



Appendix A
Beale JLUS Fact Sheet

California Joint Land Use Studies

A project of the Governor's Office of Planning and Research



Beale Joint Land Use Study

What is a Joint Land Use Study?

A Joint Land Use Study (JLUS) is a collaborative planning effort between active military installations, surrounding counties and cities, and other affected agencies. The JLUS process is funded by a grant from the Department of Defense Office of Economic Adjustment (OEA).

Goals and Objectives

The overall goal of a JLUS is to reduce potential conflicts while accommodating growth, sustaining the economic health of the region, and protecting public health and safety. Like all JLUS programs, the Beale JLUS has three primary objectives.

- **Understanding.** Convene community and military installation representatives to study the issues in an open forum, taking into consideration both community and military viewpoints and needs.
- **Collaboration.** Encourage cooperative land use planning between military installations and the surrounding communities so that future community growth and development are compatible with the training and operational missions of the installation and at the same time seek ways to reduce operational impacts on adjacent lands.
- **Actions.** Provide a set of tools, activities, and procedures that local jurisdictions, agencies, and the

military can select and use to implement the recommendations developed during the JLUS process.

The California JLUS Program

OEA is funding the preparation of two JLUSs in California. Given the large areas covered by these studies and the number of jurisdictions and agencies involved, the California JLUS program is being managed by the Governor's Office of Planning and Research (OPR). The two geographic study areas included in the California JLUS program are referred to as the Beale JLUS and the R-2508 JLUS.

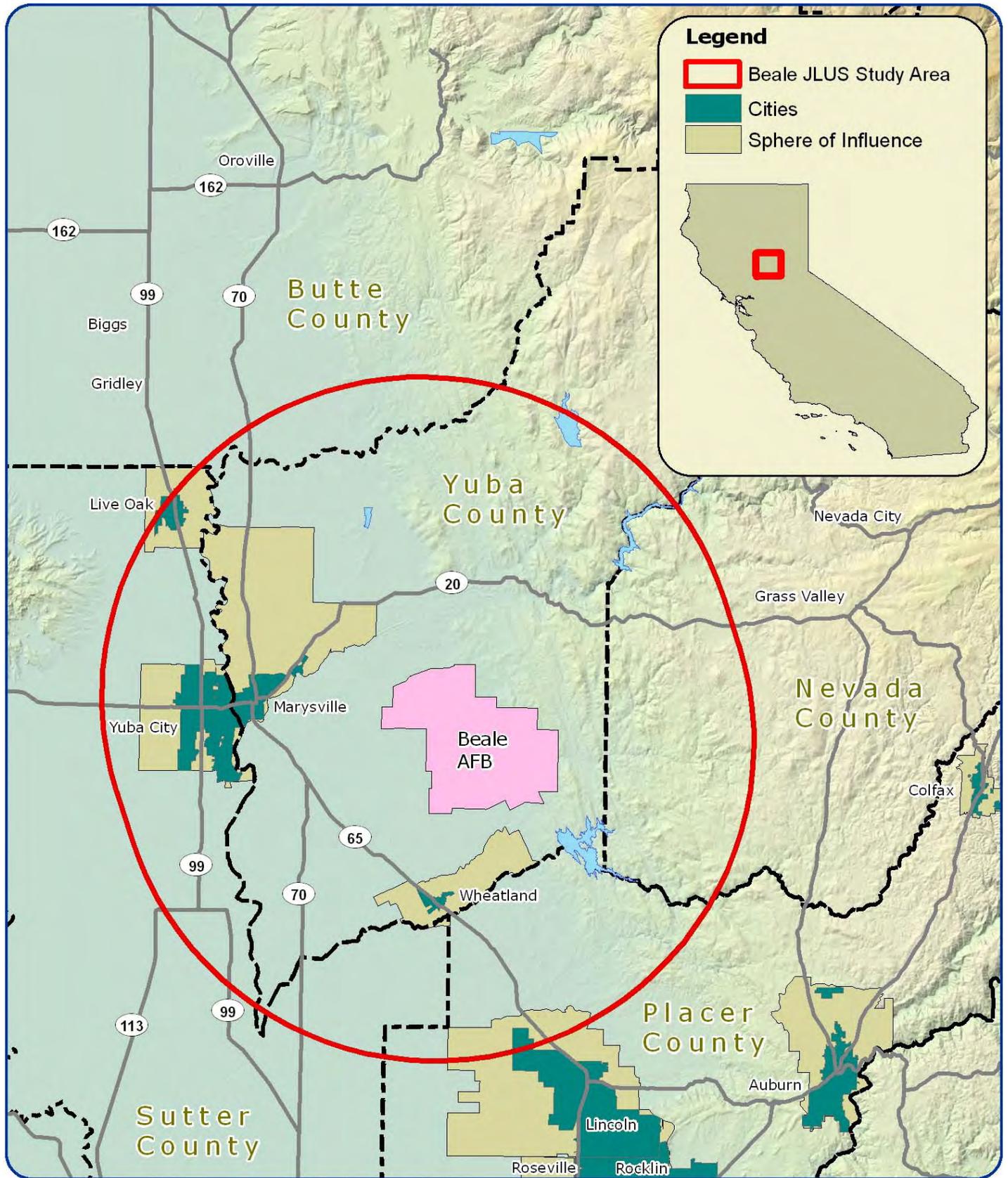
The **Beale JLUS** addresses all lands near Beale Air Force Base with a current or potential future impact on military operations at the base, and lands upon which military operations at the base have an actual or potential impact. Given the location of the base within Yuba County, the study area will include the western half of Yuba County and portions of Butte, Nevada, Placer, and Sutter Counties.

The **R-2508 JLUS** includes Edwards Air Force Base, Fort Irwin, Naval Air Weapons Station China Lake, and the land beneath the Joint Service R-2508 Special Use Airspace Complex and associated military airspace. This 20,000 square mile area encompasses portions of Fresno, Inyo, Kern, Los Angeles, San Bernardino, and Tulare Counties.

Want to know more?



www.cajlus.com



0 1 2 4 6 8 10 Miles

Beale JLUS Study Area



Appendix B
Beale AICUZ Study, Volume I

**BEALE AFB, CALIFORNIA
2005**



**AIR INSTALLATION
COMPATIBLE USE ZONE**



AIR INSTALLATION COMPATIBLE USE
ZONE
(AICUZ)

BEALE AFB CA
2005

Area Governments:

1. This Air Installation Compatible Use Zone (AICUZ) Study for Beale Air Force Base is an update of the original AICUZ study dated May 1982. The update was initiated because of changes in aircraft types and numbers of operations at Beale AFB. It is a reevaluation of aircraft noise and accident potential related to Air Force flying operations. It is designed to aid in the development of local planning mechanisms which will protect the public safety and health, as well as preserve the operational capabilities of Beale AFB.
2. The enclosed report contains a summary description of the affected area around the base. The report outlines the location of runway clear zones, aircraft accident potential zones and noise contours. Recommendations are made for land uses which are compatible with airfield operations while allowing maximum beneficial use of adjacent properties. This report outlines noise contours based upon the current mission. In the interest of preserving Beale's capability to accommodate future mission changes and growth and given that current mission noise contours are a snapshot in time, we have also outlined contours based upon a hypothetical scenario. It is our hope that this information will be incorporated into your community plans, zoning ordinances, subdivision regulations, building codes, and other related documents.
3. The basic objective of the AICUZ program is to achieve compatible uses of public and private lands in the vicinity of military airfields by controlling incompatible development through local actions. This update provides noise contours based upon the Community Noise Equivalent Level (CNEL) metric used in California. This report provides the information necessary to maximize beneficial use of the land surrounding Beale AFB while minimizing the potential for degradation of the health and safety of the affected public.
4. We greatly value the positive relationship Beale AFB has experienced with its neighbors over the years. As a partner in the process, we have attempted to minimize noise disturbances through such actions as: minimizing night flying, avoiding flights over heavily populated areas, etc. We solicit your cooperation in implementing the recommendations and guidelines presented in this AICUZ report.



H. D. POLUMBO, JR., Colonel, USAF
Commander, 9th Reconnaissance Wing

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SECTION 1 PURPOSE AND NEED

1.1 Introduction

This study is an update of the Beale Air Force Base Air Installation Compatible Use Zone (AICUZ) Study. The update presents and documents the changes to the AICUZ for the period of 1982 to 2005. It reaffirms Air Force policy of promoting public health, safety, and general welfare in areas surrounding Beale AFB. The report presents changes in flight operations since the last study, and provides current noise contours and hypothetical noise contours (based upon the airfields capabilities and aircraft currently in the Air Force inventory). Land-use guidelines for areas surrounding the base and potentially impacted by aircraft noise, accident potential and height limitations are provided. It is hoped this information will assist the local communities, and serve as a tool for future planning and zoning activities. The changes in the AICUZ are attributed to:

- Removal of the SR-71's and B-52's
- Beddown of the Global Hawk Unmanned Aerial Vehicle (UAV)
- Adjustments in flight tracks
- Technical improvements to the NOISEMAP program.

The replacement of the assigned Beale AFB aircraft and the continued operation of the previously assigned missions require an update of the Air Installation Compatible Use Zone Study.

1.2 Purpose and Need

As stated in the previous Beale AFB AICUZ Study, the purpose of the AICUZ program is to promote compatible land development in areas subject to aircraft noise and accident potential (see appendices A, B & C). Based upon the current study the Sacramento Area Council of Governments (SACOG) may want to consider preparing a revision to their comprehensive land use plan which incorporates AICUZ recommendations as an integral part of the comprehensive community planning process. Accident potential and aircraft noise are major considerations in their planning processes.

Air Force AICUZ land use guidelines reflect land use recommendations for clear zones, accident potential zones I and II, and four noise zones. These guidelines have been established on the basis of studies prepared and sponsored by several federal agencies, including the Department of Housing and Urban Development, Environmental Protection Agency, Air Force, and state and local agencies. The guidelines recommend land uses which are compatible with airfield operations while allowing maximum beneficial use of adjacent properties. The Air Force has no desire to recommend land use regulations which render property economically useless. It does, however, have an obligation to the inhabitants of the Beale AFB environs and to the citizens of the United States to point out ways to protect the people in adjacent areas, as well as the public investment in the installation itself.

The AICUZ program uses the latest technology to define noise levels in areas near Air Force installations. An analysis of Beale AFB's flying operations was performed, including types of aircraft, flight tracks utilized, variations in altitude, power settings, number of operations, and hours of operations. This information was used to develop the noise contours contained in this study. Although most of the country uses Day-Night Average A-Weighted Sound Level (DNL) metric, the standard in California is the Community Noise Equivalent Level (CNEL). The CNEL metric gives a higher weighting for flights occurring between 7 p.m. and 10 p.m. and between 10 p.m. and 7 a.m. while the DNL metric gives a higher rating between 10 p.m. and 7 a.m. only. The DNL noise zones are included in Appendix B for reference. "The CNEL metric has been used in this report to define land use and zoning impacts.

1.3 Process and Procedure

Preparation and presentation of this update to Beale AFB's AICUZ Study is part of the continuing Air Force participation in the local planning process. It is recognized that, as local communities prepare land use plans and zoning ordinances, the Air Force has the responsibility of providing inputs on its activities relating to the community. This study is presented in the spirit of mutual cooperation and assistance by Beale AFB to aid in the local land use planning process. This study updates information on base flying activities since 1982. Noise contours portrayed on the AICUZ maps in this study are based on current mission plans and a hypothetical plan based upon the capabilities of the Beale AFB runway and aircraft currently in the Air Force inventory.

Data collection was conducted at Beale AFB between 10-12 May 2005. Aircraft operational data was obtained to derive average daily operations by runway and type of aircraft. This data is supplemented by flight track information (where we fly), flight profile information (how we fly), and ground run-up information. After verification for accuracy, data was input into the NOISEMAP program and converted to Community Noise Equivalent Level (CNEL) noise contours. Contours were plotted on an area map and overlaid with clear zone and accident potential zone areas.

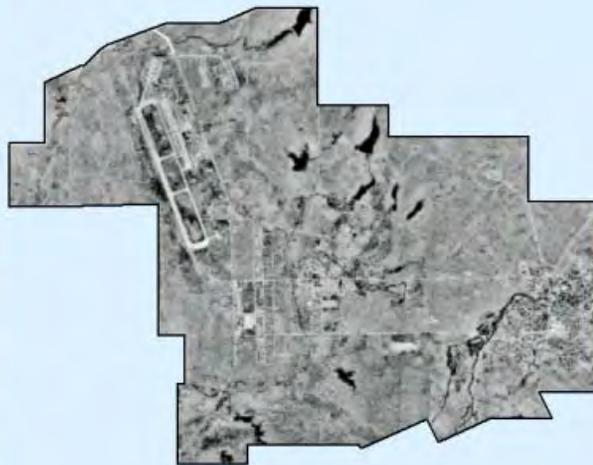
Given that current mission contours represent a snapshot in time, allowing development to occur right up to the 65dB contour could limit Beale's ability to accommodate future mission or realignments. To this end planning contours were developed based on a hypothetical scenario utilizing the largest aircraft that the Beale AFB flightline can accommodate (B-52's). Because there are currently no B-52 mission at Beale, the hypothetical model utilized the same flight track information (where we fly), flight profile information (how we fly) and existing ground run-up information to plot the hypothetical mission noise contours. In order to accommodate the potential for a full Wing of B-52's there were additional night flights added into the model. The data was input into the NOISEMAP program and converted to Community Noise Equivalent Level (CNEL) noise contours. Contours were plotted on an area map and overlaid with clear zone and accident potential zone areas.



VICINITY MAP



REGIONAL MAP



BEALE AIR FORCE BASE

Figure 1

SECTION 2 INSTALLATION DESCRIPTION

2.1 Mission

Beale Air Force Base began as a training camp in 1943 when the U.S. Army's 13th Armor Division settled there for the war years. The Army consolidated the land, which was originally the property of 150 different owners. Beale also served as a prisoner of war camp during the second world war.

After World War II, with support from the local city council, the former landowners expected to get their land back from the government. But the base became a candidate for the new Air Force Academy, and the city council changed its intentions. While Beale wasn't ultimately selected as the site for the proposed academy, the Air Force had other plans for the 86,000-acre site.

Between 1949 and 1959, the base went through many changes: It was used by the Navy, the Stanford Research Institute, the Air Base Defense School, and a survival training school. The Strategic Air Command took over the base in 1956 and became the principal user. The 86,000 acres gradually became 22,944 as land was sold off in the late 1950's and early 1960's.

The base was home to a variety of aircraft and weaponry during these years: B-52 Stratofortress, KC-135 Stratotankers, Titan intercontinental ballistic missiles (ICBM), and SR-71 Blackbirds. Today the wing operates four aircraft types: the T-38 Talon, the U-2 Reconnaissance aircraft, the TU-2S reconnaissance trainer and the Global Hawk, high-altitude Unmanned Aerial Vehicle (UAV) aircraft. The 940th Aerial Refueling Wing, a reserve associate unit, operates KC-135 Stratotankers. Beale is also the home of one of the world's most unique radar facilities: the PAVEPAWS. Completed in 1979, this 10-story phased array radar is a detection and early warning system that will detect a sea-launched or ICBM attack on the continental United States. The radar also monitors satellites in Earth's orbit.

The 9th Reconnaissance Wing is the host unit at Beale Air Force Base. The professionals at Beale provide America with the world's finest high altitude reconnaissance anytime, anywhere.

2.2 Economic Impact

Beale Air Force Base is located in Yuba County on 22,944 acres of land in the eastern part of the Sacramento Valley, which, together with the San Joaquin Valley to the south, constitutes the Great Central Valley of California. The Great Valley extends from Bakersfield in the south to Red Bluff in the north; it is about 60 miles across and is bordered on the east by the Sierra Nevada foothills and on the west by the Coast Ranges. Beale AFB straddles the Sacramento Valley at the western base boundary and the foothills of the Sierra Nevada on the east.

Population centers around Beale AFB include Wheatland, 9 miles south, Marysville, 13 miles west, Yuba City, 16 miles west, Oroville, 40 miles north, and Grass Valley, 25 miles east. Sacramento, the state capital, is located 38 miles south on Interstate 80 and Interstate 5 highways. Yuba County, along with the counties of Sutter, Butte, Nevada, and Placer make up the northern part of the Great Central Valley area.

Numerous factors link Beale AFB and Yuba County together as inter-dependent entities. Neither the base nor the community is self-sufficient; each needs the other in different ways. The relationship between base personnel and Yuba County has historically been one of cooperation, mutual respect and support. The local chamber of commerce and the Yuba County Board of Supervisors are the primary vehicles through which a strong base-community relationship has been established and prospered. One of the strongest links between Beale AFB and the county is the use of the county's services and facilities by the base personnel. Many Beale AFB dependents attend public school in Yuba County. The Yuba County school system receives significant funds as a result of the enrollment of Beale AFB dependents in the county school system. Base personnel are regularly involved in a number of civic, cultural,

religious, charitable, medical and recreational activities. For example, quarterly blood drives donate approximately 700 pints of blood annually and Beale has donated nearly \$400,000 worth of computer equipment to California Schools. During the floods of the winter of 1996 Beale Air Force Base provided lodging and care for 9000 evacuees at a cost of \$177,839. Beale's Explosive Ordinance Disposal (EOD) team travels to Sacramento, up to Oregon and as far East as Nevada annually in response to an average of 12 calls for help. They have neutralized everything from old WWII hand grenades to home made bombs, serving counties and cities that have no existing EOD support. The Fire department has a mutual aid agreement with all of the local fire departments to include the California Department of Forestry. Under this agreement Beale responds to off base emergencies and the local fire departments respond to Beale's emergencies when needed. In 2005 Beale responded to 7 off base emergencies. When flooding appeared imminent in December 2005 Beale pulled together a team to make contingency plans addressing, food, lodging, medical and transportation for the community. Fortunately the rains ceased and implementation of the plans was not required. The Yuba County area is in the unique position of having a safe haven with personnel trained in contingency operations at Beale Air Force Base. This is a resource whose value should not be underestimated .

In 2004, Beale AFB had 5,749 personnel directly employed on-base. These personnel included 3,467 active duty military, 785 appropriated fund civilians, 346 non-appropriated fund employees and 155 contract and private business personnel. Approximately, 38.7 percent of the military personnel stationed at Beale AFB reside on base, with the remainder living primarily in Yuba & Sutter Counties (Table 2-1).

The economic impact of Beale AFB on the Great Central Valley region is significant within the 50 mile radius of the economic impact region (EIR) generally associated with military installations. In 2004, Beale AFB expended nearly \$87.2 million on services contracts and construction projects.

Payroll expenditures are more likely to remain in the local economic impact area than are the contract expenditures and, therefore, have a more significant local economic impact. The base-wide payroll expenditures for 2004 amounted to \$206,887,567. Although the majority of Beale AFB personnel reside in Yuba County, surrounding counties are affected. A large number of military service retirees reside and expend funds in the region because of services provided to them by Beale AFB. In 2004 retirees contributed an estimated \$250,632,000 to the region's economy (Table 2-2).

A secondary, or indirect, economic impact results from the re-spending of payroll and contract award expenditures in the community, region, and state. According to the Economic Resource Impact Statement, Fiscal Year 2004, the estimated total Air Force expenditures in the EIR was \$144,908,759. This results in the generation of an estimated 1,687 indirect jobs in annual dollar value of of \$48,867,329 (Table 2-3).

Table 2-1 PERSONNEL BY CLASSIFICATION AND HOUSING - FY 2004

CLASSIFICATION	LIVING ON-BASE	LIVING OFF-BASE	TOTAL
ACTIVE DUTY MILITARY	1,684	1,783	3,467
TRADITIONAL GUARDSMEN/RESERVE	20	841	861
AIR FORCE RESERVE/ANG	1	8	9
TRAINEES/CADETS	2	124	126
MILITARY DEPENDENTS	2,384	1,044	3,428
TOTAL MILITARY & DEPENDENTS			7,891
APPROPRIATED FUND CIVILIAN			785
NON-APPROPRIATED FUND, CONTRACT CIVILIANS, AND PRIVATE BUSINESS			
Civilian NAF			226
Civilian BX			120
Contract Civilians			140
Private Businesses On-base			15
GRAND TOTAL			9,177

Table 2-2 SUMMARY OF ANNUAL GROSS PAYROLL - FY 2004

CLASSIFICATION	LIVING ON-BASE	LIVING OFF-BASE	TOTAL
ACTIVE DUTY MILITARY	\$54,319,119	\$96,513,627	\$150,832,746
APPROPRIATED FUND CIVILIAN			\$39,068,738
NON-APPROPRIATED FUND, CONTRACT CIVILIANS, AND PRIVATE BUSINESS			
Civilian NAF			\$3,493,011
Civilian BX			\$2,010,259
Private Business			\$198,813
Contract Civilians (not elsewhere included)			\$11,025,000
Other Civilians (not elsewhere included)			\$259,000
MILITARY RETIREES (ALL BRANCHES)			\$250,632,000
TOTAL PAYROLL (Excluding Military Retirees)			\$206,887,567

Table 2-3 SUMMARY OF CONSTRUCTION, CONTRACTS AND EXPENDITURES FOR MATERIALS, EQUIPMENT, AND SUPPLIES - FY 2004

	ACTUAL ANNUAL EXPENDITURE
CONSTRUCTION	\$66,121,051
CONTRACTS & PROCUREMENT: SERVICES, MATERIALS, EQUIPMENT, AND SUPPLIES	
Total Services	\$21,054,708
Commissary & Base Exchange	\$3,507,869
Health (TRICARE, Government Cost Only)	\$4,646,000
Education (Impact Aid and Tuition Assistance)	\$5,465,947
Temporary Duty Payments	\$583,682
Other Materials, Equipment and Supplies Procurement	\$43,529,500
TOTAL ACTUAL ANNUAL EXPENDITURES	\$144,908,757

Source: Beale AFB Economic Resource Impact Statement, Fiscal Year 2004.

2.3 Flying Activity

To describe the relationship between aircraft operations and land use, it is necessary to fully evaluate the exact nature of flying activities. An inventory has been made of such things as the types of aircraft assigned to Beale AFB, where those aircraft fly, how high they fly, how many times they fly over a given area, and at what time of day they operate.

The U-2, T-38, KC-135E, and Global Hawk are the principal aircraft operating from Beale AFB and the average number of daily operations for these aircraft are shown below. An operation is defined as one takeoff, one landing, or half of a closed pattern. A closed pattern consists of both a departure portion and an approach portion: i.e., two operations.

<u>TYPE OF AIRCRAFT</u>	<u>AVERAGE DAILY OPERATIONS</u>
U-2	79
T-38	71
KC-135	41
Global Hawk	10

In addition to these assigned aircraft, numerous transient aircraft from other military installations land and take-off from Beale AFB.

Beale AFB aircraft use the following basic flight tracks:

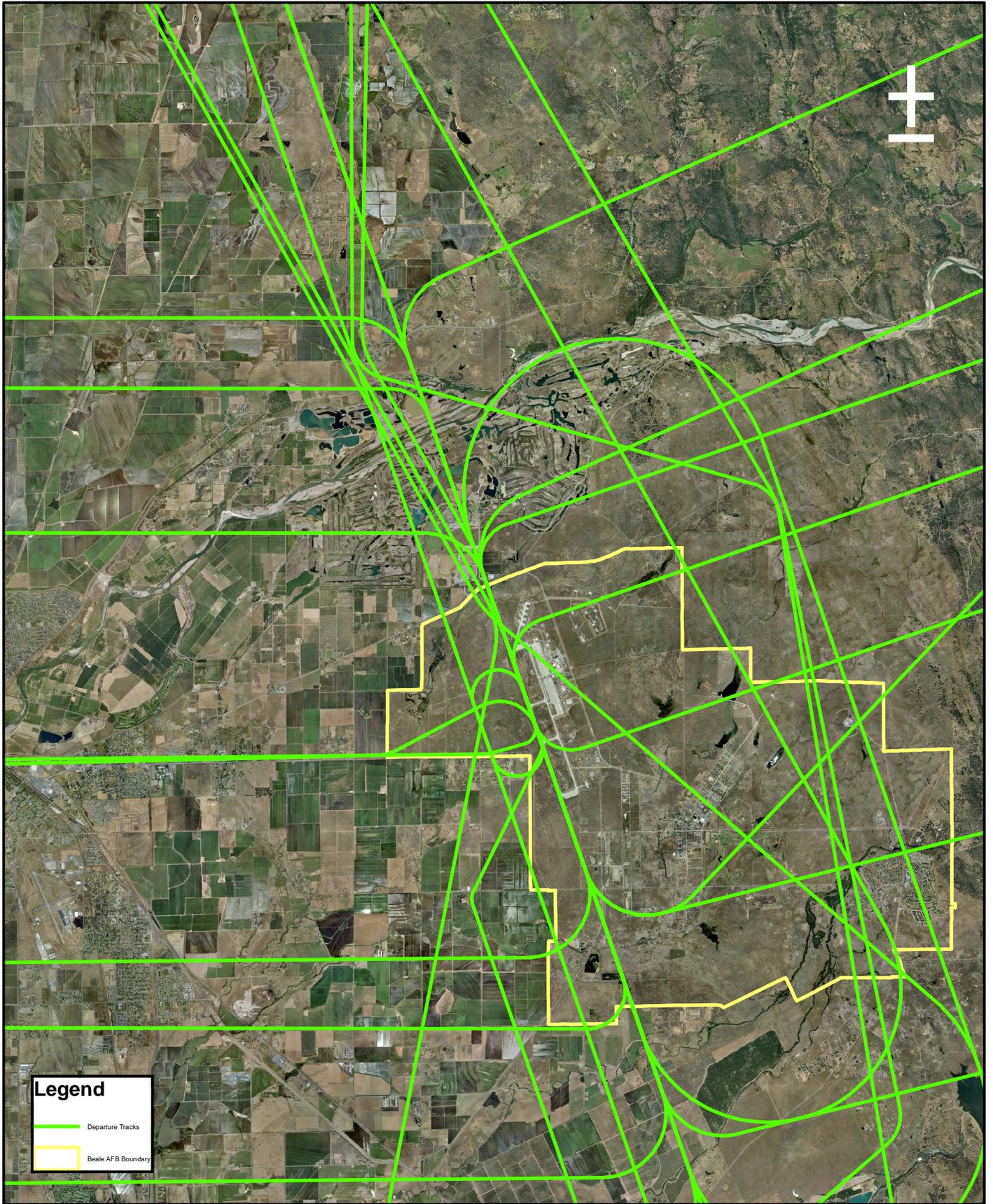
- Straight out departure.
- Straight in approach.
- Overhead landing pattern.
- Instrument flight rules (IFR) or radar closed pattern.
- Visual flight rules (VFR) or visual closed pattern.
- Re-entry VFR pattern.

Beale AFB flight tracks (Figures 2, 3 & 4) result from several considerations, including:

- Takeoff tracks routed to avoid heavily populated areas as much as possible.
- Air Force criteria governing the speed, rate of climb, and turning radius for each type of aircraft.
- Efforts to control and schedule missions to keep noise levels low, especially at night.
- Coordination with the Federal Aviation Administration (FAA) to minimize conflict with civilian aircraft operations at Sacramento Metropolitan Airport, Yuba County Airport, Sutter County Airport, Lincoln Airport, and with operations at Mather Airport.

To the maximum extent possible, engine runup locations have been established in areas that minimize noise for people on base, as well as for those in the surrounding communities. Normal base operations do not include late night engine runups, but heavy work loads or unforeseen contingencies sometimes require a limited number of late night (after 10 p.m.) engine runups.

Airfield environs planning is concerned with three primary aircraft operational/land use determinants: (1) accident potential to land users, (2) aircraft noise, and (3) hazards to operations from land uses (height obstructions, etc.). Each of these concerns is addressed in conjunction with mission requirements and safe aircraft operation to determine the optimum flight track for each aircraft type. The flight tracks depicted in Figures 2,3 & 4 are the result of such planning.



Legend

- Departure Tracks
- Beale AFB Boundary

NOTE: THIS MAP IS FOR REFERENCE ONLY

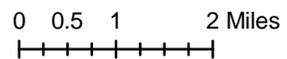
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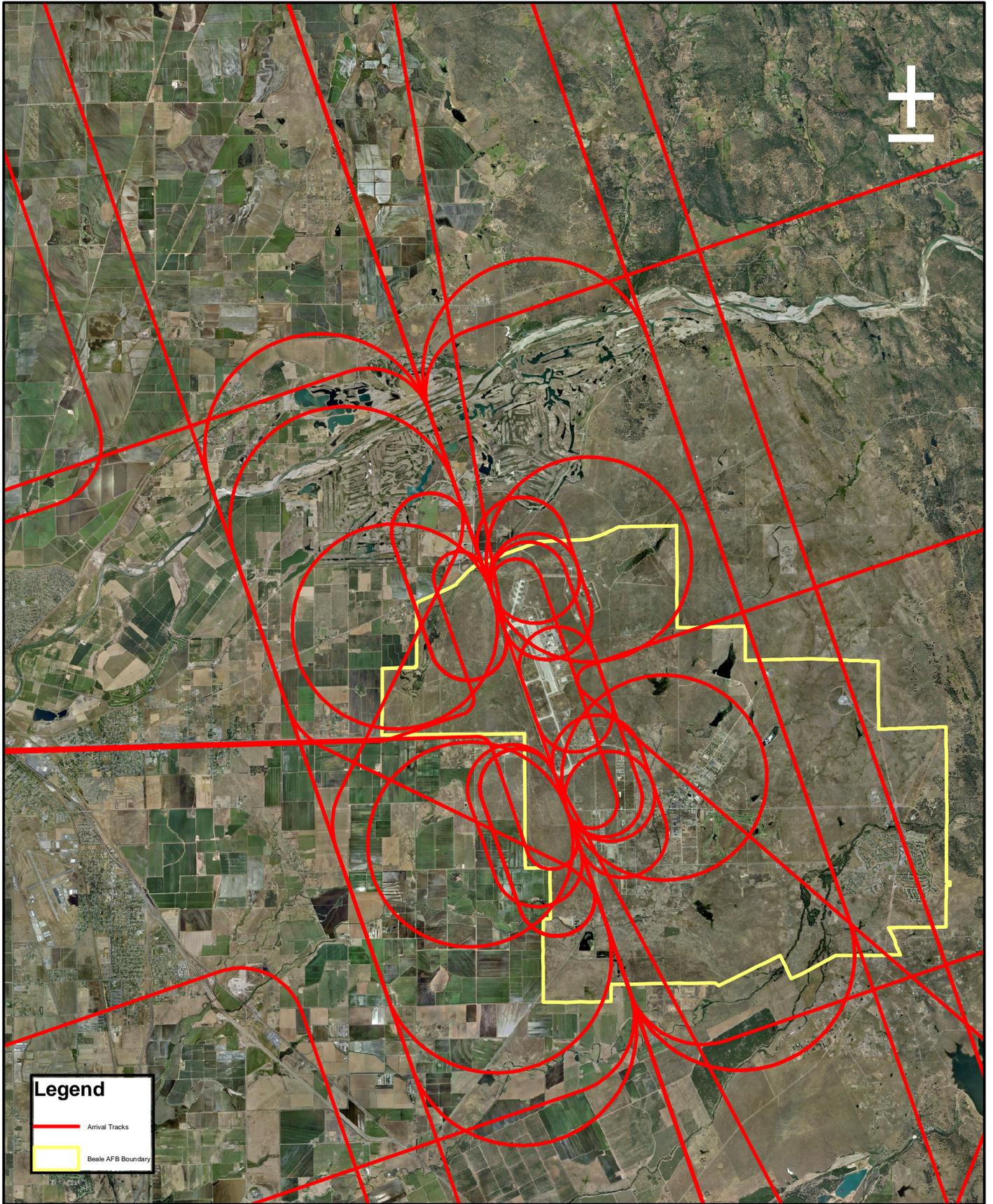
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 Map Projection:
 State Plane California I FIPS 0402 (Feet)
 North American Datum 1983

Figure 2. Departure Flight Tracks



Beale AFB
 Yuba County, CA





Legend

- Arrival Tracks
- Beale AFB Boundary

NOTE: THIS MAP IS FOR REFERENCE ONLY

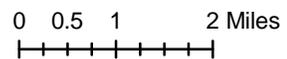
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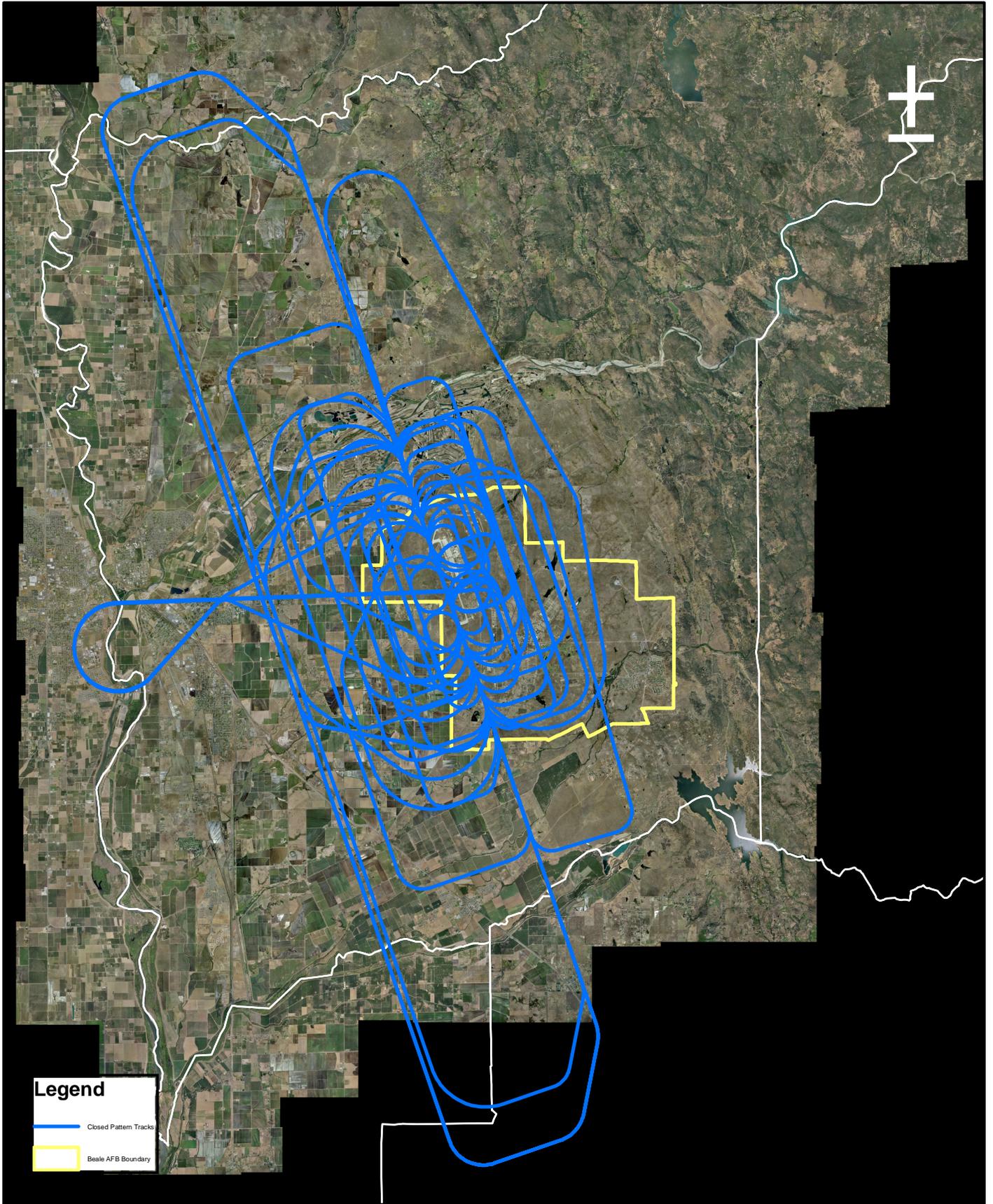
Prepared 08 SEP 2005
 Map Projection:
 State Plane California I FIPS 0402 (Feet)
 North American Datum 1983

Figure 3. Arrival Flight Tracks



Beale AFB
 Yuba County, CA





Legend

-  Closed Pattern Tracks
-  Beale AFB Boundary

NOTE: THIS MAP IS FOR REFERENCE ONLY

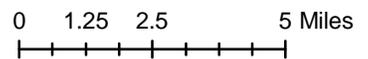
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Prepared 08 SEP 2005
 Map Projection:
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 North American Datum 1983

Figure 4. Closed Pattern Flight Tracks



Beale AFB
 Yuba County, CA



SECTION 3 LAND USE COMPATIBILITY GUIDELINES

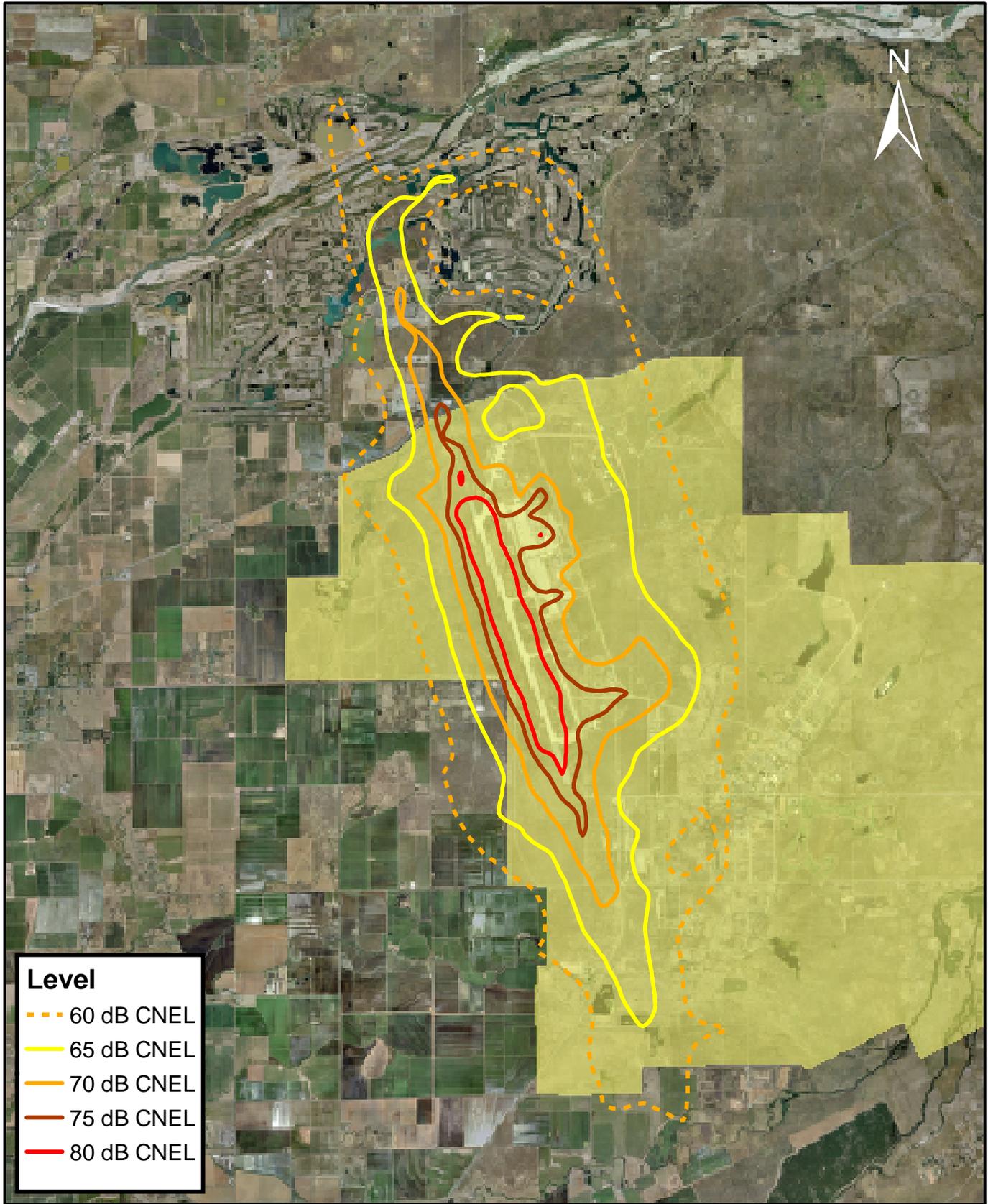
3.1 Introduction

The Department of Defense (DoD) developed the Air Installation Compatible Use Zone (AICUZ) program for military airfields. Using this program, DoD works to protect aircraft operational capabilities at its installations and to assist local government officials in protecting and promoting the public health, safety, and quality of life. The goal is to help promote compatible land use development around military airfields by providing information on aircraft noise exposure and accident potential.

AICUZ reports describe three basic types of constraints that affect, or result, from flight operations. The first constraint involves areas which the Federal Aviation Administration (FAA) and DoD have identified for height limitations (see Height and Obstruction Criteria in Appendix C). Air Force obstruction criteria are based upon those contained in Federal Aviation Regulation Part 77, Subpart C.

The second constraint involves noise zones produced by the computerized Day-Night Average A-Weighted Sound Level (DNL) metric and the DoD NOISEMAP methodology. Using the NOISEMAP program, which is similar to FAA's Integrated Noise Model, DoD produces noise contours showing the noise levels generated by current aircraft operations averaged over one year. In California, DoD also utilizes the Community Noise Equivalent Level (CNEL) to produce noise contours. CNEL is a noise measurement system introduced in the early 1970's by the State of California to quantify community noise exposure, with particular emphasis on airport noise. The CNEL system gives a higher weighting for noise events occurring between 7 PM and 10 PM and between 10 PM and 7 AM (5dB & 10dB respectively). This AICUZ report contains noise contours plotted in increments of 5 dB, ranging from CNEL 60 dB to CNEL ≥ 80 dB. (The Air Force has no recommendations for land use constraints for noise levels between 60 and 65 dB) Figure 5 shows CNEL noise contours based on current operations. Figure 6 shows CNEL noise contours based on the hypothetical scenario described previously. Additional information on noise methodology and the DNL contours are contained in Appendix B of this report.

The third constraint involves accident potential zones based on statistical analysis of past DoD aircraft accidents. DoD analysis has determined that the areas immediately beyond the ends of runways and along the approach and departure flight paths have significant potential for aircraft accidents. Based on this analysis, DoD developed three zones that have high relative potential for accidents. The clear zone, the area closest to the runway end, is the most hazardous. The overall risk is so high that DoD generally acquires the land through purchase or easement to prevent development. Accident potential zone I (APZ I) is an area beyond the clear zone that possesses a significant potential for accidents. Accident potential zone II (APZ II) is an area beyond APZ I having lesser, but still significant potential for accidents. While aircraft accident potential in APZs I and II does not warrant acquisition by the Air Force, land use planning and controls are strongly encouraged in these areas for the protection of the public. Beale AFB clear zones encompass areas 3,000 feet wide by 3,000 feet long. APZ I is 3,000 feet wide by 5,000 feet long, and APZ II is 3,000 feet wide by 7,000 feet long (Figure 7). Clear zones and accident potential zones are established for each runway. Additional information on accident potential is contained in Appendix A of this report.



Level	
---	60 dB CNEL
—	65 dB CNEL
—	70 dB CNEL
—	75 dB CNEL
—	80 dB CNEL

NOTE: THIS MAP IS FOR REFERENCE ONLY
 The end user must be aware of the data conditions and ultimately bear responsibility for the appropriate use of the information with respect to possible errors, original map scale, collection methodology, currency of data, and other conditions specific to certain data.
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 Map Projection: State Plane California I FIPS 5402 (Feet)
 North American Datum 1983

Figure 5. CNEL Noise Contours

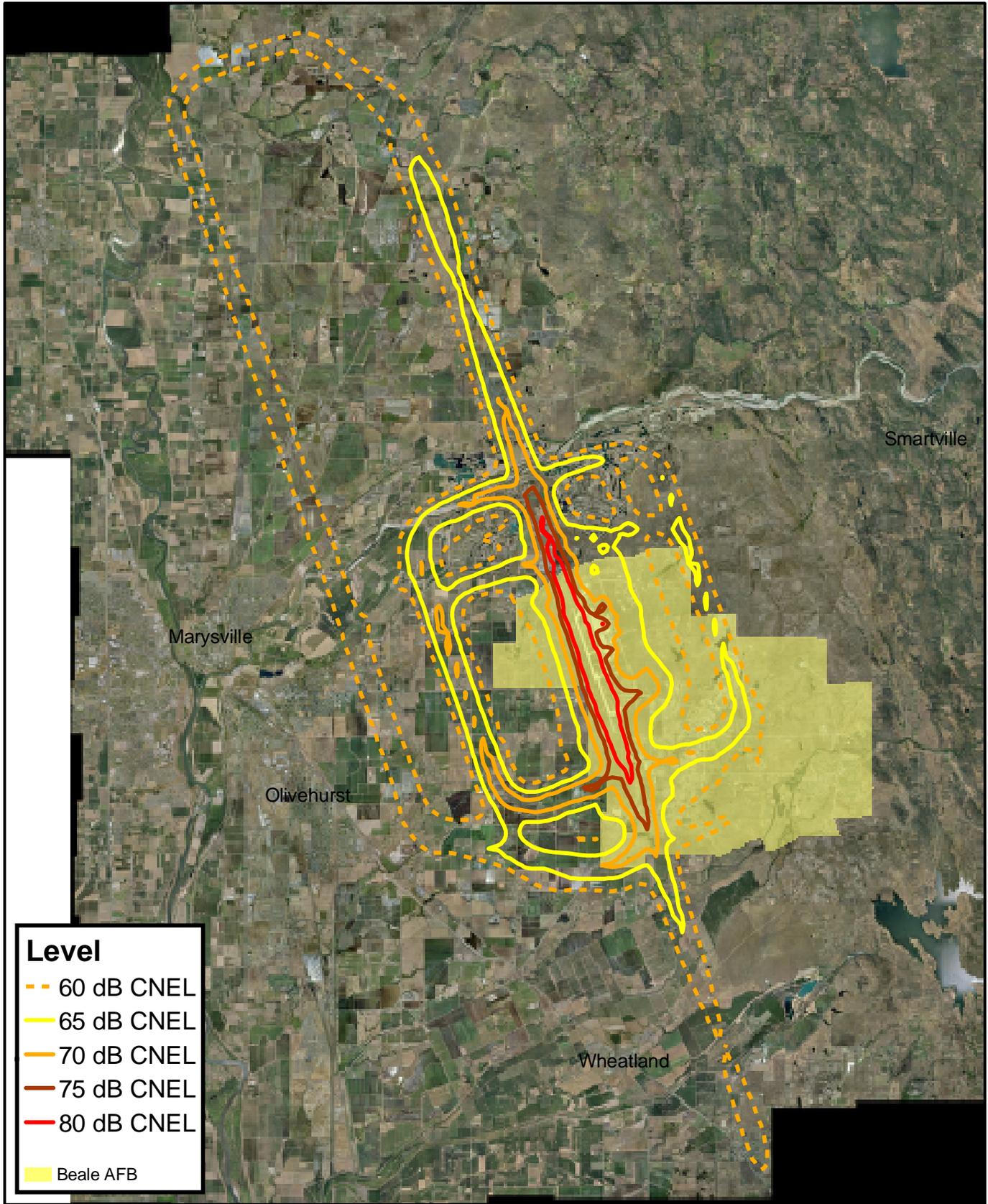


Beale AFB
 Yuba County, CA



0 0.45 0.9 1.8 Miles



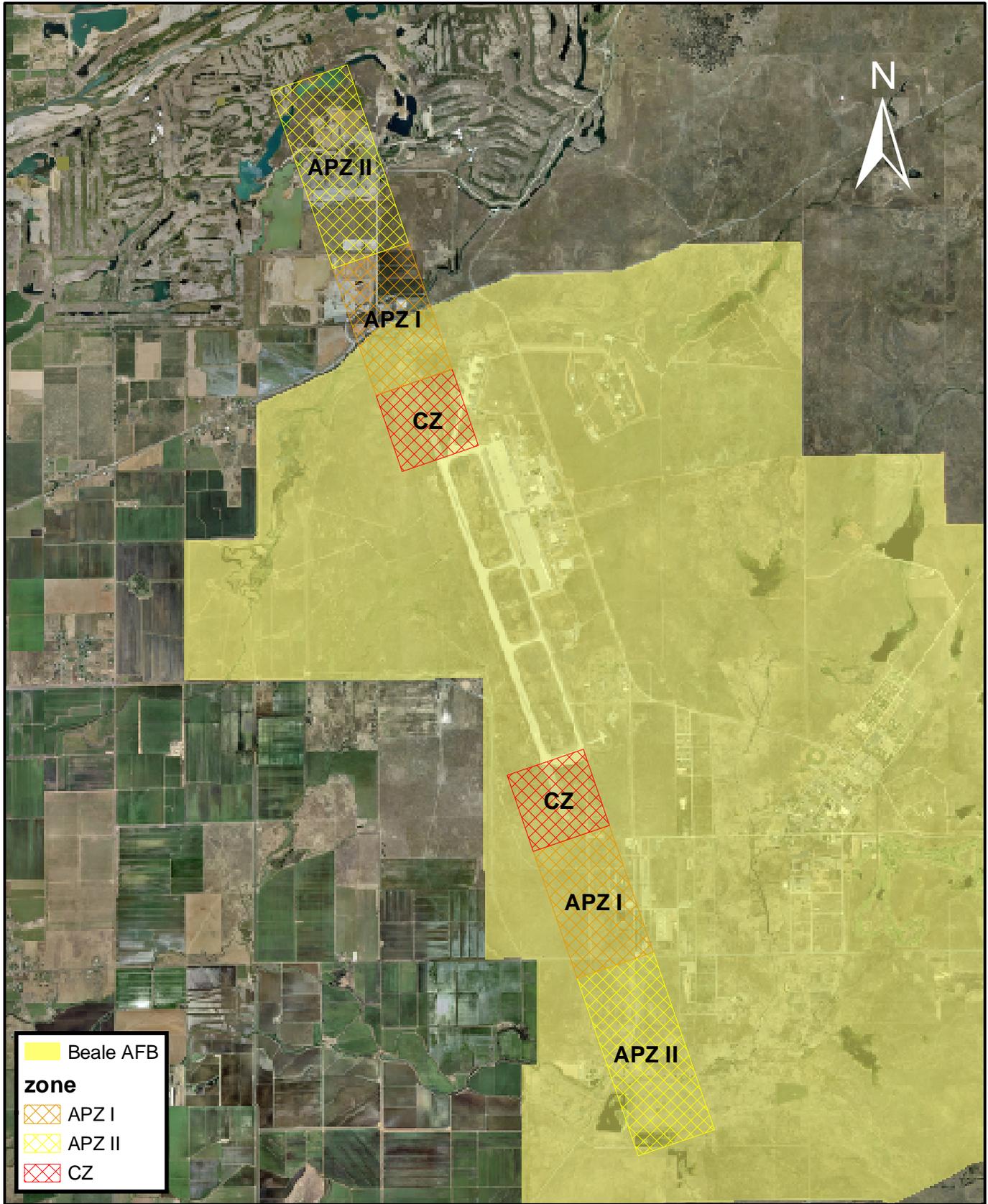


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Figure 6. Hypothetical CNEL Noise Contours


Beale AFB
 Yuba County, CA
 

0 1.25 2.5 5 Miles



	Beale AFB zone
	APZ I
	APZ II
	CZ

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Figure 7. Accident Potential Zones

	Beale AFB Yuba County, CA	
<p>0 0.35 0.7 1.4 Miles</p>		

3.2 Land Use Compatibility

The basis for any effective land use control system is the development of, and subsequent adherence to, policies which serve as the standard by which all land use planning and control actions are evaluated. Beale AFB recommends the following policies be considered for incorporation into the comprehensive plans of agencies in the vicinity of the base environs:

Policy 1. In order to promote the public health, safety, peace, comfort, convenience and general welfare of the inhabitants of airfield environs, it is necessary to:

- Guide, control and regulate future growth and development.
- Promote orderly and appropriate use of land.
- Protect the character and stability of existing land uses.
- Prevent the destruction or impairment of the airfield and the public investment therein.
- Enhance the quality of living in the areas affected.
- Protect the general economic welfare by restricting incompatible land use.

Policy 2. In furtherance of Policy 1, it is appropriate to:

- Establish guidelines of land use compatibility.
- Restrict or prohibit incompatible land use.
- Prevent establishment of any land use which would unreasonably endanger aircraft operations and the continued use of the airfield.
- Incorporate the Air Installation Compatible Use Zone concept into community land use plans, modifying them when necessary.
- Adopt appropriate ordinances to implement airfield environs land use plans.

Policy 3. Within the boundaries of the AICUZ, certain land uses are inherently incompatible. The following land uses are not in the public interest and must be restricted or prohibited:

- Uses that release into the air any substance, such as steam, dust, or smoke, which would impair visibility or otherwise interfere with the operation of aircraft.
- Uses that produce light emissions, either direct or indirect (reflective), which would interfere with pilot vision.
- Uses that produce electrical emissions which would interfere with aircraft communication systems or navigation equipment.
- Uses that attract birds or waterfowl, such as operation of sanitary landfills, maintenance or feeding stations, or growth of certain vegetation.
- Uses that provide for structures within ten feet of aircraft approach-departure.
- Uses that provide for structures that extend more than 500 feet above the ground.
- Uses that provide for structures that constitute an obstruction to air navigation (Appendix C).

Policy 4. Certain noise levels of varying duration and frequency create hazards to both physical and mental health. A limited, though definite, danger to life exists in certain areas adjacent to airfields. Where these conditions are sufficiently severe, it is not consistent with public health, safety and welfare to allow the following land uses:

- Residential.
- Retail business.
- Office buildings.
- Public buildings (schools, churches, etc.).
- Recreation buildings and structures.

Policy 5. Land areas below takeoff and final approach flight paths are exposed to significant danger of aircraft accidents. The density of development and intensity of use must be limited in such areas.

Policy 6. Different land uses have different sensitivities to noise. Standards of land use acceptability should be adopted, based on these noise sensitivities. In addition, a system of Noise Level Reduction guidelines (Appendix D) for new construction should be implemented to permit certain uses where they would otherwise be prohibited.

Policy 7. Land use planning and zoning in the airfield environs cannot be based solely on aircraft-generated effects. Allocation of land used within the AICUZ should be further refined by consideration of:

- Other military activities/operations.
- Physiographic factors.
- Climate and hydrology.
- Vegetation.
- Surface geology.
- Soil characteristics.
- Intrinsic land use potential and constraints.
- Existing land use.
- Land ownership patterns and values.
- Economic and social demands.
- Cost and availability of public utilities, transportation and community facilities
- Other noise sources.

Each runway end at Beale AFB has a 3,000 foot by 3,000 foot clear zone and two accident potential zones (Appendix A). Accident potential on or adjacent to the runway or within the clear zone is so high that the necessary land use restrictions would prohibit reasonable economic use of land. As stated previously, it is Air Force policy to request Congress to authorize and appropriate funds to acquire the necessary real property interests in this area to prevent incompatible land uses. Clear zones have been acquired for each runway at Beale AFB which restrict incompatible land uses.

Accident potential zone I is less critical than the clear zone, but still possesses a significant risk factor. This 3,000 foot by 5,000 foot area has land use compatibility guidelines which are sufficiently flexible to allow reasonable economic use of the land, such as industrial/manufacturing, transportation, communication/utilities, wholesale trade, open space, recreation, and agriculture. However, uses that concentrate people in small areas are not acceptable.

Accident potential zone II is less critical than accident potential zone I, but still possesses potential for accidents. Accident potential zone II, also 3,000 feet wide, is 7,000 feet long extending to 15,000 feet from the runway threshold. Acceptable uses include those of accident potential zone I, as well as low density single family residential, and those personal and business services and commercial/retail trade uses of low intensity or scale of operation. High density functions such as multi-story buildings, places of assembly (theaters, churches, schools, restaurants, etc.), and high density office uses are not considered appropriate.

High people densities should be limited to the maximum extent possible. The optimum density recommended for residential usage (where it does not conflict with noise criteria) in accident potential zone II is one dwelling per acre. For most non-residential usage, buildings should be limited to one story and the lot coverage should not exceed 20 percent.

These basic guidelines cannot resolve all land use compatibility questions, but they do offer a reasonable framework within which to work. Figure 8 lists land uses versus all possible combinations of noise exposure and accident

potential at Beale AFB, showing land uses that are compatible or incompatible with aircraft noise and accident potential. Although the noise contour maps show the 60 dB contour as required by California, the Air Force makes no land use restriction recommendations for the 60-65 dB range. Noise guidelines are essentially the same as those published by the Federal Interagency Committee on Urban Noise in the June 1980 publication, *Guidelines for Considering Noise in Land Use Planning and Control*. The U.S. Department of Transportation publication, *Standard Land Use Coding Manual (SLUCM)*, has been used for identifying and coding land use activities.

3.3 Participation In The Planning Process

As local communities prepare their land use plans, the Air Force stands ready to provide additional inputs. The Base Civil Engineer has been designated as the official liaison with the local community on all planning matters. This office is prepared to participate in the continuing discussion of zoning and other land use matters as they may affect, or may be affected by, Beale AFB.

Figure 8

LAND USE COMPATIBILITY

LAND USE		ACCIDENT POTENTIAL ZONES			NOISE ZONES			
SLUCM NO.	NAME	CLEAR ZONE	APZ I	APZ II	65-70	70-75	75-80	80+
10	Residential							
11	Household units							
11.11	Single units; detached	N	N	Y ¹	A ¹¹	B ¹¹	N	N
11.12	Single units; semidetached	N	N	N	A ¹¹	B ¹¹	N	N
11.13	Single units; attached row	N	N	N	A ¹¹	B ¹¹	N	N
11.21	Two units; side-by-side	N	N	N	A ¹¹	B ¹¹	N	N
11.22	Two units; one above the other	N	N	N	A ¹¹	B ¹¹	N	N
11.31	Apartments; walk up	N	N	N	A ¹¹	B ¹¹	N	N
11.32	Apartments; elevator	N	N	N	A ¹¹	B ¹¹	N	N
12	Group quarters	N	N	N	A ¹¹	B ¹¹	N	N
13	Residential hotels	N	N	N	A ¹¹	B ¹¹	N	N
14	Mobile home parks or courts	N	N	N	N	N	N	N
15	Transient lodgings	N	N	N	A ¹¹	B ¹¹	C ¹¹	N
16	Other residential	N	N	N ¹	A ¹¹	B ¹¹	N	N
20	Manufacturing							
21	Food & kindred products; manufacturing	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
22	Textile mill products; manufacturing	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
23	Apparel and other finished products made from fabrics, leather, and similar materials; manufacturing	N	N	N ²	Y	Y ¹²	Y ¹³	Y ¹⁴
24	Lumber and wood products (except furniture); manufacturing	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
25	Furniture and fixtures; manufacturing	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
26	Paper & allied products; manufacturing	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
27	Printing, publishing, and allied industries	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
28	Chemicals and allied products; manufacturing	N	N	N ²	Y	Y ¹²	Y ¹³	Y ¹⁴
29	Petroleum refining and related industries	N	N	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
30	Manufacturing							
31	Rubber and misc. plastic products; manufacturing	N	N ²	N ²	Y	Y ¹²	Y ¹³	Y ¹⁴
32	Stone, clay and glass products manufacturing	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
33	Primary metal industries	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
34	Fabricated metal products; manufacturing	N	N ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
35	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks manufacturing	N	N	N ²	Y	A	B	N
39	Miscellaneous manufacturing	N	Y ²	Y ²	Y	Y ¹²	Y ¹³	Y ¹⁴

40	Transportation, communications and utilities							
41	Railroad, rapid rail transit and street railroad transportation	N ³	Y ⁴	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
42	Motor vehicle transportation	N ³	Y	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
43	Aircraft transportation	N ³	Y ⁴	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
44	Marine craft transportation	N ³	Y ⁴	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
45	Highway & street right-of-way	N ³	Y	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
46	Automobile parking	N ³	Y ⁴	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
47	Communications	N ³	Y ⁴	Y	Y	A ¹⁵	B ¹⁵	N
48	Utilities	N ³	Y ⁴	Y	Y	Y	Y ¹²	Y ¹³
49	Other transportation communications and utilities	N ³	Y ⁴	Y	Y	A ¹⁵	B ¹⁵	N
50	Trade							
51	Wholesale trade	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
52	Retail trade-building materials, hardware and farm equipment	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
53	Retail trade-general merchandise	N	N ²	Y ²	Y	A	B	N
54	Retail trade-food	N	N ²	Y ²	Y	A	B	N
55	Retail trade-automotive, marine craft, aircraft and accessories	N	Y ²	Y ²	Y	A	B	N
56	Retail trade-apparel and accessories	N	N ²	Y ²	Y	A	B	N
57	Retail trade-furniture, home furnishings and equipment	N	N ²	Y ²	Y	A	B	N
58	Retail trade-eating and drinking establishments	N	N	N ²	Y	A	B	N
59	Other retail trade	N	N ²	Y ²	Y	A	B	N
60	Services							
61	Finance, insurance and real estate services	N	N	Y ⁶	Y	A	B	N
62	Personal services	N	N	Y ⁶	Y	A	B	N
62.4	Cemeteries	N	Y ⁷	Y ⁷	Y	Y ¹²	Y ¹³	Y ^{14,21}
63	Business services	N	Y ⁸	Y ⁸	Y	A	B	N
64	Repair services	N	Y ²	Y	Y	Y ¹²	Y ¹³	Y ¹⁴
65	Professional services	N	N	Y ⁶	Y	A	B	N
65.1	Hospitals, nursing homes	N	N	N	A*	B*	N	N
65.1	Other medical facilities	N	N	N	Y	A	B	N
66	Contract construction services	N	Y ⁶	Y	Y	A	B	N
67	Governmental services	N	N	Y ⁶	Y*	A*	B*	N
68	Educational services	N	N	N	A*	B*	N	N
69	Miscellaneous services	N	N ²	Y ²	Y	A	B	N
70	Cultural, entertainment and recreational							
71	Cultural activities (including churches)	N	N	N ²	A*	B*	N	N
71.2	Nature exhibits	N	Y ²	Y	Y*	N	N	N
72	Public assembly	N	N	N	Y	N	N	N
72.1	Auditoriums, concert halls	N	N	N	A	B	N	N
72.11	Outdoor music shell, amphitheaters	N	N	N	N	N	N	N
72.2	Outdoor sports arenas, spectator sports	N	N	N	Y ¹⁷	Y ¹⁷	N	N
73	Amusements	N	N	Y ⁸	Y	Y	N	N

74	Recreational activities (including golf courses, riding stables, water recreation)	N	Y ^{8,9,10}	Y	Y*	A*	B*	N
75	Resorts and group camps	N	N	N	Y*	Y*	N	N
76	Parks	N	Y ⁸	Y ⁸	Y*	Y*	N	N
79	Other cultural, entertainment and recreation	N	Y ⁹	Y ⁹	Y*	Y*	N	N
80	Resources production and extraction							
81	Agriculture (except livestock)	Y ¹⁶	Y	Y	Y ¹⁸	Y ¹⁹	Y ²⁰	Y ^{20,21}
81.5 to 81.7	Livestock farming and animal breeding	N	Y	Y	Y ¹⁸	Y ¹⁹	Y ²⁰	Y ^{20,21}
82	Agricultural related activities	N	Y ⁵	Y	Y ¹⁸	Y ¹⁹	N	N
83	Forestry activities and related services	N ⁵	Y	Y	Y ¹⁸	Y ¹⁹	Y ²⁰	Y ^{20,21}
84	Fishing activities and related services	N ⁵	Y ⁵	Y	Y	Y	Y	Y
85	Mining activities and related services	N	Y ⁵	Y	Y	Y	Y	Y
89	Other resources production and extraction	N	Y ⁵	Y	Y	Y	Y	Y

LEGEND

SLUCM - Standard Land Use Coding Manual, U.S. Department of Transportation.

Y - (Yes) - Land use and related structures are compatible without restriction.

N - (No) - Land use and related structures are not compatible and should be prohibited.

Y^x - (yes with restrictions) - Land use and related structures generally compatible; see notes 1 through 21.

N^x - (no with exceptions) - See notes 1 through 21.

NLR - (Noise Level Reduction) - NLR (outdoor to indoor) to be achieved through incorporation of noise attenuation measures into the design and construction of the structures. See Appendix D.

A, B, or C - Land use and related structures generally compatible; measures to achieve NLR for A(DNL 66-70), B(DNL 71-75), C(DNL 76-80), need to be incorporated into the design and construction of structures.

A*, B*, and C* - Land use generally compatible with NLR. However, measures to achieve an overall noise level reduction do not necessarily solve noise difficulties and additional evaluation is warranted. See appropriate footnotes.

***** - The designation of these uses as "compatible" in this zone reflects individual federal agencies' and program considerations of general cost and feasibility factors, as well as past community experiences and program objectives. Localities, when evaluating the application of these guidelines to specific situations, may have different concerns or goals to consider.

NOTES

1. Suggested maximum density of 1-2 dwelling units per acre, possibly increased under a Planned Unit Development (PUD) where maximum lot coverage is less than 20 percent.
2. Within each land use category, uses exist where further definition may be needed due to the variation of densities in people and structures.
3. The placing of structures, buildings, or above-ground utility lines in the clear zone is subject to severe restrictions. In a majority of the clear zones, these items are prohibited. See AFR 19-9 and AFR 86-14 for specific guidance.
4. No passenger terminals and no major above-ground transmission lines in APZ I.

5. Factors to be considered: labor intensity, structural coverage, explosive characteristics, and air pollution.
6. Low-intensity office uses only. Meeting places, auditoriums, etc., are not recommended.
7. Excludes chapels.
8. Facilities must be low intensity.
9. Clubhouse not recommended.
10. Areas for gatherings of people are not recommended.
11. a. Although local conditions may require residential use, it is discouraged in DNL 66-70 dB and strongly discouraged in DNL 71-75 dB. An evaluation should be conducted prior to approvals, indicating that a demonstrated community need for residential use would not be met if development were prohibited in these zones, and that there are no viable alternative locations.
b. Where the community determines the residential uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) for DNL 66-70 dB and DNL 71-75 dB should be incorporated into building codes and considered in individual approvals. See Appendix D for a reference to updated NLR procedures.
c. NLR criteria will not eliminate outdoor noise problems. However, building location and site planning, and design and use of berms and barriers can help mitigate outdoor exposure, particularly from near ground level sources. Measures that reduce outdoor noise should be used whenever practical in preference to measures which only protect interior spaces.
12. Measures to achieve the same NLR as required for facilities in DNL 66-70 dB range must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
13. Measures to achieve the same NLR as required for facilities in DNL 71-75 dB range must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
14. Measures to achieve the same NLR as required for facilities in DNL 76-80 dB range must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
15. If noise sensitive, use indicated NLR; if not, the use is compatible.
16. No buildings.
17. Land use is compatible provided special sound reinforcement systems are installed.
18. Residential buildings require the same NLR as required for facilities in DNL 66-70 dB range.
19. Residential buildings require the same NLR as required for facilities in DNL 71-75 dB range.
20. Residential buildings are not permitted.
21. Land use is not recommended. If the community decides the use is necessary, hearing protection devices should be worn by personnel.

SECTION 4 LAND USE ANALYSIS

4.1 Introduction

Land use planning and control is a dynamic, rather than a "static" process. The specific characteristics of land use determinants will always reflect, to some degree, the changing conditions of the economic, social, and physical environment of a community, as well as changing public concern. The planning process accommodates this fluidity in that decisions are normally not based on boundary lines, but rather on more generalized area designations.

Computer technology has enabled Beale AFB to more precisely display its flight tracks and noise contours for land use planning purposes. This same technology has revealed the extent of Beale AFB's region of influence, which extends from just north to the Sutter River, south to the Bear River, east to the unincorporated town of Linda and west to Smartville.

For the purposes of this study, existing land uses have been classified into one of the following six categories:

- Residential/Commercial. This category includes all types of residential activity, such as single and multi-family residences and mobile homes, at a density of greater than one dwelling unit per acre. It also includes offices, retail, restaurants and other types of commercial establishments.
- Industrial. This category includes manufacturing, warehousing, and other similar uses.
- Agriculture. This category includes undeveloped land areas, agricultural areas, grazing lands, and areas with residential activity at densities less
- Landfill. This category includes landfill.
- DoD/Public. This category includes publicly owned lands and/or lands to which the public has access, including military reservations and training grounds, public buildings, schools, churches, cemeteries, and hospitals.
- Specific Plan. This category includes land areas designated a specific development area, including parks, wilderness areas and reservations, conservation areas, and areas designated for trails, hiking, camping, etc.

4.2 Existing Land Use

4.2.1 Yuba County

A large portion of Yuba County is being utilized for rural purposes such as farming, mining or timber production. There are two incorporated cities within Yuba County; Wheatland and Marysville. Beale AFB lies in the center of Yuba County and has influenced development since it was an Army base during World War II. Land uses around the base include, industrial, rural residential, agriculture, wildlife management and some limited commercial. To the north of Beale's flight line is extractive industrial. West and south are largely agricultural with small pockets of rural residential, commercial development and the landfill. East of Beale is the State owned Spenceville Wildlife Management area. Until recently, development in Yuba County has been almost nonexistent. However, rapid growth and the high cost of housing in the Sacramento area has resulted in a significant increase in growth in Yuba County as well.

4.2.2 City of Marysville

Marysville's growth and development have been constrained to the east by the Yuba River and to the west by the Feather River. Highways 70 and 20 intersect the city. Historic downtown Marysville is the commercial hub and center of the city. In 2004 Marysville completed an Economic Development Strategic Plan in order to assist with long-term planning and revitalization of the downtown area. The city's boundaries and the AICUZ area of influence do not intersect. The land between the base and Marysville contains the unincorporated towns of Linda and Olivehurst, rural residential and agricultural lands.

4.2.3 City of Wheatland

Wheatland is a small town roughly 9 miles south of Beale and bi-sected by Highway 65 and the rail line. There is a small downtown commercial hub surrounded by residential areas. Historically a large percentage of the population has been composed of military retirees. As a result, Wheatland has maintained a close connection with Beale Air Force Base. The land between Wheatland and Beale is largely agricultural.

4.3 Current Zoning

4.3.1 Yuba County

Yuba County's General Plan was updated in 1994. Since that time several specific plans have been approved and incorporated into county planning activities. As housing has become more and more expensive in the greater Sacramento area, development has steadily moved north. Yuba County is currently experiencing rapid growth due to its affordable housing. Many of the new residents commute to the greater Sacramento area. Commercial development in the county has lagged behind residential development and has been focused around the transportation network. Yuba County is cognizant of the economic impact of Beale on the local community and has aggressively protected Beale from encroachment by adopting the 1982 AICUZ contours and zoning accordingly. Yuba County and Beale Air Force Base will be participating in a Joint Land-Use Study to address other encroachment factors and partnership opportunities.

4.3.2 City of Marysville

Marysville has employed planning and zoning land use controls for many years. The land to the north of town along Highway 70 and north east of town along Highway 20 is the only land likely to experience growth due to the rivers located to the east and west of the city. The land use in this area can be characterized as having pockets of light industry, limited commercial and rural residential development. Marysville lies outside of the AICUZ area of influence.

4.3.3 City of Wheatland

Wheatland has also employed planning and zoning land-use controls for many years. Commercial development is most likely to develop along the Highway 65 corridor to the north. Residential development is currently expanding to the north and south of the town center. The city's sphere of influence intersects the AICUZ area of influence to the north.

4.4 Future Land Use

Major factors controlling county growth around the base have included limited sewer, potable water, utilities, land owned by the California Department of Natural Resource's and the US Fish and Wildlife Service, and the wetlands along this corridor. The landfill currently operating South of the base has consistently worked with Beale to insure that height limitations and bird hazards are addressed. As the Sacramento area expands the pressure for new development has grown as well. Currently there are 2 large residential developments in the planning stages. Yuba Highlands which is located on the North Central boundary of Beale AFB and the new town of Woodbury which is located to the southwest are in preliminary planning stages. Yuba Highlands has been planned in accordance with the currently published (1982) AICUZ study, and it is anticipated that Woodbury will be compliant with both the current mission contours and the hypothetical contours. It should be noted however, that AICUZ is not the only factor to be considered when determining compatible land use. To that end Beale AFB and Yuba County will be participating in a Joint Land Use Study in 2006.

4.5 Incompatible Land Uses

Currently there are only minor civilian development encroachments into the Beale AFB environs. These do not jeopardize the viability of continued flight operations. However as pressure to develop the area increases it is critical for the base to work with the local planning agencies to insure that viability of flight operations are maintained. The AICUZ program addresses impacts associated with the flying mission. As an active military installation there are other operational and mission related activities that should be considered in the planning process. In order to facilitate that process Beale will be participating in a Joint Land-Use Study (JLUS) with Yuba County in the near future.

4.5.1 Noise Zones

Beale AFB noise contours actually impact very little developed land. The majority of off-base land under the CNEL contours is undeveloped and expected to remain open/agricultural/low density for the foreseeable future.

Mobile homes in any AICUZ noise zone are considered incompatible by Air Force standards. Future development in this area of Yuba County will continue to be low density residential and is expected to include mobile homes. Mobile homes are required to meet the California Energy Code which translates to more energy-absorptive construction and some sound mitigation within the noise contour environment.

4.5.2 Clear Zones and Accident Potential Zones

There is no encroachment on the clear zones or APZ I and II on either end of the runway.

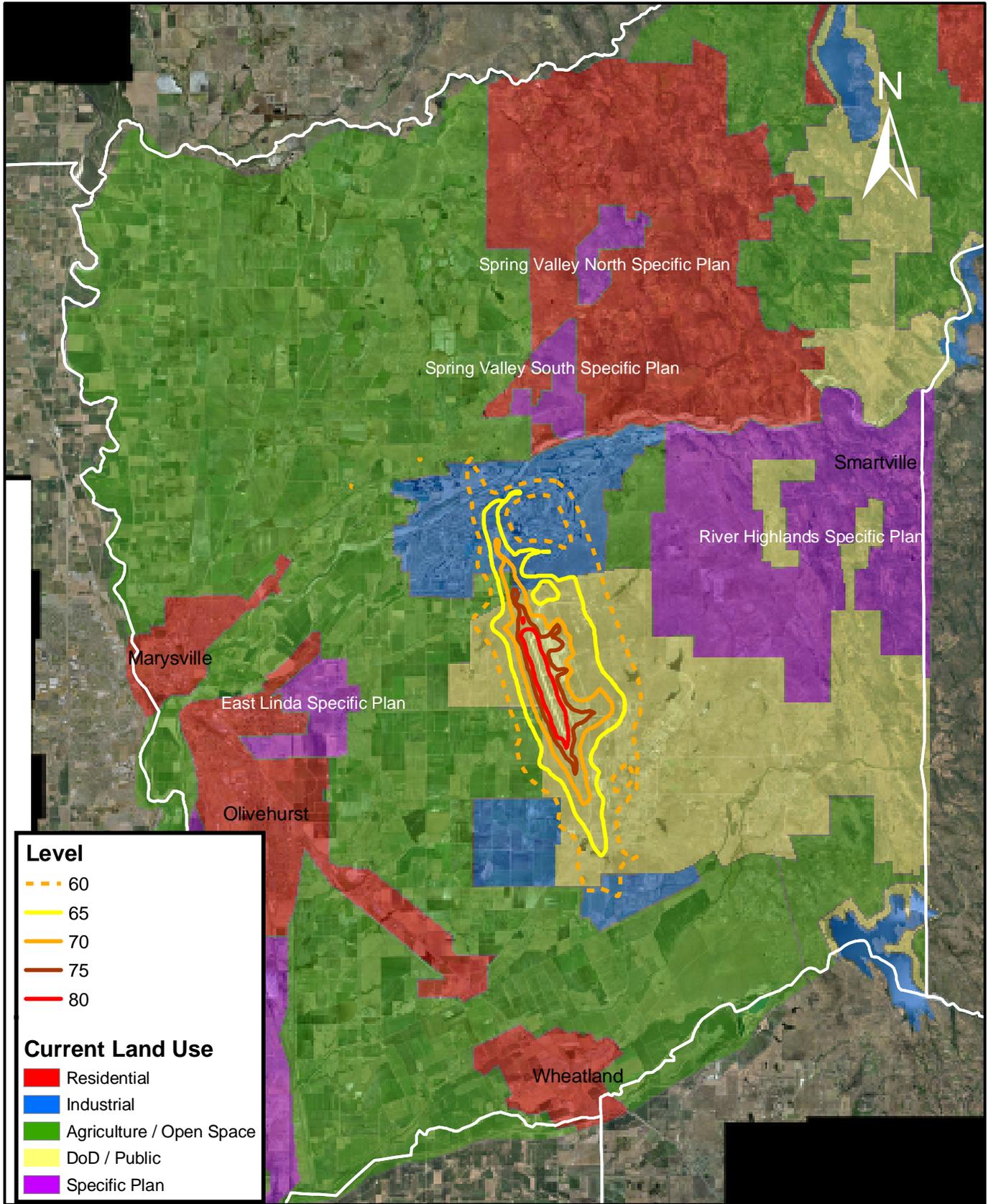
All of the Beale AFB clear zones as well as APZ I and II at runway 15 are entirely on base property.

Roughly one half of APZ I at runway 33 is on base property. The remainder of APZ I and all of APZ II extend over the Yuba Goldfields which are currently used for aggregate extraction.

4.5.3 Planning Considerations

AICUZ noise contours describe the noise characteristics of a specific operational environment, and as such, will change if a significant operational change is made. Should a new mission be established at Beale AFB, adding a larger number of airplanes or additional model types, the AICUZ could be amended; therefore contour fluctuation should be considered during the planning process to prevent possible problems in the future.

With these thoughts in mind, the Beale AFB 2005 AICUZ Study has provided flight track, accident potential zone, and noise contour information in this report that reflects the most current and accurate picture of aircraft activities as well as hypothetical noise contour information based upon the capabilities of the Beale AFB runway and the aircraft in the Air Force inventory.

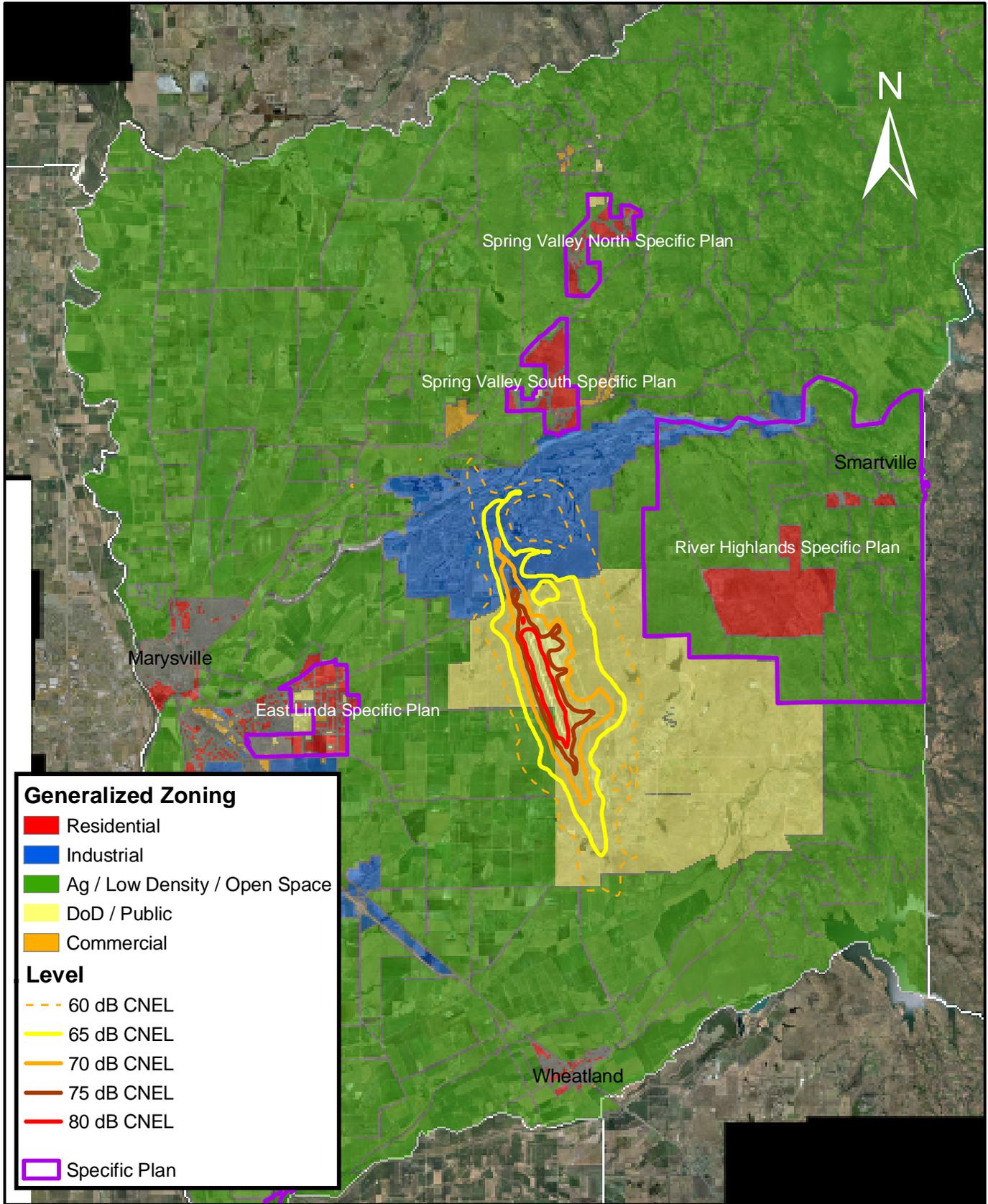


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 Map Projection: State Plane California 1 FIPS 5402 (Feet)
 North American Datum 1983

Figure 9. Existing Land Use

Beale AFB
 Yuba County, CA

0 1 2 4 Miles



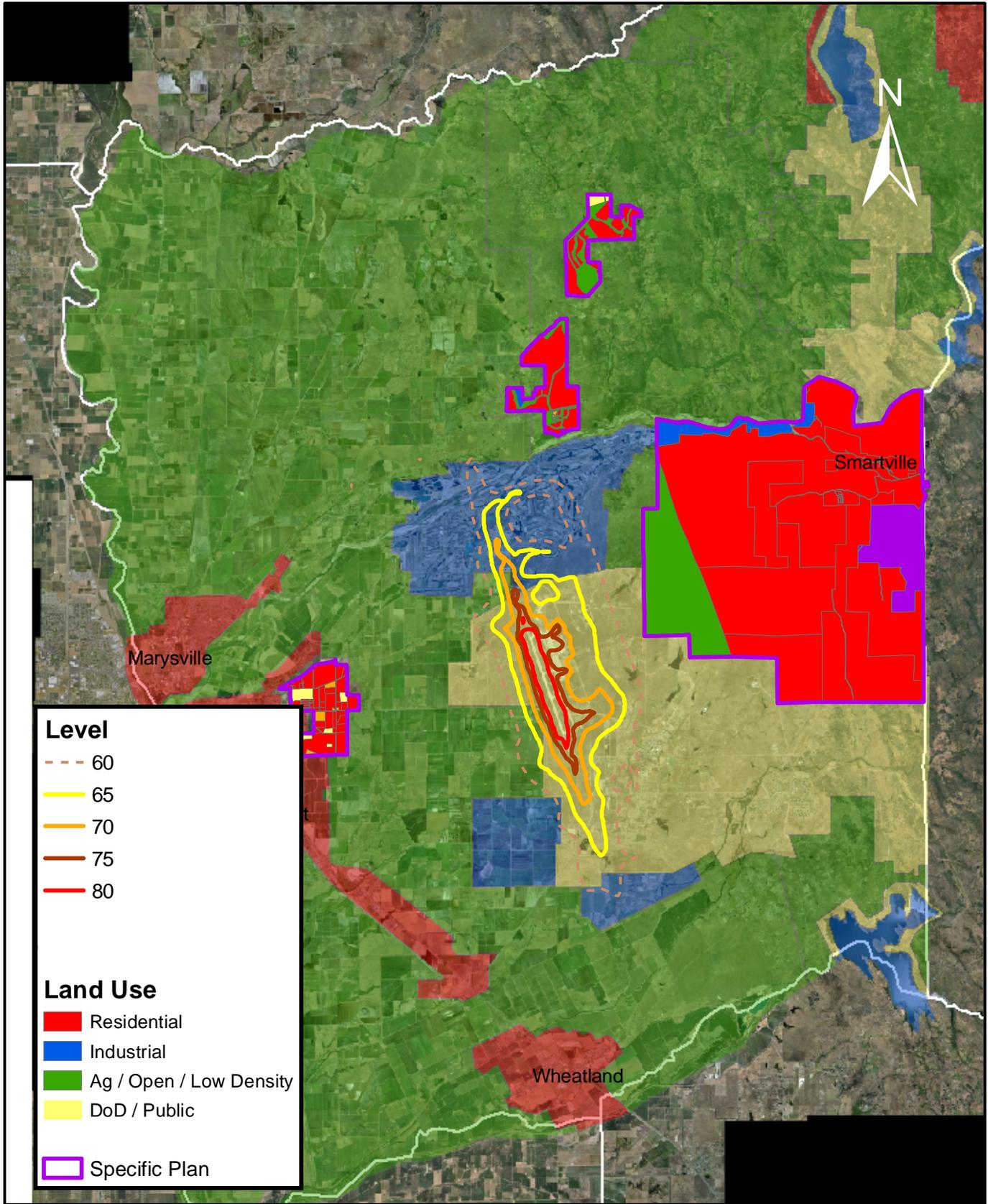
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Figure 10. Current Zoning

Beale AFB
 Yuba County, CA




0 1 2 4 Miles



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Figure 11. Future Land Use

Beale AFB
 Yuba County, CA




0 1 2 4 Miles

SECTION 5 IMPLEMENTATION

The implementation of the AICUZ Study must be a joint effort between the Air Force and the adjacent communities. The Air Force's role is to minimize the impact on the local communities by Beale AFB operations. The role of the communities is to ensure that development in the environs is compatible with accepted planning and development principles and practices.

5.1 Air Force Responsibilities

In general, the Air Force perceives its AICUZ responsibilities as encompassing the areas of flying safety and noise abatement. AICUZ serves as a tool to foster participation in the land use planning process. The AICUZ program is further supplemented by Joint Land Use Studies.

Well-maintained aircraft and well-trained aircrews do much to assure that aircraft accidents are avoided. Despite the best training of aircrews and maintenance of aircraft, however, history makes it clear that accidents do occur. It is imperative that flights be routed over sparsely populated areas as much as possible to reduce the exposure of lives and property to a potential accident.

By Air Force regulation, commanders are required to periodically review existing traffic tracks, instrument approaches, weather minima and operating practices, and evaluate these factors in relationship to populated areas and other local situations. This requirement is a direct result and expression of Air Force policy that all AICUZ plans must include an analysis of flying and flying related activities designed to reduce and control the effects of such operations on surrounding land areas. Noise is generated from aircraft both in the air and on the ground. In an effort to reduce the noise effects of Beale AFB operations on surrounding communities, the base restricts late night flying activities and has routed flight tracks to avoid populated areas such as the city of Marysville, west of the base. Practice takeoffs/landings and instrument approaches are conducted at times when individuals are normally awake. These activities are not normally scheduled between 10:00 P.M. and 6:00 A.M. During this time, only mission essential aircraft arrivals and departures are conducted. Whenever possible, traffic tracks are all located away from the population centers, both on and off-base. Base maintenance runup activities are not performed between 10:00 P.M. and 6:00 A.M., except for high priority mission requirements.

The preparation and presentation of this Beale AFB AICUZ Study is one phase of the continuing Air Force participation in the local planning process. It is recognized that as the local community updates its land use plans, the Air Force must be ready to provide additional inputs.

It is also recognized that the AICUZ program will be an ongoing activity even after compatible development plans are adopted and implemented. Base personnel are prepared to participate in the continuing discussion of zoning and other land use matters as they may affect, or may be affected by Beale AFB. Base personnel will also be available to provide information, criteria and guidelines to state, regional and local planning bodies, civic associations and similar groups.

5.2 Local Community Responsibilities

The residents of the Beale AFB environs and the personnel at Beale AFB have a long history of working together for mutual benefit. We feel that adoption of the following recommendations will strengthen this relationship, increase the health and safety of the public, and help protect the integrity of the base's flying mission:

- Incorporate AICUZ policies and guidelines into the comprehensive plans of the city of Marysville, Wheatland and Yuba County and SACOG. Use overlay maps of the AICUZ noise contours and Air Force Land Use Compatibility Guidelines to evaluate existing and future land use proposals.
- Utilize the hypothetical contours developed in this study in order to insure the continued viability of Beale Air Force Base and the potential for new missions.
- Modify existing zoning ordinances and subdivision regulations to support the compatible land uses outlined in this study.
- Ensure height and obstruction ordinances reflect current Air Force and Federal Aviation Administration (FAA) Part 77 requirements.
- Modify building codes to ensure that new construction within the AICUZ area has the recommended noise level reductions incorporated into its design and construction.
- Continue to coordinate with Beale AFB for planning and zoning actions that have the potential of affecting base operations. Develop a working group representing city planners, county planners, and base planners to meet at least quarterly to discuss AICUZ concerns and major development proposals that could affect airfield operations.

APPENDICES

AIR INSTALLATION COMPATIBLE USE ZONE STUDY (AICUZ)

BEALE AFB CA
2005

BEALE AFB AICUZ

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APPENDIX A

ACCIDENT POTENTIAL ZONES

A.1 Guidelines For Accident Potential

Urban areas around airports are exposed to the possibility of aircraft accidents even with well-maintained aircraft and highly trained aircraft crews. Despite stringent maintenance requirements and countless hours of training, past history makes it clear that accidents are going to occur.

When the AICUZ program began, there were no current comprehensive studies on accident potential. In support of the program, the Air Force completed a study of Air Force accidents that occurred between 1968 and 1972 within 10 nautical miles of airfields. The study of 369 accidents revealed that 75 percent of aircraft accidents occurred on or adjacent to the runway (1,000 feet to each side of the runway centerline) and in a corridor 3,000 feet (1,500 feet either side of the runway centerline) wide, extending from the runway threshold along the extended runway centerline for a distance of 15,000 feet.

Three zones were established based on crash patterns: The clear zone, accident potential zone (APZ) I, and accident potential zone (APZ) II. The clear zone starts at the end of the runway and extends outward 3,000 feet. It has the highest accident potential of the three zones. The Air Force has adopted a policy of acquiring property rights to areas designated as clear zones because of the high accident potential. APZ I extends from the clear zone an additional 5,000 feet. It includes an area of reduced accident potential. APZ II extends from APZ I an additional 7,000 feet in an area of further reduced accident potential.

The Air Force research work in accident potential was the first significant effort in this subject area since 1952 when the President's Airport Commission published "The Airport and Its Neighbors," better known as the "Doolittle Report." The recommendations of this earlier report were influential in the formulation of the accident potential zone concept.

The risk to people on the ground of being killed or injured by aircraft accidents is small. However, an aircraft accident is a high consequence event and when a crash does occur, the result is often catastrophic. Because of this, the Air Force does not attempt to base its safety standards on accident probabilities. Instead the Air Force approaches this safety issue from a land use planning perspective.

A.2 Accident Potential Analysis

Military aircraft accidents differ from commercial air carrier and general aviation accidents because of the variety of aircraft used, the type of missions, and the number of training flights. In 1973, the U.S. Air Force (USAF) performed a aircraft accident hazard study in order to identify land near airfields with significant accident potential. Accidents

studied occurred within ten nautical miles of airfields.

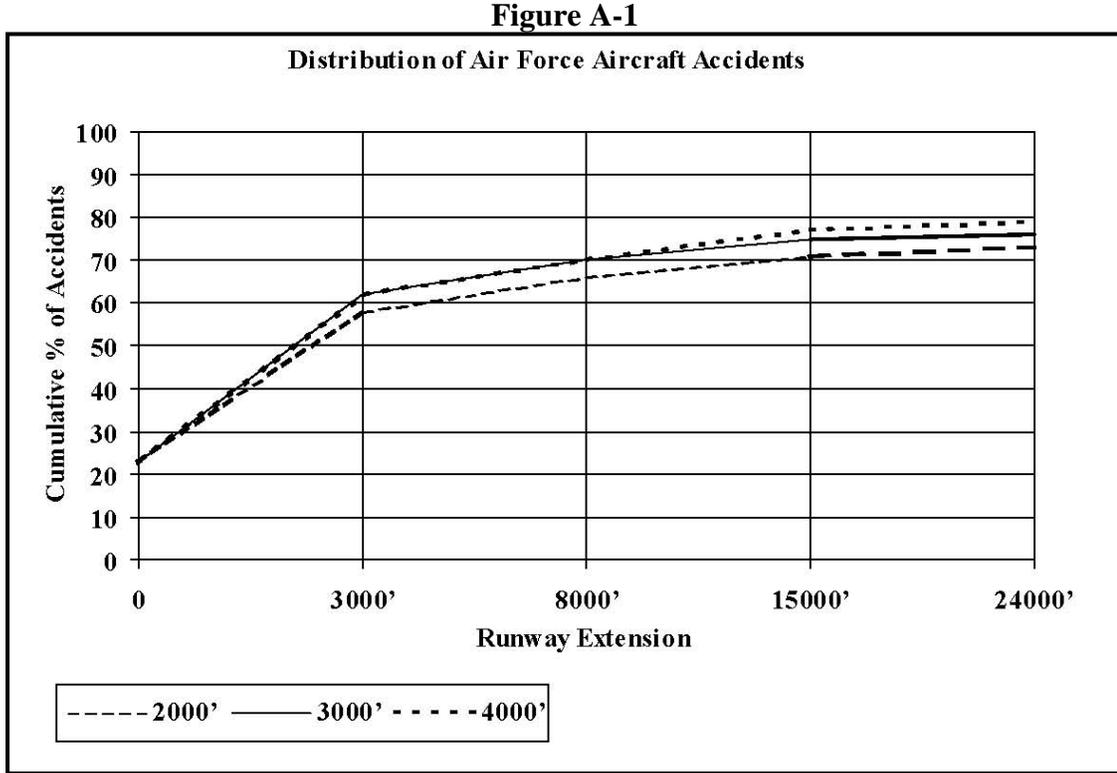
The study reviewed 369 major USAF accidents during 1968-1972, and found that 61 percent of the accidents were related to landing operations and 39 percent were takeoff related. It also found that 70 percent occurred in daylight, and that fighter and training aircraft accounted for 80 percent of the accidents.

Because the purpose of the study was to identify accident hazards, the study plotted each of the 369 accidents in relation to the airfield. This plotting found that the accidents clustered along the runway and its extended centerline. To further refine this clustering, a tabulation was prepared which described the cumulative frequency of accidents as a function of distance from the runway centerline along the extended centerline. This analysis was done for widths of 2,000, 3,000, and 4,000 total feet. The location analysis found the following:

Table A-1 LOCATION ANALYSIS

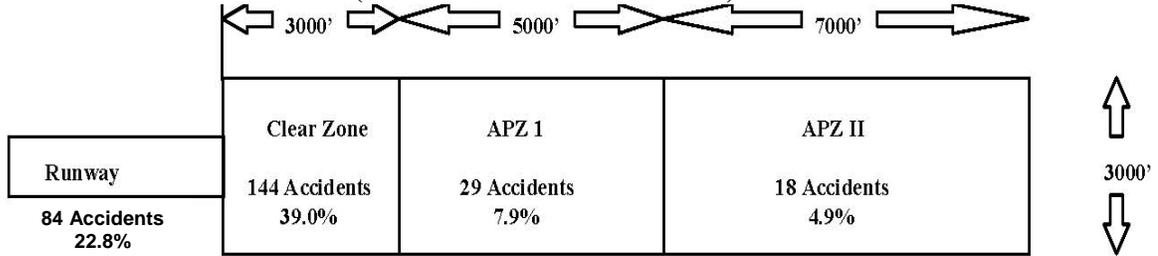
Length From both Ends of Runway (feet)	Width of Runway Extension (feet)		
	2,000	3,000	4,000
Percent of Accidents			
On or adjacent to runway (1,000 feet to each side of runway centerline)	23	23	23
0 to 3,000	35	39	39
3,000 to 8,000	8	5	8
8,000 to 15,000	5	5	7
Cumulative percent of accidents			
On or adjacent to runway (1,000 feet to each side of runway centerline)	23	23	23
0 to 3,000	58	62	62
3,000 to 8,000	66	70	70
8,000 to 15,000	71	75	77

Figure A-1 indicates that the cumulative number of accidents rises rapidly from the end of the runway to 3,000 feet, where it levels off rapidly. The location analysis also indicates that the optimum width of the runway extension, which would include the maximum percentage of accidents in the smallest area is 3,000 ft.



Using the optimum runway extension width, 3,000 feet, and the cumulative distribution of accidents from the end of the runway, zones were established which minimized the land area included and maximized the percentage of accidents included. The zone dimensions and accident statistics for the 1968-1972 study are shown in Figure A-2.

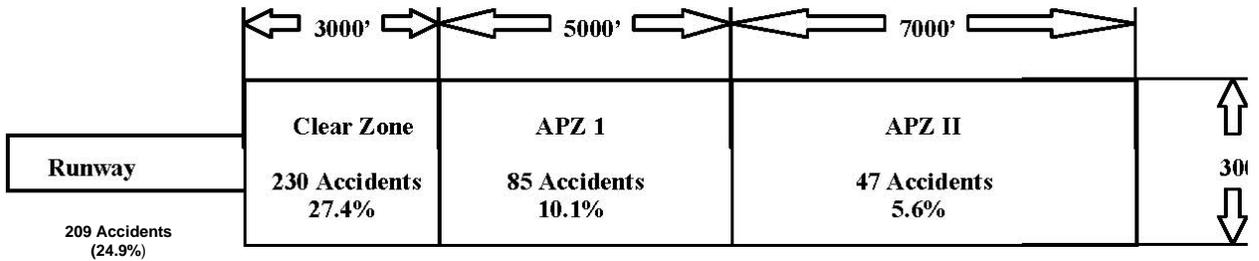
Figure A-2
Air Force Accident Data
(369 Accidents -- 1968-1972)



Other Accidents within 10 Nautical Miles
94 Accidents --25.4%

The original study was updated to include accidents through September 1995. The updated study now includes 838 accidents during the 1968-1995 period. Using the optimum runway extension width of 3,000 feet, the accident statistics of the updated study are shown below.

Figure A-3
Air Force Accident Data
(838 Accidents -- 1968-1995)



Other Accidents within 10 Nautical Miles
267 Accidents -- 31.9%

Using the designated zones and accident data, it is possible to calculate a ratio of percentage of accidents to percentage of area size. These ratios indicate that the clear zone, with the smallest area size and the highest number of accidents, has the highest ratio, followed by the runway and adjacent area, APZ I and then APZ II.

Table A-2 ACCIDENT TO AREA RATIO

Ratio of Percentage of Accidents to Percentage of Area (Air Force Accident Data 1968 - 1995)						
	Area ¹ (acres)	Number ² Accident	Accident Per Acre	% Total Area	% Total Accident	Ratio: ³ Accident to Area
Runway Area ⁴	487	209	1 Per 2.3	0.183	24.9	136
Clear Zone	413	226	1 Per 1.8	0.155	27.4	177
APZ I	689	85	1 Per 8.1	0.258	10.1	39
APZ II	964	47	1 Per 20.5	0.362	5.6	15
Other	264,053	267	1 Per 989	99.0425	31.9	0.3

- NOTES: 1. Area includes land within 10 nautical miles of runway (Total of 266,606 acres).
 2. Total number of accidents is 838 (through 1995).
 3. Percent total accidents divided by percent total area.
 4. Runway dimension are 2000' X 10,600'.

A.3 Definable Debris Impact Areas

The Air Force also determined which accidents had definable debris impact areas, and in what phase of flight the accident occurred. Overall, 75 percent of the accidents had definable debris impact areas, although they varied in size by type of accident. The Air Force used weighted averages of impact areas, for accidents occurring only in the approach and departure phase, to determine the following average impact areas:

Average Impact Areas for Approach and Departure Accidents

Overall Average Impact Area	5.06 acres
Fighter, Trainer and Misc. Aircraft	2.73 acres
Heavy Bomber and Tanker Aircraft	8.73 acres

A.4 Findings

- Designation of safety zones around the airfield and restriction of incompatible land uses can reduce the public's exposure to safety hazards.
- Air Force accident studies have found that aircraft accidents near Air Force installations occurred in the following patterns:
 - 61% were related to landing operations.
 - 39% were related to takeoff operations.
 - 70% occurred in daylight.
 - 80% were related to fighter and training aircraft operations.
 - 25% occurred on the runway or within an area extending 1,000 feet out from each side of the runway.
 - 27% occurred in an area extending from the end of the runway to 3,000 feet along the extended centerline and 3,000 feet wide, centered on the extended centerline.
 - 15% occurred in an area between 3,000 and 15,000 feet along the extended runway centerline and 3,000 feet wide, centered on the extended centerline.
- U.S. Air Force aircraft accident statistics found that 75% of aircraft accidents resulted in definable impact areas. The size of the impact areas were:
 - 5.1 acres overall average.
 - 2.7 acres for fighters and trainers.
 - 8.7 acres for heavy bombers and tankers.

APPENDIX B

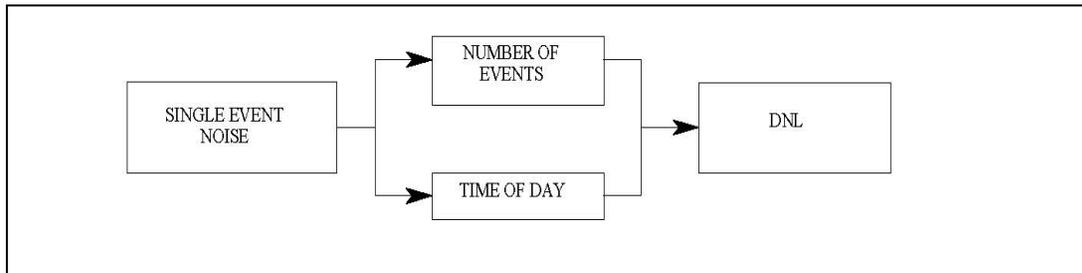
DESCRIPTION OF THE NOISE ENVIRONMENT

B.1 Noise Environment Descriptor

The noise contour methodology used herein is the Day-Night Average A-Weighted Sound Level (DNL) metric of describing the noise environment. Efforts to provide a national uniform standard for noise assessment have resulted in adoption by the Environmental Protection Agency of DNL as the standard noise descriptor. The Air Force uses the DNL descriptor in assessing the amount of aircraft noise exposure, and as a metric for community response to the various levels of exposure. The DNL values used for planning purposes are 65, 70, 75, and 80 dB. Land use guidelines are based on the compatibility of various land uses with these noise exposure levels.

It is generally recognized that a noise environment descriptor should consider, in addition to the annoyance of a single event, the effect of repetition of such events and the time of day in which these events occur. DNL begins with a single event descriptor and adds corrections for the number of events and the time of day. Since the primary development concern is residential, nighttime events are considered more annoying than daytime events and are weighted accordingly. DNL values are computed from the single event noise descriptor, plus corrections for number of flights and time of day (Figure B-1).

Figure B-1 DAY NIGHT AVERAGE A WEIGHTED SOUND



As part of the extensive data collection process, detailed information is gathered on the type of aircraft, the number, and time of day of flying operations for each flight track during a typical day. This information is used in conjunction with the single event noise descriptor to produce DNL values. These values are combined on an energy summation basis to provide single DNL values for the mix of aircraft operations at the base. Equal value points are connected to form the contour lines.

Although most of the country uses the DNL metric, the standard in California is the Community Noise equivalent Level (CNEL). The CNEL metric gives a higher weighting for flights occurring between 7 p.m. and 10 p.m. and between 10 p.m. and 7 a.m. while

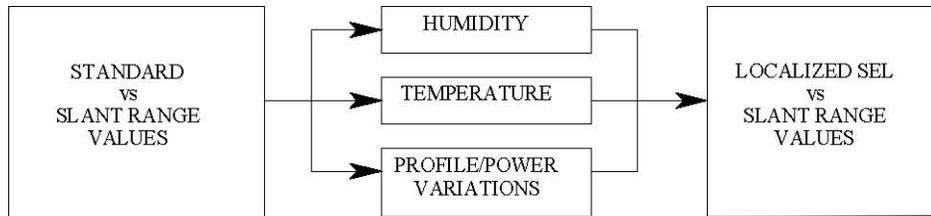
the DNL metric gives a higher rating between 10 p.m. and 7 a.m. only. The DNL noise zones are included in this appendix for reference. The CNEL metric was used to define noise zones at Beale.

B.2 Noise Event Descriptor

The single event noise descriptor used in the DNL system is the Sound Exposure Level (SEL). The SEL measure is an integration of an "A" weighted noise level over the period of a single event such as an aircraft flyover, in dB.

Frequency, magnitude, and duration vary according to aircraft type, engine type, and power setting. Therefore, individual aircraft noise data are collected for various types of aircraft/engines at different power settings and phases of flight. The following diagram shows the relationship of the single event noise descriptor (SEL) to the source sound energy.

Figure B-2 Sound Exposure Level



SEL vs. slant range values are derived from noise measurements made according to a source noise data acquisition plan developed by Bolt, Beranek, and Newman, Inc., in conjunction with the Air Force's Armstrong Laboratory (AL) and carried out by AL. These standard day, sea level values form the basis for the individual event noise descriptors at any location and are adjusted to the location by applying appropriate corrections for temperature, humidity, and variations from standard profiles and power settings.

Ground-to-ground sound propagation characteristics are used for altitudes up to 500 feet absolute with linear transition between 500 and 700 feet and air-to-ground propagation characteristics above 700 feet.

In addition to the assessment of aircraft flight operations, the DNL system also incorporates noise resulting from engine/aircraft maintenance checks on the ground. Data concerning the orientation of the noise source, type of aircraft or engine, number of test runs on a typical day, power settings used and their duration, and use of suppression

devices are collected for each ground run up or test position. This information is processed and the noise contribution added (on an energy summation basis) to the noise generated by flying operations to produce noise contours reflecting the overall noise environment with respect to aircraft air and ground operations.

B.3 Noise Contour Production

Data describing flight track distances and turns, altitudes, airspeeds, power settings, flight track operational utilization, maintenance locations, ground run-up engine power settings, and number and duration of runs by type of aircraft/engine is assembled by each individual AFB. The data is screened by the MAJCOM and HQ AFCEE/ECC. Trained personnel process the data for input into a central computer. Flight track maps are generated for verification and approval by the base/MAJCOM. After any required changes have been incorporated, DNL contours are generated by the computer using the supplied data and standard source noise data corrected to local weather conditions. These contours are plotted and prepared for photographic reproduction. A set of these contours is provided in the body of the report.

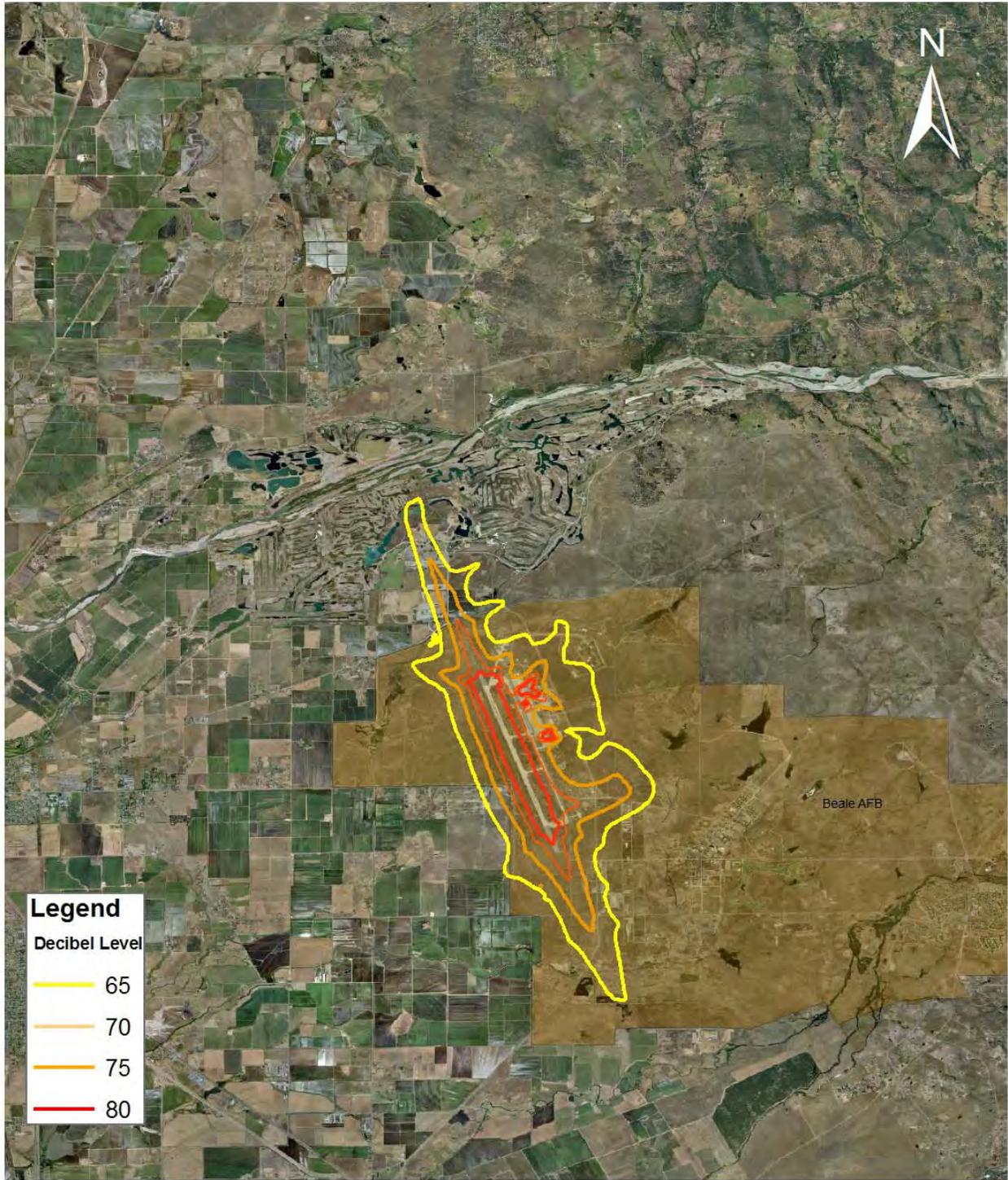
B.4 Technical Information

Additional technical information on the DNL procedures are available in the following publications:

Community Noise Exposure Resulting from Aircraft Operations: Applications Guide for Predictive Procedure, AMRL-TR-73-105, November, 1974, from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22151.

Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with Adequate Margin of Safety, EPA Report 550/9-74-004, March, 1974, from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Adopted Noise Regulations for California Airports, Title 4, Register 70, No. 48-11-28-70, Subchapter 6, Noise Standards.



NOTE: THIS MAP IS FOR REFERENCE ONLY
 The end user must be aware of data conditions and ultimately bear responsibility for the appropriate use of the information with respect to possible errors, original map scale, collection methodology, currency of data, and other conditions specific to certain data.

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 State Plane California II FIPS 0402 (FEET)
 North American Datum 1983

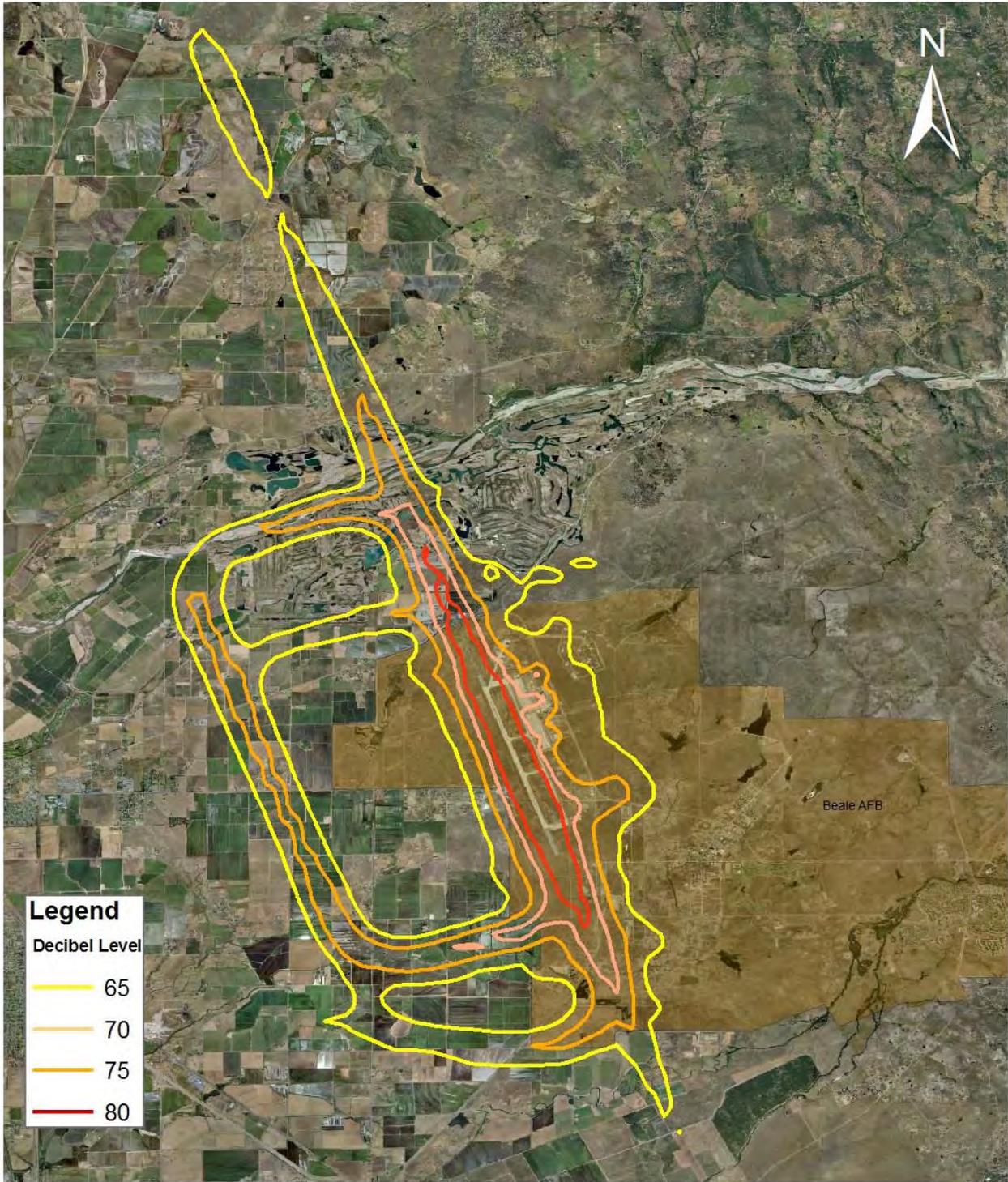
**Figure B-3 DNL
 Noise Contours**



Beale AFB
 Yuba County, CA



0 0.5 1 2 Miles
 |-----|-----|-----|-----|



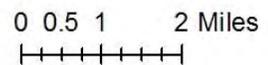
NOTE: THIS MAP IS FOR REFERENCE ONLY
 The end user must be aware of data conditions and ultimately bear responsibility for the appropriate use of the information with respect to possible errors, original map scale, collection methodology, currency of data, and other conditions specific to certain data.

Prepared 11 Jan 2006 Map Projection:
 State Plane California II FIPS 0402 (FEET)
 North American Datum 1983

Figure B-4. Hypothetical DNL Noise Contours



Beale AFB
 Yuba County, CA



APPENDIX C

HEIGHT AND OBSTRUCTIONS CRITERIA

C.1 Height And Obstructions Criteria

C.1.1 General

This appendix establishes criteria for determining whether an object or structure is an obstruction to air navigation. Obstructions to air navigation are considered to be:

- Natural objects or man-made structures that protrude above the planes or surfaces as defined in the following paragraphs, and/or;
- Man-made objects that extend more than 500 feet above the ground at the site of the structure.

C.1.2 Explanation of Terms

The following will apply (See Figure C-1):

- Controlling Elevation. Whenever surfaces or planes within the obstructions criteria overlap, the controlling (or governing) elevation becomes that of the lowest surface or plane.
- Runway Length. Beale AFB has two runways, and 12,000 feet of pavement designed and built for sustained aircraft landings and takeoffs.
- Established Airfield Elevation. The elevation, in feet above mean sea level for Beale AFB is 113feet.
- Dimensions. All dimensions are measured horizontally unless otherwise noted.

C.1.3 Planes and Surfaces.

Definitions are as follows:

- Primary Surface. This surface defines the limits of the obstruction clearance requirements in the immediate vicinity of the landing area. The primary surface comprises surfaces of the runway, runway shoulders, and lateral safety zones and extends 200 feet beyond the runway end. The width of the primary surface for a single class "B" runway is 2,000 feet, or 1,000 feet on each side of the runway centerline.
- Clear Zone Surface. This surface defines the limits of the obstruction clearance requirements in the vicinity contiguous to the end of the primary surface. The length and width (for a single runway) of a clear zone surface at Beale AFB is 3,000 feet by 3,000 feet.

- Approach-Departure Clearance Surface. This surface is symmetrical about the runway centerline extended, begins as an inclined plane (glide angle) 200 feet beyond each end of the primary surface of the centerline elevation of the runway end, and extends for 50,000 feet. The slope of the approach-departure clearance surface is 50:1 along the extended runway (glide angle) centerline until it reaches an elevation of 500 feet above the established airfield elevation. It then continues horizontally at this elevation to a point 50,000 feet from the start of the glide angle. The width of this surface at the runway end is 2,000 feet; it flares uniformly, and the width at 50,000 feet is 16,000 feet.
- Inner Horizontal Surface. This surface is a plane, oval in shape at a height of 150 feet above the established airfield elevation. It is constructed by scribing an arc with a radius of 7,500 feet above the centerline at the end of the runway and interconnecting these arcs with tangents.
- Conical Surface. This is an inclined surface extending outward and upward from the outer periphery of the inner horizontal surface for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation. The slope of the conical surface is 20:1.
- Outer Horizontal Surface. This surface is a plane located 500 feet above the established airfield elevation. It extends for a horizontal distance of 30,000 feet from the outer periphery of the conical surface.
- Transitional Surfaces. These surfaces connect the primary surfaces, clear zone surfaces, and approach-departure clearance surfaces to the outer horizontal surface, conical surface, other horizontal surface, or other transitional surfaces. The slope of the transitional surface is 7:1 outward and upward at right angles to the runway centerline. To determine the elevation for the beginning the transitional surface slope at any point along the lateral boundary of the primary surface, including the clear zone, draw a line from this point to the runway centerline. This line will be at right angles to the runway axis. The elevation at the runway centerline is the elevation for the beginning of the 7:1 slope.

The land areas outlined by these criteria should be regulated to prevent uses which might otherwise be hazardous to aircraft operations. The following uses should be restricted and/or prohibited.

- Uses which release into the air any substance which would impair visibility or otherwise interfere with the operation of aircraft (i.e. steam, dust, or smoke).
- Uses which produce light emissions, either direct or indirect (reflective), which would interfere with pilot vision.
- Uses which produce electrical emissions which would interfere with aircraft communications systems or navigational equipment.

- Uses which would attract birds or waterfowl, including but not limited to, operation of sanitary landfills, maintenance of feeding stations, or the growing of certain vegetation.
- Uses that provide for structures within ten feet of aircraft approach-departure and/or transitional surfaces.

C.2 Height Restrictions

City/County agencies involved with approvals of permits for construction should require developers to submit calculations which show that projects meet the height restriction criteria of FAA Part 77 as described, in part, by the information contained in this Appendix.

BEALE AFB Coordinates and Elevations

Airfield Elevation	113 feet MSL
Coordinates:	
Runway 15	Lat 39 Deg., 09 Min., 6.49. Sec N Long. 121 Deg., 26 Min., 32.19 Sec. W
Runway 33	Lat 39 Deg., 07 Min., 14.03. Sec N Long. 121 Deg., 25 Min., 43.39 Sec. W

Figure C-1
AIRSPACE CONTROL SURFACE PLAN

For a more complete description of airspace and control surfaces for Class A and Class B runways refer to FAR part 77, Subpart C or UFC 3-260-1 Airfield and Heliport Design.

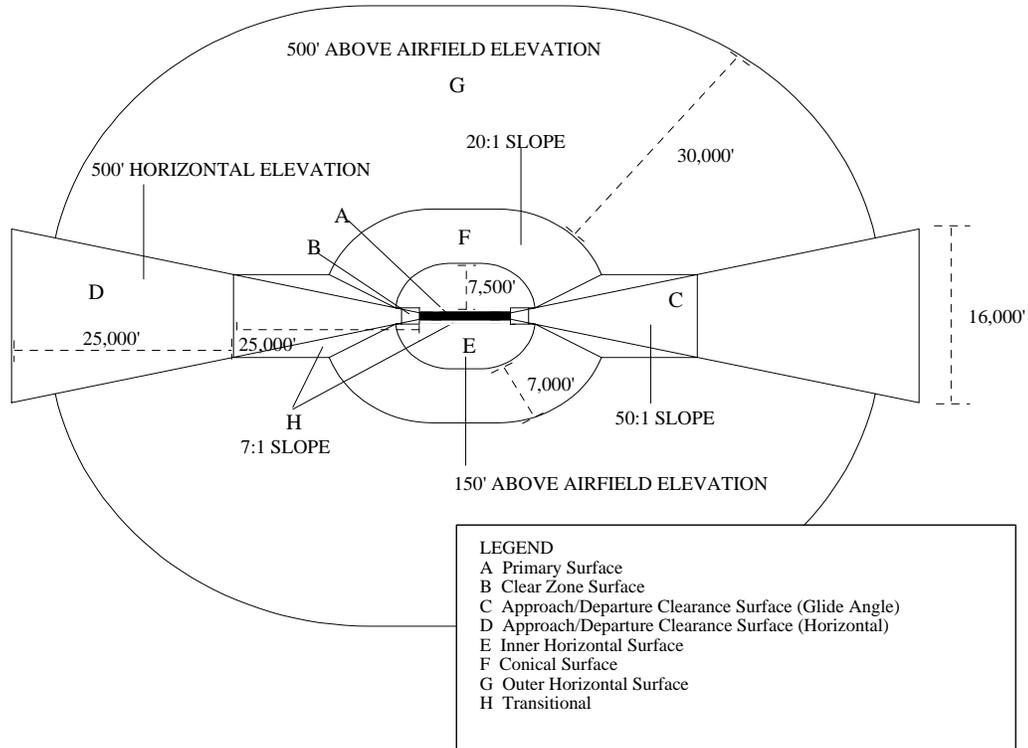
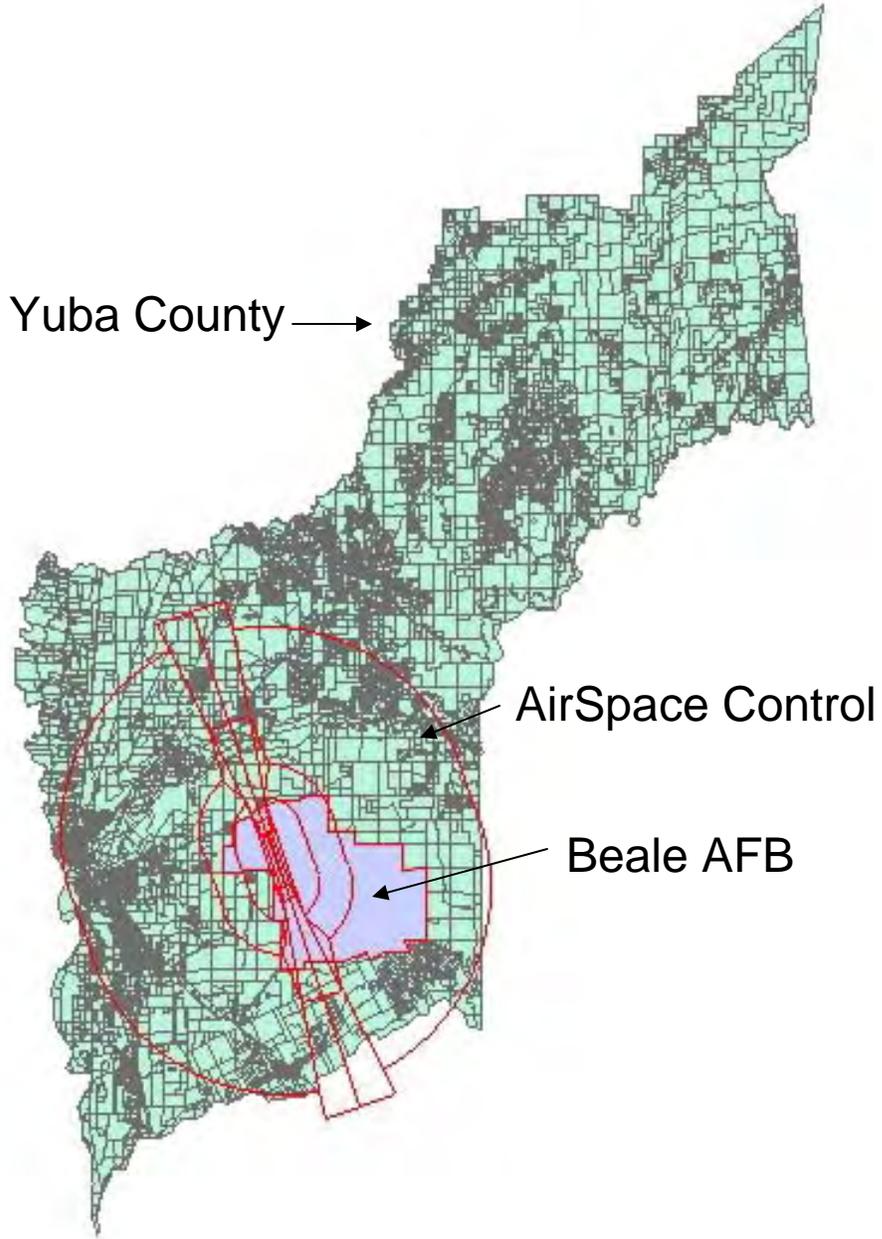


Figure C-2
AIRSPACE CONTROL SURFACE PLAN
AND YUBA COUNTY



APPENDIX D

NOISE LEVEL REDUCTION GUIDELINES

A study which provides in-depth, state-of-the-art noise level reduction guidelines was completed for the Naval Facilities Engineering Command and the Federal Aviation Administration, by Wyle Laboratories in November 1989. The study title is, *Guidelines for the Sound Insulation of Residences Exposed to Aircraft Operations*, Wyle Research Report WR 89-7. Copies of this study are available for at the following web site:
<http://www.afcee.brooks.af.mil/ec/noise/aicuz/report.pdf>



Appendix C
PAVE PAWS Information

AN ASSESSMENT OF POTENTIAL HEALTH RISKS FROM EXPOSURES TO PAVE PAWS LOW-LEVEL PHASED-ARRAY RADIOFREQUENCY ENERGY

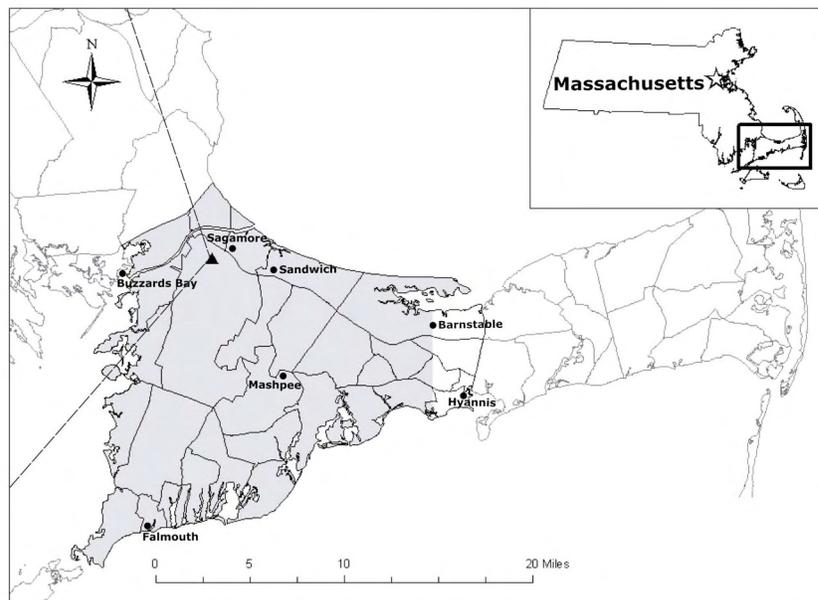
This report examines the potential biological and human-health effects from exposure to PAVE PAWS low-level phased-array radiofrequency energy. The PAVE PAWS radar system, part of the U.S. Air Force Space Command, is located at the Cape Cod Air Force Station in Cape Cod, Massachusetts (see Figure 1). The facility has been in continuous operation since 1979. “PAVE” is an Air Force program name and “PAWS” stands for Phased Array Warning System. The primary purpose of the facility is to detect and track sea-launched and intercontinental ballistic missiles. The system’s secondary function is to track earth satellites and identify other space objects.



The PAVE PAWS radar. Photo courtesy U.S. Air Force.

Even before the facility began operation, there had been concerns expressed by at least some members of the public regarding its safety and whether or not the facility had the potential to cause adverse health impacts. In 1979, concerns voiced by the public included the possibility of thermal effects, disruption to implanted medical devices (such as pacemakers), and secondary radiation effects from improperly-grounded structures exposed to the radar. Those concerns in part led to a

Figure 1. Map of Cape Cod in Massachusetts shows the “Upper Cape” (shaded area), which is the area of concern. The location of the PAVE PAWS radar is indicated by the solid triangle near the town of Sagamore. The dashed lines extending from the radar indicate the approximate boundaries of the main beam when the radar is scanning (beam scans to the east within the dashed lines).



1979 National Research Council (NRC) report on exposure levels and potential biological effects of the PAVE PAWS radar. That committee found that: “...the PAVE PAWS radar may be anticipated to expose a limited number of members of the general public intermittently to low intensities of pulse-modulated microwave fields with maximal intensities of 100 $\mu\text{W}/\text{cm}^2$ or less and time-averaged intensities lower by two orders of magnitude. There are no known irreversible effects of such exposure on either morbidity and mortality in humans or other species.”

That committee also recommended that the Air Force conduct additional research and surveillance to evaluate the potential exposure effects of PAVE PAWS. Specifically, the 1979 report recommended:

- “Additional research is recommended to clarify further the possible effects of long-term exposure to microwave radiation at low power densities,” and
- “In view of the known sensitivity of the mammalian central nervous system to electromagnetic fields, especially those modulated at brainwave frequencies, the possibility cannot be ruled out that exposure to PAVE PAWS radiation may have some effects on exposed people. Because these effects are still hypothetical, it is not feasible to assess their health implications. Such assessment will require additional research and surveillance and must be addressed in future evaluations of the potential exposure effects of PAVE PAWS and other high-power-output radar systems.”

The present NRC committee found no evidence that the Air Force or others followed up substantially on the above two recommendations.

Recent Public Concerns

Public concerns over the possibility for adverse effects from the PAVE PAWS facility have continued over the years since the time of the 1979 NRC report. In recent years, public concerns have shifted away from thermal effects of the radiofrequency (RF). Concerns instead have focused on:

- the possible biological relevance of the waveform itself;
- the inherent time delay of the phased-array radar including the secondary beams or sidelobes that are below the main beam; and
- the possible implications for health arising from the propagation of the RF energy in tissue. Some members of the public have questioned whether radiation from the PAVE PAWS system is unique such that existing safety measures may not adequately protect the public. Others have stated that the system—in spite of its unique configuration—is not that dissimilar from the other sources of RF energy to which the public is constantly exposed such as FM radio stations, TV stations, or continuous-wave radar systems.

In an effort to try to address the questions that have been raised regarding the safety and uniqueness of the system, in January 2001, Senator Edward M. Kennedy asked the U.S. Air Force to fund an independent study through the National Research Council of the National Academies “to examine the health effects of the PAVE PAWS system” and to address in a follow-on report to the 1979 NRC report, the effects if any, of the PAVE PAWS radar over its two-plus decades of operation.

What the Committee Did

The committee undertook an extensive data- and information-gathering effort. That effort included 4 sessions at which members of the public were invited to attend and where researchers whose work was referenced as important by members of the public, or considered important by the committee, were invited to provide the committee with information. An additional meeting of the committee was held as a public forum in which interested members of the public were encouraged to present their viewpoints to the committee. In addition, there were several members of the public, who, on a number of occasions, requested that the committee review specific information they wished to be made available to the committee. Over 200 submissions of information were made to the committee by interested parties. Because there have been no studies of a phased-array system similar to PAVE PAWS in the public domain, we reviewed all the relevant available data (i.e., peer reviewed and scientifically available) in the radiofrequency range most applicable to the PAVE PAWS system (see appendix A). Further, in response to concerns raised by some members of the public that classified data might exist showing effects of a phased-array radar, a number of committee members with sufficient scientific expertise and security clearances also examined and assessed whether there was any classified research done by the U.S. Air Force that might show any evidence of biological effects with potential relevance to human health effects of radiation similar in characteristics to PAVE PAWS.

The committee found no evidence of any classified, phased-array experiments that were either relevant to the PAVE PAWS exposure conditions or indicated a potential for PAVE PAWS human-health effects. Thus, we do not believe there is any classified data showing potential harm from the PAVE PAWS system.

Results and Conclusions

The committee's conclusions address three primary areas: the implications of the PAVE PAWS waveform, the potential for biological effects, and the potential for human-health effects.

The PAVE PAWS Waveform

Recently collected waveform-characterization data that the committee reviewed has answered many questions. Based on that review and some additional statistical analyses we performed, we reached the following conclusions:

1. The PAVE PAWS narrow-band radiation is in fact similar to that of continuous narrow-band reflectors or so-called "dish" antennas. Those large parabolic reflector (dish) antennas are widely used for satellite earth terminals, and for radars. Both reflectors and phased arrays have time delays, and comparable size reflector antennas also have comparable delays.
2. The large number of PAVE PAWS active elements (1,792) and their irregular spacing make the discrete beam formation almost indistinguishable from a continuous formation.
3. The existence and possible biological significance of precursors (additions to a signal waveform that may occur before, during, or after the signal waveform) forming would be extremely small and probably not measurable for the narrow-band PAVE PAWS system.

Potential for Biological Effects

The committee concluded:

4. Relevant data exist from experiments with animals and cells exposed under certain RF conditions that contribute to an understanding of RF biological effects and to an understanding of the potential for human-health effects from PAVE PAWS.
5. There is no risk of cancer, reproductive or developmental effects, or neurobehaviorial effects based on a comprehensive review of animal studies or studies in other biological systems. A few statistically significant biological changes have been reported from RF exposures, but the relevance of those biological changes is not known and may or may not have any impact on human health.

Potential Public-Health Effects

The committee recognizes the concerns of some of the members of the public regarding the ongoing operation of the facility, especially in light of the increase in cancers for colorectal, breast, prostate, and lung that have been reported in the upper Cape over time. To date, those observed elevated cancer-incidence rates among residents of upper Cape Cod have not been adequately explained through previous investigations exploring a variety of environmental factors including PAVE PAWS. The inability of investigators to explore the possibility of health effects from the PAVE PAWS radar was due principally to the lack of PAVE PAWS RF power-density information at that time.

To determine the potential for health effects, it is important to have an estimate of exposure. One of the consistent problems in most epidemiologic studies is the lack of adequate exposure data. This was true in the relevant epidemiologic studies evaluated by the committee for other populations exposed to either pulsed or continuous radiofrequency energy. Unfortunately, there are too many limitations in those epidemiological studies to rely on them for making a determination of the potential impact of radar exposure on human health. With regard to PAVE PAWS exposures, the historic lack of waveform characterization data and exposure data (in the form of power-density measurements) at locations where exposure to the Cape Cod population occurs has made assessment of the potential for health effects difficult. Recent waveform and power-density models and measurements by the Air Force and Broadcast Signal Laboratories have enabled some analyses by this committee and enabled a forthcoming health study by the International Epidemiology Institute.

The committee concluded:

6. The available power-density measurements are generally consistent and show that the spatial distribution of the PAVE PAWS radiofrequency energy, and thus potential for exposure, is strongly influenced by site-specific local topography and intervening terrain at any given location. The measured data show that average power densities are consistently below $0.1 \mu\text{W}/\text{cm}^2$, and generally in the $0.001\text{-}0.01 \mu\text{W}/\text{cm}^2$ range at locations where the public would be expected to be exposed. Measured peak levels are generally less than $1 \mu\text{W}/\text{cm}^2$, although values as high as $15 \mu\text{W}/\text{cm}^2$ have been found at a few elevated locations near the radar where exposure might occur. The levels of exposure can be compared to EPA studies of FM and TV broadcast bands (54-900 MHz) in the 1970s. Those studies estimated that the median exposure in urban areas was $0.005 \mu\text{W}/\text{cm}^2$ and that 95% of the urban population was exposed to less than $0.1 \mu\text{W}/\text{cm}^2$ from FM and TV

-
- broadcasts. Recent studies on cell-phone base stations in Great Britain, Canada, and Australia show RF frequencies in the vicinity of base stations ranging from $0.01 \mu\text{W}/\text{cm}^2$ to a high reading of $2.6 \mu\text{W}/\text{cm}^2$.
7. The potential for an individual's exposure over time is determined by how long they reside at any possible point(s) where exposure might occur, and the level of exposure at that particular point, which will vary with time and other factors. In spite of recent site-specific measurements and estimates of the PAVE PAWS waveforms and power densities that now exist for a number of geographic locations, there are still no data currently available to determine an individual's personal exposure to RF radiation from the PAVE PAWS radar.
 8. Using information on population density, topography, and direction of the PAVE PAWS radar beam, we estimated that, based on the 1990 census, 12,773 of the total resident population (11.8 % including children) of the upper Cape Cod were living in the line of sight¹ of the PAVE PAWS antenna and most likely receiving some exposure from the sidelobes of the PAVE PAWS radar beam (but not the primary beam, which is angled upward). Based on 2000 census data, the estimated number of population living in the area exposed to the PAVE PAWS radar-beam sidelobes was 16,403 (12.4%).
 9. Using power-density information from models provided by Mitre and recent power-density measurements and models provided by Broadcast Signal Laboratories, this committee also did its own statistical analysis. Based on our own statistical analyses, we did not identify any increase in cancer risk with exposure to the PAVE PAWS beam using peak and average power-density estimates. The analyses looked at the reported occurrences of all cancers combined on the upper Cape as well as specific cancers, including colorectal, breast (female), prostate, and lung. We are also aware of the epidemiologic investigation that is currently being conducted by the International Epidemiology Institute, but data from that study was not available to review as of the writing of this report.
 10. Socioeconomic status does not appear to influence results. We performed additional analyses to see whether some indicators of socioeconomic status might influence the results (an adjustment routinely made in health or epidemiologic studies). We found that adjusting for the proportion of the population below the poverty level did not influence the results.
 11. As another overall measure of health for the upper Cape Cod towns, the committee looked at premature mortality before age 75 as a useful indicator. Based on 2001 data, Barnstable, Falmouth, Mashpee, and Sandwich have lower mortality than the Massachusetts state average, while Bourne has elevated mortality.
 12. Further analysis by the committee indicates that increasing duration of exposure to the PAVE PAWS radiofrequency energy has not resulted in increased incidence of cancer over time. The committee compared the standard cancer-incidence rates, or SIRs, for 5 categories consisting of: total cancers, breast, colon, lung, and prostate cancer for the period of 1987-94 versus 1995-99 (which are the periods that the State of Massachusetts reports data) for the 5 towns in upper Cape Cod and found that there was no consistent pattern of increase. During those two time periods, a decrease in SIR was observed in 15 out of 25 SIRs, an increase in 6 out of 25 SIRs and, no change in 4 out of 25 SIRs. Again, the results indicate that increasing exposure to PAVE PAWS over time has not resulted in an increased incidence of cancer. PAVE PAWS over time has not resulted in an increased incidence of cancer.

¹Line of sight means that there are no hills between the resident and the radar that would block the radar emissions. The main beam is aimed above the population and residents in the line of sight are exposed to the sidelobes of the main beam.

Summary

In summary, based on the available scientific evidence, the committee concludes there are no adverse health effects to the population resulting from continuing or long-term exposure to the PAVE PAWS radiation. In particular, the committee concludes that there is no increase in total cancers or cancers of the prostate, breast, lung, or colon due to exposure to the PAVE PAWS radiation. Further, there are many studies and data that support the finding of no health or biological effects from RF exposures. There are a number of possible mechanisms and pathways by which electric and magnetic fields could lead to changes at higher power-density levels than the public is exposed to from the PAVE PAWS radar. However, at this time, the committee has not found evidence of a mechanism shown to change biologic processes at power levels that are associated with the PAVE PAWS radar. The recent waveform-characterization data collected for the PAVE PAWS radar has also shown that it is similar to exposures from “dish” radars to which the public are also continuously exposed.

It is extremely difficult, if not impossible, to prove ultimate safety. In the United States, various forms of safety or risk assessment are used along with regulatory guidelines to ensure that facilities, products, technologies, and other factors will not pose undue risk or harm to the public or environment. The scientific community, including medical professionals, is often reluctant to call something “safe” and so often speaks of having or not having some degree of evidence of harm or lack thereof. There is also growing interest in what is referred to as the “precautionary principle” which seeks to avoid taking actions that might have the potential for harm unless a relative degree of safety can be assured. Those decisions are policy or management decisions and not solely a matter of science. This committee has focused on the scientific evidence and carefully evaluated all the scientific evidence available to determine whether there is a reasonable degree of certainty regarding the presence or absence of harm from exposure to the PAVE PAWS phased-array radar. To those who live in the vicinity of that system, no less would be acceptable.

Recommendations Regarding Further Studies

The committee was also tasked to recommend further studies if warranted. The committee recognizes that while biological responses do not necessarily translate into human-health effects, studies on the biological effects of RF exposures should be done that build upon several existing studies demonstrating a statistically significant response to RF exposure, such as the effect of radars on studies of tree growth. Future studies should approximate the PAVE PAWS exposure characteristics as closely as possible. Specifically, we recommend that studies of tree growth in the vicinity of the PAVE PAWS facility should be done. A study of long-term exposures under similar conditions to human exposures might provide useful information as to any possible mechanisms for a biological response which currently does not exist. In addition, we recommend that a replication of a central nervous system endocrine function study be undertaken to confirm or refute previous Air Force-sponsored studies showing a significant and extended influence on brain dopamine levels during low-level RF exposures similar to that of PAVE PAWS.

The Toler and others study demonstrating a significant and long-lasting effect on serum dopamine levels does point to a biological effect that might result in a detrimental health effect. This study is one of the few studies we are aware of which utilized 435 MHz, and effects on brain activity were a major concern of the 1979 NRC review committee, so this study holds additional importance.

Moreover, the study utilized a 1 KHz modulation which would not be expected to have as profound an effect as a modulation frequency similar to that of PAVE PAWS which is in the 10-100 Hz range. For these reasons, it is recommended that this study be refined and repeated.

Finally, because of the limitations and uncertainties that exist in estimated exposure at the individual level and the number of health outcomes of interest, future health investigations or epidemiologic studies should look at exposures at both the census tract* and census-block level, and try to better estimate personal exposure and consider the types of factors known to complicate human-health investigations. Future or ongoing health studies should also specifically address possible early age-of-exposure and/or early age-at-onset of an adverse health effect. Finally, future epidemiologic studies should not be conducted unless they are expected to have sufficient statistical ability, or so-called power, to be able to detect any possible health effects in the Cape Cod population.

* For census reasons, states are divided into counties, which are in turn divided into census blocks, which are further subdivided into census tracts. Most census tracts have between 1500 and 8000 people and they average about 4000 inhabitants. Census blocks are subdivisions of a census tract and are the smallest area that the decennial census data are available to the public.

Committee to Assess Potential Health Risks from Exposures to PAVE PAWS Low-level Phased-array Radiofrequency Energy: Frank S. Barnes, Ph.D.* (Chair), University of Colorado, Boulder; **Robert C. Hansen, Ph.D.* (vice chair)** R.C. Hansen Inc., Tarzana, Calif.; **Larry E. Anderson, Ph.D.,** Pacific Northwest National Laboratory, Richland, Wash.; **Graham A. Colditz, M.D., Dr.P.H.,** Harvard School of Public Health, and Brigham and Women's Hospital, Boston; **Francesca Dominici, Ph.D.,** Johns Hopkins University, Baltimore; **Kenneth J. McLeod, Ph.D.,** State University of New York, Stony Brook; **Keith D. Paulsen, Ph.D.,** Dartmouth College, Hanover, N.H.; **Leslie L. Robison, Ph.D.** University of Minnesota, Minneapolis; **Susan L. Santos, M.S., Ph.D.** UMDNJ School of Public Health and Risk Communication Center for the Study of War Related Illness, Medford, Mass.; **Jan A.J. Stolwijk, Ph.D.,** Yale University, New Haven, Conn.; **Gayle E. Woloschak, Ph.D.,** Northwestern University, Evanston, Ill.; **Evan B. Douple** and **Rick Jostes** (Study Director), Board on Radiation Effects Research, The National Academies.

*Member National Academy of Engineering

For more information, contact the Board on Radiation Effects Research at 202-334-2840. *An Assessment of Potential Health Risks from Exposures to PAVE PAWS Low-level Phased-array Radiofrequency Energy* is available from the National Academies Press, 500 Fifth Street, NW, Washington, DC 20001; 800-624-6242 or 202-334-3313 (in the Washington area); www.nap.edu.

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Appendix D
Firing Range Information

Information provided on 1 May 2007 by:

Dan Reichard

US Army Center for Health Promotion & Preventive Medicine (USACHPPM) - Operational Noise Program

Com: (410)-436-1027

daniel.k.reichard@us.army.mil

5158 Blackhawk Road

Bldg E-1570 Room 200

APG-EA, MD 21010-5403

For reference, the tables show the *unweighted* peak levels (i.e., no filters, and not taking into account any mitigation or safety structures) for an M-60 machine gun so that the reader may get a feel for the directivity and distance decay of small arms noise.

Note: the 0° azimuth is directly in front of the weapon and the 180° azimuth is directly behind the weapon.

PREDICTED PEAK FOR M-60 (7.62 mm) MACHINE GUN, 25 METER TARGET.

Distance, meters <i>(from weapon to receiver)</i>	Predicted Level, dBP Azimuth		
	0°	90°	180°
50	121-131	117-127	107-117
100	114-124	110-120	101-111
200	108-118	103-113	94-104
400	97-107	92-101	83-93
800	88-98	83-93	75-85
1,600	80-90	74-84	67-77

PREDICTED PEAK FOR M-60 (7.62 mm) MACHINE GUN, 200 METER TARGET.

Distance, meters <i>(from weapon to receiver)</i>	Predicted Level, dBP Azimuth		
	0°	90°	180°
50	n/a	117-127	106-116
100	n/a	110-120	101-111
200	n/a	103-113	94-104
400	97-107	91-101	83-93
800	88-98	83-93	75-85
1,600	80-90	74-84	67-77

PREDICTED PEAK FOR M-60 (7.62 mm) MACHINE GUN, 400 METER TARGET.

Distance, meters <i>(from weapon to receiver)</i>	Predicted Level, dBP		
	Azimuth		
	0°	90°	180°
50	n/a	117-127	106-116
100	n/a	110-120	101-111
200	n/a	102-112	94-104
400	n/a	92-111	83-93
800	88-98	83-93	75-85
1,600	80-90	74-84	67-77

PREDICTED PEAK FOR M-60 (7.62 mm) MACHINE GUN, 800 METER TARGET.

Distance, meters <i>(from weapon to receiver)</i>	Predicted Level, dBP		
	Azimuth		
	0°	90°	180°
50	n/a	116-126	106-116
100	n/a	110-120	101-111
200	n/a	103-113	94-104
400	n/a	91-101	83-93
800	n/a	83-93	75-85
1,600	80-90	74-84	67-77



Appendix E
Sample Avigation Easement

RECORDING REQUESTED BY
GRANTOR(s) and

AFTER RECORDING, RETURN TO:
COUNTY OF YUBA
COMMUNITY DEVELOPMENT & SERVICES AGENCY
915 8th STREET, SUITE 123
MARYSVILLE, CA 95901

DEED

GRANT OF AVIATION AND NOISE EASEMENT

_____, A CALIFORNIA CORPORATION, grantor(s), hereby grant(s) to the County of Yuba, a political subdivision of the State of California, and to Beale Air Force Base of the United States Government, grantees, a perpetual and assignable Aviation and Noise easement as provided herein over the following described parcel(s) of land (parcel(s)) in which the grantor(s) hold a fee simple estate referenced by Parcels 1, 2, 3, & 4 of Parcel Map 91-28 filed at Book 59 of Maps Page 31 on August 12, 1992 in Yuba County Official Records and further described as follows:

See Exhibit A, attached hereto and incorporated herein by reference.

Grantor(s) grant(s) to the grantees for the use and benefit of the public, the right of flight for the passage of aircraft in the airspace above the parcel(s) together with the right to cause in said airspace such noise, vibration, discomfort, inconvenience or interference with the use and enjoyment of the parcel(s) as may be inherent in the operation of aircraft, now known or hereafter used for navigation or flight in air, using said air space or landing at, taking off from, or operating on the Beale Air Force Base, County of Yuba, State of California. In addition, this grant of easement incorporates herein by reference, and shall comply with, the requirements of chapter 12.115 (commencing at section 12.115.010) of title XII of the Yuba County Ordinance Code and any amendments or revisions thereto.

This grant of easement satisfies any navigation and noise easement condition or requirement imposed on grantor(s) by grantee, County of Yuba, regarding the parcel(s).

This grant of easement shall be valid and exist unto the grantees, their successors and assigns, until *either a document is recorded by the County of Yuba that the Grant of Aviation and Noise Easement is no longer required* or Beale Air Force Base is abandoned and ceases to be used for aviation purposes.

This grant of easement shall run with the land and shall be binding on and inure to the benefit of the grantor(s) and grantees, and their respective heirs, administrators, executors, successors and assigns. The

parcel(s) shall be the servient tenement and Beale Air Force Base shall be the dominant tenement.

IN WITNESS WHEREOF the grantor(s) have executed this deed on the ____ day of _____, 2006.

X _____
Grantor _____
(Type or Print)

X _____
Grantor _____
(Type or Print)

State of California)
County of _____)

On _____ before me, _____, Notary Public,
personally appeared _____, personally known to me (or proved to me on the basis of
satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and
acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by
his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted,
executed the instrument.

WITNESS my hand and official seal.

NOTARY PUBLIC
My Commission Expires: _____

CERTIFICATE OF ACCEPTANCE

This is to certify that the interest in real property conveyed by the DEED - GRANT OF AVIATION AND NOISE EASEMENT dated _____, 20__, from grantor(s) REYNEN & BARDIS COMMUNITIES, INC., A CALIFORNIA CORPORATION, to grantee, County of Yuba, a political subdivision of the State of California, is hereby accepted by the undersigned on behalf of the Board of Supervisors of grantee pursuant to authority conferred by Resolution No. 1991-182 of the Board of Supervisors of grantee, adopted on July 1, 1991, and the grantee, County of Yuba, consents to recordation thereof by its duly authorized officer.

Dated: _____

COUNTY OF YUBA

By: _____

Kevin Mallen, Director
Community Development & Services Agency
County of Yuba



Appendix F
Part 77 Information

FEDERAL AVIATION REGULATIONS

Part 77 Objections Affecting Navigable Airspace

This edition replaces the existing loose-leaf
Part 77 and its changes.

This FAA publication of the basic Part 77, effective May 1, 1965,
incorporates Amendments 77-1 through 77-11 with preambles.

Published
March 1993

Introductory Note

Part 77 is codified under Subchapter C, Aircraft, of Title 14 of the Code of Federal Regulations.

This FAA publication of the basic Part 77, effective May 1, 1965, incorporates Amendments 73-1 through 73-11.

Bold brackets [**]** throughout the regulation indicate the most recent changed or added material for that particular subpart. The amendment number and effective date of new material appear in bold brackets at the end of each affected section.

NOTICE TO FAA AND OTHER GOVERNMENT USERS

Distribution of changes to this part within the Federal Aviation Administration and other U.S. Government agencies will be made automatically by FAA in the same manner as distribution of this basic part.

Part 77--Objects affecting Navigable Airspace

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Adoption of Revised Part 77

Adopted: February 3, 1965

Effective: May 1, 1965

(Published in 30 F.R. 1837, February 10, 1965)

This revision of Part 77 of the Federal Aviation Regulations relaxes and simplifies the requirements for notice to the Agency of certain proposed structures, consolidates obstruction standards for use in the several Agency programs, and streamlines the Agency procedures for determining the effect of proposed structures on air navigation.

The proposed revision was published in the Federal Register (28 F.R. 7788-7795) on July 31, 1963. Extensive comments were received from aeronautical and non aeronautical sources which endorsed generally the changes under consideration. These comments were very constructive in nature and the Agency appreciates the cooperative spirit in which they were submitted. Since the discussion here must necessarily be a limited review and explanation of the principal actions being taken, the Agency is unable to give specific recognition to each comment. However, each person who participated may be assured that full consideration was given to his recommendations.

The first noteworthy departure in this amendment from the revisions originally proposed relates to the statement in Subpart A-General on the lack of application of Subparts B, D, and E to construction work begun before July 15, 1961. This has been deleted as unnecessary and possibly misleading. The extensive amendments made by this revision to all portions of Part 77 will take effect at the effective date provided herein. Notices received after this date will be processed under the provisions of Part 77 as revised. Aeronautical studies begun prior to this effective date will be continued under the new provisions.

Public reaction to the proposed revisions of the notice requirements disclosed a need for several adjustments. The first of these involves the requirement for notice to the Agency of any proposed structure which would pierce an imaginary slope of 100 to 1 extending from the property line of an airport listed in the "Airport Directory" of the Airman's Information Manual. The property line was selected as a point of beginning because of its greater availability to the public. This feature appears to be an inadequate substitute for the most appropriate point of beginning, that is, the nearest point of the runway nearest to the site of the proposed structure. The use of this point also fixes the elevation of the beginning of the pertinent imaginary slope at the elevation of that nearest point. In addition, the scope of the notice requirement has been substantially reduced. The horizontal distance of the 100 to 1 slope has been restricted to 20,000 feet and will now be applied only to airports with the longest runway more than 3,200 feet in length. For airports with the longest runway 3,200 feet or shorter, a 50 to 1 slope is prescribed for a horizontal distance of 10,000 feet. The FAA "Directory" furnishes the length of the longest runway at each airport. The notice requirement for helicopters now has a horizontal slope of 25 to 1 extending for 5,000 feet.

These notice requirements are made applicable for airports which are either listed in the "Directory" or are operated by a Federal military agency. We have determined that military airports need not be included in the "Directory" in view of their listing in military publications and the fact that their presence is generally well known to people living or owning property in their vicinity. In those cases where the boundaries of a runway of an airport, including a seaplane base, are not designated, the notice requirement of section 77.13(a)(2) will, obviously, not be applicable. However, the notice requirement would apply to those airports which have large sod, or other unpaved areas designated for the takeoff and landing of aircraft. Those areas constitute the runways from which the notice slope is computed. Also, the "Directory" will not list those airports constructed after December 31, 1958, which were the subject of a determination by the Agency that their establishment was not acceptable and would • have an adverse effect on the efficient use of airspace and the safety of aircraft.

While this amendment simplifies the current notice requirements, it is recognized that many construction proponents may nevertheless experience difficulty in ascertaining whether they are required to notify the Agency of their proposed structures. The Airspace Utilization Branch in each FAA regional office is staffed with technicians who are available to inform any interested person of the effect of these notice requirements on a specific construction

proposal. These technicians will also describe the airspace assignments and aeronautical operations in the area of the construction site so that the proponent may make an informed decision on the feasibility of the site and the availability of other areas which may serve his purpose equally and without derogation of air safety.

The substantial number of comments on the shielding provision of section 77.15 which excuses certain construction and alteration proposals from the notice requirements indicates a further explanation would be in order. The shielding provision adopted here is more restrictive than the one previously employed. This limitation was found necessary because of the unjustified extension of the earlier provision by certain construction proponents. As adopted, the shielding exemption is applicable only in the congested areas of cities, towns, and settlements, and then only to structures so shielded that they could not possibly derogate the safety of air navigation. It should be emphasized that this provision does not represent the Agency shielding criteria. It only relates to the exception from the notice requirements. Upon receiving the required notice, the Agency conducts an appropriate aeronautical study of the proposed structure and, in the course of that study, determines whether it would be, in fact, shielded.

The provisions describing the Agency acknowledgment of notices of construction proposals have been further simplified. The acknowledgment will advise each construction sponsor on two subjects, the possible application of the Agency marking and lighting standards, and whether the proposed structure may be a hazard to air navigation. On the first, the acknowledgment advises whether the construction proposal would be of a type included under the provisions of the FAA Manual on "Obstruction Marking and Lighting" and, if so, how the structure should be marked and lighted. On the hazard question, the acknowledgment will generally state whether the construction or alteration would exceed any of the obstruction standards of Subpart C and will either include a determination on whether the structure would be a hazard to air navigation or advise that further study is required to resolve the question. In the relatively few cases where the structure would exceed an obstruction standard and, in addition, would be located within a runway clear zone or the part of the primary surface extending beyond the end of a runway, the acknowledgment advises that the structure would be a hazard to air navigation. As indicated by this discussion, we have determined not to substitute the phrase "adverse effect on air navigation" for "hazard to air navigation." The Agency review of this portion of the proposal and the comments received with respect to it have disclosed that the "hazard" terminology is preferable.

The obstruction standards adopted here differ in many respects from those originally proposed. Upon review of the comments, the Agency has determined that the obstruction criteria most appropriate for promulgation at this time for civil airports, including joint-use airports, should be drawn more directly from the existing Technical Standard Order TSO-N18, "Criteria for Determining Obstruction to Air Navigation." In view of the substantial length of time that the TSO-N18 criteria have been employed for civil aviation purposes, the adoption of these criteria as the consolidated Agency criteria for use in the performance of the statutory functions authorized by the Federal Aviation Act and the Federal Airport Act should result in the least possible disruption of the performance of those functions.

The obstruction standards now presented in Subpart C are less stringent than those contained in the notice of Proposed Rule Making. The 200-foot limiting height of section 77.23(a) is now to be applied only within three statute miles of an airport with its longest runway more than 3,200 feet in length, rather than the proposed five statute miles. While there is an additional limiting height, beginning at 100 feet within instrument approach areas within three miles of the end of the runway and increasing to a maximum of 250 feet within ten miles from the runway end, this height is largely duplicative of other limiting heights or surfaces and does not constitute a substantial addition to the standard previously considered. We might note, in explanation of the use of the term "runway" here, that this term is now used, exclusively throughout the Part, and the term "landing strip" has been deleted to eliminate a possible ambiguity.

In sections 77.25 and 77.27, criteria are provided for all civil airports, including those constructed to "VFR Airports" standards. These standards are currently contained in the Advisory Circular 150/ 5300-1, "VFR Airports," and are prescribed for airports constructed to serve only aircraft operating under the Visual Flight Rules. The horizontal and conical airport imaginary surfaces provided in section 77.25 with respect to airport reference points are classified for (1) "VFR Airports," and (2) other airports in accordance with the planned length of the longest runway at each such airport.

The airport imaginary surfaces prescribed in section 77.27 based on runways, except those for "VFR Airports," have been reclassified so that their sizes depend upon whether the runway is equipped with a precision landing aid, such as an instrument Landing System. Runways having instrument approach procedures based upon such facilities as a VOR, ADF, ASR, low frequency range, or TACAN are now provided with the same type surfaces as runways used only for VFR operations, except those on "VFR Airports."

The Department of Defense has forwarded obstruction criteria which differ from those applied here for civil airports. The Department has requested that the criteria be incorporated into Part 77 for application at military airports, except heliports, controlled by components of the Department of Defense, where the longest runway exceeds 5,000 feet. The Department advises that these separate criteria are required at military airports because of

the operating characteristics of certain military aircraft, the necessity for low-altitude maneuvering and formation takeoffs, the more stringent air crew training, and the armament and ordnance-carrying requirements of the military. Accordingly, these criteria are stated herein in section 77.28. The Department is developing criteria for application at military airports with shorter runways than 5,000 feet; and until these criteria are developed, civil airport criteria will apply at such military airports. Also, pending development of these criteria, the military standards for the 2,000-foot width of primary surface will apply only to runways longer than 5,000 feet. The Agency will study the military criteria to determine their potential adaptability to civil airports and their appropriate consolidation with the civil criteria.

The presence of two sets of criteria, applicable to civil and military airports, will not result in inconsistent conclusions in the aeronautical studies on whether a proposed structure would be a hazard to air navigation. These determinations are not controlled by the extent to which such a structure may exceed a civil or military obstruction standard but, rather, upon the possible hazardous effect of the structure on air navigation. A "hazard" or "no hazard" determination is reached after a review of the VFR and IFR operations and procedures involved, both present and prospective. Each study not only includes a review to determine whether the construction proposal might be so altered in location or height that it would not exceed an obstruction standard but, also, a review to ascertain if the structure could be accommodated by adjustment of the aeronautical procedures. Thus, there may be a substantial difference between a construction proposal which would exceed an obstruction standard and one which is determined, as the result of the aeronautical study, to be a hazard to air navigation.

The airport imaginary surfaces proposed for helicopters have been substantially revised for compatibility with the current "Heliport Design Guide." The primary surfaces coincide in size and shape with the takeoff and landing area of each heliport. The designated approach clearance surfaces begin at the edge(s) of the primary surface and extend outward and upward at a slope of 8 to 1. The approach surface is a trapezoid whose inner width is coincident with the width of the primary surface and which extends to the minimum enroute altitude where its width is 500 feet. Transitional surfaces extend outward and upward at a slope of 2 to 1 from the lateral boundaries of each primary surface and approach surface for a horizontal distance of 250 feet from the centerline of these surfaces.

One of the minor revisions of the obstruction standards made here might also be mentioned. The proposed addition of a 17-foot height to a highway prior to the application of the obstruction criteria evoked several protests. The 17-foot clearance was proposed as a compatible measure with current Federal policy for interstate highways. To avoid an unnecessary extension of this policy, the standard here has been adjusted to permit application of the current 15-foot figure to highways which will not be used by the higher vehicles. In addition, we have added a provision which removes the requirement for the addition of any figure, 15 feet or 17 feet, to a traverse way which is under the coordinated traffic control of the airport management or the air traffic control tower.

We might conclude this brief reference to some of the salient features of the obstruction standards of Subpart C by emphasizing this Subpart may be applied with respect to air navigation facilities planned for future installation or alteration and to planned uses of the navigable airspace by aircraft if that application would result in a lower limiting height or surface. This point is of particular significance in regard to an airport since it includes all runway extensions and other improvements which may be contained in the approved airport layout plan.

The revisions in the procedures for the conduct of aeronautical studies, public hearings on the effect of proposed structures on the navigable airspace, and the establishment of antenna farm areas have been adopted substantially

as proposed. Section 77.37 has been broadened to make available a review by the Administrator of each decision by a Regional Director on the effect of a proposed structure on air navigation, including "no hazard" determinations made without notice to any possible interested aeronautical source. While decisions of this type are only made in cases where the available evidence clearly indicates that air safety would not be affected by the construction, this review procedure is nevertheless provided to insure against possible error. The effective period fixed in section 77.39 for a determination of no hazard has been extended in recognition of the time necessary for the processing by the Federal Communications Commission of an application for a construction permit and the issuance of that permit. Appropriate safeguards for the protection of air navigation have been attached to this extension of time.

The comments in response to the Notice of Proposed Rule Making included a number of recommendations for Agency action beyond the authority contained in the Federal Aviation Act of 1958. That Act does not contain a basis for the mandatory marking and lighting of structures to warn pilots of aircraft of those structures. Neither does it contain specific authorization for regulations which would limit the heights of structures. To date, no judicial decision has been issued on the extent to which ground structures may constitute an unlawful interference with the public right of freedom of transit through the navigable airspace recognized in Section 104 of the Act. Until authoritative guidance is received on that point or express legislative authority is conferred, the Agency measures in the field of ground hazards to air navigation will be limited to the areas presently covered in Part 77.

In consideration of the foregoing, Part 77 of Chapter I of Title 14 of the Code of Federal Regulations is revised, effective May 1, 1965, to read as hereinafter set forth.

This amendment is made under the authority of Sections 104, 307, 313, 1001, and 1101 of the Federal Aviation Act of 1958 (49 U.S.C. 1304, 1348, 1354, 1481, 1501).

Amendment 77-1 *

Miscellaneous Amendments

Adopted: May 11, 1965

Effective: May 11, 1965

(Published in 30 F.R. 6713, May 18, 1965)

The purpose of this amendment is to make certain minor clarifying amendments to Part 77 of the Federal Aviation Regulations, which became effective on May 1, 1965.

Section 77.19, by reference to section 77.28(b) in the last paragraph, provides for application of the dimensions of clear zones for runways at civil airports to runways at all military airports. This was not intended. As currently written, section 77.28(b)(1) states that the primary surface for military airports is "the same elevation as the centerline of the runway." The section is being revised to make it clear that the primary surface undulates with the underlying surface.

In the interest of timely correction of these discrepancies, in view of the May 1, 1965, effective date of revised Part 77, and since these amendments are clarifying in nature, I find that notice and public procedure are impracticable and contrary to the public interest and that this amendment may therefore be made effective immediately.

In consideration of the foregoing, Part 77 is amended, effective immediately, as follows.

This amendment is made under the authority of Sections 307, 313, and 1101 of the Federal Aviation Act of 1958 (49 U.S.C. 1348, 1354, and 1510), and Executive Order 10854 (24 F.R. 9565).

Amendment 77-2

Form and Time of Notice

Adopted: July 6, 1966

Effective: July 12, 1966

(Published in 31 F.R. 9448, July 12, 1966)

The purpose of this amendment is to establish an Agency policy applicable to proposals filed under section 77.13 of the Federal Aviation Regulations for any construction or alteration in excess of 2,000 feet aboveground. This amendment is a general statement of policy and is procedural in nature. Therefore notice and public procedure hereon are unnecessary and the amendment may be made effective in less than 30 days after publication.

The Federal Aviation Agency has analyzed the recent trend of competitively taller television antenna towers to determine its effect on safety in air navigation. It has long been recognized by this Agency that antenna towers of adequate height are necessary to serve the public interest in a nation-wide broadcasting system. However, there has been a proliferation of antenna towers accompanied by a progressive increase in heights over 1,000 feet above the ground that now presents hazardous conditions to the safety of air navigation. The Agency is of the firm belief that the reasonable interests of the communications industry and the aviation community be accommodated

* Included in the publication of Part 77.

concurrently. To this end, the Federal Communications Commission recently declared in Public Notice FCC 65-455 that "the public interest in broadcast service, may in some instances call for an antenna tower higher than any particular maximum imposed." However, the FCC was "nevertheless convinced that the public interest requires a specific ceiling to halt the upward trend in antenna tower heights, and that 2,000 feet above ground is both realistic and appropriate."

The Federal Aviation Agency, within the limits of its jurisdiction, has attempted to find a remedy for air safety problems inherent in the conflicting demands for a fair and reasonable sharing of airspace by tall towers and aircraft. Part 77 of the Federal Aviation Regulations established procedures for reporting to the Agency proposed construction that may constitute potential obstructions or hazards to safe air navigation as determined by the application of criteria stated therein. Under these regulations, the FAA advises the construction proponent whether his proposal would constitute a hazard to air navigation. During the time the regulation has been in effect, hundreds of proposed television and radio towers have been considered. Procedures permitting such analysis by the Agency have been of considerable value to the aviation community and to the broadcasting industry in eliminating both geographic and airspace conflicts created by their competing requirements.

In spite of steps already taken to ensure the accommodation of these competing interests, it has been determined that the cumulative effect of heights and locations of towers, both actual and proposed, have created a situation that is hazardous to safe air navigation.

On February 18-19, 1965 the Agency made the following statement to the House Committee on Interstate and Foreign Commerce concerning H.J. Res. 261, which would limit the height of certain radio and television towers:

The FCC has allocated the TV channels of the Nation on the basis of maximum power television broadcasting at a height of 2,000 feet. Whenever a television tower exceeds this 2,000-foot limitation in most areas (it is 1,000 feet for VHF TV stations in the eastern part of the United States) the power must be reduced to compensate for the increased height.

Therefore, there is no compelling need for any tower to be in excess of 2,000 feet. Although there may be a need for 2,000-foot television towers, under some conditions we would be derelict in our duty as the allocator of the airspace if we permitted all towers to be constructed to a height of 2,000 feet wherever the broadcaster desired.

The 2,000-foot tower with its problems of visibility is inherently hazardous to air navigation.

The Agency therefore considers that it is necessary to take steps to minimize the construction of any antenna tower to a height of more than 2,000 feet aboveground unless it is fully justified in accordance with this Part. This action applies equally to any other structure whose height is proposed to exceed 2,000 feet aboveground, even though the most pressing current problem relates to antenna towers. It is expected that this action will encourage proponents of tower or other type construction to formulate realistic plans, thereby avoiding unnecessary and costly proceedings before the Federal Aviation Agency. In addition, the regulation will be flexible enough to accommodate a proposal for a tower or other type construction more than 2,000 feet high in the event the proponent can demonstrate that it would not be a present or reasonably foreseeable hazard to safe air navigation.

It is of course recognized that towers or other structures with heights of less than 2,000 feet above the ground may be hazardous to air navigation, especially where they are located near airports, Federal airways or VFR routes. However, the problems engendered by these situations are totally different from the potential hazards precipitated by the taller towers. Proposed tall towers and other type structures of less than 2,000 feet will continue to be studied carefully on an individual basis to determine whether they present any adverse effects on safe air navigation or cause an inefficient utilization of navigable airspace. The Agency is convinced that from an air safety standpoint the designation of a specific ceiling is needed to halt the upward trend in heights of various type structures. As a general policy, this Agency considered 2,000 feet above the ground to be the maximum height of structures that may be acceptable for maintaining safe navigation. Any structure proposed in excess of 2,000 feet above the ground will be considered to be, inherently, a hazard to air navigation and an inefficient utilization of the airspace. It will be incumbent upon the proponent to overcome this technical assumption by demonstrating to the Agency that such a proposal will not create an inefficient use of airspace or constitute a hazard to air navigation.

In consideration of the foregoing, Part 77 of the Federal Aviation Regulations is amended, effective July 12, 1966.

This amendment is made under the authority of Sections 307, 313, and 1101 of the Federal Aviation Act of 1958 (49 U.S.C. 1348, 1354, and 1510).

Amendment 77-3

Alteration of Discretionary Review

Adopted: May 1, 1967

Effective: June 5, 1967

(Published in 32 F.R. 6970, May 6, 1967)

The purpose of this amendment is to exclude determinations of no hazard made under 77.19(c)(1) from the applicability of discretionary review provided in 77.37.

The FAA published a notice of proposed rule making in the Federal Register on August 23, 1966 (31 F.R. 11155), circulated as Notice 66-34, proposing to exclude no hazard determinations relating to those structures for which a notice must be filed under 77.13 but which would not exceed any standard of Subpart C of Part 77, and therefore would be neither an obstruction nor a hazard. Under the FAA's published criteria the proponent of a structure in this category could be given only a no hazard determination. However, under 77.37 the proponent should wait 30 days to allow any interested party the opportunity to petition for a discretionary review that could only result in a substantiation of the no hazard determination.

Comments received in response to the notice indicated a general understanding of the unneeded delay of 30 days preceding finality of the determination and generally endorsed the proposal. Objections were received to the proposal that were directed to procedural delays encountered in disseminating information concerning the proposed structure to airspace users.

The Air Line Pilots Association objected, stating that local authority would not have an opportunity to study a proposed construction with regard to local zoning ordinances, and to assess the "effects" of the proposal on aviation in that location. A proponent must, of course, obtain any necessary approval from local government authorities prior to construction, including zoning approval if any, which would consider the effects on local property interests. Elimination of the provision for discretionary review by the FAA would have no effect on any requirement local authorities may impose on the proponent.

The Department of the Air Force objected, stating that the elimination of a 30-day delay would not permit proper treatment of aviation considerations because of the length of time involved in obtaining and assessing the effect of the proposal. Particularly, the Air Force is concerned with training flights at very low levels for which a structure of moderate height could be a hazard, and which may be erected before the Air Force representatives would be aware of its existence. Part 77 was never intended to provide protection for very low level military training operations. If every structure that may be an obstruction to flights of this nature should be called a hazard, the public would be overburdened, and a hazard determination would be meaningless. The portion of the comment relating to the delay in obtaining information is pertinent, and coincidentally is similar to a comment received from the Department of the Navy in concurring with the proposal. The FAA will review its procedures to insure appropriate coordination and timely dissemination of information to appropriate parties, including military representatives.

Some comments, conceding that a delay of 30 days may be burdensome in particular circumstances, suggested that a provision be promulgated to waive the 30-day period in circumstances of hardship, or that the 30-day period be retained when an interested party specifically requests its retention to permit time for filing a petition for review. One comment suggested eliminating acknowledgments issued under 77.19(c)(1). Retention of the 30-day period under normal circumstances while waiving it in cases of hardship would base the decision for discretionary review upon the circumstances of the proponent rather than the effect upon aeronautical operations. If under the standards of Part 77 a structure could be neither an obstruction nor a hazard, periods of delay and additional reviews could not alter the determination. Moreover, issuing waivers would be time-consuming and administratively inefficient where the necessity of review is nonexistent.

In consideration of the foregoing, 77.37 of the Federal Aviation Regulations is amended, effective June 5, 19-7.

This amendment is made under the authority of Secs. 307, 313, and 1101 of the Federal Aviation Act of 1958 (49 U.S.C. 1348, 1354, and 1501).

Amendment 77-4

Standards for Determining Obstructions

Adopted: September 6, 1967

Effective: November 12, 1967

(Published in 32 F.R. 12997, September 13, 1967)

The purpose of this amendment is to eliminate the requirement that the FAA must find any structure exceeding the applicable obstruction standard and located within an airport runway clear zone or the portion of a primary surface extending beyond the end of a runway to be a hazard to air navigation, regardless of any mitigating factor.

The FAA published a Notice of Proposed Rule Making in the Federal Register on March 9, 1967 (32 F.R. 3887), circulated as Notice No. 67-7 proposing the elimination of the mandatory finding of hazard, thereby permitting the FAA to study all factors involved and make a finding based on the particular situation. The response to the notice indicated a general endorsement of the proposal. Due consideration was given to all comments received.

The Air Line Pilots Association withheld endorsement because the FAA had not indicated what factors it presently considers before granting an exemption to a proposal for an obstruction in a clear zone. It stated it had difficulty in visualizing any mitigating factor relative to an obstruction within a clear zone, and making it easier to allow an obstruction would undoubtedly increase the number of obstructions and decrease the safety margin.

Under the present regulation, we have granted exemptions in cases, there among other matters, the proposed construction, though in a clear zone, was shielded from aircraft flight paths; or where the structure was of a temporary nature such as construction machinery or rigs used in constructing a public water system and erected for use only during daylight hours under VFR conditions.

With the deletion of 77.19(c)(4), the FAA could subject any construction proposal within a clear zone that exceeded the applicable obstruction standards to an aeronautical study in accordance with 77.19(c)(3). The study, which may be reviewed by all interested persons, would determine whether the proposed construction could be a hazard. Pending such a determination the construction would be presumed to be a hazard as provided in that section.

This amendment will not reduce the protection to runway approach areas presently afforded by 77.19(c)(4), but would retain that protection through the application of 77.19(c)(3). It is not the intent of this amendment to make it easier for obstructions to be based in approach areas or to relax the position of the FAA with regard to such obstructions. This amendment will permit the FAA to exercise its discretionary authority in determining whether the obstruction will in fact be a hazard after reviewing all of the relevant factors. In so doing, the public will be made more aware of the proposed obstruction through circularization and notice, and will be given an opportunity to present relevant comments. Additionally, it will make unnecessary the present practice of granting exemptions from the notice requirements of Part 77 through a procedure recognized as time consuming and inefficient.

In consideration of the foregoing, Part 77 of the Federal Aviation Regulations is amended, effective November 12, 1967.

These amendments are made under the authority of 307, 313, and 1101 of the Federal Aviation Act of 1958 (49 U.S.C. 1348, 1354, 1501).

Amendment 77-5

Miscellaneous Amendments

Adopted: March 25, 1968

Effective: May 2, 1968

(Published in 33 F.R. 5255, April 2, 1968)

The purpose of these amendments is to make minor substantive changes and editorial corrections to Part 77.

The FAA published a notice of proposed rule making in the Federal Register on July 14, 1967 (32 F.R. 10373). circulated as Notice No. 67-29 which proposed a number of minor substantive amendments and editorial corrections to Part 77 that would clarify the intent or would make the part consistent with the FAA's current practice or organization.

Comments received to the notice indicated a general endorsement of the proposal. A number of comments suggested changes or improvements that have been incorporated herein. Due consideration was given to all comments received.

One comment raised a question on whether this proposal would increase the protection for airports with at least one runway of 3,200 feet. The proposed revision of ~77.13(a)(2) (i) and (ii) would make no change to the current notice requirement criteria. It would merely add the term "actual length" to clarify the intent that the runway length referred to in that section is the actual and not the "corrected" runway length. The actual runway length is selected because this is the measurement provided in the FAA Airport Directory, the Alaska and the Pacific Airman's Guides and Chart Supplements and is the length that the construction sponsor would see on the airport. The general public would have no means of readily determining a corrected runway length, as referred to in the proposed revision of 77.23(a)(8). and which is used by the FAA in applying its standards for determining obstructions.

The notice proposed to revoke 77.13(a)(5) which requires a notice, when requested by FAA, for any construction proposal that would be in an instrument approach area and available information indicates that it may be an

obstruction to air navigation. Information from the FAA's regional offices indicates that this provision has been used in a number of cases to obtain specific data on height and location after general information on the construction became available. This provision is therefore retained but is redesigned as 77.13(a)(4).

A new 77.2, *Definition of terms*, is included to clarify the meaning of certain terms used in this amendment.

Several comments objected to 77.1 3(a)(5)(ii) as redesigned herein, which included a planned or proposed airport within the category of airports for which the notice criteria applies, pointing out that frequently sponsors would have no way of ascertaining the sites of planned airports without an inquiry to the FAA each time. or consulting a currently maintained list of planned or proposed airports. There is merit to these comments and the amendment to that section has been revised to include only those airports under construction. Sponsors will be able to see work in progress on airports near the proposed construction and the benefits of this part will be available to those airports.

Some comments suggested that proposed 77.15(c) should be revised to clarify the phrase "approved by the Administrator" and to list the facilities to which that paragraph applies. The amendment has been revised to reflect the intent that the types of facilities and devices that have been approved by the Administrator are the subject of the reference. "Air Navigation facility" is defined in section 101(8) of the Federal Aviation Act of 1958. Therefore, it is unnecessary to again list those facilities to which the notice requirements do not apply.

The Air Line Pilots Association objected to exempting any object or structure from the notice requirements and obstruction standards. It is recognized that some of the structures exempted from the notice requirement may be obstructions to air navigation. However, these exemptions are based on the need to provide a reasonable notice that can be applied and complied with by a construction proponent. A notice requirement similar to the obstruction criteria of Subpart C of this part would be impracticable in application. The exemption of certain structures, e.g. antenna structures of 20 feet or less in height, and airport or FAA navigational aids, has been found advantageous to both the FAA and industry. Therefore, certain necessary structures, although they may be obstructions, are exempted because of their utility or the relative absence of any hazard associated therewith.

Editorial changes have been made to 77.17 to reflect the current procedure of sending notices of proposed construction to the appropriate area office instead of a regional office. The identity and address of the appropriate FAA area or regional office may be obtained from any FAA facility, therefore a listing of the respective jurisdictions and addresses is omitted.

Editorial changes have been made to 77.17(d) including the redesignation of paragraph (d) as paragraph (e), because of the intervening effectiveness of another amendment subsequent to the circularization of Notice No. 67-29.

Sections 77.11(b)(3) and 77.19 have been amended to refer to the current designation of the FAA advisory circular on "Obstruction Marking and Lighting".

The wording of 77.21(a) has been rearranged for readability without making any substantive change. One comment made the same objection to 77.21(c)(2) as to the notice criteria under ~77.13(a)(5)(ii) that the public would be unable to comply with that section since it could not be aware of airports existing only in the planning stage. This comment is not valid since the standards thereunder are applied by FAA specialists to whom this data would be available.

In consideration of the foregoing, Part 77 is amended, effective May 2, 1968, as hereinafter set forth.

(Secs 307, 313, 1101, Federal Aviation Act of 1958; 49 U.S.C. 1348, 1354, 1501)

Amendment 77-6

Objects Interfering With Air Navigation Facilities

Adopted: July 25, 1968

Effective: August 31, 1968

(Published in 33 F.R. 10842, July 31, 1968)

The purpose of this amendment to Part 77 of the Federal Aviation Regulations is to permit the Administrator to consider the effect a proposed construction or alteration would have upon the operation of an air navigation facility.

The substance of this amendment was published as a Notice of Proposed Rule Making in the Federal Register on December 21, 1967, (32 F.R. 20658) as NPRM 67-54. Many comments were received in response to the Notice. Generally, the comments were favorable and recommended adoption of the amendment as proposed.

Part 77 of the Federal Aviation Regulations establishes standards for determining obstructions in navigable airspace, sets forth the notice requirements of certain proposed construction or alteration, provides for aeronautical studies of obstructions to determine their effect on the safe and efficient use of airspace and provides for public hearings on the hazardous effect of proposed construction or alteration. In accordance with previous interpretations and practice, this part applies to the physical effect of an obstruction on the flight of aircraft through the navigable airspace.

The Federal Aviation Administration is encountering with increasing frequency, situations where construction or alteration has a deleterious effect on the operation of air navigation facilities without being a physical hazard in the flight path of aircraft. These situations have ranged from construction which partially blocked the view from an airport air traffic control tower of runways, taxi, and parking areas, to obstructions which blocked or reflected electromagnetic radiation in the vicinity of navigational aids like radio or radar installations. In some instances, the navigational aid could be moved to an interference-free location. In other situations, however, no interference-free locations were available, or the cost of razing and relocating facilities, because of their size or number, was exorbitant.

It appears desirable that when an aeronautical study is made, the Administrator should include in that study the effect that construction or alteration may have on the operation of air navigation facilities. It would be an unreasonable burden on the public to require a proponent to consider this effect because the public may not be aware of the existence or operational characteristics of an air navigation facility, and any effect thereon may not easily be ascertained by the proponent. Accordingly, the Administrator should have the authority of including in an aeronautical study the physical or electromagnetic effect of proposed construction on air navigation facilities. The study may enable the Administrator to recommend changes in the design, location, or construction material that would eliminate or reduce interference with the operation of the air navigation facility. A reduction or elimination of interference may permit the retention of existing approach minimums, use of existing runways or facility structures or avoid costly relocation expenses to the airport or the FAA.

All of the parties that submitted comments concurred in or endorsed the proposed amendment, except the Airport Operators Council International, the Department of Aviation, City of Atlanta, Georgia, and the Air Transport Association of America.

The Airport Operators Council International stated that it strongly opposed the proposed amendment primarily for the following reasons:

- (1) The FAA already has sufficient authority to minimize critical encroachment upon airport control tower sight lines through its ability to NOTAM and therefore needs no additional authority.
- (2) It is undesirable to use the proposed amendment to protect off-airport navaids from the deleterious effect on their operation by construction proposals over which the airport has no control.

Regarding the first comment, the FAA's present authority allows it to issue a Notice to Airmen to advise them concerning areas on an airport in which ground control of traffic cannot be maintained due to blocking of line-of-sight from the airport control tower. When such a condition exists, the derogation of air traffic control has already

taken place and a NOTAM merely advises of that condition. The purpose of this rule is to prevent the condition from arising in the first place.

As far as the second comment is concerned, this amendment intends to include consideration of the physical or electromagnetic effect on the operation of air navigation facilities of any construction proposal for which a notice is required under Section 77.13(a), and would exceed any standard of Subpart C, regardless of whether the facilities are located on or off an airport.

The Department of Aviation, City of Atlanta, Georgia, opposed the proposed amendment primarily on the ground that it felt that this amendment would allow the location and functioning of an FAA air navigation facility to control all other airport development prospects. The Department also stated that it felt that the present Federal Aviation Regulations were adequate to handle obstructions to airport control towers and air navigation facilities.

The aeronautical study may enable the FAA to recommend changes in the design, location or construction material that may eliminate or reduce interference with the operation of the air navigation facility. These recommendations would be made to the construction sponsor and not to the airport operator unless the construction proposal was one over which the airport operator exercised control. Proposed construction or alteration subject to an aeronautical study under the proposed amendment would be limited to those proposals for which notice to the Administrator is now required under Section 77.13(a) of Part 77, FAR, and the proposal would exceed any standard of Subpart C. Proposed construction or alteration of airports that would not require notice under Section 77.13(a) would not come within the scope of the proposed amendment even though there may be a possibility that the proposed construction or alteration might adversely affect the operation of a nearby air navigation facility.

It is not the purpose of the proposed amendment to institute control over any aspect of airport development but (1) to consider the physical and electromagnetic effects of any proposed construction or alteration on air navigation facilities, during an aeronautical study; (2) to inform the construction sponsor, if necessary, of possible interference and how to avoid it; and (3) where the construction proposal would have a substantial adverse effect upon the operation of any air navigation facility to issue a determination of hazard. Current Federal Aviation Regulations do not provide the FAA with authority to study proposed construction or alteration for the purpose of determining their physical and electromagnetic effect on the operation of air navigation facilities.

The Air Transport Association (ATA) did not oppose the proposed amendment, but made several suggestions. Among them ATA commented that FAA has published few guidelines for construction facilities on or near airports and such guidelines should be published by FAA prior to amending Part 77 as proposed.

In addition, ATA felt it should be made clear that airport control towers are not air navigation facilities in the sense of the proposed rule. ATA comments are under careful consideration and the FAA at the present time is engaged in a project to develop new criteria to determine whether proposed construction would affect the operation of air navigation facilities. The intent of the amendment to Part 77, however, is not to revise or develop criteria but to provide the authority to consider possible interference with the operation of air navigation facilities during the aeronautical study of construction proposals. At such time as new criteria have been developed a determination will be made as to their adequacy and whether they should be incorporated in the regulation.

In consideration of the foregoing, Part 77 (77.31 and 77.35) of the Federal Aviation Regulations is amended effective August 31, 1968.

This amendment is made under the authority of sections 307, 313, and 1101 of the Federal Aviation Act of 1958 (49 U.S.C. 1348, 1354, 1501).

Amendment 77-7

Utility Airports

Adopted: October 25, 1968

Effective: November 30, 1968

(Published in 33 F.R. 16056, November 1, 1968)

The purpose of this amendment is to include in Part 77 of the Federal Aviation Regulations a reference to "Utility Airports," as appropriate, with each reference to "VFR Airports" standards.

Subpart C of Part 77 contains several references to airports constructed to "VFR Airports" standards. The "VFR Airports" standards and the Advisory Circular in which they were contained were canceled and replaced with Advisory Circular 150/5300-4, "Utility Airports--Design Criteria and Dimensional Standards." Since those airports built to VFR Airports standards continue in existence, Subpart C must be revised to refer to both VFR and Utility Airports.

Since this amendment merely includes in Part 77 a reference to publications and standards currently in use, I find that notice and public procedure hereon are unnecessary.

In consideration of the foregoing, Part 77 (77.25 (a)(1) and (b)(1) and 77.27 (a)(1) and (c)(2)(i)) of the Federal Aviation Regulations is amended, effective November 30, 1968.

These amendments are made under the authority of Sections 307, 313, and 1101 of the Federal Aviation Act of 1958 (49 U.S.C. 1348, 1354, and 1510).

Amendment 77-8

Revision of Notice Form

Adopted: December 11, 1968

Effective: February 1, 1969

(Published in 33 F.R. 18614, December 17, 1968)

The purpose of this amendment to Part 77 of the Federal Aviation Regulations is to revise the reference to the form on which notices of proposed construction or alteration are filed to reflect the new form number that has been adopted and to correct an editorial error.

The FAA is adopting Form 7460 1 entitled, "Notice of Proposed Construction or Alteration" to replace Form 177. This form more adequately reflects informational requirements concerning proposed construction or alteration of objects which might effect navigable airspace. Reference is made to FAA Form 117 in several places throughout Subpart B of Part 77. Therefore, an amendment is required to revise the references to this notice form.

Amendment 77-6, effective May 2, 1968, to 77.11 erroneously identified FAA Advisory Circular AC 70/7460-1 as AC 70/7460. Therefore, this section is being changed to reflect the correct advisory circular number.

In consideration of the foregoing, Subpart B of Part 77 (77.11(b)(3) and 77.17 (a) and (d)) of the Federal Aviation Regulations is amended, effective February 1, 1969.

This amendment is made under the authority of 307, 313 and 1101 of the Federal Aviation Act of 1958 (49 U.S.C. 1348, 1354, 1501), and of 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Amendment 77-9

that plans would not be based upon heights that are impractical. The FAA considers that the height adjustments prescribed are needed for guidance when applying the notice requirement criteria, and should have limited flexibility. It should be noted that 23 feet is the highest tunnel clearance required for railroads in the United States, and this height would be in consonance with the requirements of the various states.

Several commentators objected to the proposed changes in 77.15(c) that would exclude from the notice requirement of 77.13 any air navigation facility, airport visual approach or landing aid, aircraft arresting device, or meteorological device, the location and height of which is fixed by its functional purpose, if a type approved by "an appropriate military service." After careful consideration of the objections, the FAA decided that type approval of devices and equipment on civil airports should remain with the Administrator. Therefore, the change to 77.15(c) as proposed, has been modified to exclude from the notice requirement of 77.13 any air navigation facility, airport visual approach or landing aid, aircraft arresting device, or meteorological device given type approval by an appropriate military service only when such facilities, aids, or devices would be located on a military airport.

Several isolated comments directed attention to the intention of the FAA to use the applicable MOCA instead of the established MEA as the basis for determining obstructions within an en route obstacle clearance area of a Federal airway or approved off-on airway route.

Even though some individuals or groups may consider this concept to be a new one, it is based on the rationale that through use of the MOCA alone and selectively applying the terms obstacle and obstruction to it, the application of the standards of Part 77 will be simplified and will result in bringing the entire system into conformity with intentional standards. In simplified terms, a MOCA is that minimum safe altitude that will permit an aircraft to traverse a designated area of airspace clear of obstacles below. Generally, the height of the highest or controlling obstacle in that airspace segment provides the imaginary obstacle reference line. The appropriate FAA personnel, applying established and specified standards then supply an additional amount of airspace above the obstacle reference line that forms the MOCA altitude level for that segment of flight.

In applying the standards of Part 77 to this airspace formulation, any proposed structure that does not exceed the obstacle reference line will be classified as an obstacle. However, if the proposed structure would penetrate this airspace above the obstacle reference line, it would be classified as an obstruction. Once a proposal is classified as an obstruction, under the procedures provided for in Part 77, it will be studied to determine whether it will or will not constitute a hazard to air navigation.

Accordingly, new ~ 77.23(a)(4) establishes that the MOCA instead of the MEA will be the basis for determining whether any object within any en route obstacle clearance area, including turn and termination areas. of any Federal airway or approved off-airway route will be classified as an obstruction to air navigation.

One comment was received concerning the proposed new 77.21 (b). The new paragraph was added to ensure proper application of the imaginary surfaces outlined in 77.25 at airports that have defined landing and takeoff strips. or pathways that are designated as runways but do not have specially prepared hard surfaces, or have a defined landing and takeoff area with no defined landing and takeoff strips or pathways designated as runways. For the purpose of Part 77, any clearly defined strip, pathway or lane designated by appropriate authority for the landing and takeoff of aircraft is considered to be a runway, even though its surface consists of water, turf, dirt or similar unprepared surface.

The application of new ~ 77.21(b) is based upon the philosophy that, at the thousands of airports having runways of various lateral dimensions without specially prepared hard surfaces, a factor common to each runway and its related primary surface is the centerline. This common factor permits application of the primary surface and the related transitional surfaces because the primary surface is longitudinally centered on the runway and the transitional surfaces extend outward and upward from the sides of the primary surface. Since the width of any primary surface is prescribed in 77.25(c), the width of that portion of any runway over which its primary surface is superimposed is limited by the width of the related primary surface, regardless of the runway width; the length of the primary surface, however, in this case, is the same as the length of the runway. In applying 77.21(b) to those airports, excluding seaplane bases, where the defined landing and takeoff area does not have any defined runways for the landing and

takeoff of aircraft, the agency would, applying the standards of the regulation, make a determination as to which portions of the area were being regularly used by aircraft as runways for landing and take off. The appropriate primary surface prescribed in 77.25(c) will then be centered on each portion of the landing and takeoff area determined to be used as a runway, with each end of the primary surface coinciding with the corresponding end of the determined runway.

Many commentators objected to the proposed amendment of 77.23(a)(2). After careful consideration of all objections to the proposed change, the FAA is convinced that with one exception the proposed revision should not be made. That exception is, that nautical miles will be used in lieu of statute miles in 77.23(a)(2) to conform to the units of horizontal measurement currently used in en route and terminal airspace configurations, and instrument procedures both nationally and internationally. Further study will be given to the need for relating the height of objects to the airport elevation where the terrain on which those objects are located exceeds the surfaces prescribed in ~ 77.25 or the heights prescribed in 77.23(a)(2).

The Notice proposed new 77.23(a) (3) and (4) to replace 77.23(a) (4), (5), (6), and (7). Comments on this proposal were generally favorable. Two commentators requested clarification of an en route obstacle clearance area and suggested that definitions of en route and terminal obstacle clearance be included in the regulation. Since we have already discussed in some detail the en route obstacle clearance area that falls within the scope of 77.23(a)(4), it only remains necessary to provide a brief explanation as to how obstacles and obstructions will relate to the terminal obstacle clearance area portion of the regulation provided for in 77.23(a)(3) of this amendment.

All approved procedures for instrument approach and departure of aircraft to and from airports that are conducted within specified terminal obstacle clearance and departure areas are established in conformity to the applicable criteria set forth either in the United States Standard for Terminal Instrument Procedures (TERPS) or the FAA Handbook 8260.19, Flight Procedures and Airspace. In the establishment of these instrument approach and departure criteria, the involvement of existing obstacles on the type of instrument procedure proposed for adoption, is one of the primary considerations. Accordingly, the standards of Part 77 applicable in any terminal instrument procedure area must also be based on the same obstacle concept that was used to formulate the applicable criteria of TERPS and FAA Handbook 8260.19. A brief explanation of the interrelationship of obstacles and obstructions to this concept should aid materially in understanding the provisions of 77.23(a)(3).

In the development of all types of instrument approach procedures under TERPS and departure procedures under FAA Handbook 8260.19, the method of establishing each such procedure is basically the same. The existing obstacles, including objects that are manmade, the terrain features, and the navigational facilities involving a particular approach or departure area are carefully analyzed, after which a prescribed plane, which is commonly referred to as an obstacle clearance plane, is established for that particular phase of flight. In order to insure maximum safety to all aircraft operators who may use that particular terminal instrument procedure, applicable FAA criteria is then applied to provide an additional layer of airspace above the prescribed obstacle clearance plane.

In applying the standards of Part 77 to this type of airspace structure, any object that does not exceed the obstacle clearance plane will be classified as an obstacle; but any object that penetrates the prescribed obstacle clearance plane will be classified as an obstruction, and subject to aeronautical study to determine whether or not it is a hazard to air transportation or air commerce.

Stated in another but in a more sophisticated way, any object that is located within an obstacle clearance area, including an initial approach segment, a circling approach area, or a departure area, is an obstruction to air navigation under the standards of Part 77, if it is of such height that the vertical distance between any point on it and any minimum instrument flight altitude established for any authorized instrument procedure within that area, is less than the obstacle clearance specified for that instrument procedure.

Several commentators addressed the proposed revision of 77.23. One commentator suggested that runways on air carrier airports be categorized as "air carrier" and provided with equal protection at both ends. The FAA feels that the rationale for the new categorization of runways has been explained adequately previously, therefore, this suggestion was not adopted.

Concern was expressed by some commentators as to the availability of information regarding the category of each approach to each end of each runway of any airport under consideration. The FAA agrees that the success of this concept is dependent upon definite information concerning the category of each approach to each runway end being available to the agency and to the public. This information will be available from FAA regional area offices, and from agency computer readouts.

In response to the suggestion of one commentator, 77.25(c) will be changed to include the words "or planned hard surface" after the words "has specially prepared hard surface." The FAA believes that this addition helps to clarify the intent of the section and does not modify the meaning.

Other minor changes of an editorial and technically clarifying nature have been made to the amendment. A minor change to the addresses under 77.17 has been included.

Interested persons have been afforded an opportunity to participate in the making of these amendments. Due consideration has been given to all matter presented. In other respects, for the reasons stated in the preamble to the notice, the rule is adopted as prescribed herein.

In consideration of the foregoing, Part 77 of the Federal Aviation Regulations is amended, effective May 16, 1971.

Sections 307, 313 and 1101 of the Federal Aviation Act of 1958 (49 U.S.C. 1348, 1354, and 1501), and Section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Amendment 77-10

Miscellaneous Amendments

Adopted: February 28, 1972

Effective: March 4, 1972

(Published in 37 F.R. 4705, March 4, 1972)

The purpose of this amendment is to make certain minor editorial changes to Part 77 of the Federal Aviation Regulations.

Section 77.1 I(b) contains a reference to the sale of Advisory Circular 70/7460 1 entitled "Obstruction Marking and Lighting." Effective January 1, 1972, a revised edition of this Advisory Circular has become available free of charge from the Department of Transportation. Section 77.11 (b) is revised to reflect this change.

Throughout Subpart B of Part 77 there are several references to FAA area offices and personnel. Since all area offices were eliminated April 2, 1971, and reference to them is deleted and replaced with reference to the appropriate regional office or personnel.

Section 77.73 provides for the establishment of antenna farm areas under the procedural requirements of Section 4 of the Administrative Procedure Act. This citation is no longer accurate since the recodification of the Act, and appropriate language is substituted therefor.

Since these amendments are minor and editorial in nature and no substantive change is effected, notice and public procedure thereon are not necessary and good cause exists for making them effective on less than 30 days notice.

In consideration of the foregoing, Part 77 of the Federal Aviation Regulations is amended, effective March 4, 1972.

This amendment is issued under the authority of sections 313 and 1101 of the Federal Aviation Act of 1958 (49 U.S.C. 1354, 1501), and section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Amendment 77-11

Organizational Changes and Delegations of Authority

Adopted: September 15, 1989

Effective: October 25, 1989

(Published in 54 F.R. 39288, September 25, 1989)

SUMMARY: This amendment adopts changes to office titles and certain terminology in the regulations that were affected by a recent agency wide reorganization. These changes are being made to reflect delegations of authority that were changed, as well as offices that were renamed or abolished and replaced with new office designations. These changes are necessary to make the regulations consistent with the current agency structure.

FOR FURTHER INFORMATION CONTACT: Jean Casciano, Office of Rulemaking (ARM-1), Federal Aviation Administration, 800 Independence Ave., SW., Washington, DC 20591; Telephone (202) 267-9683.

SUPPLEMENTARY INFORMATION

Background

On July 1, 1988, the FAA underwent a far-reaching reorganization that affected both headquarters and regional offices. The most significant change is that certain Regional Divisions and Offices, which formerly reported to the Regional Director, are now under "straight line" authority, meaning that these units within each Regional Office report to the appropriate Associate Administrator (or Chief Counsel) in charge of the function performed by that unit.

Within Part 11 of the Federal Aviation Regulations (FAR), various elements of the FAA have been delegated rule making authority by the Administrator. These delegations need to be updated. In addition, throughout the Federal Aviation Regulations references are made to offices that have been renamed or are no longer in existence as a result of reorganization.

Title 14 of the Code of Federal Regulations must therefore be amended to reflect the reorganizations and changes that have taken place.

Paperwork Reduction Act

The paperwork requirements in sections being amended by this document have already been approved. There will be no increase or decrease in paperwork requirements as a result of these amendments, since the changes are completely editorial in nature.

Good Cause Justification for Immediate Adoption

This amendment is needed to avoid possible confusion about the FAA reorganization and to hasten the effective implementation of the reorganization. In view of the need to expedite these changes, and because the amendment is editorial in nature and would impose no additional burden on the public, I find that notice and opportunity for public comment before adopting this amendment is unnecessary.

Federalism Implications

The regulations adopted herein will not have substantial direct effects on the states, on the relationship between the National government and the states, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this final rule does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

The FAA has determined that this document involves an amendment that imposes no additional burden on any person. Accordingly, it has been determined that: 'The action does not involve a major rule under Executive Order 12291; it is not significant under DOT Regulatory Policies and Procedures

(44 FR. 11034: February 26, 1979); and because it is of editorial nature. no impact is expected(l to result and a full regulatory evaluation is not required. In addition, the FAA certifies that this amendment will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

The Rule

In consideration of the foregoing, the Federal Aviation Administration amends the Federal Aviation Regulations (14 CFR Chapter 1) effective October 25, 1989.

The authority citation for Part 77 is revised to read as follows:

Authority 49 U.S.C. 1304, 1348, 1354, 1421 through 1430, 1431, 1501, 49 U.S.C. 106(g) (Revised Pub. L. 97 449, January 12, 1983), (Revised Pub. L. 100-223, December 30, 1987).

PART 77--OBJECTS AFFECTING NAVIGABLE AIRSPACE

Subpart A--General

Source: Docket No. 1882 (30 FR 1839, 2/10/65) effective 5/1/65, for each subpart, unless otherwise noted.

77.1 Scope.

This part:

- (a) Establishes standards for determining obstructions in navigable airspace;
- (b) Sets forth the requirements for notice to the Administrator of certain proposed construction or alteration;
- (c) Provides for aeronautical studies of obstructions to air navigation, to determine their effect on the safe and efficient use of airspace;
- (d) Provides for public hearings on the hazardous effect of proposed construction or alteration on air navigation:
and
- (e) Provides for establishing antenna farm areas.

77.2 Definition of terms.

For the purpose of this part:

Airport available for public use means an airport that is open to the general public with or without a prior request to use the airport.

A seaplane base is considered to be an airport only if its sea lanes are outlined by visual markers.

Nonprecision instrument runway means a runway having an existing 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 for which no precision approach facilities are planned, or indicated on an FAA planning document or military service military airport planning document.

Precision instrument runway means a runway having an existing instrument approach procedure utilizing an Instrument Landing System (ILS), or a Precision Approach Radar (PAR). It also means a runway for which a precision approach system is planned and is so indicated by an FAA approved airport layout plan; a military service approved military airport layout plan; any other FAA planning document, or military service military airport planning document.

Utility runway means a runway that is constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight and less.

Visual runway means 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, a military service approved military airport layout plan, or by any planning document submitted to the FAA by competent authority.

(Amdt. 77-5, Eff. 5/2/68); (Amdt. 77-9, Eff. 5/16/71)

77.3 Standards.

(a) The standards established in this part for determining obstructions to air navigation are used by the Administrator in:

- (1) Administering the Federal-aid Airport Program and the Surplus Airport Program;
- (2) Transferring property of the United States under section 16 of the Federal Airport Act;
- (3) Developing technical standards and guidance in the design and construction of airports; and
- (4) Imposing requirements for public notice of the construction or alteration of any structure where notice will promote air safety.

(b) The standards used by the Administrator in the establishment of flight procedures and aircraft operational limitations are not set forth in this part but are contained in other publications of the Administrator.

(Amdt. 77-9, Eff. 5/16/71)

77.5 Kinds of objects affected.

This part applies to:

(a) Any object of natural growth, terrain, or permanent or temporary construction or alteration including equipment or materials used therein, and apparatus of a permanent or temporary character; and

(b) Alteration of any permanent or temporary existing structure by a change in its height (including appurtenances), or lateral dimensions, including equipment or materials used therein.

Subpart B--Notice of Construction or Alteration

77.11 Scope.

(a) This subpart requires each person proposing any kind of construction or alteration described in 77.13(a) to give adequate notice to the Administrator. It specifies the locations and dimensions of the construction or alteration for which notice is required and prescribes the form and manner of the notice. It also requires supplemental notices 48 hours before the start and upon the completion of certain construction or alteration that was the subject of a notice under 77.13(a).

(b) Notices received under this subpart provide a basis for:

- (1) Evaluating the effect of the construction or alteration on operational procedures and proposed operational procedures;
- (2) Determinations of the possible hazardous effect of the proposed construction or alteration on air navigation;
- (3) Recommendations for identifying the construction or alteration in accordance with the current Federal Aviation Administration Advisory Circular AC 70/7460 1 entitled "Obstruction Marking and Lighting," which is available without charge from the Department of Transportation, Distribution Unit, TAD 484.3, Washington, DC 20590.
- (4) Determining other appropriate measures to be applied for continued safety of air navigation; and
- 5) Charting and other notification to airmen of the construction or alteration.

(Amdt. 77-8, Eff. 2/1/69); (Amdt. 77-10, Eff. 3/ 4/72)

77.13 Construction or alteration requiring notice.

a) Except as provided in 77.15, each sponsor who proposes any of the following construction or alteration shall notify the Administrator in the form and manner prescribed in 77.17:

- (1) Any construction or alteration of more than 200 feet in height above the ground level at its site.
- (2) Any construction or alteration of greater height than an imaginary surface extending outward and upward at one of the following slopes:
 - (i) 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a)(5) of this section with at least one runway more than 3,200 feet in actual length, excluding heliports.
 - (ii) 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each airport specified in paragraph (a)(5) of this section with its longest runway no more than 3,200 feet in actual length, excluding heliports.
 - (iii) 25 to 1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport specified in paragraph (a)(5) of this section.
- (3) Any highway, railroad, or other traverse way for mobile objects, of a height which, if adjusted upward 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance, 15 feet for any other public roadway, 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road, 23 feet for a railroad, and for a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it, would exceed a standard of paragraph (a) (1) or (2) of this section.
- (4) When requested by the FAA, any construction or alteration that would be in an instrument approach area (defined in the FAA standards governing instrument approach procedures) and available information indicates it might exceed a standard of subpart C of this part.
- (5) Any construction or alteration on any of the following airports (including heliports):
 - (i) An airport that is available for public use and is listed in the Airport Directory of the current Airman's Information Manual or in either the Alaska or Pacific Airman's Guide and Chart Supplement.

(ii) An airport under construction, that is the subject of a notice or proposal on file with the Federal Aviation Administration, and, except for military airports, it is clearly indicated that the airport will be available for public use.

(iii) An airport that is operated by an armed force of the United States.

(b) Each sponsor who proposes construction or alteration that is the subject of a notice under paragraph (a) of this section and is advised by an FAA regional office that a supplemental notice is required shall submit that notice on a prescribed form to be received by the FAA regional office at least 48 hours before the start of the construction or alteration.

(c) Each sponsor who undertakes construction or alteration that is the subject of a notice under paragraph (a) of this section shall, within S days after that construction or alteration reaches its greatest height, submit a supplemental notice on a prescribed form to the FAA regional office having jurisdiction over the region involved, if--

- (1) The construction or alteration is more than 200 feet above the surface level of its site; or
- (2) An FAA regional office advises him that submission of the form is required.

(Amdt. 77-5, Eff. 5/2/68); (Amdt. 77-9, Eff. 5/16/71); (Amdt. 77-10, Eff. 3/4/72)

77.15 Construction or alteration not requiring notice.

No person is required to notify the Administrator for any of the following construction or alteration:

(a) Any object that would be shielded by existing structures of a permanent and substantial character or by natural terrain or topographic features of equal or greater height, and would be located in the congested area of a city, town, or settlement where it is evident beyond all reasonable doubt that the structure so shielded will not adversely affect safety in air navigation.

(b) Any antenna structure of 20 feet or less in height except one that would increase the height of another antenna structure.

(c) Any air navigation facility, airport visual approach or landing aid, aircraft arresting device, or meteorological device, of a type approved by the Administrator, or an appropriate military service on military airports. the location and height of which is fixed by its functional purpose.

(d) Any construction or alteration for which notice is required by any other FAA regulation.

(Amdt. 77-5, Eff. 5/2/68); (Amdt. 77-9, Eff. 5/16/71)

77.17 Form and time of notice.

(a) Each person who is required to notify the Administrator under 77.13(a) shall send one executed form set (four copies) of FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area within which the construction or alteration will be located. Copies of FAA Form 7460-1 may be obtained from the headquarters of the Federal Aviation Administration and the regional offices.

(b) The notice required under 77.13(a) (1) through (4) must be submitted at least 30 days before the earlier of the following dates:

- (1) The date the proposed construction or alteration is to begin.
- (2) The date an application for a construction permit is to be filed.

However, a notice relating to proposed construction alteration that is subject to the licensing requirements of the Federal Communications Act may be sent to FAA at the same time the application for construction is filed with the Federal Communications Commission, or at any time before that filing.

(c) A proposed structure or an alteration to an existing structure that exceeds 2,000 feet in height above the ground will be presumed to be a hazard to air navigation and to result in an inefficient utilization of airspace and the applicant has the burden of overcoming that presumption. Each notice submitted under the pertinent provisions of this part 77 proposing a structure in excess of 2,000 feet above ground, or an alteration that will make an existing

structure exceed that height, must contain a detailed showing, directed to meeting this burden. Only in exceptional cases, where the FAA concludes that a clear and compelling showing has been made that it would not result in an inefficient utilization of the airspace and would not result in a hazard to air navigation, will a determination of no hazard be issued.

(d) In the case of an emergency involving essential public services, public health, or public safety that requires immediate construction or alteration, the 30-day requirement in paragraph (b) of this section does not apply and the notice may be sent by telephone, telegraph, or other expeditious means, with an executed FAA Form 7460-1 submitted within 5 days thereafter. Outside normal business hours, emergency notices by telephone or telegraph may be submitted to the nearest FAA Flight Service Station.

(e) Each person who is required to notify the Administrator by paragraph (b) or (c) of 77.13, or both, shall send an executed copy of FAA Form 117-1, Notice of Progress of Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area involved.

(Amdt. 77-2, Eff. 7/12/66); (Amdt. 77-5, Eff. 5/2/68); (Amdt. 77-8, Eff. 2/1/69); (Amdt. 77-9, Eff. 5/16/71); (Amdt. 77-10, Eff. 3/4/72); (Amdt. 77-11, Eff. 10/25/89)

77.19 Acknowledgment of notice.

(a) The FAA acknowledges in writing the receipt of each notice submitted under 77.13(a).

(b) If the construction or alteration proposed in a notice is one for which lighting or marking standards are prescribed in the FAA Advisory Circular AC 70/7460-1, entitled "Obstruction Marking and Lighting," the acknowledgment contains a statement to that effect and information on how the structure should be marked and lighted in accordance with the manual.

(c) The acknowledgment states that an aeronautical study of the proposed construction or alteration has resulted in a determination that the construction or alteration:

- (1) Would not exceed any s of subpart C and would not be a hazard to air navigation;
- (2) Would exceed a standard of subpart C but would not be a hazard to air navigation; or
- (3) Would exceed a standard of subpart C and further aeronautical study is necessary to determine whether it would be a hazard to air navigation, that the sponsor may request within 30 days that further study, and that, pending completion of any further study, it is presumed the construction or alteration would be a hazard to air navigation.

(Amdt. 77-1, Eff. 5/11/65); (Amdt. 77-4, Eff. 11/12/67); (Amdt. 77-5, Eff. 5/2/68)

Subpart C--Obstruction Standards

77.21 Scope.

(a) This subpart establishes standards for determining obstructions to air navigation. It applies to existing and proposed manmade objects, objects of natural growth, and terrain. The standards apply to the use of navigable airspace by aircraft and to existing air navigation facilities, such as an air navigation aid, airport, Federal airway, instrument approach or departure procedure, or approved off-airway route. Additionally, they apply to a planned facility or use, or a change in an existing facility or use, if a proposal therefor is on file with the Federal Aviation Administration or an appropriate military service on the date the notice required by 77.13(a) is filed.

(b) At those airports having defined runways with specially prepared hard surfaces, the primary surface for each such runway extends 200 feet beyond each end of the runway. At those airports having defined strips or pathways that are used regularly for the taking off and landing of aircraft and have been designated by appropriate authority as runways, but do not have specially prepared hard surfaces, each end of the primary surface for each such runway shall coincide with the corresponding end of the runway. At those airports, excluding seaplane bases, having a defined landing and takeoff area with no defined pathways for the landing and takeoff of aircraft, a determination shall be made as to which portions of the landing and takeoff area are regularly used as landing and takeoff pathways. Those pathways so determined shall be considered runways and an appropriate primary surface as defined in 77.25(c) will be considered as being longitudinally centered on each runway so determined, and each end of that primary surface shall coincide with the corresponding end of that runway.

(c) The standards in this subpart apply to the effect of construction or alteration proposals upon an airport if, at the time of filing of the notice required by 77.13(a), that airport is --

(1) Available for public use and is listed in the Airport Directory of the current Airman's Information Manual or in either the Alaska or Pacific Airman's Guide and Chart Supplement; or

(2) A planned or proposed airport or an airport under construction, that is the subject of a notice or proposal on file with the Federal Aviation Administration, and, except for military airports, it is clearly indicated that the airport will be available for public use; or,

(3) An airport that is operated by an armed force of the United States.

(Amdt. 77-5, Eff. 5/2/68); (Amdt. 77-9, Eff. 5/16/71)

77.23 Standards for determining obstructions.

(a) An existing object, including a mobile object, is, and a future object would be, an obstruction to air navigation if it is of greater height than any of the following heights or surfaces:

(1) A height of 500 feet above ground level at the site of the object.

(2) A height that is 200 feet above ground level or above the established airport elevation, whichever is higher, within 3 nautical miles of the established reference point of an airport, excluding heliports, with its longest runway more than 3,200 feet in actual length, and that height increases in the proportion of 100 feet for each additional nautical mile of distance from the airport up to a maximum of 500 feet.

(3) A height within a terminal obstacle clearance area, including an initial approach segment, a departure area, and a circling approach area, which would result in the vertical distance between any point on the object and an established minimum instrument flight altitude within that area or segment to be less than the required obstacle clearance.

(4) A height within an en route obstacle clearance area, including turn and termination areas, of a Federal airway or approved off-airway route, that would increase the minimum obstacle clearance altitude.

(5) The surface of a takeoff and landing area of an airport or any imaginary surface established under 77.25, 77.28, or 77.29. However, no part of the take-off or landing area itself will be considered an obstruction.

(b) Except for traverse ways on or near an airport with an operative ground traffic control service, furnished by an air traffic control tower or by the airport management and coordinated with the air traffic control service, the standards of paragraph (a) of this section apply to traverse ways used or to be used for the passage of mobile objects only after the heights of these traverse ways are increased by:

(1) Seventeen feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance.

(2) Fifteen feet for any other public roadway.

(3) Ten feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road.

(4) Twenty-three feet for a railroad, and,

(5) For a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it.

(Amdt. 77-5, Eff. 5/2/68); (Amdt. 77-9, Eff. 5/16/71)

77.25 Civil airport imaginary surfaces.

The following civil airport imaginary surfaces are established with relation to the airport and to each runway. The size of each such imaginary surface is based on the category of each runway according to the type of approach available or planned for that runway. The slope and dimensions of the approach surface applied to each end of a runway are determined by the most precise approach existing or planned for that runway end.

(a) Horizontal surface. A horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by swinging arcs of specified radii from the center of each end of the primary surface of each runway of each airport and connecting the adjacent arcs by lines tangent to those arcs. The radius of each arc is:

(1) 5,000 feet for all runways designated as utility or visual;

(2) 10,000 feet for all other runways. The radius of the arc specified for each end of a runway will have the same arithmetical value. That value will be the highest determined for either end of the runway. When a 5,000-foot arc is encompassed by tangents connecting two adjacent 10,000-foot arcs, the 5,000-foot arc shall be disregarded on the construction of the perimeter of the horizontal surface.

(b) Conical surface. A surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

(c) Primary surface. A surface longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway; but when the runway has no specially prepared hard surface, or planned hard surface, the primary surface ends at each end of that runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline. The width of a primary surface is:

(1) 250 feet for utility runways having only visual approaches.

(2) 500 feet for utility runways having nonprecision instrument approaches.

(3) For other than utility runways the width is:

(i) 500 feet for visual runways having only visual approaches.

(ii) 500 feet for nonprecision instrument runways having visibility minimums greater than three-fourths statute mile.

(iii) 1,000 feet for a nonprecision instrument runway having a nonprecision instrument approach with visibility minimums as low as three-fourths of a statute mile, and for precision instrument runways.

The width of the primary surface of a runway will be that width prescribed in this section for the most precise approach existing or planned for either end of that runway.

(d) Approach surface. A surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based upon the type of approach available or planned for that runway end.

(1) The inner edge of the approach surface is the same width as the primary surface and it expands uniformly to a width of:

(i) 1,250 feet for that end of a utility runway with only visual approaches;

(ii) 1,500 feet for that end of a runway other than a utility runway with only visual approaches;

(iii) 2,000 feet for that end of a utility runway with a nonprecision instrument approach;

- (iv) 3,500 feet for that end of a nonprecision instrument runway other than utility, having visibility minimums greater than three-fourths of a statute mile;
 - (v) 4,000 feet for that end of a nonprecision instrument runway, other than utility, having a nonprecision instrument approach with visibility minimums as low as three-fourths statute mile; and
 - (vi) 16,000 feet for precision instrument runways.
- (2) The approach surface extends for a horizontal distance of:
- (i) 5,000 feet at a slope of 20 to 1 for all utility and visual runways;
 - (ii) 10,000 feet at a slope of 34 to 1 for all nonprecision instrument runways other than utility; and,
 - (iii) 10,000 feet at a slope of 50 to 1 with an additional 40,000 feet at a slope of 40 to 1 for all precision instrument runways.
- (3) The outer width of an approach surface to an end of a runway will be that width prescribed in this subsection for the most precise approach existing or planned for that runway end.

(e) *Transitional surface.* These surfaces extend outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces. Transitional surfaces for those portions of the precision approach surface which project through and beyond the limits of the conical surface, extend a distance of 5,000 feet measured horizontally from the edge of the approach surface and at right angles to the runway centerline.

(Amdt. 77-7, Eff. 11/30/68); (Amdt. 77-9, Eff. 5/16/71)

77.27 [Reserved] (Amdt. 77-5, Eff. 5/2/68); (Amdt. 77-7, Eff. 11/ 30/68); (Amdt. 77-9, Eff. 5/16/71)

77.28 Military airport imaginary surfaces.

(a) *Related to airport reference points.* These surfaces apply to all military airports. For the purposes of this section a military airport is any airport operated by an armed force of the United States.

(1) *Inner horizontal surface.* A plane is oval in shape at a height of 150 feet above the established airfield elevation. The plane is constructed by scribing an arc with a radius of 7,500 feet about the centerline at the end of each runway and interconnecting these arcs with tangents.

(2) *Conical surface.* A surface extending from the periphery of the inner horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation.

(3) *Outer horizontal surface.* A plane, located 500 feet above the established airfield elevation, extending outward from the outer periphery of the conical surface for a horizontal distance of 30,000 feet.

(b) *Related to runways.* These surfaces apply to all military airports.

(1) *Primary surface.* A surface located on the ground or water longitudinally centered on each runway with the same length as the runway. The width of the primary surface for runways is 2,000 feet. However, at established bases where substantial construction has taken place in accordance with a previous lateral clearance criteria, the 2,000-foot width may be reduced to the former criteria.

(2) *Clear zone surface.* A surface located on the ground or water at each end of the primary surface, with a length of 1,000 feet and the same width as the primary surface.

(3) *Approach clearance surface.* An inclined plane, symmetrical about the runway centerline extended, beginning 200 feet beyond each end of the primary surface at the centerline elevation of the runway end and extending for 50,000 feet. The slope of the approach clearance surface is 50 to 1 along the runway centerline extended until it reaches an elevation of 500 feet above the established airport elevation. It then continues horizontally at this elevation to a point 50,000 feet from the point of beginning. The width of this surface at the runway end is the same as the primary surface, it flares uniformly, and the width at 50,000 is 16,000 feet.

(4) *Transitional surfaces.* These surfaces connect the primary surfaces, the first 200 feet of the clear zone surfaces, and the approach clearance surfaces to the inner horizontal surface, conical surface, outer horizontal surface or other transitional surfaces. The slope of the transitional surface is 7 to 1 outward and upward at right angles to the runway centerline.

(Amdt. 77-1, Eff. 5/11/65); (Amdt. 77-9, Eff. 5/16/71)

77.29 Airport imaginary surfaces for heliports.

a) *Helicopter primary surface.* The area of the primary surface coincides in size and shape with the designated take-off and landing area of a heliport. This surface is a horizontal plane at the elevation of the established heliport elevation.

b) *Helicopter approach surface.* The approach surface begins at each end of the heliport primary surface with the same width as the primary surface, and extends outward and upward for a horizontal distance of 4,000 feet where its width is 500 feet. The slope of the approach surface is 8 to 1 for civil heliports and 10 to 1 for military heliports.

c) *Helicopter transitional surface.* These surfaces extend outward and upward from the lateral boundaries of the heliport primary surface and from the approach surfaces at a slope of 2 to 1 for a distance of 250 feet measured horizontally from the centerline of the primary and approach surfaces.

(Amdt. 77-9, Eff. 5/16/71)

Subpart D--Aeronautical Studies of Effect of Proposed Construction on Navigable Airspace

77.31 Scope.

(a) This subpart applies to the conduct of aeronautical studies of the effect of proposed construction or alteration on the use of air navigation facilities or navigable airspace by aircraft. In the aeronautical studies, present and future IFR and VFR aeronautical operations and procedures are reviewed and any possible changes in those operations and procedures and in the construction proposal that would eliminate or alleviate the conflicting demands are ascertained.

(b) The conclusion of a study made under this subpart is normally a determination as to whether the specific proposal studied would be a hazard to air navigation.

(Amdt. 77-6, Eff. 8/31/68)

77.33 Initiation of studies.

(a) An aeronautical study is conducted by the FAA:

(1) Upon the request of the sponsor or any construction or alteration for which a notice is submitted under subpart B of this part, unless that construction or alteration would be located within an antenna farm area established under subpart F of this part; or

(2) Whenever the FAA determines it appropriate.

(Amdt. 77-4, Eff. 11/12/67)

77.35 Aeronautical studies.

(a) The Regional Manager, Air Traffic Division of the region in which the proposed construction or alteration would be located, or his designee, conducts the aeronautical study of the effect of the proposal upon the operation of air navigation facilities and the safe and efficient utilization of the navigable airspace. This study may include the physical and electromagnetic radiation effect the proposal may have on the operation of an air navigation facility.

(b) To the extent considered necessary, the Regional Manager, Air Traffic Division or his designee:

(1) Solicits comments from all interested persons;

(2) Explores objections to the proposal and attempts to develop recommendations for adjustment of aviation requirements that would accommodate the proposed construction or alteration;

(3) Examines possible revisions of the proposal that would eliminate the exceeding of the standards in subpart C of this part; and

(4) Convenes a meeting with all interested persons for the purpose of gathering all facts relevant to the effect of the proposed construction or alteration on the safe and efficient utilization of the navigable airspace.

(c) The Regional Manager, Air Traffic Division or his designee issues a determination as to whether the proposed construction or alteration would be a hazard to air navigation and sends copies to all known interested persons. This determination is final unless a petition for review is granted under 77.37.

(d) If the sponsor revises his proposal to eliminate exceeding of the standards of subpart C of this part, or withdraws it, the Regional Manager, Air Traffic Division, or his designee, terminates the study and notifies all known interested persons.

(Amdt. 77-6, Eff. 8/31/68); (Amdt. 77-11, Eff. 10/25/89)

77.37 Discretionary review.

(a) The sponsor of any proposed construction or alteration or any person who stated a substantial aeronautical objection to it in an aeronautical study, or any person who has a substantial aeronautical objection to it but was not given an opportunity to state it, may petition the Administrator, within 30 days after issuance of the determination under 77.19 or 77.35 or revision or extension of the determination under 77.39(c), for a review of the determination, revision, or extension. This paragraph does not apply to any acknowledgment issued under 77.19(c)(1).

(b) The petition must be in triplicate and contain a full statement of the basis upon which it is made

(c) The Administrator examines each petition and decides whether a review will be made and, if so, whether it will be:

(1) A review on the basis of written materials, including study of a report by the Regional Manager, Air Traffic Division of the aeronautical study, briefs, and related submissions by any interested party, and other relevant facts, with the Administrator affirming, revising, or reversing the determination issued under 77.19, 77.35 or 77.39(c); or

(2) A review on the basis of a public hearing, conducted in accordance with the procedures prescribed in subpart E of this part.

(Amdt. 77-3, Eff. 6/5/67); (Amdt. 77-11, Eff. 10/25/89)

77.39 Effective period of determination of no hazard.

(a) Unless it is otherwise extended, revised, or terminated, each final determination of no hazard made under this subpart or subpart B or E of this part expires 18 months after its effective date, regardless of whether the proposed construction or alteration has been started, or on the date the proposed construction or alteration is abandoned, whichever is earlier.

(b) In any case, including a determination to which paragraph (d) of this section applies, where the proposed construction or alteration has not been started during the applicable period by actual structural work, such as the laying of a foundation, but not including excavation, any interested person may, at least 15 days before the date the final determination expires, petition the FAA official who issued the determination to:

(1) Revise the determination based on new facts that change the basis on which it was made; or

(2) Extend its effective period.

(c) The FAA official who issued the determination reviews each petition presented under paragraph (b) of this section, and revises, extends, or affirms the determination as indicated by his findings.

(d) In any case in which a final determination made under this subpart or subpart B or E of this part relates to proposed construction or alteration that may not be started unless the Federal Communications Commission issues an appropriate construction permit, the effective period of each final determination includes--

(1) The time required to apply to the Commission for a construction permit, but not more than 6 months after the effective date of the determination; and

(2) The time necessary for the Commission to process the application except in a case where the Administrator determines a shorter effective period is required by the circumstances.

(e) If the Commission issues a construction permit, the final determination is effective until the date prescribed for completion of the construction. If the Commission refuses to issue a construction permit, the final determination expires on the date of its refusal.

(Amdt. 77-5, Eff. 5/2/68)

Subpart E--Rules of Practice for Hearings Under Subpart D

77.41 Scope.

This subpart applies to (J) hearings held by the FAA under titles 1, III, and X of the Federal Aviation Act of 1958 (49 U.S.C. subchapters I, III, and X), on proposed construction or alteration that affects the use of navigable airspace.

77.43 Nature of hearing.

Sections 4, 5, 7, and 8 of the Administrative Procedure Act (5 U.S.C. 1003, 1004, 1006, and 1007) do not apply to hearings held on proposed construction or alteration to determine its effect on the safety of aircraft and the efficient use of navigable airspace because those hearings are fact-finding in nature. As a fact-finding procedure, each hearing is non adversary and there are no formal pleadings or adverse parties.

77.45 Presiding officer.

(a) If, under 79.37, the Administrator grants a public hearing on any proposed construction or alteration covered by this part, the Director, Air Traffic Operations Service designates an FAA employee to be the presiding officer at the hearing. (b) The presiding officer may:

- (1) Give notice of the date and location of the hearing and any prehearing conference that may be held;
- (2) Administer oaths and affirmations;
- (3) Examine witnesses;
- (4) Issue subpoenas and take depositions or have them taken;
- (5) Obtain, in the form of a public record, all pertinent and relevant facts relating to the subject matter of the hearing;
- (6) Rule, with the assistance of the legal officer, upon the admissibility of evidence;
- (7) Regulate the course and conduct of the hearing; and
- (8) Designate parties to the hearing and revoke those designations.

(Amdt. 77-11, Eff. 10/25/89)

77.47 Legal officer.

The Chief Counsel designates a member of his staff to serve as legal officer at each hearing under this subpart. The legal officer may examine witnesses and assist and advise the presiding officer on questions of evidence or other legal questions arising during the hearing.

77.49 Notice of hearing.

In designating a time and place for a hearing under this subpart the presiding officer considers the needs of the FAA and the convenience of the parties and witnesses. The time and place of each hearing is published in the "Notices" section of the FEDERAL REGISTER before the date of the hearing, unless the notice is impractical or unnecessary.

77.51 Parties to the hearing.

The presiding officer designates the following as parties to the hearing--

- (a) The proponent of the proposed construction or alteration.
- (b) Those persons whose activities would be substantially affected by the proposed construction or alteration.

77.53 Prehearing conference.

(a) The presiding officer may, in his discretion, hold a prehearing conference with the parties to the hearing and the legal officer before the hearing.

(b) At the direction of the presiding officer, each party to a prehearing conference shall submit a brief written statement of the evidence he intends to provide through his witnesses and by questioning other witnesses at the hearing, and shall provide enough copies of the statement so that the presiding officer may keep three for the FAA and give one to each other party.

(c) At the prehearing conference, the presiding officer reduces and simplifies the subject matter of the hearing so far as possible and advises the parties of the probable order of presenting the evidence.

77.55 Examination of witnesses.

(a) Each witness at a hearing under this subpart shall, after being sworn by the presiding officer, give his testimony under oath.

(b) The party for whom a witness, other than an employee of the FAA, is testifying shall examine that witness. After that examination, other parties to the hearing may examine the witness, in the order fixed by the presiding officer. The presiding officer and the legal officer may then examine the witness. The presiding officer may grant any party an additional opportunity to examine any witness, if that party adequately justifies the additional examination.

(c) The legal officer examines each FAA employee who is a witness, before the other parties examine him. After that examination, the order prescribed in paragraph (b) of this section applies. An FAA employee may testify only as to facts within his personal knowledge and the application of FAA regulations, standards, and policies.

77.57 Evidence.

(a) The presiding officer receives all testimony and exhibits that are relevant to the issues of the hearing. So far as possible, each party shall submit enough copies of his exhibits that the presiding officer may keep three copies for the FAA and give one to each other party.

(b) The presiding officer excludes any testimony that is irrelevant, unduly repetitious, or consists of statements made during an aeronautical study in an effort to reconcile or compromise aviation or construction or alteration requirements. A party to the hearing may object to the admission of evidence only on the ground that it is irrelevant.

77.59 Subpoenas of witnesses and exhibits.

(a) The presiding officer of a hearing may issue subpoenas for any witness or exhibit that he determines may be material and relevant to the issues of the hearing. So far as possible, each party to the hearing shall provide the witnesses and exhibits that he intends to present at the hearing.

(b) If any party to the hearing is unable to provide his necessary witnesses and exhibits, he shall advise the presiding officer far enough in advance that the presiding officer can determine whether he should issue subpoenas for the desired witnesses or exhibits.

77.61 Revision of construction or alteration proposal.

(a) The sponsor of any proposed construction or alteration covered by this part may revise his proposal at any time before or during the hearing. If he revises it, the presiding officer decides whether the revision affects the proposal to the extent that he should send it to the Administrator for a redetermination of the need for a hearing.

(b) If the presiding officer decides that it does not need to be resubmitted to the Administrator, he advises the parties of the revised proposal and takes the action necessary to allow all parties to effectively participate in the hearing on the revised proposal. Without limiting his discretion, the presiding officer may recess and reconvene the hearing, or hold another prehearing conference.

77.63 Record of hearing.

(a) Each hearing is recorded verbatim by an official reporter under an FAA contract. The transcript, and all exhibits, become a part of the record of the hearing. (b) Any person may buy a copy of the transcript of the hearing from the reporter at the price fixed for it.

(c) The presiding officer may allow any party to withdraw an original document if he submits authenticated copies of it.

(d) Any person may buy, from the FAA, photostatic copies of any exhibit by paying the copying costs.

(e) A change in the official transcript of a hearing may be made only if it involves an error of substance. Any recommendation to correct the transcript must be filed with the presiding officer within 5 days after the hearing closes. The presiding officer reviews each request for a correction to the extent he considers appropriate and shall make any revisions that he finds appropriate as a result of that review.

77.65 Recommendations by parties.

Within 20 days after the mailing of the record of hearing by the official reporter, or as otherwise directed by the presiding officer, each party may submit to the presiding officer five copies of his recommendations for a final decision to be made by the Administrator.

77.67 Final decision of the Administrator.

After reviewing the evidence relevant to the questions of fact in a hearing, including the official transcript and the exhibits, The Administrator resolves all these questions, based on the weight of evidence, and makes his determination, stating the basis and reasons for it. He then issues an appropriate order to be served on each of the parties.

77.69 Limitations on appearance and representation.

(a) A former officer or employee of the FAA may not appear on behalf of, or represent, any party before the FAA in connection with any matter to which this part applies, if he considered or passed on that matter while he was an officer or employee of the FAA.

(b) A person appearing before the FAA on any matter to which this part applies may not, in connection with that appearance, knowingly accept assistance from, or share fees with, any person who is prohibited by paragraph (a) of this section, from appearing himself on that matter.

(c) A former official or employee of the FAA may not, within 6 months after he ceases to be such an officer or employee, appear before the FAA on behalf of, or represent, any party in connection with any proceeding that was pending under this part while he was an officer or employee of the FAA, unless he obtains written consent from an appropriate officer of the FAA, based on a verified showing that he did not personally consider the matter concerned or gain particular knowledge of it while he was an officer or employee of the FAA.

Subpart F--Establishment of Antenna Farm Areas

77.71 Scope.

(a) This subpart establishes antenna farm areas in which antenna structures may be grouped to localize their effect on the use of navigable airspace.

(b) It is the policy of the FAA to encourage the use of antenna farms and the single structure multiple antenna concept for radio and television towers whenever possible. In considering proposals for establishing antenna farm areas, it considers as far as possible the revision of aeronautical procedures and operations to accommodate antenna structures that will fulfill broadcasting requirements.

77.73 General provisions.

(a) An antenna farm area consists of a specified geographical location with established dimensions of area and height, where antenna towers with a common impact on aviation may be grouped. Each such area is established by appropriate rule making action.

(b) Each proposal for an antenna farm area is evaluated on the basis of its effect on the use of navigable airspace. The views of the Federal Communications Commission are requested on the effect that each establishment of an antenna farm area would have on its statutory responsibilities. Any views submitted by it are fully considered before the antenna farm concerned is established. If the Commission advises that the establishment of any proposed antenna farm area would interfere with its statutory responsibility, the proposed area is not established.

(c) The establishment of an antenna farm area is considered whenever it is proposed by:

- (1) The FAA;
- (2) The Federal Communications Commission;
- (3) The sponsor of a proposed antenna tower; or
- (4) Any other person having a substantial interest in a proposed antenna tower.

(Amdt. 77-10, Eff. 3/4/72)

77.75 Establishment of antenna farm areas.

The airspace areas described in the following sections of this subpart are established as antenna farm areas.

Note: Sections 77.77 through 77.1100 reserved for descriptions of antenna farm areas.

