

# UKIAH MUNICIPAL AIRPORT

Master Plan Report

Ukiah, California

Adopted by  
the  
City of Ukiah  
July 3, 1996



Prepared by  
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Ukiah Municipal Airport



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# Introduction



# **Introduction**

## **STUDY BACKGROUND**

Ukiah Municipal Airport is located within the southern limits of the City of Ukiah and adjacent to Highway 101. The Airport serves as an important community transportation resource for general aviation users desiring convenient air access to and from the City of Ukiah and portions of Mendocino, Humboldt, and Sonoma counties. Active general aviation users of the Airport include personal/recreational, business/corporate, and government/military interests. The Airport also serves as an important air attack base for the California Department of Forestry and Fire Protection's forest fire suppression operations.

Ukiah Municipal Airport features a paved 4,415-foot-long by 150-foot-wide runway which is lighted and offers nonprecision instrument approach capability. The Airport currently accommodates approximately 90 based general aviation aircraft – the large majority of these aircraft being single-engine piston-powered airplanes. In 1994, these based and visiting aircraft generated an estimated 50,000 takeoffs and landings at the Airport.

Although convenient for users, the Airport's location immediately adjacent to developed residential and commercial/industrial areas presents problems in terms of land use compatibility and facility expansion potential. Noise-sensitive land uses, primarily nearby residences, schools, and churches, are located within the Airport's environs. Also impacting airport operations is the presence of high mountainous terrain located to the east, south, and west of the Airport. The location of Ukiah Municipal Airport within this physical environment creates interactions which restrict both aircraft and airport operational flexibility.

Recognizing the need for a comprehensive evaluation of these and other issues impacting the future of Ukiah Municipal Airport, the City of Ukiah obtained a grant from the Federal Aviation Administration (FAA) to fund the preparation of a comprehensive airport master plan. The City then

engaged the aviation consulting firm of Shutt Moen Associates to conduct the planning study. This draft report represents the culmination of the various phases of the master plan study process.

During the preparation of the *Master Plan*, Shutt Moen Associates maintained a high level of interaction with City support staff, the FAA, and the California Department of Transportation Aeronautics Program. City staff contributed to the study effort with timely responses on a wide range of topics. Valuable input was also provided by the County of Mendocino, the general public, airport users, and airport tenants. In addition, key study findings and recommendations were reviewed with the City at staff briefings and public meetings held throughout the course of the study. The *Ukiah Municipal Airport Master Plan Report*, as presented herein, reflects the review, input, and contributions of these interested participants.

Following completion of the draft report in July 1995, the *Master Plan* received wide public review. Various revisions were made, primarily with regard to land use compatibility issues. These changes are incorporated into the present report. The *Ukiah Municipal Airport Master Plan* was adopted by the Ukiah City Council on July 3, 1996.

## Contents of the Plan

The *Ukiah Municipal Airport Master Plan Report* consists of eight chapters, plus a set of appendices. Included with the report is a set of three airport plan drawings. The *Airport Layout Plan* is the most significant of the three drawings in that it alone will be formally approved by the FAA as the basis for future airport operation and development.

A summary of the *Master Plan's* major findings and recommendations is presented in the following chapter (Chapter 2). Background and inventory data (Chapter 3), airport role and activity issues (Chapter 4), runway and taxiway system design issues (Chapter 5), and building area development issues (Chapter 6) are addressed in subsequent chapters. Chapter 7 contains an analysis of off-airport land use planning and environmental issues. The final chapter (Chapter 8) presents an overview of the Airport's current and projected financial condition, as well as an assessment of the Airport's ability to fund the capital improvement projects identified in the *Master Plan*.

The ten appendices contain supporting information and supplemental documentation, including an Initial Study of environmental impacts.

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## Summary



## Summary

### OVERVIEW

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The *Ukiah Municipal Airport Master Plan* was funded, in part, through a planning grant from the Federal Aviation Administration.

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The *Ukiah Municipal Airport Master Plan* is a comprehensive examination of the current status, anticipated future use, and proposed future course of development of Ukiah 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 20 years, the *Master Plan* helps to assure that individual improvements will properly function with other development, both existing and future.
  - This framework is not a detailed plan for construction, however. Such details will be determined – within the context of the interrelationships and constraints identified in the *Master Plan* – if and when individual facility improvements are studied and designed.
  - In this regard, it is important to recognize that the *Master Plan* does not represent a commitment on the part of the City of Ukiah or the Federal Aviation Administration (FAA) to proceed with any of the specific projects listed therein. Separate action by the Ukiah City Council will be required before implementation of any of the plan’s key recommendations can proceed.
- **Major Issues** – The focus of the *Master Plan* study has been on several key questions which have had central importance to the entire plan development process. These questions include:
  - What should be the long-term operational/service role(s) of Ukiah Municipal Airport?
  - Should extension of the runway be included in the *Master Plan* as a future option and, if so, how much of an extension?

- Can the Airport's instrument approach capability be enhanced and, if so, in what manner?
- How much land is needed to accommodate future airport building area development?
- What actions are required to protect the Airport from development of incompatible land uses?
- **Plan Time Frame** – The time frame of the *Ukiah Municipal Airport Master Plan* is 20 years with an emphasis on the first 10 years of this period. The ultimate build-out of some of the facilities discussed in the plan could be beyond 20 years, however.
- **Future Revisions** – The airport plan drawings, especially the *Airport Layout Plan*, should be reviewed as necessary to ensure that they continue to represent newly arising conditions and facility needs. It is recommended that the plan drawings be updated periodically to reflect new construction and operational requirements. A thorough review and updating of the *Airport Master Plan* should be accomplished within seven to ten years.

## PLAN DRAWINGS

The existing configuration and recommended future development of Ukiah Municipal Airport are graphically portrayed in three plan drawings which are part of this *Master Plan*.

- **Airport Layout Plan** – The *Airport Layout Plan (ALP)* is the most important of the airport plan drawings for Ukiah Municipal Airport. An *ALP* adopted by the City of Ukiah and approved by the FAA is a prerequisite to FAA funding of airport improvement projects under the Airport Improvement Program.
- **Building Area Plan** – The *Building Area Plan* shows details of the Airport's core areas (structures, tiedown locations, automobile parking, setbacks, etc.) not fully illustrated in the *Airport Layout Plan*.
- **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 Regulation (FAR), Part 77, *Objects Affecting Navigable Airspace*.

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

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## BACKGROUND AND INVENTORY

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Additional background and inventory data is contained in Chapter 3.

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- **Location** – Ukiah Municipal Airport lies entirely within the City of Ukiah incorporated limits, approximately 25 air miles directly inland from the Pacific Ocean and 62 miles north of Santa Rosa.
- **Historical Setting** – Ukiah Municipal Airport was originally established in 1942 as an auxiliary military landing strip. In 1954, the runway was lengthened to 5,000 feet. In 1968, the threshold of Runway 15 was relocated 585 feet to the south to its present position. Throughout the years, the City has expended federal, state, and local funds to improve the Airport and its service capabilities.
- **Management and Operation** – The Airport is owned by the City of Ukiah and is administered through the City Manager's Office. The day-to-day operation and maintenance of the Airport is the responsibility of an on-site Airport Manager employed by the City. The Airport Manager is assisted by one full-time employee and one part-time employee. In addition to the day-to-day management and operation of the Airport, City personnel are responsible for dispensing aviation fuel. A seven-member Airport Commission serves to advise the City Council regarding the operation and development of the Airport.
- **Aeronautical Services** – Six fixed base operators at Ukiah Municipal Airport offer a basic range of general aviation services to the flying public. These services include aircraft rental, flight and ground instruction, aircraft maintenance and repair, aircraft storage, aircraft sales, and air freight/charter.
- **Aeronautical Setting** – Ukiah Municipal Airport is located in a relatively isolated area of Northern California. As a result, the airspace in the vicinity of Ukiah Municipal Airport is relatively uncomplicated. Ukiah Municipal Airport is served by two nonprecision instrument approach procedures – a *straight-in* localizer approach to Runway 15 and a VOR-A (GPS-A) approach which terminates in a *circle-to-land* or *visual* maneuver. The Airport does not have an air traffic control tower, but does offer an FAA Flight Service Station.

## AIRPORT ROLE AND ACTIVITY

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For a full discussion of airport role and activity issues, see Chapter 4.

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The ultimate development potential of Ukiah Municipal Airport is expected to be largely determined by the framework established in this *Master Plan*. For this reason, issues regarding the Airport's role, projected activity, and system capacity received special attention in the planning study.

## Airport Role

- **Present** – Ukiah Municipal Airport’s basic role can be described as providing general aviation service to the City of Ukiah and southern Mendocino County. In fulfilling this basic function, the Airport also plays a variety of important individual roles:
  - Base for local personal and recreational flyers;
  - Point of access for personal and recreational visitors;
  - Transportation facility for business/corporate aviation;
  - Place to conduct aviation-related business;
  - Place to practice takeoffs and landings;
  - Site for emergency access to the community;
  - Base of operations for CDF’s fire attack mission; and
  - Potential commuter airline service point.
  
- **Future** – Although their relative importance might change to some degree, it is anticipated that the future roles of Ukiah Municipal Airport will remain essentially the same as at present.
  - *Personal/Recreational Flying* – Users of the Airport give high priority to enhancement of the Airport’s personal- and recreational-use roles for both locally based and visiting pilots.
  
  - *Aviation Businesses* – Also regarded as having high importance is the continuation and enhancement of the Airport’s role as a location for aviation-related businesses.
  
  - *Business/Corporate Aviation* – The Airport’s business/corporate aviation role is not expected to change dramatically with respect to its other roles. Efforts to enhance this role will continue to be essential to the Airport’s overall vitality and are considered to be of high priority by the local business community.
  
  - *Emergency Access* – The role of Ukiah Municipal Airport as a site for emergency air access to and within the Ukiah area will continue to be an important one.
  
  - *CDF Fire Attack Base* – Ukiah is a base for the California Department of Forestry and Fire Protection’s (CDF) fire attack mission. This important function has both regional and local significance.
  
  - *Scheduled Air Passenger Service* – Given the present character of the Airport and the status of the airline industry, reestablishment of scheduled air passenger service at Ukiah Municipal Airport is considered unlikely. However, within the 20-year time span of the *Master Plan*, limited air passenger service using small aircraft is a possibility which could be realized.

## Historical Airport Activity

- **Based Aircraft** – A count of based aircraft conducted as part of the present *Master Plan* study found that, as of late 1994, approximately 90 aircraft were based at Ukiah Municipal Airport. This number is somewhat below the Airport's historical peak of 104 aircraft. Approximately 88% of these aircraft are single-engine airplanes.
- **Transient Aircraft** – On typical busy weekends, some 15 transient aircraft may be parked on the transient apron and in fixed base operations parking areas.
- **Aircraft Operations** – During 1994, aircraft performed an estimated 50,000 takeoffs and landings at Ukiah Municipal Airport.

## Activity Forecasts

- **Based Aircraft** – The *Master Plan* projects that approximately 100 based aircraft will be based at the Airport by the year 2015. This projection reflects a 0.5% average annual growth rate. The great majority of these based aircraft will continue to be single-engine airplanes. However, the rate of increase of twin-engine airplanes and helicopters is expected to be comparatively faster than that for single-engine airplanes.
- **Transient Aircraft** – Assuming that business opportunities within the surrounding community continue to increase, long-term demand for as many as 20 transient aircraft spaces should be anticipated.
- **Aircraft Operations** – For planning purposes, a future activity level of 57,000 annual aircraft operations is projected to occur in conjunction with the Airport's projected 100 based aircraft. This operational projection reflects an average annual growth rate of 0.6%.

## Capacity Analyses

- **Airfield Capacity** – Airfield capacity measures the number of aircraft takeoffs and landings that can occur over a given period of time with an acceptable level of delay.
  - *Hourly Capacity* – The Ukiah Municipal Airport runway/taxiway system can accommodate approximately 60 VFR aircraft operations per hour or 4 IFR operations per hour.
  - *Annual Capacity* – Annual capacity calculations are highly dependent upon assumptions regarding the levels of peak versus off-peak activity. Given the Airport's present peaking characteristics,

the existing annual capacity of the runway/taxiway system is approximately 180,000 operations. This capacity is adequate to accommodate foreseeable future demand.

- **Building Area Capacity** – Relatively little land remains undeveloped within the present 40 acres of the airport building area. Future building area requirements include the need for enhanced public terminal facilities, additional aircraft storage hangars, and an aircraft washing facility.
- **Environmental Capacity** – Environmental capacity, typically measured in terms of cumulative noise impacts, is not a major constraint at Ukiah Municipal Airport. Measures to minimize noise-related conflicts between the Airport and its surroundings are nonetheless important and should continue to be emphasized.

## PROPOSED AIRFIELD IMPROVEMENTS

The airfield portion of Ukiah Municipal Airport consists of the 4,415-foot paved runway and taxiway system, together with Runway Protection Zones, required safety areas, and visual approach/landing aids.

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See Chapter 5 for the complete discussion of airfield design issues.

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### Basic Design Factors

- **Design Aircraft** – Nearly all of the aircraft now operating or expected to operate at Ukiah Municipal Airport typically have approach speeds of less than 121 knots, wingspans of less than 79 feet, and weigh 30,000 pounds or less. The FAA airport design classification for this family of aircraft is Airport Reference Code (ARC) B-II. For airfield design purposes, the *critical aircraft* at Ukiah Municipal Airport is the Beechcraft Super King Air 200 – an ARC B-II/Small twin-engine corporate turboprop.
  - Somewhat larger and/or faster aircraft (e.g., corporate turbo-props and jets and CDF fire attack aircraft) operate to and from the Airport on an occasional basis. However, such use is limited by available airfield facilities – primarily runway length and wingtip clearance considerations.
  - In addition, the Airport is experiencing increasing use by small- to mid-size helicopters. This activity is expected to continue to increase in the future.

- **Airfield Configuration** – Due to physical, demand, and economic factors, the current configuration of Ukiah Municipal Airport’s runway/taxiway system will remain essentially the same throughout the 20-year planning period.

### Runway Design

- **Runway Extension Option** – The presence of close-in obstructions makes the extension of Runway 15-33 infeasible. In addition, no demonstrable need for a runway longer than the current 4,415 feet has been identified by the *Master Plan* study. Accordingly, the current runway length of 4,415 feet is expected to remain the same throughout the 20-year planning time frame.
- **Relocated Threshold Location** – The *Master Plan* recommends that the current location of the Relocated Threshold at the approach end of Runway 15 be maintained throughout the 20-year planning period. Furthermore, the *Master Plan* recommends that Declared Distance criteria not be used to technically increase the length of available runway.

### Other Airfield Design Issues

- **Instrument Approach Capability** – Analysis of potential enhancements to the Airport’s existing instrument approaches indicates that it is unlikely existing approach minimums can be significantly improved. High terrain in the vicinity of the Airport precludes any useful reduction in instrument approach minimums. It is likely that within the next few years, a GPS-based overlay procedure will be established for the Runway 15 straight-in localizer approach.
- **Visual Approach Aids** – The airfield lighting system (i.e., runway and taxiway lights) is in good condition.
  - Installation of a visual glide slope indicator serving the approach to Runway 33 is not feasible due to high terrain to the south of the Airport.
  - Distance-To-Go signs are desirable along the length of Runway 15-33.
  - It is suggested that a supplemental wind cone be installed in the northeast corner of the Airport – near the Runway 15 touchdown zone.

## BUILDING AREA DEVELOPMENT

The building area of an airport encompasses all of the airport property not required for airfield purposes. At Ukiah Municipal Airport, the majority of the building area is located to the west of the runway/taxiway system.

### Design Considerations

- **FAA Airport Design Standards** – All building area structures, fixed objects, and aircraft parking areas must be located so as to comply with FAA design standards. At Ukiah Municipal Airport, the principal building area design considerations are the 425-foot Building Restriction Line to the west of the runway and the 50-foot Airplane Parking Limit line to the west of the parallel taxiway.
- **Land Availability** – The existing building area offers sufficient land area to accommodate projected aeronautical demand over the 20-year planning period. Acquisition of additional land area may prove advantageous in maximizing airport economic development opportunities.
- **Aircraft Storage Hangars** – Airport demand projections indicate that additional aircraft storage hangars will be needed at Ukiah Municipal Airport. Future growth of Ukiah Municipal Airport's based aircraft population will, in large measure, be dependent upon the availability of suitable aircraft storage hangars.
- **Airport User Access** – Airport ground access is currently considered to be very good, and this high level of accessibility should be maintained.
- **CDF Fire Attack Mission** – The presence at the Airport of large aircraft used in support of the CDF fire attack mission creates building area issues which must be addressed.
- **Development Staging** – The staging of improvements to the building area must be well-timed and coordinated. The objective 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 makes sense at each stage of development.

### Building Area Improvements

- **Aircraft Storage and Parking** – One of the primary roles of Ukiah Municipal Airport is to serve as a convenient location for the basing of light general aviation aircraft. Accordingly, siting and development

of additional aircraft storage hangars and tiedown positions has been provided for in the *Master Plan*. Hangar space for approximately 10 additional aircraft is depicted on the *Airport Layout Plan* and the *Building Area Plan*. The existing tiedown aprons will be adequate to accommodate anticipated decreasing future tiedown demand. Some rearrangement of tiedown areas may prove advantageous in accommodating increasing helicopter activity and development of new aircraft storage hangars.

- **Public Terminal Building** – The *Master Plan* recommends that the existing public terminal building be renovated.
- **Fixed Base Operations** – The existing fixed base operations facilities are well located and configured, both the present and the future.
- **Aviation Fueling Facilities** – A new two-product aboveground aviation fuel storage facility is being developed in the northeast portion of the Airport.
- **Helicopter Operations** – To better accommodate transient helicopter operations, the *Master Plan* recommends that at least two helicopter parking positions be designated on the concrete apron located directly to the east of the airport terminal building. Helicopters based at the Airport will continue to operate directly to/from their respective on-airport facilities.
- **CDF Fire Attack Base** – The future facility needs of the California Department of Forestry and Fire Protection (CDF) Ukiah Air Attack Base have yet to be formally addressed by the CDF and City. If CDF facilities are improved or expanded, three potential on-airport development scenarios are possible.
  - The CDF’s existing site could be expanded to the west.
  - An entirely new base could be developed in the southeast corner of the Airport.
  - An entirely new base could be developed in the northeast corner of the Airport (at the present site of a wholesale lumber yard).

Funding for the substantial redevelopment of the base would most likely have to come from or through the City. The City is currently evaluating its options with regard to the expansion or relocation of Ukiah’s CDF facilities.

- **Other Building Area Facilities** – The following facilities are identified as integral elements of the *Building Area Plan*:
  - *Aircraft Washing Facility* – The *Master Plan* suggests that an aircraft washing facility be provided at the site of the current fuel storage

facility. This washing facility must comply with California Environmental Quality Act/Environmental Protection Agency environmental requirements.

- *Future Building Area Land Acquisition* – Contiguous to the southern end of the Airport’s building area is a 2.6-acre parcel of land currently being used for the grazing of livestock. Should this parcel become available on the open market, the *Master Plan* recommends that it be acquired for airport economic support purposes.

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See Chapter 7 for the complete discussion of land use and environmental issues.

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## LAND USE AND ENVIRONMENTAL ISSUES

Ukiah Municipal Airport can be viewed as being at a crossroads with regard to long-term land use compatibility. Few major problems have arisen so far, but actions need to be taken soon to preserve the Airport’s viability. Changes in the character and magnitude of airport activity are expected to be relatively minimal over the next 20 years. However, urban expansion of the City of Ukiah is extending southward to envelop the Airport and the lands under its flight routes.

### Compatibility Concerns

- **Noise** – Noise from Ukiah Municipal Airport operations has not been a significant compatibility concern. The noise analyses conducted as part of the *Airport Master Plan* indicate that the Airport’s Community Noise Equivalent Level (CNEL) contours will remain essentially constant through the 20-year planning period. The only residences affected by the 60-dB CNEL contour in either time frame are adjacent to the runway’s south end. The principal concern with regard to noise involves the continued urban development around the Airport, especially residential development along the approach/departure corridors. Although most of these areas are beyond the normally measured CNEL contours, they are subject to annoyance factors resulting from routine aircraft overflights.
- **Runway Protection Zones** – The Federal Aviation Administration strongly encourages airport owners to have sufficient property rights to land within Runway Protection Zones (RPZs) to prevent incompatible development. Although the City of Ukiah has acquired critical properties in the center portions of the RPZs, some 12 acres of the Runway 15 (north) and 5 acres of the Runway 33 (south) RPZs remain privately owned. Some two dozen buildings are situated within these areas.

- **Density of Development in the North Approach Corridor** – This predominantly developed section of the City of Ukiah includes both the central business district bordering State Street and an area of mixed commercial, industrial, and some older residential land uses between State Street and the Northwestern Pacific Railroad line. The trend in the latter area is toward conversion of most of the remaining residential uses to commercial or industrial. This change is generally an improvement with regard to both noise and safety compatibility. Nonetheless, as this conversion takes place, it is essential to avoid high-intensity uses which attract gatherings of people. Also, it would be preferable from a compatibility perspective if the medium-intensity residential area planned to remain along Apple Avenue could eventually be converted to low-intensity commercial or industrial uses.
- **Potential New Development Elsewhere Beneath Traffic Pattern** – Chief among the concerns in these areas is the south approach corridor. This area is currently not within the Ukiah city limits, although it falls within the City's planning sphere of influence. The State Street interchange with Highway 101 – the principal southern gateway to town – makes this a potentially attractive commercial development location. To be consistent with airport safety compatibility concerns, though, any such development will need to be kept low in intensity. Other areas are less of a concern. East of the freeway, the land is mostly agricultural and is expected to stay in that use because of its proximity to the Russian River. Also, land uses inside the traffic pattern represent relatively minor concerns because overflights are infrequent.
- **Airspace Protection** – Diligence is necessary to assure that tall buildings, antennas, and trees in the center of the City north of the Airport do not become obstructions to the Airport's essential airspace. Also, tall objects on the hills south and northeast of the Airport could adversely affect the Airport's instrument approach minimums. The City has adopted an airport-related height limit ordinance, but the County has not.

### Land Use Compatibility Measures

- **Property Acquisition** – The City of Ukiah is strongly encouraged to continue to acquire fee title to property within the RPZs, if not by condemnation, then at the owners' option or as the property comes on the market. A potentially effective alternative form of acquisition is for the City to obtain approach protection easements. These easements combine standard aviation easement rights with acquisition of development rights limiting the types of land uses permitted on the property. Acquisition of fee title or approach protection easements is proposed for some 55 acres of property within and adjoining the RPZs.

- **Operational Policies** – The other side of the land use compatibility coin is to limit airport impacts through regulation of aircraft operations. Several such measures already are in effect at Ukiah Municipal Airport. No major new measures are deemed necessary. Several enhancements are recommended, however. These include: further definition of the optimum noise-abatement traffic pattern; increasing the pattern altitude from 800 to 1,000 feet above the Airport; and greater emphasis on use of Runway 15 as the calm wind runway.
- **Overlay Zone** – The City and the County should each adopt an airport overlay zone for the areas within their respective jurisdictions. Elements which should be included are:
  - Airspace-related height limits;
  - Prohibition of other land use conditions which could be hazardous to flight;
  - Establishment of density and intensity limits on nearby land uses;
  - Prohibition of uses which are highly noise-sensitive or pose high risks;
  - Noise attenuation requirements on buildings in the highest noise areas;
  - Identification of areas where compatibility is a special concern; and
  - Establishment of a buyer awareness program.
- **Recommendations to Airport Land Use Commission** – The City should request that the Mendocino County Airport Land Use Commission add a map and policies for Ukiah Municipal Airport to the Commission's adopted *Airport Land Use Compatibility Plan*. Some of the individual policies for Ukiah Municipal Airport should be modified from the county-wide policies to reflect the extent of existing urban development in the airport vicinity.

## Environmental Impacts of Airport Development

An Initial Study of the environmental impacts associated with the implementation of the *Ukiah Municipal Airport Master Plan* was prepared. The Initial Study concluded that the sum of the airfield development proposed in the *Master Plan* represents a completely mitigable impact on the environment. The recommended mitigation actions include land acquisition, restrictions on land uses near the Airport, and appropriate construction practices.

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Financial and plan implementation topics are examined in length in Chapter 8.

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## FINANCIAL AND IMPLEMENTATION ISSUES

The financial element of the *Master Plan* addresses the timing of the proposed airport improvement projects, the estimated costs of these improvements, and anticipated future airport revenues and expenses.

### Capital Improvement Program

- **Project Staging** – Table 2A lists the airport improvements proposed in the *Master Plan*. Also indicated is the timing of the recommended improvements, as well as their estimated costs (in 1994 dollars).
- **Short-Range Projects** – The major projects slated for construction in the short-range (within five years) are as follows:
  - Pavement rehabilitation and maintenance,
  - Construct aircraft storage hangars (initially 3 units),
  - Renovate terminal building,
  - Relocate/improve CDF facility (optional), and
  - Approach protection – Phase I (20 acres).
- **Costs** – The total estimated cost of the projects identified in the *Master Plan* is approximately \$11.0 million. Of this amount, roughly 36% (or \$4.0 million) is proposed for short-range implementation – primarily for approach protection and airfield pavement rehabilitation.
- **Funding Sources** – It is suggested that the recommended airport improvements be funded through a combination of Federal Aviation Administration, California Aeronautics Program, airport enterprise account funds, and private sources.
  - The FAA Airport Improvement Program is the largest single source of proposed funding – 87% of the total cost of proposed improvements is eligible for FAA grants.
  - The anticipated City of Ukiah share of the improvement costs over the 20-year *Master Plan* period is \$1,338,650. The major improvements requiring substantial City funding are 1) the acquisition of easements and property for approach protection (local share), 2) the local share of AIP-funded airfield pavement rehabilitation, and 3) the renovation of the Flight Service Station and Airport terminal building. State AIP-Match Program funds can be used to reduce the City's local share funding requirement.
  - It is anticipated that the private sector will fund the development of all hangars, fixed base operations, and specialty aeronautical facilities.

	Estimated Costs (In 1994 \$ values)		
	Total <sup>a</sup>	Federal <sup>b</sup>	Airport <sup>c</sup>
<b>Short-Range Projects (Within 5 Years)</b>			
Obstruction removal	\$ 15,000	\$ 13,500	\$ 1,500
Approach protection <sup>d</sup> – Phase I (20 acres)	2,750,000	2,475,000	275,000
Improve/relocate CDF fire attack base <sup>a</sup>	–	–	–
Rehabilitate/renovate airport terminal building	82,500	40,000	42,500
Rehabilitate/renovate Flight Service Station building	200,000	-0-	200,000
Construct Runway 33 blast pad	50,000	45,000	5,000
Construct aircraft washing facility	30,000	-0-	30,000
Install windcone	3,000	2,700	300
Install Distance-To-Go signs	12,000	10,800	1,200
Enhance airport security	15,000	13,500	1,500
Pavement rehabilitation	–	–	–
• Slurry seal (R1, T1, T2, T3, T4 and T5)	215,000	193,500	21,500
• Reconstruction (TD1A, TD1B, TD2A, and TD2B)	535,000	481,500	53,500
• Repair and slurry seal (A2A and A2B)	120,000	108,000	12,000
<b>Subtotal</b>	<b>\$4,027,500</b>	<b>\$3,383,500</b>	<b>\$644,000</b>
<b>Mid-Range Projects (5 to 10 Years)</b>			
Approach protection <sup>d</sup> – Phase II (20 acres)	\$2,750,000	\$2,475,000	\$275,000
Acquire building area property (2.6 acres)	390,000	351,000	39,000
Pavement rehabilitation	–	–	–
• Joint and crack repair (A1A)	54,000	48,600	5,400
• Coal tar seal (A1B)	19,500	17,550	1,950
• Slurry seal (R1, T1, T2, T3, T4, and T5)	214,500	193,050	21,450
• Slurry seal (TD1A, TD1B, TD2A, and TD2B)	75,000	67,500	7,500
• Slurry seal (A2A and A2B)	120,000	108,000	12,000
<b>Subtotal</b>	<b>\$3,623,000</b>	<b>\$3,260,700</b>	<b>\$362,300</b>
<b>Long-Range Projects (Beyond 10 Years)</b>			
Approach protection <sup>d</sup> – Phase III (15 acres)	\$2,062,500	\$1,856,250	\$206,250
Pavement rehabilitation	–	–	–
• Asphalt overlay (R1, T1, T2, T3, T4, and T5)	1,086,000	977,400	108,600
• Coal tar seal (TD1A, TD1B, TD2A, and TD2B)	77,000	69,300	7,700
• Coal tar seal (A2A and A2B)	101,000	90,900	10,100
<b>Subtotal</b>	<b>\$3,326,500</b>	<b>\$2,993,850</b>	<b>\$332,650</b>
<b>TOTAL</b>	<b>\$10,977,000</b>	<b>\$9,638,050</b>	<b>\$1,338,950</b>

Table 2A

**Proposed Airport Improvements**  
**Ukiah Municipal Airport**

- <sup>a</sup> Estimated construction costs are based upon a preliminary assessment of construction requirements; actual costs will depend upon detailed designs and specifications; engineering costs and contingencies included. Estimated land costs are based upon anticipated acquisition costs plus administrative costs and contingencies.
- <sup>b</sup> Federal funding for eligible projects calculated at 90% based upon current legislation. Local share equals 10%. State funds could be used (but are not expected to be) on many of the projects in lieu of federal funds. Hangars and fixed base operator facilities to be funded by the private sector.
- <sup>c</sup> The CALTRANS/Aeronautics Program AIP Match Program can be used to further reduce local AIP sponsor costs by approximately 45% (from 10% local share to 5.5% local share).
- <sup>d</sup> Approach protection acreage includes all areas recommended for acquisition – either in fee simple or through approach protection easements. Cost estimate reflects 50% fee simple acquisition and 50% easement acquisition.
- <sup>e</sup> The cost of improving/relocating the Ukiah CDF fire attack base will be determined through a separate City-sponsored analysis of development options.

Source: Shutt Moen Associates (July 1996)

Table 2A - Continued

## Financial Projection

- **Short-Term Summary** – Ukiah Municipal Airport's projected operating income and retained earnings will be insufficient to totally fund the sponsor's share of the Capital Improvement Program costs over the initial 5-year financial planning period. During this period, supplemental funding and/or interim financing from the City of Ukiah may be required to provide for the timely and cost-effective implementation of Ukiah Municipal Airport's Capital Improvement Program.
- **Long-Term Summary** – Over the course of the 20-year planning period, it is anticipated that airport revenues will continue to remain modest. Airport revenue could be enhanced by developing new sources of airport-related revenue and/or by increasing the rates charged to airport lessees and users. Caution must be exercised, however, in establishing higher rates at the Airport. A reasonable balance must be sought among such factors as the need for a financially viable airport, public air access considerations, the continuation of indirect subsidies to the private sector, and general aviation market conditions. In this regard, the Airport's rates and fees structure should be established in a manner which permits the Airport operator to safely operate and improve the Airport while attracting and serving the Airport's target user groups.

## Financial Recommendations

- **Revenue/Expenses** – The Airport operator should continue to aggressively develop all revenue resources and strictly control and minimize all operating expenses.
- **Rates and Charges** – Airport rates and charges should be reviewed and adjusted on an annual basis to ensure that maximum reasonable revenue is generated consistent with the Airport's role, facilities, and user demand.
- **Encourage Development** – Additional private and commercial aviation development on the Airport should be encouraged to bolster Airport revenues and service offerings and increase tax ratables.

## Master Plan Adoption

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An *Initial Study* covering the improvements proposed by the *Master Plan* is documented in Appendix H of the *Master Plan Report*.

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- **Environmental Impact Documentation** – An *Initial Study* was prepared in accordance with California Environmental Quality Act guidelines and the City of Ukiah’s environmental review requirements and was an integral element of this master planning process. This *Initial Study* led to the preparation of a Negative Declaration allowing adoption of the *Airport Master Plan*.
- **Plan Review** – The Ukiah Municipal Airport Commission, the Mendocino County Airport Land Use Commission, and the City of Ukiah Planning Commission each had certain review responsibilities with regard to the *Airport Master Plan*.
  - The Ukiah Municipal Airport Commission reviewed the overall plan and made recommendations regarding its adoption to the Ukiah City Council.
  - The Mendocino County Airport Land Use Commission, as required by State law, reviewed the *Master Plan* prior to its adoption.
  - The City of Ukiah Planning Commission reviewed the *Airport Master Plan* and offered an advisory recommendation to the City Council.
- **Ukiah City Council** – The Ukiah City Council had the ultimate responsibility for adoption of the *Airport Master Plan*. In addition, the Council was responsible for certifying any Negative Declaration associated with the *Master Plan*.
- **Federal Aviation Administration** – Following adoption of the *Master Plan* by the City, the FAA will formally review and approve the *Airport Layout Plan* drawing as the basis for future engineering design and grant eligibility of specific projects.

## Implementation

- **Project Funding** – Once the *Master Plan* has been adopted and a decision has been made to proceed with implementation, the City should soon thereafter submit an Airport Improvement Program grant preapplication to the California Aeronautics Program and the FAA. This preapplication should include, at a minimum, those short-range AIP-eligible projects identified in the recommended Capital Improvement Program (Table 2A).

- **Engineering Design** – The City may choose to enter into a contractual arrangement with a qualified airport engineer to prepare the detailed engineering designs for the proposed improvements. To assure continuity in design and development, it is suggested that the agreement cover not just the immediate projects, but other major improvements proposed to be constructed over the next 3 to 5 years.

3

Background  
and  
Inventory



## **Background and Inventory**

### **UKIAH MUNICIPAL AIRPORT**

#### **Location and Environs**

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A brief profile of Ukiah Municipal Airport's major features, air traffic procedures, management and services, and environs is presented in Table 3A. The accompanying paragraphs highlight a few key points.

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Ukiah Municipal Airport is located in the southeastern corner of Mendocino County, 25 air miles directly inland from the Pacific Ocean and 62 miles north of Santa Rosa (see Figure 3A). Situated less than a mile west of State Highway 101, the Airport is entirely inside the limits of the City of Ukiah, the County Seat.

Located in the Yokayo Valley, Ukiah Municipal Airport is surrounded by low hills, with Lake Mendocino to the north and the Mayacmas Mountains to the east, which rise nearly 2,000 feet above the 614-foot Mean Sea Level (MSL) elevation of the Airport.

The City of Ukiah has approximately 15,000 residents and has been growing at a rate of 1.75% per year. The four-square-mile city limits are predominately to the northwest of the Airport with the south and east being dedicated primarily to agriculture and light commercial development.

#### **Airport Development and Facilities**

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A detailed listing of existing facilities at Ukiah Municipal Airport is provided in Appendix A of this report. Figure 3B depicts an aerial view of the Airport and its immediate environs.

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Construction of Ukiah Municipal Airport began in 1942 with a 4,000-foot by 150-foot runway and 50-foot-wide parallel taxiway. The runway was extended to 5,000 feet in 1954. It remained at this length until 1986 when, because of FAA standards applicable at that time, the Runway 15 threshold was relocated to the south 585 feet. The current length of Runway 15-33 is 4,415 feet.

**MAJOR FEATURES**

**Property**

- Approximately 160 acres owned in fee by the City of Ukiah; property includes a runway/taxiway system, most of the south runway protection zone, approximately half of the north runway protection zone, and several acres of developed and undeveloped building area.

**Airfield**

- Runway 15-33 – 4,415 feet long, 150 feet wide; asphalt; lighted.
  - Visual Approach Slope Indicator (VASI) at approach end of Runway 15 (V4L-GA 3.0° - TCH 27').
  - Runway End Identification Lights (REIL) at both runway approach ends
  - Threshold relocated 585 feet at Runway 15 approach end.
- Full-length parallel taxiway on west side; centerline is 300 feet from runway centerline along the northern 2/3 of length tapering down to 225 feet at the southern end.

**Building Area**

- Located along the west side of the runway/parallel taxiway.
  - Four primary tiedown areas, as well as a few smaller areas, totaling 65 spaces.
  - One primary auto parking lot and several smaller parking areas, totaling some 75 spaces.
  - Seven conventional hangars/shop buildings.
  - Two T-hangar buildings with a capacity to store approximately 20+ aircraft.
  - One shade hangar with a capacity of 14+ aircraft.
  - Thirty portable T-hangars.
  - Aviation fuel storage facility.
  - CDF air attack facilities.
  - Airport terminal/office building.
  - FAA Flight Service Station (FSS).
  - Seven non-aviation businesses.
  - On-site utilities include: electric, water, natural gas, telephone, and sanitary sewer.

**AIR TRAFFIC PROCEDURES**

**Traffic Pattern**

- Pattern Altitude – 1,414 feet MSL (800 feet AGL).
- Left traffic on Runway 15; right traffic on Runway 33.

**Instrument Approaches**

- Localizer to Runway 15 (straight-in).
- VOR-A or GPS-A (circle-to-land/visual).

**Communications**

- Flight Service Station – 123.6 MHz, operated by the FAA (1615Z - 0145Z).

**Noise Abatement Procedures**

- Departing Runway 33, make 20° right turn to avoid built up areas.
- Departing Runway 15, make 20° left turn to avoid built up areas.

- Calm wind runway is 15 for noise abatement.
- No jet aircraft departures between 0600Z - 1500Z.
- No straight-in approaches (except LOC Runway 15).

**MANAGEMENT AND SERVICES**

- Management/operation of Airport responsibility of City of Ukiah.
- Two full-time and one part-time City employees based at Airport.

**Fixed Base Operations**

- Six FBOs offer a basic range of general aviation services (primarily to small aircraft).

**Fuel Service**

- 100LL and Jet-A fuel available daylight hours; \$20 fee for services after dusk; Chevron fuel; based in administrative building (centrally located in building area) and dispensed by City airport personnel.
- Several tenants have their own private fuel storage and dispensing facilities.

**Emergency and Security**

- City of Ukiah Police Department.
- City of Ukiah Fire Department.

**ENVIRONS**

**Topography**

- Airport elevation - 614 feet MSL.
- High terrain on approach to Runway 33.
- High points within a 10 N.M. radius include:
  - Cow Mountain; 3,019 feet (6 N.M. NE)
  - Cleland Mountain; 2,522 feet (2 N.M. E)
  - Red Mountain; 3,389 feet (7 N.M. SE)

**Access**

- Principal access from Highway 101 via Talmage Road exit to the west, then approximately 3/4 miles south on State Street to airport entrance.
- Driving Distances: Santa Rosa, 62 miles south; San Francisco, 113 miles south; Eureka, 160 miles north; Sacramento, 148 miles southeast.

**Jurisdiction**

- Airport totally within Ukiah city limits.

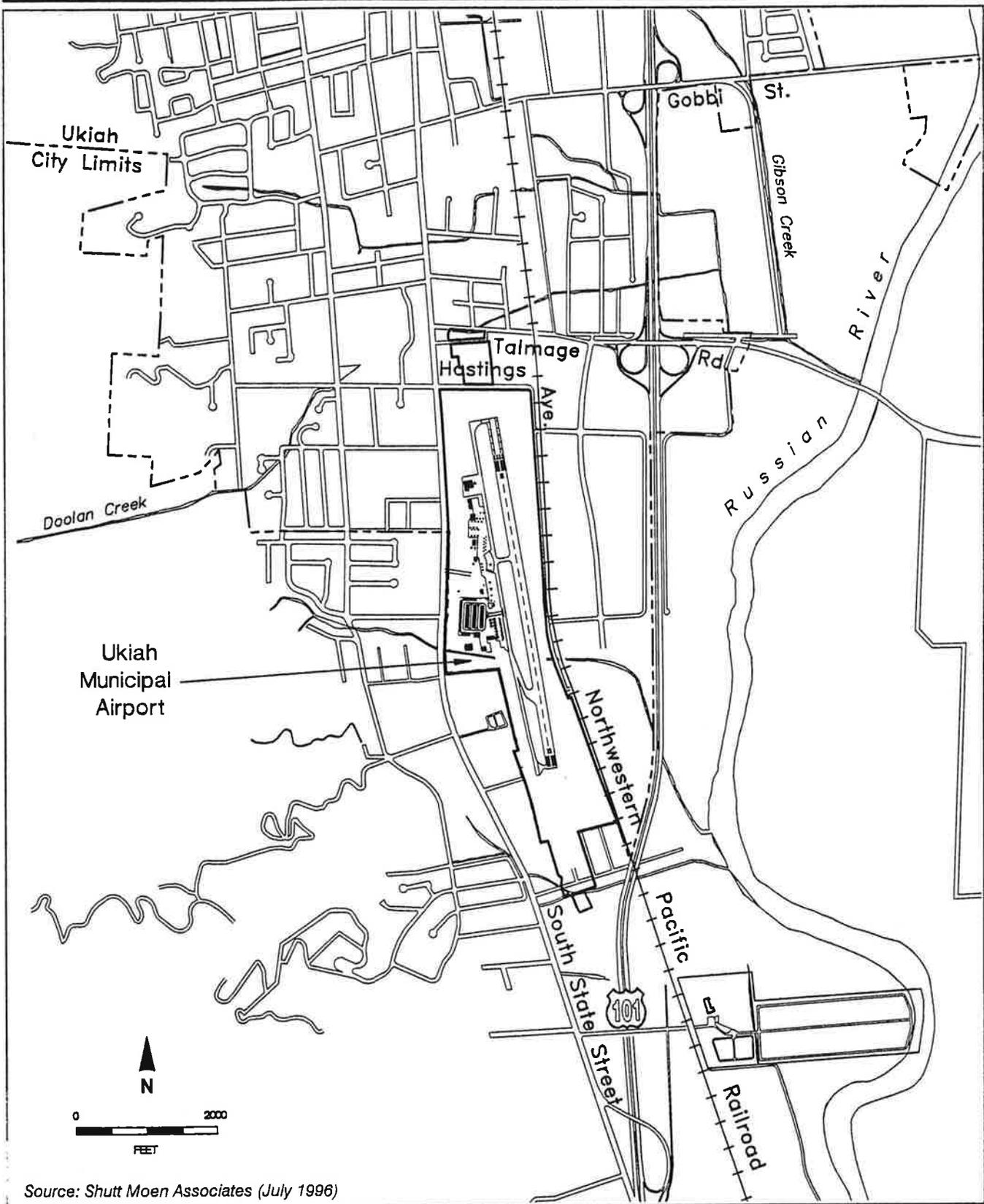
**Principal Land Uses**

- North - Mixed industrial, commercial, and residential.
- East - Immediately east is open land planned for commercial/industrial development; further east, agriculture.
- South - Open land; light commercial; some medium density residential areas.
- West - Commercial; light and medium density residential.

Source: Data compiled by Shutt Moen Associates (July 1996)

Table 3A

**Airport Profile**  
Ukiah Municipal Airport



Source: Shutt Moen Associates (July 1996)

Figure 3A

**Airport Vicinity**  
Ukiah Municipal Airport

Two nonprecision instrument approach procedures are published for Ukiah Municipal Airport. One approach, the VOR-A, utilizes the Mendocino VORTAC (5.5 nautical miles southwest of the Airport) and is a *circle-to-land* approach. The VOR-A approach can also be flown using Global Positioning System equipment (GPS-A). The other instrument approach utilizes the Ukiah localizer on Runway 15. The *straight-in* localizer approach to Runway 15 has the lowest minimums, allowing a descent to 1,106 feet above airport elevation with 1-1/4 statute mile visibility. There is no Air Traffic Control Tower at Ukiah Municipal Airport. However, the FAA Flight Service Station (FSS) located at the Airport provides Airport Advisory Service between the hours of 1615Z and 0145Z. UNICOM (123.0 MHz) and AWOS-3 (134.75 MHz) services are also available.

The building area is located primarily to the west of the runway. The majority of facilities are dedicated to aircraft storage with 64 covered hangar spaces and 95 tiedown spaces currently available.

## **Management and Services**

### ***City of Ukiah***

The day-to-day operations and management of Ukiah Municipal Airport is the responsibility of the Airport Manager, a City employee, who reports directly to the City Manager. The Airport Manager is assisted on-site by one full-time and one part-time City airport employee. Policy decisions affecting the Airport are made by the Ukiah City Council. A seven-person Airport Commission advises the City Council on matters pertaining to the Airport.

### ***Airport Tenants***

Six Fixed Base Operators (FBOs) provide a basic range of general aviation services including flight instruction, airframe and powerplant maintenance, hangar rentals, aircraft charter, and air freight services. Seven nonaviation businesses, the CDF's Ukiah Air Attack Base, and the FAA Flight Service Station (FSS) complete the list of airfield tenants. Most of the Airport's aeronautical facilities are located on the west side of the runway with the exception of the segmented circle, wind tee, lighted wind cone, and weather sensor equipment located on the Airport's east side. The City of Ukiah Corporation Yard, a privately-owned wholesale lumber yard, and a fence storage area are located in the northeast corner of the Airport.

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A listing of Ukiah Municipal Airport tenants and the services they provide is presented in Table 3B.

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Name	Fuel Sales		Flight Instruction		Aircraft Rental		Misc.		Aircraft Parts and Maintenance				Aircraft Storage		Notes
	100 / 100LL	Jet A	Fixed Wing	Helicopter	Fixed Wing	Helicopter	Pilots' Supplies	Charter (FAR 135)	Engine	Airframe	Avionics	Helicopter	Tiedowns	Hangars	
<b>Fixed Base Operations (FBO)</b>															
Ace Aerial Service			X		X		X	X	X	X			X	X	FAA written tests
Gordon Air Service			X					X	X	X			X	X	Crop dusting, fire suppression
Plane Works			X		X			X	X	X					
Smith Air								X							Car rental
Smith Helicopter								X							Aerial crane
Ukiah Aviation			X		X		X	X							
<b>Aviation-Related Functions</b>															
California Dept. of Forestry and Fire Protection															Operates Ukiah Air Attack Base jointly with U.S. Forest Service
FAA Flight Service Station															Provides weather and flight information to pilots
<b>Non-Aviation Businesses</b>															
Airport Fence															Commercial fence storage
Cagle Wholesale Lumber															Wholesale lumber sales
City of Ukiah Corporation Yard															Municipal maintenance and storage facilities
City of Ukiah Employee Credit Union															Financial services
Hertz															Car rental
Oak Valley Nursery															Nursery
Retech															Furnace manufacturer

Source: Data Compiled by Shutt Moen Associates (July 1996)

Table 3B

**Airport Tenants and Services**  
Ukiah Municipal Airport

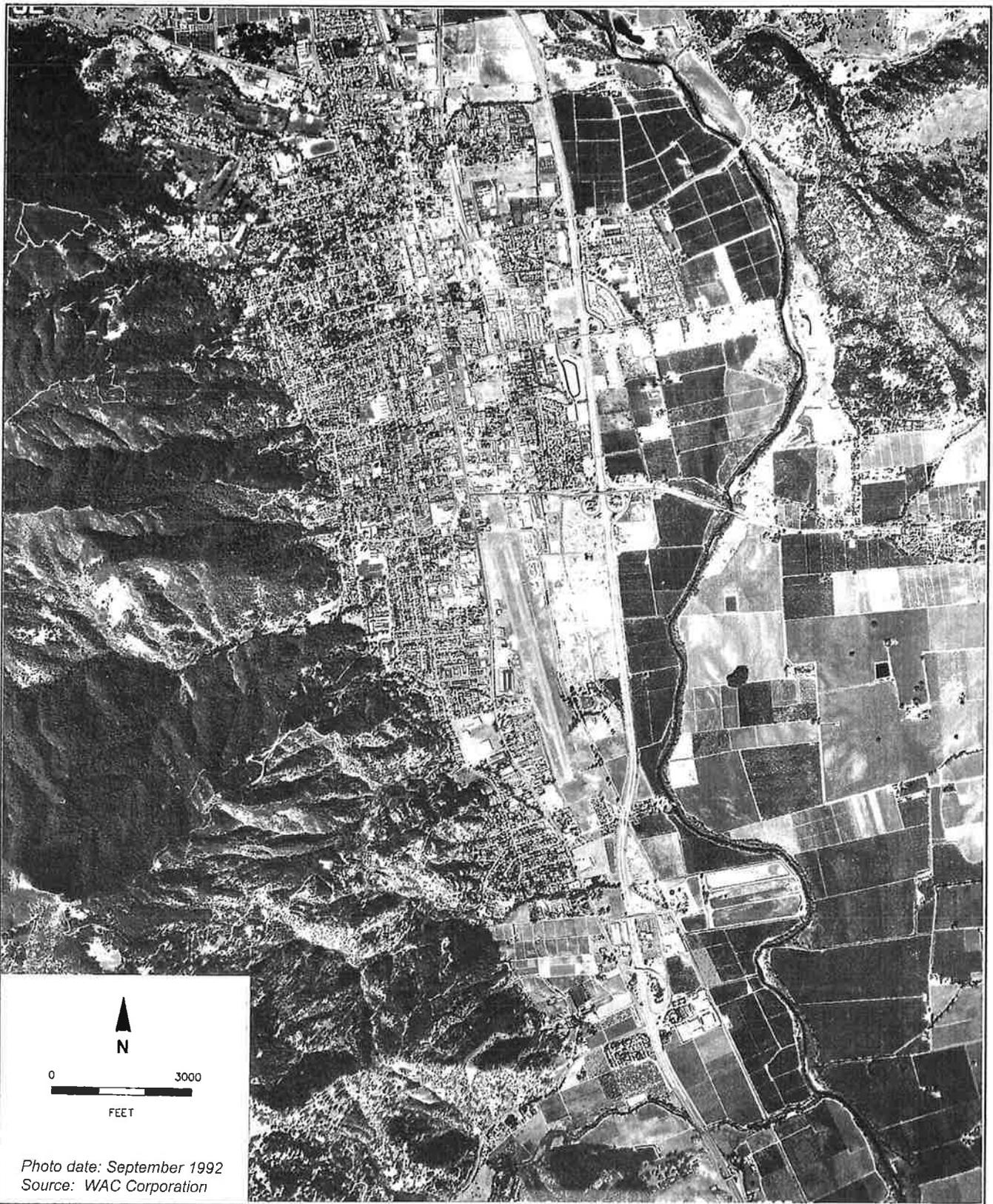


Figure 3B

**Airport Aerial View**  
Ukiah Municipal Airport

## AERONAUTICAL SETTING

### Area Airports

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Important to the preparation of an airport master plan are the interrelationships between the airport and other nearby airports. Such interrelationships can be significant with regard to the marketing and demand for aviation facilities and services, as well as in terms of air traffic control and other technical matters.

Selected data regarding airports in the vicinity of Ukiah Municipal Airport is summarized in Table 3C. Figure 3C shows the location of these airports together with key features of the area airspace.

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The City of Ukiah and Ukiah Municipal Airport are located in a fairly isolated area of Northern California with mountainous terrain to the east, south, and west. Because of this, relatively little land near Ukiah is suitable for other airport sites and only nine public use airports are located within a 35-statute-mile radius. In terms of direct distance, Boonville Airport, a limited-service general aviation facility, is the closest public-use airport to Ukiah Municipal Airport. The closest airport with scheduled air services is the Sonoma County Airport, located 50 miles southeast of Ukiah.

### Area Airspace

With no other airports nearby, airspace in the vicinity of Ukiah Municipal Airport is uncomplicated. The surrounding high terrain is the most significant influence on air traffic procedures, particularly with regard to instrument flight operations at the Airport. High minimums associated with Ukiah Municipal Airport's instrument approaches are a direct consequence of the nearby high terrain.

In addition, the Airport's traffic pattern is located on the east side of the runway (left traffic for Runway 15 and right traffic for Runway 33) due primarily to high terrain to the west of the Airport.

### Aircraft Safety Record

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A review of an airport's historical safety record can provide valuable insights into the location of airport hazards and the need for physical or operational improvements to mitigate those hazards.

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The principal sources of data on general aviation aircraft accidents in the United States are the National Transportation Safety Board (NTSB) and the Federal Aviation Administration Safety Data Branch. These agencies, though, maintain records only on *accidents* – serious mishaps resulting in substantial damage to the aircraft or severe injury to the people on board or on the ground. Information on lesser mishaps – categorized as *incidents* by the NTSB – is not usually maintained or published by the NTSB.

The NTSB/FAA data indicate that a total of 8 accidents occurred at or in the vicinity of Ukiah Municipal Airport during the recent period for which data is available (1981-1994). One of these accidents involved a single-engine airplane taxiing on a dark night. NTSB reported that the pilot failed to observe a 90° turn in the taxiway, departed the taxiway pavement, and struck a 3-foot-deep ditch. There were no taxiway edge markings and the taxiway centerline stripe was not of a reflective type.

Airport	Location			Owner	Based Aircraft	Facilities <sup>2</sup>					Services <sup>3</sup>						
	Community	County	Direction <sup>1</sup>			Rwys	Long	Surf	Lgt	Appr	Gas	Jet	Mntn	Rent	Food	ATCT	Psgr
<b>PUBLIC-USE AIRPORTS (within 30 statute miles)</b>																	
Ukiah Municipal	Ukiah	Mendocino	—	City	90	1	4,415	Asph	Yes	NP	X	X	X	X	—	—	—
Boonville	Boonville	Mendocino	12 SW	County	10	1	3,240	Asph	No	Vis	—	—	—	—	—	—	—
Cloverdale Municipal	Cloverdale	Sonoma	27 SE	City	11	1	3,155	Asph	Yes	Vis	X	—	X	X	—	—	—
Eils-Willits	Willits	Mendocino	24 NW	City	23	1	3,000	Asph	Yes	Vis	X	—	X	—	—	—	—
Gravelly Valley	Upper Lake	Lake	26 NE	USFS	0	1	4,050	Grvl	No	Vis	—	—	—	—	—	—	—
Lampson	Lakeport	Lake	19 SE	County	90	1	3,600	Asph	Yes	NP	X	—	X	X	—	—	—
Little River	Little River	Mendocino	28 W	County	20	1	5,249	Asph	Yes	Vis	X	—	—	X	—	—	—
<b>PRIVATE-USE AIRPORTS (within 30 statute miles)</b>																	
Ferndale Resort	Soda Bay	Lake	24 SE	Private	—	SPB	—	Wtr	No	Vis	—	—	—	—	—	—	—
Hoberg	Siegler Springs	Lake	33 SE	Private	—	1	3,300	Dirt	No	Vis	—	—	—	—	—	—	—
Ocean Ridge	Gualala	Mendocino	29 SW	Private	—	1	2,500	Asph	Yes	Vis	—	—	—	—	—	—	—
Sea Ranch	Sea Ranch	Sonoma	32 SW	Private	—	1	2,600	Asph	No	Vis	—	—	—	—	—	—	—

<sup>1</sup> Distance (in Statute Miles) and Direction from Ukiah Municipal Airport.

<sup>2</sup> Facilities: Rws = Number of Runways (SPB = Seaplane Base)  
 Long = Length of Longest Runway (feet)  
 Surf = Runway Surface (concrete/asphalt/gravel/dirt/water)  
 Lgt = Runway Lighted (yes/no)  
 Appr = Approach Type (precision/nonprecision/visual)

<sup>3</sup> Services: Gas = Aviation Gasoline  
 Jet = Jet Fuel  
 Mntn = Aircraft Maintenance  
 Rent = Aircraft Rental  
 Food = Restaurant  
 ATCT = Air Traffic Control Tower  
 Psgr = Scheduled Passenger Airline Service

Source: Compiled by Shutt Moen Associates (July 1996)

Table 3C

## Area Airports

### Ukiah Municipal Airport

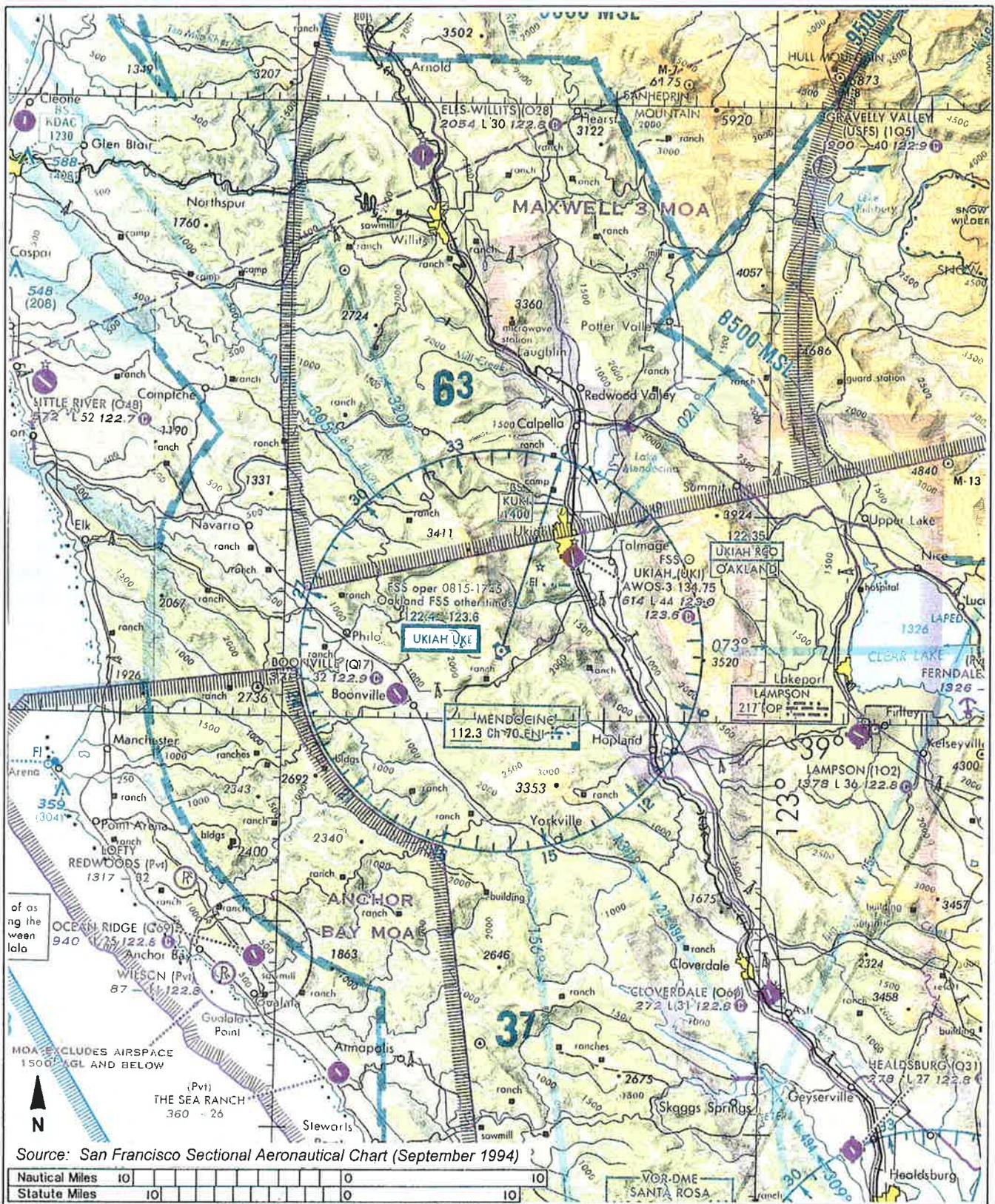


Figure 3C

### Area Airports and Airspace Ukiah Municipal Airport

The Airport currently has a taxiway lighting system with painted taxiway, centerline, and edge markings and reflectors.

There were no indications in the NTSB/FAA data that airport facilities contributed to any of the other accidents. Appendix B presents a brief summary of the nature and conditions of each recorded accident.

## COMMUNITY PROFILE

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The functioning of any airport is interrelated in two basic ways with the community in which it is located:

- Economically – The demand for aviation facilities and services is generated by the local community and the airport in turn produces economic benefits for the community.
- Physically – Airport activities have environmental effects upon the airport's surroundings and the characteristics of these surroundings also affect how an airport functions.

A recognition and general understanding of the local community, as highlighted here and in Table 3D, is essential to the preparation of an airport master plan.

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On June 6, 1996, the ALUC amended its plan to incorporate a compatibility map and policies for Ukiah Municipal Airport.

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Ukiah is a semi-rural valley community whose economy is changing from a timber and agriculture base to a more diverse retail, service, and manufacturing base. Rated #1 by Norman Crampton in his book *The 100 Best Small Towns in America*, Ukiah has balanced its small-town atmosphere with the desire for growth and expansion outlined in its General Plan and Economic Strategy.

The City of Ukiah is the hub of government, industry and health services and its area population of 35,000 represents half of Mendocino County's total population. In 1991, retail trade, services, and government topped the City's employment percentages at 21.9%, 20.6% and 18.5%, respectively.

## PREVIOUS PLANS AND STUDIES

Future development of Ukiah Municipal Airport, in particular, and Mendocino County airports, in general, has been the subject of several previous plans and studies. Chief among these are the following:

- **Ukiah Airport Master Plan (1971)** – This early document was the basis for obtaining federal funding to help finance a wide range of needed capital improvements. The proposed improvements totaled \$1,135,200 in 1971, and included extension of the parallel taxiway, construction of T-hangars, and installation of additional navigation and landing aids.
- **Airport Land Use Compatibility Plan (1993)** – Prepared for the Mendocino County Airport Land Use Commission, this plan set forth the criteria and policies which are now used in assessing the compatibility between the public use airports in the county and proposed land use development in the area around them. Compatibility policies for Ukiah Municipal Airport are expected to be added based upon recommendations set forth in Chapter 7 of this *Airport Master Plan*.

**GEOGRAPHY****Location**

- Situated in southeastern Mendocino County.
- The County seat.
- 25 miles inland from Pacific Ocean.
- 105 miles from Sacramento.

**Size**

- City of Ukiah encompasses 4.0 square miles.

**Topography**

- Situated south of Lake Mendocino, Ukiah is separated from Clear Lake to the southeast by the Mayacmas Mountain Range.
- Elevations range from just over 500 feet MSL in parts of the Yokayo Valley to 3,389 feet MSL southeast of Ukiah at Red Mountain.

**SURFACE TRANSPORTATION****Major Highways**

- Primary access to the Ukiah area is via State Highway 101.
- Highway 20 leads east to Lake County and west to the Mendocino Coast.

**Railroads**

- Northwestern Pacific Railroad.

**Public Transportation**

- Greyhound Lines serves the area, currently three trips daily to San Francisco and Eureka.
- Mendocino Transit Authority (MTA) offers dial-a-ride taxi service and daily bus schedules for local and County destinations.

**POPULATION AND ECONOMY****Population Growth**

	<u>1980</u>	<u>1990</u>	<u>1994</u>
• City of Ukiah	12,035	14,599	15,050
• County of Mendocino	66,738	80,345	84,800

– Growth rate of 1.75% per year, both City and County

(Source: City of Ukiah, State Dept. of Finance Estimates)

**Projected Population**

	<u>2000</u>	<u>2010</u>	<u>2020</u>
• County of Mendocino	98,224	116,719	136,041

(Source: California Dept. of Finance - May 1993)

**Basis of Economy**

- Major contributors to the Ukiah community include: Timber production and wood products, agriculture, and tourism.
  - Industry groups with greatest percentages of employment: Retail Trade (23.2%); Services (23.2%); Government (20.0%); and Manufacturing (18.1%).
- (Source: City of Ukiah, 1992)

**CLIMATE****Temperatures**

- Hottest month (July) - mean: 74.3°F
- Coldest month (January) - mean: 45.6°F

**Precipitation and Fog**

- Average annual rainfall at Ukiah 34" - 36"
- Average humidity: July (31%); January (62%)
- Fog is an infrequent occurrence.

**Winds**

- Wind pattern over the Ukiah area is locally influenced by topography, proximity to bodies of water, time of day, and passage of fronts.
- Prevailing winds: NW to W; 6 mph mean hourly speed.

(Source: City of Ukiah, 1993)

Source: Compiled by Shutt Moen Associates (July 1996)

Table 3D

**Community Profile**  
Ukiah, California



# 4

## Airport Role and Activity



# Airport Role and Activity

## AIRPORT ROLE

### Present

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*Personal/recreational flying:* the use of aircraft by individuals (in their own, rented, or borrowed aircraft) for pleasure, recreational, or personal transportation not in furtherance of their occupation or company business.

*Business flying:* the use of aircraft by pilots (not receiving direct salary or compensation for piloting) in connection with their occupation, their employer's business, or in the furtherance of private business.

*Corporate flying:* the use of aircraft owned or leased, and operated by a corporation or business firm for the transportation of personnel or cargo in furtherance of the corporation's or firm's business, and which are flown by professional pilots receiving a direct salary or compensation for piloting.

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Ukiah Municipal Airport's principal role can best be described as providing general aviation facilities and services in support of the local community's citizens and businesses. The large majority of pilots utilizing Ukiah Municipal Airport do so for personal, business, and commercial purposes. In fulfilling its basic function, the Airport also plays a variety of important individual roles. These roles are characterized as follows:

- **Local Base for Personal Aviation** — To pilots who fly primarily for personal reasons, whether strictly for pleasure and recreation or occasionally on personal business, the enjoyment of flying is usually paramount. Aircraft operating and storage costs and airport/airspace operational complexity are major concerns. Most of these users seek only a simple, relatively inexpensive and hassle-free "friendly" airport which provides for basic general aviation needs. Such users are unlikely to use more advanced facilities to any significant extent and, in most cases, do not want to pay for them.

Primarily because of rising aircraft operating costs over the past decade, the numbers of active personal aviation aircraft owners and pilots have decreased at most general aviation airports. Only in the last two or three years has personal use of general aviation aircraft begun to rebound somewhat. Much of this increased activity is by operators of "enthusiast" aircraft (i.e., experimental, antique, sport, and ultralight aircraft). The importance of personal aviation at Ukiah Municipal Airport, especially pleasure and recreational flying, is evident from the number of small personal-use aircraft based at the Airport.

- **Point of Access for Pleasure and Recreational Visitors to the Community** – Pilots who fly for pleasure and recreation like to fly to places which are interesting and enjoyable to visit. The popularity of Northern California and the Ukiah area as a tourist destination attracts pilots and passengers from outside the region. These visitors' aeronautical facility needs are largely similar to the local personal aviation flyers. Ideally, airport facilities used by visiting pilots should be designed to somewhat higher standards – a minimum of confusing taxiways, increased use of informational and directional signs, greater airplane wingtip clearance in apron areas, etc. – to account for many visiting pilots' unfamiliarity with the airport. In addition, visiting pilots need aviation and nonaviation services (i.e., well-marked transient parking areas, readily available aircraft fuel and servicing, 24-hour publicly accessible rest rooms, local tourist information, ground transportation, emergency aircraft maintenance, convenient restaurant/coffee shop, etc.) which make their visit more pleasant and convenient.

- **Transportation Facility for Business/Corporate Aviation** – To the extent that Ukiah Municipal Airport is used for business/corporate flying, the nature of the demand fits well with the capabilities of the facility. With a few exceptions, business/corporate aircraft users of Ukiah Municipal Airport are small to mid-sized companies which typically fly small, general aviation aircraft of the kind the Airport is designed to accommodate. In addition, the Airport sees occasional use (less than 500 operations per year) by larger business/corporate aircraft such as Louisiana-Pacific's Gulfstream corporate jets. The ability of the Airport to accommodate business/corporate aircraft is an important component of the City's economic development program.

One improvement of particular interest to pilots who use an airport for business/corporate purposes is the airport's instrument approach capability. Although many pilots who do not fly for business/corporate reasons would also like to have a usable instrument approach, the interest is typically greater among operators of business/corporate aircraft.

- **Location to Conduct Aviation-Related Business** – In addition to serving the business community and other users, Ukiah Municipal Airport is itself a place of business. Currently, a number of aviation and nonaviation businesses are located at the Airport on land leased from the City. These businesses provide a range of services to the users of general aviation aircraft as well as to the public in general. Also, these businesses contribute to the economic base of the Airport and the Ukiah community.

The principal facility need of an airport's fixed base operations and other aviation-related businesses is for sufficient land on which to conduct and perhaps expand their businesses. In addition, they re-

quire an airport which is conducive to both locally based and transient aircraft activity. Given the somewhat marginal nature of most fixed base operations in these days of limited general aviation activity, the cost of their leases and any additional fees or restrictions are important concerns.

- **Place to Practice Takeoffs and Landings** — Ukiah Municipal Airport sees occasional flight training activity — both by based and transient aircraft users. Ukiah Municipal Airport’s relatively simple airspace (in comparison to tower-controlled metropolitan airports) and better-than-average weather conditions provide an operating environment which lends itself to basic flight training activity. Airport representatives estimate that 15% of all operations are flight training-related *touch-and-go’s*.
  
- **Site for Emergency Access to the Community** — Following calamities such as a major earthquake, fire, or flood, airports are often of critical importance as points of community access for emergency and relief services. In addition, when regional ground access routes (i.e., roads, highways, and rail lines) are severed by a calamity, transportation by air may be the only means of effectively moving about and delivering supplies. It is essential that airport facilities remain operational or can quickly become operational after such events. In these emergency circumstances, airports often see use by aircraft that are larger than those normally accommodated. It is also vital that the airport have usable local ground access to the surrounding community. Ukiah Municipal Airport is well positioned in this regard, thus making this operational role an important one.
  
- **Fire Attack Base** — For many years, Ukiah Municipal Airport has served as an important air attack base for the California Department of Forestry and Fire Protection’s (CDF) forest fire suppression operations. Two twin-engine piston-powered S-2 air attack aircraft and one twin-engine piston-powered Cessna 337 Skymaster/O-2 spotter airplane are typically based at the Airport during the summer fire season (June through October). The principal mission of the Ukiah fire attack base is that of initial response to primarily local forest fires. Ukiah-based CDF aircraft also respond to large regional fires but receive support from larger aircraft (e.g., C-130, P2V, etc.) based at outlying CDF bases. The Ukiah fire attack base’s mission is considered by many to be a principal role of the Airport with both local and regional significance.
  
- **Potential Scheduled Air Passenger Service Point** — From time-to-time over the past few decades, Ukiah Municipal Airport has seen scheduled air passenger service by various commercial operators. Equipment problems, weather delays, and organizational problems hindered the success of these commercial operations, however, and none remain in operation today. The Airport’s configuration and facilities do not readily lend themselves to scheduled air passenger ser-

vice by any but the smallest commercial aircraft (i.e., under 12,500 pounds maximum gross takeoff weight). In the event that scheduled air passenger service is reestablished at Ukiah Municipal Airport at some point in the future, it is likely that the aircraft used will be compatible with the Airport's present configuration and facilities.

## **Future**

For the foreseeable future, it is anticipated that the operational role of Ukiah Municipal Airport will remain essentially the same as at present. That is, the Airport will continue to serve as an attractive base of operations and destination for operators of personal/recreational and small-to-midsize business/corporate general aviation aircraft. In addition, CDF air attack operations are expected to remain an important element of the Airport's overall activity.

Due to the increasing cost and complexity of general aviation operations, it can be anticipated that the Airport will experience a gradual shift towards more highly-utilized, better equipped, and more sophisticated general aviation aircraft over the next 5 to 10 years. This shift will be somewhat balanced by the anticipated increase in activity by locally-based and transient operators of enthusiast-type general aviation aircraft.

Supplementing this fixed-wing aircraft activity at Ukiah Municipal Airport will be a slight increase in helicopter activity. The FAA's nationwide aircraft activity forecasts project that the active helicopter fleet will increase at an annual rate of 2.3% over the next ten years. It is anticipated that Ukiah Municipal Airport will attract its fair share of this increased helicopter activity.

Beyond the *Master Plan's* 20-year time frame, it can be anticipated that Ukiah Municipal Airport will continue to serve as an important public-use aeronautical facility for the City of Ukiah and the Mendocino County region. Although it is difficult to predict the specific aeronautical role and use of the Airport beyond 20 years, it can be anticipated that the Airport property, facilities, and capabilities will prove to be of considerable value and utility to the City of Ukiah and area communities in responding to future public air transportation needs.

## **HISTORICAL AIRPORT ACTIVITY**

### **Based Aircraft**

The number and types of aircraft based at an airport are useful indicators of the airport's activity and operational role.

### ***Total Aircraft Counts***

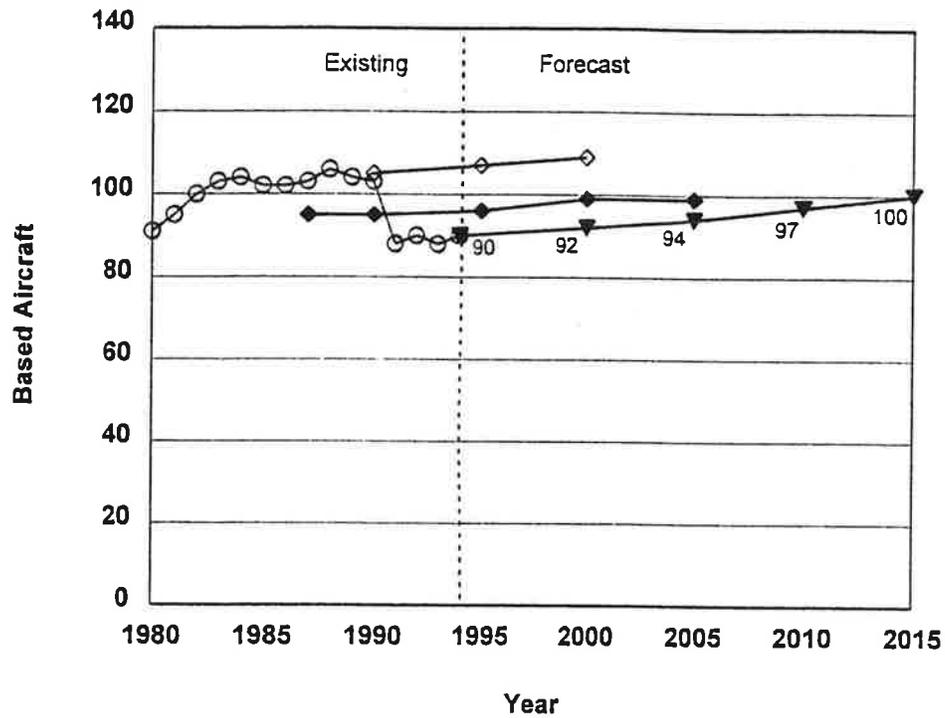
FAA and Airport records indicate that the number of aircraft based at Ukiah Municipal Airport has decreased approximately 13% over the past 10 years (1984 through 1994) — from a high count of 104 in 1984 to the current count of 90 in 1994. Factors which have influenced this decline in Ukiah Municipal Airport's based aircraft include the pervasive national decreases in general aviation activity, particularly in the personal/recreational aircraft market segment, and the increasing complexity and costs associated with general aviation aircraft operations. In addition, the economic downturn that has negatively impacted many of Northern California's rural communities in recent years, has further inhibited the growth of local general aviation activity. Figure 4A illustrates the historical based aircraft count at Ukiah Municipal Airport for the years 1980 through 1994.

### ***Aircraft Types***

As is typical of most general aviation airports, the dominant type of aircraft based at Ukiah Municipal Airport is the single-engine, propeller-driven, piston-powered airplane — comprising approximately 88% of the total. Twin-engine, propeller-driven, piston-powered airplanes based at the Airport comprise 9% of the total. Two light turbine-powered helicopters (Jet Ranger and A-Star) and one single-engine, turbine-powered, fixed-wing airplane (FedEx's Cessna 208 Caravan) are also currently based at the Airport.

### ***Aircraft Ownership Distribution***

The based aircraft users of Ukiah Municipal Airport are predominantly Mendocino County residents or businesses. According to the City's listing of based aircraft owners, 99% of the based aircraft are registered to owners from the Mendocino County area, with more than 80% of the Airport's based aircraft registered to residents and businesses with City of Ukiah mailing addresses.



LEGEND

- FAA Form 5010 Activity and Airport Records
- ◆ National Plan of Integrated Airport Systems (1990)
- ◇ California Aviation System Plan (1988)
- ▼ Master Plan Forecast (1994)\*

\* "Master Plan Forecast (1994)" reflects 0.5 percent compounded annual rate of growth.

Source: Compiled by Shutt Moen Associates (February 1995)

Figure 4A

**Based Aircraft**  
Ukiah Municipal Airport

## Aircraft Operations

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For the purposes of recording airport activity, an *operation* is considered to be a takeoff or a landing. A *touch-and-go* is recorded as two operations.

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The principal method of determining historical annual aircraft operational activity at Ukiah Municipal Airport is via an analysis of available Airport activity records. These records include FAA Form 5010 data, Flight Service Station activity logs, and Airport personnel estimates.

As can be seen in Figure 4B, the number of annual aircraft operations at Ukiah Municipal Airport has been relatively consistent – around 50,000 – since 1988. Prior to 1988, the recorded annual operations counts were somewhat lower. These lower counts may be more the result of the estimating methodology used than actual decreases in annual aircraft operations. The estimated annual aircraft operations count for 1994 was 50,000.

## Distribution of Activity

The historical distribution of operational activity (i.e., day/night, VFR/IFR, local/itinerant) can be estimated from Flight Service Station records and Airport personnel estimates. Airport representatives estimate that less than 5% of the total aircraft operations occur between sunset and sunrise. The large majority of operations at Ukiah Municipal Airport are conducted during daylight hours. This distribution is consistent with activity indices at comparable general aviation airports.

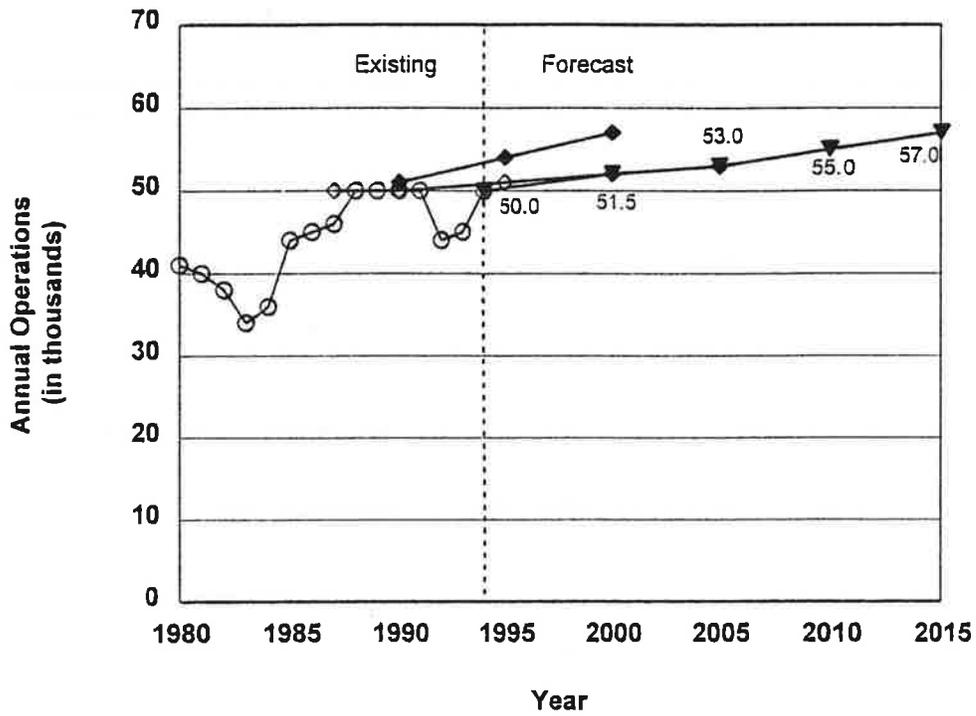
Approximately 580 instrument approaches to Ukiah Municipal Airport were recorded by the Ukiah Flight Service Station in 1994. While a number of these approaches were accomplished for flight training purposes, the majority of the instrument approaches were conducted by business/corporate aircraft users and scheduled air freight operators. This level of annual instrument approach activity is characterized by Airport representatives as normal for Ukiah Municipal Airport. The number of instrument approaches to Ukiah Municipal Airport is expected to increase in the future as more business/corporate aircraft use the Airport.

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A *Local Operation* is defined as 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. An *Itinerant Operation* is an arrival or departure performed by an aircraft from or to a point beyond the local airport area.

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A relatively small portion of the Airport's total annual operations involve local or flight training operations. Most of this flight training activity is generated by the flight schools and aircraft operators based at the Airport. It is estimated that the existing split between *local* and *itinerant* operations is 25% / 75%. Approximately 15% of total operations are *touch-and-go's* – primarily for flight training purposes.



LEGEND

- FAA Form 5010 Activity and Airport Records
- ◆ National Plan of Integrated Airport Systems (1990)
- ◇ California Aviation System Plan (1988)
- ▼ Master Plan Forecast (1994)\*

\* "Master Plan Forecast (1994)" reflects 0.6 percent compounded annual rate of growth.

Source: Compiled by Shutt Moen Associates (February 1995)

Figure 4B

**Annual Operations**  
Ukiah Municipal Airport

## **Fuel Flowage**

As depicted in Figure 4C, City records for the period 1986 through 1994 indicate that Airport aviation fuel flowage (and, indirectly, based aircraft and aircraft operations) has decreased over the past eight years. This finding is consistent with the historical record of both based aircraft and annual operations.

Aviation gasoline (100 LL) flowage has decreased consistently over the past eight years. The variation in flowage from year to year can be attributed to the extent of that year's forest fire season and the corresponding use of CDF air attack aircraft (primarily piston-powered engines).

The relatively stable annual flowage of jet fuel (Jet A) is likely associated with the regular use of the Airport by FedEx's single-engine, turbine-powered Cessna 208 Caravan aircraft and increasing use of the Airport by transient turbine-powered business/corporate aircraft. Sale of Jet A fuel at the Airport is expected to increase with the CDF's mid-1995 introduction of the S-2F turbine-powered air attack aircraft. This twin-turboprop will largely replace the twin-engine, piston-powered S-2s currently in use.

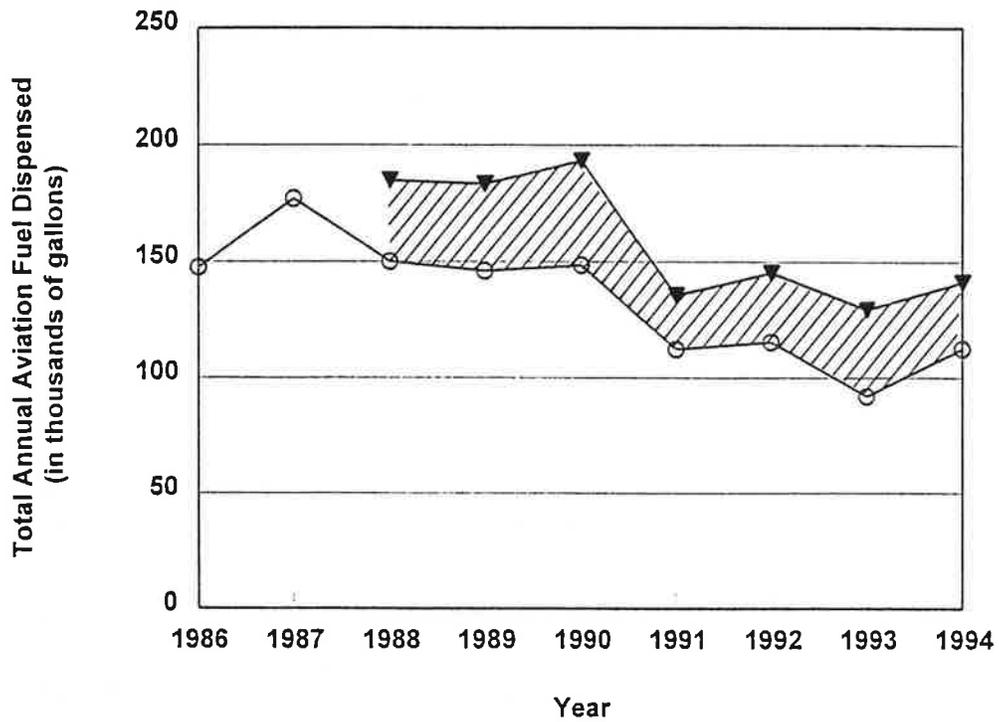
## **BASED AIRCRAFT DEMAND FORECASTS**

Current and future demand for based aircraft parking space in hangars, tiedowns, and transient parking at Ukiah Municipal Airport is influenced by a variety of factors. Some of these factors are national or regional in character; others are specific to Ukiah Municipal Airport. Each of these demand factors needs to be considered in the development of based aircraft forecasts for the Airport.

### **National Demand Factors**

National influences on local based aircraft demand are significant in that they are external influences, largely beyond the direct control of the Airport or local community. The current nationwide pattern of limited or no growth in the general aviation fleet is one of the strongest influences on future based aircraft demand in the Northern California region. According to General Aviation Manufacturers Association statistics, less than 5% as many aircraft were built in the U.S. in 1994 as in 1978. Many reasons have been cited for this limited growth trend including:

- The high cost of new aircraft, partially due to low manufacturing volume.
- High product liability costs and concerns.



LEGEND

- — Aviation Gasoline (100 LL)
- ▼ — Jet Fuel (Jet A)\*

\* No Jet Fuel information available for 1986 - 1987.

Source: Airport fuel flowage records (February 1995)

Figure 4C

**Annual Aviation Fuel Dispensed**  
Ukiah Municipal Airport

- High aircraft operational and maintenance costs.
- Airspace and airport operational restrictions (primarily in metropolitan areas).
- The operational complexity of aircraft and of flight regulations.
- The lack of simple, efficient, and comfortable new aircraft.
- The continuing availability of lower-priced used aircraft with performance characteristics that remain comparable to new higher-priced aircraft.
- Termination of the G.I. Bill which encouraged flight training.

FAA forecasts (1994) project that the nation's active general aviation fleet is expected to decline slightly (down 0.3% annually) over the next 12 years. Most of this decline is expected to occur in the early years of the forecast period. The decline is driven primarily by reductions in the piston-powered aircraft fleet.

- **Single-Engine Airplanes** — The number of active single-engine aircraft in the United States is projected to decline from 143,580 aircraft in 1993 to 131,100 aircraft in 1998 and to remain at that level throughout the remainder of the forecast period. The decline is due in large part to the expected large numbers of retirements and/or shifts to nonactive status of many of the older aircraft in the fleet. The retirement of these older aircraft is expected to continue to occur throughout the forecast period. However, after 1998, the gap caused by these retirements is expected to be replaced by newer technology aircraft that are, in part, a result of the passage of product liability legislation.
- **Multi-Engine Airplanes** — Multi-engine, piston-powered aircraft are also expected to decline in absolute numbers during the early years of the forecast period, from 18,536 in 1993 to 17,300 in 1998. The decline in these aircraft is also due to retirements of many of the older aircraft in the fleet. However, the multi-engine piston fleet is expected to increase somewhat during the latter years of the forecast period (to 17,600 in 2005) as purchases of new technology aircraft begin to outpace retirements.
- **Turbine-Powered Airplanes** — The segment of general aviation experiencing the area of strongest growth is business/corporate aircraft, especially sophisticated turbine-powered aircraft. This latter group is expected to grow throughout the forecast period (2.4% annually), largely the result of an expanding U.S. economy. The FAA projects the number of turboprop aircraft to grow from 4,704 in 1993 to 6,500 in 2005. Turbojet aircraft will increase from 4,022 in 1993 to 5,100 in 2005.
- **Helicopters** — The rotorcraft (i.e., helicopter) fleet is forecast to increase at an annual rate of 2.3% over the forecast period. All of this growth, however, is projected to occur in the turbine fleet, which will

increase from 3,541 in 1993 to 5,800 in 2005. Piston-powered rotorcraft are expected to decline from 2,211 to 1,800 over the same time period.

By all indices, the rate of growth of general aviation – both nationally and locally – will be very modest in the years ahead. The obvious consequence of this situation is that for any particular airport to have a significant increase in based aircraft, it must attract more business/corporate aircraft via local economic growth, or it must gain additional personal/recreational based aircraft from other area airports. This gain in based aircraft can result from changes in the relative advantages of one airport over another (i.e., additional storage hangars, pricing incentives, IFR approach capability, etc.), the closure/restriction of a nearby competitive airport, or major shifts in area population.

### **Demand Factors Specific to Ukiah Municipal Airport**

The airport-specific demand influences partially overlap the above national demand factors, but are more reflective of the conditions existing at Ukiah Municipal Airport.

- **Airport Role** – As noted above, the national growth potential of one of Ukiah Municipal Airport’s primary user groups – personal and recreational use aircraft – is projected to be very limited. High aircraft operational costs and increasing system complexity may cause some marginal personal and recreational aircraft users to sell or store their aircraft. On the other hand, the somewhat remote, rural location of Ukiah Municipal Airport enhances its attractiveness to users of small personal and recreational aircraft. The lower operating costs and relatively simple airspace associated with the Airport may serve to attract some aircraft users from congested metropolitan areas.
- **Facilities and Services Available** – Existing facilities and services at Ukiah Municipal Airport are somewhat less comprehensive than at other public airports. This is judged to have negative implications with respect to forecasting future demand potential. Because of physical limitations such as runway length and approach instrumentation, there is only a modest opportunity to improve Ukiah Municipal Airport’s relative attractiveness to users of sophisticated, high-performance business/corporate aircraft.
- **Demand for Hangar Space** – Increasingly more sophisticated and expensive equipment is being added to aircraft. Thus, more owners are seeking hangar storage space for their aircraft. Ukiah Municipal Airport currently has the capability of storing approximately 65 aircraft in various size hangars on the Airport. It is anticipated that any increase in the number of based aircraft will be driven in large part by the availability of additional aircraft storage hangars.

- **Airspace Complexity** – As noted previously, Ukiah Municipal Airport is located in an area characterized by relatively simple airspace. This simpler operating environment typically proves attractive to users of personal, recreational, and enthusiast types of aircraft.
- **Nearby Airports** – Six public-use airports and four private-use airports are located within 30 statute miles of Ukiah Municipal Airport (see Table 3C and Figure 3C). None of these airports offers facilities and services that are superior to those offered at Ukiah Municipal Airport. Fifty statute miles southeast of Ukiah is the Sonoma County Airport. This is the closest airport to Ukiah that offers sophisticated general aviation facilities and scheduled commuter air service.
- **Proximity to Nearby Industry** – Commercial/industrial growth in the Ukiah area will have a positive effect on the Airport's aviation activity. Users of small business and corporate aircraft desiring easy access to the City of Ukiah and the Mendocino County region are expected to make increasing use of Ukiah Municipal Airport.
- **User Perceptions** – Many aircraft users, particularly personal and recreational aircraft operators, perceive Ukiah Municipal Airport to be a desirable location for operating or basing an aircraft. Ukiah Municipal Airport's good weather conditions, relatively simple operating environment, low-cost storage hangar availability, and adequate aeronautical facilities are seen as positive growth factors.
- **Regional Population** – In the 25 years between 1970 and 1995, the population of Mendocino County and Ukiah increased by 2.4% per year. More modest growth rates are predicted for the coming two decades. Nevertheless, both Mendocino County and the Ukiah area in particular are expected to experience sustained population growth in the years ahead – on the order of 1.8% per year or a 43% increase over 20 years.

### **Other Based Aircraft Demand Forecasts**

Federal, state, and regional forecasts offer another view of possible future based aircraft demand at Ukiah Municipal Airport. Figure 4A provides a graphic comparison of various based aircraft forecasts for Ukiah Municipal Airport versus historic activity levels. As can be seen from this graphic, the various forecasts start from different base year counts and project varying rates of growth. The rapid growth projected by the FAA's National Plan of Integrated Airport Systems (NPIAS) forecast in 1990 was consistent with the general aviation aircraft activity expectations prevalent at the time. The most recent – 1988 – California Aviation System Plan (CASP) forecasts project virtually no growth and a loss of based aircraft, respectively, over the next 15 years.

It must be recognized, however, that each of these forecasts is developed in a top-down manner; that is, the forecasts are first determined for the respective geographic area, then allocated to sub-areas and ultimately to individual airports. Particularly at the federal and state levels, little attention is given to the localized conditions that may influence future activity changes at specific airports.

A basic planning philosophy underlying the *Master Plan* based aircraft forecasts for Ukiah Municipal Airport is important to note. For the purpose of providing an airport plan capable of meeting *potential* aviation demand, it is inappropriate to use a forecast which is too low or conservative. A relatively high forecast – provided that it is not unreasonably so – is generally more desirable for this purpose. Facilities necessary to accommodate the projected demand would not be built until the demand materializes, regardless of when the forecasts indicate the need will exist. On the other hand, if the forecasts underestimate actual demand, then the plan may not be sufficiently adaptable to effectively accommodate the unanticipated demand. The forecasts of aviation activity utilized in the *Ukiah Municipal Airport Master Plan* reflect the median potential future demand.

### **Based Aircraft Demand Conclusions**

In accordance with the projected slow growth trend in national and regional general aviation activity, the *Master Plan* concludes that there is potential for very slight growth of Ukiah Municipal Airport's based aircraft population – both fixed-wing and rotary-wing aircraft. This assumes that the Airport's facilities and services are adequately maintained, additional hangar space is provided, and the City continues to efficiently operate the Airport.

Depicted in Figure 4A and summarized in Table 4A is the *Master Plan's* 20-year forecast for future based aircraft for Ukiah Municipal Airport. The *Master Plan* forecast projects that based aircraft at the Ukiah Municipal Airport will increase from the current (1994) level of 90 aircraft to 100 aircraft in 2015. This increase of ten based aircraft reflects a 0.5% per annum compounded growth factor.

### **TRANSIENT AIRCRAFT PARKING DEMAND**

The demand for transient aircraft parking positions at the Airport is influenced by a combination of factors, including those mentioned above with respect to based aircraft, and those discussed subsequently which affect aircraft operations. The *Master Plan* forecasts project that peak transient aircraft parking demand will increase from the current 15 spaces to 20 spaces over the 20-year planning period, a rate greater

	Historical	Projected			
	1994	2000	2005	2010	2015
<b>BASED AIRCRAFT</b>					
<b>Aircraft Types</b>					
Single-Engine	80	82	82	83	84
Twin-Engine	8	8	9	10	10
Helicopters	2	2	3	4	6
<i>Total</i>	90	92	94	97	100
<b>Storage Demand</b>					
On Tiedowns	10	10	10	10	10
In Storage Hangars	64	66	68	71	74
At FBO Facilities	16	16	16	16	16
<i>Total</i>	90	92	94	97	100
<b>TRANSIENT AIRCRAFT</b>					
Parking Demand at Peak Periods	15	16	17	18	20
<b>ANNUAL AIRCRAFT OPERATIONS</b>					
<b>Aircraft Mix</b>					
Single-Engine	43,500	43,500	43,500	44,000	44,500
Twin-Engine	5,000	6,000	7,000	8,000	8,500
Helicopters	1,500	2,000	2,500	3,000	4,000
<i>Total</i>	50,000	51,500	53,000	55,000	57,000
<b>Type of Operation</b>					
Local	12,500	12,350	12,100	11,750	11,400
Itinerant	37,500	39,150	40,900	43,250	45,600
<i>Total</i>	50,000	51,500	53,000	55,000	57,000
<b>Average Operations per Based Aircraft</b>					
Local	139	134	129	121	114
Itinerant	417	426	431	446	456
<i>Total</i>	555	560	564	567	570
<p>Sources: Historical data from FAA Form 5010 and airport management estimates.                      Projected data by Shutt Moen Associates (1996).</p>					

Table 4A

**Master Plan Activity Forecasts**  
 Ukiah Municipal Airport

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By definition, *transient* aircraft are aircraft not based at an airport. This differs from *itinerant* aircraft which refers to aircraft arriving at or departing an airport to or from points beyond the airport's traffic area. Non-itinerant aircraft operations are considered *local* operations and usually consist mostly of *touch-and-go* training activity. Itinerant operations can be conducted by either based or transient aircraft.

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than that projected for based aircraft growth. It is anticipated that much of this future growth in transient aircraft demand will be driven, in large part, by local community businesses' and commercial enterprises' increased demand for transient aircraft facilities and services.

## AIRCRAFT OPERATIONS FORECASTS

### Forecast Influences

As with based aircraft, the number of aircraft operations at a general aviation airport is influenced both by national and regional conditions and by various circumstances specific to the individual airport. Major influences impacting Ukiah Municipal Airport aircraft operations forecast include:

- **National Trends** – The factors which determine general aviation operations levels nationally will also be the overriding influences locally. Unlike the essentially flat forecast of active based aircraft, FAA forecasts project a modest increase in the number of hours flown by the general aviation fleet over the next decade. A slight rise in the average number of annual operations per aircraft can consequently be anticipated. Use of helicopters and turbine-powered airplanes is expected to increase more rapidly than that of piston-powered airplanes.
- **Number and Type of Based Aircraft** – The minor shift toward proportionately more complex single-engine airplanes at Ukiah Municipal Airport will tend to push operations counts upward more rapidly than the rate of based aircraft growth. Typically, complex aircraft are used more frequently and thus generate more operations per aircraft.
- **Availability of Services** – Ukiah Municipal Airport's facilities and services are primarily focused to attract the personal and recreational aircraft operator and small business aircraft operator. Such facilities and services include general aviation-oriented fixed base operators, readily available single-unit aircraft storage hangars, and the relatively low cost of aircraft operations. This range of services may need to be expanded if additional business/corporate aircraft activity is to be captured.
- **Flight Training** – Flight training currently generates a minor amount of activity at the Airport. Flight training activity at Ukiah Municipal Airport is expected to remain a minor factor in the Airport's future operations.

- **Extent of Transient Aircraft Use** – Increased business and corporate development within the Ukiah area is expected to generate increased activity by both based and transient aircraft. The relatively remote location of Ukiah makes access by aircraft all the more desirable.

## National and Regional Forecasts

Federal, state, and regional forecasts provide aircraft operations forecasts for Ukiah Municipal Airport. A comparison of these federal, state, and regional forecasts is shown in Figure 4B. As with the forecasts of based aircraft, the various forecasts of operations are somewhat contradictory. The CASP (1988) forecast projects a relatively flat rate of growth, whereas the NPIAS (1990) forecast and the FAA's Terminal Area Forecast (TAF – 1990) project a significant increase in aircraft operations. As noted in the discussion of based aircraft forecasts, these operations forecasts have been generally developed using a "top-down" methodology.

## Annual Operations Demand Conclusions

Continued modest growth in annual aircraft operations at Ukiah Municipal Airport is anticipated. As noted previously, this growth in operations will be generated by the increase in based and transient aircraft (fixed-wing and rotary-wing), and greater utilization of aircraft by Ukiah Municipal Airport-based active aircraft users. The rate of growth in Ukiah Municipal Airport's annual operations is somewhat higher than the rate of growth of based aircraft, due to a projected increase over time in the average utilization rate of aircraft.

The percentage split between *local* operations and *itinerant* operations is projected to shift slightly over the 20-year planning period from a current value of 25% *local*/75% *itinerant* to a year 2015 value of 20% *local*/80% *itinerant*. This shift is influenced by: (1) the increased use of the Airport by transient aircraft operators for access to the City of Ukiah and the Mendocino County region; and (2) the greater utilization of based aircraft for transportation purposes beyond the local area.

Depicted in Figure 4B and summarized in Table 4A is the *Master Plan* 20-year forecast of future annual aircraft operations for Ukiah Municipal Airport. The *Master Plan* forecast projects that annual aircraft operations at Ukiah Municipal Airport will increase from the current (1994) level of 50,000 to 57,000 in the year 2015. This increase in operations reflects a 0.6% per annum compounded growth factor.

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The *utilization rate* of based aircraft is calculated by dividing the total number of aircraft operations – including those by transient aircraft – by the number of based aircraft.

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## CDF AIR ATTACK ACTIVITY

Two S-2 air attack aircraft and one OV-10B spotter plane are normally based at Ukiah Municipal Airport during the June through October fire season. No other CDF aircraft are normally based at the Airport. However, during a major fire response, several additional CDF and contract operator aircraft, up to the size of a Lockheed C-130, may make use of the CDF's facilities at Ukiah Municipal Airport.

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In 1990, Brown-Buntin Associates, Inc. developed noise contours for the Airport that reflected a peak of 90 CDF aircraft operations per day. This activity level is higher than has been experienced in recent years, but is possible during a major nearby fire.

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The number of fire attack aircraft operations usually fluctuates from year to year depending on fire conditions in the region. Activity forecasts for airports with air attack bases typically assume that these year-to-year fluctuations will continue, but that the future average volume will remain equal to the historical average. At Ukiah Municipal Airport, air attack aircraft generate, on average, less than 500 operations per year. The number of daily operations generated by Ukiah CDF air attack tankers and spotter aircraft during a typical fire response is 10.

## CAPACITY ANALYSES

At most public-use airports, three basic forms of capacity have particular significance to master plan development — the airfield or runway/taxiway system capacity; the capacity of the building area for aircraft parking, passenger handling, and other uses; and the environmental capacity, usually measured in terms of noise impacts. With respect to Ukiah Municipal Airport, an assessment of these capacities reveals the following.

### Airfield

An airport's airfield capacity is measured in terms of the number of aircraft operations the runway and taxiway system can accommodate in an hour or over the course of a year. Calculation of airfield capacity, particularly annual capacity, is dependent upon a variety of physical and operational factors such as those listed to the left.

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#### Runway Capacity Factors

- Runway configuration.
  - Location of runway exits.
  - Existence of air traffic control facilities and navigational aids.
  - Mix of aircraft types (including helicopters) using the airport.
  - The amount of touch-and-go training activity.
  - The extent of instrument versus visual weather conditions.
  - Peaking conditions (i.e., the hourly, daily, and seasonal variations in traffic demand).
  - The proximity of nearby airports and other factors affecting airspace use.
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One of the most significant variables affecting annual capacity is the extent of off-peak versus peak-period usage. At present, Ukiah Municipal Airport tends to have its peak activity periods in the early mornings, late afternoons, and on weekends. These peaking characteristics are typical of general aviation airports. Given the Airport's present peaking characteristics and the absence of substantial touch-and-go training activity, the annual capacity of Ukiah's existing airfield configuration is approximately 180,000 operations. For peak-period activity, the airfield's existing hourly capacity is approximately 60 VFR operations per hour and 4 IFR operations per hour.

Other than during special events or other unusual peak activity periods, the annual and hourly capacities noted above are more than adequate to accommodate foreseeable future demand.

## **Building Area**

### ***Aircraft Parking/Storage***

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An airport's building area is normally considered to encompass all portions of airport property not devoted to runways and major taxiways and their associated clear areas, Runway Protection Zones, Runway Safety Areas, etc.

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Approximately 90 aircraft were based at Ukiah Municipal Airport in 1994. There are 64 individual aircraft storage hangar spaces and 65 tie-down positions currently available at the Airport. Of the 65 available tiedown positions, only a few are regularly occupied. All of the available storage hangars are occupied. In addition, there is room within the seven conventional hangars to store or work on some 18 aircraft. It is anticipated that new storage hangars will be built to accommodate the 10 additional aircraft that are projected to be added to Ukiah's based aircraft fleet over the next 20 years. This combination of facilities and space is sufficient to accommodate the forecasted aircraft parking/storage demand through the 20-year planning period.

### ***Fixed Base Operator Facilities***

Sufficient space is available on the Airport to adequately accommodate the future growth requirements of the Airport's fixed base operators. Specific recommendations regarding the configuration and use of the Airport's building area and fixed base operator facilities are presented in Chapter 6.

## **Environmental**

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An Initial Study of environmental impacts was conducted as part of the master planning process. The Initial Study checklist with responses is presented in Appendix G.

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Environmental capacity – the most significant component typically being noise – is frequently the most critical form of airport capacity, particularly for those airports located amidst noise-sensitive land uses. While Ukiah Municipal Airport is located in an area characterized by residences and other noise-sensitive uses, aircraft noise has not been a significant environmental factor at the Airport.

The area to the north and west of Ukiah Municipal Airport is characterized by numerous residential, commercial, and industrial uses. Numerous roadways and a railroad corridor are located within the Airport's environs. If the *Master Plan* land use planning recommendations (Chapter 7) for the Airport are implemented, it is unlikely that any significant new incompatible uses will be developed in the years ahead that will substantially impact the Airport. In addition, the nature and extent of Airport activity is not expected to change significantly during the forecast period. Incompatibilities and sensitivities are not expected to increase. Never-

theless, the Airport should remain alert to any potential close-in development or change in land use that might negatively impact airport operations or safety. In addition, the Airport's users should continue to practice *good neighbor* flight procedures to minimize aircraft noise impacts on surrounding noise-sensitive land uses.

Measures to minimize noise-related conflicts between the Airport and its surroundings are discussed in Chapter 7.

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## Airfield Design



## Airfield Design

### BASIC DESIGN FACTORS

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An airport's airfield system includes the runways and taxiways, related visual approach and landing aids, and required clear areas beyond the runway ends and elsewhere adjoining these facilities. This chapter assesses the technical factors and requirements which influence the design of Ukiah Municipal Airport's airfield system. Various airfield configuration refinements are reviewed and a recommended airfield development plan is presented.

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The basic configuration of Ukiah Municipal Airport's runway/taxiway system is well defined by existing facilities and site constraints. Also, as noted in Chapter 4, the Airport's operational role — that of a general aviation facility serving the personal/recreational and business/corporate air transportation needs of the local communities' residents and businesses — is well established and is expected to remain essentially the same as at present throughout the 20-year planning period. The purpose of the proposed airfield improvements discussed in this chapter is to enhance, not expand, this established role. Such improvements must both fit within the present facility framework and be consistent with the City's airport operational objectives.

At the outset of the *Master Plan*, a number of airfield design issues were identified as requiring special attention. Figure 5A graphically summarizes these issues. The remainder of this chapter addresses these design issues, pertinent airfield design requirements, facility enhancements, and other airfield-related matters.

### Airport Classification

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**Note:** The ARC classification system has replaced the former FAA airport design classification hierarchy of Basic Utility, General Utility, Basic Transport, etc.

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For airfield design purposes, the FAA has established a set of airport classifications known as *Airport Reference Codes* (ARC) applicable to each airport and its individual runway and taxiway components. The primary determinants of these classifications are the most critical types of aircraft a runway or taxiway is intended to serve and the form of instrument approach, if any, that is available or planned for the runway.

Each ARC consists of two components relating to the airport's design aircraft:

- **Aircraft Approach Category** – Depicted by a letter (A-E), this component relates to aircraft approach speed, an operational characteristic.
- **Airplane Design Group** – Depicted by a Roman Numeral (I-IV), the second component relates to airplane wingspan, a physical characteristic.

Generally, Aircraft Approach Category applies to runways and runway related facilities. Airplane Design Group primarily relates to separation criteria involving taxiways and taxilanes. Also important in the design of the airport and its runway/taxiway components is the maximum weight of the aircraft that will operate at the airport and the type of instrument approach available. Appendix C lists size and performance data of typical aircraft accommodated within various ARC classifications.

### **Design Aircraft**

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Typical aircraft in these categories/groups include the Beechcraft Bonanza (A-I/Small), Cessna 208 Caravan (A-II/Small), Cessna 414 Chancellor (B-I/ Small), Beechcraft Super King Air B200 (B-II/Small), Cessna Citation II (B-II), and Grumman S-2 (B-II).

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The FAA categorizes any airplane with a maximum certificated take-off weight of 12,500 pounds or less as a "Small" airplane.

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The Beechcraft Super King Air B200 is a popular 8-seat twin-engine turboprop-powered corporate airplane.

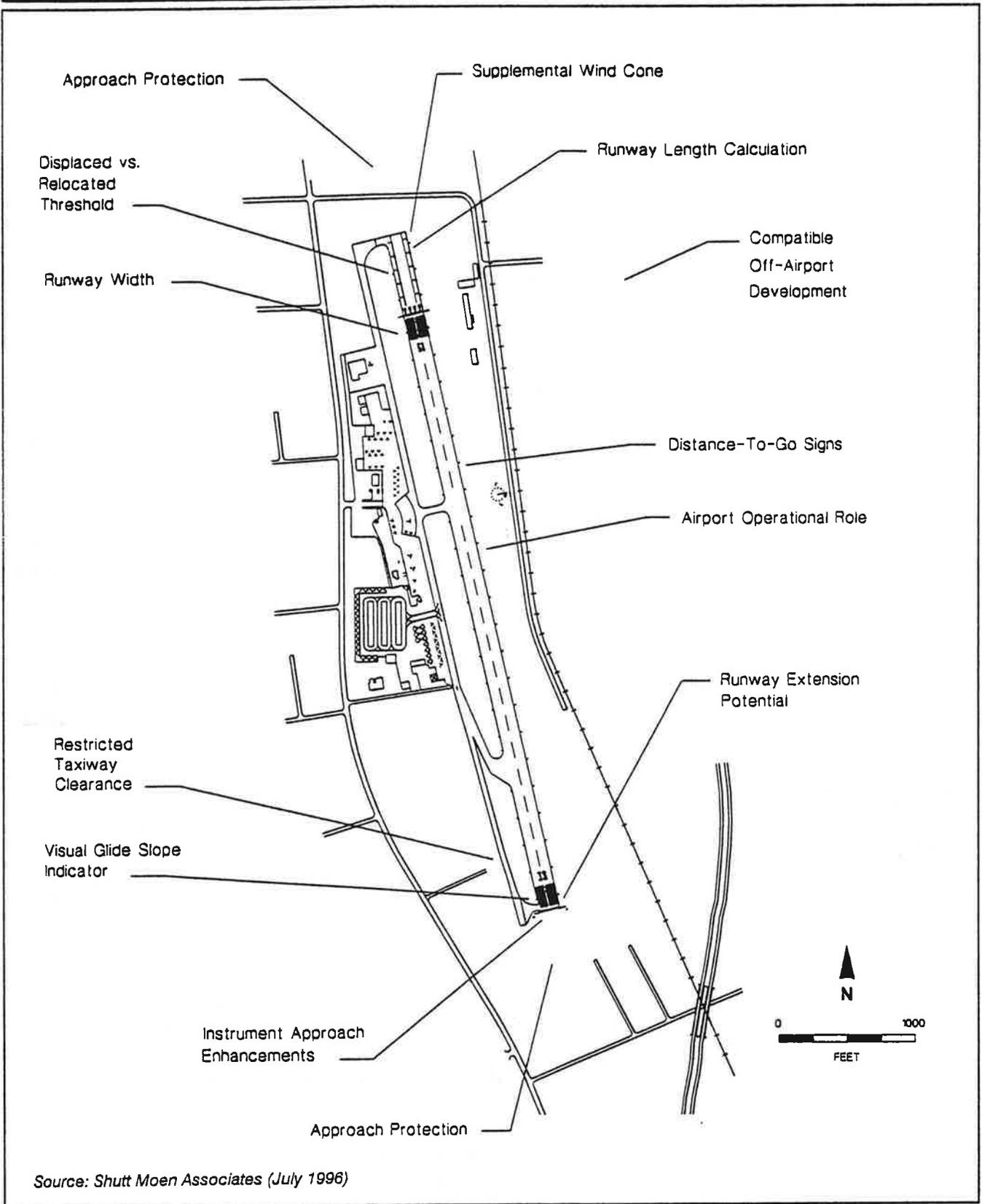
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The majority of aircraft operations at Ukiah Municipal Airport are generated by single-engine and twin-engine general aviation aircraft that fall within Aircraft Approach Categories A and B (approach speeds less than 91 knots and from 91 to 121 knots, respectively) and Airplane Design Groups I and II (airplanes with wingspans less than 49 feet and from 49 feet up to but not including 79 feet, respectively).

Ukiah Municipal Airport sees occasional use (less than 500 operations per year) by larger and faster, primarily corporate, aircraft in ARC C-I (e.g., Gates Learjet 25), C-II (e.g., Gulfstream III), C-IV (e.g., Lockheed C-130), and D-II (e.g., Gulfstream IV) categories. These larger aircraft generally weigh less than 30,000 pounds, although a few times a year the Airport may be used by aircraft weighing more than 30,000 pounds (e.g., Gulfstream IV and Lockheed C-130). Because of their runway length requirements, these aircraft are typically weight-restricted when operating from Ukiah Municipal Airport's 4,415-foot-long runway.

*Master Plan* analysis indicates that the largest general aviation aircraft projected to use Ukiah Municipal Airport on a regular basis during the next 20 years are encompassed within ARC B-II. For the purposes of this *Master Plan*, the Beechcraft Super King Air B200, an ARC B-II/Small aircraft, is considered to be the representative *critical aircraft*. With respect to Ukiah Municipal Airport, the Beechcraft B200's most demanding design characteristic is its 54.5-foot wingspan.

Aircraft in more demanding ARC categories (e.g., C-I, C-II, C-IV, D-II, etc.) can still be accommodated at the Airport on an occasional, weight-restricted basis. Such aircraft are not expected to generate more than 500 operations in any one year at Ukiah Municipal Airport.



Source: Shutt Moen Associates (July 1996)

Figure 5A

### Airfield Design Issues Ukiah Municipal Airport

### ***Instrument Approach Capability***

Ukiah Municipal Airport is presently served by two nonprecision instrument approach procedures: LOC-Runway 15 and VOR-A. In addition, the VOR-A approach procedure can be flown using Global Positioning System (GPS) equipment. *Straight-in* landing minimums are authorized for the LOC-Runway 15 procedure. The VOR-A procedure terminates in a *circle-to-land* or *visual* approach and landing on the runway. The lowest approach minimums for the Airport are 1,106 feet above Airport elevation and 1¼ statute mile visibility (LOC-Runway 15 procedure – Aircraft Category A).

A number of Airport users have suggested that enhanced instrument approach capability at Ukiah Municipal Airport would greatly facilitate their use of the Airport. Most frequently mentioned is their desire for lower approach minimums and a *straight-in* approach to Runway 33.

While enhanced instrument approach capability is highly desired by all instrument-rated pilots, its implementation at Ukiah Municipal Airport is problematic and unlikely. Airfield site constraints, local obstructions, and close-in high terrain surrounding the Airport generally preclude the establishment of a cost-effective and usable precision instrument approach to either Runway 15 or 33. These same factors preclude any significant enhancement of Ukiah's existing nonprecision instrument approach capability. Indeed, the above factors are so pervasive that it is unlikely the *straight-in* approach minimums provided by the existing localizer approach to Runway 15 can be significantly improved upon.

As the aviation industry and FAA gain additional operational experience with GPS approaches, it is possible that a GPS-overlay procedure will be established for Ukiah's LOC-Runway 15 approach. However, it is expected that the minimums for such an approach will be very similar to the Airport's existing localizer-based minimums.

Accordingly, for master planning purposes, Runway 15 is depicted on the *Airport Layout Plan* as maintaining its existing *straight-in* nonprecision instrument approach. Runway 33 will continue to be used for *circle-to-land* and *visual* approaches. It is anticipated that the visibility minimums for the *straight-in* approach to Runway 15 will remain more than ¾ statute mile throughout the planning period.

### **Airfield Design Standards**

Associated with each ARC and runway instrument approach type is a set of FAA-established runway and taxiway system design standards. These standards have been developed to assist airport sponsors and operators in the appropriate planning, development, operation, and maintenance of aviation facilities funded in part through FAA grant programs. The air-

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It should be noted that in late 1989, the FAA revised its airport design standards. Although most of the established guidelines remain the same as before, some are now considered to be *recommendations* rather than *standards*. Also, certain previous criteria are given greater emphasis, some new criteria are added, and the terminology for others has been changed. These updated standards and recommendations are documented in Advisory Circular 150/5300-13 (Change 4), *Airport Design*. The *Ukiah Municipal Airport Master Plan* is prepared in accordance with these revised FAA design standards and recommendations.

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port should be designed to the highest set of standards needed to accommodate the *critical aircraft* likely to use the facility on a regular basis in the future.

Table 5A compares the FAA design standards associated with different ARCs to Ukiah Municipal Airport's existing dimensions. As can be seen, there is relatively high correlation between the Airport's existing dimensions and the airfield design standards associated with the most critical category of aircraft expected to regularly use the Airport — those in ARC B-II. This is not unusual for a modern, well-maintained facility such as Ukiah Municipal Airport which has been designed and developed over the years to accommodate primarily private and small, business-use, general aviation aircraft.

There are, however, two exceptions to the standards that should be noted. The first exception involves the nonstandard location of Ukiah's parallel taxiway with respect to Runway 15-33. The "runway centerline-to-parallel taxiway centerline" dimensional standard for an ARC B-II airport is 240 feet. At Ukiah Municipal Airport, this dimension is 300 feet for the northern two-thirds of the parallel taxiway, but tapers down to 225 feet at the south end.

The second exception involves the nonstandard location of the Airport's Airplane Parking Limit (APL) line with respect to the parallel taxiway and the west side apron areas. The ARC B-II design standard specifies that the APL should be located a minimum of 66 feet from the parallel taxiway centerline. Along Ukiah's west side apron area, this dimension has been historically established at 50 feet.

Neither of these exceptions to FAA design standards is judged to significantly effect the safety and utility of the Airport's operations. Each of these exceptions are discussed in greater detail in subsequent sections of this chapter.

Given the above factors, it is recommended that Ukiah Municipal Airport's Runway 15-33 and associated taxiways be designed in general accordance with ARC B-II standards. However, as noted previously, the Airport should remain capable of accommodating occasional restricted use by aircraft in more demanding ARC categories (e.g., C-I, C-II, C-IV, D-II, etc.).

## Wind Coverage

FAA airfield design guidelines set the acceptable crosswind component for ARC B-II runways at 13 knots (15 mph). *Master Plan* analysis of historical wind data indicates that Runway 15-33 has 13-knot crosswind coverage of 99.6%. This level of wind coverage exceeds the FAA's minimum desired level of 95% and indicates that the existing runway orientation provides satisfactory wind coverage for all-weather aircraft opera-

<b>Airport Reference Code (ARC)</b>	<b>Current Design Standards<sup>a</sup></b>				<b>Existing Dimensions at Ukiah Municipal Airport</b>
	<b>B-II Var.<sup>b</sup></b>	<b>B-II</b>	<b>B-III</b>	<b>C-II</b>	
Aircraft Approach Speed	<121 kts	<121 kts	<121 kts	<141 kts	
Aircraft Wingspan	<55 ft. <sup>b</sup>	<79 ft.	<118 ft.	<79 ft.	
Aircraft Weight	>12,500 lbs.	>12,500 lbs.	>12,500 lbs.	>12,500 lbs.	
<b>Runway Approach Type</b>	<b>Vis or NP</b>	<b>Vis or NP</b>	<b>Vis or NP</b>	<b>Vis or NP</b>	<b>NP and VIS</b>
<b>Runway Design</b>					
Width	75 ft.	75 ft.	100 ft.	100 ft.	150 ft.
<b>Runway Safety Area (RSA)</b>					
Width	150 ft.	150 ft.	300 ft.	500 ft.	500 ft.
Length beyond Runway End	300 ft.	300 ft.	600 ft.	1,000 ft.	800 ft./650 ft.
<b>Obstacle Free Zone (OFZ)</b>					
Width	400 ft.	400 ft.	400 ft.	400 ft.	400+ ft.
<b>Object Free Area (OFA)</b>					
Width	500 ft.	500 ft.	800 ft.	800 ft.	500 ft.
Length beyond Runway End	600 ft.	600 ft.	1,000 ft.	1,000 ft.	800 ft./650 ft.
Gradient (Maximum)	2.0%	2.0%	2.0%	2.0%	0.27%
<b>Runway Setbacks</b>					
From Runway Centerline to:					
Hold Line	200 ft.	200 ft.	200 ft.	250 ft.	150 ft./200 ft.
Parallel Taxiway	240 ft.	240 ft.	300 ft.	300 ft.	300 ft./225 ft. <sup>b</sup>
Aircraft Parking Line (APL)	250 ft.	250 ft.	400 ft.	400 ft.	330 ft.
Building Restriction Line (BRL) <sup>d</sup>	495 ft.	495 ft.	495 ft.	495 ft.	425 ft./300 ft.
<b>Taxiway Design</b>					
Width	35 ft.	35 ft.	50 ft.	35 ft.	40 ft./50 ft.
Safety Area Width	55 ft. <sup>b</sup>	79 ft.	118 ft.	79 ft.	60 ft.
Object Free Area Width	100 ft. <sup>b</sup>	131 ft.	186 ft.	131 ft.	75 ft.
<b>Taxiway and Taxilane Setbacks</b>					
From Taxiway Centerline to:					
Fixed or Movable Object	50 ft. <sup>b</sup>	66 ft.	93 ft.	66 ft.	50 ft.
From Taxilane Centerline to:					
Fixed or Movable Object	40 ft. <sup>b</sup>	58 ft.	81 ft.	58 ft.	30 ft./varies

<sup>a</sup> Source FAA Advisory Circular 150/5300-13 Change 4 *Airport Design* (1993)

<sup>b</sup> "Variant" reflects less-than-standard aircraft wing span criterion associated with the Beechcraft Super King Air B200.

<sup>c</sup> Principal dimension is 300 feet – dimension decreases to 225 feet at south end of taxiway.

<sup>d</sup> The current Advisory Circular regards the Building Restriction Line setback distance as a recommendation, not a standard. Dimension shown as "standard" provides for 7:1 transitional surface clearance of a 35-foot-high structure.

Source: Data compiled by Shutt Moen Associates (July 1996)

Table 5A

## Airfield Design Standards

### Ukiah Municipal Airport

tions. According to Ukiah Flight Service Station personnel, the prevailing winds favor Runway 33 approximately 70% of the time, including calm wind periods.

## RUNWAY LENGTH, WIDTH, AND STRENGTH

### Runway Length Requirements

Today's diverse fleet of airplanes requires a wide range of runway lengths under a variety of operational and environmental conditions. FAA Advisory Circular 150/5325-4A, *Runway Length Requirements for Airport Design*, provides guidelines for determining the appropriate length for a runway or runways. The recommended length for an airport's primary runway is determined by considering either the family of user airplanes having similar performance characteristics or a specific airplane needing the longest runway. In either case, the choice should be based on the airplanes that are forecasted to use the runway on a regular basis. A regular basis is considered by the FAA to be at least 500 operations per year.

When the maximum gross weight of airplanes forecasted to use the runway is 60,000 pounds or less, FAA design criteria suggests that the runway length should be designed for a family of airplanes. This is the case at Ukiah Municipal Airport. For heavier airplanes, the runway length is normally designed for a specific *critical* airplane. The recommended runway length for a specific airplane is a function of that airplane's landing and takeoff operating weights, the wing flap settings, the airport elevation and temperature, wind component, the runway surface conditions, and the maximum difference in runway centerline elevations. For design purposes, worst case assumptions are used for conditions that vary from operation to operation.

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The ability of some aircraft, particularly turbine-powered airplanes, to climb over both close-in and distant obstructions in the departure area can also be a limiting factor in the operation of certain aircraft.

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It should be noted that local airport area obstructions and site-specific facility design factors may reduce the effective length of runway available for use by landing and departing aircraft. Relocated Thresholds, Displaced Thresholds, and Declared Distances are the three principal design mechanisms used to adjust effective runway lengths to appropriately reflect protected approach and departure surfaces. Application of these design mechanisms at Ukiah Municipal Airport is discussed in subsequent sections of this chapter.

### Runway 15-33 Length Analysis

Table 5B presents an analysis of FAA recommended runway lengths for various aircraft families and selected large aircraft types. This analysis re-

**Runway Length Calculation Parameters  
for Ukiah Municipal Airport**

- Airport Elevation = 614 feet above Mean Sea Level
- Mean Daily Maximum Temperature of the Hottest Month = 95° F
- Maximum Difference in Runway Centerline Elevation = 12 feet
- Length of Haul For Airplanes of More Than 60,000 Pounds = 500 miles
- Dry Runway Surface
- Existing Runway Length = 4,415 feet

<b>Aircraft Category</b>	<b>Recommended Runway Lengths</b>
<ul style="list-style-type: none"> <li>• Small airplanes having approach speed of 50 knots or more and maximum certificated takeoff weights of 12,500 pounds or less                             <ul style="list-style-type: none"> <li>- 75% of Fleet / Less than 10 Passenger Seats</li> <li>- 95% of Fleet / Less than 10 Passenger Seats</li> <li>- 100% of Fleet / Less than 10 Passenger Seats</li> <li>- 10 Passenger Seats or More</li> </ul> </li> </ul>	<p>2,770 feet</p> <p>3,310 feet</p> <p>3,950 feet</p> <p>4,470 feet</p>
<ul style="list-style-type: none"> <li>• All airplanes with maximum certificated takeoff weights of 12,500 to 60,000 pounds                             <ul style="list-style-type: none"> <li>- 75% of Fleet / 60% of Useful Load</li> <li>- 75% of Fleet / 90% of Useful Load</li> <li>- 100% of Fleet / 60% of Useful Load</li> <li>- 100% of Fleet / 90% of Useful Load</li> </ul> </li> </ul>	<p>4,940 feet</p> <p>7,250 feet</p> <p>5,970 feet</p> <p>9,300 feet</p>
<ul style="list-style-type: none"> <li>• Airplanes of more than 60,000 pounds</li> </ul>	<p>5,230 feet</p>
<ul style="list-style-type: none"> <li>• Selected aircraft types (Balanced Field Length)                             <ul style="list-style-type: none"> <li>- Beechcraft Super King Air (B200) 1,000 nautical mile flight with IFR reserves Two crew, four passengers</li> <li>- Cessna Citation II 1,000 nautical mile flight with IFR reserves Two crew, four passengers</li> <li>- Lear 36A 1,000 nautical mile flight with IFR reserves Two crew, four passengers</li> <li>- Gulfstream II 2,000 nautical mile flight with IFR reserves Two crew, eight passengers</li> </ul> </li> </ul>	<p>3,500 feet</p> <p>3,000 feet</p> <p>4,000 feet</p> <p>5,900 feet</p>

Source: FAA AC 150/5325-4A, Runway Length Requirements for Airport Design (Including Change 1). Aircraft manufacturer's performance data (October 1994).

**Table 5B**

**Recommended Runway Lengths  
Ukiah Municipal Airport**

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The FAA disseminates runway length information to pilots via the federal flight information publication *Airport/Facility Directory*. This publication is updated on a 56-day cycle. Privately published airport directories are also available and provide much the same information.

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flects the site characteristics that are unique to Ukiah Municipal Airport's Runway 15-33. As can be seen from this analysis, the present published length of 4,415 feet is capable of accommodating all small airplanes (i.e., airplanes weighing 12,500 pounds or less) seating less than 10 passengers, as well as a small portion of the aircraft fleet weighing between 12,500 and 30,000 pounds. In addition, larger/heavier aircraft are capable of utilizing the Airport with certain operating restrictions. This capability encompasses virtually all of the aircraft anticipated to use the Airport within the 20-year planning period.

### ***CDF Aircraft***

Formal runway length requirements for the CDF's Grumman S-2 aircraft were not calculated. However, based upon conversations with CDF's flight operations staff, Ukiah's current runway length does not limit payload — even during the hot summer months. The most recent CDF planning document anticipates that only twin-engine aircraft will be based at Ukiah Municipal Airport. S-2s converted to turboprop engines (i.e., S-2Fs) are likely candidates for the future type of Ukiah-based fire attack aircraft. Based upon the experience with a prototype, turboprop engines will improve the performance of the S-2s. Therefore, it is concluded that the existing runway length is adequate to meet both existing and future requirements of CDF's Ukiah-based fire attack aircraft.

### ***Turbine-Powered Aircraft***

Although Ukiah Municipal Airport receives relatively low levels of use by turbine aircraft, the range of aircraft types spans the entire spectrum of corporate aircraft. The Airport receives regular, if infrequent, use by aircraft ranging from the turboprop Beechcraft Super King Air B200 and Cessna Citation series, all the way up to a Gulfstream IV. The runway length requirements for four common turbine-powered aircraft were calculated. These calculations were based upon flight distances (stage lengths) and passenger loads consistent with the typical roles of these aircraft. Gross maximum takeoff weight was not used. These aircraft are not commonly flown in that configuration to/from Ukiah Municipal Airport. Table 5B presents the results of these calculations.

Based upon the data presented in Table 5B, it is clear that the existing 4,415-foot length will accommodate all but the largest of the four aircraft (i.e., the Gulfstream II). One aircraft is responsible for all historical Gulfstream operations. This aircraft is operated by a timber company which has operations in the Ukiah area. Given the population base and mix of industries in Mendocino County, it is not anticipated that operators of other large corporate aircraft will regularly utilize Ukiah Municipal Airport in the future.

### **Larger/Heavier Aircraft**

Most larger/heavier aircraft, particularly certain commuter aircraft types and first-generation corporate jets, are only able to utilize Ukiah Municipal Airport's runway if the aircraft's weight is reduced through restricted loading of fuel, passengers, and/or cargo. Further impacting such larger/heavier aircraft operations is the Relocated Threshold associated with the approach end of Runway 15. This Relocated Threshold reduces the published runway length to 4,415 feet.

Runway 15-33 previously was 5,000 feet long. The Runway 15 threshold was relocated in 1986 to shift more of the Runway Protection Zone onto airport property and to provide the required clearance over Hastings Avenue. This brought the Airport into compliance with the then-applicable FAA standards.

The 585 feet of entrance taxiway that leads to the Runway 15 threshold is used by many pilots as an acceleration taxiway for takeoffs on Runway 15. Likewise, many pilots make use of this taxiway segment for roll-out and deceleration during landings or aborted takeoffs on Runway 33. While not formally recognized by the FAA as being available for runway length calculations, this 585-foot segment of taxiway serves a very useful purpose at the Airport and should be retained.

### **Declared Distance Alternative**

Recent changes to FAA design criteria allow other runway configuration options not previously available. In the case of Ukiah, the most applicable of these is the use of Declared Distances. The FAA limits the use of Declared Distances to cases of constrained airports where it is impractical to provide the required safety areas.

At Ukiah Municipal Airport, Declared Distances could be used to theoretically increase the length of runway available for takeoffs from Runway 15 (TORA and TODA) and for accelerate-stop operations (ASDA) on Runway 33. The additional runway length available for these three specific operations would be 585 feet – the length of the north end threshold relocation.

Master Plan analysis of this alternative concluded that use of Declared Distances criteria at Ukiah Municipal Airport is neither warranted nor desirable. Aircraft operating at the Airport are already constrained by objects located in the runway approach and departure paths including high terrain to the south and west. In addition, scattered residential uses are located within the Runway Protection Zones. Use of Declared Distance criteria in this situation is not appropriate. The additional 585 feet of theoretical runway length that would be gained by use of Declared Distance criteria would not significantly impact the operations of aircraft currently using or projected to use the Airport.

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*Declared Distances* are defined as the distances the airport owner declares available for takeoffs and landings. The distances are:

- **Takeoff Run Available (TORA)** – The runway length declared available and suitable for the ground run of an airplane taking off.
- **Takeoff Distance Available (TODA)** – The TORA plus the length of any remaining runway or clearway (CWY) beyond the far end of the TORA.
- **Accelerate-Stop Distance Available (ASDA)** – The runway plus stopway (SWY) length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff.
- **Landing Distance Available (LDA)** – The runway length declared available and suitable for a landing airplane.

NOTE: The full length of TODA may not be usable for all takeoffs because of obstacles in the departure area. The usable TODA length is aircraft performance dependent and, as such, must be determined by the aircraft operator before each takeoff and requires knowledge of the location of each controlling obstacle in the departure area.

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### **Runway Extension Alternative**

Also examined as part of the *Master Plan* was the feasibility of extending Runway 15-33. Extension to the north is not practical due to the close-in presence of numerous structures and obstacles. In addition, the recently improved Hastings Avenue presents a formidable physical constraint.

Extension of the runway to the south would be possible but at a very high cost. Extensive acquisition of land and relocation of established residential and business land uses would be required for any extension of the runway to the south. In addition, lengthening of the runway would probably be associated with an upgrading of the Airport's applicable design criteria from ARC B-II to ARC C-II or ARC D-II. The ARC C-II and ARC D-II design standards are more restrictive than those applying to ARC B-II facilities – particularly with regard to OFA dimensions and setbacks. The application of ARC C-II or ARC D-II design criteria at Ukiah would further diminish the area available for aprons and buildings along the west side of the parallel taxiway.

Operational impacts associated with the runway's existing length affect only a few large, high-performance aircraft and are not considered to be a significant factor in the overall operation, development, and use of the Airport. Accordingly, the *Airport Layout Plan*, as described herein, provides that the Airport's existing physical runway length of 4,415 feet be maintained essentially as is. No extension or reconfiguration of the runway is anticipated or required.

### **Runway Width Requirements**

Ukiah Municipal Airport's Runway 15-33 is 150 feet wide. This width is considerably greater than the minimum recommended width of 75 feet for an ARC B-II runway. When crosswind effects on light aircraft performance are considered, runway width in excess of the recommended standards is entirely appropriate for a single-runway airport configuration. However, this benefit must be balanced against the greater cost of maintaining the wider pavement and the increased difficulty some light aircraft pilots experience in operating from excessively wide runways. This difficulty is particularly evident during night operations by small aircraft.

Airport user and City input strongly supports the maintenance of the runway at its existing 150-foot width. Accordingly, the *Airport Layout Plan* depicts the existing and future width of Runway 15-33 at 150 feet.

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As part of the *Master Plan* study, an evaluation of the condition of all existing airfield and building area pavements was conducted. A summary of this evaluation is included in Appendix D, together with recommendations regarding pavement maintenance.

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## Pavement Strength Requirements

Runway 15-33 has a published pavement strength rating of 28,000 pounds for airplanes with single-wheel landing gear. This rating is adequate throughout the 20-year planning period. Occasional use by aircraft weighing up to 60,000 pounds (e.g., Gulfstream IV) should not have a deleterious effect on the overall condition of the pavement.

## OTHER RUNWAY DESIGN CONSIDERATIONS

Runway length, width, and strength are only a few of the runway design characteristics that must be considered in preparation of an airfield plan. Other design components of particular significance to Ukiah Municipal Airport's airfield design include: Runway Safety Areas, Object Free Areas, FAR Part 77 imaginary surfaces, and Runway Protection Zones (formerly known as *Clear Zones*).

### Runway Safety Areas

FAA design standards (AC 150/5300-14, Change 4) for ARC B-II facilities, such as Ukiah Municipal Airport's Runway 15-33, specify that the Runway Safety Area (RSA) be 150 feet wide the full length of the runway and extend a minimum of 300 feet beyond the ends of the runway pavement.

Since Runway 15-33 is 150 feet wide, it is recommended that the RSA be increased to a width of 225 feet. This increased RSA width will preserve the 37.5-foot shoulder clearance area provided for in the ARC B-II runway design standards. The RSA encompassing Runway 15-33 meets or exceeds this FAA design standard.

### Object Free Areas

FAA design standards for ARC B-II facilities, such as Ukiah Municipal Airport's Runway 15-33, specify that the Object Free Area (OFA) be 500 feet wide the full length of the runway and extend a minimum of 300 feet beyond the ends of the runway pavement.

The OFA encompassing Ukiah Municipal Airport's Runway 15-33 meets or exceeds this FAA design standard.

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A *Runway Safety Area (RSA)* is a cleared, drained, graded, and preferably stabilized surface, symmetrically located about the runway. Under dry conditions, an RSA should be capable of supporting aircraft rescue and fire-fighting equipment and of accommodating the occasional passage of aircraft without causing major damage to the aircraft. The area must be free of objects, except ones whose function requires their location in the RSA, in which case they must be installed on frangible supports.

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An *Object Free Area* (OFA) is a two-dimensional ground surface surrounding the runways, taxiways, and taxilanes. The OFA clearing standards preclude parked airplanes, operations, and objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. The OFA should be under the direct control of the airport operator. This designated area is newly defined in the revised FAA airport design standards.

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The FAR Part 77 imaginary surfaces for Ukiah Municipal Airport are illustrated in the *Airspace Plan* located in the airport plan set.

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## Obstacle Free Zone

The *Obstacle Free Zone* (OFZ) is a three dimensional volume of airspace which supports the transition of ground to airborne aircraft operations (and vice versa). The OFZ clearing standard precludes taxiing and parked airplanes and object penetrations, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function.

For runways serving large airplanes, such as Ukiah's Runway 15-33, the OFZ is 400 feet wide and extends 200 feet beyond each end of the runway. For runways with nonprecision instrument approach capability, the sides of the OFZ extend from the ground vertically up at a 90° angle. The OFZ encompassing Runway 15-33 meets or exceeds this FAA design standard.

## FAR Part 77 Imaginary Surfaces

Federal Aviation Regulation (FAR) Part 77, *Objects Affecting Navigable Airspace*, identifies the airspace necessary to ensure the safe operation of aircraft to, from, and around 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 runway system. Generally, most critical among the FAR Part 77 surfaces are the Approach Surfaces. Approach Surfaces are, in effect, extensions of the RPZs, but in the air rather than at ground level.

### Existing Configuration

The Airport's current Approach Surfaces are configured in accordance with an ARC B-II – Nonprecision/Visual facility. The dimensions of the existing Approach Surfaces for Ukiah Municipal Airport's Runway 15-33 are as follows:

	<i>Approach End of Runway 15</i>	<i>Approach End of Runway 33</i>
Length:	10,000 feet	5,000 feet
Inner Width:	500 feet	500 feet
Outer Width:	3,500 feet	1,500 feet
Slope:	34:1	20:1
Approach Type:	Nonprecision [C]	Visual [B(V)]

These Approach Surfaces begin at the surface 200 feet outward from the ends of the runway pavement.

### **Future Configuration**

Since no change in the Airport's role, Airport Reference Code, or instrument approach capability is anticipated, the dimensions of the future Approach Surfaces for Ukiah Municipal Airport's Runway 15-33 will remain the same as the present surfaces' dimensions.

### **Obstructions**

Numerous objects (e.g., ground, poles, and trees) have been identified by the FAA as penetrating the Approach Surfaces and/or adjacent Transitional Surfaces at Ukiah Municipal Airport. These objects are documented in the FAA's *Obstruction Chart* (OC 698) for Ukiah Municipal Airport (dated September 1993) and depicted in the *Airspace Plan* drawings in the back of this *Master Plan Report*. As part of an AIP grant project, the City and FAA are currently evaluating these objects as to their impact on airport operations and the feasibility of their removal/ mitigation. The need for a greater degree of City control over airspace obstructions is addressed in Chapter 7 -- Land Use and Environmental Issues.

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Any object penetrating the Part 77 surfaces must be evaluated by the FAA to determine if it constitutes a hazard to air navigation.

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### **Runway Protection Zones**

The FAA's *Airport Design Advisory Circular* recently redefined the purpose of a Runway Protection Zone (RPZ) from one of enhancing the safety of aircraft operations to that of enhancing the protection of people and property on the ground. Accordingly, the FAA recommends that airport operators acquire sufficient property interest in RPZs to effectively control the use of land within those areas.

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A *Runway Protection Zone (RPZ)* is a trapezoidal area situated at ground level and located beyond each end of an airport runway. The RPZ is centered upon the extended runway centerline and, under most circumstances, begins at the end of the Primary Surface. RPZs may also be sited at locations other than at the end of the Primary Surface. Typically, this is done to address immovable obstructions in the runway's approach and departure paths. The term *Runway Protection Zone* has replaced the formerly used term *Clear Zone*.

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Ideally, RPZs should be clear of all objects other than aviation-related objects which functionally must be located there. Where this objective is impractical to achieve, the FAA considers certain activities to be acceptable within various areas of the RPZ. Where it is determined to be impractical for the airport owner to acquire and plan the land uses within the entire RPZ, the RPZ land use standards have recommendation status for that portion of the RPZ not controlled by the airport owner.

The status of each RPZ is discussed in the following paragraphs.

### **RPZ Configuration**

Runway 15-33 is designed to serve ARC B-II airplanes landing and departing under *straight-in* nonprecision (Runway 15) and *visual* (Runway 33) flight conditions. As such, the RPZs serving the approach and departure ends of Runway 15-33 are configured as follows:

	<i>Approach End of Runway 15</i>	<i>Approach End of Runway 33</i>
Length:	1,700 feet	1,000 feet
Inner Width:	500 feet	500 feet
Outer Width:	1,010 feet	700 feet
RPZ Area:	29.5 acres	13.8 acres

The inner edge of each RPZ is located 200 feet outward from the end of the runway pavement. In the case of Ukiah's Runway 15, the RPZ begins 200 feet outward from the relocated threshold. These are the standard locations for an RPZ.

The RPZ serving the approach end of Ukiah's Runway 15 is bisected by Hastings Road — a recently improved public thoroughfare. Approximately 40% (12 acres) of the RPZ's total land area (29.5 acres) is located off-Airport and is not under the control of the City. Numerous objects (roads, structures, fences, trees, poles, etc.) are located within the RPZ. The City owns, in fee simple, the central portion of the RPZ extending 1,650 feet outward from the Runway 15 threshold.

The RPZ serving the approach end of Runway 33 is truncated on its far end by Norgard Lane — a residential, dead-end access road. Approximately 36% (5 acres) of the RPZ's total land area (13.8 acres) is located off-Airport and is not under the control of the City. Similar to the Runway 15 RPZ, numerous objects (road, structures, fences, etc.) are located within the RPZ. The City owns, in fee simple, the central portion of the RPZ extending 1,050 feet outward from the Runway 33 threshold.

The RPZs described above for Runway 15-33 are depicted on the *Airport Layout Plan* and the *Airspace Plan*. Future land use planning implications related to these RPZs are discussed in Chapter 7.

## Building Restriction Lines

Building Restriction Lines (BRLs) identify suitable locations for airport buildings and other stationary structures. The FAA *Airport Design Advisory Circular* no longer establishes standard setback distances or BRLs. Rather, the FAA recommends that the BRL encompass the runway OFA, RPZs, areas required for airport traffic control tower clear line-of-sight (if applicable), and navigational aid critical areas.

### West Side

At Ukiah Municipal Airport, the west side BRL for Runway 15-33 has historically been established 425 feet from the runway centerline. This distance reflects an old FAA standard. As depicted in the *Airport Layout Plan* and *Building Area Plan*, this 425-foot BRL fully encompasses the

*Plan and Building Area Plan*, this 425-foot BRL fully encompasses the Runway 15-33 OFA and adequately protects navigational aid critical areas. This 425-foot BRL would permit a 25-foot-high structure to be sited at the BRL without penetrating the adjacent FAR Part 77 7:1 Transitional Surface. It is recommended that the 425-foot BRL setback distance be maintained along the west side of Runway 15-33 throughout the 20-year planning period.

### **East Side**

It is recommended that the BRL on the east side of the Airport be established 350 feet from the runway centerline. This 350-foot BRL would permit a 14-foot-high structure to be sited at the BRL without penetrating the adjacent FAR 77 7:1 Transitional Surface.

Two structures on the east side of the Airport are located less than 350 feet from the runway centerline – a small storage building in the City Corporation Yard and a portion of the new aviation fuel storage facility. Neither of these structures penetrates the adjacent 7:1 Transitional Surface and are, therefore, considered to be acceptably located.

### **Blast Pads**

Runway blast pads provide blast erosion protection beyond runway ends. While useful on all runways, blast pads are particularly beneficial on runways used by jet and large, propeller-powered aircraft.

The approach end of Runway 15 features a 150-foot-wide by 585-foot-long paved section of former runway. This paved surface effectively functions as a blast pad.

There is no blast pad at the approach end of Runway 33. It is recommended that a blast pad (150 feet wide by 150 feet long) be constructed at the approach end of Runway 33.

## **TAXIWAY SYSTEM**

Ukiah Municipal Airport is well-served by its existing taxiway system. Aside from fading striping/markings and the need for a protective slurry seal coat, the parallel taxiway system is in good condition and is well lighted.

The centerline of the full-length parallel taxiway serving the west side of Runway 15-33 is currently located 300 feet from the runway centerline along the northern two-thirds of its length, tapering down to 225 feet at

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The FAA defines a *taxiway* as a designated path established for the taxiing of aircraft from one part of an airport to another. A *taxilane* is that portion of the aircraft parking area used for access between taxiways and aircraft parking positions. Typically, taxilanes offer less clearance than taxiways.

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the southern end. The runway centerline-to-parallel taxiway centerline dimension recommended by the FAA for an ARC B-II facility is 240 feet. As a result, the southernmost 400 feet of the parallel taxiway offers slightly less (approximately 15 feet) runway centerline-to-parallel taxiway centerline clearance than the FAA design standard.

As noted earlier in this chapter, this exception to current FAA standards is judged to not significantly effect the safety and utility of airport operations. As part of the FAA's *Airport Layout Plan* approval process, this deviation from design standards will be evaluated by the FAA as to its impact on airport safety and operations. It is anticipated that the FAA will grant a waiver from design standards to accommodate this minor dimensional deviation.

### Taxiway Widths

The width of the parallel taxiway serving Runway 15-33 is 50 feet, and the widths of the four runway entrance/exit taxiways are a minimum of 50 feet as well. These taxiway widths are somewhat greater than current FAA design standards which specify a 35-foot-wide taxiway for ARC B-II facilities. This greater taxiway width facilitates the clearing of aircraft from the runway and should be retained.

### Aircraft Parking Limit

The appropriate setback distance from taxiways-to-fixed or movable objects or to an Aircraft Parking Limit (APL) line is based primarily upon the size of aircraft (i.e., wingspan) intended to use the facilities. Typically, the APL line represents the outer edge of the taxiway's Object Free Area (OFA). In the case of ARC B-II facilities, the standard distance between the taxiway centerline and fixed or movable object is 66 feet.

However, the configuration of Ukiah Municipal Airport's building area is historically based on the use of an APL line which is located 50 feet to the west of the parallel taxiway's centerline. Strict application of the ARC B-II APL setback dimension of 66 feet would result in the loss of some 16 apron tiedown positions. In addition, tenant apron areas would be reduced in depth by 15 feet. Since the Airport's west side apron area is already relatively shallow, any further reduction in apron depth is not desirable.

Earlier in this chapter, it was determined that the *critical* aircraft regularly using Ukiah Municipal Airport is the Beechcraft Super King Air B200. The appropriate taxiway OFA for this aircraft is 96 feet, which results in a taxiway centerline-to-APL dimension of 48 feet. Therefore, the Airport's historic APL line dimension of 50 feet adequately accommodates the Airport's critical design aircraft. Occasional use by aircraft with

greater wingspans, such as the S2 (70-foot wingspan) and Grumman IV (78-foot wingspan), should be acceptable provided that the pilots of the larger aircraft exercise appropriate care while maneuvering on the parallel taxiway and apron areas.

The appropriate setback distance from a *taxilane-to-fixed* or movable objects or to an APL for Ukiah's *critical* aircraft (B200) should be a minimum of 40 feet. This dimension can be further reduced in areas where only small airplanes operate.

## Holding Bays

Also known as *run-up areas*, holding bays provide a standing space for airplanes (1) to test their engine(s) and equipment immediately prior to takeoff, and (2) to wait for an opportunity to fit into the aircraft arrival/departure stream. The approach end of Runway 33 is adequately served by a large holding bay. The holding bay serving the approach end of Runway 15 is somewhat small and should be enlarged. Enlargement of this holding bay is recommended and is depicted on the *Airport Layout Plan*.

## OTHER AIRFIELD DESIGN ELEMENTS

### Helicopter Operations

Two turbine-powered helicopters (Jet Ranger and A-Star) are currently based at Ukiah Municipal Airport. These helicopters are parked in the airport building area and are used for flight training purposes and corporate flight operations. These based helicopters access the runway area for takeoff/landing by hover-taxiing through the aircraft parking aprons and taxilanes. While not necessarily a desirable routing, this procedure represents an operational compromise that reflects the Airport's constrained layout and available facilities.

Ukiah Municipal Airport also sees occasional operations by light-to-medium-sized transient helicopters (e.g., Robinson R-22s, Bell Jet Rangers, etc.). In addition, transient military helicopters (e.g., CH-47 and UH-1) occasionally utilize the Airport for refueling. Due to the relatively infrequent need to accommodate such helicopters, a formal helipad or approach/departure target area has not been established on the Airport. Current practice is for transient helicopters to park on the concrete apron located to the east of the airport terminal building. No formal helicopter parking pads are currently designated on the Airport.

Ideally, helicopter and airplane operations should be conducted from their own dedicated facilities and areas on an airport. Due to Ukiah Municipal Airport's physical site constraints, there is currently no area on the Airport that would readily lend itself to development of such dedicated helicopter operating areas. As a result, for the short-to-intermediate time frame, helicopter and airplane operations at the Airport will of necessity, continue to be interactive and dependent – as they are at present.

Nevertheless, to facilitate current and future helicopter operations at the Airport, particularly transient helicopter operations, it is recommended that a transient helicopter parking area (2-3 positions) be formally designated at the Airport. The concrete apron just east of the airport terminal building appears to be the best location for siting these parking positions. This location site is depicted on the *Airport Layout Plan*.

It is anticipated that the operators of small helicopters based at Ukiah Municipal Airport will continue to operate directly to/from their respective on-airport facilities. Future decreases in demand for airplane tie-down facilities could result in more apron becoming available for development of a dedicated helicopter operations area on the Airport. In this event, a portion of an unused airplane tiedown area and/or hangar apron could be developed for dedicated helicopter operations. Due to the uncertainty of such a scenario, a specific layout for this area/use has not been identified on the *Airport Layout Plan*. Such an area, however, should be located near suitable helicopter-oriented hangar/office facilities and should be located so as to minimize helicopter/airplane operational interaction.

### **Runway Lighting, Visual Approach Aids, and Marking**

Runway 15-33 is equipped with Medium-Intensity Runway Lights (MIRL) which are in good condition and are suitable for the Airport's existing and future use.

A Visual Approach Slope Indicator (VASI-V4L) with an approach slope angle of 3.0° and a threshold crossing height of 27 feet serves the approach end of Runway 15. There is no visual glide slope indicator (VGSI) serving the approach end of Runway 33. The presence of high terrain to the south of the Airport makes it unlikely that a VGSI could be established on this runway.

Runway 15-33 is equipped at each approach end with Runway End Identification Lights (REILs). These lights are useful in locating the runway threshold during hours of darkness and periods of low visibility.

Runway 15-33 is marked as a *nonprecision* runway. Last painted in 1984, these markings are in poor condition. It is recommended that

these markings/striping be renewed within the next 12 months – perhaps in conjunction with the proposed slurry seal of the airfield surfaces.

### **Taxiway Lighting and Marking**

The full-length parallel taxiway serving Runway 15-33 is equipped with a low-intensity edge lighting system. This system is in good condition.

The parallel taxiway system is appropriately marked with a centerline stripe, edge stripes, and hold lines. In addition, reflective pavement markers are installed along the centerline and edges of the parallel taxiway system. It is recommended that these markings/striping be renewed in conjunction with the proposed slurry seal of the taxiway system.

### **Hold Lines**

The FAA requires hold lines on all taxiways intersecting with runways. The hold lines at the entrance taxiway serving the approach end of Runway 15 and the two mid-field exit taxiways are currently located 150 feet from the runway centerline. The hold line at the entrance taxiway serving the approach end of Runway 33 is currently located 200 feet from the runway centerline.

The standard hold line location for an ARC B-II runway is 200 feet from the runway centerline. It is recommended that all four of Ukiah's hold lines be located 200 feet from the centerline of Runway 15-33.

### **Signing**

Ukiah Municipal Airport is equipped with lighted runway/taxiway guidance signing in accordance with FAA standards. This guidance signing is in fair condition.

It has been suggested by some users that Distance-To-Go signs be installed along Runway 15-33. While not required by the FAA for an airport of this type, the installation of Distance-To-Go signs would enhance the safety of airport operations – particularly by large aircraft.

### **Segmented Circle**

A 100-foot diameter segmented circle with traffic pattern direction indicators is located on the east side of the runway. The traffic pattern indicators depict a left traffic pattern for Runway 15 and a right traffic pattern for Runway 33. Also located within the segmented circle is an un-

lighted free-swiveling wind tee. It is suggested that this wind tee be lighted to facilitate its use during nighttime hours.

### **Wind Indicators**

The Airport is currently equipped with two wind cones – a lighted wind cone within the segmented circle and an unlighted supplemental wind cone to the west of the localizer antenna array. These two wind cones provide adequate but not optimal visual wind information for Runway 15-33.

To further enhance airport safety, it is suggested that the unlighted wind-cone be located closer to the Runway 33 touchdown zone. In addition, a third wind cone should be located to the east of the runway near the Runway 15 touchdown zone. A supplemental wind cone in this area will provide useful wind information for pilots landing on Runway 15.



# 6

## Building Area Development



## **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. Among the facilities found at most public-use general aviation airports are:

- Based aircraft tiedowns and storage hangars.
- Transient aircraft parking.
- Fixed base operations facilities.
- Fuel storage and dispensing equipment.
- Access roads and automobile parking.
- Security/perimeter fencing and access gates.
- Lighting, marking, and signing.
- Public rest room(s).
- Public telephone(s).
- Aircraft washing area(s).

Also common, particularly at busy public-use general aviation airports, are:

- Public terminal building.
- Air traffic control tower.
- Emergency response equipment.
- Corporate aircraft storage hangars/offices.
- Airport maintenance facilities.
- Tenant aircraft maintenance shelter(s).
- Public airport viewing area(s).
- Aviation support facilities, such as restaurant/coffee shop, rental car facilities, etc.
- Commercial/industrial buildings and other nonaviation revenue producing uses.

This chapter examines the factors which affect the siting and development of future building area facilities at Ukiah Municipal Airport and alternative ways of accommodating projected demand. The focus is on providing direction for the appropriate expansion and use of the core building area of the Airport. The various design and use issues associated with Ukiah Municipal Airport's building area are graphically presented in Figure 6A.

## **DESIGN FACTORS**

Many factors influence the planning and, later, the development decisions associated with Ukiah Municipal Airport's building area. Most of these factors can be grouped under six basic headings:

- **Demand** – The demand for additional building area facilities at Ukiah Municipal Airport is forecast to be very modest over the 20-year planning period. This modest level of growth is typical of general aviation airports serving communities in nonmetropolitan areas. As documented in Chapter 4, based aircraft are forecast to increase by approximately 10% – from the current 90 aircraft to 100 aircraft – by the year 2015. With minor facility adjustments, this minimal increase in demand can be accommodated within the currently available building area.

In addition, the various types of aircraft that will use the Airport in the future are not expected to be significantly different from the types of aircraft currently using the Airport – that is, personal/recreational aircraft and small- to mid-size business/corporate aircraft.

Demand for new or significantly redeveloped fixed base operations facilities and services is expected to be minimal or nonexistent throughout the planning period. Existing fixed base operations facilities and services, with enhancements, should be capable of accommodating future demand.

- **Setback Distances** – The interior boundary of the airport building area is determined in large part by the necessary setback distances from the runway and parallel taxiway. As discussed in the preceding chapter, the following design criteria are recommended:
  - A minimum of 425 feet and 350 feet respectively from the Runway 15-33 centerline to any future buildings on the Airport's west and east sides (shown on the *Airport Layout Plan* as the Building Restriction Line [BRL]),
  - A minimum of 50 feet from the parallel taxiway centerline to aircraft parking positions (shown as the Airplane Parking Limit [APL]).

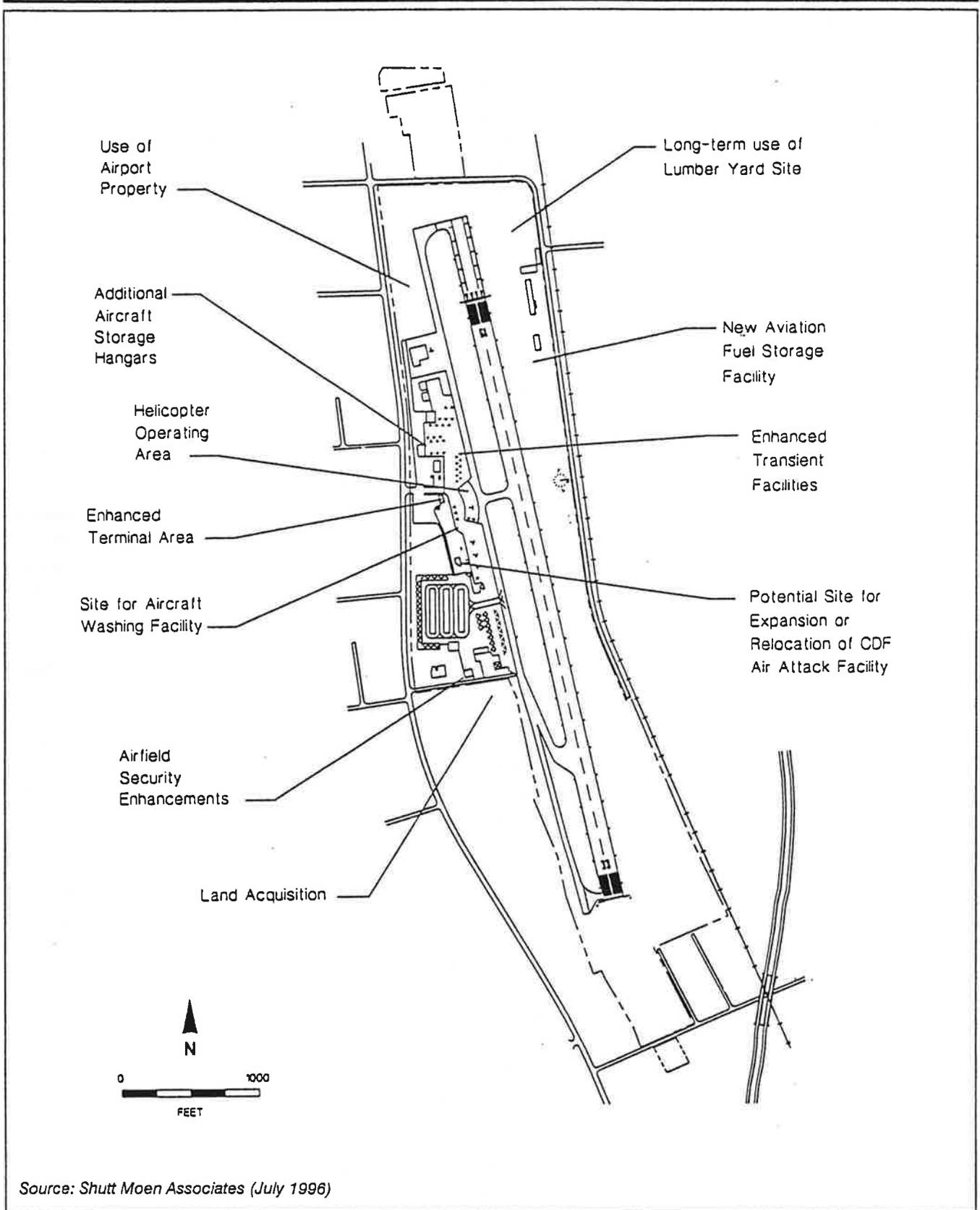


Figure 6A

**Building Area Issues**  
Ukiah Municipal Airport

These setbacks should be adequate to accommodate regular use by aircraft with wingspans of up to 57 feet (e.g., Beechcraft Super King Air B200). Occasional use by aircraft with greater wingspans (e.g., Grumman S-2, Gulfstream IV, etc.) should be acceptable provided that the pilots of the larger aircraft exercise appropriate care while maneuvering on the parallel taxiway and apron areas.

- **Existing Facilities and Leases** – All of the Airport’s aviation-oriented buildings and facilities used by the public are located to the west of the runway. A wholesale lumber yard, city corporation yard, commercial fence storage area, and airport wind/weather equipment are located on the east side of the runway. In addition, the future aviation fuel storage facility will be located to the east of the runway adjacent to the southern boundary of the city corporation yard.

With the exception of the possible future development of a replacement CDF air attack base on the east side of the Airport, no additional on-airport development to the east of the runway is planned or likely. Limited land availability and site constraints preclude additional development of the eastern portion of the Airport.

To the west of the runway and parallel taxiway system, several undeveloped areas offer room for useful expansion of Airport-related facilities. For example, the 3.5-acre parcel of undeveloped land located in the Airport’s northwest corner adjacent to the parallel taxiway readily lends itself to future aviation-related development. The recent development of the FedEx air freight handling facility just south of this area is an excellent example of an appropriate use for this parcel. Additional development opportunities within the Airport’s building area are discussed in subsequent sections of this chapter.

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The present condition and use of the various building area facilities are described in Appendix A.

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The physical condition of the existing structures and other facilities range from poor to very good. Many of the existing facilities are expected to be usable for 20 or more years and are assumed to remain in place and fully functional. However, several of the fixed base operations hangars and the CDF administration building are in poor condition and will need to be replaced or demolished within the next 5-10 years.

- **Accessibility** – An important design consideration is the ease of access to individual portions of the building area from both the taxiway system and public roads. At Ukiah Municipal Airport, the full-length parallel taxiway provides excellent access between the runway and west side building area. Full development of the building area, particularly the southern portion, is hindered by terrain and surface slope considerations. The need to provide gentle gradients (maximum of 2%) on taxiways and aprons results in the less-than-optimum use and layout of this area. In some cases, facilities are terraced and are served by relatively steep access taxiways.

Public vehicular access to the west side building area facilities (both public and private) is provided from South State Street. Vehicular access to the southernmost portion of the building area is available via a restricted access road and code-operated gate off of South State Street.

Vehicular access to the land uses on the east side of the Airport is via Hastings Avenue and Airport Road. There is no taxiway access to the Airport's east side.

- **Land Acquisition Potential** – An important consideration is the desirability of providing sufficient land for unforeseen future Airport building area development needs. The area around Ukiah Municipal Airport is substantially developed. Only a very few land areas adjacent to the Airport would readily lend themselves to expansion of the airport building area. Should there be unanticipated strong demand for new building area facilities, the Airport could be constrained in its ability to significantly expand the building area.
- **Development Staging** – Another important factor in the preparation of a building area plan is the timing of future development. The objective 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 makes sense at each stage of development. Sometimes, the best location for facilities in the short-term may conflict with the optimum long-range plan.

## **BUILDING AREA FACILITY REQUIREMENTS**

### **Aircraft Storage and Parking**

The forecasts and demand/capacity analyses prepared as part of the *Master Plan* indicate that, if adequate storage facilities are constructed, approximately 100 aircraft could be based at Ukiah Municipal Airport by the year 2015. Peak transient aircraft parking demand is expected to increase from 15 spaces to 20 spaces over this same period. All of the additional future based aircraft are expected to be accommodated within existing or newly constructed aircraft storage hangars.

### **Hangars**

There are 40 individual hangar structures at Ukiah Municipal Airport housing approximately 80 aircraft. Virtually all of these hangars are currently owned by the City. The ownership of the few remaining private hangars will transfer to the City at the end of their respective leases. As noted previously, it is anticipated that demand for additional aircraft

storage hangars will increase in the years ahead. The continued availability of reasonably priced storage hangars is one of the key factors encouraging growth of based aircraft at Ukiah Municipal Airport. It is suggested that future hangar development reflect: (1) user demand, (2) physical siting and locational considerations and, (3) funding resources.

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This area is depicted in Figure 6B  
– Future Hangar Development.

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There is sufficient land available within the existing building area to accommodate development of the additional number of hangars required to meet projected demand over the 20-year planning period. It would be most efficient to construct these new hangar units on the edge of the existing apron area to the northwest of the Flight Service Station.

This area would readily lend itself to development of up to three conventional hangars, for either aircraft storage or small specialty fixed base operations facilities. The area is already paved, well-drained, offers utilities and ground access, and is committed to similar hangar use.

The type and size of hangars can best be determined through a survey of potential hangar users. Aircraft type, airframe dimensions, the nature of hangar use (i.e., aircraft storage only versus workshop capability), facility siting considerations, availability of adequate utilities, (specifically water and electricity), and market price largely determine the range of hangar types and sizes required to satisfy demand.

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Appendix E provides additional information regarding the financing and development of aircraft storage hangars at publicly-owned airports.

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Experience at most general aviation airports suggests that mid- to large-sized individual conventional hangars are highly preferred by users. It is likely that the new hangars noted above will be of the conventional or box-type – approximately 50 feet by 40 feet in size.

### ***Based Tiedowns***

There are approximately 30 fixed aircraft tiedown positions currently designated at the Airport. These positions are well located throughout the building area. At the time of the *Master Plan* inventory (August 1994), approximately half of these tiedowns were in use.

Future demand for based aircraft tiedowns is expected to remain constant as new storage hangars are constructed. Accordingly, demand for based aircraft tiedowns at Ukiah Municipal Airport is projected to remain the same as at present – approximately 15 positions through the year 2015.

### ***Transient Airplane Parking Positions***

Fifteen transient aircraft parking positions are currently located to the east and southeast of the FAA Flight Service Station.

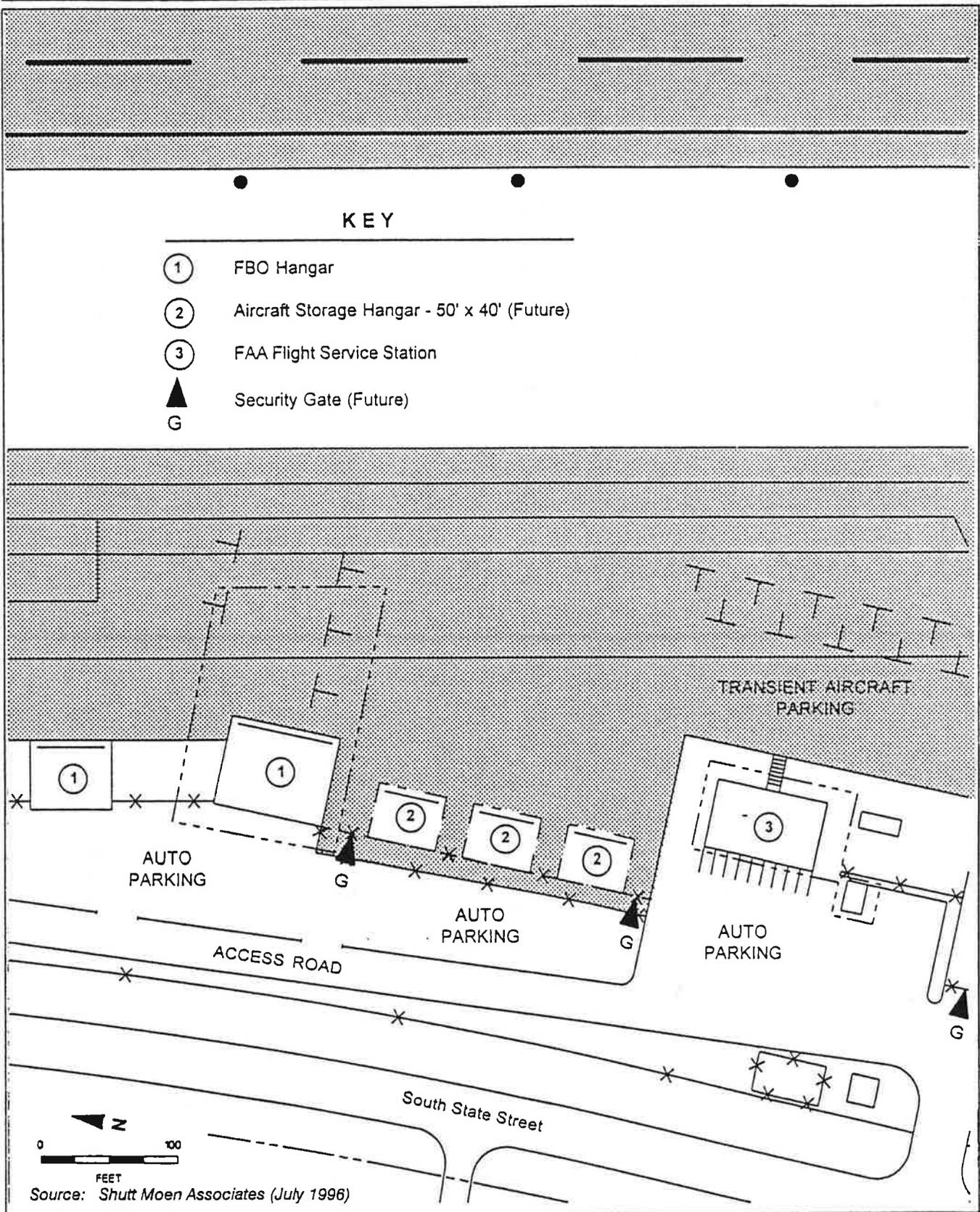


Figure 6B

**Future Hangar Development**  
Ukiah Municipal Airport

The majority of transient aircraft will continue to utilize the transient parking apron located to the east of the Flight Service Station. A small number of transient aircraft users will park, with permission, at the Airport's various fixed base operator facilities.

### ***Transient Helicopter Parking Positions***

As noted in Chapter 5, Ukiah Municipal Airport sees occasional transient operations by light- to medium-size civil helicopters and large military helicopters. The *Master Plan* recommends that 2-3 parking positions for transient helicopters be established on the concrete apron located east of the airport terminal building. It is anticipated that the operators of small helicopters based at Ukiah Municipal Airport will continue to operate directly to/from their respective on-airport facilities.

Future decreases in demand for airplane tiedown facilities could result in more apron becoming available for development of a dedicated helicopter operations area on the Airport. In this event, a portion of an unused airplane tiedown area and/or hangar apron could be developed for dedicated helicopter operations. Due to the uncertainty of such a scenario, a specific layout for this area/use has not been identified on the *Airport Layout Plan*. Such an area, however, should be located near suitable helicopter-oriented hangar/office facilities and should be located so as to minimize helicopter/airplane operational interaction.

### **Fixed Base Operations Areas**

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As of mid-1995, there are six fixed base operations (FBOs) located at Ukiah Municipal Airport. The Airport's FBO facilities and services are briefly described in Appendix A.

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The *Master Plan* anticipates that the six conventional hangars currently being used for fixed base operations will continue to be used for this same purpose throughout the 20-year planning period. Little or no significant expansion of FBO-related facilities is anticipated. Reconstruction of deteriorating apron pavement and replacement of older hangars will be required, however, within the next few years. The cost of reconstructing airfield and apron pavements is identified in Table 2A as an airport capital improvement expense. For reasons outlined in Chapter 8, all new and replacement hangars are expected to be funded by the private sector.

Should additional fixed based operations facilities be desired, sufficient developable land exists within the building area to accommodate this demand. Potentially developable sites are located in the northwest corner of the Airport and northwest of the FAA Flight Service Station. Potential redevelopment sites include the Ace Aerial Service site and the existing CDF site (if the CDF facilities are relocated).

## **Automobile Parking**

Two paved public-use automobile parking lots are located within the airport building area. These two lots should adequately serve the present and anticipated public parking needs of the present and future fixed base operators, the airport terminal building, Flight Service Station, and transient aircraft users. To reduce demand upon this area, based aircraft operators are permitted to park their vehicles in their hangars or in the vicinity of their tiedown location. Additional unimproved facilities for the parking of employee and customer vehicles are located within or adjacent to the Airport tenants' individual leaseholds.

## **Fuel Storage/Dispensing Facilities**

Bulk aviation fuel (100 LL) is currently stored in one 12,000 gallon aboveground steel tank located on the main apron to the southeast of the airport terminal building. This is an interim location pending the planned development of a new 20,000 gallon two-product (100 LL and Jet A) aviation fuel storage facility on the Airport's east side. The new storage facility is programmed for construction in 1995. This new facility should prove adequate throughout the planning period. The existing bulk aviation fuel storage and dispensing facilities are described in Appendix A.

## **CDF Fire Attack Base**

As noted in Chapter 4, Ukiah Municipal Airport serves as an important fire attack base for the California Department of Forestry and Fire Protection's (CDF) forest fire suppression operations. The CDF mission has considerable local and regional significance and is a primary operational role of the Airport.

The existing CDF facilities at Ukiah Municipal Airport are marginal. There is insufficient apron area for the efficient loading and operation of CDF aircraft. In addition, the base's existing structures and equipment are old and in poor physical condition.

Expansion or improvement of the Ukiah CDF base has been suggested by local CDF personnel – either at the base's existing location or at another location on the Airport. Funding for an improved facility is not currently available through either the State or federal government. The City of Ukiah has been mentioned as a possible source for funding the proposed CDF facility improvements. This funding option is currently being evaluated by the City.

If the CDF facilities are improved or expanded, three potential on-airport development scenarios are possible.

- **Existing Site** – The CDF’s existing site could be expanded and improved. The CDF apron area could be expanded by excavating and leveling the ground underlying the present CDF operations building and parking area. By shifting the entire CDF operations compound to the west, additional apron depth could be provided. A significant disadvantage of this scenario is that it maintains the CDF base location in the midst of the Airport’s busy public-use operational area.
- **Southeast Site** – The CDF base could be relocated to the 12.5-acre triangular segment of undeveloped land located in the southeast corner of the Airport. Development of this site would require the installation of all new facilities – utilities, access roads, apron, equipment, and structures. A key advantage to this site is that it is separate from the Airport’s busy public-use operational area. A significant disadvantage would be that CDF aircraft would have to cross the approach end of the active runway to access the west side parallel taxiway.
- **Northeast Site** – In the event that the wholesale lumber supply yard located in the northeast corner of the Airport ceases operation, this site could be developed as a replacement CDF base. This location offers the same basic advantages and disadvantages as the southeast site. In addition, this site offers the advantage of readily available utilities and nearby access roads. The site offers approximately 2.8 acres of developable area.

If the CDF base is developed at either of the east-side sites, the site of the current base could be developed for general aviation use (e.g., fixed base operations, hangars, expanded apron, dedicated helicopter area, etc.).

In deciding the appropriate course of action for the City, it should be noted that a CDF air attack base has a relatively specialized physical plant. In the event that Ukiah’s CDF air attack mission is terminated (due to lack of State funding, change in aircraft type, or statewide base consolidation), the City could be left with a facility which has little, if any, alternative commercial use or economic value.

Because of the importance of the CDF mission to the Ukiah community, it is recommended that the City undertake an in-depth analysis of the issues, benefits, and costs of improving the Ukiah CDF base. It may be more practical and cost-effective to enhance the existing base than to develop an entirely new dedicated facility.

## Terminal Area Enhancements

Five structures are located within the Airport's terminal area.

- **Airport Terminal Building** – Housing the airport management/operations office, a flight school office, Hertz rental car counter, miscellaneous commercial office space, public rest rooms, and a passenger waiting area.
- **FAA Flight Service Station Building** – Housing the FAA's Flight Service Station function.
- **Three Small Structures** – Housing the City of Ukiah Employee Credit Union, the future airport management/operations office, and a miscellaneous storage area.

These structures are in poor-to-fair condition – the Flight Service Station being in the best condition of the five structures. The terminal building is in need of significant repair and renovation.

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The future status of the Ukiah Flight Service Station is uncertain at this time. Congress and the FAA are currently evaluating various alternative scenarios for the future funding and operation of the nation's Flight Service Station system.

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It is anticipated that the two large structures will continue to be used in support of the Airport. In the event that the FAA permanently closes Ukiah's Flight Service Station, the building could be used for a flight school operation, restaurant, and/or commercial office space. The development of a restaurant/coffee shop is seen as a very high priority by many Airport users. There are advantages and disadvantages associated with the development of an airport-oriented restaurant/coffee shop. A generic discussion of airport restaurant issues and opportunities is presented in Appendix F. Local demand should dictate the scope and extent of on-Airport restaurant development.

The terminal building should be renovated to make it more attractive and useful to pilots and passengers. The airport operational audit conducted as part of this master planning process suggested that transient user services and facilities should be enhanced. The suggested enhancements include:

- The "Airport Terminal" should be identified with readily visible signs so that transient pilots can easily determine its location and function.
- The bulletin board in the terminal is relatively unstructured and informal. It is suggested that a more organized airport/community informational board be established and maintained – primarily for the benefit of transient users of the Airport. Information presented on this board should be viewable 24-hours per day and should include the following:
  - Airport layout diagram.
  - Directory/map of Airport tenants and services.

- Traffic pattern and noise abatement/departure procedure information.
- Pertinent NOTAMs and Airport safety/operational information.
- Useful telephone numbers for after-hours fuel service, emergency response, local services, area transportation (buses, taxis, and rental cars), etc.
- The aircraft fueling area is not well designated. The procedure for refueling of transient aircraft is not readily evident to a pilot taxiing in.
- Additional flood lighting of the public apron areas would enhance user safety and security, and facilitate user access.
- It is suggested that a warning sign – "Pilots and Passengers Only Beyond This Point" – be installed at the base of the Airport terminal steps leading to the parking apron.
- One or more low-profile signs should be installed near the parallel taxiway or apron to identify the location of the transient/visitor parking area.
- Transient aircraft parking positions are not adequately marked or designated. It is suggested that the words "Visitor Parking" be painted at each designated transient tiedown/parking position.
- Public-use rest rooms are located within the Airport terminal and at the fixed base operators. These rest rooms are only available when the terminal/fixed base operators are open. There are no 24-hour accessible public-use rest rooms available on the Airport. It is recommended that such facilities be provided near the transient/visitor aircraft parking area.
- One public-use pay telephone booth is located on the north exterior side of the Airport terminal building. It is hidden by surrounding bushes and is not readily visible to transient aircraft users – particularly at night. The phone should be relocated to a place where it is more visible to transient users.
- FBO buildings are not clearly identified or marked. It is suggested that a tenant signboard or directory map be installed at the public entrance to the terminal parking lot and in the transient aircraft parking area.
- There are no "noise abatement/departure procedure" informational signs installed at the aircraft runup areas. The City should install such signs to encourage pilot compliance with Airport noise abatement/departure procedures.

## Aircraft Washing Facility

The Airport does not now offer a dedicated aircraft washing facility. At one time, an informal aircraft washing facility was provided in the southernmost portion of the building area. However, in 1992, a hangar was built on the site.

It is suggested that an environmentally compatible aircraft washing facility be made available to the Airport's tenants and users. The facility must be located near a suitable water supply and sewer. A possible future site for such a facility is in the apron area currently occupied by the Airport's aboveground aviation fuel storage tank. This site is depicted on the *Building Area Plan*.

## Security Fencing and Gating

The entire Airport perimeter is enclosed with either six-foot-high chain-link fence or four-foot-high field fence. The existing perimeter fencing appears to be serving the Airport well and is judged to be satisfactory both in terms of condition and location.

The airport operational audit identified a number of areas where airfield security should be improved. During the audit, it was noted that there are various entry points where the public can drive virtually unhindered onto the Airport's active airfield operational areas. Of particular concern is the potential hazard associated with unauthorized personnel inadvertently driving or walking onto the runway, parallel taxiway, and active aircraft operational areas.

These entry points include the three open airfield access gates serving: (1) the T-hangar area, (2) the extreme south end of the Airport building area, and (3) the FedEx auto parking area. It is recommended that the access gates serving the T-hangar area and the south building area be closed, code-controlled, or otherwise signed to prevent inadvertent entry by unauthorized personnel. In addition, it is recommended that the interface between the FedEx auto parking apron area and parallel taxiway be appropriately signed, marked, fenced, or otherwise designated to prevent inadvertent entry onto the parallel taxiway by unauthorized personnel.

## SUPPLEMENTAL BUILDING AREA DEVELOPMENT

A 2-acre parcel of undeveloped Airport property is located to the west of the existing CDF base. This parcel should prove to be of considerable value to the Airport in addressing future building area needs. Future

development of this parcel could include one or a combination of the following uses:

- Expansion of the existing CDF air attack base.
- Development of additional aircraft storage facilities — tiedown apron or hangars.
- Development of fixed base operations facilities (assuming that adequate taxiway access can be provided).

Long-term nonaviation development or use of this parcel is not recommended. Short-term revenue-producing nonaviation use of this parcel may be acceptable provided that the parcel can be readily reclaimed should it be needed for an aircraft related use.

Much the same can be said for the parcel of Airport property currently being used as a nursery. Any nonaviation use of this parcel should be of short-term duration in recognition of this parcel's likely eventual use for aviation purposes.

## **BUILDING AREA LAND ACQUISITION**

As mentioned previously, there is sufficient land available within the building area to accommodate development of terminal area facilities, hangars, tiedowns, fixed base operations, specialty shops, and related aviation uses to meet current needs and anticipated aeronautical demand throughout the 20-year planning period. Should the building area develop as anticipated, the Airport will have utilized all of the land available for aeronautical uses. To provide for future building area needs beyond the year 2015, it may be advisable for the City to acquire some additional property.

The Airport is landlocked by existing private development and public facilities on all sides except at the southern boundary of the west-side building area where there is a 2.6-acre parcel of undeveloped land. Expansion into this area is not contemplated at the present time. However, acquisition of this parcel for Airport purposes should be considered if this parcel becomes available on the open market.

# 7

## Land Use and Environmental Issues



# **Land Use and Environmental Issues**

## **OVERVIEW**

Ukiah Municipal Airport can be viewed as being at a crossroads with regard to long-term land use compatibility. Few major problems have arisen so far, but actions need to be taken soon to preserve the Airport's viability. Changes in the character and magnitude of airport activity are expected to be relatively minimal over the next 20 years. However, urban expansion of the City of Ukiah is extending southward to envelop the Airport and the lands under its flight routes.

Given the generally positive existing compatibility status, it is not the intent of the analysis in this chapter to create an issue where none now exists. Rather, the purpose is to further promote an awareness of compatibility concerns and to identify actions which should be taken – and ones which should be avoided – to prevent problems from arising.

The following discussion examines noise and safety concerns typical of general aviation airports. The Ukiah Municipal Airport land use compatibility issues addressed in this chapter center around these concerns. The chapter's final section summarizes some of the other types of environmental impacts associated with the proposed development and use of Ukiah Municipal Airport.

## **NOISE COMPATIBILITY**

Noise is often described as unwanted or disruptive sound. Because of its routine, everyday occurrence, it is usually perceived as the most significant adverse impact of airport activity.

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As used here, measured noise is the type of noise impact primarily defined and measured by standardized, cumulative noise level metrics.

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#### 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.
- 

## Measured Noise

A pure sound is measured in terms of: its *magnitude* (often thought of as loudness) as indicated on the decibel (dB) scale; its *frequency* (or tonal quality) measured in cycles per second (hertz); and its *duration* or length of time over which it occurs. To measure the noise value of a sound or series of sounds, other factors also must be considered. Airport noise is particularly complex to measure because of the widely varying characteristics of the individual sound events and the intermittent nature of these events' occurrence.

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

The primary function of the contours produced by CNEL and DNL calculations is to show areas affected by significant noise levels resulting from high concentrations of aircraft takeoffs and landings. For this purpose, these metrics are considered to be the best tools available. Two limitations of cumulative noise level metrics are important to recognize, however:

- **Accuracy** – Because of the number of assumptions usually involved in the calculation inputs, cumulative noise level contours for general aviation airports are regarded as having an accuracy of about  $\pm 3$  dB (the accuracy is somewhat greater at airline airports because airline aircraft are more consistent in the flight paths and procedures they follow and better data is usually available). Cumulative noise level contours do not encompass the total area affected by aircraft noise around an airport. Use of noise contours to show marginally affected areas is, at best, imprecise because of the varied distribution of aircraft flight tracks and altitudes which occurs with increased distance from the ends of runways.
- **Averaging** – The values produced by CNEL and DNL calculations each represent decibel averages of the individual noise events and the quieter periods between them. Because decibels are measured on a logarithmic scale, the average is weighted in favor of the louder noise events. Nevertheless, cumulative noise level metrics do not directly measure either the peak sound levels of individual events or how frequently the events occur.

Single-event overflight noise can be of particular concern at general aviation airports, especially when a small number of operations by certain aircraft may be distinctly louder than the majority of aircraft

using the airport. These occasional loud individual events are often the principal cause of noise complaints from people living nearby.

## Overflight Impacts

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As the term is applied here, an *overflight* means any distinctly audible and usually visible passage of an aircraft, not necessarily one which is directly overhead.

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A general definition of *overflight* impacts is that they are noise-related impacts which occur in the portions of an airport environs lying beyond the typical contours measured by cumulative noise level metrics. Compared to the measured noise impacts, overflight impacts are more subtle and subjective. Also, they seem to include elements of both noise and safety concerns. Often the impacts are revealed in the form of *annoyance* expressed by some people living near an airport.

Although overflight noise is detectable and therefore measurable, the highly subjective individual reactions to overflights makes the value of measurement on a decibel scale questionable. A more representative measure of overflight impacts is the absolute number of events which occur, but little is known about what an acceptable number might be.

For the purposes of airport land use compatibility planning, a simpler form of assessment may be more practical. This approach presumes that aircraft overflight impacts are potentially a concern anywhere along the standard aircraft traffic pattern flight tracks. Concerns can also be expected, but to lesser degrees, elsewhere in the airport vicinity where aircraft fly at or below traffic pattern altitude while approaching or departing the runway.

Whether a significant degree of overflight annoyance will actually occur in the vicinity of an airport is influenced by a variety of factors, both environmental and human. Building type and design, ambient noise levels, the characteristics and predictability of the noise itself, and (as noted above) the frequency of occurrence are among the environmental factors involved. An individual's sense of annoyance at overflights depends upon such factors as personal sensitivity to noise, attitudes toward aviation, and experience and expectations regarding noise levels in the community.

## Noise Compatibility Concepts

The basic approach to enhancing noise compatibility is to minimize the extent to which noise impacts *disrupt* human activities. Among the factors in this equation are:

- The absolute loudness of the noises people hear;
- The relative loudness compared to background noise levels;
- The frequency with which the noise events occur; and
- The types of activity affected.

Various studies have been done to ascertain the relationships among these factors. Typically, the results are formulated in terms of the cumulative noise levels acceptable or unacceptable for specific types of land uses. California State Aeronautics Law establishes a CNEL of 65 dB as the maximum acceptable noise exposure for residential land uses. Part 150 of the Federal Aviation Regulations has a similar residential limit of DNL-65. These criteria, however, are set primarily with regard to air carrier airports in urban locations. For general aviation airports located in comparatively quiet settings, a CNEL or DNL of 60 dB is commonly used. In very quiet, rural locations, a 55-dB criterion can even be appropriate. Neither the FAA nor the California Aeronautics Program currently has criteria relating the acceptability of *single-event* noise levels to specific land uses.

As with measured noise impacts, the ideal strategy for limiting overflight impacts is to avoid residential or other noise-sensitive development in affected locations. To the extent that this strategy is not practical, the most useful approach is one which recognizes the subjective nature of annoyance. From a land use compatibility policy perspective, this characteristic of annoyance suggests the importance of educating the community about the airport. Most importantly, if people are made aware of an airport's proximity and the nature and location of aircraft overflights before moving into the airport area, the likelihood of them being annoyed by the airport activity can be reduced. This objective can best be accomplished through some form of *buyer awareness* program as discussed later in this chapter.

## SAFETY COMPATIBILITY

In examining safety factors in the vicinity of an airport, the primary concern is usually for the safety of people and property on the ground. The safety of aircraft occupants is also an important consideration, however. In each case, the concept of *risk* is central to the assessment of safety compatibility.

### Safety on the Ground

A fundamental objective of airport/land use compatibility planning is to provide for the safety of people and property on the ground in the event of an aircraft accident near an airport. However, because aircraft accidents are infrequent occurrences — particularly accidents occurring beyond airport boundaries — determining how much risk exists and how much is acceptable are often difficult questions.

Aircraft accident probabilities increase with closer proximity to the end of a runway. This increased risk to people and structures on the ground is largely due to the greater concentration of aircraft flying over these areas. Additionally, the low altitude of the aircraft during final approach or initial climb contributes to the risk. The most critical areas are the lands immediately beyond the runway ends — the *runway protection zones*. Beyond these FAA-defined boundaries, the remainder of the runway approach zones plus other areas over which aircraft commonly fly at low altitudes also have significant levels of risk.

Low flight altitudes present greater risks because they offer pilots less opportunity to recover from unexpected occurrences or choice of where to make an emergency landing if one becomes unavoidable. At altitudes less than 500 feet above the ground, only moderate turns are advisable and the choice of emergency landing area is essentially limited to what lies ahead. Above this altitude, recovery or at least a fairly wide discretion in choice of emergency landing sites is possible. An emergency landing on the runway normally can be accomplished when the aircraft is flying in the traffic pattern at the typical traffic pattern altitude (800 to 1,000 feet).

Additional areas where the risks are above average are along the most common flight tracks for aircraft approaching and departing an airport. Accidents occur relatively infrequently in these areas, however, and the probability of occurrence in any given location is substantially less than within the approach/departure corridors.

## Safety of Aircraft Occupants

There are two facets to this safety concern: avoiding land use conditions that can become hazards to flight; and increasing the chances of the aircraft occupants' survival if an aircraft accident takes place beyond the runway environment.

- **Hazards to Flight** — Land use conditions that can constitute hazards to flight include airspace obstructions, visual or electronic interference to aircraft navigation or communication, and activities which attract birds.
  - *Airspace Obstructions* — The airspace needed for operation of aircraft around an airport is defined by Part 77 of the Federal Aviation Regulations (FAR) and by the U.S. Standards for Terminal Instrument Procedures (TERPS). In most circumstances, the latter is the less restrictive set of criteria. Limiting the heights of structures to the heights indicated by the Part 77 surfaces provides an ample margin of safety for normal aircraft operations. The most critical locations with regard to the height of objects are those within the runway approach zones.

- *Visual and Electronic Interference* – Various other land use characteristics that can affect flight safety fall into this category. Visual hazards include distracting lights (particularly lights which can be confused with airfield lights), glare, and sources of smoke. Electronic hazards include any uses which interfere with aircraft instruments or radio communication.
- *Bird Strike Hazards* – Flocks of birds or even individual large birds can pose a serious hazard to all types of aircraft operating near airports. Any land uses which tend to attract birds should be avoided in the vicinity of an airport. Uses which are artificial attractions – a refuse disposal site, for example – are considered particularly inappropriate because they generally can be located elsewhere.
- **Limiting On-Board Injuries** – In some respects, a concern over limiting on-board injuries in the event of an aircraft accident seems irrelevant in that aircraft occupants (and particularly general aviation aircraft occupants) presumably accept the risk associated with flying when they board the aircraft. Nevertheless, the precedent for land use measures to enhance the survivability of an aircraft accident is set by FAA criteria for establishment of safety areas and object free areas adjacent to and at the ends of airport runways. Because a significant percentage of aircraft accidents occur in locations beyond these areas, as well as beyond the boundaries of runway protection zones, the availability of level, open land around an airport is an important measure of the safety compatibility between an airport and its environs.

## Safety Compatibility Concepts

To a considerable extent, the concepts for providing safety for people on the ground near an airport overlap with the approaches to enhancing safety for occupants of aircraft. There are three basic land use approaches to safety compatibility:

- Limiting the density of development;
- Providing open areas for emergency aircraft landings; and
- Limiting hazards to flight.

### *Density of Development*

A primary means of limiting the risks of injury to persons or damage to property on the ground due to near-airport aircraft accidents is to limit the density of land use development in these areas. For residential development, the number of dwelling units per acre is the standard measure of density. For nonresidential land uses, the best measure of development density from a safety compatibility perspective is the maximum

number of people likely to occupy the facility per acre of property. The question of where to set these limits is dependent upon both the probability of an accident and the degree of risk that the community finds acceptable.

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Typical light industrial uses, such as the ones common to the Ukiah Airport vicinity, tend to average around 50 people per acre, as do two-story motels. Shopping centers are likely to average about 75 people per acre and restaurants are often over 100.

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Some airports and local communities have set development density limitations ranging between 25 and 100 people per acre for various parts of runway approach corridors. Many times these basic criteria are translated into a matrix indicating the acceptability or unacceptability of specific land use categories within various safety zones around an airport.

### ***Open Areas for Emergency Aircraft Landing***

A high percentage of off-airport aircraft accidents and incidents involve circumstances in which an engine malfunction forces an emergency landing. In most such instances, it is possible for the pilot to maintain control of the aircraft as it descends. When an emergency occurs while approaching or departing an airport, most pilots will attempt to reach or return to that airport. If landing at the airport is not possible, the preferred choice usually is to head for the best available open space located somewhere ahead — preferably landing into the wind. An open area does not have to be very large to enable a successful emergency landing — the objective is for the occupants to survive the accident with limited injury; damage to the aircraft is irrelevant in these circumstances. For example, a 75-foot by 300-foot area (the size of a football field) can be sufficient for a survivable emergency landing in a small plane if the area is relatively level and mostly free of overhead lines and large obstacles such as trees and poles. Because the pilot's discretion in selecting an emergency landing site is reduced as the aircraft's altitude decreases, open areas preferably should be spaced more closely in those locations overflowed at low altitude.

Preserving suitable open areas in the vicinity of airports is seldom an easy proposition. Historically, little has been done in this regard around most urban area airports. In more recent years, greater awareness of this issue — as well as recognition of the safety benefits of limiting land use density near airports — has led planners to try to locate parks, golf courses, or even parking lots in the most critical areas around airports situated in urbanizing communities. Open areas also can sometimes be provided by clustering of development more closely together on the remainder of the land. To be successful, all of these efforts usually must be made as part of a general plan, specific plan, or planned development process. Once an area has been divided into small parcels, few opportunities to preserve open spaces remain.

### **Hazards to Flight**

Hazards to flight – airspace obstructions, visual and electronic interference, and uses which attract birds – frequently occur near airports simply because of a lack of awareness of the potential problems. Fortunately, the most significant of these hazards – tall structures which pose airspace obstructions – are the best recognized, thanks largely to California state airport regulations and the FAA’s model height limit ordinance based on FAR Part 77 (Advisory Circular 150/5190-4A). Even so, potentially hazardous structures sometimes are built without proper notification to and review by the FAA. It is thus important for communities near airports not only to adopt local regulations regarding hazards to flight, but also to make certain that their planners are aware of and enforce those regulations.

## **UKIAH MUNICIPAL AIRPORT LAND USE COMPATIBILITY STATUS**

This analysis of Ukiah Municipal Airport’s compatibility status begins with a review of current land use conditions and plans. The Airport’s existing and projected impacts are evaluated next. The discussion concludes with identification of specific present and potential future compatibility concerns.

### **Existing Land Uses**

Located at the southern edge of the City of Ukiah, aircraft operations at the Ukiah Municipal Airport affect land uses both within the city limits and in adjacent unincorporated portions of the county of Mendocino. All of the airport property, as well as the Runway 15 (north) approach zone, fall within the city boundaries. Most of the Runway 33 (south) approach, along with the majority of the traffic pattern’s downwind leg are situated over lands within the county’s planning jurisdiction.

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Figure 7A illustrates in simplified form the types of land uses found in the vicinity of Ukiah Municipal Airport.

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The Ukiah central business district lies along the runway approach corridor directly north of the Airport. Most of the City’s residential areas are found along the west side of town, including west and southwest of the Airport. New development, both commercial and residential, is occurring in the northeastern part of the City, adjacent to Highway 101. To the south and along the Russian River east of the freeway, the land remains mostly agricultural and unincorporated.

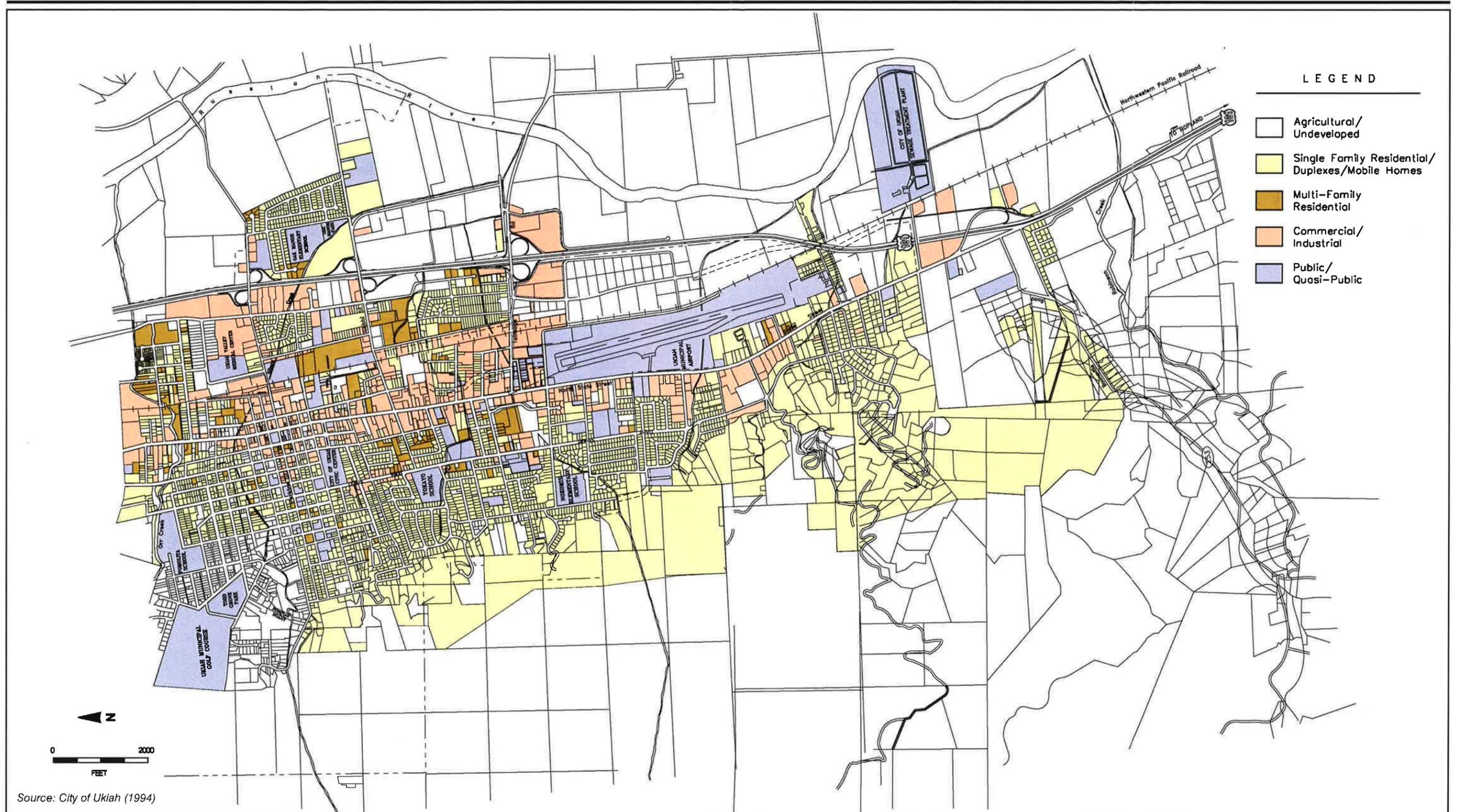


Figure 7A

Existing Airport Vicinity Land Uses  
Ukiah Municipal Airport

## Existing Land Use Plans and Policies

The principal guidance regarding the compatibility of land use development in the Ukiah Municipal Airport vicinity comes from two sources: the *Ukiah General Plan* and the *Mendocino County Airport Land Use Compatibility Plan*. Because the Ukiah planning sphere of influence encompasses most of the airport vicinity, the *Mendocino County General Plan* contains very little material having a direct relationship to compatibility planning around the Airport.

### *Ukiah General Plan*

The City of Ukiah adopted a new *General Plan* on December 6, 1995. Work on the *Airport Master Plan* has been accomplished simultaneously with preparation of the new *General Plan*. Coordination was maintained during the two planning efforts and the two documents are, with minor exceptions, consistent. The following paragraphs highlight portions of the *General Plan* which address airport-related concerns. Airport-related matters for which amendment of the *General Plan* is recommended are listed on page 7-28.

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**Ukiah General Plan  
Residential Land Use Densities**

Rural Residential	<1 du/ac
Low Density	1-6 du/ac
Medium Density	1-14 du/ac
High Density	1-28 du/ac

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- **Land Use Element** – The Land Use Element sets forth broad classifications for future use of land within the city limits and adjacent planning areas. These classifications are defined both geographically and descriptively. The land use map indicates that a mixture of land uses – commercial, industrial, and medium-to-high-density residential – will continue to exist in the area north of the Airport along the approach corridor for Runway 15. High-density residential uses also are allowed within the commercial district. Most expansion of the city limits is planned to occur northward in areas not significantly affected by airport activity. No expansion into the agricultural areas east of the Airport is planned.
- **Airport Element** – This element of the *General Plan* focuses on the role of the Ukiah Municipal Airport and the land use compatibility issues associated with the Airport’s operations. No specific recommendations regarding future development of the Airport are made. Land use compatibility policies are also kept in general terms, with the emphasis instead being placed on future adoption of an *Airport Overlay Zone* which would set forth detailed compatibility criteria.
- **Noise Element** – The Noise Element describes the City’s principal noise sources, both from transportation and nontransportation activities, and defines policies which would address the impacts of this noise. Airport noise contours representing 1990 activity levels are included. The policies establish a 60-dB CNEL as the maximum allowable transportation-related (highways, airport, and rail) noise exposure for new residential land uses. The policies further direct that a real estate disclosure program be developed and applied to existing resi-

dential property exposed to noise in excess of this level. Also, initiation of a program to educate pilots regarding noise abatement flight procedures is encouraged.

### ***Mendocino County Airport Land Use Compatibility Plan***

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The establishment of ALUCs and the preparation of airport land use compatibility plans are required by state law. ALUCs have responsibilities for the review of proposed land uses in the vicinity of airports. They have no authority over existing land uses or the operation of any airport.

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The *Mendocino County Airport Land Use Compatibility Plan* (also sometimes referred to as the *Comprehensive Land Use Plan* or CLUP) was prepared for the Mendocino Airport Land Use Commission (ALUC) and adopted by that body in October 1993. The plan pertains to the land uses surrounding the five public-use airports in the county other than Ukiah Municipal Airport. A compatibility map and policies for Ukiah's airport were omitted from the 1993 county-wide plan in anticipation of the land use compatibility planning subsequently conducted as part of the current *Master Plan* study effort. The Ukiah Municipal Airport compatibility map and policy recommendations set forth later in this chapter are intended to be submitted to the ALUC for consideration as amendments to the CLUP.

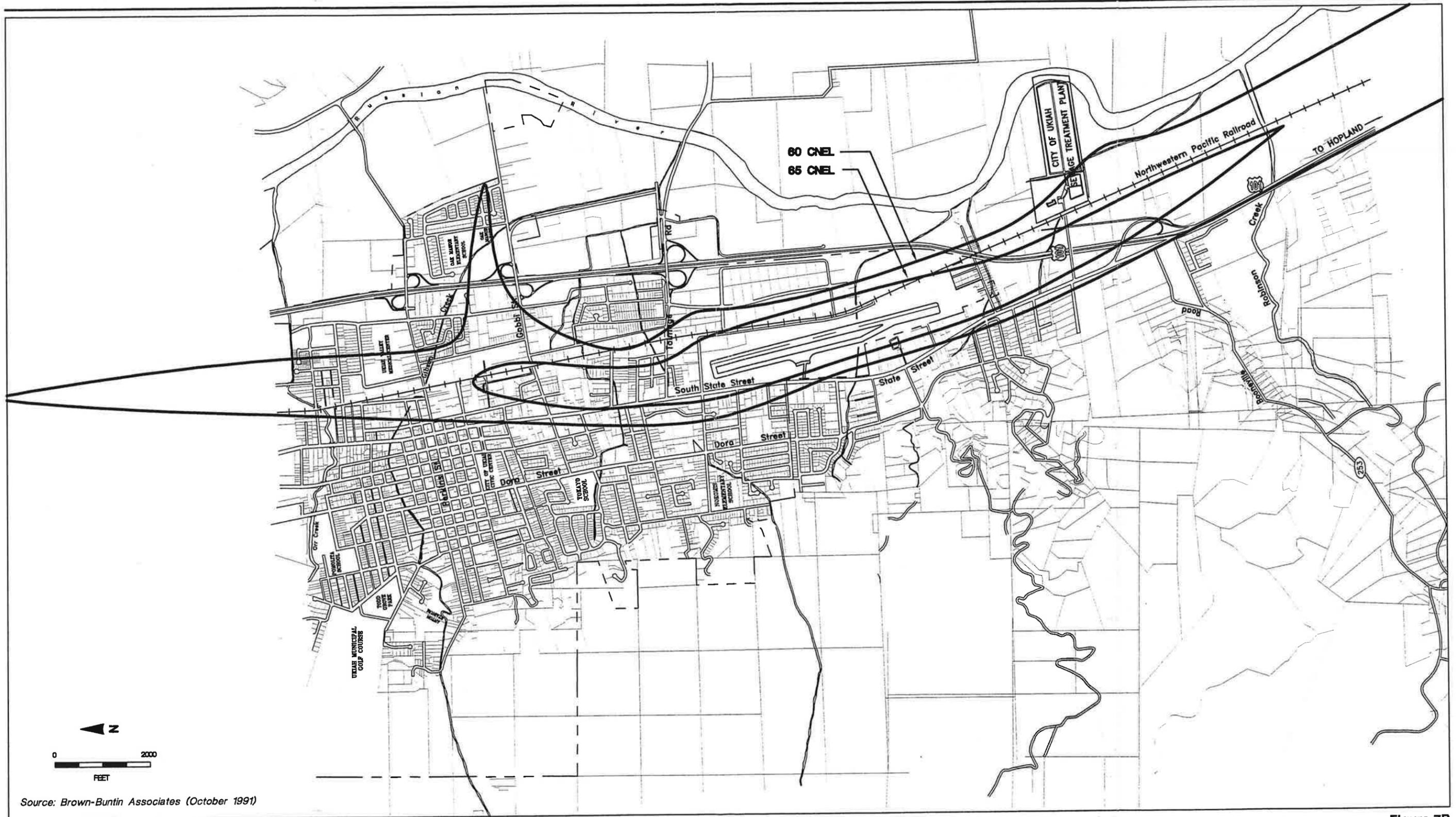
One function of airport land use plans is to define the boundaries of the areas considered to be affected by airport operations. Within these boundaries, appropriate restrictions on land use development are set to assure compatibility with noise and safety criteria. Each ALUC establishes the policies for the airports within its jurisdiction. Among the compatibility policies in the Mendocino County plan are the following:

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The compatibility criteria table from the *Mendocino County Airport Land Use Compatibility Plan* is reproduced in Table 7A of this report.

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- **Primary Criteria** – The *Compatibility Plan* establishes a primary set of criteria for use in evaluating the compatibility of most types of new land use development which might be proposed for the vicinity of any of the five airports covered by the plan. These criteria define maximum densities and other conditions for acceptable development within each of five compatibility zones. A set of compatibility maps depicts the boundaries of the zones for each airport.
- **Supporting Criteria** – For instances when the compatibility or incompatibility of a particular land use proposal cannot be fully determined from the primary criteria, a set of supporting criteria is provided. These supporting criteria individually address noise, safety, airspace protection, and overflight compatibility concerns.



Source: Brown-Buntin Associates (October 1991)

Figure 7B

**Noise Impacts -  
1994 Peak Fire Attack Day  
Ukiah Municipal Airport**

## Ukiah Municipal Airport Impacts

### Noise

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A summary of the data used in calculation of the current and projected noise contours is presented in Appendix F.

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Current noise contours for Ukiah Municipal Airport were calculated as part of the present *Master Plan* study. Two scenarios were analyzed: one representing the average daily operations in 1994 (this is the standard methodology defined by state and FAA guidelines); and a second depicting a busy day. Average daily activity is estimated at 137 takeoffs and landings or a total of approximately 50,000 operations per year. For noise modeling purposes, the busy day was defined as 1.5 times the average annual day for general aviation aircraft operations and 1.5 times the average day of the 4-month fire season for fire attack aircraft. The resulting contours are presented in Figures 7C and 7D.

The 1994 average-day noise contours are essentially the same as ones calculated for 1990 as part of a study of all major noise sources in the City (Brown-Buntin Associates – 1991). The current estimated total activity level (50,000 annual operations) is unchanged from 1990 estimated activity.

Another 1990 scenario assessed in the earlier study was the noise impacts associated with peak-day fire attack aircraft activity (Figure 7B). This scenario represents the extreme worst-case noise impact likely to occur – it assumes a total of 90 fire attack (S-2) takeoffs and landings in one day or almost 20% of the recent average of less than 500 operations per year.

Two sets of projected contours for 2015 – an average day and a busy day – are presented in Figures 7E and 7F. The activity levels used in the calculations are based upon the forecasts set forth in Chapter 4 of this *Master Plan Report*.

A comparison of the average and busy-day contours for 1994 with the respective contours for 2015 reveals that there will be no change in the Airport's noise impacts during this time frame. The slight increase in noise which would result from the small projected growth in activity is canceled by the reduction in single-event noise levels resulting from conversion of the fire attack fleet from piston to turbine engines. Except for several parcels adjacent to the south end of the runway, the average-day 65-dB CNEL contour remains on airport property in both time frames. Similarly, with respect to the 60-dB contour, the only affected residences are at the Airport's south end. These impacts are primarily the result of noise from aircraft beginning their takeoff roll for departures to the north.

The 55-dB contours, especially for the busy-day scenarios, are less precise than the other contours because their location is dependent upon assumptions of where aircraft turn while on approach or departure. In

Zone	Location	Impact Elements	Maximum Densities		Open Land <sup>3</sup>
			Residential <sup>1</sup>	Other Uses (people/ac) <sup>2</sup>	
A	Runway Protection Zone or within Building Restriction Line	<ul style="list-style-type: none"> <li>High risk</li> <li>High noise levels</li> </ul>	0	10	All Remaining Required
B1	Approach/Departure Zone and Adjacent to Runway	<ul style="list-style-type: none"> <li>Substantial risk – aircraft commonly below 400 ft. AGL or within 1,000 ft. of runway</li> <li>Substantial noise</li> </ul>	10 acres	60	30% Required
B2	Extended Approach/Departure Zone	<ul style="list-style-type: none"> <li>Significant risk – aircraft commonly below 800 ft. AGL</li> <li>Significant noise</li> </ul>	2 acres	60	30% Recommended
C	Common Traffic Pattern	<ul style="list-style-type: none"> <li>Limited risk – aircraft at or below 1,000 ft. AGL</li> <li>Frequent noise intrusion</li> </ul>	15 units per acre	150	15% Recommended
D	Other Airport Environs	<ul style="list-style-type: none"> <li>Negligible risk</li> <li>Potential for annoyance from overflights</li> </ul>	No Limit	No Limit	No Requirement

Zone	Additional Criteria		Examples	
	Prohibited Uses <sup>7</sup>	Other Development Conditions	Normally Acceptable Uses <sup>4</sup>	Uses Not Normally Acceptable <sup>5</sup>
A	<ul style="list-style-type: none"> <li>All structures except ones with location set by aeronautical function</li> <li>Assemblages of people</li> <li>Objects exceeding FAR Part 77 height limits</li> <li>Hazards to flight<sup>6</sup></li> </ul>	<ul style="list-style-type: none"> <li>Dedication of avigation easement</li> </ul>	<ul style="list-style-type: none"> <li>Aircraft tiedown apron</li> <li>Pastures, field crops, vineyards</li> <li>Automobile parking</li> </ul>	<ul style="list-style-type: none"> <li>Heavy poles, signs, large trees, etc.</li> </ul>
B1 and B2	<ul style="list-style-type: none"> <li>Schools, day care centers, libraries</li> <li>Hospitals, nursing homes</li> <li>Highly noise-sensitive uses (e.g. amphitheaters)</li> <li>Storage of highly flammable materials<sup>8</sup></li> <li>Hazards to flight<sup>6</sup></li> </ul>	<ul style="list-style-type: none"> <li>Locate structures maximum distance from extended runway centerline</li> <li>Dedication of avigation easement</li> </ul>	<ul style="list-style-type: none"> <li>Uses in Zone A</li> <li>Single-story offices</li> <li>Single-family homes on an existing lot</li> <li>Low-intensity retail, office, etc.</li> <li>Low-intensity manufacturing</li> <li>Food processing</li> </ul>	<ul style="list-style-type: none"> <li>Residential subdivisions</li> <li>Intensive retail uses</li> <li>Intensive manufacturing or food processing uses</li> <li>Multiple story offices</li> <li>Hotels and motels</li> <li>Multi-family residential</li> </ul>
C	<ul style="list-style-type: none"> <li>Schools</li> <li>Hospitals, nursing homes<sup>9</sup></li> <li>Hazards to flight<sup>6</sup></li> </ul>	<ul style="list-style-type: none"> <li>Dedication of overflight easement for residential uses</li> </ul>	<ul style="list-style-type: none"> <li>Uses in Zone B</li> <li>Parks, playgrounds</li> <li>Two-story motels</li> <li>Residential subdivisions</li> <li>Intensive retail uses</li> <li>Intensive manufacturing or food processing uses</li> <li>Multi-family residential</li> </ul>	<ul style="list-style-type: none"> <li>Large shopping malls</li> <li>Theaters, auditoriums</li> <li>Large sports stadiums</li> <li>Hi-rise office buildings</li> </ul>
D	<ul style="list-style-type: none"> <li>Hazards to flight<sup>6</sup></li> </ul>	<ul style="list-style-type: none"> <li>Deed notice required for residential development</li> </ul>	<ul style="list-style-type: none"> <li>All except ones hazardous to flight</li> </ul>	

Table 7A

**Current Compatibility Criteria**  
Mendocino County ALUC

**NOTES**

- 1 Residential parcels should not be smaller than the indicated size nor have more than the indicated number of units per acre. Maximum densities expressed in acres are gross acres; those expressed in units per acre are net acres.
- 2 The land use should not attract more than the indicated number of people per acre at any time. This figure should include all individuals who may be on the property (e.g., employees, customers/visitors, etc.). These densities are intended as general planning guidelines to aid in determining the acceptability of proposed land uses. Special short-term events related to aviation (e.g., air shows), as well as non-aviation special events, are exempt from the maximum density criteria.
- 3 Open land requirements are intended to be applied with respect to the entire zone. This is typically accomplished as part of the community's master plan or a specific plan.
- 4 These uses typically can be designed to meet the density requirements and other development conditions listed.
- 5 These uses typically do not meet the density and other development conditions listed. They should be allowed only if a major community objective is served by their location in this zone and no feasible alternative location exists.
- 6 See Policy Section 3.3.
- 7 May be modified by airport-specific policies.
- 8 In those portions of the B Zones located lateral to the runway, no restrictions on the storage of flammables apply. Within the balance of the B1 and B2 Zones, up to 2,000 gallons of fuel or flammables is allowed per parcel. More than 2,000 gallons of fuel or flammables per parcel within the balance of the B1 and B2 Zones requires the review and approval by the ALUC. See Appendix G for a diagram of typical area lateral to the runway.
- 9 Refer to Policy 3.2.3. for definitions which distinguish between hospitals and medical clinics.

*Source: Mendocino County Airport Land Use Compatibility Plan (October 1993)*

*Note: The criteria listed in this table are the countywide policies adopted by the Mendocino County Airport Land Use Commission. Recommended modifications specifically applicable to Ukiah Municipal Airport are discussed on page 7-32.*

**Table 7A - Continued**

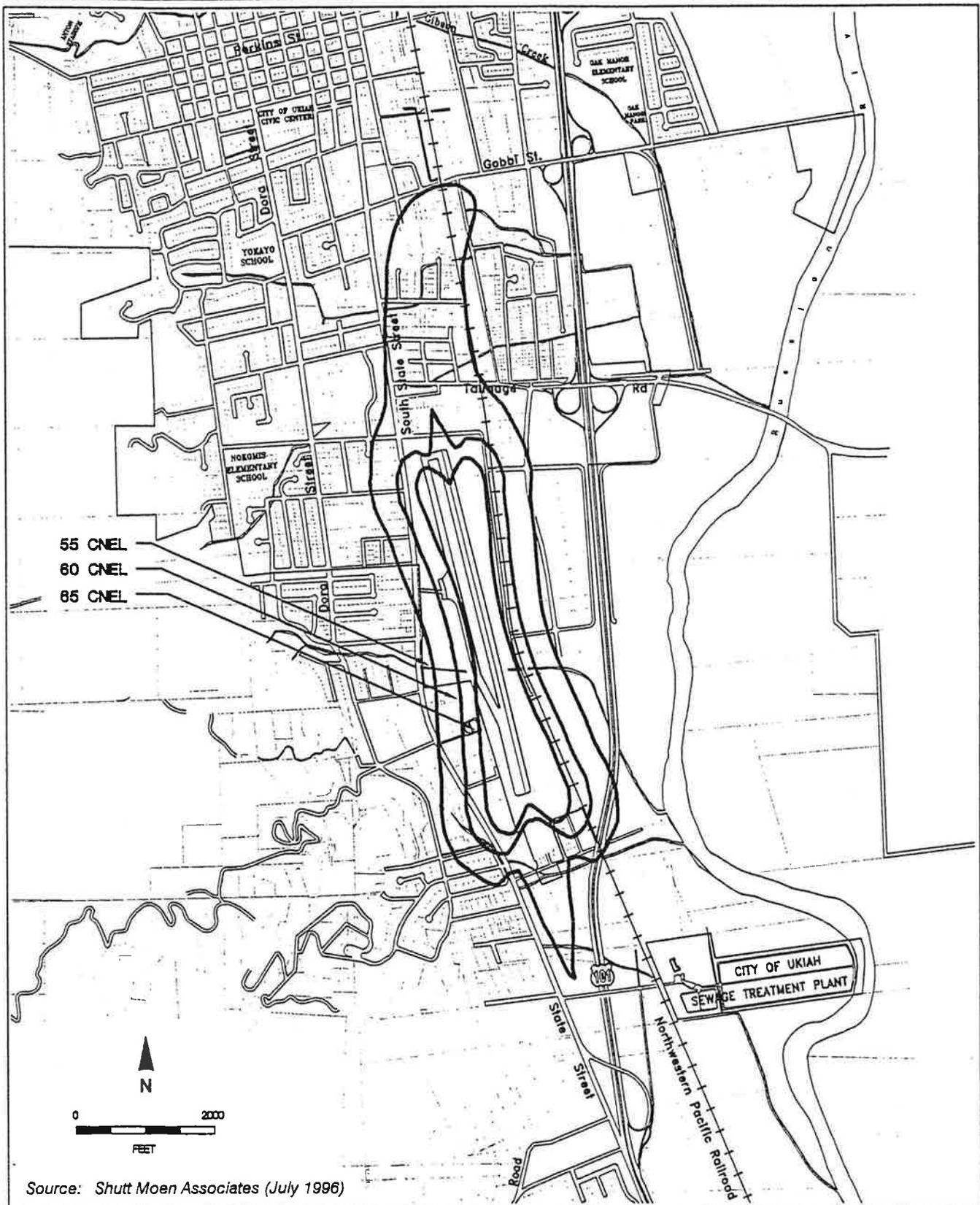


Figure 7C

### Noise Impacts - 1994 Average Day Ukiah Municipal Airport

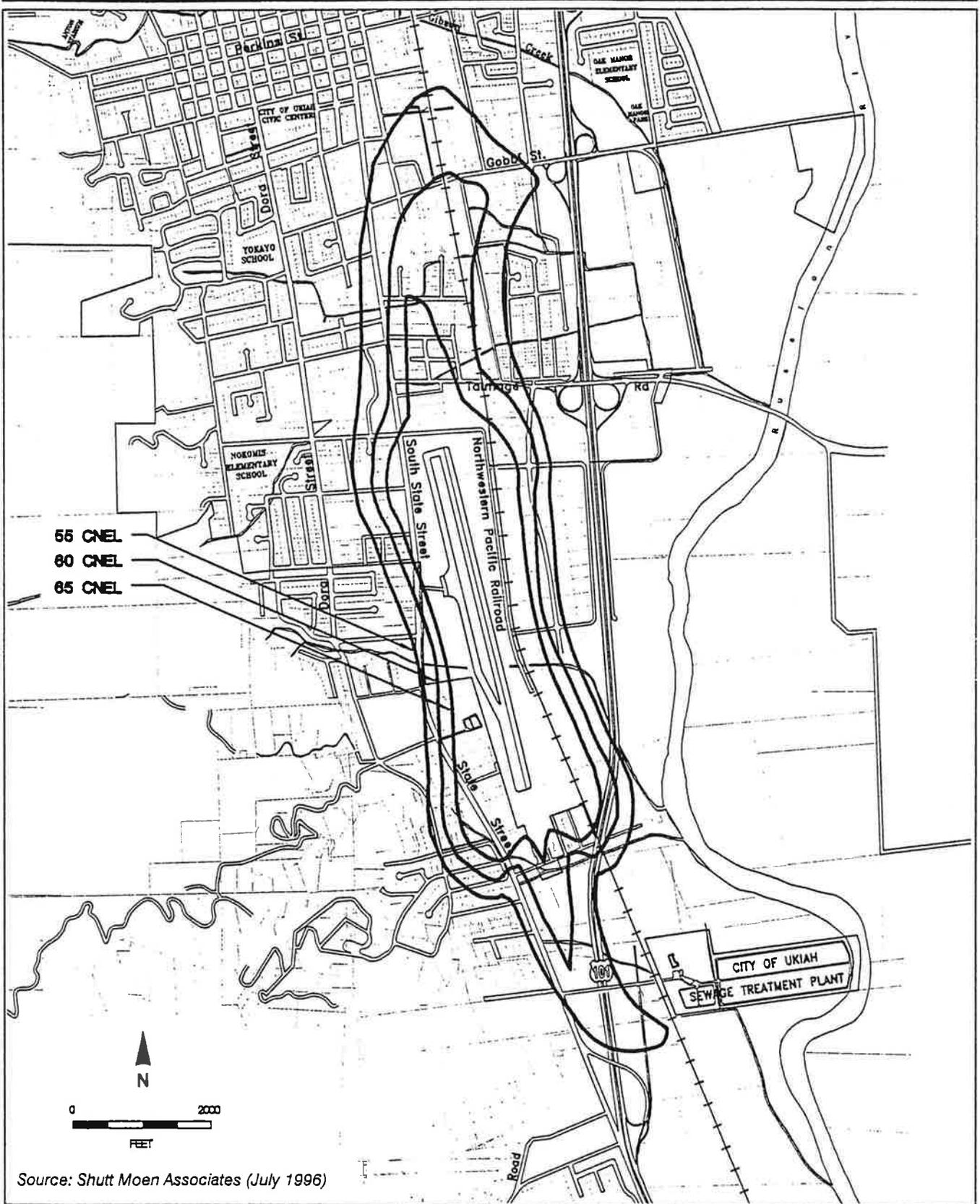


Figure 7D

**Noise Impacts - 1994 Busy Day**  
Ukiah Municipal Airport

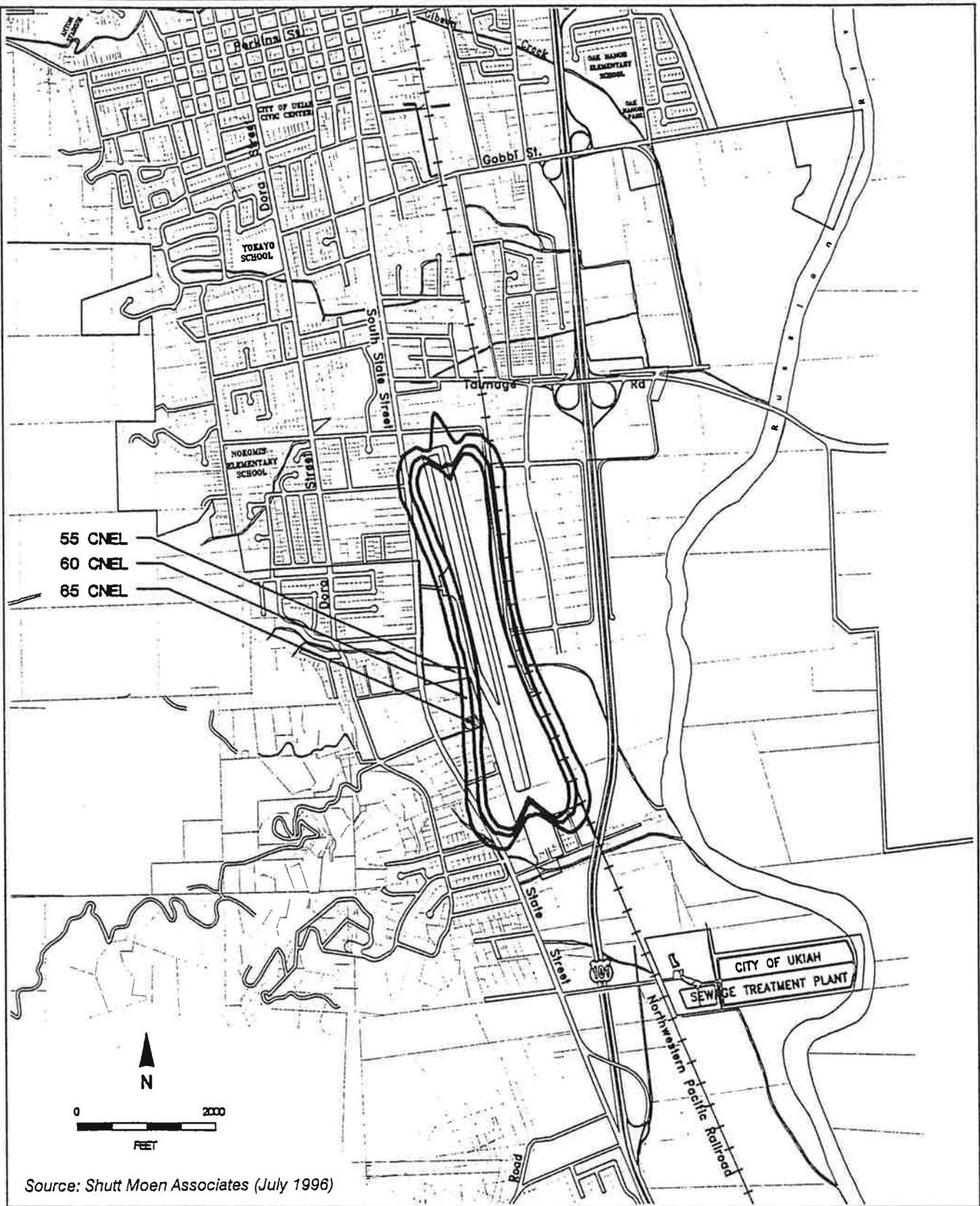
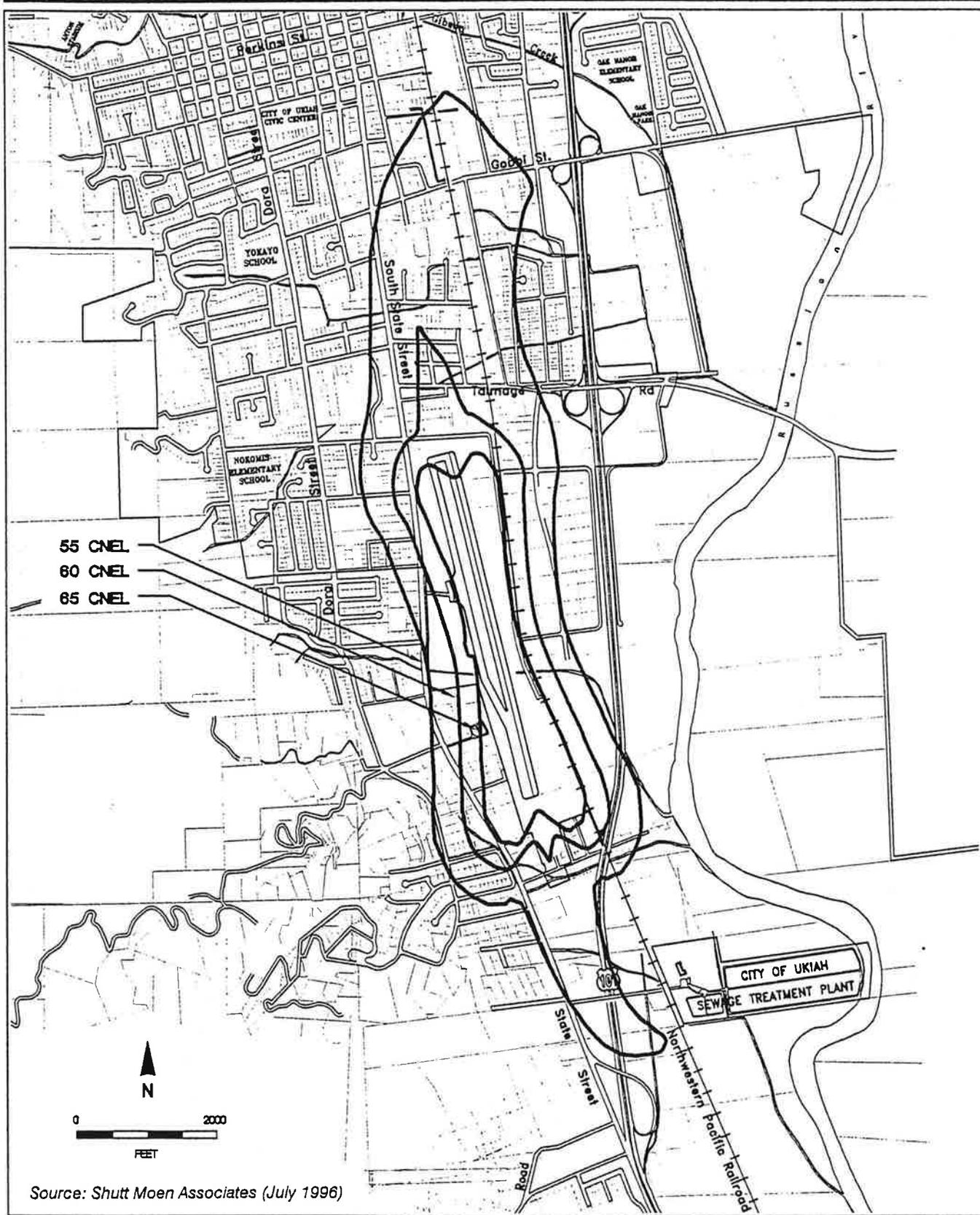


Figure 7E

### Noise Impacts - 2015 Average Day Ukiah Municipal Airport



Source: Shutt Moen Associates (July 1996)

Figure 7F

### Noise Impacts - 2015 Busy Day Ukiah Municipal Airport

any case, this outer-most contour shows that the most widely impacted area is north of the Airport. This area of mixed land uses is overflowed by some two-thirds of the departing aircraft.

### Safety

As indicated by the summary in Appendix B, Ukiah Municipal Airport has had few serious aircraft accidents over the past 15 years and only one event which occurred beyond the airport boundaries. This rarity of off-airport accidents notwithstanding, planning for safety compatibility around any airport cannot be based solely on its historical pattern of accidents. A larger database gathered from numerous comparable airports is more statistically significant. The most comprehensive data of this type for general aviation airports is included in the *Caltrans Airport Land Use Planning Handbook* (Shutt Moen Associates – 1993). The *Handbook* data shows that, while the greatest concentration of accidents occurring beyond the immediate runway environment are within the runway protection zones, a substantial percentage of accidents also take place in adjoining areas.

### Compatibility Concerns

Despite the lack of major compatibility conflicts at the present time, several facets of airport activity and nearby land use development pose compatibility concerns. Among the most notable are the following:

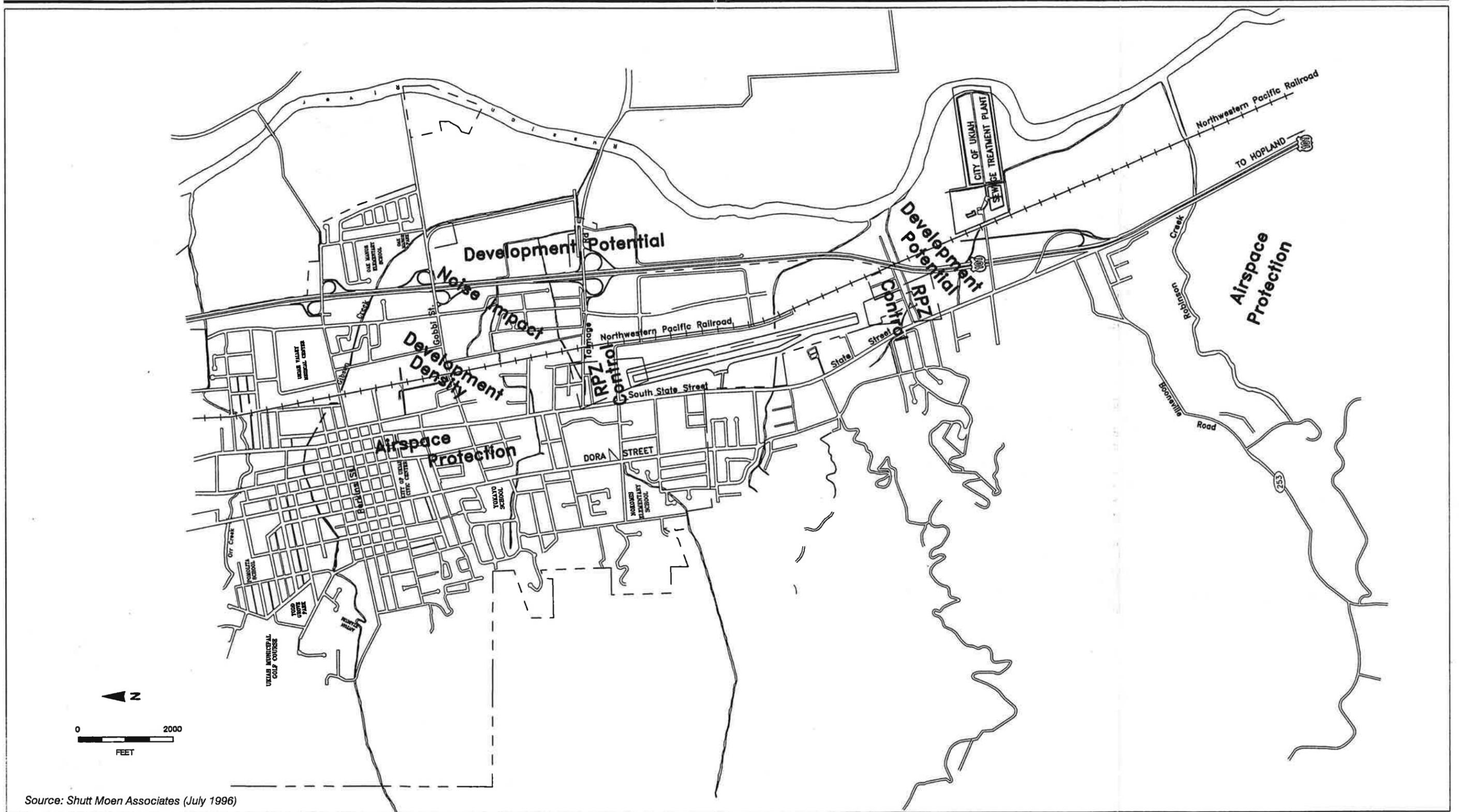
- **Noise** – Noise from Ukiah Municipal Airport operations has not been a significant compatibility concern. The City receives few airport noise complaints and most of those are related to fire attack or night-time jet aircraft operations. Nevertheless, with continued expansion of urban development around the Airport, the potential for noise conflicts remains a concern.
- **Runway Protection Zones** – Historically, most of the land encompassed by the RPZs at Ukiah Municipal Airport was not on airport property. Over the years, the City of Ukiah has acquired several of these parcels so that the majority of both existing RPZs – including the most critical central portions – is now under airport control (or within city streets). Nevertheless, approximately 12 acres of the Runway 15 (north) RPZ and 5 acres of Runway 33 (south) RPZ remain privately owned. In total, all or part of 14 parcels on the north and 10 on the south lie within the RPZ boundaries.

Both the character of the land uses and the height of objects are concerns on this property. Some two dozen buildings – mostly commercial, some residential – are situated within the two RPZs. On several parcels at each end of the runway, height restrictions of less than 35

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Figure 7G shows the locations where compatibility concerns are apparent.

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Source: Shutt Moen Associates (July 1996)

Figure 7G

**Land Use Compatibility Concerns**  
Ukiah Municipal Airport

feet are necessary for protection of the approaches. Tall trees are of particular concern.

- **Density of Development in North Approach Corridor** — Beyond the limits of the RPZs, the portion of the airport environs for which compatibility is the greatest concern is in the runway approach/departure corridor north of the Airport. This predominantly developed section of the City of Ukiah includes both the central business district bordering State Street and an area of mixed commercial, industrial, and some older residential land uses between State Street and the Northwestern Pacific Railroad line. Most of this existing development has low to moderate density which, although not ideal from an airport compatibility standpoint, is acceptable.

The continuing trend in the area is for conversion of most of the remaining residential properties to other uses. In terms of noise compatibility, this is a desirable trend. From a safety compatibility perspective, such changes can also be beneficial provided that uses which attract large concentrations of people are avoided. Schools and day care centers, nursing homes, theaters and churches, and large shopping centers or restaurants are examples of uses which would be particularly incompatible.

The remaining residential land uses in this area are planned to be either medium or high density. The block of medium-density residential uses along Apple Avenue about 0.5 miles north of the runway end, is subject both to noise levels in the 55-to-60 dB CNEL range on busy days and to moderate degrees of risk. Eventual conversion of this area to low-intensity industrial or commercial uses would be preferable in terms of airport land use compatibility. The high-density residential area is situated farther north, some 0.7 miles from the runway end. While not optimum, the greater distance from the Airport makes this use acceptable. Also, high-density residential uses are generally regarded as being less sensitive to noise than medium and low-density residential areas (because of fewer exterior walls, less outdoor living, and typically higher ambient noise levels).

- **Potential New Development Elsewhere Beneath Traffic Pattern** — Other than on the north, the majority of the land beneath the Ukiah Municipal Airport traffic pattern is either in agricultural use or vacant. Several locations have significant development potential, however. To a high degree, the long-term viability of the Airport will depend upon the success in maintaining airport-compatible land uses within these areas.
  - *South Approach Corridor* — Some long-established development is situated within the southern runway protection zone, as described above, and adjacent to it. This area is currently not within the Ukiah city limits, although it falls within the City's planning sphere of influence. The State Street interchange — the principal south-

ern gateway to town — makes this a potentially attractive commercial development location. To be consistent with airport safety compatibility concerns, though, any such development will need to be kept low in intensity.

- *East of the Freeway* — The downwind leg of the traffic pattern follows a strip of land situated between Highway 101 and the Russian River. Except for commercial uses adjoining the Talmage Road interchange, the land usage is all agricultural. Because of the river's proximity, agriculture is expected to remain the predominant use. Continuation of this pattern would be provide the highest level of airport compatibility.
- *Within Traffic Pattern* — The portion of the airport vicinity where new development is anticipated to first take place is immediately east of the runway, between the rail line and the freeway. This area is planned for commercial and industrial uses. The one major development already in place is a Walmart store which recently opened at the southwest corner of the Talmage Road interchange. For the most part, the area lies inside of the typical airport traffic pattern and is seldom overflowed by arriving or departing aircraft. This factor reduces the safety concerns. Nevertheless, consideration should be given to aircraft flight tracks and the statewide accident pattern database when planning new development along the edges of this area. Also, the area's exposure to noise sources — the runway and the rail line on the west and the freeway on the east — suggests that noise-sensitive land uses should be avoided.
- **Airspace Protection** — Continuing urban development in the area together with nearby high terrain make protection of the Ukiah Municipal Airport airspace an important compatibility consideration. Although Ukiah does not currently have any high-rise buildings, future development of that type almost anywhere in the central business district could adversely effect the Airport's airspace. Also, tall antennas, trees, or other objects — especially ones situated on the high terrain south and northeast of the Airport — could have adverse safety or operational implications. The City of Ukiah adopted an airport-related height-limit ordinance in 1992. Mendocino County, however, has not adopted a similar ordinance governing the unincorporated lands around the Airport.

## COMPATIBILITY MEASURES

There are numerous types of measures that can and have been taken by communities and airports to help preserve or improve noise and safety compatibility. The following discussion highlights the particular compatibility measures deemed appropriate for Ukiah Municipal Airport given

the character of the Airport's environs, the nature of its operations, and the likely direction and magnitude of future changes to each. The recommendations fall into four distinct groups:

- Actions which the City can directly take as owner of the Airport.
- Actions which the City can take as the agency having land use jurisdiction in much of the airport vicinity.
- Actions which the City can recommend be taken by the county in its land use jurisdiction capacity for unincorporated portions of the airport environs.
- Actions which the City can recommend be taken by the Mendocino County Airport Land Use Commission.

Although these measures are primarily directed at enhancing compatibility by restricting land uses, the other side of the compatibility coin also must be recognized. To be more specific, it is also important for compatibility measures to assure that airport activity does not grow or change to the extent that it unnecessarily creates new conflicts with already existing land uses. Measures of this type are examined with respect to actions which the City can take as owner of the Airport.

### **City Actions as Airport Owner**

Airport owners have certain airport/land use compatibility powers which other bodies normally do not have. Specifically, they can acquire property, modify airport facilities, and adopt airport operational policies.

#### ***Property Acquisition***

Property acquisition provides the most absolute means of controlling the uses of land around an airport. It also is the only form of land use control which can be directly implemented by the operators of airports (as distinct from land use jurisdictions). Property acquisition can take the form of either fee title or easements. The most critical property for an airport to own or otherwise control are the runway protection zones situated at the ends of the runways.

- **Acquisition of Fee Simple Title** – Outright purchase of property by the airport owner is the most direct and certain, but the most costly, means of ensuring land use compatibility in the vicinity of an airport. The City of Ukiah has had a program to acquire RPZ property in recent years and the most important portions along the extended runway centerline have been acquired. Nevertheless, as outlined earlier, much of the RPZ land remains outside of airport boundaries. The City is strongly encouraged to continue to acquire fee title to proper-

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*Approach protection easements* are an extended form of standard aviation easements often used as an airport-related compatibility measure. They combine the typical overflight, noise, and height-related conditions of aviation easements, as described below, with acquisition of specified development rights on the affected property. No approach protection easements currently exist at Ukiah Municipal Airport.

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As the term has come to be applied in the aviation industry, a standard *aviation easement* conveys the following property rights:

- A right-of-way for free and unobstructed passage of aircraft through the airspace over the property at any altitude above an imaginary surface specified in the easement (usually set in accordance with FAR Part 77 criteria).
  - A right to subject the property to noise, vibration, fumes, dust, and fuel particle emissions associated with normal airport activity.
  - A right to prohibit the erection or growth of any structure, tree, or other object that would enter the acquired airspace.
  - A right-of-entry onto the property, with appropriate advance notice, for the purpose of removing, marking or lighting any structure or other object that enters the acquired airspace.
  - A right to prohibit electrical interference, glare, misleading lights, visual impairments, and other hazards to aircraft flight from being created on the property.
- 

ty within the RPZs, if not by condemnation, then at the owners' option or as the property comes on the market.

The FAA normally insists that no development be allowed within RPZs when federal grants have been used to acquire the property. Certain very-low-density uses can normally be considered acceptable, however. Agriculture is the best such example, although not often a very practical one within urban areas. Automobile parking, commercial nurseries, and outdoor storage are other potential uses which come to mind, provided that the central portion of the RPZ is avoided, no buildings are included, and no functions which would attract more than about 10 people per acre are involved.

- **Approach Protection Easements** – As an alternative to fee simple acquisition, the City might be able to restrict development and use of RPZ property to a few identified, airport-compatible activities by acquisition of approach protection easements. Residential dwellings and all but low-intensity nonresidential uses would be excluded. The uncertainty arises because the circumstances at Ukiah differ from those in which approach protection easements are normally considered. This type of easement is generally best suited to situations in which the existing land uses are compatible with airport operations and it is reasonable to prohibit most other types of development. Most applications thus involve agricultural land. Despite the nonagricultural character of the RPZ property at Ukiah, a more broadly defined easement could be written to allow other potentially compatible land uses such as those noted above. Another important factor to consider in any decision to pursue acquisition of approach protection easements is whether the cost would be sufficiently less than that of fee title acquisition to warrant the added administrative costs.
- **Avigation Easements** – A third option which would provide a form of City control over RPZ property is a standard aviation easement. Avigation easements would protect the Airport against most noise and overflight-related complaints or lawsuits and also keep the approach surfaces clear of obstructions. These restrictions are important to airport/land use compatibility and worth acquiring, especially if they can be obtained for little or no cost. It is important to recognize, however, that avigation easements do not explicitly restrict the underlying types of land uses permitted on the property. Airports can implement such limitations only through fee title or approach protection easement acquisition (and cities and counties can do so to some extent through zoning).

Figure 7H depicts the parcels for which property acquisition is recommended for approach protection purposes. The acquisition area totals approximately 55 acres. The proposed acquisition area is also shown on the *Airport Layout Plan*. Depiction of the acquisition area on the *Airport Layout Plan* will indicate the City's intentions regarding the property and also make the acquisition eligible for FAA funding assistance. All of the

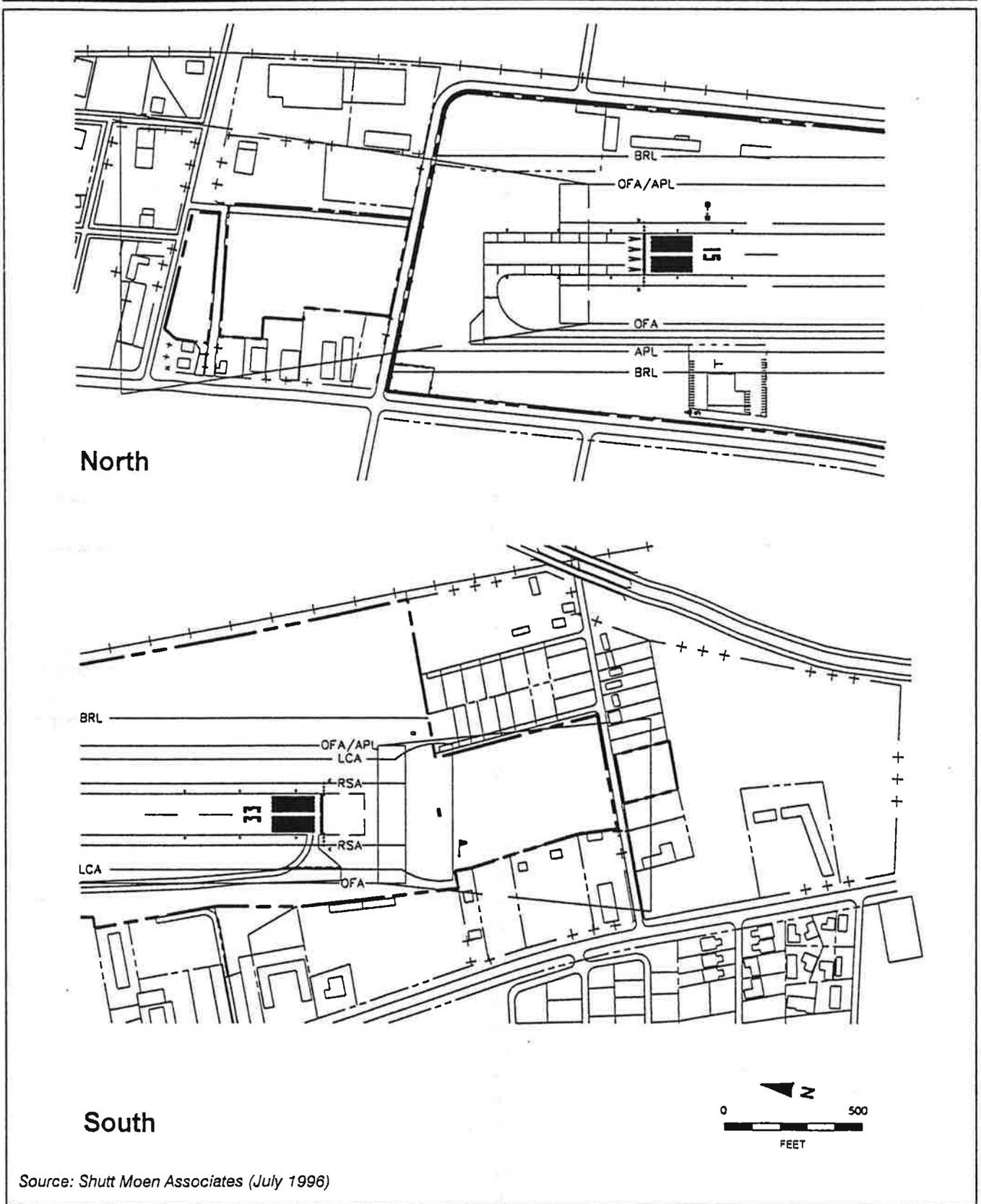


Figure 7H

### Proposed Property Acquisition Airport Approach Protection

acquisition areas are shown as approach protection easements. This is regarded as the minimum acceptable form of acquisition. Where fee simple title can be reasonably obtained, it is the preferable choice.

A factor to be recognized with regard to the proposed acquisition area at the south end of the Airport is that most of this property is not within the current Ukiah city limits. The new *Ukiah General Plan* does not propose annexation in this area. City acquisition of approach protection easements on this property, as proposed in this *Master Plan*, would not necessitate annexation. However, if negotiations with property owners results in fee title rather than easement acquisition of any of the parcels, then city annexation of those parcels would be appropriate.

### ***Airport Facility Modification***

The configuration and sizes of airport facilities, particularly the runway system, have a direct bearing on the magnitude of noise and safety impacts created by the Airport's operations. Modification of these physical components can sometimes be an effective means of impact mitigation. Although the opportunities for and potential usefulness of such measures are limited at Ukiah Municipal Airport, several have been considered.

- **Airport Capacity Limitations** – For general aviation airports, one means of limiting noise and safety impacts is to restrict the number of based aircraft. Only minimal growth in based aircraft demand is projected for Ukiah Municipal Airport, however, and this growth will not significantly increase the Airport's impacts. Even full utilization of all the remaining vacant land at the Airport would not produce major additional impacts. This type of restriction, therefore, would not provide any worthwhile benefits.
- **Configuration of Runway 15 Approach End** – As discussed in Chapter 5, the City of Ukiah has already taken the significant action of relocating the Runway 15 threshold southward from the physical end of the pavement. This change was necessary in order to meet safety area length and approach surface clearance criteria relative to Hastings Avenue and also to bring more of the runway protection zone onto airport property. Recent changes to FAA design criteria allow other configuration options not previously available. None of the modifications considered would have any negative effect on noise or safety compatibility. A very slight noise and safety benefit would occur with respect to aircraft taking off toward the south.
- **Southward Runway Extension** – The advantages and disadvantages of extending the runway southward to regain the length lost by the threshold displacement on the north end were also examined in Chapter 5. From a compatibility standpoint, a runway extension would have both advantages and disadvantages. The principal advantage would be that aircraft departing on Runway 33 would be at

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Alternatives for the configuration of the Runway 15 approach end are analyzed in Chapter 5. For the reasons identified in that analysis, the *Master Plan* recommends that the configuration remain as is.

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a slightly higher altitude when overflying land uses to the north. Areas to the south would be adversely affected by the repositioning of the runway protection zone and, unless the threshold were to be displaced, by the lower altitude of landing aircraft.

- **Approach Slope Angle** – Minor reductions in arrival noise impacts can sometimes be attained by installing visual glide slope indicators where they do not exist and setting them for steep approach angles. Ukiah Municipal Airport currently has a visual approach slope indicator (VASI) at the north end of the runway. It is set for a standard 3.0° glide slope. Because the straight-in instrument approach procedure is for this end of the runway, an increase in the glide slope, while feasible, is not desirable. Installation of a visual glide slope indicator at the south end of the runway would be desirable, but the FAA has determined that it is not feasible because of the high terrain along the approach course.
- **Aircraft Run-Up Noise** – Engine run-ups are an essential aviation function both immediately prior to takeoff and as part of engine maintenance work. This activity can produce significant noise impacts if conducted in locations near residential or other noise-sensitive land uses. A noise wall potentially could be of some benefit at Ukiah Municipal Airport where the run-up area for Runway 15 is less than 1,000 feet from residential development. Intervening nonresidential buildings could provide similar noise attenuation, however.

### *Operational Policies*

Policies regulating the procedures used for aircraft operations often can accomplish even more than facility modifications to control airport impacts. Airports which have compatibility problems – especially noise compatibility problems – have adopted a wide variety of operational measures.

As listed below, several important compatibility-related aircraft operational procedures have already been established at Ukiah Municipal Airport. Some of these can benefit from refinement. Among the other measures noted here, most do not appear to be necessary at the present time. They should be kept in mind, though, as steps which can be taken if airport impacts begin to increase significantly.

- **Aircraft Types** – FAA regulations limit the extent to which airports can restrict aircraft operations based upon aircraft type. However, use of an airport by undesirable aircraft types often can be controlled both by not providing facilities and services for these aircraft and through voluntary measures. At Ukiah Municipal Airport, the vast majority of aircraft activity is by single-engine and light, twin-engine, propeller airplanes. The Airport is well-suited for these aircraft types

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As described earlier in this chapter, the projected increase in Ukiah Municipal Airport operations over the next 20 years will lead to a slight expansion of the airport's noise contours. This change is anticipated to be so minor as to be imperceptible to the local populace.

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and, with rare exceptions, the noise impacts they create have not created significant compatibility problems.

The majority of comparatively loud aircraft now operating at Ukiah Municipal Airport are the fire attack airplanes. Because of the importance of the fire attack mission, most airports which have fire attack bases exempt these aircraft from any operational restrictions that might be established. Also, expected changes to the fire attack fleet will result in replacement or re-engining of the existing piston-engine planes. The new or modified aircraft will have turboprop engines and will be much quieter than the current piston-engine fleet.

Business jets (particularly older models) and helicopters are the other types of aircraft which usually produce more noise than the small, propeller planes. As indicated in the *Master Plan* forecasts, use of Ukiah Municipal Airport by these aircraft types is expected to increase more rapidly than other aircraft. The number of operations, though, will remain a small proportion of the total. Also, unlike the situation anticipated for light, propeller-driven airplanes, technology improvements over the next 20 years are expected to provide noticeable reductions in the noise levels generated by new model business jets and helicopters. An additional, and effective, factor limiting the noise impacts of business jet operations at Ukiah Municipal Airport is the established voluntary prohibition on operations between 10 p.m. and 7 a.m.

- **Airport Traffic Pattern Location** – At some airports, impacts can be reduced by eliminating the traffic pattern on one side of the runway or by defining where pilots should fly portions of the pattern. The sole traffic pattern at Ukiah Municipal Airport is situated on the east side of the field because of the close-in high terrain to the west. Fortunately, although new development is occurring close to the east side of the Airport, most of the land to the east is comparatively less developed than on the west. An east-side pattern is thus the best choice for both practical and compatibility reasons.

As an additional step to minimize overflight impacts, the City of Ukiah has established an airport operational policy requesting that aircraft execute a 20° turn to the east when taking off toward either the north or the south. This procedure routes aircraft roughly along the rail line and mostly nonresidential land uses to the north and over the freeway to the south. Other, similar operational procedures might be worth formalizing, particularly for the sake of transient pilots (most locally based pilots tend to do these things already). In addition to adoption by the City (with concurrence by the FAA), these procedures should be published and illustrated in pilots' guides and posted at the Airport.

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This third procedure is particularly applicable to the fire attack aircraft (the airport noise contours previously prepared for the City show the fire attack aircraft flight track passing directly over the school).

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- Fly downwind leg east of Highway 101.
- For landings on Runway 15, fly base leg over Gobbi Street (second interchange north of airport); avoid overflight of Oak Manor Elementary School.
- Similarly, for departures on Runway 33, make crosswind turn either along Gobbi Street or continue northward along railroad tracks and turn over Perkins Street (third interchange north of airport); again, avoid overflight of Oak Manor Elementary School.
- **Traffic Pattern Altitude** – Some additional reduction in noise impacts also could be attained by raising the pattern altitude. Currently, it is set at 800 feet above the Airport. A 1,000-foot pattern altitude is more common today, especially at urban-area airports, and is generally the FAA-recommended altitude. The City should request FAA approval for this change.
- **Calm Wind Runway** – Runway 15 has been established as the calm wind runway at Ukiah Municipal Airport. Because aircraft make more noise on departure than while on approach, this southerly flow of traffic is the best choice for impact reduction. Further usage of Runway 15 should be encouraged, especially for takeoffs by nose aircraft. For example, Runway 15 could be designated as the preferred runway even when its use would involve a tailwind of up to 3 or 4 knots.
- **Touch-and-Go Restrictions** – The touch-and-go operations which pilots do in order to practice takeoffs and landings are often found by airport area residents to be particularly annoying. The amount of this type of activity is quite low at Ukiah Municipal Airport, however, and there is no indication that it causes significant problems. The traffic pattern location refinements described above will help minimize touch-and-go impacts as well. If touch-and-go activity ever should increase to the point where it warrants special controls, the following measures could be considered:
  - Require aircraft to exit the runway after landing and then taxi back for takeoff when the number of aircraft in the pattern exceeds a certain number. The tendency for the pattern to become very elongated would thus be reduced.
  - Prohibit touch-and-go's during specified busy periods or on weekends and at night (the times when area residents are more likely to be disturbed).
- **Helicopter Flight Routes** – Helicopter noise is a significant impact around many general aviation airports. Not only do helicopters usually fly lower than airplanes, but they often approach and depart airports over areas airplanes do not normally overfly. At Ukiah Municipi-

pal Airport, the volume of helicopter traffic has been low and problems have been correspondingly few. With projected increases in helicopter activity, definition of noise abatement procedures may become desirable. For safety reasons, the relationship of helicopter flight routes to airplane traffic patterns also need to be taken into account. Helicopter routes which follow the freeway except for a short leg to and from the Airport would appear to be preferable.

- **Pilot Techniques** – Related to many of the above concerns is the fact that variations in pilot techniques can generate substantially different aircraft noise impacts. In addition to the routes and altitudes flown, differences in engine RPM, propeller blade controls, and wing flap settings can affect noise levels on the ground. In most cases, the minimal-impact techniques are not difficult – pilots only need to be aware of them and use them where appropriate. Continued efforts on the part of airport management and fixed base operators to educate pilots regarding noise abatement techniques is thus essential to airport/land use compatibility.

### **City Land Use Jurisdiction Actions**

The principal measures available to the City of Ukiah in this category are designation of appropriate land uses, adoption of an airport overlay zone, and establishment of a buyer awareness program.

#### ***Land Use Designation***

The basic form of land use designation is that which is established by local general plans and zoning ordinances. In undeveloped or developing areas, designation of compatible land uses is essential to airport/land use compatibility planning. However, in built-up areas such as north of Ukiah Municipal Airport, land use designations mostly just reflect existing conditions. At most, designation of an area for a different use than one already existing may encourage market-based change over the long run, but it would not directly eliminate any incompatible uses.

As noted on page 7–11, the most significant concerns regarding land use designations around Ukiah Municipal Airport involve land uses within the runway protection zones. Also of concern are the potential for more intensive development north of the Airport and for new urban uses to the south.

The adoption of an *Airport Overlay Zone* as proposed in the new *Ukiah General Plan* is capable of largely eliminating this latter concern. The underlying land use designations should nevertheless be modified in the area bordering the north end of the Runway 15 Protection Zone. A commercial or industrial designation should be shown on the *General Plan Land Use Map* in place of the present medium- and high-density

residential designations. The *General Plan* also should reflect the proposed City acquisition of approach protection easements within and adjacent to both RPZs.

### **Airport Overlay Zone**

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The City of Ukiah does not currently have an airport overlay zone for Ukiah Municipal Airport other than height limits in accordance with FAR Part 77. Adoption of an airport overlay zoning ordinance is recommended in the draft *Ukiah General Plan Airport Element*.

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An airport overlay or combining zone is a method of incorporating specific airport compatibility criteria into local zoning ordinances while still allowing the basic underlying zoning applicable throughout the community to be maintained. Various types of airport-related criteria can be included in an airport overlay zone.

- **Height Limitations** – The most common use of an airport overlay zone is to implement the height restrictions defined by FAR Part 77 for airspace protection purposes. Figure 71 depicts the Part 77 Airspace Plan for Ukiah Municipal Airport. This section of the overlay zone also should indicate the Part 77 requirements for notifying the FAA regarding construction near the Airport.
- **Other Flight Hazards** – This section of the ordinance would prohibit other conditions which could be hazardous to flight. As described earlier in this chapter, these conditions include visual and electronic interference and uses which attract birds.
- **Development Density Limitations** – As discussed earlier, development density is a primary measure of noise and safety-related airport/land use compatibility. Because density limitations are generally not incorporated into community-wide zoning regulations for nonresidential development, an overlay zoning ordinance offers one of the few mechanisms for codifying these criteria. The criteria could be presented in the form of a "Compatibility Criteria" table such as the one included in the Mendocino County Airport Land Use Commission's *Compatibility Plan*. (Several modifications to the ALUC's criteria with respect to Ukiah Municipal Airport are noted on page 7–23 in the recommendations for ALUC action.)
- **Prohibited Land Uses** – Certain types of land uses, even if otherwise acceptable with respect to category and density, pose high risks and should be prohibited within portions of the airport environment. These uses, as noted earlier, include schools, day care facilities, hospitals, and nursing homes.
- **Noise Attenuation Requirements** – The purpose of this section would be to assure that aircraft noise levels occurring outside of structures located in high noise areas are reduced to acceptable levels inside the structures. The criteria to be met would be established here, but specific structural techniques would more likely be defined in the building code.

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An alternative – or perhaps supplemental – method for defining airport-related density criteria would be to incorporate the criteria into an airport area specific plan, rather than into an overlay zoning ordinance. This concept is basically the format used in the *Airport Industrial Park Planned Development* – in which principal uses, conditional uses, nuisances, prohibited uses, and development standards are each listed. The *Airport Industrial Park Planned Development*, however, does not address airport compatibility issues. Criteria regarding hazards to flight, particularly the potential for tall antennas, should be added. Also, some restrictions on very-high densities are needed.

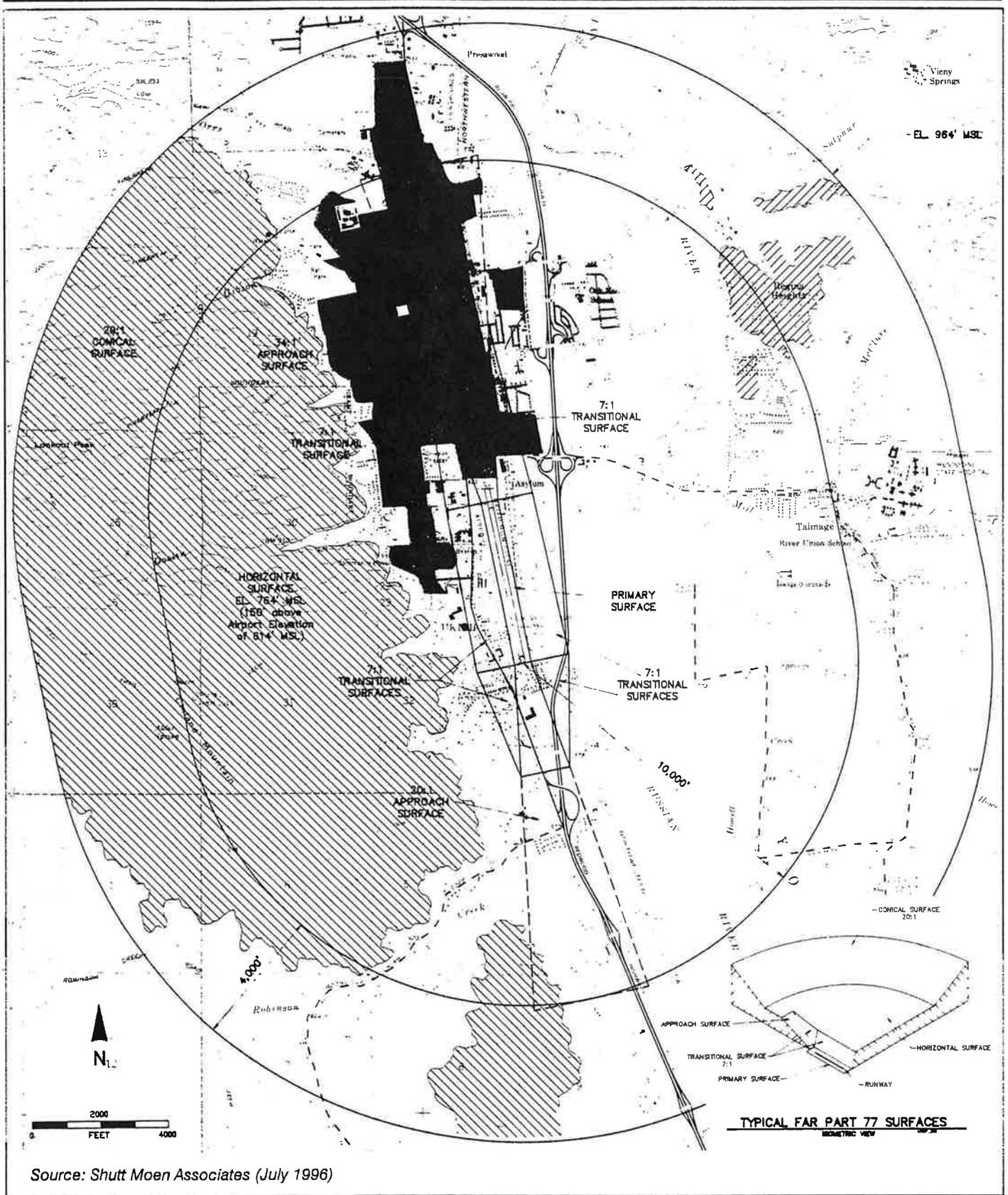
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- **Areas of Special Compatibility Concern** – A minor, but potentially valuable, function of an airport overlay zone would be to broadly indicate the areas affected by airport activity. This technique is particularly useful as a means of designating parcels for which the existing land use zoning is compatible with airport activities, but for which a change to other classifications may not be compatible. In effect, it would serve as sort of a caution flag indicating that airport compatibility concerns must be addressed when considering any proposals to change or grant variations to the underlying zoning designation.
- **Buyer Awareness Measures** – The boundaries of areas where buyer awareness measures would apply can be delineated as part of an overlay zone. Forms of measures which might be considered are discussed below.

### ***Buyer Awareness Program***

Buyer awareness is an umbrella category for three types of measures whose objective is to ensure that prospective buyers of property in the vicinity of an airport are informed about the impacts on the property. It can be implemented either as part of an airport overlay zone as described above or as a separate ordinance. The City is strongly encouraged to establish a program of this type.

- **Avigation Easement Dedication** – A requirement for avigation easement dedication is usually applied only to new development. It is the most comprehensive and stringent form of a buyer awareness measure. Although the rights associated with most avigation easements are established in other forms (e.g., local, airport-vicinity, height-limit zoning ordinances and Federal Aviation Regulations), an avigation easement clearly conveys these rights to the airport owner.
- **Deed Notices** – Deed notices are similar to avigation easements in that they are recorded with the deed to a property and are usually implemented only in conjunction with some form of development approval process. Unlike easements, though, they do not convey any property rights. Deed notices serve only to formalize the fact that a property is subject to aircraft overflights and noise.
- **Real Estate Disclosure** – Real estate disclosure is the least formal method of implementing a buyer awareness program. It relies upon standard real estate disclosure practices to ensure that prospective buyers of property in the airport vicinity are informed about the proximity of the airport and the impacts it creates. The likelihood of this information being disclosed can be increased if the airport or the local land use jurisdiction provide official notification to local real estate brokers and title companies. This notification should indicate the location of airport traffic patterns and other areas routinely subject to overflights by aircraft arriving at and departing from the airport.



Source: Shutt Moen Associates (July 1996)

Figure 71

# Airspace Plan Ukiah Municipal Airport

Each of these measures has potential application in the Ukiah Municipal Airport vicinity. These are described in the "Recommendations to ALUC" section below.

### **Recommendations to County**

The County of Mendocino has responsibilities for compatible land use planning in the unincorporated portions of the Ukiah Municipal Airport environs at least until such time as these areas are brought within the Ukiah city limits. Primarily, this affects lands to the south and east of the Airport.

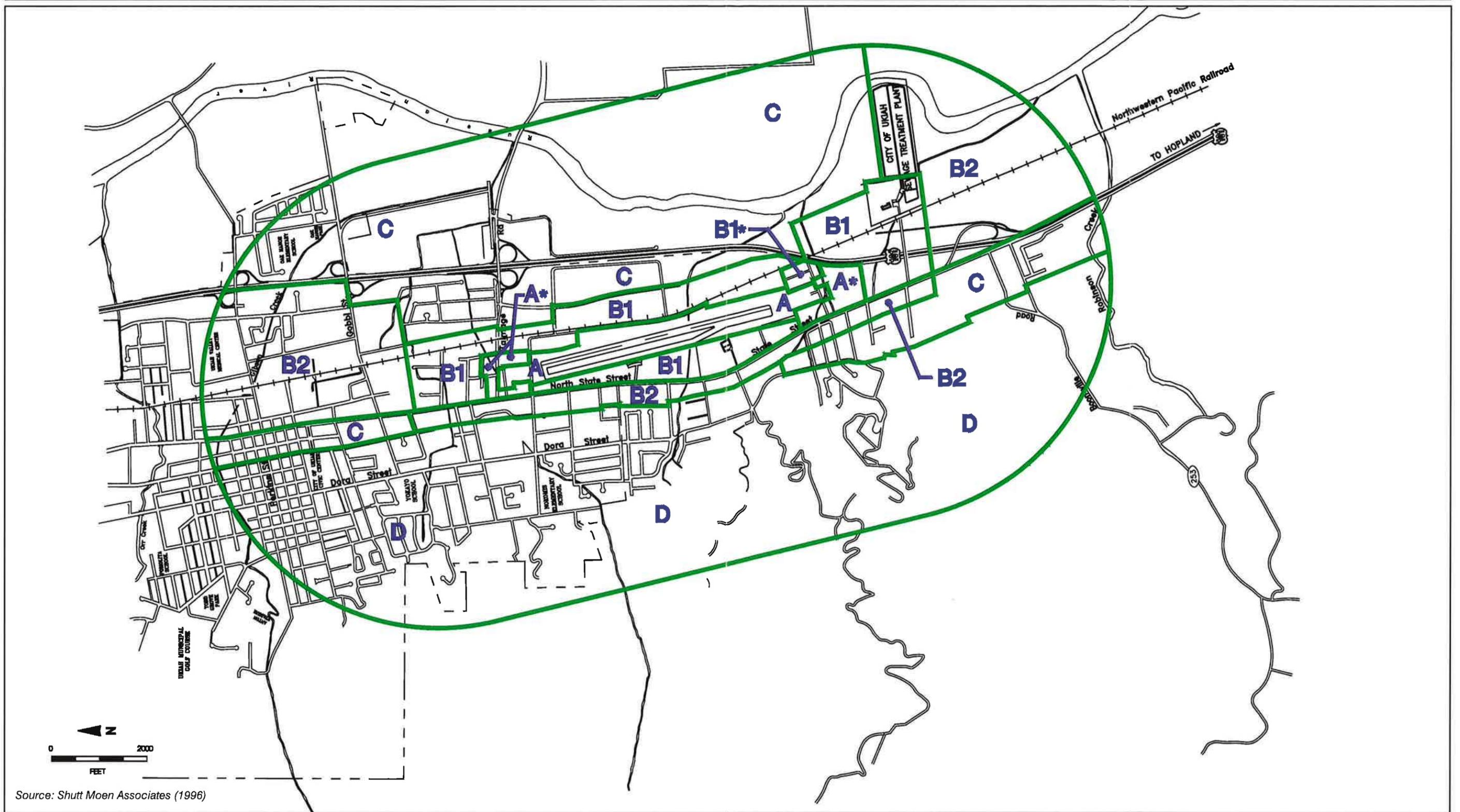
In conjunction with adopting this *Master Plan*, the City of Ukiah should request that the county implement appropriate land use compatibility measures for the areas within its jurisdiction. The recommendations to the county involve the same types of land use actions which should be taken by the City. Specifically, the county should:

- Designate airport-compatible land uses;
- Adopt an airport overlay zone; and
- Implement a buyer awareness program.

### **Recommendations to ALUC**

Two options for creating a Mendocino County Airport Land Use Commission compatibility plan for Ukiah Municipal Airport are available. One approach would be for the ALUC to adopt a complete document, separate from the plan for the other airports. This method would allow the compatibility criteria for Ukiah to be more detailed or structured differently than done in the county-wide plan. The disadvantages to a separate-document approach are the redundancy in documentation of common elements which would result and the greater potential for confusion or inconsistent application of the criteria.

The alternative is for the ALUC to amend the existing county-wide *Compatibility Plan* by adding sections applicable to Ukiah Municipal Airport. Compatibility criteria for Ukiah Municipal Airport can then be fine tuned to reflect the land use conditions particular to the Airport's environs. The county-wide plan allows for such airport-specific policies in Chapter 3. The latter approach is recommended here. Even with this single county-wide *Compatibility Plan* format, the City of Ukiah is free to adopt its own more specific set of compatibility measures consistent with the ALUC's criteria. Indeed, City actions such as those described earlier in this chapter are recommended.



Source: Shutt Moen Associates (1996)

Figure 7J

**Land Use Compatibility Map**  
Ukiah Municipal Airport

The City should encourage the ALUC to take the following actions relative to Ukiah Municipal Airport:

- The attached map (Figure 7J) should be adopted as the "Compatibility Map" for Ukiah Municipal Airport.
- The following individual airport policies should be adopted for the Ukiah Municipal Airport. These policies modify the criteria set forth in the ALUC's "Compatibility Criteria" table.
  - Lands within the A\* and B1\* zones are currently not under airport ownership. However, it is the intention of the City of Ukiah to provide long-term control of the land uses within these areas by either acquiring the property in fee or obtaining approach protection easements restricting the type and density of land uses permitted.
  - The B2 zone north of the Airport largely encompasses existing development. Some vacant land remains, however, and redevelopment of other parcels is anticipated. The *Infill* policy (policy 2.1.6) of the county-wide *Compatibility Plan* is applicable to the entirety of this B2 zone. This policy allows new development of a similar intensity to that of surrounding, already existing, uses.

A survey of the area has been conducted to determine the current types and intensities of uses. The following limits on future development of this zone are set accordingly:

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Note that using the standard multiplier of 1.92 people per multi-family residence as prescribed by the California Housing and Community Development Department, the 28 dwelling-units-per-acre density equates to a maximum of 54 people per acre.

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- (1) New residential development is discouraged in this zone. However, where such development is considered the best land use for a particular parcel with regard to general city planning shall — because of its lower sensitivity to noise compared to single-family residential uses — be deemed normally acceptable. Any new multi-family residential development shall not exceed 28 dwelling units per acre. Also, any proposed multi-family development on a parcel of more than 4 acres shall maintain a minimum of 30% open space (including major landscaping areas, non-enclosed automobile parking lots and driveways, and a share of adjacent streets). New single-family residential uses shall continue to be regarded as normally unacceptable.
- (2) Non-residential uses shall not exceed 90 people per acre.
- (3) Routinely occupied portions of buildings shall not exceed two stories in height (equipment rooms, etc., are exempt).
- (4) Restaurants and motels are acceptable uses in the B2 infill zone provided that they do not exceed the above two criteria.

- (5) An existing school or hospital located within the B2 infill zone provided that the buildings are single-story and the use does not exceed an intensity of 60 people per acre.
- An existing school or hospital located within the C zone may be expanded provided that the buildings are single-story and the use does not exceed an intensity of 60 people per acre. [Note: intensities of up to 150 people per acre are allowed for other uses in the C zone.]
- Recording of a Deed Notice is considered an acceptable alternative to dedication of an avigation or overflight easement in the B2 and C zones.
- Establishment of a Real Estate Noise Disclosure requirement shall be considered an acceptable alternative to a Deed Notice requirement in the D zone.
- With regard to the "Compatibility Criteria" table in general, the reference to "Significant risk" under the impact elements for the B2 zone should be changed to "Moderate risk."

## ENVIRONMENTAL IMPACTS OF AIRPORT DEVELOPMENT

An Initial Study of the environmental impacts associated with implementation of the *Ukiah Municipal Airport Master Plan* was prepared in accordance with California Environmental Quality Act guidelines as part of the planning effort. It is included here as Appendix H. Both the temporary and permanent impacts of the proposed construction and the long-term effects of the increased airport use are considered.

The noise and safety-related impacts associated with future use of the Airport are addressed in this chapter. The land use compatibility measures recommended for implementation as part of this *Master Plan* are designed to preclude these impacts from becoming significant. Some of these measures will result in property acquisition or restrictions on land uses near the Airport. However, the policies incorporated into the proposed compatibility program will serve to avoid significant adverse effects on these properties.

The impacts of construction recommended for the continued efficient operation and development of Ukiah Municipal Airport are completely mitigable within the scope of each project and all conform to standard engineering practices.

8

Financial  
and  
Implementation Plan



# **Financial and Implementation Plan**

## **OVERVIEW**

This chapter of the *Ukiah Municipal Airport Master Plan* reviews the resources available to the City for funding airport capital improvements, develops a 5-year "pro forma" financial projection to determine capital funding requirements, and identifies a proposed capital improvement program that makes maximum effective use of available airport funding resources.

The historical revenue, expense, and funding data presented herein have been obtained from City airport records. The proposed airport development costs identified in the *Master Plan* and presented in Table 2A have been estimated on an order-of-magnitude basis consistent with their intended use for preliminary planning and programming purposes. Specific project analysis and detailed engineering design will be required at the time of project implementation to provide more refined and up-to-date estimates of development costs.

## **CAPITAL FUNDING RESOURCES**

There are a variety of resources from which funding and financing for publicly-owned airport facilities and improvements can be obtained. These resources include federal grants, State grants and loans, airport sponsor self-funding, passenger facility charges, and private investment.

### **Federal Grants**

Currently, the most common source of federal aid for airport facilities is the Airport Improvement Program (AIP) administered by the FAA. Re-authorized in 1994, the current AIP is the latest evolution of a funding program originally authorized by Congress in 1946 as the Federal Aid to Airports Program (FAAP).

The AIP is based upon a user trust fund concept, allocating aviation-generated tax revenues for specified airport facilities on a local matching share basis. The program currently provides for 90% federal participation and 10% local participation on eligible airport projects in the State of California. It is anticipated that this federal funding program for airports will continue to be extended without significant change for at least the next 2 to 3 years.

Under the AIP, there are both "entitlement" and "discretionary" grants. Entitlement grants apply to commercial service airports; Ukiah Municipal Airport does not qualify for this form of grant. As a general aviation facility, Ukiah Municipal Airport must compete for discretionary funds with other general aviation airports in the region and across the nation.

Although the AIP is designed specifically for public airport improvement, there are other federal programs which can also be applied to airport needs. The federally-funded Economic Development Administration Program and the State and Local Fiscal Assistance Act of 1972, as amended, have also been used on a limited basis to fund airport facilities not otherwise eligible for AIP grants. As it is relatively difficult for public airports to qualify for these special federal funding programs, these resources have not been considered in the formulation of project funding alternatives identified in the *Master Plan*.

## **State of California Airport Grants and Loans**

The Aeronautics Program (formerly the Division of Aeronautics) within the California Department of Transportation (Caltrans) administers four different programs which provide funding for airport improvements. These funding programs and their potential application at Ukiah Municipal Airport are discussed below.

### ***Acquisition and Development Grant Program***

The Caltrans' Acquisition and Development (A&D) Grant Program is similar to the federal AIP grant program inasmuch as the state program provides airport development funds on a matching share basis – currently 90% state and 10% local. The state grants are allocated through the California Transportation Commission (CTC) and are governed by the priorities set forth in the State Transportation Improvement Program (STIP) and the California Aviation System Plan (CASP).

Typically, the A&D grant program has concentrated on construction of airfield improvements that primarily benefit general aviation users. Funding opportunities within this program are sometimes very limited because of statewide funding constraints. An airport improvement project submitted for an A&D grant faces statewide competition for limited funds. Consequently, the A&D grant program is not considered to be a

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In 1984, the City utilized the State A&D grant program for funding the reconstruction of Runway 15-33 and the westside apron.

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significant resource for funding of improvements at Ukiah Municipal Airport. Nevertheless, state airport improvement grants, when available, can be useful in furthering airport improvement.

### ***Annual Grant Program***

The California Aeronautics Program also administers an Annual Grant Program through which all qualifying publicly owned airports in the state receive \$10,000 per year to be used for eligible projects. Funds received must be kept in a Special Aviation Account and, with the permission of Caltrans, can be accumulated for up to five years toward a larger capital project. The funds can also be used as part of a local match for a federal grant.

This grant program is intended to assist general aviation airports. Airports that have been designated as *reliever* or *commercial service* by the FAA are not eligible for this annual grant. Ukiah Municipal Airport is not designated by the FAA as a *reliever* or *commercial service* facility; thus it receives this annual grant.

### ***Airport Loan Program***

Another funding source available from the California Aeronautics Program is the State Airport Loan Program. This program was established to allow public airport owners the opportunity to borrow funds for an eight- to fifteen-year term at lower than commercial interest rates. The funds can be used on specified revenue-generating projects and as the local share of FAA grant-funded projects. Nearly any type of project that will benefit the airport is eligible. In the past, the most common use of these loans was for revenue producing hangar construction and development of aviation fueling facilities. More recently, however, the primary use for such loans has been to provide the local share of an FAA grant.

The City may want to consider pursuing a state loan to help finance the renovation of the terminal building and related building area facilities.

### ***AIP Matching Grant Program***

Effective October 1, 1995, state funds are able to be allocated by the CTC to partially match an AIP grant once an airport sponsor has accepted the AIP grant from the FAA. This match program only applies to general aviation and reliever airports whose projects are included in the State Transportation Improvement Program. The state match is 5% of the AIP grant. Thus, AIP funds 90% of a project, the state funds 4.5% (i.e., 5% of 90%), and the sponsor pays for the remaining 5.5% of a project.

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The City is currently utilizing the State Airport Loan Program to finance the construction of the Airport's new aviation fuel storage facility.

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State matching funds can only be used for "airport and aviation purposes." These are defined in existing state law and regulations. Because federal regulations permit expenditure for some items that the state does not, situations can occur for which the state will not match the full amount of an AIP grant. Projects for which this distinction occur include general aviation terminal buildings and access roads.

As a *general aviation* facility, Ukiah Municipal Airport is eligible to participate in this new Caltrans AIP grant match program.

### **Airport Sponsor Self-Funding**

At large, publicly-owned airports, this source of funding typically involves the issuance of general obligation bonds or revenue bonds. General obligation bonds are backed by the full faith and credit of the issuing governmental agency. General obligation bonds are usually limited by a restriction or cap placed on the issuing governmental agency's indebtedness. Revenue bonds are secured by the pledge of revenue from one or more airport facilities. A particular disadvantage of revenue bonds is the coverage requirement that net operating revenue exceed debt service by a stipulated ratio. Additionally, the fixed underwriting costs and complexities of a bond sale generally dictate their use only for large-scale projects. For all but the largest airports, the cost and restrictions associated with the issuance of general obligation bonds or revenue bonds combine to make such sources impractical for use in funding capital improvement projects at small airports.

At publicly-owned airports the size and character of Ukiah Municipal Airport, airport sponsor self-funding is principally provided by a combination of airport-generated income and retained earnings, and the airport sponsor's internal financial resources (i.e., City general funds). Funding of airport improvements and providing the local matching share for grants-in-aid from these sources is the simplest and often most economical method because direct interest costs are eliminated.

### **Passenger Facility Charge**

Passenger Facility Charges (PFCs) are a new airport funding mechanism authorized by the U.S. Congress as part of the Aviation Safety and Capacity Expansion Act of 1990 and the Airport Noise and Capacity Act of 1990. The rules and regulations for collection and use of PFCs are set forth in Part 158 of the Federal Aviation Regulations. Upon approval of the Federal Aviation Administration, the regulations allow *commercial service* airports to impose a charge of up to \$3.00 on each enplaning passenger. *Commercial service* airports are defined as airports which have scheduled passenger service and enplane 2,500 or more passengers annually.

Revenues generated by PFCs are intended to be applied toward projects which:

- Preserve or enhance safety, security, or capacity;
- Reduce noise or mitigate noise impacts resulting from airport operations; or
- Furnish opportunities for enhanced competition between or among air carriers.

Because Ukiah Municipal Airport does not have commercial airline service, PFCs are not currently a source of improvement funding for the Airport. However, if scheduled service is ever established at Ukiah Municipal Airport, the City may wish to seek FAA approval for collection of these fees.

### **Private Investment**

Private sector investment is an important source of funding for such airport improvements as fixed base operations facilities and aircraft storage hangars. At Ukiah Municipal Airport, most of the fixed base operator facilities and aircraft storage hangars were developed using private funds.

The City can continue to enhance the Airport's attractiveness to private investors by promoting the Airport, improving its facilities, and expanding its service offerings. By maintaining a prudent lease policy and enforcing reasonable development standards, additional private investment can be attracted to the Airport. In this manner, the City can shift the burden of financing certain facility development to the tenant while increasing the asset value of the Airport, thereby adding to the Airport's attractiveness and revenue-producing capability.

The most common source of funding for private sector development are commercial lending institutions and insurance companies. In the case of private development on public lands, these types of financing may be difficult and expensive to obtain because the borrower can encumber only the improvements as loan collateral, not the underlying publicly owned land. These conditions necessitate close attention to leasing policies and tenant contract negotiations. It is essential that agreements be reached with the tenants which provide for adequate airport revenues and facility development while encouraging private investment and satisfying the tenant's borrowing requirements. Specifically, the lease term should be sufficient to allow reasonable investment amortization over the period of the agreement.

On occasion, private gifts and contributions are a source of funding for certain airport improvements. Often, the private contribution facilitates the development of public airfield improvements that jointly benefit both the private and public sectors.

Those capital expenditures which are most appropriately constructed with private funds (e.g., aircraft storage hangars and fixed base operations facilities) have been excluded from the list of proposed capital projects identified in the *Master Plan*. Public capital resources have not been considered for funding those projects identified as being private sector projects.

## **PRO FORMA FINANCIAL PROJECTION**

In order to obtain a more complete picture of Ukiah Municipal Airport's finances, a Pro Forma Financial Projection of operating revenues and expenses covering the first five years of the master planning period has been prepared (Table 8A). These values are intended as an initial guide for financial planning purposes. It is recommended that the City periodically update and revise this financial projection to correspond with future information.

The projected data is referenced to 1994 dollar values; no attempt is made to adjust for future inflation. The projection values set forth in Table 8A are based upon the following assumptions:

- Aviation activity at the Airport will increase as anticipated by the *Master Plan* forecasts. Airport operating expenses reflect this projected growth in airport operations.
- Airport management will endeavor to regularly review and adjust all rates and charges consistent with demand and airport role. As a minimum, the rates and charges should track the Consumer Price Index rate to maintain constant value.
- Airport management will continue to develop and operate the Airport on a break-even, self-supporting basis.
- Eligible capital improvements will be financed to the maximum extent possible with FAA Airport Improvement Program (AIP) and California Aid to Airport Program (CAAP) funds, with the City's share coming from the Airport Enterprise Account and the California Airport Grant/Loan Program.
- Proposed airport improvements will be constructed at the times indicated in the capital improvement program (Table 2A).
- All hangar development and fixed-base operator improvements will be constructed as warranted by demand and will be funded by the private sector.

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Comparative advantages and disadvantages of other hangar financing options are discussed in Appendix E – Hangar Financing Options.

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(All Values Are In Dollars x 1,000)

Fiscal Year <sup>3</sup>	Historical <sup>1</sup>				Budgeted	Projected <sup>2</sup>				
	'89/'90	'91/'92	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97	'97/'98	'98/'99	'99/'00
<b>OPERATING REVENUES</b>										
Charges for Current Services	\$480.9	\$421.3	\$420.9	\$414.7	\$415.0	\$417.5	\$420.0	\$422.5	\$425.1	\$427.6
Total Operating Revenues	\$480.9	\$421.3	\$420.9	\$414.7	\$415.0	\$417.5	\$420.0	\$422.5	\$425.1	\$427.6
<b>OPERATING EXPENSES<sup>4</sup></b>										
Operations and Maintenance	\$376.2	\$347.7	\$376.3	\$400.5	\$369.4	\$370.9	\$372.4	\$373.9	\$375.3	\$376.8
Utilities	9.5	12.0	10.5	12.4	11.0	11.0	11.0	11.0	11.0	11.0
General and Administration	23.5	37.8	42.3	37.8	38.5	38.6	38.7	38.8	38.9	40.0
Total Operating Expenses	\$409.2	\$397.5	\$429.1	\$450.7	\$418.9	\$420.5	\$422.1	\$423.7	\$425.2	\$427.8
Total Operating Income (Loss) <sup>5</sup>	\$71.7	\$23.8	(\$8.2)	(\$36.0)	(\$3.9)	(\$3.0)	(\$2.1)	(\$1.2)	(\$0.1)	(\$0.2)

Notes:

1. The historical revenue and expense figures shown above are as provided by the City of Ukiah, Finance Department, Airport Fund (600) for the Fiscal Years shown.
2. The projected revenue and expense figures shown above were prepared by Shutt Moen Associates as part of the *Master Plan*. These projections, calculated in 1995 dollars, reflect the operational factors and planning assumptions identified in Chapter 8.
3. The City of Ukiah's Fiscal Year is July 1 through June 30. No historical data was provided for Fiscal Year '90/'91.
4. Operating values do not include tax revenue, interest, depreciation, and capital improvements.
5. Totals may vary in some cases due to rounding off.

Source: City of Ukiah / Shutt Moen Associates (May 1995)

Table 8A

Pro Forma Financial Projection  
Ukiah Municipal Airport

## COST ESTIMATES

Table 2A in Chapter 2 sets forth cost estimates (based upon 1994 dollar values) for proposed airport development at Ukiah Municipal Airport over the next 20 years. The estimates are tabulated in three stages (0-5 years, 6-10 years, and 11-20 years) consistent with the anticipated project implementation sequences. It must be emphasized that the development costs presented in Table 2A have been estimated on an order-of-magnitude basis for preliminary planning and programming purposes only. Specific project analysis and detailed engineering design will be required at the time of project implementation to provide more refined and up-to-date estimates of developmental costs.

As presented in Table 2A, the *Master Plan* projects a total Capital Improvement Program cost of approximately \$11.0 million over the 20-year planning period. Of this total amount, an estimated \$9.6 million (or 87%) potentially could be funded through the FAA's Airport Improvement Program.

## FINANCIAL SUMMARY

As can be seen in Table 8A, Ukiah Municipal Airport's projected operating income will be insufficient to totally fund the sponsor's share of the Capital Improvement Program costs over the initial five-year financial planning period. During this period, supplemental funding and/or interim financing may be required to provide for the timely and cost-effective implementation of the Capital Improvement Program.

It should be noted that significant City tax revenues are generated each year by Airport-related activity (e.g., possessory interest taxes and personal property taxes). These sources are not directly accounted for as airport revenues, nor are they directly expended on the Airport. These Airport-generated tax revenues flow into the local communities where they are typically used for nonaviation purposes.

Over the course of the 20-year planning period, it is anticipated that Ukiah Municipal Airport's operating revenues will increase at a slightly greater rate than operating expenses. The Airport's fiscal condition could be improved by further reducing expenses or increasing revenues. Operating expenses are already relatively modest, however, and a significant reduction in expenses may not be achievable. Airport revenues could be enhanced by developing new sources of airport-related revenue or by increasing rates charged to airport lessees, permittees, and users. Caution must be exercised, however, in establishing higher rates at the Airport. A reasonable balance must be sought between the need for a financially viable airport, the continuation of subsidies to the private

sector, and general aviation market conditions. In this regard, Ukiah Municipal Airport's rates and fees structure should be established in a manner which permits the City to safely operate and improve the Airport while attracting the Airport's target user groups — personal/recreational aircraft users and small corporate/business aircraft users desiring general aviation air transportation access to the Ukiah/Mendocino County area.

## **MASTER PLAN ADOPTION AND IMPLEMENTATION ACTIONS**

In order for the City to adopt the *Ukiah Municipal Airport Master Plan* and implement the first-phase improvement projects, a variety of State and federal environmental and other review or permit actions were completed. The major steps in this process were as follows:

### **Master Plan Adoption**

- **Environmental Impact Documentation** — As part of this *Master Plan*, an *Initial Study* assessing the potential environmental impacts associated with the construction and long-term use of the proposed airport improvements has been prepared in accordance with California Environmental Quality Act (CEQA) guidelines (see Appendix H). This *Initial Study* led to preparation of a *Negative Declaration* allowing adoption of the *Master Plan*. More substantial environmental documentation may be necessary in accordance with CEQA guidelines before major projects (such as the potential relocation of the CDF air attack base) can be implemented. No FAA environmental review is required for adoption of the *Master Plan*.
- **Ukiah Municipal Airport Commission** — The Ukiah Municipal Airport Commission has participated in the preparation of the *Ukiah Municipal Airport Master Plan* through discussions held at regular Commission meetings.
- **Mendocino County Airport Land Use Commission** — The Mendocino County Airport Land Use Commission has, as required by State law, reviewed the *Master Plan* prior to its adoption.

On June 6, 1996, the Commission amended its own plan to incorporate the Ukiah Municipal Airport Compatibility Map (Figure 7I) and airport-specific policies. The Commission then found the *Master Plan* to be consistent with the ALUC plan.

- **Ukiah City Council** — The Ukiah City Council had the ultimate responsibility for adoption of the *Airport Master Plan*. The Council's action followed established City procedures regarding public hearings,

public notification, etc. On July 3, 1996, the Council formally adopted the *Airport Master Plan*.

- **Federal Aviation Administration** – Ongoing coordination has been maintained with the FAA throughout the *Master Plan* study and the agency received the draft plan for informal review and comment. The FAA will conduct a formal internal coordination and review of the City-adopted *Airport Layout Plan* drawings. After any necessary technical revisions are made, the FAA will then approve the *Airport Layout Plan* as the basis for the engineering design and grant eligibility of specific projects. The FAA approval of the *Airport Layout Plan* is not a commitment by the FAA to fund any given project.

## **Implementation**

- **Proposed Projects** – As described elsewhere in this report, several of the proposed airport improvements are programmed for early implementation. These projects include the development of additional aircraft storage hangars, possible relocation or improvement of the CDF air attack base, and rehabilitation of airfield pavement.
- **Project Funding** – The City should assess the availability and timing of local funds that can be committed to the proposed airport improvements. Once a decision is made to proceed with specific projects, an Airport Improvement Program grant Preapplication should be submitted to the FAA. To facilitate the timely processing of key projects, it is recommended that the Capital Improvement Program identified in the *Master Plan* be submitted to the FAA as soon as possible in accordance with its annual CIP submission procedures.
- **Engineering Design** – The *Airport Master Plan Report* and *Airport Layout Plan* drawings serve only as the starting point for the more detailed engineering design work necessary for actual construction of the proposed improvements. After the *Master Plan* has been adopted and a decision has been made to construct the proposed projects, the City should proceed in a timely manner to arrange a contractual agreement with a qualified airport engineer. To assure a continuity in design development, it is suggested that the agreement cover not just the immediate projects, but other major improvements proposed to be constructed over the next three to five years.
- **Environmental Impact Documentation** – There is no apparent requirement for preparation of a federal environmental document for any of the projects listed in the *Master Plan*. The projects proposed in the *Master Plan* meet the FAA criteria for being Categorically Excluded from federal environmental review and, therefore, there is no federal requirement for an Environmental Assessment.

- **State Airport Permit** – There are no proposed modifications to the Airport that would require the Airport Permit issued by the California Aeronautics Program to be amended.
- **Airspace Review** – Before work is conducted on or near the runway, a "Notice of Proposed Construction or Alteration" (FAA Form 7460-1) must be submitted to the FAA in accordance with FAR Part 77.



# Appendices



**Appendix A**  
**Existing Airport Facilities**

**UKIAH MUNICIPAL AIRPORT**

Item	Description	Condition/Comments
<b><i>RUNWAY/TAXIWAY SYSTEM</i></b>		
<b><i>Runway 15-33</i></b>		
<i>Pavement</i>	4,415' long; 150' wide Effective gradient: 0.27% Section (estimated): 4" asphalt course 6" base aggregate Strength: 28,000# (single-wheel)	Good
<i>Shoulders</i>	West Side: Dirt/grass; surface graded and level East Side: Dirt/grass; surface graded and level	Satisfactory  Satisfactory
<i>Runway Safety Areas</i>	Length: Minimum of 300' beyond runway departure ends Width: Minimum of 150' (225' recommended)	Satisfactory  Satisfactory
<i>Markings</i>	Nonprecision Relocated threshold Runway 15: 585'	Fair – Need to be repainted in near future
<i>Lighting</i>	Medium-intensity runway edge lights	Good

Item	Description	Condition/Comments
<i>Taxiways</i>		
<i>West Side Parallel</i>	50' wide; asphalt Full length of runway Runway-to-taxiway separation: 300' along northern 2/3 to 225' at southern end Low-intensity taxiway edge lights and centerline/edge reflectors Exit signs	Good – Markings are faded
<i>Runway Entrances/Exits</i>	Four designated entrances/exits – one at each end, one 1,400' southeast of the Runway 15 threshold, and one 1,000' northwest of the Runway 33 threshold Hold lines: 200' from runway centerline at Runway 33 threshold taxiway and 150' all others	Good  Hold lines should be remarked at 200'
<i>Blast Pads</i>	None	Entrance taxiway on approach end of Runway 15 serves as blast pad
<i>Holding Bays</i>	Located adjacent to each runway entrance taxiway	Holding bay at approach end of Runway 15 is of minimal size
<i>Marking</i>	Standard centerline stripes Standard holdline stripes Standard runway designation numbers "Ukiah" is painted on the east side of the runway	Fair – Need to be repainted
<i>Visual Approach Aids</i>	Four-box VASI serving Runway 15 REILs serving Runways 15 and 33 No VGSI on Runway 33 due to terrain constraints	Runway 15: V4L @3.0° GA with TCH of 27'

Item	Description	Condition/Comments
<b>Other</b>		
<i>Wind Indicators</i>	Lighted wind cone on east side of runway	Good
	Unlighted wind cone in southwest corner of airport property near Runway 33 threshold	Good
	Segmented circle with traffic pattern indicators and wind tee on east side of runway	Good – Wind tee is unlighted
<i>Radio Aids</i>	On-Airport Localizer/DME (109.1 mHz IUKI) and LOM (KEARN NDB-371 mHz)	Good – Maintained by FAA
	Off-Airport VORTAC (MENDOCINO-112.3 mHz) located 5.5 m.n. at 202°)	
	On-Airport Flight Service Station (1615Z-0145Z)	
<i>Rotating Beacon</i>	One beacon located on T-hangar in airport building area and one beacon located on mountain 250° and 2 miles from the Airport	Good
<b>BUILDING AREA</b>		
<b><i>Aircraft Aprons</i></b>		
<i>North Apron (North of FSS)</i>	1.1 acres; asphalt 15 aircraft parking positions	Fair
<i>Central Apron (East of FSS to CDF apron)</i>	1.9 acres; asphalt and concrete 20 based tiedown positions 15 transient parking positions Aviation fuel storage facility (one 12,000 gallon 100LL aboveground tank)	Fair

Item	Description	Condition/Comments
CDF Apron (South of aviation fuel storage facility)	1.0 acres; asphalt and concrete 4 CDF aircraft parking positions	Fair
<b>Other Facilities</b>		
<i>Fuel Storage</i>	One aboveground steel tank (12,000 gal. 100LL octane) Jet-A stored in 750 gallon refueler truck Various tenants also have on-site fuel storage facilities	Good — Relocation of the Airport's aviation fuel storage facility to the east side of the runway is programmed for 1995
<i>Fuel Dispensing</i>	All fuel (100LL and Jet A) dispensed by two 750 gallon refueler trucks	
<i>Perimeter Fencing</i>	Security fencing completely encloses Airport perimeter Primary controlled-access (push-button code) entrance gate to main apron from terminal auto parking area Secondary controlled-access (push-button code) entrance gate serving south FBO apron area	
<b>Roads and Parking</b>		
<i>Main Public Access Point</i>	Off South State Street Serves various FBO areas via internal access roads	Fair — Paved with asphalt
<i>Controlled-Access Points</i>	From main auto parking lot near airport terminal building (serves main apron area) and from side street off of South State Street (serves south FBO apron area)	Good — Code-controlled vehicle gates
<i>Public Auto Parking</i>	Adjacent to airport terminal building area and various FBO offices/hangars	Fair — pavement and markings in poor-to-fair condition

<b>Item</b>	<b>Description</b>	<b>Condition/Comments</b>
<i>Utilities</i>		
<i>Electricity</i>	Supplier: City of Ukiah	
<i>Telephone</i>	Supplier: Pacific Bell Public phones located at terminal and FBO facilities	
<i>Water</i>	Supplier: City of Ukiah	
<i>Sewer</i>	City of Ukiah sewer system	
<i>Natural Gas</i>	Supplier: PG&E	



## Summary of Aircraft Accidents

## UKIAH MUNICIPAL AIRPORT

DATE TYPE OF AIRCRAFT	11/19/81 Cessna 172	10/18/82 Taylor- craft BC12-65	5/1/84 Piper PA-23-250	12/5/84 Cessna 150	12/13/85 Cessna 177RG	11/26/85 Piper PA-23-250	6/30/86 Piper PA-18-150	7/18/92 Cessna 180H
<b>PHASE of OPERATION</b>								
stationary/taxiing	X				X			
takeoff - run		X		X			X	
takeoff - initial climb								X
landing - in traffic pattern								
landing - in final approach			X		X			
landing - touchdown/roll out						X		
other			X <sup>1</sup>					
<b>NATURE of IMPACT</b>								
hard landing/gear up/ground								
undershoot/overshoot						X		
collision with objects	X	X	X <sup>2</sup>	X	X			X
forced landing						X		
uncontrolled descent/impact								
collision between aircraft in flight								
other							X <sup>7</sup>	
<b>LOCATION of IMPACT</b>								
on/adjacent to runway		X		X	X		X	
in clear zone								
in approach zone								
on airport property	X					X		X
off airport			X					
<b>CAUSES/FACTORS</b>								
pilot - improper operation of controls	X	X	X <sup>3</sup>	X		X	X <sup>8</sup>	X
pilot - failure to see/avoid objects	X				X			
pilot - inadequate preflight								
fuel exhaustion						X <sup>6</sup>		
mechanical failure								
adverse wind/weather							X	
other					X <sup>4</sup>			
<b>MISCELLANEOUS CONDITIONS</b>								
time								
visibility (S.M.)					X <sup>5</sup>			
student pilot				X				
injuries (yes/no)	NO	NO	NO	NO	NO	NO	NO	YES
fatalities (yes/no)	NO	NO	YES	NO	NO	NO	NO	NO
other								

## Notes:

- In-flight.
- Mountainous terrain.
- Pilot selected the DME on the wrong NAV receiver.
- No lighting on taxiway.
- Dark night.
- Aircraft had fuel in auxiliary fuel tanks but pilot failed to switch to them.
- Dragged wing.
- Pilot initiated flight in known adverse weather conditions.



## Airport Reference Codes of Selected Aircraft

Aircraft Type	Airport Reference Code	Wingspan (Feet)	Approach Speed (Knots)	Maximum Takeoff Weight (Pounds)
Cessna 150	A-I/Small	32.7	55	1,600
Beechcraft V35B Bonanza	A-I/Small	33.5	70	3,400
Piper PA-31-310 Navajo	B-I/Small	40.7	100	6,200
Cessna 208 Caravan	A-II/Small	52	80	8,750
Cessna 441 Conquest	B-II/Small	49.3	100	9,925
Cessna Citation I	B-I/Small	47.1	108	11,850
Swearingen Metro	B-I/Small	46.2	112	12,500
Beechcraft Super King Air B200	B-II/Small	54.5	103	12,500
Embraer 110 Bandeirante	B-II	50.3	92	13,007
Cessna Citation II	B-II	51.7	108	13,300
Lear Jet 35A/36A	D-I	39.5	143	18,300
Cessna Citation III	B-II	53.5	114	22,000
Embraer 120 Brazilia	B-II	64.9	<121	23,353
HS 125-700A	C-I	47.0	125	24,200
Shorts 360	B-II	74.8	104	26,453
Grumman S-2	B-II	70	95	27,000
Falcon 20	B-II	53.5	107	28,660
Gulfstream II	D-II	68.8	141	65,300
Gulfstream III	C-II	77.8	136	68,700
Gulfstream IV	D-II	77.8	145	71,780
Lockheed C-130 (L100-20)	C-IV	132.6	137	155,000

Source: FAA Advisory Circular 150/5300-13/Appendix 13



## UKIAH MUNICIPAL AIRPORT

### Introduction

The airfield pavements were evaluated as part of the *Airport Master Plan* study. This evaluation included a review of soils and pavement section information contained in the FAA Pavement Strength Survey (Form 5335-1), and a review of previous state Airport Pavement Management System (APMS) reports. Additionally, a visual pavement condition survey was performed and the pavement condition index (PCI) ratings were calculated. Random or representative areas of each airfield pavement area were surveyed for visual pavement distress in accordance with guidelines in FAA Advisory Circular 150/5380-6. Random sample units were used for larger pavement sections and representative sample areas for smaller sections. Figure D-1 depicts the pavement areas and associated field survey sampling method used.

The Micro PAVER pavement management computer program was used to calculate the PCI ratings from the pavement distresses measured during the field survey. PCI values can range from a high of 100 (*excellent*) to a low of 0 (*failed*).

### Pavement Conditions

The runway, parallel taxiway, and exit taxiways at Ukiah are in *good* to *very good* condition with PCI ratings of 67 to 73. The types of distress observed were low severity weathering and cracking, all associated with aging rather than aircraft loading. The aprons and tiedown areas are in worse condition with PCI ratings generally ranging from 1 (*failed*) to 38 (*poor*). Only aprons A1A, A1B, and A2A had ratings of *fair*, *good*, and *very good*. As with the runway/taxiway system, the distress in apron and tiedown areas is primarily age-related with Tiedown 2D the only area exhibiting load associated distress. The PCI ratings for each pavement area are shown on Figure D-2.

### Maintenance/Repair Recommendations

Recommended pavement repair/maintenance projects for the Airport are summarized in Table D-1. The projects in this table are scheduled in 0- to 5-year, 5- to 10-year, and 10- to 20-year time periods according to their urgency in restoring the pavements and maintaining them in good condition.

The strategy of maintaining pavements in good condition is based on the relationship of pavement condition to rate of deterioration. As illustrated in Figure D-3, the rate of deterioration increases significantly as pavement condition drops. This increase becomes drastic when pavement conditions drop in the *fair* to *poor* range. Because of this drastic change, the additional cost to rehabilitate a pavement in *poor* condition, versus *good* to *fair* condition, are significantly higher. Since many of the apron and tiedown areas are in such poor condition, the majority of these

areas are scheduled for reconstruction in the first five years. From an engineering standpoint, this is the correct sequencing of repairs. However, the realities of funding for these projects may necessitate some form of staging.

Scheduling of the recommended pavement repair/maintenance projects was based upon minimizing long-term repair costs. In this analysis, funding of the projects was not considered a limiting factor. In cases where projects are considered to be equally important in terms of pavement maintenance, user safety and operating costs were also considered in the ranking process. Without a substantial amount of historical performance data and an accurate picture of future airport conditions, it is difficult to forecast beyond the 5- to 10-year period. Thus, the 10- to 20-year projects represent our best estimate of required maintenance projects for that period. The pavements should be evaluated in 7 to 8 years to reassess maintenance needs.

Timeframe	Project No.	Pavement Designation	Project Description	Estimated Cost
0 - 5 Years	1	R1, T1, T2, T3, T4, and T5	Slurry Seal	\$215,000
	2	TD1A, TD1B, TD2A, and TD2B	Reconstruction	\$535,000
	3	A2A and A2B	Repair and Slurry Seal	\$120,000
<i>Subtotal</i>				<i>\$870,000</i>
5 - 10 Years	1	A1A	Joint and Crack Repair	\$54,000
	2	A1B	Coal Tar Seal	\$19,500
	3	R1, T1, T2, T3, T4, and T5	Slurry Seal	\$214,500
	4	TD1A, TD1B, TD2A, and TD2B	Slurry Seal	\$75,000
	5	A2A and A2B	Slurry Seal	\$120,000
<i>Subtotal</i>				<i>\$483,000</i>
10 - 20 Years	1	R1, T1, T2, T3, T4, and T5	Asphalt Overlay	\$1,086,000
	2	TD1A, TD1B, TD2A, and TD2B	Coal Tar Seal	\$77,000
	3	A2A and A2B	Coal Tar Seal	\$101,000
<i>Subtotal</i>				<i>\$1,264,000</i>
<b>TOTAL</b>				<b>\$2,617,000</b>

Source: Shutt Moen Associates (July 1996)

Table D-1

**Recommended Airport Pavement Repair/Maintenance Projects**  
**Ukiah Municipal Airport**

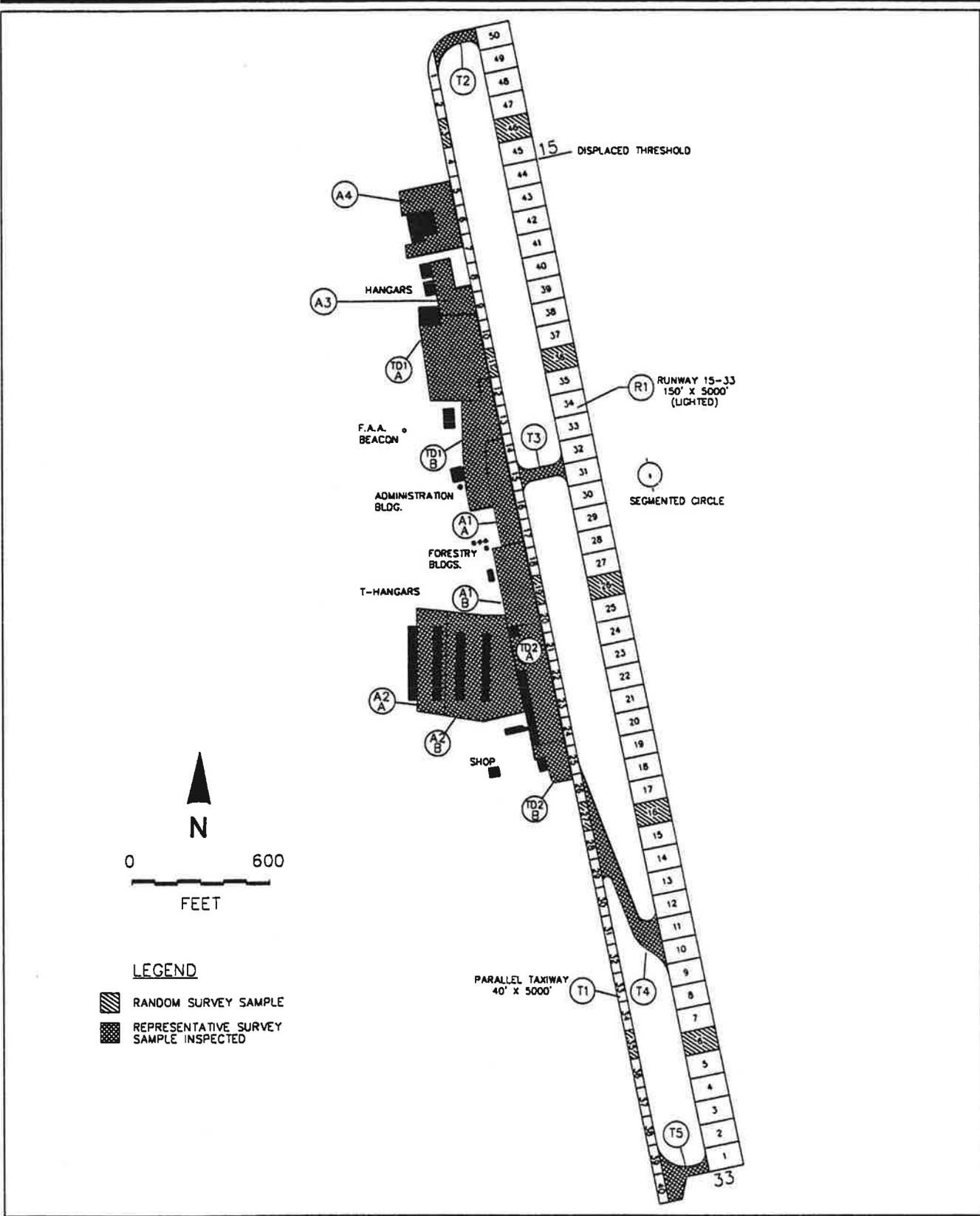


Figure D-1

### Pavement Sampling Diagram Ukiah Municipal Airport

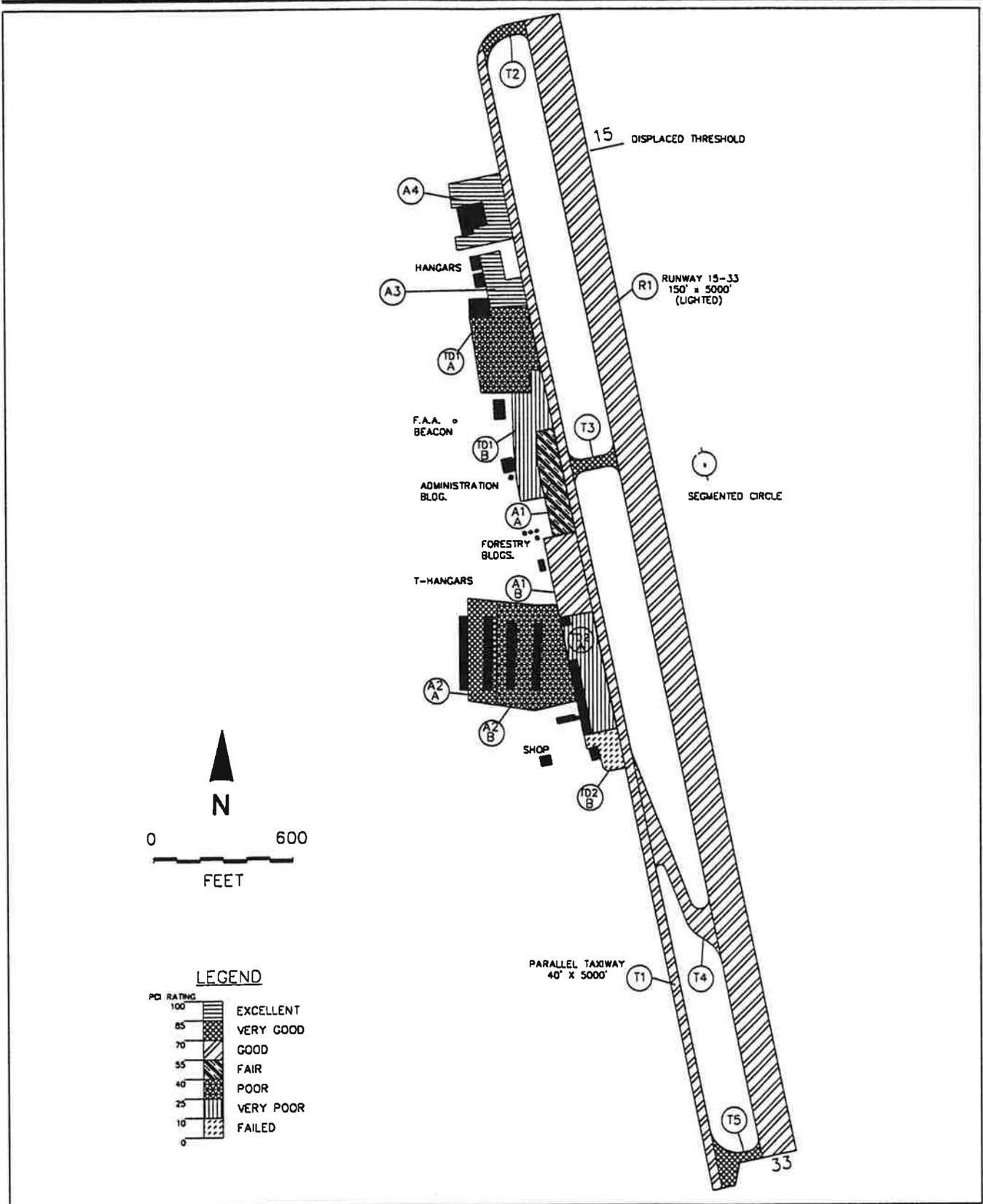
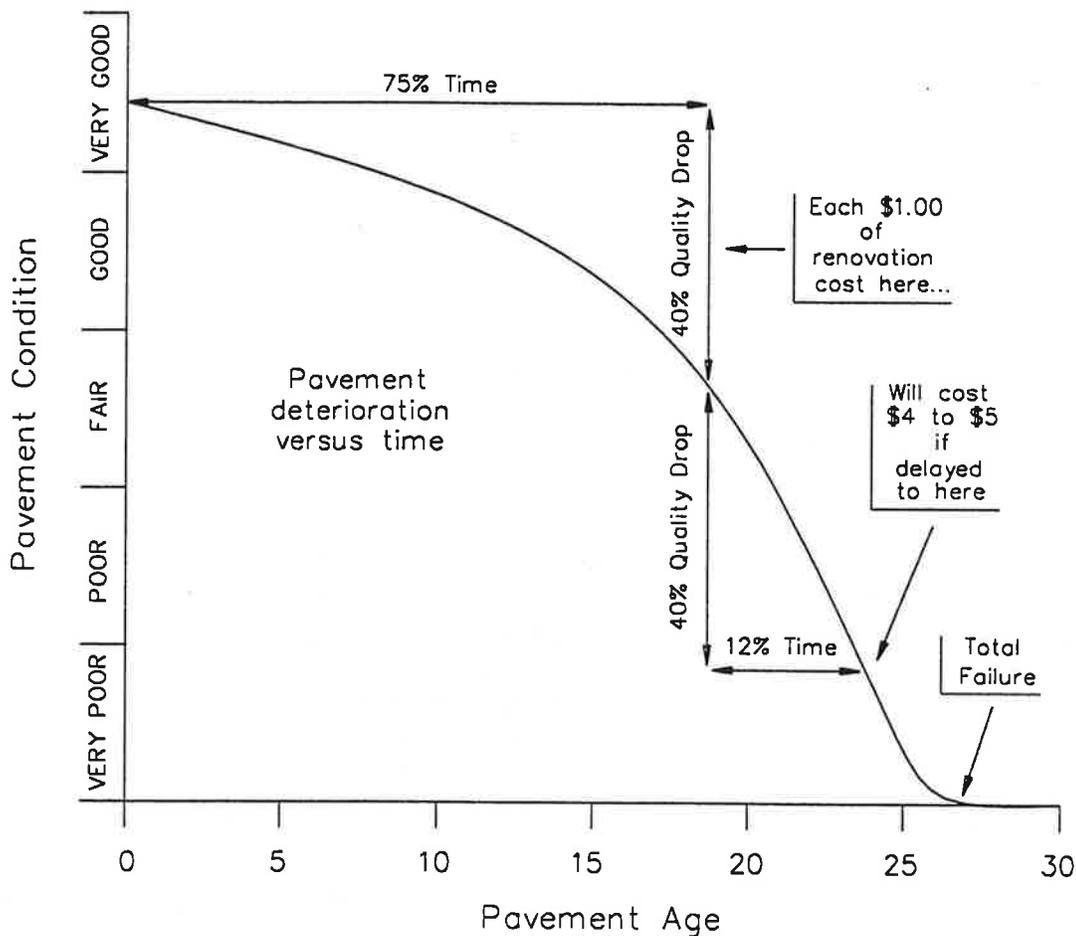


Figure D-2



Reference: American Public Works Association  
 'Paver Training Manual' (1986)

Figure D-3

### Theoretical Pavement Deterioration Curve

Ukiah Municipal Airport

**Hangar Financing Options**

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**UKIAH MUNICIPAL AIRPORT**

Hangars are unusual among airport facilities in terms of the ways in which they can be financed. Not all of the typical airport funding sources can be used for hangar development — hangars are not eligible, for example, to receive federal AIP grants. Portions of the hangars' access taxiways, however, are eligible for AIP grants. Considering the high priority assigned to construction of additional hangars at Ukiah Municipal Airport, it is appropriate to take a closer look at hangar financing options.

The attached table (Table E-1) compares the advantages of five different public and private hangar financing options. While intended primarily for financing the development of permanent T-hangars, the five financing options can also be applied to the development of portable hangars and corporate or executive style hangars.

At Ukiah Municipal Airport, the existing aircraft storage hangars have been developed by both the City and the private sector. Due to the increasing cost of development and the Airport's limited budget, it is anticipated that all future hangar construction (fixed or portable types; T or box types) will be developed by the private sector. As with all of the privately-developed hangars at the Airport, ownership of the hangars will revert to the City at the end of the lease term.

With respect to Ukiah Municipal Airport, the privately-owned/privately-financed approach to financing hangar development appears to offer the greatest likelihood of success. It is anticipated that, at least for the near-term, any new hangars constructed at the Airport will be financed in this manner. Should future Airport revenues permit, the City may also want to consider the Airport-owned/State Loan Program-financed approach as well.

**Privately Owned/Privately Financed**

This approach is most often pursued at publicly owned airports that are unable to afford the initial development cost of hangar construction or prefer to use their limited financial resources for other higher priority projects. The hangars are designed, financed, and owned by private sector interests. Title to improvements may or may not revert to the airport upon expiration of the lease term.

*Advantages*

- No public financing or capital required.
- Private development can generally be accomplished at lower cost and in less time than public development.
- Pride of private ownership and ownership equity interest may encourage above-average structural maintenance and facility utilization.
- Airport gains immediate revenue from land area rental/use fees.

*Disadvantages*

- Airport either gains no equity interest in improvements or gains no equity interest until term expiration.
- Revenue accruing to airport is modest (i.e., generally land rent only).
- Potential for private default and resultant turmoil.
- Airport sacrifices a measure of control to private interests.
- Potential for low quality or inconsistent design unless airport owner sets precise design and construction standards.

**Airport Owned/Privately Financed**

With this approach, the airport owner obtains private sector financing to construct the hangars and subsequently owns and operates them.

*Advantages*

- No public financing or capital required.
- Airport "owns" improvements thus facilitating control. (Note that private financier may retain some element of control over the facility and its use).

*Disadvantages*

- Private financing costs may be high.
- Loan assurances may encumber or constrain airport.
- Private financial interests (banks, savings and loans institutions, developers, etc.) are generally not familiar with hangar development projects.

**Airport Owned/Airport Financed**

This approach assumes that the airport has sufficient surplus income and/or retained earnings to self-finance hangar construction.

*Advantages*

- Generally results in the lowest "financing" costs.
- Airport owns improvements thus facilitating control.
- Use of airport funds does not impact community's general funds or bonding capability.
- Over the long term, airport realizes a significant measure of revenue.

*Disadvantages*

- Only larger airports with adequate financial resources are capable of pursuing this approach.
- Utilizes frequently scarce airport capital resources that might better be applied toward other airport improvement projects for which alternative funding sources are not available.
- Positive cash flow frequently not realized by airport for several years.

Table E-1

**Hangar Financing Options  
Ukiah Municipal Airport**

**Airport Owned/State Loan Program Financed**

This method of hangar financing has been successfully utilized by numerous airport owners in the state of California. The public airport owner borrows the funds necessary for hangar development from the California State Airport Loan Program. The loan is then retired from hangar rental revenues over a period of up to 15 years.

*Advantages*

- Airport owns improvements thus facilitating control.
- Scarce airport and community funds are not required.
- Interest rate charged (currently 6.8% per annum) is attractively below the rates available from private financing sources.
- Loan can be retroactively applied to eligible projects.
- Over the long term, airport realizes a significant measure of revenue.

*Disadvantages*

- The State Loan Program usually has backlog of loan requests - sometimes as long as a year.

**Airport Owned/Publicly Financed**

Using this arrangement, the airport utilizes funds or financial resources (general fund, general obligation bonds, revenue bonds, etc.) to construct hangars.

*Advantages*

- Airport owns improvements thus facilitating control.
- Scarce airport funds are not required.

*Disadvantages*

- Public resources may be unavailable or required for higher priority community projects.
- Bonding process may require security pledge and/or vote of citizenry.

Source: Shutt Moen Associates (July 1996)

Table E-1 continued



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**Airport-Oriented Restaurants/Coffee Shops**

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**Observations Regarding the Operation  
of  
Restaurants and Coffee Shops  
on  
General Aviation Airports**

There is a pervasive feeling throughout the general aviation community that every airport of any modest size needs and is capable of supporting an on-airport restaurant. On the surface, an on-airport restaurant appears to be a reasonable proposition. It offers the "exciting allure" of aviation activity and has ready access to a somewhat captive customer base – the based and transient pilots and passengers that frequent the airport.

However, the record of success for most general aviation airport restaurants has not been good. There are seemingly more failures than successes in this business. One needs only to visit a few local airports to learn of the numerous attempts to either start or sustain a viable on-airport restaurant – most end in failure.

Restaurants located on general aviation airports are typically one of two kinds – the small "Mom & Pop" style coffee shop/snackbar or the upper-scale, full-service public-access eatery featuring an aeronautical theme.

The "coffee shop/snackbar" typically caters to pilots and tenants based at the airport. In addition, transient pilots and passengers may fly into the airport and purchase food and drink – either as a primary destination or just passing through. There isn't much public street traffic or local community clientele. The basic on-airport coffee shop customer is somewhat informally attired (after all, he just drained 7 quarts of dirty oil from his Lycoming O-320 engine), buys one cup of coffee (complains about the cost), and sits around most of the day talking about airplanes and complaining about the FAA. The small on-airport coffee shop is the local pilot and aviation enthusiast hang-out – dusty old model planes hang from the ceiling and yellowing aeronautical sectionals and dog-eared airplane photos line the walls. The place is busy on good-weather summer weekends at lunch time, but is slow most other times. There is not much volume and very little profit – if any.

Of course, there are successful on-airport coffee shops (airports like Petaluma, Auburn, Chino, Brackett Field, Big Bear, and Lampson Field in California come to mind). These restaurants are well-known throughout their respective pilot communities as good places to fly to on a nice summer weekend for the proverbial \$75 airport hamburger. They are modestly sized and informally operated to minimize costs and remain attractive to their pilot/airport user customer base.

The second kind of on-airport restaurant is the full-service, public-access eatery. This restaurant typically endeavors to attract the upper-scale lunch and dinner crowd by featuring quality food and drink with the allure and excitement of an aeronautical setting. This type of restaurant relies heavily upon the local population base, area businesses and roadside traffic for its clientele. A very small percentage (less than 10%) of its business comes from pilots, passengers, and airport tenants. Based pilots and airport tenants typically don't patronize such establishments because these restaurants tend to be relatively expensive and not conducive to informal "hanging around." Frequently, these restaurants have a minimum table service charge, no counter service, and actively discourage "informal" customers.

Through advertising and word of mouth, such restaurants can attract the transient pilot and passengers for a meal. Flying to Acme Community Airport for a nice lunch or dinner was once a popular form of entertainment for many general aviation pilots. With the recent decline in general aviation activity, particularly recreational and discretionary flying, this customer base has eroded significantly.

To survive, the full-service on-airport restaurant must have a strong, non-airport-related customer base and offer quality food and service. The aeronautical theme will draw customers the first time but good food and service is required to keep them coming back.

The aeronautical theme that distinguishes such restaurants is, unfortunately, diminishing in its impact. Many customers come to on-airport restaurants to see the planes, lights, and activity associated with an active, vibrant airport. In these days of declining general aviation activity, however, there are precious few planes flying. Large acreage multi-runway airports frequently place the flight activity a considerable distance from the restaurant windows – closeup viewing is difficult at best. Electrical energy conservation programs mean that few runway and taxiway lights are visible at night. FAA security restrictions, particularly at air carrier and commuter airports, inhibit access to the airfield and project an inhospitable fortress mentality. At some airports, general aviation fly-in customers cannot taxi directly to the restaurant due to airport security requirements – the pilot and passengers are required to take a frequently inconvenient courtesy car or taxicab to the restaurant via public roads.

Successful examples of full-service public-access restaurants include the 94th Aero Squadron and 306th Bomb Group theme restaurants at San Jose International Airport (CA) and Sarasota-Bradenton Airport (FLA), respectively, and the Blue Max Restaurant at Boeing Field in Seattle (WA).

Generally speaking, it is not practical to successfully mix the two restaurant types at one location. The two restaurant types serve substantially different clienteles with differing service and facility requirements.

The following additional thoughts and observations regarding on-airport restaurants are offered:

- Airport/Pilot Guides are a useful tool in advertising both on-airport and near-airport restaurants. There are even special guides that describe nothing but on-airport restaurants.

- Business/corporate aircraft food catering offers some potential for added restaurant revenue – particularly at busier general aviation airports in metropolitan areas. However, on-airport restaurants could face stiff catering competition from off-airport restaurants and local delicatessens.
- A number of restaurants are located on airports with contiguous corporate/ industrial parks. Usually, these restaurants consider the nearby corporate/industrial parks as an important element of their customer base – particularly at lunch time.
- Occasionally, a local community restaurant operator will establish a "satellite" restaurant operation at the local airport. Hopefully, such an operator will know the local market and will be able to reduce costs through bulk purchasing and shared administration.
- Infrastructure and equipment costs for on-airport restaurants are relatively high. This is particularly true for start-up operations. This generally requires high initial capitalization and a relatively long lease term. Neither the airport operator nor the restaurateur is typically interested in these terms for such a speculative business endeavor.

*Prepared in August 1993 by David B. Heal, Shutt Moen Associates, Santa Rosa, California.*



## Noise Model Calculation Data

## Ukiah Municipal Airport

AIRCRAFT MIX				
(Estimated 1994 Activity Level)				
Aircraft Type	Total Operations			Touch & Go's
	Annual	Average Day	% of Operations	% of Operations
Single-Engine, Propeller, Fixed Pitch	21,750	59.5	44.0	75.0
Single-Engine, Propeller, Variable Pitch	21,750	59.5	44.0	20.0
Twin-Engine, Propeller, Piston	3,800	10.4	7.0	5.0
Twin-Engine, Turboprop	800	2.2	2.0	0.0
Small Business Jet (e.g., Citation)	100	0.3	0.2	0.0
Large Twin (e.g., Grumman S-2)	300	0.8	0.6	0.0
Helicopters	1,500	4.1	3.0	0.0
<b>Total</b>	<b>50,000</b>	<b>137.0</b>	<b>100.0</b>	<b>41.7</b>

AIRCRAFT MIX				
(Projected 2015 Activity Level)				
Aircraft Type	Total Operations			Touch & Go's
	Annual	Average Day	% of Operations	% of Operations
Single-Engine, Propeller, Fixed Pitch	22,250	61.0	39.0	75.0
Single-Engine, Propeller, Variable Pitch	22,250	61.0	39.0	20.0
Twin-Engine, Propeller, Piston	5,300	14.5	9.3	5.0
Twin-Engine, Turboprop	2,600	7.1	4.6	0.0
Small Business Jet (e.g., Citation)	300	0.8	0.5	0.0
Large Twin (e.g., Grumman S-2)	300	0.8	0.5	0.0
Helicopters	4,000	11.0	7.0	0.0
<b>Total</b>	<b>57,000</b>	<b>156.2</b>	<b>100.0</b>	<b>37.5</b>

TIME OF DAY (Estimated 1994 and Projected 2015)				
Aircraft Type		% 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	Ldg & T/O	95.0	3.0	2.0
	Touch&Go	95.0	3.0	2.0
Single-Engine, Propeller, Variable Pitch	Ldg & T/O	95.0	3.0	2.0
	Touch&Go	95.0	3.0	2.0
Twin-Engine, Propeller, Piston	Ldg & T/O	95.0	3.0	2.0
	Touch&Go	95.0	3.0	2.0
Twin-Engine, Turboprop	Ldg & T/O	95.0	3.0	2.0
Small Business Jet (e.g., Citation)	Ldg & T/O	95.0	3.0	2.0
Large Twin (e.g., Grumman S-2)		98.0	2.0	0.0
Helicopters	Ldg & T/O	95.0	3.0	2.0

RUNWAY UTILIZATION (Estimated 1994 and Projected 2015)					
Aircraft Type		% of Landings & Touch-and-Go's		% of Takeoffs	
		Rwy 15	Rwy 33	Rwy 15	Rwy 33
All Aircraft	Day	60.0	40.0	25.0	75.0
	Evening	60.0	40.0	25.0	75.0
	Night	60.0	40.0	25.0	75.0

FLIGHT TRACKS - LANDINGS (other than touch & go's) (Estimated 1995 and Projected 2015)					
Aircraft Type		Runway 15 % of Operations		Runway 33 % of Operations	
		Straight In	Left Downwind	Straight In	Right Downwind
Single-Engine		10.0	90.0	10.0	90.0
Twin-Engine & Jet		25.0	75.0	10.0	90.0
Helicopters*					

FLIGHT TRACKS - TAKEOFFS (departing the pattern)				
(Estimated 1994 and Projected 2015)				
Aircraft Type	Runway 15 % of Operations		Runway 33 % of Operations	
	Straight In	15° Left	Straight Out	15° Right
Single-Engine	10.0	90.0	5.0	95.0
Twin-Engine & Jet	10.0	90.0	5.0	95.0
Helicopters*	0.0	0.0	0.0	0.0

FLIGHT TRACKS - TOUCH & GO'S (Remaining in the pattern)			
(Projected 2015)			
Aircraft Type	Runway 15 Pattern % of Operations		Runway 33 Pattern % of Operations
Airplanes	25.0		75.0
Helicopters*	0.0		0.0

\* Note: Helicopters approach/depart from Airport at mid-field.

Source: Shutt Moen Associates (July 1996)



Initial Study of Environmental Impacts

INITIAL STUDY  
OF  
POTENTIAL ENVIRONMENTAL IMPACTS

City of Ukiah

I. BACKGROUND INFORMATION

1. Name of Project Proponent City of Ukiah
2. Address of Project Proponent 300 Seminary Avenue, Ukiah
3. Name of Project Ukiah Municipal Airport Master Plan Report
4. Assessors Parcel Number(s) Ukiah Municipal Airport/Various
5. Date of *Initial Study* Preparation 3-21-95
6. Name of Lead Agency City of Ukiah/Office of the City Manager
7. Address and Phone Number of Lead Agency \_\_\_\_\_  
300 Seminary Avenue, Ukiah, California 95482 (707/463-6200)
8. Brief project Description 20-year plan for the future operation  
and development of the Ukiah Municipal Airport.  
\_\_\_\_\_  
\_\_\_\_\_
9. Person Responsible for Preparing *Initial Study*  
David B. Heal - Senior Consultant, Shutt Moen Associates (707/526-5010)

# ENVIRONMENTAL CHECKLIST

WILL THE PROJECT RESULT IN THE FOLLOWING ENVIRONMENTAL EFFECTS:	No	Not Significant	Significant Unless Mitigated	Significant — No Apparent Mitigation	Cumulative Impacts
<b>1. EARTH:</b>					
a. Unstable earth conditions or changes in geologic structures.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Disruptions, displacements, compaction, or overcovering of soil.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Change in topography or ground surface relief features.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. The destruction, covering, or modification of any unique geologic or physical features.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Any increase in wind or water erosion of soils, either on or off the site.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition, or erosion that may modify the channel of a river, stream, inlet, or bay?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Exposure of people or property to geologic hazards such as earthquakes.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>2. AIR:</b>					
a. Substantial air emissions or deterioration of ambient air quality.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. The creation of objectional odors.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



WILL THE PROJECT RESULT IN THE FOLLOWING ENVIRONMENTAL EFFECTS:	No	Not Significant	Significant Unless Mitigated	Significant — No Apparent Mitigation	Cumulative Impacts
<b>5. ANIMAL LIFE:</b> a. Change in the diversity of species, or number of any species of animals including birds, land animals, reptiles, fish, insects, and benthic organisms. b. Reduction in the number of any unique, rare, or endangered species of animals. c. Introduction of new species of animals into an area, or in a barrier to the migration or movement of animals. d. Deterioration of existing fish or wildlife habitat.	<input checked="" type="checkbox"/>    <input checked="" type="checkbox"/>   <input checked="" type="checkbox"/>  <input checked="" type="checkbox"/>	<input type="checkbox"/>    <input type="checkbox"/>   <input type="checkbox"/>  <input type="checkbox"/>			
<b>6. NOISE:</b> a. Increase in existing noise levels. b. Exposure of people to severe noise levels.	<input type="checkbox"/>  <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>
<b>7. LIGHT AND GLARE:</b> a. Production of new light and glare. b. Reduction of solar exposure or adverse impacts to existing solar collection facilities.	<input checked="" type="checkbox"/>  <input checked="" type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>
<b>8. LAND USE:</b> a. Substantial alteration of the present or planned land use of a given area.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>9. NATURAL RESOURCES:</b> a. Increase in the rate of use of any natural resources.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

WILL THE PROJECT RESULT IN THE FOLLOWING ENVIRONMENTAL EFFECTS:	No	Not Significant	Significant Unless Mitigated	Significant — No Apparent Mitigation	Cumulative Impacts
<b>10. RISK OF UPSET:</b>  a. A risk of an explosion or the release of hazardous substances, (including oil, pesticides, chemicals, or radiation) in the event of an accident or upset conditions.  b. Possible interference with an emergency response plan or evacuation plan.	<input type="checkbox"/>  <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>
<b>11. POPULATION:</b>  a. Alterations in the location, distribution, density, or growth rate of human populations.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>12. HOUSING:</b>  a. Will the proposal affect existing housing or create a demand for new housing?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>13. TRANSPORTATION:</b>  a. Generation of substantial additional vehicular movement?  b. Effects on existing parking facilities, or demand for new parking facilities?  c. Substantial impact upon existing transportation systems?  d. Alterations to present patterns of circulation or movement of people and/or goods?  e. Alterations to waterborne, rail, or air traffic?  f. Increase in traffic hazards to motor vehicles, bicyclists or pedestrians?	<input checked="" type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/>  <input checked="" type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/>	<input type="checkbox"/>  <input checked="" type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>

WILL THE PROJECT RESULT IN THE FOLLOWING ENVIRONMENTAL EFFECTS:	No	Not Significant	Significant Unless Mitigated	Significant — No Apparent Mitigation	Cumulative Impacts
<p><b>14. PUBLIC SERVICES:</b></p> <p>a. Will the proposal have an effect upon, or result in a need for new or altered government services in any of the following areas:</p> <p>1. Fire protection?</p> <p>2. Police protection?</p> <p>3. Schools?</p> <p>4. Parks &amp; recreation facilities?</p> <p>5. Maintenance of public facilities?</p> <p>6. Other governmental services?</p>	<input type="checkbox"/>   <input checked="" type="checkbox"/>  <input type="checkbox"/>  <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>  <input checked="" type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>
<p><b>15. ENERGY:</b></p> <p>a. Use of substantial amounts of fuel or energy?</p> <p>b. Substantial increase in demand upon existing sources of energy, or require the development of new energy sources?</p>	<input type="checkbox"/>  <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>
<p><b>16. UTILITIES:</b></p> <p>a. Will the project result in a need for new systems or substantial alterations to the following:</p> <p>1. Potable water?</p> <p>2. Sewerage?</p> <p>3. Transmission lines?</p>	<input checked="" type="checkbox"/>  <input checked="" type="checkbox"/>  <input checked="" type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>	<input type="checkbox"/>  <input type="checkbox"/>  <input type="checkbox"/>

WILL THE PROJECT RESULT IN THE FOLLOWING ENVIRONMENTAL EFFECTS:	No	Not Significant	Significant Unless Mitigated	Significant — No Apparent Mitigation	Cumulative Impacts
<b>17. HUMAN HEALTH:</b> a. Creation of any health hazard or potential health hazard? b. Exposure of people to any existing health hazards?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>18. AESTHETICS:</b> a. Obstruction of any scenic vista or view open to the public, or create an aesthetically offensive site open to public view?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>19. RECREATION:</b> a. Impact upon the quality or quantity of existing recreational opportunities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>20. CULTURAL RESOURCES:</b> a. Alteration or destruction of a prehistoric or historic archaeological site? b. Adverse physical or aesthetic effects to a prehistoric or historic building or structure? c. Cause a physical change that would effect the unique ethnic cultural values?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**MANDATORY FINDINGS OF SIGNIFICANCE:**

- a. **Potential to degrade:** Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal species, or eliminate important examples of the major periods of California history or prehistory?

YES

NO

- b. **Short Term:** Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environments one which occurs in a relatively, brief, definitive period of time. Long-term impacts will endure well into the future).

YES

NO

- c. **Cumulative:** Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect on the total of those impacts on the environment is significant).

YES

NO

- d. **Substantial Adverse:** Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

YES

NO

**DISCUSSION OF POTENTIAL ENVIRONMENTAL IMPACTS  
AND  
SUGGESTED MITIGATION MEASURES**

**ENVIRONMENTAL EVALUATION**

**General Note:** The Ukiah Municipal Airport Master Plan is a comprehensive assessment of the facility and service enhancements required to see the Airport fulfill its public service role through the year 2015. This Master Plan builds upon the Airport Master Plan approved by the City of Ukiah in 1971.

The following key findings and recommendations are identified in the Master Plan:

- The Airport's future operational/service role is not expected to differ significantly from the role the Airport has served since its first use in 1935.
- There are no proposed changes to the basic configuration of the runway/taxiway system.
- Within the initial 5-year period, the following key Airport improvements are recommended by the Master Plan:
  - Acquisition of property and/or approach protection easements (approximately 20 acres) to ensure compatible land use within the Airport's approach/departure corridors.
  - Rehabilitation/repair of airfield pavement.
  - Possible improvement/relocation of CDF fire attack base.
  - Rehabilitation/renovation of Airport terminal area buildings.
  - Construction of three aircraft storage hangars.
- Towards the latter part of the 20-year master planning period, it is anticipated that the following Airport improvements may be required:
  - Further acquisition of property and/or approach protection easements (approximately 35 acres) to ensure compatible land use within the Airport's approach/departure corridors.
  - Continued rehabilitation/repair of airfield pavements.
  - Possible acquisition of additional building area property (approximately 2.6 acres).

The sum of the airfield development proposed in the Master Plan represents a mitigable impact on the environment. The appropriate actions are identified herein and in the Master Plan.

The following is submitted in response to the preceding environmental impact checklist.

- 1b. The Master Plan proposes that relatively few physical changes be made to Ukiah Municipal Airport, both on- and off-Airport property. However, any enhancement of Airport facilities requiring pavement and/or building development would require overcovering of the site's soil.

It is not anticipated that repaving or limited amounts of new paving would adversely affect soil conditions or drainage patterns on- or off-site. In addition, it is not anticipated that the new paving of previously unpaved soil would increase the potential for on- or off-site erosion because it would be limited, and the required erosion control measures contained in the Ukiah Municipal Code would be implemented.

No mitigation measures required.

- 1c. Minor changes to the topography and ground surface relief features of Airport property may be required to accommodate facility development. However, the topography of the Municipal Airport is basically flat, and these anticipated changes would be minor and insignificant.

No mitigation measures required.

- 1e. New development will result in the creation of additional impervious surfaces (i.e., pavement and structures) and, therefore, additional storm water run-off. The engineering design of the new facilities would include provisions for handling run-off to prevent an increase in erosion. Site watering and other techniques should be used during construction to minimize dust and wind erosion.

No mitigation measures required.

- 2a. The forecasted percentage increase (approximately 0.6% per annum) in aircraft operations will increase the amount of emissions attributable to the Airport (both directly by aircraft and fueling operations, and indirectly by automobiles associated with Airport users). However, the total amount of emissions will not have a significant effect on regional air quality. The amount of emissions is negligible compared to the much larger effect attributable to the existing and planned urbanized development in the area.

No mitigation measures required.

- 2b. Aircraft engines, especially turbine engines, produce exhaust odors which some people find objectionable. However, the volume of use by turbine aircraft, which are typically the most objectionable, is forecast to be insignificant, and no significant change will occur with the other engine types. New state and federal air quality standards are expected to address the limited emissions and odors associated with the fueling and operation of the aircraft.

No mitigation measures are required.

- 3b. As described in 1e, any land development will slightly increase the amount of storm runoff. This would result in a minor increase in flows of water into the existing storm water drainage system. However, it is not anticipated that this minor amount would result in a need for new storm drainage improvements, nor would it have significant effects on existing waterways or associated wildlife habitat.

No mitigation measures required.

- 3e. In a manner similar to roads, the run-off from airfield pavement can be expected to contain materials associated with the vehicles which use it (aircraft, automobiles, and trucks). The amount of these materials is small and insignificant, and no specific mitigation measure is proposed or required.

Four underground storage tanks were removed from the subject site (see Figure H1) on November 9, 1989, and petroleum hydrocarbon contamination was discovered in the soil and groundwater. Eight monitoring wells were installed and the site is currently under strict monitoring by the California Regional Water Quality Control Board (RWQCB). The site is under directives from the California Regional Water Quality Control Board (RWQCB) to investigate and clean up a previously documented petroleum hydrocarbon release. Any monitoring well(s) damaged or destroyed during construction will require repair or replacement. If any petroleum hydrocarbons are detected during subsequent work or monitoring well(s) damaged, please notify Marti Lyon at the RWQCB at (707) 576-2220 and George Hyneck at the Mendocino County Environmental Health Department at (707) 463-4466 as soon as possible.

Current state and federal hazardous materials regulations (which require increasingly stringent controls over the next decade) are adequate to protect the environment. There are no unusual conditions at Ukiah Municipal Airport which require special mitigation measures.

- 4a-d. Review of Planning Department resource materials reveals no known or documented rare/endangered or special status plant species on the City Airport property. However, Baker's Meadowfoam (*Limnanthes bakeri*) has been found on the Redwood Business Park (RBP) property to the east, and Douglas Meadowfoam (*Limnanthes douglasii*), a seasonal wetland plant, was found on the Airport Business Park (ABP) property adjacent to the southeast. The vacant eastern portion of the Airport property has similar grassland habitat, drainage, and elevations as the RBP/ABP properties to the east. Preliminary discussions with the Local Chapter of the California Native Plant Society (CNPS) reveal the possible presence of sensitive plant species along the central and southeastern portions of the Airport property. While members of the CNPS have performed field work on the site in the past to search for and collect seeds of various plant species, no documented professional study has been performed to identify or locate existing plants on the property.

It is not anticipated that implementation of the Airport Master Plan would have a significant adverse impact upon any rare, endangered, or special status plant species because no new development is proposed along the eastern portion of the site. The Master Plan does indicate, however, that in the event that new construction projects not discussed in the plan or environmental document are proposed in the future, additional environmental review would be required to assess potential impacts. An example would be the potential relocation of the California Department of Forestry (CDF) facility on the Airport. If the relocation is proposed, and it includes new construction on barren ground, particularly along the eastern portion of the site, additional environmental review would be necessary to comply with the provisions of the California Environmental Quality Act. It is likely that if new construction is ever proposed along the eastern portion of the property, a biological survey/plant study would be required as a part of that environmental review.

No mitigation measures required.

- 6a. Forecasted increases in aircraft operations (approximately 0.6% per annum) will not significantly increase the cumulative level of noise experienced off Airport property, and single-event noise levels are not anticipated to change significantly. The new California Department of Forestry and Fire Protection aircraft soon to be based at Ukiah Municipal Airport during the fire season are quieter than those aircraft that have utilized the Airport in the past.

No mitigation measures required.

- 8a. Acquisition of the remaining land parcels within the north and south Runway Protection Zones (RPZs) would result in changes in land use to those more compatible to Airport operations (i.e., low density land uses such as agriculture, golf course, automobile parking). However, this acquisition would be expected only at the land owners' option.

No mitigation measures required.

- 9a. Annual aircraft operations are forecast to increase by 0.6%. It can be assumed, therefore, that if the same types of aircraft continue to use the Airport, the rate of use of petrochemicals (i.e., aviation fuel and oil) associated with Ukiah Municipal Airport will increase at the same rate.

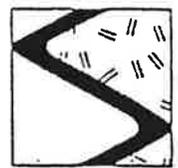
No mitigation measures required.

- 10a. Inherent in the operation of an airport is the potential for an explosion or release of hazardous material (i.e., fuel) in the event of an accident or fuel spill. There are, however, no existing or planned operations at Ukiah Municipal Airport that present an unusual level of risk. Current land use measures are in place to mitigate this risk. No additional measures are provided for in this Master Plan.

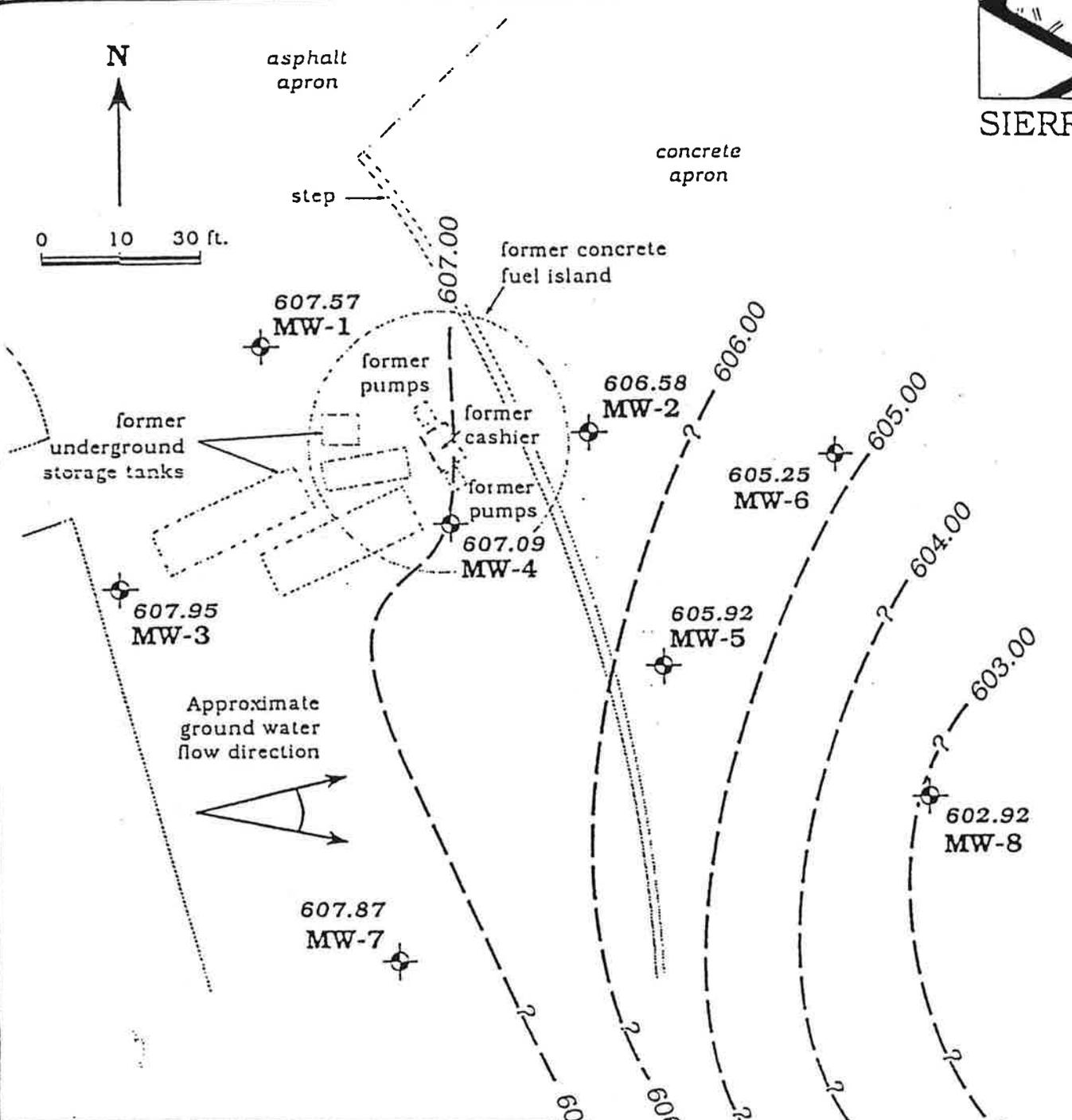
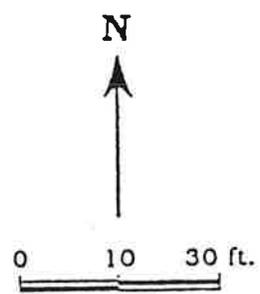
- 11a. For noise and safety compatibility purposes, the Master Plan recommends that the City acquire additional control over the remaining private property within the Airport's two RPZs. Fee title acquisition is strongly encouraged. Acquisition of approach protection easements - easements which would restrict the underlying uses of the land as well as convey rights of overflight, etc. - are an alternative where fee-title acquisition is impractical. A total of 24 parcels, covering some 55 acres, lie within the proposed acquisition area. Most of the parcels are in commercial use, although several are residential. Some two dozen buildings are located on these parcels.

On properties acquired in fee, most of the structures would be removed. Assuming that FAA funds are used in the acquisition, such removal is normally required. The businesses and residences within this acquisition area would be displaced. For properties on which approach protection easements are acquired, the existing structures can be expected to remain. However, they would be restricted to very low-intensity uses. Also, expansion would be prohibited.

Although not consistent with the long-term compatibility objectives, most of the existing land uses in the RPZs do not constitute serious compatibility conflicts requiring immediate action. The Master Plan, therefore, recommends the City pursue acquisition only at the owner's option or as the property comes on the market. Acquisition by means of condemnation is not proposed unless necessary to avoid development of major new compatible land uses. This approach will avoid significant impacts on affected businesses and residences.



SIERRA



**EXPLANATION**

- MW-5 Monitoring well
- 605.92 Ground water elevation
- 605.00 Ground water elevation contour, dashed where inferred, queried where uncertain

Base map after Western Geologic Resources, Inc.

Figure 6. Monitoring Well Locations and Ground Water Elevation Contour Map - June 19, 1991 - Former Chevron Aircraft Fueling Station #84114, Ukiah, California



- 12a. As Comment 11a states, should it be necessary to acquire incompatible housing located within the RPZs either in fee or by approach protection easements, compensation would be offered to property owners to provide sufficient mitigation. Some of the 24 buildings on the edges of the RPZs could remain as low-intensity uses; others would be removed if required.

No additional mitigation measures required.

- 13b. The additional parking required to serve the projected increases in vehicular traffic will be accommodated by on-Airport parking areas designated in the Airport Master Plan.

No mitigation measures required.

- 14a. Additional public services would be required to protect and maintain any expanded facilities proposed by the Master Plan. However, the effect would be minor. As an Enterprise Fund, Ukiah Municipal Airport is a self-contained unit contributing its share to the costs arising from the services and maintenance City agencies provide. Revenues generated by increased Airport usage are expected to offset any added costs.

No mitigation measures required.

- 15a. As stated in Comment 9a, it can be assumed that the 0.6% forecasted increases in annual aircraft operations will result in a 0.6% increase in the rate of use of aircraft and automobile fuels, gas, and electricity associated with Ukiah Municipal Airport. Therefore, no significant impact to energy or utilities would result from the project.

No mitigation measures required.

- 19a. To many of the aircraft owners based at Ukiah Municipal Airport, flying is principally a recreational activity. The projects identified in the Master Plan will support this recreational activity. No other effects on recreation on- or off-airport are anticipated.

No mitigation measures required.



**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 Route Air Carrier)

**AIR CARRIERS:** The commercial system of air transportation, consisting of the certificated route 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 (ADG):** 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 LAYOUT PLAN:** 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:** 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.

**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 FL600, 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 (charted 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 extend 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.

**DECLARED DISTANCE:** The distance the airport owner declared available for the airplane's takeoff run, takeoff distance, accelerate-stop distance, and landing distance requirements. the distances are:

*Takeoff run available (TORA):* the runway length declared available and suitable for the run of an airplane taking off;

*Takeoff distance available (TODA):* the TORA plus the length of any remaining runway or clearway (CWY) beyond the far end of the TORA;

*Accelerate-stop distance available (ASDA):* the runway plus stopway (SWY) length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff; and

*Landing distance available (LDA):* the runway length declared available and suitable for all landing airplane.

*Note: the full length of TODA may not be usable for all takeoffs because of obstacles in the departure area. The usable TODA length is aircraft performance dependent and, as such, must be determined by the aircraft operator before each takeoff and requires knowledge of the location of each controlling obstacle in the departure area. (Airport Design)*

**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 which 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 which 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.

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

**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 space-based radio positioning, navigation, and time-transfer system being developed by the U.S. Department of Defense. This newly-emerging technology may eventually become the principal system for air navigation throughout the world.

**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.

**MICROWAVE LANDING SYSTEM (MLS):** A precision instrument approach system providing a function similar to an ILS, but operating in the microwave spectrum. It normally consists of three components: azimuth station, elevation station, and precision distance measuring equipment.

**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)

**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)

**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)

**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:** A defined trapezoidal area at ground level, under the control of the airport authorities, for the purpose of protecting the safety of approaches and keeping the area clear of the congregation of people. The runway protection zone 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 event 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 VORDME 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 (VGS):** 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. (1992)

**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)

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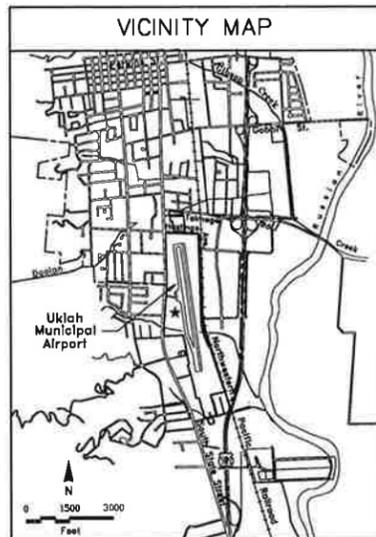
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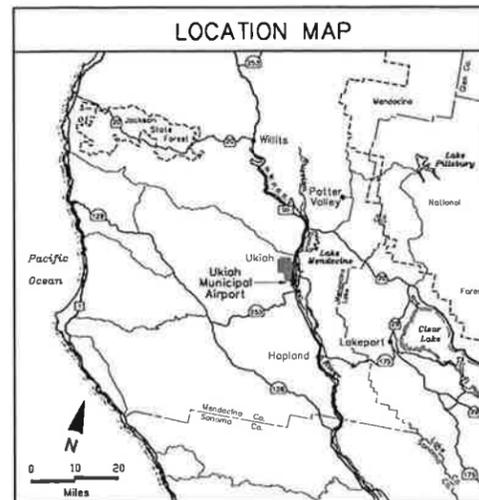
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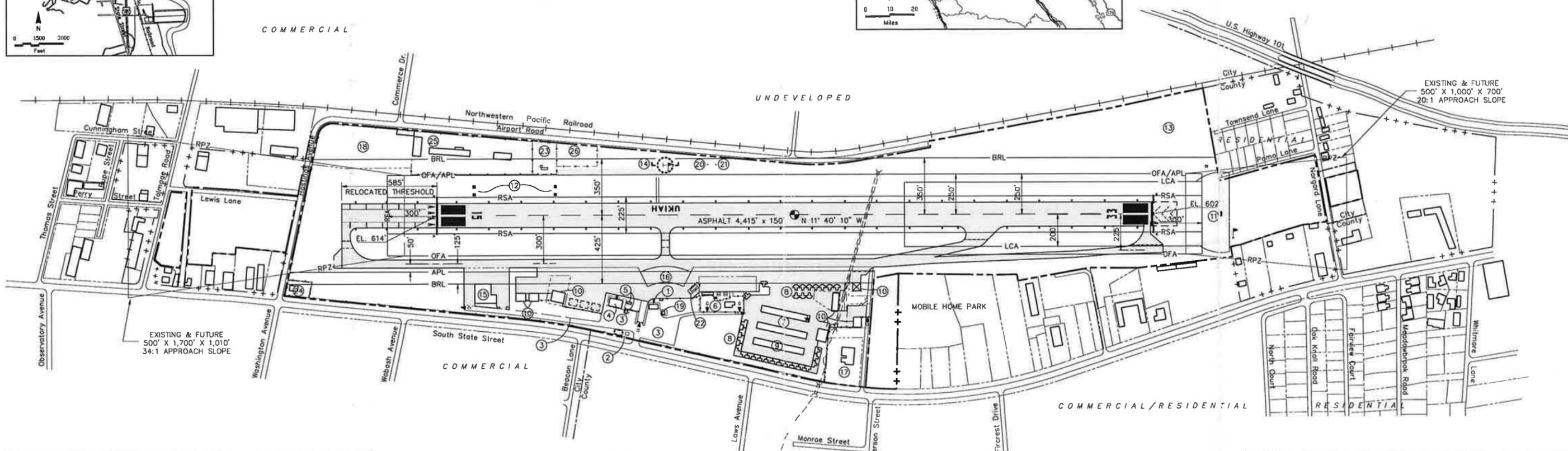




BUILDING AND FACILITY LEGEND	
1	Airport Terminal Building/Offices
2	AWOS-III & Electrical Vault
3	Automobile Parking
4	FAA Flight Service Station
5	Office & Shed
6	CDF Air Attack Base (Existing)
7	T-Hangars
8	Portable T-Hangars
9	Shade Hangar
10	Conventional Hangar
11	Localizer Antenna
12	VASI (V4L) GA 3.0'
13	CDF Air Attack Base (Potential Future Site)
14	Segmented Circle, Lighted Wind Cone, & Wind Tee
15	FEDEX Hangar
16	Concrete Apron
17	Nursery
18	Lumber Yard
19	City of Ukiah Employee Credit Union
20	Ceilmeter
21	Wind Direction and Velocity Indicator
22	Aviation Fuel Storage Facility (Former Location)
23	Aviation Fuel Storage Facility
24	Mayocama Industries (Landscaping)
25	City of Ukiah Corporation Yard
26	Commercial Fence Storage Area

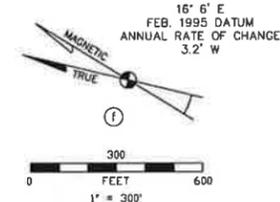


- NOTES**
- Airport coordinates and approach slope data source: U.S. Department of Commerce, National Ocean Service, Ukiah Obstruction Chart (February 1993); horizontal datum is NAD 83 & vertical datum is NGVD 29.
  - The entire airport perimeter is enclosed by fence.
  - There are two existing deviations from ARC B-II standards; 1) the southern 400' of the parallel taxiway is located less than 240' and 2) the western edge of the parallel taxiway Object Free Area (also the Aircraft Parking Limit) is located 50' from the parallel taxiway centerline.
  - A second rotating beacon is located on a mountain 250' and 2 miles from the Airport.
  - Acquisition of fee simple title is encouraged as an alternative to approach protection easements wherever practical.
  - Wind Data not available.
  - The airport is also served by a nonprecision/circle-to-land instrument approach procedure based on the ENI VOR and GPS.



DRAWING LEGEND		
	EXISTING	FUTURE
ACTIVE AIRFIELD PAVEMENT	[Symbol]	[Symbol]
OTHER PAVEMENT IN USE	[Symbol]	[Symbol]
PAVEMENT TO BE REMOVED	[Symbol]	[Symbol]
ABANDONED AIRFIELD PAVEMENT	[Symbol]	[Symbol]
GRAVEL SHOULDER/ROAD	[Symbol]	[Symbol]
AIRPORT PROPERTY LINE	[Symbol]	[Symbol]
OTHER PROPERTY LINES	[Symbol]	[Symbol]
INTERNAL BOUNDARY (e.g., lease, R.O.W., etc)	[Symbol]	[Symbol]
APPROACH PROTECTION EASEMENT	[Symbol]	[Symbol]
AIRFIELD FUNCTIONAL LINES	[Symbol]	[Symbol]
BUILDINGS	[Symbol]	[Symbol]
BUILDINGS TO BE REMOVED	[Symbol]	[Symbol]
FENCE	[Symbol]	[Symbol]
VEHICLE GATE	[Symbol]	[Symbol]
WIND CONE	[Symbol]	[Symbol]
AIRFIELD LIGHTS: SINGLE/GROUP/FLASHING	[Symbol]	[Symbol]
ROTATING BEACON	[Symbol]	[Symbol]
AIRPORT REFERENCE POINT	[Symbol]	[Symbol]
DITCH/CULVERT/CHANNEL	[Symbol]	[Symbol]

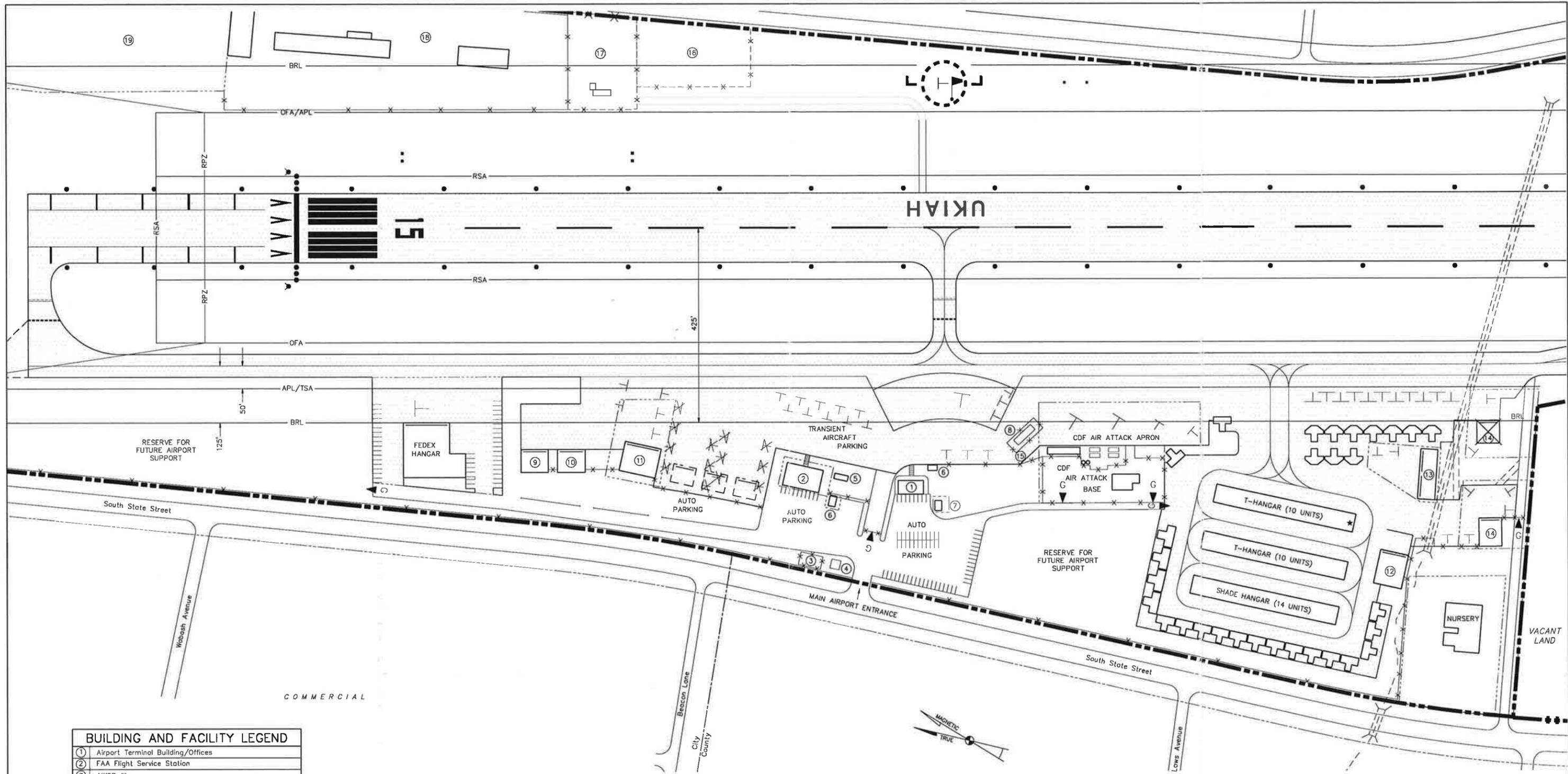
\* APL - Aircraft Parking Limits  
 BRL - Building Restriction Line  
 RSA - Runway Safety Area  
 LCA - Localizer Critical Area  
 RPZ - Runway Protection Zone  
 OFA - Object Free Area



AIRPORT DATA		
	EXISTING	FUTURE
AIRPORT SERVICE LEVEL (NPIAS)	GENERAL AVIATION	No Change
AIRPORT REFERENCE POINT	Latitude 39° 07' 33.45" N Longitude 123° 12' 03.08" W	No Change
AIRPORT ELEVATION (Above Mean Sea Level)	614'	No Change
MEAN MAX. TEMP. (Hottest Month)	95'	No Change
TERMINAL NAVIGATIONAL AIDS	VORTAC & GPS	No Change
AIRPORT ACREAGE	160	163.4
BASED AIRCRAFT SPACES	Easement	None
	Tiedowns	30
	T-Hangars	50
	Shade Hangars	14
TRANSIENT AIRCRAFT SPACES	FBO Area (Approx.)	20
		15

RUNWAY DATA			
RUNWAY 15-33			
	EXISTING	FUTURE	
AIRPORT REFERENCE CODE	B-II (C)	No Change	
CRITICAL AIRCRAFT	BEECH SUPER KING AIR	No Change	
PHYSICAL LENGTH AND WIDTH	4,415' x 150'	No Change	
EFFECTIVE GRADIENT (PERCENT)	0.27	No Change	
PAVEMENT STRENGTH (1000#) S/D/DT	28/-/-	No Change	
APPROACH TYPE:	Approach End	15	Nonprecision [C]
[FAR PART 77 CATEGORY]	of Runway	33	Visual [B(V)]
APPROACH SLOPE:	Approach End	15	34:1/14:1
REQUIRED/CLEAR	of Runway	33	20:1/12:1
APPROACH AND	Approach End	15	VASI, REIL, LOC
LANDING AIDS	of Runway	33	VASI, REIL
RUNWAY END COORDINATES	Approach End	Latitude 39° 07' 54.81" N Longitude 123° 12' 08.75" W	No Change
	of Runway 33	Latitude 39° 07' 12.08" N Longitude 123° 11' 57.41" W	No Change
RUNWAY LIGHTING		Medium-Intensity	No Change
TAXIWAY LIGHTING		Low-Intensity	No Change
RUNWAY MARKING		Nonprecision	No Change

NO.	REVISION	SPONSOR	DATE
SUBMITTED BY: CITY OF UKIAH			
By _____		Date _____	
<b>UKIAH MUNICIPAL AIRPORT</b> UKIAH, CALIFORNIA <b>AIRPORT LAYOUT PLAN</b>			
<b>SHUTT MOEN ASSOCIATES</b> AIRPORT CONSULTANTS & ENGINEERS 707 Aviation Blvd., Santa Rosa, California 95403			
DESIGN:	DBH	DRAWN:	RGL
DATE:	JULY 1996	SHEET	1 OF 3



**BUILDING AND FACILITY LEGEND**

- ① Airport Terminal Building/Offices
- ② FAA Flight Service Station
- ③ AWOS-III
- ④ Electrical Vault
- ⑤ Airport Manager's Office (Future)
- ⑥ Storage Shed
- ⑦ City of Ukiah Employee Credit Union Office
- ⑧ Aviation Fuel Storage Tank (Former Location)
- ⑨ Retch (Aircraft Storage)
- ⑩ Plane Works (FBO) & Flight Care Helicopter (FBO)
- ⑪ Plane Works (FBO) & Air Charter Enterprises (FBO)
- ⑫ Bob Veal's Hangar (Aircraft Storage)
- ⑬ Gordon Air Service (FBO)
- ⑭ ACE Aerial Service (FBO)
- ⑮ Aircraft Washing Facility (Future)
- ⑯ Commercial Fence Storage Area
- ⑰ Aviation Fuel Storage Facility
- ⑱ City of Ukiah Corporation Yard
- ⑲ Lumber Yard

NO.	REVISION	SPONSOR	DATE
<b>UKIAH MUNICIPAL AIRPORT</b> <b>UKIAH, CALIFORNIA</b> <b>BUILDING AREA PLAN</b>			
<b>SHUTT MOEN ASSOCIATES</b> <small>AIRPORT CONSULTANTS &amp; ENGINEERS  707 Aviation Blvd., Santa Rosa, California 95403</small>		 <small>City of Ukiah</small>	
DESIGN: DBH	DRAWN: RGL	DATE: JULY 1996	SHEET 2 OF 3

