CNEL contour at the southwest end of the airport. The forecast 60 dB CNEL contour also extends 700 feet east of the end of Runway 25.

Other Land Use Compatibility Impacts

In addition to noise, other impacts generated by airport activity have the potential to affect surrounding land uses. Policies concerning these impacts are included in the ALUC's *Airport Land Use Compatibility Plan*.

- Foremost among these concerns is the risk of an aircraft accident. The *Master Plan* proposes no changes in the runway configuration that would accommodate different types of aircraft than now operate at the airport or otherwise shift the areas of risk. No changes in instrument approach procedures that might affect risks are proposed either.



Source: Mead & Hunt, Inc. (December 2005)

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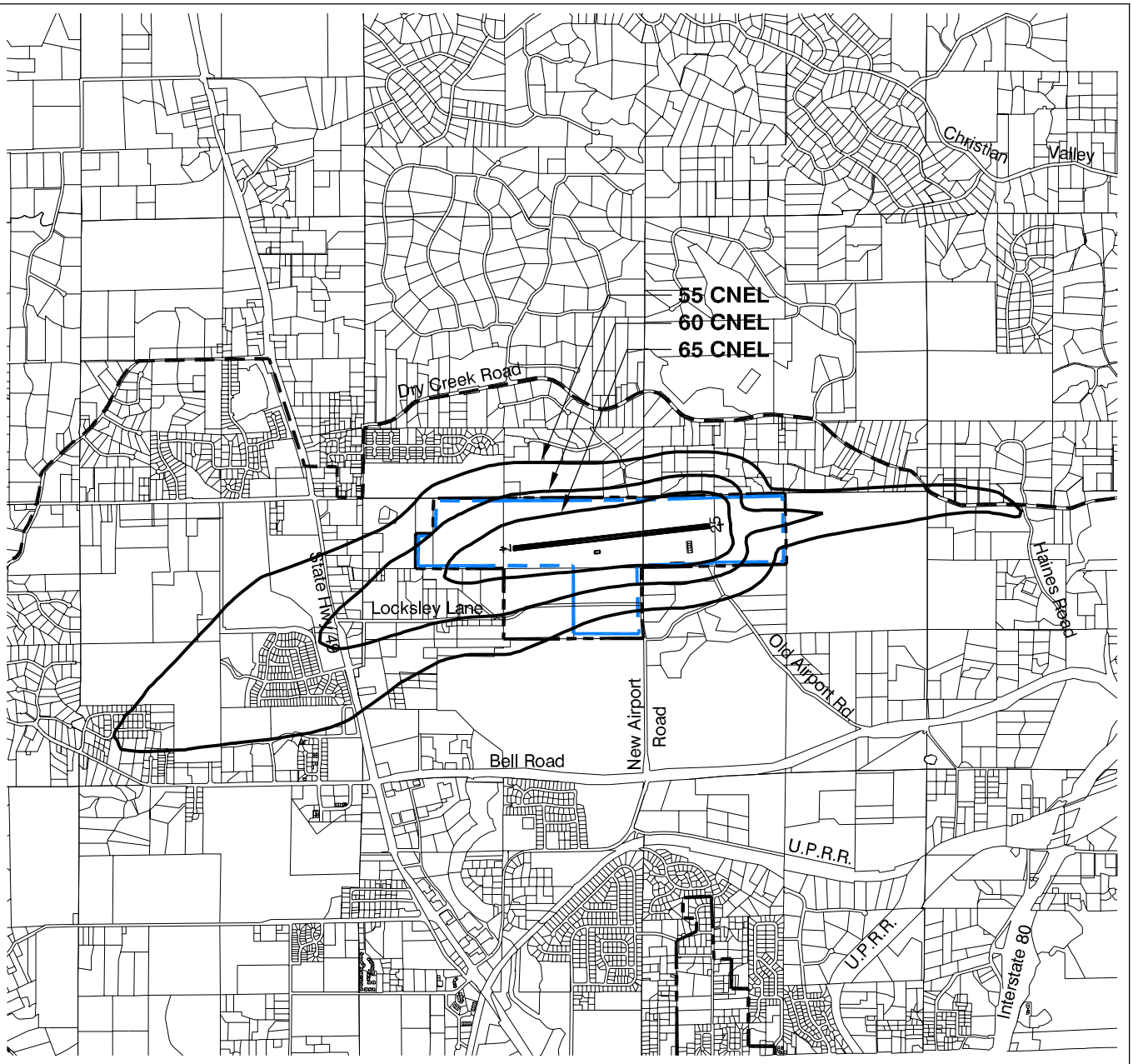
Figure 5A

Noise Impacts - Existing

Auburn Municipal Airport



Source: Mead & Hunt, Inc. (December 2005)

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Figure 5B

Noise Impacts - Future

Auburn Municipal Airport

- To protect airspace required for aircraft approaches and departures at an airport, limitations on the heights of nearby structures and trees are necessary. These airspace protection criteria are defined in accordance with Federal Aviation Regulations Part 77. As discussed in Chapter 3, the generally lower terrain near the airport minimizes the potential for airspace obstructions. Height limits of less than 35 feet are required in only a few small hilltop locations. None of the improvements proposed in the *Master Plan* would affect the location or extent of airspace-related height limitations.

FINANCIAL ISSUES

Funding Sources

The primary source of funding for most of the capital improvements recommended in this master plan is the Federal Aviation Administration. Limited funding is also available through the Aeronautics Account of the California State Transportation Fund. Additionally, City of Auburn and/or private funding will be required on all projects. Specific funding programs for airport improvement projects include the following.

Federal AIP Grants

Federal grants are currently available through the Airport Improvement Program (AIP). The current AIP legislation, *Vision 100 – Century of Aviation Reauthorization Act* was signed into law on December 13, 2003. The program will be funded at $3.4 billion in FY 2004, and will increase $100 million each year through FY 2007, when the annual allocation will be $3.7 billion.

AIP provides both entitlement funds and discretionary funds. Under Vision 100, the entitlement amount for general aviation airports is $150,000 per year through 2007. These entitlement funds can be used each year that they become available or they can be held up to two years for a larger project. The AIP program also allows for discretionary funding to be made available from the FAA to provide financial support for capacity and safety-related projects, as well as projects intended to keep the critical components of the airfield operational (e.g., runway/taxiway rehabilitation).

Projects that are eligible for FAA AIP funding are determined based on guidelines contained in FAA Order 5100.38, *Airport Improvement Handbook*. As a general rule, only airport projects that are related to non-revenue producing facilities, such as airfield con-

struction, public areas of a terminal, and land acquisition, have been eligible for federal funding. Vision 100, however, expanded eligibility for use of AIP funds to include construction of hangars, public terminals, and aviation fueling facilities, albeit at a relatively low priority level. Vision 100 increased the FAA's share of the costs for eligible projects. For general aviation airports in California, the FAA share is 95% through 2007. Beyond that time, it is scheduled to return to 90%.

State of California Aviation Program

The State of California operates an airport grant program similar in concept to the Federal AIP program. The state grant program is administered by the California Division of Aeronautics. All grants are awarded on a competitive basis. Grants are judged using a numerical weighting scheme. As with the Federal program, priority is given to projects that enhance safety. Due to substantial reduced revenue available to the state as of 2005, the state's overall airport funding program has been significantly impacted; however, funding is still available.

- **State Annual Grant**—General aviation airports are eligible to receive a $10,000 annual grant. These funds can be used for airfield maintenance and construction projects, as well as airfield and land use compatibility planning. Airports can accumulate these funds for up to five years. No local match is required for an Annual Grant.

- **AIP Matching Grants**—This state grant assists the airport sponsor in meeting the local match for AIP grants from the FAA. The state's AIP matching grant provides 5% of the federal share of eligible projects. Currently, with the federal share at 95%, the state will contribute 4.75%, leaving the airport sponsor's match at just 0.25% of the project amount.

- **Acquisition and Development Grants**—This state grant program is similar to the FAA's AIP in that an outright grant is offered for qualifying projects. The local match can vary from 10% to 50% of the project's cost. For the past 15 years, the local match rate has been 10%.

The California Division of Aeronautics also administers a revolving loan program called the State Loan Program. Loans are available to provide funds to match AIP grants to develop revenue – producing facilities (e.g., aircraft storage hangars and fuel facilities). The interest rate for such loans is very favorable and the payback period is between 8 and 17 years.

Other Grant Programs

Airport projects can also sometimes qualify for grant funding from nonaviation sources. Although not commonly available, airports have received grants from a variety of federal and state programs including; economic development, community development, and rural infrastructure. Airports are encouraged to seek out and qualify for these nonaviation funding programs where applicable.

Local/Airport Funds

At general aviation airports the size and character of Auburn Municipal Airport, airport sponsor self-funding is principally provided by a combination of airport-generated income and airport owner (municipal) funds. Funding of airport improvements that are not grant eligible and providing the local matching share for grants-in-aid from these sources are the simplest and often most economical methods because direct interest costs are eliminated.

Cost Estimates

The proposed 20-year capital improvement program for Auburn Municipal Airport is presented in Table 5A. Proposed improvements described in the preceding two chapters are included in the list together with major pavement maintenance work that will be necessary over the planning time frame. Costs are listed only for improvements to be sponsored by the city. Costs for hangar buildings, FBO facilities, and other development that are expected to be privately financed are not included.

The indicated costs are order-of-magnitude estimates in 2005 dollar values. Design engineering, construction inspection, and other related costs are included for each item and a contingency factor is added as well. The cost estimates are intended only for preliminary planning and programming purposes. Specific project analyses and detailed engineering design will be required at the time of project implementation to provide more refined and up-to-date estimates of the individual project costs.

Projects listed in Table 5A are grouped into four phases of development:

- Short range (within 5 years);
- Mid range (approximately 6 to 10 years);
- Long range (10 to 20 years); and
- Extended long range (beyond 20 years).

Figure 5C depicts the location of each of the proposed major improvements and the anticipated time frame of construction. The timing indicated is based upon the forecasts presented in Chapter 2. It is important to emphasize, though, that the general sequence of development indicated in the capital improvement program is more significant than the precise timing. The actual timing of major improvements will be driven by demand, not by the calendar. If the growth rate of projected aviation activity is not realized, then each phase of development would extend over additional years. On the other hand, demands for construction of certain facilities could arise more quickly than the staging plan anticipates.

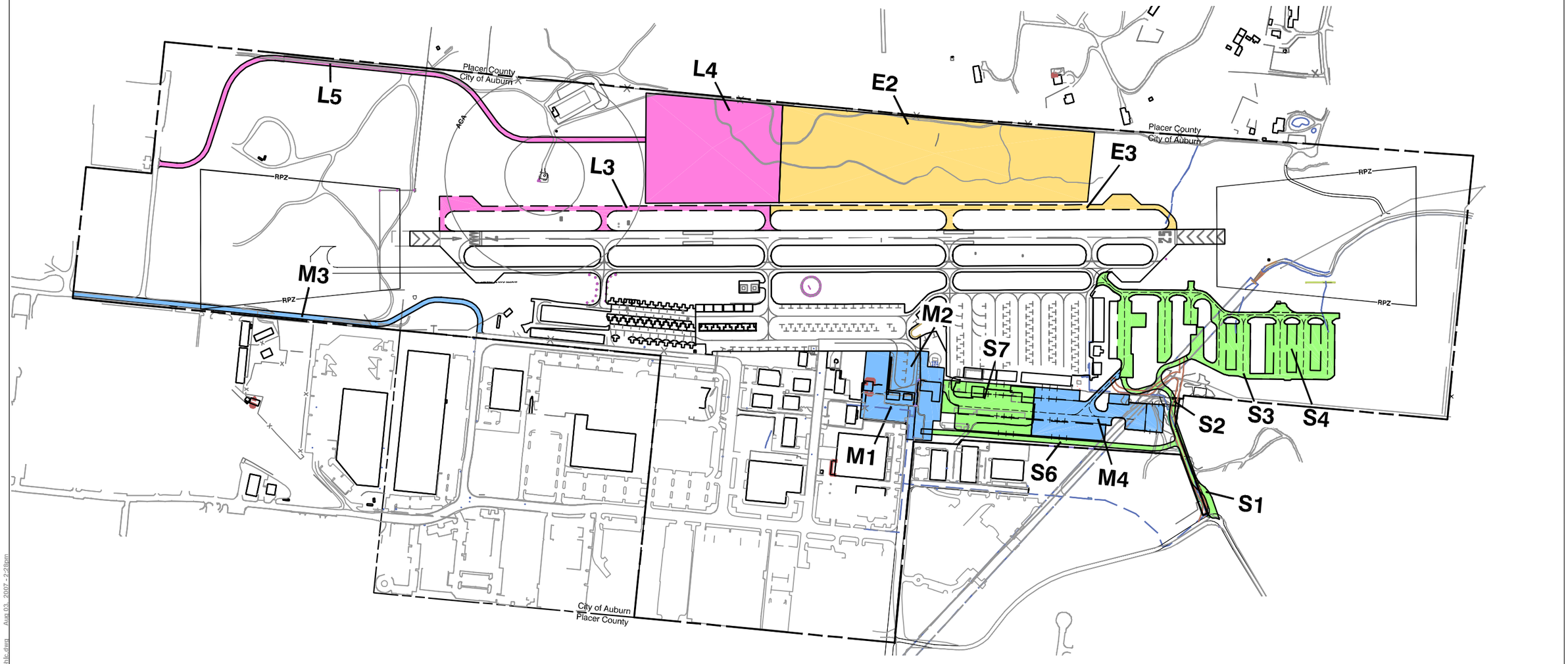
		Estimated Costs (in 2005 dollars)		
		Total	**Federal**	**City**
Short-Range Projects (within 5 years)				
S1	Acquire property for east hangar area access road	$100,000	$95,000	$5,000
S2	Construct east end access road; install fencing and gate	$400,000	$380,000	$20,000
S3	Pave hangar taxilanes	$1,600,000	$1,520,000	$80,000
S4	Construct east hangars (city-owned hangars only)	$2,500,000	$2,375,000	$125,000
S5	Install south-side fencing and access gates	$100,000	$95,000	$5,000
S6	Construct southeast public access road	$550,000	$522,500	$27,500
S7	Redevelop southeast apron area	$450,000	$427,500	$22,500
S8	Pavement maintenance	$400,000	$380,000	$20,000
	Subtotal	*$6,100,000*	*$5,795,000*	*$305,000*
Mid-Range Projects (6 to 10 years)				
M1	Redevelop core area – Phase 1	$750,000	$712,500	$37,500
M2	Construct administration building – Phase 1	$2,000,000	$1,900,000	$100,000
M3	Improve and extend Shale Ridge Lane	$250,000	$237,500	$12,500
M4	Extend southeast apron	$500,000	$475,000	$25,000
M5	Pavement maintenance	$700,000	$665,000	$35,000
	Subtotal	*$4,200,000*	*$3,990,000*	*$210,000*
Long-Range Projects (11 to 20 years)				
L1	Redevelop core area – Phase 2	$250,000	$237,500	$12,500
L2	Construct administration building – Phase 2	$1,500,000	$1,425,000	$75,000
L3	Construct north-side parallel taxiway – Phase 1	$1,000,000	$950,000	$50,000
L4	Prepare north-side development area sites – Phase 1	$1,200,000	$1,140,000	$60,000
L5	Construct north-side access road	$650,000	$617,500	$32,500
L6	Pavement maintenance	$1,000,000	$950,000	$50,000
	Subtotal	*$5,600,000*	*$5,320,000*	*$280,000*
Extended Long-Range Projects (beyond 20 years)				
E1	Construct north-side parallel taxiway – Phase 2	$800,000	$760,000	$40,000
E2	Prepare north-side development area sites – Phase 2	$800,000	$760,000	$40,000
	Subtotal	$1,600,000	$1,520,000	$80,000
	TOTAL	***$17,500,000***	***$16,625,000***	***$875,000***

Notes:
1. Federal share assumed to remain at 95% throughout the planning period; all listed projects are currently grant eligible.
2. Most projects listed are eligible for state share equal to 5% of federal share, but state participation is dependent upon state funding availability and project prioritization.
3. Projects within each time range are not necessarily in priority order.
4. Privately funded projects (e.g., hangar construction) not listed.

Table 5A

Capital Improvement Program

Auburn Municipal Airport



Source: Mead & Hunt, Inc. (April 2006)

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Figure 5C

Proposed Major Improvements

Auburn Municipal Airport

		Estimated Costs (in 2005 dollars)		
		Total	**Federal**	**City**
Short-Range Projects (within 5 years)				
S1	Acquire property for east hangar area access road	$100,000	$95,000	$5,000
S2	Construct east end access road; install fencing and gate	$400,000	$380,000	$20,000
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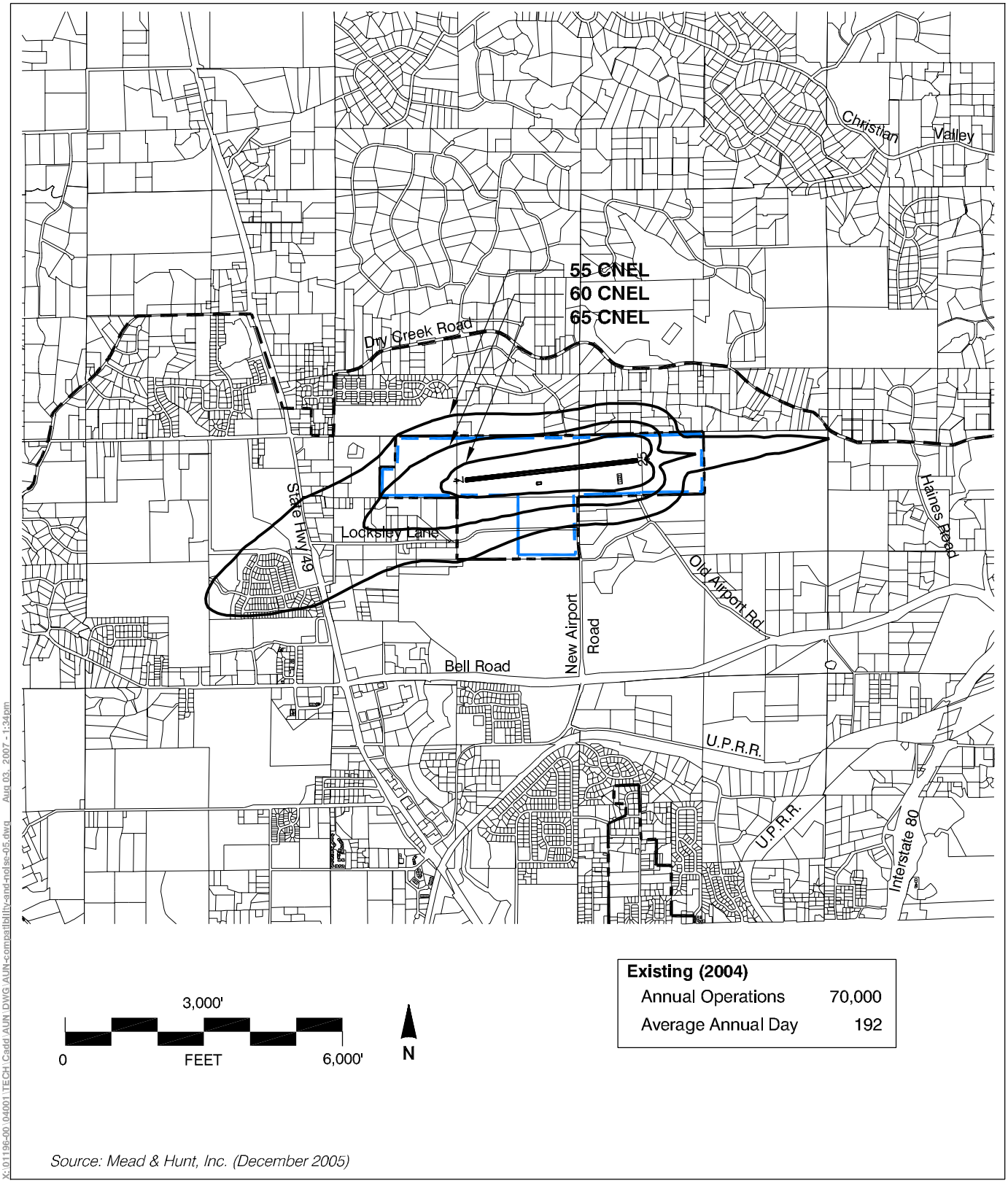

Source: Mead & Hunt, Inc. (December 2005)

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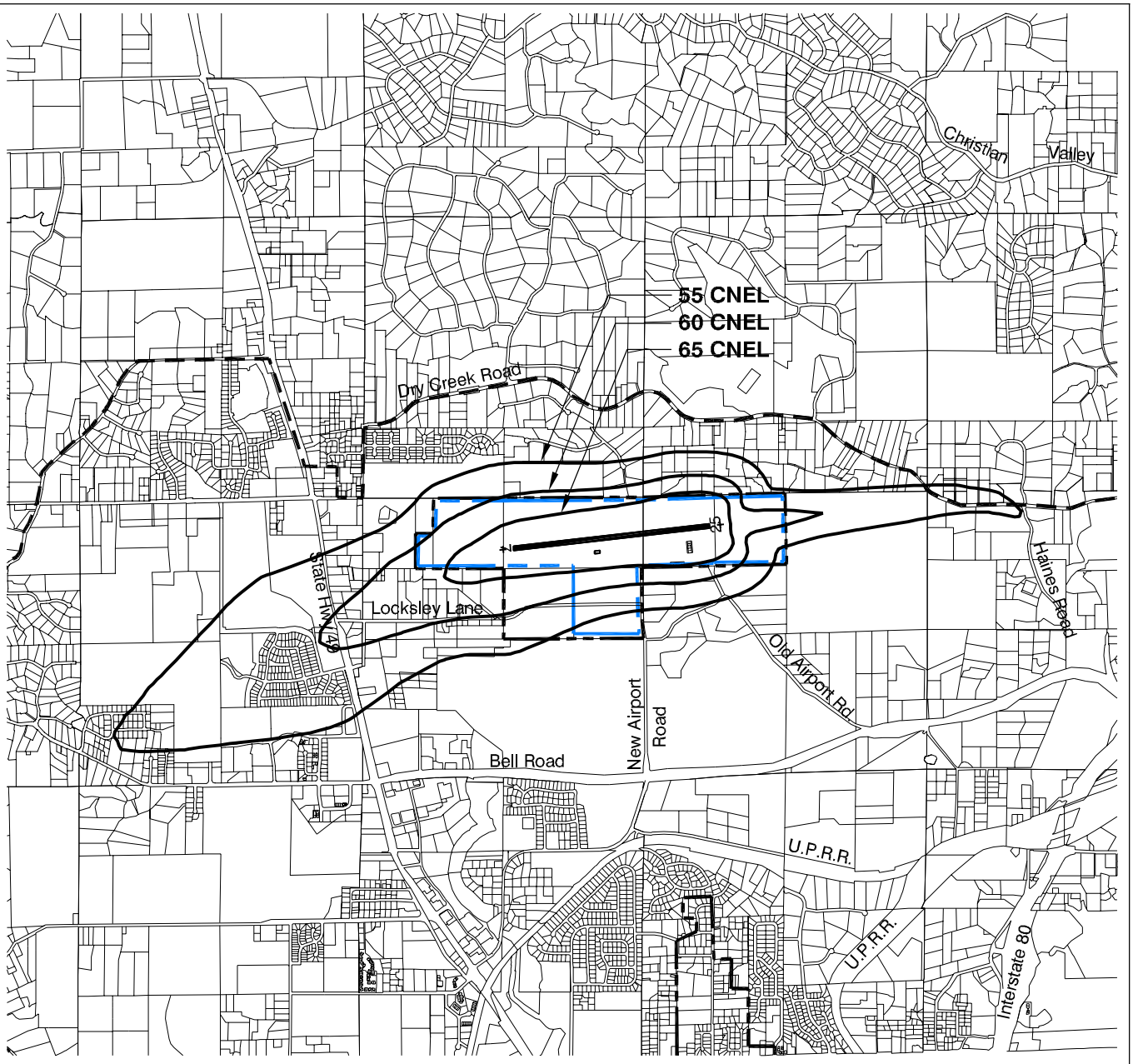
Figure 5A

Noise Impacts - Existing

Auburn Municipal Airport



Source: Mead & Hunt, Inc. (December 2005)

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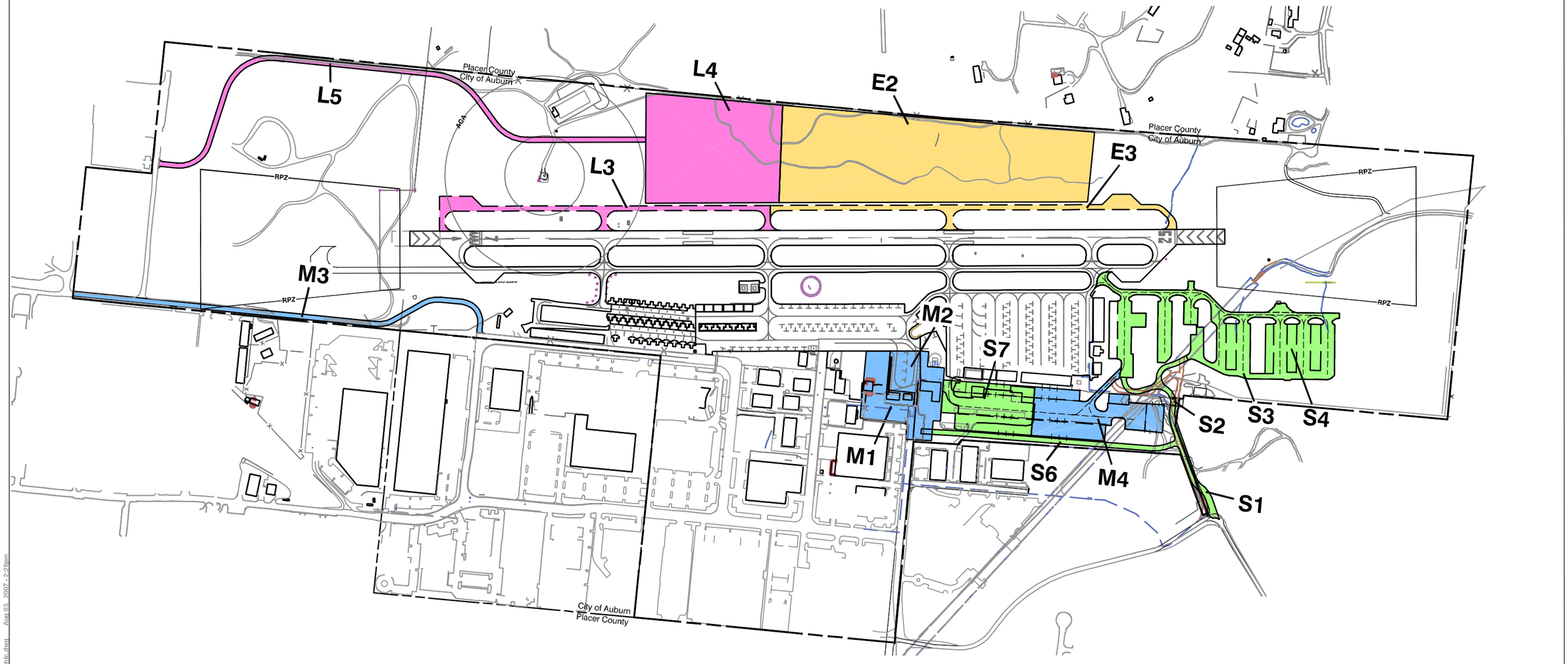
Figure 5B

Noise Impacts - Future

Auburn Municipal Airport



Source: Mead & Hunt, Inc. (April 2006)

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Figure 5C

Proposed Major Improvements

Auburn Municipal Airport

Appendices

Noise Model Calculation Data

Auburn Municipal Airport

AIRCRAFT MIX (Estimated 2004 Activity Level)			
Aircraft Type	*Total Operations*		
	Annual	*Average Day*	*Percentage*
Single-Engine, Propeller, Fixed Pitch	37,000	101.37	52.86%
Single-Engine, Propeller, Variable Pitch	24,850	68.08	35.50%
Twin-Engine, Propeller, Piston	5,000	13.70	7.14%
Twin-Engine, Turboprop	2,000	5.48	2.86%
Small Business Jet (e.g., Lear)	150	0.41	0.21%
Helicopter	1,000	2.74	1.43%
Total	70,000	191.78	100.00%

AIRCRAFT MIX (Forecast 2024 Activity Level)			
Aircraft Type	*Total Operations*		
	Annual	*Average Day*	*Percentage*
Single-Engine, Propeller, Fixed Pitch	52,000	142.47	50.00%
Single-Engine, Propeller, Variable Pitch	33,850	92.74	32.55%
Twin-Engine, Propeller, Piston	11,000	30.14	10.58%
Twin-Engine, Turboprop	4,000	10.96	3.85%
Small Business Jet (e.g., Lear)	500	1.37	0.48%
Helicopter	2,650	7.26	2.55%
Total	104,000	284.93	100.00%

TIME OF DAY
(Estimated 2004 and 2024)

Aircraft Type		*Percentage of Operations by Aircraft Type*		
		Day 7:00 a.m. 7:00 p.m.	*Evening 7:00 p.m. 10:00 p.m.*	*Night 10:00 p.m. 7:00 a.m.*
Single-Engine, Propeller, Fixed Pitch	Takeoff	90.0	8.0	2.0
	Landing	90.0	8.0	2.0
	Touch-and-go	100.0	--	--
Single-Engine, Propeller, Variable Pitch	Takeoff	90.0	8.0	2.0
	Landing	90.0	8.0	2.0
	Touch-and-go	100.0	--	--
Twin-Engine, Propeller, Piston	Takeoff	90.0	8.0	2.0
	Landing	90.0	8.0	2.0
	Touch-and-go	100.0	--	--
Twin-Engine, Turboprop	Takeoff	90.0	8.0	2.0
	Landing	90.0	8.0	2.0
	Touch-and-go	100.0	--	--
Small Business Jet (e.g., Lear)	Takeoff	90.0	8.0	2.0
	Landing	90.0	8.0	2.0
	Touch-and-go	100.0	--	--
Helicopter	Takeoff	90.0	8.0	2.0
	Landing	90.0	8.0	2.0
	Touch-and-go	100.0	--	--

RUNWAY UTILIZATION
(Estimated 2004 and 2024)

Aircraft Type		*Percentage of Takeoffs*		*Percentage of Landings*		*Percentage of Touch-and-go*	
		Runway 07	*Runway 25*	*Runway 07*	*Runway 25*	*Runway 07*	*Runway 25*
All Aircraft	Day	10.0	90.0	10.0	90.0	10.0	90.0
	Evening	5.0	95.0	50.0	50.0	--	--
	Night	5.0	95.0	50.0	50.0	--	--

FLIGHT TRACKS
(Estimated 2004 and 2024)

Aircraft Type	*Percentage of Track Usage by Runway*					
	Takeoffs		*Landings*		*Touch-and-go*	
	Runway 07	*Runway 25*	*Runway 07*	*Runway 25*	*Runway 07*	*Runway 25*
	Straight Out	*20° Left Turn*	*Straight In*	*Left Turn*	*Left Turn*	*Left Turn*
All Aircraft	100.0	100.0	100.0	100.0	100.0	100.0

Source: Mead & Hunt, Inc. (December, 2005)

Appendix **B**

Biological Survey

Auburn Municipal Airport

Prepared by

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TABLE OF CONTENTS

Biological Survey

AUBURN MUNICIPAL AIRPORT EXPANSION PROJECT

Biological Survey

This biological survey identifies the biological resources (wetlands, habitats, vegetation, and wildlife) present within the Auburn Municipal Airport property (airport) that may be affected by the proposed developments. Environmental Science Associates (ESA) conducted a reconnaissance-level field survey for biological resources including special-status species, wetlands and jurisdictional waters, and vegetation communities/wildlife habitats within specific study areas identified by the client (Figure 1) as well as the adjacent habitats. ESA biologist Sara Lee and botanist Joshua Boldt surveyed the study areas on July 27, 2005. Based on the information collected, ESA identified specific biological features that may be encountered by site development. These features are described in this memorandum.

Methods

ESA biologists surveyed the study areas and surrounding areas to identify potential habitat for special-status plant and animal species, as well as sensitive or protected vegetative and wetland communities as defined by the California Native Plant Society (CNPS), U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game, and U.S. Army Corps of Engineers (Corps). Before the field survey, literature and databases (including the California Natural Diversity Database [CNDDB]) for the region were reviewed to identify which biological resources would likely be encountered. Species characteristics and habitat requirements were also reviewed to aid in the field recognition of suitable habitats and visual identification. ESA biologists conducted the surveys on foot, walking meandering transects through the identified study areas. Vegetative communities and potentially jurisdictional wetlands and waterways were delineated on a map scaled at 1 inch equals 300 feet, provided by the client. A list of all plant species encountered during the reconnaissance-level survey is included in Appendix A.

The determination of habitat suitability and possible species occurrence are based on this reconnaissance-level assessment of plant communities, the potential for these communities to support identified species, and information gleaned from the CNDDB (see Special-Status Species section below). Focused surveys for special-status species were not conducted at this time, and no special-status species were observed on the site.

Plant Communities and Wildlife Habitats

Plant communities are assemblages of plant species that occur together in the same area. They are defined by species composition and relative abundance. The vegetative community descriptions and nomenclature generally follows the classification system provided in Sawyer and Keeler-Wolf's *A Manual of California Vegetation* (1995). The study areas include several vegetation habitat types, but are dominated by two types: California annual grassland and blue oak woodland. Other plant communities in the study areas include cattail series in a swale and deerbrush series in the chaparral **(**Figure 2). These plant communities can be generally correlated to habitats for wildlife. The descriptions of the wildlife habitats identified in this section are derived from the California Department of Fish and Game's (CDFG) A Guide to Wildlife Habitats (Mayer and Laudenslayer, 1988). Photos of the habitats in the project area are shown on Figures 3, 4, and 5.

California Annual Grassland

Valley and foothill grassland includes areas dominated mostly by non-native Mediterranean annual grasses such as wild oats (*Avena barbata, A. fatua*) and ripgut brome (*Bromus diandrus*). The study areas' grasslands show signs of having been previously disturbed and are primarily composed of ruderal, nonnative species. Yellow star-thistle (*Centaurea solstitialis*) is particularly dominant in the grasslands south of the airfield and in those west of the runway. A few lone hoary coffeeberry shrubs (*Rhamnus tomentella*) suggest that the grassland was previously part of the blue oak woodland community. The annual grassland community occurs in the undeveloped study areas just south of the airfield on the east side of the airport, in a large area west of the runway, along the runway to the north, and in small patches surrounded by developed areas.

California annual grassland provides foraging and breeding habitat for many wildlife species. Grasslands are important foraging grounds for insectivores and seed-collecting mammals such as the California ground squirrel (*Spermophilus beecheyi*), California vole (*Microtus californicus*), and black-tailed jackrabbit (*Lepus californicus*). Only the black-tailed jackrabbit was observed during the site reconnaissance. Very few burrows were observed in the study areas. A variety of birds may also use the annual grassland for foraging, including aerial insect foragers, seed foragers, and raptors preying on small rodents. Because this plant community is relatively dry, few amphibian species are likely to inhabit it during the summer. The grassland also may provide suitable shelter, basking sites, and foraging habitat for reptiles such as western rattlesnake (*Crotalus viridis*), Pacific gopher snake (*Pituophis melanoleucus catenifer*), and western fence lizard (*Sceloporus occidentalis*).

SOURCE: GlobeXplorer, 2005; and ESA, 2005

Auburn Municipal Airport Expansion Project . 205094

Figure 1

Study Areas within the Project Area

SOURCE: GlobeXplorer, 2005; and ESA, 2005

Auburn Municipal Airport Expansion Project . 205094

Figure 2

Habitats in the Project Area

Yellow star-thistle in annual grassland in Study Area C.

Seasonal wetland in annual grassland in Study Area C. The wetland is located at the base of an earthen berm.

SOURCE: ESA, 2005

Auburn Municipal Airport Expansion Project . 205094

Figure 3
Site Photographs

Freshwater emergent wetland at end of drainage, just outside of Study Area A.

Blue oak woodland in Study Area A, adjacent to a developed road.

SOURCE: ESA, 2005

Auburn Municipal Airport Expansion Project . 205094

Figure 4
Site Photographs

Vernal swale in Study Area B, adjacent to the existing runway.

Developed area in Study Area C. Small patches of annual grassland and oaks are interspersed between buildings.

SOURCE: ESA, 2005

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Figure 5
Site Photographs

Blue Oak Woodland

Blue oak woodland is dominated mostly by blue oak (*Quercus douglasii*), although the structure, associated species, and understory composition may vary. Herbaceous species on the ground are mostly annual grasses and forbs such as brome, wild oats, foxtail, needlegrass, and filaree. The blue oak woodlands in the study areas are mixed with some interior live oak (*Quercus wizlizeni*) and foothill pine (*Pinus sabiniana*) in the canopy; common manzanita (*Arctostaphylos manzanita*), hoary coffeeberry, and poison oak (*Toxicodendron diversiloba*) in the shrub layer; and weedy annual grasses in the ground layer. Blue oak woodland occurs in several places in the study areas, the largest at the northwest corner of the airport. Other small stands of blue oak woodland occur in clumps with valley oak along the southeast boundary and with live oak and foothill pine along the southwest boundary of the airport. There are several large oak trees in the study areas, some with a trunk diameter greater than 30 inches and even one valley oak at nearly 60 inches.

Oak woodland provides foraging and breeding habitat for many wildlife species. Detailed information on wildlife and habitat relationships specific to blue oak woodland is limited, but one study shows that blue oak savannahs are used most by bird species, then amphibians and reptiles, and finally mammals. During the site reconnaissance, several signs of wild turkey (*Meleagris gallopavo*) were noted.

Deerbrush Chaparral

Chaparral occurs on low- to mid-elevation slopes below various types of woodland or forest. Chaparral is characterized by shrubs with thick, stiff, and waxy evergreen leaves. The chaparral in the study areas is dominated by sparsely distributed deerbrush and a ground cover of annual grasses and forbs. There are no wildlife species that are restricted to this plant community. In fact, other types of shrub communities such as Coastal Scrub or Montane Chaparral are more likely to support more wildlife. The deerbrush chaparral may provide limited cover for some lizards, snakes, jackrabbits, and various birds that also use the adjacent grassland or oak woodland. Deerbrush chaparral is limited to a portion of the northern study area of the airport.

Wetlands and Drainages

Wetlands are ecologically complex habitats that support a variety of both plant and animal life. Examples of wetlands include salt marsh, seasonal wetlands, and brackish marsh complexes that have a hydrologic link to other waters of the U.S. Examples of other waters of the U.S. include rivers, creeks, intermittent and ephemeral channels, ponds, and lakes.

While a formal wetland delineation was not performed for this report, potential wetland features on the project site were assessed on July 27, 2005, by ESA biologist Sara Lee and botanist Joshua Boldt. These include seasonal wetlands, vernal swales, roadside drainages, and freshwater emergent wetland in portions of a drainage channel (Figure 2). All conclusions presented are the

results of the preliminary delineation and are subject to change, pending a formal wetland delineation of the site and the Corps' official review and final determination.

Drainages

Alongside a road perpendicular to Shale Ridge Lane (west end of airport) is a ditch that runs north from Shale Ridge Lane and briefly turns east into the blue oak woodland. Another roadside ditch follows along the northern edge of the airport property. There was no water in these ditches during the site visit in late July. Upland species dominated the vegetation in the ditches. Near the intersection of Bill Clark Way and Wilbur Way is a drainage channel that runs westward to a rock-lined channel where there is a pipe drain. This drainage, which held standing water during the reconnaissance survey, is likely a modified channel of what was once a historical natural drain. The drainage channel is vegetated at Wilbur Way and near the drain but may be considered "other waters" where it flows through blue oak woodland. The source of water is likely runoff from the airfields and airport property. Finally, a ditch on the east side following the edge of the annual grassland was likely created to drain the airport property. This drainage ditch continues south out of the study area.

Wetlands

Potential wetlands within the project site are characterized as seasonal wetland, vernal swale, and freshwater emergent wetland. The seasonal wetland lies against an earthen berm in a low area in the annual grassland on the east side of the airport. Water likely drains from the upland grassland areas, flows along this berm, and collects in the low spot, forming the seasonal wetland. There was no water in the wetland at the time of the survey, but remnants of wetland vegetation were identified and include Great Valley button-celery, nutsedge (*Cyperus eragrostis*), and curly dock (*Rumex crispus*). The two vernal swales are in the study area north of the runways. One swale runs almost north-south along a natural contour and collects water from the surrounding uplands. The other runs east-west along a slope that drains the runway. Both swales support vegetation associated with wet areas, such as rabbitsfoot grass (*Polypogon monspeliensis*), rush (*Juncus* sp.), and arroyo willow (*Salix lasiolepis*). Finally, the freshwater emergent wetland occurs in parts of the drainage channel on the south end of the airport. Just north of Wilbur Way and Bill Clark Way, a wetland supports cattail, iris-leaved rush (*Juncus xiphioides*), water cress (*Rorippa nasturtium-aquaticum*), and common knotweed (*Polygonum arenastrum*). Further west in the channel, just beyond the oaks, there are more cattails as well as Himalayan blackberry (*Rubus discolor*) and arroyo willow.

Special-Status Species

Special-status species are those plants and animals recognized by federal, state, or other agencies because of their recognized rarity or vulnerability to various causes of habitat loss or population decline. A list of special-status plant and animal species that may occur in the vicinity of the project site was compiled, based on data in the CNDDB (CDFG, 2005), the CNPS Inventory of

Rare and Endangered Plants database (CNPS, 2005), and the USFWS list of federal endangered and threatened species that may be affected by projects in the Auburn, California 7½-minute quad (USFWS, 2005). Conclusions regarding habitat suitability and species occurrence are based on a reconnaissance-level area assessment as well as information from the CNDDB. Focused surveys for special-status species were not conducted; however, no special-status species were observed during the site visit. Appendix B lists special-status plants and animals with the potential to occur within the project site. The following species have a medium to high potential (see Appendix B for definitions) to occur within the project area and should be considered in further development planning:

- Burrowing owl (*Athene cunicularia*)
- Oak titmouse (*Baeolophus inornatus*)
- Lawrence's goldfinch (*Carduelis lawrencei*)
- White-tailed kite (*Elanus leucurus*)
- Loggerhead shrike (*Lanius ludovicianus*)
- Lewis' woodpecker (*Melanerpes lewis*)
- Nuttall's woodpecker (*Picoides nuttallii*)
- Big-scale balsamroot (*Balsamorhiza macrolepis var. macrolepis*)
- Brandegee's clarkia (*Clarkia biloba* ssp. *brandegee*)
- Butte County fritillary (*Fritillaria eastwoodiae*)
- Dubious pea (*Lathyrus sulphureus* var. *argillaceus*)
- Oval-leaved viburnum (*Viburnum ellipticum*)

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Appendix A
Plants Observed During Reconnaissance Survey

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APPENDIX A

Plants Observed During Reconnaissance Survey

VASCULAR FLORA RECORDED FROM AUBURN AIRPORT PROJECT SITE (TAXOMONY FOLLOWS JEPSON [1993], AS UPDATED ON JEPSON ONLINE INTERCHANGE [2005])

Scientific Name	Common Name
Division Coniferophyta	
Pinaceae	**Pine Family**
Pinus ponderosa	Ponderosa pine
Pinus sabiniana	Foothill pine
Pinus sylvestris	Scotch pine
Division Anthophyta	
Class Dicotyledones	
Anacardiaceae	**Cashew Family**
Toxicodendron diversilobum	Poison oak
Apiaceae	**Carrot Family**
Eryngium castrense	Great Valley button-celery
Torilis arvensis	Field hedge-parsley
Apocynaceae	**Dogbane Family**
Nerium oleander	Oleander
Asteraceae	**Sunflower Family**
Achillea millefolium	Yarrow
Baccharis pilularis	Coyote brush
Carduus pycnocephalus	Italian thistle
Centaurea solstitialis	Yellow star-thistle
Centromadia fitchii	Fitch's tarweed
Chamomilla suaveolens	Pineapple weed
Cirsium vulgare	Bull thistle
Conyza canadensis	Horseweed
Gnaphalium luteo-album	Cudweed
Grindelia camporum	Common gumplant
Holocarpha virgata ssp. *virgata*	Narrow tarplant
Hypochaeris glabra	Smooth cat's ear
Hypochaeris radicata	Rough cat's ear
Lactuca serriola	Prickly lettuce
Picris echliodes	Bristly ox-tongue
Senecio vulgaris	Common groundsel
Sonchus asper ssp. *asper*	Prickly sow thistle
Taraxacum officinale	Dandelion
Brassicaceae	**Mustard Family**
Brassica nigra	Black mustard
Rorippa nasturtium-aquaticum	Water cress
Cactaceae	**Cactus Family**
Optunia sp.	Prickly-pear
Caryophyllaceae	**Pink Family**
Cerastium arvense	Field chickweed
Cerastium glomeratum	Mouse-ear chickweed
Silene gallica	Windmill pink
Convolvulaceae	**Morning-glory Family**
Convolvulus arvensis	Field bindweed

VASCULAR FLORA RECORDED FROM AUBURN AIRPORT PROJECT SITE (TAXOMONY FOLLOWS JEPSON [1993], AS UPDATED ON JEPSON ONLINE INTERCHANGE [2005])

Scientific Name	Common Name
Ericaceae	**Heath Family**
Arctostaphylos manzanita	Common manzanita
Euphorbiaceae	**Spurge Family**
Chamaesyce maculata	Spotted spurge
Eremocarpus setigerus	Turkey mullein
Fabaceae	**Legume Family**
Acacia sp.	Acacia
Lotus purshianus var. purshianus	Spanish clover
Medicago polymorpha	California burclover
Melilotus indica	Sourclover
Trifolium fragiferum	Strawberry clover
Trifolium wildenovii	Tomcat clover
Trifolium sp.	Clover
Vicia sativa ssp. *nigra*	Common vetch
Fagaceae	**Oak Family**
Quercus douglasii	Blue oak
Quercus lobata	Valley oak
Quercus wislizeni	Interior live oak
Geraniaceae	**Geranium Family**
Erodium botrys	Broadleaf filaree
Erodium cicutarium	Red-stemmed filaree
Geranium dissectum	Common wild geranium
Hypericaceae	**St. John's Wort Family**
Hypericum perforatum	Klamathweed
Lamiaceae	**Mint Family**
Trichostema lanceolatum	Vinegar weed
Lythraceae	**Loosestrife Family**
Lythrum hyssopifolium	Hyssop loosestrife
Moraceae	**Mulberry Family**
Morus alba	White mulberry
Plantaginaceae	**Plantain Family**
Plantago lanceolata	English plantain
Polemoniaceae	**Phlox Family**
Gilia tricolor	Tricolor gilia
Polygonaceae	**Buckwheat Family**
Polygonum arenastrum	Common knotweed
Rumex crispus	Curly dock
Primulaceae	**Primrose Family**
Anagallis arvensis	Scarlet pimpernel
Rhamnaceae	**Buckthorn Family**
Ceanothus cuneatus var. *cuneatus*	Buck brush
Rhamnus tomentella	Hoary coffeeberry
Rosaceae	**Rose Family**
Cercocarpus betuloides var. *betuloides*	Birch-leaf mountain-mahogany
Heteromeles arbutifolia	Toyon
Rubus discolor	Himalyan blackberry
Rubiaceae	**Madder Family**
Galium aparine	Goose grass
Galium porrigens	Climbing bedstraw
Salicaceae	**Willow Family**
Salix lasiolepis	Arroyo willow
Viscaceae	**Mistletoe Family**
Phoradendron villosum	Oak mistletoe
Class Monocotyledones	
Cyperaceae	**Sedge Family**
Cyperus eragrostis	Nutsedge
Juncaceae	**Rush Family**
Juncus xiphioides	Iris-leaved rush
Liliaceae	**Lily Family**
Brodiaea elegans	Harvest brodiaea

VASCULAR FLORA RECORDED FROM AUBURN AIRPORT PROJECT SITE (TAXOMONY FOLLOWS JEPSON [1993], AS UPDATED ON JEPSON ONLINE INTERCHANGE [2005])

Scientific Name	Common Name
Poaceae	**Grass Family**
Aegilops triuncialis	Barbed goatgrass
Aira caryophyllea	Annual hairgrass
Avena fatua	Wild oat
Briza minor	Little quaking grass
Bromus diandrus	Ripgut brome
Bromus hordeaceous	Soft brome
Cynodon dactylon	Bermuda grass
Cynosurus echinatus	Hedgehog dogtail
Elymus glaucus	Blue wildrye
Hordeum marinum var. *gussoneanum*	Mediterranean barley
Hordeum murinum var. *leporinum*	Hare barley
Lolium multiflorum	Italian ryegrass
Lolium perenne	Perennial ryegrass
Poa annua	Annual bluegrass
Polypogon monspeliensis	Annual beard grass
Taeniatherum caput-medusae	Medusahead
Vulpia bromoides	Brome fescue
Vulpia myuros var. *myuros*	Rattail fescue
Typhaceae	**Cattail Family**
Typha latifolia	Broad-leaved cattail

Appendix B
Special-Status Species That May Occur Within the Project Area

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APPENDIX B

Special-Status Species That May Occur Within the Project Area

The "Potential for Occurrence" category is defined as follows:

- **Unlikely:** The project site and/or immediate area do not support suitable habitat for a particular species. Project site is outside of the species known range.
- **Low Potential:** Project site and/or immediate area only provide limited habitat for a particular species. In addition, the known range for a particular species may be outside of the immediate project area.
- **Medium Potential:** The project site and/or immediate area provide suitable habitat for a particular species.
- **High Potential:** The project site and/or immediate area provide ideal habitat conditions for a particular species and/or known populations occur in immediate the area.

Species that have a medium or high potential to be impacted by the proposed project are shown in **boldface** type.

LIST OF POTENTIALLY AFFECTED SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA

Species	Federal/ State/CNPS Status	General Habitat	Potential for Occurrence
Federal or State Listed, Proposed, and Candidate Species			
Birds			
Falco peregrinus anatum American peregrine falcon (nesting)	FD/SE/--	Breeds on high cliffs, banks, and human-made structures near wetlands, lakes, rivers, or other sources of water.	None - No habitat exists for this species in the project area.
Haliaeetus leucocephalus Bald eagle (nesting and wintering)	FT-FPD/SE/--	Nests in large trees with open branches along lake and river margins, usually within one mile of water.	None - No habitat exists for this species in the project area.
Riparia riparia Bank swallow	FSC/ST/--	Banks of rivers, creeks, lakes and seashores; nests in excavated dirt tunnels near the top of steep banks.	None - No habitat exists for this species in the project area.
Amphibians			
Rana aurora draytonii California red-legged frog	FT/CSC/--	Breeds in slow-moving streams, ponds, and marshes with emergent vegetation.	Unlikely – no breeding habitat exists for this species and there are no known occurrences within

LIST OF POTENTIALLY AFFECTED SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA

Species	Federal/ State/CNPS Status	General Habitat	Potential for Occurrence
			10 miles of the project area. The nearest known occurrence is approximately 18 miles east of the project area.
Fish			
Acipenser medirostris Green sturgeon	FC/CSC/--	Spawn in the Sacramento River and the Klamath River. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock.	None - No habitat exists for this species in the project area.
Hypomesus transpacificus Delta smelt	FT/ST/--	Delta estuaries with dense aquatic vegetation and low occurrence of predators. May be affected by downstream sedimentation.	None - No habitat exists for this species in the project area.
Oncorhynchus mykiss Central Valley steelhead	FT/--/--	Spawns in Sacramento River and tributaries where gravelly substrate and shaded riparian habitat occurs.	None – No habitat exists for this species in the project area.
Oncorhynchus tshawytscha Central Valley fall/late fall-run chinook salmon	FC/CSC/--	This population occurs in the Sacramento and San Joaquin Rivers and their tributaries, and spawns in cool flowing water with suitably sized cobble.	None – No habitat exists for this species in the project area.
Oncorhynchus tshawytscha Central Valley spring-run chinook salmon	FT/ST/--	Occurs in the Sacramento River watershed and spawns in a few select tributaries with flowing water, cool temperatures, and suitably sized cobble.	None – No habitat exists for this species in the project area.
Oncorhynchus tshawytscha Winter-run chinook salmon	FE/SE/--	Spawns in Sacramento River where gravelly substrate and adequate flow conditions occur.	None – No habitat exists for this species in the project area.
Pogonichthys macrolepidotus Sacramento splittail	FD/CSC/--	Prefers backwaters and sloughs of the Delta and lower San Joaquin and Sacramento Rivers.	None – No habitat exists for this species in the project area.
Invertebrates			
Branchinecta lynchi Vernal pool fairy shrimp	FT/--/--	Lifecycle restricted to vernal pools.	Unlikely – Seasonal wetland in project area is not a vernal pool.
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	FT/--/--	Breeds and forages exclusively on blue elderberry shrubs (*Sambucus mexicana*) below 3,000 feet in elevation.	None – No habitat exists for this species in the project area.
Plants			
Calystegia stebbinsii Stebbin's morning glory	FE/SE/1B	Rhizomatous herb that grows in open areas of chaparral and cismontane woodland. Grows on gabbroic substrate at elevations 185-730 m. Blooms April-July.	Unlikely – Habitat (soil type) unsuitable for this species in the project area.

LIST OF POTENTIALLY AFFECTED SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA

Species	Federal/ State/CNPS Status	General Habitat	Potential for Occurrence
Ceanothus roderickii Pine Hill ceanothus	FE/SR/1B	Evergreen shrub occurring in chaparral and on volcanic, serpentinite or gabbroic substrate in cismontane woodland. Often in a 'historically disturbed' area with other rare plants. 260-630 m. Blooms May-Jun.	Unlikely – Habitat (soil type) unsuitable for this species in the project area.
Galium californicum ssp. S*ierrae* El Dorado bedstraw	FE/SR/1B	Perennial herb growing in chaparral, cismontane woodland and lower montane coniferous forest on gabbroic substrate. Found more often in pine-oak woodland than chaparral. Found at elevations 100-585 m. Blooms May-June.	Unlikely – Habitat (soil type) unsuitable for this species in the project area.
Gratiola heterosepala Boggs Lake hedge-hyssop	FSC/SE/1B	Marshes and swamps, lake margins, and in clay substrate in vernal pools. Blooms Apr-Aug. 10-2375 meters elevation.	None – No habitat exists for this species in the project area.
Senecio layneae Layne ragwort	FT/SR/1B	Perennial herb growing in chaparral, cismontane woodland on serpentinite or gabbroic, rocky substrates. Occasionally found along streams. Found at elevations 200-1000 m. Blooms April-July.	Unlikely – Habitat (soil type) unsuitable for this species in the project area.
Federal and State Species of Special Concern			
Birds			
Agelaius tricolor Tricolored blackbird (nesting)	FSC/CSC/--	Largely endemic to California, most numerous in the Central Valley and nearby vicinity. Requires open water, protected nesting substrate, and foraging grounds within vicinity of the nesting colony. Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, and other tall herbs near fresh water.	Unlikely –Vegetation in the project area is too limited to support this species.
Athene cunicularia Burrowing owl (burrow sites)	FSC/CSC/--	Forages in open plains, grasslands and prairies; typically nests in abandoned small mammal burrows.	**Medium** – No burrows were observed and the vegetation in the study areas was likely too tall for this species. However, a focused survey for this species was not conducted, nor were all areas of the airport surveyed during the reconnaissance survey. This species does have a tendency to inhabit airport properties due to the general isolation and short vegetation near the runways. Therefore, the possibility of this species

LIST OF POTENTIALLY AFFECTED SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA

Species	Federal/ State/CNPS Status	General Habitat	Potential for Occurrence
			occurring in the project area should not be ruled out.
Baeolophus inornatus Oak titmouse	FSLC/--/--	Breeds in open pine-juniper and oak woodlands, often in riparian areas.	**Medium** – This species has potential to occur in the small patches of oak woodland in the project area.
Carduelis lawrencei Lawrence's goldfinch (nesting)	FSC/--/--	Dry grassy slopes with weed patches, chaparral, and open woodlands; nests in trees or shrubs.	**Medium** – This species has potential to occur in the small patches of oak woodland and chaparral in the project area.
Chaetura vauxi Vaux's swift (nesting)	FSC/CSC/--	Nests in large hollow trees in coniferous forests and forages widely, especially over riparian areas and open water.	None - No habitat exists for this species in the project area.
Cypseloides niger Black swift (nesting)	FSC/CSC/--	Nests in steep canyons in cliff faces and near waterfalls, June through August.	None - No habitat exists for this species in the project area.
Elanus leucurus White-tailed kite	FSC/SFP/--	Forages in open plains, grasslands and prairies; typically nests in trees.	**Medium** – Although prey species may be limited, this species has potential to forage in the open grasslands and nest in oak woodland in the project area.
Empidonax traillii brewsteri Little willow flycatcher (nesting)	FSC/--/--	Wet meadow and montane riparian habitats at 600-2500 meters.	None - No habitat exists for this species in the project area.
Lanius ludovicianus Loggerhead shrike (nesting)	FSC/CSC/--	Nests in dense shrub or tree foliage, forages in scrub, open woodlands, grasslands, and croplands.	**Medium** – This species has potential to nest and forage in chaparral and oak woodland habitats in the project area.
Melanerpes lewis Lewis' woodpecker	FSC/--/--	Winters in oak savannahs, and broken deciduous and coniferous habitats.	**Medium** – Although the project area is outside of this species' breeding range, it may winter in the oak woodland within the project area.
Numenius americanus Long-billed curlew (nesting)	FSC/CSC/--	Forages along lakes, marshes, mudflats and sandy beaches. Nests in prairies and plains.	Unlikely – Wetlands in the project area are too limited to support this species.
Picoides nuttallii Nuttall's woodpecker	FSLC/--/--	Uses riparian areas with adjacent oak woodland.	**Medium** – This species may use the oak woodland within the project area.
Plegadis chihi White-faced ibis (rookery)	FSC/CSC/--	Forages in salt, freshwater and coastal marshes; nests in shrubs or reed beds associated with marsh habitats.	Unlikely – Wetlands in the project area are too limited to support this species.
Selasphorus rufus Rufous hummingbird (migratory)	FSC/--/--	Riparian areas, open woodlands, chaparral and other areas rich with nectar producing flowers.	Low – Oak woodlands and chaparral within the project area lack nectar-producing flowers for forage.

LIST OF POTENTIALLY AFFECTED SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA

Species	Federal/ State/CNPS Status	General Habitat	Potential for Occurrence
Toxostoma redivivum California thrasher	FSC/--/--	Nests in dense chaparral habitats, March through August.	Low – Deerbrush chaparral habitat within the project area is too open to support this species.
Mammals			
Euderma maculatum Spotted bat	FSC/CSC/--	Roosts primarily in crevices in cliff faces. Primarily feeds on moths. Maternity colonies active April through July.	None - No habitat exists for this species in the project area.
Eumops perotis californicus Greater western mastiff-bat	FSC/CSC/--	Isolated occurrences in northern California. Roosts primarily in crevices within cliffs and canyons, occasionally in buildings. Primarily feeds on moths. Maternity colonies active May through July.	None - No habitat exists for this species in the project area.
Martes pennanti pacifica Pacific fisher	FSC/CSC/--	Inhabits mixed conifer and Douglas fir forest, and are also at higher elevation fir and pine forests such as red fir, lodgepole pine, and mixed evergreen/broad leaf forest. Dens in cavities near the tops of large trees, hollow logs, talus, and crevices in rock outcrops.	None - No habitat exists for this species in the project area.
Myotis ciliolabrum Small-footed myotis bat	FSC/--/--	In association with steep limestone outcrops and talus slopes.	None - No habitat exists for this species in the project area.
Myotis evotis Long-eared myotis bat	FSC/--/--	Primarily a mixed-conifer forest associated species. Roosts in caves, mines, trees, crevices, buildings, and bridges. Maternity colonies active May through July.	None - No habitat exists for this species in the project area.
Myotis thysanodes Fringed myotis	FSC/--/--	Primarily in woodland/forests. Mostly roosts in buildings or mines. Maternity colonies active April through June.	Low – Limited habitat exists for this species in the project area.
Myotis volans Long-legged myotis bat	FSC/--/--	Primarily in mixed-conifer forested habitats. Mostly roosts in large diameter trees and snags. Maternity colonies active May through July.	None - No habitat exists for this species in the project area.
Myotis yumanensis Yuma myotis bat	FSC/--/--	Often near reservoirs. Roosts in buildings, trees, mines, caves, bridges, and rock crevices. Maternity colonies active May through July.	None - No habitat exists for this species in the project area.

LIST OF POTENTIALLY AFFECTED SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA

Species	Federal/ State/CNPS Status	General Habitat	Potential for Occurrence
Perognathus inornatus inornatus San Joaquin pocket mouse	FSC/--/--	Primarily above 1,000 feet in dry, open grasslands or scrub. Will dig burrows for cover.	Low – Soil substrate is likely unsuitable (not friable) for this species. No burrows were noted during the reconnaissance evaluation.
Amphibians			
Rana boylii Foothill yellow-legged frog	FSC/CSC/--	Breeds in shaded stream habitats with rocky, cobble substrate, usually below 6,000 feet in elevation. Absent or infrequent when introduced predators are present.	None - No habitat exists for this species in the project area.
Spea (Scaphiopus) hammondii Western spadefoot toad	FSC/CSC/--	Occurs seasonally in grasslands, prairies, chaparral, and woodlands, in and around wet sites. Breeds in shallow, temporary pools formed by winter rains. Takes refuge in burrows.	Low – Limited upland refugia available due to lack of burrows onsite.
Reptiles			
Emys (=Clemmys) marmorata Western pond turtle	--/CSC/--	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	Low – Limited suitable upland refugia, basking sites, and aquatic habitat.
Phrynosoma coronatum frontale California horned lizard	FSC/CSC/--	In a variety of habitats, most commonly in lowlands and sandy washes with scattered low bushes. Requires open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant ant/insect prey.	Low – Soil substrate is likely unsuitable for this species.
Fish			
Spirinchus thaleichthys Longfin smelt	FSC/CSC/--	All major bays and estuaries from San Francisco Bay northward.	None - No habitat exists for this species in the project area.
Invertebrates			
Ammonitella yatesi Tight coin (Yates' snail)	--/--/--	Inhabits limestone caves and outcroppings. Favors north-facing slopes. Found in humus in limestone outcroppings.	None - No habitat exists for this species in the project area.
Andrena subapasta (no common name)	--/--/--	Native bee. Collects pollen primarily from *Arenaria Californica* but also butter-and-eggs (*Tryphysaria eriantha*) and goldfields (*Lasthenia* sp.). Nests in uplands near vernal pools.	None - No habitat exists for this species in the project area.

LIST OF POTENTIALLY AFFECTED SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA

Species	Federal/ State/CNPS Status	General Habitat	Potential for Occurrence
Banksula californica (no common name)	--/--/--	Cave spider. Known only from the type locality, Alabaster Cave in Auburn, Placer County. Type locality has been partially destroyed and species may be extinct.	None - No habitat exists for this species in the project area.
Banksula galilei (no common name)	--/--/--	Cave spider. Known only from the type locality, Lime Rock Caves in El Dorado County. Species is troglobitic (lives only in caves).	None - No habitat exists for this species in the project area.
Goeracea oregona Sagehen Creek goracean caddisfly	FSC/--/--	Found in relatively warm springs. Currently found only at the source spring.	None - No habitat exists for this species in the project area.
Plants			
Allium jepsonii Jepson's onion	FSC/--/1B	Cismontane woodland, coniferous forests on serpentine or volcanic substrates.	Unlikely – Habitat (soil type) unsuitable for this species in the project area.
Balsamorhiza macrolepis var. macrolepis Big-scale balsamroot	FSC/--/1B	Perennial herb occurring in chaparral, cismontane woodland, and in valley and foothill grassland, sometimes on serpentinite substrate. 90-1400 m elevation. Blooms Mar-Jun.	**Medium** – This species may occur in the grassland and oak woodland habitats in the project area.
Chlorogalum grandiflorum Red Hills soaproot	FSC/--/1B	Bulbiferous herb growing in chaparral, cismontane woodland, coniferous forests on serpentinite or gabbroic substrates. At elevations 245-1170 m. Blooms May-June.	Unlikely – Habitat (soil type) unsuitable for this species in the project area.
Clarkia biloba ssp. *Brandegee* Brandegee's clarkia	--/--/1B	Annual herb that occurs in chaparral and cismontane woodland at elevations 225-915 m. Blooms May-July.	**Medium** – This species may occur in the chaparral and oak woodland habitats in the project area.
Fritillaria eastwoodiae Butte County fritillary	--/--/3	Bulbiferous herb that grows in chaparral, cismontane woodland, and lower montane coniferous forest. Usually found on dry slopes but also found in wet places. Soils can be serpentine, red clay, or sandy loam. Occurs at elevations 40-1500 m. Blooms March-May.	**Medium** – This species may occur in the grassland and oak woodland habitats in the project area.
Helianthemum suffrutescens Amador (Bisbee Peak) rush-rose	FSC/--/3	Evergreen shrub occurring in chaparral, often on serpentinite, gabbroic, or Ione soil. 45-840 m elevation. Blooms Apr-Jun.	Unlikely – Habitat (soil type) unsuitable for this species in the project area.

LIST OF POTENTIALLY AFFECTED SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE PROJECT AREA

Species	Federal/ State/CNPS Status	General Habitat	Potential for Occurrence
Lathyrus sulphureus var. *argillaceus* Dubious pea	--/--/3	Perennial herb occurring in cismontane woodland and lower and upper montane coniferous forest. Found at 150-305 m elevation. Blooms in April.	**Medium** – This species may occur in oak woodland habitat in the project area.
Wyethia reticulate El Dorado County mule ear	--/--/1B	Perennial herb growing in chaparral, cismontane woodland, and lower montane coniferous forest on clay or gabbroic substrates. Found at elevations 185-630 m. Blooms May-July.	Unlikely – Habitat (soil type) unsuitable for this species in the project area.
Viburnum ellipticum Oval-leaved viburnum	--/--/2	Deciduous shrub occurring in chaparral, cismontane woodlands, and lower montane coniferous forest from 215-1400 m elevation.	**Medium** – This species may occur in the chaparral and oak woodland habitats in the project area.

Status Codes

Federal

FE = Endangered
FT = Threatened
FPE = Proposed Endangered
FPT = Proposed Threatened
FC = Candidate
FSC = Species of Concern
FSLC = Species of Local Concern
PX = Proposed Critical Habitat

State

SE = Endangered
ST = Threatened
SR = Rare
SFP = Fully Protected
CSC = California Department of Fish and Game Special Concern species

California Native Plant Society

List 1B = Plants rare, threatened, or endangered in California and elsewhere
List 2 = Plants rare, threatened, or endangered in California, but more common elsewhere
List 3 = Plants about which we need more information--a review list
List 4 = Plants of limited distribution--a watch list

Appendix C

Glossary of Terms

ABOVE GROUND LEVEL (AGL): An elevation datum given in feet above ground level.

AIR CARRIER: A person who undertakes directly by lease, or other arrangement, to engage in air transportation. (FAR 1) (Also see Certificated Air Carrier)

AIR CARRIERS: The commercial system of air transportation, consisting of the certificated air carriers, air taxis (including commuters), supplemental air carriers, commercial operators of large aircraft, and air travel clubs. (FAA Census)

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC): A facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace, principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft. (AIM)

AIR TAXI: A classification of air carriers which directly engage in the air transportation of persons, property, mail, or in any combination of such transportation and which do not directly or indirectly utilize large aircraft (over 30 seats or a maximum payload capacity of more than 7,500 pounds) and do not hold a Certificate of Public Convenience and Necessity or economic authority issued by the Department of Transportation. (Also see commuter air carrier and demand air taxi.) (FAA Census)

AIR TRAFFIC CONTROL (ATC): A service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic. (FAR 1)

AIRCRAFT ACCIDENT: An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage. (NTSB)

AIRCRAFT APPROACH CATEGORY: A grouping of aircraft (Categories A–E) based on 1.3 times their stall speed in their landing configuration at their maximum certificated landing weight. (Airport Design)

AIRCRAFT OPERATION: The airborne movement of aircraft in controlled or non-controlled airport terminal areas and about given en route fixes or at other points where counts can be made. There are two types of operations — local and itinerant. (FAA Stats)

AIRCRAFT PARKING LINE LIMIT (APL): A line established by the airport authorities beyond which no part of a parked aircraft should protrude. (Airport Design)

AIR/FIRE ATTACK BASE: An established on-airport base of operations for the purposes of aerial suppression of large-scale fires by specially-modified aircraft. Typically, such aircraft are operated by the California Department of Forestry and/or the U.S. Forest Service.

AIRPLANE DESIGN GROUP: A grouping of airplanes (Groups I–V) based on wingspan. (Airport Design)

AIRPORT: An area of land or water that is used or intended to be used for the landing and takeoff of aircraft, and includes its buildings and facilities, if any. (FAR 1)

AIRPORT ELEVATION: The highest point of an airport's usable runways, measured in feet above mean sea level. (AIM)

AIRPORT HAZARD: Any structure or natural object located on or in the vicinity of a public airport, or any use of land near such airport, that obstructs the airspace required for the flight of aircraft in landing or taking off at the airport or is otherwise hazardous to aircraft landing, taking off, or taxiing at the airport. (Airport Design)

AIRPORT LAND USE COMMISSION (ALUC): A commission established in accordance with the California State Aeronautics Act in each county having an airport operated for the benefit of the general public. The purpose of each ALUC is "to assist local agencies in ensuring compatibility land uses in the vicinity of all new airports and in the vicinity of existing airports to the extent that the land in the vicinity of those airports is not already devoted to incompatible uses." An ALUC need not be created if an alternative process, as specified by the statutes, is established to accomplish the same purpose. (California Public Utilities Code, Section 21670 et seq.)

AIRPORT LAYOUT PLAN (ALP): A scale drawing of existing and proposed airport facilities, their location on the airport, and the pertinent clearance and dimensional information required to demonstrate conformance with applicable standards.

AIRPORT REFERENCE CODE (ARC): A coding system used to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at the airport. (Airport Design)

AIRPORT REFERENCE POINT (ARP): A point established on an airport, having equal relationship to all existing and proposed landing and takeoff areas, and used to geographically locate the airport and for other planning purposes. (Airport Design)

AIRPORT TRAFFIC CONTROL TOWER (ATCT): A terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area. (AIM)

AIRWAY/FEDERAL AIRWAY: A Class E airspace area established in the form of a corridor, the centerline of which is defined by radio navigational aids. (AIM)

ALERT AREA: A special use airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft. (AIM)

APPROACH LIGHT SYSTEM (ALS): An airport lighting system which provides visual guidance to landing aircraft by radiating light beams in a directional pattern by which the pilot aligns the aircraft with the extended runway centerline during a final approach to landing. Among the specific types of systems are:

- **LDIN—**Lead-in Light System.
- **MALSR—**Medium-intensity Approach Light System with Runway Alignment Indicator Lights.
- **ODALS—**Omnidirectional Approach Light System, a combination of LDIN and REILS.
- **SSALR—**Simplified Short Approach Light System with Runway Alignment Indicator Lights. (AIM)

APPROACH SPEED: The recommended speed contained in aircraft manuals used by pilots when making an approach to landing. This speed will vary for different segments of an approach as well as for aircraft weight and configuration. (AIM)

AUTOMATED WEATHER OBSERVING SYSTEM (AWOS): Airport electronic equipment which automatically measures meteorological parameters, reduces and analyzes the data via computer, and broadcasts weather information which can be received on aircraft radios in some applications, via telephone.

AUTOMATIC DIRECTION FINDER (ADF): An aircraft radio navigation system which senses and indicates the direction to a L/MF nondirectional radio beacon (NDB) ground transmitter. (AIM)

AUTOMATIC TERMINAL INFORMATION SERVICE (ATIS): The continuous broadcast of recorded non-control information in selected terminal areas. (AIM)

BACK COURSE APPROACH: A non-precision instrument approach utilizing the rearward projection of the ILS localizer beam.

BALANCED FIELD LENGTH: The runway length at which the distance required for a given aircraft to abort a takeoff and stop on the runway (accelerate-stop distance) equals the distance required to continue the takeoff and reach a height of 35 feet above the runway end (accelerate-go distance).

BASED AIRCRAFT: Aircraft stationed at an airport on a long-term basis.

BUILDING RESTRICTION LINE (BRL): A line which identifies suitable building area locations on airports.

CEILING: Height above the earth's surface to the lowest layer of clouds or obscuring phenomena that is reported as "broken", "overcast", or "obscuration" and is not classified as "thin" or "partial". (AIM)

CERTIFICATED ROUTE AIR CARRIER: An air carrier holding a Certificate of Public Convenience and Necessity issued by the Department of Transportation authorizing the performance of scheduled service over specified routes, and a limited amount of nonscheduled service. (FAA Census)

CIRCLING APPROACH/CIRCLE-TO-LAND MANEUVER: A maneuver initiated by the pilot to align the aircraft with a runway for landing when a straight-in landing from an instrument approach is not possible or is not desirable. (AIM)

COMMERCIAL OPERATOR: A person who, for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, other than as an air carrier. (FAR 1)

COMPASS LOCATOR: A low power, low or medium frequency (L/MF) radio beacon installed at the site of the outer or middle marker of an instrument landing system (ILS). (AIM)

COMPASS ROSE: A circle, graduated in degrees, printed on some charts or marked on the ground at an airport. It is used as a reference to either true or magnetic direction. (AIM)

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL): The noise rating adopted by the State of California for measurement of airport noise. It represents the average daytime noise level during a 24-hour day, measured in decibels and adjusted to an equivalent level to account for the lower tolerance of people to noise during evening and nighttime periods.

COMMUTER AIR CARRIER: An air taxi operator which performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week and places between which such flights are performed. (FAA Census)

CONTROLLED AIRSPACE: A generic term that covers the different classifications of airspace (Class A, Class B, Class C, Class D and Class E airspace) and defines dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification. Controlled airspace in the United States is designated as follows:

- **Class A—**Generally, that airspace from 18,000 feet MSL up to and including 60,000 feet MSL (Flight Level 600), including the airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous states and Alaska. Unless otherwise authorized, all persons must operate their aircraft under IFR.
- **Class B—**Generally, that airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of airport operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored and consists of a surface area and two or more layers (some Class B airspaces areas resemble upside-down wedding cakes), and is designed to contain all published instrument procedures once an aircraft enters the airspace. An ATC clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace. The cloud clearance requirement for VFR operations is "clear of clouds".
- **Class C—**Generally, that airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by radar approach control, and that have a certain number of IFR operations or passenger enplanements. Although the configuration of each Class C airspace area is individually tailored, the airspace usually consists of a surface area with a 5 nm radius, and an outer area with a 10 nm radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Each person must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while within the airspace. VFR aircraft are only separated from IFR aircraft within the airspace.
- **Class D—**Generally, that airspace from the surface to 2,500 feet above the airport elevation (chartered in MSL) surrounding those airports that have an operational control tower. The configuration of each Class D airspace area is individually tailored and when instrument

procedures are published, the airspace will normally be designed to contain the procedures. Arrival extensions for instrument approach procedures may be Class D or Class E airspace. Unless otherwise authorized, each person must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while in the airspace. No separation services are provided to VFR aircraft.

- **Class E—**Generally, if the airspace is not Class A, Class B, Class C, or Class D, and it is controlled airspace, it is Class E airspace. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Also in this class are Federal airways, airspace beginning at either 700 or 1,200 feet AGL used to transition to/from the terminal or en route environment, en route domestic, and offshore airspace areas designated below 18,000 feet MSL. Unless designated at a lower altitude, Class E airspace begins at 14,500 MSL over the United States, including that airspace overlying the waters within 12 nautical miles of the coast of the 48 contiguous States and Alaska. Class E airspace does not include the airspace 18,000 feet MSL or above.

DEMAND AIR TAXI: Use of an aircraft operating under Federal Aviation Regulations, Part 135, passenger and cargo operations, including charter and excluding commuter air carrier. (FAA Census)

DISPLACED THRESHOLD: A threshold that is located at a point on the runway other than the designated beginning of the runway. (AIM)

DISTANCE MEASURING EQUIPMENT (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid. (AIM)

FAR PART 77: The part of the Federal Aviation Regulations that deals with objects affecting navigable airspace.

FAR PART 77 SURFACES: Imaginary surfaces established with relation to each runway of an airport. There are five types of surfaces: (1) primary; (2) approach; (3) transitional; (4) horizontal; and (5) conical.

FEDERAL AVIATION ADMINISTRATION (FAA): The United States government agency that is responsible for insuring the safe and efficient use of the nation's airspace.

FIXED BASE OPERATOR (FBO): A business operating at an airport that provides aircraft services to the general public, including but not limited to sale of fuel and oil; aircraft sales, rental, maintenance, and repair; parking and tiedown or storage of aircraft; flight training; air taxi/charter operations; and specialty services, such as instrument and avionics maintenance, painting, overhaul, aerial application, aerial photography, aerial hoists, or pipeline patrol.

FLIGHT SERVICE STATION (FSS): FAA facilities which provide pilot briefings on weather, airports, altitudes, routes, and other flight planning information.

FRACTIONAL OWNERSHIP: A company or individual buys, or leases, a fractional interest in one aircraft just as they might acquire a partial interest in one condo unit. They can use their own aircraft or another similar or identical aircraft a certain number of hours or days per year. The economics of each situation differs depending on the number of people who will use the aircraft, the value of their time to the company, and the dollars saved in airline tickets, hotels, etc.

GENERAL AVIATION: That portion of civil aviation which encompasses all facets of aviation except air carriers. (FAA Stats)

GENERIC VISUAL GLIDE SLOPE INDICATOR (GVGI): A generic term for the group of airport visual landing aids which includes Visual Approach Slope Indicators (VASI), Precision Approach Path Indicators (PAPI), and Pulsed Light Approach Slope Indicators (PLASI). When FAA funding pays for this equipment, whichever type receives the lowest bid price will be installed unless the airport owner wishes to pay the difference for a more expensive unit.

GLIDE SLOPE: An electronic signal radiated by a component of an ILS to provide descent path guidance to approaching aircraft.

GLOBAL POSITIONING SYSTEM (GPS): A relatively new navigational system which utilizes a network of satellites to determine a positional fix almost anywhere on or above the earth. Developed and operated by the U.S. Department of Defense, GPS has been made available to the civilian sector for surface, marine, and aerial navigational use. For aviation purposes, the current form of GPS guidance provides en route aerial navigation and selected types of nonprecision instrument approaches. Eventual application of GPS as the principal system of navigational guidance throughout the world is anticipated.

HELIPAD: A small, designated area, usually with a prepared surface, on a heliport, airport, landing/takeoff area, apron/ramp, or movement area used for takeoff, landing, or parking of helicopters. (AIM)

INSTRUMENT APPROACH PROCEDURE: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually. It is prescribed and approved for a specific airport by competent authority. (AIM)

INSTRUMENT FLIGHT RULES (IFR): Rules governing the procedures for conducting instrument flight. Also term used by pilots and controllers to indicate a type of flight plan. (AIM)

INSTRUMENT LANDING SYSTEM (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids: (1) Localizer; (2) Glide Slope; (3) Outer Marker; (4) Middle Marker; (5) Approach Lights. (AIM)

INSTRUMENT OPERATION: An aircraft operation in accordance with an IFR flight plan or an operation where IFR separation between aircraft is provided by a terminal control facility. (FAA ATA)

INSTRUMENT RUNWAY: A runway equipped with electronic and visual navigation aids for which a precision or non-precision approach procedure having straight-in landing minimums has been approved. (AIM)

ITINERANT OPERATION: An arrival or departure performed by an aircraft from or to a point beyond the local airport area.

LARGE AIRCRAFT: An aircraft of more than 12,500 pounds maximum certificated takeoff weight. (FAR 1)

LIMITED REMOTE COMMUNICATIONS OUTLET (LRCO): An unmanned, remote air/ground communications facility which may be associated with a VOR. It is capable only of receiving communications and relies on a VOR or a remote transmitter for full capability.

LOCALIZER (LOC): The component of an ILS which provides course guidance to the runway. (AIM)

LOCAL OPERATION: An arrival or departure performed by an aircraft: (1) operating in the traffic pattern, (2) known to be departing or arriving from flight in local practice areas, or (3) executing practice instrument approaches at the airport. (FAA ATA)

LORAN: An electronic ground-based navigational system established primarily for marine use but used extensively for VFR and limited IFR air navigation.

MARKER BEACON (MB): The component of an ILS which informs pilots, both aurally and visually, that they are at a significant point on the approach course.

MEAN SEA LEVEL (MSL): An elevation datum given in feet from mean sea level.

MEDIUM-INTENSITY APPROACH LIGHTING SYSTEM (MALS): The MALS is a configuration of steady-burning lights arranged symmetrically about and along the extended runway centerline. MALS may also be installed with sequenced flashers — in this case, the system is referred to as MALSF.

MILITARY OPERATIONS AREA (MOA): A type of special use airspace of defined vertical and lateral dimensions established outside of Class A airspace to separate/segregate certain military activities from IFR traffic and to identify for VFR traffic where these activities are conducted. (AIM)

MINIMUM DESCENT ALTITUDE (MDA): The lowest altitude, expressed in feet above mean sea level, to which descent is authorized on final approach or during circle-to-land maneuvering in execution of a standard instrument approach procedure where no electronic glide slope is provided. (FAR 1)

MISSED APPROACH: A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing. (AIM)

NAVIGATIONAL AID/NAVAID: Any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight. (AIM)

NONDIRECTIONAL BEACON (NDB): A 4 MF or UHF radio beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment

can determine his bearing to or from the radio beacon and "home" on or track to or from the station. (AIM)

NONPRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which no electronic glide slope is provided. (FAR 1)

NONPRECISION INSTRUMENT RUNWAY: A runway with an instrument approach procedure utilizing air navigation facilities, with only horizontal guidance, or area-type navigation equipment for which a straight-in nonprecision instrument approach procedure has been approved or planned, and no precision approach facility or procedure is planned. (Airport Design)

OBJECT FREE AREA (OFA): A surface surrounding runways, taxiways, and taxilanes which should be clear of parked airplanes and objects except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. (Airport Design)

OBSTACLE: An existing object, object of natural growth, or terrain at a fixed geographical location, or which may be expected at a fixed location within a prescribed area, with reference to which vertical clearance is or must be provided during flight operation. (AIM)

OBSTACLE FREE ZONE (OFZ): A defined volume of airspace above and adjacent to a runway and its approach lighting system if one exists, free of all fixed objects except FAA-approved frangible aeronautical equipment and clear of vehicles and aircraft in the proximity of an airplane conducting an approach, missed approach, landing, takeoff, or departure.

OBSTRUCTION: An object/obstacle, including a mobile object, exceeding the obstruction standards specified in FAR Part 77, Subpart C. (AIM)

OUTER MARKER: A marker beacon at or near the glide slope intercept position of an ILS approach. (AIM)

PRECISION APPROACH PATH INDICATOR (PAPI): An airport visual landing aid similar to a VASI, but which has light units installed in a single row rather than two rows.

PRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which an electronic glide slope is provided, such as an ILS or PAR. (FAR 1)

PRECISION INSTRUMENT RUNWAY: A runway with an instrument approach procedure utilizing an instrument landing system (ILS), microwave landing system (MLS), or precision approach radar (PAR). (Airport Design)

RELOCATED THRESHOLD: The portion of pavement behind a relocated threshold that is not available for takeoff and landing. It may be available for taxiing and aircraft. (Airport Design)

REMOTE COMMUNICATIONS AIR/GROUND FACILITY (RCAG): An unmanned VHF/UHF transmitter/receiver facility which is used to expand ARTCC air/ground communications coverage and to facilitate direct contact between pilots and controllers. (AIM)

REMOTE COMMUNICATIONS OUTLET (RCO) AND REMOTE TRANSMITTER/ RECEIVER (RTR): An unmanned communications facility remotely controlled by air traffic personnel. RCO's serve FSS's. RTR's serve terminal ATC facilities. (AIM)

RESTRICTED AREA: Designated airspace within which the flight of aircraft, while not wholly prohibited, is subject to restriction. (FAR 1)

RUNWAY CLEAR ZONE: A term previously used to describe the runway protection zone.

RUNWAY EDGE LIGHTS: Lights used to define the lateral limits of a runway. Specific types include:

- **HIRL—**High-Intensity Runway Lights.
- **MIRL—**Medium-Intensity Runway Lights.

RUNWAY END IDENTIFIER LIGHTS (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide a pilot with a rapid and positive visual identification of the approach end of a particular runway. (AIM)

RUNWAY PROTECTION ZONE (RPZ): A trapezoidal shaped area at the end of a runway, the function of which is to enhance the protection of people and property on the ground through airport owner control of the land. The RPZ usually begins at the end of each primary surface and is centered upon the extended runway centerline. (Airport Design)

RUNWAY SAFETY AREA (RSA): A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the even of an undershoot, overshoot, or excursion from the runway. (Airport Design)

SMALL AIRCRAFT: An aircraft of 12,500 pounds or less maximum certificated takeoff weight. (FAR 1)

SPECIAL USE AIRSPACE: Airspace of defined horizontal and vertical dimensions identified by an area on the surface of the earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. (AIM)

STANDARD INSTRUMENT DEPARTURE (SID): A preplanned instrument flight rules (IFR) air traffic control departure procedure printed for pilot use in graphic and/or textual form. SID's provide transition from the terminal to the appropriate en route structure. (AIM)

STANDARD TERMINAL ARRIVAL ROUTE (STAR): A preplanned instrument flight rule (IFR) air traffic control arrival route published for pilot use in graphic and/or textual form. STARs provide transition from the en route structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area. (AIM)

STOPWAY: An area beyond the takeoff runway, no less wide than the runway and centered upon the extended centerline of the runway, able to support the airplane during an aborted takeoff, without causing structural damage to the airplane, and designated by the airport authorities for use in decelerating the airplane during an aborted takeoff. (FAR 1)

STRAIGHT-IN INSTRUMENT APPROACH — IFR: An instrument approach wherein final approach is begun without first having executed a procedure turn; it is not necessarily completed with a straight-in landing or made to straight-in landing weather minimums. (AIM)

TAXILANE: The portion of the aircraft parking area used for access between taxiways, aircraft parking positions, hangars, storage facilities, etc. (Airport Design)

TAXIWAY: A defined path, from one part of an airport to another, selected or prepared for the taxiing of aircraft. (Airport Design)

TERMINAL INSTRUMENT PROCEDURES (TERPS): Procedures for instrument approach and departure of aircraft to and from civil and military airports. There are four types of terminal instrument procedures: precision approach, nonprecision approach, circling, and departure.

TERMINAL RADAR SERVICE AREA (TRSA): Airspace surrounding designated airports wherein ATC provides radar vectoring, sequencing, and separation on a full-time basis for all IFR and participating VFR aircraft. (AIM)

THRESHOLD: The beginning of that portion of the runway usable for landing. (AIM)

TOUCH-AND-GO: An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and-go is defined as two operations. (AIM)

TRAFFIC PATTERN: The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach. (AIM)

TRANSIENT AIRCRAFT: Aircraft not based at the airport.

TRANSMISSOMETER: An apparatus used to determine visibility by measuring the transmission of light through the atmosphere. (AIM)

UNCONTROLLED AIRSPACE: Now known as Class G airspace. Class G airspace is that portion of the airspace that has not been designated as Class A, Class B, Class C, Class D, and Class E airspace.

UNICOM (Aeronautical Advisory Station): A nongovernment air/ground radio communication facility which may provide airport information at certain airports. (AIM)

VERY-HIGH-FREQUENCY OMNIDIRECTIONAL RANGE (VOR): The standard navigational aid used throughout the airway system to provide bearing information to aircraft. When combined with Distance Measuring Equipment (DME) or Tactical Air Navigation (TACAN) the facility, called VOR-DME or VORTAC, provides distance as well as bearing information.

VISUAL APPROACH SLOPE INDICATOR (VASI): An airport landing aid which provides a pilot with visual descent (approach slope) guidance while on approach to landing. Also see PAPI.

VISUAL FLIGHT RULES (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term "VFR" is also used by pilots and controllers to indicate type of flight plan. (AIM)

VISUAL GLIDE SLOPE INDICATOR (VGSI): A generic term for the group of airport visual landing aids which includes Visual Approach Slope Indicators (VASI), Precision Approach Path Indicators (PAPI), and Pulsed Light Approach Slope Indicators (PLASI). When FAA funding pays for this equipment, whichever type receives the lowest bid price will be installed unless the airport owner wishes to pay the difference for a more expensive unit.

VISUAL RUNWAY: A runway intended solely for the operation of aircraft using visual approach procedures, with no straight-in instrument approach procedure and no instrument designation indicated on an FAA-approved airport layout plan. (Airport Design)

WARNING AREA: A type of special use airspace which may contain hazards to nonparticipating aircraft in international airspace. (AIM)

SOURCES

FAR 1: Federal Aviation Regulations Part 1, Definitions and Abbreviations. (1993)

AIM: Airman's Information Manual, Pilot/Controller Glossary. (1993)

Airport Design: Federal Aviation Administration. *Airport Design*. Advisory Circular 150/5300-13, Change 7. (2002)

FAA ATA: Federal Aviation Administration. *Air Traffic Activity*. (1986)

FAA Census: Federal Aviation Administration. *Census of U.S. Civil Aircraft*. (1986)

FAA Stats: Federal Aviation Administration. *Statistical Handbook of Aviation*. (1984)

NTSB: National Transportation Safety Board. *U.S. NTSB 830-3*. (1989)

Appendix C

Glossary of Terms

Airport Plan Drawings

RUNWAY END DATA

APPROACH END OF RUNWAY:			7	25
RUNWAY END COORDINATES (a)	Latitude	Existing	38° 57' 15.46" N	38° 57' 19.23" N
		Future	No Change	No Change
	Longitude	Existing	121° 05' 17.51" W	121° 04' 30.92" W
		Future	No Change	No Change
RUNWAY END ELEVATIONS (a)		Existing	1,490.00'	1,535.90'
		Future	No Change	No Change
RUNWAY MARKING		Existing	Visual	Visual
		Future	Non-Precision	Non-Precision
RUNWAY TOUCHDOWN ZONE ELEVATION		Existing	1,529.25'	1536.0'
		Future	No Change	No Change
NAVIGATION AIDS		Existing	GPS	None
		Future	No Change	No Change
VISUAL AIDS		Existing	PAPI-2	PAPI-2
		Future	No Change	No Change
APPROACH TYPE (FAR Part 77 Category)		Existing	Non-Precision [A(NP)]	Visual [A(V)]
		Future	No Change	No Change
APPROACH VISIBILITY (Minimums)		Existing	1 mile	1 mile (circling)
		Future	No Change	No Change
APPROACH SLOPE (Required/Clear)		Existing	20:1/>20:1	20:1/>20:1
		Future	No Change	No Change
RUNWAY SAFETY AREA	Width	Existing	120'	120'
		Future	No Change	No Change
	Length Beyond Rwy End	Existing	240'	240'
		Future	No Change	No Change
OBJECT FREE AREA	Width	Existing	250'	250'
		Future	No Change	No Change
	Length Beyond Rwy End	Existing	240'	240'
		Future	No Change	No Change
OBSTACLE FREE ZONE	Width	Existing	250'	250'
		Future	No Change	No Change
	Length Beyond Rwy End	Existing	200'	200'
		Future	No Change	No Change
DISTANCE FROM RWY ℄ TO HOLD BARS		Existing	125'	125'
		Future	No Change	No Change

AIRPORT DATA

		EXISTING	FUTURE
AIRPORT REFERENCE CODE		B-I (small)	No Change
AIRPORT REFERENCE POINT (a)	Latitude	38° 57' 17.345" N	No Change
	Longitude	121° 04' 54.213" W	No Change
AIRPORT ELEVATION (Above Mean Sea Level)		1,536'	No Change
MEAN MAX. TEMP. (Hottest Month)		92° F (July)	No Change
AIRPORT AND TERMINAL NAVIGATIONAL AIDS		GPS/Beacon	No Change
GPS APPROACH ESTABLISHED		Yes	No Change
AIRPORT ACREAGE	Fee Simple	253	254
	Avigation Easement	0	No Change
AIRCRAFT PARKING SPACES	Tiedowns	138	No Change
	Hangar Spaces (approx.)	80	188
	Helicopter	3	4

ALP NOTES

(a) Airport coordinates data source: Andregg Inc. survey , December 2001. Coordinates are NAD83. Elevations are NAVD88.

(b) Core area redevelopment - layout to be determined by detailed design studies.

(c) All building elevations are estimated.

(d) Runway Protection Zones shown at wider than required dimensions based upon prior plans and occasional use of airport by large aircraft.

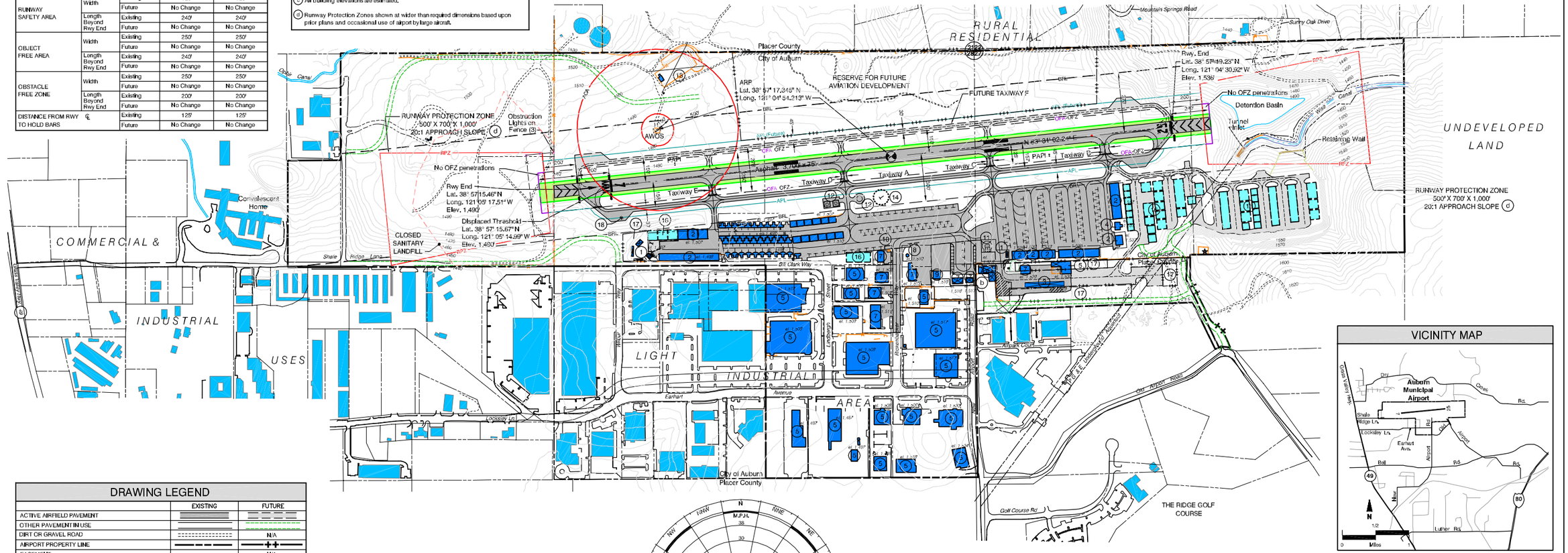
RUNWAY DATA

		RUNWAY 7-25 EXISTING	RUNWAY 7-25 FUTURE
AIRPORT REFERENCE CODE		B-I (small)	No Change
CRITICAL AIRCRAFT	AIRCRAFT	Cessna 414 Chancellor	No Change
	WINGSPAN	44.1'	No Change
	UNDERCARRIAGE WIDTH	10.4'	No Change
	APPROACH SPEED (kts.)	94	No Change
	MAX. TAKEOFF WT. (lbs.)	6,785	No Change
PHYSICAL LENGTH AND WIDTH		3,700' x 75'	No Change
RUNWAY HIGH POINT		1,536'	No Change
RUNWAY LOW POINT		1,490.00'	No Change
VERTICAL LINE-OF-SIGHT PROVIDED		Yes	No Change
EFFECTIVE GRADIENT (%)		1.24%	No Change
MAXIMUM GRADIENT (%)		2.00%	No Change
RUNWAY/TAXIWAY SURFACE TYPE		Asphalt	No Change
PAVEMENT STRENGTH (1,000#) - S/D/DT		30/-/-	No Change
RUNWAY EDGE LIGHTING		MIRL	No Change

TAXIWAY DATA

TAXIWAY	EXISTING A / B / C,D,E	FUTURE F
DESIGN GROUP	B-I	B-I
WIDTH	A = 30' B = 54' C,D,E = 35'	30'
SURFACE TYPE	Asphalt	Asphalt
STRENGTH (1,000#) S/D/T	30/-/-	30/-/-
SHOULDER TYPE	Asphalt	Asphalt
LIGHTING	MITL	MITL
RWY CL. to TWY CL.	A = 157'	F = 150'
TAXIWAY SAFETY AREA WIDTH	49'	49'
TAXIWAY OBJECT FREE AREA WIDTH	89'	89'
RWY CL. to FIXED or MOVABLE OBJECT	45'	45'
TAXIWAY WINGTIP CLEARANCE	20'	20'

LOCATION MAP



VICINITY MAP

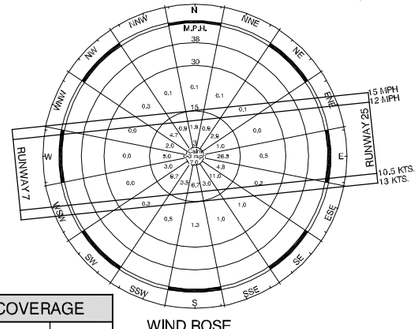
DRAWING LEGEND

	EXISTING	FUTURE
ACTIVE AIRFIELD PAVEMENT		
OTHER PAVEMENT IN USE		
DIRT OR GRAVEL ROAD		N/A
AIRPORT PROPERTY LINE		
EASEMENT		N/A
OTHER PROPERTY LINES		N/A
RUNWAY SAFETY AREA		N/A
AIRCRAFT PARKING LIMIT	APL	N/A
BUILDING RESTRICTION LINE	BRL	N/A
RUNWAY PROTECTION ZONE	RPZ	N/A
OBJECT FREE AREA	OFA	N/A
OBSTACLE FREE ZONE	OFZ	N/A
BUILDING - ON AIRPORT / OFF AIRPORT		
BUILDING TO BE REMOVED		
FENCE		N/A
VEHICLE GATE		N/A
WIND CONE		N/A
PAPI		N/A
RUNWAY EDGE LIGHTS/REILS	* / ****	N/A
AIRPORT BEACON		N/A
CHANNEL/FLOW LINE		N/A
TOPOGRAPHIC CONTOURS		N/A
AIRPORT REFERENCE POINT		N/A
SECTION CORNER		

BUILDING AND FACILITY LEGEND

(1) Mobile/Portable Office(s)	(13) Firing Range
(2) Small Box Hangar(s)	(14) Wind Cone and Segmented Circle
(3) T-hangar(s)	(15) Compass Rose
(4) Large Box Hangar(s)	(16) Hangar Building - Future
(5) Industrial Building	(17) Hangar / FBO Sites - Future
(6) Airport Administration Building	
(7) Aviation-Related Uses	
(8) Viewing Gazebo	
(9) Restaurant	
(10) Wash Rack	
(11) Fuel Island	
(12) Helicopter Parking	

Note: Elevation data shown in drawing

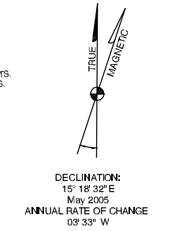


WIND ROSE

WIND COVERAGE

RUNWAY	12 M.P.H. (10.5 KNOTS)	15 M.P.H. (13 KNOTS)
7-25	92.0%	96.7%

Source: U.S. Weather Bureau recorded at Auburn
Period: Surface wind velocity data reflects an undetermined five year period of time



DECLINATION:
15° 18' 32" E
May 2005
ANNUAL RATE OF CHANGE
03' 33" W

SUBMITTED BY:
City of Auburn

By _____ Date _____

FAA Approval Space

NO.	REVISION	SPONSOR	DATE

AUBURN MUNICIPAL AIRPORT
AUBURN, CALIFORNIA

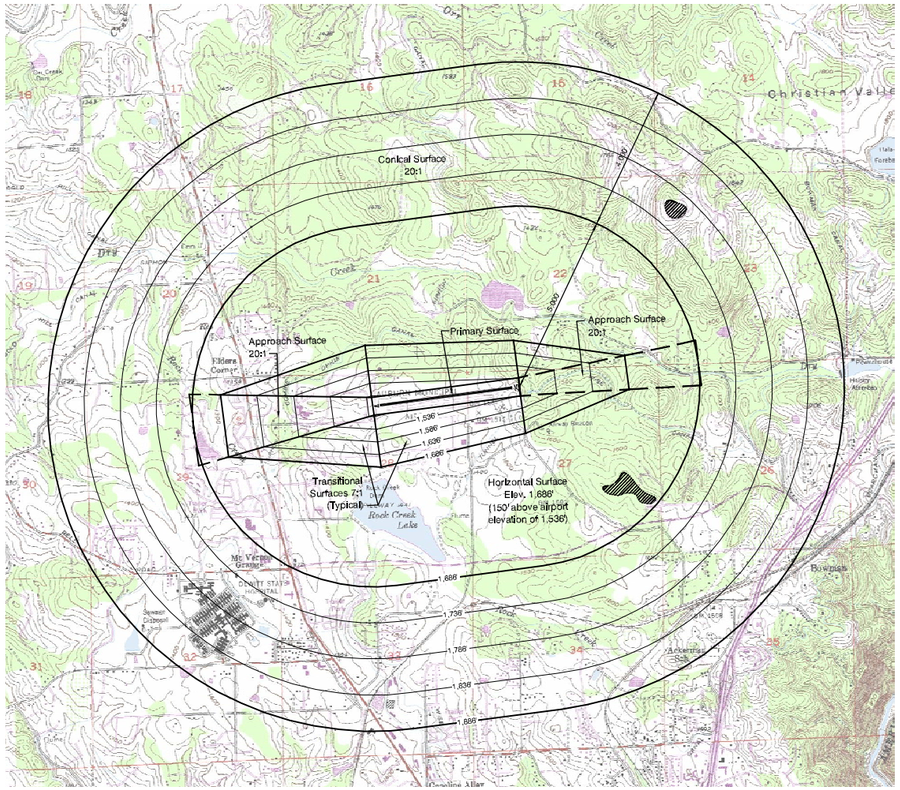
AIRPORT LAYOUT PLAN

MEAD & HUNT
133 Aviation Boulevard, Suite 100
Santa Rosa, California 95403
(707) 526-5010
Fax (707) 526-9721
www.meadhunt.com

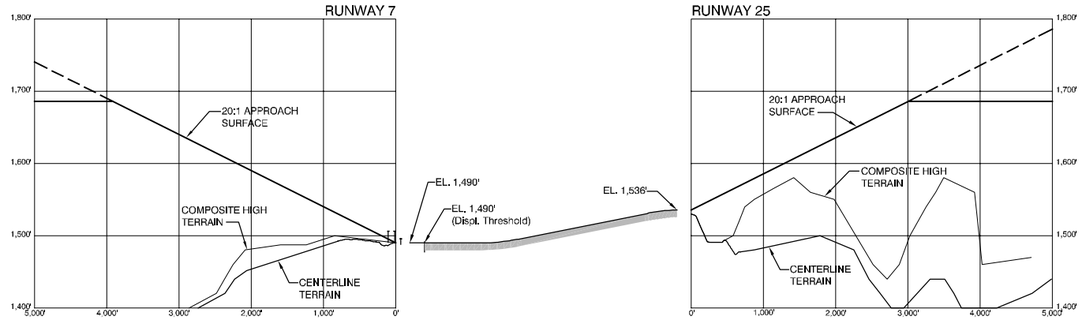
City of Auburn

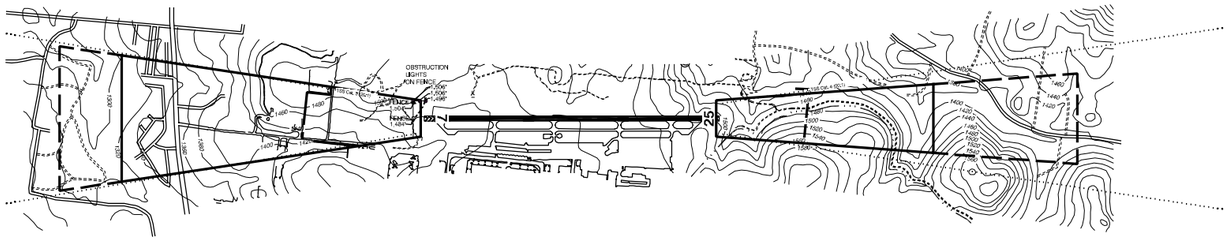
DESIGN:	KB	DRAWN:	TE	DATE:	July 23, 2007	SHEET	1	OF	1

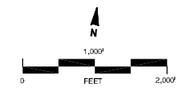
The preparation of these documents was financed in part through a planning grant from the Federal Aviation Administration as provided under Section 505 of the Airport and Airway Improvement Act of 1982, as amended. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of these documents by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted herein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public laws.



TYPICAL FAR PART 77 SURFACES







LEGEND

- Penetrating Object
- Non-penetrating Object
- Part 77 Surface Penetration
- Part 77 Surfaces
- Terrain Contours
- Penetrating Terrain

MAP SOURCE:

USGS Topographic Survey Map
coordinates: NAD27. Terrain
contours: NGVD29

NO.	REVISION	SPONSOR	DATE

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AUBURN, CALIFORNIA

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