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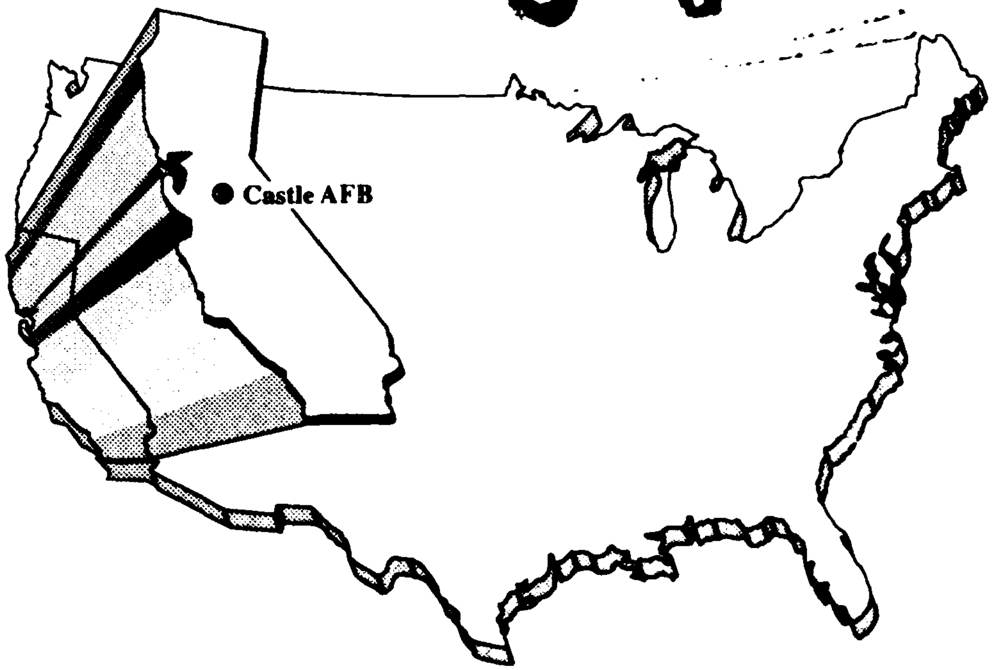
FINAL
ENVIRONMENTAL IMPACT STATEMENT
November 1994



DISPOSAL AND REUSE OF CASTLE AIR FORCE BASE, CALIFORNIA

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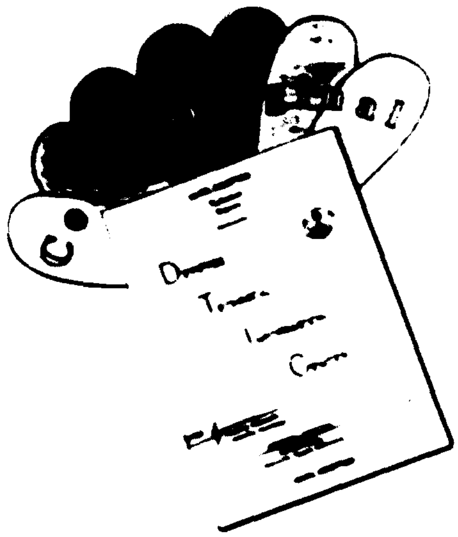

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

NOV 21 1994

TO: ALL INTERESTED GOVERNMENT AGENCIES, PUBLIC GROUPS, AND INDIVIDUALS

Attached is the Final Environmental Impact Statement (FEIS) for the Disposal and Reuse of Castle AFB CA. This document has been made available to the public in compliance with the President's Council on Environmental Quality National Environmental Policy Act Regulations.

If extra copies or additional information are needed, please contact:

Lt Col Terry D. Armstrong
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8106 Chennault Road
Brooks AFB TX 78235-5318
(210) 536-3007

Thank you for your cooperation.

T. DEAN FOX, Colonel, USAF
Directorate of Environment
Office of The Civil Engineer

Attachment
FEIS

FINAL

ENVIRONMENTAL IMPACT STATEMENT

DISPOSAL AND REUSE OF CASTLE AIR FORCE BASE, CALIFORNIA

NOVEMBER 1994

COVER SHEET

FINAL ENVIRONMENTAL IMPACT STATEMENT
DISPOSAL AND REUSE OF CASTLE AIR FORCE BASE, CALIFORNIA

a. Lead Agency: U.S. Air Force

b. Cooperating Agencies: Federal Aviation Administration
Federal Bureau of Prisons

c. Proposed Action: Disposal and Reuse of Castle Air Force Base (AFB), Merced County, California

d. Inquiries on this document may be directed to: Lt. Col. Terry Armstrong, Director Environmental Conservation and Planning, Headquarters AFCEE/EC, 8106 Chennault Road, Brooks AFB, Texas 78235-5318, (210) 536-3907.

e. Designation: Final Environmental Impact Statement (EIS).

f. Abstract: On April 12, 1991, the Secretary of Defense announced the closure of Castle AFB, California, pursuant to the Base Closure and Realignment Act. The base is scheduled for closure in September 1995. This EIS has been prepared in accordance with the National Environmental Policy Act to analyze the potential environmental consequences of the disposal and reasonable alternatives for reuse of the base. The document includes analyses of community setting, land use and aesthetics, transportation, utilities, hazardous materials/wastes, soils and geology, water resources, air quality, noise, biological resources, and cultural resources.

Potential environmental impacts are increased noise levels, traffic, and emissions of air pollutants over closure baseline conditions and impacts to biological resources. Noise mitigations could include measures identified by Federal Aviation Regulation Part 150 studies. Roadway improvements may be needed to prevent unacceptable traffic congestion. For all alternatives except the Castle Aviation Center Alternative, air emissions would not interfere with achievement of attainment goals through the application of emission reduction measures identified in the State Implementation Plan without the consideration of conformity offset allocations. Insufficient conformity offsets exist to simultaneously accommodate reuse and the Naval Air Station Lemoore realignment cumulative action. Impacts to biological resources could require consultation under Section 7 of the Endangered Species Act. Redevelopment activities could alter drainage patterns and increase erosion which could be mitigated through proper engineering designs. Cultural resources could be impacted by conveyance of the property to a non-federal entity. Preservation covenants within disposal documents could eliminate or reduce these effects to a non-adverse level. Because the Air Force is disposing of the property, some of the mitigation measures are beyond the control of the Air Force. Remediation of hazardous waste sites under the Installation Restoration Program is and will continue to be the responsibility of the Air Force.

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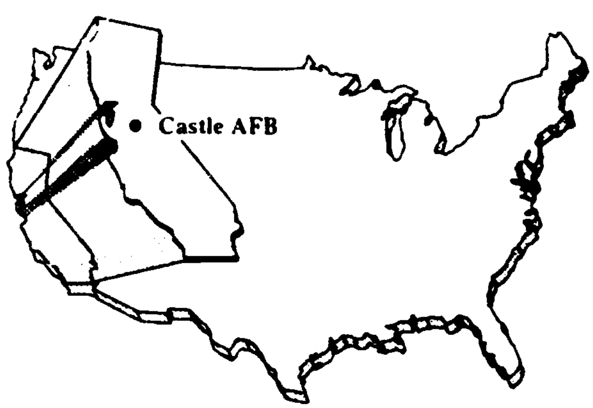


SUMMARY

SUMMARY

PURPOSE OF AND NEED FOR ACTION

Castle Air Force Base (AFB), California, was one of the bases recommended by the 1991 Defense Base Closure and Realignment Commission for closure. The Commission's recommendations were accepted by the President and submitted to Congress on July 12, 1991. As Congress did not disapprove the recommendations in the time given under the Defense Base Closure and Realignment Act (DBCRA) of 1990 (Public Law 101-510, Title XXIX), the recommendations have become law. Castle AFB is scheduled to be closed on September 30, 1995.

The Air Force is required to comply with the National Environmental Policy Act (NEPA) in the implementation of the base disposal and reuse. The Air Force must now make a series of interrelated decisions concerning the disposition of base property. This Environmental Impact Statement (EIS) has been prepared to provide information on the potential environmental impacts resulting from disposal and proposed reuse of the base property. The Federal Aviation Administration (FAA) and the Federal Bureau of Prisons are cooperating agencies in the preparation of this EIS, who will make decisions on their own and assist the Air Force in making related decisions concerning Castle AFB property. Several alternative reuse concepts are studied to identify the range of potential direct and indirect environmental consequences of disposal.

After completion and consideration of this EIS, the Air Force will prepare decision documents stating what property is excess and surplus, and the terms and conditions under which the dispositions will be made. These decisions may affect the environment by influencing the nature of the future use of the property.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

Castle AFB comprises 2,777 acres, including two housing areas separated from the main base. The main base contains the airfield and aviation support, industrial, medical, educational, commercial, residential, and public facilities/recreation land uses, as well as vacant land. All of this acreage will be available for disposal for civilian reuse, and is evaluated in this EIS.

A Proposed Action and four alternatives are assessed in this EIS for the purposes of evaluating potential environmental impacts resulting from the subsequent use of this land. The Air Force has adopted as the Proposed Action the Preliminary Reuse Plan of the Castle Joint Powers Authority (CJPA). The CJPA was formed by Merced County and the cities of Atwater and Merced as a multi-jurisdictional authority responsible for planning the civilian reuse and development of Castle AFB and for managing closure and post-closure activities. To encompass the range of possible reuses, the Air Force developed three other alternatives for analysis. The No-Action Alternative is also addressed.

Proposed Action. The Proposed Action developed by the CJPA features reuse of the airfield and aviation support areas for major aircraft maintenance, maintenance training, pilot and crew proficiency training, and general aviation. Non-aviation areas in the cantonment include industrial, institutional (medical and educational), commercial, residential, and public facilities/recreation.

The following alternatives to the Proposed Action are also being considered:

- The **Castle Aviation Center Alternative** proposes an integrated general aviation support center, which would provide general aircraft maintenance and repair, classic aircraft restoration, aircraft storage, sales, testing, and support for air shows. Non-aviation land uses include industrial, institutional (medical and educational), commercial, residential, public facilities/recreation, and agricultural.

- The **Commercial Aviation Alternative** proposes a general aviation airport with commercial passenger service, airline pilot proficiency training, and air cargo operations. This alternative would have the largest number of flight operations of any of the aviation-related reuse scenarios. Non-aviation land uses include industrial, institutional (medical), commercial, residential, public facilities/recreation, and agricultural.

- The **Aviation with Mixed Use Alternative** proposes airfield/ aviation support land use similar to the Proposed Action, although the number of aircraft operations is substantially lower under this alternative. Non-aviation land uses include industrial, institutional (medical and educational), commercial, residential, public facilities/recreation, and agricultural.

- The **Non-Aviation Alternative** proposes an extensive industrial research and development area on the existing airfield and aviation support acreage. Other land use includes a major educational campus, as well as commercial, residential, public facilities/recreation, and agricultural.

- The **No-Action Alternative** would result in the base being placed in caretaker status. No further activity would take place. The U.S. government would not be required to retain ownership of the base under this alternative.

Other Land Use Concepts. Two other land uses have been identified as possible components of any of the alternatives. They are the establishment of a Federal Bureau of Prisons correctional complex and a recreational trapshooting range in the land east of the runway.

Other Future Actions in the Region. One reasonably foreseeable project was identified that could potentially contribute to cumulative impacts. The realignment of activities to Naval Air Station (NAS) Lemoore fall within the Region of Influence (ROI) for air quality.

SCOPE OF STUDY

The Notice of Intent (NOI) to prepare an EIS for the disposal and reuse of Castle AFB was published in the Federal Register on October 9, 1991. Issues related to the disposal and reuse of Castle AFB were identified during a subsequent scoping period. A public scoping meeting was held on November 6, 1991, in Merced, California. The comments and concerns expressed at that meeting and in written correspondence received by the Air Force, as well as information from other sources, were used to determine the scope and direction of studies and analyses required to accomplish this EIS.

This EIS discusses the potential environmental impacts associated with the Proposed Action and reasonable alternatives, as well as interim activities (e.g., interim outleases) that may be allowed by the Air Force before final disposition of the base. In order to establish the context in which these environmental impacts may occur, potential changes in population and employment, land use and aesthetics, transportation, and community and public utility services are discussed as reuse-related influencing factors. Issues related to current and future management of hazardous materials and wastes are also discussed. Potential impacts to the physical and natural environment are evaluated for soils and geology, water resources, air quality, noise, biological resources, and cultural resources. These impacts may occur as a direct result of disposal and reuse actions or as an indirect result of changes to the local communities.

The baseline against which the Proposed Action and alternatives are analyzed consists of the conditions projected at base closure in 1995. Although the baseline assumes a closed base, a reference to preclosure conditions is provided in several sections (e.g., air quality and noise) to allow a comparative analysis over time. This will assist the Air Force decision maker and other agencies that may be making decisions relating to reuse of Castle AFB in understanding potential long-term trends in comparison to historic conditions when the installation was active.

The Air Force is also preparing a separate Socioeconomic Impact Analysis Study (SIAS) on the economic impacts expected in the region as a result of the closure, disposal, and reuse of Castle AFB. That document, although not required by NEPA, will assist the local community in planning for the transition of the base from military to civilian use. The EIS uses population and employment projections from the SIAS to support the analysis of potential environmental impacts to biophysical resources.

SUMMARY OF ENVIRONMENTAL IMPACTS

This EIS considers environmental impacts of the Air Force's disposal of the installation and portrays a variety of potential land uses to cover reasonable future uses of the property and facilities by others. Several alternative scenarios, including the community's proposed plan, were used to group reasonable land uses and tc examine the environmental effects of likely reuse of Castle AFB.

Environmental impacts of the Proposed Action and reasonable alternatives are briefly described below. Influencing factors include projections of the reuse activities that would likely influence the biophysical environment, including ground disturbance, socioeconomic factors, and infrastructure demands, and are summarized in Table S-1. The employment and population trends are depicted in Figures S-1 and S-2. Impacts of the Proposed Action and alternatives over the 20-year study period are summarized in Table S-2. Impacts for air quality, including cumulative impacts, are summarized over a 10-year period due to the speculative nature of projecting pollutant concentrations far in the future.

Mitigations and Pollution Prevention. Options for mitigating potential environmental impacts that might result from the Air Force disposing of property or from the implementation of the Proposed Action or alternatives by property recipients are presented and discussed. Since most potential environmental impacts would result directly from the reuse by others, the Air Force would not typically be responsible for implementing such mitigations. Full responsibility for these suggested mitigations, therefore, would be borne primarily by future property recipients or local governmental agencies. Mitigation suggestions, where appropriate, are listed in terms of their potential effectiveness if implemented for affected resource areas and are summarized along with the environmental impacts of the Proposed Action and alternatives in Table S-2. Mitigation measures include pollution prevention measures where appropriate, such as suggestions to implement waste minimization, recycling, and transportation management measures to reduce motor vehicle pollution.

PROPOSED ACTION

Local Community. Redevelopment of Castle AFB under the Proposed Action would lead to an increase in employment and population in Merced County. The Proposed Action would generate 3,824 direct and 2,427 secondary jobs

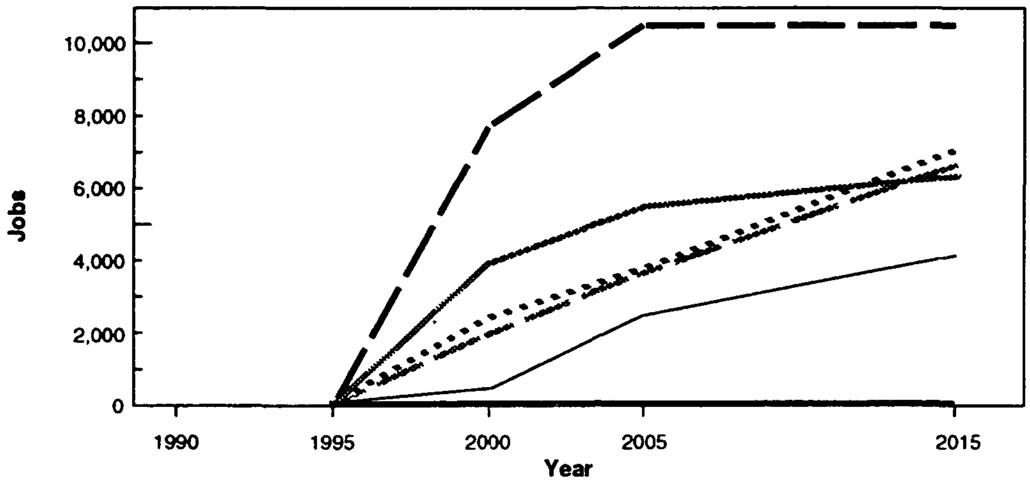
Table S-1. Summary of Reuse-Related Influencing Factors

Factor	Proposed Action 2000	Proposed Action 2005	Proposed Action 2015	Castle Aviation Center Alternative 2000	Castle Aviation Center Alternative 2005	Castle Aviation Center Alternative 2015	Commercial Aviation Alternative 2000	Commercial Aviation Alternative 2005	Commercial Aviation Alternative 2015	Aviation with Mixed Use Alternative 2000	Aviation with Mixed Use Alternative 2005	Aviation with Mixed Use Alternative 2015	Non-Aviation Alternative 2000	Non-Aviation Alternative 2005	Non-Aviation Alternative 2015	No-Action Alternative[a]
Ground Disturbance (acres, by phase)	215	148	87	119	27	0	160	111	198	203	66	91	210	207	227	No change
Aircraft Operations (annual)	102,384	106,530	115,319	7,348	8,894	11,110	176,926	192,890	234,437	33,650	36,650	40,800	0	0	0	No change
Direct Employment	2,447	3,322	3,824	4,560	6,150	6,150	1,232	2,350	4,001	1,516	2,356	4,175	241	1,689	2,650	50
Secondary Employment	1,414	2,011	2,427	3,210	4,404	4,404	765	1,444	2,697	895	1,480	2,880	199	839	1,451	12
Population Increase	3,335	4,842	6,114	6,445	9,142	9,979	1,666	3,379	6,373	2,078	3,430	6,708	282	2,366	4,105	No change
Traffic (average daily vehicular traffic)	28,700	38,250	39,800	42,900	47,700	47,700	24,400	44,300	54,200	21,9[illegible]	30,450	36,050	11,700	24,650	34,750	500
Increase in Water Consumption (MGD)	0.79	1.16	1.41	1.48	2.16	2.34	0.37	0.74	1.38	0.46	0.75	1.41	0.25	0.72	1.18	No change
Increase in Wastewater Treatment (MGD)	0.33	0.49	0.59	0.63	0.95	1.02	0.13	0.28	0.55	0.18	0.30	0.58	0.08	0.29	0.50	No change
Increase in Solid Waste Disposal (tons/day)	11.8	15.1	17.9	18.3	27.4	28.6	4.5	9.0	16.4	6.8	9.3	17.3	4.9	10.4	17.1	No change
Increase in Electricity Consumption (MWH/day)	38.9	73.5	94.7	79.2	126.0	135.6	12.8	46.2	110.7	16.1	44.2	112.7	1.9	45.2	97.3	No change
Increase in Natural Gas Consumption (therms/day)	2,200	3,600	4,600	4,300	6,500	7,100	900	2,500	5,300	1,100	2,300	5,200	200	2,100	4,100	No change

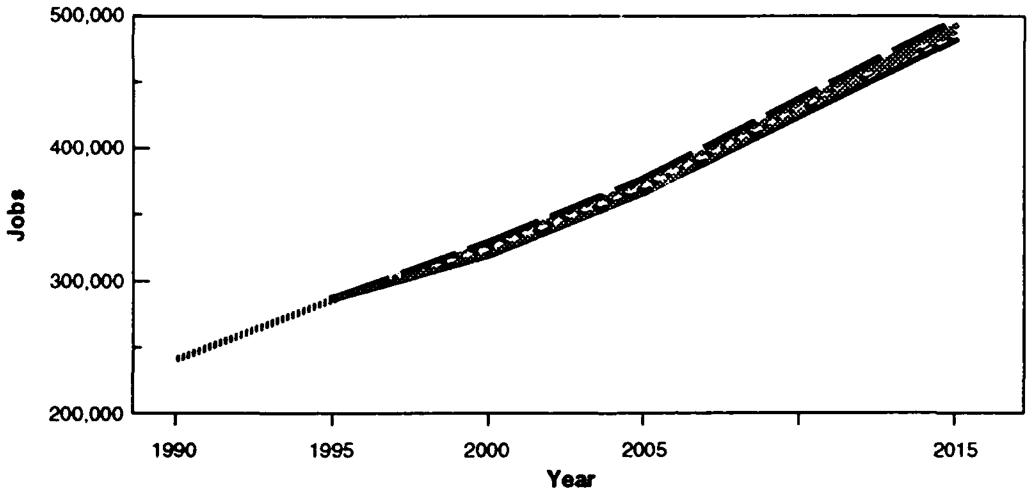
Note: (a) The No-Action Alternative summarizes influencing factors relative to the closure baseline conditions.
MGD = Million gallons per day.
MWH = Megawatt-hours.

ALTERNATIVE	1995[a]	2000	2005	2015
Proposed Action	62	3,861	5,333	6,251
Castle Aviation Center	62	7,770	10,554	10,554
Commercial Aviation	62	1,997	3,794	6,698
Aviation with Mixed Use	62	2,411	3,836	7,055
Non-Aviation	62	440	2,528	4,101

Reuse-Related Employment Effects[b]



Reuse-Related Employment Effects[b]



Total ROI Employment Including Reuse-Related Effects

EXPLANATION

- Preclosure
- Proposed Action
- Castle Aviation Center
- Commercial Aviation
- Aviation with Mixed Use
- Non-Aviation
- No-Action/Post-Closure

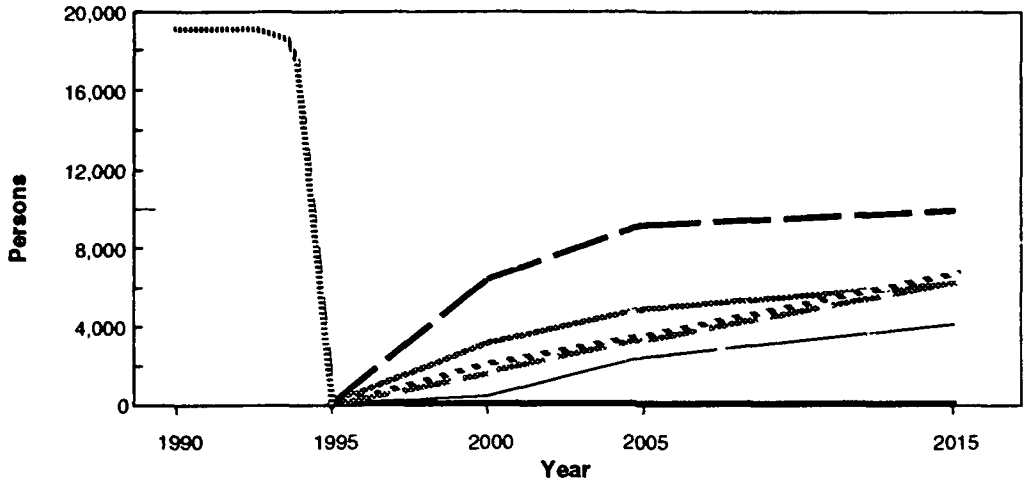
Reuse-Related Employment Effects

(a) The 1995 values represent total base-related employment under the closure baseline.
(b) Employment effects represent the change in employment relative to the No-Action Alternative.

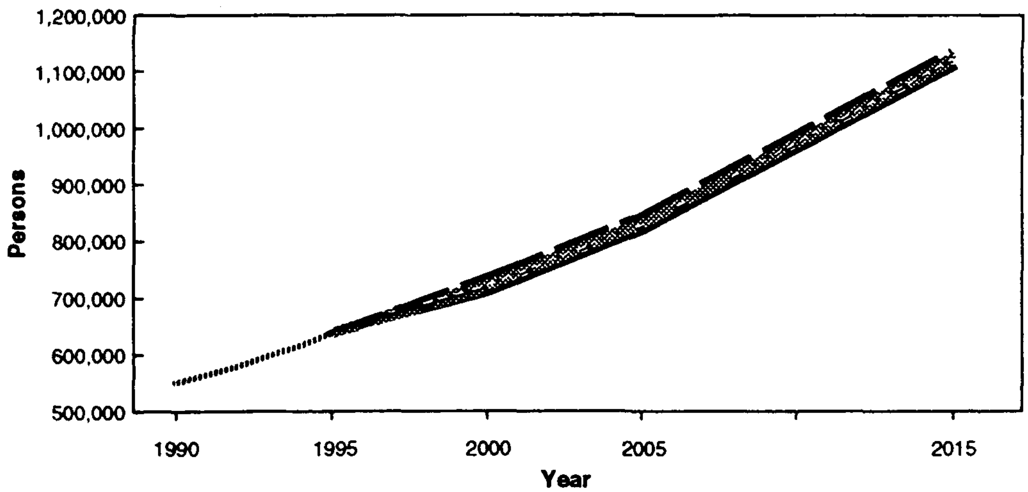
Figure S-1

ALTERNATIVE	1995[a]	2000	2005	2015
Proposed Action	0	3,338	4,841	6,114
Castle Aviation Center	0	6,445	9,142	9,979
Commercial Aviation	0	1,666	3,379	6,373
Aviation with Mixed Use	0	2,078	3,430	6,708
Non-Aviation	0	282	2,366	4,105

Reuse-Related Population Effects[b]



Reuse-Related Population Effects[b]



Total ROI Population Including Reuse-Related Effects

EXPLANATION

- Preclosure
- Proposed Action
- Castle Aviation Center
- Commercial Aviation
- Aviation with Mixed Use
- Non-Aviation
- No-Action/Post-Closure

(a) 1995 represents closure conditions

(b) Reuse-related population effects are the persons that move into the ROI solely as a result of reuse.

Reuse-Related Population Effects

Figure S-2

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 1 of 14

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No Action Alternative
Local Community						
• Land Use and Aesthetics	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts
	Local general plans would require updating. Planned reuses conflict with local zoning ordinances	Local general plans would require updating. Planned reuses conflict with local zoning ordinances	Local general plans would require updating. Planned reuses conflict with local zoning ordinances	Local general plans would require updating. Planned reuses conflict with local zoning ordinances	Local general plans would require updating. Planned reuses conflict with local zoning ordinances	Local general plans would require updating No change from closure
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	
	Local jurisdictions would revise general plans and zoning ordinances to reflect reuse	Local jurisdictions would revise general plans and zoning ordinances to reflect reuse	Local jurisdictions would revise general plans and zoning ordinances to reflect reuse	Local jurisdictions would revise general plans and zoning ordinances to reflect reuse	Local jurisdictions would revise general plans and zoning ordinances to reflect reuse	
• Transportation	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts	• Impacts
	Increase of 39,800 daily trips from closure. Six new base-access points provided. Reuse-generated traffic would deteriorate SH 99 to an unacceptable LOS by 2008, Santa Fe Drive by 2001, and Bellevue Road by 2011	Increase of 47,700 daily trips from closure. Six new base-access points provided. Reuse-generated traffic would deteriorate SH 99 to an unacceptable LOS by 2007, Santa Fe Drive by 2000, and Bellevue Road by 2004	Increase of 54,200 daily trips from closure. Six new base-access points provided. Reuse-generated traffic would deteriorate SH 99 to an unacceptable LOS by 2008, Santa Fe Drive by 2002, and Bellevue Road by 2008	Increase of 36,050 daily trips from closure Six new base-access points provided. Reuse-generated traffic would deteriorate SH 99 to an unacceptable LOS by 2008, Santa Fe Drive by 2003, and Bellevue Road by 2010	Increase of 34,750 daily trips from closure. Six new base-access points provided. Reuse-generated traffic would deteriorate SH 99 to an unacceptable LOS by 2009, Santa Fe Drive by 2008, and Bellevue Road by 2012	No changes in base related traffic SH 99 and Santa Fe Road would deteriorate to an unacceptable LOS by 2010

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
LOS = Level of Service.
SH = State Highway.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 2 of 14

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Local Community (Continued)						
• Transportation (Continued)	Increase of 115,319 annual aircraft operations. No airspace conflicts or air transportation impacts	Increase of 11,110 annual aircraft operations. No airspace conflicts or air transportation impacts	Increase of 234,437 annual aircraft operations. No airspace conflicts or air transportation impacts	Increase of 40,800 annual aircraft operations. No airspace conflicts or air transportation impacts	No aircraft operations	No aircraft operations
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	Develop road improvements and traffic management programs	Develop road improvements and traffic management programs	Develop road improvements and traffic management programs	Develop road improvements and traffic management programs	Develop road improvements and traffic management programs	Develop program for improvements to SH 99
• Utilities Use	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts
	Up to 4 percent increase in ROI utility use. Current systems, with planned improvements, would be able to accommodate increased demands. Interconnection required to provide service to on-base users. *Pretreatment of industrial* wastewater may be required	Up to 7 percent increase in ROI utility use. Current systems, with planned improvements, would be able to accommodate increased demands. Interconnection required to provide service to on-base users. Pretreatment of industrial wastewater may be required	Up to 4 percent increase in ROI utility use. Current systems, with planned improvements, would be able to accommodate increased demands. Interconnection required to provide service to on-base users. Pretreatment of industrial wastewater may be required	Up to 5 percent increase in ROI utility use. Current systems, with planned improvements, would be able to accommodate increased demands. Interconnection required to provide service to on base users. Pretreatment of industrial wastewater may be required	Up to 4 percent increase in ROI utility use Current systems, with planned improvements, would be able to accommodate increased demands Interconnection required to provide service to on base users Pretreatment of industrial wastewater may be required	No changes in base related utility use

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative
ROI = Region of Influence.
SH = State Highway.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 3 of 14

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management						
• Hazardous Materials Management	• Impacts: Similar types and an increase in quantities of materials used. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Similar types and an increase in quantities of materials used. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Similar types and an increase in quantities of materials used. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Similar types and quantities of materials used. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Similar types and quantities of materials used. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: No change in types and quantities used
	• Mitigation: Establish cooperative planning body	• Mitigation: Establish cooperative planning body	• Mitigation: Establish cooperative planning body	• Mitigation: Establish cooperative planning body	• Mitigation: Establish cooperative planning body	
• Hazardous Waste Management	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: No change in quantities generated

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 4 of 14

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)						
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	
	Collection of hazardous household products; educational programs on recycling, waste minimization, waste disposal	Collection of hazardous household products; educational programs on recycling, waste minimization, waste disposal	Collection of hazardous household products; educational programs on recycling, waste minimization, waste disposal	Collection of hazardous household products; educational programs on recycling, waste minimization, waste disposal	Collection of hazardous household products; educational programs on recycling, waste minimization, waste disposal	
• Installation Restoration Program	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Possible redevelopment delays and land use restrictions due to remediation	Possible redevelopment delays and land use restrictions due to remediation	Possible redevelopment delays and land use restrictions due to remediation	Possible redevelopment delays and land use restrictions due to remediation	Possible redevelopment delays and land use restrictions due to remediation	IRP remediation activities continued as needed
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	
	Coordination between OL and planning agencies to address potential problems. Close out IRP sites. Reuse sites as open space	Coordination between OL and planning agencies to address potential problems. Close out IRP sites. Reuse sites as open space	Coordination between OL and planning agencies to address potential problems. Close out IRP sites. Reuse sites as open space	Coordination between OL and planning agencies to address poter..al problems. Close out IRP sites. Reuse sites as open space	Coordination between OL and planning agencies to address potential problems. Close out IRP sites. Reuse sites as open space	

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
IRP = Installation Restoration Program.
OL = Operating Location.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 5 of 14

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)						
• Storage Tanks	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Storage tanks required by new owner/operator would be subject to all regulations to avoid unacceptable impacts	Storage tanks required by new owner/operator would be subject to all regulations to avoid unacceptable impacts	Storage tanks required by new owner/operator would be subject to all regulations to avoid unacceptable impacts	Storage tanks required by new owner/operator would be subject to all regulations to avoid unacceptable impacts	Storage tanks required by new owner/operator would be subject to all regulations to avoid unacceptable impacts	Storage tanks would be removed or maintained in place according to required standards
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	Coordinate use of tanks with planning agencies to ensure tank and piping integrity is maintained	Coordinate use of tanks with planning agencies to ensure tank and piping integrity is maintained	Coordinate use of tanks with planning agencies to ensure tank and piping integrity is maintained	Coordinate use of tanks with planning agencies to ensure tank and piping integrity is maintained	Coordinate use of tanks with planning agencies to ensure tank and piping integrity is maintained	None required
• Asbestos	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Pending survey results	Pending survey results	Pending survey results	Pending survey results	Pending survey results	Continued management of asbestos in accordance with Air Force policy
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos would be managed in place	Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos would be managed in place	Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos would be managed in place	Removal and disposal of asbestos in facilities to be renovated. Remaining asbestos would be managed in place	Removal and disposal of asbestos in facilities to be renovated. Remaining asbestos would be managed in place	None required

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)						
• Pesticide Usage	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptable impacts	Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptable impacts	Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptable impacts	Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptaole impacts	Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptable impacts	No change in usage or management practices
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	None required	None required	None required	None required	None required	None required
• Polychlorinated Biphenyls	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	No Air Force owned PCB or PCB-contaminated equipment exists on base	No Air Force owned PCB or PCB-contaminated equipment exists on base	No Air Force owned PCB or PCB-contaminated equipment exists on base	No Air Force owned PCB or PCB-contaminated equipment exists on base	No Air Force owned PCB or PCB-contaminated equipment exists on base	No Air Force owned PCB or PCB-contaminated equipment exists on base
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	None required	None required	None required	None required	None required	None required

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
FIFRA = Federal Insecticide, Fungicide, and Rodenticide Act.
PCB = Polychlorinated biphenyl.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
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Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)						
• Radon	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	No impact. Current radon levels below 4 pCi/l	No impact. Current radon levels below 4 pCi/l	No impact. Current radon levels below 4 pCi/l	No impact. Current radon levels below 4 pCi/l	No impact. Current radon levels below 4 pCi/l	No impact Current radon levels below 4 pCi/l
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	None required	None required	None required	None required	None required	None required
• Medical/Biohazardous Waste	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Amounts generated by civilian medical facility would be similar to preclosure levels. Proper management under applicable regulations would avoid unacceptable impacts	Amounts generated by civilian medical facility would be similar to preclosure levels. Proper management under applicable regulations would avoid unacceptable impacts	Amounts generated by civilian medical facility would be similar to preclosure levels. Proper management under applicable regulations would avoid unacceptable impacts	Amounts generated by civilian medical facility would be similar to preclosure levels. Proper management under applicable regulations would avoid unacceptable impacts	Amounts generated by civilian medical facility would be similar to preclosure levels. Proper management under applicable regulations would avoid unacceptable impacts	Wastes would not be generated
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	None required	None required	None required	None required	None required	None required
• Ordnance	• No impact	• No impact	• No impact	• No impact	• No impact	• No impact
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	None required	None required	None required	None required	None required	None required

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
pCi/l = Picocuries per liter.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the [illegible] Action and Reasonable Reuse Alternatives

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment						
• Soils and Geology	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Minor erosion effects from 450 acres of ground disturbance	Minor erosion effects from 146 acres of ground disturbance	Minor erosion effects from 469 acres of ground disturbance	Minor erosion effects from 360 acres of ground disturbance	Minor erosion effects from 644 acres of ground disturbance	No ground disturbance
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	Use techniques such as protective cover and diversion dikes to minimize erosion during and after construction	Use techniques such as protective cover and diversion dikes to minimize erosion during and after construction	Use techniques such as protective cover and diversion dikes to minimize erosion during and after construction	Use techniques such as protective cover and diversion dikes to minimize erosion during and after construction	Use techniques such as protective cover and diversion dikes to minimize erosion during and after construction	None required
• Water Resources	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Disturbance and development of 450 acres could affect surface water flow and water quality	Disturbance and development of 146 acres could affect surface water flow and water quality	Disturbance and development of 469 acres could affect surface water flow and water quality	Disturbance and development of 360 acres could affect surface water flow and water quality	Disturbance and development of 644 acres could affect surface water flow and water quality	No ground disturbance. No change in water demand
	2.7 percent increase in ROI water demand would not affect water supply but could contribute to an incremental increase in aquifer depletion	4.5 percent increase in ROI water demand would not affect water supply but could contribute to an incremental increase in aquifer depletion	2.6 percent increase in ROI water demand would not affect water supply but could contribute to an incremental increase in aquifer depletion	2.7 percent increase in ROI water demand would not affect water supply but could contribute to an incremental increase in aquifer depletion	2.2 percent increase in ROI water demand would not affect water supply but could contribute to an incremental increase in aquifer depletion	

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
ROI = Region of Influence.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment (Continued)						
• Water Resources (Continued)	• Mitigation: Use of proper construction techniques, control of site runoff, minimizing surface disturbance and length of exposure time. Compliance with NPDES and local permit requirements for storm water runoff	• Mitigation: Use of proper construction techniques, control of site runoff, minimizing surface disturbance and length of exposure time. Compliance with NPDES and local permit requirements for storm water runoff	• Mitigation: Use of proper construction techniques, control of site runoff, minimizing surface disturbance and length of exposure time. Compliance with NPDES and local permit requirements for storm water runoff	• Mitigation: Use of proper construction techniques, control of site runoff, minimizing surface disturbance and length of exposure time. Compliance with NPDES and local permit requirements for storm water runoff	• Mitigation: Use of proper construction techniques, control of site runoff, minimizing surface disturbance and length of exposure time. Compliance with NPDES and local permit requirements for storm water runoff	• Mitigation: None required
• Air Quality	• **Reuse-Related Impacts:** (Without consideration of conformity offset allocations to other actions in the region [cumulative impacts]) Increase in reuse-related emissions in 2005: ROG: 1.52 tons/day NO_x: 4.41 tons/day PM_{10}: 3.86 tons/day SO_2: 0.52 ton/day CO: 16.38 tons/day	• **Reuse-Related Impacts:** (Without consideration of conformity offset allocations to other actions in the region [cumulative impacts]) Increase in reuse-related emissions in 2005: ROG: 2.91 tons/day NO_x: 3.27 tons/day PM_{10}: 7.58 tons/day SO_2: 0.86 ton/day CO: 30.94 tons/day	• **Reuse-Related Impacts:** (Without consideration of conformity offset allocations to other actions in the region [cumulative impacts]) Increase in reuse-related emissions in 2005: ROG: 1.12 tons/day NO_x: 4.08 tons/day PM_{10}: 2.75 tons/day SO_2: 0.39 ton/day CO: 13.97 tons/day	• **Reuse-Related Impacts:** (Without consideration of conformity offset allocations to other actions in the region [cumulative impacts]) Increase in reuse-related emissions in 2005: ROG: 1.06 tons/day NO_x: 1.32 tons/day PM_{10}: 2.73 tons/day SO_2: 0.31 ton/day CO: 11.61 tons/day	• **Reuse-Related Impacts:** (Without consideration of conformity offset allocations to other actions in the region [cumulative impacts]) Increase in reuse-related emissions in 2005: ROG: 0.71 ton/day NO_x: 0.84 ton/day PM_{10}: 1.84 tons/day SO_2: 0.21 ton/day CO: 7.59 tons/day	• Impacts: No change

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
CO = Carbon monoxide.
NO_x = Nitrogen oxides.
NPDES = National Pollutant Discharge Elimination System.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.
SO_2 = Sulfur dioxide.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment (Continued)						
• Air Quality (Continued)	Increased air pollutant emissions during construction and operations would not exceed preclosure conditions and, therefore, are not expected to affect the region's progress toward attainment of the ozone or PM_{10} standard. Concentrations would *not increase* the frequency or severity of violations of the ozone or PM_{10} standard	Increased air pollutant emissions of ROG and NO_x would not exceed preclosure conditions; emissions of PM_{10}, SO_2, and CO would likely exceed preclosure conditions. Reuse activities may require mitigation or offsets of PM_{10} emissions to avoid delays in attainment milestones. Air emission concentrations would not cause increased or new violations of NAAQS	Increased air pollutant emissions during construction and operations would not exceed preclosure conditions and, therefore, are not expected to affect the region's progress toward attainment of the ozone or PM_{10} standard. Concentrations would *not increase* the frequency or severity of violations of the ozone or PM_{10} standard. Insufficient conformity offsets exist to accommodate all reuse-related aircraft emissions for NO_x	Increased air pollutant emissions during construction and operations would not exceed preclosure conditions and, therefore, are not expected to affect the region's progress toward attainment of the ozone or PM_{10} standard. Concentrations would *not increase* the frequency or severity of violations of the ozone or PM_{10} standard	Increased air pollutant emissions during construction and operations would not exceed preclosure conditions and, therefore, are not expected to affect the region's progress toward attainment of the ozone or PM_{10} standard. Concentrations would *not increase* the frequency or severity of violations of the ozone or PM_{10} standard	
	• **Cumulative Impacts**	• **Cumulative Impacts**	• **Cumulative Impacts**	• **Cumulative Impacts**	• **Cumulative Impacts**	
	Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for NO_x and PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated	Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated	Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for NO_x and PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated	Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated	Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated	

Note: *Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.*
CO = Carbon monoxide.
NAAQS = National Ambient Air Quality Standards.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.
SO_2 = Sulfur dioxide.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
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Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment (Continued)						
• Air Quality (Continued)	• Mitigation:	• Mitigation:	• Mitigation:	• *Mitigation:*	• *Mitigation:*	• *Mitigation:*
	Control of fugitive dust and combustion emissions from construction activities. Application of control measures such as land use or transportation planning and management measures to reduce motor vehicle pollution	Control of fugitive dust and combustion emissions from construction activities. Application of control measures such as land use or transportation planning and management measures to reduce motor vehicle pollution	Control of fugitive dust and combustion emissions from construction activities. Application of control measures such as land use or transportation planning and management measures to reduce motor vehicle pollution	Control of fugitive dust and combustion emissions from construction activities. Application of control measures such as land use or transportation planning and management measures to reduce motor vehicle pollution	Control of fugitive dust and combustion emissions from construction activities. Application of control measures such as land use or transportation planning and management measures to reduce motor vehicle pollution	None required
• Noise	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	2,851 acres and 263 residents exposed to CNEL 60 dB or greater due to civilian aircraft operations in 2015. 358 additional residents exposed to CNEL 60 dB or greater due to increased surface traffic in 2015	1,373 acres and 5 residents exposed to CNEL 60 dB or greater due to civilian aircraft operations in 2015. 692 additional residents exposed to CNEL 60 dB or greater due to increased surface traffic in 2015	5,291 acres and 290 residents exposed to CNEL 60 dB or greater due to civilian aircraft operations in 2015. 383 additional residents exposed to CNEL 60 dB or greater due to increased surface traffic in 2015	1,149 acres and no residents exposed to CNEL 60 dB or greater due to civilian aircraft operations in 2015. 365 additional residents exposed to CNEL 60 dB or greater due to increased surface traffic in 2015	No aircraft noise. 296 additional residents exposed to CNEL 60 dB or greater due to increased surface traffic in 2015	No change in base-related noise levels. 2,843 residents exposed to CNEL 60 dB or greater due to surface traffic in 2015

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
CNEL = Community Noise Equivalent Level.
dB = Decibel.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
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Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment (Continued)						
• Noise (Continued)	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	Change takeoff climbout or landing procedures to minimize aircraft noise. Conduct FAR 150 to identify potential mitigation. Barrier walls to mitigate surface traffic noise. Use of sound insulation, barriers, and buffer zones	Change takeoff climbout or landing procedures to minimize aircraft noise. Conduct FAR 150 to identify potential mitigation. Barrier walls to mitigate surface traffic noise. Use of sound insulation, barriers, and buffer zones	Change takeoff climbout or landing procedures to minimize aircraft noise. Conduct FAR 150 to identify potential mitigation. Barrier walls to mitigate surface traffic noise. Use of sound insulation, barriers, and buffer zones	Change takeoff climbout or landing procedures to minimize aircraft noise. Conduct FAR 150 to identify potential mitigation. Barrier walls to mitigate surface traffic noise. Use of sound insulation, barriers, and buffer zones	Barrier walls to mitigate surface traffic noise. Use of sound insulation, barriers, and buffer zones	None required
• Biological Resources	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Potential direct and indirect impacts on wetlands and fairy shrimp habitat from industrial development	Potential indirect impacts to wetlands and fairy shrimp habitat	Potential direct and indirect impacts to wetlands and fairy shrimp habitat	Potential indirect impacts to wetlands and fairy shrimp habitat	Potential indirect impacts to wetlands and fairy shrimp habitat	No change in base-related activities. Potential increase in habitat value due to long-term decrease in human activity. No impact on wetlands or fairy shrimp habitat
	No likely direct loss of wetlands or fairy shrimp habitat	No likely direct loss of wetlands or fairy shrimp habitat	No likely direct loss of wetlands or fairy shrimp habitat	No likely direct loss of wetlands or fairy shrimp habitat	No likely direct loss of wetlands or fairy shrimp habitat	No loss of wetlands or fairy shrimp habitat

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
FAR = Federal Aviation Regulation.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
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Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment (Continued)						
• Biological Resources (Continued)	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	Selective siting of improvements and restriction of operations to non-sensitive sites will avoid direct impacts to wetlands and fairy shrimp habitat. Controlling runoff through design and engineering practices will minimize indirect impacts to wetlands and fairy shrimp habitat. Compliance with Sections 7, 8, and 9 of the Endangered Species Act will minimize impacts to sensitive species. Compliance with Section 404 of the Clean Water Act will minimize impacts to wetlands	Selective siting of improvements and restriction of operations to non-sensitive sites will avoid indirect impacts to wetlands and fairy shrimp habitat. Controlling runoff through design and engineering practices will minimize indirect impacts to wetlands and fairy shrimp habitat. Compliance with Sections 7, 8, and 9 of the Endangered Species Act will minimize impacts to sensitive species	Selective siting of improvements and restriction of operations to non-sensitive sites will avoid direct impacts to wetlands and fairy shrimp habitat. Controlling runoff through design and engineering practices will minimize indirect impacts to wetlands and fairy shrimp habitat. Compliance with Sections 7, 8, and 9 of the Endangered Species Act will minimize impacts to sensitive species. Compliance with Section 404 of the Clean Water Act will minimize impacts to wetlands	Selective siting of improvements and restriction of operations to non-sensitive sites will avoid indirect impacts to wetlands and fairy shrimp habitat. Controlling runoff through design and engineering practices will minimize indirect impacts to wetlands and fairy shrimp habitat. Compliance with Sections 7, 8, and 9 of the Endangered Species Act will minimize impacts to sensitive species	Selective siting of improvements and restriction of operations to non-sensitive sites will avoid indirect impacts to wetlands and fairy shrimp habitat. Controlling runoff through design and engineering practices will minimize indirect impacts to wetlands and fairy shrimp habitat. Compliance with Section 404 of the Clean Water Act will minimize impacts to wetlands	None required
• Cultural Resources	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	No effect on prehistoric, Native American, or paleontological resources	No effect on prehistoric, Native American, or paleontological resources	No effect on prehistoric, Native American, or paleontological resources	No effect on prehistoric, Native American, or paleontological resources	No effect on prehistoric, Native American, or paleontological resources	No impact
	Possible adverse effects to historic structures potentially eligible for listing on the NRHP	Possible adverse effects to historic structures potentially eligible for listing on the NRHP	Possible adverse effects to historic structures potentially eligible for listing on the NRHP	Possible adverse effects to historic structures potentially eligible for listing on the NRHP	Possible adverse effects to historic structures potentially eligible for listing on the NRHP	

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
NRHP = National Register of Historic Places.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
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Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment (Continued)	• Mitigation: Properties may be conveyed to non-federal owners with preservation covenants. Consult with SHPO and Advisory Council on Historic Preservation in development and implementation of mitigation strategies	• Mitigation: Properties may be conveyed to non-federal owners with preservation covenants. Consult with SHPO and Advisory Council on Historic Preservation in development and implementation of mitigation strategies	• Mitigation: Properties may be conveyed to non-federal owners with preservation covenants. Consult with SHPO and Advisory Council on Historic Preservation in development and implementation of mitigation strategies	• Mitigation: Properties may be conveyed to non-federal owners with preservation covenants. Consult with SHPO and Advisory Council on Historic Preservation in development and implementation of mitigation strategies	• Mitigation: Properties may be conveyed to non-federal owners with preservation covenants. Consult with SHPO and Advisory Council on Historic Preservation in development and implementation of mitigation strategies	• Mitigation: None required

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
SHPO = State Historic Preservation Officer.

by 2015, resulting in a 2.7 percent annual increase in regional employment between closure and 2015, the same annual regional growth rate as the No-Action Alternative. This increase in jobs is small compared to total employment in the ROI (almost 500,000 in 2015), but represents a sizeable increase over the 50 direct and 12 secondary jobs projected under the No-Action Alternative. Population in the ROI would increase by 6,114 by 2015, compared to a projected total of 1,112,133 in 2015 under the No-Action Alternative. This estimate represents a 2.9-percent annual increase in population between closure and 2015.

Land uses on base would remain similar to existing uses, but increased acreages would be devoted to aviation support, industrial, commercial development, institutional (education), and public facilities/recreation use areas. These increases would occur primarily as a result of conversion of existing vacant land. Merced County and the city of Atwater would have to revise their general plans and zoning ordinances to reflect the redevelopment of the base and to minimize conflicts between incompatible land uses.

Traffic on and near the base would increase over No-Action Alternative projections. Segments of State Highway (SH) 99 and Santa Fe Drive would drop to an unacceptable level of service (demand exceeding capacity) by 2008 and 2001, respectively, compared to the projected date of 2010 under the No-Action Alternative. Segments of Bellevue Road would drop to an unacceptable level of service by 2011, whereas those segments would operate at an acceptable level of service under the No-Action Alternative through 2015. Road improvement and transportation planning measures would have to be implemented to prevent deterioration to an unacceptable level of service. No airspace or air transportation impacts are anticipated as a result of the Proposed Action.

Utility consumption in the area would increase by up to 4 percent over No-Action Alternative projections under the Proposed Action. With or without the Proposed Action, improvements to local water, wastewater, and electricity systems would be required before 2015.

Hazardous Materials and Hazardous Waste Management. The types of hazardous materials used and hazardous wastes generated under the Proposed Action would be similar to preclosure. The quantities would be greater than under the No-Action Alternative. The responsibility for managing hazardous materials and wastes would shift from a single user to multiple, independent users.

Reuse activities are not expected to affect the remediation of Installation Restoration Program (IRP) sites, which is proceeding according to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Federal Facility Agreement (FFA) among the Air Force, U.S. Environmental Protection Agency (EPA), and California EPA.

Remediation of the Air Force's IRP sites is, and will continue to be, the responsibility of the Air Force. Disposal and reuse of some Castle AFB properties may be delayed or limited by the extent and type of contamination at IRP sites and by current or future IRP remediation activities.

Existing and new underground storage tanks (USTs), the underground fuel hydrant system, and aboveground storage tanks required by the new users would be subject to all applicable federal, state, and local regulations. USTs that would not support reuse activities would be closed in conformance with the appropriate federal, state, and local regulations. All oil/water separators will be pumped and cleaned prior to disposal. Aboveground storage tanks that would not be reused would be purged of fumes to preclude fire hazards.

A comprehensive survey to identify asbestos-containing material (ACM) at facilities on Castle AFB will be conducted prior to disposal. ACM will be managed in accordance with all applicable regulations, thus, ensuring the protection of human health and the environment. A full disclosure of the asbestos survey results will be provided to new recipients prior to lease, sale, conveyance, or transfer of the property. Demolition or renovation of structures with ACM would be the responsibility of the new owners and would be conducted in compliance with applicable Occupational Safety and Health Administration (OSHA) regulations and National Emissions Standards for Hazardous Air Pollutants (NESHAP).

Pesticide usage would increase from baseline conditions as a result of reuse. Management practices would be subject to applicable federal and state regulations. All Air Force-owned and federally regulated polychlorinated biphenyl (PCB) equipment and PCB-contaminated equipment and state-regulated PCB items have been removed from Castle AFB. A survey conducted on base revealed radon levels below the U.S. EPA-recommended threshold for mitigation. Amounts of biohazardous wastes generated under the Proposed Action would be similar to preclosure levels, and would be subject to the state Medical Waste Management Act. The Explosive Ordnance Disposal (EOD) Range will be cleared of unexploded ordnance and the small arms range will be cleared of spent bullets prior to base disposal. If the small arms range is reused, proper maintenance procedures would have to be followed to reduce the potential for lead contamination in the soils. Base reuse activities that involve the demolition or renovation of structures containing lead-based paints would be subject to applicable federal, state, and local regulations to minimize potential risks to human health and the environment.

Natural Environment. The Proposed Action could result in minor impacts to soils, geology, and water resources as a result of runoff from ground disturbance associated with demolition, renovation, and construction activities. Use of standard mitigation measures during ground-disturbing activities would minimize these impacts. New owners/users may be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for storm water runoff during construction activities. Reuse would result in a 2.7-percent increase in water demand over closure baseline; this increase would result in negligible effects to local water supplies.

Castle AFB is in an area designated by the U.S. EPA as being in nonattainment of the National Ambient Air Quality Standards (NAAQS) for ozone and particulate matter less than 10 microns in diameter (PM_{10}), and unclassified for sulfur dioxide (SO_2). The area is designated by the California Air Resources Board (ARB) as being in nonattainment of the California Ambient Air Quality Standards (CAAQS) for ozone and PM_{10} and unclassified for carbon monoxide (CO). Construction activities under the Proposed Action could result in temporary, localized emissions of PM_{10}. Emissions of criteria pollutants, including ozone precursors, associated with reuse activities would remain below preclosure levels throughout the 10-year analysis period. Further, the San Joaquin Valley Unified Air Pollution Control District (UAPCD) is committed to implementing controls on emission of ozone precursors as identified in the 1991 Air Quality Attainment Plan (AQAP). Therefore, no significant impacts to air quality are expected, nor would reuse activities contribute to a delay in attainment of the ozone or PM_{10} standards. Without consideration of conformity offset allocations to other actions in the region (cumulative impacts), ozone precursor emissions of ROG and NO_x would be less than preclosure conditions and, therefore, would not interfere with the attainment of the ozone standard. For primary pollutants, impacts would not affect maintenance of the current attainment status of the standards for NO_2, SO_2, or CO, or progress toward attainment of the standard for PM_{10}.

However, the Navy has expressed interest in obtaining available conformity offsets for ROG, NO_x, and PM_{10} from the closure of Castle AFB in order to demonstrate no net emission increases from their BRAC-directed NAS Lemoore realignment action. Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for NO_x and PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated.

Aircraft noise from Proposed Action aviation activities would result in increased noise levels compared to closure conditions. However, by 2015 there would be 134,764 fewer acres exposed to a Community Noise Equivalent Level (CNEL) of 60 decibels (dB) or greater than under preclosure conditions. The number of people living in areas exposed to CNEL 60 dB or more from surface traffic noise would increase by 358 from No-Action Alternative projections. Use of noise barriers and proper land use planning could reduce the effects of surface traffic noise.

The Proposed Action could affect biological resources primarily through a loss of vegetation and wildlife habitat. Urban development could increase runoff of storm water and pollutants from developed areas into nondeveloped areas. A potential loss of habitat for the threatened fairy shrimp, as well as other federally and state-protected species may occur if grasslands, wetlands, and other sensitive habitats on the base are developed. Direct losses to some species may occur from operation of construction and other equipment and vehicles in newly developed areas. Wetlands occurring on Castle AFB would be impacted directly under this alternative, and wetlands may be impacted indirectly by adjacent activities. Standard construction mitigation measures to control runoff would minimize effects on aquatic species. Facilities and other improvements in industrial and recreational areas should be sited to minimize impacts to grasslands, fairy shrimp habitat, and wetlands. Fences could be constructed around fairy shrimp habitat and wetlands to avoid direct impacts.

Under the Proposed Action, the historic trash dump designated as CAFB-1H, the Riise-McVey site (CAFB-2H), and the Harris site (CAFB-3H) would be within the airport boundary on vacant land not proposed for development. Construction of an access point nearby could result in impacts to CAFB-1H and CAFB-2H. Certain historic structures could be considered eligible following the Cold War inventory and evaluation. Demolition, renovation, deterioration, or conveyance of these properties from federal control could be considered an adverse effect. Preservation covenants could be placed on the disposal document to reduce impacts associated with conveyance to a non-federal entity to a nonadverse level. Other mitigation measures could include avoidance, preservation in place, or data recovery in the form of documentation.

CASTLE AVIATION CENTER ALTERNATIVE

Local Community. Redevelopment of Castle AFB under the Castle Aviation Center Alternative would generate 6,150 direct and 4,404 secondary jobs by 2015, resulting in a 2.8-percent annual increase in regional employment between closure and 2015, in contrast to an annual regional employment increase of 2.7 under the No-Action Alternative. This increase in jobs is small compared to total employment in the ROI (almost 500,000 in 2015), but represents a sizeable increase over the 50 direct and 12 secondary jobs projected under the No-Action Alternative. Population in the ROI would increase by 9,979 by 2015, compared to a projected total of 1,112,133 in 2015 under the No-Action Alternative. This estimate represents a 2.9-percent annual increase in population between closure and 2015.

Land uses on base would remain similar to existing uses, but increased acreages would be devoted to industrial development and public facilities/ recreation use areas. These increases would occur primarily as a result of conversion of existing vacant land. Merced County and the city of Atwater would have to revise their general plans and zoning ordinances to reflect the redevelopment of the base and to minimize conflicts between incompatible land uses.

Traffic on and near the base would increase over the No-Action Alternative and Proposed Action projections. Segments of SH 99 and Santa Fe Drive would drop to an unacceptable level of service by 2007 and 2000, respectively, compared to the projected date of 2010 when these segments would drop to an unacceptable level of service under the No-Action Alternative. Segments of Bellevue Road would drop to an unacceptable level of service by 2004, whereas those segments would operate at an acceptable level of service under the No-Action Alternative through 2015. Road improvement and transportation planning measures would have to be implemented to prevent deterioration to an unacceptable level of service. No airspace or air transportation impacts are anticipated as a result of the Castle Aviation Center Alternative.

Utility consumption in the area would increase by up to 7 percent over No-Action Alternative projections under the Castle Aviation Center Alternative. With or without this alternative, improvements to local water, wastewater, and electricity systems would be required before 2015.

Hazardous Materials and Hazardous Waste Management. The types of hazardous materials used and hazardous wastes generated under the Castle Aviation Center Alternative would be similar to those at preclosure and under the Proposed Action. The quantities would be greater than under the No-Action Alternative. The responsibility for managing hazardous materials and wastes would shift from a single user to multiple, independent users.

Reuse activities are not expected to affect the remediation of IRP sites, which is proceeding according to CERCLA and the FFA among the Air Force, U.S. EPA, and California EPA. Remediation of the Air Force's IRP sites is, and will continue to be, the responsibility of the Air Force. Disposal and reuse of some Castle AFB properties may be delayed or limited by the extent and type of contamination at IRP sites and by current or future IRP remediation activities.

Existing and new USTs and aboveground storage tanks required by the new users would be subject to all applicable federal, state, and local regulations. USTs that would not support reuse activities, and the underground fuel hydrant system would be closed in conformance with the appropriate federal, state, and local regulations. All oil/water separators will be pumped and cleaned prior to disposal. Aboveground storage tanks that would not be reused would be purged of fumes to preclude fire hazards.

A comprehensive asbestos survey of facilities on Castle AFB will be conducted prior to disposal. Demolition or renovation of structures with

ACM would be the responsibility of the new owners and would be conducted in compliance with applicable OSHA regulations and NESHAP.

Pesticide usage would increase from baseline conditions as a result of reuse. Management practices would be subject to applicable federal and state regulations. All Air Force owned federally regulated PCB equipment and PCB-contaminated equipment, and state-regulated PCB items have been removed from Castle AFB. A survey conducted on base revealed radon levels below the U.S. EPA-recommended threshold for mitigation. Amounts of biohazardous wastes generated under this alternative would be similar to preclosure levels, and would be subject to the state Medical Waste Management Act. The EOD Range will be cleared of unexploded ordnance and the small arms range will be cleared of spent bullets prior to base disposal. Base reuse activities that involve the demolition or renovation of structures containing lead-based paints would be subject to applicable federal, state, and local regulations to minimize potential risks to human health and the environment.

Natural Environment. The Castle Aviation Center Alternative could result in minor impacts to soils, geology, and water resources as a result of runoff from ground disturbance associated with renovation. Because no demolition or new facility construction is proposed, the effects of this alternative would be less than those for the Proposed Action. Use of standard mitigation measures during ground-disturbing activities would further reduce these impacts. New owners/users may be required to obtain an NPDES permit for storm water runoff during renovation activities. Reuse would result in a 4.5-percent increase in water demand over closure baseline; this increase would result in negligible effects to local water supplies.

Redevelopment activities under the Castle Aviation Center Alternative could result in temporary, localized emissions of PM_{10}. Increased air pollutant emissions of reactive organic gases (ROG) and nitrogen oxides (NO_x) during construction and operations would not exceed preclosure conditions. Emissions of PM_{10}, SO_2, and CO would exceed preclosure conditions. Project reuse proponents may be required to mitigate and/or offset PM_{10} emissions to meet the applicable State Implementation Plan (SIP) requirements and ensure no interference with attainment plans and schedules. Concentrations would not be sufficient to increase the frequency or severity of new violations of the NAAQS for other criteria pollutants. Further, the San Joaquin Valley UAPCD is committed to implementing controls on emission of ozone precursors as identified in the 1991 AQAP. With adequate mitigations and offsetting applied, no significant impacts to air quality are expected, nor would reuse activities contribute to a delay in attainment of the ozone or PM_{10} standards.

Without consideration of conformity offset allocations to other actions in the region (cumulative impacts), ozone precursor emissions of ROG and NO_x

would be less than preclosure conditions and, therefore, would not interfere with the attainment of the ozone standard. For primary pollutants, impacts would not affect maintenance of the current attainment status of the standards for NO_2, SO_2, or CO, but could interfere with progress toward attainment of the standard for PM_{10} unless mitigated.

However, the Navy has expressed interest in obtaining available conformity offsets for ROG, NO_x, and PM_{10} from the closure of Castle AFB in order to demonstrate no net emission increases from their BRAC-directed NAS Lemoore realignment action. Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated.

Aircraft noise from Castle Aviation Center Alternative aviation activities would result in increased noise levels compared to closure conditions. However, by 2015 there would be 132,684 fewer acres exposed to CNEL 60 dB or greater than under preclosure conditions. The number of people living in areas exposed to CNEL 60 dB or more from surface traffic noise would increase by 692 from No-Action Alternative projections. Use of noise barriers and proper land use planning could reduce the effects of surface traffic noise.

Impacts to biological resources at Castle AFB could occur as a result of ground-disturbing activities associated with facility renovation. However, because much of the base area has been previously developed or disturbed, and because no demolition or new facility construction is proposed, impacts to biological resources would be minimal. Development activities in the industrial area northeast of the airfield should be planned to avoid the fairy shrimp habitat. The designation of most of the area northeast of the airfield for passive recreation and conservation uses would result in beneficial effects to the fairy shrimp habitat and associated species.

Under the Castle Aviation Center Alternative, the historic trash dump designated as CAFB-1H, the Riise-McVey site (CAFB-2H), and the Harris site (CAFB-3H) would be within the airport boundary on vacant land not proposed for development. Construction of an access point nearby could result in impacts to CAFB-1H and CAFB-2H. Certain historic structures could be considered eligible following the Cold War inventory and evaluation. Demolition, renovation, deterioration, or conveyance of these properties from federal control could be considered an adverse effect. Preservation covenants could be placed on the disposal document to reduce impacts associated with conveyance to a non-federal entity to a nonadverse level. Other mitigation measures could include avoidance, preservation in place, or data recovery in the form of documentation.

COMMERCIAL AVIATION ALTERNATIVE

Local Community. Redevelopment of Castle AFB under the Commercial Aviation Alternative would generate 4,001 direct and 2,697 secondary jobs by 2015, resulting in a 2.7-percent annual increase in regional employment between closure and 2015, the same annual regional growth rate as under the No-Action Alternative. This increase in jobs is small compared to total employment in the ROI (almost 500,000 in 2015), but represents a sizeable increase over the 50 direct and 12 secondary jobs projected under the No-Action Alternative. Population in the county would increase by 6,373 by 2015, compared to a projected total of 1,112,133 in 2015 under the No-Action Alternative. This estimate represents a 2.9-percent annual increase in population between closure and 2015.

Land uses on base would remain similar to existing uses, but increased acreages would be devoted to industrial development, medical, and residential land use areas. These increases would occur primarily as a result of conversion of existing vacant land. Merced County and the city of Atwater would have to revise their general plans and zoning ordinances to reflect the redevelopment of the base and to minimize conflicts between incompatible land uses.

Traffic on and near the base would increase over the No-Action Alternative. Segments of SH 99 and Santa Fe Drive would drop to an unacceptable level of service by 2008 and 2002, respectively, compared to the projected date of 2010 when these segments would drop to an unacceptable level of service under the No-Action Alternative. Segments of Bellevue Road would drop to an unacceptable level of service by 2008, whereas those segments would operate at an acceptable level of service under the No-Action Alternative through 2015. Road improvement and transportation planning measures would have to be implemented to prevent deterioration to an unacceptable level of service. No airspace or air transportation impacts are anticipated as a result of the Commercial Aviation Alternative.

Utility consumption in the area would increase by up to 4 percent over No-Action Alternative projections under the Commercial Aviation Alternative. With or without this alternative, improvements to local water, wastewater, and electricity systems would be required before 2015.

Hazardous Materials and Hazardous Waste Management. The types of hazardous materials used and hazardous wastes generated under the Commercial Aviation Alternative would be similar to those at preclosure and under the Proposed Action. The quantities would be greater than under the No-Action Alternative. The responsibility for managing hazardous materials and wastes would shift from a single user to multiple, independent users.

Reuse activities are not expected to affect the remediation of IRP sites, which is proceeding according to CERCLA and the FFA among the Air Force, U.S. EPA and California EPA. Remediation of the Air Force's IRP sites is, and will continue to be, the responsibility of the Air Force. Disposal and reuse of some Castle AFB properties may be delayed or limited by the extent and type of contamination at IRP sites and by current or future IRP remediation activities.

Existing and new USTs and aboveground storage tanks required by the new users would be subject to all applicable federal, state, and local regulations. USTs that would not support reuse activities and the underground fuel hydrant system would be closed in conformance with the appropriate federal, state, and local regulations. All oil/water separators will be pumped and cleaned prior to disposal. Aboveground storage tanks that would not be reused would be purged of fumes to preclude fire hazards.

A comprehensive asbestos survey of facilities on Castle AFB will be conducted prior to disposal. Demolition or renovation of structures with ACM would be the responsibility of the new owners and would be conducted in compliance with applicable OSHA regulations and NESHAP.

Pesticide usage would increase from baseline conditions as a result of reuse. Management practices would be subject to applicable federal and state regulations. All Air Force owned federally regulated PCB equipment and PCB-contaminated equipment, and state-regulated PCB items have been removed from Castle AFB. A survey conducted on base revealed radon levels below the U.S. EPA-recommended threshold for mitigation. Amounts of biohazardous wastes generated under this alternative would be similar to preclosure levels, and would be subject to the state Medical Waste Management Act. The EOD and grenade ranges will be cleared of unexploded ordnance and the small arms range will be cleared of spent bullets prior to base disposal. Base reuse activities that involve the demolition or renovation of structures containing lead-based paints would be subject to applicable federal, state, and local regulations to minimize potential risks to human health and the environment.

Natural Resources. The Commercial Aviation Alternative could result in minor impacts to soils, geology, and water resources as a result of runoff from ground disturbance associated with renovation. Use of standard mitigation measures during ground-disturbing activities would reduce these impacts. New owners/users may be required to obtain an NPDES permit for storm water runoff during renovation activities. Reuse would result in a 2.6-percent increase in water demand over closure baseline, this increase would result in negligible effects to local water supplies.

Redevelopment activities under the Commercial Aviation Alternative could result in temporary, localized emissions of PM_{10}. Emissions of criteria pollutants, including ozone precursors, associated with reuse activities would remain below preclosure levels throughout the 10-year analysis period. Further, the San Joaquin Valley UAPCD is committed to implementing controls on emissions of ozone precursors as identified in the 1991 AQAP. Therefore, no significant impacts to air quality are expected, nor would reuse activities contribute to a delay in attainment of the ozone and PM_{10} standards.

Without consideration of conformity offset allocations to other actions in the region (cumulative impacts), ozone precursor emissions of ROG and NO_x would be less than preclosure conditions and, therefore, would not interfere with the attainment of the ozone standard. For primary pollutants, impacts would not affect maintenance of the current attainment status of the standards for NO_2, SO_2, or CO, or progress toward attainment of the standard for PM_{10}.

However, the Navy has expressed interest in obtaining available conformity offsets for ROG, NO_x, and PM_{10} from the closure of Castle AFB in order to demonstrate no net emission increases from their BRAC-directed NAS Lemoore realignment action. Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for NO_x and PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated.

Aircraft noise from Commercial Aviation Alternative aviation activities would result in increased noise levels compared to closure conditions. However, by 2015 there would be 135,534 fewer acres exposed to CNEL 60 dB or greater than under preclosure conditions. The number of people living in areas exposed to CNEL 60 dB or more from surface traffic noise would increase by 383 from No-Action Alternative projections. Use of noise barriers and proper land use planning could reduce the effects of surface traffic noise.

Impacts to biological resources at Castle AFB could occur as a result of ground-disturbing activities associated with facility renovation. Development activities in the industrial area northeast of the airfield have the potential to directly impact wetlands and cause direct and indirect impacts to fairy shrimp habitat. Development in this area should be planned to avoid the wetlands and fairy shrimp habitat there. Agricultural development of the northwestern end of the base could impact wetlands located there.

Under the Commercial Aviation Alternative, CAFB-1H, part of CAFB-2H, and CAFB-3H would be within the airport boundary on vacant land not proposed for development. The remainder of CAFB-2H lies in the agricultural land use. Construction of an access point nearby could result in impacts to CAFB-1H and CAFB-2H. Certain historic structures could be considered eligible following the Cold War inventory and evaluation. Demolition, renovation, deterioration, or conveyance of these properties from federal control could be considered an adverse effect. Preservation covenants could be placed on the disposal document to reduce impacts associated with conveyance to a non-federal entity to a nonadverse level. Other mitigation measures could include avoidance, preservation in place, or data recovery in the form of documentation.

AVIATION WITH MIXED USE ALTERNATIVE

Local Community. Reaevelopment of Castle AFB under the Aviation with Mixed Use Alternative would generate 4,175 direct and 2,880 secondary jobs by 2015, resulting in a 2.7-percent annual increase in regional employment between closure and 2015, the same annual regional employment growth rate as the No-Action Alternative. This increase in jobs is small compared to total employment in the ROI (almost 500,000 in 2015), but represents a sizeable increase over the 50 direct and 12 secondary jobs projected under the No-Action Alternative. Population in the county would increase by 6,708 by 2015, compared to a projected total of 1,112,133 in 2015 under the No-Action Alternative. This estimate represents a 2.9-percent annual increase in population between closure and 2015.

Land uses on base would remain similar to existing uses, but increased acreages would be devoted to aviation support, industrial, institutional (educational), and commercial development and public facilities/recreation use areas. These increases would occur primarily as a result of conversion of existing vacant land and on-base residential areas. Merced County and the city of Atwater would have to revise their general plans and zoning ordinances to reflect the redevelopment of the base and to minimize conflicts between incompatible land uses.

Traffic on and near the base would increase over No-Action Alternative projections. Segments of SH 99 and Santa Fe Drive would drop to an unacceptable level of service by 2008 and 2003, respectively, compared to the projected date of 2010 when these segments would drop to an unacceptable level of service under the No-Action Alternative. Segments of Bellevue Road would drop to an unacceptable level of service by 2010, whereas those segments would operate at an acceptable level of service under the No-Action Alternative through 2015. Road improvement and transportation planning measures would have to be implemented to prevent deterioration to an unacceptable level of service. No airspace or air transportation impacts are anticipated as a result of the Aviation with Mixed Use Alternative.

Utility consumption in the area would increase by up to 5 percent over No-Action Alternative projections under the Aviation with Mixed Use Alternative. With or without this alternative, improvements to local water, wastewater, and electricity systems would be required before 2015.

Hazardous Materials and Hazardous Waste Management. The types of hazardous materials used and hazardous wastes generated under the Aviation with Mixed Use Alternative would be similar to those at preclosure and under the Proposed Action. The quantities would be greater than under the No-Action Alternative. The responsibility for managing hazardous materials and wastes would shift from a single user to multiple, independent users.

Reuse activities are not expected to affect the remediation of IRP sites, which is proceeding according to CERCLA and the FFA among the Air Force, U.S. EPA, and California EPA. Remediation of the Air Force's IRP sites is, and will continue to be, the responsibility of the Air Force. Disposal and reuse of some Castle AFB properties may be delayed or limited by the extent and type of contamination at IRP sites and by current or future IRP remediation activities.

Existing and new USTs and aboveground storage tanks required by the new users would be subject to all applicable federal, state, and local regulations. USTs that would not support reuse activities, and the underground fuel hydrant system would be closed in conformance with the appropriate federal, state, and local regulations. All oil/water separators will be pumped and cleaned prior to disposal. Aboveground storage tanks that would not be reused would be purged of fumes to preclude fire hazards.

A comprehensive asbestos survey of facilities on Castle AFB will be conducted prior to disposal. Demolition or renovation of structures with ACM would be the responsibility of the new owners and would be conducted in compliance with applicable OSHA regulations and NESHAP.

Pesticide usage would increase from baseline conditions as a result of reuse. Management practices would be subject to applicable federal and state regulations. All Air Force owned federally regulated PCB equipment and PCB-contaminated equipment, and state-regulated PCB items have been removed from Castle AFB. A survey conducted on base revealed radon levels below the U.S. EPA-recommended threshold for mitigation. Amounts of biohazardous wastes generated under this alternative would be similar to preclosure levels, and would be subject to the state Medical Waste Management Act. The EOD Range will be cleared of unexploded ordnance and the small arms range will be cleared of spent bullets prior to base disposal. Base reuse activities that involve the demolition or renovation of structures containing lead-based paints would be subject to applicable federal, state, and local regulations to minimize potential risks to human health and the environment.

Natural Environment. The Aviation with Mixed Use Alternative could result in minor impacts to soils, geology, and water resources as a result of runoff from ground disturbance associated with construction, renovation, and demolition. Use of standard mitigation measures during ground-disturbing activities would reduce these impacts. New owners/users may be required to obtain an NPDES permit for storm water runoff during construction activities. Reuse would result in a 2.7-percent increase in water demand over closure baseline; this increase would result in negligible impacts to local water supplies.

Redevelopment activities under the Aviation with Mixed Use Alternative could result in temporary, localized emissions of PM_{10}. Emissions of criteria pollutants, including ozone precursors, associated with reuse activities would remain below preclosure levels throughout the 10-year analysis period. Further, the San Joaquin Valley UAPCD is committed to implementing controls on emission of ozone precursors as identified in the 1991 AQAP. Therefore, no significant impacts to air quality are expected, nor would reuse activities contribute to a delay in attainment of the ozone standard.

Without consideration of conformity offset allocations to other actions in the region (cumulative impacts), ozone precursor emissions of ROG and NO_x would be less than preclosure conditions and, therefore, would not interfere with the attainment of the ozone standard. For primary pollutants, impacts would not affect maintenance of the current attainment status of the standards for NO_2, SO_2, or CO, or progress toward attainment of the standard for PM_{10}.

However, the Navy has expressed interest in obtaining available conformity offsets for ROG, NO_x, and PM_{10} from the closure of Castle AFB in order to demonstrate no net emission increases from their BRAC-directed NAS Lemoore realignment action. Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated.

Aircraft noise from Aviation with Mixed Use Alternative aviation activities would result in increased noise levels compared to closure conditions. However, by 2015 there would be 132,565 fewer acres exposed to CNEL 60 dB or greater than under preclosure conditions. The number of people living in areas exposed to CNEL 60 dB or more from surface traffic noise would increase by 365 from No-Action Alternative projections. Use of noise barriers and proper land use planning could reduce the effects of surface traffic noise.

Impacts to biological resources at Castle AFB could occur as a result of ground-disturbing activities associated with facility construction, renovation, and demolition. The designation of most of the area northeast of the airfield for passive recreation and conservation uses would result in beneficial effects to the fairy shrimp habitat and associated species. Facilities and other improvements in this area should be sited to minimize impacts to grasslands, wetlands, and fairy shrimp habitat. Fences could be constructed around wetlands and fairy shrimp habitat to avoid direct impacts.

Under the Aviation with Mixed Use Alternative, CAFB-1H, CAFB-2H, and CAFB-3H would be within the airport boundary on vacant land not proposed for development. Construction of an access point nearby could result in impacts to CAFB-1H and CAFB-2H. Certain historic structures could be considered eligible following the Cold War inventory and evaluation. Demolition, renovation, deterioration, or conveyance of these properties from federal control could be considered an adverse effect. Preservation covenants could be placed on the disposal document to reduce impacts associated with conveyance to a non-federal entity to a nonadverse level. Other mitigation measures could include avoidance, preservation in place, or data recovery in the form of documentation.

NON-AVIATION ALTERNATIVE

Local Community. Redevelopment of Castle AFB under the Non-Aviation Alternative would generate 2,650 direct and 1,451 secondary jobs by 2015, resulting in a 2.7-percent annual increase in regional employment between closure and 2015, the same annual regional employment growth rate as the No-Action Alternative. This increase in jobs is small compared to total employment in the ROI (almost 500,000 in 2015), but represents a sizeable increase over the 50 direct and 12 secondary jobs projected under the No-Action Alternative. Population in the county would increase by 4,105 by 2015, compared to a projected total of 1,112,133 in 2015 under the No-Action Alternative. This estimate represents a 2.9-percent annual increase in population between closure and 2015.

Land uses on base would change from existing uses. There would be no airfield or aviation support uses, but the amount of industrial, institutional (educational), and residential development would increase, as would the acreage devoted to public facilities/recreation uses. An agricultural land use area would be created at the north end of the existing airfield. Merced County and the city of Atwater would have to revise their general plans and zoning ordinances to reflect the redevelopment of the base and to minimize conflicts between incompatible land uses.

Traffic on and near the base would increase over No-Action Alternative projections, but would be much less than under any of the aviation alternatives. Segments of SH 99 and Santa Fe Drive would drop to an unacceptable level of service by 2009 and 2006, respectively, compared to the projected date of 2010 when these segments would drop to unacceptable level of service under the No-Action Alternative. Segments of Bellevue Road would drop to an unacceptable level of service by 2012, whereas those segments would operate at an acceptable level of service under the No-Action Alternative through 2015. Road improvement and transportation planning measures would have to be implemented to prevent deterioration to an unacceptable level of service. No airspace or air transportation impacts are anticipated as a result of the Non-Aviation Alternative.

Utility consumption in the area would increase by up to 4 percent over No-Action Alternative projections under the Non-Aviation Alternative. With or without this alternative, improvements to local water, wastewater, and electricity systems would be required before 2015.

Hazardous Materials and Hazardous Waste Management. The types of hazardous materials used and hazardous wastes generated under the Non-Aviation Alternative would be similar to those at preclosure and under the Proposed Action. However, no aviation-associated hazardous materials or wastes would be used or generated under this alternative. The quantities would be greater than under the No-Action Alternative. The responsibility for managing hazardous materials and wastes would shift from a single user to multiple, independent users.

Reuse activities are not expected to affect the remediation of IRP sites, which is proceeding according to CERCLA and the FFA among the Air Force, U.S. EPA, and California EPA. Remediation of the Air Force's IRP sites is, and will continue to be, the responsibility of the Air Force. Disposal and reuse of some Castle AFB properties may be delayed or limited by the extent and type of contamination at IRP sites and by current or future IRP remediation activities.

Existing and new USTs and aboveground storage tanks required by the new users would be subject to all applicable federal, state, and local regulations. USTs that would not support reuse activities, and the underground fuel hydrant system would be closed in conformance with the appropriate federal, state, and local regulations. All oil/water separators will be pumped and cleaned prior to disposal. Aboveground storage tanks that would not be reused would be purged of fumes to preclude fire hazards.

A comprehensive asbestos survey of facilities on Castle AFB will be conducted prior to disposal. Demolition or renovation of structures with ACM would be the responsibility of the new owners and would be conducted in compliance with applicable OSHA regulations and NESHAP.

Pesticide usage would increase from baseline conditions as a result of reuse. Management practices would be subject to applicable federal and state regulations. All Air Force owned federally regulated PCB equipment and PCB-contaminated equipment, and state-regulated PCB items have been removed from Castle AFB. A survey conducted on base revealed radon levels below the U.S. EPA-recommended threshold for mitigation. Amounts of biohazardous wastes generated under this alternative would be similar to preclosure levels, and would be subject to the state Medical Waste Management Act. The EOD Range will be cleared of unexploded ordnance and the small arms range will be cleared of spent bullets prior to base disposal. Base reuse activities that involve the demolition or renovation of structures containing lead-based paints would be subject to applicable federal, state, and local regulations to minimize potential risks to human health and the environment.

Natural Environment. The Non-Aviation Alternative could result in minor impacts to soils, geology, and water resources as a result of runoff from ground disturbance associated with construction, renovation, and demolition. Use of standard mitigation measures during construction and agricultural activities would reduce these impacts. New owners/users may be required to obtain an NPDES permit for storm water runoff during construction activities. Reuse would result in a 2.2-percent increase in water demand over closure baseline; this increase would cause negligible effects to locate water supplies.

Redevelopment activities under the Non-Aviation Alternative could result in temporary, localized emissions of PM_{10}. Emissions of criteria pollutants, including ozone precursors, associated with reuse activities would remain below preclosure levels throughout the 10-year analysis period, and would be lower than emissions from the other alternatives because there would be no aircraft activity. Further, the San Joaquin Valley UAPCD is committed to implementing controls on emission of ozone precursors as identified in the 1991 AQAP. Therefore, no significant impacts to air quality are expected, nor would reuse activities contribute to a delay in attainment of the ozone or PM_{10} standards.

Without consideration of conformity offset allocations to other actions in the region (cumulative impacts), ozone precursor emissions of ROG and NO_x would be less than preclosure conditions and, therefore, would not interfere with the attainment of the ozone standard. For primary pollutants, impacts would not affect maintenance of the current attainment status of the standards for NO_2, SO_2, or CO, or progress toward attainment of the standard for PM_{10}.

However, the Navy has expressed interest in obtaining available conformity offsets for ROG, NO_x, and PM_{10} from the closure of Castle AFB in order to demonstrate no net emission increases from their BRAC-directed NAS Lemoore realignment action. Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated.

There would be no aircraft noise from the Non-Aviation Alternative. The number of people living in areas exposed to CNEL 60 dB or more from surface traffic noise would increase by 296 from No-Action Alternative projections. Use of noise barriers and proper land use planning could reduce the effects of surface traffic noise.

Impacts to biological resources at Castle AFB could occur as a result of ground-disturbing activities associated with facility construction, renovation, and demolition. The designation of most of the area northeast of the airfield for passive recreation and conservation uses would result in beneficial effects to the fairy shrimp habitat and associated species. Agricultural activities at the north end of the airfield present potential impacts to wetlands from disturbance and increased runoff. Standard construction mitigation measures to control runoff would minimize effects on aquatic species. Facilities and other improvements around sensitive habitats should be sited to minimize impacts. Fences could be constructed around fairy shrimp habitat and wetlands to avoid direct impacts.

Under the Non-Aviation Alternative, CAFB-1H and CAFB-2H are contained in agricultural, and CAFB-3H within industrial land use parcels. These sites could be impacted by disturbance associated with reuse activities such as agricultural practices, demolition of the runway pavement, or construction of access points and facilities. Certain historic structures could be considered eligible following the Cold War inventory and evaluation. Demolition, renovation, deterioration, or conveyance from federal control could be considered an adverse effect. Preservation covenants could be placed on the disposal document to reduce impacts associated with conveyance to a non-federal entity to a nonadverse level. Other mitigation measures could include avoidance, stabilization, preservation in place, or data recovery in the form of documentation.

NO-ACTION ALTERNATIVE

Local Community. The only Air Force activities associated with the No-Action Alternative would be caretaker maintenance of the base. This would generate approximately 50 direct and 12 secondary jobs. There would be no overall increase in employment or population. The presence of an essentially vacant and unused area in the middle of the community could hamper or delay redevelopment and revitalization of adjacent lands. No effects on utilities, or on road, air, or railroad transportation are expected.

Hazardous Materials and Hazardous Waste Management. Small quantities of various types of hazardous materials and pesticides would be used for this alternative. All materials and waste would be managed and controlled by the Air Force Base Conversion Agency Operating Location (OL) team in accordance with applicable regulations. Storage tanks would be removed or maintained in place according to required standards.

Natural Environment. This alternative would result in negligible impacts on air quality, the noise environment, and biological resources. The No-Action

Alternative would not impact geological resources, soils, water resources, or cultural resources relative to baseline conditions.

OTHER LAND USE CONCEPTS

Other land use concepts are analyzed in terms of their effects on employment, population, and the environment when combined with the Proposed Action and the other alternatives, including the No-Action Alternative. Impacts on the local community and the environment associated with the implementation of other land use concepts are summarized in Table S-3.

Federal Correctional Complex. The U.S. Department of Justice, Federal Bureau of Prisons, has requested approximately 660 acres northeast of the airfield for development of a minimum of two federal correctional complexes. Construction could occur in two phases. The first phase would be constructed in the 1995-2000 period, and would involve the northern 462 acres of the parcel. The second phase could occur concurrently or sometime thereafter and would involve the remaining 198 acres. For analysis purposes, it is assumed that the second phase would be completed in the 2005 to 2015 time period. Each of the approximately 388,000-square-foot facilities would house approximately 1,600 inmates. The facilities would be sited within a fenced compound with surrounding buffer zones. Employment is estimated at 450 full-time employees, and vehicular traffic at 1,200 daily trips by 2015.

The increased utility demand associated with this land use concept, in addition to the reuse- and non-reuse-related demand in the area, would be within the capacity of infrastructure systems, but modifications to distribution/collection systems would probably be required. Ground-disturbing activities associated with construction and grading for the facilities could increase the potential for erosion and runoff effects, but these would be small and could be minimized through use of standard construction mitigation measures. Ground-disturbing activities would also present a potential for impacts to the wetlands (specifically vernal pools) scattered throughout that area, which support the threatened fairy shrimp. Additionally, several state-listed and federal candidate plant species found in the vernal pools could also be affected. Careful planning and siting before development begins could minimize impacts to sensitive biological areas. Overall, if appropriate mitigations are employed, no substantial environmental impacts would be associated with implementation of this proposal in combination with any of the reuse alternatives.

Private Recreational Facility. The California Golden State Trapshooting Association has proposed development of an extensive trapshooting range and gun club on 335 acres east of the airfield. Proposed uses include private and public use of trapshooting facilities, other shooting events, a

Table S-3. Summary of Impacts from Other Land Use Concepts

Resource Category	Federal Correctional Complex	Private Recreational Facility
Local Community		
Land Use and Aesthetics	Under federal control. Potential visual impacts	Minimal use impacts
Transportation	1,200 daily trips. Potential net increase in traffic volumes would not affect level of service	460 daily trips. Potential net increase in traffic volumes would not affect level of service
Utilities	Potential net increases in utility use would require further evaluation as part of site development plans	Minimal utility use
Hazardous Materials and Hazardous Waste Management		
Hazardous Material Management	Management in compliance with applicable regulations	Small quantities used
Hazardous Waste Management	Management in compliance with applicable regulations	Small quantities generated
Installation Restoration Program	Potential delays in disposal and redevelopment	Potential delays in disposal and redevelopment
Storage Tanks	No impact	No impact
Asbestos	No impact	No impact
Pesticides Usage	Small quantities used	Small quantities used
Polychlorinated Biphenyls	No impact	No impact
Radon	No impact	No impact
Medical/Biohazardous Waste	Managed in accordance with applicable regulations	None generated
Ordnance	No impact	No impact
Natural Environment		
Soils and Geology	Up to 248 acres of ground disturbance	Up to 215 acres of ground disturbance
Water Resources	No adverse impact due to potential net increase in demand	No impact
Air Quality	No adverse impact due to potential net increase in emissions	No impact
Noise	No impact	No impact
Biological Resources	Potential direct and indirect impacts on fairy shrimp habitat and wetlands No likely direct loss of fairy shrimp habitat or wetlands	Potential direct and indirect impacts on fairy shrimp habitat and wetlands No likely direct loss of fairy shrimp habitat or wetlands
Cultural Resources	No impact	No impact

Note: Impacts are presented as net effects to the Proposed Action and alternatives.

recreational vehicle park, and open space conservation. Many of the existing facilities would be reused. Little demolition and approximately 10,000 square feet of new construction are proposed. It is estimated that the facility would employ 5 full-time employees and generate 460 daily vehicular trips by 2015.

Although this proposal would entail increased human activity, there would be minimal increases in population and utility usage. Ground disturbance associated with facility development would total 135 acres. An additional 80 acres would be disturbed by operational activities. There would be increased noise levels associated with the shooting activities, but there are no nearby residential areas or other noise-sensitive land uses, so impacts would be minimal. Ground-disturbing and other human activities could present a potential for impacts to the wetlands (vernal pools) scattered through the area, which support the threatened fairy shrimp. However, careful planning and siting of facilities and use areas could minimize impacts to sensitive biological areas. With use of appropriate mitigation measures, implementation of this land use concept in combination with any of the reuse alternatives would result in moderate environmental impacts.

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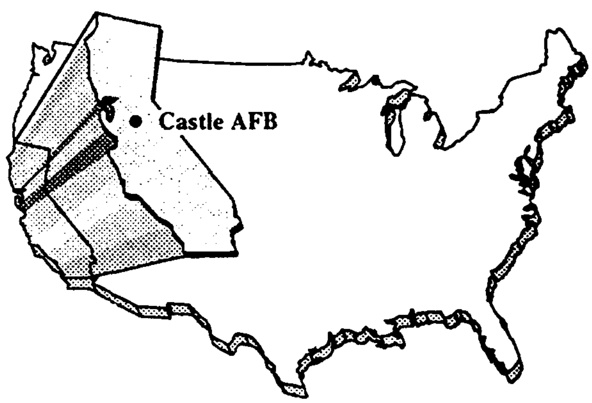

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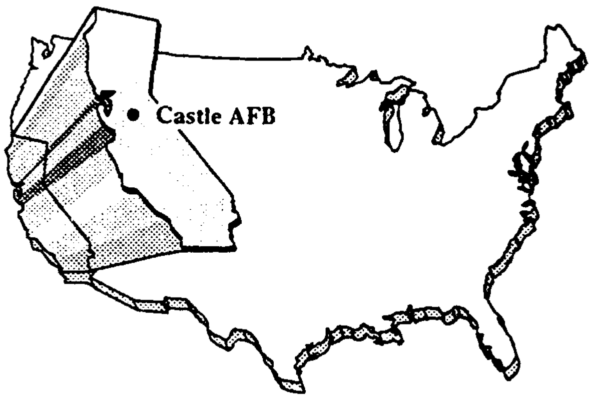

CHAPTER 1
PURPOSE OF AND NEED FOR ACTION

1.0 PURPOSE OF AND NEED FOR ACTION

This Environmental Impact Statement (EIS) examines the potential for impacts to the environment as a result of the disposal and reuse of Castle Air Force Base (AFB), California, as well as with interim activities (e.g., interim outleases) that may be allowed by the Air Force before final disposal of the base. This document has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality (CEQ) regulations implementing NEPA. Appendix A presents a glossary of terms, acronyms, and abbreviations used in this document.

1.1 PURPOSE OF AND NEED FOR

Due to the changing international political scene and the resultant shift toward a reduction in defense spending, the Department of Defense (DOD) must realign and reduce its military forces pursuant to the Defense Base Closure and Realignment Act (DBCRA) of 1990 (Public Law [P.L.] 101-510, Title XXIX). DBCRA established new procedures for closing or realigning military installations in the United States.

DBCRA established an independent Defense Base Closure and Realignment Commission (hereafter "Commission") to review the Secretary of Defense's base closure and realignment recommendations. After reviewing these recommendations, the 1991 Commission forwarded its recommended list of base closures and realignments to the President, who accepted the recommendations and submitted them to Congress on July 12, 1991. Since Congress did not disapprove the recommendations within the time period provided under DBCRA, the recommendations have become law.

Because Castle AFB was on the Commission's list, the decision to close the base is final. Castle AFB is scheduled to close in September 1995.

To fulfill the requirement of reducing defense expenditures, the Air Force plans to dispose of excess and surplus real property and facilities at Castle AFB. DBCRA requirements relating to disposal of excess and surplus property include:

- Environmental restoration of the property as soon as possible with funds made available for such restoration
- Consideration of the local community's reuse plan prior to Air Force disposal of the property
- Compliance with specific federal property disposal laws and regulations.

The Air Force action, therefore, is to dispose of Castle AFB property and facilities. Usually, this action is taken by the Administrator of General Services. However, DBCRA required the Administrator to delegate to the Secretary of Defense the authorities to utilize excess property, dispose of surplus property, convey airport and airport-related property, and determine the availability of excess or surplus real property for wildlife conservation purposes. The Secretary of Defense has since redelegated these authorities to the respective Service Secretaries.

1.2 DECISIONS TO BE MADE

The purpose of this EIS is to provide information for interrelated decisions concerning the disposition of Castle AFB. The EIS is to provide the decision maker and the public the information required to understand the future potential environmental consequences of disposal as a result of reuse options at Castle AFB.

After completion of this EIS, the Air Force will issue a Record of Decision (ROD) on the disposal of Castle AFB. The ROD will determine the following:

- What property is excess to the needs of the DOD and what property is surplus to the needs of the United States of America
- The methods of disposal to be followed by the Air Force
- The terms and conditions of disposal.

The methods of disposal granted by the Federal Property and Administrative Services Act of 1949, implemented in the Federal Property Management Regulations (FPMR), and 49 U.S. Code (U.S.C.) Section 47151 are:

- Transfer to another federal agency
- Public benefit conveyance to an eligible entity
- Negotiated sale to a public body for a public purpose
- Competitive sale by sealed bid or auction.

The EIS considers environmental impacts of the Air Force's disposal of the installation using all of the above-mentioned procedures and by portraying a variety of potential land uses to cover reasonable future uses of the property and facilities by others. Several alternative scenarios were used to group reasonable land uses and to examine the environmental effects of redevelopment of Castle AFB. This methodology was employed because, although the disposal will have few, if any, direct effects, future use and control of use by others will create indirect effects. This EIS, therefore, seeks to analyze reasonable redevelopment scenarios to determine the potential indirect environmental effects of Air Force decisions.

1.3 DISPOSAL PROCESS AND REUSE PLANNING

DBCRA requires compliance with NEPA (with some exceptions) in the implementation of the base closures and realignments. Among the issues that were excluded from NEPA compliance are:

- The selection of installations for closure or realignment
- Analysis of closure impacts.

The Air Force goal is to dispose of Castle AFB property through transfer and/or conveyance to other government agencies or private parties. The Proposed Action in the EIS reflects the community's goals for base reuse, which are to:

- Promote new economic activity at Castle AFB to minimize adverse impacts and optimize beneficial effects on the local/regional economy
- Respond to community needs
- Achieve optimum land use compatibility with uses surrounding the base and among uses on base property
- Protect environmental resources and public health and safety
- Provide for effective implementation.

The Air Force has based the Proposed Action on a plan developed by the Castle Joint Powers Authority (CJPA) for the purpose of conducting the required environmental analysis. The Air Force also developed additional reasonable alternatives to provide the basis for a broad environmental analysis, thus ensuring that all reasonably foreseeable impacts resulting from potential reuse have been identified and the decision maker has multiple options regarding ultimate property disposition. Subject to the terms of transfer or conveyance, the recipients of the property, planning and zoning agencies, and elected officials will ultimately determine the reuse of the property. Six alternatives have been identified, which include four aviation reuse proposals, a non-aviation reuse, and a No-Action Alternative that would not involve reuse.

The Secretary of the Air Force has full discretion in determining how the Air Force will dispose of the property. DBCRA requires the Air Force to comply with federal property disposal laws and federal property management regulations (41 Code of Federal Regulations [CFR] 101-47). The services were authorized to issue additional regulations, if required, to implement their delegated authorities and the Air Force has issued supplemental regulations (41 CFR 132). Another provision of the act requires the services to consult with the state governor, and heads of local governments, or equivalent political organizations for the purpose of considering any plan for the use of such property by the local community concerned. Accordingly, the Air Force is working with state authorities and the CJPA to meet this requirement.

In some cases, compliance with environmental laws may delay reuse of some parts of the base. Until property can be disposed of, the Air Force may execute interim or long-term leases to allow reuse to begin as quickly as possible. The Air Force would structure the leases to provide the lessees with maximum control over the property, consistent with the terms of the final disposal. Restrictions may be necessary to ensure protection of human health and the environment and to allow implementation of required remedial actions. Environmental analysis in the EIS encompasses those possible interim or long-term leasing decisions.

Certain activities inherent in the development or expansion of an airport constitute federal actions that fall under the statutory and regulatory authority of the Federal Aviation Administration (FAA). The FAA generally reviews these activities through the processing and approval of an Airport Layout Plan (ALP). Goals of the ALP review system are to: (1) determine its effectiveness in achieving safe and efficient utilization of airspace, (2) assess factors affecting the movement of air traffic, and (3) establish conformance with FAA design criteria. The FAA approval action may also include other specific elements such as preparation of the Airport Certification Manual (Part 139); the Airport Security Plan (Part 107); the location, construction, or modification of an air traffic control (ATC) tower, terminal radar approach control (TRACON) facility, other navigational and visual aids, and facilities; and establishment of instrument approach procedures.

In view of its possible direct involvement with the disposal of Castle AFB, the FAA is serving as a cooperating agency in the preparation of the EIS. If surplus property is conveyed to a local agency for airport purposes, the FAA will be the federal agency that would enforce deed covenants requiring the property to be used for airport purposes. Additionally, the FAA may later provide airport improvement program grants to the airport sponsor (local agency taking title). The FAA also has special expertise and the legal responsibility to make recommendations to the Air Force for the disposal of surplus property for airport purposes. The 49 U.S.C. Section 47151 authorizes disposal of surplus real and related personal property for airport purposes and requires the FAA to certify that the property is necessary, suitable, and desirable for an airport.

The potential environmental impacts of airport development must be assessed prior to commitment of federal funding, in accordance with NEPA and FAA Orders 1050.1D, Policies and Procedures for Considering Environmental Impacts, and 5050.4A, Airport Environmental Handbook. Environmental impacts must be assessed prior to authorization of plans of local agencies for the development of the entire area in which the airport is located. Section 4(f) of the Department of Transportation (DOT) Act (recodified at 49 U.S.C. Subtitle I, Section 303) provides that the Secretary of Transportation shall not approve any program or project which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land of an historic site of national, state, or local significance as determined by the officials having jurisdiction thereof unless there is no feasible and prudent alternative to the use of such land and such program or project includes all possible planning to minimize harm resulting from the use.

Compliance with FAA regulations requires the preparation of a proposed airport development plan. This EIS presents the assessment of potential environmental impacts of available plans. If a reuse proponent has developed only conceptual plans for the airport area, the environmental impacts of that concept plan are analyzed. The FAA may then use this document to complete their NEPA requirements. This EIS also provides environmental analyses to aid FAA decisions on funding requests for airport development projects. The new owners would be required to prepare a final ALP and submit it to the FAA, as appropriate, for approval.

The U.S. Department of Justice, Federal Bureau of Prisons is also a cooperating agency in the preparation of this EIS. The Federal Bureau of Prisons has a long history of utilizing former, as well as active, military bases for housing federal inmates. In this instance, the Federal Bureau of Prisons has expressed interest in the Castle AFB properties for construction of a federal correctional complex consisting of a minimum of two separate facilities. This transfer of property would contribute substantially to the programs and goals of the Federal Bureau of Prisons.

1.4 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

NEPA established a national policy to protect the environment and ensure that federal agencies consider the environmental effects of actions in their decision making. The CEQ is authorized to oversee and recommend national policies to improve the quality of the environment, and has published regulations that describe how NEPA should be implemented. The CEQ regulations encourage federal agencies to develop and implement procedures that address the NEPA process in order to avoid or minimize adverse effects on the environment. Air Force Regulation (AFR) 19-2, Environmental Impact Analysis Process (EIAP), addresses implementation of NEPA as part of the Air Force planning and decision-making process.

NEPA, CEQ regulations, FAA Orders 1050.1D and 5050.4A, Department of Justice regulations implementing NEPA (28 CFR 61), and AFR 19-2 provide guidance on the types of actions for which an EIS must be prepared. Once it has been determined that an EIS must be prepared, the proponent must publish a Notice of Intent (NOI) to prepare an EIS. This formal announcement signifies the beginning of the scoping period, during which the major environmental issues to be addressed in the EIS are identified. A Draft EIS (DEIS) is prepared, which includes the following:

- A statement of the purpose and need for the action
- A description of the Proposed Action and alternatives, including the No-Action Alternative
- A description of the environment that would be affected by the Proposed Action and alternatives
- A description of the potential environmental consequences of the Proposed Action and alternatives, and potential mitigation measures.

The DEIS is filed with the U.S. Environmental Protection Agency (EPA), and is circulated to the interested public and government agencies for a period of at least 45 days for review and comment. During this period, a public hearing will be held so that the proponent can summarize the findings of the analysis and receive input from the affected public. At the end of the review period, all substantive comments received must be addressed. A Final EIS (FEIS) is produced that contains responses to comments, as well as changes to the document, if necessary.

The FEIS is then filed with U.S. EPA and distributed in the same manner as the DEIS. Once the FEIS has been available for at least 30 days, the Air Force may publish its ROD for the action.

1.4.1 Scoping Process

The scoping process identifies the significant environmental issues relevant to disposal and reuse and provides an opportunity for public involvement in the development of the EIS. The NOI (Appendix B) to prepare an EIS for disposal and reuse of Castle AFB was published in the Federal Register on October 9, 1991. Notification of public scoping was also made through local media as well as through letters to federal, state, and local agencies and officials and interested groups and individuals.

The scoping period for the disposal and reuse of Castle AFB began on October 9, 1991. A public meeting was held on November 6, 1991 in the Pavilion Building at the Merced County Fairgrounds to solicit comments and concerns from the general public on the disposal and reuse of Castle AFB. Approximately 70 people attended the meeting. Representatives of the Air Force presented an overview of the meeting's objectives, agenda, and procedures, and described the process and purpose for the development of a disposal and reuse EIS. In addition to verbal comments, written comments were received during the scoping process. These comments, as well as information from meetings with the CJPA, experience with similar programs, and NEPA requirements, were used to determine the scope and direction of studies/analysis to accomplish this EIS.

1.4.2 Public Comment Process

The DEIS was made available for public review and comment in January 1994. Copies of the DEIS were made available for review in local libraries and provided to those requesting copies. At a public hearing held on February 2, 1994, the Air Force presented the findings of the DEIS and invited public comments. All comments were reviewed and addressed, when applicable, and have been included in their entirety in this document. Responses to comments offering new data, changes to data, and questions about the presentation of data are also included. Comments simply stating facts or opinions, although appreciated, did not require specific responses. Chapter 9, Public Comments and Responses, more thoroughly describes the comment and response process.

1.5 CHANGES FROM THE DEIS TO THE FEIS

The text of this EIS has been revised, when appropriate, to reflect concerns expressed in public comments. These changes range from typographical corrections to amendments of reuse plans. The responses to the comments indicate the relevant sections of the EIS that have been revised. The major comments received on the DEIS were:

- Request for greater community involvement during the EIS process
- Concern over the appropriate use of deed restrictions to ensure compatible reuses in conjunction with remediation efforts
- Request for greater specificity in mitigation measures presented
- Questions regarding the population and employment projections generated for the Region of Influence (ROI)
- Request for clarification of traffic analysis
- Questions regarding details of the groundwater contamination issue

- Request for further details on conversion of and impacts to agricultural lands

- Request for expansion and verification of the air quality analysis, including assumptions used, attainment status of criteria pollutants, baseline emission inventories selected, emissions of respirable particulate matter equal to or less than 10 microns in diameter (PM_{10}), and effect of State Implementation Plan (SIP) updates

- Questions regarding noise impacts and appropriate mitigation

- Request for expansion of mitigation to protect wetlands and vernal pools, and a clarification of impacts to vernal pools.

Based on more recent studies and/or comments received, the following sections of the EIS have been updated or revised:

- Section 2.6, Other Future Actions in the Region, has been revised to include the BRAC-directed base realignment of Naval Air Station (NAS) Lemoore as an action that could contribute to cumulative impacts to air quality in the region.

- The preclosure aviation operations presented in Section 3.2.3.2, Airspace/Air Traffic, have been changed to reflect 1990 operations to provide consistency with the historic air emissions baseline utilized in the air quality analysis.

- Section 3.4.2.4 Groundwater, has been revised to more accurately present the current state of the aquifer.

- Section 3.4.3, Air Quality, has ben revised to reflect 1990 aircraft operations for use as the preclosure reference point in accordance with U.S. EPA conformity determination guidelines, and has been expanded for clarification.

- Sections 3.4.4 and 4.4.4, Noise, have been modified to maintain consistency between preclosure aircraft operations presented for noise and air quality.

- Sections 3.4.5 and 4.4.5, Biological Resources, have been updated to incorporate additional field survey results, information contained in the Wetlands Delineation, and recent changes to species categorization.

- A table has been added to Section 3.4.5.3, Threatened and Endangered Species, that lists sensitive species in the vicinity of Castle AFB.

- Sections 3.4.6 and 4.4.6, Cultural Resources, have been updated to incorporate the most current results of cultural resources investigation.

- Section 4.2.2, Land Use and Aesthetics, has been revised to clarify restrictions associated with the Air Installation Compatible Use Zone (AICUZ) study and to add the use of standard mitigation measures.

- An explanation of mitigation measure development for transportation impacts has been added to Section 4.2.3, Transportation.

- Section 4.2.4, Utilities, has been expanded to address potential solid waste impacts associated with the Highway 59 Landfill.

- Section 4.4.3, Air Quality, has been expanded regarding issues related to emission projections, Prevention of Significant Deterioration (PSD), SIP, conformity determinations, and potential impacts to the attainment status of sulfur dioxide (SO_2), carbon monoxide (CO), and PM_{10}. It has further been expanded to include discussion of conformity offsets and emission reduction credits (ERCs), and an analysis of possible cumulative impacts resulting from the base realignment of NAS Lemoore.

- Clarification of potential noise impacts and the need for an FAA Regulation Part 150 study has been added to Section 4.4.4.

- Discussions of fairy shrimp habitat and wetlands impacts in Section 4.4.5 have been expanded for clarification. Requirements under the California Endangered Species Act and Section 404 of the Clean Water Act for future property recipients have also been added to Section 4.4.5, Biological Resources.

- Additional definitions have been added to Appendix A.

- Appendix H has been updated.

- Appendix M has been updated to reflect the air quality analytical methodology and modeling results.

1.6 ORGANIZATION OF THIS EIS

This EIS is organized into the following chapters and appendices. Chapter 2 provides a description of the Proposed Action, reasonable alternatives to the Proposed Action, and other land use concepts that have been identified for reuse of Castle AFB property. Chapter 2 describes other future actions in the region that could contribute to cumulative impacts, and briefly discusses alternatives eliminated from further consideration. Finally, Chapter 2 provides a comparative summary of the effects of the Proposed Action and alternatives with respect to effects on the local community and the natural environment. Chapter 3 presents the affected environment under the baseline conditions of base closure, providing a basis for analyzing the impacts of the Proposed Action and alternatives. When needed for analytical comparisons, a preclosure reference is provided for certain resource areas. It describes a point in time at or near the closure announcement, and depicts an active base condition. The results of the environmental analysis are presented in Chapter 4 and form the basis for the summary table at the end of Chapter 2. Chapter 5 lists individuals and organizations consulted during the preparation of the EIS; Chapter 6 provides a list of the document's preparers; Chapter 7 contains references; and Chapter 8 contains an index. Chapter 9 describes the public comment and response process, and contains the comments and responses.

In addition to the main text, the following appendices are included in this document:

- Appendix A - a glossary of terms, acronyms, and abbreviations used in this document
- Appendix B - the NOI to prepare this disposal and reuse EIS
- Appendix C - a list of individuals and organizations who were sent a copy of the FEIS
- Appendix D - an Installation Restoration Program (IRP) Bibliography
- Appendix E - a description of the methods used to evaluate the impacts of base reuse on resources of the local community and the environment
- Appendix F - a list of environmental permits held by Castle AFB
- Appendix G - a list of storage tanks at Castle AFB
- Appendix H - Air Force policy regarding management of asbestos-containing material (ACM) at bases that are closing
- Appendix I - Farmland Impact Conversion Rating, Form AD-1006
- Appendix J - a detailed description of issues and assumptions related to noise effects
- Appendix K - agency letters and certifications
- Appendix L - a list of federally and state-listed plant and animal species occurring or potentially occurring in the vicinity of Castle AFB

- Appendix M - a detailed description of the methods used for analysis of air quality impacts and an air emissions inventory for Castle AFB

- Appendix N - influencing factors and environmental impacts by land use category.

1.7 RELATED ENVIRONMENTAL DOCUMENTS

The environmental documents listed below have been or are being prepared separately and address environmental issues at Castle AFB. These documents provided supporting information for the environmental analysis.

- Castle AFB, California, Federal Correctional Institution Site Investigation (U.S. Department of Justice, Federal Bureau of Prisons, 1992)

- Castle AFB, California, Recommendations for Historic Preservation (Landreth and Isaacson, 1990)

- Wetland delineation for Castle AFB, California.

- IRP Bibliography (Appendix D).

1.8 FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

Representative federal permits, licenses, and entitlements that may be required of recipients of Castle AFB for purposes of redevelopment are presented in Table 1.8-1. The table is presented for illustrative purposes only. It does not include state or local permits, licenses, or entitlements that may be required.

Table 1.8-1. Representative Federal Permits, Licenses, and Entitlements Potentially Required for Reusers or Developers of Disposed Base Property
Page 1 of 2

Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Authority	Regulatory Agency
Title V permit under the Clean Air Act (CAA)	Any major source (source that emits more than 100 tons/year of criteria pollutant in nonattainment area for that pollutant or is otherwise defined in Title I of CAA as a major source); affected sources as defined in Title IV of CAA; sources subject to Section 111 regarding New Source Performance Standards; sources of air toxics regulated under Section 112 of CAA; sources required to have new source or modification permits under Parts C or D of Title I of CAA; and any other source designated by U.S. Environmental Protection Agency regulations	Title V of CAA, as amended by the 1990 CAA Amendments, Title V of CAA	U.S. Environmental Protection Agency; California Air Resources Board
National Pollutant Discharge Elimination System (NPDES) permit	Discharge of pollutant from any point source into waters of the United States	Section 402 of Clean Water Act, 33 U.S.C. §1342	U.S. Environmental Protection Agency; California Regional Water Quality Control Board
Section 404 (Dredge and Fill) Permit	Any project activities resulting in the discharge of dredged or fill material into bodies of water, including wetlands, within the United States	Section 404 of Federal Water Pollution Act, 33 U.S.C. §1344	U.S. Department of Defense - Army Corps of Engineers, in consultation with U.S. Environmental Protection Agency
Hazardous waste treatment, storage, or disposal (TSD) facility permit	Owners or operators of a new or existing hazardous waste TSD facility	Resource Conservation and Recovery Act (RCRA) as amended, 42 U.S.C. §6901; 40 CFR 270	U.S. Environmental Protection Agency; California Environmental Protection Agency

CFR = Code of Federal Regulations.
U.S.C. = U.S. Code.

Table 1.8-1. Representative Federal Permits, Licenses, and Entitlements Potentially Required for Reusers or Developers of Disposed Base Property
Page 2 of 2

Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Authority	Regulatory Agency
U.S. Environmental Protection Agency identification number	Generators or transporters (off-site transport) of hazardous waste	40 CFR 262.10 (generators); 40 CFR 263, Subpart B (transporters)	U.S. Environmental Protection Agency
Archaeological Resources Protection Act permit	Excavation and/or removal of archaeological resources from public lands or Indian lands and carrying out activities associated with such excavation and/or removal	Archaeological Resource Protection Act of 1979, 16 U.S.C. §470cc	U.S. Department of the Interior - National Park Service
Endangered Species Act §10 permit	Taking endangered or threatened wildlife species; engaging in certain commercial trade of endangered or threatened plants or removing such plants on property subject to federal jurisdiction	Section 10 of Endangered Species Act, 16 U.S.C. §1539; 50 CFR 17 Subparts C, D, F, and G	U.S. Department of the Interior - Fish and Wildlife Service
Federal Aviation Administration Form 7480-1 "Notice of Landing Area Proposal"	Activation of an airport for civil use	Federal Aviation Act of 1958, 49 U.S.C. App. §1432	U.S. Department of Transportation - Federal Aviation Administration
Airport Operating Certificate	Operating a land airport serving any scheduled or unscheduled passenger operation of air carrier aircraft designed for more than 30 passenger seats	Federal Aviation Act of 1958, 49 U.S.C. App. §1432	U.S. Department of Transportation - Federal Aviation Administration

CFR = Code of Federal Regulations.
U.S.C. = U.S. Code.

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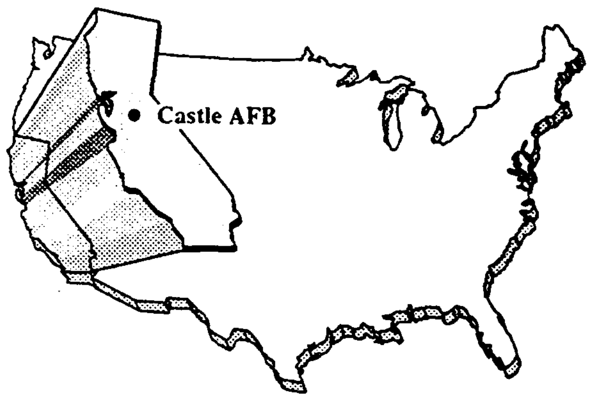


CHAPTER 2
ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

This section describes the Proposed Action, reasonable alternatives to the Proposed Action, and the No-Action Alternative. In addition, potential conveyances of Castle AFB properties and facilities from the Air Force to other federal agencies are described, as are independent reuse options that are not part of a complete reuse plan. Other alternatives that were identified but eliminated from further consideration are briefly described. Other future actions in the region that could potentially contribute to cumulative impacts are described. The potential environmental impacts of the Proposed Action and alternatives are summarized in table form.

Generally, the Administrator of the General Services Administration (GSA) has authority to dispose of excess and surplus real property belonging to the federal government. With regard to closure of bases, however, the DBCRA requires the GSA Administrator to delegate disposal authority to the Secretary of Defense. FPMR, which govern property disposal methods associated with base closure, allow the Secretary of Defense to dispose of closure property by transfer to another federal agency, by public benefit conveyance, by negotiated sale to a state or local government, and by public sale at auction or sealed bid. These methods, or a combination of them, could be used to dispose of property at Castle AFB.

Provisions of DBCRA and FPMR require that the Air Force first notify other DOD departments that Castle AFB is scheduled for disposal. Any proposals from these departments for the transfer of Castle AFB are given priority consideration.

Pursuant to the McKinney Act, 42 U.S.C. §11411, the Air Force is required to provide the Department of Housing and Urban Development (HUD) with information regarding properties being disposed of at Castle AFB. HUD makes a determination about the suitability of these properties for homeless assistance programs. HUD reports the suitability and potential availability of facilities at Castle AFB in the Federal Register. Homeless assistance providers must express written interest to the Department of Health and Human Services (HHS) within 60 days of publication and submit a complete application within 150 days of publication. After determination that the application is complete, HHS is required to approve or disapprove the application within 25 days. In disposing of surplus real property, the Air Force must give priority of consideration to uses that assist the homeless, although "other compelling and meritorious uses may be considered."

Under all alternatives, an Air Force Base Conversion Agency (AFBCA) Operating Location (OL) will be established at Castle AFB. The responsibilities of the OL will include coordinating post-closure activities with the active force closure activities, establishing a caretaker force to maintain Air Force-controlled properties after closure, and serving as the Air Force local liaison to community reuse groups until lease termination, title surrender, or disposal (as appropriate) of the Air Force-controlled property has been completed. For the purposes of environmental analysis, it was assumed that the OL would consist of approximately 50 direct employees at the time of closure, conceptually composed of 10 Air Force employees and 40 non-federal supporting personnel. The OL, as used in this document, may refer to either the AFBCA or non-federal personnel.

In some cases each group may have distinct responsibilities. For example, under the No-Action Alternative, the non-federal personnel would be responsible for the management and disposition of their own hazardous materials and waste. The Air Force OL would be responsible for inspection and oversight to ensure that hazardous substance practices on Air Force-controlled property are in compliance with pertinent regulations.

In order to address the range of potential environmental impacts of disposal and reuse, a Proposed Action, four conceptual reuse alternatives, and a No-Action Alternative have been developed:

- The **Proposed Action** entails reuse of the airfield and aviation support land for major aircraft maintenance, maintenance training, pilot and crew proficiency training, and general aviation. Non-aviation land uses include industrial, institutional (medical and educational), commercial, residential, public facilities/ recreation, and agricultural.

- The **Castle Aviation Center Alternative** proposes an integrated general aviation support center, which would provide general aircraft maintenance and repair, classic aircraft restoration, aircraft storage, sales, testing, and support for air shows. Non-aviation land uses include industrial, institutional (medical and educational), commercial, residential, public facilities/recreation, and agricultural.

- The **Commercial Aviation Alternative** proposes a general aviation airport with commercial passenger service, airline pilot proficiency training, and air cargo operations. This alternative would have the largest number of flight operations of any of the aviation-related reuse scenarios. Non-aviation land uses include industrial, institutional (medical), commercial, residential, public facilities/recreation, and agricultural.

- The **Aviation with Mixed Use Alternative** proposes airfield/ aviation support land use similar to the Proposed Action, although the number of aircraft operations is substantially lower under this alternative. Non-aviation land uses include industrial, institutional (medical and educational), commercial, residential, public facilities/recreation, and agricultural.

- The **Non-Aviation Alternative** proposes an extensive industrial research and development area on the existing airfield and aviation support acreage. Other land use includes a major educational campus, as well as commercial, residential, public facilities/recreation, and agricultural.

- The **No-Action Alternative** would result in the base being placed in caretaker status. No further activity would take place. The U.S. government would not be required to retain ownership of the base under this alternative.

Two other independent land uses have been identified as being possible components of any of the reuse alternatives: a Federal Bureau of Prisons correctional complex consisting of a minimum of two separate facilities and a recreational trapshooting range under private administration. Both have been proposed for the undeveloped land east of the runway.

Under DBCRA, NAS Miramar, San Diego, operational forces will be realigned to NAS Lemoore. Realignment activities are projected to begin in 1995. Consequently, on April 8, 1994, the U.S. Navy requested that the Air Force consider transferring conformity offsets from Castle AFB to NAS Lemoore. A Draft EIS for the realignment of NAS Lemoore was prepared and published in June 1994. The proposed realignment was analyzed for its potential to contribute to cumulative impacts and is included within this document. The Final EIS for the realignment proposed by the U.S. Navy is expected to be issued following the publication of the FEIS for the Disposal and Reuse of Castle AFB.

In order to accomplish impact analyses for the various alternatives, a set of general assumptions was made. These assumptions include employment and population changes arising from implementation of each reuse plan, consistent land use designations for similar reuse options, the proportion of ground disturbance anticipated for each land use type, transportation and utility effects of each proposal as a function of increased population growth due to redevelopment, and anticipated phasing of the various elements of each reuse plan (as measured at the closure baseline, and at the baseline plus 5, 10, and 20 years, respectively). The air quality analysis is discussed in terms of closure baseline, and at the baseline plus 5- and 10-year levels. Details regarding the generation of these assumptions are found in Appendix E, Methods of Analysis. Specific assumptions developed for individual reuse plans are identified in the discussion of each proposal in Sections 2.2 and 2.3. Each alternative addresses all of the land within the base boundary.

During the development of alternatives addressed in the EIS, the Air Force considered the compatibility of future land uses with current site conditions that may restrict reuse activities to protect human health and the environment. These conditions include potential contamination from past releases of hazardous substances and Air Force efforts to remediate the contamination under the IRP. IRP remediation at Castle AFB and other environmental studies may result in lease/deed restrictions that limit reuse options at certain locations within the base. Additionally, the Air Force may retain access rights to these sites to implement IRP remediation (e.g., temporary easement for access to monitoring wells).

2.2 DESCRIPTION OF PROPOSED ACTION

Section 2905(b)(2)(E) of DBCRA requires the Air Force, as part of the disposal process, to consult with the applicable state governor and heads of local governments, or equivalent political organizations for the purposes of considering any plan for the use of such property by the concerned local community. Air Force policy is to encourage timely community reuse planning by offering to use the community's plan for reuse or development of land and facilities as the Air Force's Proposed Action in the EIS.

The CJPA was formed in August 1991 by Merced County and the cities of Atwater and Merced, through the execution of a 5-year Joint Powers Agreement under California Government Code, Section 6500. CJPA is a multi-jurisdictional authority responsible for planning the civilian reuse and development of Castle AFB and for managing closure and post-closure activities. The governing board of the CJPA consists of six members, two from the Merced County Board of Supervisors, and two city council members from each of the municipalities. In addition, a representative of the local congressional district may serve as a non-voting member. The governing board appointed a permanent executive director and other staff to conduct the business of the CJPA.

CJPA contracted with a consulting consortium to assess existing resources, constraints, and market parameters for Castle AFB and evaluate the potential for civilian aviation and non-aviation reuse concepts. A Preliminary Reuse Plan (EDAW, Inc., 1992) was prepared, addressing the following:

- Site and vicinity description
- Socioeconomic setting
- Economic, market, and physical opportunities for reuse
- Development strategies
- Identification of a preliminary reuse plan and alternatives.

The Air Force has used the community's plan in the development of the Proposed Action. This comprehensive reuse plan focuses on a civilian airport, with major aircraft maintenance and aviation training as the dominant aviation themes, and general aviation and aircraft storage as additional components. Existing facilities would be reused in development of commercial office and retail, light industrial, educational, residential, recreation, and medical facilities. Industrial, public facilities/recreation, and agricultural uses are proposed for existing undeveloped areas of the base.

The land uses presented in the Proposed Action (Figure 2.2-1) provide a framework for development. The aviation-related areas (including airfield and aviation support land uses) would encompass 1,505 acres, or over 54 percent of the base fee-owned property. Non-aviation land uses would comprise the remaining 1,272 acres, including industrial, institutional (medical and educational), commercial, residential, public facilities/recreation, and agricultural components. Over 2.6 million square feet of existing facilities would be reused and 743,000 square feet of new construction are proposed. The acreage associated with each land use category is provided in Table 2.2-1.

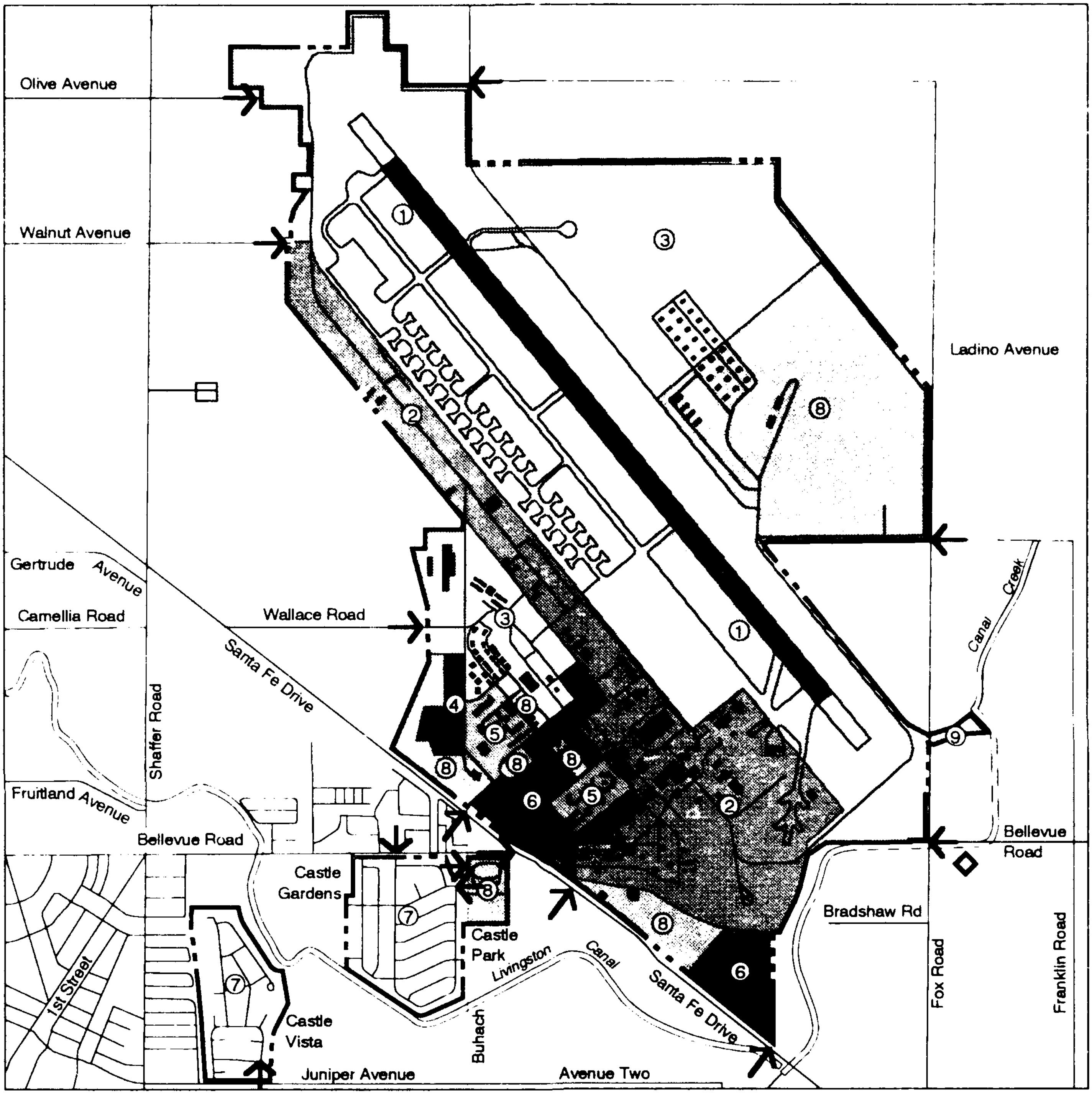
Table 2.2-1. Land Use Acreage - Proposed Action

Land Use	On-Base Acreage
Airfield	1,033
Aviation support	472
Industrial	447
Institutional	
Medical	23
Educational	51
Commercial	124
Residential	188
Public facilities/recreation	433
Agriculture	6
Total	2,777

Information for the development of the Proposed Action was obtained from the CJPA and its consultants. When specific data were not available, assumptions were generated by the Air Force for analytical purposes. The following types of data were provided by CJPA:

- Proposed reuse options for the airfield (e.g., aviation uses, aviation support functions)

- Layout and general acreage of the proposed land uses



EXPLANATION

- ① Airfield
- ② Aviation Support
- ③ Industrial
- ④ Institutional (Medical)
- ⑤ Institutional (Educational)
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public Facilities/ Recreation
- ⑨ Agriculture
- ⑩ Vacant Land *
- Base Boundary
- Access Points
- Runway

0 650 1300 2600 Feet

* This standard land use designation is not applicable to this figure.

Proposed Action

Figure 2.2-1

- Anticipated building demolition and new construction

- Long-range development concept for the airfield, aviation support, and mixed land uses

- Projected annual aircraft operations for a 20-year planning period

- The potential closure of Atwater Municipal Airport.

The following assumptions were used:

- Projected fleet mix for a 20-year planning period

- Proposed airport improvements

- Proposed roadway access points to the base

- Project-related population, employment, traffic generation, and utility requirement projections to 2015

- The percent of each land use component disturbed by construction, demolition, and reuse activities

- The continuing operation of other airports in the region.

The amount of development, including existing facility demolition and retention and new facility construction, for each land use under the Proposed Action is provided in Table 2.2-2. Not all existing (retained) facilities would be fully utilized by 2015.

The acreages within each land use assumed to be disturbed by construction of facilities, infrastructure improvements, or other operational activities under the Proposed Action are provided in Table 2.2-3 for three phases of development. The sections below describe activities associated with each land use category.

2.2.1 Airfield

The preliminary airport plan developed by the Air Force provides for use of the existing runway, parallel taxiway system, and navigational aids. The central apron area would be used for large jet aircraft parking, based aircraft parking, and transient aircraft parking. The south end of the central apron area associated with the aircraft maintenance hangars would continue to be used for large aircraft maintenance, aircraft refurbishing, or aircraft storage.

The airfield land use category in the Proposed Action consists of 1,033 acres, over 37 percent of the total base, and includes the runway, taxiways, aircraft parking aprons, and runway protection zones (RPZs), as depicted in

Table 2.2-2. Facility Development - Proposed Action

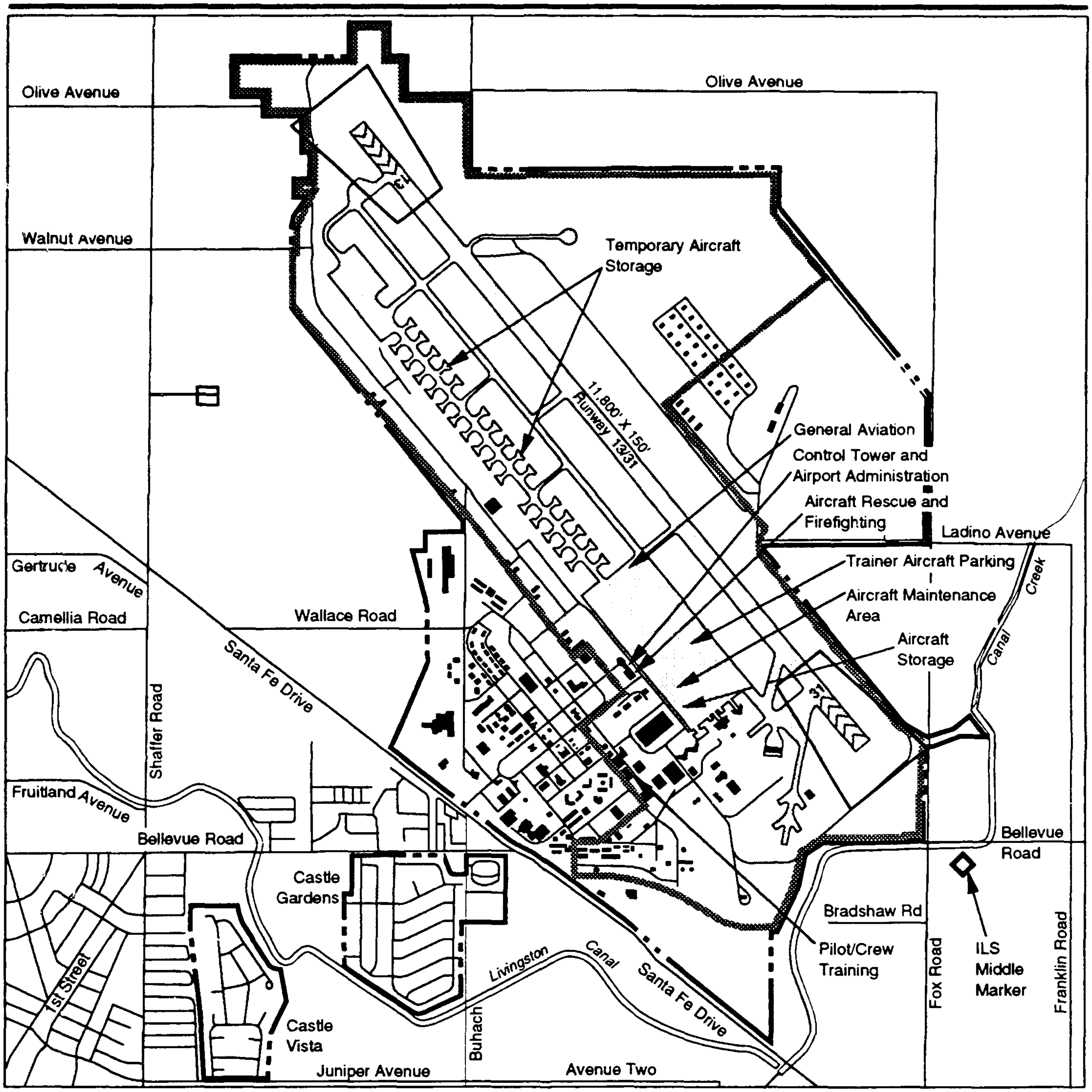
Land Use	Existing Facility Demolition	Existing Facility Retention	New Facility Construction
	(in thousands of square feet of floor space)		
Airfield	0	0	0
Aviation support	516	537	0
Industrial	240	219	573
Institutional			
Medical	0	162	0
Educational	0	415	0
Commercial	122	266	170
Residential	119	1,006	0
Public facilities/ recreation	112	68	0
Agriculture	0	0	0
Total	1,109	2,673	743

Table 2.2-3. Acres Disturbed by the Proposed Action

	Acres Disturbed (by phase)			
Land Use	1995-2000	2000-2005	2005-2015	Total
Airfield	0	0	0	0
Aviation support	24	38	9	71
Industrial	104	78	78	260
Institutional				
Medical	0	0	0	0
Educational	3	3	0	6
Commercial	29	5	0	34
Residential	24	24	0	48
Public facilities/ recreation	31	0	0	31
Agriculture	0	0	0	0
Total	215	148	87	450

Figure 2.2-2. The airfield would be used primarily by wide-body aircraft flight and maintenance crew training, aircraft servicing, general aviation operations, aircraft equipment and engine retrofits, and temporary large aircraft storage.

The northern apron area would be reserved for a temporary storage area for large aircraft, additional aircraft maintenance hangars, and other airfield or aviation support development. A 1-acre parcel located southeast of the



EXPLANATION

Airport Boundary

Base Boundary

Airfield Pavement

Runway Protection Zone

0 650 1300 2600 Feet

Preliminary Airport Plan-Proposed Action

Figure 2.2-2

Bellevue Road-Fox Road intersection would be utilized to site a navigational aid.

A preliminary airport plan (Figure 2.2-2) for the civilian use of the aviation facilities at Castle AFB was developed by the Air Force. The airport layout characteristics (e.g., dimensions, separations, and clearances) were developed using the FAA Advisory Circular 150/5300-13 to allow operation of all current commercial aircraft. The following would be needed:

- Recommission Runway 13/31 to a width of 150 feet and add high intensity runway lighting (HIRL).
- Recondition Runway 13/31 pavement to conform with wide-body aircraft structural loading requirements in accordance with FAA airport design standards.
- Install new runway and taxiway guidance signs.
- Install a precision approach path indicator (PAPI) system for Runway 13/31.
- Install runway end identifier lighting (REIL) for Runway 13.
- Establish or retain a full precision instrument landing system (ILS) including runway visual range (RVR) with off-airport marker facilities to Runway 31; the ILS would consist of a localizer, glide slope, approach lighting system, runway visual range indicator, and middle and outer marker facilities.
- Establish or retain a nonprecision instrument approach to Runway 13.
- Retain and operate the ATC tower.
- Establish RPZs for Runways 13 and 31 to meet FAA design standards.
- Construct or retain taxiways, aprons, buildings, and hangars for specific aviation support functions as needed.
- Reuse underground fuel hydrant distribution systems.
- Modify aboveground fuel storage facilities to accommodate expected demand.
- Install an automated weather observation station.

- Retain and operate the airport surveillance radar (ASR) and related facilities.

The airfield and aviation support areas would likely be conveyed to an airport authority, which would manage the development and operations of the airfield in accordance with FAA and state regulations.

Projected airfield operations are shown in Table 2.2-4 for 2000, 2005, and 2015. An operation is defined as one landing or one takeoff. Up to 95 percent of annual operations are expected to be on Runway 31. Projected operations were generated within three categories: aircraft maintenance, pilot/crew training, and general aviation. Aircraft maintenance operations would reach 2,500 by 2015. Pilot and crew training operations would exceed 64,000 by 2015. General aviation operations are expected to exceed 48,000 annually by 2015 with the majority of these performed by single-engine aircraft. All turbojet-powered aircraft are assumed to be in compliance with the FAA's Stage 3 Noise Standards. For analytical purposes, 86 percent of operations in 2000, 2005, and 2015 are projected to occur during daytime hours (7:00 a.m. to 6:00 p.m.), 9 percent are expected to occur during evening hours (6:00 p.m. to 10:00 p.m.), and 5 percent are expected to occur during nighttime hours (10:00 p.m. to 7:00 a.m.). Nighttime operations could occur from all aircraft types.

2.2.2 Aviation Support

The proposed aviation support area covers 472 acres, or nearly 17 percent of the base, and includes the control tower, aircraft rescue and fire station, hangars, aircraft maintenance facilities, fuel farm, engine test cells, alert facilities, and other aviation uses. It also includes several non-aviation industrial facilities, former landfills, and undeveloped open space. The aviation support area parallels the southwest side of the airfield. Aviation support functions are likely to include aircraft maintenance, engine maintenance, aircraft refurbishing and conversion, aircraft painting, and long-term aircraft storage. The development of facilities and operations within the aviation support area included in the airport plan would be managed in accordance with FAA and state aviation regulations. Reuse of existing facilities and later development of vacant land would occur throughout the 20-year analysis period.

2.2.3 Industrial

The industrial land use for the Proposed Action covers 447 acres, or approximately 16 percent of the base, and is located in two distinct areas, north and south of the airfield. The northern area includes portions of the Weapons Storage Area (WSA), Explosive Ordnance Disposal (EOD) Range, and landfills in an undeveloped open space and could be used as a prison site or for light manufacturing, agricultural product processing, or

Table 2.2-4. Projected Flight Operations - Proposed Action

Year	Operations	Function	%	Fleet Mix	Annual Operations
2000	Aircraft maintenance	Maintenance	50	747-400[a]	500
			25	MD-88[a]	250
			25	Fokker-100[a]	250
	Pilot training	Training	100	747-400[a]	50,000
	Crew training	Training	100	737-300[a]	11,000
	General aviation	Private	83	Single-engine	33,539
			9	Multi-engine	3,733
			5	King Air	1,867
			3	Gulfstream IV	1,245
				Total	102,384
2005	Aircraft maintenance	Maintenance	42	747-400[a]	630
			29	MD-88[a]	435
			29	Fokker-100[a]	435
	Pilot training	Training	100	747-400[a]	50,000
	Crew training	Training	100	737-300[a]	12,100
	General aviation	Private	81	Single-engine	34,443
			10	Multi-engine	4,460
			5	King Air	2,169
			4	Gulfstream IV	1,858
				Total	106,530
2015	Aircraft maintenance	Maintenance	40	747-400[a]	1,000
			30	MD-88[a]	750
			30	Fokker-100[a]	750
	Pilot training	Training	100	747-400[a]	50,000
	Crew training	Training	100	737-300[a]	14,641
	General aviation	Private	73	Single-engine	35,483
			13	Multi-engine	6,348
			7	King Air	3,173
			7	Gulfstream IV	3,174
				Total	115,319

Note: (a) Stage 3 aircraft.

warehousing. Comprising 335 acres, this area is proposed for light industrial development between 1995 and 2015. Road access and infrastructure systems to this area would have to be provided.

The southern area, defined as business/light industrial, comprises 112 acres in the northwestern portion of the cantonment, and includes the recently constructed Civil Engineering facilities, the Flight Simulator building, several administrative offices, and a variety of residential facilities. Approximately 34 percent of the land use area is vacant or paved, and is suitable for redevelopment. Reuse of existing facilities and construction of new facilities could occur throughout the analysis period.

2.2.4 Institutional (Medical and Educational)

The proposed medical land use comprises 23 acres located on the western edge of the cantonment, and includes the hospital (with related parking) and four 20-person dormitories. Reuse of the hospital as a community medical facility is to be completed by 2000, concurrent with associated use of the residential units as staff or outpatient housing.

An educational land use is proposed for two areas comprising 51 acres in the cantonment. The western parcel includes two major classroom facilities, library, shoppette, and several residential facilities. Proposed reuses would include classrooms, living quarters, and supporting facilities for a vocational and/or community education center, or for aircraft maintenance training. The eastern parcel includes dormitories and dining halls, and would be used for student housing. Complete reuse of facilities would occur by 2005.

2.2.5 Commercial

The commercial area comprises 124 acres and is generally located in the south-central cantonment. Components of the commercial land use include two retail centers, a commercial tourist/convention complex, and administrative offices.

The existing base community center on the southwestern edge of the cantonment is proposed for reuse as a shopping center. Existing facilities include the Base Exchange, Commissary, bowling center, theater, credit union, auto service station, and package store. Commercial tourist/ convention facilities would include the Officers' Club, the recreation center and the child-care center. Airport and CJPA administrative office reuses are proposed for five blocks in the center of the cantonment, including the base and wing headquarters. Reuse of existing facilities is expected to be complete by 2005. Commercial development would include a second retail center proposed for a parcel in the extreme southern portion of the base.

2.2.6 Residential

Two family housing areas, comprising 188 acres, are located southwest of the main base. Castle Gardens, located south of Bellevue Road and west of Buhach Road, contains 677 duplex and single-family units and is proposed for conversion to affordable or retirement housing. Conversion would include demolition of some units, and extensive renovation and infrastructure upgrades to others. No additional units would be constructed. Reuse of this component would begin between 1995 and 2005 and would be phased over 10 years.

Castle Vista, south of Bellevue Road and east of Shaffer Road, would be reused for single-family and duplex residences. Two former landfills located on the south and west boundary of Castle Vista would not be available for residential development, but would remain as open space. Reuse of this housing would take place over a 10-year period, beginning in 1995. Existing access to family housing areas would remain.

2.2.7 Public Facilities/Recreation

Public facilities/recreation land uses cover 433 acres, or nearly 16 percent of the base. Of this total, 325 acres are located northeast of the airfield. Existing facilities within this component include the WSA; small arms and grenade ranges, a portion of the EOD Range; and various navigational, communications, and radar facilities. Proposed land uses for this area could include a trapshooting range and gun club or more passive uses including hiking and other outdoor activities.

Other components of the public facilities/recreation land use include the physical fitness and outdoor recreation complex located south of the cantonment. Facilities include a gymnasium, three softball fields, and one football/soccer field with a running track. Castle Park, located southeast of Bellevue and Buhach roads, contains similar facilities, including a youth center and picnic pavilion. Proposed reuse of these facilities by the local community would occur throughout the analysis period. The Castle Air Museum, on the west side of the base, would continue to operate in its present location as a community enterprise. Vacant land north of the developed portion of the museum is reserved for future expansion. The Proposed Action also identifies three park blocks within the cantonment that would connect the adjacent uses with a park-like setting.

2.2.8 Agriculture

Six acres of existing farmland, located east of Fox Road (across from the southern end of Runway 31), would be reused for agricultural purposes. Reuse of this parcel would begin immediately after base closure.

2.2.9 Employment and Population

The Proposed Action would generate 3,861 direct jobs on site by 2015. Employment effects are shown in Table 2.2-5.

Table 2.2-5. Total On-Site Employment and Population Effects - Proposed Action

	Closure	2000	2005	2015
Direct employment	50	2,423	3,391	3,861
On-Site population	NA	815	1,630	1,630

NA = Not applicable.

By 2005, the projected employment would generate an estimated on-site population increase of 1,630 over the post-closure estimate, then remain at the same level throughout the remainder of the analysis period. Population effects are also shown in Table 2.2-5.

2.2.10 Transportation

The Proposed Action would provide ten access points to the main base area (see Figure 2.2-1). These include the three currently used access gates (the Wallace Road Gate [Gate 3], the Main Gate on Buhach Road, and Gate 2 on Santa Fe Drive southeast of the Main Gate). The Walnut Avenue Gate, which is currently closed, would be reopened. Six new access points would provide two entries on Olive Avenue at the northern end of the base, Ladino Avenue on the east side of the base, Bellevue Road on both the eastern and western sides of the base, and Santa Fe Drive at the southern end of the base. The two existing access points to Castle Gardens (located on Bellevue Road and Buhach Road), the existing access point to Castle Park from Buhach Road, and the existing access point to Castle Vista from Juniper Avenue would also be reused.

Based on land use and employment projections, average daily vehicular traffic to and from base property would be approximately 39,800 by 2015. Road improvements, if needed, would be accomplished to meet level-of-service requirements.

2.2.11 Utilities

By 2015, the projected activities associated with the Proposed Action would generate the following on-base utility demands:

- Water - 0.57 million gallons per day (MGD)
- Wastewater - 0.36 MGD

- Solid waste - 15.0 tons per day
- Electricity - 79.3 megawatt-hours (MWH) per day
- Natural gas - 2,886 therms per day.

Improvements to some utility systems would be required to provide adequate service to proposed new facilities. A brief description of utility configurations in support of reuse is provided below.

Water Supply. Water to the main base would continue to be provided by two on-base wells and treated at the wellheads prior to distribution. Water supply to Castle Vista and Castle Gardens would continue to be provided by the city of Atwater.

Wastewater. For purposes of analysis, the base sewer system is assumed to be connected to the city of Atwater Regional Wastewater Treatment Plant (ARWTP).

Solid Waste. Refuse disposal services are now provided by private contractors who dispose of solid waste at the county landfill north of Merced. No major changes to this service are planned under the Proposed Action.

Electricity. Electricity is now and would continue to be provided to the base by the Western Area Power Administration (WAPA) and Pacific Gas and Electric Company (PG&E). The base is served through one substation located on the west-central side of the cantonment. Individual facility meters would need to be installed to measure electrical consumption by reusers.

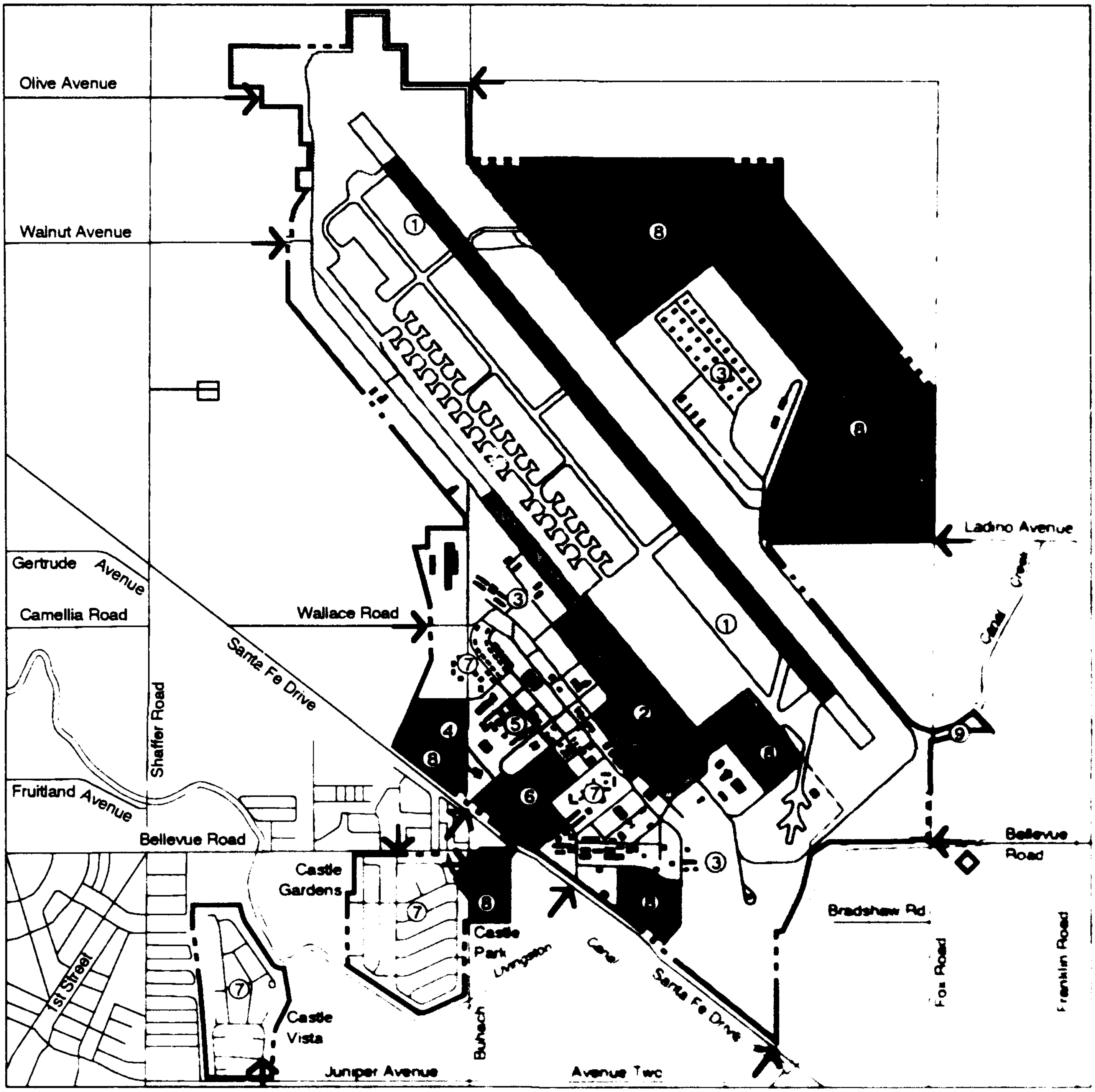
Natural Gas. PG&E would continue to supply the base with natural gas via a main metering station located near the main gate. Individual facility meters would need to be installed to measure natural gas consumption by reusers.

2.3 DESCRIPTION OF ALTERNATIVES

2.3.1 Castle Aviation Center Alternative

The Castle Aviation Center Alternative (Figure 2.3-1) focuses on a general aviation center with major aircraft maintenance and refurbishing, classic aircraft restoration and repair, aircraft storage, sales and testing of kit and experimental aircraft, and support for air shows and additional air museum functions.

The airfield and aviation support areas comprise 1,191 acres, or nearly 43 percent of the base property. Other related land uses comprise the remaining 1,586 acres and have been designated industrial, institutional (educational and medical), commercial, residential, public facilities/



EXPLANATION

- ① Airfield
- ② Aviation Support
- ③ Industrial
- ④ Institutional (Medical)
- ⑤ Institutional (Educational)
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public Facilities/Recreation
- ⑨ Agriculture
- ⑩ Vacant Land
- Base Boundary
- Access Points
- Runway

0 650 1300 2600 Feet

This standard land use designation is not applicable to this figure

Castle Aviation Center Alternative

Figure 2.3-1

recreation, and agricultural. Approximately 3.8 million square feet of existing facilities would be reused; no demolition or new construction is proposed. The total acreage of each land use category is shown in Table 2.3-1.

Table 2.3-1. Land Use Acreage - Castle Aviation Center Alternative

Land Use	On-Base Acreage
Airfield	1,033
Aviation support	158
Industrial	641
Institutional	
Medical	20
Educational	70
Commercial	45
Residential	240
Public facilities/recreation	564
Agriculture	6
Total	2,777

The data used to develop the Castle Aviation Center Alternative were obtained from a proposal provided to the Air Force by a private organization. When specific data were not available in the plan, assumptions were generated for analytical purposes. The following types of data provided in the Castle Aviation Center Proposal were used for the analysis:

- Proposed reuse options for the airfield (e.g., aviation uses, aviation support functions)
- Long-range development concept for the airfield, aviation support, and mixed-use land uses
- Project-related population and employment

The following assumptions were developed to expand upon the analysis:

- Layout and acreage of the proposed land uses
- Projected fleet mix and annual aircraft operations for a 20-year planning period
- Proposed roadway access points to the base
- The percent of each land use component disturbed by construction and reuse activities

- Project-related traffic generation and utility requirement projections

- The continuing operation of airports in the region

The amount of development, including existing facility demolition, facility retention, and new facility construction, for each land use under the Castle Aviation Center Alternative is provided in Table 2.3-2. However, existing (retained) facilities may not be fully utilized during this 20-year analysis period.

Table 2.3-2. Facility Development - Castle Aviation Center Alternative

Land Use	Existing Facility Demolition	Existing Facility Retention	New Facility Construction
	(in thousands of square feet of floor space)		
Airfield	0	0	0
Aviation support	0	550	0
Industrial	0	1,393	0
Institutional			
Medical	0	124	0
Educational	0	200	0
Commercial	0	225	0
Residential	0	1,125	0
Public facilities/recreation	0	164	0
Agriculture	0	0	0
Total	0	3,781	0

Table 2.3-3 summarizes acreage assumed to be disturbed by construction of facilities, infrastructure improvements, or other operational activities during each phase of development. The sections below describe activities associated with each land use category.

2.3.1.1 Airfield. The proposed airfield component consists of 1,033 acres, or over 37 percent of the base. This land use area includes a 1-acre parcel located south of Bellevue Road and east of Fox Road.

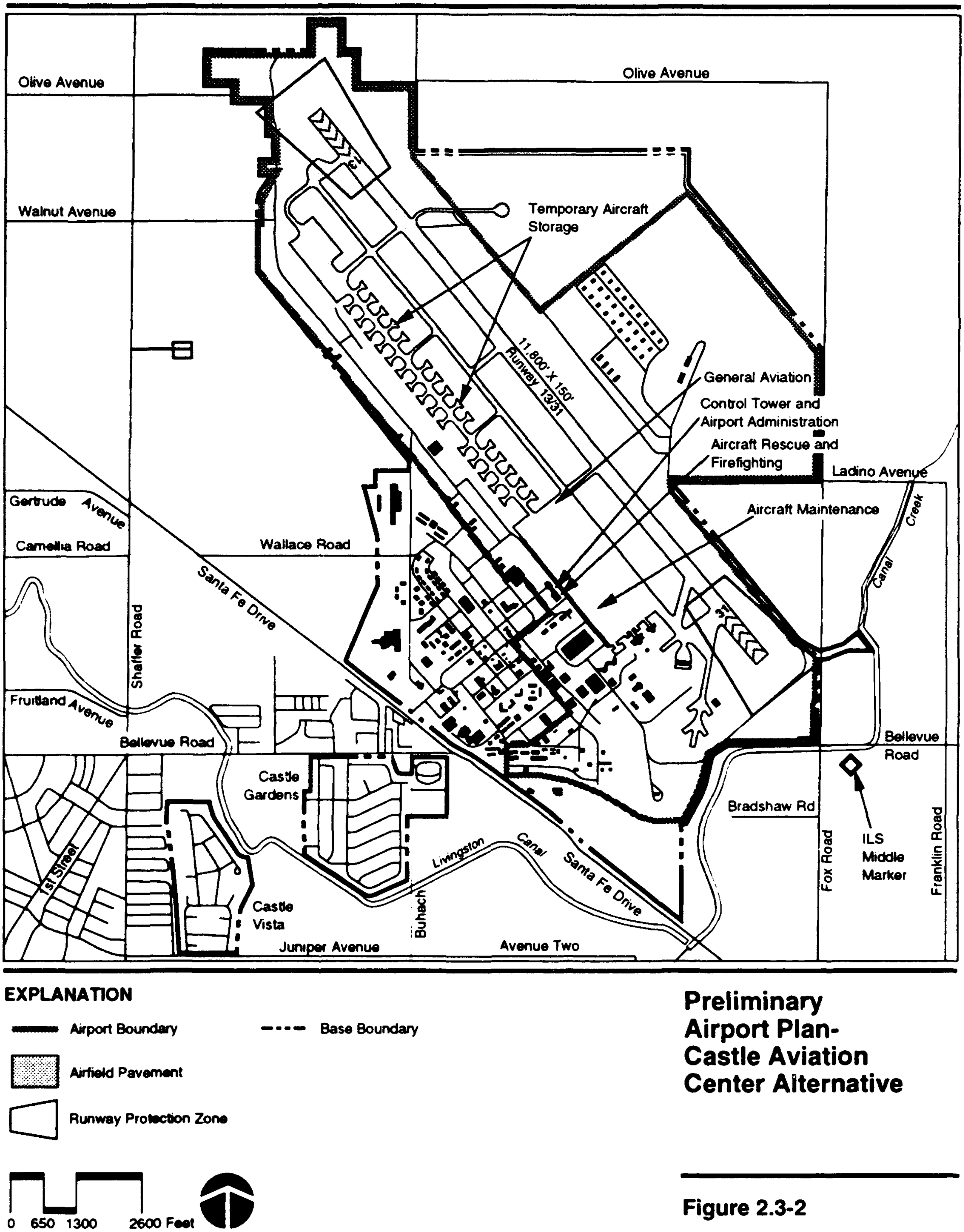
A preliminary airport plan (Figure 2.3-2) for this alternative was developed by the Air Force. The airport plan characteristics (e.g., dimensions, separations, and clearances) were developed using the FAA Advisory Circular 150/5300-13 to allow operation of all current commercial aircraft. Specific improvements for this alternative are the same as those for the Proposed Action except the hydrant fueling system would be closed in place.

Table 2.3-3. Acres Disturbed by the Castle Aviation Center Alternative

Land Use	Acres Disturbed (by phase) 1995-2000	2000-2005	2005-2015	Totals
Airfield	0	0	0	0
Aviation support	6	2	0	8
Industrial	45	19	0	64
Institutional				
Medical	0	0	0	0
Educational	0	0	0	0
Commercial	0	0	0	0
Residential	12	6	0	18
Public facilities/ recreation	56	0	0	56
Agriculture	0	0	0	0
Total	119	27	0	146

Projected airfield operations are provided in Table 2.3-4 for 2000, 2005, and 2015. Up to 95 percent of operations are expected to occur on Runway 31. Projected operations were generated within four categories: aircraft maintenance, classic aircraft refurbishment, airshow operations, and general aviation. Operations by classic aircraft such as the DC-3 are expected to number less than 50 annually in 2000, increasing to an estimated 60 operations by the end of the analysis period. All turbojet-powered aircraft are in compliance with the FAA's Stage 3 Noise Standards. For analytical purposes, 83 percent of operations in 2000 are projected to occur during daytime hours (7:00 a.m. to 6:00 p.m.), 15 percent are expected to occur during evening hours (6:00 p.m. to 10:00 p.m.), and 2 percent are expected to occur during nighttime hours (10:00 p.m. to 7:00 a.m.). In 2005 and 2015, 84 percent of operations are expected to occur during daytime hours, 14 percent are expected to occur during evening hours, and 2 percent are expected to occur during nighttime hours. These nighttime operations are attributable to miscellaneous general aviation operations.

2.3.1.2 Aviation Support. The aviation support component includes facilities to support general aviation (aircraft rescue and fire fighting, control tower), major aircraft maintenance and refurbishing, classic aircraft restoration and repair, aviation museum display, air shows, and the research/development and sales of experimental and kit aircraft. A fixed base operator (FBO) is proposed to support general aviation operations. The aviation support land use comprises 158 acres and is located in the operational flightline area of the former military airfield. The existing facilities (hangars, maintenance docks, and aircraft maintenance shops) would be suitable for reuse for large or small aircraft maintenance, aircraft storage, and aircraft display.



Preliminary Airport Plan-Castle Aviation Center Alternative

Figure 2.3-2

Table 2.3-4. Projected Flight Operations - Castle Aviation Center Alternative

Year	Operations	Function	%	Fleet Mix	Annual Operations
2000	Aircraft maintenance	Maintenance	84	747-400[a]	1,000
			8	MD-88[a]	100
			8	Fokker-100[a]	100
	Classic aircraft refurbishment	Maintenance	100	DC-3	48
	Airshow	Education/ entertainment	63	DC-3	750
			37	F-16	450
	General aviation	Private	62	Single-engine	3,000
			20	Multi-engine	1,000
			10	King Air	500
			8	Gulfstream IV	400
				Total	7,348
2005	Aircraft maintenance	Maintenance	74	747-400[a]	1,500
			13	MD-88[a]	250
			13	Fokker-100[a]	250
	Classic aircraft refurbishment	Maintenance	100	DC-3	54
	Airshow	Education/ entertainment	69	DC-3	990
			31	F-16	450
	General aviation	Private	57	Single-engine	3,100
			22	Multi-engine	1,200
			11	King Air	600
			10	Gulfstream IV	500
				Total	8,894
2015	Aircraft maintenance	Maintenance	70	747-400[a]	2,000
			18	MD-88[a]	500
			12	Fokker-100[a]	350
	Classic aircraft refurbishment	Maintenance	100	DC-3	60
	Airshow	Education/ entertainment	75	DC-3	1,350
			25	F-16	450
	General aviation	Private	48	Single-engine	3,100
			23	Multi-engine	1,500
			13	King Air	800
			16	Gulfstream IV	1,000
				Total	11,110

Note: (a) Stage 3 aircraft.

2.3.1.3 Industrial. The industrial area comprises 641 acres, or approximately 23 percent of the total base acreage, and is in two areas north and south of the airfield. The industrial land use would include all Castle Aviation Center support functions and a variety of related revenue-producing operations utilizing existing facilities.

The area north of the airfield, estimated to cover 160 acres, is occupied by the former WSA and would be used for film and television production operations. The extensive industrial area south of the airfield extends from the northwest portion of this area to the southeast portions of the cantonment. The northwest area includes the new Civil Engineering complex and would be suitable for general office or industrial development. Over half of this area would be available as open space to support film and television production operations. The southeastern industrial component contains several facilities suitable for light industrial or warehousing reuse. Nearly 175 acres of vacant property would be available to support other Castle Aviation Center support functions, as needed.

2.3.1.4 Institutional (Medical and Educational). A 20-acre parcel located on the western edge of the cantonment includes the hospital and associated parking north and south of the facility. Reuse for the hospital would be similar to the Proposed Action.

The educational component in the Castle Aviation Center Alternative occupies 70 acres in the western half of the cantonment and includes two major classroom facilities, the base chapel, library, shoppette, and residential facilities. The types of educational uses would be similar to those described in the Proposed Action.

2.3.1.5 Commercial. The commercial area in the Castle Aviation Center Alternative comprises 45 acres, and is located centrally in the cantonment. A retail complex would utilize the Base Exchange and Commissary. This 25-acre parcel would be reused by 2000. Other commercial land use components include the Officers' Club, the recreation center, and the child-care center.

2.3.1.6 Residential. The residential area in the Castle Aviation Center Alternative comprises 240 acres, including the two single-family tracts off base and two unaccompanied personnel facilities (dormitories, Visiting Officers' Quarters, etc.) in the cantonment. The Castle Gardens and Castle Vista housing areas would be used for Castle Aviation Center employee and trainee housing. The dorms, proposed for use in coordination with the educational land use, would be renovated and fully occupied by 2000.

2.3.1.7 Public Facilities/Recreation. The public facilities/recreation land occupies 564 acres, or approximately 20 percent of the base, and is located in five areas. The largest area comprises 500 acres northeast of the airfield.

This area would be reused for passive outdoor recreation, or open space support for film and television production operations. The other four components are the physical recreation facilities, including the gymnasium, the Castle Air Museum, a proposed second aviation museum site located in the alert/flightline area, and Castle Park. Reuse of these facilities would be similar to the Proposed Action. Differences include the absence of park blocks within the cantonment and a reduction in the size of the physical fitness and air museum components, which would be limited to existing developed facilities.

2.3.1.8 Agriculture. Six acres of existing farmland east of Fox Road, across from the southern end of Runway 31, would be reused for agricultural purposes. Reuse of this parcel could begin immediately after base closure.

2.3.1.9 Employment and Population. The Castle Aviation Center Alternative would generate 6,200 new direct jobs on site by 2005. Employment effects are shown in Table 2.3-5.

Table 2.3-5. Total On-Site Employment and Population Effects - Castle Aviation Center Alternative

	Closure	2000	2005	2015
Direct employment	50	4,610	6,200	6,200
On-site population	NA	4,209	4,209	4,209

NA = Not applicable.

These projected employment increases would generate population changes in the area. By 2000, the on-site population is estimated to increase by 4,209 above the post-closure level. Population effects are shown in Table 2 3-5.

2.3.1.10 Transportation. The same access points would be used for the Castle Aviation Center Alternative as for the Proposed Action. The transportation network would be required to accommodate one-way traffic flows of 15,000 to 20,000 vehicles over a 2-hour period anticipated to occur during air shows and other Castle Aviation Center events. Entry roads would be widened to four lanes to accommodate this traffic volume.

Based on land use and employment projections, average daily vehicular traffic to and from the base would be approximately 47,700 trips by 2015. If needed, roads would be improved to meet level-of-service requirements.

2.3.1.11 Utilities. By 2015, the projected activities associated with the Castle Aviation Center Alternative would generate the following on-base utility demands:

- Water - 1.29 MGD
- Wastewater - 0.68 MGD
- Solid waste - 23.4 tons/day
- Electricity - 102.6 MWH/day
- Natural gas - 3,281 therms/day.

The projected utility system would be identical to the Proposed Action. Improvements to some utility systems would be required to provide adequate service to proposed new facilities.

2.3.2 Commercial Aviation Alternative

The Commercial Aviation Alternative (Figure 2.3-3) focuses on a general aviation airport with commercial passenger service, airline pilot proficiency training, and air cargo. Approximately 3.0 million square feet of existing facilities would be reused and nearly 2.9 million square feet of new construction are proposed.

The airfield and aviation support areas comprise 1,251 acres, or 45 percent of the base property. Non-aviation land uses comprise the remaining 1,526 acres and have been designated industrial, institutional (medical), commercial, residential, public facilities/recreation, and agriculture. The total acreage of each land use category is shown in Table 2.3-6.
The following assumptions were used to develop data in support of the analysis for the Commercial Aviation Alternative:

- Proposed land uses

- Acreage figures for proposed land uses

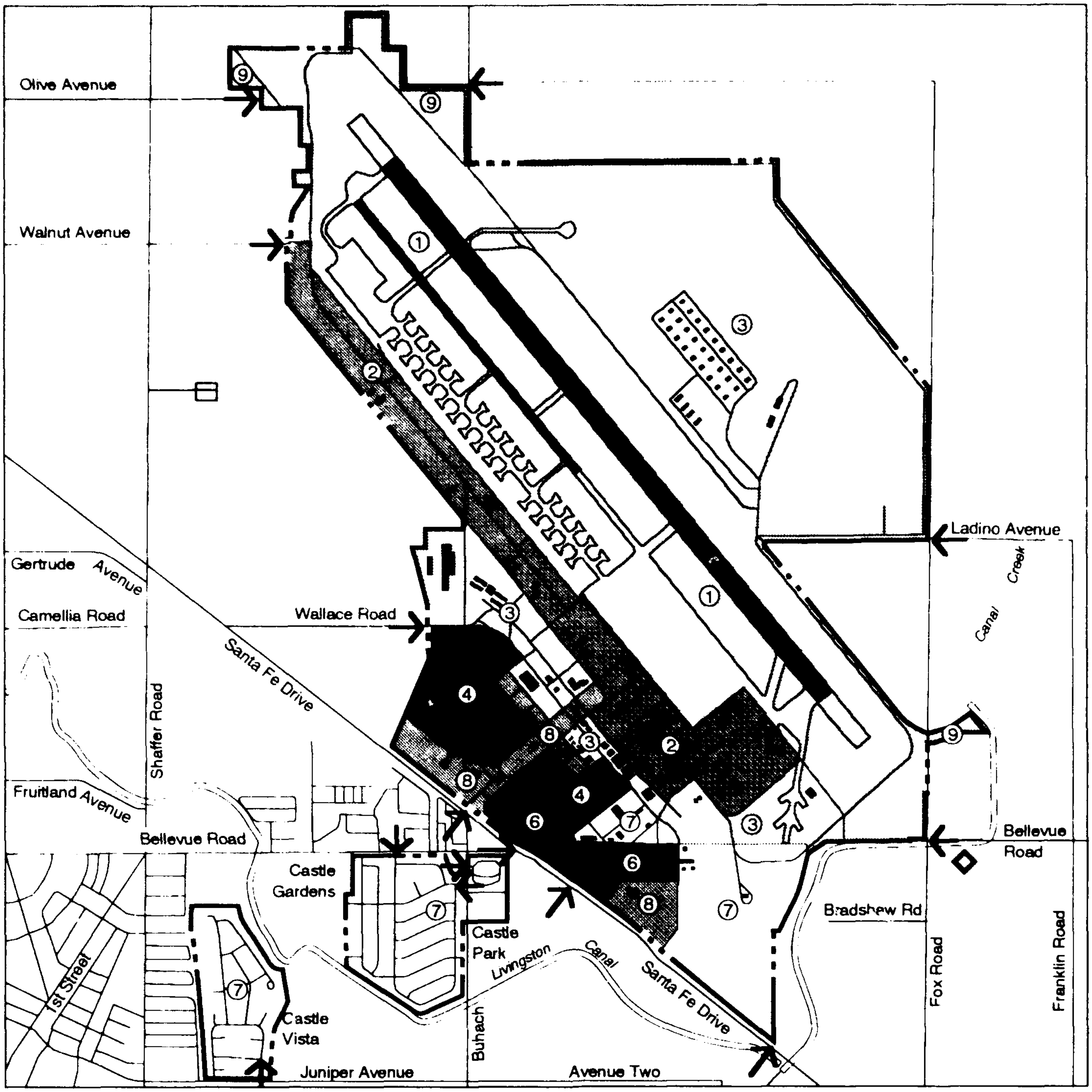
- Projected flight operations and fleet mix for a 20-year planning period

- Anticipated building demolition and new construction

- The percent of each land use component disturbed by construction, demolition, and reuse activities

- Proposed roadway access points to the base

- Project-related population, employment, traffic generation, and utility requirement projections to 2015



EXPLANATION

- ① Airfield
- ② Aviation Support
- ③ Industrial
- ④ Institutional (Medical)
- ⑤ Institutional (Educational) *
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public Facilities/ Recreation
- ⑨ Agriculture
- ⑩ Vacant Land *
- Base Boundary
- Access Points
- Runway

0 650 1300 2600 Feet

* This standard land use designation is not applicable to this figure.

Commercial Aviation Alternative

Figure 2.3-3

Table 2.3-6. Land Use Acreage - Commercial Aviation Alternative

Land Use	On-Base Acreage
Airfield	997
Aviation support	254
Industrial	875
Institutional	
Medical	113
Commercial	59
Residential	342
Public facilities/recreation	81
Agriculture	56
Total	2,777

- The closure of the Merced, Atwater, and Turlock airports and the transfer of the majority of the general aviation operations from these airports to Castle AFB.

The amount of development, including existing facility demolition, facility retention, and new facility construction, for each land use under the Commercial Aviation Alternative is provided in Table 2.3-7. Not all existing (retained) facilities would be fully utilized by 2015.

Table 2.3-7. Facility Development - Commercial Aviation Alternative

Land Use	Existing Facility Demolition	Existing Facility Retention	New Facility Construction
	(in thousands of square feet of floor space)		
Airfield	0	0	0
Aviation support	57	698	213
Industrial	228	449	1,124
Institutional			
Medical	141	592	331
Commercial	68	187	253
Residential	220	1,030	956
Public facilities/ recreation	55	57	0
Agriculture	0	0	0
Total	769	3,013	2,877

Table 2.3-8 summarizes acreage assumed to be disturbed by construction of facilities, infrastructure improvements, or other operational activities during each phase of development. The sections below describe activities associated with each land use category.

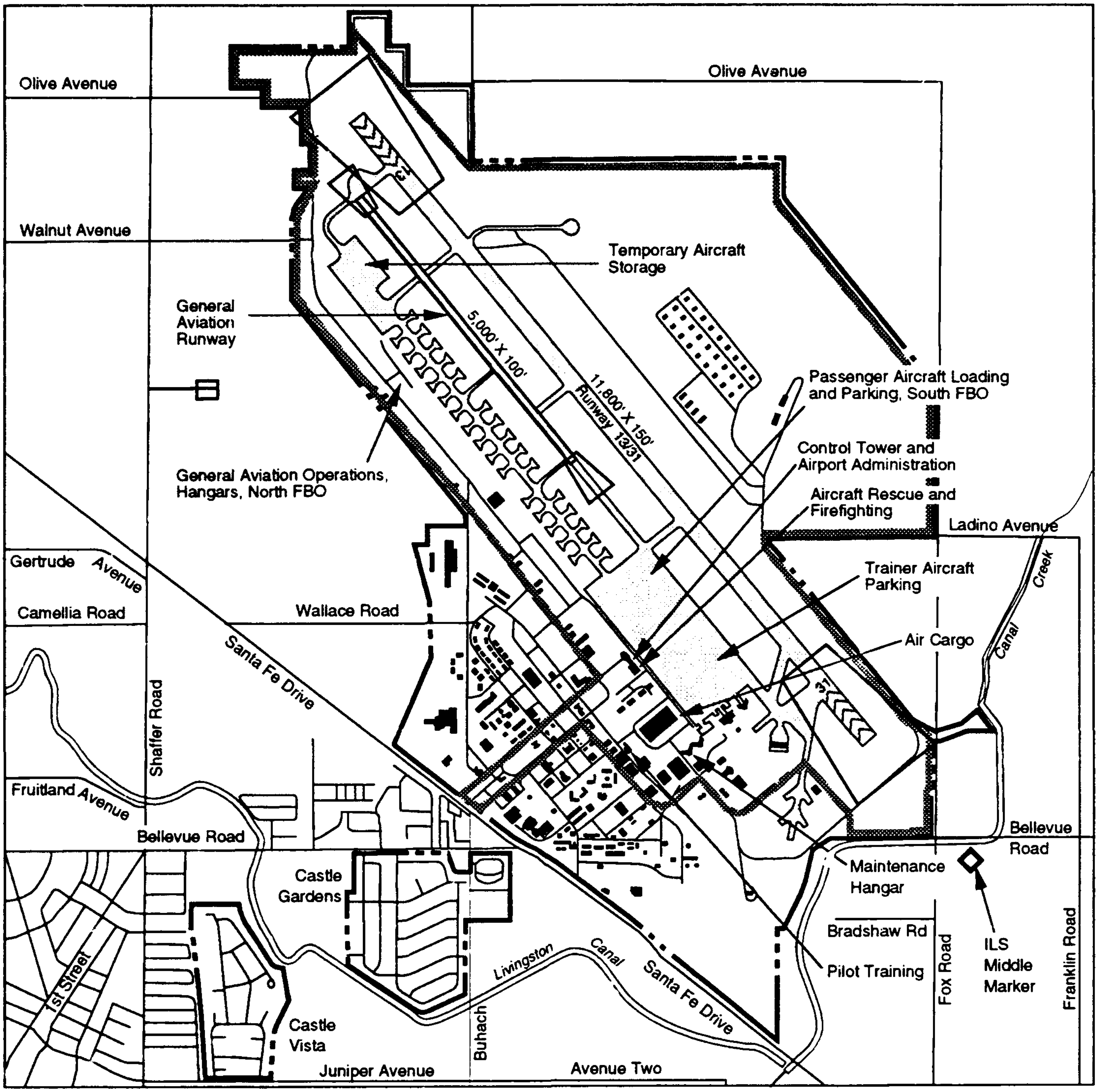
Table 2.3-8 Acres Disturbed by Commercial Aviation Alternative

Land Use	Acres Disturbed (by phase) 1995-2000	2000-2005	2005-2015	Totals
Airfield	0	0	0	0
Aviation support	12	12	26	50
Industrial	25	34	79	138
Institutional				
Medical	4	4	9	17
Commercial	3	20	0	23
Residential	53	41	84	178
Public facilities/ recreation	13	0	0	13
Agriculture	50	0	0	50
.al	160	111	198	469

2.3.2.1 Airfield. The airfield land use category includes 997 acres, or approximately 36 percent of the base acreage. It encompasses the runways, taxiways, RPZs, and apron. The airfield would be used primarily by commercial category aircraft being flown for pilot proficiency training and by general aviation aircraft.

The northern apron area would be reserved for general aviation operations, including based aircraft tie-downs and future hangar construction, as applicable. The central apron area would be reserved for commercial aviation based aircraft parking and transient aircraft parking. The south end of the central apron area adjacent to the aircraft maintenance hangars would be used for trainer aircraft parking. The northern 5,000 feet of Taxiway 1 would be designated as a visual general aviation aircraft runway. This 5,000-foot by 100-foot parallel runway would be utilized to support the numerous small general aviation aircraft that will be relocated from the three area airports, which would be closed. Alternative taxiway routes would be established. A 1-acre parcel located south of Bellevue Road and east of Fox Road would be used to site a navigational aid.

A preliminary airport plan (Figure 2.3-4) for this alternative was developed by the Air Force. The airport layout characteristics (e.g., dimensions, separations, and clearances) were developed using the FAA Advisory Circular 150/5300-13 to allow operation of all current commercial aircraft. Specific airfield improvements for this alternative would be the same as those for the Proposed Action with the addition of the following:



EXPLANATION

Airport Boundary

Base Boundary

Airfield Pavement

Runway Protection Zone

0 650 1300 2600 Feet

Preliminary Airport Plan-Commercial Aviation Alternative

Figure 2.3-4

- Designate the 5,000-foot by 100-foot section of existing Taxiway 1 between the northernmost end of Taxiway 1 and existing Taxiway 7 as a visual flight rule (VFR) general aviation runway.

- Install PAPI system for new parallel runway.

- Install REILs for new parallel runway.

- Install medium intensity runway lighting (MIRL) for new parallel runway.

- Paint and mark existing Taxiway 1 pavement to conform to general aviation runway marking standards.

- Establish visual RPZs for the new parallel general aviation runway to conform with FAA design standards.

- The hydrant fueling system would be closed in place.

The airfield and aviation support areas would likely be conveyed to an airport authority, which would manage the development and operations of the airfield in accordance with FAA and state regulations.

Projected airfield operations are provided in Table 2.3-9 for 2000, 2005, and 2015. Up to 40 percent of general aviation operations are expected to use the new runway; approximately 95 percent of total operations would take place to the northwest. Projected operations were generated within four categories: general aviation, commercial aviation, pilot proficiency training, and air cargo. General aviation operations are expected to be about 86,400 annually in 2000, increasing to nearly 103,200 by 2015. Operations related to commercial aviation are expected to number about 2,700 annually in 2000, increasing to nearly 3,700 by 2015. Pilot proficiency training operations are expected to number about 86,000 annually in 2000, increasing to nearly 125,000 by 2015. Operations related to air cargo are expected to range from approximately 1,250 in 2000 to nearly 2,500 annual operations by 2015. All turbojet-powered aircraft are assumed to be in compliance with the FAA's Stage 3 Noise Standards. For analytical purposes, 85 percent of operations in the planning period are projected to occur during daytime hours (7:00 a.m. to 6:00 p.m.), 12 percent are expected to occur during evening hours (6:00 p.m. to 10:00 p.m.), and 3 percent are expected to occur during nighttime hours (10:00 p.m. to 7:00 a.m.).

2.3.2.2 Aviation Support. The aviation support area covers 254 acres, or nearly 10 percent of the base, and includes the control tower, aircraft rescue and fire fighting station, hangars, aircraft maintenance facilities, air cargo, general aviation, and other aviation uses. The aviation support land use area parallels the southwest side of the airfield. Aviation support functions are likely to include a commercial passenger terminal; air cargo

Table 2.3-9 Projected Flight Operations - Commercial Aviation Alternative

Year	Operation	Function	%	Fleet Mix	Annual Operations
2000	Passenger operations	Commercial	100	Jetstream 31	2,712
	Air cargo	Cargo	32	Beech 99	400
			13	Piper Navajo	163
			5	Piper Cherokee	62
			50	Cessna Caravan	625
	Pilot training	Training	61	747-400[a]	52,720
			26	Multi-engine	22,536
			13	Jetstream 31	11,268
	General aviation	Private	91	Single-engine	76,640
			7	Multi-engine	7,400
			1	King Air	1,200
			1	Gulfstream IV	1,200
				Total	176,926
2005	Passenger operations	Commercial	100	Jetstream 31	2,920
	Air cargo	Cargo	42	Beech 99	521
			8	Piper Navajo	104
			50	Cessna Caravan	625
	Pilot training	Training	57	747-400[a]	56,015
			29	Multi-engine	28,170
			14	Jetstream 31	14,085
	General aviation	Private	91	Single-engine	79,450
			7	Multi-engine	7,800
			1	King Air	1,600
			1	Gulfstream IV	1,600
				Total	192,890
2015	Passenger operations	Commercial	40	Jetstream 31	1,460
			60	Saab 340B	2,190
	Air cargo	Cargo	50	Beech 99	1,250
			50	Cessna Caravan	1,250
	Pilot training	Training	53	747-400[a]	65,300
			32	Multi-engine	39,438
			15	Jetstream 31	19,719
	General aviation	Private	85	Single-engine	87,480
			10	Multi-engine	9,000
			3	King Air	3,600
			2	Gulfstream IV	3,150
				Total	234,437

Note: (a) Stage 3 aircraft.

facilities, pilot proficiency facilities, aircraft maintenance and refurbishing, engine maintenance, refurbishing, and conversion, and aircraft painting. The development of facilities and operations within the aviation support area would be managed in accordance with FAA and state aviation regulations. Reuse of existing facilities and new construction would occur throughout the 20-year analysis period and would reach 32 percent of potential development by 2015.

With the closure of the three area airports, annual aircraft operations would be sufficient to support a minimum of two FBOs. As shown on Figure 2.3-4, one FBO would be located in the commercial passenger terminal on the south airfield. The second, located on the northern airfield west of the new runway, could accommodate general aviation based aircraft as well as the temporary storage of at least 15 large commercial aircraft. The south FBO would require a new 30,000-square-foot maintenance hangar in addition to its required space in the terminal building. The ATC tower would be retained and reused.

2.3.2.3 Industrial. The industrial area covers 875 acres, or approximately 32 percent of the total base area, and is located in three distinct areas, one northeast of and two southwest of the airfield. The northern area includes portions of the WSA, EOD Range, and landfills in an undeveloped open space. The WSA would be utilized for warehousing and storage. The northern area, comprising 691 acres, is proposed for light industrial/manufacturing development between 1995 and 2015. Road access and infrastructure systems to this area would have to be provided.

One of the two southern areas, which is comprised of 90 acres in the northwestern portion of the cantonment, would be reused as an office/industrial park, and includes the recently constructed Civil Engineering facilities, the new flight simulator building, three administrative offices, and one dormitory. Existing (retained) facilities would occupy 70 percent of this area, while 30 percent would be available for redevelopment. Facilities reuse and new development would occur through 2015.

The western 44 acres of the southernmost industrial area are designated as office/industrial park. Two buildings would be reused, and the remaining buildings in this area would be demolished to allow for new construction that would occur in the 1995 to 2015 period. The eastern 50 acres are designated for light industrial/manufacturing and include the readiness crew building and the alert apron. The remaining area is vacant and would be utilized for new development, which would occur through 2015.

Throughout the industrial areas, development would reach 40 percent of potential use by 2015.

2.3.2.4 Institutional (Medical). The medical component occupies the center of the cantonment and comprises 113 acres, or 4 percent of the base. Proposed reuse as a major medical institution would require the dormitories, administrative medical offices, the day-care center, the hospital, existing unaccompanied residential facilities, and new outpatient residential facilities. The types of uses would typify a major medical rehabilitation institution. Approximately 331,000 square feet of new construction is proposed. Complete development of this area would occur between 2005 and 2015.

2.3.2.5 Commercial. The commercial area comprises 59 acres, or 2 percent of the base, and is generally located in the south-central cantonment fronting Santa Fe Drive. Components of the commercial l... use include a neighborhood shopping center and a new community cen...

The base community center, located on a 30-acre parcel at the southwestern edge of the cantonment, is proposed for reuse as a neighborhood shopping center. Existing facilities include the Base Exchange, Commissary, bowling center, theater, credit union, and package store. Complete reuse of existing facilities for a neighborhood center would occur in the 1995 to 2000 period.

The other commercial development would include a new community center proposed for a parcel fronting Santa Fe Drive in the vicinity of the Bellevue Road intersection. Development of this area would be complete between 2000 and 2005.

2.3.2.6 Residential. The residential area covers 342 acres, or 12 percent of the base, and is located within five parcels. The first parcel, consisting of 109 acres, is in the southernmost portion of the base immediately northeast of Santa Fe Drive. All existing facilities in this parcel would be demolished, and 409 new single-family residences would be constructed. The development of this residential parcel is projected to be 100 percent complete by 2015.

The second parcel of 25 acres is southeast of the dormitory complex. All existing facilities in this parcel would be demolished to allow for development of 300 new multi-family units. The development of this parcel is projected to be 100 percent complete by 2015.

A noncontiguous parcel, Castle Park, consists of 18 acres southwest of the base that would be developed with 68 single-family residences. Development would be 100 percent complete by 2015. The youth center would be retained as a neighborhood recreation center.

Another noncontiguous family housing area, Castle Gardens, comprises 108 acres south of Bellevue Road and west of Buhach Road. It contains 677 duplex and single-family units, and is proposed for conversion to affordable or retirement housing. Conversion would include demolition of approximately 50 buildings and extensive renovation and infrastructure upgrades to others. No additional units would be constructed. Reuse of this area would begin between 1995 and 2005 and would be phased over 5 years.

The fifth parcel, Castle Vista, consisting of 82 acres north of Juniper Avenue and east of Shaffer Road, would be retained for single-family and duplex residences. Two former landfills on the southern and western boundary of Castle Vista would not be available for residential development, but would remain as open space. Reuse of the Castle Vista housing would be complete over a 10-year period beginning in 1995.

2.3.2.7 Public Facilities/Recreation. Public facilities/recreation land covers 81 acres, or 3 percent of the base. South of the cantonment is an indoor and outdoor recreation complex, which includes a gymnasium, three softball fields, and one football/soccer field with a running track. The Castle Air Museum, on the southwest side of the base, would continue to operate as a community enterprise. The Commercial Aviation Alternative also identifies a park within the cantonment to complement and enhance the adjacent medical, commercial, and industrial uses. The Castle AFB chapel would be retained for reuse for religious purposes. Proposed reuse of the public facilities/recreation area would occur between 1995 and 2000.

2.3.2.8 Agriculture. Three areas comprising 56 acres, or approximately 2 percent of the base, would be used for agricultural purposes. Two of these parcels are in the northern portion of the base on both sides of the airfield. The third is located east of Fox Road across from the southern end of Runway 31. Agricultural land use would begin during the first 5 years of the analysis period.

2.3.2.9 Employment and Population. The Commercial Aviation Alternative would generate 4,051 new direct jobs on site by 2015. Employment effects are shown in Table 2.3-10.

Table 2.3-10. Total On-Site Employment and Population Effects - Commercial Aviation Alternative

	Closure	2000	2005	2015
Direct employment	50	1,282	2,400	4,051
On-site population	NA	2519	3,295	4,491

NA = Not applicable.

Projected employment would generate population changes in the area. By 2015, the on-site population is estimated to increase by 4,491 above the post-closure level. Population effects are shown in Table 2.3-10.

2.3.2.10 Transportation. The Commercial Aviation Alternative would use the same access points as the Proposed Action. Based on land use and employment projections, average daily vehicular traffic to and from the base would be approximately 54,200 trips by 2015. Road improvements, if needed, would be accomplished to meet level-of-service requirements.

2.3.2.11 Utilities. By 2015, the projected activities associated with the Commercial Aviation Alternative would generate the following on-base utility demands:

- Water - 1.04 MGD
- Wastewater - 0.50 MGD
- Solid waste - 20.4 tons/day
- Electricity - 120.1 MWH/day
- Natural gas - 4,440 therms/day.

The projected utility system would be identical to the Proposed Action. Some utility systems would be improved to provide adequate service to proposed new facilities.

2.3.3 Aviation with Mixed Use Alternative

The Aviation with Mixed Use Alternative (Figure 2.3-5) focuses on a general aviation airport with major aircraft maintenance and refurbishing. Approximately 2.7 million square feet of existing facilities would be reused and nearly 1.5 million square feet of new construction is proposed.

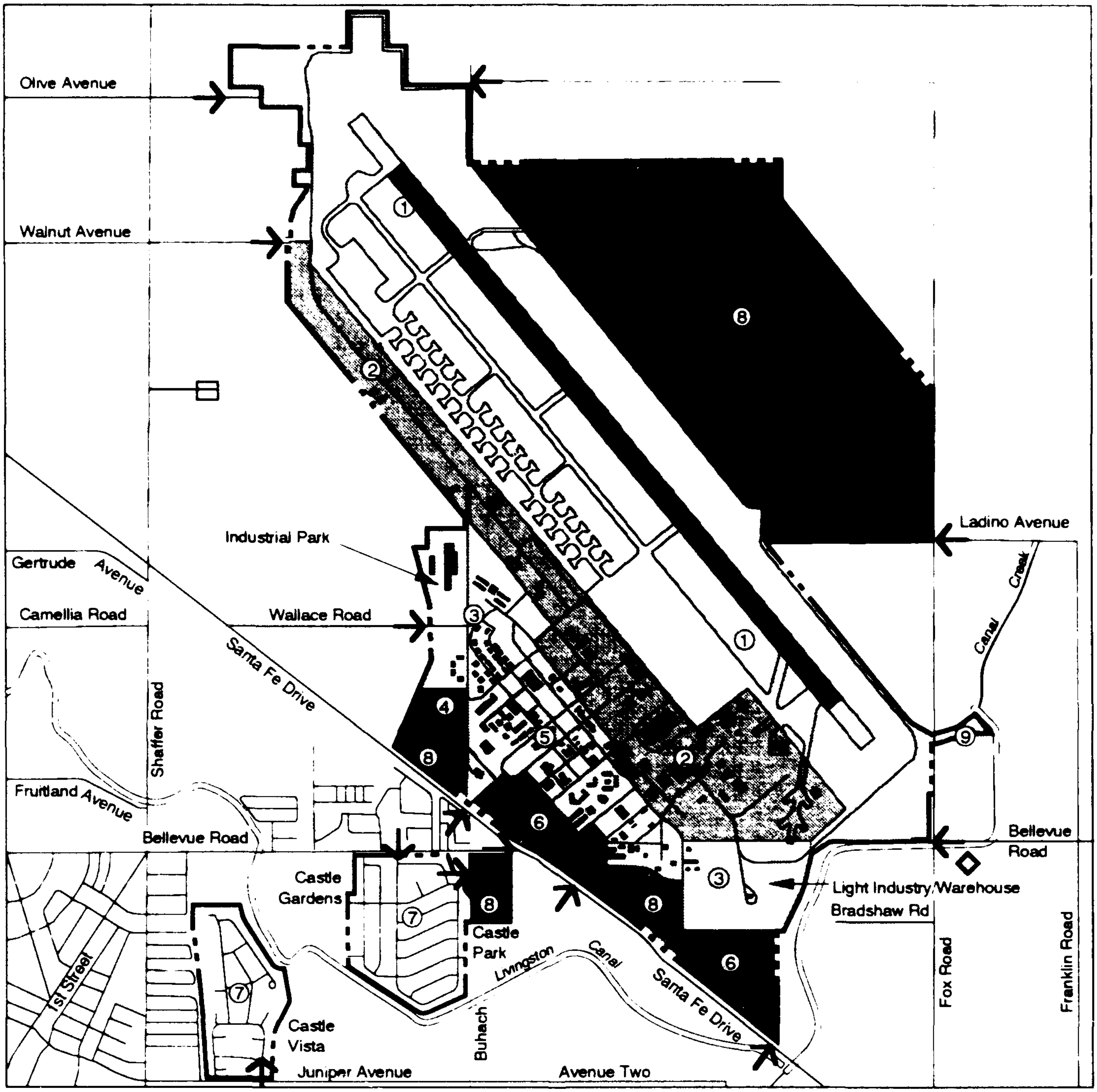
The airfield and aviation support areas comprise 1,419 acres, or over 51 percent of the base. Non-aviation land uses comprise the remaining 1,358 acres and include industrial, institutional (medical and educational), commercial, residential, public facilities/recreation, and agriculture. The total acreage of each land use category is shown in Table 2.3-11.

The following assumptions were used to develop data in support of the analysis for the Aviation with Mixed Use Alternative:

- Proposed land uses and associated acreages

- Anticipated building demolition and new construction

- Projected annual aircraft operations and fleet mix for a 20-year planning period



EXPLANATION

① Airfield	⑤ Institutional (Educational)	⑨ Agriculture
② Aviation Support	⑥ Commercial	⑩ Vacant Land *
③ Industrial	⑦ Residential	Base Boundary
④ Institutional (Medical)	⑧ Public Facilities/ Recreation	Access Points
		Runway

0 650 1300 2600 Feet

* This standard land use designation is not applicable to this figure.

Aviation with Mixed Use Alternative

Figure 2.3-5

Table 2.3-11. Land Use Acreage - Aviation with Mixed Use Alternative

Land Use	On-Base Acreage
Airfield	1,033
Aviation support	386
Industrial	206
Institutional	
Medical	20
Educational	115
Commercial	99
Residential	188
Public facilities/recreation	724
Agriculture	6
Total	2,777

- The percent of each land use component disturbed by construction, demolition, and reuse activities
- Project-related population, employment, traffic generation, and utility requirement projections to 2015
- Proposed roadway access points to the base
- The closure of Atwater Municipal Airport and the transfer of the majority of the general aviation operations to Castle AFB.

The amount of development, including existing facility demolition, facility retention, and new facility construction, for each land use under the Aviation with Mixed Use Alternative is provided in Table 2.3-12. Not all existing (retained) facilities would be fully utilized by 2015.

Table 2.3-13 summarizes acreage assumed to be disturbed by construction of facilities, infrastructure improvements, or other operational activities during each phase of development. The sections below describe activities associated with each land use category.

2.3.3.1 Airfield. The airfield includes 1,033 acres, or approximately 37 percent of the base acreage. It encompasses the same areas as in the Proposed Action: runways, taxiways, RPZs, and aprons. The airfield would be used primarily by transport category aircraft flown in for maintenance, and by general aviation aircraft.

A preliminary airport plan (Figure 2.3-6) for this alternative was developed by the Air Force. The airport plan characteristics (e.g., dimensions, separations, and clearances) were developed using the FAA Advisory

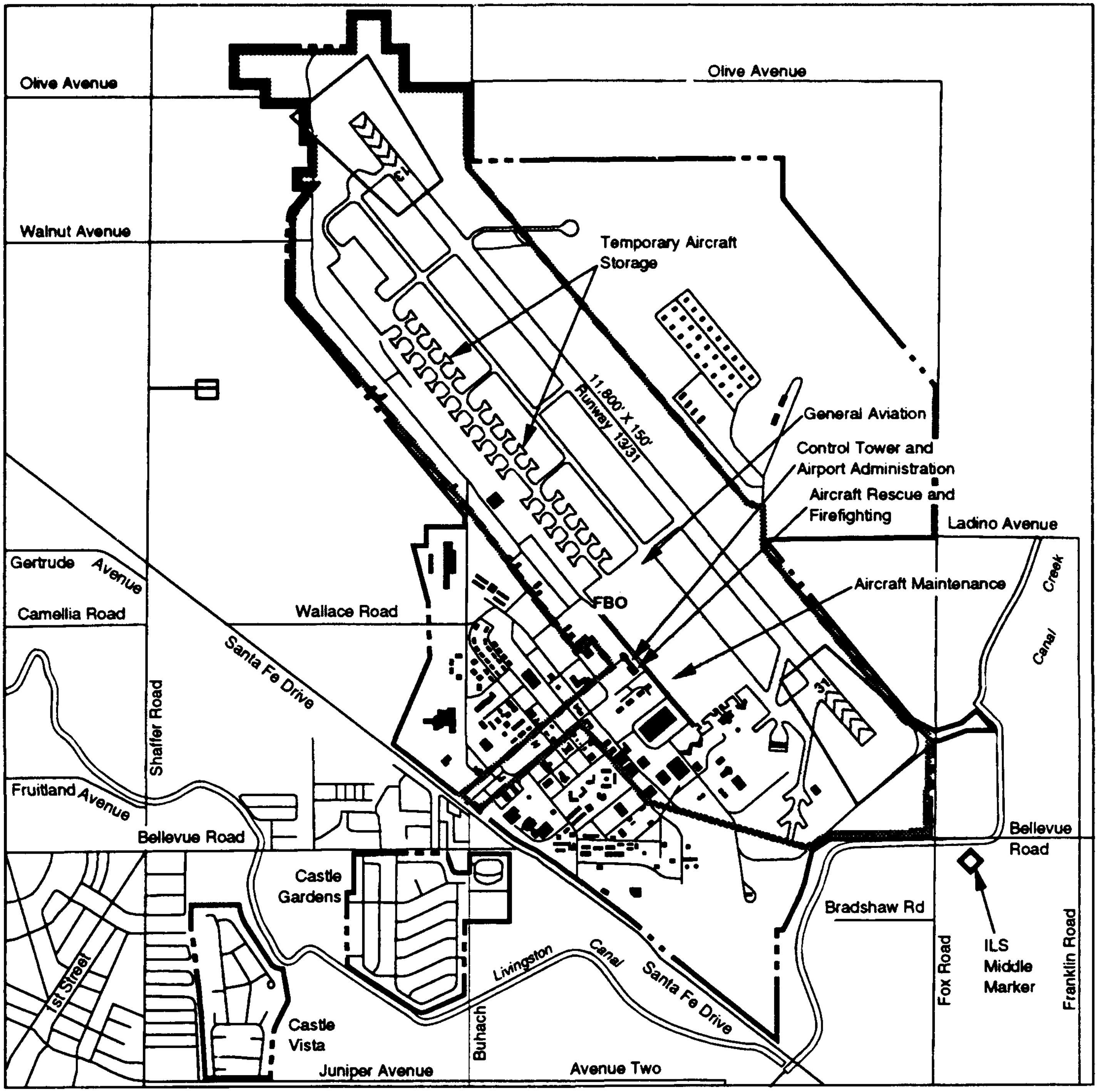
Table 2.3-12. Facility Development - Aviation with Mixed Use Alternative

Land Use	Existing Facility Demolition	Existing Facility Retention	New Facility Construction
	(in thousands of square feet of floor space)		
Airfield	0	0	0
Aviation support	365	587	197
Industrial	217	243	1,139
Institutional			
Medical	0	124	0
Educational	188	511	0
Commercial	73	191	115
Residential	119	1,006	0
Public facilities/ recreation	110	48	0
Agriculture	0	0	0
Total	1,072	2,710	1,451

Table 2.3-13. Acres Disturbed by the Aviation with Mixed Use Alternative

	Acres Disturbed (by phase)			
Land Use	1995-2000	2000-2005	2005-2015	Totals
Airfield	0	0	0	0
Aviation support	20	10	29	59
Industrial	11	19	46	76
Institutional				
Medical	0	0	0	0
Educational	8	8	16	32
Commercial	23	5	0	28
Residential	24	24	0	48
Public facilities/ recreation	117	0	0	117
Agriculture	0	0	0	0
Total	203	66	91	360

Circular 150/5300-13 to allow operation of all current commercial aircraft. Specific improvements for this alternative are the same as those for the Proposed Action except the hydrant fueling system would be closed in place.



EXPLANATION

Airport Boundary

FBO Fixed Base Operator

Airfield Pavement

Base Boundary

Runway Protection Zone

0 650 1300 2600 Feet

Preliminary Airport Plan-Aviation with Mixed Use Alternative

Figure 2.3-6

The central apron area would be used for large jet aircraft parking, based aircraft parking, and transient aircraft parking. The south end of the central apron area associated with the aircraft maintenance hangars would also be used for large aircraft maintenance or refurbishing. The northern apron area would be reserved for general aviation operations, including based aircraft tie-downs and future hangar construction, as applicable. A 1-acre parcel located south of Bellevue Road and east of Fox Road would be reused to site a navigational aid. The required improvements of the airfield would be similar to those described in the Proposed Action.

Projected airfield operations are provided in Table 2.3-14 for 2000, 2005, and 2015. Up to 95 percent of operations are expected to use Runway 31. Projected operations were generated within two categories: aircraft maintenance and general aviation. General aviation operations are expected to number about 32,500 annually in 2000, increasing to nearly 38,000 by 2015. Operations related to aircraft maintenance are expected to range from approximately 1,200 in 2000 to nearly 2,900 annual operations by 2015. All turbojet-powered aircraft are in compliance with the FAA's Stage 3 Noise Standards. For analytical purposes 78 percent of operations in 2000 and 2005 are projected to occur during daytime hours (7:00 a.m. to 6:00 p.m.), 20 percent are expected to occur during evening hours (6:00 p.m. to 10:00 p.m.), and 2 percent are expected to occur during nighttime hours (10:00 p.m. to 7:00 a.m.). By 2015, 78 percent of operations are projected to occur during daytime hours, 19 percent during evening hours, and 3 percent during nighttime hours.

2.3.3.2 Aviation Support. The proposed aviation support area covers 386 acres, or approximately 14 percent of the base. The aviation support area would include the control tower, aircraft rescue and fire station, hangars, aircraft maintenance facilities, fuel farm, engine test cells, and other aviation uses. An FBO is proposed for inclusion within the Aviation with Mixed Use Alternative. Aviation support functions are likely to include aircraft maintenance and general aviation support. The development of facilities and operations within the aviation support area included in the airport plan would be managed in accordance with FAA and state of California regulations.

Nearly 200,000 square feet of new construction are proposed, with development beginning in 1995 and continuing throughout the analysis period. The existing facilities (hangars, maintenance docks, and aircraft maintenance shops) would be suitable for reuse for large aircraft maintenance operations. Aviation support areas would be 60 percent developed by 2015.

2.3.3.3 Industrial. The industrial area comprises 206 acres, located in two areas northwest and southeast of the cantonment. The northwest area includes the new Civil Engineering complex and would be suitable for

Table 2.3-14. Projected Flight Operations - Aviation with Mixed Use Alternative

Year	Operations	Functions	%	Fleet Mix	Annual Operations
2000	Aircraft maintenance	Maintenance	84	747-400[a]	1,000
			8	MD-88[a]	100
			8	Fokker-100[a]	100
	General aviation	Private	83	Single-engine	26,950
			9	Multi-engine	3,000
			5	King Air	1,500
			3	Gulfstream IV	1,000
				Total	33,650
2005	Aircraft maintenance	Maintenance	74	747-400[a]	1,500
			13	MD-88[a]	250
			13	Fokker-100[a]	250
	General aviation	Private	81	Single-engine	27,800
			10	Multi-engine	3,600
			5	King Air	1,750
			4	Gulfstream IV	1,500
				Total	36,650
2015	Aircraft maintenance	Maintenance	70	747-400[a]	2,000
			18	MD-88[a]	500
			12	Fokker-100[a]	350
	General aviation	Private	73	Single-engine[a]	27,950
			13	Multi-engine	5,000
			7	King Air	2,500
			7	Gulfstream IV	2,500
				Total	40,800

Note: (a) Stage 3 aircraft.

development as an office/industrial park. Over half of this area would be available for new development, which would occur throughout the 20-year analysis period.

The southeastern area contains several facilities suitable for light industrial or warehousing reuse. However, most of the facilities would be demolished to allow new construction. This area would be developed with over 1.1 million square feet of new construction throughout the 20-year analysis period, beginning in 2000.

2.3.3.4 Institutional (Medical and Educational). The medical component occupies a 20-acre parcel on the western edge of the cantonment and includes the hospital and associated parking north and south of the facility. The hospital would be reused as a community medical facility.

The educational component in the Aviation with Mixed Use Alternative occupies 115 acres in the center of the cantonment, and includes the major training facilities, administrative offices, community service facilities, and most of the unaccompanied residential (dormitory) facilities. The types of educational uses would be similar to those described in the Proposed Action and would be 80 percent complete by 2015. No new construction is proposed.

2.3.3.5 Commercial. The commercial area in the Aviation with Mixed Use Alternative comprises 99 acres, and is located in two parcels fronting the north side of Santa Fe Drive. A retail complex would be developed, utilizing existing facilities including the Base Exchange and Commissary. This 25-acre parcel adjoins another area of equal size available for commercial development. The remaining commercial area in the extreme southern corner of the base would be reserved for a second retail center. Commercial areas would be 60 percent developed by 2015.

2.3.3.6 Residential. Residential land use in the Aviation with Mixed Use Alternative comprises 188 acres and is located in two areas: Castle Vista and Castle Gardens. Castle Vista would be reused for single-family housing. Castle Gardens would be converted into a cooperative housing complex for senior citizens. Housing units in both areas would be absorbed by 2005.

2.3.3.7 Public Facilities/Recreation. The public facilities/recreation land use component occupies 724 acres, or approximately 26 percent of the base, and is located in four areas. The largest area comprises 660 acres northeast of the airfield. Reuse of this area would be for passive outdoor recreation or open space conservation. The other three components are the gymnasium, the Castle Air Museum, and Castle Park. Reuse of these facilities would be similar to the Proposed Action. Differences include the absence of park blocks within the cantonment and a reduction in the size of the physical fitness and air museum components, which would be limited to existing developed facilities.

2.3.3.8 Agriculture. Six acres of existing farmland located east of Fox Road (across from the southern end of Runway 31) would be reused for agricultural purposes. Reuse of this parcel could begin immediately after base closure.

2.3.3.9 Employment and Population. The Aviation with Mixed Use Alternative would generate 4,225 new direct jobs on site by 2015. Employment effects are shown in Table 2.3-15.

Table 2.3-15. Total On-Site Employment and Population Effects - Aviation with Mixed Use Alternative

	Closure	2000	2005	2015
Direct employment	50	1,566	2,406	4,225
On-site population	NA	1,141	2,282	2,282

NA = Not applicable.

Projected employment would generate population changes in the area. By 2005, the on-site population is estimated to increase by 2,282 above the post-closure level. Population effects are shown in Table 2.3-15.

2.3.3.10 Transportation. The Aviation with Mixed Use Alternative would use the same access points as the Proposed Action.

Based on land use and employment projections, average daily vehicular traffic to and from the base would be approximately 36,050 trips by 2015. If needed, roads would be improved to meet level-of-service requirements.

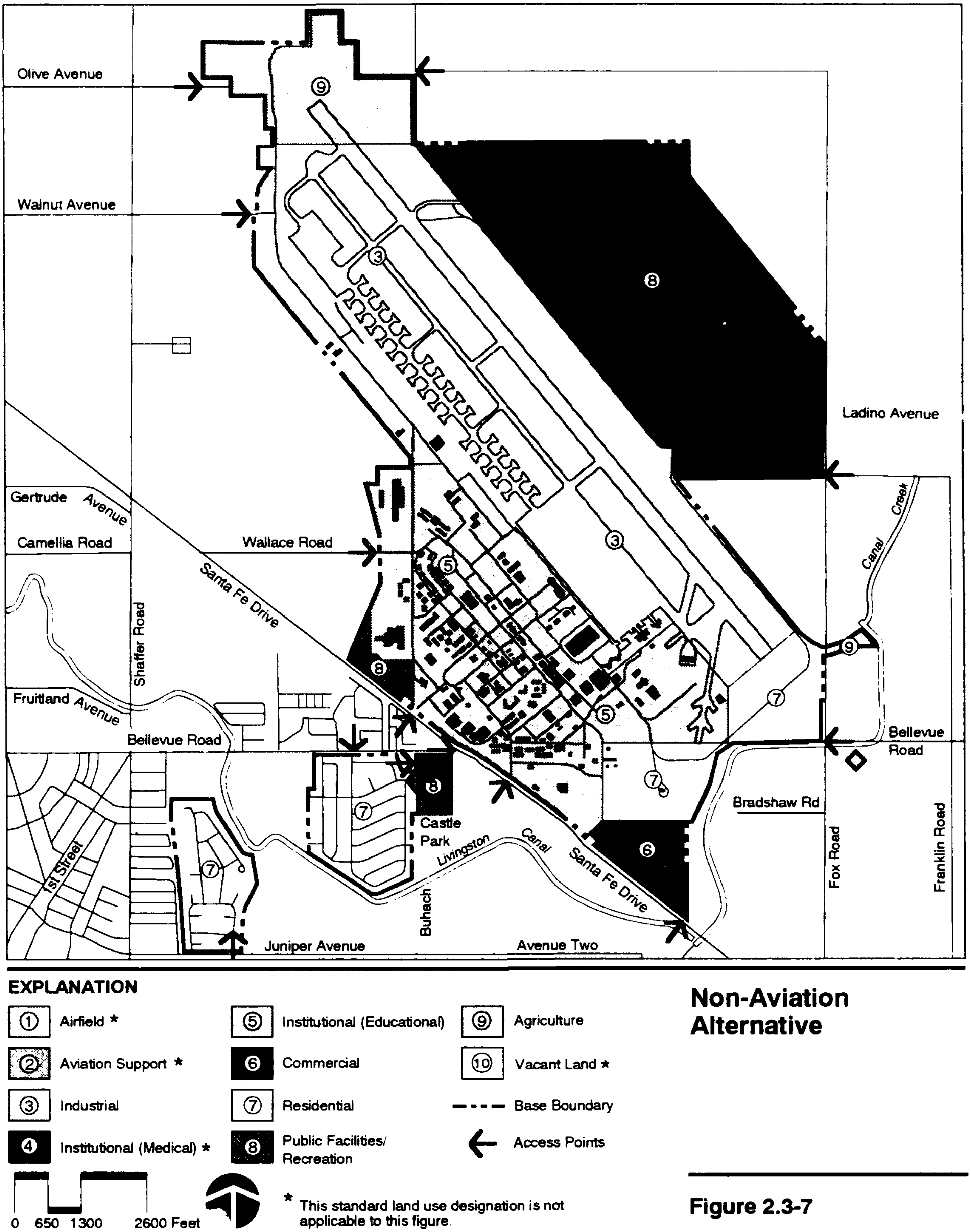
2.3.3.11 Utilities. By 2015, the projected activities associated with the Aviation with Mixed Use Alternative would generate the following on-base utility demands:

- Water - 0.93 MGD
- Wastewater - 0.37 MGD
- Solid waste - 15.4 tons/day
- Electricity - 104.5 MWH/day
- Natural gas - 3,183 therms/day.

The projected utility system would be identical to the Proposed Action. Some utility systems would be improved to provide adequate service to proposed new facilities.

2.3.4 Non-Aviation Alternative

The Non-Aviation Alternative (Figure 2.3-7) focuses on a major educational campus, coupled with extensive research and development-oriented industrial land uses occupying the former airfield. Multi-family residential housing would occupy two unpaved areas south and southeast of the former runway. An estimated 2.5 million square feet of existing facilities would be reused and over 2.5 million square feet of new construction are proposed. The total acreage of each land use category is shown in Table 2.3-16.



Non-Aviation Alternative

Figure 2.3-7

Table 2.3-16. Land Use Acreage - Non-Aviation Alternative

Land Use	On-Base Acreage
Industrial	991
Institutional	
Educational	545
Commercial	47
Residential	333
Public facilities/recreation	696
Agriculture	165
Total	2,777

The assumptions used to develop data in support of the analysis for the Non-Aviation Alternative are similar to those for the Aviation with Mixed Use Alternative, excluding aviation-related assumptions:

- Proposed land uses and associated acreages
- Anticipated building demolition and new construction
- The percent of each land use component disturbed by construction, demolition, and reuse activities
- Proposed roadway access points to the base
- Project-related population, employment, traffic generation, and utility requirement projections to 2015.

The amount of development, including existing facility demolition, facility retention, and new facility construction, for each land use under the Non-Aviation Alternative is provided in Table 2.3-17. Not all existing (retained) facilities would be fully utilized by 2015.

Table 2.3-18 summarizes acreage assumed to be disturbed by construction of facilities, infrastructure improvements, or other operational activities during each phase of development. The sections below describe activities associated with each land use category.

2.3.4.1 Industrial. The industrial component comprises 991 acres, or nearly 36 percent of the base, and includes most of the former airfield and aviation-related features. Proposed land use would be laboratory-related agricultural research and development, including products, crops, and evaluations of methodologies. New development would occur after 2000 and continue throughout the 20-year analysis period. The industrial component contains 300,000 square feet of existing facilities suitable for light industrial, research and development, or warehousing reuse. An

Table 2.3-17. Facility Development - Non-Aviation Alternative

Land Use	Existing Facility Demolition	Existing Facility Retention	New Facility Construction
	(in thousands of square feet of floor space)		
Industrial	70	300	360
Institutional			
Educational	989	1,142	960
Commercial	0	0	200
Residential	125	1,006	1,015
Public facilities/ recreation	108	42	0
Agriculture	0	0	0
Total	1,292	2,490	2,535

Table 2.3-18. Acres Disturbed by the Non-Aviation Alternative

	Acres Disturbed (by phase)			
Land Use	1995-2000	2000-2005	2005-2015	Total
Industrial	0	72	96	168
Institutional				
Educational	24	97	73	194
Commercial	0	38	0	38
Residential	19	0	58	77
Public facilities/ recreation	25	0	0	25
Agriculture	142	0	0	142
Total	210	207	227	644

estimated 360,000 square feet of new industrial facilities are proposed to be developed by 2015, representing 30 percent of the potential development of this area.

2.3.4.2 Institutional (Educational). The educational component of the Non-Aviation Alternative comprises 545 acres, or nearly 20 percent of the base, and occupies the entire cantonment and many of the flightline facilities. Proposed reuse as a major campus for higher education would incorporate the aviation training facilities, administrative offices, community service facilities, industrial support facilities, the hospital, and all of the unaccompanied residential facilities. The types of educational uses would typify a University of California campus and/or a consortium of public and private educational institutions. Approximately 960,000 square feet of new construction are proposed within this land use by 2015, representing 80 percent of the potential development within this area.

2.3.4.3 Commercial. The commercial area in the Non-Aviation Alternative comprises 47 acres, or nearly 2 percent of the base, and is located in an undeveloped parcel in the extreme southern portion of the base. The proposed use is for a retail complex to be developed in the 2005 to 2015 period. Approximately 200,000 square feet of new construction is proposed.

2.3.4.4 Residential. The residential area in the Non-Aviation Alternative totals 333 acres, or nearly 12 percent of the base, and consists of single-family and multi-family housing. The single-family portion would be identical to that described in the Proposed Action. The multi-family portion would occupy vacant land south of the alert area and in the southeast clear zone (CZ) of the former military airfield. Demolition of facilities in these areas would make way for over 1 million square feet of residential space by 2015, which would follow the development of industrial and institutional (educational) land uses nearby. Approximately 70 percent of the new residential development is expected to occur during the 20-year analysis period, with development beginning in 1995.

2.3.4.5 Public Facilities/Recreation. The public facilities/recreation land occupies 696 acres, or approximately 25 percent of the base, in three areas. The largest area comprises 660 acres northeast of the airfield. The other two areas are the Castle Air Museum and Castle Park. Reuse would be similar to that proposed for the Aviation with Mixed Use Alternative.

2.3.4.6 Agriculture. In addition to research conducted within the industrial component of this alternative, a 158-acre area in the northern portion of the base would be used for agricultural research, such as the growing of experimental crops. Two other parcels, a 6-acre area east of Fox Road and north of Bellevue Road and a 1-acre parcel south of Bellevue Road, would be reused for agricultural purposes.

2.3.4.7 Employment and Population. The Non-Aviation Alternative would generate 2,700 new direct jobs on site by 2015. Employment effects are shown in Table 2.3-19.

Table 2.3-19. Total On-Site Employment and Population Effects - Non-Aviation Alternative

	Closure	2000	2005	2015
Direct employment	50	291	1,739	2,700
On-site population	NA	1,783	1,783	3,126

NA = Not applicable.

Projected employment would generate population changes in the area. An on-site population increase of 3,126 above post-closure conditions is estimated by 2015. Population effects are shown in Table 2.3-19.

2.3.4.8 Transportation. The Non-Aviation Alternative would use the same access points as the Proposed Action.

Based on land use and employment projections, average daily vehicular traffic to and from the base would be approximately 34,750 trips by 2015. If needed, roads would be improved to meet level-of-service requirements.

2.3.4.9 Utilities. By 2015, the projected activities associated with the Non-Aviation Alternative would generate the following on-base utility demands:

- Water - 1.02 MGD
- Wastewater - 0.41 MGD
- Solid waste - 15.7 tons/day
- Electricity - 105.3 MWH/day
- Natural gas - 3,263 therms/day.

Some utility systems would be improved to provide adequate service to proposed new facilities.

2.3.5 No-Action Alternative

The No-Action Alternative would result in the U.S. government retaining ownership of the property after base closure. The base would be preserved, i.e., placed in a condition intended to limit deterioration and ensure public safety. Caretaker activities would consist of base resource protection, grounds maintenance, existing utilities, operations as necessary, and building care. No other military activities/missions are anticipated to be performed on the property.

The future land uses and levels of maintenance would be as follows:

- Maintain structures to limit deterioration.

- Isolate or deactivate utility distribution lines on base.

- Provide limited maintenance of roads to ensure access.

- Provide limited grounds maintenance of open areas to eliminate fire, health, and safety hazards.

2.3.6 Other Land Use Concepts

In compliance with the Federal Property and Administrative Services Act of 1949, the Air Force solicited proposals from other federal agencies regarding their interest in acquiring any lands or facilities identified for disposal at Castle AFB. Responses included one proposal for direct federal use, and one sponsorship of a local governmental program. The two major independent proposals analyzed are:

- Federal correctional complex
- Trapshooting and recreational gun club.

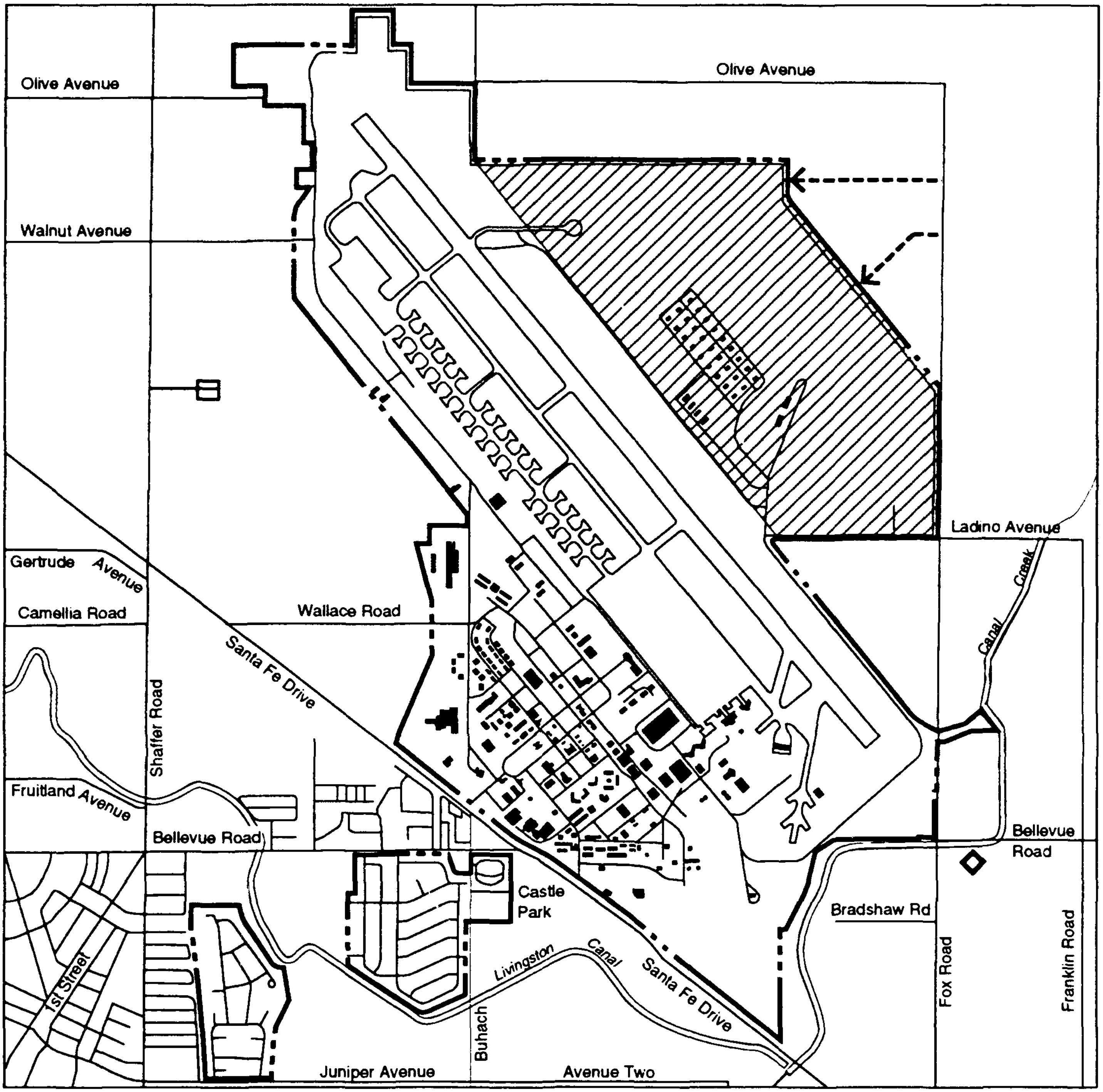
This section describes land use concepts that are not part of any integrated reuse plan, but could be initiated on an individual basis. They are independent of one another and could be implemented individually or in combination with any one of the reuse alternatives, including the Proposed Action.

Federal Correctional Complex. The Federal Bureau of Prisons has requested approximately 660 acres, or nearly 24 percent of the base acreage, for the development of a correctional complex consisting of a minimum of two separate facilities (Figure 2.3-8). Construction of the correctional complex may occur in two phases. The first phase would occur in the first 5 years after closure (1995-2000) and would be contained within a 462-acre area in the northern portion of the undeveloped area east of the runway. The second phase could occur concurrently or sometime thereafter and would involve the remaining 198 acres of the 660-acre parcel. For analysis purposes, it has been assumed that the second phase would be completed in the 2005-2015 time period.

The federal correctional complex would occupy the largely undeveloped portion of the base northeast of the airfield, containing the WSA, small arms and grenade ranges, and the EOD Range. No existing facilities would be demolished. The WSA storage bunkers would be reused or included as part of a buffer area surrounding the prison complex.

The correctional complex would include administrative, maintenance and personnel support, education, recreation, and residential land use components. Facilities would consist of one- and two-story buildings sited within a fenced compound and a surrounding buffer zone. Each of the two 388,000-square foot facilities would house approximately 1,600 inmates. Combined employment for both facilities is estimated at 450 full-time employees.

Two new access points would be required via Fox Road from the east. Based on land use and employment projections, average daily vehicular



EXPLANATION

Federal Correctional Complex

Base Boundary

Proposed Access Points

0 650 1300 2600 Feet

Other Land Use Concept - Federal Correctional Complex

Figure 2.3-8

traffic to and from the federal correctional complex would be approximately 1,200 trips by 2015. If needed, roads would be improved to meet level-of-service requirements.

Of the total 660 acres dedicated for use as federal correctional facilities within this land use, 248 acres would be disturbed due to construction, infrastructure improvements, and operational activities.

By 2015, the projected activities associated with the federal correctional facilities would generate the following on-base utility demands:

- Water - 0.7 MGD
- Wastewater - 0.6 MGD
- Solid waste - 6.4 tons/day
- Electricity - 85 MWH/day
- Natural gas - 1,000 therms/day.

Improvements to utility systems would be required to provide adequate service to proposed new facilities.

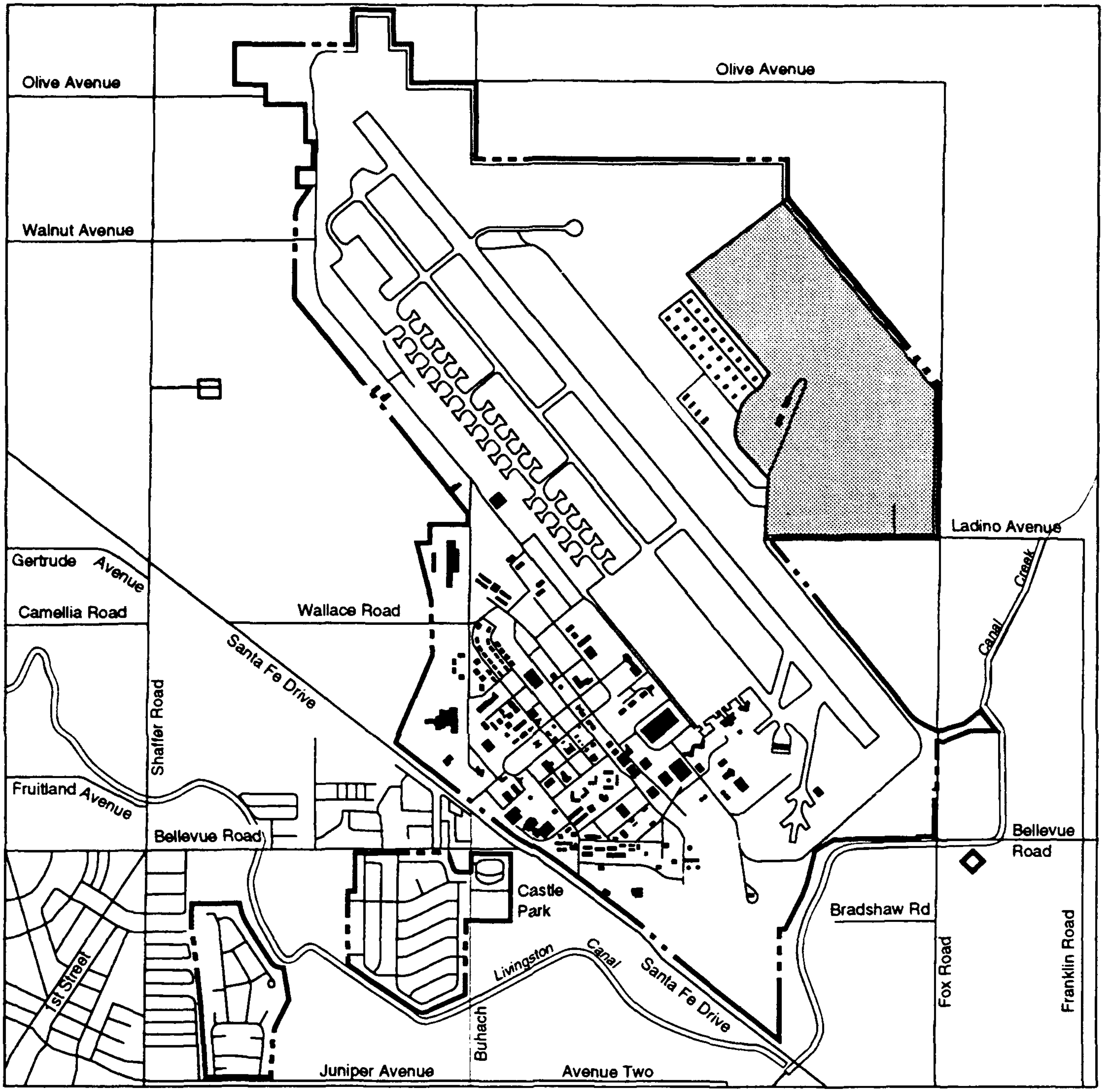
Private Recreational Facility. The California Golden State Trapshooting Association (CGSTA) has proposed an extensive trapshooting range and gun club to occupy 325 acres east of the airfield (Figure 2.3-9). Proposed uses would include private use for trapshooting and other shooting events sponsored by the CGSTA and a recreational vehicle park. Many of the existing facilities could be reused; little demolition and an estimated 10,000 square feet of new construction are proposed. It is estimated that the club would employ 10 full-time employees and 175 temporary employees during peak (event) periods, which could occur up to 9 times per year.

Access to the site would be provided from Ladino Avenue. Based on land use and employment projections, average daily vehicular traffic to and from the CGSTA would be approximately 460 trips by 2015 and approximately 2,850 trips during special events. Road improvements, if needed, would be accomplished to meet level-of-service requirements.

The areas within the CGSTA land use concept assumed to be disturbed by construction of facilities, infrastructure improvements, or other operational activities are 135 acres for the 1995-2000 period. Operational activities would add an additional 80 acres of disturbance, for a total of 215 disturbed acres in the 20-year analysis period.

By 2015, the projected activities associated with the CGSTA would generate the following on-base utility demands:

- Water - 0.03 MGD (average); 0.09 MGD (peak)
- Wastewater - 0.01 MGD; 0.05 MGD (peak)



EXPLANATION

California Golden State Trapshooters Association

Base Boundary

0 650 1300 2600 Feet

Other Land Use Concept - California Golden State Trapshooters Association

Figure 2.3-9

- Solid waste - 0.39 tons/day; 2.24 tons/day (peak)
- Electricity - 0.75 MWH/day; 1.08 MWH/day (peak)
- Natural gas - 19 therms/day; 19 therms/day (peak).

Water would be supplied by existing wells. Wastewater will be connected to new lines provided to the area, or an independent treatment system would be installed. Propane tanks may be used in place of natural gas for CGSTA buildings.

2.4 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

All reuse proposals submitted for Castle AFB were either addressed as individual land use concepts or fell within the context of the reuse alternatives described previously. In addition to reuse proposals received, the Air Force identified potential reuse alternatives that would be reasonable for Castle AFB.

In a letter dated November 7, 1994, the FAA suggested that the Commercial Aviation Alternative be revised to incorporate the construction of a parallel runway, as indicated in the CJPA ALP. Analysis of the proposed runway was not included in the FEIS because: (1) the proposed airfield runway system is adequate to meet the needs of the number of aircraft operations and fleet mix presented in the alternative, and (2) due to the receipt of this request late in the EIS process, such revisions would have severely impacted the scheduled FEIS publication date.

2.5 INTERIM USES

Interim uses include predisposal short-term uses of the base facilities and property. Predisposal interim uses are conducted under lease agreements with the U.S. government. The terms and conditions of each lease will be arranged to ensure that the predisposal interim uses do not prejudice future disposal and reuse plans of the base. The continuation of interim uses beyond disposal would be arranged through agreements with the new property owner(s).

A zero baseline representing conditions at the point of closure is used for the environmental analysis. Predisposal interim uses are not considered in the baseline conditions used for the environmental analysis because the baseline captures the future conditions at the point of closure and does not presuppose a decision of continued interim uses at that time.

2.6 OTHER FUTURE ACTIONS IN THE REGION

No reasonable foreseeable actions were identified that could be considered as contributing to a potential cumulative impact on the disposal and reuse of Castle AFB.

One future action has been identified that may result in cumulative environmental impacts in combination with reuse of Castle AFB. Under the DBCRA of 1990, the Navy will be relocating aircraft, equipment, and personnel from NAS Miramar, in San Diego, California, to Naval Air Station Lemoore, approximately 40 miles south of Fresno, California, and 90 miles southeast of Castle AFB. The Navy proposes to establish a Military Operations Area and two ATC Assigned Areas (ATCAAs) above Naval Air Station Lemoore to support the approximately 2,300 training sorties by F/A-18 aircraft associated with this realignment. Construction of support facilities at NAS Lemoore is scheduled to begin in FY 1995 to support initiation of flying activities in the new Military Operations Area and ATCAAs in 1997; construction will continue into 1998. A potential for cumulative air quality impacts (see Section 4.4.3) has been identified as a result of Naval realignment activities at NAS Lemoore in combination with proposed reuse activities at Castle AFB. The Navy requested that Air Force consider transferring conformity offsets resulting from the closure of Castle AFB in a letter dated April 8, 1994 (Appendix K).

2.7 COMPARISON OF ENVIRONMENTAL IMPACTS

A summary comparison of the influencing factors and environmental impacts and potential mitigations for each biophysical resource affected by the Proposed Action and alternatives over the 20-year study period is presented in Tables 2.7-1 and 2.7-2. Impacts for air quality are summarized over a 10-year period due to the speculative nature of predicting pollutant emissions and concentrations far into the future under changing regulatory and climatic conditions (see Section 4.4.3). Table 2.7-2 also includes a summary of closure baseline conditions to provide a basis for comparison of reuse-related changes and associated impacts. Influencing factors are non-biophysical elements, such as population, employment, land use, aesthetics, public utility systems, and transportation networks that directly impact the environment. These activities have been analyzed to determine their effects on the environment. Impacts to the environment are described briefly in the summary and discussed in detail in Chapter 4. Table 2.7-3 presents environmental impacts of other land use concepts.

Table 2.7-1. Summary of Reuse-Related Influencing Factors

Factor	Proposed Action			Castle Aviation Center Alternative			Commercial Aviation Alternative			Aviation with Mixed Use Alternative			Non-Aviation Alternative			No-Action Alternative[a]
	2000	2005	2015	2000	2005	2015	2000	2005	2015	2000	2005	2015	2000	2005	2015	
Ground Disturbance (acres, by phase)	215	148	87	119	27	0	160	111	198	203	66	91	210	207	227	No change
Aircraft Operations (annual)	102,384	106,530	115,319	7,348	8,894	11,110	176,926	192,890	234,437	33,650	36,650	40,800	0	0	0	No change
Direct Employment	2,447	3,322	3,824	4,560	6,150	6,150	1,232	2,350	4,001	1,516	2,356	4,175	241	1,689	2,650	50
Secondary Employment	1,414	2,011	2,427	3,210	4,404	4,404	765	1,444	2,697	895	1,480	2,880	199	839	1,451	12
Population Increase	3,335	4,842	6,114	6,445	9,142	9,979	1,666	3,379	6,373	2,078	3,430	6,708	282	2,366	4,105	No change
Traffic (average daily vehicular traffic)	28,700	38,250	39,800	42,900	47,700	47,700	24,400	44,300	54,200	21,950	30,450	36,050	11,700	24,650	34,750	500
Increase in Water Consumption (MGD)	0.79	1.16	1.41	1.48	2.16	2.34	0.37	0.74	1.38	0.46	0.75	1.41	0.25	0.72	1.18	No change
Increase in Wastewater Treatment (MGD)	0.33	0.49	0.59	0.63	0.95	1.02	0.13	0.28	0.55	0.18	0.30	0.58	0.08	0.29	0.50	No change
Increase in Solid Waste Disposal (tons/day)	11.8	15.1	17.9	18.3	27.4	28.6	4.5	9.0	16.4	6.8	9.3	17.3	4.9	10.4	17.1	No change
Increase in Electricity Consumption (MWH/day)	38.9	73.5	94.7	79.2	126.0	135.6	12.8	46.2	110.7	16.1	44.2	112.7	1.9	45.2	97.3	No change
Increase in Natural Gas Consumption (therms/day)	2,200	3,600	4,600	4,300	6,500	7,100	900	2,500	5,300	1,100	2,300	5,200	200	2,100	4,100	No change

Note: (a) The No-Action Alternative summarizes influencing factors relative to the closure baseline conditions.
MGD = Million gallons per day.
MWH = Megawatt-hours.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 1 of 14

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Local Community						
• Land Use and Aesthetics	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts
	Local general plans would require updating. Planned reuses conflict with local zoning ordinances	Local general plans would require updating. Planned reuses conflict with local zoning ordinances	Local general plans would require updating. Planned reuses conflict with local zoning ordinances	Local general plans would require updating. Planned reuses conflict with local zoning ordinances	Local general plans would require updating. Planned reuses conflict with local zoning ordinances	Local general plans would require updating. No change from closure
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	
	Local jurisdictions would revise general plans and zoning ordinances to reflect reuse	Local jurisdictions would revise general plans and zoning ordinances to reflect reuse	Local jurisdictions would revise general plans and zoning ordinances to reflect reuse	Local jurisdictions would revise general plans and zoning ordinances to reflect reuse	Local jurisdictions would revise general plans and zoning ordinances to reflect reuse	
• Transportation	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Increase of 39,800 daily trips from closure. Six new base-access points provided. Reuse-generated traffic would deteriorate SH 99 to an unacceptable LOS by 2008, Santa Fe Drive by 2001, and Bellevue Road by 2011	Increase of 47,700 daily trips from closure. Six new base-access points provided. Reuse-generated traffic would deteriorate SH 99 to an unacceptable LOS by 2007, Santa Fe Drive by 2000, and Bellevue Road by 2004	Increase of 54,200 daily trips from closure. Six new base-access points provided. Reuse-generated traffic would deteriorate SH 99 to an unacceptable LOS by 2008, Santa Fe Drive by 2002, and Bellevue Road by 2008	Increase of 38,050 daily trips from closure. Six new base-access points provided. Reuse-generated traffic would deteriorate SH 99 to an unacceptable LOS by 2008, Santa Fe Drive by 2003, and Bellevue Road by 2010	Increase of 34,750 daily trips from closure. Six new base-access points provided. Reuse-generated traffic would deteriorate SH 99 to an unacceptable LOS by 2009, Santa Fe Drive by 2008, and Bellevue Road by 2012	No changes in base-related traffic. SH 99 and Santa Fe Road would deteriorate to an unacceptable LOS by 2010

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
LOS = Level of Service.
SH = State Highway.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
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Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Local Community (Continued)						
• Transportation (Continued)	Increase of 115,319 annual aircraft operations. No airspace conflicts or air transportation impacts	Increase of 11,110 annual aircraft operations. No airspace conflicts or air transportation impacts	Increase of 234,437 annual aircraft operations. No airspace conflicts or air transportation impacts	Increase of 40,800 annual aircraft operations. No airspace conflicts or air transportation impacts	No aircraft operations	No aircraft operations
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	Develop road improvements and traffic management programs	Develop road improvements and traffic management programs	Develop road improvements and traffic management programs	Develop road improvements and traffic management programs	Develop road improvements and traffic management programs	Develop program for improvements to SH 99
• Utilities Use	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Up to 4 percent increase in ROI utility use. Current systems, with planned improvements, would be able to accommodate increased demands. Interconnection required to provide service to on-base users. Pretreatment of industrial wastewater may be required	Up to 7 percent increase in ROI utility use. Current systems, with planned improvements, would be able to accommodate increased demands. Interconnection required to provide service to on-base users. Pretreatment of industrial wastewater may be required	Up to 4 percent increase in ROI utility use. Current systems, with planned improvements, would be able to accommodate increased demands. Interconnection required to provide service to on-base users. Pretreatment of industrial wastewater may be required	Up to 5 percent increase in ROI utility use. Current systems, with planned improvements, would be able to accommodate increased demands. Interconnection required to provide service to on-base users. Pretreatment of industrial wastewater may be required	Up to 4 percent increase in ROI utility use. Current systems, with planned improvements, would be able to accommodate increased demands. Interconnection required to provide service to on-base users. Pretreatment of industrial wastewater may be required	No changes in base-related utility use

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
ROI = Region of Influence.
SH = State Highway.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
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Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management						
• Hazardous Materials Management	• Impacts: Similar types and an increase in quantities of materials used. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Similar types and an increase in quantities of materials used. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Similar types and an increase in quantities of materials used. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Similar types and quantities of materials used. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Similar types and quantities of materials used. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: No change in types and quantities used
	• Mitigation: Establish cooperative planning body	• Mitigation: Establish cooperative planning body	• Mitigation: Establish cooperative planning body	• Mitigation: Establish cooperative planning body	• Mitigation: Establish cooperative planning body	
• Hazardous Waste Management	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts	• Impacts: No change in quantities generated

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 4 of 14

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)						
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	
	Collection of hazardous household products; educational programs on recycling, waste minimization, waste disposal	Collection of hazardous household products; educational programs on recycling, waste minimization, waste disposal	Collection of hazardous household products; educational programs on recycling, waste minimization, waste disposal	Collection of hazardous household products; educational programs on recycling, waste minimization, waste disposal	Collection of hazardous household products; educational programs on recycling, waste minimization, waste disposal	
• Installation Restoration Program	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Possible redevelopment delays and land use restrictions due to remediation	Possible redevelopment delays and land use restrictions due to remediation	Possible redevelopment delays and land use restrictions due to remediation	Possible redevelopment delays and land use restrictions due to remediation	Possible redevelopment delays and land use restrictions due to remediation	IRP remediation activities continued as needed
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	
	Coordination between OL and planning agencies to address potential problems. Close out IRP sites. Reuse sites as open space	Coordination between OL and planning agencies to address potential problems. Close out IRP sites. Reuse sites as open space	Coordination between OL and planning agencies to address potential problems. Close out IRP sites. Reuse sites as open space	Coordination between OL and planning agencies to address potential problems. Close out IRP sites. Reuse sites as open space	Coordination between OL and planning agencies to address potential problems. Close out IRP sites. Reuse sites as open space	

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
IRP = Installation Restoration Program.
OL = Operating Location.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
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Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)						
• Storage Tanks	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Storage tanks required by new owner/operator would be subject to all regulations to avoid unacceptable impacts	Storage tanks required by new owner/operator would be subject to all regulations to avoid unacceptable impacts	Storage tanks required by new owner/operator would be subject to all regulations to avoid unacceptable impacts	Storage tanks required by new owner/operator would be subject to all regulations to avoid unacceptable impacts	Storage tanks required by new owner/operator would be subject to all regulations to avoid unacceptable impacts	Storage tanks would be removed or maintained in place according to required standards
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	Coordinate use of tanks with planning agencies to ensure tank and piping integrity is maintained	Coordinate use of tanks with planning agencies to ensure tank and piping integrity is maintained	Coordinate use of tanks with planning agencies to ensure tank and piping integrity is maintained	Coordinate use of tanks with planning agencies to ensure tank and piping integrity is maintained	Coordinate use of tanks with planning agencies to ensure tank and piping integrity is maintained	None required
• Asbestos	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Pending survey results	Pending survey results	Pending survey results	Pending survey results	Pending survey results	Continued management of asbestos in accordance with Air Force policy
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos would be managed in place	Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos would be managed in place	Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos would be managed in place	Removal and disposal of asbestos in facilities to be renovated. Remaining asbestos would be managed in place	Removal and disposal of asbestos in facilities to be renovated. Remaining asbestos would be managed in place	None required

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 6 of 14

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)						
• Pesticide Usage	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptable impacts	Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptable impacts	Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptable impacts	Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptable impacts	Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptable impacts	No change in usage or management practices
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	None required	None required	None required	None required	None required	None required
• Polychlorinated Biphenyls	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	No Air Force owned PCB or PCB-contaminated equipment exists on base	No Air Force owned PCB or PCB-contaminated equipment exists on base	No Air Force owned PCB or PCB-contaminated equipment exists on base	No Air Force owned PCB or PCB-contaminated equipment exists on base	No Air Force owned PCB or PCB-contaminated equipment exists on base	No Air Force owned PCB or PCB-contaminated equipment exists on base
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	None required	None required	None required	None required	None required	None required

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
FIFRA = Federal Insecticide, Fungicide, and Rodenticide Act.
PCB = Polychlorinated biphenyl.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 7 of 14

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)						
• Radon	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	No impact. Current radon levels below 4 pCi/l	No impact. Current radon levels below 4 pCi/l	No impact. Current radon levels below 4 pCi/l	No impact. Current radon levels below 4 pCi/l	No impact. Current radon levels below 4 pCi/l	No impact. Current radon levels below 4 pCi/l
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	None required	None required	None required	None required	None required	None required
• Medical/Biohazardous Waste	• *Impacts:*	• *Impacts:*	• *Impacts:*	• *Impacts:*	• *Impacts:*	• *Impacts:*
	Amounts generated by civilian medical facility would be similar to preclosure levels. Proper management under applicable regulations *would avoid* unacceptable impacts	Amounts generated by civilian medical facility would be similar to preclosure levels. Proper management under applicable regulations *would avoid unacceptable* impacts	Amounts generated by civilian medical facility would be similar to preclosure levels. Proper management under applicable *regulations would avoid* unacceptable impacts	Amounts generated by civilian medical facility would be similar to preclosure levels. Proper management under applicable *regulations would avoid* unacceptable impacts	Amounts generated by civilian medical facility would be similar to preclosure levels. Proper management under applicable regulations *would avoid* unacceptable impacts	Wastes would not be generated
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	None required	None required	None required	None required	None required	None required
• Ordnance	• No impact	• No impact	• No impact	• No impact	• No impact	• No impact
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	None required	None required	None required	None required	None required	None required

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
pCi/l = Picocuries per liter.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 8 of 14

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment						
• Soils and Geology	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Minor erosion effects from 450 acres of ground disturbance	Minor erosion effects from 146 acres of ground disturbance	Minor erosion effects from 469 acres of ground disturbance	Minor erosion effects from 360 acres of ground disturbance	Minor erosion effects from 644 acres of ground disturbance	No ground disturbance
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	Use techniques such as protective cover and diversion dikes to minimize erosion during and after construction	Use techniques such as protective cover and diversion dikes to minimize erosion during and after construction	Use techniques such as protective cover and diversion dikes to minimize erosion during and after construction	Use techniques such as protective cover and diversion dikes to minimize erosion during and after construction	Use techniques such as protective cover and diversion dikes to minimize erosion during and after construction	None required
• Water Resources	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Disturbance and development of 450 acres could affect surface water flow and water quality	Disturbance and development of 146 acres could affect surface water flow and water quality	Disturbance and development of 469 acres could affect surface water flow and water quality	Disturbance and development of 360 acres could affect surface water flow and water quality	Disturbance and development of 644 acres could affect surface water flow and water quality	No ground disturbance. No change in water demand
	2.7 percent increase in ROI water demand would not affect water supply but could contribute to an incremental increase in aquifer depletion	4.5 percent increase in ROI water demand would not affect water supply but could contribute to an incremental increase in aquifer depletion	2.6 percent increase in ROI water demand would not affect water supply but could contribute to an incremental increase in aquifer depletion	2.7 percent increase in ROI water demand would not affect water supply but could contribute to an incremental increase in aquifer depletion	2.2 percent increase in ROI water demand would not affect water supply but could contribute to an incremental increase in aquifer depletion	

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
ROI = Region of Influence.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 9 of 14

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment (Continued)						
• Water Resources (Continued)	• Mitigation: Use of proper construction techniques, control of site runoff, minimizing surface disturbance and length of exposure time. Compliance with NPDES and local permit requirements for storm water runoff	• Mitigation: Use of proper construction techniques, control of site runoff, minimizing surface disturbance and length of exposure time. Compliance with NPDES and local permit requirements for storm water runoff	• Mitigation: Use of proper construction techniques, control of site runoff, minimizing surface disturbance and length of exposure time. Compliance with NPDES and local permit requirements for storm water runoff	• Mitigation: Use of proper construction techniques, control of site runoff, minimizing surface disturbance and length of exposure time. Compliance with NPDES and local permit requirements for storm water runoff	• Mitigation: Use of proper construction techniques, control of site runoff, minimizing surface disturbance and length of exposure time. Compliance with NPDES and local permit requirements for storm water runoff	• Mitigation: None required
• Air Quality	• **Reuse-Related Impacts:** (Without consideration of conformity offset allocations to other actions in the region [cumulative impacts]) Increase in reuse-related emissions in 2005: ROG: 1.52 tons/day NO_x: 4.41 tons/day PM_{10}: 3.86 tons/day SO_2: 0.52 ton/day CO: 16.38 tons/day	• **Reuse-Related Impacts:** (Without consideration of conformity offset allocations to other actions in the region [cumulative impacts]) Increase in reuse-related emissions in 2005: ROG: 2.91 tons/day NO_x: 3.27 tons/day PM_{10}: 7.58 tons/day SO_2: 0.86 ton/day CO: 30.94 tons/day	• **Reuse-Related Impacts:** (Without consideration of conformity offset allocations to other actions in the region [cumulative impacts]) Increase in reuse-related emissions in 2005: ROG: 1.12 tons/day NO_x: 4.08 tons/day PM_{10}: 2.75 tons/day SO_2: 0.39 ton/day CO: 13.97 tons/day	• **Reuse-Related Impacts:** (Without consideration of conformity offset allocations to other actions in the region [cumulative impacts]) Increase in reuse-related emissions in 2005: ROG: 1.06 tons/day NO_x: 1.32 tons/day PM_{10}: 2.73 tons/day SO_2: 0.31 ton/day CO: 11.61 tons/day	• **Reuse-Related Impacts:** (Without consideration of conformity offset allocations to other actions in the region [cumulative impacts]) Increase in reuse-related emissions in 2005: ROG: 0.71 ton/day NO_x: 0.84 ton/day PM_{10}: 1.84 tons/day SO_2: 0.21 ton/day CO: 7.59 tons/day	• Impacts: No change

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
CO = Carbon monoxide.
NO_x = Nitrogen oxides.
NPDES = National Pollutant Discharge Elimination System.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.
SO_2 = Sulfur dioxide.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment (Continued)						
• Air Quality (Continued)	Increased air pollutant emissions during construction and operations would not exceed preclosure conditions and, therefore, are not expected to affect the region's progress toward attainment of the ozone or PM_{10} standard. Concentrations would not increase the frequency or severity of violations of the ozone or PM_{10} standard	Increased air pollutant emissions of ROG and NO_x would not exceed preclosure conditions; emissions of PM_{10}, SO_2, and CO would likely exceed preclosure conditions. Reuse activities may require mitigation or offsets of PM_{10} emissions to avoid delays in attainment milestones. Air emission concentrations would not cause increased or new violations of NAAQS	Increased air pollutant emissions during construction and operations would not exceed preclosure conditions and, therefore, are not expected to affect the region's progress toward attainment of the ozone or PM_{10} standard. Concentrations would not increase the frequency or severity of violations of the ozone or PM_{10} standard. Insufficient conformity offsets exist to accommodate all reuse-related aircraft emissions for NO_x	Increased air pollutant emissions during construction and operations would not exceed preclosure conditions and, therefore, are not expected to affect the region's progress toward attainment of the ozone or PM_{10} standard. Concentrations would not increase the frequency or severity of violations of the ozone or PM_{10} standard	Increased air pollutant emissions during construction and operations would not exceed preclosure conditions and, therefore, are not expected to affect the region's progress toward attainment of the ozone or PM_{10} standard. Concentrations would not increase the frequency or severity of violations of the ozone or PM_{10} standard	
	• Cumulative Impacts	**• Cumulative Impacts**	**• Cumulative Impacts**	**• Cumulative Impacts**	**• Cumulative Impacts**	
	Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for NO_x and PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated	Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated	Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for NO_x and PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated	Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated	Insufficient conformity offsets exist to simultaneously accommodate reuse and Navy-related requirements for PM_{10}, which could cause cumulative adverse air quality impacts unless mitigated	

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
CO = Carbon monoxide.
NAAQS = National Ambient Air Quality Standards.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.
SO_2 = Sulfur dioxide.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
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Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment (Continued)						
• Air Quality (Continued)	• Mitigation: Control of fugitive dust and combustion emissions from construction activities. Application of control measures such as land use or transportation planning and management measures to reduce motor vehicle pollution	• Mitigation: Control of fugitive dust and combustion emissions from construction activities. Application of control measures such as land use or transportation planning and management measures to reduce motor vehicle pollution	• Mitigation: Control of fugitive dust and combustion emissions from construction activities. Application of control measures such as land use or transportation planning and management measures to reduce motor vehicle pollution	• Mitigation: Control of fugitive dust and combustion emissions from construction activities. Application of control measures such as land use or transportation planning and management measures to reduce motor vehicle pollution	• Mitigation: Control of fugitive dust and combustion emissions from construction activities. Application of control measures such as land use or transportation planning and management measures to reduce motor vehicle pollution	• Mitigation: None required
• Noise	• Impacts: 2,851 acres and 263 residents exposed to CNEL 60 dB or greater due to civilian aircraft operations in 2015. 358 additional residents exposed to CNEL 60 dB or greater due to increased surface traffic in 2015	• Impacts: 1,373 acres and 5 residents exposed to CNEL 60 dB or greater due to civilian aircraft operations in 2015. 692 additional residents exposed to CNEL 60 dB or greater due to increased surface traffic in 2015	• Impacts: 5,291 acres and 290 residents exposed to CNEL 60 dB or greater due to civilian aircraft operations in 2015. 383 additional residents exposed to CNEL 60 dB or greater due to increased surface traffic in 2015	• Impacts: 1,149 acres and no residents exposed to CNEL 60 dB or greater due to civilian aircraft operations in 2015. 365 additional residents exposed to CNEL 60 dB or greater due to increased surface traffic in 2015	• Impacts: No aircraft noise. 296 additional residents exposed to CNEL 60 dB or greater due to increased surface traffic in 2015	• Impacts: No change in base-related noise levels. 2,843 residents exposed to CNEL 60 dB or greater due to surface traffic in 2015

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
CNEL = Community Noise Equivalent Level.
dB = Decibel.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment (Continued)						
• Noise (Continued)	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	Change takeoff climbout or landing procedures to minimize aircraft noise. Conduct FAR 150 to identify potential mitigation. Barrier walls to mitigate surface traffic noise. Use of sound insulation, barriers, and buffer zones	Change takeoff climbout or landing procedures to minimize aircraft noise. Conduct FAR 150 to identify potential mitigation. Barrier walls to mitigate surface traffic noise. Use of sound insulation, barriers, and buffer zones	Change takeoff climbout or landing procedures to minimize aircraft noise. Conduct FAR 150 to identify potential mitigation. Barrier walls to mitigate surface traffic noise Use of sound insulation, barriers, and buffer zones	Change takeoff climbout or landing procedures to minimize aircraft noise. Conduct FAR 150 to identify potential mitigation. Barrier walls to mitigate surface traffic noise. Use of sound insulation, barriers, and buffer zones	Barrier walls to mitigate surface traffic noise. Use of sound insulation, barriers, and buffer zones	None required
• Biological Resources	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:	• Impacts:
	Potential direct and indirect impacts on wetlands and fairy shrimp habitat from industrial development	Potential indirect impacts to wetlands and fairy shrimp habitat	Potential direct and indirect impacts to wetlands and fairy shrimp habitat	Potential indirect impacts to wetlands and fairy shrimp habitat	Potential indirect impacts to wetlands and fairy shrimp habitat	No change in base-related activities. Potential increase in habitat value due to long-term decrease in human activity. No impact on wetlands or fairy shrimp habitat
	No likely direct loss of wetlands or fairy shrimp habitat	No likely direct loss of wetlands or fairy shrimp habitat	No likely direct loss of wetlands or fairy shrimp habitat	No likely direct loss of wetlands or fairy shrimp habitat	No likely direct loss of wetlands or fairy shrimp habitat	No loss of wetlands or fairy shrimp habitat

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
FAR = Federal Aviation Regulation.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 13 of 14

Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment (Continued)						
• Biological Resources (Continued)	• Mitigation: Selective siting of improvements and restriction of operations to non-sensitive sites will avoid direct impacts to wetlands and fairy shrimp habitat. Controlling runoff through design and engineering practices will minimize indirect impacts to wetlands and fairy shrimp habitat. Compliance with Sections 7, 8, and 9 of the Endangered Species Act will minimize impacts to sensitive species. Compliance with Section 404 of the Clean Water Act will minimize impacts to wetlands	• Mitigation: Selective siting of improvements and restriction of operations to non-sensitive sites will avoid indirect impacts to wetlands and fairy shrimp habitat. Controlling runoff through design and engineering practices will minimize indirect impacts to wetlands and fairy shrimp habitat. Compliance with Sections 7, 8, and 9 of the Endangered Species Act will minimize impacts to sensitive species	• Mitigation: Selective siting of improvements and restriction of operations to non-sensitive sites will avoid direct impacts to wetlands and fairy shrimp habitat. Controlling runoff through design and engineering practices will minimize indirect impacts to wetlands and fairy shrimp habitat. Compliance with Sections 7, 8, and 9 of the Endangered Species Act will minimize impacts to sensitive species. Compliance with Section 404 of the Clean Water Act will minimize impacts to wetlands	• Mitigation: Selective siting of improvements and restriction of operations to non-sensitive sites will avoid indirect impacts to wetlands and fairy shrimp habitat. Controlling runoff through design and engineering practices will minimize indirect impacts to wetlands and fairy shrimp habitat. Compliance with Sections 7, 8, and 9 of the Endangered Species Act will minimize impacts to sensitive species	• Mitigation: Selective siting of improvements and restriction of operations to non-sensitive sites will avoid indirect impacts to wetlands and fairy shrimp habitat. Controlling runoff through design and engineering practices will minimize indirect impacts to wetlands and fairy shrimp habitat. Compliance with Section 404 of the Clean Water Act will minimize impacts to wetlands	• Mitigation: None required
• Cultural Resources	• Impacts: No effect on prehistoric, Native American, or paleontological resources Possible adverse effects to historic structures potentially eligible for listing on the NRHP	• Impacts: No effect on prehistoric, Native American, or paleontological resources Possible adverse effects to historic structures potentially eligible for listing on the NRHP	• Impacts: No effect on prehistoric, Native American, or paleontological resources Possible adverse effects to historic structures potentially eligible for listing on the NRHP	• Impacts: No effect on prehistoric, Native American, or paleontological resources Possible adverse effects to historic structures potentially eligible for listing on the NRHP	• Impacts: No effect on prehistoric, Native American, or paleontological resources Possible adverse effects to historic structures potentially eligible for listing on the NRHP	• Impacts: No impact

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
NRHP = National Register of Historic Places.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 14 of 14

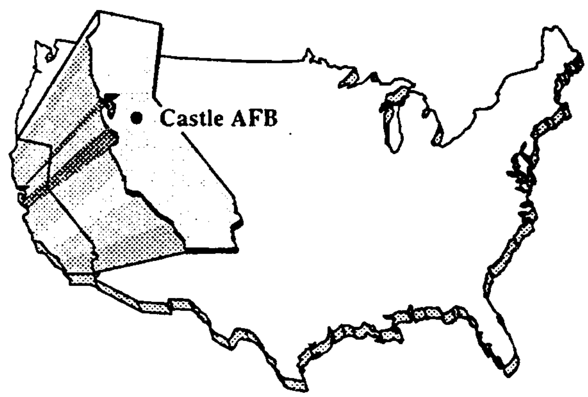
Resource Category	Proposed Action	Castle Aviation Center Alternative	Commercial Aviation Alternative	Aviation with Mixed Use Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment (Continued)						
	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:	• Mitigation:
	Properties may be conveyed to non-federal owners with preservation covenants. Consult with SHPO and Advisory Council on Historic Preservation in development and implementation of mitigation strategies	Properties may be conveyed to non-federal owners with preservation covenants. Consult with SHPO and Advisory Council on Historic Preservation in development and implementation of mitigation strategies	Properties may be conveyed to non-federal owners with preservation covenants. Consult with SHPO and Advisory Council on Historic Preservation in development and implementation of mitigation strategies	Properties may be conveyed to non-federal owners with preservation covenants. Consult with SHPO and Advisory Council on Historic Preservation in development and implementation of mitigation strategies	Properties may be conveyed to non-federal owners with preservation covenants. Consult with SHPO and Advisory Council on Historic Preservation in development and implementation of mitigation strategies	None required

Note: Impacts are based on the changes from closure baseline that are projected to occur as a result of implementing each alternative.
SHPO = State Historic Preservation Officer.

Table 2.7-3. Summary of Impacts from Other Land Use Concepts

Resource Category	Federal Correctional Complex	Private Recreational Facility
Local Community		
Land Use and Aesthetics	Under federal control. Potential visual impacts	Minimal use impacts
Transportation	1,200 daily trips. Potential net increase in traffic volumes would not affect level of service	460 daily trips. Potential net increase in traffic volumes would not affect level of service
Utilities	Potential net increases in utility use would require further evaluation as part of site development plans	Minimal utility use
Hazardous Materials and Hazardous Waste Management		
Hazardous Material Management	Management in compliance with applicable regulations	Small quantities used
Hazardous Waste Management	Management in compliance with applicable regulations	Small quantities generated
Installation Restoration Program	Potential delays in disposal and redevelopment	Potential delays in disposal and redevelopment
Storage Tanks	No impact	No impact
Asbestos	No impact	No impact
Pesticides Usage	Small quantities used	Small quantities used
Polychlorinated Biphenyls	No impact	No impact
Radon	No impact	No impact
Medical/Biohazardous Waste	Managed in accordance with applicable regulations	None generated
Ordnance	No impact	No impact
Natural Environment		
Soils and Geology	Up to 248 acres of ground disturbance	Up to 215 acres of ground disturbance
Water Resources	No adverse impact due to potential net increase in demand	No impact
Air Quality	No adverse impact due to potential net increase in emissions	No impact
Noise	No impact	No impact
Biological Resources	Potential direct and indirect impacts on fairy shrimp habitat and wetlands No likely direct loss of fairy shrimp habitat or wetlands	Potential direct and indirect impacts on fairy shrimp habitat and wetlands No likely direct loss of fairy shrimp habitat or wetlands
Cultural Resources	No impact	No impact

Note: Impacts are presented as net effects to the Proposed Action and alternatives.



CHAPTER 3
AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

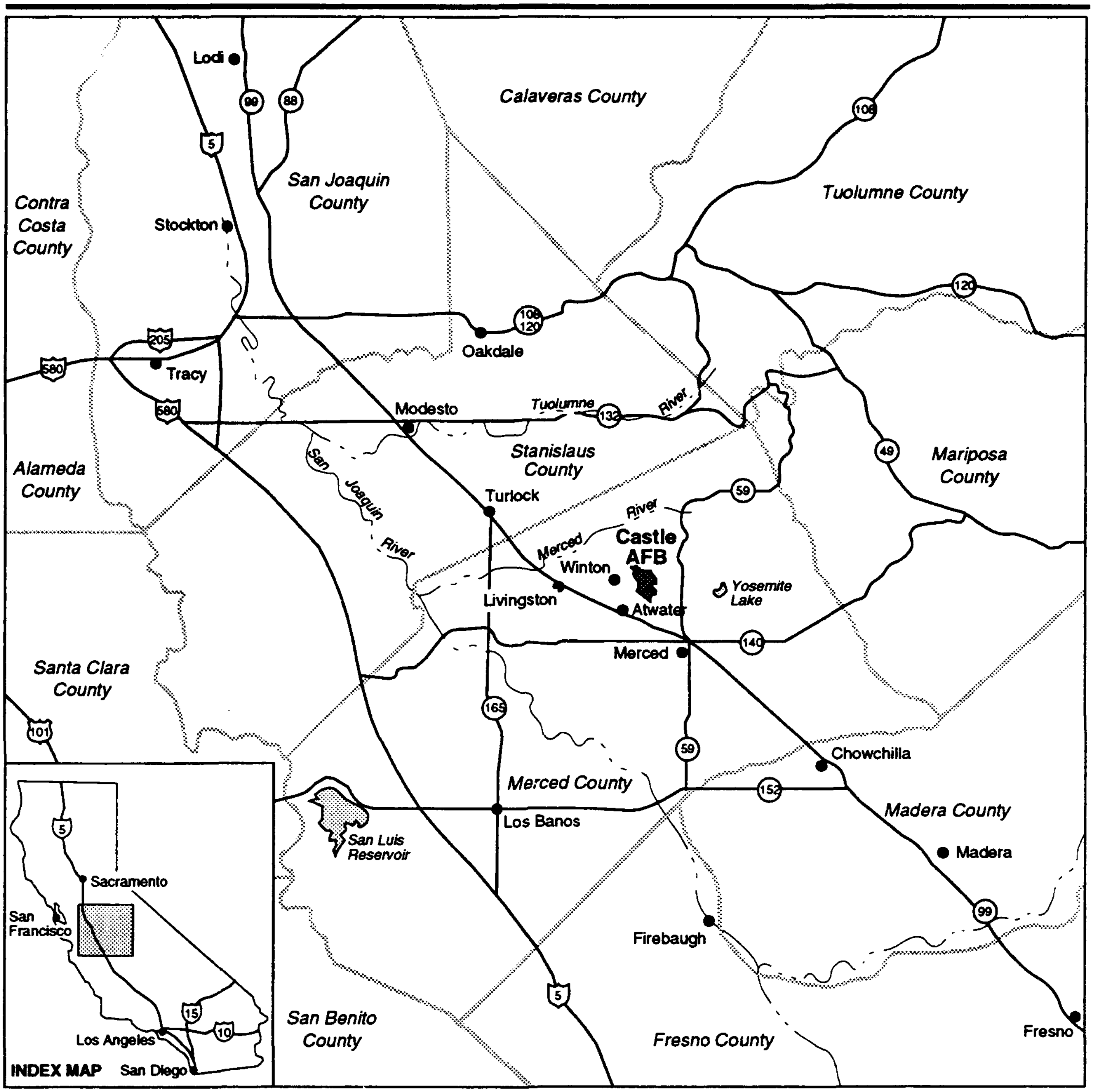
This chapter describes the environmental conditions of Castle AFB and its ROI as it would be at the time of base closure. It provides information to serve as a baseline from which to identify and evaluate environmental changes resulting from disposal and reuse of Castle AFB. Although this EIS focuses on the biophysical environment, some non-biophysical elements are addressed. The non-biophysical elements (influencing factors) of population and employment, land use and aesthetics, public utility systems, and transportation networks in the region and local communities are addressed. This chapter also describes the storage, use, and management of hazardous materials/wastes found on base, including storage tanks, asbestos, pesticides, polychlorinated biphenyls (PCBs), radon, medical/biohazardous waste, and ordnance. The current status of the IRP is also described. Finally, the chapter describes the pertinent natural resources of soils and geology, water resources, air quality, noise, biological resources, and cultural resources.

The ROI to be studied will be defined for each resource area affected by the Proposed Action and alternatives. The ROI determines the geographical area to be addressed as the Affected Environment. Although the base boundary may constitute the ROI limit for many resources, potential impacts associated with certain issues (e.g., air quality, utility systems, and water resources) transcend these limits.

The baseline conditions assumed for the purposes of analysis are the conditions projected at base closure in September 1995. Impacts associated with disposal and/or reuse activities may then be addressed by comparing projected conditions under various reuses to closure conditions. A reference to preclosure conditions is provided, where appropriate (e.g., air quality) in this document, in order to provide a comparative analysis over time. Data used to describe the preclosure reference point are those that depict conditions as close as possible to the closure announcement date. This will assist the decision maker and agencies in understanding potential long-term impacts in comparison to conditions when the installation was active.

3.2 LOCAL COMMUNITY

Castle AFB is located in Merced County, in the northeastern San Joaquin Valley area of central California (Figure 3.2-1). The San Joaquin Valley lies within the southern portion of the Central Valley. The Coast Ranges form the western boundary of the Central Valley, rising to an altitude of about



EXPLANATION

- Interstate Highway
- U. S. Highway
- State Highway
- County Line

0 3.75 7.5 15 Miles

Regional Map

Figure 3.2-1

4,000 feet. The Sierra Nevada east of the Central Valley rise to over 14,000 feet.

Castle AFB is adjacent to the community of Atwater, approximately 7 miles northwest of the city of Merced, 63 miles northwest of the city of Fresno, and 29 miles southeast of the city of Modesto. The communities of Winton and Livingston are approximately 2 and 6 miles west of the base, respectively. The Sacramento area is approximately 103 miles to the north, and the San Francisco Bay area is approximately 130 miles to the west.

The base encompasses 2,777 acres and includes two housing areas separated from the main base (Figure 3.2-2). The topography of the base is basically flat.

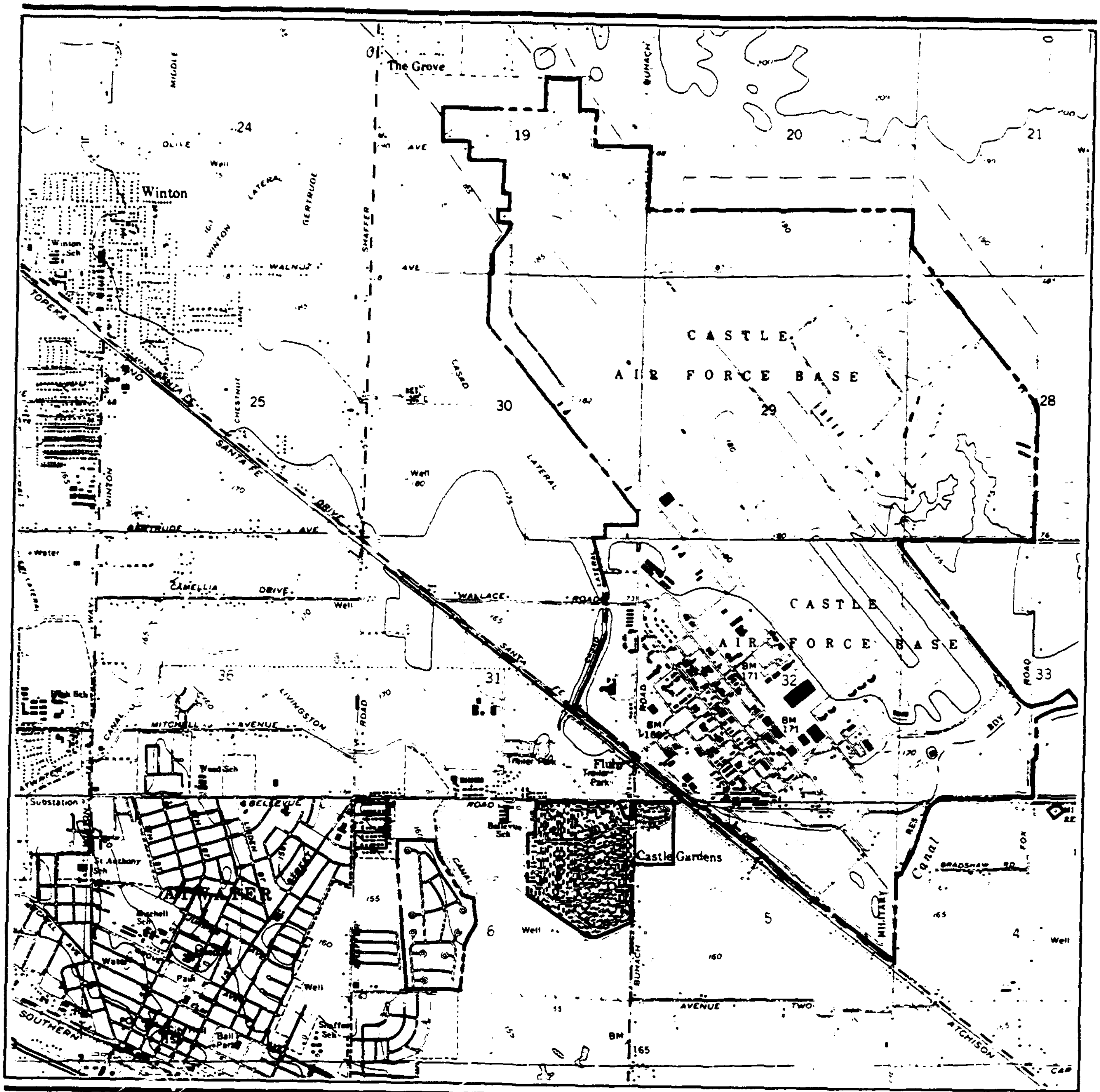
The climate in the vicinity of Castle AFB is Mediterranean, with mild winters and hot summers. Precipitation occurs primarily during November through March, and averages 11.8 inches per year. Temperatures range from an average daily minimum temperature of 36 degrees Fahrenheit (°F) in January to an average daily maximum temperature of 94°F in July.

Castle AFB is adjacent to the Valley Line of the Atchison, Topeka, and Santa Fe Railway (AT&SF), and is approximately 2 miles east of State Highway (SH) 99. The closest commercial airport is in Merced.

Installation Background. Castle AFB was activated as Merced Army Flying School in December 1941. Renamed the Merced Army Airfield in 1943, the installation provided basic flying training until June 1945, and was then used as a processing center for personnel moving to and from combat zones in the Pacific. In April 1946, Merced Army Airfield was renamed Castle Field in honor of Brigadier General Frederick Castle, who was killed in action during a bombing raid over Germany on December 24, 1944. He was posthumously awarded the Congressional Medal of Honor for staying at the controls of his crippled B-17, thus allowing his crew to escape the burning aircraft.

The Strategic Air Command (SAC) took over Castle Field in April 1946. The 93rd Bombardment Wing (BMW) was assigned to the base the following year. Castle Field was renamed Castle AFB in January 1948. A number of different aircraft were based at Castle AFB between 1947 and 1956, including B-29 and B-50 Superfortresses, KB-29s, KC-97s, and B-47 Stratojets. In 1952, an extensive runway remodeling and facility expansion program was launched to prepare Castle AFB for conversion of the 93rd BMW to a B-52 Stratofortress crew training unit.

The first Stratofortress delivered to a SAC unit arrived at Castle AFB in June 1955. By March 1956, the changeover was complete. Additional expansion took place during 1956 to prepare for the arrival of KC-135



EXPLANATION

---- Base Boundary

Castle AFB and Vicinity

0 750 1500 3000 Feet

Map Sources: U.S. Geological Survey, 1987a, 1987d.

Figure 3.2-2

Stratotankers. In May 1957, the 93rd Air Refueling Squadron began providing KC-135 crew training. Since 1957, the 93rd BMW has trained all Air Force "G" and "H" model B-52 combat crews and all KC-135 combat crews.

Aviation training provided at Castle AFB includes academic, simulator, and flight training. Since April 1992, B-52 and KC-135 crew training has been the primary mission. Castle AFB came under the control of the Air Combat Command (ACC) in June 1992, with the disestablishment of SAC.

3.2.1 Community Setting

The area surrounding Castle AFB is characterized by growing urban areas and large tracts of land devoted to irrigated agriculture. The ROI is defined as the region in which the principal effects of base disposal and reuse would occur. The ROI consists of Merced and Stanislaus counties and various local communities within these counties (see Figure 3.2-1).

Employment in the ROI was 241,681 in 1990, and is projected to be 287,262 at the time of base closure. Overall employment growth in the region averaged 3.3 percent per year between 1970 and 1990, higher than the national average of 2.1 percent. The major employment sectors in the ROI are services, government, retail trade, and manufacturing. In 1990, the services sector provided 19.7 percent of the total jobs in the ROI.

Population in the ROI was 548,925 in 1990, and is projected to be 635,326 at base closure in 1995. Population growth in the ROI averaged 3.1 percent annually between 1970 and 1990, above the United States average of 1.0 percent. In 1990, there were 189,501 off-base housing units in the ROI.

Approximately 99 percent of the personnel (military and civilian) working at Castle AFB live in Merced County (principally in and around the cities of Atwater and Merced, and to a lesser extent in the unincorporated community of Winton). Less than 1 percent live in Stanislaus County. In addition, a few personnel live in other communities in adjoining counties. A total of 2,812 military retirees lived in the area in 1990. The cities of Atwater and Merced and the community of Winton are the principal support communities of the base.

The city of Atwater, adjacent to the southwest corner of Castle AFB, had a population of 22,282 in 1990, and is home for about 48 percent of base personnel living off base. The two Castle AFB family housing areas, Castle Gardens and Castle Vista, are located within the city of Atwater. The city is located between Santa Fe Drive on the north and SH 99 on the south, both of which run in a northwest-southeast direction. The southern portion of the city contains industrial park sites on both sides of SH 99.

The city of Merced, with a 1990 population of 56,216, is home to about 33 percent of base personnel living off base. The industrial part of the city is located to the south, in the vicinity of the airport and the Merced County Fairgrounds. Merced Community College is located near the northern city limit.

Winton, home to about 4 percent of base personnel who reside off base, is a small (7,559 population in 1990), unincorporated community.

3.2.2 Land Use and Aesthetics

This section describes the land uses and aesthetics for the base property and surrounding areas at the time of closure. Projected land uses at closure are assumed to be similar to existing land uses in the vicinity unless specific development plans project a change. The ROI includes the base property and potentially affected adjacent properties that are within the jurisdictions of the city of Atwater and Merced County.

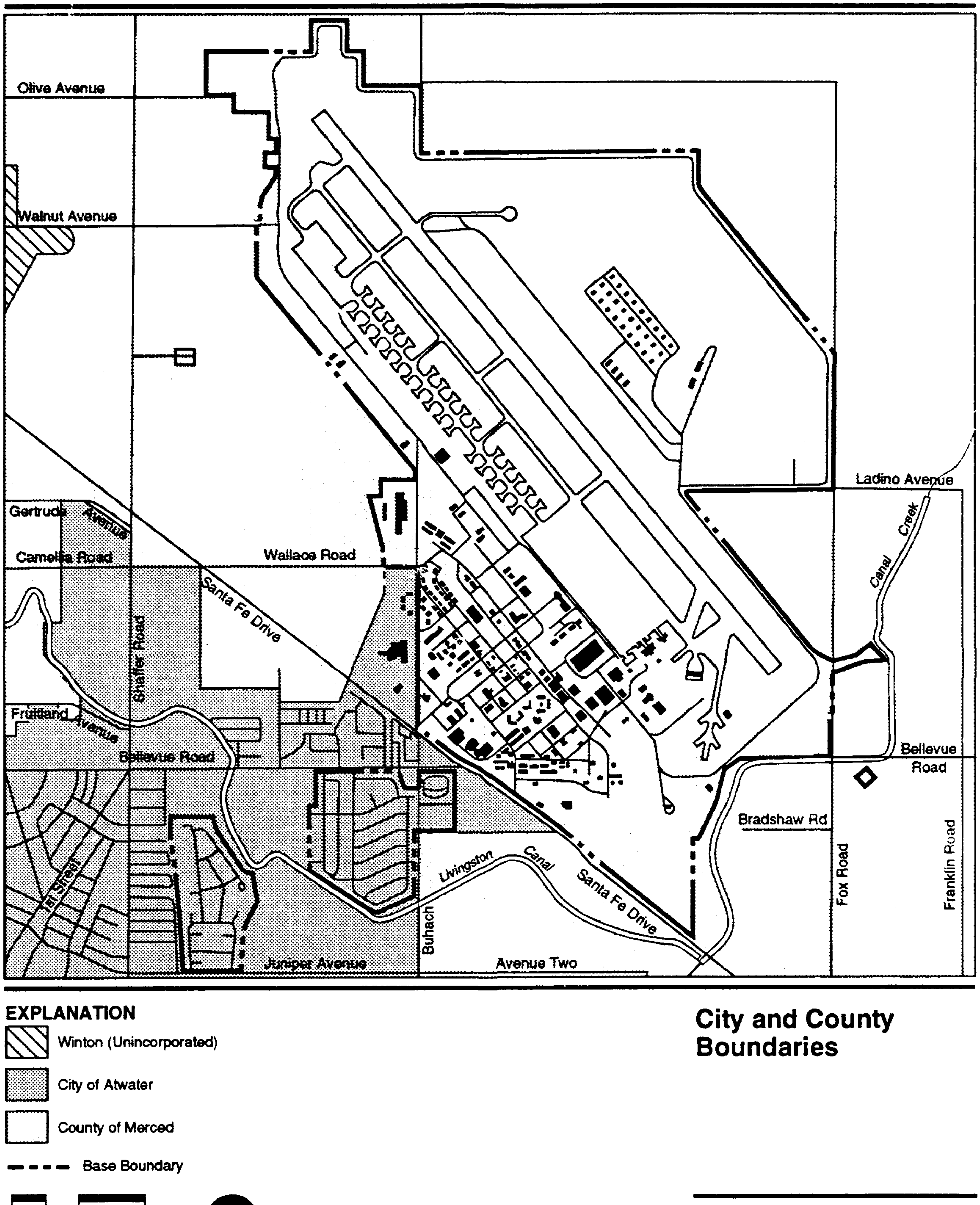
All Castle AFB property is owned by the U.S. Government and lies within Merced County. An area of approximately 268 acres, including Castle Park, Castle Air Museum, the base hospital, and the two off-base housing areas, is within the corporate limits of the city of Atwater. The boundaries of various local governments on and near the base are shown on Figure 3.2-3.

3.2.2.1 Land Use

Land Use Plans and Regulations. The general plan for a jurisdiction represents the official position on long-range development and resource management. The position is expressed in goals, policies, plans, and actions regarding the physical, social, and economic environments, both now and for the long term.

Most of Castle AFB lies within unincorporated areas of Merced County. The Year 2000 General Plan for Merced County (Merced County, 1990) identifies various agriculture and agricultural-related land uses for areas surrounding Castle AFB. The base property within the jurisdiction of Merced County has not been identified for redevelopment because closure of the base was not anticipated at the time of plan generation. However, the county is taking steps toward redevelopment and formal revisions to the general plan are anticipated.

The two off-base family housing tracts, Castle Park, and a portion of the base south of Wallace Road and west of Hospital Road are within the Atwater city limits. The Atwater General Plan (City of Atwater, 1992) includes the Atwater Urban Expansion area. While the city has identified policy options such as providing infrastructure and annexing base property, the general plan does not address redevelopment.



City and County Boundaries

Figure 3.2-3

Zoning. Zoning provides for the division of the jurisdiction, in conformity with the general plan, into districts within which the height, open space, building coverage, density, and type of future land uses are set forth. Zoning is designated to achieve various community development goals, including base reuse plans.

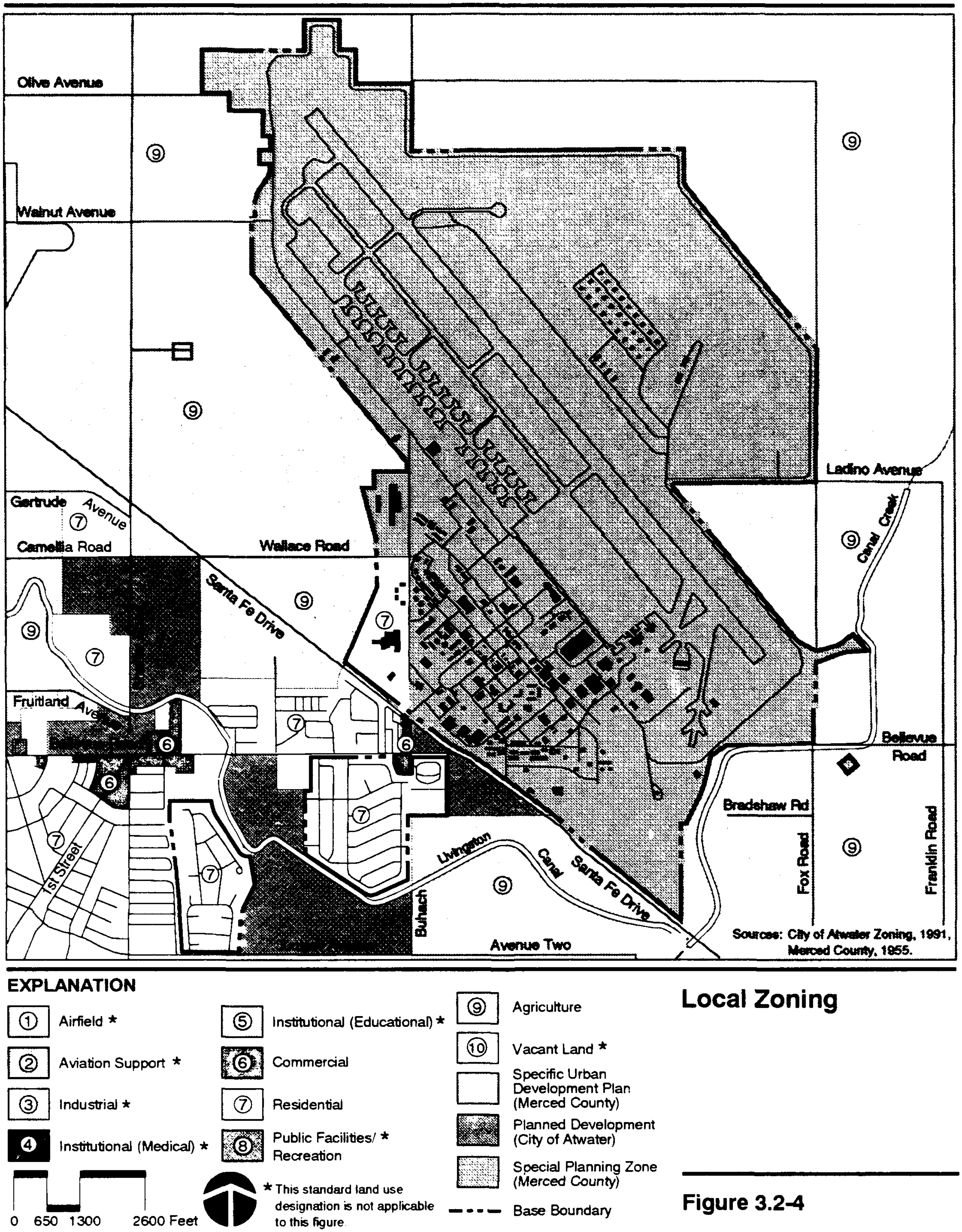
The portion of the base within Merced County's jurisdiction is zoned as a Special Planning Zone that is designed to protect unique land uses. The county is in the process of amending its zoning ordinance by adding a Planned Development Zone. It is anticipated that the portions of the base within Merced County's jurisdiction would be rezoned to this new designation. Merced County has zoned areas adjacent to the base for primarily agricultural uses (Figure 3.2-4). The portions of Castle AFB within the city of Atwater are zoned for single-family residential use (see Figure 3.2-4). Zoning in the city of Atwater adjacent to the base includes planned development, single-family residential, and neighborhood commercial.

On-Base Land Use. Land use identifies the present land usage by various general categories. Existing (preclosure) land uses on the base property are shown in Figure 3.2-5 and described in this section. Land use acreages at Castle AFB are shown below.

Land Use	Acreage
Airfield	1,106
Aviation support	165
Industrial	140
Medical	17
Educational	25
Commercial	80
Residential	243
Public facilities/recreational	85
Agriculture	6
Vacant land	910
Total	**2,777**

The **airfield** land use area at Castle AFB contains facilities to support an active military flying installation with an operational airfield. The airfield consists of one runway (Runway 13/31), which is 11,800 feet long and 300 feet wide. The runway is in generally good condition, but some areas of sub-base weakness have been identified. The airfield also includes extensive aircraft parking aprons, taxiways, and alert pads.

The **aviation support** area contains facilities for aircraft ground equipment and aircraft maintenance. Facilities include the control tower, aircraft rescue and fire fighting station, equipment repair and inspection shops, hangars,



Local Zoning

Figure 3.2-4

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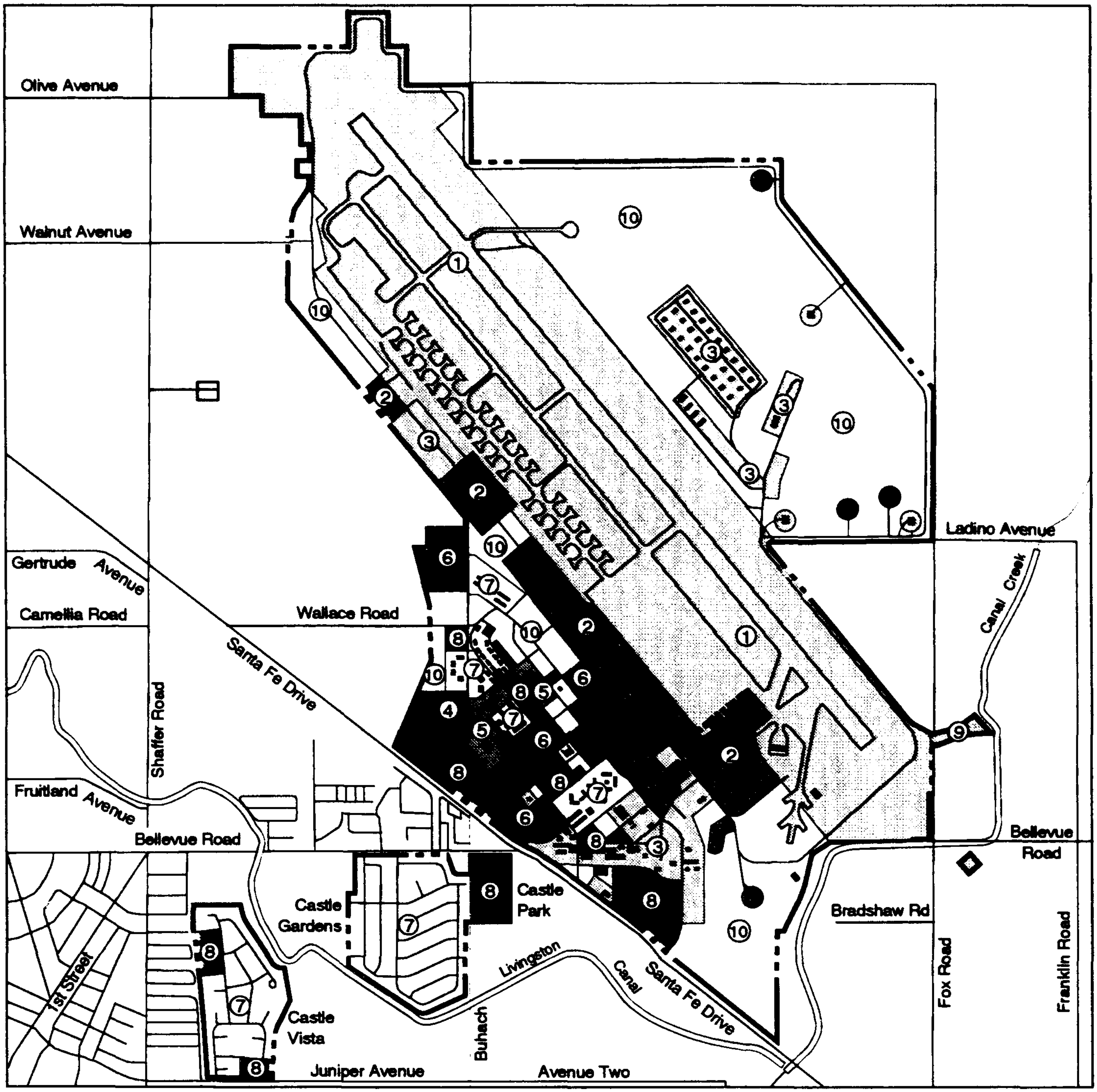


EXPLANATION

① Airfield	⑤ Institutional (Educational)	⑨ Agriculture
② Aviation Support	⑥ Commercial	⑩ Vacant Land
③ Industrial	⑦ Residential	Base Boundary
④ Institutional (Medical)	⑧ Public Facilities/Recreation	

0 650 1300 2600 Feet

* This standard land use designation is not applicable to this figure.

Existing On-Base Land Use

Figure 3.2-5

warehouses, and administrative offices. The control tower and aircraft rescue and fire fighting facility are centrally located adjacent to the flightline.

The **industrial** areas are found in three general locations on the base. Facilities used for ground vehicle storage and maintenance and warehousing, located in the southern portion of the base, are generally in good condition. The WSA, located northeast of the airfield, contains about 40 concrete munitions storage structures and warehouse facilities constructed in the 1950s. A third area, located west of the airfield, contains the fire training area, civil engineering facilities yard, and a group of aboveground storage tanks used to store JP-4 and waste oil.

The **medical** land use area in the southwestern corner of the base includes the hospital and several associated temporary support and administrative facilities. The hospital provides a full range of medical and dental services.

The **educational** land use areas are in the west-central portion of the cantonment. They contain various facilities, including classrooms and simulator facilities, which support the KC-135 and B-52 crew training mission.

Commercial land uses are located in the central and northern cantonment. The office buildings on base are generally older, but have been renovated and are well maintained. Retail and service buildings include a new Commissary, Base Exchange, bowling center, credit union, package store, service station, post office, child-care center, theater, and thrift store.

Residential areas at Castle AFB include single-family, duplex, and dormitory units.

Residential facilities at Castle AFB include Visiting Officers' Quarters (VOQ), enlisted personnel dormitories, and temporary lodging facilities (TLFs). The VOQs, which consist of 15 apartment buildings built between 1948 and 1976, are located in the northwest cantonment. Other temporary and visitors quarters are located in the same area and consist of 12 3,610-square-foot dormitories constructed in 1948. Nine additional dormitories are located in the south-central cantonment in a complex that includes a dining hall and recreation facilities. Five of these dormitories were constructed in the 1986-1990 period; the remaining four were built between the late 1950s and early 1970s.

Two off-base family housing areas are located southwest of the base. The Castle Gardens housing area contains 677 units of pre-1960 Wherry housing consisting primarily of duplexes with some single-family units. The Castle Vista housing area contains 244 duplex units constructed in 1972 and includes about 13 acres of open space areas and playgrounds.

Public facilities/recreation areas include a gymnasium, the Castle Air Museum, and the recreation center. The gymnasium is at the southern edge of the cantonment and contains a full-size basketball court, three racquetball courts, showers, lockers, and a weight room. Southeast of the gymnasium are two baseball fields, a football/soccer field, a running track, and a cross-country running course. Castle Park is an off-base community park, with an outdoor picnic pavilion and youth center. The youth center contains a small indoor basketball court, child-care facilities, and outdoor play areas. South of the youth center are softball and soccer/football fields. The air museum, located on the western corner of the base between the hospital and Santa Fe Drive, contains approximately 35 static aircraft displays, a parking lot, and two facilities housing a gift shop, museum, and snack bar.

Other recreation facilities are located in the center of the cantonment near the Officers' Club. The recreation center, north of the enlisted personnel dormitory complex, consists of a multi-function building housing weight rooms, lockers, a large meeting/events room, and a small pub. A large outdoor swimming pool and tennis courts are located in the same block as the recreation center. Another swimming pool and additional tennis courts are located near the Officers' Club.

A 6-acre **agricultural** area, located in the southeast portion of the base, has been farmed by adjacent landowners for several years.

Vacant land is present in several areas on base. A large parcel east of the airfield serves as an airfield safety zone and explosive safety distance around the WSA. The vacant parcel in the southern portion of the base contains several landfills no longer in use and a buffer area around the jet engine test cell.

Leases and Outgrants. The Air Force typically outgrants a number of leases, easements, and licenses to other agencies and organizations for the use of base property. At Castle AFB, these include right-of-way easements for Merced County, the city of Atwater, and utility companies. In addition, there are agreements for use of base property for agricultural use and use of facilities by organizations including the Travis Federal Credit Union and Western Union Telegraph Company. The terms of these outgrants are displayed in Table 3.2-1.

Various easements and restrictions are in effect outside the base boundaries of Castle AFB for safety and avigation purposes. Major base avigation easements, totaling approximately 303 acres, include 228 acres at the northwestern end of the runway and 75 acres at the southeastern end of the runway. Safety easements include 174 acres adjacent to the northeastern side of the WSA.

Table 3.2-1. Inventory of Easement Agreements, Licenses, Permits, and Leases in Effect at Base Closure (Outgrants)

Document Number	Expiration Date	Description/Location	Responsible Party
AF04-(604)-58	Perpetual	Agreement to allow operation of railroad on government tracks	Atchison Topeka & Santa Fe Railway
CTL-9-90-001	May 31, 1995	Land lease to credit union	Travis Federal Credit Union
CTL-9-91-001	February 24, 1996	License to park facility on base	SABER Contractor
DA(s)2533	Perpetual	Right-of-way easement for widening Bellevue Road	Merced County
DA(s)5	Perpetual	License to install, maintain telegraphic equipment, and facility use	Western Union Telegraph Co.
DA(s)935	Perpetual	Right-of-way easement for road across installation	Merced County
DACA5-2-84-525	Perpetual	Right-of-way easement for widening Santa Fe Drive	Merced County
DACA5-2-85-603	Perpetual	Right-of-way easement	Pacific Gas & Electric
DACA5-3-84-604	Indefinite	License to install lawn sprinkler and landscaping	Castle Air Museum Foundation
SFRE(s)-320	Perpetual	Right-of-way easement for widening of Yam (Santa Fe) Road	Merced County
SFRE(s)-800	Perpetual	Right-of-way easement for underground concrete pipeline	Merced Irrigation District
05-5-3-89-547	September 30, 1993	License for meetings, activities, and storage	Civil Air Patrol
DACA5-2-85-542	September 12, 2010	Right-of-way easement for storm drain (Castle Park)	City of Atwater
DACA5-9-89-543	March 26, 2012	Right-of-way easement for storm drain expansion (Castle Park)	City of Atwater
DACA5-9-87-536	December 31, 1994	Easement for grazing and agricultural use	Mr. & Mrs. Allen R. Christensen

In addition, the Air Force holds contracts with agencies and private individuals to use property outside the base boundaries for reasons other than avigation and safety easements. These are primarily licenses for Air Force personnel to monitor groundwater and right-of-way easements for utilities, and are presented in Table 3.2-2.

Table 3.2-2. Inventory of Easement Agreements, Licenses, Permits, and Leases in Effect at Base Closure (Ingrants)

Document Number	Expiration Date	Description/Location	Responsible Party
05-9-89-127	Perpetual	Storm Drain Permit for Base Civil Engineering	Merced Irrigation District
112-208	No expiration date	Water Pipeline License to Cross Railroad	Atchison, Topeka & Santa Fe Railway
CTL-9-90-002	January 6, 1996	License for Right of Entry to Test Groundwater	Merced Irrigation District
CTL-9-90-003	January 6, 1996	License for Right of Entry to Test Groundwater	Martin & Jean Enos
CTL-9-90-005	January 6, 1996	License for Right of Entry to Test Groundwater	Robert Bailey
CTL-9-90-006	January 6, 1996	License for Right of Entry to Test Groundwater	Robert & Dorothea Blythe
CTL-9-90-008	January 6, 1996	License for Right of Entry to Test Groundwater	Ronnie & Elnora Jantz
CTL-9-90-009	January 6, 1996	License for Right of Entry to Test Groundwater	Arnold & Irene Roedell
CTL-9-90-010	January 6, 1996	License for Right of Entry to Test Groundwater	Carlon Tanner
CTL-9-90-012	January 6, 1996	License for Right of Entry to Test Groundwater	Atwater Elementary District
DACA05-5-87-98	August 31, 1992 (renewal requested)	Lease to install, operate, and maintain, monitor well	William E. Pratt
DACA05-5-87-99	August 31, 1992 (renewal requested)	Lease to install, operate, and maintain, monitor well	Robert W. Bailey
DACA67-5-90-34	December 31, 1994	Wartime Dispersal and Exercises Lease	Port of Moses Lake
SFRE-654	Perpetual	Install 12-inch pipeline under road right-of-way easement	Merced County and Atchison, Topeka & Santa Fe Railway
SPNVG-801.1-(GEN)-12-116	Perpetual	License for gravity drainage outlet to Crook Canal	Merced Irrigation District
UN-CTL-ELEC LN	Perpetual	License to operate and maintain underground electric cable	Merced County
UN-CTL-MID	Perpetual	Agreement to allow crossing of Casad Canal	Merced Irrigation District
UN-CTL-MON-WEL	Perpetual	Permit to install, operate, and maintain, test wells in right-of-way	Merced Irrigation District
UN-CTL-SEWERLN	Perpetual	License to operate and maintain underground sewer line	Merced County
UN-CTL-SOUZA	Perpetual	Right-of-way easement for access road to 3 water wells	James L. Souza
DACA5-2-77-561	Perpetual	Right-of-way easement for underground water pipeline	Merced Irrigation District
SFRE(s)-575	Perpetual	Right-of-way easement for road	Merced County
CTL-9-91-002	September 30, 1995	License for right to entry to test and monitor groundwater contamination	Clifford & Alice Gordon

Adjacent Land Use. Some off-base land uses may not conform with existing zoning ordinances. The existing land uses in the immediate vicinity of the base are discussed in this section.

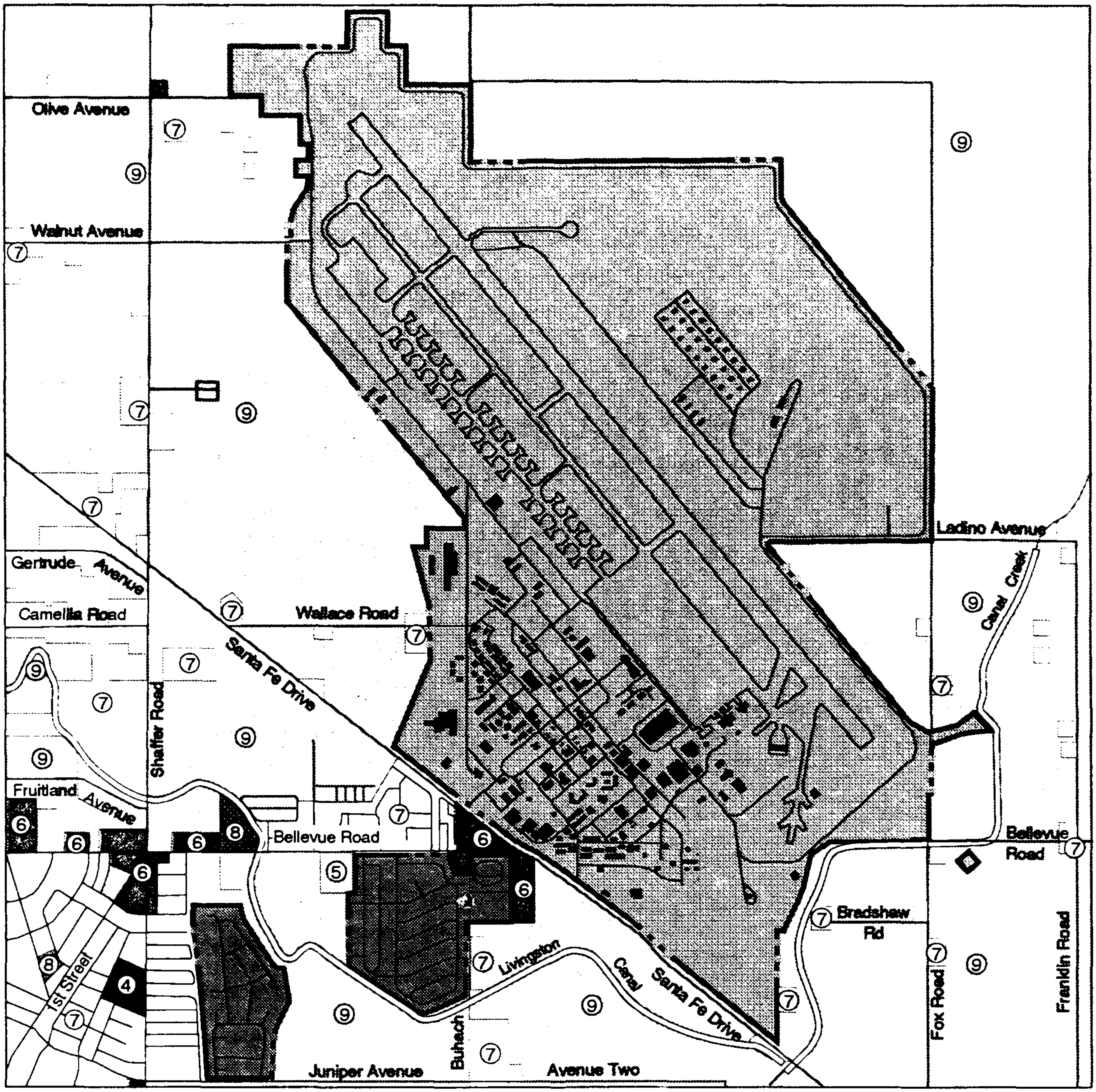
The predominant land use surrounding Castle AFB is agriculture, primarily almond orchards and vineyards, and dairy, beef, and poultry operations (Figure 3.2-6).

The area south of Santa Fe Drive, adjacent to Castle Gardens and Castle Park, is dominated by a se[illegible]ge facility, a mini-mall, and residential areas. Residential development is also apparent along Shaffer Road, west of the base.

Local land use is not anticipated to change rapidly in the future. Residential uses will continue to grow within the city limits of Atwater and the unincorporated area of Winton. Agricultural land use will continue to dominate the unincorporated areas surrounding these communities and the base.

Air Force Policies Affecting Adjacent Land Uses. The Air Force has developed the Air Installation Compatible Use Zone (AICUZ) program to minimize development that is incompatible with aviation operations in areas on and adjacent to military airfields. The AICUZ land use recommendations are based on (1) land uses compatible with exposure to aircraft noise, and (2) safety considerations. Recommended compatible land uses are derived from data on noise contours (noise zones) and safety zones (Accident Potential Zones [APZs]). These zones are delineated specifically for each base, using operational information derived from the base mission. Municipalities with jurisdiction over adjacent lands may zone this land in accordance with AICUZ recommendations, but they are not required to do so. An AICUZ report for Castle AFB was issued in 1980 and updated in 1988 (U.S. Air Force, 1980). The Merced County zoning ordinance is generally compatible with the AICUZ as the APZ is zoned for agricultural land use on either side of the runway (Figure 3.2-7).

AICUZ noise contours are based on standard noise ratings that are calculated from types of aircraft, number of aircraft daily operations, time of day flown, aircraft flight patterns, power settings, air speeds, altitudes, and climatic conditions. AICUZ contours typically use the day-night weighted average sound level (DNL) to describe the noise environment. However, the state of California recognizes the more conservative CNEL for assessing noise impacts to land use. Therefore, CNEL contours, based on aircraft operations, were used to establish the preclosure noise environment at Castle AFB. Noise contours for preclosure conditions at Castle AFB are presented and discussed in Section 3.4.4. A total of 130,914 acres, including portions of the cities of Atwater and Merced and the community of



EXPLANATION

- ① Airfield *
- ② Aviation Support *
- ③ Industrial *
- ④ Institutional (Medical)
- ⑤ Institutional (Educational) *
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public Facilities/ Recreation
- ⑨ Agriculture
- ⑩ Vacant Land *
- ⑪ Base Property
- - - - Base Boundary

* This standard land use designation is not applicable to this figure

Existing Off-Base Land Use

Figure 3.2-6

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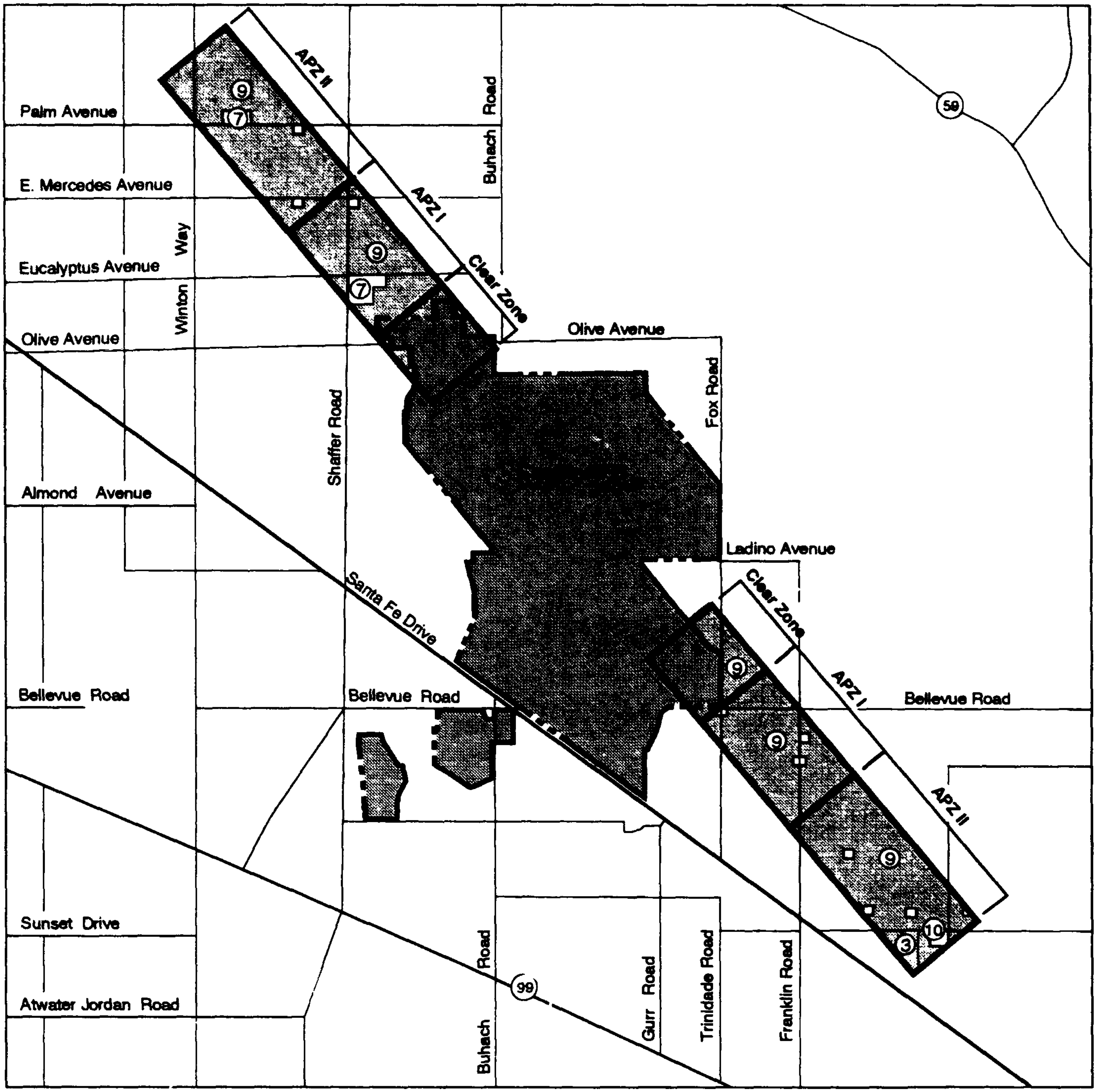


EXPLANATION

1 Airfield *	5 Institutional (Educational) *	9 Agriculture
2 Aviation Support *	6 Commercial *	10 Vacant Land
3 Industrial	7 Residential	Base Boundary
4 Institutional (Medical) *	8 Public Facilities/ Recreation *	Highways
		165 State Highways

0 .25 .5 1 Mile

* This standard land use designation is not applicable to this figure.

Clear Zones and Accident Potential Zones

Figure 3.2-7

Winton, were exposed to aircraft noise levels of CNEL 60 decibels (dB) and above.

The AICUZ delineates areas at both ends of the runway where the probability of aircraft accidents is highest, based on the locations of past aircraft accidents at various bases. The risk of accidents is so high in the area at the immediate end of the runway (known as the CZ) that the Air Force has a program to purchase property or acquire easements to preclude most land uses. Certain land use restrictions are recommended in lower risk areas, identified as APZ I and APZ II. All of APZ I and APZ II are located outside the city limits of Atwater and Merced and the community of Winton.

At Castle AFB, the CZ at the southeast end of the runway is approximately 75 percent contained within the base boundary. The remaining 25 percent of the CZ is pastureland and fodder farmland associated with dairy farms. The CZ at the northwest end of the runway is approximately 75 percent contained within the base boundary. The remaining 25 percent is pastureland.

The APZ I at the southeast end of the runway is predominantly occupied by dairy farms and includes five residences. The northwest end of APZ I contains 37 residences, dairies, and almond orchards.

The southeast end of APZ II includes dairy farms, industrial storage, four residences, and an abandoned Merced County work farm. The northwest end of APZ II contains agricultural land uses and ten residences.

The AICUZ program applies only to military airfields. Similar criteria are established by the FAA for civilian airports. After the closure of Castle AFB, FAA criteria will apply if airport activities are continued.

Closure Baseline Under closure baseline conditions, Castle AFB would be closed and military airfield operations would be terminated, removing all land use conflicts and constraints associated with the AICUZ program.

3.2.2.2 Aesthetics. Visual resources include natural and man-made features that give a particular environment its aesthetic qualities. Criteria used in the analysis of these resources include visual sensitivity, which is the degree of public interest in a visual resource and concern over adverse changes in its quality. Visual sensitivity is categorized in terms of high, medium, or low levels.

High visual sensitivity exists in areas where views are rare, unique, or in other ways special, such as in remote or pristine environments. High-sensitivity views would include landscapes that have landforms, vegetative patterns, water bodies, or rock formations of unusual or outstanding quality.

Medium visual sensitivity areas are more developed than those of high sensitivity. Human influence is more apparent in these areas and the presence of motorized vehicles and other evidence of modern civilization is commonplace. These landscapes generally have features containing varieties in form, line, color, and texture, but tend to be more common than high visual sensitivity areas.

Low visual sensitivity areas tend to have minimal landscape features, with little change in form, line, color, and texture.

No areas in the vicinity of Castle AFB are considered to be of high visual sensitivity.

Most of the buildings on Castle AFB are one or two story; constructed from a variety of materials including concrete block masonry, metal and wood siding, corrugated metal, brick, and stucco; and are of medium visual sensitivity. All undeveloped areas at Castle AFB exhibit low visual sensitivity.

3.2.3 Transportation

Transportation addresses roadways, airspace and air transportation, and other transportation modes. The ROI for the transportation analysis includes the existing principal road, air, and rail networks that serve the local communities of Atwater, Merced, and Winton, with emphasis on the area within the immediate vicinity of Castle AFB. Within this geographic area, the analysis focuses on the elements of transportation networks that serve as direct or key indirect linkages to the base and those that are commonly used by Castle AFB personnel.

3.2.3.1 Roadways. The evaluation of the existing roadway conditions focuses on capacity, which reflects the ability of the network to serve the traffic demand and volume. The capacity of a roadway segment depends mainly on the street width, number of lanes, intersection control, and other factors. Traffic volumes typically are reported, depending on the project and data base available, as the daily number of vehicles in both directions on a segment of roadway, averaged over a full year (average annual daily traffic [AADT]), the daily number of vehicles in both directions on a segment of roadway averaged over a period of time less than a year (average daily traffic [ADT]), and/or the number of vehicular movements on a road segment during the peak hour. The peak-hour volume is about 10 percent of the AADT (Transportation Research Board, 1985). These values are useful indicators in determining the extent to which the roadway segment is used and in assessing the potential for congestion and other problems.

The performance of a roadway segment is generally expressed in terms of Level of Service (LOS). The LOS scale ranges from A to F with each level defined by a range of volume-to-capacity ratios. LOS A, B, and C are considered good operating conditions under which minor or tolerable delays are experienced by motorists. LOS D represents below average conditions, LOS E corresponds to the capacity of the roadway, and LOS F represents a jammed situation. Table 3.2-3 presents the LOS designations and their associated volume-to-capacity ratios. For freeways and two-lane highways, these levels are based primarily on the Highway Capacity Manual (HCM), (Transportation Research Board, 1985), and are adjusted for local conditions.

Table 3.2-3. Road Transportation Levels of Service

		Criteria (Volume to Capacity)		
LOS	Description	Freeway[a]	Urban Arterial[b]	2-Lane Highway[c]
A	Free flow with users unaffected by presence of other users of roadway	0-0.35	0-0.60	0-0.12
B	Stable flow, but presence of other users in traffic stream becomes noticeable	0.36-0.54	0.61-0.70	0.13-0.24
C	Stable flow, but operation of single users becomes affected by interaction with others in traffic stream	0.55-0.77	0.71-0.80	0.25-0.39
D	High density, but stable flow; speed and freedom of movement are severely restricted; poor level of comfort and convenience	0.78-0.93	0.81-0.90	0.40-0.62
E	Unstable flow; operating conditions near capacity with reduced speeds, maneuvering difficulty, and extremely poor levels of comfort and convenience	0.94-1.00	0.91-1.00	0.63-1.00
F	Forced or breakdown flow with traffic demand exceeding capacity; unstable stop-and-go traffic	>1.00	>1.00	>1.00

Notes: (a) Table 3-1, LOS for basic freeway sections, 70 miles per hour (Transportation Research Board, 1985).
(b) Merced County Association of Governments, 1992.
(c) Table 8-1, level terrain, 20 percent no passing zones, design speed >50 miles per hour. Applicable to two-lane collector segments (Transportation Research Board, 1985).
LOS = Level of Service.

For urban arterials with signalized intersections (interrupted flow), the criteria for LOS are those recommended in the Year 2000 General Plan (Merced County, 1990). These criteria were utilized in the development of a countywide traffic model for the implementation of a Regional Transportation Plan (RTP) and the Congestion Management Plan (CMP) (Merced County Association of Governments [MCAG], 1992). One regional transportation objective set by the MCAG is to maintain at least LOS C in the rural areas and LOS D in the urban areas.

Existing roads and highways within the ROI are described at three levels: (1) regional, representing the major links to Castle AFB; (2) local, representing key community roads; and (3) on-base roads.

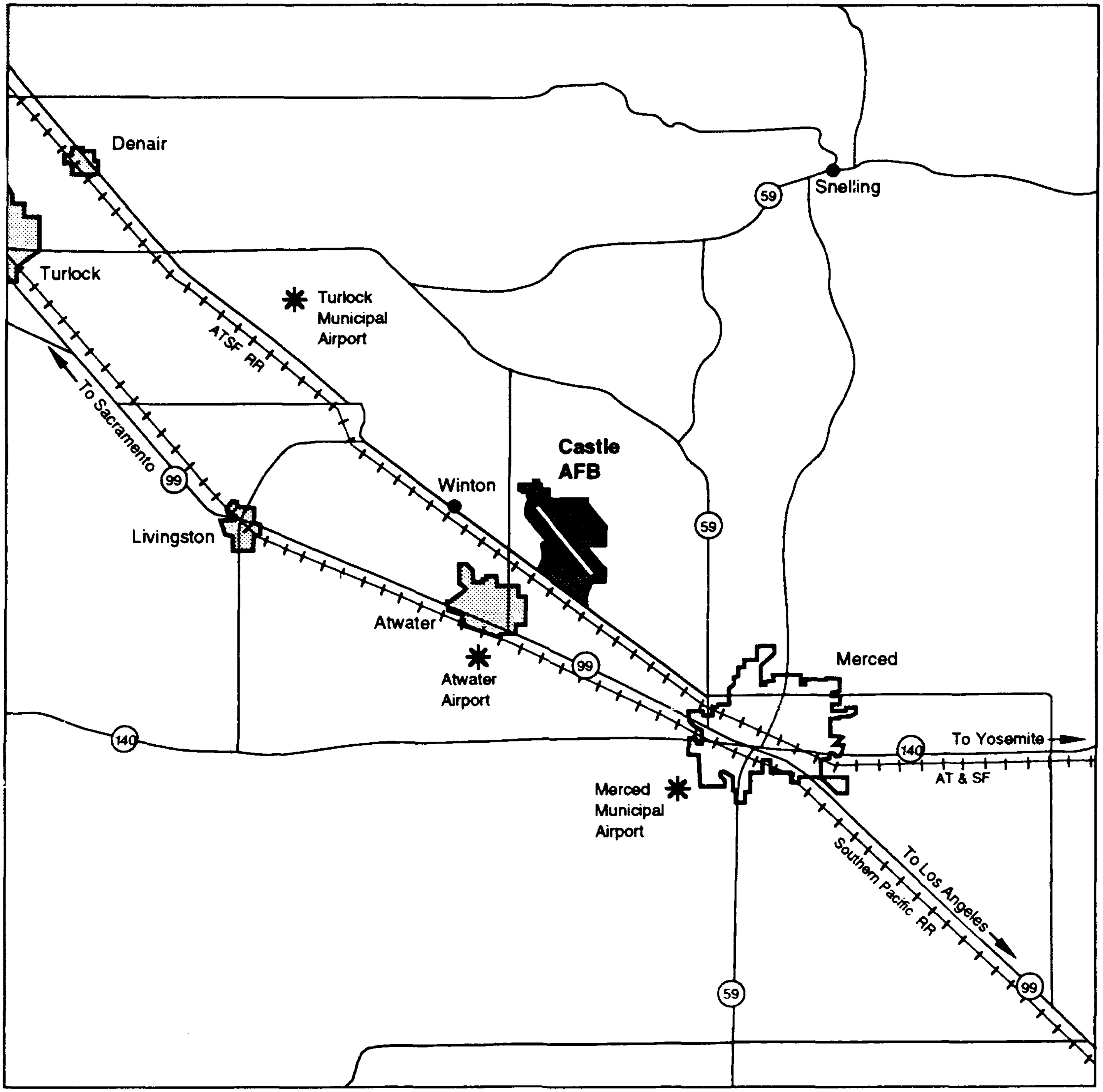
Regional. Regional access to Castle AFB is provided by SH 99, a principal north-south highway through the east side of the San Joaquin Valley (see Figures 3.2-1 and 3.2-8). SH 99 runs through the city of Merced, crosses the southern portion of the city of Atwater, and connects the regional employment centers and communities of Bakersfield, Fresno, and Modesto. SH 99 is a four-lane highway, but it is below U.S. interstate freeway standards. It carries an average of 40,000 vehicles per day in the Atwater area. Buhach and Shaffer roads provide access to Castle AFB from SH 99.

In addition, regional access to the vicinity of Castle AFB is provided by SH 140 and SH 59. SH 140 is a major east-west roadway providing access to Interstate 5 to the west and to Yosemite National Park to the east. In the Atwater-Merced area, it is a two-lane highway with an ADT of 8,600 (1990). SH 59 is a north-south highway providing access to Snelling, Merced, and SH 152, which is a major east-west link between SH 99 and Interstate 5. Between SH 140 and Snelling, SH 59 is a two-lane highway with an ADT of 5,300 (1990) near Santa Fe Drive.

Local. Figure 3.2-9 shows the general local road network now in place and projected to be in place in the vicinity of Castle AFB at the time of base closure. Primary arterial access to the base is provided by Santa Fe Drive, Buhach Road, and Bellevue Road. Key local roadways are as follows:

- Santa Fe Drive (County Road J7) is classified in the City of Atwater General Plan as an arterial road (major road with moderate speed 35 to 50 miles per hour [mph]), providing a route for through traffic as well as local access for the base personnel living in Atwater, Merced, Winton, and, to a much lesser degree, elsewhere in Merced County. It constitutes the primary access to the three gates of the base. Between Buhach Road and SH 59, Santa Fe Drive, which forms the southwest boundary of the base, is a four-lane arterial with a median lane and widely spaced signalized intersections. Northwest of Buhach Road, Santa Fe Drive is a two-lane rural arterial. Because of its regional significance, MCAG has identified Santa Fe Drive for improvement to four and six lanes between Winton and SH 59 within the next 20 years (Merced County, 1990).

- West Olive Avenue provides access to the city of Merced from Santa Fe Drive. It is classified as an arterial between SH 59 and G Street in the City of Merced General Plan. It is currently a six-lane roadway and provides access to the base for personnel living in north Merced.



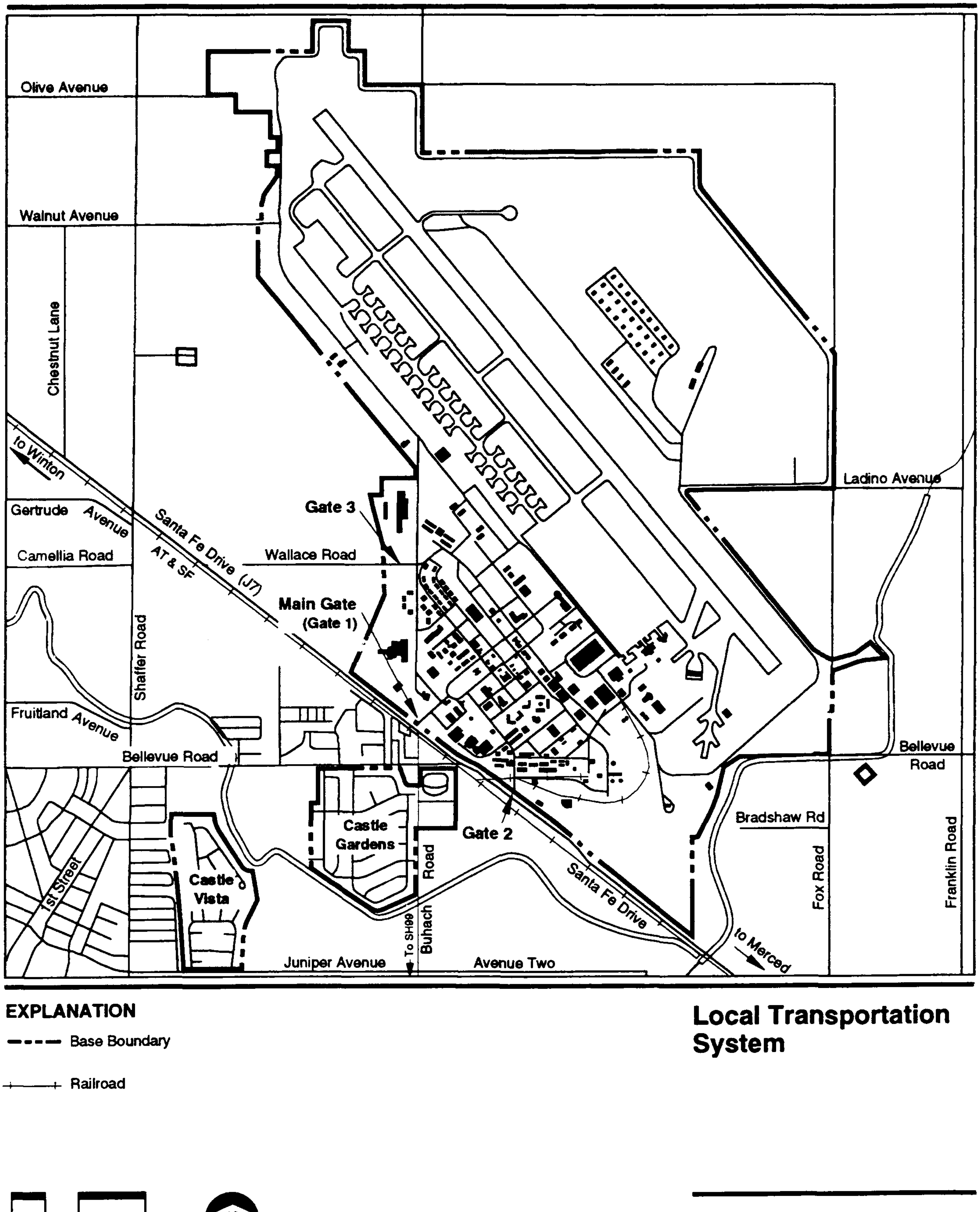
EXPLANATION

- Airports
- Highways
- Railroads
- State Highways

0 1 2 4 Miles

Regional Transportation System

Figure 3.2-8



Local Transportation System

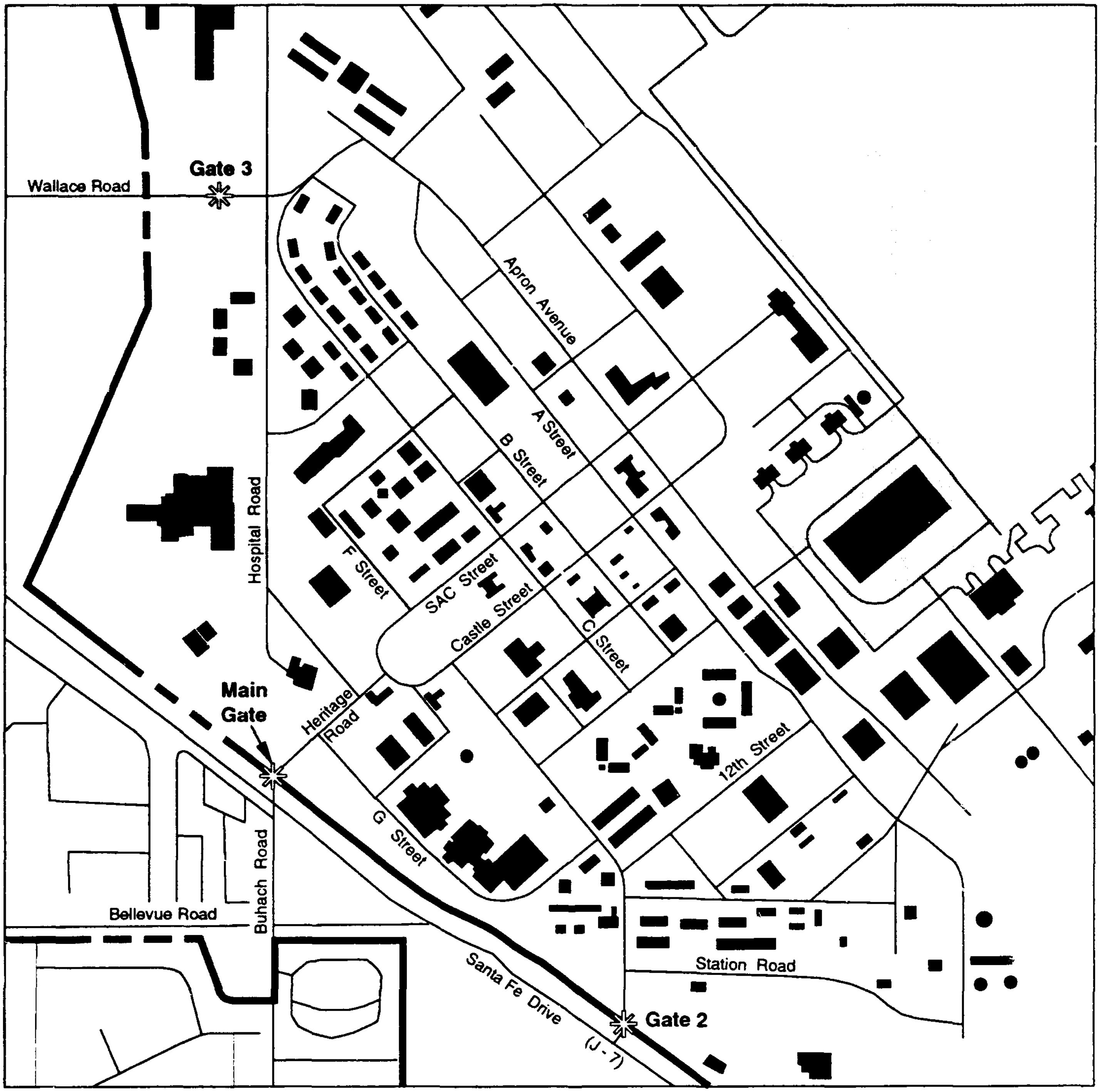
Figure 3.2-9

- Buhach Road is classified as an arterial in the Atwater General Plan and identified for right-of-way improvements in the Merced County General Plan because of its regional significance. It provides direct access to the base for personnel living in Castle Gardens and Castle Vista housing via Juniper Avenue (Avenue Two). It is also the primary access to SH 99. Buhach Road is a four-lane roadway between Santa Fe Drive and SH 99 (about 2 miles) and two lanes elsewhere.

- Bellevue Road is a four-lane arterial providing direct access to the base for personnel living in the Castle Gardens housing area and for those living in Atwater. Bellevue Road is the most congested street in the city of Atwater with an ADT of 16,000 (1990). The extension of Bellevue Road to the east (through the southern part of the base) is incorporated in all scenarios analyzed in the Atwater General Plan. The regional significance of Bellevue Road, between the city of Atwater and SH 99, has been identified in the RTP (MCAG, 1992).

On-Base. Figure 3.2-10 shows the location of three gates that provide access to Castle AFB. The Main Gate (Gate 1) at Santa Fe Drive and Buhach Road is open 24 hours per day. Incoming vehicles from the Main Gate travel on Heritage Road; traffic divides at the intersection between F and G streets, with approximately 44 percent flowing toward Hospital Road and 56 percent toward Castle Street. Gate 2, about 0.6 mile southeast of Gate 1 on Santa Fe Drive, functions as a secondary access to the base, but as a primary access for industrial and commercial traffic. Gate 2 is open between 6:00 a.m. and 6:00 p.m. Gate 3, at Wallace Road and Hospital Road, about 0.8 mile east of Santa Fe Drive, functions as a secondary access and is used during peak hours by base personnel living north and west of the base. Gate 3 operates between 6:00 and 8:00 a.m., 11:30 a.m. and 1:00 p.m., and 4:00 and 5:30 p.m. Gates 2 and 3 are closed Saturdays, Sundays, and holidays.

All on-base roads are two-lane paved roads with curbs and gutters. Stop signs and speed limits are the primary means of traffic control. In general, speed limits are 25 mph on the main base and 15 mph in the family housing areas. Traffic volume data are not maintained on base. Traffic counts performed in October 1992 show 20,000 ADT at the three access gates (Gate 1 accounts for 53 percent of the total, Gate 2 for 35 percent, and Gate 3 for 12 percent). The key on-base roads, which receive the heaviest traffic, and their traffic volumes for the noon peak hour are: Heritage Road north of Gate 1, a two-way street with 670 vehicles; Castle Street, a one-way street with 450 vehicles; G Street, a two-way street with 550 vehicles; and E Street, a two-way street with 370 vehicles.



EXPLANATION

Airfield Pavement

Base Gates

Base Boundary

0 200 400 800 Feet

Key On-Base Roads

Figure 3.2-10

Preclosure Reference. Table 3.2-4 summarizes preclosure (1990) and projected closure (1995) conditions for key road segments. For each road segment the table shows hourly capacity in vehicles per hour, the peak-hour traffic volumes, and the corresponding LOS during peak hours. In 1990, SH 99 at Buhach Road operated at LOS B, and Santa Fe Drive between the Main Gate and Shaffer Road operated at LOS C. All other key local and on-base road segments operated at LOS A.

Closure Baseline. Table 3.2-4 also shows the traffic conditions of key roads projected for closure conditions (1995). Upon closure of Castle AFB, traffic generated by the base working population, residents, and their dependents will no longer exist, except as generated by the OL. Off-site traffic on key roads will have changed with population changes and with future land use. A rate of 2 to 4 percent is assumed for annual traffic growth on key regional and local road segments during the 1990-1995 period.

At closure (1995), the afternoon peak-hour traffic volumes will be reduced from preclosure (1990) levels on all key road segments. The reduction is estimated at 20 to 40 percent on Santa Fe Drive near the base, 50 percent on Buhach Road near Castle Gardens housing, and 10 to 20 percent on Bellevue Drive between Santa Fe Drive and Shaffer Road. On SH 99, the anticipated reduction in afternoon peak-hour traffic is below 5 percent. However, SH 99 at Buhach Road would deteriorate to LOS C due to regional traffic increases. Santa Fe Drive between Shaffer Road and the Main Gate would operate at LOS B, compared to LOS C at preclosure. Other key road segments will continue to operate at the preclosure level (LOS A).

Upon closure, traffic on base roads will be limited to the movement of the OL, which will be minimal. All on-base roads will operate at LOS A.

Public Transportation. The Merced Area Regional Transit Service (MARTS) provides countywide public transit service with two fixed routes along Santa Fe Drive and SH 99 in the Atwater area. MARTS provides weekday bus service from the Main Gate to and from Merced. The MARTS bus fleet has 14 vehicles. Greyhound-Trailways provides intercity bus passenger service via SH 99 with a station in Merced and a stop in Atwater. Very few base personnel use these public transportation systems and no formal car or vanpooling programs are currently in effect at Castle AFB. One of the RTP (MCAG, 1992) objectives is to increase public transit and carpooling and vanpooling by 3 percent annually.

3.2.3.2 Airspace/Air Traffic. Airspace is a finite resource that can be defined vertically and horizontally, as well as temporally, when describing its use for aviation purposes. As such, it must be managed and utilized in a manner that best serves the competing needs of commercial, general, and military aviation interests. The FAA is responsible for the overall management of airspace and has established different airspace designations

Table 3.2.4. Peak-Hour Traffic Volumes on Key Roads

Road	Capacity[a] (VPH)	Preclosure (1990) Traffic[b]	Preclosure (1990) LOS	Closure (1995) Traffic[c]	Closure (1995) LOS
Regional					
State Highway 99					
Buhach Road Southeast	7,200	3,850	B	4,550	C
Buhach Road Northwest	7,200	3,850	B	4,700	C
Local					
Santa Fe Drive, 2-lane segments					
Chestnut Lane-Shaffer Road	1,800	777	A	600	A
Shaffer Road-Wallace Road	1,800	1,405	C	1,100	B
Wallace Road-Buhach Road	1,800	1,332	C	1,200	B
Santa Fe Drive, 4-lane segments					
Buhach Road-Bellevue Road	3,600	2,095	A	1,900	A
Bellevue Road-Gate 2	3,600	2,095	A	1,650	A
Gate 2-Gurr Road	3,600	1,682	A	1,250	A
Beachwood Drive-SH 59	3,600	2,129	A	1,800	A
West Olive Avenue					
SH 59-R Street	4,500	1,470	A	1,250	A
Buhach Road					
Santa Fe Drive-Bellevue Road	3,000	1,108	A	650	A
Bellevue-Juniper Avenue	3,000	781	A	500	A
Juniper Av-SH 99	3,000	612	A	500	A
Bellevue Road					
Santa Fe Drive-Buhach Road	2,250	1,040	A	1,000	A
Buhach-Castle Drive	3,000	1,570	A	1,400	A
Castle Drive-Shaffer Road	3,000	1,641	A	1,600	A
Juniper Avenue					
Buhach Road-Shaffer Road	3,000	591	A	350	A
Wallace Road					
Gate 3-Santa Fe Drive	1,500	228	A	50	A
On-Base					
Heritage Road					
Main Gate	3,000	666	A	50[d]	A
Castle Street					
Heritage Road-E Street	1,500	446	A	50[d]	A
G Street,					
Heritage Road-Hospital Road	1,500	549	A	50[d]	A
E Street					
Castle Street-9th Street	1,500	368	A	50[d]	A

Notes: (a) Capacity figures are those used by the County-wide Traffic Model, Merced County Association of Governments.
(b) For SH 99, the source is 1990 Traffic Volumes by California Department of Transportation for local road segments, the source is the County-wide Traffic Model; for on-base roads, the source is 1992 short-period counts performed for this study and assumed to apply to 1990 as well.
(c) For SH 99, a growth rate of 4.4 percent annually is assumed for the period 1990-1995 based on 1991 Traffic Volumes by California Department of Transportation. For local roads, an arbitrary growth rate of 2 percent annually is assumed based on personnel drawdown and population out-migration from the Atwater area. A 3-percent growth rate is assumed on Olive Avenue, based on city of Merced population increases under the closure conditions.
(d) The closure 1995 on-base road traffic volumes are rough estimates and should be interpreted as very low volumes.
LOS = Level of Service.
VPH = Vehicles per hour.
SH = State Highway.

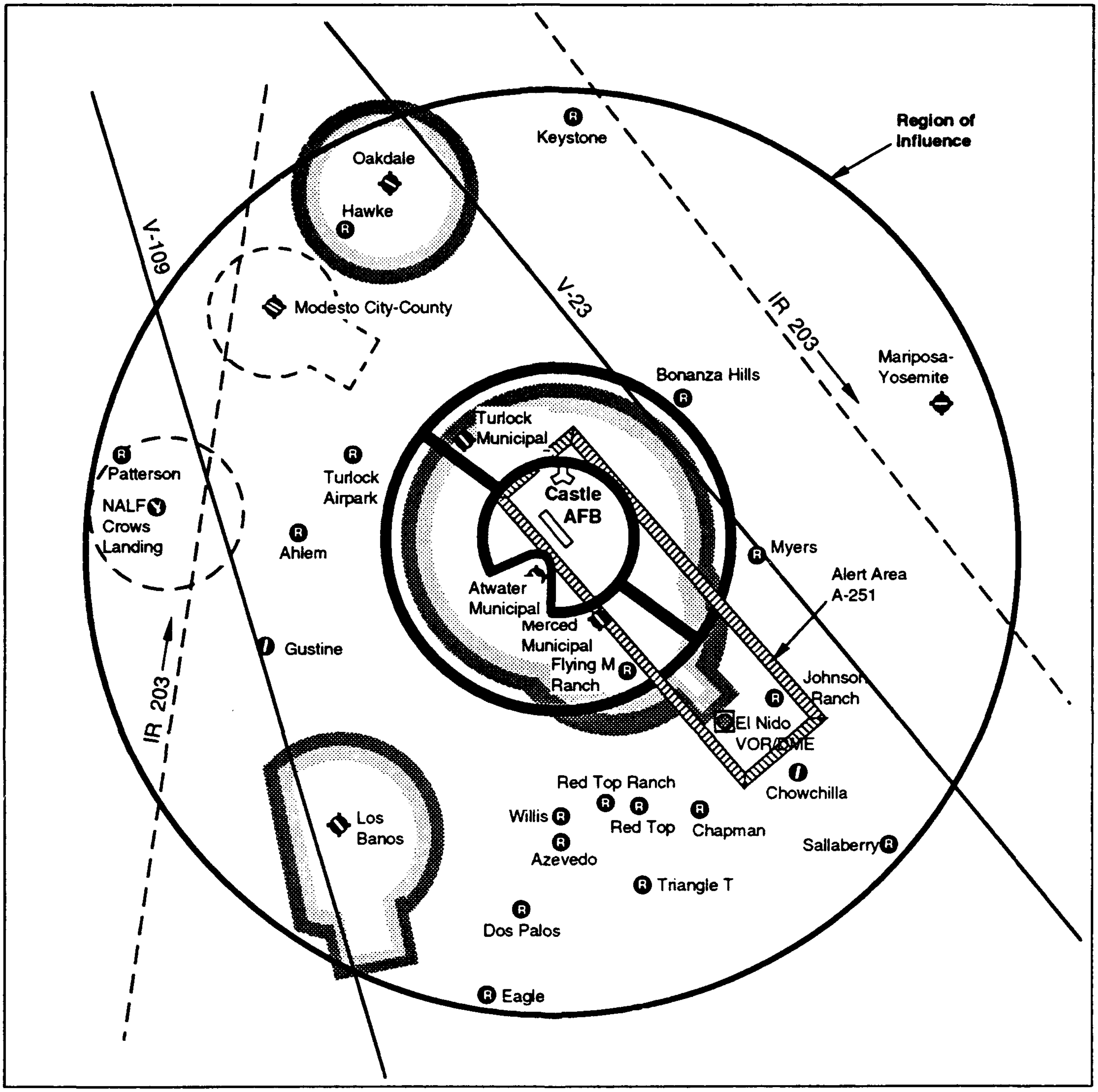
that are designed to protect aircraft while operating to or from an airport, transitioning en route between airports, or operating within "special use" areas identified for defense-related purposes. Rules of flight and ATC procedures have been established, which govern how aircraft must operate within each type of designated airspace. All aircraft operate under either instrument flight rules (IFR) or VFR.

The type and dimension of individual airspace areas established within a given region and their spatial and procedural relationships to one another are contingent upon the different aviation activities conducted in that region. When any significant change is planned for this region, such as airport expansion, a new military flight mission, etc., the FAA will reassess the airspace configuration to determine if such changes will adversely affect (1) ATC systems and/or facilities, (2) movement of other air traffic in the area, or (3) airspace already designated and used for other purposes (i.e., restricted areas).

The ROI selected for this airspace analysis is an area within a 30-nautical mile radius of Castle AFB from the surface up to 10,000 feet above mean sea level (MSL). The ROI encompasses the different airspace areas that were associated with preclosure operations at Castle AFB. Airspace within and immediately surrounding this ROI is under the jurisdiction of Oakland Air Route Traffic Control Center (ARTCC), which is operated by the FAA. In the vicinity of Castle AFB, Castle Radar Approach Control (RAPCON) has been delegated the responsibility of providing approach and departure control to all IFR aircraft. Aircraft operations at other airfields within the ROI, as well as flyover traffic, are managed by ATC airspace operating procedures in order to minimize potential airspace conflicts with traffic from Castle AFB. Airspace above 10,000 feet MSL is controlled by Oakland ARTCC and is not affected by operations within the ROI that are attributable to Castle AFB.

Preclosure Reference. An understanding of the ROI for airspace/air traffic environment and its use under the preclosure reference is necessary to help determine its capability and capacity to assimilate future aviation activities into the National Airspace System. Constraints and considerations such as terrain, runway alignments, and air traffic flows would apply under alternate aviation uses of Castle AFB.

Airspace designated for ATC purposes around Castle AFB consists of low-altitude federal airways, military training routes, transition areas, control zones, control areas, and aircraft approach alert areas. Figure 3.2-11 depicts each of the designated ATC airspace areas in the Castle ROI. Navigational aids at Castle AFB include tactical air navigation (TACAN) and ASR. Although the navigational aids are generally well maintained and in good condition, some of the equipment is not compatible with FAA standards and will likely be removed following closure. The El Nido very high frequency omnidirectional range/distance measuring equipment



EXPLANATION

Hard surface runways 1500-8000 ft. in length

Services - Fuel available and field tended during normal working hours

Private - non-public use

0 3 6 12 Nautical Miles

0 3 6 12 Miles

VOR/DME

Control Zone

TACAN

V-109 Low-Altitude Airway

ARSA (Airport Radar Service Area)

Transition Area Controlled Airspace

Warning and Alert Area

Military Training Route

NALF Naval Auxillary Landing Field

Airspace Region of Influence

Figure 3.2-11

(VOR/DME) navigational beacon is located within the Castle AFB airspace ROI. This VOR/DME is operated and maintained by the FAA. The Castle AFB RAPCON controls airspace that is delegated to the base by Oakland ARTCC. Castle AFB provides ATC services to arriving and departing aircraft, as well as aircraft practicing approaches, for Castle AFB and the surrounding airports within the ROI. An Airport Radar Service Area (ARSA) has been established for Castle AFB, requiring aircraft to be in radio communications with Castle ATC while operating within the ARSA airspace.

The traffic patterns, instrument approaches, and departure procedures used at Castle AFB under preclosure conditions represent the airspace requirements for IFR aircraft operating at the base and transitioning between the base and the en route airspace system. A total of 107,175 operations conducted by both transient aircraft and aircraft based at Castle AFB were recorded in 1990 (Table 3.2-5).

Table 3.2-5. Castle AFB Aircraft Operations, 1990

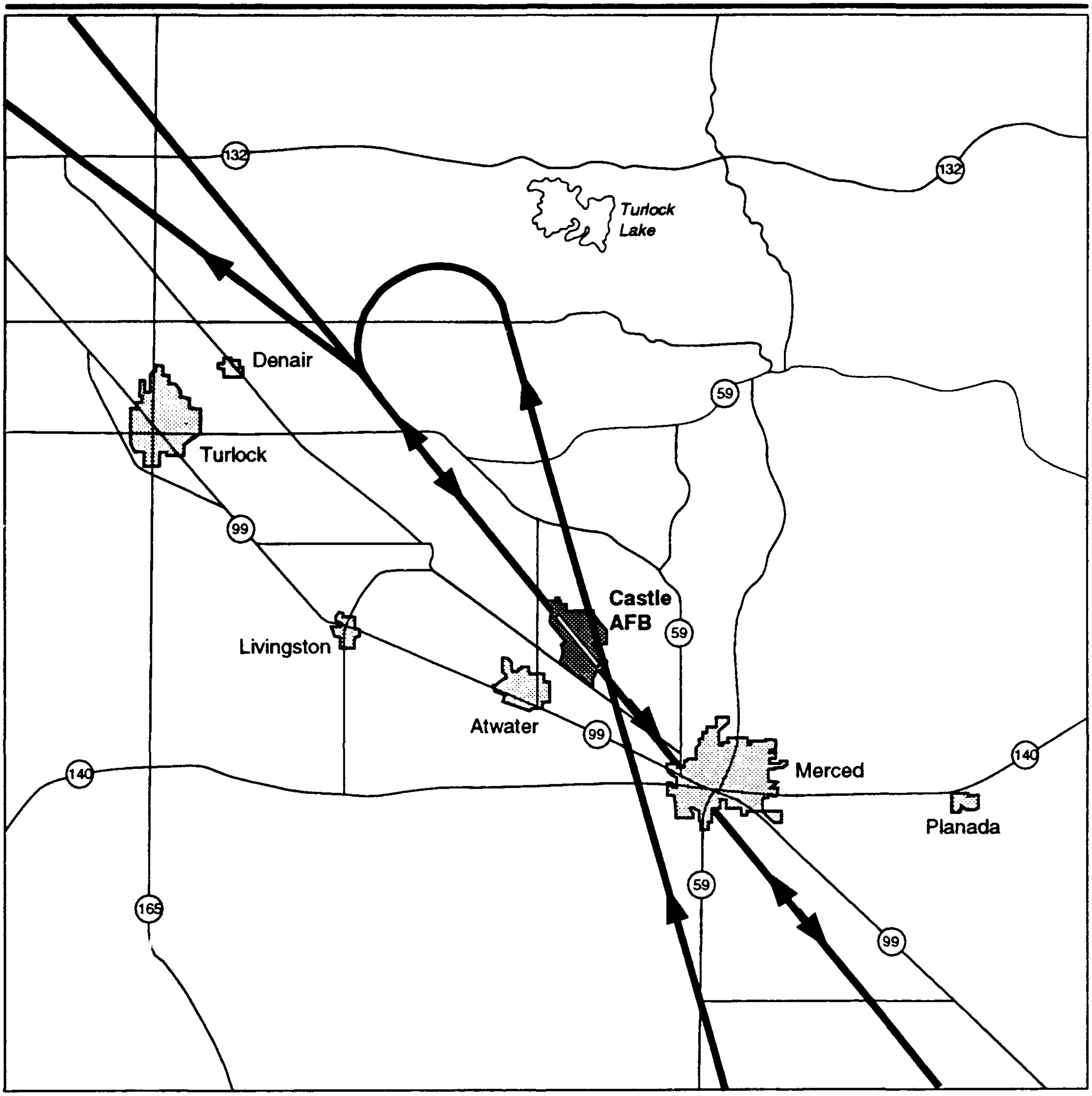
		Aircraft Operations			
Assignment	Type	Day	Evening	Night	Total
Aircraft based at Castle AFB	B-52G	33,690	1,331	3,994	39,015
	KC-135 A	15,126	540	1,621	17,287
	KC-135R	33,164	1,338	4,013	38,515
Transients		11,457	226	677	12,359
Totals		93,436	3,435	10,304	107,175

Note: An aircraft operation is one takeoff or one landing.

The orderly flow of the base IFR aircraft is predicated on the use of instrument procedures and traffic patterns or other directions from ATC to maintain proper sequencing and separation. Primary published IFR arrival and departure flight paths are shown on Figure 3.2-12.

Defense-related airspace within the ROI includes a 20-mile by 6-mile aircraft alert area (A-251) as shown on Figure 3.2-11. The placement of A-251 on regional aviation maps is intended to advise all aircraft to be aware of B-52 and KC-135 instrument approach training operations that are conducted in the Runway 31 approach area south of Castle AFB.

In addition to A-251, other defense-related airspace within the ROI includes an IFR military training route (IR-203), which consists of a north route passing to the west of Castle AFB and a south route to the east of Castle AFB. The IFR military training routes are used by DOD and associated Reserve and Air Guard units for low-altitude navigation and tactical training in both IFR and VFR weather conditions at altitudes below 10,000 feet MSL and at airspeeds in excess of 250 knots.



EXPLANATION

Published IFR Arriving and Departing Flight Paths

Primary IFR Arriving and Departing Aircraft Flight Paths

0 1.5 3 6 Miles

Figure 3.2-12

Within the ROI there are 9 public and 18 private airports. Aircraft operations at these airports occur primarily during VFR weather conditions. Of these 27 civilian airports within the ROI, only Merced Municipal Airport and Modesto City-County Airport have ILS runway approach procedures. Aircraft operating at these airports are generally unaffected by flight operations at Castle AFB. Aircraft within the ROI generally contact Castle AFB approach control when approaching an area airport or transitioning through the ROI airspace. Activity levels at nearby airports for 1991 are illustrated in Table 3.2-6. The three public airports within the Castle AFB radar service area are Turlock Municipal (7 miles north of Castle AFB), Atwater Municipal (2 miles west of Castle AFB), and Merced Municipal (5 miles south of Castle AFB).

Table 3.2-6. Annual Aircraft Operations for Civil Public-Use Airports in the Vicinity of Castle AFB

	Annual Operations	
Airport	1991	1992
Atwater Municipal	11,864	N/A
Merced Municipal	54,730	57,000
Turlock Municipal	N/A	25,600
Modesto City-County	120,953	130,000

N/A = Not available.

Sources: California Department of Transportation, 1991a; Federal Aviation Administration, 1991, 1992a, 1992b.

Closure Baseline. Upon termination of flight operations at Castle AFB, all designated ATC airspace areas, Alert Area A-251, and published instrument procedures would be canceled and the areas would revert to the control of the Oakland ARTCC. The RAPCON, control tower, and navigational aids could be removed from operational service, pending reuse requirements for these facilities. VFR aircraft operating from the surrounding public and private airports could transit freely through the airspace surrounding the closed airfield without any tower communication requirements or concerns with military aircraft operations. These airports would experience the greatest effects the loss of the Castle AFB radar service area. Pilots departing and approaching these airports will no longer have the ATC guidance that the base has provided.

3.2.3.3 Air Transportation. Air transportation includes passenger travel by commercial airline and charter flights, business and recreational travel by private (general) aviation, and priority package and freight delivery by commercial and air carriers.

Scheduled passenger service for the region surrounding Castle AFB is available at Merced Municipal Airport, Modesto City-County Airport, and Fresno Air Terminal. Fresno lies outside the airspace ROI, but is included in this analysis because it is the closest airport to Castle AFB providing jet service. Merced, which is 6 miles from Castle AFB, recorded 5,256 passengers boarded in 1991. Modesto, which is approximately 28 miles north of Castle AFB, recorded 31,230 passengers boarded in 1991. Fresno Air Terminal, located approximately 45 miles south of Castle AFB, recorded 446,743 passengers boarded in 1991.

Of these three airports, only Fresno Air Terminal has scheduled cargo activity. In 1991, 3,645 tons of cargo were loaded.

It can reasonably be assumed that at base closure, the number of passengers using the Merced and Modesto airports and the Fresno Air Terminal will decrease. The reduction in the total number of passengers would likely be largest at Fresno, but this loss would represent a smaller percentage of total enplanements than at the Merced and Modesto airports. The volume of cargo processed at the Fresno Air Terminal should remain relatively unchanged because the Air Force tends to process much of its own cargo.

3.2.3.4 Other Transportation Modes. The Southern Pacific (SP) Railroad runs adjacent to SH 99 and through the commercial/industrial areas south of Atwater. The AT&SF operates a rail line adjacent and parallel to Santa Fe Drive. This railroad serves the base with a spur that is not currently in use.

Both rail lines provide freight service. Commodities commonly transported by rail include grains, vehicles, and fuels. AT&SF accommodates Amtrak trains with stations in Riverbank, Turlock, Merced, and Fresno. In 1991, there were 53,253 Amtrak passengers boarding or alighting at Merced Station (a 6 percent increase from 1990), traveling on four trains per day in each direction.

Most railroad crossings in the vicinity of the base are at-grade. The city of Atwater and SP are working together to facilitate the use of the SP rail line by Amtrak. One of the objectives of the RTP (MCAG) is to reroute Amtrak rail service to the SP rail tracks by 1995.

Upon closure of Castle AFB, no major change in local regional rail service is expected. Amtrak ridership in Merced Station is likely to continue to increase in relation to population increases.

3.2.4 Utilities

The utility systems addressed in this analysis include the facilities and infrastructure used for:

- Potable water pumping, treatment, storage, distribution, and demand

- Wastewater collection and treatment

- Solid waste collection and disposal

- Energy generation and distribution, including the provision of electricity, natural gas, and central heating systems.

The ROI for utilities is made up of the service areas of each utility purveyor servicing the base and local community. The major components of these utility systems include processing and distribution capacity, storage capacity, average daily consumption, peak demand, and related factors required to determine the adequacy of such systems to provide service in the future.

The ROI includes on-base and off-base housing areas, the cities of Atwater and Merced, the community of Winton, and unincorporated portions of Merced County.

Population and projected demand for utilities through 1995 (closure) were obtained from various utility purveyors for each of their respective service areas. Baseline utility demand through 1994 (Table 3.2-7) is based on estimated population changes in the communities around Castle and the future rates of per capita consumption either explicitly indicated by each purveyor's projections or derived from those projections.

For each utility, the most recent comprehensive projections were made prior to the base closure announcement and do not take into account the decrease in demand from the base that would occur after closure. The projections shown in Table 3.2-7 have been adjusted to reflect that decrease in demand.

3.2.4.1 Water Supply

On-Base. Castle AFB currently derives the majority of its water from two new, on-base wells (10 and 12), which are approximately 900 feet deep. Two older, shallow wells (6 and 7) serve the facilities in the northeast part of the base (WSA, small arms range). The total pumping capacity of the base wells is 7.2 MGD. The water from wells 10 and 12 is chlorinated, fluoridated, and pumped directly into the water distribution system. Most of the older, shallower wells on base have been taken out of service due to poor water quality. The two active wells are deep enough to be unaffected by contamination. The availability of water is limited by the total capacity of the pumping and treatment systems. As of August 1993, water for the

Table 3.2-7. Estimated Utility Demand in the ROI

	Preclosure 1990	1991	1992	1993	1994	Closure 1995
Water consumption (MGD)	24.2	21.8	25.0	25.9	26.4	24.4
Wastewater treatment (MGD)	10.4	10.4	10.7	11.0	11.3	10.4
Solid waste disposal (tons/day)	542	554	566	585	601	592
Electricity consumption (MWH/day)	1,234	1,256	1,267	1,306	1,328	1,174
Natural gas consumption (thousand therms/day)	79.3	81.6	82.8	85.6	87.4	80.5

Notes: The 1990, 1991, and 1992 figures were obtained from the base utility service billings and from each utility provider. Some figures were estimated. The 1993, 1994, and 1995 figures were estimated using the per capita rates and the projected population in the ROI, accounting for base drawdown.
MGD = Million gallons per day.
MWH = Megawatt-hours.

Castle Gardens and Castle Vista housing areas was supplied by Atwater's system.

Average daily water usage for the main base and Castle Gardens in 1990 (based on pumped quantities) was 1.34 MGD with an average of 2.3 MGD during the peak month of July and an average of 0.47 MGD during the minimum use month of December. Water consumption throughout the year displays a clear seasonal variation with a summer peak extending from early May until October. About 40 percent of the water pumped is used for landscape maintenance. The net domestic water use is best reflected by January and February records which average 0.8 MGD.

Domestic water storage capacity consists of two elevated tanks of 500,000 and 15,000 gallons, respectively. The distribution system appears to be in excellent condition.

Off-Base. Four domestic water purveyors serve the Castle area: the city of Atwater, Winton Water and Sanitary District (WSD), the Meadowbrook Water Company, and the city of Merced. In 1990, the city of Atwater obtained domestic water from seven wells located within the city boundaries. The pump depths at these wells vary from 70 to 177 feet. The total water pumping capacity for Atwater is 10.8 MGD; average demand in 1990 was 6.0 MGD; and peak demand was 10.1 MGD in July. Due to contamination, many wells are no longer operable and new wells are being developed. All operating wells are monitored for chlorine and related chemicals. The Atwater water storage system consists of a 1-million-gallon elevated tank with a usable capacity of 750,000 gallons; the remainder is used as a backup for fire fighting.

The community of Winton obtains domestic water from five groundwater wells at depths ranging from 300 to 900 feet with a total pumping capacity of 7.2 MGD. In 1990, Winton used on average 1.5 MGD. The WSD owns and operates the system, which includes pressure tanks instead of elevated tanks.

The Franklin/Beachwood residential area obtains domestic water from four groundwater wells, at depths ranging from 18 to 175 feet, and a total pumping capacity of 3.45 MGD. Meadowbrook Water Company owns and operates the water system. This community does not have an elevated tank but, instead, uses eight pressure tanks. No contamination problems are reported. In 1990, the community used an average of 0.8 MGD.

Water for the city of Merced is drawn from 19 groundwater wells at depths ranging from 161 to 850 feet with a total pumping capacity of approximately 38 MGD. In 1990, water use averaged 14.6 MGD. The Merced water storage system consists of four elevated tanks (300,000 to 500,000 gallons) with a total capacity of 1.5 million gallons.

Preclosure Reference. In 1990, the water storage and distribution system requirements for pressure, domestic, fire, and sprinkler demand were met in the ROI. In 1990, the ROI had a pumping capacity of 66.7 MGD and a storage capacity of 3.0 million gallons; total demand averaged 24.3 MGD. Table 3.2-5 shows the water demand in the ROI for preclosure years 1990 through 1994.

Closure Baseline. Water demand at Castle AFB will decrease to an average of 0.3 MGD at closure, used during caretaker activities. By 1995, the water demand for the ROI, including the base, would be 24.4 MGD (Table 3.2-7).

3.2.4.2 Wastewater

On-Base. Domestic sewage at Castle AFB (including Castle Gardens) is discharged to the base wastewater treatment plant (WWTP). Average daily sewage flow in 1990 was 0.5 MGD; the monthly sewage flows show little variation during the year. The collection system includes a gravity main and several force mains from on-base lift stations. A primary concern is root intrusion.

The base has both domestic and industrial wastewater treatment. The WWTP at Castle was placed in operation in 1941. A rectangular primary clarifier, a large trickling filter, and a large secondary clarifier were added in 1952, raising the rated capacity to the current 1.0 MGD. The effluent is chlorinated, pumped to an aeration basin, and then discharged under National Pollutant Discharge Elimination System (NPDES) permit number CA0082996 to Canal Creek downstream of the Livingston Canal diversion. The bulk of the industrial wastewater is generated at the aircraft wash rack and the fuel cell maintenance dock. Industrial wastewater is pretreated with a membrane filter and then discharged into the WWTP for treatment with the domestic wastewater.

The Castle WWTP operates under a Waste Discharge Requirements order issued by the California Regional Water Quality Control Board, Central Valley Region in 1979. This is still in effect, but now is conducted under an NPDES permit. There is no expiration date for the waste discharge limits, though the Central Valley Regional Water Quality Control Board reserves the right to revise the requirements when necessary. The Central Valley Regional Water Quality Control Board indicated that there is evidence of past discharge operations conducted over an abandoned landfill, which may have had an impact on groundwater quality and requested that the base prepare a Report of Waste Discharge evaluating alternative disposal options (Metcalf & Eddy, 1992). This evaluation resulted in the termination of discharging treated effluent over the abandoned landfill in favor of discharging it into Canal Creek. A recent feasibility study conducted for the city of Atwater recommends connecting the base WWTP to the ARWTP, rather than constructing a new plant at the base (Nolte and Associates, 1992). Untreated wastewater from Castle AFB would be conveyed to the ARWTP for treatment via a new trunk sewer line. This trunk line may be completed prior to base closure.

The Castle Vista housing sewer system is maintained by the city of Atwater and connected to the ARWTP.

Off-Base. The ROI for wastewater collection, treatment, and disposal consists of the cities of Atwater and Merced, the community of Winton, and the unincorporated residential area of Franklin/Beachwood.

The ARWTP is owned and operated by the city of Atwater and serves Atwater and Winton, including wastewater from the Davis Cannery. The Atwater facility began operations in 1950, and was upgraded in 1979 and 1991. The Atwater and Winton wastewater is characteristic of municipal wastewater. However, the biological oxygen demand loading from the cannery can be quite high (with an average population equivalent of approximately 60,000, a little more than twice the population serviced).

The design average dry weather flow treatment capacity for the ARWTP is 6 MGD based on a maximum flow from the Davis Cannery of 0.7 MGD. The design hydraulic capacity of the plant is 12 MGD. In 1990, the plant treated an average of 3.2 MGD. The plant provides secondary treatment, and the effluent meets applicable standards. The effluent is discharged to the Atwater Drain, a tributary of Bear Creek, which flows into the San Joaquin River. The Atwater sewer system relies heavily on pump stations.

The Franklin/Beachwood residential area has an on-site sewer facility with a small treatment plant that can handle 0.4 MGD. The average daily use is

0.25 MGD (with a remaining capacity of 0.15 MGD). In the future, with more residential development, the connection of this community sewer system to the Atwater plant may become feasible.

The Merced Wastewater Treatment Plant (MWTP) is designed for average daily flows up to 10 MGD and short-term peak flows up to 23 MGD. The plant provides secondary treatment. The effluent, which meets applicable standards, is used to supplement irrigation water. In 1990, the MWTP treated an average of 6.4 MGD.

Preclosure Reference. Approximately 10.4 MGD of wastewater were generated within the ROI in 1990. The combined treatment capacity of the base, Atwater, Merced, and Franklin/Beachwood plants is 17.4 MGD. All communities are served with extensive collection systems and rely heavily on pumping. Table 3.2-7 displays wastewater treatment demand in the ROI for preclosure years 1990 through 1994.

Closure Baseline. Baseline wastewater flows at Castle AFB would decrease in proportion to the personnel drawdown. It is estimated that 0.03 MGD of wastewater would be produced at closure, resulting from caretaker activities. Wastewater generated would be so minimal that flow in the pipes would soon be stopped by accumulation of debris and sediment. For this reason, a new, small on-site wastewater system or establishment of a connection to the Atwater sewer system would occur at closure.

The total wastewater production in the ROI in 1995 would be about 10.4 MGD (see Table 3.2-7).

3.2.4.3 Solid Waste

On-Base. Solid waste generated by on-base organizations and residents of the military housing areas is hauled off base by a private contractor to the Highway 59 Landfill. In 1990, the base generated an average of 9.5 tons of nonhazardous solid waste, per day.

Nonhazardous solid wastes within the county are disposed of at one of the two landfill sites in the county. The Merced County Department of Public Works operates these landfills and two transfer stations. The west side of the county is served by the Billy Wright Road Landfill and the Dos Palos Transfer Station, while the eastern portion of the county is served by the Highway 59 Landfill and the Livingston Transfer Station. Solid waste collection services in the county are provided by four municipal systems and six private companies.

The landfill sites are directly managed through operating plans which were updated in 1985. Overall planning for solid waste collection and disposal systems is contained in the Merced County Solid Waste Management Plan

(SWMP). This plan provides the goals, policies, and programs to provide adequate solid waste facilities with capacity to meet projected needs. This plan, last updated in 1983, is undergoing its second 3-year review. The current review will include requirements of the county to meet California requirements for an 8-year capacity at both landfills and achieve a recycling rate of 20 percent of all solid wastes. It is currently estimated that the remaining capacity of the Highway 59 site is 6 years and the Billy Wright Road site is 8 years. The future landfill needs of the county through the year 2000 will be met by expansion of these sites; no new sites are presently contemplated. The Highway 59 site is proposed for a 200-acre expansion adding an additional 19 years capacity. A 37.5-acre expansion of the Billy Wright Road site will add 6 years capacity.

Off-Base. Solid waste generated in Atwater and the communities of Winton and Franklin/Beachwood is handled by a private contractor and disposed of in the Highway 59 Landfill. The city of Merced Public Works Department handles the refuse produced by Merced.

Preclosure Reference. Merced County generated 191,522 tons of nonhazardous solid waste in 1989 and approximately 197,700 tons in 1990. This represents approximately 6.1 pounds per day per capita. Merced County's resource recovery rate in 1989 was 1.6 percent. The Highway 59 Landfill received approximately 156,000 tons or 78 percent of the nonrecyclable nonhazardous waste in 1990. The Billy Wright Landfill received approximately 22 percent of the county's nonrecyclable nonhazardous solid waste. The county landfills received an average of approximately 525 tons per day for 1989, and 542 tons per day in 1990. Table 3.2-7 shows the amount of solid waste generated in the ROI for the preclosure years through 1994.

Closure Baseline. At base closure, Castle AFB will generate approximately 0.5 ton of nonhazardous solid waste per day, which represents less than 0.1 percent of the 592 tons produced daily in the ROI. Table 3.2-7 lists the amount of solid waste generated in the ROI for the preclosure years through 1994.

3.2.4.4 Energy

Electricity

On-Base. Castle AFB purchases its electricity from the WAPA and PG&E. The power is allocated to the base through one substation constructed in 1979. This substation consists of one transformer, rated 12/16 megavolt ampere (MVA)-115/12 kilovolt (kV), owned and maintained by PG&E. The electrical distribution system is a 12,000-volt delta consisting of overhead and underground lines constructed during the 1950s. There are three main feeders coming from the substation. The base does not have a central electrical generator plant. Backup power is provided by 48 generators ranging in power from 5 to 600 kilowatts (kw). These generators are in good operating condition.

The electrical distribution system on base operates at approximately 70 percent capacity, with a peak demand of 10.3 MVA at the single substation. The 1990 average daily usage of electricity was 185 MWH, including off-base housing. In the summer, the average usage for the base was 25 percent higher than the annual average month, primarily as a result of air conditioning.

Off-Base. Electricity is supplied by PG&E through major transmission lines (above 100 kV), concentrated along the SH 99 corridor. Major substations are located in Cressey, Winton, and Merced. PG&E is responsible for the maintenance and operation of electrical distribution lines in the region. In Atwater, 48 percent of electric energy consumed in 1990 was residential, 37 percent commercial, and 15 percent industrial.

Preclosure Reference. In 1990, Castle AFB consumed an average of 185 MWH/day, which represents about 15 percent of the ROI consumption of 1,234 MWH/day. Table 3.2-7 displays the electric energy demand in the ROI for the preclosure years 1990 through 1994.

Closure Baseline. At base closure, the demand for electric energy on base will decrease to 30 MWH/day, the amount necessary to keep buildings from deteriorating, for external lighting, and for caretaker needs. In the ROI, the average daily consumption would be 1,174 MWH/day (see Table 3.2-7). This decrease in electricity consumption upon closure is due to the loss of base activities and the population out-migration counterbalanced by the natural growth of the ROI population.

Natural Gas

On-Base. Natural gas is supplied to Castle AFB by PG&E through a main metering station near the Main Gate. Natural gas has been extensively used on base, mainly for heating with the exception of a few facilities that use heating oil. The natural gas distribution on base is a low-pressure piping system installed in the 1940s and the 1950s. The majority of piping is in fair and good condition.

The natural gas systems in the Castle Gardens and Castle Vista housing areas are maintained by PG&E. Both distribution systems are in good condition.

In 1990, natural gas usage for Castle AFB, including the off-base residential areas, averaged 5,700 therms per day. Natural gas usage peaks in the winter months due to heating.

Off-Base. PG&E supplies natural gas to the base and surrounding area via a main line along the SH 99 corridor.

Preclosure Reference. In 1990, the ROI consumed an average of 79,300 therms per day. Table 3.2-7 shows natural gas consumption in the ROI for preclosure years 1990 through 1994.

Closure Baseline. At base closure, the demand for natural gas at Castle AFB would decrease to an estimated 700 therms per day to prevent the buildings from deteriorating (minimum heating) and to satisfy the needs of the caretaker. In the ROI, the demand for natural gas would be 80,500 therms per day (see Table 3.2-7).

3.3 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

Hazardous materials and hazardous waste management activities at Castle AFB are governed by specific environmental regulations. For the purpose of the following analysis, the term hazardous waste or hazardous materials will mean those substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 42 U.S.C. §§9601-9675, and the Solid Waste Disposal Act (also known as the Resource Conservation and Recovery Act [RCRA] 42 U.S.C. §§6901-6992). In general, this includes substances that, because of their quantity, concentration, or physical, chemical, or toxic characteristics, may present an unreasonable risk to health, safety, and the environment when released.

The state regulations, which must be at least as stringent as the federal regulations, are outlined in the California Code of Regulations (CCR) Title 22, Section 30.

Transportation of hazardous materials is regulated by the federal DOT regulations within Chapter 49 of the CFR.

Treatment and disposal of nonhazardous waste, including wastewater, are discussed in Section 3.2.4, as part of infrastructure support.

The ROI encompasses all geographic areas that are exposed to the possibility of a release of hazardous materials or hazardous wastes. The ROI for known contaminated sites is within the existing base boundaries, with the exception of three groundwater contamination plumes that originate on the base but are known to migrate off site. Specific on- and off-base geographic areas affected by past and current hazardous waste operations, including remediation activities, are presented in detail in the following sections.

The preclosure reference for the purposes of this analysis was established as October 1991. This date represents conditions of full mission operation prior to the initiation of drawdown activities.

3.3.1 Hazardous Materials Management

Preclosure Reference. Hazardous materials most commonly utilized at Castle AFB include aviation and motor fuels, a myriad of petroleum products such as motor oils and lubricants, hydraulic fluids, cleaning solvents, pesticides (see Section 3.3.6), paints, and thinners. These materials are delivered to base supply (Building 1360) and are either distributed to the workplaces for immediate use or transferred to the Hazardous Materials Storage Compound (Buildings 1263 through 1270) for long-term storage.

The Castle AFB Spill Prevention and Response (SPR) Plan provides response guidelines for spills of oils and hazardous substances. The SPR Plan identifies and coordinates responsibilities, resources, and remediation procedures; it also provides spill prevention control measures. The SPR Plan guidelines maintain compliance with all applicable federal, state, and local regulations. This document combined the Spill Prevention Control and Countermeasures Plan and the Oil and Hazardous Substance Pollution Prevention Contingency Plan (U.S. Air Force, 1990b).

Material Safety Data Sheets for all hazardous materials utilized on base are kept on file in the Bioenvironmental Engineering Office, Building 118.

Closure Baseline. After base closure, only caretaker personnel will be using hazardous materials. All parties will be responsible for managing these materials in accordance with federal, state, and local regulations to protect their employees from occupational exposure to hazardous materials and to protect the public health of the surrounding community. Pursuant to Air Force policy, the parties will generally comply with the federal Emergency Planning and Community Right-to-Know Act, also known as the Superfund Amendments and Reauthorization Act (SARA), Title III. The Air Force will also comply with Chapter 6.95 of the California Health and Safety Code (Title 19 CCR); Castle AFB has submitted a hazardous materials handler business plan to the Merced County Department of Public Health.

The OL will be responsible for the safe storage and handling of all hazardous materials used in conjunction with base maintenance operations, such as paint, paint thinner, solvents, corrosives, ignitibles, pesticides, and miscellaneous materials associated with vehicle and machinery maintenance (motor oils/fuels). These materials will be delivered to the base in compliance with the Hazardous Materials Transportation Act (HMTA) under 49 CFR.

3.3.? Hazardous Waste Management

Pre... e Reference. Normal operations at Castle AFB currently produce wastes defined as haza·dous by RCRA; 40 CFR 261-265; and Title 22, Division 4, Chapter 30 of the CCR.

Hazardous wastes generated at Castle AFB are the responsibility of the Environmental Flight located in the Civil Engineering complex (Building 1200). Wastes most commonly generated include waste oils and fuels (including storage tank rinsate and sorbent materials), wastewater treatment and oil/water separator sludge, batteries, solvent residues, and others. An estimated 56,000 gallons and 340,000 pounds of these hazardous wastes were turned in to the Defense Reutilization and Marketing Office (DRMO) for disposal during calendar year 1991.

These wastes are gener... ar . held at 22 hazardous waste daily collection points located throughout th. industrial areas of the base (Table 3.3-1). Under an agreement with California EPA, the wastes at these points are collected at the beginning of each duty day and taken to the hazardous substance control facility (Building 8E?). This facility, as well as the hazardous waste drum storage facility (Buildings 1524 and 1526), and the Army-Air Force Exchange System (AAFES) service station (Building 785) make up the three 90-day accumulation points utilized at Castle AFB. Over 55 gallons of hazardous waste may be accumulated at each of these locations for up to 90 days. Additionally, the paint shop serves as the only satellite waste accumulation point on base, where up to 55 gallons of hazardous waste may be stored on site for an indefinite period of time. Wastes are accumulated at daily collection points and taken to the hazardous substance control facility for waste segregation and analysis. Wastes are then transferred to the hazardous waste drum storage facility. Final inspection and manifesting takes place prior to disposal off base. A permitted hazardous waste transporter is used for off-base disposal of these wastes. The drum storage facility is currently operating under an RCRA interim Part B permit. The latest revision of the Part B application was submitted to California EPA on October 30, 1991, and is under review by the California Department of Toxic Substances Control (DTSC), Region 1. The AAFES service station separately contracts with a permitted contractor for hazardous waste removal.

On-base management of hazardous waste is outlined in the Castle AFB Hazardous Waste Management Plan, which provides definition of waste types, waste handling and administrative guidelines, and training requirements (U.S. Air Force, 1992c). The SPR Plan addresses procedures and resources for preventing and remediating release of hazardous waste.

Closure Baseline. At the time of base closure, all of the hazardous waste generated by base functions will have been collected from all storage and

Table 3.3-1. Hazardous Waste Accumulation Points

Site	Location (Building)	Description
Daily Collection Sites		
1	35/545	Security Police Arms Room
2	T-51	Museum Hangar
3	T-65	Military Service Station
4	T-90	Vehicle Operations
5	175/1332	Weapons System/Air Refueling Trainers
6	325	Vehicle Maintenance Complex
7	340	Auto Crafts Shop and Parts Store
8	508	Petroleum Operations
9	949	Engine Test Cell Shop
10	1200	Civil Engineering Complex
11	1213	Life Support
12	1253	Metal Shops
13	1260	Jet Engine Maintenance
14	1313	Waste Jet Fuel Storage
15	1319	Aircraft Maintenance Tool Cache
16	1324	AGE Repair Shop
17	1335	T-40 Trainer/Supply
18	1350	Aircraft Maintenance
19	1509	Fuel System Repair
20	1532	Non-Destructive Inspection Laboratory
21	1550	Munitions Maintenance
22	1709	Surveillance Inspection Shop
Satellite Accumulation Point (up to 55 gallons)		
1	1354	Paint Shop
Accumulation Points (90-day storage)		
1	785	AAFES Service Station[a]
2	850	Hazardous Substance Control Facility
Interim Part B Storage Facility (1-year storage)		
1	1524/1526	Hazardous Waste Drum Storage Facility

Notes: Data current as of October 6, 1992.
(a) Maintains separate service contract for waste disposal.

Source: U.S. Air Force, 1992c.

designated accumulation and collection points and disposed off site to a permitted facility, in accordance with RCRA. Hazardous waste generated by the OL will be tracked to ensure proper identification, storage, transportation, and disposal, as well as implementation of waste minimization programs.

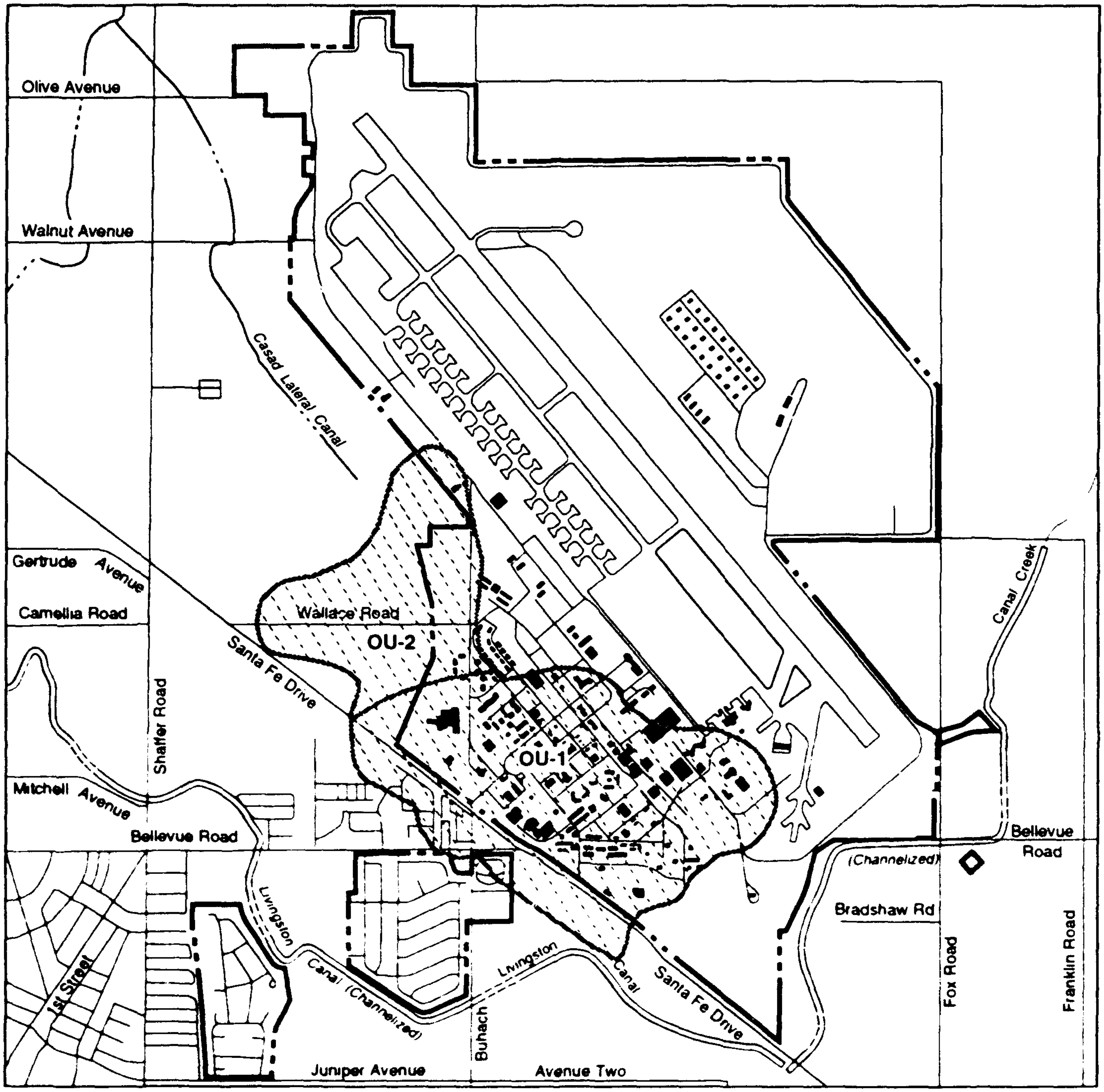
In order to comply with Title 22, Section 66265 of the CCR, a closure plan for the hazardous substance control facility and the AAFES service station accumulation point is provided in the Hazardous Waste Management Plan. Closure of the hazardous waste drum storage facility will occur within 120 days after base closure and is a condition of the interim Part B permit.

3.3.3 Installation Restoration Program Sites

The IRP is an Air Force program to identify, characterize, and remediate past environmental contamination on its installations. Although widely accepted at the time, procedures followed prior to the mid-1970s for managing and disposing of many wastes often resulted in contamination of the environment. The program has established a process to evaluate past disposal sites, control the migration of contaminants, and control potential hazards to human health and the environment. Section 211 of the SARA, codified as the Defense Environmental Restoration Program (DERP), of which the Air Force IRP is a subset, ensures that the DOD has the authority to conduct its own environmental restoration programs. The DOD coordinates IRP activities with U.S. EPA and appropriate state agencies.

Prior to passage of SARA and the establishment of the National Contingency Plan (NCP) for hazardous waste sites, Air Force IRP procedures followed DOD policy guidelines mirroring the U.S. EPA's Superfund Program. Since SARA was passed, many federal facilities have been placed on a federal docket and the U.S. EPA has been evaluating the facilities' waste sites for possible inclusion on the National Priorities List (NPL). Castle AFB was officially listed on the NPL in July 1987.

On November 21, 1989, the U.S. Air Force entered into a Federal Facility Agreement (FFA) with U.S. EPA Region IX and the state of California. The California Department of Health Services (DHS) was the designated single state agency responsible for the federal programs carried out under the agreement. The California DHS authority has since been transferred to the DTSC of the California EPA. The FFA was agreed upon to prioritize and schedule investigations and remedial actions at Castle AFB. Listed IRP sites and potential sites of contamination at Castle AFB have been divided into three operable units (OUs) (Figures 3.3-1a, 3.3-1b, and 3.3-1c). OU-1 addresses the Central Base TCE groundwater plume. OU-2 contains the Wallace Road trichloroethylene (TCE) groundwater contamination plume and Site SD-12, which is believed to be the source of this contamination plume. The third OU is the Source Control Operable Unit (SCOU), which is under a



EXPLANATION

Groundwater Plume, TCE 5 ppb or greater

Base Boundary

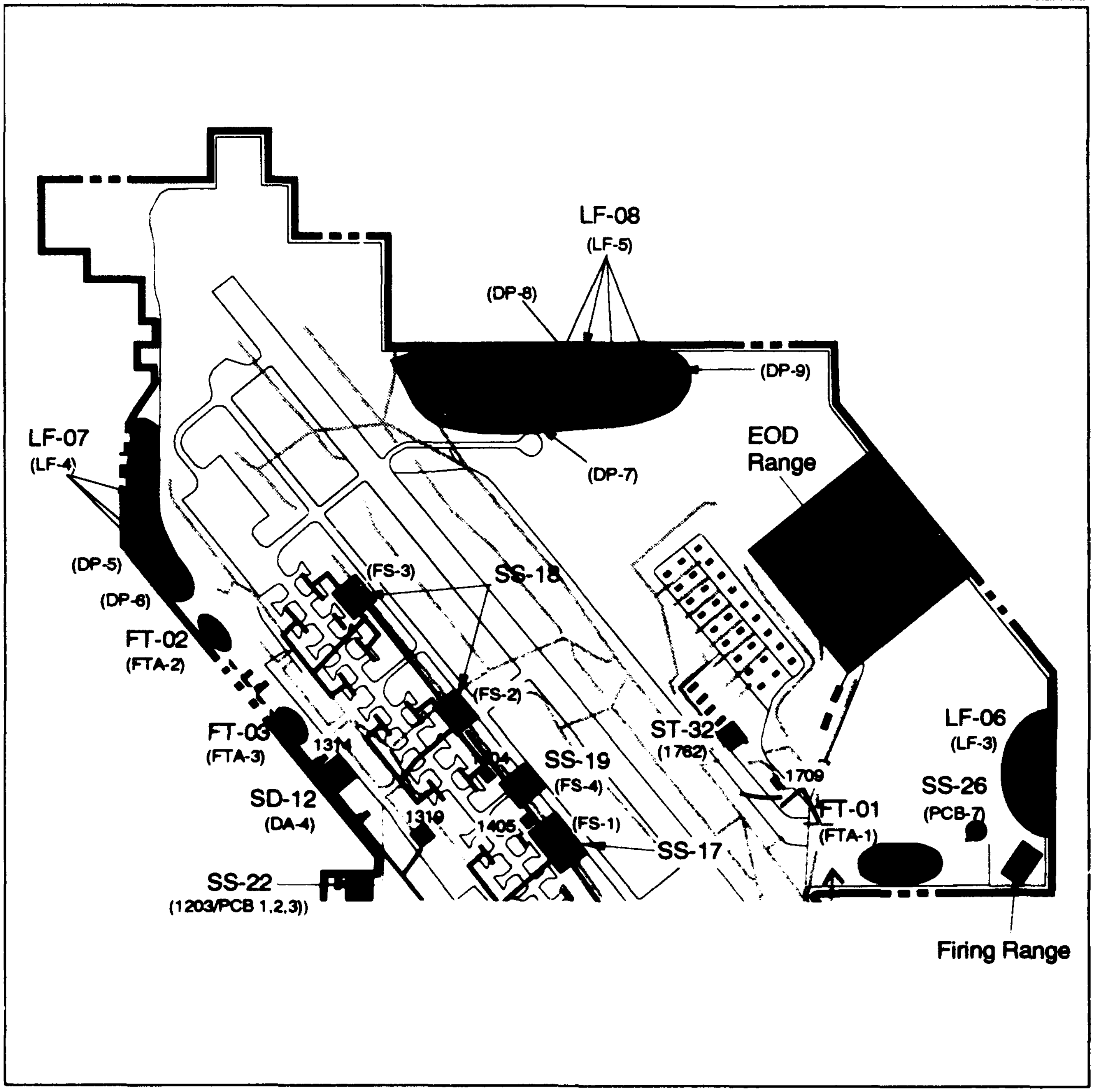
* Other organic chemicals occur in the main TCE plume but are within the area of the plumes shown

0 650 1300 2600 Feet

Note Information is current as of October 19, 1993

Operable Units (OU) 1 and 2

Figure 3.3-1a



EXPLANATION

Listed IRP sites and potential sites of contamination (DOD ID numbers in smaller text)

Base Boundary

JP Fuel hydrant system

Sanitary/Industrial sewer lines

Storm drains

0 450 900 1800 Feet

Note: Information is current as of October 19, 1993.

Source Control Operable Unit Site Location - North Base

Figure 3.3-1b

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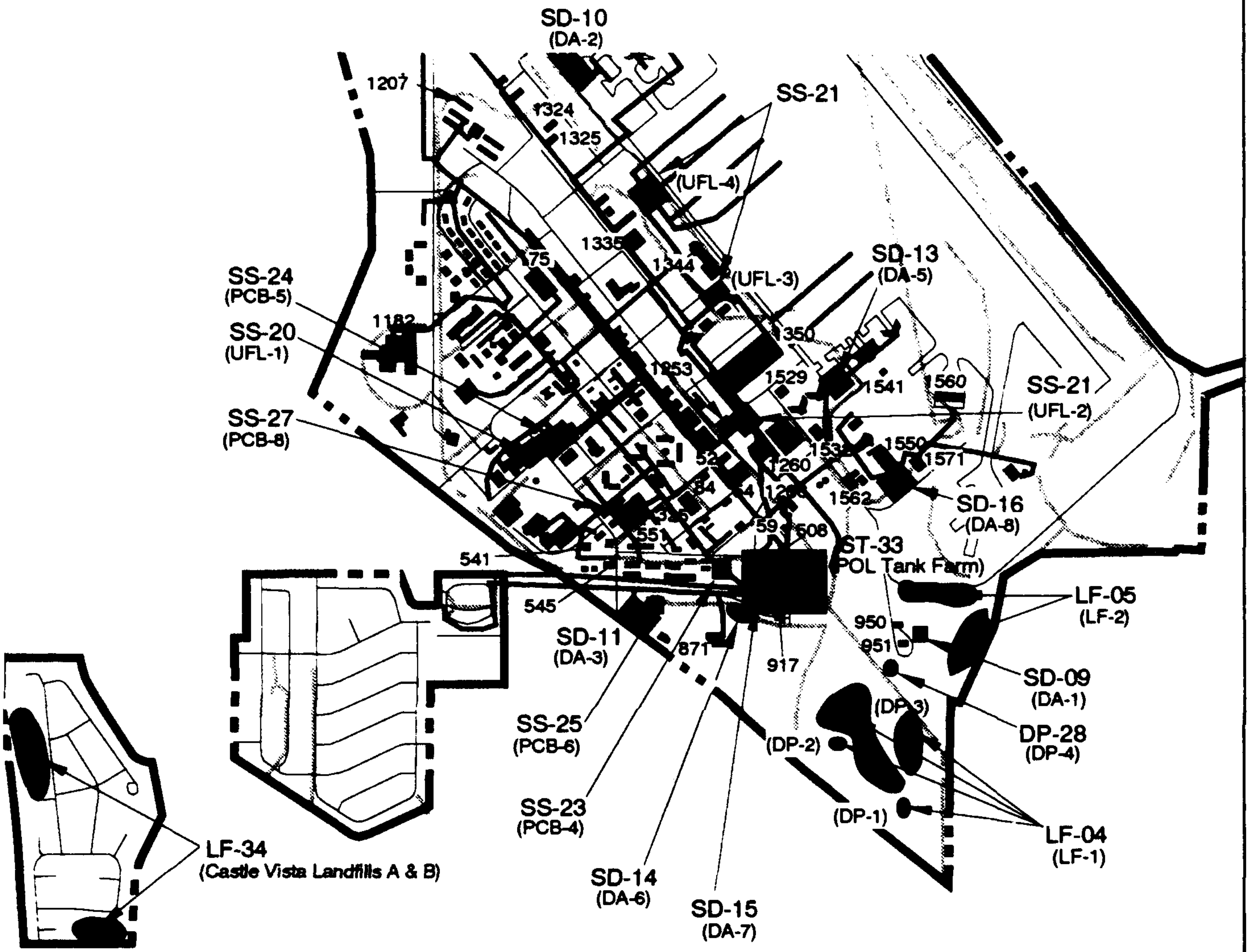


:XPLANATION

Listed IRP sites and potential sites of contamination (DOD ID numbers in smaller text)

Base Boundary

JP Fuel hydrant system

Sanitary/Industrial sewer lines

Storm drains

) 450 900 1800 Feet

Note: Information is current as of October 19, 1993.

Source Control Operable Unit Site Location - South Base

Figure 3.3-1c

Remedial Investigation/Feasibility Study (RI/FS) covering on-base surface and vadose zone soils and other medias that could be source(s) of groundwater contamination at Castle AFB. The Comprehensive Basewide RI/FS integrates OU-1 and OU-2 with the results of the SCOU RI/FS into a comprehensive soils and groundwater RI/FS, which will eventually lead to a basewide ROD for implementation of remedial actions at Castle AFB.

The FFA established a procedural framework, schedule, and deadlines for developing, implementing, and monitoring appropriate response actions at Castle AFB in accordance with CERCLA and applicable state regulations.

The agreement stipulates that any corrective actions under RCRA shall be considered and managed pursuant to CERCLA. Objectives, responsibilities, procedures, and schedules for remediation were established in the FFA. The deadlines are binding on the Air Force subject to compliance by the other FFA parties to the agreed review periods. The parties to the FFA may request extensions for good cause, such as identification of significant new site conditions. Table 3.3-2 contains an FFA document delivery schedule for Castle AFB.

The identification of IRP sites and the implementation of remediation actions mandated under CERCLA and called for by the FFA are ongoing processes. Therefore, the IRP sites and site status discussed within this EIS are current as of October 1993.

Ongoing activities at identified IRP sites may delay or limit some proposed land uses at or near those sites. Future land uses by the recipients on a site-specific level may be, to a certain extent, limited by the severity of contamination or level of remediation effort at these IRP sites. Reasonably foreseeable land use constraints are discussed in this EIS. Regulatory review as required by the FFA and the Air Force programs will also ensure that any site-specific land use limitations are identified and considered. A representation of the IRP management process under CERCLA is shown in Figure 3.3-2.

The original IRP was divided into four phases, consistent with CERCLA:

- Phase I: Problem Identification and Records Search
- Phase II: Problem Confirmation and Quantification
- Phase III: Technology Development (TD)
- Phase IV: Corrective Action.

After SARA was passed in 1986, the IRP was realigned to incorporate the terminology used by the U.S. EPA and to integrate the new requirements in the NCP. The result was the creation of three action stages:

- Preliminary Assessment/Site Inspection (PA/SI)

Table 3.3-2. Castle AFB FFA Document Delivery Schedule

Document Name	Basewide	Source Control Operable Unit
Draft Work Plan to Regulators	Mar 1, 1993	Dec 15, 1992
Regulators Comments to Air Force	May 1, 1993	Feb 15, 1993
Draft Final Work Plan to Regulators	Jul 1, 1993	Apr 15, 1993
Implement Work Plan	Jul 1. 1993 - Jan 1, 1994	Apr 15, 1993-Jan 15, 1994
Draft RI Report to Regulators[a]	Aug 1, 1994[b]	May 1, 1994
Regulators Comments to Air Force	Oct 1, 1994[b]	Jul 1, 1994
Draft Final RI Report to Regulators	Dec 1, 1994[b]	Sep 1, 1994
Draft FS to Regulators[a]	Aug 1, 1994	May 1, 1994
Regulators Comments to Air Force	Oct 1, 1994	July 1, 1994
Draft Final FS to Regulators	Dec 1, 1994	Sep 1, 1994
Draft Proposed Plan to Regulators	Dec 1, 1994	Sep 1, 1994
Regulators Comments to Air Force	Jan 1, 1995	Oct 1, 1994
Draft Final Proposed Plan to Regulators	Feb 1, 1995	Nov 1, 1994
Begin Public Comment Period	Mar 1, 1995	Dec 1, 1994
End Public Comment Period	Apr 1, 1995	Jan 1, 1995
Draft ROD to Regulators	Jun 1, 1995[c]	Feb 1, 1995
Regulators Comments to Air Force	Aug 1, 1995[c]	Apr 1, 1995
Draft Final ROD to Regulators	Oct 1, 1995[c]	June 1, 1995

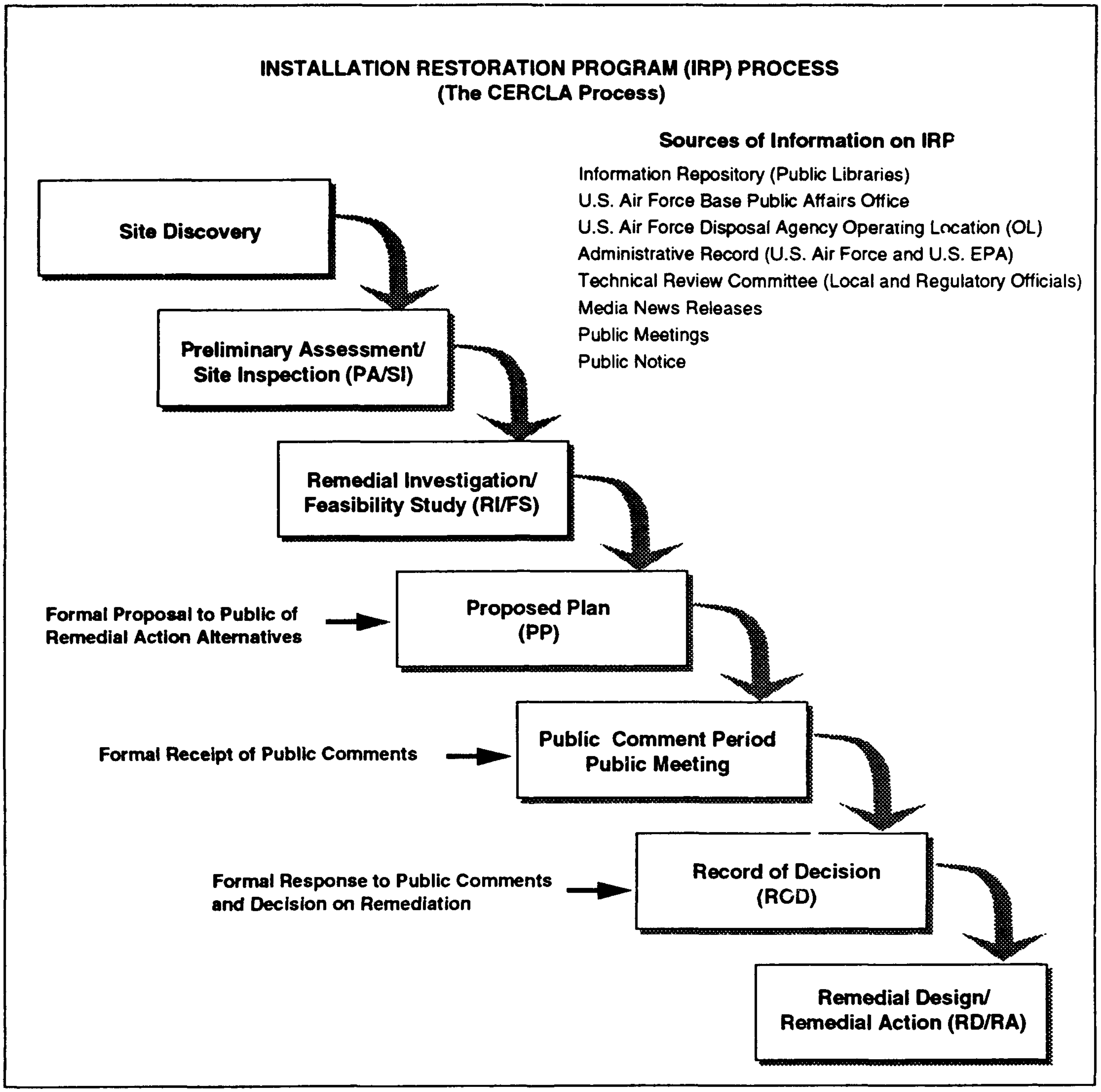
Notes: (a) RI and FS for Operable Units will be submitted as a single document.
(b) Includes the comprehensive basewide risk assessment.
(c) Includes the comprehensive basewide Record of Decision.
FFA = Federal Facility Agreement.
FS = Feasibility Study.
RI = Remedial Investigation.
ROD = Record of Decision.

- RI/FS
- Remedial Design/Remedial Action (RD/RA).

The PA portion of the first stage under the NCP is comparable to the original IRP Phase I and consists of a records search and interviews to determine whether potential problems exist. A brief SI that may include soil and water sampling is performed to give an initial characterization or confirm the presence of contamination at a potential site.

An RI is similar to the original Phase II and consists of additional field work and evaluations in order to assess the nature and extent of contamination. It includes a risk assessment and determines the need for site remediation.

The original IRP Phase IV has been replaced by the FS and the RD within the third stage. The FS documents the development, evaluation, and selection



Pictorial Presentation of IRP Process

Figure 3.3-2

of alternatives to remediate the site. The selected alternative is then designed (RD) and implemented (RA). Long-term monitoring is often performed in association with site remediation to assure future compliance with contaminant standards or achievement of remediation goals. The Phase III portion of the IRP process is not included in the normal SARA process. TD under SARA is done under separate processes including the Superfund Innovative Technology Evaluation program. The Air Force has an active TD program in cooperation with the U.S. EPA to find solutions to problems common to Air Force facilities.

The closure of Castle AFB will not affect the ongoing IRP activity. These IRP activities, managed by the OL, will continue in accordance with federal, state, and local regulations to protect human health and the environment, regardless of the disposal decision. The FFA among the U.S. Air Force, U.S. EPA, and California EPA formalizes the joint involvement in IRP. The investigations of IRP sites will be conducted in accordance with the FFA. The Air Force will retain any necessary interests (e.g., easements) in order to complete investigations, perform long-term monitoring, and operate and maintain all remediation systems.

The public may keep abreast of the IRP at Castle AFB through various sources of information (see Figure 3.3-2). Additionally, the IRP as mandated by CERCLA and the NCP has a public participatory program much like the one in the preparation of this EIS. The Air Force will, with the acceptance of each RI/FS by the regulatory community, prepare a proposed plan for the remediation of a site(s), which will include a discussion of alternatives considered. The proposed plan will be distributed to the public for comment; a public meeting will be held to discuss the proposed plan and comments on the proposed plan will be accepted by the Air Force. The Air Force will then respond to all comments, making those responses part of a decision document on what the remediation will entail prior to any remedial action being taken.

Preclosure Reference. Because the Air Force began the IRP process at Castle AFB in 1983, prior to terminology and procedural changes, both phases and stages are contained in the IRP administrative record. The IRP Phase I Records Search was published in October 1983 (Engineering Science, Inc., 1983). It initially identified 37 potential disposal sites, which included five landfills, eight discharge areas, nine chemical disposal pits, eight PCB spill areas, three fire training facilities, and four fuel spill areas. The individual sites were consolidated into 26 sites of potential contamination source areas. Response actions for PCB spills 4 through 8 reduced the number of active IRP sites to 21.

In 1978, TCE groundwater contamination was discovered in the base water supply. The Central Valley Regional Water Quality Control Board ordered the Air Force to treat the contaminated groundwater as well as neighboring areas In 1980, TCE, exceeding the state action level of 5 parts per billion (ppb), was detected in off-base wells in the vicinity of Wallace and Santa Fe roads. The Air Force supplied residents in this area with bottled water in 1986 and later installed carbon filter systems. Residents affected by the TCE contamination now obtain water from either the base or city of Atwater water systems or use their existing wells fitted with filters to remove the TCE. The discovery of TCE groundwater contamination at Castle AFB brought the number of sites to be investigated during the Phase II studies to 22.

Following Phase II studies, a soil vapor monitoring investigation was conducted to better define the extent of the TCE groundwater contamination. As a result of Phase II and soil vapor surveys, additional sites were identified, including seven areas contaminated by underground fuel tanks and underground storage tanks (USTs) at the tank farm. In 1985, hydrocarbon contamination was discovered at the three flightline fuel hydrant system pump stations; the petroleum, oil, and lubricants (POL) storage area; and at the southern end of Taxiway 2. Two solvent tanks at the corrosion control facility (Building 1354) were also investigated and found to have hydrocarbon contamination. These additional sites were included for further study under the RI. Sites were then evaluated/scored under the Hazard Ranking System and as a result, Castle AFB was placed on the NPL in July 1987.

Two landfills in the Castle Vista housing area were incorporated into the Castle AFB IRP in 1989. These landfills are believed to contain hardfill, construction materials, and landscaping debris.

All listed IRP sites are being investigated under a basewide RI/FS. The TCE groundwater contamination located in the central base area (OU-1), is currently in a Phase-I RA Stage, which involves modeling and evaluation of a groundwater pump and treat pilot study. OU-2, including the Wallace Road TCE groundwater contamination and site SD-12, is presently in the RD/RA Stage. The SCOU (OU-3) was established in early 1993, and contains 117 sites, including 33 listed IRP sites, 8 disposal pits incorporated into 3 on-base landfills, and 76 additional potential sources of contamination. The SCOU is under a basewide RI/FS, which addresses sites of possible surface and vadose zone soil contamination, as well as other medias that could be potential source(s) of groundwater contamination on Castle AFB. Field investigation of the potential sites of contamination will be conducted to determine if incorporation into the IRP is necessary. With the establishment of the SCOU, a Groundwater Remediation OU was eliminated by incorporating it into the Comprehensive Basewide RI/FS. Therefore, the results of the Comprehensive Basewide RI/FS will include a comprehensive soils and groundwater RI/FS by integrating the results from the SCOU and the former Groundwater Remediation OU, and will eventually lead to a basewide ROD for implementation of RAs at Castle AFB.

All listed IRP sites and potential sites of contamination are in various stages of RI/FS. The exception to this are the PCB spill sites, which have been recommended for no further action. Site locations and suspected site contaminants are provided in Table 3.3-3.

In addition to the mandates of the IRP, prior to the transfer of any property at Castle AFB, the Air Force must also comply with the provisions of CERCLA §120(h). CERCLA §120(h) requires that, before property can be transferred from federal ownership, the United States must provide notice of specific hazardous waste activities on the property and include in the deed a covenant warranting that "all remedial action necessary to protect human health and the environment with respect to any [hazardous] substance remaining on the property has been taken before the date of such transfer." Furthermore, the covenant must also warrant that "any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States."

The Air Force must complete the IRP for the contaminated sites on Castle AFB and provide the assurances required by CERCLA §120(h) for all properties transferred. The combination of these requirements may delay parcel disposition or conveyance and affect reuse.

The Air Force is committed to the identification, assessment, and remediation of the contamination from hazardous substances at Castle AFB. This commitment will assure the protection of public health as well as restoration of the environment. Additionally, the Air Force will work aggressively with the regulatory community to ensure that parcel disposition or conveyance occurs at the earliest possible date so as not to impede the economic redevelopment of the area through reuse of Castle AFB. Quantification of those delays based on the conceptual plans for all redevelopment alternatives and what is currently known at this stage of the IRP is not possible.

Closure Baseline. IRP remedial activities will continue well past the September 1995 closure date for Castle AFB. The OL will oversee the coordination of the contractors and assure that U.S. EPA, California EPA, and local regulatory agency concerns are addressed pursuant to the FFA. The Air Force will retain easements in order to perform operations and maintenance on all remediation systems. Funding for the restoration activities at closure installations was authorized by Congress in 1991 specifically for that purpose. It is anticipated that future authorization acts will continue to fund environmental restoration activities at closing installations.

Table 3.3-3. Listed IRP Sites and Potential Sites of Contamination
Page 1 of 10

Site Description/(IRP Site Number)[a]	Location and Possible Site Contamination
Operable Unit 1	
Central Base Area Groundwater Contamination (OT-29)	Remediation investigations addressing the trichloroethylene central base plume.
Operable Unit 2	
Wallace Road Groundwater Contamination and Discharge Area 4 (OT-30)	Remediation investigations addressing the Wallace Road trichlorethylene groundwater plume and Discharge Area 4.
Operable Unit 3, Source Control Operable Unit	
JP-4 Fuel Hydrant System	Located in the main base area near the POL tank farm along the operational and stub parking aprons. JP-4 fuel constituents may have leaked from system.
Sanitary Sewer System	Located throughout the base. Fuels, solvents, oils, and other possible wastes may have accessed system.
Industrial Sewer System	Located along the southern end of the operational apron and extending to the WWTP Fuels, solvents, oils, and other possible wastes may have accessed system.
Storm Drain System	Located throughout the base in open culverts or underground pipes. Fuels, solvents, oils, and other possible wastes may have accessed system.
Discharge Area 3 (SD-11)	Washrack located in the southern portion of the main base adjacent to Santa Fe Road. Washrack runoff to ditch may have included solvents (including trichloroethylene), POL, herbicides, acids, and antifreeze.
Discharge Area 5 (SD-13) Hazardous Waste Storage Area 2 and 5 (HWS-2 and HWS-5)	Located at the southwest corner of the operational apron adjacent to Buildings 1521 and 1523. Fuels, POL, solvents, paints, volatile organic compounds, and pesticides may have entered drainage ditch.
Discharge Area 6 (SD-14)	This former oil/water separator evaporation pond is located in the south-central main base area in an open field adjacent to the WWTP. Possible contamination includes solvents, phenols, and volatile organic compounds (including benzene).

Note: (a) *Pertains only to 33 listed Installation Restoration Program sites.*
IRP = Installation Restoration Program.
POL = Petroleum, oil, and lubricants.
WWTP = Wastewater treatment plant.

Table 3.3-3. Listed IRP Sites and Potential Sites of Contamination
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Site Description/(IRP Site Number)[a]	Location and Possible Site Contamination
Discharge Area 7 (SD-15)	Buildings 908 and 909, located in the south-central main base area adjacent to WWTP. Pesticide container and equipment waste area.
Discharge Area 8 (SD-16)	Located in the southeast portion of main base area adjacent to Building 1550. Solvents (including trichloroethylene and perchloroethylene), POL, paints, hydraulic fluids, and heavy metals discharged to drainage ditch.
Underground Fuel Leak 1 (SS-20)	Located in main base area adjacent to Building 708. Fuels (including diesel), oils, and trichloroethylene leaked from underground storage tank.
Underground Fuel Leak 2 (SS-21)	Located in the main base area between Building 1253 and East Perimeter Road. Contamination includes trichloroethylene and JP-4. JP-4 may have leaked from fuel pipeline.
Underground Fuel Leak 3 (SS-21)	Located between the fire station and Building 1353 and adjacent to the operational apron. Solvents (including perchloroethylene and trichloroethylene) and JP-4 leaked from underground storage tanks and fuel transfer system.
Underground Fuel Leak 4 (SS-21)	Located north of JP-4 storage tank yard and adjacent to operational apron. Trichloroethylene and JP-4 leaked from underground storage tank and fuel transfer system.
PCB Spill 4 (SS-23)	Located in main base area, adjacent to Building 534 and North Industry Road. PCB transformer leak.
PCB Spill 5 (SS-24)	Located in main base area, adjacent to Building 404. PCB transformer leak.
PCB Spill 6/Building 851 (SS-25)	Located in southern main base area, adjacent to Building 851, near Santa Fe Drive. PCB transformer leak.
PCB Spill 8 (SS-27)	Located in main base area, adjacent to Building 360. PCB transformer leak.
PCB Spill 9	Located in northern portion of main base area, adjacent to Building 1213. PCB transformer leak.
Building 23	Former maintenance facility located in main base area between 6th Street, Apron Avenue, and A Street. Solvents, POL, and hydraulic fluids utilized at this facility.

Note: (a) Pertains only to 33 listed Installation Restoration Program sites.
IRP = Installation Restoration Program.
PCB = Polychlorinated biphenyl.
POL = Petroleum, oil, and lubricants.
WWTP = Wastewater treatment plant.

Table 3.3-3. Listed IRP Sites and Potential Sites of Contamination
Page 3 of 10

Site Description/(IRP Site Number)[a]	Location and Possible Site Contamination
Building 47	Former maintenance facility located in main base between 11th Street, Apron Avenue, and A Street. Solvents, POL, paints, and thinners utilized at this facility.
Building 51	Former maintenance facility located in main base between 11th Street, Apron Avenue, and A Street. Solvents, POL, paints, and thinners utilized at this facility.
Building 52	Facility demolished, former general purpose aircraft shop located in main base area between Apron Avenue and A and 12th streets. Solvents, fuels, POL, paints, thinners, and cyanides utilized at this facility.
Building 53	Facility demolished, former engine cleaning and general purpose aircraft shop located in main base area between Apron Avenue and A and 12th streets. Solvents, fuels, POL, paints, and thinners utilized at this facility.
Building 54	Former engine maintenance facility located in the main base area at the south end of Apron Avenue and A Street. Solvents, fuels, POL, paints, and thinners were utilized at this facility.
Structure 55	Washrack located in the main base area at the south end of Apron Avenue and A Street. Solvents, fuels, and POL may have been in wastewater generated and discharged to storm drain or sanitary sewer.
Building 59	Vehicle maintenance and refueling area located in southern main base area near 16th Street. Waste oils generated and solvents utilized at this facility.
Structure T61/Hazardous Waste Storage Area 1	Former service station located in southern main base area, bound by 14th and 15th streets and North Industry Road. Fuels (including diesel), solvents, and POL were utilized and wastes were generated at this facility.
Structure T66	Washrack located in the main base area at the southern end of Apron Avenue. Solvents and POL utilized at this facility.
Structure T67	Washrack located in the main base area at the southern end of Apron Avenue. Solvents and POL utilized at this facility.
Building 84	Photo laboratory located in the main base area on the corner of 12th and A streets. Photochemicals (e.g., developer fixers) utilized at this facility. Silver recovery unit on premises.

Note: (a) Pertains only to 33 listed Installation Restoration Program sites.
IRP = Installation Restoration Program.
POL = Petroleum, oil, and lubricants.

Table 3.3-3. Listed IRP Sites and Potential Sites of Contamination
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Site Description/(IRP Site Number)[a]	Location and Possible Site Contamination
Building T85	Former photo laboratory located in main base area on 12th Street adjacent to Building 84. Photochemical utilized at this facility.
Building 175	Flight simulator building located in the main base area at the intersection of 5th and B streets. Hydraulic fluids and POL utilized for flight simulators.
Building 325	Vehicle maintenance shop located in the main base area between 12th and 13th streets. Vehicle maintenance shop utilized hazardous material and generated wastes associated with fuels, POL, paints, thinners, and batteries.
Building 508	Fuels laboratory located in the southern main base area near intersection of North Industry Road and 15th Street. Fuels, acids, and solvents utilized at this building. Possible discharge to sanitary sewer.
Building 541	Located in main base area, adjacent to Building 765. Facility contains asbestos.
Building 545	Liquid fuels and equipment maintenance shops located in main base area at the intersection of North Industry Road and E Street. Waste fuels and POL generated and other hazardous materials utilized.
Building 551	Former auto repair shop located in the main base area between 12th and D streets and North Industry Road. Presently the base recycling center; previously an auto repair shop where fuels, POL, and solvents utilized.
Building 871/Recreational Facility	Former DRMO hazardous waste storage facility and railroad engine repair yard located in the southern main base area adjacent to Santa Fe Road.
Building 917	Former entomology shop located in the southern main base area, adjacent to the WWTP, where pesticides were stored.
Building 1182	Base hospital and dental clinic located in the main base area adjacent to the Castle Air Museum. Utilized photochemicals for X-ray development and generated biomedical wastes.
Structure 1201	Unknown facility located in the northwest main base area adjacent to irrigation canal storm water catch basin. Facility no longer standing; facility history and use unknown.

Note: (a) Pertains only to 33 listed Installation Restoration Program sites.
DRMO = Defense Reutilization and Marketing Office.
IRP = Installation Restoration Program.
POL = Petroleum, oil, and lubricants.
WWTP = Wastewater treatment plant

Table 3.3-3. Listed IRP Sites and Potential Sites of Contamination
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Site Description/(IRP Site Number)[a]	Location and Possible Site Contamination
Building 1205	Former motor repair shop and POL storage area located at the northern end of Hospital Road, Facility demolished in 1970; Building 1200 constructed over this site. Fuels, POL, hydraulic fluids, batteries, and other materials utilized at this facility.
Structure 1206	Former washrack located at the northern end of Hospital Road. Facility demolished in 1970; Building 1200 constructed over this site. Fuels, POL, and solvents discharged to cesspool.
Building 1207	Gas mask test facility located at the northern end of Hospital Road across from the civil engineering complex (Building 1200). Hazardous materials utilized are unknown.
Building 1253	Corrosion control facility located in the main base area near the intersection of 11th Street and Apron Avenue. Paints, thinners, paint strippers, and POL materials utilized and wastes generated associated with this corrosion control facility.
Building 1260	Jet engine maintenance located in the main base area adjacent to base supply (Building 1360) and Apron Avenue. Solvents, POL, paints, and numerous other hazardous materials utilized.
Building 1266	Solvent and acid storage area located in the main base area at the end of Apron Avenue.
Building 1324	Grounds equipment maintenance shop located near the southern end of the stub parking apron and adjacent to Tanker Trail. Fuels, POL, hydraulic fluids, paints, and solvents utilized at this facility.
Building 1325/Hazardous Waste Storage Area 3	Solvent, hydraulic fluid, and waste storage area located near the southern end of the stub parking apron and adjacent to Tanker Trail.
Building 1335	Electronic countermeasures/defense fire control shop located in the main base area adjacent to the JP-4 flightline storage facility. Numerous hazardous materials utilized and wastes generated during aircraft maintenance.
POL Fuel Tank Farm (ST-33)	Fuel and POL bulk storage facility located in the main base area at 16th Street and Fuel Circle
Building 1344	Base fire station located adjacent to the central operational apron. Solvents and waste oils generated by vehicle maintenance.
Building 1350	Aircraft repair shop located off the southwest corner of the operational apron. Numerous hazardous materials utilized and wastes generated during aircraft maintenance.

Note: (a) Pertains only to 33 listed Installation Restoration Program sites.
IRP = Installation Restoration Program.
POL = Petroleum, oil, and lubricants.

Table 3.3-3. Listed IRP Sites and Potential Sites of Contamination
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Site Description/(IRP Site Number)[a]	Location and Possible Site Contamination
Building 1529	Aircraft service dock and washrack located along the southern flightline area, adjacent to base supply (Building 1360) and Building 1350. Washrack discharges wastewater which may contain fuels, POL, and solvents to industrial sewer
Building 1532	Non-destructive inspection/precision measurement equipment laboratory located in the southern main base area, east of Perimeter Road and adjacent to base supply (Building 1360). Oil, penetrants, solvents, and mercury used.
Building 1541	Corrosive control facility located in the eastern portion of the main base immediately south of Building 1509, identified as SWMU 4.23. Solvents, paints, thinners, strippers, and POL utilized.
Building 1560	Fighter Interceptor Squadron building located at the southern end of the flightline near the intersections of taxiways 1, 4, and 5. Jet fuels were utilized at this facility.
Building 1562	Aerospace ground equipment shop located in the southeast portion of the main base area near the intersection of Panther Place and East Perimeter Road. Solvents, POL, paints, and thinners utilized at this facility.
Structure 1571	Former aircraft washrack located at the southern end of the flightline, between Building 1562 and the Alert Apron discharged to oil/water separators; effluent may have contained solvents, fuels, POL paints, and metals.
Stain 38	Stain located in the main base area, near the intersection of 328th Street and West Perimeter Road. Stain identified by aerial photograph analysis; materials utilized are unknown.
Stain 39	Stain located at the northern portion of the operational apron. Stain identified by aerial photograph analysis; materials utilized, are unknown.
Stain 40	Stain located at the northern portion of the operational apron. Stain identified by aerial photograph analysis; materials utilized, are unknown.
Stain 41	Stain located at the southern portion of the operational apron. Stain identified by aerial photograph analysis; materials utilized are unknown.
Stain 42	Stain located at the southern portion of the operational apron. Stain identified by aerial photograph analysis; materials utilized are unknown.

Note: (a) Pertains only to 33 listed Installation Restoration Program sites.
IRP = Installation Restoration Program.
POL = Petroleum, oil, and lubricants.
SWMU = Solid Waste Management Unit.

Table 3.3-3. Listed IRP Sites and Potential Sites of Contamination
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Site Description/(IRP Site Number)[a]	Location and Possible Site Contamination
Stain 43	Stain located at the southern portion of the operational apron. Stain identified by aerial photograph analysis; materials utilized are unknown.
Stain 44	Stain located at the northern end of the runway in an open field between taxiway 1 and taxiway 4. Stain identified by aerial photograph analysis; materials utilized are unknown.
Storage Area B-2	Potential storage area located at the southern portion of the main base area adjacent to the engine test cell (Building 956). Materials usage unknown.
Storage Area B-3	Potential storage area located in the southern portion of the main base area adjacent to base supply (Building 1360). Materials usage unknown.
Storage Area B-4	Potential storage area located on the operational apron immediately east of the base fire station (Building 1344). Materials usage unknown.
Solid Waste Management Unit 4.14	Oil/water separator located in the main base area, near the corner of North Industry Road and D Street. Fuels, POL, hydraulic fluids, and solvents discharged to oil/water separator.
Solid Waste Management Unit 4.16	Oil/water separator located in the southern portion of the main base, adjacent to the engine test cell (Building 956). Fuels, POL, hydraulic fluids, and solvents discharged to oil/water separator.
Solid Waste Management Unit 4.20	Oil/water separator located at the southern end of the flightline next to Building 1509. JP-4 and detergents discharged to oil/water separator.
Solid Waste Management Unit 4.38	Possible catch basin located at the southern end of the flightline area between Building 1509 and oil/water separator at Building 1523. Materials utilized unknown.
Solid Waste Management Unit 4.6	Oil/water separator located in the main base area at the intersection of 13th Street and A Avenue. Fuels, POL, hydraulic fluids, and solvents discharged to oil/water separator.
Landfill 5 (LF-08)	Located in the northeast portion of the base. Specific content unknown; construction rubble deposited on surface.
Disposal Pit 7	Located in the northeast portion of the base, within Landfill 5. Waste POL, leaded fuel sludge disposed at this site.
Disposal Pit 8	Located in the northeast portion of the base, within Landfill 5. Waste POL, leaded fuel sludge disposed at this site.

Note: (a) Pertains only to 33 listed Installation Restoration Program sites.
IRP = Installation Restoration Program.
POL = Petroleum, oil, and lubricants.

Table 3.3-3. Listed IRP Sites and Potential Sites of Contamination
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Site Description/(IRP Site Number)[a]	Location and Possible Site Contamination
Disposal Pit 9	Located in the northeast portion of the base, within Landfill 5. Waste POL, leaded fuel sludge disposed at this site.
Discharge Area 1 (SD-09)	Located in the southern portion of the base, between Landfill 2 and former engine test cell. Engine test cell runoff containing fuels and POL discharged to this area.
Disposal Pit 4 (DP-28)	Located in the southern portion of the base, between Landfill 1 and the former engine test cell. Fuels, POL and solvents disposed of at this site.
Landfill 1 (LF-04)	Located in the southern corner of the base. Specific content unknown; recently utilized by the WWTP as a treated effluent spray field.
Disposal Pit 1	Low-level radioactive tube and plating sludge disposal site located at the southern portion of the base, within Landfill 1.
Disposal Pit 2	Low-level radioactive tube and plating sludge disposal site located in the southern portion of the base, within Landfill 1.
Disposal Pit 3	Low-level radioactive tube and plating sludge disposal site located at the southern portion of the base, within Landfill 1.
Landfill 2 (LF-05)	Located in the southern portion of the base, adjacent to East Perimeter Road, the former engine test cell, and the base boundary. Specific contents of landfill are unknown.
Building 950	Former engine test cell located in the southern portion of the base. JP-4 and solvents may have been discharged to soils.
Building 951	Former engine test cell located in the southern portion of the base. Solvents, acids, and other unidentified wastes generated at this site; possible disposal to landfills or sanitary sewer.
Fire Training Area 1 (FT-01)	Fire training area located in the eastern portion of the base adjacent to Rifle Range Road. Waste fuels, POL, and solvents used during fire training exercises.
PCB Spill 7 (SS-26)	Located in the eastern portion of the base adjacent to Rifle Range Road. PCB transformer leak.
Small Arms Firing Range	Located in the eastern portion of the base adjacent to Rifle Range Road. Lead and copper in soils.

Note: (a) Pertains only to 33 listed Installation Restoration Program sites.
IRP = Installation Restoration Program.
POL = Petroleum, oil, and lubricants.
WWTP = Wastewater treatment plant.

Table 3.5-3. Listed IRP Sites and Potential Sites of Contamination
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Site Description/(IRP Site Number)[a]	Location and Possible Site Contamination
Landfill 3 (LF-06)	Located in the eastern portion of the base, north of the small arms firing range. Contents of landfill are believed to be construction materials.
Discharge Area 4 (SD-12)	Located in the western portion of the base, currently the liquid oxygen storage area. Solvents, POL, and other wastes materials spread over soils.
Hazardous Waste Storage Area 4	Located in the western portion of the base next to Fire Training Area 3 and the liquid oxygen storage area. Contaminated fuels stored at this site.
Fire Training Area 2 (FT-02)	Located in the northwest portion of the base between the base boundary and West Road. JP-4 utilized during fire training exercises.
Fire Training Area 3 (FT-03)	Located in the northwest portion of the base between the base boundary and West Road. Fire extinguishing foam utilized during fire training exercises.
Landfill 4 (LF-07)	Located in the northwest portion of the base between the base boundary and West Perimeter Road. Waste POL, solvents, and general/refuse disposal.
Disposal Pit 5	Located in the northwest portion of the base within Landfill 4. Waste POL, solvents and other types of waste disposal site.
Disposal Pit 6	Located in the northwest portion of the base within Landfill 4. Waste POL, solvents and other types of waste disposal site.
Building 1203/PCB Spill Sites 1, 2 and 3 (SS-22)	PCB transformer storage facility located in the western portion of the base, immediately adjacent to civil engineering (Building 1200).
Building 1204	Former vehicle refueling station located in the western portion of the base. Facility demolished; civil engineering (Building 1200) constructed over this site.
Building 1314	Former liquid oxygen plant located in western portion of the base between the base boundary and liquid oxygen storage area. Waste oil storage site.
Building 1319	Located at the southern portion of the stub parking apron between Hardstand Road and West Perimeter Road. Numerous hazardous materials utilized at this facility.
Fuel Spill 1 (SS-17)	Located at the south end of the flightline between the main taxiway and the stub parking apron. JP-4 surface spill at Pumphouse 1403.

Note: (a) Pertains only to 33 listed Installation Restoration Program sites.
IRP = Installation Restoration Program.
PCB = Polychlorinated biphenyl.
POL = Petroleum, oil, and lubricants.

Table 3.3-3. Listed IRP Sites and Potential Sites of Contamination
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Site Description/(IRP Site Number)[a]	Location and Possible Site Contamination
Fuel Spill 2 (SS-18)	JP-4 leaked from underground storage tanks at Pumphouse 1402 between taxiway 7 and the stub parking apron.
Fuel Spill 3 (SS-18)	JP-4 spill at Pumphouse 1401 located at the north end of the flightline between the stub parking apron and the main taxiway.
Fuel Spill 4 (SS-19)	JP-4 pipeline rupture located in the northern flightline area adjacent to taxiway 9.
Discharge Area 2 (SD-10)	Located in the southern portion of the stub parking apron between Hardstand Road and parking area 6. Solvent, POL, and soaps contained within wastewater.
Building 1404	Located in the central portion of the stub parking apron, adjacent to parking area 11. Solvents and POL utilized at this facility.
Building 1405	Battery shop located in the southern portion of the stub parking apron, adjacent to parking area 9. Facility utilized hazardous materials and generated wastes; neutralized acid discharged to sewer.
Explosive Ordnance Disposal Range	Located in the eastern portion of the base, between the Weapons Storage Area and the base boundary. Lead and metal debris.
Building 1709	Located within the Weapons Storage Area. Hazardous materials utilized at this facility.
Building 1762 (ST-32)	Weapons maintenance shop located within the Weapons Storage Area. Hazardous materials utilized at this facility.
Castle Vista Landfill A (LF-34)	Located in the Castle Vista off-base military family housing areas. Contents believed to be construction debris, general refuse, and landscaping debris.
Castle Vista Landfill B (LF-34)	Located in the Castle Vista off-base military family housing areas. Contents believed to be construction debris, general refuse, and landscaping debris.
Other Sites	
Comprehensive Basewide RI/FS (OT-31)	This RI/FS will combine OU-1, OU-2, and the results of the SCOU into a comprehensive basewide assessment and eventual Record of Decision.

Note: (a) Pertains only to 33 listed Installation Restoration Program sites.
IRP = Installation Restoration Program.
OU = Operable Unit.
POL = Petroleum, oil, and lubricants.
RI/FS = Remedial Investigation/Feasibility Study.

3.3.4 Storage Tanks

USTs are subject to federal regulations within RCRA, 40 CFR 280. These regulations were mandated by the Hazardous and Solid Waste Amendments of 1984.

California regulates USTs under Title 23, Division 5, Chapter 16 of the CCR, which is more stringent than the federal regulations. California's regulations are intended to protect waters of the state from discharges of hazardous substances from USTs by establishing construction, monitoring, release reporting, repair, upgrade, and closure standards for new and/or existing USTs. At Castle AFB, these regulations are enforced by the Merced County Division of Environmental Health.

The base fire department enforces aboveground storage tank regulations under California Health and Safety Code, Division 20, Section 6.67; and guidelines under the Uniform Fire Code Article 79, and the National Fire Protection Association guidelines Chapters 30, 58, and 329.

Preclosure Reference. Castle AFB has an Underground Storage Tank Management Plan that addresses UST regulations and compliance strategies, monitoring alternatives, and operating procedures. An SPR Plan has also been implemented at Castle AFB and is discussed in Section 3.3.1.

There are 72 active and 8 inactive USTs at Castle AFB. The former fuel hydrant system consisted of 42 USTs with a total volume of 1,360,000 gallons. This system has been deactivated and the tanks have been removed. The fuel hydrant pump houses along the north side of the parking apron have been identified as IRP sites (see Section 3.3.3).

Of the 72 USTs that Castle AFB operates, 44 are heating oil tanks ranging in size from 300 to 25,000 gallons. These tanks are exempt from state permitting requirements because they are utilized for storing heating oil for use on the premises; however, Castle AFB is in the process of obtaining permits for these storage tanks from Merced County.

Twenty oil/water separators are presently utilized at Castle AFB. Oil/water separators are flow-through systems and are not considered USTs. They are exempt from regulation and closure requirements under Title 23 of the CCR. However, the oil/water separator located at the Auto Hobby Shop (Building 340) has a 350-gallon waste oil UST, which is permitted by the county and therefore is regulated under Title 23.

Castle AFB currently has 57 active and 4 inactive aboveground storage tanks (Appendix G, Table G-2). Two bulk fuel storage systems utilized the largest of these tanks. The bulk JP-4 and flightline hydrant refueling system consists of four aboveground storage tanks with a total capacity of 3.2

million gallons, located adjacent to the WWTP. JP-4 is delivered to these tanks via a liquid fuels pipeline owned by the Southern Pacific Pipeline company. The fuel is then transferred to two 600,000-gallon aboveground storage tanks located on the western edge of the operational apron. These tanks distribute JP-4 through a distribution system to the numerous aircraft refueling hydrants located on the flightline. The second bulk fuel storage area consists of two inactive 420,000-gallon JP-7 aboveground storage tanks located in the southern area of the base.

Closure Baseline. When a UST is temporarily closed for more than 1 year, it must be permanently closed or upgraded to meet the new UST standards except for spill and overfill protection. USTs that meet the state regulations may be left in place to support reuse activities. USTs that do not meet current regulations and have not been identified for reuse will be deactivated and removed. The aboveground storage tanks will be purged to minimize fire hazards at base closure. All oil/water separators will be pumped and cleaned of any contents.

3.3.5 Asbestos

Asbestos-containing material (ACM) remediation is regulated by the U.S. EPA and the Occupational Safety and Health Administration (OSHA). The state of California also has regulations pertaining to ACM remediation which are enforced by California EPA. Asbestos fiber emissions into the ambient air are regulated in accordance with Section 112 of the Clean Air Act (CAA), which established the National Emissions Standards for Hazardous Air Pollutants (NESHAP). The NESHAP regulations address the demolition or renovation of buildings with ACM. The Toxic Substances Control Act (TSCA), 15 U.S.C. §§2601-2671, and the Asbestos Hazard Emergency Response Act (AHERA) provide the regulatory basis for handling ACM in kindergarten through 12th grade school buildings. AHERA and OSHA regulations cover worker protection for employees who work around or remediate ACM.

Renovation or demolition of buildings with ACM has a potential for releasing asbestos fibers into the air. Asbestos fibers could be released due to disturbance or damage of various building materials, such as pipe and boiler insulation, acoustical ceilings, sprayed-on fireproofing, and other material used for soundproofing or insulation.

There are two primary categories that describe ACM. Friable ACM is defined as any material containing more than 1 percent asbestos (as determined using the method specified in Appendix A, Subpart F, 40 CFR 763, Section 1, polarized light microscopy) that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable ACM contains more than 1 percent asbestos, but does not meet the rest of the criteria for friable ACM.

Preclosure Reference. The current Air Force policy is to manage or remove ACM in active facilities and to remove ACM, following regulatory requirements, prior to facility demolition. ACM is removed when there is a potential for asbestos fiber release that would affect the environment or human health. The Air Force policy concerning the management of asbestos for base closures can be found in Appendix H.

A basewide survey for ACM is required by FPMR disclosure requirements and Air Force policy prior to property disposal. A comprehensive asbestos survey for Castle AFB will be performed prior to property disposal. Asbestos surveys of selected base buildings were conducted prior to renovation projects or due to health concerns. The survey results are summarized in an Asbestos Register. The Asbestos Register, kept by the base Bioenvironmental Engineer, identifies areas where friable asbestos is present and identifies priorities for removal. The Castle AFB Asbestos Operating Plan (U.S. Air Force, 1992b) and Asbestos Management Plan establish management and operating procedures for ensuring that personnel are not exposed to excessive levels of airborne asbestos and assignments for proper management of asbestos. The implementation of these plans is the responsibility of the base Civil Engineer. Bioenvironmental Engineering supports the Civil Engineer by conducting site surveys, bulk sampling, and air monitoring. Bioenvironmental Engineering personnel also monitor asbestos removal projects, which are performed by the on-base asbestos abatement team or by an outside contractor.

Closure Baseline. Asbestos will be removed as necessary to protect human health. Exposed friable asbestos will be removed or remediated in accordance with Air Force policy (Appendix H) and applicable health laws, regulations, and standards, if it is determined that a health hazard exists. Asbestos survey results including type, quantity, and condition of ACM will be provided to recipients prior to lease, sale, conveyance, or transfer of the property.

3.3.6 Pesticide Usage

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. §136, regulates the registration and use of pesticides. Pesticide management activities are subject to federal regulations contained in 40 CFR 162, 165, 166, 170, and 171. Implementation of federal regulations by the state are found under Title 3, Chapter 4 of the CCR.

Preclosure Reference. The Base Entomologist is responsible for implementation of the Pest Management Program at Castle AFB. On-base application, as well as health and safety practices, are regularly inspected by Bioenvironmental Engineering. Biannual and annual reviews are also conducted by ACC. An inventory of pesticides utilized every month is submitted to the Merced County Agriculture Department. A private contractor provides grounds maintenance services on base and in doing so utilizes only herbicides, under a separate applicator certification.

An inventory of pesticides stored at Castle AFB in 1992 is provided in Table 3.3-4. The majority of these materials are stored in the Entomology Shop (Building 907); the grounds maintenance contractor stores only herbicides (Building 851). Most pesticides are utilized for grounds maintenance and pest management; however, household pesticides are available at the Commissary (Building 765) and the AAFES shoppette (Building 425). Some pesticides are used on a seasonal basis. For example, approximately 50 gallons of Round-Up are applied during the spring; in the fall approximately 75 gallons of Hyvar X, a soil sterilant, are used. Pesticides are ordered through base supply or directly from local vendors.

Closure Baseline. At the time of closure, pesticides will continue to be used, on an as-needed basis, for pest management and grounds maintenance.

3.3.7 Polychlorinated Biphenyls

Commercial PCBs are industrial compounds produced by chlorination of biphenyls. PCBs persist in the environment, accumulate in organisms, and concentrate in the food chain. PCBs are used in electrical equipment, primarily in capacitors and transformers, because they are electrically nonconductive and stable at high temperatures.

The disposal of these compounds is regulated under the federal TSCA, which banned the manufacture and distribution of PCBs with the exception of PCBs used in enclosed systems. By federal definition, PCB equipment contains 500 parts per million (ppm) PCBs or more, whereas PCB-contaminated equipment contains PCB concentrations of 50 ppm or greater, but less than 500 ppm. The U.S. EPA, under TSCA, regulates the removal and disposal of all sources of PCBs containing 50 ppm or more; the regulations are more stringent for PCB equipment than for PCB-contaminated equipment.

California laws under Title 22, Chapter 30 of the CCR and Chapter 6.5 of the California Health and Safety Code are more stringent than TSCA when regulating the disposal of PCBs. Within California, fluids containing 5 to 49 ppm PCBs are defined as PCB items and are regulated as a hazardous waste.

Preclosure Reference. The Castle AFB Environmental Flight is responsible for the management of PCBs at Castle AFB. A basewide survey to identify all PCBs on base was conducted between November 1979 and November 1984. During and after the survey, PCBs were removed from the base. The last Air Force-owned transformer containing 5 ppm or more of PCBs was removed from Castle AFB in January 1991. PG&E owns and operates

Table 3.3-4. Pesticide Storage, Entomology Building

Name	Quantity
Insecticide	
Cargamate 1.5EC	4 gallons
Diazinon 4E Liquid	5 gallon
Diazinon D	5 pounds
Dursban L.O.	1.5 quarts
Dursban TC	3 gallons
Ficam D	1 pint
Ficam W	1 pound
Malathion 57%	110 gallons
Malathion 96%	55 gallons
Piperonyl Butoxide	3 gallons
Pyrethrum	1 gallon
Pyrid	1 gallon
Pyronyl Oil	6 gallons
Resmethrin	2 gallons
Sevin Carbaryl	100 pounds
Synthrin 3%	1 gallon
Temp 2	3 pounds
Fungicide	
Benlate	4 pounds
Blue Shield	40 pounds
Daconil 2787	20 pounds
Kocide 101	30 pounds
Herbicide	
Diquat	1 gallon
Fusilade	1 gallon
Hyvar X	300 pounds
Round-Up (liquid)	75 gallons
Surflan	7.5 gallons
Rodenticide	
Chlorophancinone 0.01%	50 pounds
Diphacinone 0.005%	550 pounds
Rodenticide	2 pounds
Avicide	
Avitrol	5 pounds

Note: As of October 1992.

48 transformers at Castle Gardens and Castle Vista that have not been listed for PCBs.

Closure Baseline. No federally or state-regulated PCB equipment, PCB-contaminated equipment, or PCB items under control of the Air Force will be left on the base at base closure.

3.3.8 Radon

Radon is a naturally occurring, colorless and odorless radioactive gas that is produced by radioactive decay of naturally occurring uranium. Uranium decays to radium, of which radon gas is a by-product. Radon is found in high concentration in rocks containing uranium, such as granite, shale, phosphate, and pitchblende. Atmospheric radon is diluted to insignificant concentrations. Radon that is present in soil, however, can enter a building through small spaces and openings, accumulating in enclosed areas, such as basements. The cancer risk caused by exposure, through the inhalation of radon, is currently a topic of concern.

There are no federal or state standards regulating radon exposure at the present time. U.S. EPA publishes a pamphlet, A Citizen's Guide to Radon (U.S. EPA, 1992), which offers advice to persons concerned about radon in their homes. U.S. Air Force policy requires implementation of the Air Force Radon Assessment and Mitigation Program to determine levels of radon exposure of military personnel and their dependents. The U.S. EPA has made testing recommendations for both residential structures and schools. For residential structures, using a 2- to 7-day charcoal canister test, a level between 4 and 20 picocuries per liter (pCi/l) should lead to additional screening within a few years. For levels of 20 to 200 pCi/l, additional confirmation sampling should be accomplished within a few months. If the level is in excess of 200 pCi/l, the structure should be evacuated immediately. Schools are to use a 2-day charcoal canister test; if readings are 4 to 20 pCi/l, a 9-month school year survey is required. If levels are below 4 pCi/l, no further action is recommended. Table 3.3-5 summarizes the recommended radon surveys and action levels.

Preclosure Reference. The Air Force policy requires a detailed radon assessment program for levels of 4 pCi/l or greater. The radon screening survey at Castle AFB was conducted in December 1987 by base Bioenvironmental Engineering personnel. The survey consisted of 35 samples taken from 30 military family housing units, the child-care center, airman's dormitories, two temporary lodging facilities, and a dormitory converted to an administrative facility (Building 1212). All sample results were below U.S. EPA's recommended mitigation level of 4 pCi/l; therefore, no detailed assessment survey is needed and mitigation activities are not necessary or advised.

Table 3.3-5. Recommended Radon Surveys and Mitigations

Facility	U.S. EPA Action Level	Recommendation
Residential	4 to 20 pCi/l	Additional screening. Expose detector for 1 year. Reduce radon levels within 3 years if confirmed high readings exist.
Residential	20 to 200 pCi/l	Perform follow-up measurements. Expose detectors for no more than 6 months.
Residential	Above 200 pCi/l	Follow-up measurements. Expose detectors for no more than one week. Immediately reduce radon levels.
	Two-Day Weekend Measurement	
School	4 to 20 pCi/l	Confirmatory 9-month survey. Alpha track or ion chamber survey.
School	Greater than 20 pCi/l	Diagnostic survey or mitigation.

Note: Congress has set a national goal for indoor radon concentration equal to the outdoor ambient levels of 0.2 to 0.7 pCi/l.
EPA = Environmental Protection Agency.
pCi/l = Picocuries per liter.

Closure Baseline. The radon screening sample results were all below 4 pCi/l; therefore, no follow-up assessment survey is required.

3.3.9 Medical/Biohazardous Waste

Current federal regulations do not provide for regulation of medical wastes, but do allow states to individually regulate medical wastes. The state of California regulates medical waste under the Medical Waste Management Act, Division 20, Chapter 6.1 of the California Health and Safety code. The Act provides for treatment of such wastes prior to disposal by all generators of medical wastes regardless of the amount generated. Article 9 of this act details the approved treatment methods briefly described below:

- Incineration in a controlled-air multi-chambered incinerator, which provides complete combustion of the waste to carbonized or mineralized ash, rendering infectious waste noninfectious and disposable as nonhazardous waste

- Discharge to the sewage system if the waste is liquid or semiliquid
- Sterilization by heating in a steam sterilizer (autoclave)
- Other sterilization techniques approved by the DHS, which results in the destruction of pathologic organisms.

All medical/biohazardous waste disposal regulations are administered by the Merced County Department of Public Health.

Preclosure Reference. The 93rd Medical Group at Castle AFB operates a 15-bed hospital (Building 1182), which provides diagnostic, treatment, and immunization care to active military and their dependents, as well as retirees and their dependents. The base dental clinic is also located within Building 1182. The hospital and dental clinic generated approximately 1,900 pounds of biohazardous waste monthly in 1992; this amount includes a small amount of waste generated by vaccination services provided by the base veterinary clinic (Building 806). Castle AFB has been permitted by Merced County to generate biohazardous waste and to treat the waste on site (Permit No. 4096). These wastes are collected daily, stored in a secure and properly placarded area overnight, and disposed of the following day by placement in a permitted San-I-Pak device. The San-I-Pak combines a biohazardous waste autoclave and domestic refuse trash compactor. Biohazardous wastes are placed in a small compartment, autoclaved, compressed to one-fifth their original size, then automatically placed in the domestic refuse compartment and compacted further. Once the unit is full, its contents are disposed of as municipal waste.

Medical and dental X-ray operations, as well as other on-base X-ray and photographic operations, produce photochemical wastes. These wastes are treated by silver recovery units that extract silver from the photochemical solution. The silver is then turned in to DRMO, while the remaining solution is discharged to the sanitary sewer and further treated at the WWTP.

Closure Baseline. The hospital will be inactive and no biohazardous waste will be generated at base closure. Existing biohazardous waste will be processed and removed prior to closure in accordance with appropriate federal, state, and local regulations. All photochemical wastes will be properly disposed of prior to base closure.

3.3.10 Ordnance

Castle AFB has operated an EOD Range since the mid-1950s. The EOD Range is located in the northeast portion of the base between the WSA and the base boundary. The range lies in an open area and consists of an unlined pit surrounded by an earthen berm.

An outdoor small arms range is located south of the EOD Range in the northeastern corner of the base. This range was constructed in 1961 and consists of a three-sided protective earthen berm, spanned by wooden sound baffles. A weapons maintenance facility is also located at the range.

Immediately south of the EOD Range is the grenade launching range, which consists of an open area approximately 1,400 feet by 300 feet.

Any ordnance remaining at the EOD Range after disposal would generally be regulated under RCRA; transportation of ordnance is regulated by the federal DOT.

Preclosure Reference. Ordnance scheduled for disposal in the past has been placed in a disposal pit and destroyed by detonation or burning. The base discontinued disposal by burning in early 1991 in order to comply with state air quality standards. Ordnance disposal has been conducted by detonation since that time. Following any detonations, surface debris is collected and properly disposed of. Disposed materials include a variety of small arms ammunition, flares, fuses, smoke grenades, and other types of ordnance. Historically, the EOD Range is utilized on a quarterly basis and is limited to a maximum disposal weight of 27 pounds (net explosive weight). The type and amount of ordnance varies with each disposal.

The small arms range is utilized on a regular basis to qualify military personnel in small arms proficiency and has occasionally been used by local law enforcement agencies. Targets are placed at various intervals and fired upon, with the bullets lodging in an earthen berm at the back of the range. Bullets lodged in the berm contain lead, which could pose a threat to human health and to the environment.

The grenade range was constructed in 1986 and was utilized by the security police approximately every 6 months. Forty-millimeter practice grenades were launched from the southern end of the range. The base ceased operations at the grenade range in late 1992.

The EOD Squadron from Hill AFB began to conduct a site closure evaluation of the EOD and grenade ranges in May 1993 to determine necessary range closure procedures. This evaluation is being conducted as part of the SCOU. The EOD Range will be cleared to a depth of 3 feet by the Hill AFB EOD Squadron.

Closure Baseline. The EOD Range, the small arms range, and the grenade range will be cleared of unexploded ordnance and properly closed prior to disposal of that parcel. All ordnance accumulated since the range has been closed will be properly packaged and transported off base for use by other Air Force units.

3.3.11 Lead

Lead is a heavy, ductile metal that is commonly found in association with organic compounds, as well as oxides, salts, or as metallic lead. Human exposure to lead has been determined to be an adverse health risk by agencies such as OSHA and U.S. EPA. Sources of exposure to lead are through paint, dust, and soil. Blood lead levels in excess of 30 micrograms per deciliter are of concern in adults or 10 micrograms per deciliter in children, and can cause various ailments according to the Centers for Disease Control.

Waste containing levels of lead exceeding the Total Threshold Limit Concentration of 1,300 milligrams per kilogram or the Soluble Threshold Limit Concentration of 5.0 milligrams per liter are defined as hazardous under 40 CFR 261 and Title 22 of CCR. If a waste is classified as hazardous, disposal must take place in accordance with U.S. EPA and California hazardous waste rules. The federal OSHA has established a general industry Permissible Exposure Limit (PEL) standard of 50 micrograms per cubic meter ($\mu g/m^3$) for workers and a more lenient 200 $\mu g/m^3$ in the construction field.

In 1973, the Consumer Product Safety Commission (CPSC) established a maximum lead content in paint of 0.5 percent by weight in a dry film of paint newly applied; in 1978, the CPSC lowered the allowable lead level in paint to 0.06 percent. In September 1989, U.S. EPA established a cleanup criterion for lead in soil of 500 to 1,000 ppm total lead when the possibility of child contact exists. Currently, both U.S. and California EPA have specific guidelines for the cleanup of lead in soils based on the characteristics of individual sites.

Preclosure Reference. No study to assess the presence of lead-based paint or its associated soil contamination on base has been performed. The guideline used by HUD is to issue written notification to buyers of HUD homes built prior to 1978 of the possible presence of lead-based paint and its associated hazards.

Closure Baseline. The Air Force will acknowledge that lead-based paint may be present in all facilities built prior to 1978. Therefore, disclosure will be provided on property leases or transfer documents.

3.4 NATURAL ENVIRONMENT

3.4.1 Soils and Geology

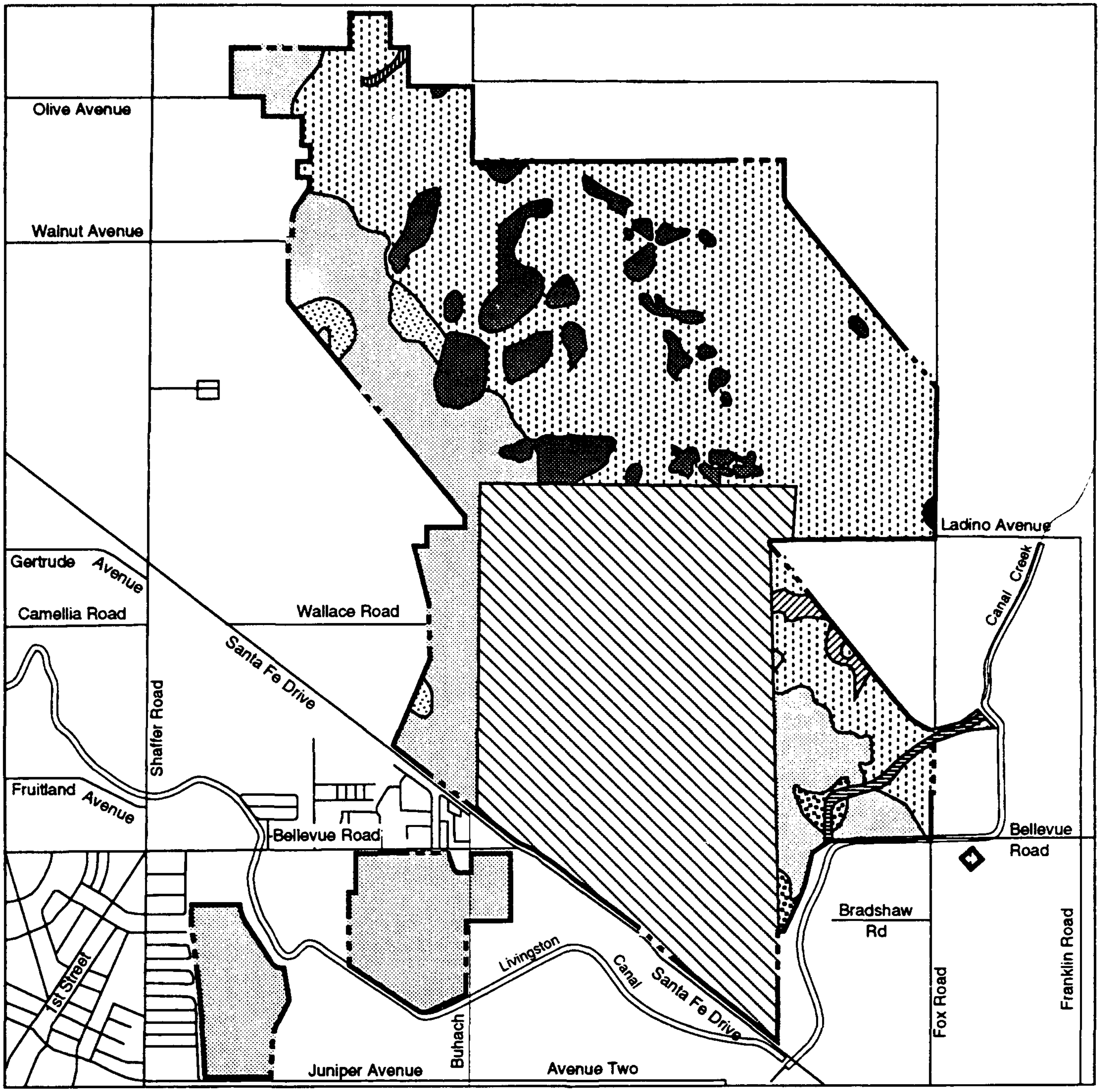
Soils, geology, mineral resources, and natural hazards are addressed in this section. The ROI for soils is the area within Castle AFB. The ROI for geology includes Castle AFB and the immediate vicinity to provide regional context. The ROI for mineral resources and seismic issues addressed in this section is localized and limited to Castle AFB itself.

3.4.1.1 Soils. The three primary soil associations identified in and around Castle AFB are the Whitney-Rocklin-Montpellier, the San Joaquin-Madera, and the Delhi-Atwater associations. The soils of each association were formed in different geomorphic settings ranging from high alluvial terraces through low alluvial terraces to alluvial fan surfaces and, as a result, have slightly different characteristics. Figure 3.4-1 shows Castle AFB soils as mapped by the U.S. Soil Conservation Service (SCS) (U.S. Department of Agriculture, 1962).

Soils of the Whitney-Rocklin-Montpellier association were formed on high alluvial terraces between the Touleman and Merced rivers. The terraces have been eroded to form undulating and rolling topography. These soils were created from moderately coarse granitic sediments that are weakly consolidated. The texture of these soils ranges from medium (loam) to somewhat coarser (sandy loam) with some subsurface clay accumulation and a thin iron-silica, cemented hardpan in the Rocklin loam. Runoff from these soils is slow and the erosion hazard is slight to moderate (U.S. Department of Agriculture, 1962).

Soils of the San Joaquin-Madera association were formed on low alluvial terraces topographically lower than the high terraces of the Whitney association soils. These terraces show much less relief than the high terraces, and are characterized as gently undulating with depression-like microrelief features. Soils included in the San Joaquin-Madera association include Alamo clay and San Joaquin loams and sandy loams (see Figure 3.4-1). Alamo clay was formed from loam texture sediment derived from granitic rocks or other soils, and San Joaquin soils from granitic alluvium. Alamo clay has very fine texture and a potentially significant hardpan layer that can be up to 12 inches thick. San Joaquin soils have a medium (loam) to medium coarse (sandy loam) texture and can also have a significant iron-silica cemented hardpan, which can range from 6 to 16 inches in thickness. Runoff from soils in the San Joaquin-Madera association is slow to medium, and the erosion hazard ranges from none to moderate (U.S. Department of Agriculture, 1962).

Soils of the Delhi-Atwater association were formed on alluvial fan surfaces, at the lower end of the topographic section represented by these three soil associations. The fan surface is gently sloping to undulating; the latter characteristic is believed to be caused by wind action. Soils included within the Delhi-Atwater association include the Atwater sand and loamy sand, and the Greenfield sandy loam. The parent material for these soils is granitic alluvium with moderately coarse (sand) texture. Soil textures range from medium (loam) to moderately coarse (sand) and commonly rest unconformably above an iron-silica, cemented hardpan layer. In most Atwater soils this hardpan layer is found at a depth of 6 to 10 feet, whereas



EXPLANATION

- Alamo clay
- Atwater loamy sand
- Atwater sand
- Greenfield sandy loam
- San Joaquin loam
- San Joaquin - Alamo complex
- San Joaquin sandy loam
- Whitney sandy loam
- Not Mapped (heavily disturbed)
- Fill
- Base Boundary

0 650 1300 2600 Feet

Source: U.S.D.A., 1962

Soils Distribution

Figure 3.4-1

in Greenfield soils it is usually no deeper than 4 feet. However, not all Atwater soils contain hardpans. Runoff from these soils is slow to very slow and there is little or no erosion hazard (U.S. Department of Agriculture, 1962).

Many of the soils in the ROI contain hardpan layers, which contribute to poor drainage and ponding. The hardpan layer is not continuous beneath Castle AFB, and in fact can be quite variable in short distances. Where present, the hardpan layer is usually within 5 feet of the surface and varies in thickness from 1 foot to more than 5 feet (Roy F. Weston, Inc., 1988).

Approximately 600 acres of the mapped portion of Castle AFB contain soils suitable as prime or statewide important farmland in their natural state. The Farmland Conversion Impact Rating, Form AD-1006, is currently in coordination with the SCS (Appendix I). Most of the prime farmland soils and statewide important soils are located within heavily disturbed areas of the base (i.e., runway, taxiways, etc.). Most of the soils mapped in the area are best suited for use as pastureland, and some of the soils are suitable for dryland agriculture. The only soil that has hydric (or humic gley) soil characteristics in this area is the Alamo clay, found in isolated, relatively small depressions within the San Joaquin-Madera association, which are quite abundant in the northern portion of the base (U.S. Department of Agriculture, 1962). The presence of hydric soil is one of the three characteristics used to distinguish wetland areas. More discussion of potential wetland areas is provided in Section 3.4.5, Biological Resources.

Soil Contamination. Initial field investigations for the IRP suggest that soils have not been significantly impacted by the base operations, even though spills and disposal of hazardous chemicals, including solvents (TCE) and petroleum products such as JP-4, to the ground surface have occurred (Roy F. Weston, Inc., 1988). This is due in part to the mobility of chemicals and in part to the generally coarse texture of the soils. The greatest potential for soil contamination will be from a petroleum product spill or disposal on a soil with a high clay content or an underlying cemented hardpan. Residual and relatively immobile petroleum by-products may be present in soils at discharge areas 1 and 3, located in the southeastern portion of the base (Roy F. Weston, Inc., 1988). Hazardous materials and wastes are discussed further in Section 3.3.

3.4.1.2 Physiography and Geology

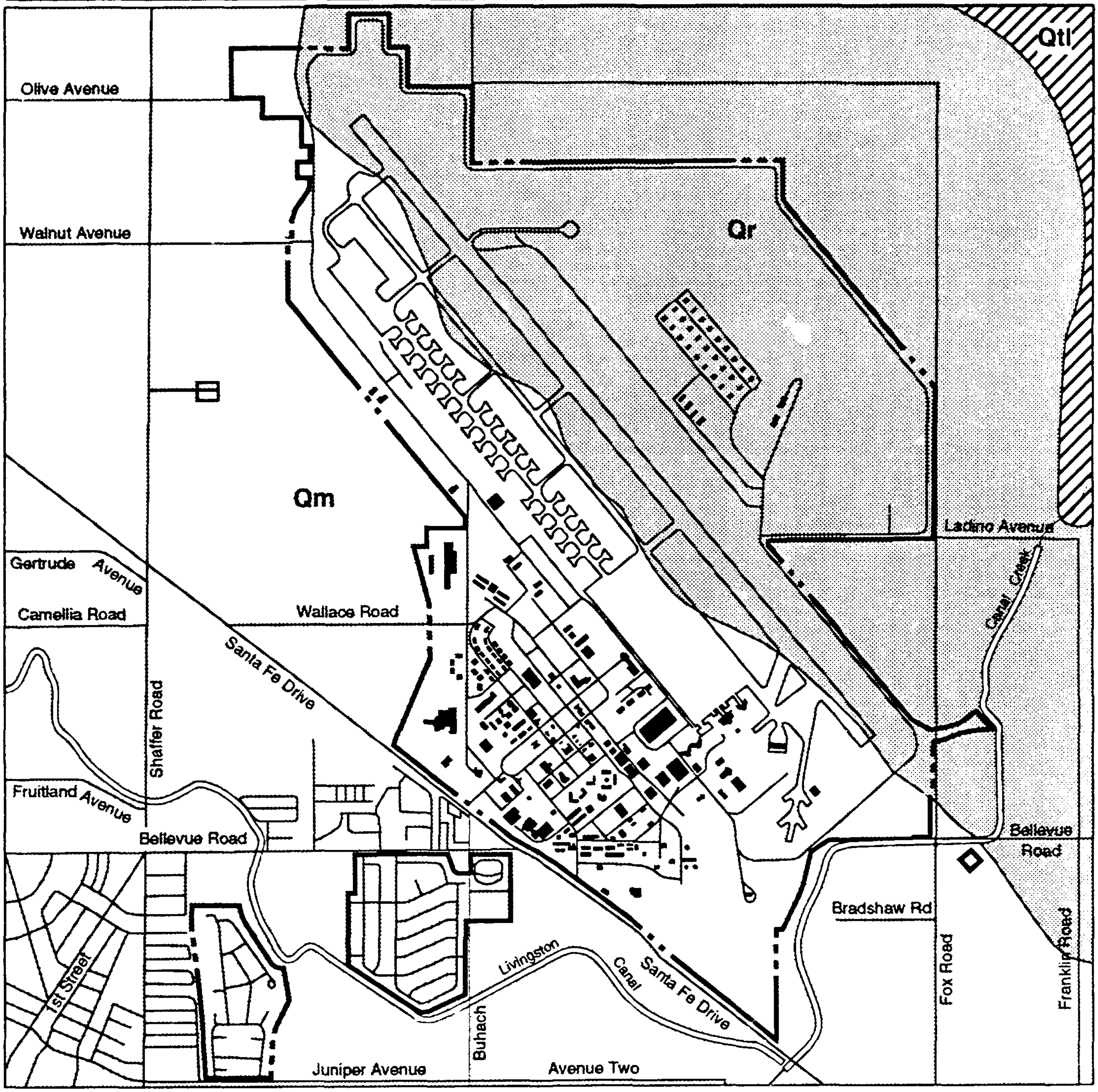
Physiography. Castle AFB is located in the northeastern portion of the San Joaquin Valley of central California. The base is within the southern half of the Central Valley section of the Pacific Border physiographic province (Fenneman, 1931). The Central Valley is a north-south trending valley, bordered by the Sierra Nevada on the east and the Coast Ranges on the west. A maximum thickness of 5,000 feet of sediments from these two mountain ranges fill the valley.

Most of Castle AFB is located on alluvial fan surfaces, but a small portion is located on alluvial terrace deposits. Surface features on the base are primarily the result of surface water erosion and deposition, but wind erosion has also shaped the landforms to a lesser extent. Underlying deposits are composed primarily of sediment eroded from the granitic rock of the Sierra Nevada. The terrain at Castle AFB is essentially flat, with a gentle slope to the west toward the San Joaquin River. Total relief across the base is approximately 35 feet, with elevations ranging from 165 feet above MSL at the southern boundary to 200 feet above MSL at the northwestern boundary.

Geology. Castle AFB is underlain by the sediments of the Great Valley sequence, thousands of feet thick and consisting of older marine deposits overlain by younger continental deposits. The continental deposits, which typically consist of complexly interbedded sands, silts, and clays, form alluvial fans along both sides of the valley. These sediments began accumulating from material eroded off the newly emerging Sierra Nevada to the east, over 100 million years ago. The sediments deposited in the Central Valley area, which at the time was below sea level, were laid down in a marine environment on what then constituted the continental shelf. The Coast Ranges formed to the west of the valley approximately 40 million years ago, creating a closed basin. During this mountain building period the entire area rose above sea level (Engineering-Science, Inc., 1983; Roy F. Weston, Inc., 1985).

A general stratigraphic description of the eastern San Joaquin Valley has been prepared by Page and Balding (1973), as reported in Engineering-Science, Inc. (1983) and Roy F. Weston (1985). These reports characterize the upper 700 to 1,000 feet of sediment as unconsolidated Quaternary deposits. Within these deposits, four distinct units can be distinguished, (from youngest [shallowest] to oldest [deepest]): flood-basin deposits, younger alluvium, older alluvium, and lake/marsh deposits. Each of these units can have sediment textures ranging from clays to gravel. Beneath the top four Quaternary deposits are 450 to 700 feet of unconsolidated sediment of either Tertiary or Quaternary age. Underlying the total thickness of unconsolidated sediment at a depth of 1,150 to 1,700 feet are consolidated sedimentary rocks of Tertiary age.

Mapping of Quaternary deposits in the Merced area showed several periodic sequences of rapid deposition from glacial outwash followed by long periods of stability, and then by periods of erosion of the deposits. At the same time, the Sierra Nevada continued to be tilted, and the San Joaquin Valley floor subsided (Marchand, 1976a, 1976b). Current surface geology for the Castle AFB area includes only three mappable units: the Modesto, Riverbank, and Turlock Lake formations (Figure 3.4-2). These are all unconsolidated Quaternary deposits, listed in age from youngest to oldest, with the oldest located in the northeast, closest to the Sierra Nevada, and



EXPLANATION

Qm Modesto Formation

Qr Riverbank Formation

Qtl Turlock Lake Formation

Base Boundary

0 650 1300 2600 Feet

Source: Wagner, 1990.

Surface Geology

Figure 3.4-2

the youngest located in the southwest, the most distant from the mountains.

The stratigraphy underlying Castle AFB is relatively well known because of the large number of soil boreholes and wells drilled on base as part of the IRP. In addition, 11 groundwater supply wells, with depths ranging from 50 to 300 feet, have been drilled in the past. Drilling records indicate that the sedimentary units are stacked on top of each other, with the youngest layers on top, and dip to the southwest. All three units are present on the southwestern half of the base. In the northeastern half of the base, the Modesto Formation is not present; northeast of the base, the Turlock Lake Formation is exposed at the surface (CDM Federal Programs Corporation and Woodward-Clyde Consultants, 1992).

Mineral Resources. The Mineral Resources Data System (MRDS) of the U.S. Geological Survey had records of nine mines in Merced County; none are currently active. Two of these were developed in unconsolidated sediments near Castle AFB. One was located about 4.5 miles to the northwest, and appeared to be a sand and gravel mine that was operated intermittently for an undetermined period of time. The second was a placer mining operation on the Merced River about 6 miles north of the base. This mine was active intermittently from the mid-1800s to 1952. No known mineral resources occur on base. The geologic setting of the region (coalesced alluvial fans) is such that sources of sand and gravel are abundant.

Natural Hazards. The primary natural hazard of concern at Castle AFB is seismicity. Flooding is discussed in Section 3.4.2. Although tectonic activity in the region has been significant over the past 100 million years, with the uplift of the Sierra Nevada and then the Coast Ranges, the current geology in the Castle AFB area is relatively stable. The closest significant, mapped faults lie about 20 miles to the northeast in the Sierra Nevada, and 30 miles to the southwest in the Diablo Range (Wagner et al., 1990). The nearest Alquist-Priolo Special Studies Zone is the Ortigalito Fault Zone in the southwestern part of Merced County, about 38 miles from Castle AFB (Hart, 1990). No development is allowed by the state of California in these zones until a detailed geologic study can be performed to demonstrate that the threat of earthquakes is not significant. However, Castle AFB does not fall within any of these Special Studies Zones. Castle AFB is located within Seismic Zone 3, as defined by the Uniform Building Code (International Conference of Building Officials, 1991). Seismic Zone 3 is identified as likely to sustain damage due to major seismic events and design inputs for construction of new facilities are required to minimize damage.

3.4.2 Water Resources

The general discussion of water resources is focused primarily on Castle AFB and an area within a 5-mile radius of the base boundaries. The ROI for surface water and groundwater issues addressed in this section is limited to Castle AFB and an area within a 1-mile radius of the base.

3.4.2.1 Surface Water. Castle AFB is located within the San Joaquin River watershed, and the nearest major rivers are the San Joaquin (about 18 miles southwest of Castle AFB at its closest point), the Merced (about 6 miles north of Castle AFB at its closest point), and the Tuolumne (about 17 miles north of Castle AFB at its closest point). The nearest wild and scenic river is the Tuolumne, flowing through the Sierra Nevada and its foothills.

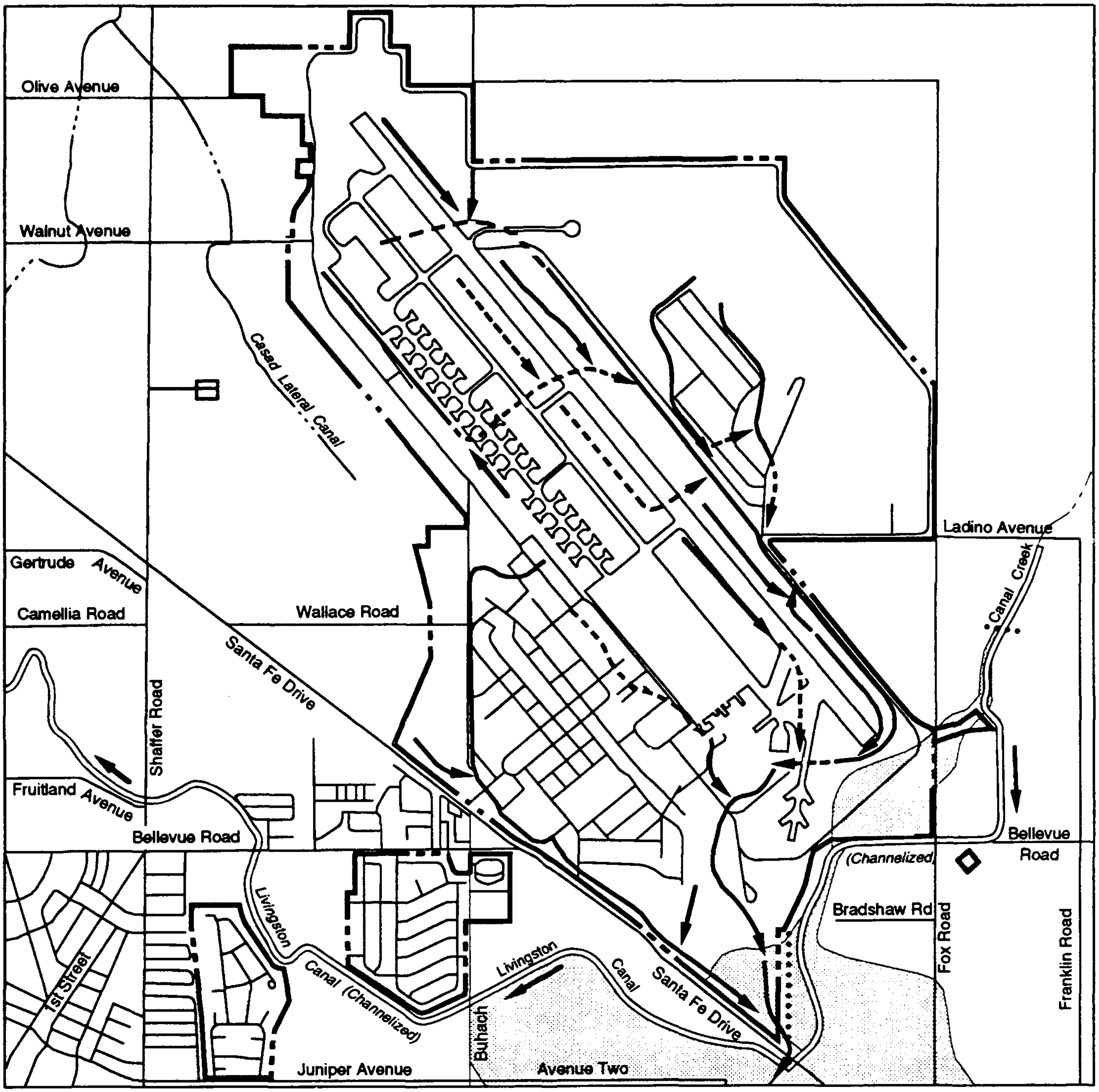
The limit of the 100-year floodplain has been delineated by the Federal Emergency Management Agency (FEMA) in the study of unincorporated areas of Merced County, but the study area did not include Castle AFB. The only channel with a mapped 100-year floodplain, according to the FEMA study, is Canal Creek southeast of the base. The area of potential flooding along Canal Creek is shown on Figure 3.4-3. The estimated depth of water over most of the floodplain area shown is about 1 foot (FEMA, 1988) for a 100-year flood.

The southern end of Castle AFB adjacent to Canal Creek is the low point for drainage from the base and, although the mapping does not show potential flooding here, it is likely to occur. The base flood elevations provided by FEMA (1988) for Canal Creek suggest that the entire area of the base south of Bellevue Road could be flooded, depending on the local configuration of the levees along Canal Creek and any flood protection measures on base. In the worst case, this area of flooding on Castle AFB could exceed 130 acres. This appears to be the only area on base with a potential for flooding from a 100-year flood.

A limited amount of surface water sampling and analysis has been performed at Castle AFB for IRP investigations and for landfill solid waste assessment testing investigations started in the early 1980s. Interpretations of the results of these analyses are somewhat contradictory, but this may be explained by the differences in analyses performed.

Samples were taken from Canal Creek and the upstream drainage ditches within Castle AFB from February 1981 to December 1982 and analyzed for chemical oxygen demand, oil and grease, lead, and surfactants (Engineering-Science, 1983). Results indicated that runoff from the base did not cause any degradation of water quality in Canal Creek.

Samples taken from drainage channel locations in the central and southern portion of the base were analyzed for the presence of organics (including volatiles) and other compounds (Roy F. Weston, Inc., 1985). The results showed detectable levels of trichloroethane, TCE, benzene, and ethyl benzene, and trace amounts of some pesticides and herbicides. However, the only standard that was exceeded was for a pH higher than 8.5 at a



EXPLANATION

- Surface Water Course
- Drainage Ditch
- Drainage Pipe/Culvert
- 100-Year Floodplain
- Artificial Floodplain Boundary (study area limits)
- Base Boundary

0 650 1300 2600 Feet

Surface Hydrology

Figure 3.4-3

number of locations. The U.S. EPA secondary drinking water standard for pH ranges from 6.5 to 8.5. This range is a guideline or recommended goal, rather than a level requiring action to ensure compliance.

Areas containing vernal pools located near LF-06 and LF-08 were sampled and analyzed for organics (including volatiles) and other compounds (Roy F. Weston, Inc., 1988). Detectable levels of phthalates and total petroleum hydrocarbons were reported, as well as a number of metals, none of which exceeded water quality criteria. The report concluded that LF-08 was impacting the water quality of the adjacent vernal pool area.

Kleinfelder, Inc. (1991a, 1991b) reported results for analyses of organics (including volatiles) and other compounds for samples taken from the on-base drainage channels and off-base canals. Detectable levels of phthalates were found in the on-base channels and in the off-base sample from Livingston Canal, suggesting that some off-base contamination from landfills had occurred. Analytical results indicated no such contamination in Canal Creek.

The Merced Irrigation District operates an extensive network of surface irrigation canals and drains in central Merced County that supply irrigation water and carry irrigation runoff. Water supplied to this system of canals initially comes from the Merced River. However, the network also carries water from drainage or irrigation supply wells.

3.4.2.2 Wetlands. Wetland areas, including vernal pools, are found throughout the base. Wetlands are protected under federal and state regulations because of their ecological value, and are discussed further in Section 3.4.5, Biological Resources.

3.4.2.3 Surface Water Drainage. Regional drainage generally carries runoff from the Sierra Nevada to the west-southwest toward the San Joaquin River. To the north of the base, the Tuolumne and Merced rivers flow west-southwest across the valley to the San Joaquin River after leaving the foothills of the Sierra. South of the base, a smaller drainage, Black Rascal Creek, also flows west-southwest toward the San Joaquin River. Local drainage in the vicinity of the base is complicated by the presence of irrigation canals. The two canals of importance to Castle AFB are Canal Creek and Livingston Canal. Canal Creek brings water from the Merced River to the agricultural areas south and southeast of the base. Canal Creek flows by the southeastern boundary of the base, and discharges into Livingston Canal at a diversion structure located adjacent to the AT&SF tracks. Canal Creek then becomes a drainage canal below the diversion structure, carrying water to Black Rascal Creek and acting as a collector for runoff and irrigation drainage. Livingston Canal flows along the southwestern boundary of the base toward the northwest, and eventually empties into the Merced River (Roy F. Weston, Inc., 1985).

Local drainage for Castle AFB is shown on Figure 3.4-3. Surface runoff is conveyed through a series of drainage ditches to the southernmost point of the base where it is discharged to Canal Creek downstream of the diversion structure, but only at times of heavy rainfall (on the average about twice per year). At other times, drainage water is retained on base behind a weir. Storm water discharge is permitted as part of the basewide NPDES permit for wastewater effluent and storm water.

3.4.2.4 Groundwater. Castle AFB is located within the Merced Sub-Basin of the San Joaquin Valley Basin Hydrologic Study Area (Engineering-Science, Inc., 1983). Four regional water-bearing stratigraphic units are located in this sub-basin; from top to bottom they are the shallow, subshallow (or intermediate), confined, and deep units. Various sources report that three or four of these water-bearing units underlie the base (CDM Federal Programs Corporation and Woodward-Clyde Consultants, 1992; Kleinfelder, Inc., 1991c; Martin Marietta Energy Systems, Inc., 1991).

Recharge of groundwater to these units comes primarily from runoff infiltrating the exposed edges of these units to the northeast of the base. A secondary source of recharge to these units is irrigation water conveyed throughout the area by the extensive network of canals, drains, and creeks, as well as the direct application of irrigation water to agricultural fields (Roy F. Weston, Inc., 1988).

The shallow unit includes sediment from the Modesto and Riverbank formations and reaches a depth of approximately 90 to 120 feet below grade (CDM Federal Programs Corporation and Woodward-Clyde Consultants, 1992). These sediments consist of complexly interbedded sequences of alluvial deposits consisting of silty sand, silts, sands, and gravels (IT Corp., 1991). The gravels occur from approximately 70 to 95 feet below ground level. Hardpans occur intermittently at depths generally up to 10 feet (Roy F. Weston, Inc., 1988).

The subshallow or intermediate unit consists of the unconsolidated alluvium of the upper Turlock Lake Formation at a depth between 90 and 260 feet. This formation is composed predominantly of clays, but contains lenses of gravels, sands, and clayey sands. The thickest sequences of alluvial gravels have accumulated in trough-like depressions in the clay sequence. The contact between the clay section (upper Turlock Lake Formation) and the underlying alluvium (lower Turlock Lake Formation) seems to be erosional (CDM Federal Programs Corporation and Woodward-Clyde Consultants, 1992).

The lower Turlock Lake Formation is the confined unit at Castle AFB. This is a fairly continuous unit composed predominantly of sands and occurs from approximately 265 to 350 feet below ground level. The sands of the lower Turlock Lake Formation are the deepest of the unconsolidated alluvium underlying the base. The confining layer for this unit is generally acknowledged to be the Corcoran clay, which is not found under Castle AFB, thus causing disagreements over the existence of the unit under the base (CDM Federal Programs Corporation and Woodward-Clyde Consultants, 1992; Kleinfelder, Inc., 1991c; Martin Marietta Energy Systems, Inc., 1991).

The deep unit is composed of Mehrten Formation sedimentary rocks from a depth of 650 feet to a bottom depth of more than 1,000 feet (Roy F. Weston, Inc., 1988). The rocks of the Mehrten Formation have high water yields in spite of their depth and consolidation, with values up to 2,100 gallons per minute (CDM Federal Programs Corporation and Woodward-Clyde Consultants, 1992).

All four of these units slope and thicken toward the southwest, and the slope of the groundwater surface generally has the same direction except where production wells are pumping and a cone of depression develops. Groundwater gradients in the area of Castle AFB generally range from 0.1 to 0.2 percent, but can be as shallow as 0.05 percent. In addition, pumping of off-base irrigation wells to the west and southwest has increased the gradient toward the southwest (Martin Marietta Energy Systems, Inc., 1991). According to the Merced Irrigation District, the regional aquifer is currently in a state of equilibrium. This could change, however, as the city of Merced's consumption of surface water decreases and its consumption of groundwater increases (Selb, 1994).

Groundwater Quality. General natural water quality in the three upper water-bearing units is good, with only moderate hardness and little or no chemical differences to distinguish the waters taken from different units. These groundwaters have been characterized as calcium-sodium-bicarbonate or sodium-calcium-bicarbonate based on general water quality parameters (Roy F. Weston, Inc., 1988).

TCE, one of the most commonly used solvents during past operations at Castle AFB, is the primary contaminant of concern. Two major TCE plumes have been delineated at Castle with concentrations that consistently exceed federal and state maximum contaminate levels. This contamination is concentrated mainly in groundwater of the shallow unit, and in the lower part of this unit TCE has already migrated off base. Some TCE from at least one of these plumes has migrated into the subshallow unit, and to a much lesser extent into the confined unit. Other contaminants that have been detected at concentrations exceeding the maximum contaminant levels are benzene, toluene, ethylbenzene, xylene, tetrachloroethane, 1,2-dichloroethylene, and other organics. The primary plume of concern is migrating off base to the southwest and was threatening Castle Gardens water supply wells immediately downgradient (CDM Federal Programs Corporation and Woodward-Clyde Consultants, 1992; Martin Marietta

Energy Systems, Inc., 1991; Roy F. Weston, Inc., 1988). Section 3.3, Hazardous Materials/Hazardous Waste Management, provides a detailed discussion of groundwater contamination on base.

Groundwater Use. The water supply for Castle AFB comes entirely from wells with a total pumping capacity of 7.2 MGD; average usage in 1990 was 1.34 MGD. Two deep wells provide water to the main base area. Two older, shallow wells serve facilities in the northeast portion of the base. Many other older, shallow on-base wells have been shut down because of contamination. The two deep wells are newer and draw water from sources deep enough to be unaffected by contamination.

Off base, the primary groundwater pumper is the Merced Irrigation District, with 240 wells located around Castle AFB. Included in this number are 145 shallow drainage wells (less than 30 feet deep), which supply water for irrigation and are pumped in the spring and summer to prevent saturation of the soils. The Merced Irrigation District also operates 13 deeper irrigation wells (80 to 100 feet deep) and 80 project wells (180 to 300 feet deep), which are used to supply irrigation water to the system during drought years (Roy F. Weston, Inc., 1988).

As of 1990, the city of Atwater has seven active production wells drawing groundwater from depths ranging from about 70 feet to 177 feet. The city of Winton operates four water supply wells drawing groundwater from depths averaging about 160 feet. A number of residential wells are also located close to the base; these primarily draw groundwater from the shallow unit (Roy F. Weston, Inc., 1988).

3.4.3 Air Quality

Air quality in a given location is described as the concentration of various pollutants in the atmosphere, generally expressed in ppm or $\mu g/m^3$. Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The significance of a pollutant concentration is determined by comparing it to federal and/or state ambient air quality standards. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare, with a reasonable margin of safety. The federal standards are established by the U.S. EPA and termed the National Ambient Air Quality Standards (NAAQS). The state standards are established by the California Air Resources Board (ARB) and are termed the California Ambient Air Quality Standards (CAAQS). The NAAQS and CAAQS are presented in Table 3.4-1.

The main pollutants considered in this EIS are ozone (O_3), CO, nitrogen oxides (NO_X), nitrogen dioxide (NO_2), SO_2, and PM_{10}. NO_X include all oxide species of nitrogen. NO_X are of concern because of their potential

Table 3.4-1. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a,c]	National Standards[b] Primary[c,d]	Secondary[c,e]
Ozone	1-hour	0.09 ppm (180 $\mu g/m^3$)	0.12 ppm (235 $\mu g/m^3$)	Same as primary standard
Carbon monoxide	8-hour	9 ppm (10,000 $\mu g/m^3$)	9 ppm (10,000 $\mu g/m^3$)	--
	1-hour	20 ppm (23,000 $\mu g/m^3$)	35 ppm (40,000 $\mu g/m^3$)	--
Nitrogen dioxide	Annual	--	0.053 ppm (100 $\mu g/m^3$)	Same as primary standard
	1-hour	0.25 ppm (470 $\mu g/m^3$)	--	--
Sulfur dioxide	Annual	--	0.03 ppm (80 $\mu g/m^3$)	--
	24-hour	0.04 ppm (105 $\mu g/m^3$)	0.14 ppm (365 $\mu g/m^3$)	--
	3-hour	--	--	0.5 ppm (1,300 $\mu g/m^3$)
	1-hour	0.25 ppm (655 $\mu g/m^3$)	--	--
PM_{10}	Annual	30 $\mu g/m^3$ [f]	50 $\mu g/m^3$ [g]	Same as primary standard
	24-hour	50 $\mu g/m^3$	150 $\mu g/m^3$	Same as primary standard
Sulfates	24-hour	25 $\mu g/m^3$	--	--
Lead	30-day	1.5 $\mu g/m^3$	--	--
	Quarterly	--	1.5 $\mu g/m^3$	Same as primary standard
Hydrogen sulfide	1-hour	0.03 ppm (42 $\mu g/m^3$)	--	--
Vinyl chloride	24-hour	0.010 ppm (26 $\mu g/m^3$)	--	--
Visibility reducing particles[h]	8-hour (10 a.m. to 6 p.m., Pacific Standard Time)	In a sufficient amount to produce an extinction coefficient of 0.23 per km due to particles when the relative humidity is less than 70% ARB Method V.	--	--

Notes: (a) California standards for ozone, carbon monoxide, sulfur dioxide (1 hour and 24 hour), nitrogen dioxide, particulate matter (PM_{10}), and visibility reducing particles are values that are not to be exceeded. The sulfates, lead, hydrogen sulfide, and vinyl chloride standards are not to be equaled or exceeded.

(b) National standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year, with maximum hourly average concentrations above the standards, is equal to or less than one.

(c) Equivalent units given in parentheses are based on a reference temperature of 25 degrees Centigrade (°C) and a reference pressure of 760 millimeters (mm) of mercury. All measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 mm of mercury (1,013.2 millibar); ppm in this table refers to parts per million by volume, or micromoles of pollutant per mole of gas.

(d) National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

(e) National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of pollutant.

(f) Calculated as geometric mean.

(g) Calculated as arithmetic mean.

(h) This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range when relative humidity is less than 70 percent.

$\mu g/m^3$ = Micrograms per cubic meter.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ppm = Parts per million.

Source: ARB, 1992.

contribution to ozone formation. Only that portion of total NO_x that is measurable as NO_2 is subject to the NAAQS and CAAQS. The previous NAAQS for particulate matter was based upon total suspended particulate (TSP) levels; it was replaced in 1987 by an ambient standard based only on the PM_{10} fraction of the TSP.

Lead is not addressed in this EIS because there are no known lead emission sources in the region or included in the reuse alternatives. Lead concentrations are monitored in a number of high population density areas throughout the state, and all sites meet the quarterly and monthly standard of 1.5 $\mu g/m^3$. Similarly, there are no known major sources of sulfates, hydrogen sulfide, or vinyl chloride associated with the reuse alternatives.

The existing air quality of the affected environment is defined by air quality data and emissions information. Air quality data are obtained by examining air quality monitoring records from monitoring stations maintained by the San Joaquin Valley Unified Air Pollution Control District (UAPCD). Information on pollutant concentrations measured for short-term (24 hours or less) and long-term (annual) averaging periods is extracted from the monitoring station data in order to characterize the existing air quality background of the area. Emission inventory information for the affected environment was obtained from the UAPCD and Castle AFB. Inventory data are separated by pollutant and reported in tons per year in order to describe the baseline conditions of pollutant emissions in the area.

Identifying the ROI for an air quality assessment requires knowledge of the pollutant types, source emission rates and re'ease parameters, the proximity relationships of project emission sources to other emission sources, and local and regional meteorological conditions. For inert pollutants (all pollutants other than ozone, its precursors, and NO_2), the ROI is generally limited to an area extending a few miles downwind from the source.

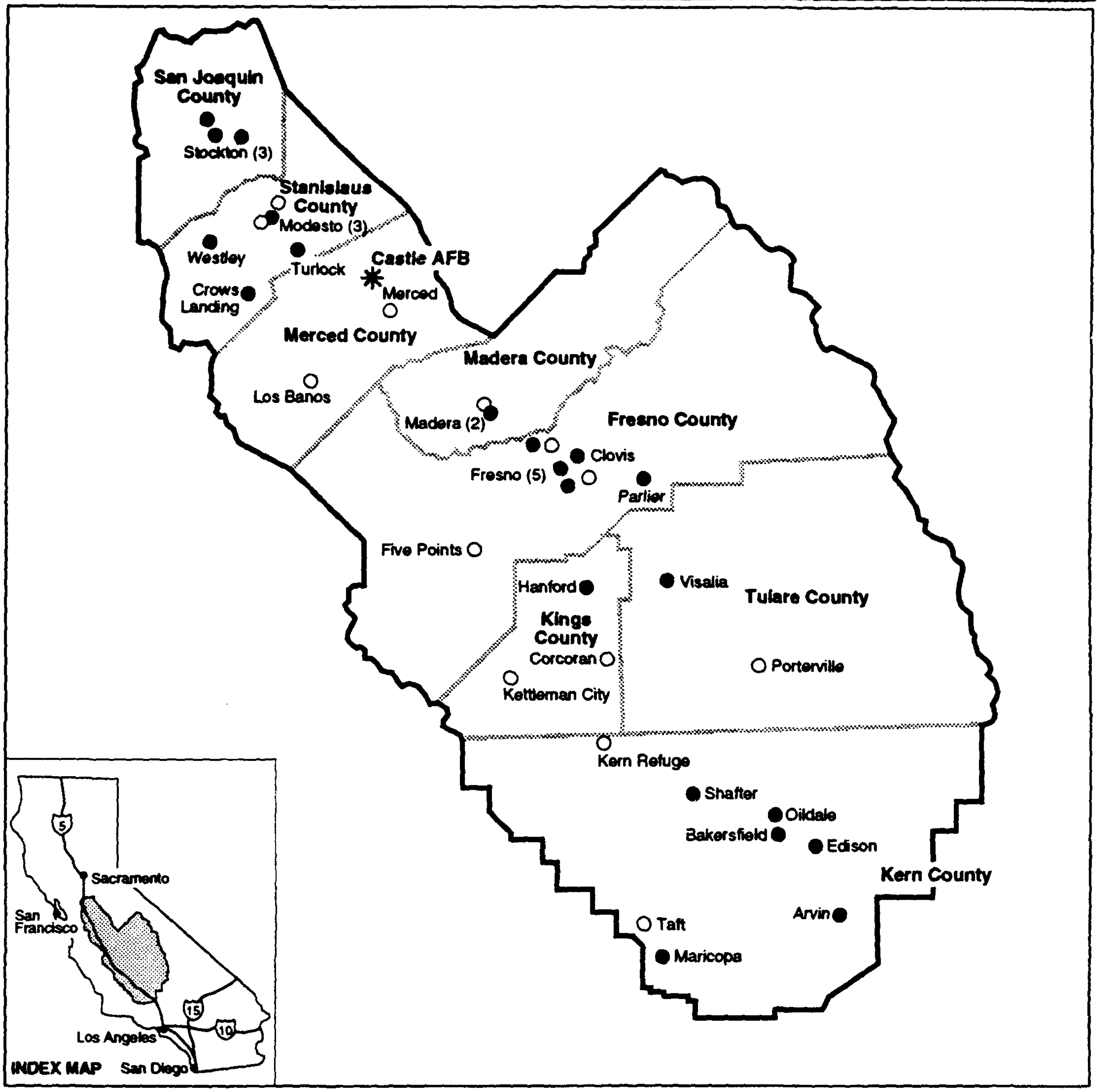
Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors. Ozone precursors are mainly reactive organic gases (ROGs) and NO_x. ROGs are a subset of volatile organic compounds (VOCs), which are volatile compounds containing carbon and hydrogen. ROGs, as defined by California regulations, do not include methane, chlorofluorocarbons, or other compounds that do not contribute to ozone formation. NO_x is the designation given to the group of all oxygenated nitrogen species, including nitrous oxide (N_2O), nitric oxide (NO), NO_2, nitrogen trioxide (NO_3), nitrogen tetroxide (N_2O_4), nitric anhydride (N_2O_5), and nitrous anhydride (N_2O_3). Although all of these compounds can exist in air, only N_2O, NO, and NO_2 are present in appreciable quantities.

The ROI for ozone may extend much farther downwind than the ROI for inert pollutants. In the presence of solar radiation, the maximum effect of precursor emissions on ozone levels usually occurs several hours following precursor emissions and, therefore, many miles from the source. Ozone and its precursors transported from other regions can also combine with local emissions to produce high local ozone concentrations. Ozone concentrations are generally the highest during the summer months and coincide with periods of maximum solar radiation. Maximum ozone concentrations tend to be regionally distributed because precursor emissions are homogeneously dispersed in the atmosphere.

Like ozone, NO_2 concentrations are also regionally distributed. NO_2 is formed primarily by the conversion of NO to NO_2 in the presence of oxygen (either during combustion or in the atmosphere). NO is produced by fuel combustion in both stationary and mobile sources, such as automobiles and aircraft. The amount of NO produced is dependent upon the combustion temperature and the rate of exhaust gas cooling. Higher temperatures and rapid cooling rates produce greater quantities of NO. Where higher NO concentrations and temperatures exist, some of the NO is immediately oxidized to NO_2. The amount of immediate NO_2 combustion generation generally varies from 0.5 to 10 percent of the NO present (U.S. EPA, 1971). The remaining unconverted NO is oxidized to NO_2 in the atmosphere primarily through photochemical secondary reactions initiated by the presence of sunlight. These photochemical reactions may take place hours after the initial NO release and many miles from the original source, dependent upon the prevailing meteorological conditions.

For the purpose of this air quality analysis, the ROI for emissions of ozone precursors and NO_2 from the reuse-related construction and operational activities would be the existing airshed surrounding Castle AFB, i.e., the San Joaquin Valley Air Basin (SJVAB). Reuse-related emissions of ROG, NO_x, and NO_2 are compared to emissions generated within the SJVAB. The SJVAB comprises eight counties: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and central and western Kern County (Figure 3.4-4). The ROI for emissions of the inert pollutants (CO, SO_2, and PM_{10}) is limited to the more immediate area of Castle AFB. Reuse-related emissions of inert pollutants are compared to the Merced County portion of the total SJVAB emissions as a means of assessing potential changes in air quality.

The federal CAA 42 U.S.C. §§7401-7671(q), most recently amended in November 1990, dictates that project emission sources must comply with the air quality standards and regulations that have been established by federal, state, and county regulatory agencies. These standards and regulations focus on (1) the maximum allowable ambient pollutant concentrations resulting from project emissions, both separately and combined with other surrounding sources, and (2) the maximum allowable emissions from the project.



EXPLANATION

● Gaseous pollutant or multipoint monitoring site

○ Particulate sampling only

(2) Multiple Monitoring Points

San Joaquin Valley Air Basin

Figure 3.4-4

Prior to the 1990 CAA Amendments (CAAA), federal regulation of hazardous air emissions was very limited. Section 112, as amended in 1990, requires the U.S. EPA to regulate a greatly expanded list of hazardous air pollutants (HAPs). Additionally, U.S. EPA must publish a list of all categories and subcategories of emission sources of HAPs. After identifying and listing sources of HAPs, U.S. EPA must promulgate emission standards that are equivalent to maximum achievable control technology. By 2000, most medium- and large-sized sources of HAPs can expect final U.S. EPA regulations that will control HAP emissions and require adoption of costly control measures.

3.4.3.1 **Regional Air Quality**. Castle AFB is located in the northern portion of the San Joaquin Valley. The boundaries of the San Joaquin Valley are the Sacramento Valley to the north, the Sierra Nevada to the east, the Tehachapi Mountains to the south, and the Coast Ranges to the west.

Because of the weak circulation over the eastern Pacific during summer and the presence of the coastal mountains to the west, Castle AFB is protected from cool, moist, marine air during the summer. As a result, summer months are hot, dry, and nearly cloudless. During the summer, Pacheco Pass and the Carquinez Straits occasionally allow cool maritime air to enter the basin, providing relief from hot summer temperatures and dry conditions. During the winter, stronger circulations and frontal passages carry moisture into the valleys. The surrounding mountains trap the moist air and produce frequent (often prolonged) periods of fog and stratus clouds.

From June through September, temperatures around the Castle AFB area range from a mean low of 60°F to a mean high of 90°F. Haze will frequently reduce visibility during the summer months, but seldom to below a visual range of 3 miles. During the winter, fog can restrict visibility to less than 3 miles on at least 15 mornings each month, and produces an average of less than 0.5 mile visual range on 50 percent of these days. Visibility tends to be most degraded, and fog occurrences most persistent, when high pressure remains over the basin, acting to cap the valley and prevent vertical mixing. A cold frontal passage or strong dry flow from the east will bring relief from these foggy conditions.

Castle AFB has an average of four thunderstorms per year. Prevailing winds are from the north-northwest, and wind gusts exceeding 50 knots occur, on average, only once every 7 years. Sustained winds greater than 25 knots occur approximately twice a year.

According to the U.S. EPA guidelines, an area with air quality better than the NAAQS is designated as being in attainment; areas with worse air quality are classified as nonattainment areas. The NAAQS, other than for ozone and those standards based on annual arithmetic means, are considered to be in attainment if they are not exceeded more than once per year. The ozone standard is attained when the expected number of days per calendar year with a maximum hourly concentration above the standard is equal to or less than one. Pollutants in an area may be designated as unclassified when there is a lack of data for the U.S. EPA to form a basis of attainment status. An area designated as unclassified is assumed to be in attainment.

The Merced County portion of SJVAB is designated by the U.S. EPA as being in attainment of the NAAQS for CO and NO_2, in nonattainment for ozone and PM_{10}, and unclassified for SO_2 (40 CFR 81.305, July 1, 1993). The SJVAB metropolitan areas of Fresno, Modesto, and Stockton are designated as being nonattainment for CO by the U.S. EPA. The SJVAB is designated by the U.S. EPA as a "serious" nonattainment area for ozone (ozone concentration greater than 0.16 ppm). An area designated as "serious" is subject to a number of special requirements, including provisions for use of reasonable available control technology on all major sources, vapor recovery and motor vehicle inspection and maintenance programs, and reductions in VOCs. Attainment must be achieved by November 15, 1999.

Initially, all areas that exceed the PM_{10} NAAQS are classified as "moderate" nonattainment areas. Subsequently, all moderate nonattainment areas that the U.S. EPA determines cannot attain the standard by November 1996 are reclassified as "serious" nonattainment areas.

The SJVAB was reclassified as serious on January 8, 1993. Serious PM_{10} nonattainment areas must reach attainment as expeditiously as practical, but not later than the 10th calendar year after the designation. In addition, serious PM_{10} nonattainment areas must implement best available control measures within 4 years of classification. Also, serious PM_{10} nonattainment areas must be demonstrated to have made reasonable further progress every 3 years until attainment is reached.

The ARB also designates areas of the state that are in attainment or nonattainment of the CAAQS. An area is in nonattainment for a pollutant if its CAAQS has been exceeded at least once in the last 3 years. Presently, the Merced County portion of the SJVAB is designated by the state as nonattainment for ozone and PM_{10}, attainment for NO_2 and SO_2, and unclassified for CO (ARB, 1991a). The SJVAB is designated by the ARB as a "severe" nonattainment area for ozone. The designation "severe" is given to an area if its ozone design day value concentration falls in the range between 0.16 and 0.20 ppm. The design day value is defined as the fourth highest pollutant concentration recorded in a 3-year period. Under the California Clean Air Act (CCAA), severe nonattainment areas such as the SJVAB are required to implement new emission control measures. These control measures include an indirect and area source control program, application of best available retrofit control technology (BARCT) to existing stationary sources, a modification of the permitting program to achieve no net increase of emissions from new or modified stationary sources, consideration of transportation control measures, and significant use of low-emission motor vehicles by operators of motor vehicle fleets.

Data from the monitoring stations in Merced County indicate a peak ozone concentration of 0.13 ppm from 1989 to 1991. This ozone concentration exceeds the NAAQS and the CAAQS, and would classify Merced County as a "serious" nonattainment area according to the state standard and as a "marginal" nonattainment area according to the federal standard. However, the air quality attainment designation for Merced County is determined by the designation of the entire SJVAB, which is in "severe" nonattainment of the state standard and in "serious" nonattainment of the federal standard, based on the fourth highest ozone concentration reported in the basin.

The ARB has determined that the SJVAB is both a receptor and contributor of transported air pollutants. The SJVAB has been identified by ARB as a receptor of air pollution from the San Francisco Bay area and broader Sacramento air basins, and as a contributor of air pollution to the broader Sacramento, Southeast Desert, and Great Basin Valley air basins. Since the SJVAB has been identified as a source of air pollution to other areas, additional transport mitigation requirements are mandated by the CCAA. The CCAA key requirements for the UAPCD include a 5-percent per year reduction in nonattainment emissions, or implementation of "every feasible measure" in the Air Quality Attainment Plan (AQAP); establishment of a permitting program that achieves no net increase in stationary source emissions; development of a strategy to reduce vehicle trips, use, and miles traveled; an increase in average vehicle ridership to 1.5 persons per vehicle during commute hours by January 1, 1999; reduction of population exposure to nonattainment pollutants by 25 percent by December 31, 1994; establishment of BARCT requirements for all permitted sources, with BARCT rules adopted for at least 75 percent of the permitted inventory by December 31, 1993; and development of indirect and area source programs (San Joaquin Valley UAPCD, 1992b). Strategies for compliance with these requirements are addressed by the UAPCD in the 1991 AQAP. This analysis considers the emission forecasts and compliance strategies adopted in the 1991 AQAP, which represents the best available data at the time of analysis. The 1994 Ozone SIP for SJVAB is pending finalization and approval by the U.S. EPA.

In addition to being subject to control measures contained in the 1991 AQAP, new or modified major stationary sources in the area of Castle AFB would be subject to the New Source Review provisions of the CAA. Any new or modified major source emitting more than 50 tons per year of VOC (as ROG), NO_x, or PM_{10} in a serious nonattainment area must satisfy technology standards reflecting the lowest achievable emission rate and must provide offsets representing emission reductions from other sources at a ratio of at least 1.2 to 1.0.

New or modified major sources of attainment pollutants would also be subject to PSD review to ensure that these sources are constructed without significant adverse deterioration of the clean air in the area. Emissions of attainment or unclassifiable pollutants from any new or modified source must be controlled using best available control technology (BACT). The air quality impacts in combination with other PSD sources in the area must not exceed the maximum allowable incremental increases identified in Table 3.4-2. Certain national parks and wilderness areas are designated as Class I areas, where any appreciable deterioration in air quality is considered significant. Class II areas are those where moderate, well controlled industrial growth could be permitted. Class III areas allow for greater industrial development. The area surrounding Castle AFB is designated by the U.S. EPA as Class II.

Table 3.4-2. Maximum Allowable Pollutant Concentration Increases under PSD Regulations for SO_2 and NO_2

Pollutant	Averaging Time	Maximum Allowable Increment ($\mu g/m^3$)		
		Class I	Class II	Class III
Sulfur dioxide	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
Nitrogen dioxide	Annual	2.5	25	50

Notes: Class I areas are regions in which the air quality is intended to be kept pristine, such as national parks and wilderness areas. All other lands are initially designated Class II. Individual states have the authority to redesignate Class II lands to Class III to allow for maximum industrial use.
$\mu g/m^3$ = Micrograms per cubic meter.

Source: 40 CFR 51.166.

In the Sierra Nevada, part of which are located in the eastern portion of Merced County, there are 117,409 acres in the National Forest System lands and 1,623,000 acres in Yosemite, Sequoia, and Kings Canyon national parks that are designated as Class I areas within the SJVAB. All Class I areas are at least 50 miles from Castle AFB. In addition, there are approximately 1.8 million acres in the SJVAB designated as Class II. The CAA, Section 165, gives federal land managers the legal responsibility to review PSD permit applications that may have an impact on air quality within Class I areas. PSD permit issuance in the San Joaquin Valley is currently under the authority of the U.S. EPA. If the UAPCD is delegated authority to permit PSD sources, then federal land managers would work directly with the UAPCD on PSD permit reviews.

The UAPCD currently operates air quality monitoring stations throughout the SJVAB (see Figure 3.4-4). However, ambient air quality is not measured within the boundary of Castle AFB. The nearest monitoring stations to Castle AFB are Los Banos (located approximately 27 miles southwest of the base) and Merced (located approximately 8 miles to the southeast). The Los Banos and Merced stations measure PM_{10} concentrations for the area. The nearest stations for monitoring ozone levels are Turlock (located in Stanislaus County, approximately 16 miles west-northwest of the base) and Merced. Similarly, data from Crows Landing (located in Stanislaus County, approximately 27 miles west of the base) are used for ambient concentrations of NO_2, CO, and SO_2. The federal ozone standard was exceeded on 3 days at the Turlock station from 1989 through 1991, and the state standard was exceeded on 70 days during the same time period (Table 3.4-3). The federal and state ozone standards were exceeded 2 days and 13 days, respectively, at the Merced station in 1991. Annual and 24-hour state PM_{10} standards were exceeded at both the Los Banos and Merced stations every year from 1989 through 1991. However, federal PM_{10} standards were exceeded only at the Merced station. All other pollutants were measured at levels below the NAAQS and CAAQS at all stations.

Preclosure Reference. Preclosure pollutant concentrations due to aircraft emissions in the immediate area of the base runways were estimated with the Emissions and Dispersions Modeling System (EDMS). (Refer to Section 4.4.3 for a discussion of EDMS.) The results of the EDMS modeling for preclosure conditions are provided in Table 3.4-4. The values in Table 3.4-4 represent the maximum concentrations that occurred in the vicinity of the runways as a result of preclosure aircraft operations. State and federal PM_{10} standards were exceeded at the maximum impact receptor location by aircraft-related impacts alone.

Closure Baseline. It can be reasonably assumed that pollutant concentrations at base closure would be less than concentrations experienced under preclosure conditions due to the implementation of regional air emission control measures. Pollutant concentrations in the area of the base itself would be lower than the preclosure levels due to the reduction or elimination of numerous emission sources associated with normal base activities (e.g., all current aircraft operations and aerospace ground activity would be eliminated). The closure would also reduce the number of motor vehicles operating in the surrounding area. Emissions associated with vehicles assigned to the base, military and civilian employees, retirees visiting Castle AFB facilities, and truck traffic associated with base operations would all be eliminated, with the exception of activities associated with the OL.

3.4.3.2 Air Pollutant Emission Sources

Preclosure Reference. An emission inventory is a summary of pollutant emissions from a site or facility during a given year, broken down by

Table 3.4-3. Existing Air Quality in Area of Castle AFB
Page 1 of 2

Pollutant/Station	Averaging Time	Maximum Concentration by Year[a] ($\mu g/m^3$) ppm			Number of Days[b] Federal Standard Exceeded			Number of Days[b] State Standard Exceeded		
		1989	1990	1991	1989	1990	1991	1989	1990	1991
Ozone										
Turlock	1-hour	0.13[c] (258.7)	0.12[c] (238.8)	0.12[c] (238.8)	3	0	0	31	17	22
Merced	1-hour	ND	ND	0.13[c] (258.7)	ND	ND	2	ND	ND	13
Nitrogen Dioxide										
Crows Landing	Annual	0.015[c] (28.7)	0.013 (24.8)	0.012[c] (22.9)	0	0	0	NA	NA	NA
Crows Landing	1-hour	0.06[c] (114.6)	0.06 (114.6)	0.05[c] (95.5)	NA	NA	NA	0	0	0
Carbon Monoxide										
Crows Landing	8-hour	1.3[c] (1,508)	1.0 (1,160)	1.3[c] (1,508)	0	0	0	0	0	0
Crows Landing	1-hour	2.0[c] (2,320)	1.0 (1,160)	3.0[c] (3,480)	0	0	0	0	0	0
Sulfur Dioxide										
Crows Landing	Annual	<0.0005[c] (<1.3)	<0.0005 (<1.3)	<0.0005[c] (<1.3)	0	0	0	NA	NA	NA
Crows Landing	24-hour	0.003[c] (8.0)	0.002 (5.3)	0.005[c] (13.3)	0	0	0	0	0	0
Crows Landing	1-hour	0.01[c] (26.5)	0.01 (26.5)	0.07[c] (185.5)	NA	NA	NA	0	0	0

Notes: (a) Pollutant concentrations are presented in units of ppm and ($\mu g/m^3$), except for PM_{10} which is presented in units of $\mu g/m^3$ only.
(b) Annual averaging periods are reported as either being exceeded or not being exceeded. PM_{10} 24-hour standard exceedance measured as percentage of total samples that exceed the standard. Percentage is used because PM_{10} sampling is not performed on a daily basis.
(c) Data presented are valid, but incomplete in that insufficient number of valid data points were collected to meet the U.S. EPA and/or the California Air Resources Board criteria for representativeness.

$\mu g/m^3$ = Micrograms per cubic meter.
NA = Not applicable.
ND = No data.
< = Less than.

Table 3.4-3. Existing Air Quality in Area of Castle AFB
Page 2 of 2

Pollutant/Station	Averaging Time	Maximum Concentration by Year[a] ($\mu g/m^3$) ppm			Number of Days[b] Federal Standard Exceeded			Number of Days[b] State Standard Exceeded		
		1989	1990	1991	1989	1990	1991	1989	1990	1991
PM_{10} ($\mu g/m^3$)										
Los Banos	Annual (arithmetic)	40.8	37.2	42.4[c]	0	0	0	NA	NA	NA
Los Banos	Annual (geometric)	34.0	30.0	33.2[c]	NA	NA	NA	1	0	1
Merced	Annual (arithmetic)	52.5	54.2	51.9	1	1	1	NA	NA	NA
Merced	Annual (geometric)	45.0	44.7	42.7	NA	NA	NA	1	1	1
Los Banos	24-hour	127	150	114	0.0%	0.0%	0.0%	22.4%	21.7%	28.1%
Merced	24-hour	148	211	145	0.0%	5.0%	0.0%	29.7%	41.7%	40.7%

Notes: (a) Pollutant concentrations are presented in units of ppm and ($\mu g/m^3$), except for PM_{10} which is presented in units of $\mu g/m^3$ only.

(b) Annual averaging periods are reported as either being exceeded or not being exceeded. PM_{10} 24-hour standard exceedance measured as percentage of total samples that exceed the standard. Percentage is used because PM_{10} sampling is not performed on a daily basis.

(c) Data presented are valid, but incomplete in that insufficient number of valid data points were collected to meet the U.S. EPA and/or the California Air Resources Board criteria for representativeness.

$\mu g/m^3$ = Micrograms per cubic meter.
NA = Not applicable.
ND = No data.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.

Sources: ARB, 1989, 1990, 1991b.

Table 3.4-4. Air Quality Modeling Results for Preclosure Conditions in the Vicinity of the Runways at Castle AFB, ppm ($\mu g/m^3$)

Pollutant	Averaging Time	Maximum Impact[a]	Background Concentration[b]	Limiting Standard[c]
Carbon monoxide	8-hour	2.3 (2,807)	1.2 (1,392)	9 (10,000)
	1-hour	3.4 (4,010)	2.0 (2,320)	20 (23,000)
Sulfur dioxide	Annual	0.007 (17.6)	<0.0005 (<1.3)	0.08 (80)
	24-hour	0.026 (70.4)	0.003 (9)	0.04 (105)
	3-hour	0.060 (158.4)	0.030 (80)	0.5 (1,300)
	1-hour	0.067 (176.0)	0.030 (80)	0.25 (655)
PM_{10}	Annual (arithmetic)	NA (322)	NA (47)	NA (50)
	Annual (geometric)	NA (322)	NA (38)	NA (30)
	24-hour	NA (1,288)	NA (149)	NA (50)

Notes: (a) Maximum impact in all cases occurred at a receptor located at the centerline of the runway (approximately 2,300 feet from the northwest end of runway 13/31).
(b) Background concentrations assumed to equal the mean of first-high values monitored during the period 1989 to 1991 (refer to Table 3.4-3).
(c) Limiting standard is equal to the more stringent of the California Ambient Air Quality Standards or National Ambient Air Quality Standards (refer to Table 3.4-1).
$\mu g/m^3$ = Micrograms per cubic meter.
NA = Not applicable.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ppm = Parts per million.
< = Less than.

emitting source. The emission inventory representative of preclosure conditions at Castle AFB is detailed in Appendix M. The base emissions inventory represents direct sources within the base boundary and off-site vehicular emission sources from on-base residents and direct employee commute trips. This inventory does not consider indirect air emissions associated with the base-related population, including direct and secondary employees and their dependents.

For NEPA purposes, the preclosure emissions have been supplemented with a broader set of sources, including other off-site emission sources which are indirectly related to Castle AFB (e.g., lawn mowers, dry cleaning equipment, etc.). Table 3.4-5 summarizes the total preclosure base-related emissions associated with on-site sources, and off-site sources associated with the direct and secondary workers and their dependents. These base-related

Table 3.4-5. Total Base-Related Emissions from Direct and Indirect Sources

	PM_{10}	SO_x	CO	ROG	NO_x
Preclosure (tons/year)	2,033	303	10,067	3,216	2,190
Preclosure (tons/day)	5.57	0.83	27.58	8.81	6.00
Closure, 1995 (tons/year)	14.6	1.8	58.8	8.4	8.8
Closure, 1995 (tons/day)	0.04	0.005	0.16	0.023	0.024

CO = Carbon monoxide.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.
SO_x = Sulfur oxides.

emission sources are used in this environmental analysis to allow consistent comparison with the total site-related emissions generated for each reuse alternative. The emissions presented in Table 3.4-5 were developed using the same forecasting methods applied to the reuse alternatives. Appendix M describes the consistent methodology used to calculate direct and indirect preclosure emissions for direct comparison with projected reuse-related emissions.

Closure Baseline. The base-related emissions for Castle AFB at closure in 1995 were estimated by calculating the direct and indirect emissions associated with only the OL activities, which include maintenance and security of Castle AFB facilities (Table 3.4-5). The reduction in base-related emissions from preclosure conditions reflects the loss of both direct and indirect sources due to reduced on-base activities, limited facility heating and power requirements, and the reduction in the direct and indirect population associated with Castle AFB at the time of closure. At closure, emission offsets would become available to demonstrate conformity to applicable actions within the SJVAB. The preclosure emissions that could be used as potential offsets would include 6,947 tons/year of CO, 2,411 tons/year of ROG, 1,010 tons/year of NO_x, 99 tons/year of sulfur oxides (SO_x), and 152 tons/year of PM_{10}. Available offsets are described in further detail in Section 4.4.3.

3.4.4 Noise

The ROI for noise sources at Castle AFB is defined using land use compatibility guidelines developed by both the FAA and the state of California. The area most affected by noise due to the base disposal and reuse is limited to the area in and around the base within the 60-dB CNEL contour. This includes, but is not limited to, portions of the communities of Merced, Atwater, and Winton.

The characteristics of sound include parameters such as amplitude, frequency, and duration. Sound can vary over an extremely large range of amplitudes. The dB, a logarithmic unit that accounts for the large variations in amplitude, is the accepted standard unit measurement of sound. Table 3.4-6 presents examples of typical sound levels. Different sounds may have different frequency contents. When measuring sound to determine its effects on a human population, A-weighted sound levels are typically used to account for the response of the human ear. A-weighted sound levels represent adjusted sound levels. The adjustments, established by the American National Standards Institute (1983) are applied to the frequency content of the sound.

Noise is usually defined as sound that is undesirable because it interferes with speech communication and hearing, is intense enough to damage hearing, or is otherwise annoying. Noise levels often change with time; therefore, to compare levels over different time periods, several descriptors were developed that take into account this time-varying nature. These descriptors are used to assess and correlate the various effects of noise on man and animals, including land-use compatibility, sleep interference, annoyance, hearing loss, speech interference, and startle effects.

DNL was developed to evaluate the total community noise environment. DNL (sometimes abbreviated as L_{dn}) is the average A-weighted acoustical energy during a 24-hour period with a 10-dB penalty added to the nighttime levels (between 10 p.m. and 7 a.m.). This adjustment is an effort to account for the increased sensitivity to nighttime noise events. DNL was endorsed by the U.S. EPA for use by federal agencies to measure noise and has been adopted by HUD, FAA, and DOD.

DNL is an accepted unit for quantifying human annoyance to general environmental noise, which includes aircraft noise. The Federal Interagency Committee on Urban Noise developed land-use compatibility guidelines for noise in terms of DNL (U.S. DOT, 1980). Table 3.4-7 provides FAA-recommended DNL ranges for various land use categories sed upon the committee's guidelines.

In California, CNEL, a descriptor similar to DNL, is used to evaluate impacts due to noise. The CNEL is similar to the DNL with the one exception that there is a 5-dB penalty added to those noises occurring during evening hours (7:00 p.m. to 10:00 p.m.). Both DNL and CNEL represent a 24-hour average of the A-weighted noise levels at a particular location. For most transportation and community noise sources, the CNEL and DNL are equal, to within 1 dB. The land-use compatibility guidelines shown in Table 3.4-7 are applicable for both CNEL and DNL. CNEL is used in this report because it is the noise descriptor recognized by the FAA and Air Force for airfield environments within the state of California.

The California Department of Health, Office of Noise Control, has also developed land-use compatibility guidelines (California Office of Planning and

Table 3.4-6. Comparative Sound Levels

Common Outdoor Sound Levels	Sound Level (dB)	Common Indoor Sound Levels
	110	Rock Band
Jet Flyover at 1,000 ft		
	100	Inside Subway Train (New York)
Gas Lawnmower at 3 ft		
	90	
Diesel Truck at 50 ft		Food Blender at 3 ft
Noisy Urban Daytime		Garbage Disposal at 3 ft
	80	
		Shouting at 3 ft
Gas Lawnmower at 100 ft		Vacuum Cleaner at 10 ft
	70	
Commercial Area		Normal Speech at 3 ft
Heavy Traffic at 300 ft		
	60	
		Large Business Office
		Dishwasher Next Room
	50	
Quiet Urban Nighttime		Small Theater, Large Conference Room (Background)
	40	
Quiet Suburban Nighttime		Library
	30	Bedroom at Night
Quiet Rural Nighttime		Concert Hall (Background)
	20	
		Broadcast and Recording Studio
	10	
		Threshold of Hearing
	0	

Table 3.4-7. Land Use Compatibility with Yearly Day-Night Average Sound Levels
Page 1 of 2

Land Use	Yearly Day-Night Average Sound Level (DNL) in Decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N[a]	N[a]	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N[a]	N[a]	N[a]	N	N
Public Use						
Schools	Y	N[a]	N[a]	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[b]	Y[c]	Y[d]	Y[d]
Parking	Y	Y	Y[b]	Y[c]	Y[d]	N
Commercial Use						
Offices, business, and professional	Y	Y	25	30	N	N
Wholesale and retail--building materials, hardware, and farm equipment	Y	Y	Y[b]	Y[c]	Y[d]	N
Retail trade--general	Y	Y	25	30	N	N
Utilities	Y	Y	Y[b]	Y[c]	Y[d]	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y[b]	Y[c]	Y[d]	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y[f]	Y[g]	Y[h]	Y[h]	Y[h]
Livestock farming and breeding	Y	Y[f]	Y[g]	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y[e]	Y[e]	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Letters in parentheses refer to notes (see next page). The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

Key

Y (Yes)	Land use and related structures compatible without restrictions.
N (No)	Land use and related structures are not compatible and should be prohibited.
25, 30, or 35	Land use and related structures generally compatible; measures to achieve Noise Level Reduction (NLR) of 25, 30, or 35 dB must be incorporated into design and construction of structure.

Table 3.4-7. Land Use Compatibility with Yearly Day-Night Average Sound Levels
Page 2 of 2

Notes

(a) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(b) Measures to achieve an NLR of 25 dB 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.

(c) Measures to achieve an NLR of 30 dB 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.

(d) Measures to achieve an NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office area, noise-sensitive areas, or where the normal noise level is low.

(e) Land use compatible provided special sound reinforcement systems are installed.

(f) Residential buildings require an NLR of 25.

(g) Residential buildings require an NLR of 30.

(h) Residential buildings not permitted.

Source: Derived from FAR Part 150 Airport Noise Compatibility Planning (FAA, 1989).

Research, 1987). These guidelines, summarized in Table 3.4-8, determine the ranges of acceptable levels for noise-sensitive receptors similar to those presented in the FAA-developed land-use compatibility guidelines. The most relevant difference between the two guidelines, for this study, is the acceptable level for residential (single-family, duplex, and mobile homes) land uses. The federal guidelines indicate that 65 dB is the maximum acceptable exterior noise level compatible with residential land uses, whereas the California guidelines establish 60 dB as the maximum normally acceptable level. The California guidelines were used in this study to determine noise impacts. The county of Merced has incorporated the Office of Noise Control guidelines in the Merced County General Plan Noise Element. The county defines CNEL 60 dB as the acceptable external noise level for residential lands (CNEL 65 dB if noise reduction is incorporated into structures) and CNEL 45 dB as the acceptable interior level.

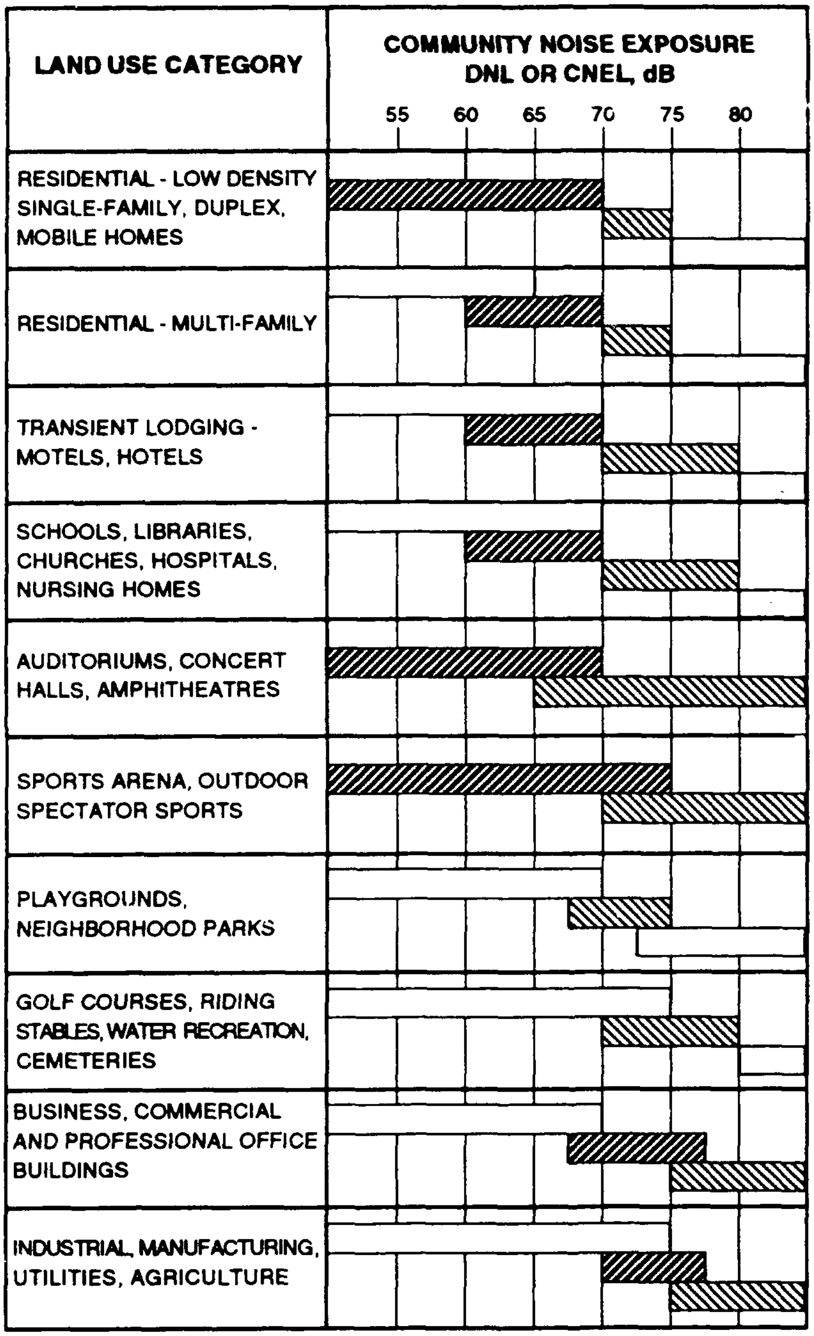
Metrics such as DNL and CNEL, which represent 24-hour averages, are sometimes supplemented with other metrics, primarily the equivalent sound level (L_{eq}). The L_{eq} is the equivalent, steady-state level that would contain the same acoustical energy as the time-varying level during the same time interval.

Appendix J provides additional information about the measurement and prediction of noise. This appendix also provides more information on the units used in describing noise, as well as information about the effects of noise such as annoyance, sleep interference, speech interference, health effects, and effects on animals.

3.4.4.1 Existing Noise Levels. Typical noise sources in and around airfields usually include aircraft, surface traffic (including rail traffic), and other human activities. Military (and civilian) aircraft operations, surface traffic on local streets and highways, and rail are the existing primary sources of noise in the vicinity of Castle AFB. In airport analyses in California, areas with CNEL above 60 dB are often considered in land-use compatibility planning and impact assessment; therefore, the contours of CNEL greater than 60 dB are of particular interest. Contours above CNEL 60 dB are presented in 5 dB intervals.

Preclosure Reference. Aircraft noise at Castle AFB occurs during aircraft engine warmup, maintenance and testing, taxiings, takeoffs, approaches, and landings. Noise contours for preclosure aircraft operations (see Table 3.2-5) were modeled using information on aircraft types; runway use; maintenance and engine runup locations; flight paths; aircraft altitude, airspeeds, and engine power settings; and number of daytime (7 a.m. to 7 p.m.), evening (7 p.m. to 10 p.m.), and nighttime (10 p.m. to 7 a.m.) operations. The noise contours for 1992 were developed using the U.S. Air Force's Noise Exposure Model (NOISEMAP) Version 6.3 and 1988 AICUZ

Table 3.4-8. Land Use Compatibility for Community Noise Environments



Source: Based on Santa Barbara County, 1979.

INTERPRETATION

NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will suffice.

NORMALLY UNACCEPTABLE
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

data updated to reflect 1990 operations (Figure 3.4-5). Only those contours equal to or above CNEL 60 dB are shown.

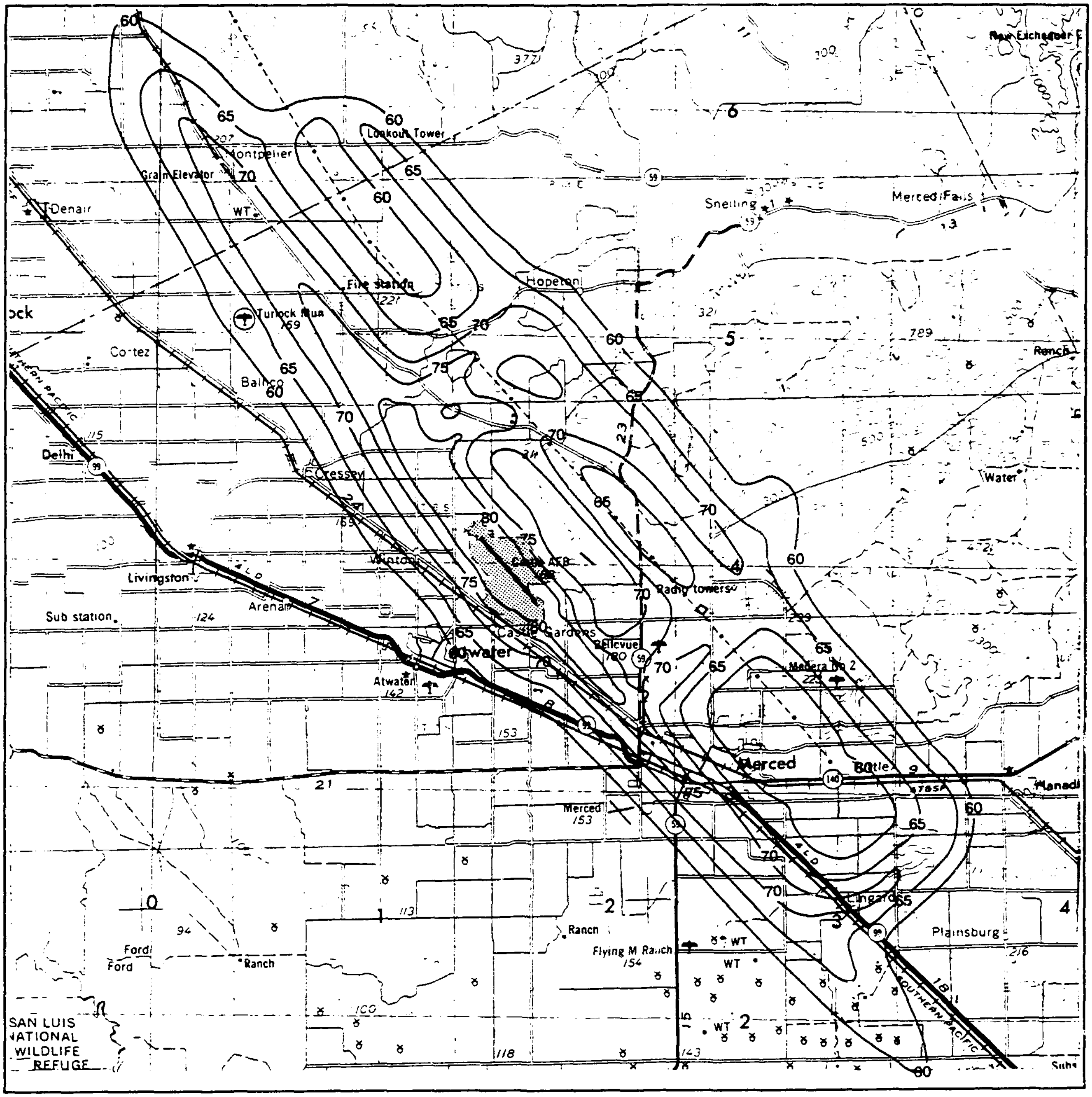
Surface vehicle traffic noise levels for roadways in the vicinity of Castle AFB were analyzed using the Federal Highway Administration's Highway Noise Model (1978). This model incorporates vehicle mix, traffic volume projections, and speed to generate CNEL. The noise levels are then presented as a function of distance from the centerline of the nearest road. The results of the modeling for surface traffic are presented in Table 3.4-9. The actual distances to the CNELs may be less than those presented in the table because the screening effects of intervening buildings, terrain, and walls were not accounted for in the modeling.

Table 3.4-9. Distance to CNEL from Roadway Centerline for the Preclosure Reference

		Distance (feet)							
Roadway	Segment	CNEL 60		CNEL 65		CNEL 70		CNEL 75	
West Olive Ave	SH 59 to R St	180		90		50		(a)	
Buhach Rd	Santa Fe Dr to Bellevue Rd	[illegible]		70		40		(a)	
Buhach Rd	Bellevue Rd to Juniper Ave	140		70		40		(a)	
Buhach Rd	Juniper Ave to SH 99	120		60		30		(a)	
Bellevue Rd	Santa Fe Dr to Buhach Rd	140		70		40		(a)	
Bellevue Rd	Buhach Rd to Castle Dr	180		90		50		(a)	
Bellevue Rd	Castle Dr to Shaffer Rd	200		90		50		(a)	
Juniper Ave	Buhach Rd to Shaffer Rd	100		50		30		(a)	
Wallace Rd	Gate 3 to Santa Fe Dr	50		20		(a)		(a)	
		North	South	North	South	North	South	North	South
SH 99[b]	Atwater to Rail Overpass	1,410	1,160	1,080	570	950	170	880	130
SH 99[b]	Rail Overpass to Buhach Rd	1,170	1,200	590	640	280	370	140	250
SH 99[b]	Buhach Rd to Franklin Rd	1,420	1,440	690	730	330	390	160	260
Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	390	550	220	370	80	260	30	190
Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	430	570	220	380	100	260	40	190
Santa Fe Dr[b]	Wallace Rd to Buhach Rd	440	580	220	380	100	260	40	190
Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	460	590	250	390	120	260	50	190
Santa Fe Dr[b]	Bellevue Rd to Gate 2	440	580	240	380	120	260	50	190
Santa Fe Dr[b]	Gate 2 to Gurr Rd	470	600	240	390	110	260	50	190
Santa Fe Dr[b]	Beachwood Dr to SH 59	500	620	[illegible]	[illegible]	120	270	50	190

Notes: (a) Contained within the roadway.
(b) Indicates roadways that are parallel to rail lines; distances are for combined noise from roadway and rail traffic. Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.

CNEL = Community Noise Equivalent Level.
SH = State Highway.



EXPLANATION

—65— CNEL Noise Contours (5 dB intervals)

Castle AFB

0 1 2 4 Miles

Map Source: U.S. Geological Survey, 1969.

Preclosure Aircraft Noise Contours

Figure 3.4-5

Appendix J contains the data used in the surface traffic analysis. These data include AADTs, traffic mix, day-night split, and speeds.

The rail noise levels were predicted from published models and data (Nelson, 1987; Swing and Pies, 1973; Remington et al., 1980). Due to the proximity of roadways and the rail lines (the AT&SF rail line parallels Santa Fe Drive and the SP parallels SH 99), distances cannot be presented for the roadways independent of the rail contribution. For these roadways, distances from the roadway centerline to the CNEL are derived from a composite of both roadway and rail traffic noise. Distances presented in Table 3.4-10 are offset from the roadway centerline due to the rail traffic noise contribution to the overall composite noise levels.

Appendix J contains the data and assumptions made for the rail traffic analysis. These data include number of trains, types of trains, number of locomotives and cars per train, day-evening-night split, and speeds.

Closure Baseline. The projected noise levels for the closure baseline were calculated using the surface traffic and rail traffic projections at base closure (Appendix J). The results of the modeling for the roadways analyzed are presented in Table 3.4-10. Again, the actual distances to the CNELs may be less than those presented in the table because the model does not account for screening effects of intervening buildings, terrain, and walls.

3.4.4.2 Noise-Sensitive Areas. The preclosure ROI for Castle AFB includes noise-sensitive receptors such as residences, schools, and hospitals that are within the CNEL 60 dB contour. The modeled contours (see Figure 3.4-5) indicate that there are 131,914 acres exposed to CNEL 60 dB or greater in and around Castle AFB. This includes 45,884 acres with an estimated 13,500 residents in the region between CNEL 60 and 65 dB; 42,890 acres with an estimated 10,000 residents in the region between CNEL 65 and 70 dB; 27,661 acres with an estimated 8,000 residents in the region between CNEL 70 and 75 dB, and 15,479 acres with an estimated 1,000 residents in the region greater than CNEL 75 dB. Section 3.2.3, Land Use and Aesthetics, describes land uses on and near the base.

At closure it is assumed that there would be no aircraft operations and, therefore, there would be no areas impacted by aircraft noise.

3.4.5 Biological Resources

Biological resources include the native and introduced plants and animals in the project area. For discussion purposes, these are divided into vegetation, wildlife (including aquatic biota), threatened or endangered species, and sensitive habitats.

Table 3.4-10. Distance to CNEL from Roadway Centerline for the Closure Baseline

		Distance (feet)							
Roadway	Segment	CNEL 60		CNEL 65		CNEL 70		CNEL 75	
West Olive Ave	SH 59 to R St	160		80		40		(a)	
Buhach Rd	Santa Fe Dr to Bellevue Rd	100		50		30		(a)	
Buhach Rd	Bellevue Rd to Juniper Ave	110		50		30		(a)	
Buhach Rd	Juniper Ave to SH 99	110		50		30		(a)	
Bellevue Rd	Santa Fe Dr to Buhach Rd	140		70		40		(a)	
Bellevue Rd	Buhach Rd to Castle Dr	170		80		50		(a)	
Bellevue Rd	Castle Dr to Shaffer Rd			90		50		(a)	
Juniper Ave	Buhach Rd to Shaffer Rd	70		40		(a)		(a)	
Wallace Rd	Gate 3 to Santa Fe Dr	20		(a)		(a)		(a)	
		North	South	North	South	North	South	North	South
SH 99[b]	Atwater to Rail Overpass	1,480	1,280	1,090	630	950	300	880	150
SH 99[b]	Rail Overpass to Buhach Rd	1,290	1,310	650	690	310	380	150	250
SH 99[b]	Buhach Rd to Franklin Rd	1,600	1,620	780	800	370	430	180	260
Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	370	550	190	370	80	260	30	190
Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	410	560	210	380	90	260	40	190
Santa Fe Dr[b]	Wallace Rd to Buhach Rd	430	580	220	380	100	260	40	190
Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	450	590	240	390	120	260	50	190
Santa Fe Dr[b]	Bellevue Rd to Gate 2	420	560	230	380	110	260	50	190
Santa Fe Dr[b]	Gate 2 to Gurr Rd	430	580	220	380	100	260	40	190
Santa Fe Dr[b]	Beachwood Dr to SH 59	480	610	240	390	110	260	50	190

Notes: (a) Contained within the roadway.
(b) *Indicates roadways that are parallel to rail lines; distances are for combined noise from roadway and rail traffic.* Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

The ROI for discussion of biological resources includes Castle AFB property and sensitive habitats near the base. This includes the area within which potential impacts could occur and provides a basis for evaluating the level of impact.

The natural environment of the base has been extensively altered by human activity. Irrigated agriculture, consisting mostly of orchards, surrounds a majority of the base. Portions of the grassland habitat found within the base show evidence of previous military landfill and agricultural activities (refer to Section 3.3.3, Installation Restoration Program Sites). The southern half of the base consists predominantly of buildings, runway, hangars, and landscaped property.

The following descriptions are based on field visits to the base in September 1992; March, May, and November 1993; and February and May 1994; data from the California Natural Diversity Data Base (CNDDB); information from the Castle AFB Fish and Wildlife Management Plan and

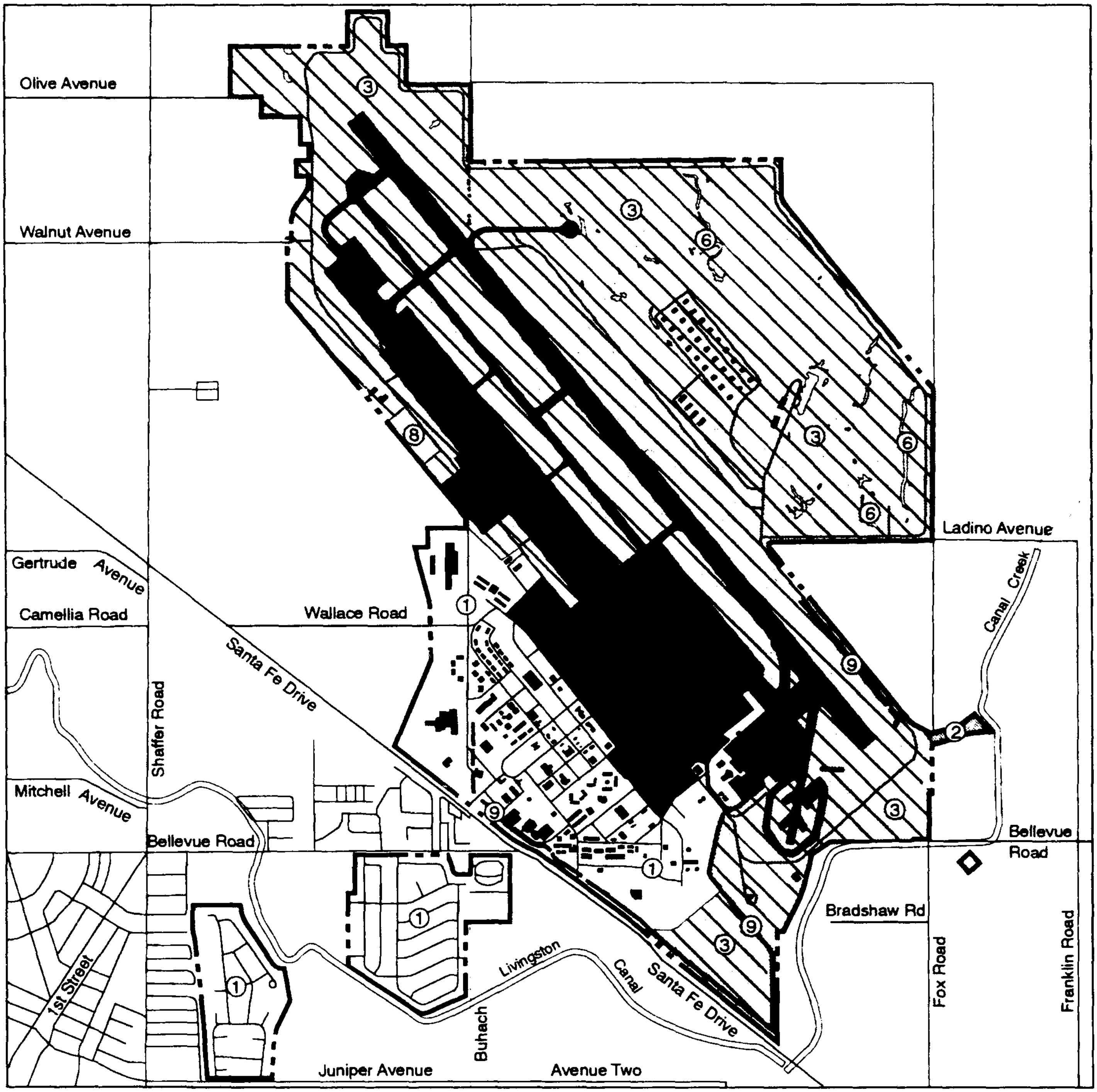
Land Use Plan; aerial photographs; and the U.S. Army Corps of Engineers Wetland Delineation for Castle Air Force Base, California (1994). Responses to inquiries by the U.S. Fish and Wildlife Service (USFWS) are included in Appendix K. All wildlife and plant species known to occur at Castle AFB and their scientific names are included in Appendix L.

3.4.5.1 **Vegetation.** Castle AFB occupies 2,777 acres in California's San Joaquin Valley. Soils on the base are derived primarily from alluvial fans and floodplains generated by erosion in the Sierra Nevada, and the terrain of the base varies from nearly flat to slightly undulating. Disturbed grasslands cover 1,534 acres of the base, landscaped areas cover 619 acres, developed areas cover 610 acres, agricultural crops cover 6 acres, and 8 acres are barren.

Approximately 21.9 acres of wetlands, the majority of which are vernal pools, are scattered throughout the grasslands in the northeastern portion of the base. Three small wetlands (0.5 acre total) at the northern end of Runway 31 support wetland vegetation. No natural vegetation remains within the 610 acres of cantonment area that have been disturbed by construction of buildings, runways, roads, and other facilities. A barren, graded area comprising about 8 acres occurs near the fire training area in the west-central portion of the base, adjacent to the airfield (Figure 3.4-6).

Historically, the land occupied by the base is thought to have been dominated by native perennial bunchgrasses. However, these species have been superseded in the grassland areas by introduced annual grasses such as wild oats and bromegrass. Short-pod mustard, vinegar weed, and dove weed are common forbs within the grassland, while Russian thistle and yellow star thistle occur occasionally. Jimson weed is a common native species. Several species of eucalyptus, black locust, and other introduced trees occur within the grasslands in the northwestern and southern parts of the base. One arroyo willow was noted growing on a disturbed slope in grassland habitat near the rifle range. Grasslands in the vicinity of the flightline are mowed several times annually. Other grasslands are controlled through annual mowings or controlled burns.

Vernal pools generally support a unique flora (containing a relatively large proportion of endemic species) that are adapted to a seasonal water supply. Terrestrial annual species are predominant and tend to bloom in conspicuous concentric rings as the pools dry up in spring or early summer. The pools on base appear to be associated with soils mapped by the SCS as "Alamo clay," a soil unit characterized by "a clay profile and a strongly cemented, very slowly permeable, alkaline, calcareous hardpan" that is "poorly drained and often ponded in winter and spring" (U.S. Department of Agriculture, 1962). Hydrophytic (wetland) species commonly occurring in the vernal pools at Castle AFB include Vasey's coyote thistle, creeping spike rush, dwarf woolly heads, and bractless hedge-hyssop; each of these species is



EXPLANATION

①	Landscaped
②	Agriculture
③	Grassland
④	Shrubland*
⑤	Forest*
⑥	Swamp/Marsh
⑦	Tundra*
⑧	Barren
⑨	Water
	Developed
	Disturbed
- - - -	Base Boundary

0 650 1300 2600 Feet

* This standard land use designation is not applicable to this figure.

Vegetation Distribution

Figure 3.4-6

commonly associated with California Central Valley vernal pools. Curly dock and wild heliotrope were also noted along the margins of pools. Weedy upland species that frequently invade the Castle AFB vernal pools in late spring after the water has evaporated include vinegar weed, dove weed, and Fitch's spikeweed. Several sensitive plant species may also occur in the vernal pools on base (see Section 3.4.5.3, Threatened and Endangered Species).

Species in the three wetlands located in the northwest portion of the base include Fremont cottonwood, broadleaf cattail, western goldenrod, California blackberry, perennial smartweed, tall nutsedge, common rush, dallis grass, and long-leaved ammannia. In addition to the three wetlands, standing water, which appeared to be irrigation runoff from an adjacent farm, was observed in this area during the late September 1992 and May 1994 field surveys.

Several drainage ditches, in the southern part of the base and along the southeast portion of the flightline, channel irrigation runoff. Portions of these ditches, which contain perennial water, are shown in Figure 3.4-6. Vegetation along and within the ditches is removed by heavy equipment several times per year. Plants observed growing in water within the ditches include yellow water weed and broadleaf cattail. Plants that typically occur along the steep slopes on the margins of the ditches include perennial smartweed, dallis grass, tall nutsedge, knotroot bristlegrass, yellow bristle grass, and common monkey flower.

Landscaped portions of the base (including the off-base residential areas and park) have been planted with a diverse assemblage of plant species. Maintained lawns are common, and typically consist of Kentucky bluegrass and Bermuda grass. Common tree species include European olive, sweet gum, western sycamore, maple, poplar, pines, and purpleleaf plum. Castle Park is dominated by a grove of mature western sycamore trees.

3.4.5.2 Wildlife Resources. Wildlife at Castle AFB includes species associated with grasslands, vernal pools, seasonal standing water, riparian drainage ditches, and urbanized areas. These habitats support numerous species, including some that are considered sensitive by the state and federal governments.

Most of the mammal species present on base are found throughout the grasslands northeast of the runway. Species common throughout this habitat include the California (Beechey) ground squirrel, Audubon's cottontail, Botta's pocket gopher, and black-tailed hare (jackrabbit). Occasional evidence (i.e., scat, tracks, or burrows) of coyote and red fox was observed. Both striped skunk and opossum forage within drainage ditches in the southern section of the base. Rodents observed and positively identified include both hous[illegible] deer mice. Other small mammals expected on base include the broad-footed mole, western harvest mouse, and California meadow vole. Bat species visit the base to feed. Rodent control is practiced on base. Poisoned bait is used to eliminate ground squirrels primarily in the grassland surrounding the runway.

Various bird species are known to use the base and were observed during the field surveys (Appendix L). Numerous raptors forage in the grasslands of the northeast section of the base. Eucalyptus stands along Walnut Avenue and orchards surrounding the base offer raptors vantage points for hunting and possible roost sites. Observed birds of prey include the red-tailed hawk, red-shouldered hawk, northern harrier, and American kestrel. Barn owls nest in one of the hangars on base. Cooper's hawks, designated as a California Department of Fish and Game (CDFG) "Species of Special Concern" (CSC), and on the CDFG watch list, utilize the wetland area along the fence line in the northernmost section of the base. Also observed hunting over the grasslands in this area were a pair of black-shouldered kites, which are Fully Protected by the CDFG. Burrowing owls, another CSC, were observed in the grasslands.

Other birds that inhabit the grasslands include western meadowlark, mourning dove, killdeer, California quail, house finch, and Brewer's blackbird. Also observed on the grasslands area were ring-necked pheasant, an introduced game species. Numerous bird species use the habitat along the fence line separating the base from adjoining orchards and agricultural fields. These species include the northern flicker, scrub jay, northern mockingbird, and savannah sparrow. Many birds that are well adapted to urban environments inhabit the base's residential and landscaped areas. These species include the yellow-billed magpie, cliff swallow, barn swallow, and American crow. Drainage ditches throughout the base attract mallards, song sparrows, and red-winged blackbirds. Great blue heron, snowy egret, and American coot have also been noted in drainage ditches. Introduced species include the English house sparrow, pigeon (rockdove), and starling.

Reptiles common to the area and present on the base include the Pacific gopher snake, California kingsnake, side-blotched lizard, southern alligator lizard, and western fence lizard.

Drainage ditches are scattered throughout the base. Ditches range from completely dry (except during irrigation and rainfall) to permanently full of water. Drainage canals that contained water during the September 1992 field visit provide habitat for numerous wetland bird species (mentioned above) and mosquito fish. Amphibians present throughout the base drainage ditches and temporary water sources include the western toad, bullfrog, and Pacific treefrog.

Vernal pools, drainage ditches, and other pools of standing water in the northeast section of the base are inhabited by aquatic invertebrates, such as fairy shrimp and various insects including water striders. These species can complete their life cycle during the short periods in which water is present.

3.4.5.3 Threatened and Endangered Species. The CNDDB and published literature were consulted for information on rare and protected species. A survey was conducted in spring 1993 to determine the presence or absence of three species of fairy shrimp proposed to be listed as endangered under the Federal Endangered Species Act of 1973, 16 U.S.C. §§1531-1544. In addition, a letter requesting a list of sensitive species for the project area was sent to the USFWS to initiate informal consultation under Section 7 of the Endangered Species Act (Appendix K). Sensitive species found in the vicinity of Castle AFB are summarized in Table 3.4-11.

Vernal pool fairy shrimp (threatened) and California Linderiella (C3), occur in the northeast portion of the base. Fairy shrimp habitat was found on a total of 46.5 acres in the northeast portion of the base in the area surrounding the WSA. The habitat includes vernal pools and other areas of standing water including drainage ditches. No critical habitat has been established for the federally threatened vernal pool fairy shrimp. The loggerhead shrike, a candidate for federal listing, is commonly seen foraging in the open grassland areas of the base. The tricolored blackbird, another candidate for federal listing, was found nesting in the wetlands northwest of the runway during the May 1994 survey.

Sensitive animal species that may occur or forage on base include the American peregrine falcon, the Aleutian Canada goose, and the California tiger salamander. The federally endangered Aleutian Canada goose may stop to forage in the grasslands and vernal pools on the base during its migratory trip through the region, but Castle AFB provides only marginal habitat for this species, so its use of this foraging area is unlikely. Suitable habitat for the federal candidate California tiger salamander occurs at Castle AFB in temporary pools and permanent waters within grasslands in the northeast portion of the base, although none were observed during the 1993 and 1994 spring surveys.

Five animal species that are listed or are candidates for listing and are known to be present in the San Joaquin Valley are not expected to be found on Castle AFB due to lack of suitable habitat. The giant garter snake, a species proposed for federal listing as endangered, is found in aquatic habitats. It is not expected to be present on the base because the drainage canals are disturbed by regular dredging operations. The blunt-nosed leopard lizard, a federally listed endangered species, is not expected to be found on Castle AFB because the habitat that exists on base is of low quality and is frequently disturbed by mowing. The southwestern pond turtle, a federal candidate species, is not expected due to the absence of suitable undisturbed habitat. It is unlikely that the Pacific western big-eared

Table 3.4-11. Candidate Species Potentially Found in the Vicinity of Castle AFB
Page 1 of 2

Species Name	Federal Status	State Status	Presence
Invertebrates			
Conservancy fairy shrimp *(Brachinecta conservatio)*	E	-	Not observed on base, may occur on base
Vernal pool fairy shrimp *(Branchinecta lynchi)*	T	-	Occurs on base
California Linderiella *(Linderiella occidentalis)*	C3	-	Occurs on base
Vernal pool tadpole shrimp *(Lepidurus packardi)*	E	-	Outside of known distributions, not observed or expected on base
Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)*	T	-	No habitat present on base
Amphibians			
California tiger salamander *(Ambystoma californiense)*	C2	CSC	Not observed on base, may occur on base
Arroyo southwestern toad *(Bufo microscaphus californicus)*	C2	CSC	Found in vicinity of base, may occur on base
Reptiles			
Giant gartner snake *(Thamnophis gigas)*	T	T	Not observed on base, not likely to occur on base.
Blunt-nosed leopard lizard *(Gambelia silus)*	E	E	Not observed on base, not likely to occur on base
Southwestern pond turtle *(Clemmys marmorata pallida)*	C1	CSC	Not observed on base, not likely to occur on base
Birds			
Loggerhead shrike *(Lanius ludovicianus)*	C2	-	Occurs on base
American peregrine falcon *(Falco peregrinus anatum)*	E	E	Not observed on base, likely to forage over grasslands on base
Aleutian Canada goose *(Branta canadensis leucopareia)*	E	CSC	Not observed on base, may forage on base during migration
Tricolored blackbird *(Agelaius tricolor)*	C2	-	Occurs on base, nests in wetlands northwest of runway
Mammals			
Pacific western big-eared bat *(Plecotus townsendii)*	C2	CSC	Not observed on base, not likely to occur on base
Greater mastiff bat *(Eumops perotis californicus)*	C2	CSC	Not observed on base, not likely to occur on base
San Joaquin kit fox *(Vulpes macrotis mutica)*	E	T	Not observed on base, outside current distribution, not expected on base

Table 3.4-11. Candidate Species Potentially Found in the Vicinity of Castle AFB
Page 2 of 2

Species Name	Federal Status	State Status	Presence
Fresno kangaroo rat *(Dipodomys nitratoides exillis)*	E	E	Not observed on base, outside current distribution, not expected on base
Plants			
Henderson's bentgrass *(Agrostis microphylla var. hendersonnii)*	C2	-	Not observed on base, may occur on base
Hoover's rosinweed *(Calycadenia hooveri)*	C2	-	Not observed on base, may occur on base
Beaked clarkia *(Clarkia rostrata)*	C2	-	Not observed on base, may occur on base
Colusa grass *(Neostapfia colusana)*	PT	E	Observed on base in May 1993, not observed on base in May 1994.
San Joaquin orcutt grass *(Orcuttia inaequalis)*	PE	E	Not observed on base, may occur on base
Pilose orcutt grass *(Orcuttia pilosa)*	PE	E	Not observed on base, may occur on base
Fleshy owl's clover *Orthocarpus campestris var. succulentar)*	PT	E	Not observed on base, may occur on base
Merced phacelia *(Phacelia ciliata var. opaca)*	C2	-	Not observed on base, may occur on base
Greene's orcutt grass *(Tuctoria greenei)*	PE	R	Not observed on base, may occur on base

Notes: Federal status:
E = Listed as Endangered by the U.S. Fish and Wildlife Service (USFWS).
PE = Proposed as Endangered by the USFWS.
T = Listed as Threatened by the USFWS.
C1 = Category 1 candidate for federal listing. (Taxa for which the USFWS has sufficient biological information to support a proposal to list as Endangered or Threatened.)
C2 = Category 2 candidate for federal listing. (Taxa which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking.)
C3 = Withdrawn from candidacy for federal listing.

California status:
E = Listed as Endangered by the state of California.
T = Listed as Threatened by the state of California.
CSC = California Department of Fish and Game "Species of Special Concern."

bat and the greater western mastiff-bat, two federal candidate species, are present at Castle AFB because suitable roosting habitat is lacking.

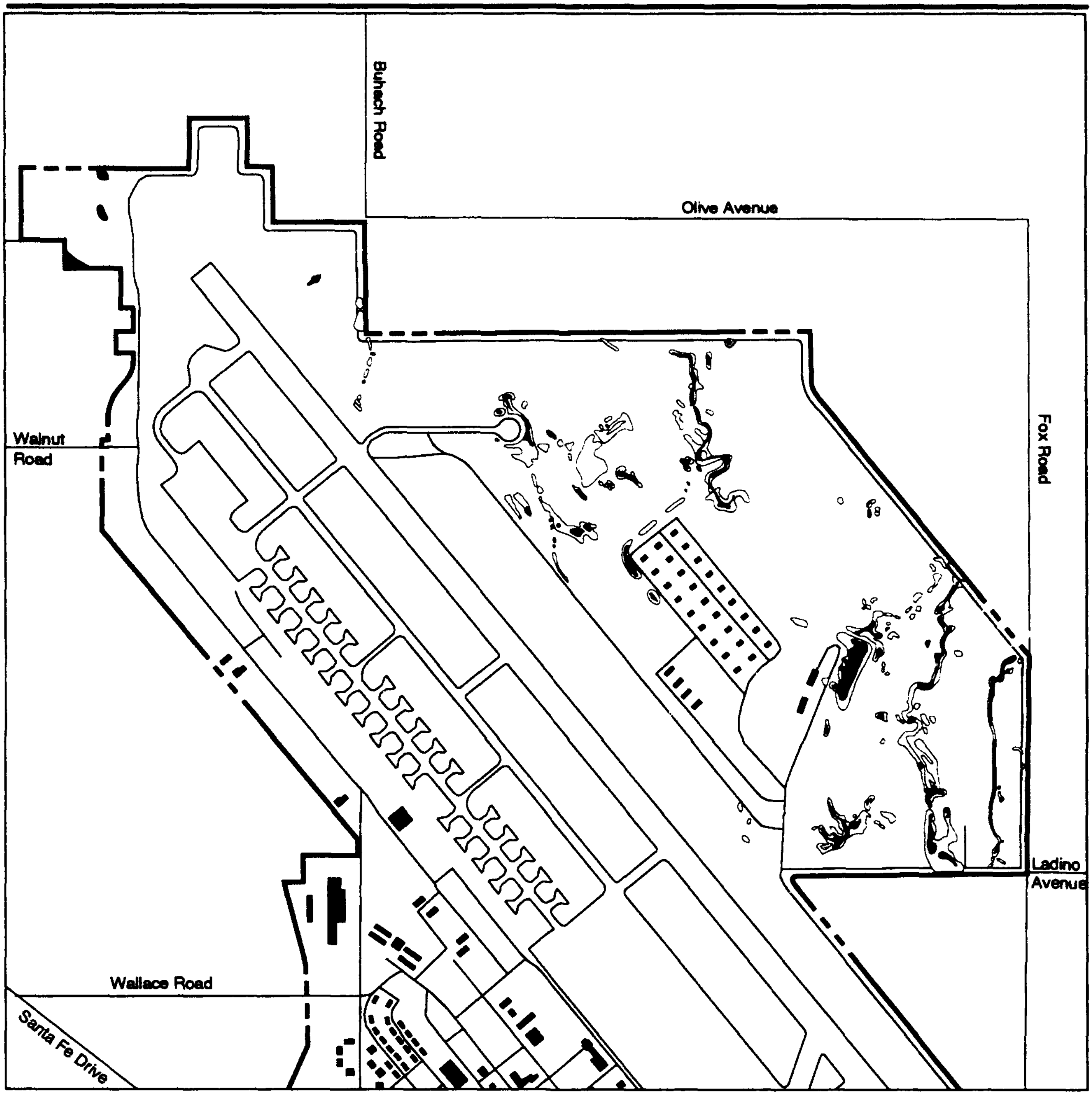
Castle AFB provides suitable habitat for nine plant species that are candidates for federal listing as threatened or endangered (Appendix L). Several of these plant species are also listed as endangered by the state of California. The nine plant species are Henderson's bentgrass, Hoover's rosinweed, beaked clarkia, Colusa grass, San Joaquin orcutt grass, pilose orcutt grass, fleshy owl's-clover, Merced phacelia, and Greene's orcutt grass. The first three are found in grassland and the rest are found in vernal pools; Henderson's bentgrass is found in both habitats. One of these plant species, Colusa grass, was found on base during the May 1993 survey but was not observed on base during the May 1994 survey.

Five federally listed or proposed species present in the vicinity of the base are not found on Castle AFB. Literature (i.e., Jameson and Peeters, 1986) and surveys indicate that the base is outside the current distribution of the endangered San Joaquin kit fox, vernal pool tadpole shrimp, and the Fresno kangaroo rat. Surveys for the San Joaquin kit fox, conducted in November 1993, February 1994, and May 1994 failed to reveal any signs of kit fox presence on base. The threatened valley elderberry longhorn beetle is not expected to be present because no elderberry trees, upon which this species feeds, are present at Castle AFB. Although suitable habitat for the Conservancy fairy shrimp, federally listed as endangered, is found on base, no individuals were identified during the March 1993 survey.

A total of 46.5 acres of vernal pool fairy shrimp habitat (referred to herein as fairy shrimp habitat) were observed at Castle AFB during the spring 1993 biological surveys (see Figure 3.4-7). Of this habitat, 21.4 acres are vernal pools and 25.1 acres are vernal swales or other areas of shallow, standing water. These 25.1 acres, while not defined as wetlands, are considered to be sensitive because they are habitat for the federally threatened vernal pool fairy shrimp. The majority of fairy shrimp species habitat, 45.4 acres, is located in the largely undeveloped 660-acre parcel northeast of the runway. The remaining 1.1 acres are located within the northeast portion of the airfield.

3.4.5.4 Sensitive Habitats. Sensitive habitats include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, or crucial summer/winter habitat). Fairy shrimp habitat, consisting of vernal pools and other areas of standing water, has been described in Section 3.4.5.3. Other sensitive habitats at Castle AFB (Figure 3.4-7) consist of two types of wetlands: freshwater marsh and vernal pools.

Wetlands are defined in 33 CFR §328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and



EXPLANATION

Fairy Shrimp Habitat Boundary

Wetlands

Base Boundary

0 450 900 1800 Feet

Sensitive Habitats

Figure 3.4-7

duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." The majority of jurisdictional wetlands in the United States meet three wetland delineation criteria (hydrophytic vegetation, hydric soils, and wetland hydrology) and are subject to protection under Section 404 of the federal Clean Water Act. Although drainage ditches may also have these wetland characteristics, they are exempt from Section 404 for maintenance activities.

Vernal pools are ephemeral wetlands of shallow depressions that are filled with water during the rainy season and are completely dry during the summer. The shallow depressions are underlain by an impervious subsurface layer that prohibits percolation to lower soil profiles.

On Castle AFB, vernal pools occur in a complex and interrelated network of swales and mounds. Disruption of drainages can affect the hydrology of vernal pools and disturbance to adjacent mounds can result in increased sedimentation of swales and associated vernal pools.

A total of 21.9 acres of wetlands exist at Castle AFB, of which 21.4 are vernal pools and 0.5 acre are freshwater marsh. The vernal pools are all found within the 660-acre parcel northeast of the runway, while the freshwater wetlands are found in the northwest portion of the base (see Figure 3.4-7).

3.4.6 Cultural Resources

Cultural resources are prehistoric and historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, or religious reasons. For ease of discussion, cultural resources have been divided into three main categories: prehistoric resources, historic structures and resources, and traditional resources. These types of resources are defined in Appendix E, Methods. For this analysis, paleontological remains, the fossil evidence of past plant and animal life, have been included within the cultural resource category.

The ROI for the analysis of cultural resources includes, minimally, all areas within the base boundaries, whether or not certain parcels would be subject to ground disturbance. For this analysis, the ROI is synonymous with the Area of Potential Effect (APE) as defined by the National Historic Preservation Act (NHPA). The conveyance of federal property to a private party or non-federal agency constitutes an undertaking, or a project that falls under the requirements of cultural resource mandates, because any historic properties located on that property would cease to be protected by federal law. However, impacts resulting from conveyance could be reduced to a nonadverse level by placing preservation covenants within the lease or disposal document. Reuse activities within designated parcels that may affect historic properties would require the user to comply with the requirements contained in the preservation covenants.

Numerous laws and regulations require federal agencies to consider the effects of a proposed project on cultural resources. These laws and regulations stipulate a process for compliance, define the responsibilities of the federal agency proposing the action, and prescribe the relationship between other involved agencies (e.g., State Office of Historic Preservation, the Advisory Council on Historic Preservation). Methods used to achieve compliance with these requirements are presented in Appendix E.

Only those potential historic properties determined to be significant under cultural resource legislation are subject to protection or consideration by a federal agency. The quality of significance, in terms of applicability to National Register of Historic Places (NRHP) criteria and of integrity, is discussed in Appendix E, Methods. Significant cultural resources, either prehistoric or historic in age, are referred to as "historic properties."

In compliance with the NHPA, the Air Force has initiated the Section 106 review process with the California State Historic Preservation Officer (SHPO). Record and literature searches were performed at the Central California Information Center, California State University, Stanislaus. Results are discussed under the appropriate resource category.

3.4.6.1 Prehistoric Resources. Castle AFB is located in the northern San Joaquin Valley, one of the least explored and most poorly understood areas of California from an archaeological standpoint (Landreth and Isaacson, 1990; Moratto, 1984).

Prior to modern reclamation projects, the San Joaquin Valley, a topographically low elevation flatland, supported extensive wetlands produced by tidal action of the Delta and seasonal flooding of streams. The wetlands, a series of lakes, marshes, and sloughs, at one time covered more than 5,000 square kilometers in the San Joaquin Valley alone. These areas were rich in animal and plant resources such as tules and cattails, Tule elk, waterfowl, and fish. The lush swamp vegetation was complemented by riparian woodlands growing along the watercourses, the tall grass prairie and oak groves above the floodplains, and the chaparral and woodlands of the mountain foothills.

The prehistoric occupation of the San Joaquin Valley probably began in the late Pleistocene. Fluted points and Western Pluvial Lake Tradition finds in the valley establish aboriginal occupation by 11000 before present (B.P.), or 9000 B.C. Early and middle Holocene sites are rare (probably located under deep layers of alluvium deposits).

- **Windmiller Pattern** begins a continuous occupation sequence by the late Holocene (circa 2000 B.C.) (Landreth and Isaacson, 1990).

- **Berkeley Pattern** began approximately 1500 B.P. initially in the San Francisco Bay region and gradually spread to the surrounding coastal and interior areas of central California (Moratto, 1984).

- **Augustine Pattern** appears around 1400 A.D. in the San Joaquin Valley area. This pattern is distinguished by an increase in population size and site density.

Cross-dating of artifacts from the Buena Vista Lake excavations (Wedel, 1941) and a series of projects at San Luis, Los Banos, and Little Panoche reservoirs (Olsen and Payen, 1968) indicate periods of significant occupation between circa 2000 B.C. and A.D. 500 and from circa A.D. 1500 to 1850.

At the time of European contact this area was inhabited by the Northern Valley Yokuts, a division of the tribe that claimed the lower Sierra Nevada foothills south of the Fresno River as well as the San Joaquin Valley. In the eighteenth century the abundant resources of this area supported as many as 41,000 persons, making the Yokuts the largest ethnic group in pre-contact California. The Yokuts' villages were located on high ground above watercourses and consisted of both large, communal residences and single-family dwellings (Moratto, 1984).

Spanish colonial expansions and mission recruitment after A.D. 1770 reduced the Yokuts' population. The most traumatic decimation was caused by the epidemic of 1833 which killed up to 75 percent of the native population, followed by the invasion of large numbers of American prospectors during the 1849 "Gold Rush" (Moratto, 1984).

A record search and literature review was performed at the Central California Information Center, California State University, Stanislaus. The record search included review of maps for the specific project area and a 1-mile radius of the project area, review of the NRHP (California Department of Parks and Recreation, 1990c); Office of Historic Preservation Computer Listing (California Department of Parks and Recreation, 1990b and updates); California Inventory of Historic Resources (California Department of Parks and Recreation, 1990a); and California Points of Historical Interest listing (California Historical Resources Commission, 1992 and updates).

The record search indicated that no cultural resource surveys had been conducted on Castle AFB and that no cultural resources have been recorded on the base. Six cultural resource surveys have been conducted within a 1-mile radius of the base (Hampson, 1988; Napton, 1978a, 1978b, 1980, 1992), with one cultural resource recorded within that radius. CA-MER-254H, which consists of an historic trash scatter, a chert flake, and a possible mano fragment, is located to the north of Castle AFB on the bank of Canal Creek.

A surface survey of Castle AFB was conducted from September 28 to October 8, 1992. Approximately 40 percent of the base was disturbed (i.e., covered with buildings, concrete, asphalt, lawns, and landfills) and was not surveyed. Another 30 percent was determined to be unsuitable for survey, as less than 5 percent of the ground surface was visible due to a dense cover of vegetation. The remaining 30 percent had varying visibility, generally between 5 and 25 percent, and was surveyed by four archaeologists walking transects at intervals of 10 to 15 meters.

One isolated prehistoric artifact, a quartzite flake, was found along a dirt road to the east of the runway. Surface visibility off the road was poor due to heavy growth of vegetation, and adjacent ground surfaces could not be adequately examined.

Due to limited surface visibility encountered during the September 1992 survey, additional work was required to investigate and determine the presence and extent of any subsurface deposits. In May 1994, a subsurface investigation was conducted in three areas considered to have a high probability of prehistoric utilization by the Yokuts. One area is of high topographic relief, the other two areas are along a buried stream course. A strategy of limited backhoe trenching and sampling was used in an effort to detect deeply buried site deposits. The backhoe trenching did not uncover evidence of buried prehistoric site deposits. Of seven trenches excavated, only two contained any cultural material. One trench contained one chipped stone flake, the other contained two chipped stone flakes and one piece of debitage. The results of the backhoe trenching indicate, at best, very ephemeral prehistoric use of the area. Therefore, it is considered unlikely that intact buried deposits would be discovered at Castle AFB (U.S. Air Force, 1994). This assessment is subject to review and concurrence by the SHPO before recommendations can be considered final.

3.4.6.2 Historic Structures and Resources. The historic period in California began in the late eighteenth century with the arrival of the Spanish and the construction of 4 presidios and 21 missions. Anglo-American settlement began with the advent of coastal trade in the early nineteenth century and expanded rapidly with the discovery of gold in 1849 and California statehood in 1850.

The San Joaquin Valley became open to American settlement with the discovery of gold in the western Sierra Nevada in 1849. Miners were followed by farmers. In the early 1850s John W. Mitchell bought 120,000 acres in the Merced area, which he then leased to farmers in 2,000-acre parcels. In 1872 one of Mitchell's leaseholders, Marshall D. Atwater, purchased from him 4,480 acres near the site of Castle AFB on which he raised grain, fruit, and livestock. He persuaded the Central Pacific Railroad to construct a spur from their newly built line to Merced to his property so he could ship his produce to northern California. This spur became known as Cuba Station.

Cuba Station became the site of the Air Corps Basic Flying School, Merced (now Castle AFB), in 1941 when it was authorized as an aviation training school. By April 1942, 130 temporary wood-frame mobilization-type buildings had been constructed on former farmland. Construction continued throughout the war, and by 1945, a total of 281 temporary and permanent facilities of all types had been constructed; 49 of these buildings exist today.

An inventory of the World War II temporary and permanent buildings on Castle AFB was conducted in September 1992. There are 49 facilities that have been identified from the World War II period, predating 1946. Two, the swimming pool (Facility 393) and the flagpole (Facility 451), have been identified as World War II permanent structures. These facilities were evaluated for eligibility to the NRHP and were considered not eligible. The remaining 47 buildings are classified as World War II temporary wood-frame buildings, which are covered under the Programmatic Agreement of 1986, amended in 1991. An architectural and historical evaluation of the 49 World War II-era structures was conducted in 1994. It was determined that all 49 structures had either been documented through the nationwide survey, in compliance with the Programmatic Agreement, or did not meet the criteria for eligibility for inclusion on the NRHP. SHPO concurrence with this determination was given on October 7, 1994 (Appendix K).

Some buildings and structures may demonstrate exceptional importance under the Cold War context. A study has been initiated to assess the potential significance of these structures.

No archaeological resources have been recorded on base. CA-MER-254H, north of the base, as stated in Section 3.4.6.1, is a historic trash scatter with a prehistoric component.

As a result of the two field surveys, three historic sites were identified and assigned temporary numbers. The first site, referred to as the Pattison site (CAFB-1H), is a historic trash dump located at the north end of the runway. The Pattison site consisted of two loci of domestic debris, each measuring approximately 10 by 20 meters. This site was evaluated in May 1994. Surface and subsurface investigations determined that the area was severely disturbed and no longer retains integrity. The Pattison site cannot be considered a significant cultural resource as it does not meet any of the NRHP criteria (36 CFR 60.4). SHPO concurrence with this conclusion is pending.

The second and third sites are historic farmstead sites, the Riise-McVey site (CAFB-2H) and the Harris site (CAFB-3H). The Riise-McVey site consists of the remains of two farmsteads which were acquired by Castle AFB in 1954 as part of the expansion of the base. The structures were removed by the property owners prior to acquisition of the property by Castle AFB. The Harris site consists of the remains of a farmstead which was acquired by Castle AFB in 1951. The structures on this site are believed to have been demolished in the late 1980s. An evaluation of these two sites for eligibility for listing on the NRHP is pending and shall be completed prior to disposal.

3.4.6.3 Traditional Resources. A record search and literature review performed at the Central California Information Center, California State University, Stanislaus indicated that no traditional or sacred sites for the Northern Valley Yokuts or other Native American ethnic groups are known to occur or to have been recorded at Castle AFB. Consultation with the Native American Heritage Commission to ascertain whether or not any Native American group or individual has concern with or can identify sacred areas within the Castle AFB environs has been initiated; a final response is pending.

3.4.6.4 Paleontological Resources. Castle AFB is situated on Atwater loamy sand, a soil formed from sandy, granitic alluvium deposited by wind or water. No fossil remains have been identified or recorded in the ROI. No fossil remains have been found on the base and none are expected, given the depth of alluvium.

3.5 LOCAL AIRPORT CLOSURES

Baseline information related to the relocation of all airport activities from the Merced, Turlock, and Atwater municipal airports to Castle AFB is described in this section. This section summarizes the affected environment at these three airports. The environmental consequences of the potential closure of these sites are summarized in Section 4.5. No reasonably foreseeable reuse of the property is recognized at this time. The description below of the affected environment is provided for each of the resource categories discussed in this chapter.

3.5.1 Merced Municipal Airport

Community Setting. Merced Municipal Airport is located southwest of downtown Merced (see Figure 3.2-8), approximately 2 miles from the city center. The airport currently occupies 450 acres and has easements over 28 additional acres (Hodges & Shutt, 1990). Land to the west and south of the airport is within unincorporated Merced County. The city of Merced currently employs three full-time employees to support airport activity. Overall, approximately 45 workers are employed at Merced Municipal Airport.

Land Use and Aesthetics. The Merced County Airport Land Use Commission (ALUC) was created to protect public use airports and has prepared a 1978 Policy Plan. The ALUC Plan provides policy for compatible land uses near airports and has established CZs and safety zones for the Merced Municipal Airport. Land use surrounding the airport is a mixture of industrial and agricultural. Future areas for industrial expansion have been delineated adjacent to the airport.

Transportation. Access to the airport is provided by MacReady Drive via Grogan Avenue. The main terminal parking lot provides approximately 75 spaces. Local roadways servicing the airport, residential, and agriculture-related traffic are adequate for present requirements.

Merced Municipal Airport has an estimated 1989 activity level of 55,000 annual operations. In 1989 it hosted a total of 94 based aircraft. The current runway length is 5,904 feet and the current runway capacity is calculated to be 135,000 operations. Approximately 98 percent of all operations take place between 7 a.m. and 10 p.m. (Hodges & Shutt, 1990).

Merced Municipal Airport has a small, scheduled commercial passenger service with 5,256 boardings recorded in 1991. A private cargo operation is working out of the airport but is currently using trucks only, although air operations are planned (Coe, 1993).

Utilities. The airport and its activity result in the consumption of water, electricity, and natural gas and the generation of solid waste and wastewater. Electricity and natural gas are provided by PG&E, while telephone service is provided by Pacific Bell. Water, wastewater, and solid waste services are provided by the city of Merced.

Hazardous Materials and Hazardous Waste Management. General aviation and aviation support activities require the use of a number of hazardous materials, including aviation fuels, glycols, POL, solvents, paints, thinners, hydraulic fluids, degreasers, corrosives, heavy metals, reactives, heating oils, and pesticides. Hazardous wastes generated by the use of these materials would include waste fuels, POL, solvents, thinners, paints, corrosives, and heavy metals.

Aviation fuel for Merced Municipal Airport is stored in two 7,500-gallon steel tanks and one 12,000-gallon fiberglass, double-walled tank. The tanks store Jet-A and 100 octane low-lead aviation gasoline. The fueling depot has a leak detection system. There are no aboveground storage tanks on site.

No surveys for radon, lead, and asbestos have taken place at Merced Municipal Airport. The existing terminal building, as well as several support facilities, were constructed between 1937 and 1988 (Hodges & Shutt, 1990) and, therefore, may contain lead-based paint or ACM.

Pesticides are used in landscaping and for control of pests in and around the buildings. Merced Municipal Airport does not currently host any aerial applications aircraft, as this practice was terminated approximately 15 years ago.

Natural Environment

Soils and Geology. No known faults, or geologic or physical features are found on or near the airport (Hodges & Shutt, 1990). Soils in the vicinity of the airport are of the Wyman-Yokohl-Margureite association, and consist of well-drained, medium and moderately fine-textured soils, which developed from alluvium. These soils are intensively used for growing peaches, almonds, figs, grapes, alfalfa, and field crops. Prime and unique farmlands are known to exist throughout the area, although at the airport the soils have been manipulated through development into non-agricultural uses.

Water Resources. Runoff from Merced Municipal Airport drains into Owens Creek, which eventually flows into the San Joaquin River. The airport is in the vicinity of a 100-year flood zone (Merced County, 1990). Storm water runoff, which occurs on impervious surfaces (e.g., airfield and parking lots) at the airport, is collected in the MWTP.

Air Quality. The airport is located in the SJVAB. Currently, the entire SJVAB is designated by the U.S. EPA as being in attainment of the NAAQS for SO_2, CO, and NO_2, and in nonattainment for ozone and PM_{10} (San Joaquin UAPCD, 1992b). The SJVAB is designated bv the U.S. EPA as a "serious" nonattainment area for ozone (O_3 concentration greater than 0.16 ppm) and PM_{10}. An area designated as "serious" is subject to a number of special requirements, including provisions for use of reasonable available control technology on all major sources, vapor recovery, motor vehicle inspection, and maintenance programs, and reductions in VOCs. Attainment must be achieved by November 15, 1999.

The ARB also designates areas of the state that are in attainment or nonattainment of the CAAQS. An area is in nonattainment for a pollutant if its CAAQS has been exceeded at least once in the last 3 years. Presently, the Merced County portion of the SJVAB is designated by the state as severe nonattainment for czone, nonattainment for PM_{10}, attainment for SO_2 and NO_2, and unclassified for CO (ARB, 1991a).

Noise. The noise study generated for the Merced Municipal Airport Master Plan indicated that the 65 dB CNEL noise contour lies almost entirely within the airport property line (Figure 3.5-1). The 60 dB CNEL noise contour extends over the privately held land surrounding the airport. Land uses surrounding the airport are compatible with aircraft noise.

Biological Resources. No rare, endangered, or threatened plant or animal species is known to inhabit Merced Municipal Airport (Hodges & Shutt, 1990). No biological resource surveys have been conducted in support of activities associated with Merced Municipal Airport. No wetlands have been noted at the site (Merced County, 1990).

Cultural Resources. The existing terminal building was constructed in 1947. There are no known archaeological or historical sites on the airport property. One potential burial site is located within the RPZ for Runway 12 (Hodges & Shutt, 1990). No cultural resource surveys have been conducted in support of activities associated with Merced Municipal Airport.

3.5.2 Turlock Municipal Airport

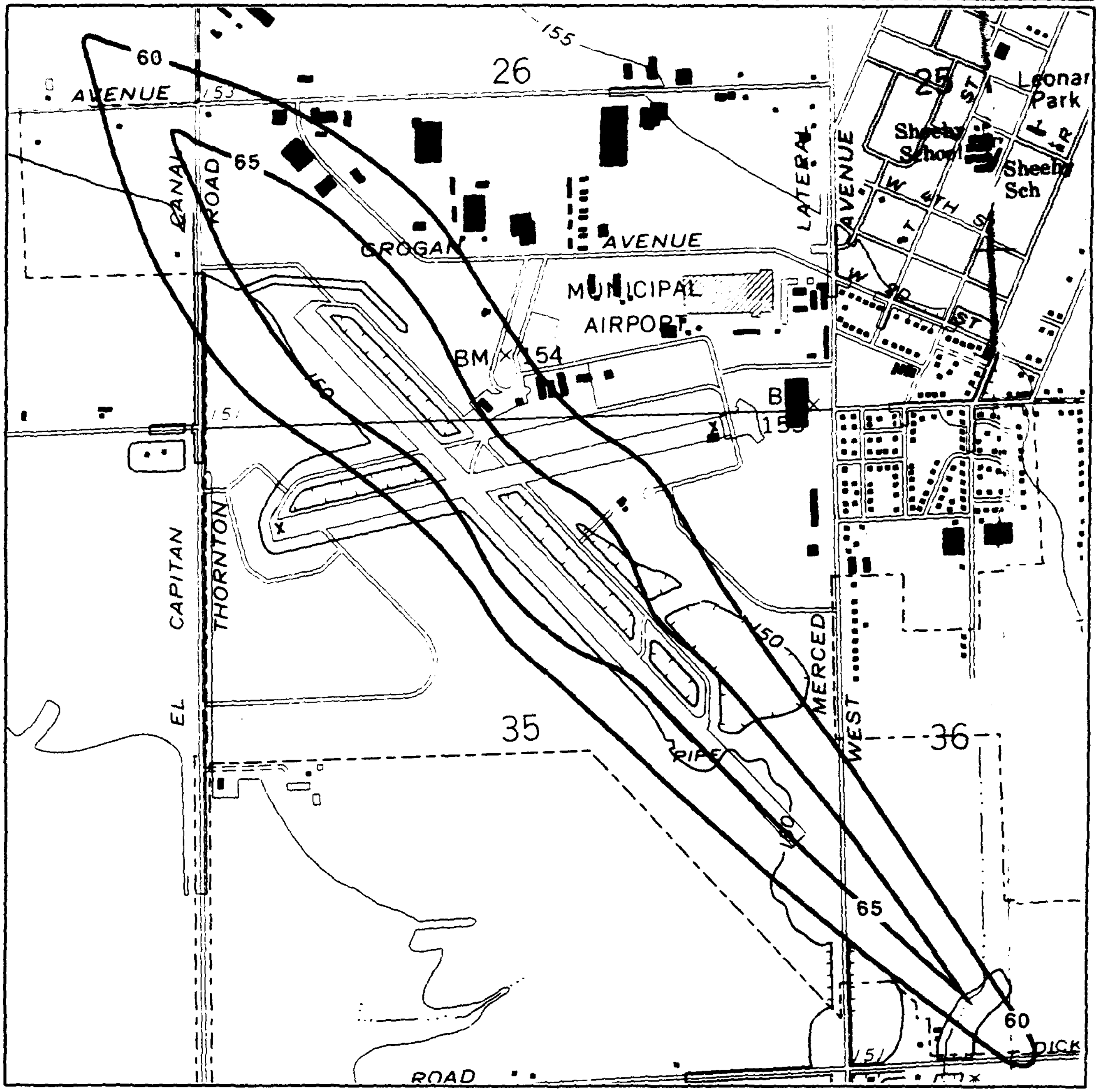
Community Setting. The airport occupies a 350-acre facility surrounded by agriculture. The airport is located approximately 11 miles east of the city of Turlock, near the intersection of East Avenue and Newport Road (see Figure 3.2-8). Airport activities currently employ three workers.

Land Use and Aesthetics. Land use surrounding the airport is predominantly agricultural. The Merced County ALUC was created to protect public use airports and has prepared a 1978 Policy Plan. The ALUC Plan provides policy for compatible land uses near airports and has established CZs and safety zones for Turlock Municipal Airport. The airport consists of several small hangars and a rotating beacon. The 3,000-foot runway has Low Intensity Runway Lighting, and has been recently repaved.

Transportation. Access to the airport is provided on Newport Road via East Avenue. Local roadways service agriculture-related traffic, along with the airport-generated traffic, and are adequate to meet present needs.

The airport hosts 65 based aircraft, and approximately 25,600 operations were flown in 1992. Greater than 95 percent of all operations are performed between 7 a.m. and 10 p.m. No scheduled passenger or cargo service is provided at Turlock Municipal Airport.

Utilities. The airport and its activity result in the consumption of water and electricity, and the generation of solid waste and wastewater. Water is provided by a well located approximately 40 feet southeast of the terminal building. Wastewater is disposed of by a septic tank located west of the terminal. Solid waste is disposed of by Winton Disposal. Electric power is provided by the Turlock Irrigation District. There is no underground natural gas service to the airport (Aries Consultants, Ltd., 1991).



EXPLANATION

—65— CNEL Noise Contours (5 dB intervals)

X Closed Runway

0 300 600 1200 Feet

Map Sources: U.S. Geological Survey, 1976, 1987b.

Merced Municipal Airport

Figure 3.5-1

Hazardous Materials and Hazardous Waste Management. General aviation and aviation support activities require the use of a number of hazardous materials, including aviation fuels, glycols, POL, solvents, paints, thinners, hydraulic fluids, degreasers, corrosives, heavy metals, reactives, heating oils, and pesticides. Hazardous wastes generated by the use of these materials would include waste fuels, POL, solvents, thinners, paints, corrosives, and heavy metals. The airport stores aviation gasoline in two 10,000-gallon aboveground storage tanks.

No surveys for radon, lead, and asbestos have taken place in support of the possible closure of Turlock Municipal Airport. The hangar that contains the FBO was built in the mid-1940s (Mercer, 1993); therefore, it may contain lead-based paint and ACM.

Pesticides are used in landscaping and for control of pests in and around the buildings. Aerial applications aircraft were based at Turlock Airport at one time; however, these operations have ceased and contaminated areas have been remediated (Ecology and Environment, Inc., 1991).

Natural Environment

Soils and Geology. Soil types in this area are of the San Joaquin-Madera association. They are reddish brown in color and are slightly to medium acidic. These soils are sandy loams, and are used for intensive irrigated agriculture. Soils in this area are subject to irrigation flooding. Prime and unique farmlands are known to exist throughout the area, although at Turlock Municipal Airport these have been manipulated through development into nonagricultural uses.

Water Resources. Turlock Municipal Airport drains into the Highline Canal, which eventually flows into the Merced River. The Merced River drains much of the northeastern portion of Merced County. Turlock Municipal Airport does not lie within a 100-year floodplain.

Air Quality. The airport is located in the SJVAB. Currently, the entire SJVAB is designated by the U.S. EPA as being in attainment of the NAAQS for SO_2, CO, and NO_2, and in nonattainment for ozone and PM_{10} (San Joaquin UAPCD, 1992b). The SJVAB is designated by the U.S. EPA as a "serious" nonattainment area for ozone (O_3 concentration greater than 0.16 ppm) and PM_{10}. An area designated as "serious" is subject to a number of special requirements, including provisions for use of reasonable available control technology on all major sources, vapor recovery, motor vehicle inspection, and maintenance programs, and reductions in VOCs. Attainment must be achieved by November 15, 1999.

The ARB also designates areas of the state that are in attainment or nonattainment of the CAAQS. An area is in nonattainment for a pollutant if its CAAQS has been exceeded at least once in the last 3 years. Presently, the Merced County portion of the SJVAB is designated by the state as severe nonattainment for ozone, nonattainment for PM_{10}, attainment for SO_2 and NO_2, and unclassified for CO (ARB, 1991a).

Noise. Noise contours generated by the MCAG show that the 65 dB CNEL noise contour lies within the airport boundary or over agricultural lands (Figure 3.5-2). A 60-dB CNEL noise contour was not generated for Turlock Municipal Airport. Land uses surrounding the airport are compatible with aircraft noise.

Biological Resources. No biological resource surveys have been conducted in support of activities associated with Turlock Municipal Airport. No wetlands have been noted at the site (Merced County, 1990).

Cultural Resources. No cultural resource surveys have been conducted in support of activities associated with Turlock Municipal Airport.

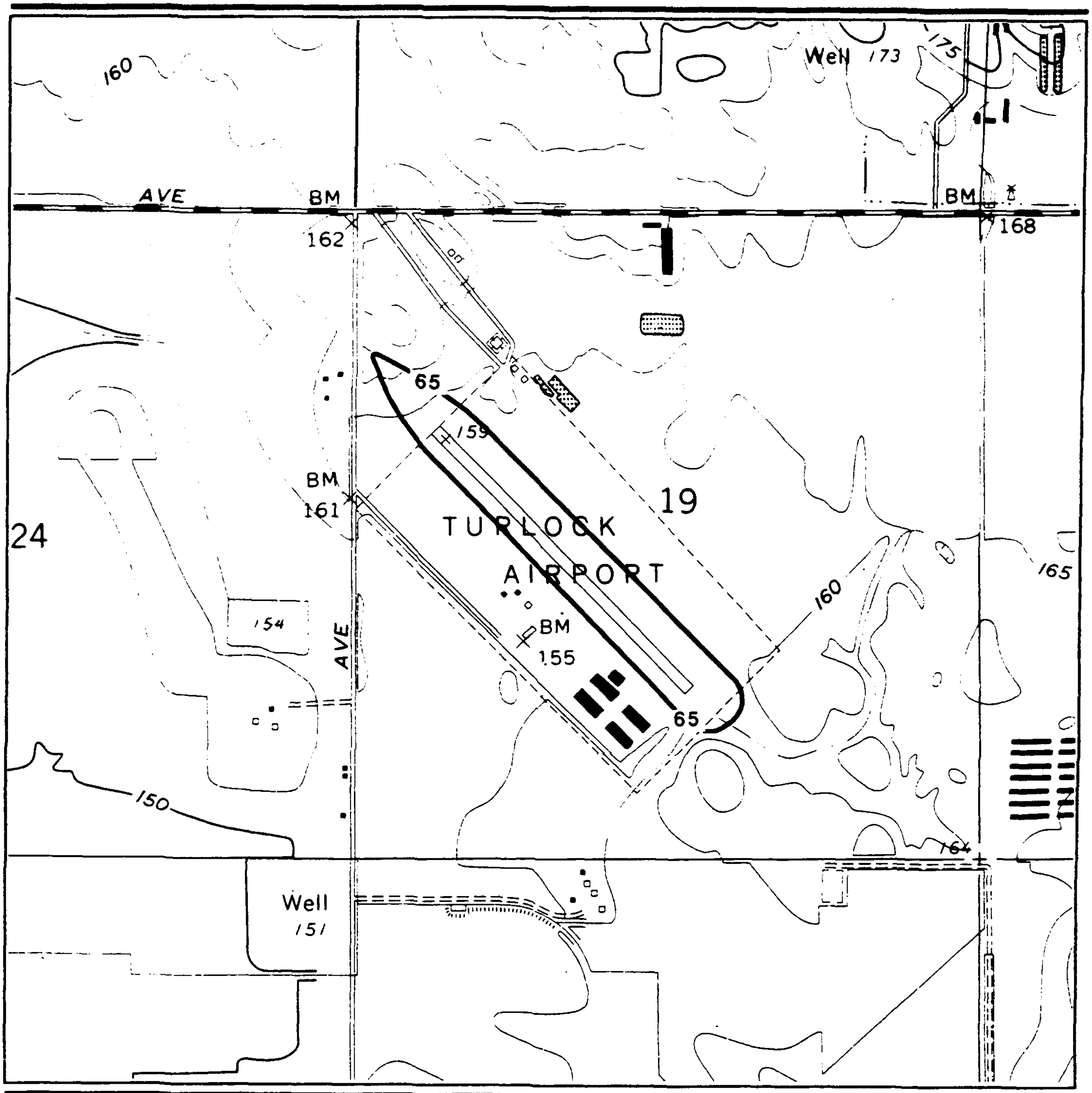
3.5.3 Atwater Municipal Airport

Community Setting. Atwater Municipal Airport is located on city property on the south side of the city of Atwater, south of the AT&SF railroad and SH 99 (see Figure 3.2-8). The city of Atwater closed the airport in 1994 due to the recent decline in airport business and in anticipation of relocating operations to Castle AFB (Haug, 1993). The FBO abandoned operation at the airport in summer 1993.

Land Use and Aesthetics. Land use surrounding the airport is predominantly agricultural and light industrial. The north side of the airport is adjacent to the ARWTP. The Merced County ALUC has established CZs and safety zones for Atwater Municipal Airport. The airport consists of a vacant FBO building, several hangars, and one maintenance hangar. The small hangars are individually owned.

Transportation. Access to the airport is provided by Giannini Road. Local roadways service industrial, airport-related, and agricultural activities and are adequate for present uses. The airport hosts 36 based aircraft, and approximately 12,000 annual operations were conducted in 1992. Approximately 98 percent of operations are conducted between 7 a.m. and 10 p.m. No scheduled passenger or air cargo service is provided at Atwater Municipal Airport.

Utilities. The airport and its past activity resulted in the consumption of water and electricity, and the generation of solid waste and wastewater. Water is provided by the city of Atwater; electricity and gas are provided by PG&E. Wastewater is treated by the ARWTP.



EXPLANATION

—65— CNEL Noise Contours (5 dB intervals)

Turlock Municipal Airport

0 300 600 1200 Feet

Map Source: U.S. Geological Survey, 1987a.

Figure 3.5-2

Hazardous Materials and Hazardous Waste Management. General aviation and aviation support activities required the use of a number of hazardous materials, including aviation fuels, glycols, POL, solvents, paints, thinners, hydraulic fluids, degreasers, corrosives, heavy metals, reactives, heating oils, and pesticides. Hazardous wastes generated by the use of these materials included waste fuels, POL, solvents, thinners, paints, corrosives, and heavy metals. City-owned fuel pumps and one 12,000-gallon UST that contained aviation gasoline are located at Atwater Municipal Airport. No surveys for radon, lead, and asbestos have taken place in support of the possible closure of Atwater Municipal Airport. Pesticides are used in landscaping and for control of pests in and around the buildings.

Natural Environment

Soils and Geology. No major earthquake faults, or physical or geologic features are known to exist in the area. Soils in the Atwater area are exclusively Atwater-Dehli association soils consisting of sandy, granitic alluvium, and are characterized by a coarse-textured surface soil. They are highly permeable, and highly susceptible to wind erosion (City of Atwater, 1992). The chief crops grown in this association are alfalfa, sweet potatoes, almonds, peaches, and grapes. Prime and unique farmlands are known to exist throughout the area, although at Atwater Municipal Airport these have been manipulated through development into nonagricultural uses.

Water Resources. Atwater Municipal Airport is in the watershed of the Atwater Drain, which ultimately flows into the San Joaquin River. The Atwater City Planning Department has concluded that storm drainage is one of the city's major problems, as this system was not designed to accommodate rapid growth and development. Agricultural-related pesticide and fertilizer runoff is known to exist in several of the drainages surrounding Atwater Municipal Airport (City of Atwater, 1992). The Atwater Municipal Airport does not lie within a 100-year floodplain.

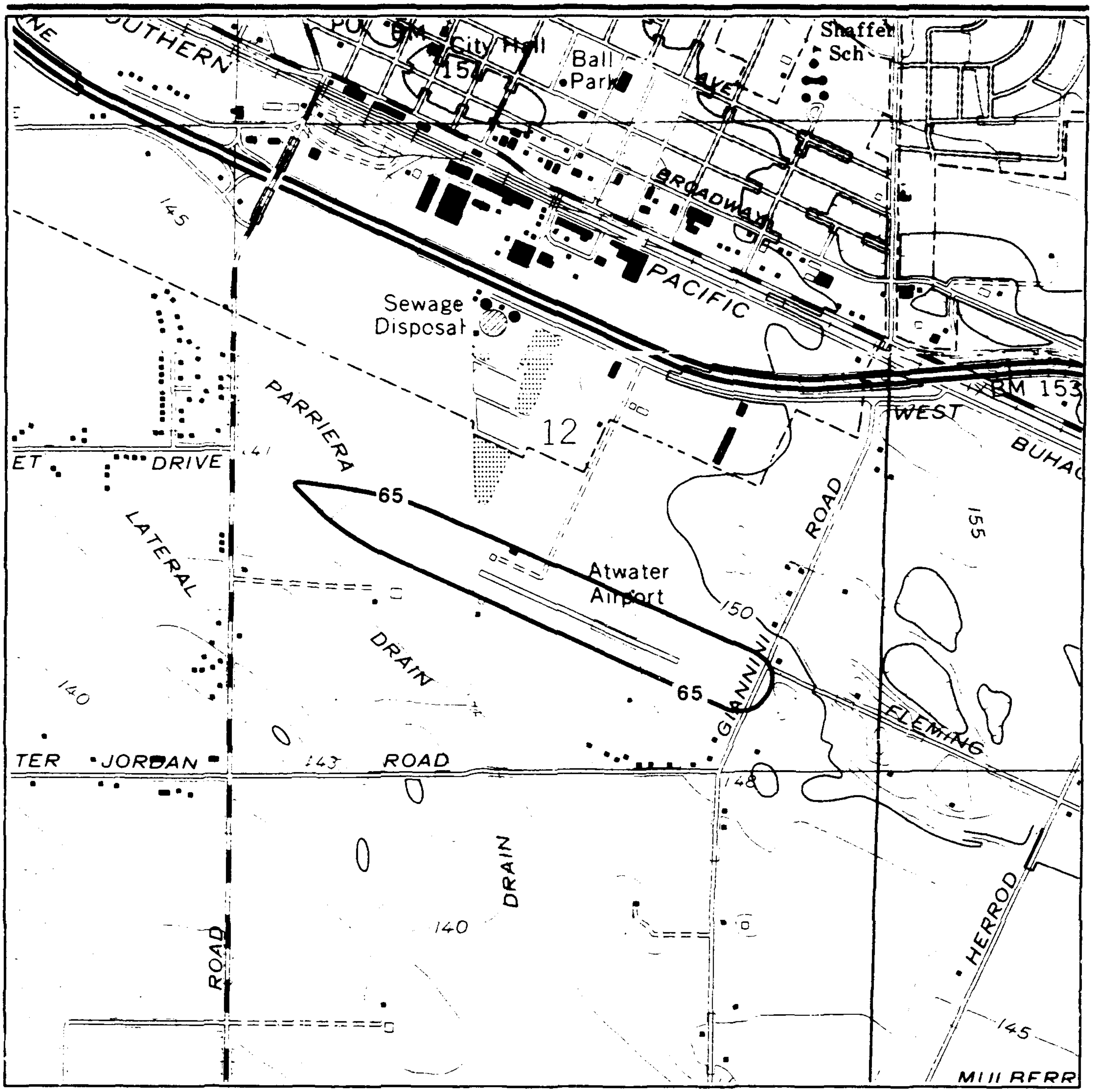
Air Quality. The airport is located in the SJVAB. Currently, the entire SJVAB is designated by the U.S. EPA as being in attainment of the NAAQS for SO_2, CO, and NO_2, and in nonattainment for ozone and PM_{10} (San Joaquin Valley UAPCD, 1992b). The SJVAB is designated by the U.S. EPA as a "serious" nonattainment area for ozone (O_3 concentration greater than 0.16 ppm) and PM_{10}. An area designated as "serious" is subject to a number of special requirements, including provisions for use of Reasonable Available Control Technology on all major sources, vapor recovery, motor vehicle inspection, and maintenance programs, and reductions in VOCs. Attainment must be achieved by November 15, 1999.

The ARB also designates areas of the state that are in attainment or nonattainment of the CAAQS. An area is in nonattainment for a pollutant if its CAAQS has been exceeded at least once in the last 3 years. Presently, the Merced County portion of the SJVAB is designated by the state as severe nonattainment for ozone, nonattainment for PM_{10}, attainment for SO_2 and NO_2, and unclassified for CO (ARB, 1991a).

Noise. Noise contours generated by the MCAG show that the 65 dB CNEL noise contour, applicable while the airport was open, lies within the airport boundary or over agricultural lands (Figure 3.5-3). A 60-dB noise contour was not generated for Atwater Municipal Airport. Land uses surrounding the airport are compatible with aircraft noise

Biological Resources. No biological resource surveys have been conducted in support of activities associated with Atwater Municipal Airport. No wetlands have been identified at the site (Merced County, 1990).

Cultural Resources. No cultural resource surveys have been conducted in support of Atwater Municipal Airport activities.



EXPLANATION

—65— CNEL Noise Contours (5 dB intervals)

Atwater Municipal Airport

0 300 600 1200 Feet

Map Source: U.S. Geological Survey, 1976.

Figure 3.5-3

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter discusses the potential environmental consequences associated with the Proposed Action and alternatives. To provide the context in which potential environmental impacts may occur, discussions of potential changes to the local communities, including population, land use and aesthetics, transportation, and community and public utility services, are included in this EIS. In addition, issues related to current and future management of hazardous materials and wastes are discussed. Impacts to the physical and natural environment are evaluated for soils and geology, water resources, air quality, noise, biological resources, and cultural resources. These impacts may occur as a direct result of disposal and reuse activities or as an indirect result caused by changes within the local communities. Possible mitigation measures to minimize or eliminate the adverse environmental impacts are also presented.

Means of mitigating adverse environmental impacts that may result from implementation of the Proposed Action or alternatives by property recipients are discussed as required by NEPA. Mitigation measures are suggested for those components likely to experience substantial and adverse changes under any or all of these alternatives. Potential mitigation measures depend upon the particular resource affected. In general, however, mitigation measures are defined in CEQ regulations as actions that include:

(a) Avoiding the impact altogether by not taking an action or certain aspect of the action.

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

(e) Compensating for the impact by replacing or providing substitute resources or environments.

A discussion of the effectiveness of mitigation measures is included for those resource areas where it is applicable, as in the case of air quality. Where appropriate, a discussion regarding the probability of success associated with a particular mitigation is included. Since most potential environmental impacts would result directly from the reuse by others, the Air Force would not typically be responsible for implementing such mitigations. Full responsibility for these suggested mitigation measures, therefore, would be borne primarily by future property recipients or local government agencies.

hough reuse development would be decided by recipients and local zoning authorities, probable reuse scenarios were evaluated to analyze environmental impacts.

Alternatives are defined for this analysis on the basis of (1) plans of local communities and interested individuals, (2) general land use planning considerations, and (3) Air Force generated plans to provide a broad range of reuse options. Reuse scenarios considered in this EIS must be sufficiently detailed to permit environmental analysis. Initial concepts and plans are taken as starting points for scenarios to be analyzed. Available information on any reuse alternative is then supplemented with economic, demographic, transportation, and other planning data to provide a reuse scenario for analysis

4.2 LOCAL COMMUNITY

This section discusses potential effects on local communities as a result of disposal and reuse of Castle AFB

4.2.1 Community Setting

Socioeconomic effects will be addressed only to the extent that they are interrelated with the biophysical environment. A complete assessment of socioeconomic effects is presented in the Socioeconomic Impact Analysis Study (SIAS). Employment and population generated by the implementation of the Proposed Action and each alternative are discussed herein. The closure baseline projects employment levels of 50 direct and 12 secondary jobs in 1995, which would remain constant through 2015 for the No-Action Alternative. ROI population estimates for the closure baseline and post-closure are 635,326 for 1995 and 1,112,133 for 2015. This represents an increase of 476,807, or approximately 2.8 percent per year. ROI employment estimates for the closure baseline and post-closure are 287,262 for 1995 and 485,650 for 2015. This represents an increase of 198,388, or approximately 2.7 percent per year.

This analysis recognizes the potential for community impacts arising from "announcement effects" stemming from information regarding the base's closure or reuse. Such announcements may impact the affected communities' perceptions and, in turn, could have important local economic effects. An example would be the in-migration of people anticipating employment under one of the reuse options. If it were later announced that the No-Action Alternative was chosen, many of the newcomers would leave the area to seek employment elsewhere. Such an effect could, therefore, result in an initial, temporary increase in population followed by a decline in population as people leave the area.

4.2.1.1 Proposed Action. Redevelopment activities at Castle AFB under the Proposed Action would generate an increase of 3,824 direct and 2,427 secondary jobs by 2015, compared to the No-Action Alternative. This increase in jobs is small compared to closure baseline (No-Action Alternative) employment for the ROI; the rate of job growth would remain at 2.7 percent per year between closure and 2015, the same as with the No-Action Alternative. Nearly all the direct jobs created would be located on site. Secondary jobs would be created throughout the ROI. Figure 4.2-1 shows the effects of the Proposed Action and alternatives on employment in the ROI.

Population in the ROI would increase by 6,114 by 2015, as a result of new civilian jobs (Figure 4.2-2). ROI population with the Proposed Action is expected to increase 2.9 percent per year between closure and 2015, compared to 2.8 percent under closure baseline (No-Action Alternative) conditions. Most of this new population is expected to locate in Merced County, primarily in Atwater and the city of Merced.

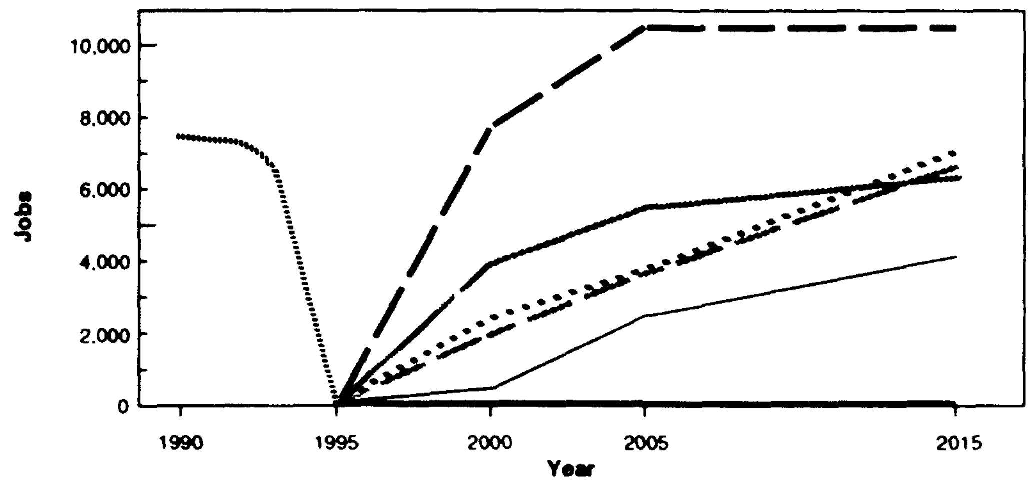
4.2.1.2 Castle Aviation Center Alternative. The Castle Aviation Center Alternative would create an increase of 6,150 direct jobs and 4,404 secondary jobs in the ROI by 2015 (see Figure 4.2-1). This represents a 2.8-percent annual average growth during this period. Projected net population change in the ROI would reach 9,979 persons by 2015 (see Figure 4.2-2). Growth in total ROI population is expected to average 2.9 percent annually between closure and 2015.

4.2.1.3 Commercial Aviation Alternative. Under this alternative, an increase of 4,001 direct jobs and 2,697 secondary jobs would be created within the ROI by 2015 (see Figure 4.2-1), representing a 2.7-percent annual growth rate. Resulting population growth in the ROI would reach 6,373 by 2015 (see Figure 4.2-2), with an expected average growth rate of 2.9 percent annually.

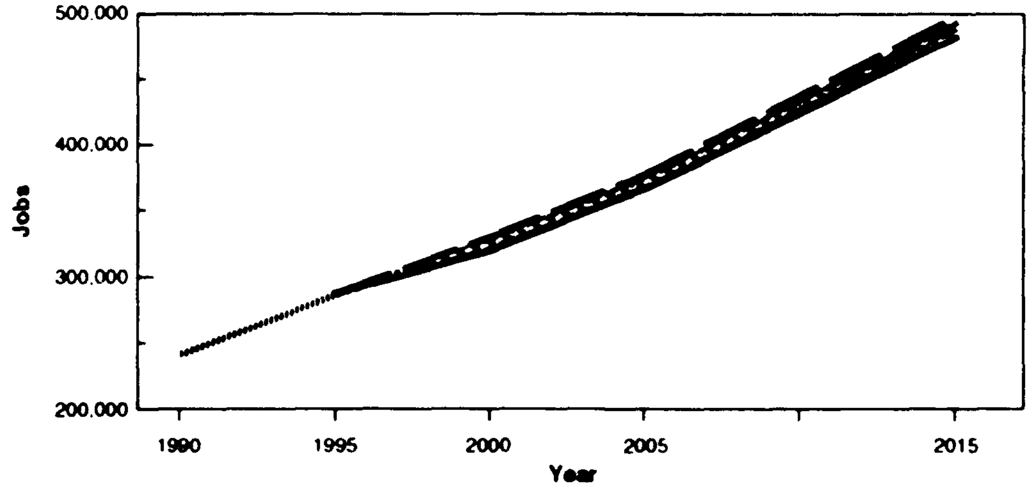
4.2.1.4 Aviation with Mixed Use Alternative. The level of economic activity under this alternative would be less than reported for the Proposed Action. Reuse of the base under this alternative would generate an increase of 4,175 direct jobs and 2,880 secondary jobs by 2015 (see Figure 4.2-1). ROI employment growth is projected to average 2.7 percent per year between closure and 2015. ROI net population change caused by the Aviation with Mixed Use Alternative would total 6,708 persons in 2015 (see Figure 4.2-2). This population gain would result in ROI population growth averaging 2.9 percent per year from closure to 2015.

ALTERNATIVE	1995[a]	2000	2005	2015
Proposed Action	62	3,861	5,333	6,251
Castle Aviation Center	62	7,770	10,554	10,554
Commercial Aviation	62	1,997	3,794	6,698
Aviation with Mixed Use	62	2,411	3,836	7,055
Non-Aviation	62	440	2,528	4,101

Reuse-Related Employment Effects[b]



Reuse-Related Employment Effects[b]



Total ROI Employment Including Reuse-Related Effects

EXPLANATION

- Preclosure
- Proposed Action
- Castle Aviation Center
- Commercial Aviation
- Aviation with Mixed Use
- Non-Aviation
- No-Action/Post-Closure

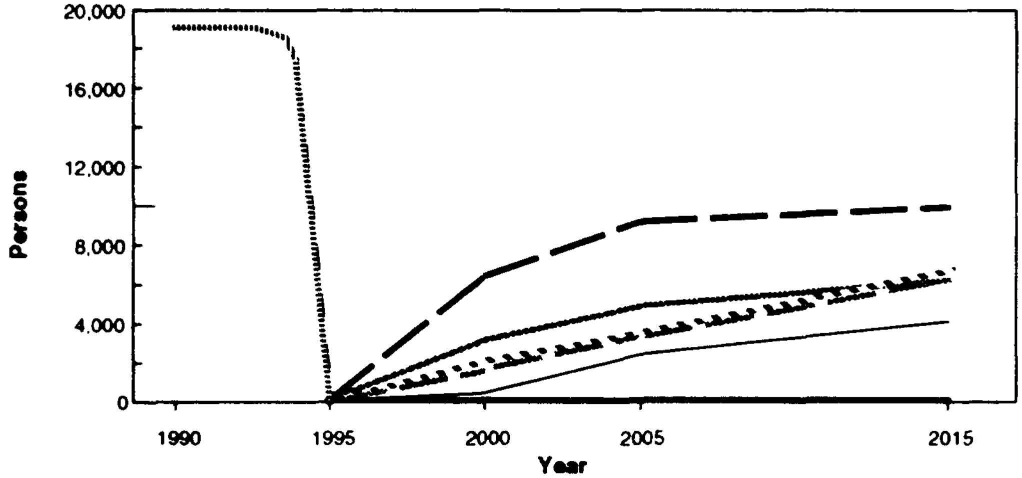
(a) The 1995 values represent total base-related employment under the closure baseline
(b) Employment effects represent the change in employment relative to the No-Action Alternative

Reuse-Related Employment Effects

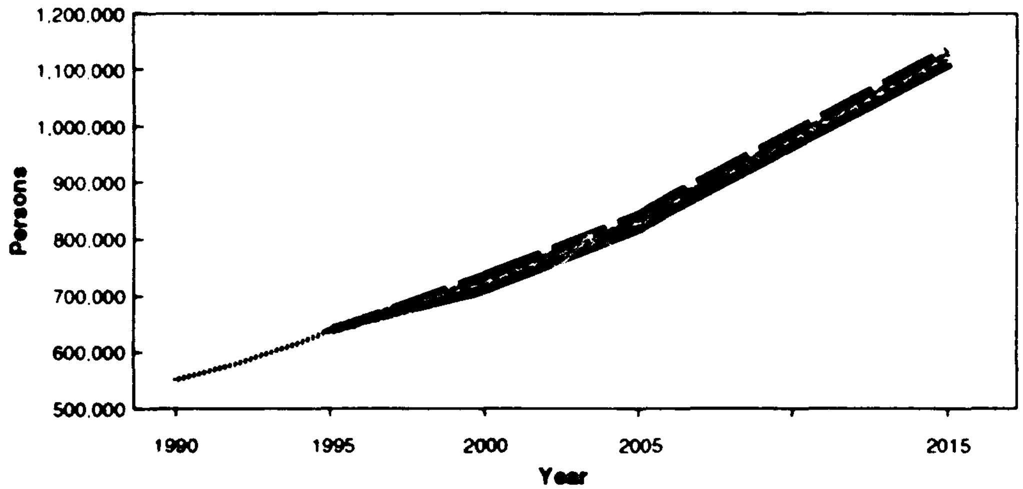
Figure 4.2-1

ALTERNATIVE	1995[a]	2000	2005	2015
Proposed Action	0	3,338	4,841	6,114
Castle Aviation Center	0	6,445	9,142	9,979
Commercial Aviation	0	1,666	3,379	6,373
Aviation with Mixed Use	0	2,078	3,430	6,708
Non-Aviation	0	282	2,366	4,105

Reuse-Related Population Effects[b]



Reuse-Related Population Effects[b]



Total ROI Population Including Reuse-Related Effects

EXPLANATION

- Preclosure
- Proposed Action
- Castle Aviation Center
- Commercial Aviation
- Aviation with Mixed Use
- Non-Aviation
- No-Action/Post-Closure

(a) 1995 represents closure conditions

(b) Reuse-related population effects are the persons that move into the ROI solely as a result of reuse

Reuse-Related Population Effects

Figure 4.2-2

4.2.1.5 Non-Aviation Alternative. This alternative would create an increase of 2,650 direct jobs and 1,451 secondary jobs in the ROI by 2015 (see Figure 4.2-1). This represents a 2.7-percent annual average employment growth during the 20-year period. Net population change in the ROI is projected to reach 4,105 persons by 2015 (see Figure 4.2-2). Growth in total ROI population is expected to average 2.9 percent annually under the Non-Aviation Alternative between closure and 2015.

4.2.1.6 No-Action Alternative. Under the No-Action Alternative, only caretaker status activities would occur at the base. It is estimated that the caretaker activities at Castle AFB would maintain approximately 50 direct and 12 secondary jobs in Merced and Stanislaus counties through 2015. There would be no net increase in population as a result of the No-Action Alternative. Total population in the ROI is expected to be 1,112,133 by 2015.

4.2.1.7 Other Land Use Concepts. Federal property transfers and independent land use concepts would be initiated on an individual basis and not as part of any integrated reuse alternatives. The potential effects of federal transfers and independent land use concepts will be discussed in relation to their effects on the Proposed Action and/or other reuse alternatives. Only alternatives for which impacts exist are cited; the remainder have little or no impacts.

Federal Correctional Complex. The U.S. Department of Justice, Federal Bureau of Prisons has requested approximately 660 acres northeast of the airfield for the development of a minimum of two federal correctional facilities. Direct employment is estimated at 450 full-time employees. This represents a reduction of 507 direct employees from the Proposed Action reuse of the same area, a decrease of 557 direct employees from the Castle Aviation Center Alternative, a reduction of 1,142 direct employees under the Commercial Aviation Alternative, and an increase of 432 and 431 direct employees for the Aviation with Mixed Use and Non-Aviation alternatives, respectively.

Private Recreational Facility. The CGSTA has proposed an extensive trapshooting range and gun club to occupy 325 acres northeast of the airfield. Proposed uses would include private and public use of facilities for trapshooting and other shooting events sponsored by the CGSTA, general range use by local citizen and police groups, a recreational vehicle park, and open space conservation. Direct employment is estimated at five full-time employees. This represents a reduction of 178 direct employees from reuse under the Proposed Action of the same area, and a reduction of 932 direct employees for the Commercial Aviation Alternative. An increase of 3, 5, and 5 direct employees for the Castle Aviation Center, Aviation with Mixed Use, and Non-Aviation alternatives, respectively, would be experienced if these alternatives were implemented in conjunction with this concept.

4.2.2 Land Use and Aesthetics

This section discusses the Proposed Action and alternatives relative to land use and zoning to determine potential impacts in terms of general plans, zoning, land use, and aesthetics. Land use compatibility with aircraft noise is discussed in Section 4.4.4, Noise.

4.2.2.1 Proposed Action

General Plans. As stated in Section 3.2.2, the city of Atwater and Merced County are the planning bodies for the area surrounding Castle AFB.

The current general plans for the city of Atwater and Merced County do not provide for the redevelopment of Castle AFB. Necessary plan revisions would include provisions for the airfield, aviation support, industrial, institutional (medical and educational), commercial, residential, public facilities/recreation, and agricultural uses.

Zoning. Zoning ordinances of the city of Atwater and Merced County would be applicable when the base property is conveyed to private ownership.

Merced County has zoned the portion of the base within its jurisdiction for a Special Planning Zone, representing the military land uses at Castle AFB. The county would need to rezone the base property to allow for proposed land uses under the Proposed Action. Merced County could amend its zoning ordinance according to the land use recommendations found in FAA Regulation, Part 150. This change would establish zoning policies for the airfield and adjacent areas impacted by noise, height restrictions, and safety hazards and would define compatible types and patterns of future land uses.

The southwestern portion of the base south of Wallace Road and west of Buhach Road, and the off-base housing areas, fall within the jurisdiction of the city of Atwater. The city has zoned these areas for single-family (R-1) residential use. Thus, the city would need to rezone these areas to allow for the residential, industrial, institutional (medical), and public facilities/ recreation land uses associated with the Proposed Action.

Land Use. Civilian development of the base property may change the land use patterns within the ROI by attracting investment and development in surrounding areas, especially in the vicinity of Santa Fe Drive and Bellevue Road.

Specific changes in major on-base land use categories associated with development under the Proposed Action would include the elimination of vacant lands by conversion to aviation support, industrial, commercial, and public facilities/recreation uses. A new industrial area would be created in the northern portion of the cantonment and the public facilities/recreational land use would be increased north of the airfield. The aviation support, industrial, institutional (medical), educational, commercial, and public facilities/recreation land uses would increase in area, while the airfield, residential, and vacant land areas would decrease.

Most of the proposed land uses for Castle AFB would be compatible with one another. Standard land use planning techniques like buffer zones and walls could mitigate potential conflicts. The communities' development review and approval processes would ensure that land use planning includes provisions to minimize potential conflicts of industrial with institutional and commercial land uses, and aviation support with commercial and public facilities/recreation land uses.

Under the Proposed Action, the airfield would be reused as a civilian airport, and Air Force AICUZ guidelines would be removed. FAA land use compatibility criteria outlined in FAA Advisory Circulars, including Noise Control and Compatibility Planning for Airports, Airport Land Use Compatibility Planning, Airport Design and Airport Master Plans could be used if Merced County decides to rezone the area surrounding the base. The FAA RPZs would be entirely contained within the airfield, with the exception of the northern RPZ, which overlies approximately 1 acre of agricultural land off base. Noise impacts are discussed in Section 4.4.4.

Aesthetics. Under the Proposed Action, the visual quality of the base property would be temporarily impacted by the demolition of buildings and facilities. The overall character of the base would become more urbanized as redevelopment occurs.

Mitigation Measures. Due to procedures that ensure the implementation of appropriate general plan and zoning revisions and review of land use compatibility, there would be no impacts associated with these land use categories. Renovation of facilities and landscaping could enhance the visual quality of the site.

4.2.2.2 Castle Aviation Center Alternative

General Plans. Revisions to the general plans for Merced County and the city of Atwater would be adopted to reflect the proposed land uses associated with the Castle Aviation Center Alternative.

Zoning. As under the Proposed Action, Merced County would need to rezone to allow for the proposed land uses under this alternative. The zoning ordinance for Merced County could be modified according to recommendations in FAA Regulation, Part 150.

The city of Atwater would need to rezone base property to allow residential, institutional (medical), and public facilities/recreation land uses.

Land Use. Civilian development of the base property may change the land use patterns within the ROI by attracting investment and development in surrounding areas.

Specific changes in major on-base land use categories associated with the Castle Aviation Center Alternative would include the elimination of vacant lands by conversion to industrial and public facilities/recreation uses. The industrial, medical, educational, and public facilities/recreation land use areas would increase, while the airfield, aviation support, commercial, residential, and vacant areas would decrease.

Most of the proposed land uses for Castle AFB would be compatible with one another. Standard land use planning techniques like buffer zones and walls could mitigate potential conflicts. The communities' development review and approval processes would ensure that land use planning includes provisions to minimize potential conflicts between the residential and industrial, institutional (medical), and commercial land uses.

The airfield would be reused as a civilian airport and Air Force AICUZ guidelines would be removed. FAA land use compatibility criteria could be used if Merced County decides to rezone the area surrounding the base. The FAA RPZs would be entirely contained within the airfield with the exception of the northern RPZ, which overlies approximately 1 acre of agricultural land off base, thus eliminating preclosure AICUZ, CZ, and APZ incompatibilities.

Aesthetics. Only minor, temporary impacts to aesthetics would result from implementation of the Castle Aviation Center Alternative.

Mitigation Measures. Mitigation measures are the same as those described under the Proposed Action.

4.2.2.3 Commercial Aviation Alternative

General Plans. Similar to the Proposed Action, the Commercial Aviation Alternative would entail a formal revision to the general plans of Merced County and the city of Atwater to include redevelopment of the base for the proposed commercial airport and industrial, institutional (medical), commercial, residential, public facilities/recreation, and agricultural land uses.

Zoning. Base property within Merced County's jurisdiction would need to be rezoned to allow for the proposed land uses under the Commercial Aviation Alternative. Atwater would also need to rezone the portions of the base within the city limits to allow for residential, institutional (medical), and public facilities/recreation land uses. In addition, Merced County could modify its zoning ordinance according to recommendations in FAA Regulation, Part 150.

Land Use. Civilian development of the base property may change the land use patterns within the ROI by attracting investment and development in surrounding areas.

Specific changes in major on-base land use categories associated with development under the Commercial Aviation Alternative would include the elimination of vacant lands by conversion to aviation support, industrial, and residential uses. The aviation support, industrial, institutional (medical), residential, and agricultural land uses would increase in area, while the airfield, educational, commercial, public facilities/recreation, and vacant land areas would decrease.

Most of the proposed land uses under this alternative would be compatible with one another. Standard land use planning techniques, like buffer zones and walls, could mitigate potential conflicts. The communities' development and review process would ensure that land use planning includes provisions to minimize potential conflicts among industrial, residential, and institutional (medical) land uses.

The airfield would be reused as a civilian airport and Air Force AICUZ guidelines would be removed. FAA land use compatibility criteria could be used if Merced County decides to rezone the area surrounding the base. The FAA RPZs would be entirely contained within base boundaries with the exception of a 1-acre portion of the northwest RPZ, which contains a compatible agricultural land use parcel.

Aesthetics. Impacts to the visual quality of the site would be the same as those described for the Proposed Action.

Mitigation Measures. Mitigation measures would be the same as those described for the Proposed Action.

4.2.2.4 Aviation with Mixed Use Alternative

General Plans. Similar to the Proposed Action, revisions to the general plans for the city of Atwater and Merced County would need to be adopted to reflect proposed land uses at Castle AFB.

Zoning. As discussed under the Proposed Action, the Merced County zoning ordinances could be modified according to recommendations in FAA Regulation, Part 150.

Merced County would need to rezone to allow for the proposed land uses under the Aviation with Mixed Use Alternative. The city of Atwater would have to rezone for residential, industrial, institutional (medical), and public facilities/recreation land uses.

Land Use. Civilian development of the base property may change the land use patterns within the ROI by attracting investment and development in surrounding areas.

Specific changes in major on-base land use categories associated with development under the Aviation with Mixed Use Alternative would include the elimination of vacant lands by conversion to aviation support, industrial, commercial, and public facilities/recreation uses. The aviation support, industrial, institutional (medical, educational), commercial, and public facilities/recreation land uses would increase in area, while the airfield and residential areas would decrease.

Most of the proposed land uses for Castle AFB under the Aviation with Mixed Use Alternative would be compatible with one another. Standard land use planning techniques, like buffer zones and walls, could mitigate potential conflicts. The communities' development review and approval processes would ensure that land use planning includes provisions to minimize potential conflicts of industrial with institutional (medical and educational), commercial, and public facilities/recreation land uses; and aviation support with institutional (educational) land uses.

The airfield would be reused as a civilian airport and Air Force AICUZ guidelines would be removed. FAA land use compatibility criteria could be used if Merced County decides to rezone the area surrounding the base. The FAA RPZs would be entirely contained within the airfield with the exception of the northern RPZ, which overlies approximately 1 acre of agricultural land use off base, thus eliminating preclosure AICUZ, CZ, and APZ incompatibilities.

Aesthetics. Under the Aviation with Mixed Use Alternative, impacts to visual quality would be the same as those described for the Proposed Action.

Mitigation Measures. Mitigation measures would be the same as those described for the Proposed Action.

4.2.2.5 Non-Aviation Alternative

General Plans. Similar to the Proposed Action, revisions to the general plans for the city of Atwater and Merced County would need to be adopted to reflect proposed land uses at Castle AFB, including industrial, institutional (educational), commercial, residential, public facilities/recreation, and agricultural land uses.

Zoning. Similar to the Proposed Action, under the Non-Aviation Alternative Merced County would need to rezone base property to reflect proposed land uses. The city of Atwater would need to rezone to allow for residential, institutional (educational), and public facilities/recreation land uses.

Land Use. The Non-Aviation Alternative, like the Proposed Action, proposes civilian development of the base property that may change the land use patterns within the ROI by attracting investment and development in surrounding areas.

Specific changes in major on-base land use categories associated with development under the Non-Aviation Alternative would include the elimination of the airfield, aviation support, and vacant land uses. These uses would be replaced by industrial, commercial, residential, public facilities/recreation, and agricultural uses. In addition, this alternative provides for a large institutional (educational) land use that includes the entire cantonment. The industrial, educational, residential, public facilities/recreation, and agricultural areas would increase, while the airfield, aviation support, medical, commercial and vacant areas would decrease.

Most of the proposed land uses for Castle AFB under this alternative would be compatible with one another. Standard land use planning techniques, like buffer zones and walls, could mitigate potential conflicts. The communities' development review and approval processes would ensure that land use planning includes provisions to minimize potential conflicts between industrial and institutional (educational), public facilities/recreation, and residential land uses. In addition, aviation noise conflicts with off-base land uses would be eliminated.

Aesthetics. Under the Non-Aviation Alternative, impacts to aesthetics would be the same as those described for the Proposed Action.

Mitigation Measures. Mitigation measures would be the same as those described for the Proposed Action.

4.2.2.6 No-Action Alternative. The No-Action Alternative would cause no physical changes in on-base land use from conditions at closure. Land use conflicts described under baseline conditions would continue.

Aesthetics. The No-Action Alternative could affect the visual and aesthetic quality of the base and the surrounding area because landscaped portions of the base and facilities would receive less intensive maintenance.

4.2.2.7 Other Land Use Concepts. Impacts of each proposed federal transfer and other independent land use concepts are evaluated for compatibility with land use plans and regulations, impacts to on- and off-base land uses, and general land use trends in the region.

Federal Correctional Complex. This proposal would require revisions to the Merced County General Plan. Since this concept would be on federal property, it would not be subject to local zoning. Therefore, the parcel would retain its Special Planning Zone designation reflecting federal use. The correctional complex would be compatible with the Proposed Action and all alternatives. The complex would occupy up to 660 acres proposed for industrial and/or public facilities/recreation land. The correctional complex would enhance the visual quality of the area due to the creation of an open space buffer surrounding the complex and landscaping around the proposed buildings. The correctional complex would be compatible with off-base adjacent land uses.

Private Recreational Facility. This proposal would require revision of the Merced County General Plan and zoning. The CGSTA plan would be compatible with the Proposed Action and all alternatives. The configuration of the approximately 325 acres of public facilities/recreation land needed for the proposed use would replace industrial development northeast of the airfield in the Proposed Action and Castle Aviation Center and Commercial Aviation alternatives. The visual quality of the area would be enhanced by the replacement of existing vacant and industrial land uses with public facilities/recreation uses and by blending the area into the rural atmosphere of Merced County.

4.2.3 Transportation

The effects of the Proposed Action and alternatives on each component of the transportation system, including roadways, airspace and air traffic, and railroads, are presented in this section. Possible mitigation measures are discussed for those components likely to experience substantial adverse impacts under the Proposed Action or any alternative.

Roadways. Reuse-related effects on roadway traffic were assessed by estimating the number of trips generated by each land use, considering employees, visitors, residents, and service vehicles associated with construction and all other on-site activities for the Proposed Action and each alternative. Principal trip-generating land uses include airport, industrial, office, commercial, institutional, and residential uses. These trips were assigned to the roadway system based on existing travel patterns. This analysis is based on the peak-hour trips as distributed and data on roadway capacities, traffic volumes, and standards established by state and local transportation agencies (California Department of Transportation, 1992a, 1992b; MCAG, 1992).

The transportation analysis used the standard analysis techniques of trip generation, trip distribution, and traffic assignment. Trip generation was based on applying the trip rates from the Institute of Transportation Engineer's Trip Generator Manual, 5th edition, to the existing and proposed land uses to get total daily trips. Peak hour analyses assumed that 10.4 percent of daily trips would occur during the peak hour.

The distribution of project trips to and from the site is based on existing travel patterns for commuters and on the locations of residences of civilian base personnel as obtained from zip code data. It was assumed that the residential choices of the project related employees would correspond to those of the current civilian base personnel. The resulting vehicle trips distributed to the public roads by the project during the peak hour were then added to the peak hour non project generated traffic (background traffic) projected under post closure conditions. Future traffic in the area was projected using average population and traffic growth rates during the period of analysis, and applied to all of the existing traffic volumes on the key roads.

Traffic impacts were determined based on LOS changes for each of the key roads, and as a percent increase of reuse traffic over post-closure (No-Action Alternative) traffic projections. Intersections along key roads that would experience heavy traffic were examined for deficiencies. Details on reuse are not sufficiently developed to permit an in-depth evaluation of intersection capacities.

Mitigation measures described for each alternative are generalized and would be adjusted by future project-specific analysis, which would be routinely conducted by the city or county of Merced or when the ADT reaches a certain level.

Airspace/Air Traffic. The airspace analysis examines the type and level of aircraft operations projected for the Proposed Action and alternatives and compares them to the airspace configuration used under the preclosure reference. The impact analysis considers the relationship of the projected aircraft operations to the operational capacity of the airport, using criteria that have been established by the FAA for determining airport service volumes. Potential effects on airspace use were assessed, based on the extent to which the Proposed Action or alternatives could (1) require modifications to the airspace structure or ATC systems and/or facilities; (2) restrict, limit, or otherwise delay other air traffic in the region; or (3) encroach on other airspace areas and uses.

The FAA is ultimately responsible for evaluating the specific effects that the reuse of an airport will have on the safe and efficient use of navigable airspace by aircraft. Such a study is based on details from the airport proponent's ALP and consists of an airspace analysis, a flight safety review, and a review of the potential effect of the proposal on ATC and air navigational facilities. Once this study is completed, the FAA can then determine the actual requirements for facilities, terminal and en route airspace, and instrument flight procedures.

Methods used to perform the airspace/air traffic analysis are described in Appendix E.

Other Transportation Modes. A description of the methods used to analyze impacts on other transportation modes is found in Appendix E.

4.2.3.1 Proposed Action

Roadways. The major traffic generators under the Proposed Action would be the direct operations employees of industrial and aviation support activities, the commercial/retail uses, and the Castle Gardens and Castle Vista housing areas. By 2015, the traffic generated as a result of the Proposed Action land use and direct employment is estimated to [illegible]9,800 vehicle trips for a typical weekday (Table 4.2-1).

Table 4.2-1. Average Daily Trip Generation

	2000	2005	2015
Proposed Action	28,700	38,250	39,800
Castle Aviation Center Alternative	42,900	47,700	47,700
Commercial Aviation Alternative	24,400	44,300	54,200
Aviation with Mixed Use Alternative	21,950	30,450	36,050
Non-Aviation Alternative	11,700	24,650	34,750
No-Action Alternative	500	500	500

Note: All values are rounded to the nearest 50. Daily trips shown are defined as one-way vehicle trips.

During the afternoon peak hour on a typical weekday in 2015, the site would generate about 4,150 trips, which represents 10.4 percent of the total number of daily trips. The corresponding figure for the morning peak hour is 2,450 vehicle trips, which represents 6 percent of the total daily trips. Based on the proposed redevelopment schedule, the number of daily trips generated by the Proposed Action would increase steadily during the 20-year study period. By 2005, the total daily trips would reach about 96 percent of the 2015 level.

The Proposed Action includes ten access points to the main base area of the site. However, most traffic generated by the proposed development is likely to use the five access points located along Santa Fe Drive: three existing access points at the Main Gate, Gate 2, and Gate 3 (via Wallace Road); the proposed access aligned with Bellevue Road; and the proposed access at the southeast corner of the base on Santa Fe Drive. The remaining five access points located northwest and east of the base would provide access to the industrial area and the recreational area north of the runway and access to a portion of the aviation support activities. Residents of Castle Gardens and

Castle Vista would use the existing access on Buhach and Bellevue roads and Juniper Avenue. The segment of Santa Fe Drive between the Main Gate and the proposed southern access is likely to experience an appreciable amount of traffic throughout the day, with numerous left and right turns entering the site during the morning peak hour and leaving the site during the afternoon peak hour.

Table 4.2-2 presents the projected peak-hour traffic on key roads, and the associated LOS that would result under the Proposed Action, for closure (1995), 2000, 2005, and 2015. Under the Proposed Action, traffic on SH 99 southeast of Buhach Road would increase by 450 vehicles during the peak hour, or 5.5 percent, over the 2015 post-closure conditions (8,250 vehicles), and LOS would drop to F by 2008, and to F by 2010 with no reuse (No-Action Alternative).

Under the Proposed Action, the two-lane segments of Santa Fe Drive between Shaffer and Buhach roads would operate at LOS F during the peak hour by 2001. These same segments would drop to LOS F by 2010 under the No-Action Alternative. Three segments of Santa Fe Drive between Buhach Road and SH 99 would operate at LOS F during the peak hour by 2012. By 2011, all three segments of Bellevue Road between Santa Fe Drive and Shaffer Road would deteriorate to LOS F under the Proposed Action. These same conditions would occur without reuse by 2015.

A peak-hour increase of 53 percent, or 950 vehicles, over post-closure traffic of 1,800 vehicles would occur on Bellevue Road between Buhach Road and Santa Fe Drive by 2015.

The Proposed Action assumes that existing on-base roads would be used during the construction period, and would be upgraded where local development plans dictate a need based on community standards for acceptable LOS.

Airspace/Air Traffic. Aircraft activity based at Castle AFB under the Proposed Action would reach 115,319 operations by 2015. The majority of these operations would be flown by transport category aircraft, although general aviation aircraft also constitute a major portion of reuse. The single runway at Castle AFB is capable of accommodating approximately 230,000 annual operations under FAA guidelines.

The TACAN equipment at Castle AFB is not suitable for civilian use. Because this navigational aid cannot play a role in the National Airspace System, the decommissioning of the equipment would not affect airspace management in the area.

Air Transportation. The Proposed Action does not allow for any passenger activity during the planning period. Passenger activity would continue to be

Table 4.2-2. Peak-Hour Traffic Volumes and LOS on Key Roads - Proposed Action

Road	Capacity (VPH)	Closure (1995) Traffic	Closure (1995) LOS	2000 Traffic	2000 LOS	2005 Traffic	2005 LOS	2015 Traffic	2015 LOS
Regional									
SH 99									
Buhach Rd Southeast	7,200	4,550	C	5,600	C	6,600	D	8,700	F
Buhach Rd Northwest	7,200	4,700	C	5,650	D	6,550	D	8,750	F
Local									
Santa Fe Dr, 2-lane segments									
Chestnut Ln-Shaffer Rd	1,800	600	A	950	A	1,200	B	1,450	D
Shaffer Rd-Wallace Rd	1,800	1,100	B	1,700	E	2,000	F	2,500	F
Wallace Rd-Buhach Rd	1,800	1,200	B	1,750	E	2,050	F	2,600	F
Santa Fe Dr, 4-lane segments									
Buhach Rd-Bellevue Rd	3,600	1,900	A	2,600	C	3,000	D	3,950	F
Bellevue Rd-Gate 2	3,600	1,650	A	2,800	C	3,300	E	4,050	F
Gate 2-Gurr Rd	3,600	1,250	A	2,350	B	2,750	C	3,350	E
Beachwood Dr-SH 59	3,600	1,800	A	2,750	C	3,300	E	4,200	F
West Olive Ave									
SH 59-R St	4,500	1,250	A	1,950	A	2,400	A	3,350	C
Buhach Rd									
Santa Fe Dr-Bellevue Rd	3,000	650	A	1,250	A	1,600	A	1,950	C
Bellevue Rd-Juniper Ave	3,000	500	A	1,200	A	1,500	A	1,800	B
Juniper Av-SH 99	3,000	500	A	900	A	1,200	A	1,450	A
Bellevue Rd									
Santa Fe Dr-Buhach Rd	2,250	1,000	A	1,900	D	2,250	F	2,750	F
Buhach Rd-Castle Dr	3,000	1,400	A	2,250	C	2,650	D	3,300	F
Castle Dr-Shaffer Rd	3,000	1,600	A	2,300	C	2,700	E	3,450	F
Juniper Ave									
Buhach Rd-Shaffer Rd	3,000	350	A	850	A	1,250	A	1,400	A
Wallace Rd									
Gate 3-Santa Fe Dr	1,500	50	A	300	A	350	A	350	A

Note: Peak-hour traffic volumes include reuse-related and baseline (No-Action Alternative) volumes. All traffic volume figures are rounded to the nearest 50.

LOS = Level of Service.
SH = State Highway.
VPH = Vehicles per hour.

accommodated at Merced, Modesto, and Fresno. It is possible that the loss of base-related traffic would lead to a reduction in the number of daily round trips offered at Merced, but it is unlikely that service would cease entirely. Air cargo service would likely be unaffected by the Proposed Action.

The Proposed Action also includes a moderate amount of general aviation and maintenance operations.

Other Transportation Modes. The implementation of the Proposed Action could increase ridership on Amtrak at Merced Station; however, the projected effects would be minimal.

Mitigation Measures. Improvements to Santa Fe Drive between Buhach and Shaffer roads would be required before the year 2000. Before 2010, improvements to Santa Fe Drive between Buhach Road and SH 59 should be addressed. Improvements to Bellevue Road between Shaffer Road and Santa Fe Drive would be required before 2011 to preclude these sections from dropping to LOS F. Suggested improvements could include widening of roadways, control of access, and intersection upgrades to raise the LOS to a level consistent with transportation planning criteria. An adequate on-site circulation system has the potential of distributing traffic evenly and, therefore, mitigating traffic impact on some segments.

Other potential mitigations include Transportation Demand Management (TDM) measures to encourage person- and vehicle-trip reductions and peak period modification. These measures could include, for example, reduced work weeks and telecommuting to reduce person-trips, ridesharing (vanpools and carpools) and mass transit usage to reduce vehicle trips, and flexible work schedules to modify peak traffic periods. Implementation of TDM could reduce vehicle trips by as much as 20 percent. With efficient use of TDM measures, the deterioration of Bellevue Road segments to LOS F would not occur until 2013, rather than 2011, and the deterioration to LOS F on other road segments would be delayed 2 years.

4.2.3.2 Castle Aviation Center Alternative

Roadways. The major traffic generators under this reuse plan would be direct operations employees of industrial and aviation support activities, the commercial/retail uses, and the Castle Gardens and Castle Vista housing areas. The traffic generated as a result of the Castle Aviation Center Alternative land use and direct employment is estimated to be 47,700 vehicle trips for a typical weekday by 2015 (see Table 4.2-1).

During the afternoon peak hour on a typical weekday in 2015, the site would generate about 5,350 trips, which represents 11 percent of the total daily vehicle trips. The corresponding figure for the morning peak hour is 4,450 vehicle trips, which represents 9 percent of the total daily trips. Based on the proposed redevelopment schedule, the number of daily trips generated by this alternative would increase sharply during the first 5 years. The total daily trips would reach about 90 percent of the 2015 level by 2000 and 100 percent by 2005. Air shows are special features of this alternative. These events would occur during a limited number of 2-day weekends, but are expected to generate a significant amount of traffic at access points to the site. Traffic management practices are expected to be developed locally to address the traffic impacts of such events. Access to the base would be identical to that described under the Proposed Action.

Table 4.2-3 presents the projected peak-hour traffic on key roads, and the associated LOS that would result under the Castle Aviation Center Alternative for closure (1995), 2000, 2005, and 2015. Under the Castle Aviation Center Alternative, traffic on SH 99 southeast of Buhach Road would increase by 550 vehicles during the peak hour, or 7 percent, over the 2015 post-closure conditions of 8,250 vehicles, resulting in LOS F by 2007.

Under the Castle Aviation Center Alternative, the two-lane roadway segments of Santa Fe Drive between Shaffer and Buhach roads would operate at LOS F by about 2000. One four-lane segment of Santa Fe Drive between Beachwood Drive and SH 59 would operate at LOS F by 2005. Three of these four-lane segments of Santa Fe Drive would operate at LOS F by 2009.

By 2004, all three segments of Bellevue Road between Santa Fe Drive and Shaffer Road would deteriorate to LOS F during the peak hour under the Castle Aviation Center Alternative. A 58-percent increase of 1,050 reuse-related vehicles over post-closure traffic of 1,800 vehicles would occur on Bellevue Road between Buhach Road and Santa Fe Drive by 2015.

Under the Castle Aviation Center Alternative, it is assumed that existing on-base roads would be used during the construction period and upgraded where local development plans dictate a need based on community standards for acceptable LOS.

Airspace/Air Traffic. Aircraft activity based at Castle AFB under the Castle Aviation Center Alternative would reach 11,110 operations by 2015. The majority of these operations would be flown by general aviation aircraft, although maintenance and air show-related activities also constitute a major portion of reuse. Based on the decrease in operations, and the elimination of high-performance military aircraft from the area airspace, no impact to the ROI airspace would be anticipated.

Air Transportation. Impacts to air transportation under the Castle Aviation Center Alternative would be similar to those for the Proposed Action. This alternative does, however, include uses typically associated with a small number of tourists. As such, some of the passenger loss associated with base closure may be offset by passenger increases from activities in this alternative.

Other Transportation Modes. The implementation of the Castle Aviation Center Alternative could increase ridership on Amtrak at Merced Station; however, the projected effects would be minimal. The air show events

Table 4.2-3. Peak-Hour Traffic Volumes and LOS on Key Roads - Castle Aviation Center Alternative

Road	Capacity (VPH)	Closure (1995) Traffic	LOS	2000 Traffic	LOS	2005 Traffic	LOS	2015 Traffic	LOS
Regional									
SH 99									
Buhach Rd Southeast	7,200	4,550	C	5,800	D	6,700	D	8,800	F
Buhach Rd Northwest	7,200	4,700	C	5,750	D	6,650	D	8,800	F
Local									
Santa Fe Dr, 2-lane segments									
Chestnut Ln-Shaffer Rd	1,800	600	A	1,150	B	1,350	C	1,600	D
Shaffer Rd-Wallace Rd	1,800	1,100	B	1,950	F	2,250	F	2,750	F
Wallace Rd-Buhach Rd	1,800	1,200	B	1,950	F	2,250	F	2,800	F
Santa Fe Dr, 4-lane segments									
Buhach Rd-Bellevue Rd	3,600	1,900	A	2,800	C	3,250	E	4,150	F
Bellevue Rd-Gate 2	3,600	1,650	A	2,950	D	3,400	E	4,150	F
Gate 2-Gurr Rd	3,600	1,250	A	2,500	B	2,850	C	3,450	E
Beachwood Dr-SH 59	3,600	1,800	A	3,100	D	3,600	F	4,450	F
West Olive Ave									
SH 59-R St	4,500	1,250	A	2,150	A	2,650	A	3,550	C
Buhach Rd									
Santa Fe Dr-Bellevue Rd	3,000	650	A	1,850	B	2,100	C	2,400	D
Bellevue Rd-Juniper Ave	3,000	500	A	1,500	A	1,700	A	1,950	B
Juniper Ave-SH 99	3,000	500	A	1,150	A	1,300	A	1,550	A
Bellevue Rd									
Santa Fe Dr-Buhach Rd	2,250	1,000	A	2,050	E	2,400	F	2,850	F
Buhach Rd-Castle Dr	3,000	1,400	A	2,650	D	3,050	F	3,700	F
Castle Dr-Shaffer Rd	3,000	1,600	A	2,600	D	3,000	F	3,750	F
Juniper Ave									
Buhach Rd-Shaffer Rd	3,000	350	A	850	A	1,000	A	1,150	A
Wallace Rd									
Gate 3-Santa Fe Dr	1,500	50	A	500	A	550	A	550	A

Note: Peak-hour traffic volumes include reuse-related and baseline (No-Action Alternative) volumes. All traffic volume figures are rounded to the nearest 50.

LOS = Level of Service.
SH = State Highway.
VPH = Vehicles per hour.

could increase ridership on Amtrak during a limited number of weekends throughout the year.

Mitigation Measures. Improvements to Santa Fe Drive between Shaffer and Buhach roads would be required before the year 2000. By 2009, improvements to Santa Fe Drive between Buhach Road and SH 59 should be addressed. Improvements to Bellevue Road between Shaffer Road and Santa Fe Drive would be required shortly after 2000 to preclude these sections from dropping to LOS F. Suggested improvements could include widening of roadways, control of access, and intersection upgrades to raise the LOS to a level consistent with transportation planning criteria. An adequate on-site circulation system has the potential of distributing traffic evenly and, therefore, mitigating the traffic impact on some segments.

Other potential mitigations include TDM measures as described for the Proposed Action to encourage trip reductions and peak period modification. With efficient use of TDM measures, the deterioration of some key segments to LOS F would be delayed by 1 to 3 years.

4.2.3.3 Commercial Aviation Alternative

Roadways. The major traffic generators under the Commercial Aviation Alternative would be the direct operations employees of industrial and aviation support activities, and the commercial, medical, and residential uses. By 2015, the traffic generated as a result of the Commercial Aviation Alternative land use and direct employment is estimated to be 54,200 vehicle trips for a typical weekday (see Table 4.2-1).

During the afternoon peak hour on a typical weekday in 2015, the site would generate about 4,900 trips, which represents 9 percent of the total number of daily trips. The corresponding figure for the morning peak hour is 3,050 vehicle trips, which represents 6 percent of the total daily trips. Based on the proposed redevelopment schedule, the number of daily trips generated by the Commercial Aviation Alternative would increase steadily during the 20-year study period. By 2005, the total daily trips would reach approximately 82 percent of the 2015 level. Access to the base would be identical to that described under the Proposed Action.

Table 4.2-4 presents the projected reuse-related and baseline peak-hour traffic on key roads, and the associated LOS that would result under the Commercial Aviation Alternative for closure (1995), 2000, 2005, and 2015. Under the Commercial Aviation Alternative, traffic on SH 99 south of Buhach Road would increase by 500 vehicles during the peak hour, or 6 percent, over the 2015 post-closure conditions (8,250), and LOS would drop to F by 2008.

Under the Commercial Aviation Alternative, the two-lane segments of Santa Fe Drive between Shaffer and Buhach roads would drop to LOS F during the peak hour by the year 2002. Three of the four-lane segments on Santa Fe Drive between Buhach Road and SH 59 would operate at LOS F during the peak hour shortly after 2010. By 2008, all three segments of Bellevue Road between Santa Fe Drive and Shaffer Road would deteriorate to LOS F under the Commercial Aviation Alternative.

Table 4.2-4. Peak-Hour Traffic Volumes and LOS on Key Roads - Commercial Aviation Alternative

Road	Capacity (VPH)	Closure (1995) Traffic	Closure (1995) LOS	2000 Traffic	2000 LOS	2005 Traffic	2005 LOS	2015 Traffic	2015 LOS
Regional									
SH 99									
Buhach Rd Southeast	7,200	4,550	C	5,600	C	6,550	D	8,750	F
Buhach Rd Northwest	7,200	4,700	C	5,600	C	6,550	D	8,750	F
Local									
Santa Fe Dr, 2-lane segments									
Chestnut Ln-Shaffer Rd	1,800	600	A	950	A	1,200	B	1,550	D
Shaffer Rd-Wallace Rd	1,800	1,100	B	1,650	E	2,100	F	2,700	F
Wallace Rd-Buhach Rd	1,800	1,200	B	1,700	E	2,100	F	2,750	F
Santa Fe Dr, 4-lane segments									
Buhach Rd-Bellevue Rd	3,600	1,900	A	2,500	B	3,100	D	4,100	F
Bellevue Rd-Gate 2	3,600	1,650	A	2,450	B	3,100	D	4,100	F
Gate 2-Gurr Rd	3,600	1,250	A	1,950	A	2,500	B	3,400	E
Beachwood Dr-SH 59	3,600	1,800	A	2,550	C	3,200	D	4,350	F
West Olive Ave									
SH 59-R St	4,500	1,250	A	1,850	A	2,400	A	3,450	C
Buhach Rd									
Santa Fe Dr-Bellevue Rd	3,000	650	A	1,450	A	1,850	B	2,350	C
Bellevue Rd-Juniper Ave	3,000	500	A	1,100	A	1,450	A	1,900	B
Juniper Ave-SH 99	3,000	500	A	900	A	1,150	A	1,500	A
Bellevue Rd									
Santa Fe Dr-Buhach Rd	2,250	1,000	A	1,650	C	2,150	E	2,800	F
Buhach Rd-Castle Dr	3,000	1,400	A	2,200	C	2,800	E	3,650	F
Castle Dr-Shaffer Rd	3,000	1,600	A	2,250	C	2,800	E	3,700	F
Juniper Ave									
Buhach Rd-Shaffer Rd	3,000	350	A	700	A	900	A	1,100	A
Wallace Rd									
Gate 3-Santa Fe Dr	1,500	50	A	300	A	450	A	550	A

Note: Peak-hour traffic volumes include reuse-related and baseline (No-Action Alternative) volumes. All traffic volume figures are rounded to the nearest 50.

LOS = Level of Service.
SH = State Highway.
VPH = Vehicles per hour.

A peak-hour increase of 56 percent, or 1,000 vehicles, over post-closure traffic of 1,800 vehicles would occur on Bellevue Road between Buhach Road and Santa Fe Drive by 2015.

The Commercial Aviation Alternative assumes that existing on-base roads would be used during the construction period, and would be upgraded where local development plans dictate a need based on community standards for acceptable LOS.

Airspace/Air Traffic. Aircraft activity based at Castle AFB under the Commercial Aviation Alternative would reach 234,437 operations by 2015. The majority of these operations would be flown by transport category aircraft for commercial jet and turboprop pilot training. General aviation aircraft would constitute the bulk of the remaining operations, with limited cargo and passenger traffic accounting for a small portion of reuse. Because the existing runway at Castle AFB has a maximum capacitv of 230,000 operations, it would be necessary to open a second parallel runway (Taxiway 1). Under the Commercial Aviation Alternative, the existing runway arrival and departure procedures under VFR weather conditions would remain similar to those under the preclosure reference. Arrival and departure procedures for the new general aviation runway would also be relatively unconstrained, as the separation between the two runway centerlines is sufficient to support independent departure and arrival procedures for the majority of the airport's fleet mix. Under IFR conditions, it is unlikely that the general aviation runway would be used. Aircraft operating in IFR conditions could be routed to the updated ILS in a manner similar to preclosure procedures.

The Commercial Aviation Alternative is expected to produce a substantially higher level of activity than occurred under the preclosure reference. However, the addition of the general aviation runway would provide the needed support to adequately handle the anticipated demand.

Air Transportation. The Commercial Aviation Alternative calls for the closure of the Turlock, Atwater, and Merced municipal airports. Passenger activity would probably be relocated from Merced to Castle. It is possible that the loss of base-related traffic would lead to a reduction in the number of daily round trips offered at Castle, as compared to the preclosure level at Merced, but it is unlikely that the demand for service would cease entirely. The Commercial Aviation Alternative also includes the relocation of cargo activity from Merced to Castle. It is not anticipated that cargo volumes would be affected by the relocation.

The Commercial Aviation Alternative also incudes a substantial level of general aviation operations. These operations would primarily consist of relocated activity from the three closing airports and would, therefore, support similar levels of general aviation passenger activity as compared to the preclosure reference. While some general aviation activity would be lost to airports outside the ROI, such as Fresno or Modesto, new levels of general aviation activity associated with the passenger, cargo, and training operations would be expected. As such, no measurable impacts on general aviation are anticipated as a result of the Commercial Aviation Alternative.

Mitigation Measures. Improvements to Santa Fe Drive between Buhach and Shaffer roads would be required before 2002. Before 2010, improvements to Santa Fe Drive between Buhach Road and SH 59 should be addressed.

Improvements to Bellevue Road between Shaffer Road and Santa Fe Drive would be required before 2008, to preclude these sections from dropping to LOS F. Suggested improvements could include widening of roadways, control of access, and intersection upgrades to raise the LOS to a level consistent with transportation planning criteria. An adequate on-site circulation system has the potential of distributing traffic evenly and, therefore, mitigating traffic impact on some segments.

Other potential mitigations include TDM measures as described for the Proposed Action to encourage person- and vehicle-trip reductions and peak period modification. These measures could include, for example, reduced work weeks and telecommuting to reduce person-trips, ridesharing (vanpools and carpools) and mass transit usage to reduce vehicle trips, and flexible work schedules to modify peak traffic periods. Implementation of TDM could reduce vehicle trips by as much as 20 percent. With efficient use of TDM measures, the deterioration of Bellevue Road segments to LOS F would not occur until 2011, rather than 2008, and the deterioration to LOS F on other road segments would be delayed 1 to 3 years.

4.2.3.4 Aviation with Mixed Use Alternative

Roadways. The major traffic generators under this reuse plan would be the direct operations employees of industrial and aviation support activities, the commercial/retail uses, and the Castle Gardens and Castle Vista housing areas. The traffic generated as a result of the Aviation with Mixed Use Alternative land use and direct employment is estimated to be 36,050 vehicle trips for a typical weekday by 2015 (see Table 4.2-1).

During the afternoon peak hour on a typical weekday in 2015, the site would generate about 4,050 trips, which represents 11 percent of the total daily vehicle trips. The corresponding figure for the morning peak hour is 2,450 vehicle trips, which represents 7 percent of the total daily trips. Based on the proposed redevelopment schedule, the number of daily trips generated by this alternative would increase steadily during the 20 year study period. By 2005, the total daily trips would reach 85 percent of the 2015 level. Access to the base would be as described under the Proposed Action.

Table 4.2-5 presents the projected reuse-related and baseline peak-hour traffic on key roads, and the associated LOS that would result under the Aviation with Mixed Use Alternative for closure (1995), 2000, 2005, and 2015. Under the Aviation with Mixed Use Alternative, traffic on SH 99 southeast of Buhach Road by 2015 would increase by 400 vehicles during the peak hour, or 5 percent, over post-closure conditions of 8,250 vehicles, and the LOS would drop to F by 2008.

Table 4.2-5. Peak-Hour Traffic Volumes and LOS on Key Roads - Aviation with Mixed Use Alternative

Road	Capacity (VPH)	Closure (1995) Traffic	Closure (1995) LOS	2000 Traffic	2000 LOS	2005 Traffic	2005 LOS	2015 Traffic	2015 LOS
Regional									
SH 99									
Buhach Rd Southeast	7,200	4,550	C	5,500	D	6,500	D	8,650	F
Buhach Rd Northwest	7,200	4,700	C	5,600	D	6,500	D	8,700	F
Local									
Santa Fe Dr, 2-lane segments									
Chestnut Ln-Shaffer Rd	1,800	600	A	900	A	1,150	B	1,450	D
Shaffer Rd-Wallace Rd	1,800	1,100	B	1,600	D	1,950	F	2,550	F
Wallace Rd-Buhach Rd	1,800	1,200	B	1,650	E	2,000	F	2,650	F
Santa Fe Dr, 4-lane segments									
Buhach Rd-Bellevue Rd	3,600	1,900	A	2,500	B	2,950	D	3,950	F
Bellevue Rd-Gate 2	3,600	1,650	A	2,600	C	3,150	D	4,050	F
Gate 2-Gurr Rd	3,600	1,250	A	2,150	A	2,550	C	3,300	E
Beachwood Dr-SH 59	3,600	1,800	A	2,600	C	3,100	D	4,150	F
West Olive Ave									
SH 59-R St	4,500	1,250	A	1,850	A	2,300	A	3,350	C
Buhach Rd									
Santa Fe Dr-Bellevue Rd	3,000	650	A	1,200	A	1,600	A	2,050	B
Bellevue Rd-Juniper Ave	3,000	500	A	1,050	A	1,350	A	1,700	A
Juniper Ave-SH 99	3,000	500	A	800	A	1,050	A	1,350	A
Bellevue Rd									
Santa Fe Dr-Buhach Rd	2,250	1,000	A	1,750	C	2,150	E	2,700	F
Buhach Rd-Castle Dr	3,000	1,400	A	2,200	C	2,700	E	3,500	F
Castle Dr-Shaffer Rd	3,000	1,600	A	2,250	C	2,700	E	3,550	F
Juniper Ave									
Buhach Rd-Shaffer Rd	3,000	350	A	550	A	850	A	1,050	A
Wallace Rd									
Gate 3-Santa Fe Dr	1,500	50	A	250	A	300	A	400	A

Note: Peak-hour traffic volumes include reuse-related and baseline (No-Action Alternative) volumes. All traffic volume figures are rounded to the nearest 50.

LOS = Level of Service.
SH = State Highway.
VPH = Vehicles per hour.

Under the Aviation with Mixed Use Alternative, the two-lane roadway segments of Santa Fe Drive between Shaffer and Buhach roads would operate at LOS F during the peak hour by about 2003. Three of the four-lane segments of Santa Fe Drive between Buhach and SH 59 would operate at LOS F during the peak hour by 2012.

By 2010, all three segments of Bellevue Road between Santa Fe Drive and Shaffer Road would deteriorate to LOS F during the peak hour under the Aviation with Mixed Use Alternative. By 2015, reuse-related vehicles between Buhach Road and Santa Fe Drive would increase 50 percent or 900 vehicles over post-closure traffic of 1,800 vehicles.

The Aviation with Mixed Use Alternative assumes that existing on-base roads would be used during the construction period and upgraded where local development plans dictate a need based on community standards for acceptable LOS.

Airspace/Air Traffic. Aircraft activity based at Castle AFB under the Aviation with Mixed Use Alternative would reach 40,800 operations by 2015. The majority (over 90 percent) of these operations would be flown by general aviation aircraft, although maintenance of jet aircraft would also constitute a small portion of reuse. Based on the decrease in operations, and the reduction of high-performance aircraft from the area airspace, no impact to the ROI airspace would be anticipated. The Aviation with Mixed Use Alternative assumes that only minimal ATC services and navigational aids would be retained under reuse. Because this alternative includes minimal air carrier maintenance operations it is assumed that the ATC tower would be decommissioned. This alternative does include the establishment of a non-precision instrument approach to Runway 13/31 from the El Nido VOR/DME. Without the ATC tower, no airport traffic area or control zone would be required.

To provide for pilot communications with the airport, the airport would be given a UNICOM (two-way radio) frequency to provide safe and orderly flow of traffic.

Total use of regional airspace under this alternative would be less than under preclosure conditions. Due to this decrease, and the elimination of the majority of high-performance military aircraft from the area airspace, no impacts to the region's airspace would be realized.

Air Transportation. Implementation of the Aviation with Mixed Use Alternative would not provide commercial passenger or air cargo service at Castle AFB. Impacts on commercial passenger service at Merced Municipal would be as described for the Proposed Action.

Because this alternative assumes the relocation of the Atwater Municipal Airport to Castle AFB, it is unlikely that any substantial impacts on general aviation in the region would occur. It is possible that some shifts in aircraft basings from one regional airport to another may occur, due to the reluctance of aircraft owners to use Castle AFB or due to increased driving time to their hangar. The probability of these occurrences is low.

Other Transportation Modes. The implementation of the Aviation with Mixed Use Alternative could increase ridership on Amtrak at Merced Station; however, the projected effects would be minimal.

Mitigation Measures. Improvements to Santa Fe Drive between Shaffer and Buhach roads would be required before 2003. By 2010, improvements to segments of Santa Fe Drive between Buhach Road and SH 59 should be addressed. Improvements to Bellevue Road between Santa Fe Drive and Shaffer Road would be required before 2010, to preclude these sections from dropping to LOS F. Suggested improvements could include widening of roadways, control of access, and intersection upgrades to raise the LOS to a level consistent with transportation planning criteria. An adequate on-site circulation system has the potential of distributing traffic evenly and, therefore, mitigating traffic impacts on some segments.

Other potential mitigations include TDM measures as described for the Proposed Action to encourage person- and vehicle-trip reductions and peak period modification. With efficient use of TDM measures, the deterioration of some key segments to LOS F could be delayed by 1 to 3 years.

4.2.3.5 Non-Aviation Alternative

Roadways. The major traffic generators under the Non-Aviation Alternative would be the direct operations employees of the research and development facility, employees of the university, the commercial/retail uses, and the Castle Gardens and Castle Vista housing areas as well as the new residential areas. The traffic generated as a result of the Non-Aviation Alternative and direct employment is estimated to be 34,750 vehicle trips for a typical weekday by 2015 (see Table 4.2-1).

During the afternoon peak hour on a typical weekday in 2015, the site would generate about 3,400 trips, which represents 10 percent of the total number of daily trips. The corresponding figure for the morning peak hour is 2,300 vehicle trips, which represents 7 percent of the total daily trips. Based on the proposed redevelopment schedule, the number of daily trips generated by the Non-Aviation Alternative would increase steadily during the 20-year study period. By 2005, the total daily trips would reach about 72 percent of the 2015 level. Access to the base would be similar to that described under the Proposed Action.

Table 4.2-6 presents the projected reuse-related and baseline peak-hour traffic on key roads and the LOS that would result under the Non-Aviation Alternative for closure (1995), 2000, 2005, and 2015. Under the Non-Aviation Alternative, traffic on SH 99 at Buhach Road would increase by 300 vehicles during the peak hour, or 4 percent, over post-closure conditions of 8,250 vehicles by 2015. The LOS would drop to F by 2009.

Under the Non-Aviation Alternative, the two-lane roadway segments of Santa Fe Drive between Shaffer and Buhach roads would deteriorate to LOS F during the peak hour by 2006. This condition would occur by 2010

Table 4.2-6. Peak-Hour Traffic Volumes and LOS on Key Roads - Non-Aviation Alternative

Road	Capacity (VPH)	Closure (1995) Traffic	LOS	2000 Traffic	LOS	2005 Traffic	LOS	2015 Traffic	LOS
Regional									
SH 99									
Buhach Rd Southeast	7,200	4,550	C	5,400	C	6,350	D	8,550	F
Buhach Rd Northwest	7,200	4,700	C	5,500	C	6,450	D	8,700	F
Local									
Santa Fe Dr, 2-lane segments									
Chestnut Ln-Shaffer Rd	1,800	600	A	800	A	1,050	A	1,350	C
Shaffer Rd-Wallace Rd	1,800	1,100	B	1,400	C	1,750	E	2,350	F
Wallace Rd-Buhach Rd	1,800	1,200	B	1,500	D	1,850	F	2,500	F
Santa Fe Dr, 4-lane segments									
Buhach Rd-Bellevue Rd	3,600	1,900	A	2,300	B	2,800	C	3,750	F
Bellevue Rd-Gate 2	3,600	1,650	A	2,150	A	3,050	D	3,900	F
Gate 2-Gurr Rd	3,600	1,250	A	1,700	A	2,450	B	3,200	D
Beachwood Dr-SH 59	3,600	1,800	A	2,250	B	3,000	D	4,050	F
West Olive Ave									
SH 59-R St	4,500	1,250	A	1,700	A	2,200	A	3,250	C
Buhach Rd									
Santa Fe Dr-Bellevue Rd	3,000	650	A	950	A	1,200	A	1,700	A
Bellevue Rd-Juniper Ave	3,000	500	A	750	A	1,100	A	1,500	A
Juniper Ave-SH 99	3,000	500	A	700	A	850	A	1,200	A
Bellevue Rd									
Santa Fe Dr-Buhach Rd	2,250	1,000	A	1,400	B	2,050	E	2,600	F
Buhach Rd-Castle Dr	3,000	1,400	A	1,850	B	2,450	D	3,300	F
Castle Dr-Shaffer Rd	3,000	1,600	A	2,050	B	2,550	D	3,450	F
Juniper Ave									
Buhach Rd-Shaffer Rd	3,000	350	A	550	A	750	A	1,000	A
Wallace Rd									
Gate 3-Santa Fe Dr	1,500	50	A	150	A	200	A	250	A

Note: Peak-hour traffic volumes include reuse-related and baseline (No-Action Alternative) volumes. All traffic volume figures are rounded to the nearest 50.

LOS = Level of Service.
SH = State Highway.
VPH = Vehicles per hour.

without reuse. Three four-lane segments of Santa Fe Drive between Buhach Road and SH 59 would operate at LOS F during the peak hour by 2014.

By 2012, the peak hour for all three segments of Bellevue Road between Santa Fe Drive and Shaffer Road would deteriorate to LOS F under the Non-Aviation Alternative. A 44-percent increase of 800 reuse-related vehicles over post-closure traffic of 1,800 vehicles would occur between Buhach Road and Santa Fe Drive by 2015.

The Non-Aviation Alternative assumes that existing on-base roads would be used during the construction period, and would be upgraded where local development plans dictate a need based on community standards for acceptable LOS.

Airspace/Air Traffic. Under this alternative, the airfield would be replaced with industrial/agricultural uses. Cessation of all air operations at Castle AFB would eliminate the need for all of the airspace/ATC associated with the VFR and IFR airfield traffic patterns, published instrument approach/ departure procedures, and the transitioning of aircraft between the air base terminal and the en route airspace system. The elimination of Castle AFB-related airspace requirements and air traffic operations would provide additional unconstrained airspace for the overall ATC environment in the ROI.

Air Transportation. With the exception of commercial passenger service impacts as described in the Proposed Action, no impact to air transportation under this alternative is anticipated.

Other Transportation Modes. The implementation of the Non-Aviation Alternative could increase ridership on Amtrak at Merced Station; however, the projected effects would be minimal.

Mitigation Measures. Improvements to Santa Fe Drive between SH 59 and Shaffer Road would be required before 2006. Before 2015, improvements to Santa Fe Drive between Buhach Road and SH 59 should be addressed. Improvements to Bellevue Road between Buhach and Shaffer roads would be required before 2012 to preclude some segments from dropping to LOS F. Suggested improvements could include widening of roadways, control of access, and intersection upgrades to raise the LOS to a level consistent with transportation planning criteria. An adequate on-site circulation system has the potential of distributing traffic evenly and therefore mitigating traffic impacts on some segments.

Other potential mitigation measures include TDM measures as described for the Proposed Action to encourage trip reductions and peak period modifications. With efficient use of TDM measures, the deterioration of some key segments to LOS F would be delayed by 1 to 3 years.

4.2.3.6 No-Action Alternative

Roadways. Under the No-Action Alternative, the expected population growth and development unrelated to reuse of Castle AFB would lead to traffic volume increases on local roadways through 2015. It is projected that traffic on the key local roads would increase in proportion to the area's population growth, minus the traffic generated by the current users of the base, plus the traffic generated by the OL. Therefore, a net growth rate of

3 percent per year was applied to traffic volumes on various road segments during the period of analysis.

Table 4.2-7 presents the projected peak-hour traffic on key roads and the associated LOS that would result under the No-Action Alternative. With Castle AFB closed and in caretaker status, afternoon peak-hour traffic volume is projected to be 8,250 vehicles on SH 99 at Buhach Road and 2,200 vehicles on the two-lane segment of Santa Fe Drive between Wallace and Buhach roads. These volumes would bring operating conditions on these segments to LOS F by 2010. All other key road segments would operate at LOS E or better during the period of analysis.

In the absence of any reuse of the base, on-base roads would no longer be used except by a 50-person OL team, which would use primarily the existing gates to the base for access.

4.2.3.7 Other Land Use Concepts. Transportation effects are discussed for each independent land use concept. The analysis considers the impact of the implementation of each of these plans in conjunction with the Proposed Action or alternatives. The net change in traffic generated is presented.

Federal Correctional Complex. The major traffic generators for this land use concept would be the 450 full-time employees, visitors, and service vehicles to the site. The federal correctional facilities would generate approximately 1,200 daily vehicle trips by 2015, which would result in a net reduction of 1,700 daily vehicle trips under the Proposed Action and 3,650 daily vehicle trips under the Commercial Aviation Alternative, but without affecting the LOS on key road segments.

Under all reuse alternatives, this land use concept would result in a net increase of 1,200 daily vehicle trips by 2015 without affecting the projected LOS on key road segments.

Under the Proposed Action and alternatives, the access points to this land use would be provided from the east, thus relieving other access points along Santa Fe Drive.

Private Recreational Facility. The major traffic generators for this land use would be recreational visitors and police groups. This recreational facility would generate approximately 460 daily vehicle trips by 2015. In combination with the Proposed Action, this land use would result in a net reduction of 2,450 daily vehicle trips by 2015. In combination with the Commercial Aviation Alternative, this reuse would result in a net reduction of 2,000 daily trips by 2015. Under the other alternatives, there would be a net increase of 460 daily vehicle trips by 2015.

Table 4.2-7. Peak-Hour Traffic Volumes and LOS on Key Roads - No-Action Alternative

Road	Capacity (VPH)	Closure (1995) Traffic	LOS	2000 Traffic	LOS	2005 Traffic	LOS	2015 Traffic	LOS
Regional									
SH 99									
Buhach Rd Southeast	7,200	4,550	C	5,300	C	6,150	D	8,250	F
Buhach Rd Northwest	7,200	4,700	C	5,450	C	6,300	D	8,450	F
Local									
Santa Fe Dr, 2-lane segments									
Chestnut Ln-Shaffer Rd	1,800	600	A	700	A	850	A	1,150	B
Shaffer Rd-Wallace Rd	1,800	1,100	B	1,300	C	1,500	D	2,000	F
Wallace Rd-Buhach Rd	1,800	1,200	B	1,400	C	1,650	E	2,200	F
Santa Fe Dr, 4-lane segments									
Buhach Rd-Bellevue Rd	3,600	1,900	A	2,200	B	2,550	C	3,450	E
Bellevue Rd-Gate 2	3,600	1,650	A	1,900	A	2,200	B	2,950	D
Gate 2-Gurr Rd	3,600	1,250	A	1,450	A	1,650	A	2,250	B
Beachwood Dr-SH 59	3,600	1,800	A	2,050	A	2,400	B	3,250	D
West Olive Ave									
SH 59-R St	4,500	1,250	A	1,550	A	1,900	A	2,800	B
Buhach Rd									
Santa Fe Dr-Bellevue Rd	3,000	650	A	750	A	900	A	1,200	A
Bellevue Rd-Juniper Ave	3,000	500	A	550	A	650	A	900	A
Juniper Ave-SH 99	3,000	500	A	550	A	650	A	900	A
Bellevue Rd									
Santa Fe Dr-Buhach Rd	2,250	1,000	A	1,150	A	1,350	A	1,800	C
Buhach Rd-Castle Dr	3,000	1,400	A	1,600	A	1,900	B	2,550	D
Castle Dr-Shaffer Rd	3,000	1,600	A	1,850	B	2,150	C	2,900	E
Juniper Ave									
Buhach Rd-Shaffer Rd	3,000	350	A	400	A	500	A	650	A
Wallace Rd									
Gate 3-Santa Fe Dr	1,500	50	A	100	A	100	A	100	A

Note: All traffic volume figures are rounded to the nearest 50.
LOS = Level of Service.
SH = State Highway.
VPH = Vehicles per hour.

4.2.4 Utilities

Direct and indirect changes in future utility demand for the Proposed Action and each alternative were estimated based on per capita preclosure average daily use on Castle AFB and in each of the nearby communities in the ROI. These per capita rates were applied to projections of numbers of future residents and employees associated with the Proposed Action and each of the alternatives. Table 4.2-8 shows the projected changes in utility demand for 5, 10, and 20 years after closure. The figures shown for forecasted ROI demand also represent the No-Action Alternative and generally reflect the change expected in utility usage in the area without redevelopment of the base, and are estimated based on projected changes in population and preclosure per capita use. The overall population projections for the ROI utilities indicate a net increase of approximately 130 percent from 1995 to 2015 under the No-Action Alternative, and this increase is reflected in the utility projections for that alternative. The utility projections for the Proposed Action and alternatives reflect the growth anticipated due to base reuse. Effects of reuse on utility systems were assessed by comparing projected demand under each reuse alternative to projected demand under the No-Action Alternative for each period of analysis (2000, 2005, 2015). On-site utility demands were estimated by applying use rates to appropriate units of land uses.

With or without the Proposed Action and alternatives, major infrastructure improvements and new supply sources in the ROI would be required as a result of non-site-related population growth. Also, under any reuse alternative, changes to the on-site water and wastewater systems, solid waste disposal, and the distribution systems for electricity and natural gas would be required. Additional utility corridors would likely be required on site, and new metered service may be needed at existing facilities. The following assumptions were made in the analysis of potential effects on utilities:

- The site would be serviced by local utility providers.
- The existing distribution/collection systems would be available in their current condition for reuse.
- Wells on base would be available in the short term to provide water for reuse activities.

4.2.4.1 Proposed Action

Water Demand. Water consumption in the ROI would increase from No-Action Alternative projections by 1.41 MGD under the Proposed Action, increasing total demand in the ROI to 53.89 MGD in 2015. The Proposed Action would create an on-site water demand of 0.91 MGD by 2015; over one-third of this demand would be needed for residential land use and over one-third for landscape irrigation. This demand would be less than the 1.34 MGD on-base demand in 1990, and could be met by on-base wells.

Increases in ROI water demand, resulting primarily from non-site-related population growth, would require major infrastructure improvements and new supply sources in the ROI. Without the Proposed Action, these improvements would still be required before 2015.

The availability and quality of groundwater and other water resource issues are addressed in Section 4.4.2, Water Resources.

Table 4.2-8. Total Projected Utility Demand in ROI

	2000	Percent Increase	2005	Percent Increase	2015	Percent Increase
Water Consumption (MGD)						
No-Action[a]	28.34	---	35.34	---	52.48	---
Proposed Action	29.13	2.8	36.50	3.3	53.89	2.7
Castle Aviation Center	29.82	5.2	37.50	6.1	54.82	4.5
Commercial Aviation	28.71	1.3	36.08	2.1	53.86	2.6
Aviation with Mixed Use	28.80	1.6	36.09	2.1	53.89	2.7
Non-Aviation	28.59	0.9	36.06	2.0	53.66	2.2
Wastewater Treatment (MGD)						
No-Action[a]	12.13	---	15.15	---	22.55	---
Proposed Action	12.46	2.7	15.64	3.2	23.14	2.6
Castle Aviation Center	12.76	5.2	16.10	6.3	23.57	4.5
Commercial Aviation	12.26	1.1	15.43	1.8	23.10	2.4
Aviation with Mixed Use	12.31	1.5	15.45	2.0	23.13	2.6
Non-Aviation	12.21	0.7	15.44	1.9	23.05	2.2
Solid Waste Disposal (tons/day)						
No-Action[a]	683	---	838	---	1,231	---
Proposed Action	704	3	866	3	1,263	3
Castle Aviation Center	721	5	887	6	1,282	4
Commercial Aviation	700	2	863	3	1,269	3
Aviation with Mixed Use	693	1	858	2	1,265	3
Non-Aviation	686	0	851	2	1,257	2
Electricity Consumption (MWH/day)						
No-Action[a]	1,360.5	---	1,692.0	---	2,503.1	---
Proposed Action	1,399.4	2.9	1,765.5	4.3	2,597.8	3.8
Castle Aviation Center	1,439.7	5.8	1,818.0	7.4	2,638.7	5.4
Commercial Aviation	1,373.3	0.9	1,738.2	2.7	2,613.8	4.4
Aviation with Mixed Use	1,376.6	1.2	1,736.2	2.6	2,615.8	4.5
Non-Aviation	1,362.4	0.1	1,737.2	2.7	2,600.4	3.9
Natural Gas Consumption (thousand therms/day)						
No-Action[a]	93.5	---	116.6	---	173.2	---
Proposed Action	95.7	2.4	120.2	3.1	177.8	2.7
Castle Aviation Center	97.8	4.6	123.1	5.6	180.3	4.1
Commercial Aviation	94.4	1.0	119.1	2.1	178.5	3.1
Aviation with Mixed Use	94.6	1.2	118.9	2.0	178.4	3.0
Non-Aviation	93.7	0.2	118.7	1.8	177.3	2.4

Notes: Values for Proposed Action and reuse alternatives represent total projected demand in the ROI.
(a) Represents total demand forecasted for the ROI for the years indicated, based on projected changes in population and 1990 per capita use, and data from local utility purveyors.
MGD = Million gallons per day.
MWH = Megawatt-hours per day.
ROI = Region of Influence.

Wastewater. Under the Proposed Action, wastewater production in the ROI would increase from No-Action Alternative projections by 0.59 MGD by 2015, to a total of 23.14 MGD. By 2007, the total ROI wastewater production with reuse would exceed the 17.40 MGD total treatment capacity in the ROI (including Merced, Atwater, Franklin/Beachwood and the base WWTP). Most of this increase in wastewater production would be associated with baseline population growth in Merced, Atwater, and Winton. Without the Proposed Action, additional wastewater treatment capacity would be required in the ROI before 2008.

On-site wastewater generation would total 0.36 MGD in 2015, which is below the 0.53 MGD generated in 1990 and within the plant's 1 MGD capacity. Improvements to the existing base WWTP, if reused, would be required in order to obtain an NPDES permit and maintain compliance. Industrial users might be required to provide pretreatment of industrial wastewater. The connection of the base sewerage system to the ARWTP has been determined to be feasible (Nolte and Associates, 1992).

Solid Waste. The amount of nonhazardous solid waste generated in the ROI would increase from No-Action Alternative projections by 33 tons/day to 1,263 tons/day in 2015. On-site solid waste generated would account for 15 tons/day. This is an increase of approximately 3 percent over the No-Action Alternative. Assuming that the state of California requires an 8-year landfill capacity and that 20 percent of the nonhazardous solid waste be recycled, the project would reduce the life of existing landfills approximately 3 months.

Energy

Electricity. Electricity consumption in the ROI under the Proposed Action would increase by 94.7 MWH/day from No-Action Alternative projections for 2015, to a total of 2,597.8 MWH/day. The future on-site electricity demand for the Proposed Action would amount to 91.15 MWH/day in 2015, less than the 1990 base demand of 148 MWH/day and within the capacity of the on-base system. These average demands account for the airfield and exterior lighting, water and wastewater pumping, and some incidental loads.

With or without the Proposed Action, the increase in electricity demand in the ROI primarily resulting from non-site-related population growth, would require major infrastructure improvements before 2015. PG&E has adequate capacity to supply the projected demands.

Natural Gas. In the ROI, natural gas consumption under the Proposed Action would increase from No-Action Alternative projections by 4,600 therms/day to a total of 177,800 therms/day by 2015. On-site demand would account for 2,886 therms/day. PG&E has adequate capacity to supply these demands.

With or without the Proposed Action, the increase in natural gas demand, resulting primarily from non-site-related population growth, would require major infrastructure improvements in the ROI before 2015.

Mitigation Measures. As no adverse impacts are anticipated to water, natural gas, or electricity, no mitigation would be necessary for these utilities. Mitigation measures would be needed to address industrial pretreatment of wastewater generated by future industrial and commercial reuses of the site. The type(s) and extent of mitigation measures cannot be specified at the present time because they would be dependent on the chemical and physical characteristics of the wastewater. New users would also be required to obtain discharge permits from the Central Valley Regional Water Quality Control Board. Recycling and/or reuse of inert demolition/construction wastes such as wood, metals, concrete, and asphalt would decrease any impact on landfills.

4.2.4.2 Castle Aviation Center Alternative

Water Demand. Water consumption in the ROI would increase from No-Action Alternative projections by an average of 2.34 MGD under the Castle Aviation Center Alternative, increasing total demand in the ROI to 54.82 MGD by 2015. This alternative would create an on-site water demand of 1.29 MGD by 2015; about 56 percent of this demand would be needed for residential land use and about 22 percent for landscape irrigation. This on-site demand would be comparable to the 1.34 MGD on-base demand in 1990 and could be met by on-base wells.

Increases in water demand would require major infrastructure improvements and new supply sources in the ROI, resulting primarily from non-site-related population growth. Without this alternative, these improvements would be required before 2015.

Wastewater. Under the Castle Aviation Center Alternative, wastewater production in the ROI would increase from No-Action Alternative projections by 1.02 MGD by 2015, to a total of 23.57 MGD. Shortly before 2007, the total ROI wastewater production with reuse would exceed the 17.40 MGD total treatment capacity in the ROI (including Merced, Atwater, Franklin/Beachwood and the base WWTP). Most of the increase in wastewater production would be associated with baseline population growth in the Merced, Atwater, and Winton areas. Without this alternative, additional wastewater treatment capacity would be required in the ROI by 2008.

On-site wastewater generation would total 0.68 MGD in 2015, which is higher than the 0.53 MGD generated in 1990, but within the 1 MGD capacity of the base WWTP. Necessary improvements and compliance requirements would be similar to those described under the Proposed Action.

Solid Waste. The amount of nonhazardous solid waste generated in the ROI would increase from the No-Action Alternative projections by 51 tons/day to 1,282 tons/day in 2015. On-site solid waste generated would account for 23 tons/day. This is an increase of approximately 4 percent over the No-Action Alternative. Assuming that the state of California requires an 8-year landfill capacity and that 20 percent of the nonhazardous solid waste be recycled, the project would reduce the life of existing landfills approximately 4 months.

Energy

Electricity. Electricity consumption in the ROI under the Castle Aviation Center Alternative would increase by 135.6 MWH/day from No-Action Alternative projections for 2015, to a total of 2,638.7 MWH/day. The future on-site electricity demand for the Castle Aviation Center Alternative would amount to 102.6 MWH/day in 2015, less than the 1990 base demand of 148 MWH/day and within the capacity of the on-base system. These average demands account for the airfield and exterior lighting, water and wastewater pumping, and some incidental loads.

With or without the Castle Aviation Center Alternative, the increase in electricity demand, resulting primarily from non-site-related population growth, would require major infrastructure improvements in the ROI before 2015. PG&E has adequate capacity to supply the projected demands.

Natural Gas. In the ROI, natural gas consumption under the Castle Aviation Center Alternative would increase from No-Action Alternative projections by 7,100 therms/day to a total of 180,300 therms/day by 2015. On-site demand would account for 3,281 therms/day. PG&E has adequate capacity to supply these demands.

With or without the Castle Aviation Center Alternative, the increase in natural gas demand, resulting primarily from non-site-related population growth, would require major infrastructure improvements in the ROI before 2015.

Mitigation Measures. Mitigation measures would be the same as those described for the Proposed action.

4.2.4.3 Commercial Aviation Alternative

Water Demand. Water consumption in the ROI would increase from No-Action Alternative projections by an average of 1.38 MGD under the Commercial Aviation Alternative, increasing total demand in the ROI to 53.86 MGD. This alternative would create an on-site water demand of 1.04 MGD by 2015; a little more than half of this demand would be needed for residential land use and about one-quarter for landscape irrigation. This demand would be less than the 1.34 MGD on-base demand in 1990, and could be met by on-base wells.

Increases in water demand would require major infrastructure improvements and new supply sources in the ROI, resulting primarily from non-site-related population growth. Without this alternative, these improvements would still be required before 2015.

Wastewater. Under the Commercial Aviation Alternative, wastewater production in the ROI would increase from No-Action Alternative projections by 0.55 MGD by 2015, to a total of 23.10 MGD. By mid-2007, the total ROI wastewater production with reuse would exceed the 17.40 MGD total treatment capacity in the ROI (including Merced, Atwater, Franklin/ Beachwood and the base WWTP). Most of this increase in wastewater production would be associated with baseline population growth in the Merced, Atwater, and Winton areas. Without this alternative, additional wastewater treatment capacity would be required in the ROI before 2008.

On-site wastewater generation would total 0.50 MGD in 2015, which is comparable to the 0.53 MGD generated in 1990 and within the 1 MGD capacity of the base WWTP. Necessary improvements and compliance requirements would be similar to that described under the Proposed Action.

Solid Waste. The amount of nonhazardous solid waste generated in the ROI would increase from No-Action Alternative projections by 38 tons/day to 1,269 tons/day in 2015. On-site solid waste generated would account for 20 tons/day. This is an increase of approximately 3 percent over the No-Action Alternative. Assuming that the state of California requires an 8-year landfill capacity and that 20 percent of the nonhazardous solid waste be recycled, the project would reduce the life of existing landfills approximately 3 months.

Energy

Electricity. Electricity consumption in the ROI under the Commercial Aviation Alternative would increase by 110.7 MWH/day from No-Action Alternative projections for 2015, to a total of 2,613.8 MWH/day. The future on-site electricity demand for this alternative would amount to 120.1 MWH/day, within the capacity of the on-base system. These average demands account for the airfield and exterior lighting, water and wastewater pumping, and some incidental loads.

With or without the Commercial Aviation Alternative, the increase in electricity demand, resulting primarily from non-site-related population growth, would require major infrastructure improvements in the ROI before 2015. PG&E has adequate capacity to supply the projected demands.

Natural Gas. In the ROI, natural gas consumption under the Commercial Aviation Alternative would increase from No-Action Alternative projections by 5,300 therms/day to a total of 178,500 therms/day by 2015. On-site consumption would account for 4,440 therms/day. PG&E has adequate capacity to supply these demands.

With or without the Commercial Aviation Alternative, the increase in natural gas demand, resulting primarily from non-site-related population growth, would require major infrastructure improvements in the ROI before 2015.

Mitigation Measures. Mitigation measures would be the same as those described for the Proposed Action.

4.2.4.4 Aviation with Mixed Use Alternative

Water Demand. Water consumption in the ROI would increase from No-Action Alternative projections by an average of 1.41 MGD under the Aviation with Mixed Use Alternative, increasing total demand in the ROI to 53.89 MGD by 2015. This alternative would create an on-site water demand of 0.93 MGD by 2015; a little less than half of this demand would be needed for residential land use and about one-third for landscape irrigation. This demand would be less than the 1.34 MGD on-base demand in 1990, and could be met by on-base wells.

Increases in water demand would require major infrastructure improvements and new supply sources in the ROI, resulting primarily from non-site-related population growth. Without this alternative, these improvements would still be required before 2015.

The availability and quality of groundwater and other water supply issues are addressed in Section 4.4.2, Water Resources.

Wastewater. Under the Aviation with Mixed Use Alternative, wastewater production in the ROI would increase from No-Action Alternative projections by 0.58 MGD by 2015, to a total of 23.13 MGD. By mid-2008, the total ROI wastewater production with reuse would exceed the 17.40 MGD total treatment capacity in the ROI (including Merced, Atwater, Franklin/ Beachwood, and the base WWTP). Most of this increase in wastewater production would be associated with baseline population growth in the Merced, Atwater, and Winton areas. Without this alternative, additional wastewater treatment capacity would be required in the ROI before 2008.

On-site wastewater generation would total 0.37 MGD in 2015, which is below the 0.53 MGD generated in 1990 and within the 1 MGD capacity of the base WWTP. Necessary improvements and compliance requirements would be similar to those described under the Proposed Action.

Solid Waste. The amount of nonhazardous solid waste generated in the ROI would increase from the No-Action Alternative projections by 34 tons/day to 1,265 tons/day in 2015. On-site solid waste generated would account for 15 tons/day. This is an increase of approximately 3 percent over the No-Action Alternative. Assuming that the state of California requires an 8-year landfill capacity and that 20 percent of the nonhazardous solid waste be recycled, the project would reduce the life of existing landfills approximately 3 months.

Energy

Electricity. Electricity consumption in the ROI under the Aviation with Mixed Use Alternative would increase by 112.7 MWH/day from No-Action Alternative projections for 2015, to a total of 2,61[illegible].8 MWH/day. The future on-site electricity demand for this alternative would amount to 104.5 MWH/day in 2015, less than the 1990 base demand of 148 MWH/day and within the capacity of the on-base system. These average demands account for the airfield and exterior lighting, water and wastewater pumping, and some incidental loads.

With or without the Aviation with Mixed Use Alternative, the increase in electricity demand, resulting primarily from non-site-related population growth, would require major infrastructure improvements in the ROI before 2015. PG&E has adequate capacity to supply the projected demands.

Natural Gas. In the ROI, natural gas consumption under the Aviation with Mixed Use Alternative would increase from No-Action Alternative projections by 5,200 therms/day to a total of 178,400 therms/day by 2015. On-site demand would account for 3,183 therms/day. PG&E has adequate capacity to supply these demands.

With or without the Aviation with Mixed Use Alternative, the increase in natural gas demand, resulting primarily from non-site-related population growth, would require major infrastructure improvements in the ROI before 2015.

Mitigation Measures. Mitigation measures would be the same as those described for the Proposed Action.

4.2.4.5 Non-Aviation Alternative

Water Demand. Water consumption in the ROI would increase from No-Action Alternative projections by an average of 1.18 MGD under this alternative, increasing total demand in the ROI to 53.66 MGD by 2015. The Non-Aviation Alternative would create an on-site water demand of 1.02 MGD by 2015; about half of this demand would be needed for residential land use and over one-quarter for landscape irrigation. This demand would be less than the 1.34 MGD on-base demand in 1990 and could be met by on-base wells.

Increases in water demand would require major infrastructure improvements and new supply sources in the ROI, resulting primarily from non-site-related population growth. Without the Non-Aviation Alternative, these improvements would still be required before 2015.

The availability and quality of groundwater and other water supply issues are addressed in Section 4.4.2, Water Resources.

Wastewater. Under the Non-Aviation Alternative, wastewater production in the ROI would increase from No-Action Alternative projections by 0.50 MGD by 2015, to a total of 23.05 MGD by mid-2008. The total ROI wastewater production with reuse would exceed the 17.40 MGD total treatment capacity in the ROI (including Merced, Atwater, Franklin/Beachwood and the base WWTP). Most of this increase in wastewater production would be associated with baseline population growth in the Merced, Atwater, and Winton areas. Without the Non-Aviation Alternative, additional wastewater treatment capacity would be required in the ROI by 2008.

On-site wastewater generation would total 0.41 MGD in 2015, which is below the 0.53 MGD generated in 1990 and within the 1 MGD capacity of the base WWTP. Necessary improvements and compliance requirements would be similar to those described under the Proposed Action.

Solid Waste. The amount of nonhazardous solid waste generated in the ROI would increase from the No-Action Alternative projections by 26 tons/day to 1,257 tons/day in 2015. On-site solid waste generated would account for 14 tons/day. This is an increase of approximately 2 percent over the No-Action Alternative. Assuming that the state of California requires an 8-year landfill capacity and that 20 percent of the nonhazardous solid waste be recycled, the project would reduce the life of existing landfills approximately 2 months.

Energy

Electricity. Electricity consumption in the ROI under the Non-Aviation Alternative would increase by 97.3 MWH/day from No-Action Alternative projections for 2015 to a total of 2,600.4 MWH/day. The future on-site electricity demand for the Non-Aviation Alternative would amount to 105.3 MWH/day in 2015, less than the 1990 base demand of 148 MWH/day and within the capacity of the on-base system. These average demands account for exterior lighting, water and wastewater pumping, and some incidental loads.

With or without the Non-Aviation Alternative, the increase in electricity demand, resulting primarily from non-site-related population growth, would require major infrastructure improvements in the ROI before 2015. PG&E has adequate capacity to supply the projected demands.

Natural Gas. In the ROI, natural gas consumption under the Non-Aviation Alternative would increase from No-Action Alternative projections by 4,100 therms/day to a total of 177,300 therms/day by 2015. On-site demand would account for 3,263 therms/day. PG&E has adequate capacity to supply these demands.

With or without the Non-Aviation Alternative, the increase in natural gas demand, resulting primarily from non-site-related population growth, would require major infrastructure improvements in the ROI before 2015.

Mitigation Measures. Mitigation measures would be the same as those described for the Proposed Action.

4.2.4.6 No-Action Alternative. Under the No-Action Alternative, there would be no reuse of Castle AFB property. An OL team of approximately 50 personnel would maintain the facilities and grounds. Utility usage on site would be minimal in comparison to the Proposed Action and other alternatives. The disuse of utility systems, however, could result in their degradation over the long term.

In the absence of any reuse actions at Castle AFB, post-closure utility demand in the study area is projected to change in relation to population. The No-Action Alternative utility usage (see Table 4.2-8) was forecast using the preclosure 1990 per capita demand factors determined from consumption figures obtained from the utility providers in the study area.

Mitigation Measures. Under the No-Action Alternative, no adverse impacts are anticipated to water, wastewater, solid waste, electricity, or natural gas utilities; therefore, no mitigation measures would be necessary.

4.2.4.7 Other Land Use Concepts. Estimated changes in utility demand for each independent land use concept, and resulting net changes in utility demand in combination with the Proposed Action and alternatives, are discussed below.

Federal Correctional Complex. By 2015, this independent land use would result in utility demands of 0.70 MGD for water, 0.60 MGD for wastewater, 6.4 tons/day for solid waste, 85 MWH/day for electricity, and 1,000 therms/day for natural gas. In combination with any of the alternatives, the federal correctional facilities would result in net increases in utility consumption. Impacts would be similar to those described for each alternative. If implemented with the Castle Aviation Center Alternative, combined wastewater production would exceed the capacity of the base WWTP. The federal correctional complex would require new infrastructure for water supply, wastewater collection and disposal, and electricity and natural gas supply.

Private Recreational Facility. By 2015, this independent land use would result in small utility demands of 0.03 MGD for water, 0.01 MGD for wastewater, 0.39 tons/day for solid waste, 0.75 MWH/day for electricity, and 19 therms/day for natural gas. In combination with any of the alternatives, this land use would result in a small net reduction in water demand, and very small increases in wastewater, solid waste, electricity, and natural gas. New infrastructure for utility systems would be required to provide adequate service to this land use concept.

4.3 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

This section addresses the potential impacts of existing contaminated sites on the various reuse options, and the potential for environmental impacts caused by hazardous materials/waste management practices associated with the reuse options. Hazardous materials/wastes, IRP sites, storage tanks, asbestos, pesticides, PCBs, radon, medical/biohazardous wastes, ordnance, and lead will be discussed within this section.

The U.S. Air Force is committed to the remediation of all contamination at Castle AFB due to past Air Force activities. The OL will remain after base closure to coordinate remediation activities. Delays or restrictions in disposal and reuse of property may occur due to the extent of contamination and the results of both the risk assessment and remedial designs determined for contaminated sites. Examples of conditions resulting in land use restrictions would be the capping of landfills and the constraints from methane generation and cap integrity, as well as the location of long-term monitoring wells. These conditions would have to be considered in the layout of future development. Options to recipients include creation of parks, greenbelts, or open spaces over these areas.

Regulatory standards and guidelines have been applied in determining the impacts caused by hazardous materials/waste. The following criteria were used to identify potential impacts:

- Accidental release of friable asbestos during the demolition or modification of a structure

- Generation of 100 kilograms (or more) of hazardous waste or 1 kilogram (or more) of an acutely (California Health and Safety Code Chapter 6.95, Section 25532) hazardous waste in a calendar month, resulting in increased regulatory requirements

- New operational requirements or service for all UST and tank systems

- Any spill or release of a reportable quantity of a hazardous material

- Manufacturing of any compound that requires notifying the pertinent regulatory agency

- Exposure of the environment or public to any hazardous material through release or disposal practices.

4.3.1 Proposed Action

4.3.1.1 Hazardous Materials Management. The hazardous materials likely to be utilized for activities occupying the proposed land use areas are identified in Table 4.3-1. The types of hazardous materials used would be similar to those used by the base prior to and at closure. The quantity of hazardous materials utilized under the Proposed Action would increase over the baseline conditions at closure. The specific chemical compositions and exact use rates associated with the proposed reuse are not known.

If the Proposed Action were implemented, each separate organization would be responsible for the management of hazardous materials according to applicable regulations. Additionally, each organization would have to comply with SARA, Section 311, Title III, which requires that local communities be informed of the use of hazardous materials. Management of hazardous materials would be the same as discussed under the closure baseline (Section 3.3.1) and, if properly managed under all applicable regulations, these materials would not cause any unacceptable impacts.

4.3.1.2 Hazardous Waste Management. Under the Proposed Action, hazardous wastes would be generated from hazardous materials and the processes that utilize those materials. Such wastes would include fuels, POL, solvents, paints, thinners, heavy metals, and batteries.

Upon disposal of parcels, hazardous wastes would fall under the control of the recipients. Once the responsibilities of hazardous waste management are allocated to individual organizations, proficiency with those materials and spill responses is required by OSHA regulations (29 CFR). Mutual aid agreements with surrounding communities may require additional scrutiny and training of emergency staff.

The presence of numerous independent owners/operators on the base would change the regulatory requirements and probably increase the regulatory burden relative to hazardous waste management. Activities associated with the Proposed Action would lead to an increase in the amount of hazardous waste generated compared to the closure baseline. However, hazardous

Table 4.3-1. Hazardous Material Usage - Proposed Action

Land Use	Operation Process	Hazardous Materials
Airfield	Aircraft refueling; utilization of clear zones, runways, and taxiways, corporate and private aviation facilities; aircraft parking	Aviation fuels, heating oils, hydraulic fluids, POL
Aviation support	Operations associated with aircraft maintenance, air transportation-related industry and warehousing, law enforcement, administrative offices, other governmental administrative services	Corrosives, cyanides, degreasers, fuels, glycols, heating oils, heavy metals, hydraulic fluids, ignitibles, paints, pesticides, POL, reactives, solvents, thinners
Industrial	Activities associated with light industry and manufacturing, research and development, warehousing, and corporate offices	Aerosols, catalysts, corrosives, fuels, heavy metals, heating oils, ignitibles, pesticides, POL, solvents
Institutional (medical)	Hospital/clinic, hospital administration, rehabilitation facilities, X-ray unit, patient, family, and staff housing	Heavy metals, household chemicals, pesticides, pharmaceuticals, radiological sources
Institutional (educational)	Public education, higher education, training facilities, vocational schools	Cleaners, corrosives, fuels, heating oils, household chemicals, ignitibles, paints, pesticides, POL, solvents, thinners
Commercial	Activities associated with offices, warehousing, retail, service industries, restaurants	Aerosols, cleaners, corrosives, fuels, heating oils, household chemicals, ignitibles, paints, pesticides, POL, solvents, thinners
Residential	Utilization/maintenance of residential units, swimming pools, landscaping	Chlorine, fertilizers, fuels, household chemicals, oils, pesticides
Public facilities/ recreation	Maintenance of existing recreational facilities including aircraft museum, sports complex, swimming pools, and other recreational facilities	Aerosols, chlorine, cleaners, fertilizers, fuels, heating oils, paints, pesticides, POL, solvents, thinners
Agriculture	Equipment maintenance, weed and pest control	Fertilizers, fuels, pesticides, POL

POL = Petroleum, oil, and lubricants.

waste management by all independent owners in accordance with all applicable regulations would preclude any unacceptable impacts.

4.3.1.3 Installation Restoration Program Sites. The U.S. Air Force is committed to continue IRP activities under DERP, CERCLA, and the FFA among the U.S. Air Force, U.S. EPA, and California EPA. IRP activities will be coordinated by the OL and the aforementioned agencies.

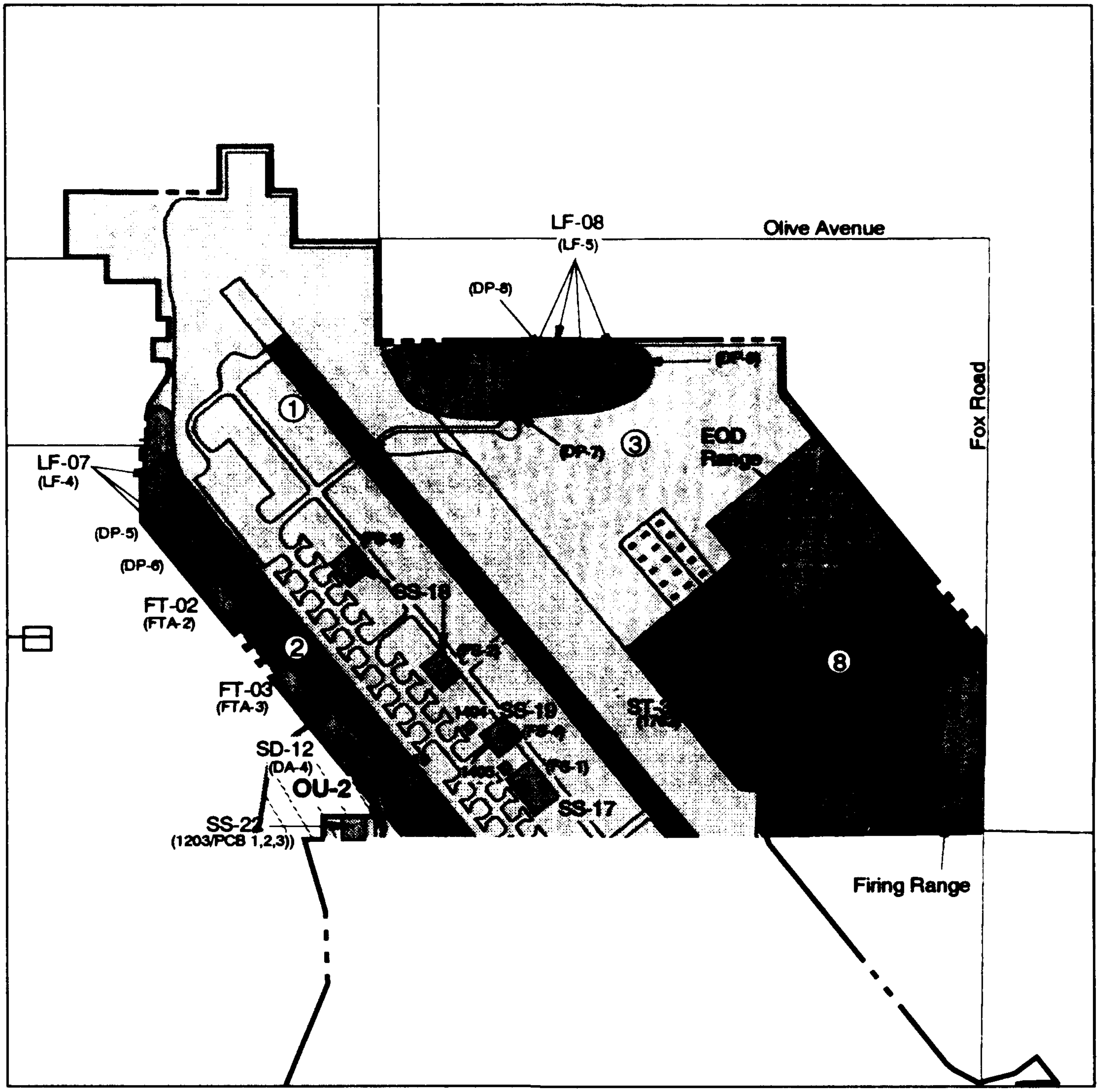
The type of development that is appropriate for property adjacent to or over an IRP site may be limited by the risk to human health and the environment posed by contaminants at the site. For example, residential development over an IRP landfill is generally not appropriate. The risk posed by IRP sites is measured by a risk assessment that analyzes the types of substances present at a site and the potential means by which the public and the environment may be exposed to them. An ROD, or blueprint for remediating the IRP site, considers the results of the risk assessment, which is included in the RI/FS stage of the IRP process, and the geographical extent of the contamination.

Disposal and reuse of some Castle AFB properties may be delayed or limited by investigations at potential sites of contamination, by the extent and type of contamination at listed sites, and by current and future IRP remediation activities (Figures 4.3-1a and 4.3-1b). Based on the results of IRP investigations, the Air Force may, where appropriate, place limits on reuse through deed restrictions on conveyances and use restrictions on leases. The Air Force may also retain right of access to other properties to inspect monitoring wells or conduct other remedial activities.

The listed IRP sites and potential sites of contamination within each land use area for the Proposed Action are discussed below and summarized in Table 4.3-2.

Airfield. Listed IRP sites within this land use area include small portions of landfills 7 and 8 (LF-07 and LF-08) in the northwest and northeast corners of the airfield; remediation of these sites should not impact flight operations. Fuel spill sites SD-10, SS-17, and SS-18 in the central parking apron areas should not impact aircraft parking or taxiway access. However, remediation efforts at site SS-19 may result in the temporary closure of Taxiway 9.

Twelve potential sites of contamination are within the airfield land use area. These sites include six stained areas, a former hazardous materials storage area, the JP-4 fuel hydrant system, and two flightline maintenance facilities (Buildings 1404 and 1405); these sites are located within the stub parking apron and the operational apron. The basewide storm drain system and sanitary sewer system are also located within this land use. Delays in property disposal and land use restriction may result from continued site



EXPLANATION

①	Airfield	⑤	Institutional (Educational)*	⑨	Agriculture*
②	Aviation Support	⑥	Commercial*	⑩	Vacant Land*
③	Industrial	⑦	Residential*		Listed IRP sites and potential sites of contamination (DOD ID numbers in smaller text)
④	Institutional (Medical)*	⑧	Public Facilities/ Recreation		Runway
					Base Boundary

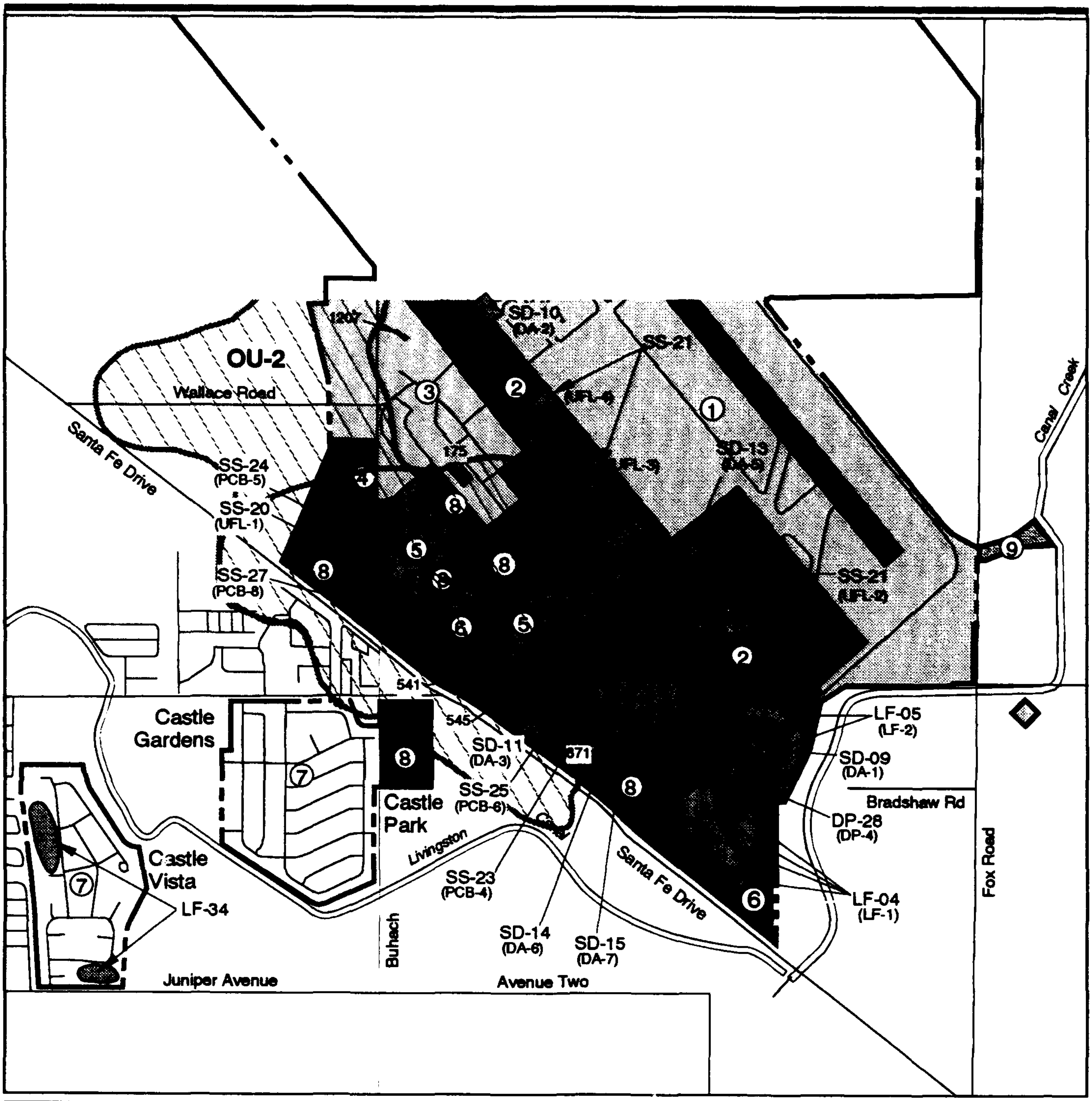
0 500 1000 2000 Feet

* This standard land use designation is not applicable to this figure.

IRP Sites-North Base Proposed Action

Note: Information is current as of October 19, 1993.

Figure 4.3-1a



EXPLANATION

1 Airfield

2 Aviation Support

3 Industrial

4 Institutional (Medical)

5 Institutional (Educational)

6 Commercial

7 Residential

8 Public Facilities/ Recreation

9 Agriculture

10 Vacant Land*

Listed IRP sites and potential sites of contamination (DOD ID numbers in smaller text)

Runway

Base Boundary

0 500 1000 2000 Feet

* This standard land use designation is not applicable to this figure.

IRP Sites-South Base Proposed Action

Note: Information is current as of October 19, 1993.

Figure 4.3-1b

Table 4.3-2. Listed IRP Sites and Potential Sites of Contamination within Land Use Areas - Proposed Action

Proposed Land Use	Listed IRP Sites	Potential Sites
Airfield	SD-10, SS-17, SS-18, SS-19, LF-07, LF-08,	Buildings 1404 and 1405, JP-4, fuel hydrant system, storage area B-4, sanitary sewer system, stain 39, stain 40, stain 41, stain 42, stain 43, stain 44, and storm drain system
Aviation support	Central Base TCE groundwater contamination, FT-02, FT-03, LF-04, LF-05, LF-07, SD-09, SD-10, SD-11, SD-12, SD-13, SD-14, SD-15, SD-16, SS-17, SS-21, SS-23, SS-25, DP-28, POL fuel tank farm, Wallace Road TCE groundwater contamination	Buildings 47, 51, 52, 53, 54, 55, 59, T61, T66, T67, 508, 917, 950, 951, 1253, 1260, 1266, 1314, 1319, 1324, 1325, 1335, 1344, 1350, 1529, 1532, 1541, 1560, 1562, 1571; disposal pit 5, disposal pit 6, hazardous waste storage area 4, industrial sewer system, JP-4 fuel hydrant system, storage area B-2, storage area B-3, sanitary sewer system, stain 38, storm drain system; SWMUs 4.16, 4.20, 4.38, 4.6
Industrial	Central Base TCE groundwater contamination, LF-08, SS-22, Wallace Road TCE groundwater contamination	Buildings 23, 175, 1201, 1204, 1205, 1206, 1207; disposal pit 7, disposal pit 8, disposal pit 9, EOD Range, PCB-9, sanitary sewer system, storm drain system
Institutional (medical)	Central Base TCE groundwater contamination, Wallace Road TCE groundwater contamination	Building 1182, sanitary sewer system, storm drain system
Institutional (educational)	Central Base TCE groundwater contamination, SS-27	Sanitary sewer system, storm drain system
Commercial	Central Base TCE groundwater contamination, LF-04, SS-20, SS-24	Buildings 84, T85, 325, 541, 545, 551, disposal pit 1, disposal pit 2, disposal pit 3, JP-4 fuel hydrant system; sanitary sewer system, storm drain system, SWMU 4.14
Residential	LF-34	Sanitary sewer system, storm drain system
Public facilities/recreation	Central Base TCE groundwater contamination, FT-01, LF-04, LF-06, SD-11, SS-25, SS-26, ST-32, Wallace Road TCE groundwater contamination	Buildings 871 and 1709, EOD Range, sanitary sewer system, small arms firing range, storm drain system
Agriculture	None	None

EOD = Explosive Ordnance Disposal.
IRP = Installation Restoration Program.
PCB = Polychlorinated biphenyl.
POL = Petroleum, oil, and lubricants.
SWMU = Solid Waste Management Unit.
TCE = Trichloroethylene.

investigations and remedial activities upon incorporation of these sites into the Castle IRP.

Aviation Support. The aviation support land use area contains 21 listed IRP sites and 44 potential sites of contamination.

Groundwater contamination beneath the southern and central aviation support land use areas is associated with the Central Base and Wallace Road TCE plumes. Remediation and long-term monitoring of this groundwater contamination could result in land use restrictions and delays in property redevelopment. Remediation activities associated with fire training facilities FT-02 and FT-03, as well as the POL fuel tank farm and numerous spill sites located throughout the aviation support land use zone, could also delay redevelopment. Remediation and long-term monitoring of landfills 4 and 5 (LF-04 and LF-05) in the south and LF-07 in the north could result in land-use restrictions as well as delays in reuse.

Potential sites of contamination in this land use include 33 facilities that utilized hazardous materials or generated hazardous wastes at some time during the life of the facility. Portions of the JP-4 fuel hydrant system, the sanitary and industrial sewer systems, and the storm drain system lie within this land use area, as well as a number of oil/water separators identified as Solid Waste Management Units (SWMUs). Incorporation of all or a portion of these potential sites may result in property disposal and redevelopment delays and land use restrictions.

Industrial. Four listed and 14 potential sites of contamination lie within the industrial land use area.

Remediation activities associated with landfill 8 (LF-08) in the northern portion of the base and Building SS-22 in the western portion could delay redevelopment. Land use restrictions and delays in reuse could also result from long-term monitoring and remediation activities associated with the Central Base and Wallace Road TCE groundwater contamination.

Land use restrictions and delays in property disposal and reuse may occur as a result of ongoing site investigation at the 14 potential sites of contamination associated with this land use. These sites include portions of the sanitary sewer and storm drain systems; the EOD Range; disposal pits 7, 8, and 9 within landfill 8 (LF-08); PCB spill site 9; and seven maintenance facilities that utilized or generated hazardous substances.

Institutional (Medical). Remediation and long-term monitoring activities associated with TCE groundwater contamination in the Central Base and Wallace Road areas could result in land use restrictions and delays in property redevelopment.

Investigations and future remediation activities of any portion of the sanitary sewer and storm drain systems, as well as the base hospital (Building 1182), may result in disposal delay and restricted land use.

Institutional (Educational). Land use restrictions and delays in redevelopment could occur due to remediation and long-term monitoring associated with the Central Base TCE groundwater contamination and remediation of site SS-27. Similar impacts may occur to potential sites of contamination as a result of remedial activities associated with portions of the sanitary sewer and storm drain systems that lie within this land use area.

Commercial. Four listed and 13 potential sites of contamination lie within this land use area. Remediation activities associated with spill sites SS-20 and SS-24 could delay redevelopment in the central cantonment area. Remediation of landfill 4 (LF-04) in the southern portion of the base could also delay redevelopment. Remediation and long-term monitoring activities associated with the Central Base TCE groundwater contamination could result in land use restrictions and delays in property redevelopment.

Land use restrictions and delays in property disposal may result from RIs and remediation activities associated with the potential sites of contamination within the commercial land use area. These potential sites include six facilities that may have utilized or generated hazardous materials or wastes; disposal pits 1, 2, and 3 within landfill 4 (LF-04); an oil/water separator (SWMU 4.14); and portions of the JP-4 fuel hydrant system, sanitary sewer system, and storm drain system.

Residential. Land use restrictions and delays in reuse could occur due to remediation and long-term monitoring associated with landfills A and B (site LF-34) in the off-base Castle Vista housing area.

Site investigations and remediation of the storm drain system may result in redevelopment delay or land use restrictions.

Public Facilities/Recreation. The public facilities/recreation land use area contains nine listed IRP sites and six potential sites of contamination. Remediation and long-term monitoring activities associated with the Central Base and Wallace Road TCE groundwater contamination could result in land use restrictions and delays in property redevelopment for the proposed recreational areas in the Central Base and Castle Park areas. Delays in redevelopment of proposed recreational areas in the southern portion of the base could occur due to remediation activities associated with sites LF-04 and SS-25; while remediation of sites FT-01, LF-06, and SS-26 could delay reuse in the eastern portion of the base.

Potential sites of contamination in the eastern portion of the base include Building 1709, the EOD Range, the small arms firing range, the sanitary sewer system, and the storm drain system. Building 871, in the southwest portion of the base, is also a potential site of contamination. Remediation activities associated with these sites may result in restricted land uses and delays in property disposal and redevelopment.

Determination of future base land uses will be, to a certain extent, dependent upon a regulatory review of the RD of the IRP sites. This review will identify current monitoring well locations and future land use limitations as a result of their presence. The regulatory review process would include notifying the FAA concerning the construction and locations of any monitoring wells within the airport boundary.

4.3.1.4 Storage Tanks. Flight and maintenance operations under the Proposed Action would require both aboveground tanks and USTs. Existing as well as new USTs and aboveground storage tanks required by the new owners/operators would be subject to all applicable federal, state, and local regulations. These regulations include provisions for acceptable leak detection methodologies, spill and overfill protection, cathodic protection, secondary containment for the tank systems including the piping, and liability insurance.

Any USTs and the portions of the underground fuel hydrant system that would not be used to support reuse activities will be closed in conformance with the appropriate federal, state, and local regulations. All oil/water separators will be pumped and cleaned prior to disposal. Aboveground fuel storage tanks that would not be utilized to support the reuse activities would be purged of fumes to preclude fire hazards. Storage tank recommendations and guidelines are provided under Article 79.11b of the Uniform Fire Code and under Chapters 3, 8, 30, and 329 of the National Fire Protection Association codes. The permanent closure of these tanks and any unused portions of the fuel hydrant system would be subject to the requirements of the Merced County Fire Department.

4.3.1.5 Asbestos. Existing structures with ACM may be renovated or demolished with reuse development. Such activities would be subject to all applicable federal, state, and local regulations to minimize potential risks to human health and the environment.

4.3.1.6 Pesticides. Pesticide usage associated with the Proposed Action would increase from amounts used under baseline conditions (caretaker status). Management practices would be subject to FIFRA and state regulations; therefore, no unacceptable impacts would result.

4.3.1.7 Polychlorinated Biphenyls. All Air Force-owned federally regulated PCB equipment and PCB-contaminated equipment as well as state-regulated PCB items, have been removed and properly disposed of.

4.3.1.8 Radon. Since all radon screening survey results were below the U.S. EPA's recommended mitigation level of 4 pCi/l, there would be no impact on reuse activities.

4.3.1.9 Medical/Biohazardous Waste. Biohazardous wastes generated with the reuse of the hospital would be subject to conformance with the state Medical Waste Management Act. The generation rates for waste products and disposal requirements would be similar to preclosure levels as a result of similar use of the facility. Wastes generated under this reuse alternative would not represent any unacceptable impacts if managed under all applicable regulations.

4.3.1.10 Ordnance. The EOD and grenade ranges will be cleared of unexploded ordnance, the EOD Range will be cleared to a depth of 3 feet, and the small arms firing range will be cleared of spent bullets prior to disposal. Additional testing will be conducted to determine the existence of contaminated soil. If present, these soils would be remediated prior to property disposal.

4.3.1.11 Lead. Base reuse may involve the occupation, demolition, or renovation of existing structures that may contain lead-based paints. Occupants of facilities constructed prior to or during 1978 would be advised that these facilities may contain lead-based paint. Demolition or renovation activities would be subject to all applicable federal, state, and local regulations to minimize potential risks to human health and the environment.

If the small arms range is reused, the earthen berms surrounding the range could become contaminated with lead from bullets. This would not create an impact to reuse and should not create any unacceptable impacts if the range is properly maintained and the lead bullets are removed on a regular basis.

4.3.1.12 Mitigation Measures. A cooperative planning body for hazardous materials and waste management could be established with the support of the new individual operators on the base. Establishment of such a body could reduce the costs of environmental compliance training, health and safety training, and hazardous waste management, and could increase recycling, minimize waste, and assist in mutual spill responses.

The scheduling of collection days for hazardous household wastes, such as waste paints, pesticides, and cleaners, could mitigate publicly owned treatment works and storm water discharge concerns. Articles in the local papers and classes offered by community educational programs could increase public awareness on recycling, appropriate use of pesticides, waste minimization, and waste disposal.

Not all IRP sites require remediation; however, all of them must be addressed and properly closed out. Active coordination between the OL and new construction planning agencies could mitigate potential problems. The presence of IRP sites may limit certain land uses within overlying areas; options could include reuse as open space, greenbelt, or parks. Current and future facilities utilized for pump and treat remediation of groundwater contamination would require the Air Force to retain access rights-of-way.

Use of USTs and any portions of the hydrant fueling system that would remain in service would have to be coordinated with planning agencies to preclude construction of facilities that would endanger the integrity of the tanks or piping systems.

Coordination of asbestos removal or management in conjunction with construction or renovation activities could mitigate potential impacts. Compliance with NESHAP would mitigate and preclude asbestos exposures.

Coordinating removal of lead-based paint by preparation of a paint abatement and disposal plan prior to facility demolition or renovation, as well as use of lead-free paint and proper painting practices, would mitigate potential impacts and assure compliance with applicable federal standards.

4.3.2 Castle Aviation Center Alternative

4.3.2.1 Hazardous Materials Management. The types of hazardous materials utilized under the Castle Aviation Center Alternative are provided in Table 4.3-3, and would be similar to those materials utilized under the Proposed Action. The quantities utilized under this alternative would increase over the amounts utilized at closure due to the establishment of general aviation and aviation support activities and industrial, commercial, and residential land uses, as well as educational and medical institutions. Quantities would be less than amounts estimated for the Proposed Action due to the reduction of proposed flight operations. Management of these materials under all applicable regulations would not create any unacceptable impacts.

4.3.2.2 Hazardous Waste Management. Under the Castle Aviation Center Alternative, hazardous wastes would be generated from the hazardous materials and processes utilized and would consist of waste fuels, POL, solvents, heavy metals, corrosives, paints, and thinners. The amount of hazardous waste generated would be greater than that produced at closure due to an increase in reuse activities. Quantities would be less than those estimated for the Proposed Action due to the reduced level of proposed flight operations. The number of independent owners/operators associated

Table 4.3-3. Hazardous Material Usage by Land Use - Castle Aviation Center Alternative

Land Use	Operation Process	Hazardous Materials
Airfield	Air shows; aircraft refueling; utilization of clear zones, runways, taxiways, corporate and private aviation facilities; aircraft parking	Aviation fuels, heating oils, hydraulic fluids, POL
Aviation support	Operations associated with aircraft maintenance, air museum displays, research and development, air transportation-related industry and warehousing, law enforcement, administrative offices, other governmental administrative services	Corrosives, cyanides, degreasers, fuels, glycols, heating oils, heavy metals, hydraulic fluids, ignitibles, paints, pesticides, plating chemicals, POL, reactives, solvents, thinners
Industrial	Activities associated with light industry and manufacturing, research and development, warehousing, corporate office, and film and television	Aerosols, catalysts, corrosives, fuels, heating oils, heavy metals, ignitibles, pesticides, POL, solvent
Institutional (medical)	Hospital/clinic, hospital administration, rehabilitation facilities, X-ray unit	Heavy metals, pharmaceuticals, radiological sources
Institutional (educational)	Public education, higher education, training facilities, vocational schools	Cleaners, corrosives, fuels, heating oils, household chemicals, ignitibles, paints, pesticides, POL, solvents, thinners
Commercial	Activities associated with offices, retail, service industries, restaurants	Aerosols, cleaners, corrosives, fuels, heating oils, ignitibles, paints, pesticides, POL, solvents, thinners
Residential	Utilization/maintenance of residential units, swimming pools, landscaping	Chlorine, fertilizers, fuels, household chemicals, oils, pesticides
Public facilities/ recreation	Maintenance of existing recreational facilities include aircraft museum, sports complex, swimming pools, film and television production, and other recreational facilities	Aerosols, chlorine, cleaners, fertilizers, fuels, heating oils, paints, pesticides, POL, solvents, thinners
Agriculture	Equipment maintenance, weed and pest control	Fertilizers, fuels, pesticides, POL

POL = Petroleum, oil, and lubricants.

with this alternative could increase the regulatory burden of hazardous waste management over the closure baseline. However, management of wastes utilizing all applicable regulations would not create any unacceptable impacts.

4.3.2.3 Installation Restoration Program Sites. The IRP sites located within each land use area for the Castle Aviation Center Alternative are identified in Figures 4.3-2a and 4.3-2b and summarized in Table 4.3-4.

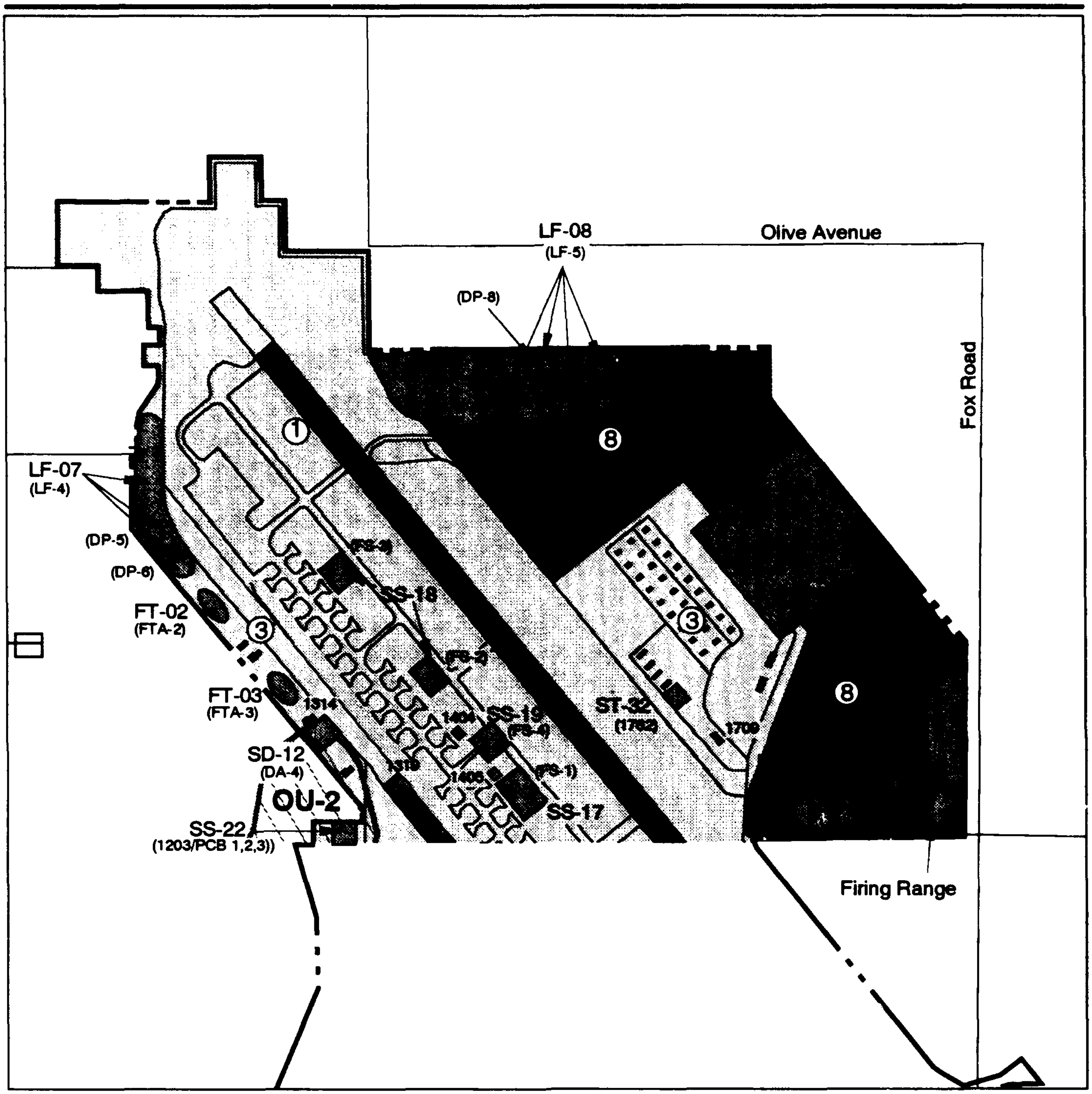
Airfield. Listed IRP sites, potential sites of contamination, and their impacts to the airfield under the Castle Aviation Center Alternative are similar to those identified under the Proposed Action.

Aviation Support. Four listed IRP sites and 17 potential sites of contamination are located within the aviation support land use area. Remediation and long-term monitoring activities associated with the Central Base TCE groundwater contamination could result in land use restrictions and delays in reuse. Delays in redevelopment could occur at sites SD-13 and SS-21 as a result of remediation activities.

Ten facilities that utilized hazardous materials or generated hazardous materials comprise the majority of potential sites of contamination within the aviation support land use. The remaining sites include the JP-4 fuel hydrant system, the industrial sewer, sanitary sewer and storm drain systems, an aircraft apron stain, and two oil/water separators. Site investigation and remediation activities associated with any of these sites could result in property disposal and reuse delays.

Industrial. Eighteen listed IRP sites and 49 potential sites of contamination are located within this land use area. Remediation and long-term monitoring activities associated with landfills LF-04 and LF-05 in the south base area and LF-07 located in the northern portion of the base could result in land use restrictions and delays in reuse. Similar impacts could occur as a result of RAs associated with the Central Base and Wallace Road TCE groundwater contamination. Remediation activities associated with numerous fire training, spill, and dump sites located throughout the industrial land use zone could delay redevelopment.

The 49 potential sites of contamination include the JP-4 fuel hydrant system, the industrial sewer system, sanitary sewer system, and the storm drain system; 35 facilities that utilized hazardous substances; 5 disposal pits located within landfills 4 and 7; the EOD Range; a PCB spill; and 3 oil/water separators (SWMUs 4.14, 4.16, and 4.6). Reuse delays and land use restrictions could result from site investigations and remediation activities at any of these sites.



EXPLANATION

- ① Airfield
- ② Aviation Support
- ③ Industrial
- ④ Institutional (Medical)*
- ⑤ Institutional (Educational)*
- ⑥ Commercial*
- ⑦ Residential*
- ⑧ Public Facilities/ Recreation
- ⑨ Agriculture*
- ⑩ Vacant Land*
- Listed IRP sites and potential sites of contamination (DOD ID numbers in smaller text)
- Runway
- Base Boundary

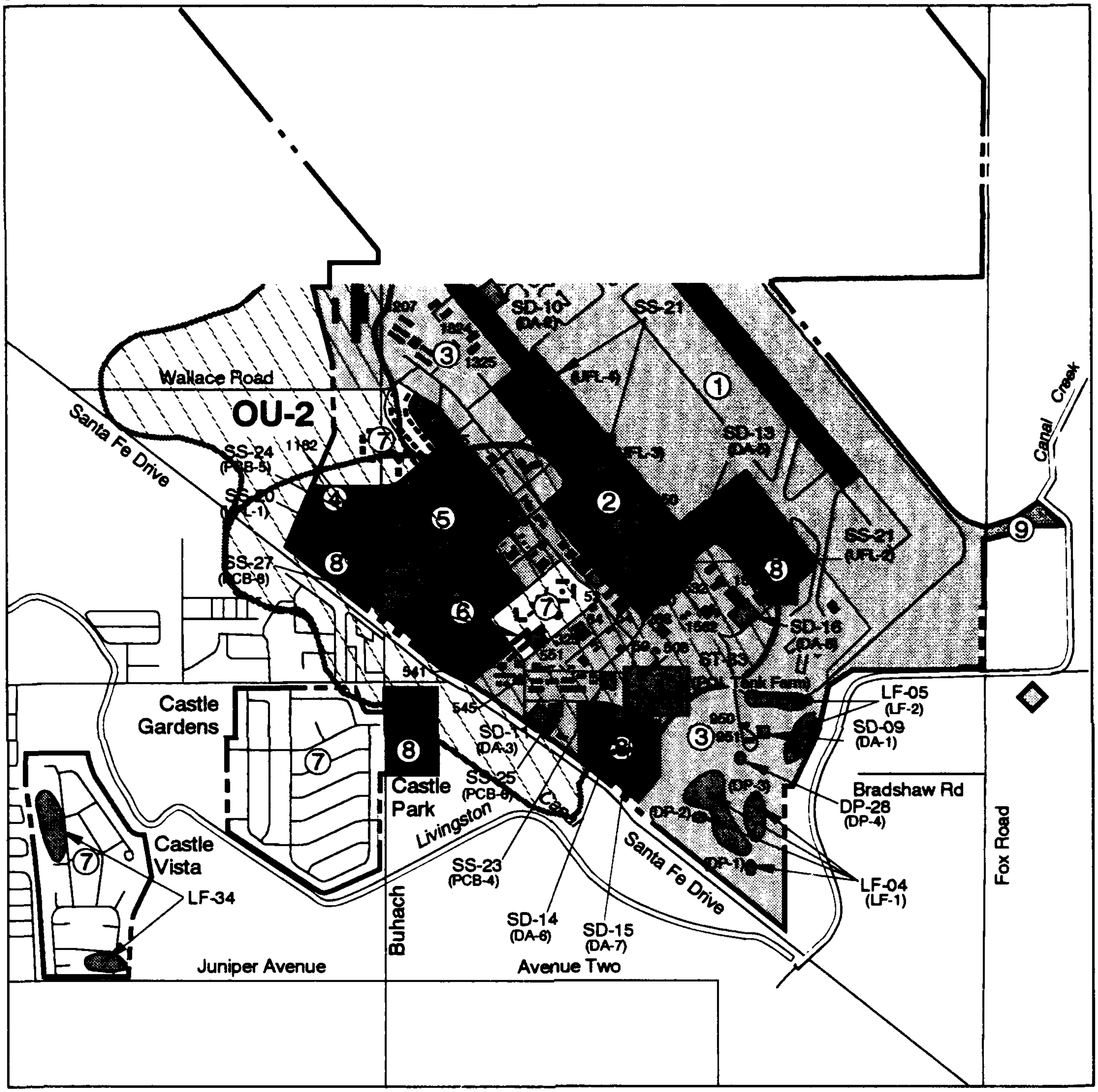
0 500 1000 2000 Feet

* This standard land use designation is not applicable to this figure.

IRP Sites - North Base Castle Aviation Center Alternative

Note: Information is current as of October 19, 1993.

Figure 4.3-2a



EXPLANATION

1 Airfield

2 Aviation Support

3 Industrial

4 Institutional (Medical)

5 Institutional (Educational)

6 Commercial

7 Residential

8 Public/Recreation

9 Agriculture

10 Vacant Land*

Listed IRP sites and potential sites of contamination (DOD ID numbers in smaller text)

Base Boundary

Runway

Groundwater Plume

0 500 1000 2000 Feet

* This standard land use designation is not applicable to this figure.

IRP Sites - South Base Castle Aviation Center Alternative

Note: Information is current as of October 19, 1993.

Figure 4.3-2b

Table 4.3-4. Listed IRP Sites and Potential Sites of Contamination within Land Use Areas - Castle Aviation Center Alternative

Proposed Land Use	Listed IRP Sites	Potential Sites
Airfield	LF-07, LF-08, SD-10, SS-17, SS-18, SS-19	Buildings 1404 and 1405, JP-4 fuel hydrant system, storage area B-4, sanitary sewer system, stain 39, stain 40, stain 41, stain 42, stain 43, stain 44, and storm drain system
Aviation support	Central Base TCE groundwater contamination, SD-13, SS-17, SS-21	Buildings T66, T67, 1253, 1260, 1319, 1335, 1344, 1350, 1529, 1532; industrial sewer system, JP-4 fuel hydrant system, sanitary sewer system, stain 38, storm drain system, SWMU 4.20, SWMU 4.38
Industrial	Central Base TCE groundwater contamination, FT-02, FT-03, LF-04, LF-05, LF-07, SD-09, SD-11, SD-12, SD-15, SD-16, SS-22, SS-23, SS-25, DP-28, ST-32, POL fuel tank farm, Wallace Road TCE groundwater contamination	Buildings 23, 47, 51, 52, 53, 54, 55, 59, T61, 84, T85, 325, 508, 541, 545, 551, 871, 950, 951, 971, 1201, 1204, 1205, 1206, 1207, 1266, 1314, 1324, 1325, 1562, 1571, and 1709; disposal pit 1, disposal pit 2, disposal pit 3, disposal pit 5, disposal pit 6, EOD Range, hazardous waste storage area 4, industrial sewer system, JP-4 fuel hydrant system, PCB-9, storage area B-2, storage area B-3, sanitary sewer system, storm drain system, SWMU 4.14, SWMU 4.16, SWMU 4.6
Institutional (medical)	Central Base TCE groundwater contamination, Wallace Road TCE groundwater contamination	Building 1182, sanitary sewer system, storm drain system
Institutional (educational)	Central Base TCE groundwater contamination	Building 175, sanitary sewer system, storm drain system
Commercial	Central Base TCE groundwater contamination, SS-20, SS-24	Sanitary sewer system, storm drain system
Residential	Central Base and Wallace Road TCE groundwater contamination, LF-34, SS-27	Sanitary sewer system, storm drain system
Public facilities/recreation	Central Base TCE groundwater contamination, FT-01, LF-06, LF-08, SD-14, SS-26, POL fuel tank farm	Buildings 871, 1541, 1560; disposal pit 7, disposal pit 8, disposal pit 9, EOD Range, small arms firing range, storm drain system, sanitary sewer system
Agriculture	None	None

EOD = Explosive Ordnance Disposal.
IRP = Installation Restoration Program.
PCB = Polychlorinated biphenyl.
POL = Petroleum, oil, and lubricants.
SWMU = Solid Waste Management Unit.
TCE = Trichloroethylene.

Institutional (Medical). Listed IRP sites, potential sites of contamination, and their impacts to the medical land use under the Castle Aviation Center Alternative are similar to those identified under the Proposed Action.

Institutional (Educational). Delays in property disposal and/or land use restrictions may occur as a result of remediation and long-term monitoring activities associated with the Central Base TCE groundwater contamination. Potential sites of contamination within the institutional (educational) land use consist of Building 175, the sanitary sewer system, and the storm drain system. Delays in property disposal and reuse may occur as a result of site investigations and remediation activities.

Commercial. Remediation and long-term monitoring activities associated with the Central Base TCE groundwater contamination could result in land use restrictions and delays in reuse. Remediation activities associated with sites SS-20 and SS-24 could delay redevelopment. Site investigation and remediation activities at the two potential sites of contamination, the sanitary sewer system and the storm drain system, may result in delays in property disposal and redevelopment.

Residential. Remediation activities associated with spill site SS-27 could delay redevelopment of that site. Remediation and long-term monitoring activities associated with landfill LF-34, located at the Castle Vista housing area, and the Central Base and Wallace Road TCE groundwater contamination could result in land use restrictions and delays ir reuse.

The potential sites of contamination within the residential land use include the sanitary sewer system and the storm drain system. Land use restrictions and delays in property disposal and redevelopment or reuse may occur within this land use as a result of site investigation or RAs associated with any of these sites.

Public Facilities/Recreation. This land use area contains seven listed IRP sites and ten potential sites of contamination. Remediation and long-term monitoring activities associated with the Central Base TCE groundwater contamination, as well as landfills LF-06 and LF-08, and site FT-01 located in the eastern portion of Castle AFB, could result in land use restrictions and delays in reuse. Delays in redevelopment could occur as a result of an RA associated with site SS-26 in the east base area, and site SD-14 in the southern portion of the base.

Remediation activities associated with any of the numerous potential sites of contamination within this land use area could impact redevelopment. These sites include the sanitary sewer system, the storm drain system, the EOD Range, the small arms firing range, the disposal pits within LF-08, and three facilities that at one time utilized hazardous substances (Buildings 871, 1541, and 1560).

4.3.2.4 Storage Tanks. Flight and maintenance operations under the Castle Aviation Center Alternative would require both USTs and aboveground storage tanks. New and existing storage tanks and the closed hydrant fueling system would be subject to the same federal, state, and local regulations discussed under the Proposed Action. All oil/water separators would be pumped and cleaned prior to disposal.

4.3.2.5 Asbestos. Renovations and demolition of existing structures that contain ACM may occur with reuse development. Scheduled activities would be considerably less under the Castle Aviation Center Alternative than under the Proposed Action. Such activities are subject to all applicable federal, state, and local regulations to minimize the potential risk to human health and the environment.

4.3.2.6 Pesticides. Pesticide usage associated with the Castle Aviation Center Alternative would increase from amounts used under closure baseline conditions. Pesticide usage under this alternative would be similar to that under the Proposed Action. Management practices would be subject to FIFRA and state guidelines and would preclude any unacceptable impacts.

4.3.2.7 Polychlorinated Biphenyls. All Air Force owned federally regulated PCB equipment and PCB-contaminated equipment, as well as state-regulated PCB items, have been removed and properly disposed of.

4.3.2.8 Radon. Since all radon screening survey results were below the U.S. EPA's recommended mitigation level of 4 pCi/l, there would be no impacts on reuse activities.

4.3.2.9 Medical/Biohazardous Waste. The amounts of biohazardous waste generated under the Castle Aviation Center Alternative would be similar to the amounts generated under the Proposed Action. Waste management practices would be similar to those identified under the Proposed Action.

4.3.2.10 Ordnance. Management of the EOD, grenade, and small arms firing ranges would be similar to those practices discussed under the Proposed Action.

4.3.2.11 Lead. Lead management practices (including occupant notification) would be similar to those identified under the Proposed Action.

4.3.2.12 Mitigation Measures. Mitigation measures for this alternative are similar to those identified under the Proposed Action.

4.3.3 Commercial Aviation Alternative

4.3.3.1 Hazardous Materials Management. The types of hazardous materials utilized under the Commercial Aviation Alternative are provided in

Table 4.3-5. Hazardous Material Usage - Commercial Aviation Alternative

Land Use	Operation Process	Hazardous Materials
Airfield	Aircraft refueling; utilization of clear zones, runways, and taxiways; aircraft parking; pilot training	Aviation fuels, heating oils, hydraulic fluids, POL
Aviation support	Operations associated with aircraft maintenance, commercial passenger terminal, air cargo facilities, corporate and private aviation facilities, pilot training, air transportation-related industry and warehousing, law enforcement, administrative offices, other governmental administrative services	Corrosives, cyanides, degreasers, fuels, glycols, heating oils, heavy metals, hydraulic fluids, ignitibles, paints, pesticides, plating chemicals, POL, reactives, solvents, thinners
Industrial	Activities associated with light industry and manufacturing, hospital administration, warehousing, and corporate offices	Aerosols, corrosives, fuels, heating oils, heavy metals, ignitibles, pesticides, POL, solvents
Institutional (medical)	Hospital/clinic, hospital administration, rehabilitation facilities, X-ray unit, patient, family, and staff housing	Heavy metals, household chemicals, pesticides, pharmaceuticals, radiological sources
Commercial	Activities associated with offices, community center, retail, service industries, restaurants, banking	Aerosols, cleaners, corrosives, fuels, heating oils, household chemicals, ignitibles, paints, pesticides, POL, solvents, thinners
Residential	Utilization/maintenance of residential units, swimming pools, landscaping	Chlorine, fertilizers, fuels, household chemical, oils, pesticides
Public facilities/ recreation	Maintenance of existing recreational facilities including aircraft museum, sports complex, swimming pools, and other recreational facilities	Aerosols, chlorine, cleaners, fertilizers, fuels, heating oils, paints, pesticides, POL, solvents, thinners
Agriculture	Equipment maintenance, weed and pest control	Fertilizers, fuels, pesticides, POL

POL = Petroleum, oil, and lubricants.

Table 4.3-5, and would be similar to those materials utilized under the Proposed Action. The quantities utilized under this alternative would increase over the amounts utilized at closure due to the substantial increase in flight operations associated with the establishment of general aviation and accompanying aviation support activities. The amount of materials utilized under this alternative would also be larger than those used under the Proposed Action. However, no unacceptable impacts would occur upon compliance with all applicable regulations.

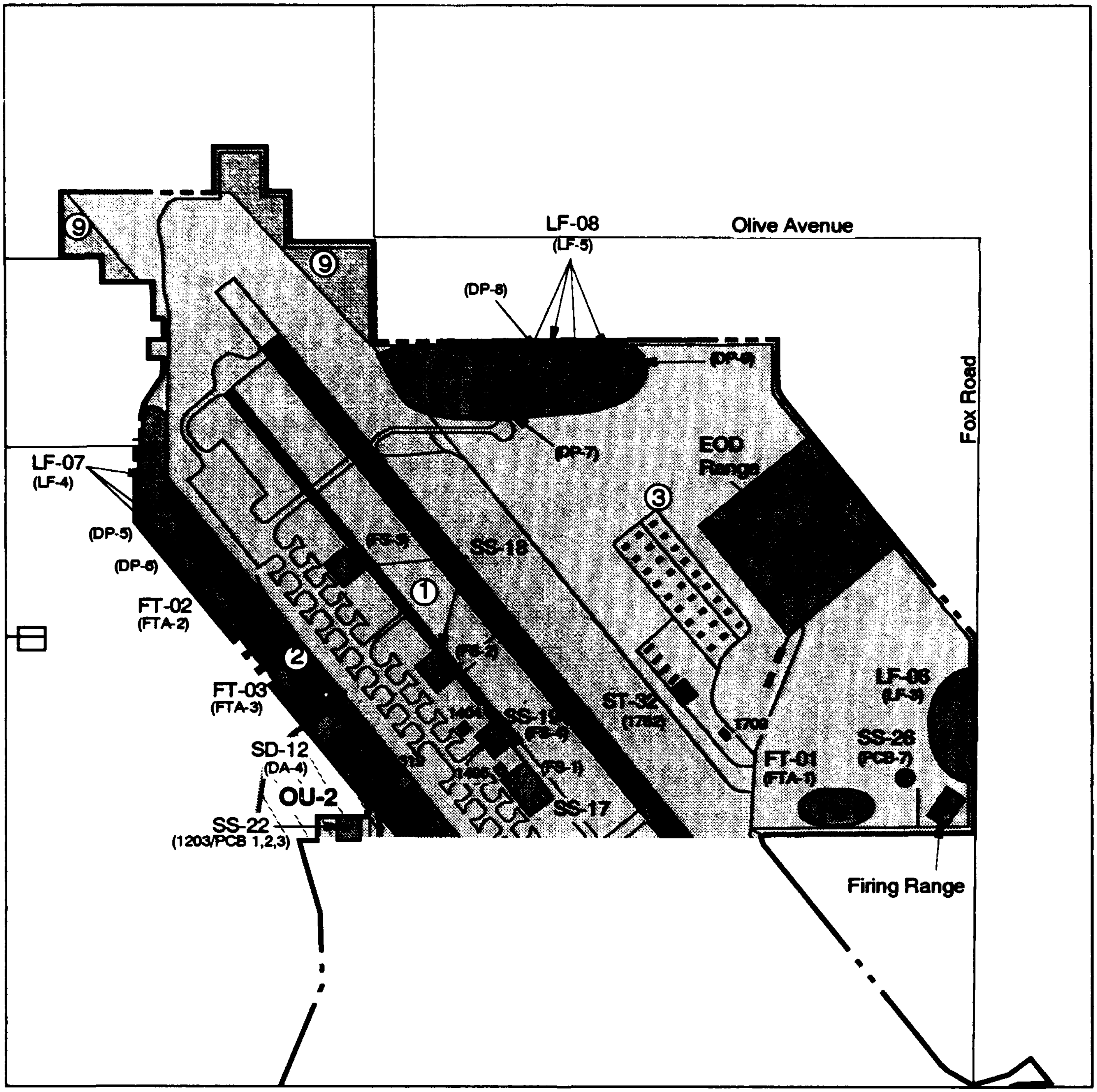
4.3.3.2 Hazardous Waste Management. Under the Commercial Aviation Alternative, the amount of hazardous waste generated would be greater than that produced at the time of closure. Additionally, the amount of wastes generated under this alternative would be greater than that generated by the Proposed Action. Hazardous waste would be generated from the hazardous materials and the processes that utilize them, and would include waste fuels, POL, solvents, heavy metals, corrosives, paints, and thinners. The number of independent owners/operators associated with this alternative could increase the regulatory burden of hazardous waste management. Management of hazardous wastes utilizing all applicable regulations would not create any unacceptable impacts.

4.3.3.3 Installation Restoration Program Sites. The listed IRP sites and potential sites of contamination within each land use area for the Commercial Aviation Alternative are identified in Figures 4.3-3a and 4.3-3b and summarized in Table 4.3-6.

Airfield. Listed IRP sites, potential sites of contamination, and their impacts to this land use under the Commercial Aviation Alternative would be similar to those identified under the Proposed Action.

Aviation Support. Ten listed IRP sites and 29 potential sites of contamination are located within the aviation support land use area. Delays in redevelopment could occur as a result of remediation activities associated with fire protection training areas FT-02 and FT-03, as well as at numerous spill sites within the aviation support land use area. Remediation and long-term monitoring activities at landfill LF-07 and identical operations associated with the Central Base and Wallace Road TCE groundwater contamination plumes could create land use restrictions and delays in reuse.

Land use restriction and delays in reuse and redevelopment may occur as a result of site investigations or remedial activities associated with the potential sites of contamination within this land use zone. These sites include 20 facilities that at one time utilized or stored hazardous substances. The remaining sites include disposal pits 5 and 6 (located within landfill 7), the JP-4 fuel system, the industrial waste and sanitary sewer systems, the storm drain system, two oil/water separators, and a stain on the corner of West Perimeter Road and 328th Street.



EXPLANATION

① Airfield	⑤ Institutional (Educational)*	⑩ Vacant Land*	
② Aviation Support	⑥ Commercial*	Listed IRP sites and potential sites of contamination (DOD ID numbers in smaller text)	
③ Industrial	⑦ Residential*	Base Boundary	
④ Institutional (Medical)*	⑧ Public/Recreation*	Runway	
	⑨ Agriculture	Groundwater Plume	

0 500 1000 2000 Feet

*This standard land use designation is not applicable to this figure.

IRP Sites - North Base Commercial Aviation Alternative

Note: Information is current as of October 19, 1993.

Figure 4.3-3a

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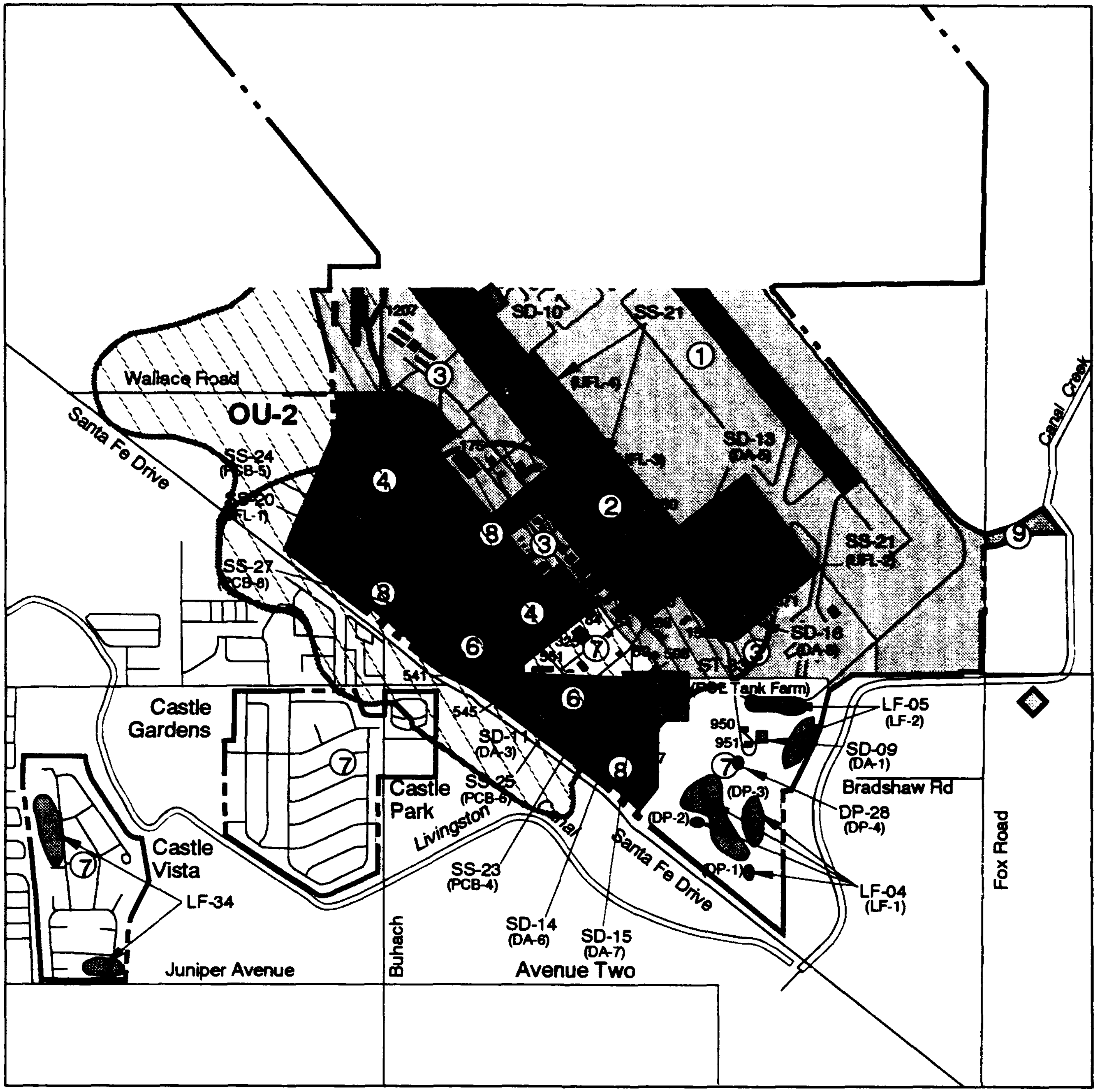


EXPLANATION

- ① Airfield
- ② Aviation Support
- ③ Industrial
- ④ Institutional (Medical)
- ⑤ Institutional (Educational)*
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public/Recreation
- ⑨ Agriculture
- ⑩ Vacant Land*
- Listed IRP sites and potential sites of contamination (DOD ID numbers in smaller text)
- Base Boundary
- Runway

0 500 1000 2000 Feet

* This standard land use designation is not applicable to this figure

IRP Sites - South Base Commercial Aviation Alternative

Note: Information is current as of October 19, 1993.

Figure 4.3-3b

Table 4.3-6. Listed IRP Sites and Potential Sites of Contamination within Land Use Areas - Commercial Aviation Alternative

Proposed Land Use	Listed IRP Sites	Potential Sites
Airfield	LF-07, LF-08, SD-10, SS-17, SS-18, SS-19	Buildings 1404 and 1405, JP-4 fuel hydrant system, storage area B-4, sanitary sewer system, stain 39, stain 40, stain 41, stain 42, stain 43, stain 44, and storm drain system
Aviation support	Central Base TCE groundwater contamination, FT-02, FT-03, LF-07, SD-12, SD-13, SD-16, SS-17, SS-21, Wallace Road, TCE groundwater contamination	Buildings T66, T67, 1253, 1260, 1314, 1319, 1324, 1325, 1335, 1344, 1350, 1529, 1532, 1541, 1550, 1560, 1562, 1571; disposal pit 5, disposal pit 6, hazardous waste storage area 4, industrial sewer system, JP-4 fuel hydrant system, sanitary sewer system, stain 38, storm drain system, SWMU 4.20, SWMU 4.38
Industrial	Central Base TCE groundwater contamination, FT-01, LF-06, LF-08, SS-22, SS-26, ST-32, POL fuel tank farm, Wallace Road TCE groundwater contamination	Buildings 23, 47, 51, 52, 53, 54, 55, 59, 175, 1201, 1204, 1205, 1206, 1207, 1266, 1709; disposal pit 7, disposal pit 8, disposal pit 9, EOD Range, industrial sewer system, JP-4 fuel hydrant system, PCB-9, storage area B-2, storage area B-3, sanitary sewer system, small arms firing range, storm drain system, SWMU 4.16
Institutional (medical)	Central Base TCE groundwater contamination, SS-24, SS-27, Wallace Road TCE groundwater contamination	Building 1182, sanitary sewer system, storm drain system
Commercial	Central Base TCE groundwater contamination, SD-11, SD-14, SD-15, SS-20, SS-23, SS-25, POL fuel tank farm	Buildings 508, 541, 545, and 917; sanitary sewer system, storm drain system
Residential	Central Base TCE groundwater contamination, LF-04, LF-05, SD-09, DP-28, LF-34, POL fuel tank farm	Buildings T61, 84, T85, 325, 551, 950, [illegible] disposal pit 1, disposal pit 2, disposal pit 3, sanitary sewer system, storm drain system, SWMU 4.14, SWMU 4.6
Public facilities/ recreation	Central Base TCE groundwater contamination	Building 871, JP-4 fuel hydrant system, sanitary sewer system, storm drain system
Agriculture	None	None

EOD = Explosive Ordnance Disposal.
IRP = Installation Restoration Program.
PCB = Polychlorinated biphenyl.
POL = Petroleum, oil, and lubricants.
SWMU = Solid Waste Management Unit.
TCE = Trichloroethylene.

Industrial. The industrial land use area contains 9 listed IRP sites and 29 sites of potential contamination. Land use restrictions and delays in redevelopment may occur due to remediation and long-term monitoring activities associated with the Central Base and Wallace Road groundwater contamination plumes and landfills LF-06 and LF-08. Remediation associated with fire training area FT-01 and spill sites SS-22, SS-26, ST-32, and ST-33 could also result in delays in reuse.

Sites of potential contamination within the industrial land use consist of 18 facilities, which at one time utilized or stored hazardous materials or generated hazardous wastes, the basewide sanitary sewer and storm drain systems, the industrial sewer system, and the JP-4 fuel hydrant system. The EOD Range, the small arms firing range, a PCB spill, an oil/water separator, and three disposal pits located within landfill 8 constitute the remaining sites of potential contamination. Delays in property disposal and reuse, as well as land use restrictions could result from site investigations and remedial activities associated with these sites.

Institutional (Medical). Remediation and long-term monitoring activities associated with the Central Base and Wallace Road TCE groundwater contamination plumes could result in land use restrictions and delays in reuse. Redevelopment delays may also result from remediation of sites SS-24 and SS-27.

The base hospital (Building 1182), the sanitary sewer system, and the storm drain system are the potential sites of contamination identified within this land use zone under the Commercial Aviation Alternative. Identification and remediation of contamination at these sites may delay property disposal, which may result in reuse and redevelopment delays or land use restrictions.

Commercial. Remediation and long-term monitoring activities associated with the Central Base TCE groundwater contamination and with the POL tank farm could create land use restrictions and delays in reuse. Delays in redevelopment may also occur as a result of remediation activities associated with sites SD-11, SD-14, SD-15, SS-20, SS-23, and SS-25.

Potential sites of contamination located within this land use include the storm drain system, the sanitary sewer system, and four facilities in the southeast portion of the base (Buildings 541, 545, 871, and 917) that utilized, generated, or stored hazardous materials or waste. Remediation activities at these sites may result in land use restrictions or delays in reuse and redevelopment.

Residential. Redevelopment delay may result from remediation activities associated with sites DP-28, SD-09, and the POL fuel tank farm. Long-term monitoring and remediation associated with landfills LF-04, LF-05, and LF-34 and the Central Base TCE groundwater contamination plume could result in land use restrictions and reuse delays.

Remediation activities associated with potential sites of contamination in the southern portion of the base could delay property disposal and delay redevelopment or create land use restrictions. Potential sites include seven facilities that have at one time utilized or stored hazardous substances, three disposal pits in landfill 4, two oil/water separators, and the storm drain and sanitary sewer systems.

Public Facilities/Recreation. Remediation and long-term monitoring of the Central Base groundwater contamination plume may result in reuse delays and land use restrictions.

Reuse could also be delayed as a result of remediation activities associated with Building 871, the JP-4 fuel hydrant system, the storm drain system, and the sanitary sewer system, all potential sites of contamination.

Agriculture. No IRP sites are located within this land use zone.

4.3.3.4 Storage Tanks. Under the Commercial Aviation Alternative, flight and maintenance operations would require the use of both USTs and aboveground storage tanks; however, the fuel hydrant system would be closed in place. New and existing storage tanks required by the new owners/operators would be subject to the same federal, state, and local regulations discussed under the Proposed Action. The fuel hydrant system would be closed in accordance with all applicable regulations. Oil/water separators would be pumped and cleaned prior to disposal.

Aboveground fuel storage tanks not utilized to support reuse activities would be emptied and purged of fumes to preclude fire hazards. Under this alternative, aboveground storage tank management practices would be similar to those discussed under the Proposed Action. Proper storage tank management under this alternative would not create any unacceptable impacts.

4.3.3.5 Asbestos. Renovation and demolition of existing structures that contain ACM may occur with reuse development. Scheduled activities under the Commercial Aviation Alternative would be less than those identified under the Proposed Action and would be subject to all applicable federal, state, and local regulations to minimize the potential risk to human health and the environment.

4.3.3.6 Pesticides. Pesticide usage would increase over closure baseline conditions under the Commercial Aviation Alternative, mainly due to increased activities in the aviation support, industrial, commercial, and residential land use zones. Pesticide use under the Commercial Aviation

Alternative would be greater than the amounts utilized under the Proposed Action. Management practices would be subject to FIFRA and state guidelines and would preclude any unacceptable impacts.

4.3.3.7 Polychlorinated Biphenyls. All Air Force-owned federally regulated PCB equipment and PCB-contaminated equipment, as well as state-regulated PCB items, have been removed and properly disposed of.

4.3.3.8 Radon. As described under the Proposed Action, there would be no impacts to reuse activities from radon.

4.3.3.9 Medical/Biohazardous Waste. The amount of biohazardous waste generated under the Commercial Aviation Alternative would be similar to the amount generated under the Proposed Action and the Castle Aviation Center Alternative. Waste management practices would be similar to those identified under the Proposed Action.

4.3.3.10 Ordnance. The EOD and grenade ranges will be cleared of unexploded ordnance and the small arms range cleared of spent bullets prior to closure. Therefore, no impacts on reuse activities would occur under the Commercial Aviation Alternative.

4.3.3.11 Lead. Lead management practices under this alternative (including occupant notification) would be similar to those identified under the Proposed Action.

4.3.3.12 Mitigation Measures. Mitigation measures for this alternative would be similar to those identified under the Proposed Action.

4.3.4 Aviation with Mixed Use Alternative

4.3.4.1 Hazardous Materials Management. The types of hazardous materials utilized under the Aviation with Mixed Use Alternative are provided in Table 4.3-7, and would be similar to those materials utilized under the Proposed Action. The quantities utilized under this alternative would be more than those utilized at closure due to the establishment of general aviation and aviation support activities, industrial, commercial, residential, as well as educational and institutional (medical) land uses. The amounts would be less than those utilized under the Proposed Action due to fewer flight and maintenance operations proposed. No unacceptable impacts would occur if management in compliance with all applicable regulations is ensured.

4.3.4.2 Hazardous Waste Management. Under the Aviation with Mixed Use Alternative, the amount of hazardous waste generated would be greater than the quantity produced at closure due to an increase in reuse activities. The amount would be less than that of the Proposed Action due to a

Table 4.3-7. Hazardous Material Usage by Land Use - Aviation with Mixed Use Alternative

Land Use	Operation Process	Hazardous Materials
Airfield	Aircraft refueling; utilization of clear zones, runways, and taxiways; aircraft parking	Aviation fuels, heating oils, hydraulic fluids, POL
Aviation support	Operations associated with aircraft maintenance, corporate and private aviation facilities, air transportation-related industry and warehousing, law enforcement, administrative offices, other governmental administrative services	Corrosives, cyanides, degreasers, fuels, glycols, heating oils, heavy metals, hydraulic fluids, ignitibles, paints, pesticides, POL, reactives, solvents, thinners
Industrial	Activities associated with light industry and manufacturing, research and development, warehousing, and corporate offices	Aerosols, catalysts, corrosives, fuels, heating oils, heavy metals, ignitibles, pesticides, POL, solvents
Institutional (medical)	Hospital/clinic, hospital administration, rehabilitation facilities, X-ray unit	Heavy metals, pharmaceuticals, radiological sources
Institutional (educational)	Public education, higher education, training facilities, vocational schools	Cleaners, corrosives, fuels, heating oil, household chemicals, ignitibles, paints, pesticides, POL, solvents, thinners
Commercial	Activities associated with offices, retail, service industries, restaurants	Aerosols, cleaners, corrosives, fuels, heating oils, ignitibles, paints, pesticides, POL, solvents, thinners
Residential	Utilization/maintenance of residential units, swimming pools, landscaping	Chlorine, fertilizers, fuels, household chemicals, oils, pesticides
Public facilities/ recreation	Maintenance of existing recreational facilities including aircraft museum, sports complex, swimming pools, and other recreational facilities	Aerosols, chlorine, cleaners, fertilizers, fuels, heating oils, paints, pesticides, POL, solvents, thinners
Agriculture	Equipment maintenance, weed and pest control	Fertilizer, fuels, pesticides, POL

POL = Petroleum, oil, and lubricants.

reduced use of hazardous materials associated with fewer flight operations. These wastes would be generated from the hazardous materials and processes utilized and would consist of waste fuels, POL, solvents, heavy metals, corrosives, paints, and thinners. The number of independent owners/operators associated with this alternative could increase the regulatory burden of hazardous waste management over the closure baseline. Management of hazardous wastes utilizing all applicable regulations would not create any unacceptable impacts.

4.3.4.3 Installation Restoration Program Sites. The listed IRP sites and potential sites of contamination within each land use area for the Aviation with Mixed Use Alternative are identified in Figures 4.3-4a and 4.3-4b and summarized in Table 4.3-8.

Airfield. Listed IRP sites, potential sites of contamination, and their impacts to the airfield land use under the Aviation with Mixed Use Alternative are similar to those identified under the Proposed Action.

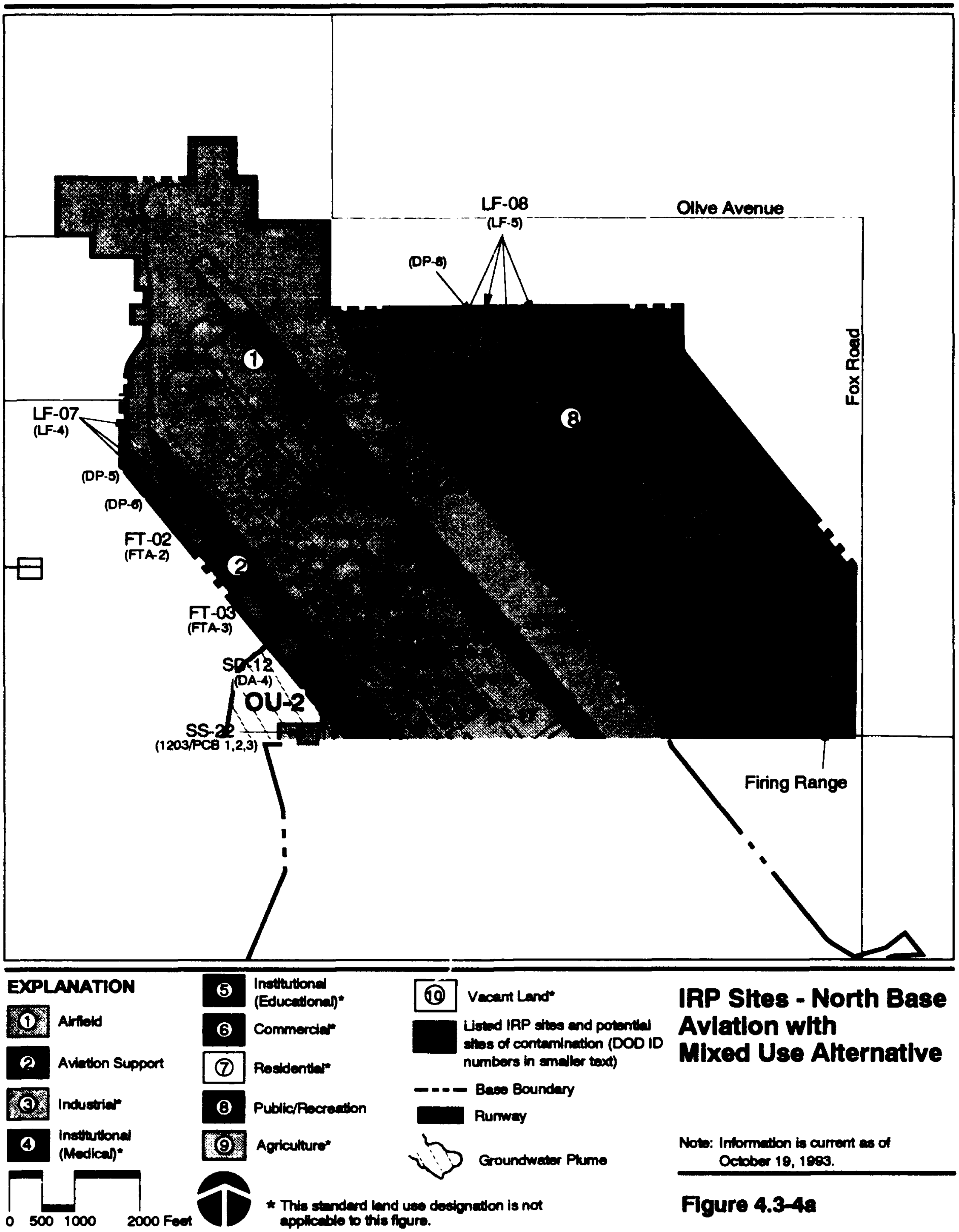
Aviation Support. Twelve listed IRP sites and 37 potential sites of contamination are located within the aviation support land use area. Remediation and long-term monitoring activities associated with the Wallace Road and Central Base TCE groundwater contamination and landfill LF-07 could result in land use restrictions and delays in reuse. Delays in redevelopment could occur as a result of remediation activities at numerous fire training and spill sites located throughout the aviation support land use zone.

Remediation of potential sites of contamination within the aviation support land use area may result in land use restrictions or delays in property disposal and facility reuse. These sites consist of the JP-4 fuel hydrant system, the industrial and sanitary sewer systems, the storm drain system, 3 disposal pits within landfill 7, 2 oil/water separators, and 28 different facilities that at one time utilized hazardous materials or generated hazardous waste.

Industrial. The industrial land use under the Aviation with Mixed Use Alternative contains 10 listed IRP sites and 20 potential sites of contamination. Remediation and long-term monitoring activities could result in land use restrictions and delays in reuse at the Wallace Road and Central Base TCE groundwater contamination and landfills LF-04 and LF-05, located in the southern portion of Castle AFB. Remediation activities associated with numerous spill and dump sites throughout this land use area could result in land use restrictions and delays in reuse.

Land use restrictions or delays in property disposal and reuse may occur as a result of remediation activities or site investigations associated with the sites of potential contamination. These sites include 13 facilities wherein at one time hazardous material was utilized or hazardous waste was generated, the storm drain system, the industrial and sanitary sewer systems, the JP-4 fuel hydrant system, two oil/water separator sites, and a PCB spill area.

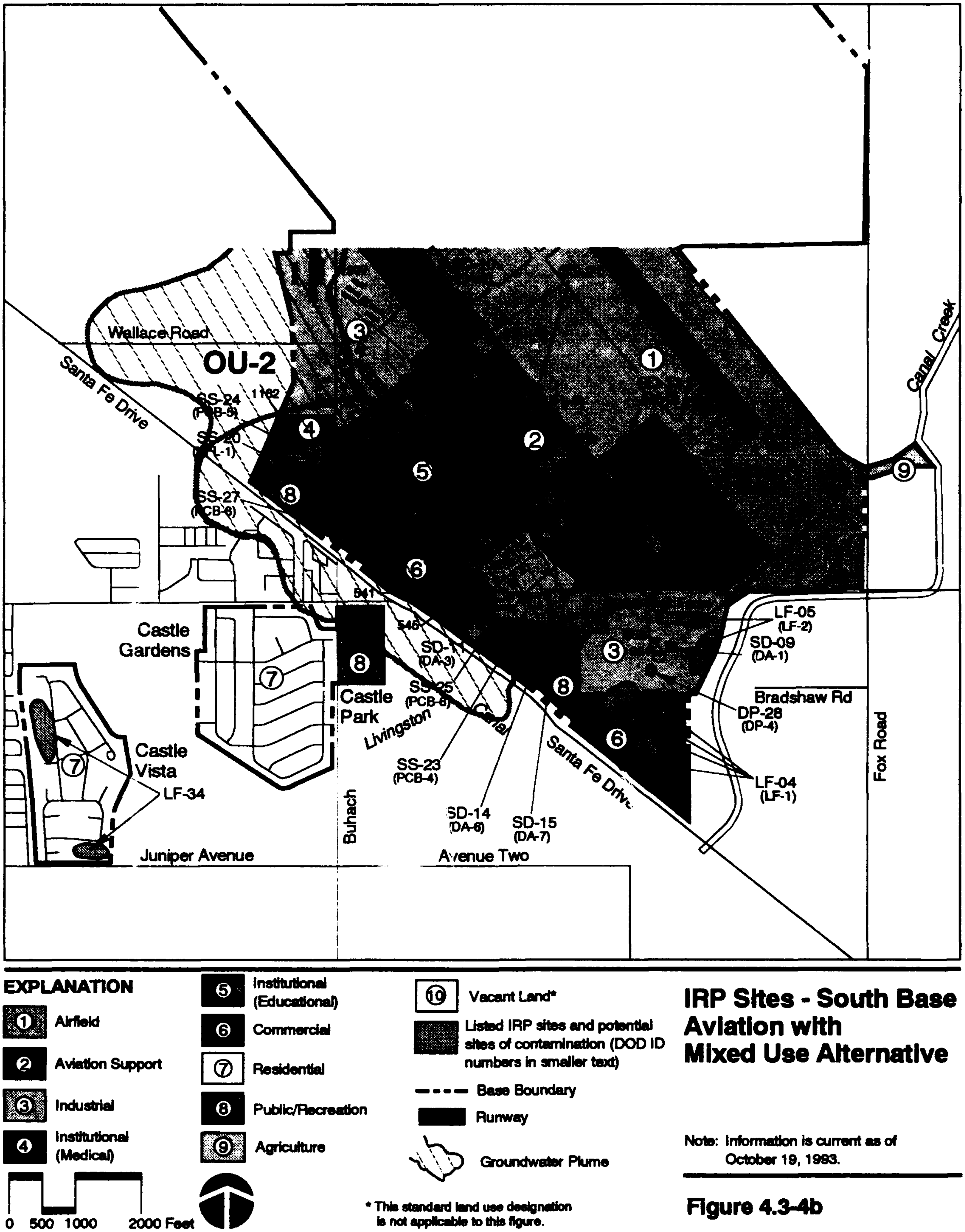
Institutional (Medical). Listed IRP sites, potential sites of contamination, and their impacts to the medical land use under the Aviation with Mixed Use Alternative are similar to those identified under the Proposed Action.



IRP Sites - North Base Aviation with Mixed Use Alternative

Note: Information is current as of October 19, 1993.

Figure 4.3-4a



IRP Sites - South Base Aviation with Mixed Use Alternative

Note: Information is current as of October 19, 1993.

Figure 4.3-4b

Table 4.3-8. Listed IRP Sites and Potential Sites of Contamination within Land Use Areas - Aviation with Mixed Use Alternative

Proposed Land Use	Listed IRP Sites	Potential Sites
Airfield	LF-07, LF-08, SD-10, SS-17, SS-18, SS-19	Buildings 1404 and 1405, JP-4 fuel hydrant system, storage area B-4, sanitary sewer system, stain 39, stain 40, stain 41, stain 42, stain 43, stain 44, and storm drain system
Aviation support	Central Base TCE groundwater contamination, FT-02, FT-03, LF-07, SD-10, SD-12, SD-13, SD-16, SS-17, SS-21, POL fuel tank farm, Wallace Road TCE groundwater contamination	Buildings 47, 51, 52, 53, 54, 55, 59, T66, T67, 1253, 1260, 1266, 1314, 1319, 1324, 1325, 1335, 1344, 1350, 1529, 1532, 1541, 1560, 1562, 1571; disposal pit 5, disposal pit 6, JP-4 fuel hydrant system, hazardous waste storage area 4, industrial sewer system, storage area B-2, storage area B-3, sanitary sewer system, stain 38, storm drain system, SWMU 4.20, SWMU 4.38,
Industrial	Central Base TCE groundwater contamination, LF-04, LF-05, SD-09, SD-15, SS-22, SS-23, DP-28, POL fuel tank farm, Wallace Road TCE groundwater contamination	Buildings T61, 84, T85, 325, 508, 917, 950, 951, 1201, 1204, 1205, 1206, 1207; industrial sewer system, JP-4 fuel hydrant system, PCB-9, sanitary sewer system, storm drain system, SWMU 4.16, SWMU 4.6
Institutional (medical)	Central Base TCE groundwater contamination, Wallace Road TCE groundwater contamination	Building 1182, sanitary sewer system, storm drain system
Institutional (educational)	Central Base TCE groundwater contamination, SS-24, SS-27	Buildings 23 and 175, sanitary sewer system, storm drain system
Commercial	Central Base TCE groundwater contamination, LF-04, SD-11, SS-20, SS-25	Buildings 541, 545, 551; disposal pit 1, disposal pit 2, disposal pit 3, sanitary sewer system, storm drain system, SWMU 4.14
Residential	LF-34	Storm drain system
Public facilities/ recreation	Central Base TCE groundwater contamination FT-01, LF-06, LF-08, SD-14, SS-26, ST-32, POL fuel tank farm	Buildings 871 and 1709, disposal pit 7, disposal pit 8, disposal pit 9, EOD Range, sanitary sewer system, small arms firing range, storm drain system
Agriculture	None	None

EOD = Explosive Ordnance Disposal.
IRP = Installation Restoration Program.
PCB = Polychlorinated biphenyl.
POL = Petroleum, oil, and lubricants.
SWMU = Solid Waste Management Unit.
TCE = Trichloroethylene.

Institutional (Educational). Remediation and long-term monitoring activities associated with the Central Base TCE groundwater contamination could result in land use restrictions and delays in reuse. Remediation activities associated with sites SS-24 and SS-27 could delay redevelopment at these sites.

Delays in redevelopment or restricted land use may result from site investigations or remediation activities associated with the potential sites of contamination identified in this land use. These sites include the sanitary sewer system, the storm drain system, and Buildings 23 and 175.

Commercial. Remediation and long-term monitoring activities associated with the Central Base TCE groundwater contamination and landfill LF-04 in the southern portion of Castle AFB could result in land use restrictions and delays in reuse. Remediation activities associated with sites SD-11, SS-20, and SS-25 could delay redevelopment at these sites.

Sites of potential contamination in the commercial land use area include three disposal pits in landfill 4; the sanitary sewer system; the storm drain system; an oil/water separator; and Buildings 541, 545, and 551 wherein hazardous materials were once used or where hazardous wastes were generated. Site investigations or remediation activities associated with these sites could result in land use restrictions or delays in property disposal and reuse or redevelopment.

Residential. Listed IRP sites and potential sites of contamination and their impacts to the residential land use under the Aviation with Mixed Use Alternative are similar to those identified under the Proposed Action.

Public Facilities/Recreation. Impacts, such as delays in property disposal and land use restrictions, may occur as a result of remediation and long-term monitoring associated with the Central Base TCE groundwater contamination, the POL tank farm, LF-06, LF-08, and FT-01. Delays in disposal and redevelopment may occur as a result of remediation activities at sites SD-14, SS-26, and SF-32.

Sites of potential contamination in this land use zone include disposal pits 7, 8, and 9, all located within landfill 8; Buildings 371 and 1709, wherein at one time hazardous materials were utilized or hazardous wastes were generated; the EOD and small arms firing ranges; the storm drain system; and sanitary sewer system. Site investigations and remediation of these sites may result in delays in property disposal and reuse.

4.3.4.4 Storage Tanks. Flight and maintenance operations under the Aviation with Mixed Use Alternative would require both USTs and aboveground storage tanks. Under this alternative the fuel hydrant system would be closed in place in accordance with all applicable regulations prior to disposal. New and existing storage tanks would be subject to the same federal, state, and local regulations discussed under the Proposed Action. Oil/water separators would be pumped and cleaned prior to disposal.

4.3.4.5 Asbestos. Renovations and demolition of existing structures that contain ACM may occur with reuse development. Proposed activities would be less under the Aviation with Mixed Use Alternative than under the Proposed Action. However, such activities would be subject to all applicable federal, state, and local regulations to minimize the potential risk to human health and the environment.

4.3.4.6 Pesticides. Pesticide usage associated with the Aviation with Mixed Use Alternative would increase over closure baseline conditions. Pesticide usage under this alternative would be similar to that of the Proposed Action. Management practices would be subject to FIFRA and state guidelines and would preclude any unacceptable impacts.

4.3.4.7 Polychlorinated Biphenyls. All Air Force-owned federally regulated PCB equipment and PCB-contaminated equipment, as well as state regulated PCB items, have been removed and properly disposed of.

4.3.4.8 Radon. Since all radon screening survey results were below the U.S. EPA's recommended mitigation level of 4 pCi/l, there would be no impact on reuse activities.

4.3.4.9 Medical/Biohazardous Waste. The amount of medical/ biohazardous waste generated under the Aviation with Mixed Use Alternative would be similar to the amount generated under the Proposed Action. Waste management practices would be similar to those identified under the Proposed Action.

4.3.4.10 Ordnance. Management of the EOD, grenade, and small arms firing ranges would be similar to those practices discussed under the Proposed Action.

4.3.4.11 Lead. Lead management practices (including occupant notification) would be similar to those identified under the Proposed Action.

4.3.4.12 Mitigation Measures. Mitigation measures for this alternative are similar to those identified under the Proposed Action.

4.3.5 Non-Aviation Alternative

4.3.5.1 Hazardous Materials Management. The types of hazardous materials utilized under the Non-Aviation Alternative are provided in Table 4.3-9, and would be similar to those utilized under the Proposed Action, with the exception of materials associated with aviation-related

Table 4.3-9 Hazardous Material Usage by Land Use - Non-Aviation Alternative

Land Use	Operation Process	Hazardous Materials
Industrial	Activities associated with light industry and manufacturing, research development, warehousing, corporate offices	Aerosols, catalysts, corrosives, fuels, heating oils, heavy metals, ignitibles, pesticides, POL, solvents
Institutional (educational)	Public/private education, higher education, corporate training facilities, vocational/technical schools, research laboratories	Cleaners, corrosives, fuels, heating oils, household products, ignitibles, paints, pesticides, POL, solvents, thinners
Commercial	Activities associated with office, retail, service industries, and restaurants	Aerosols, cleaners, corrosives, fuels, heating oils, ignitibles, paints, pesticides, POL, solvents, thinners
Residential	Utilization/maintenance of residential units, swimming pools, landscaping	Chlorine, fertilizers, fuels, household chemicals, oils, pesticides
Public facilities/ recreation	Maintenance of existing recreational facilities including aircraft museum, sports complex, swimming pools, and other recreational facilities	Aerosols, chlorine, cleaners, fertilizers, heating oils, paints, pesticides, POL, solvents, thinners
Agriculture	Equipment maintenance, weed and pest control	Fertilizers, fuels, pesticides, POL

POL = Petroleum, oil, and lubricants.

activities. The quantities utilized under this alternative would increase over amounts at closure due to the establishment of industrial and educational reuse development. Quantities should be less than those used under the Proposed Action. Management of these materials under all applicable regulations would not create any unacceptable impacts.

4.3.5.2 Hazardous Waste Management. Hazardous wastes under the Non-Aviation Alternative would be generated from the hazardous materials and processes utilized and would consist of solvents, heavy metals, corrosives, plating waste, POL, fuels, paints, and thinners. The amount of hazardous waste generated would be greater than that produced at closure mainly due to an increase in industrial and educational reuse activities. The number of independent owners/operators associated with this alternative could increase the regulatory burden on hazardous waste management over the closure baseline. However, management of wastes utilizing all applicable regulations would not create any unacceptable impacts.

4.3.5.3 Installation Restoration Program Sites. The IRP listed sites and potential sites of contamination located within each land use area for the

Non-Aviation Alternative are identified in Figures 4.3-5a and 4.3-5b and summarized in Table 4.3-10.

Industrial. Twelve listed IRP sites and 20 potential sites of contamination are located within the Non-Aviation Alternative industrial land use. Land use restrictions and delays in property reuse could result from remediation and long-term monitoring activities associated with the Central Base and Wallace Road TCE groundwater contamination and landfill LF-07 in the north base area. Remediation activities associated with numerous fire training, dump sites, and spill sites could result in redevelopment delays.

Site investigations and remediation activities associated with any of the potential sites of contamination may result in land use restrictions or delays in property disposal and reuse. These sites include eight facilities wherein at one time hazardous materials were utilized or hazardous waste was generated: disposal pits 5 and 6 within landfill 1 and six stained areas. The JP-4 fuel hydrant system, the storm drain system, and the industrial and sanitary sewer systems make up the remaining sites of potential contamination.

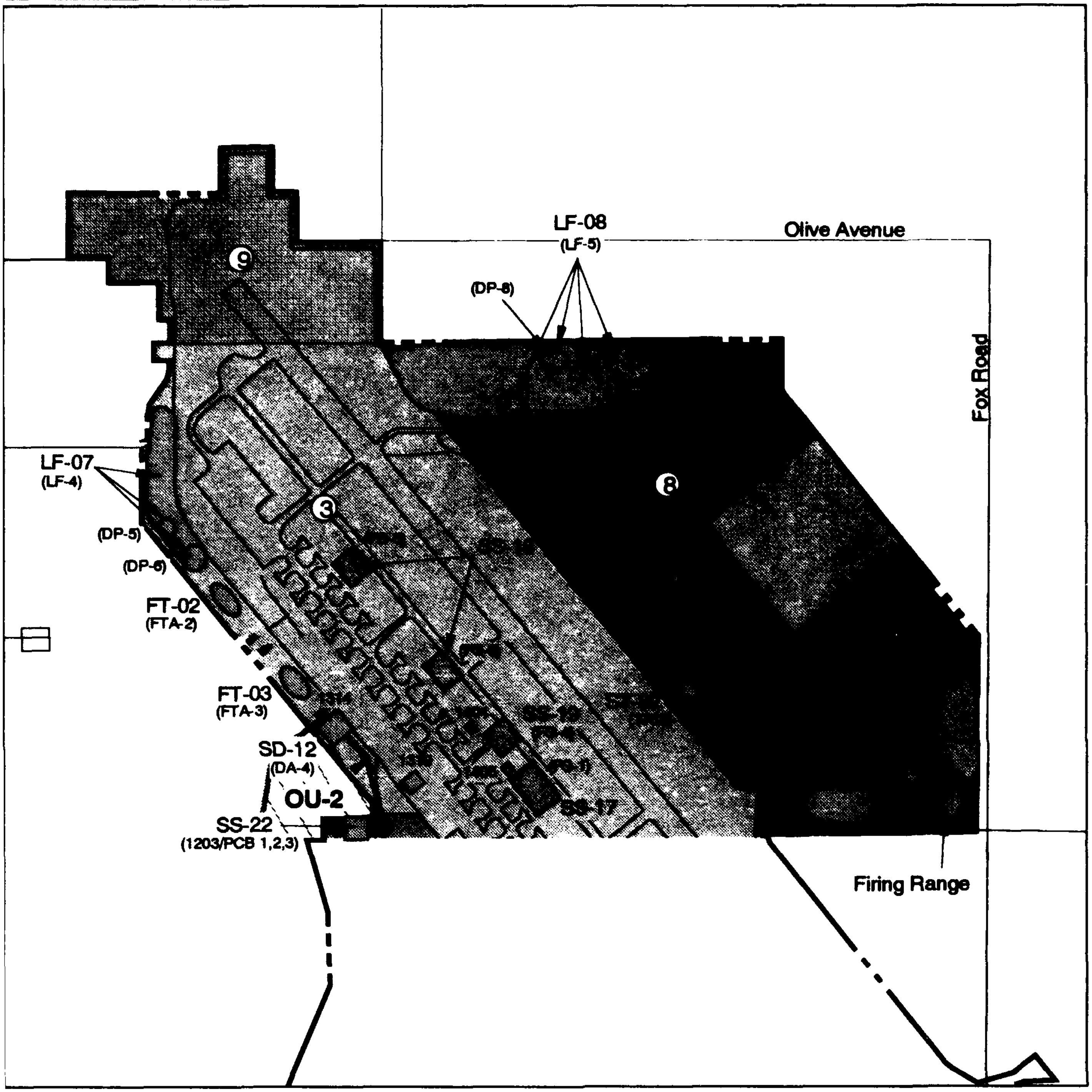
Institutional (Educational). Fifteen listed IRP sites and 51 sites of potential contamination are associated with this land use.

Remediation activities associated with the numerous spill and dump sites located throughout the educational land use zone could result in redevelopment delays. Remediation and long-term monitoring associated with the Wallace Road and Central Base TCE groundwater contamination could result in land use restrictions and delays in property reuse.

Hazardous materials have been utilized or hazardous wastes have been generated in 41 facilities, which make up the majority of the potential sites of contamination within this educational land use. The remaining sites include the industrial sewer and sanitary sewer systems, the storm drain system, the JP-4 hydrant system, a PCB spill site, four oil/water separator sites, and an area of staining. Land use restrictions and delays in reuse may occur as a result of ongoing site investigations and remediation activities associated with these sites.

Commercial. Remediation and long-term monitoring associated with landfill LF-04 in the southern portion of Castle AFB could result in land use restrictions and delays in property reuse.

Land use restrictions and delays in property disposal could result from site investigation and remediation activities associated with the potential sites of contamination within this land use area. These sites include the storm drain system, and disposal pits 1, 2, and 3 within landfill 4.



EXPLANATION

1 Airfield*
2 Aviation Support*
3 Industrial
4 Institutional (Medical)*
5 Institutional (Educational)
6 Commercial*
7 Residential*
8 Public/Recreation
9 Agriculture
10 Vacant Land*
Listed IRP sites and potential sites of contamination (DOD ID numbers in smaller text)
Base Boundary
Runway
Groundwater Plume

0 500 1000 2000 Feet

* This standard land use designation is not applicable to this figure.

IRP Sites - North Base Non-Aviation Alternative

Note: Information is current as of October 19, 1993.

Figure 4.3-5a

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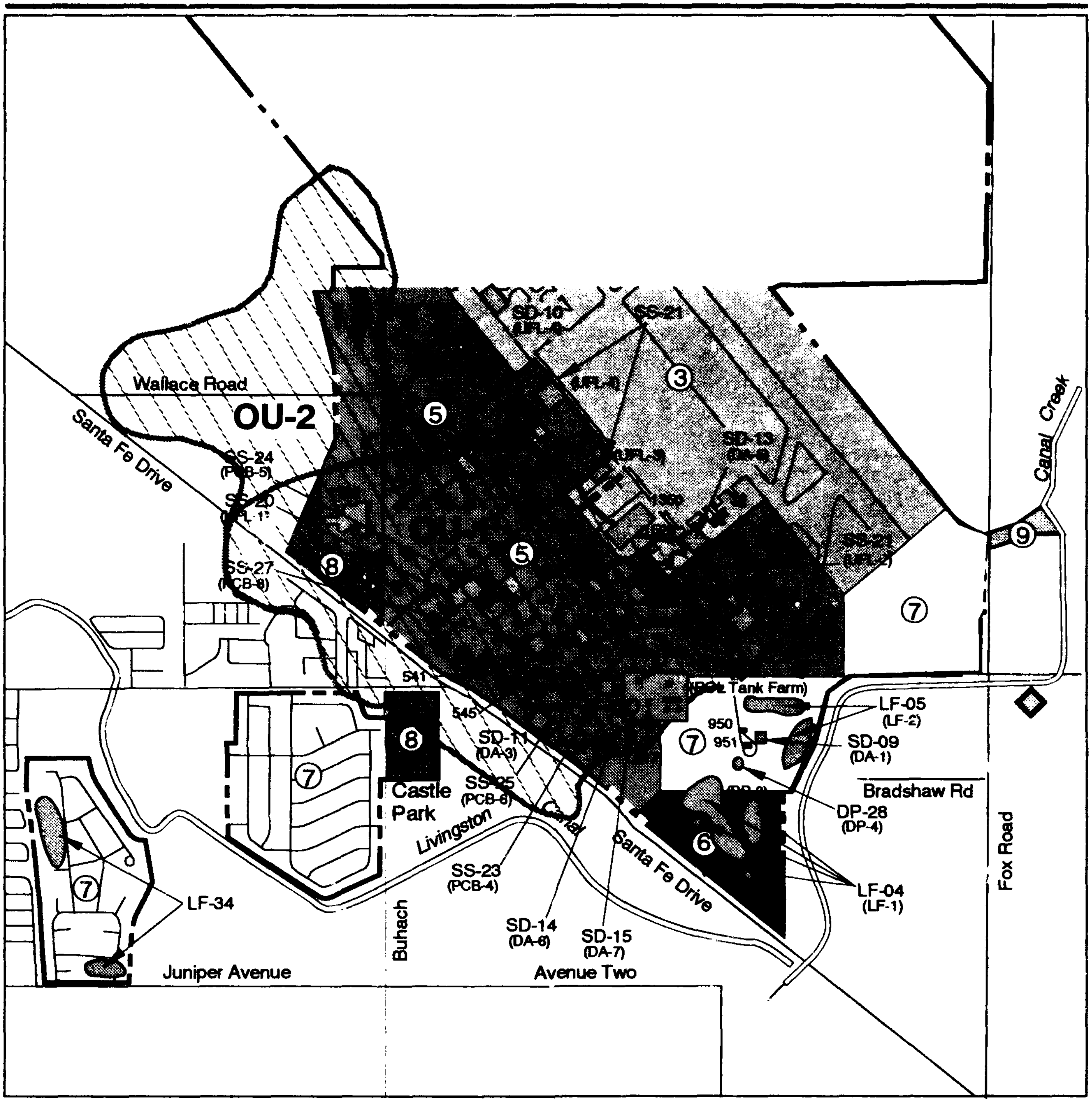


EXPLANATION

- ① Airfield*
- ② Aviation Support*
- ③ Industrial
- ④ Institutional (Medical)*
- ⑤ Institutional (Educational)
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public/Recreation
- ⑨ Agriculture
- ⑩ Vacant Land*
- Listed IRP sites and potential sites of contamination (DOD ID numbers in smaller text)
- Base Boundary
- Runway
- Groundwater Plume

0 500 1000 2000 Feet

* This standard land use designation is not applicable to this figure.

IRP Sites - South Base Non-Aviation Alternative

Note: Information is current as of October 19, 1993.

Figure 4.3-5b

Table 4.3-10. Listed IRP Sites and Potential Sites of Contamination within Land Use Areas - Non-Aviation Alternative

Proposed Land Use	Listed IRP Sites	Potential Sites
Industrial	Central Base TCE groundwater contamination, FT-02, FT-03, LF-07, LF-08, SD-10, SD-12, SD-13, SS-17, SS-18, SS-19, Wallace Road TCE groundwater contamination	Buildings 1314, 1319, 1350, 1404, 1405, 1529; disposal pit 5, disposal pit 6, hazardous waste storage area 4, industrial sewer system, JP-4 fuel hydrant system, storage area B-4, sanitary sewer system, stain 39, stain 40, stain 41, stain 42, stain 43, stain 44, storm drain system
Institutional (educational)	Central Base TCE groundwater contamination, SD-11, SD-13, SD-14, SD-15, SD-16, SS-17, SS-20, SS-21, SS-22, SS-23, SS-24, SS-25, SS-27, POL fuel tank farm, Wallace Road TCE groundwater contamination	Buildings 23, 47, 51, 52, 53, 54, 55, 59, T61, T66, T67, 84, T85, 175, 325, 508, 541, 545, 551, 871, 917, 1182, 1201, 1204, 1205, 1206, 1207, 1253, 1260, 1266, 1324, 1325, 1335, 1344, 1532, 1541, 1560, 1562, 1571; industrial sewer system, JP-4 fuel hydrant system, PCB-9, sanitary sewer system, storage area B-2, storage area B-3, stain 38, storm drain system, SWMU 4.14, SWMU 4.20, SWMU 4.38, SWMU 4.6
Commercial	LF-04	Disposal pit 1, disposal pit 2, disposal pit 3, storm drain system
Residential	LF-04, LF-05, SD-09, DP-28, LF-34, Central Base TCE groundwater contamination, POL fuel tank farm	Buildings 950 and 951, sanitary sewer system, storm drain system, JP-4 fuel hydrant system
Public facilities/recreation	Central Base TCE groundwater contamination, FT-01, LF-06, LF-08, SS-26, ST-32	Building 1709, disposal pit 7, disposal pit 8, disposal pit 9, EOD Range, sanitary sewer system, small arms firing range, storm drain system
Agriculture	None	Storm drain system

EOD = Explosive Ordnance Disposal.
IRP = Installation Restoration Program.
PCB = Polychlorinated biphenyl.
POL = Petroleum, oil, and lubricants.
SWMU = Solid Waste Management Unit.
TCE = Trichloroethylene.

Residential. Delays in redevelopment could occur as a result of RA taken at sites DP-28, SD-09, and the POL fuel tank farm, all located in the southern portion of Castle AFB. Remediation and long-term monitoring associated with the Central Base TCE groundwater contamination, at landfills 4 and 5 (LF-04 and LF-05) in the south base area, and at landfill LF-34 in the Castle Vista housing area could result in land use restrictions and delays in property reuse.

The JP-4 fuel hydrant system, the storm drain system, and Buildings 950 and 951 are the only potential sites of contamination associated with the residential land use under this alternative. Site investigations or remediation activities associated with these sites may result in land use restrictions or delays in property disposal or reuse.

Public Facilities/Recreation. Six listed IRP sites and eight potential sites of contamination are located within the public facilities/recreation land use under the Non-Aviation Alternative. Land use restrictions and delays in property reuse could result from remediation and long-term monitoring activities associated with landfills LF-06 and LF-08 in the northeast section of Castle AFB and the Central Base TCE groundwater contamination. Redevelopment could be delayed as a result of remediation at sites FT-01, SS-26, and ST-32, all located in the eastern portion of the base.

The potential sites of contamination associated with this land use area include Building 1709 wherein hazardous substances were utilized at one time, the small arms firing range, the EOD Range, the storm drain system, the sanitary sewer system, and three disposal pits within landfill 8. Site investigations or RAs associated with these sites may result in land use restrictions or delays in property redevelopment.

Agriculture. No listed IRP sites exist within this land use category. The storm drain system is a potential site of contamination; site investigation or remediation of this site could result in land use restrictions or delays in reuse.

4.3.5.4 Storage Tanks. Under the Non-Aviation Alternative, industrial and educational facilities would require the use of both USTs and aboveground storage tanks. New and existing storage tanks would be subject to the same federal, state, and local regulations discussed under the Proposed Action. The fuel hydrant system would be closed in accordance with all applicable regulations. Oil/water separators will be pumped and cleaned prior to disposal.

4.3.5.5 Asbestos. Renovation and demolition of existing structures that contain ACM may occur with reuse development. Scheduled activities would be similar to those identified under the Proposed Action. These activities are subject to all applicable federal, state, and local regulations to minimize the potential risk to human health and the environment.

4.3.5.6 Pesticides. Pesticide usage associated with the Non-Aviation Alternative would be more than under closure baseline conditions. Management practices would be subject to FIFRA and state guidelines and would preclude any unacceptable impacts.

4.3.5.7 Polychlorinated Biphenyls. All Air Force-owned federally regulated PCB equipment and PCB-contaminated equipment, as well as state regulated PCB items, have been removed and properly disposed of.

4.3.5.8 Radon. Since all radon screening survey results were below the U.S. EPA's recommended mitigation level of 4 pCi/l, there would be no impact on reuse activities.

4.3.5.9 Medical/Biohazardous Waste. Under the Non-Aviation Alternative the amount of biohazardous waste generated by the proposed educational reuse will be more than that generated under baseline conditions. Waste management practices would be similar to those identified under the Proposed Action.

4.3.5.10 Ordnance. Management of the EOD, grenade, and small arms firing ranges would be similar to those practices discussed under the Proposed Action.

4.3.5.11 Lead. Lead management practices (including occupant notification) would be similar to those identified under the Proposed Action.

4.3.5.12 Mitigation Measures. *Mitigation measures for this alternative are* similar to those identified under the Proposed Action.

4.3.6 No-Action Alternative

The hazardous materials/waste issues associated with this alternative would include painting, maintenance, and the final phases of the IRP activities. Under the No-Action Alternative, the OL would manage all waste generated under the applicable regulations.

4.3.6.1 Hazardous Materials Management. Hazardous materials would be utilized in preventive and regular maintenance activities, grounds maintenance, and wastewater treatment. The materials used for these activities would include pesticides, fuels, paints, and corrosives. The OL would be responsible for hazardous materials handling training, as well as the hazardous materials communication requirements of OSHA regulations. Quantities of hazardous materials would be similar to those used at closure.

4.3.6.2 Hazardous Waste Management. With the exception of facilities utilized by OL personnel, all satellite accumulation points would be closed and the DRMO would dispose of all hazardous waste prior to closure. The small amount of hazardous waste that would be generated under the No-Action Alternative may enable the OL to become an exempt, small-quantity generator. The OL must comply with all RCRA and state regulations.

4.3.6.3 Installation Restoration Program Sites. Ongoing sampling and RD activities would be continued by the individual IRP contractors. The OL would support the utility requirements for these contractors and provide security for the IRP areas. Pump and treat remediation and monitoring of groundwater contamination would continue and possibly expand in scope.

4.3.6.4 Storage Tanks. USTs remaining at Castle AFB would be managed in accordance with all applicable regulations by the OL. Cathodic protection and leak detection systems on the USTs would also be the responsibility of the OL. Federal regulations require the closure of USTs out of service for 1 year or longer. The underground fuel hydrant system would be closed in place, and oil/water separators would be pumped and cleaned in accordance with all applicable regulations.

The aboveground storage tanks would be emptied and purged of fumes to preclude fire hazards. The county of Merced may order the removal of tanks that are out of service. The OL would provide cathodic protection, repair, and general maintenance for the aboveground storage tanks and piping.

4.3.6.5 Asbestos. The impacts from the No-Action Alternative would be minimal. Vacated buildings would be secured to prevent contact with ACM if the No-Action Alternative were implemented. Upon completion of the asbestos survey, management of ACM will be accomplished to ensure a safe site environment.

4.3.6.6 Pesticides. Under the No-Action Alternative, the grounds would be maintained in such a manner as to facilitate economic resumption of use. There should not be an appreciable increase in the use of pesticides from the closure baseline. Application of pesticides would be conducted in accordance with FIFRA and state regulations to assure the proper and safe handling and application of all chemicals.

4.3.6.7 Polychlorinated Biphenyls. All Air Force-owned federally regulated PCB equipment and PCB-contaminated equipment, as well as state-regulated PCB items, have been removed and properly disposed of.

4.3.6.8 Radon. Since all radon screening survey results were below the U.S. EPA's recommended mitigation level of 4 pCi/l, there would be no impacts from implementation of the No-Action Alternative.

4.3.6.9 Medical/Biohazardous Waste. All existing materials will be removed prior to closure; therefore, these materials would not create an impact under the No-Action Alternative.

4.3.6.10 Ordnance. The EOD, grenade, and small arms firing ranges will be cleared of any unexploded ordnance, and any contaminated soils would be remediated. Therefore, no impacts would occur under the No-Action Alternative.

4.3.6.11 Lead. The impacts under the No-Action Alternative would be minimal. Vacated buildings would be secured to prevent contact with lead-based paints.

4.3.6.12 Mitigation Measures. Under the No-Action Alternative, the OL would be responsible for the basewide management of hazardous materials/waste. Contingency plans developed to address spill response would be less extensive than those required for the Proposed Action. Implementation of such procedures could effectively mitigate any potential impacts associated with the No-Action Alternative.

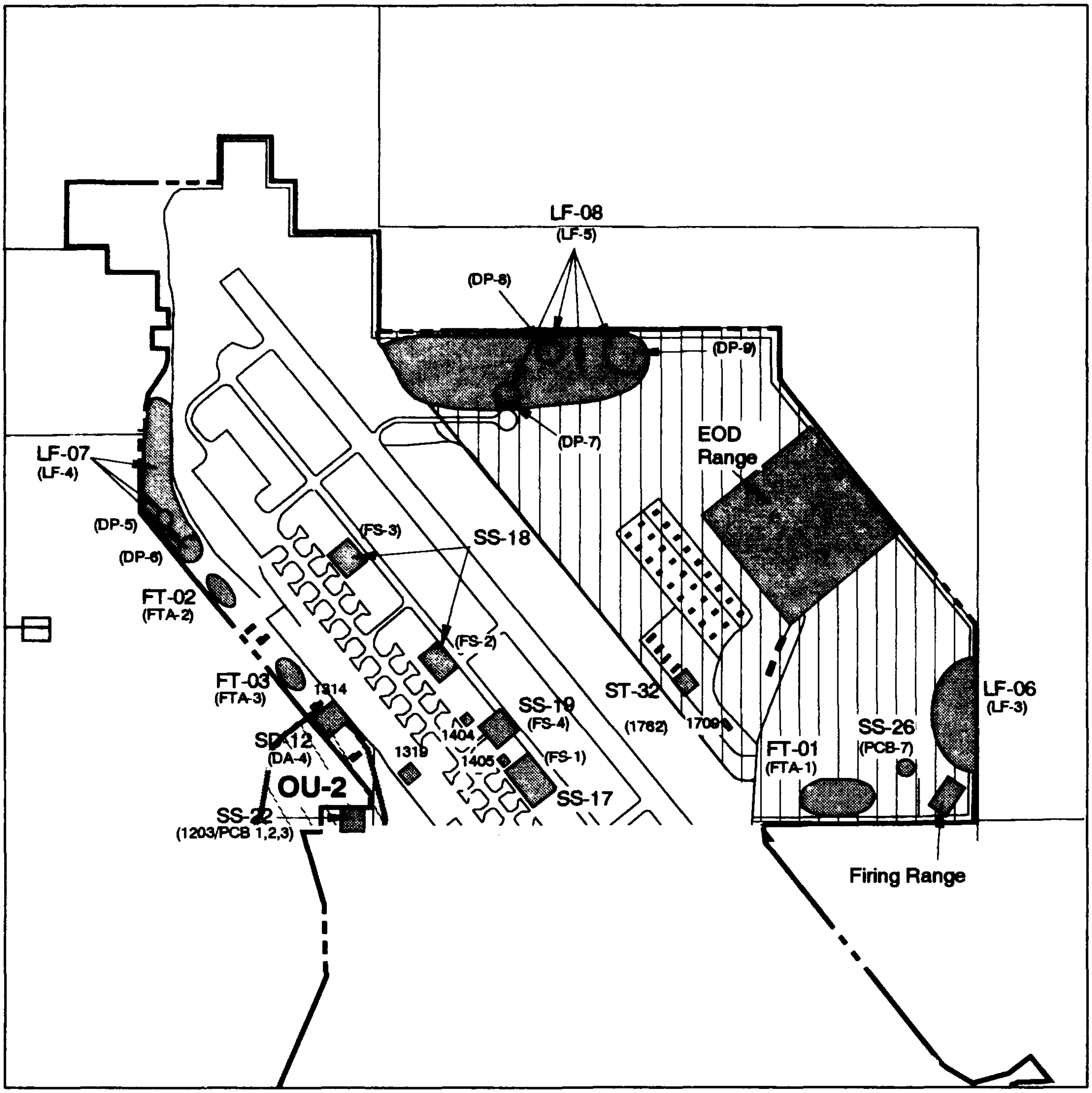
4.3.7 Other Land Use Concepts

This section discusses transfers/conveyances within the framework of the IRP and within the context of the hazardous materials typically associated with their proposed reuses.

Federal Correctional Complex. Hazardous materials would be utilized for facility maintenance and operations. These materials would include fuels, POL, heating oils, paints, thinners, solvents, pesticides, and household products. Small amounts of hazardous wastes may be generated by the use of nazardous materials. Biomedical wastes would be handled in accordance with applicable federal and state regulations. Management of these facilities in compliance with all applicable regulations would preclude any unacceptable impacts. Since all unexploded ordnance would be cleared prior to disposal, there would be no impact from implementation of this proposal.

Five listed IRP sites are located within the area designated for reuse by the Federal Bureau of Prisons. These sites include landfills LF-06 and LF-08, fire training area FT-01, and spill sites SS-26 and ST-32. Seven potential sites of contamination are also located within this land use area: the storm drainage system; Building 1709; disposal pits 7, 8, and 9 in landfill 8; the small arms firing range; and the EOD Range. Redevelopment delays and land use restrictions could occur as a result of ongoing site investigations or RAs at these sites (Figure 4.3-6).

Private Recreational Facility. Hazardous materials utilized under this proposal could include pesticides, paints, thinners, fuels, and oils for facility maintenance proposes. Small arms ammunition would also be utilized on site. For purposes of analysis, it has been assumed that lead shot remediation would be performed annually prior to the onset of winter, thereby minimizing impacts from lead. Reuse facilities may contain ACM or lead-based paint. No unacceptable impacts would result under this proposal due to compliance with all applicable regulations.



EXPLANATION

Federal Correctional Complex

Listed IRP sites and potential sites of contamination (DOD ID numbers in smaller text)

Base Boundary

0 500 1000 2000 Feet

Note: Information is current as of October 19, 1993.

IRP Sites - Other Land Use Concept- Federal Correctional Complex

Figure 4.3-6

The area designated for reuse by the CGSTA contains three listed IRP sites: FT-01, LF-06, and SS-26, as well as three sites of potential contamination (the small arms firing range, the EOD Range, and the storm drain system) (Figure 4.3-7). Remediation and long-term monitoring activities associated with landfill LF-06 could create land-use restrictions and could delay reuse; delays in redevelopment could occur as a result of RAs at sites FT-01, SS-26, and the sites of potential contamination.

4.4 NATURAL ENVIRONMENT

This section describes the potential effects of the Proposed Action and alternatives on the natural resources of soils and geology, water resources, noise, biological resources, and cultural resources in the base area and the surrounding region.

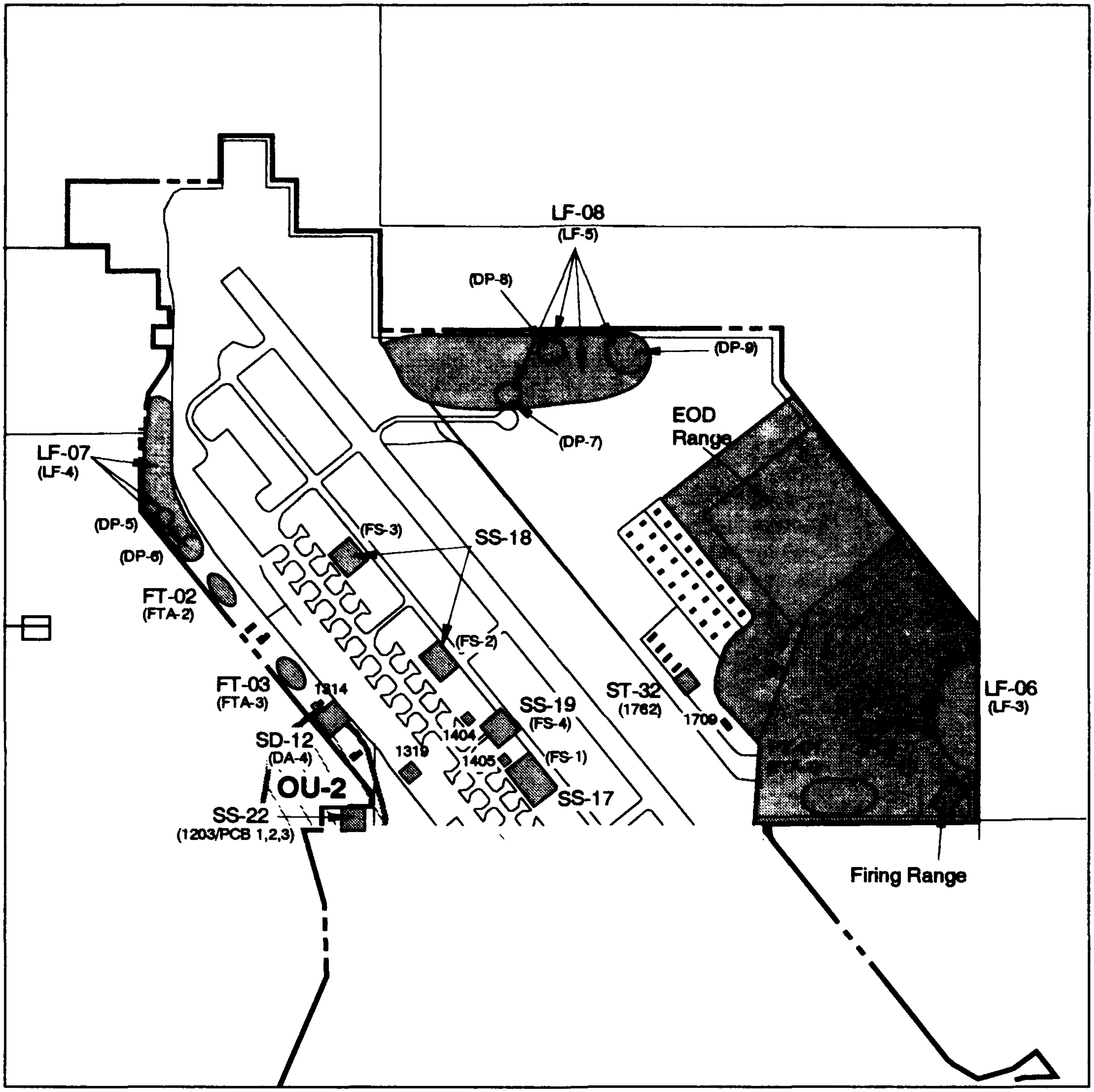
4.4.1 Soils and Geology

The potential effects of the Proposed Action and other reuse alternatives on the local soils and geology have been analyzed with data obtained from various sources. Potential impacts to the soils and geology from closure of Castle AFB include possible effects from earthwork associated with land development activities, including surface grading and/or excavation, as well as possible impacts on geologic or soil resources, such as changes in their availability or condition. Impacts to these earth resources can be greater than impacts from earthwork, because the effects on resources are generally permanent and the resources are finite.

4.4.1.1 Proposed Action. Effects of the Proposed Action on the regional soils and geology would be minimal. Effects on local soils and geology would result primarily from the construction activities associated with the Proposed Action, such as grading, excavating, and recontouring the soils. These activities could alter the soil profiles and local topography.

Excavated and stockpiled materials exposed to rainfall for extended periods could produce a leachate of undesirable chemicals, depending on the mineral content of the stockpiled material. Acreages to be disturbed under the Proposed Action from the time of closure through redevelopment at the 5-year, 10-year, and 20-year periods are presented in Chapter 2 (see Table 2.2-3).

The greatest amount of ground disturbance under the Proposed Action would occur during the first 5 years, with 215 acres expected to be disturbed. This would be reduced to 148 acres during the next 5 years and 87 acres during the subsequent 10 years. During the 20-year analysis period for the Proposed Action, no single development is expected to disturb any more than about 104 acres, a relatively small area from which to control erosion. In addition, ground surface slopes on the Castle AFB property are



EXPLANATION

Private Recreational Facility

Listed IRP sites and potential sites of contamination (DOD ID numbers in smaller text)

Base Boundary

0 500 1000 2000 Feet

Note: Information is current as of October 19, 1993.

IRP Sites - Other Land Use Concept- California Golden State Trapshooters Association

Figure 4.3-7

quite shallow and the grading and excavation activity would be minor; both factors would reduce the potential for large amounts of erosion. Finally, disturbance of the soil layers or the underlying rock is not expected to expose any undesirable, leachable minerals. Exposure of excavated soils is not expected for extended periods of time.

Analysis of loss of prime farmland is pending completion of Form AD-1006 (Appendix I) by the SCS.

No impacts on the availability of sand and gravel resources in the area are expected as a result of their use in the Proposed Action. The relative abundance of these materials, compared to the expected amount required by the Proposed Action over the 20-year implementation period, should leave more than adequate amounts of these resources for other construction demands.

Mitigation Measures. In order to minimize impacts to areas disturbed by earthwork, the use of Best Management Practices (BMPs) for construction sites is strongly recommended. Use of BMPs will reduce the potential for erosion of disturbed soils and their transport off site to natural channels or agricultural drainage canals. These BMPs include the following:

- Schedule grading and excavation activities to minimize the extent and duration of disturbance in any given area, and avoid earthwork during the rainy season.
- Lay foundations, complete paving, or apply mulch and/or mulch and seed combinations to disturbed areas as soon as practical after grading or excavation is completed.
- Establish perimeter controls through use of silt fences, berms, sand bags, or other physical means to contain sediment and runoff and direct it to an engineered sediment trap or basin.

4.4.1.2 Castle Aviation Center Alternative. Effects of the Castle Aviation Center Alternative on the regional soils and geology are expected to be minimal.

The potential for soil erosion and other impacts due to construction activities associated with the Castle Aviation Center Alternative would be the same as that under the Proposed Action. Acreages to be disturbed under the Castle Aviation Center Alternative from the time of closure through the redevelopment period at the 5-year, 10-year, and 20-year periods are presented in Chapter 2 (see Table 2.3-3).

The greatest amount of ground disturbance under the Castle Aviation Center Alternative would occur during the first 5 years, with 119 acres expected to be disturbed. This would be reduced to 27 acres during the next 5 years, and no disturbance would occur during the subsequent 10 years. During the 20-year development period, the total disturbed area would be 32 percent of that expected for the Proposed Action, and no single development should disturb more than 56 acres. Ground surface slopes on base are shallow, grading and excavation activity should be minor, and no undesirable leachable minerals should be exposed for extended periods of time.

Analysis of prime farmland loss is pending completion of Form AD-1006 (Appendix I) by the SCS.

As under the Proposed Action, no impacts on the availability of sand and gravel resources in the area are expected as a result of their use in the Castle Aviation Center Alternative.

Mitigation Measures. The mitigation measures discussed for the Proposed Action would also be applicable for the Castle Aviation Center Alternative.

4.4.1.3 Commercial Aviation Alternative. Effects of the Commercial Aviation Alternative on the regional soils and geology are expected to be minimal.

The potential for soil erosion and other impacts due to construction activities associated with the Commercial Aviation Alternative would be the same as that under the Proposed Action. Acreages to be disturbed under the Commercial Aviation Alternative from the time of closure through the redevelopment period at the 5-year, 10-year, and 20-year periods are presented in Chapter 2 (see Table 2.3-8).

The most intense period of ground disturbance under the Commercial Aviation Alternative would occur during the 5-year period from 1995 to 2000, with 160 acres expected to be disturbed. The rate of ground disturbance would reduce to 111 acres during the following 5 years, and continue at the lower rate during the 10 years from 2005 to 2015, with 198 acres disturbed. During the 20-year development period for the Commercial Aviation Alternative, the total disturbed area would be 4 percent greater than that expected for the Proposed Action, with no single development disturbing more than 84 acres at a time. Ground surface slopes on base are shallow, grading and excavation activity should be minor, and no undesirable leachable minerals should be exposed for extended periods of time.

Analysis of loss of prime farmland is pending completion of Form AD-1006 (Appendix I) by the SCS.

As under the Proposed Action, no impacts on the availability of sand and gravel resources in the area are expected as a result of their use in the Commercial Aviation Alternative.

Mitigation Measures. The mitigation measures discussed for the Proposed Action would also be applicable for the Commercial Aviation Alternative.

4.4.1.4 Aviation with Mixed Use Alternative. Effects of the Aviation with Mixed Use Alternative on the regional soils and geology are expected to be minimal.

The potential for soil erosion and other impacts due to construction activities associated with the Aviation with Mixed Use Alternative would be the same as that under the Proposed Action. Acreages to be disturbed under the Aviation with Mixed Use Alternative from the time of closure through redevelopment at the 5-year, 10-year, and 20-year periods are presented in Chapter 2 (see Table 2.3-13).

The greatest amount of ground disturbance under the Aviation with Mixed Use Alternative would occur during the first 5 years, with 203 acres expected to be disturbed. This would be reduced to 66 acres during the next 5 years and 91 acres during the subsequent 10 years. During the 20-year development period, the total disturbed area would be 80 percent of that expected for the Proposed Action, and no single development should disturb more than 117 acres. Ground surface slopes on base are shallow, grading and excavation activity should be minor, and no undesirable leachable minerals should be exposed for extended periods of time.

Analysis of loss of prime farmland is pending completion of Form AD-1006 (Appendix I) by the SCS.

As under the Proposed Action, no impacts on the availability of sand and gravel resources in the area are expected as a result of their use in the Aviation with Mixed Use Alternative.

Mitigation Measures. The mitigation measures discussed for the Proposed Action would also be applicable for the Aviation with Mixed Use Alternative.

4.4.1.5 Non-Aviation Alternative. Effects of the Non-Aviation Alternative on the regional soils and geology are expected to be minimal.

The potential for soil erosion and other impacts due to construction activities associated with the Non-Aviation Alternative would be the same as that under the Proposed Action. Acreages to be disturbed under the Non-Aviation Alternative from the time of closure through redevelopment at the 5-year, 10-year, and 20-year periods are presented in Chapter 2 (see Table 2.3-18).

Under the Non-Aviation Alternative, the rate of disturbance would remain almost the same during the first 10 years, with 210 acres disturbed during the first 5 years and 207 acres disturbed during the next 5 years. The rate of disturbance would then drop by almost 50 percent to 227 acres disturbed during the next 10 years. During the 20-year development period, the total disturbed area would be 43 percent more than that expected for the Proposed Action. However, no single development would disturb more than 97 acres except the additional 142 acres of farmland in the northern portion of the base property. This area of disturbed soil would be constantly exposed to erosion from rainfall-runoff processes, and specific BMPs for agricultural activities should be implemented. Ground surface slopes on base are flat; therefore, grading and excavation activity should be minor, and no undesirable leachable minerals should be exposed for extended periods of time.

Analysis of loss of prime farmland is pending completion of Form AD-1006 (Appendix I) by the SCS.

As under the Proposed Action, no impacts on the availability of sand and gravel in the area are expected as a result of their use in the Non-Aviation Alternative.

Mitigation Measures. The mitigation measures discussed for the Proposed Action would also be applicable for the Non-Aviation Alternative. In addition, the following BMPs should be implemented for agricultural activities:

- Plant or till (if tilling is used) along topographic contours to minimize channeling of surface water runoff, which concentrates the erosive forces.

- Plant crops without tilling to minimize the amount of ground/soil disturbance associated with the agricultural land use.

- Keep fertilizer and pesticide use to a minimum to reduce the potential for water quality impacts from agricultural drainage.

4.4.1.6 No-Action Alternative. No impacts would be expected under the No-Action Alternative. There would be no grading or excavation in the base area and, therefore, no surface disturbance. There would also be no new construction activity on the base area that would place a demand on the sand and gravel resources of the region. Because no impacts would be expected, no mitigation measures would be necessary.

4.4.1.7 Other Land Use Concepts. Effects on soils and geology, as a result of other land use concepts that may be implemented in conjunction with one of the integrated reuse alternatives, are discussed below.

Federal Correctional Complex. This proposal would disturb up to 120 acres from 1995 to 2000 and another 128 acres from 2005 to 2015. If implemented in conjunction with any of the reuse alternatives, construction and grading activities associated with the Federal Correctional Complex would increase the potential for erosion effects. However, the topography of the area is quite level, and if BMPs are implemented during construction, soil erosion should be minor and temporary.

Private Recreational Facility. This proposal would entail disturbance of 107 acres over the 10 years after closure. If implemented in conjunction with any of the reuse alternatives, construction and grading activities would result in very small additional soil erosion effects. BMPs should be implemented during construction activities to minimize soil erosion effects.

4.4.2 Water Resources

The following section describes the potential impacts on water resources as a result of the Proposed Action and reuse alternatives. Construction activities could alter soil profiles and natural drainages, which, in turn, may alter water flow patterns temporarily. Impacts on water quality from hazardous waste contamination are addressed in Section 4.3, Hazardous Materials and Hazardous Waste Management.

4.4.2.1 Proposed Action

Surface Water. The impacts to surface water resources from the Proposed Action are expected to be minor.

Under the Proposed Action, soils would be compacted during new construction and overlain by asphalt, asphaltic concrete or buildings, all of which create impervious surfaces that cause increased surface runoff to local storm drains and drainage systems. In addition, drainage patterns could be altered to divert runoff away from and around construction sites and ultimately completed facilities, especially airfield pavements. However, the Castle AFB property is already heavily developed (paved, built on, and artificially drained) and the additional construction is not expected to substantially alter the small volume of runoff. Any increase in erosion from the Proposed Action is likely to be from earthwork, rather than channel erosion, as discussed in Section 4.4.1.

A one-hundred year floodplain occurs on Canal Creek; this floodplain overlaps the southeastern and southernmost portions of the base. It is likely that this floodplain also includes portions of the base that are expected to be used for airfield and aviation support under the Proposed Action. Development in these areas would be considered an impact in that it is a loss of a natural resource. With careful planning, development of these properties could reduce or avoid potential floodplain encroachment that would increase the flooding potential for this area. Upstream from the base, along Canal Creek, the adjacent properties are rural farmland. As required by Executive Order (EO) 11988, the Air Force would implement a series of procedures to minimize impacts, including identifying federal, state, and local restrictions on development of floodplains on any applicable land transfer deeds.

Surface water in the area of Castle AFB is used exclusively for agricultural purposes, primarily as irrigation water. Development activities planned under the Proposed Action should not affect the quantity of water available for agricultural uses in the region or impact the existing surface water delivery system.

Surface Water Quality. Storm water discharge may carry non-point source pollutants from the airfield, aviation support areas, and other heavy industrial areas in the form of fuels, oils, and other residual contaminants that could degrade surface water resources. This is not expected to be a major impact to the area, since Castle AFB has been operating as an airfield for a number of years and non-point source pollution from the airfield is unlikely to change. Non-point source runoff would also be subject to storm water management regulations of the Clean Water Act. Further, any new industrial development on the Castle AFB property would likely be subject to NPDES permitting requirements, which would help reduce the potential non-point source pollution loads to manageable levels.

Groundwater. Impacts to groundwater quality are possible, but unlikely, during the construction phase of any new development. Groundwater contamination would require an unusual occurrence such as a spill, a line break, or some other accident to release enough contaminant (which may not even be expected at a construction site) onto the bare ground surface. Because such occurrences are uncommon, and the likelihood that highly toxic chemicals such as solvents would be present is equally uncommon, the potential for groundwater contamination from such an event is considered small.

The long-term potential for groundwater contamination from the general operations of an airfield and industrial facilities is greater than for the construction phase. Minor spills of contaminants onto the ground surface over time can result in contaminants being flushed through the soil to the groundwater. However, RCRA regulations for handling hazardous materials make even these minor occurrences much less likely than in the past, and the contamination of groundwater is considered unlikely.

The projected water demand for all activities associated with the Proposed Action is 0.57 MGD by 2015. This water usage would be much less than preclosure use of groundwater on base of approximately 1.34 MGD. Because the regional aquifer is in a state of overdraft, this water use would be an incremental impact to aquifer depletion. However, this is a very small use rate compared to agricultural and other regional uses and, therefore, is a negligible incremental impact. The water would continue to be supplied by the two existing on-base wells and the city of Atwater.

Mitigation Measures. Encroachment of buildings on 100-year floodplains delineated by FEMA is regulated by local governments as part of their agreement to be a part of the National Flood Insurance Program. Such encroachment is limited to fixed areas delineated on FEMA maps, and must meet elevation criteria to reduce the potential for property damage from flooding and to limit the amount of fill that can be placed on floodplains. Other restrictions, such as defined by EO 11988, may be attached to land transfer documents by the Air Force to reduce the amount of floodplain impacts.

Federal legislation would likely require that developers responsible for constructing new commercial and industrial facilities obtain an NPDES permit that will govern the quality of the storm water runoff from the construction site. Similar requirements may also apply to owners and operators of industrial facilities, and possibly even commercial facilities. Such permit requirements would help to mitigate impacts to surface water quality from both short-term (construction phase) and long-term (facility operation phase) effects from the Proposed Action.

No specific mitigation measures are expected to be needed to protect groundwater resources, other than the existing RCRA regulations with adequate enforcement.

4.4.2.2 Castle Aviation Center Alternative

Surface Water. The impacts to surface water resources from the Castle Aviation Center Alternative are expected to be minor.

The Castle Aviation Center Alternative is expected to have runoff and erosion effects similar to those described for the Proposed Action. Runoff is not expected to change significantly with the planned development activities, and neither is channel erosion.

A small amount of floodplain may be impacted from ground-disturbing activities from this alternative. Minimum change in the risk of flooding in the proposed industrial and airfield areas adjacent to Canal Creek is expected because no new facility construction is proposed and ground disturbance would be minimal. Risk of upstream flooding caused by reuse activities would also be minor for this alternative. As with the Proposed Action, the Air Force would comply with EO 11988 requirements for disposal of federal land in floodplains.

Current surface water use in the area surrounding Castle AFB is exclusively for agricultural purposes, primarily as irrigation water. Reuse activities planned under the Castle Aviation Center Alternative should not affect the quantity of water available for agricultural uses in the region, or impact the existing surface water delivery system.

Surface Water Quality. Concerns about impacts to surface water quality from the Castle Aviation Center Alternative would be similar to those identified for the Proposed Action. Non-point source pollution would be an important consideration, but it should not be substantially different than under preclosure conditions. Runoff would be subject to storm water management regulations of the Clean Water Act.

Groundwater. As discussed under the Proposed Action, impacts to groundwater quality are possible but unlikely either during the construction phase of any new development or during the general operations of an industrial facility. This is primarily due to current regulations concerning business operations and hazardous materials.

The projected water demand for all activities associated with the Castle Aviation Center Alternative is expected to be 1.29 MGD by 2015, compared to 0.57 MGD under the Proposed Action. This is less than the preclosure use of groundwater on base of approximately 1.34 MGD. This incremental impact to aquifer overdraft is somewhat greater than the Proposed Action, but is still very small in comparison to other regional uses.

Mitigation Measures. The surface water mitigation measures discussed for the Proposed Action would also be applicable for the Castle Aviation Center Alternative. No specific mitigation measures are expected to be needed to protect groundwater resources, other than the existing RCRA regulations with adequate enforcement.

4.4.2.3 Commercial Aviation Alternative

Surface Water. The impacts to surface water resources from the Commercial Aviation Alternative are expected to be minor.

The Commercial Aviation Alternative is expected to have runoff and erosion effects similar to those described for the Proposed Action. Runoff and channel erosion are not expected to change significantly with the planned development activities. Therefore, downstream flooding should not be affected by the Commercial Aviation Alternative.

It is likely that some measure of planning will be necessary to ensure that the risk of flooding under the development planned with the Commercial Aviation Alternative is not exacerbated by the proposed industrial and airfield areas adjacent to Canal Creek. Concerns about upstream flooding caused by the development for this alternative are also minor because the adjacent properties are rural farmland. The residential development planned for the southernmost portion of the base would include impacts from proper development in 100-year floodplains. The 178 acres of devel t would include all of the susceptible floodplains at the southern end base. The Air Force would comply with EO 11988 in the disposal of the property for this use.

At present the surface water in the area surrounding Castle AFB is exclusively used for agricultural purposes, primarily as irrigation water. Development activities planned under the Commercial Aviation Alternative should not affect the quantity of water available for agricultural uses in the region, nor impact the existing surface water delivery system.

Surface Water Quality. Concerns about impacts to surface water quality from the Commercial Aviation Alternative will be similar to those identified for the Proposed Action. N oint source pollution will be an important consideration, but it shoul ubstantially different than under preclosure conditions. Runo the site area would be subject to the storm water management regulations of the Clean Water Act.

Groundwater. As discussed under the Proposed Action, impacts to groundwater quality are possible, but unlikely either during the construction phase of any new development or during the general operations of an industrial facility. This is primarily due to current regulations concerning business operations and hazardous materials.

The projected water demand for all activities associated with the Commercial Aviation Alternative is expected to be 1.04 MGD by 2015, compared to the 0.57 MGD of the Proposed Action. This is less than the preclosure groundwater use on base of approximately 1.34 MGD. This incremental impact to groundwater overdraft is approximately twice the impact from the Proposed Action, but is still very small in comparison to other regional uses.

Mitigation Measures. The surface water mitigation measures discussed for the Proposed Action would also be applicable for the Commercial Aviation Alternative. Aside from enforcement of existing RCRA regulations, no specific mitigation measures are expected to be needed to protect groundwater resources.

4.4.2.4 Aviation with Mixed Use Alternative

Surface Water. The impacts to surface water resources from the Aviation with Mixed Use Alternative are expected to be minor.

The Aviation with Mixed Use Alternative is expected to have runoff and erosion effects similar to those described for the Proposed Action. Runoff and channel erosion are not expected to change significantly with the planned development activities.

The commercial development planned for the southernmost portion of the base would have similar floodplain impacts as the Commercial Aviation Alternative. The Air Force would comply with EO 11988 in the disposal of the property.

Surface water in the area surrounding Castle AFB is used exclusively for agricultural purposes, primarily as irrigation water. Development activities planned under the Aviation with Mixed Use Alternative should not affect the quantity of water available for agricultural uses in the region, or impact the existing surface water delivery system.

Surface Water Quality. Concerns about impacts to surface water quality from the Aviation with Mixed Use Alternative would be similar to those identified for the Proposed Action. Non-point source pollution would be an important consideration, but it should not be significantly different than under preclosure conditions. Runoff would be subject to storm water management regulations of the Clean Water Act.

Groundwater. As discussed under the Proposed Action, impacts to groundwater quality are possible, but unlikely either during the construction phase of any new development or during the general operations of an industrial facility. This is primarily due to current regulations concerning business operations and hazardous materials.

The projected water demand for all activities associated with the Aviation with Mixed Use Alternative is expected to be 0.93 MGD by 2015, compared to 0.57 MGD under the Proposed Action. This is less than the preclosure groundwater use on base of approximately 1.34 MGD. This incremental impact to groundwater overdraft is somewhat greater than impacts from the Proposed Action, but is still very small in comparison to other required uses.

Mitigation Measures. The surface water mitigation measures discussed for the Proposed Action would also be applicable for the Aviation with Mixed Use Alternative.

Aside from enforcement of existing RCRA regulations, no specific mitigation measures are expected to be needed to protect groundwater resources.

4.4.2.5 Non-Aviation Alternative

Surface Water. The impacts to surface water resources from the Non-Aviation Alternative are expected to be minor.

The Non-Aviation Alternative is expected to cause less runoff, with smaller flood peaks, than the Proposed Action. This is due to fewer acres of fully developed land and more acres of open space and agricultural land than the Proposed Action. Little change in channel erosion is expected.

Floodplain impacts would be the same as for the Aviation with Mixed Use Alternative. The Air Force would comply with EO 11988 requirements for the disposal of the property.

Surface water in the area surrounding Castle AFB is used exclusively for agricultural purposes, primarily as irrigation water. Reuse planned under the Non-Aviation Alternative includes agricultural activities on 158 acres within the current base boundaries. This would increase surface water use for the area, but probably by only a small amount when compared to the current total agricultural acreage for the area.

Surface Water Quality. Concerns about impacts to surface water quality from the Non-Aviation Alternative would not be as great as those identified for the Proposed Action. Non-point source pollution would be of less concern because the high development land uses, with their associated contaminants, represent less than 2 percent of the planned area. Land uses with moderate development would represent 67 percent of the planned area, while those with low development would occupy 31 percent of the area. However, one-fifth of the low development area would be agricultural land, which can produce fertilizer and pesticide pollutant runoff.

Groundwater. As discussed under the Proposed Action, impacts to groundwater quality are possible but unlikely either during the construction phase of any new development or during the general operations of an industrial facility, primarily due to current regulations concerning business operations and hazardous materials. The increase in agricultural land use could impact groundwater quality by increasing the nutrient levels or pesticide content of the water.

The projected water demand for all activities associated with the Non-Aviation Alternative is expected to be 1.02 MGD by 2015, compared to 0.57 MGD under the Proposed Action. This is much less than the on-base preclosure use of approximately 1.34 MGD of groundwater. This incremental impact to groundwater overdraft is approximately twice that of the Proposed Action; however, these use rates are very small in comparison to other regional uses.

Mitigation Measures. The surface water mitigation measures discussed for the Proposed Action would also be applicable for the Non-Aviation Alternative.

No specific mitigation measures are expected to be needed to protect groundwater resources, other than the existing RCRA regulations with adequate enforcement.

4.4.2.6 No-Action Alternative. No adverse impacts would be expected under the No-Action Alternative. There would be no additional impervious area and, therefore, no increase in surface runoff and channel erosion. There would also be no new construction activity on the base area that would encroach on floodplains and increase flood risk. Groundwater use would decrease and water quality should improve, at least for surface water. Because no adverse impacts are expected, no mitigation measures would be necessary.

4.4.2.7 Other Land Use Concepts. Effects on water resources as a result of other land uses that may be implemented individually or in combination with one of the reuse alternatives are discussed below.

Federal Correctional Complex. Runoff during construction for these facilities would slightly increase impacts to surface and groundwater resources. Mitigation measures as described for the Proposed Action should be implemented to minimize these impacts. During the operations phase, the facility would increase groundwater use by 0.6 MGD. When added to projected water use for the reuse alternatives, the total would be well within the pumping capacity of on-base wells.

Private Recreational Facility. Implementation of this proposal in conjunction with any of the reuse alternatives would entail no impacts to surface or groundwater quality, and would result in negligible increases in groundwater use.

4.4.3 Air Quality

Air quality impacts would occur during construction and operations associated with the Proposed Action and alternatives for the reuse of Castle AFB. Intermittent construction-related impacts could result from fugitive dust (particulate matter) and construction equipment emissions. Operational impacts would occur from: (1) mobile sources such as aircraft, aircraft operation support equipment, commercial transport vehicles, and personal vehicles; (2) point sources such as heating/power plants, generators, incinerators, and storage tanks; and (3) secondary emission sources associated with a general population increase, such as residential heating.

The methods selected to analyze impacts depend upon the types of air emission sources being examined. Air quality analytical methods are summarized here and presented in detail in Appendix M. Analysis during the construction phase consists of estimating the amount of uncontrolled fugitive dust emitted from disturbed areas and the combustion emissions associated with construction equipment. Analysis for point source and secondary source emissions during the operation phase consists of quantifying the emissions associated with the airport and reuse-related employment and population. These emissions are then evaluated to determine how they would affect the region's ability to reach or maintain the CAAQS and NAAQS.

Ambient effects to local air quality are analyzed by modeling pollutant concentrations at receptor locations likely to receive maximum air quality impacts. For aviation-related alternatives, a number of receptors are typically selected at the downwind end of the runway to analyze the impacts from airport operations. Other receptors are located at key locations and in sensitive receptor areas around the base in order to assess the air quality impact from non-aviation activities on base (vehicle traffic on major roadways).

The ambient effects of aircraft and related vehicular emissions are analyzed by modeling with the EDMS (Segal, 1991). EDMS is a U.S. EPA recommended model for estimating emissions at airports and air bases. EDMS was developed jointly by the FAA and the U.S. Air Force specifically for the purpose of generating airport and air base emissions inventories, and for calculating the ambient concentrations caused by these emissions as they disperse downwind. The model uses U.S. EPA and United States military emission factors for motor vehicles and aircraft and information on peak-hour traffic and peak-hour landing and takeoff cycles to produce an emissions inventory of vehicle and aircraft operations. Typical aircraft operations include takeoff, runway climb and approach, runway queuing, taxi-in and taxi-out, and idling at the gates.

Air quality modeling is presented for the Proposed Action and alternatives through the year 2005 (10 years of analysis after closure). The effects of the 1990 CAAA, such as electric and other low-emission vehicle ownership percentages, cannot be accurately predicted very far into the twenty-first century. The uncertainties of long-range population and traffic projections, future CAA changes, and the complex interaction of meteorology with emission inventories make 20-year emission and pollution concentration projections too speculative.

The following assumptions were made in estimating the emissions and effects of the Proposed Action and alternatives:

- For construction, fugitive dust emissions were based on the acreage graded each year and an assumption of 4 grading days per acre. Combustion emissions from construction equipment were based on per-acre emission factors developed for a generic construction scenario. Construction equipment was assumed to be active 230 days per year.

- EDMS was used to calculate aircraft emissions for the airport operations associated with the reuse alternatives.

- Future reuse-related long-term emissions from sources other than aircraft and construction activities were derived using per capita emission factors. Future reuse-related emissions were estimated by multiplying per capita emission factors by the total direct and indirect population related to reuse. Future reuse-related emission sources were assumed to be subject to control measures promulgated as part of the 1991 AQAP. Reuse-related emissions estimated in this manner are conservative since no additional controls other than those contained in the 1991 AQAP were assumed to apply. Reuse-related sources would be subject to further emission reductions as a result of ARB and EPA promulgated control measures applied to sources outside the jurisdiction of the UAPCD 1991 AQAP. For example, ARB has promulgated regulations related to use of low-sulfur fuels in diesel mobile sources.

Because Merced County is included in the SJVAB, which is designated as a serious ozone nonattainment area by the U.S. EPA, measures must be developed to show that the region will attain the ozone standard by November 15, 1999. The UAPCD has developed the 1991 AQAP to attain the state ambient ozone standard as expeditiously as possible by implementing all feasible stationary source and mobile source emission control measures (San Joaquin Valley UAPCD, 1992b). Since the CAAQS for ozone is more stringent than the NAAQS for ozone, attainment of the state standard will also result in attainment of the federal standard. In order to attain the CAAQS for ozone, stationary sources will be limited to no net increase in emissions from new or modified permit units, and BARCT will be required for existing stationary sources. The CCAA also requires that the AQAP consider extensive transportation control measures, namely, reducing projected increases in vehicle miles traveled, achieving a minimum of 1.5 persons per vehicle (peak commute hours), achieving no net increase in vehicle emissions, and use of alternate fuels.

In addition, under the New Source Review provisions of the federal CAAA, any new or modified major source emitting more than 50 tons per year of VOC (ROG) or NO_x in a serious ozone nonattainment area must satisfy technology standards reflecting the lowest achievable emission rate and must provide offsets representing emission reductions from other sources at a ratio of at least 1.2 to 1.0. Another major effect of the CAAA is the establishment of new federal permitting requirements for new source construction. The new requirements will necessitate permit approval from the UAPCD, not only for projects that historically would have required a New Source Review permit, but also for other smaller sources that in the past would not have required a permit. Federal permitting requirements have not yet been fully established. However, it is anticipated that in addition to ozone precursors, the regulations will also require offsetting of PM_{10} emissions from new or modified major sources located in PM_{10} nonattainment areas.

The New Source Review requirements governing the control of attainment pollutants (NO_2, CO, and SO_2) differ somewhat from the requirements for nonattainment pollutants described above. New or modified major sources of NO_2, CO, and/or SO_2 in an attainment area must not cause or contribute to an exceedance of an ambient air quality standard. In addition, except for CO, the PSD program prevents emissions of pollutants in an attainment area from creating a nonattainment condition by limiting the allowable ambient impact of NO_2 and SO_2 emissions from new or modified major stationary sources to specific increments (refer to Table 3.4-2). These increments are designed to prevent new or modified sources from causing significant degradation of an area's air quality. For PSD purposes, major stationary sources are generally defined as those sources that emit more than 100 tons per year of an attainment pollutant. Ambient impacts from new or modified air pollution sources are generally determined through air quality modeling. Although the PSD process provides adequate means for assessing and regulating impacts from stationary sources of air pollution, this process does not provide a mechanism for dealing with nonstationary sources such as motor vehicles and aircraft.

Section 176(c) of the CAA provides that a federal agency cannot support an activity in any way unless the federal agency determines that activity will conform to an EPA-approved SIP's purpose of attaining and maintaining the NAAQS. This means that federally supported or funded activities will not: (1) cause or contribute to any new violation of any standard; (2) increase the frequency or severity of any existing violation of any standard; or (3) delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area. In accordance with Section 176(c), the U.S. EPA promulgated the final conformity rule for general federal actions on November 30, 1993, which is codified as 40 CFR Part 51 Subpart W, and Part 93 Subpart B. The 40 CFR Part 93 Subpart B applies to federal agencies until states revise their SIPs to adopt a conformity rule at least as stringent as U.S. EPA's rule (40 CFR Part 51 Subpart W). U.S. EPA's rule contains several exemptions from conformity procedures for certain actions, on the basis that they are clearly below the threshold of significance (de minimis). These exemptions include the transfer of ownership of real property (40 CFR 93.153 [c][2][xiv] and [xx]) as well as leasing agreements pending environmental restoration under CERCLA (40 CFR 93.153 [c][2][xix]). As such, it is not necessary for the Air Force to prepare a conformity determination for disposal of the property. Federal agencies would be required to comply with the conformity regulations and, if necessary, prepare conformity determinations prior to implementing federal actions associated with reuse of the property.

The conformity rule applies to federal actions occurring in federal nonattainment or maintenance areas. As noted in Section 3.4.3, Merced County is located in an area designated by the U.S. EPA as nonattainment for ozone and PM_{10}.

The conformity rule defines the applicability criteria including several source exemptions and emission thresholds, which determine whether the federal action requires a conformity determination. For example, non-exempt federal actions with total direct and indirect emissions which remain below the de minimis emission thresholds and regionally significant thresholds do not require written conformity determinations prior to taking the action. The specific de minimis emission thresholds for Merced County are 50 tons per year for ozone precursors, and 70 tons per year for PM_{10} and its precursors. The definitions of total direct and indirect emissions for conformity purposes distinguish emissions according to timing and location rather than the type of emission source. Direct emissions occur at the same time and place as the federal action. Indirect emissions include those which may occur later in time or at a distance from the federal action. In addition the conformity rule limits the scope of indirect emissions to those which can be quantified and are reasonably foreseeable by the federal agency at the time of analysis, and those which the federal agency can practicably control and maintain control through its continuing program responsibility.

If the federal reuse action is subject to a conformity determination, one of five criteria may be used to demonstrate positive conformity. These criteria are based on the type of pollutant and status of the applicable SIP. Examples include: revising the applicable SIP to incorporate enforceable control measures to fully offset net emission increases, or fully offsetting net emission increases from other surplus emission reductions which become available in the region.

If a written conformity determination is required, the regulations include provisions for public notice and review, including a 30-day public review period for the draft determination and notification to applicable federal, state, and local regulatory agencies.

The specific conformity determination requirements for base reuse will be evaluated by the responsible federal agencies prior to their reuse actions. If the airfield is utilized as a civil airport, the FAA would likely be required to prepare a conformity determination for their ALP approval actions associated with federally funded airport developments at Castle AFB.

Emission Offsets. For purposes of demonstrating conformity under U.S. EPA's rule for general federal actions, emission offsets are emission reductions that are quantifiable, consistent with the applicable SIP attainment and progress demonstrations, surplus to reductions already required by the SIP, enforceable, and permanent. These "conformity offsets" include emission reduction credits (ERCs) and emission reductions that may not qualify as ERCs under local air district rules. ERCs, as a subset of conformity offsets, are emission reductions traditionally derived from the shutdown or reduced operation of stationary sources and, in limited circumstances, from certain mobile sources such as scrapped motor vehicles. Conformity offsets can include emission reductions from additional sources such as aircraft and employee motor vehicle commutes to and from work. Conformity offsets generally cannot be derived from emission sources that are beyond the agency's ability to control, such as off-duty employee motor vehicle trips off base for shopping or other personal errands.

Closure of a military installation can result in a substantial amount of emission reductions that qualify as conformity offsets but are not ERCs. Reduc n in military aircraft activity and federal employee motor vehicle commutes generate large annual tonnages of conformity offsets. They can be allocated to other federal agencies for use as conformity offsets within the air basin. Potential conformity offset emissions from Castle AFB, based on preclosure emissions, are shown in Table 4.4-1.

Table 4.4-1. Potential Conformity Offset Emissions from Preclosure Activities at Castle AFB[a] (tons per year)

Emission Category	CO	ROG	NO_x	SO_x	PM_{10}
Aircraft flight operations	2,526.53	1,889.24	647.15	89.06	132.86
Aircraft ground operations	6.11	4.24	10.10	0.96	1.32
Aerospace ground equipment	99.65	12.07	122.84	8.31	8.77
Vehicle miles traveled	4,001.62	469.23	210.80		6.44
Government vehicles	302.26	31.38	15.39		0.48
Heavy duty equipment	4.31	0.62	3.50	0.33	0.26
Fire fighting training	6.56	3.75	0.05	0.00	1.50
Totals	6,947.04	2,410.53	1,009.83	98.66	151.63

Note: (a) These emission offsets do not include other Emission Reduction Credits which could be utilized as conformity offsets. The approximate amount of stationary source emission which may qualify as Emission Reduction Credits, as defined under the Unified Air Pollution Control District rules, are: 25.6 tons of ROGs, 29.1 tons of NO_x, and 8.9 tons of PM_{10}.

CO = Carbon monoxide.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.
SO_x = Sulfur oxides.

The amount of preclosure conformity offsets shown in Table 4.4-1 differ from the preclosure base-related emission amounts listed in Table 3.4-5 and in the preclosure columns presented in the Emissions Associated with the Proposed Action and Alternatives tables in this section. Those tables represent total direct and indirect base-related emissions, including secondary sources that are beyond the Air Force's ability to control and thereby do not qualify as conformity offsets.

The Air Force's decisions regarding allocation of the conformity offsets can affect the amount of preclosure emissions available for evaluating the air quality impacts of the Proposed Action and reuse alternatives. The allocation can also affect the ability of other federal agencies to demonstrate conformity for actions within the air basin, including FAA approval and funding of the various airport alternatives discussed in this EIS. The impacts of the conformity offset allocation are discussed in greater detail in the Cumulative Impacts section for each reuse alternative.

ERCs are the common currency of all emission trading activity. ERCs may be created by shutdown or permanent curtailment of emissions from either stationary, area or mobile sources. In order to qualify as an ERC the emission reduction must be real, surplus, enforceable, permanent, and quantifiable. ERC certificates are issued by the UAPCD for qualifying emission reductions. These certificates may be banked, used in later emissions trading, or transferred in whole or in part to a new owner.

Certain preclosure source emissions at Castle AFB qualify to be converted to ERCs under the San Joaquin Valley UAPCD's ERC rule. The Air Force can apply for ERCs for these emissions and then allocate the ERCs to support reuse activities that will need ERCs, to other federal agencies for their vital needs, or for other validated needs. In lieu of applying for the ERCs, the Air Force may elect to transfer the operating permits of some or all of its emission sources to recipients of the property on which the sources are located, in accordance with the UAPCD's rules. This option may be desirable to avoid costly losses from discounts and offset ratios associated with the conversion and use of the ERCs.

Transfer or conveyance of an emission source to reuse proponents without permanent shutdown or curtailment of the emission source would not result in the accumulation of ERCs for those sources. Such a transfer or conveyance would require the new owner of the emission source to apply to the UAPCD for a transfer of the permit to operate. However, the new owner would not be subject to New Source Review requirements as long as the existing emission source would continue to operate within the original permit conditions.

4.4.3.1 Proposed Action

Construction. Fugitive dust would be generated during construction in aviation support, industrial, institutional/educational, commercial, residential, and recreation land use areas proposed as part of this alternative. These emissions would be greatest during site clearing and grading activities. Uncontrolled fugitive dust (particulate matter) emissions from ground-disturbing activities are estimated to be emitted at a rate of 1.2 tons per acre per month, or 110 pounds per acre per working day (U.S. EPA, 1985). The PM_{10} fraction of the total fugitive dust emissions is assumed to be 50 percent, or 55 pounds per acre per working day.

Construction activities would disturb a total of 363 acres in the 10 years after closure, with an average disturbance of 1.50 acres per day from 1995 to 2000, and 1.03 acres per day from 2000 to 2005. The amount of PM_{10} generated would be 82.3 pounds (0.041 tons) per day from 1995 to 2000 and 56.6 pounds (0.028 tons) per day from 2000 to 2005. The impact of these PM_{10} emissions would cause elevated short-term concentrations at receptors located close to the construction areas. However, the elevated concentrations would be temporary and would fall off rapidly with distance from the site.

Combustive emissions from construction equipment associated with the reuse alternatives were calculated based on average emission factors and the amount of land to be developed per time interval. The total combustive emissions due to construction were determined to be 82.1 tons per year of CO, 23.5 tons per year of NO_x, 1.8 tons per year of PM_{10}, 6.2 tons per year of ROG, and 2.2 tons per year of SO_x during the time period from 1995 to 2000. Emissions of CO, NO_x, PM_{10}, ROG, and SO_x in the period from 2000 to 2005 would be 56.5 tons per year, 16.2 tons per year, 1.3 tons per year, 4.3 tons per year, and 1.5 tons per year, respectively.

Operation. A summary of construction and operation emissions for the Proposed Action is presented in Table 4.4-2 for 2000 and 2005. These reuse-related emissions include the direct on-site sources, as well as the off-site emissions related to the direct and secondary workers and their dependents. Appendix M provides further description of these reuse-related emissions.

Table 4.4-2. Emissions Associated with the Proposed Action (tons/day)

	Merced County[a]	Base-Related Emissions[b]		Reuse-Related Emissions Increase		Total Reuse-Related Emissions[b]	
Pollutant	Preclosure 1989	Preclosure	Closure 1995	2000	2005	2000	2005
ROG	32.8	8.81	0.02	1.20	1.52	1.22	1.54
Nitrogen oxides	34.8	6.00	0.02	4.04	4.41	4.06	4.43
PM_{10}	79.8	5.57	0.04	2.67	3.86	2.71	3.90
Sulfur dioxide	5.0	0.83	0.01	0.38	0.52	0.39	0.53
Carbon monoxide	178.9	27.58	0.16	11.52	16.38	11.68	16.54

Notes: (a) Emissions are from the 1989 Emission Inventory (ARB, 1991c).
(b) Emissions are total emissions from both direct and indirect sources, as described in Appendix M.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.

The major on-site source of reuse-related emissions would be the proposed aircraft operations. Under the Proposed Action, approximately 0.04 tons per day of ROG, 2.8 tons per day of NO_x, 0.66 tons per day of CO, 0.06 tons per day of SO_2, and 0.001 tons per day of PM_{10} would occur from aircraft flying and ground operations by 2005. The proposed pilot and crew training activity is the greatest contributor to the aircraft emissions, accounting for 96, 68, 97, 94, and 50 percent of the ROG, NO_x, CO, SO_2, and PM_{10}, respectively.

Potential impacts to air quality as a result of reuse-related emissions from the Proposed Action were evaluated in terms of two spatial scales: regional and local. The regional-scale analysis considered the potential for total reuse-related emissions to affect the schedule for attainment of the federal ozone standard (ROG and NO_x emissions) or cause large increases in the regional pollutant inventories (NO_2, PM_{10}, CO, and SO_2 emissions). The local-scale analysis evaluated the potential for aircraft and traffic emissions to exceed the CAAQS or NAAQS in the immediate vicinity of the base. If one of these conditions were to occur, the Proposed Action would have an adverse impact on air quality.

Regional Scale. Emissions of ozone precursors from the Proposed Action would contribute to regional ozone levels. However, with the application of control measures identified in the 1991 AQAP, the Proposed Action would be consistent with the local district's efforts to reach attainment.

Ozone Precursors. Base-related emissions include the direct emissions at Castle AFB (see Section 3.4.3.2), as well as the indirect emissions associated with Castle AFB under preclosure and closure conditions. Similarly, the reuse-related emissions include both direct and indirect emissions associated with the Proposed Action. Table 4.4-2 shows that, although the total reuse-related emissions of ROG would increase from closure conditions by 1.52 tons per day in 2005, the emissions would remain below preclosure levels throughout the 10-year analysis period. By 2005, the total reuse-related ROG emissions would be approximately 17 percent of the total preclosure ROG emissions associated with Castle AFB. By 2005, reuse-related emissions of NO_x would increase by 4.41 tons per day over closure conditions. Total reuse-related emissions of NO_x in 2005 would be approximately 74 percent of the preclosure level of NO_x emissions associated with Castle AFB.

Without consideration of conformity offset allocation, which is discussed in the Cumulative Impacts section, emissions of ROG and NO_x would be less than preclosure emission levels and, therefore, would not interfere with the attainment of the ozone standard.

NO_2, PM_{10}, SO_2, and CO. Direct and indirect reuse-related NO_2, PM_{10}, SO_2, and CO emissions would increase by 4.41 tons per day, 3.86 tons per day, 0.52 ton per day, and 16.38 tons per day over closure conditions, respectively. However, all reuse-related emissions would be less than preclosure emission levels. In 2005, total reuse-related emissions of NO_2,

PM_{10}, SO_2, and CO would represent 74, 70, 64, and 60 percent, respectively, of the preclosure emissions related to Castle AFB. Without the consideration of conformity offset allocation, which is discussed in the Cumulative Impacts section, air quality impacts from each of these primary pollutants are not expected to affect maintenance of the current attainment status of the respective pollutant standards for NO_2, SO_2, and CO or progress toward attainment of the PM_{10} standards.

Local Scale. A summary of the EDMS analysis for the Proposed Action is presented in Table 4.4-3. The modeling results show that during peak hours of airport operation, the maximum 1-hour pollutant concentrations for SO_2 would occur at a receptor located at the base boundary along the centerline of the runway (approximately 2,300 feet from the northwest end of Runway 13/31) assuming a wind direction parallel to the runway. The primary contributing factor at this location would be aircraft exhaust emitted during takeoffs. The maximum 1-hour impact for CO and PM_{10} would occur in an area near the intersection of three major roadways, i.e., Santa Fe Drive, Buhach Road, and Bellevue Road. The primary cause of high impact at this location is vehicle exhaust. The modeling results indicate that reuse-related concentrations would not exceed the CAAQS or NAAQS in the immediate area surrounding the airport. However, when added to existing background concentrations, the total impact would exceed the annual and 24-hour CAAQS for PM_{10}.

The PM_{10} exceedances would primarily be due to the high background concentrations, which for the annual (geometric mean) and 24-hour averaging periods exceed the state standards. The reuse-related impacts would contribute less than 0.2 percent to the total impact. The reuse-related PM_{10} impacts are much less than the preclosure impacts, primarily due to the elimination of military aircraft. In particular, the B-52 and KC-135 aircraft present during preclosure emit much more PM_{10} than the civilian aircraft associated with reuse. Since the predicted increase in PM_{10} is less than 0.2 percent of the background concentration, ambient concentrations would not be made measurably higher. In addition, the background PM_{10} should decrease in future years due to the implementation of control measures designed to bring the area into compliance with state and federal PM_{10} standards.

Cumulative Impacts. As introduced in Section 2.6, Other Future Actions in the Region, the only other project planned in the region that will foreseeably contribute to cumulative environmental impacts is the BRAC-directed realignment at NAS Lemoore. The Navy is proposing to establish a Military Operations Area and two ATCAAs to support 2,300 annual sorties by F/A 18 aircraft above NAS Lemoore, which is approximately 90 miles southeast of Castle AFB. Because of the distance between the two bases, no impacts to local ambient air quality in the area are expected. However, the proposed Navy realignment, in combination with the redevelopment of

Table 4.4-3 Air Quality Modeling Results for Airport Operations and Vehicle Traffic Associated with the Proposed Action ($\mu g/m^3$)

Pollutant	Averaging Time	Castle AFB: Preclosure Conditions[a]	Base Reuse: Reuse Related Impact[b] 2000	Base Reuse: Reuse Related Impact[b] 2005	Preclosure Background Concentration[c]	California Standards ($\mu g/m^3$)	Federal Standards ($\mu g/m^3$)
PM_{10}	Annual (Arithmetic)	322	0.05	0.06	47	-	50[d]
	Annual (Geometric)	322	0.05	0.06	38	30[d]	-
	24 hour	1,288	0.2	0.2	149	50[d]	150
Sulfur dioxide	Annual	17.6	2.0	2.0	1	-	80[d]
	24 hour	70.4	8.0	9.0	9	105[d]	
	3 hour	158.4	18.0	20.0	80	-	1,3[illegible]
	1 hour	176.0	20.0	22.0	80	655[d]	
Carbon monoxide	8 hour	2,807	833	980	1,392	10,000[d]	10,000[d]
	1 hour	4,010	1,190	1,400	2,320	23,000[d]	40,000

Notes: (a) Aircraft Only

(b) Projected pollutant concentrations were determined from Emissions and Dispersions Modeling System modeling results. Concentrations represent incremental increase due to airport operations and related traffic.

(c) Background concentrations of carbon monoxide and sulfur dioxide are assumed to equal the mean of first-high values monitored at the Crows Landing monitoring station from 1989 to 1991. Background concentrations for PM_{10} were obtained from the Los Banos and Merced monitoring stations (refer to Table 3.4-3).

(d) Limiting standard is equal to the more stringent of the CAAQS or NAAQS (refer to Table 3.4-1). Impacts were determined by comparing the aggregate of reuse-related impact and background concentrations to the limiting standard.

CAAQS = California Ambient Air Quality Standards.
$\mu g/m^3$ = Micrograms per cubic meter.
NAAQS = National Ambient Air Quality Standards.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.

Castle AFB, may cause cumulative impacts to regional air quality in the SJVAB. This could result in competing Navy and reuse demand for air credits and conformity offsets for permits and conformity determinations to ensure that SIP attainment goals are achieved.

The proposed Navy realignment would generate emissions from construction activities, aircraft operations, related ground service equipment, government-owned vehicles, privately owned vehicles, and residential sources. The maximum emissions for this action would occur in 1997 and 1998 as a result of construction and operational activities. As shown in Table 4.4-4, ROG, NO_x, and PM_{10} emissions requiring conformity offsets would peak at 96 tons per year of ROG in 1998, 367 tons per year of NO_x in 1998, and 187 tons per year of PM_{10} in 1997. Emissions would decline slightly thereafter, to a steady state of approximately 87, 346, and 99 tons per year of ROG, NO_x, and PM_{10}, respectively. Navy PM_{10} emissions requiring conformity offsets would primarily be associated with construction activities, while the ROG and NO_x emissions requiring conformity offsets would primarily be associated with aircraft operations.

Table 4.4-4. Availability of Conformity Offset Emissions, Proposed Action (tons per year)

	ROG	NO_x	PM_{10}
Available conformity offsets	2410.5	1009.8	151.6
Reuse-related aircraft emissions (2005)	16.1	1005.6	0.4
Navy request for offsets[a]			
Peak	96.3[b]	367.1[b]	186.8[c]
Long-term (2000)	87.1	346.4	99.2

Notes: (a) Source: Dennis, 1994.
(b) 1998.
(c) 1997.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.

The Navy has expressed interest in obtaining available conformity offsets from the closure of Castle AFB in order to demonstrate no net emission increases from their realignment action. The potential conformity offsets available from the closure of Castle AFB are shown in Table 4.4-4. In the event that the Navy's emission offset request is met, then their short- and long-term ROG and NO_x emissions, as well as their long-term PM_{10} emissions would be completely offset and their short-term (construction-related) PM_{10} emissions would be partially offset. The Navy would be required to obtain additional offsets or ERCs, develop mitigations, or implement other conformity criteria options to demonstrate conformity for PM_{10} emissions. However, surplus ROG and NO_x conformity offset emissions would be available for other purposes.

Federal agencies involved in the reuse of Castle AFB, such as the FAA, would also be required to evaluate their direct and indirect emissions to determine the conformity requirements for reuse actions. In lieu of specific emission estimates for the Proposed Action, aircraft emissions are provided as an indicator for potential civil airport offset requirements. The total civil aviation offset requirements, which include other airport-related emission offset needs, are expected to be slightly higher that the indicator amount. Table 4.4-4 provides a comparison of the potentially competing requirements for conformity offsets.

The demand for conformity offsets to achieve positive conformity for the Navy realignment and conformity determinations required to support the Proposed Action may result in a shortfall. This shortfall in conformity offsets and emission credits may cause cumulative adverse air quality impacts unless mitigated.

Mitigation Measures. The UAPCD suggests that the reuse proponents take all feasible measures to reduce the amount of dust (fine particulate matter [PM_{10}]). Feasible measures should also be taken to minimize ozone precursors (ROG), and oxides of nitrogen (NO_2, NO_x) that will result from construction of this project. Specifically, the UAPCD suggests that the following mitigation measures be included as part of reuse-related construction activities.

- All material excavated, graded, or otherwise disturbed should be sufficiently watered to prevent excessive amounts of dust. Watering should occur at least twice daily with complete coverage, preferably in the late morning and after work is done for the day.

- All clearing, grading, earth moving, or excavation activities should cease when wind speeds are equal to or greater than 20 miles per hour.

- On-site vehicle speed should be limited to 15 miles per hour.

Implementation of these measures would substantially reduce air quality impacts from construction activities associated with the Proposed Action.

Although reuse-related emissions are shown to be less than preclosure conditions, a concerted effort should be made to reduce project emissions when development occurs.

The following items are requirements that have been adopted by the UAPCD to reduce emissions throughout the San Joaquin Valley.

- District Rule 4901 - Residential Wood Burning regulates the sale, installation and transfer of wood burning devices, and establishes a public education and voluntary wood burning curtailment program intended to reduce emissions of CO and PM_{10}.

- District Rule 4902 - Residential Water Heaters regulates the sale and installation of natural gas-fired water heaters to limit the emissions of oxides of nitrogen.

- District Regulation VIII - Fugitive Dust Rules is a series of rules designed to reduce PM_{10} emissions generated by human activity, including but not limited to construction, road building, bulk materials storage, and landfill operations.

The following items are suggested, but not required by the UAPCD to further reduce emissions that may ultimately result from the civilian reuse activities application. These measures should be incorporated into the future user's project designs:

- Housing units should be oriented to utilize passive solar cooling and heating to the fullest extent possible.

- Conventional open-hearth and zero-clearance fireplaces that do not meet U.S. EPA Phase II certification should be discouraged.

- Trees should be carefully selected and located (generally on the southern and western exposure) to shade structures during the hot summer months. Deciduous trees should be used since they help cool in the summer and allow sun to reach the house during cold winter months.

- Natural gas lines (if applicable) and electrical outlets should be installed in backyards or patio areas to encourage use of gas and/or electric barbecues.

- Electrical outlets should be installed around the exterior of the home to encourage electric lawn mowers, edgers, etc.

The following mitigation measures for industrial, retail, service, office, and institutional projects should also be considered in future civilian redevelopments.

- Pedestrian Access - Provide direct pedestrian access to the main entrance of the project from existing or potential public transit stops and the sidewalk. Such access should consist of paved walkways, ramps, or stairways and should be physically separated from parking areas and vehicle access routes.

- Preferential Parking for Ridesharers - Provide priority parking for employees who rideshare.

- Bicycle Enhancements - Provide bicycle racks, and consider enclosed and locked bicycle storage.

- Showers and Lockers - Employee shower and locker areas should be constructed for bicycle and pedestrian commuters. Consider providing one full-size locker per ten employees.

- Eating Areas - Provide on-site cafeteria services, lounge, and eating areas.

- On-Site Banking and Postal Services - Provide on-site automatic teller machines (ATMs) and postal services.

- On-Site Child Care - Provide on-site child-care facilities.

- On-Site Bus Turnouts - Where transit service exists, construct on-site bus turnouts and loading areas with shelters acceptable to the local transit provider at a location acceptable to the provider. Shelters should include benches and bus schedules.

- Transit Easements - Where transit service does not exist, but the project is within the transit district's sphere of influence, provide a site at a location acceptable to the transit provider for bus turnouts and shelters.

Ozone precursor emissions should be controlled by the following methods:

- All internal combustion engine-driven equipment should be properly maintained and tuned according to manufacturer specifications.

- Idling of all internal combustion equipment shall be limited to 10 minutes at any given time.

- Use of building materials that do not require the use of paints/solvents.

Future reuse proponents will be responsible for complying with all applicable permitting requirements for new or modified emission sources subject to UAPCD rules and regulations. Included in these requirements may be provisions to mitigate and offset emission increases and/or impacts associated with the new sources. ERCs could be used to fulfill the role of offsetting the emission increases.

Potential cumulative impacts to conformity may also be mitigated by evaluating other conformity demonstration opportunities or by selecting a different conformity criteria option. For example, positive conformity could be demonstrated through revisions to the applicable SIP which enforce control measures to offset the direct and indirect emissions of the proposed federal action, or for some pollutants conformity may be demonstrated based on local and/or regional-scale dispersion modeling.

Additional mitigations (e.g., trip reduction measures, paved construction roads) or reuse planning modifications (e.g., reduction in civilian aviation operations, phased construction and operations schedules) could also be implemented, as required, by the responsible federal agency to meet the conformity requirements.

4.4.3.2 Castle Aviation Center Alternative

Construction. Construction impacts from the Castle Aviation Center Alternative would occur due to the generation of fugitive dust during development of the aviation support, industrial, institutional/educational, commercial, residential, and recreation land use areas. It is estimated that a total of 146 acres would be disturbed by construction in the 10 years after closure, with an average disturbance of 0.83 acre per day during the period from 1995 to 2000, and 0.19 acre per day from 2000 to 2005. These levels of disturbance would release an estimated 45.5 pounds (0.023 ton) per day and 10.3 pounds (0.005 ton) per day of PM_{10} during the two periods, respectively. The impact of these emissions would cause elevated concentrations of particulates at receptors close to the construction areas. The concentrations would decrease rapidly with distance from the site.

Combustive emission from construction equipment associated with the Castle Aviation Center Alternative were calculated based on the same average emission factors and assumptions as previously described for the Proposed Action. The total combustive emissions due to construction were determined to be 45.5 tons per year of CO, 13.0 tons per year of NO_x, 1.0 ton per year of PM_{10}, 3.5 tons per year of ROG, and 1.2 tons per year of SO_x during the time period from 1995 to 2000. Emissions from 2000 to 2005 would be 10.3 tons per year of CO, 3.0 tons per year of NO_x, 0.2 ton per year of PM_{10}, 0.8 ton per year of ROG, and 0.3 ton per year of SO_x

Operation. Table 4.4-5 summarizes the results of the construction and operation emission calculations associated with the Castle Aviation Center Alternative for the years 2000 and 2005.

Table 4.4-5. Emissions Associated with the Castle Aviation Center Alternative (tons/day)

	Merced County[a]	Base-Related Emissions[b]		Reuse-Related Emissions Increase		Total Reuse-Related Emissions[b]	
Pollutant	Preclosure 1989	Preclosure	Closure 1995	2000	2005	2000	2005
ROG	32.8	8.81	0.02	2.30	2.91	2.32	2.93
Nitrogen oxides	34.8	6.00	0.02	2.60	3.27	2.62	3.29
PM_{10}	79.8	5.57	0.04	5.31	7.58	5.35	7.62
Sulfur dioxide	5.0	0.83	0.01	0.60	0.86	0.61	0.87
Carbon monoxide	178.9	27.58	0.16	21.69	30.94	21.85	31.10

Notes: (a) Emissions are from the 1989 Emission Inventory (ARB, 1991c).
(b) Emissions are total emissions from both direct and indirect sources, as described in Appendix M.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.

Regional Scale. The Castle Aviation Center Alternative would generate emissions of ozone precursors and would, therefore, impact regional ozone levels. However, with the required application of control measures identified in the 1991 AQAP, this alternative would be consistent with the local district's efforts to reach attainment of the ozone standard.

Ozone Precursors. Table 4.4-5 shows that total reuse-related emissions of ROG in 2005 would increase by 2.91 tons per day over closure conditions, but would remain below preclosure emission levels throughout the 10-year analysis period. By 2005, the total reuse-related ROG emissions would be about 33 percent of the total preclosure emissions associated with Castle AFB. Reuse-related NO_x emissions in 2005 would increase by 3.27 tons per day over closure levels and would be approximately 55 percent of base-related preclosure levels. Without consideration of conformity offset allocation, which is discussed in the Cumulative Impacts section, ROG and NO_x emissions would be reduced from preclosure conditions, and the Castle Aviation Center Alternative, therefore, would not interfere with the attainment of the ozone standard.

NO_2, PM_{10}, SO_2, and CO. Total reuse-related emissions of these criteria pollutants would increase from closure levels as shown in Table 4.4-5 (all NO_x assumed to convert to NO_2 on a regional basis). Total reuse-related emissions would be less than total preclosure emission levels for each pollutant in the year 2000. Emissions of SO_2 and CO in 2005 would exceed preclosure conditions. Without consideration of conformity offset allocation, which is discussed in the Cumulative Impacts section, the increases would not be sufficient to jeopardize the current SO_2 or CO attainment status. Emission increases of PM_{10} in 2005, which exceed preclosure levels, could potentially interfere with efforts to achieve and maintain attainment of the PM_{10} standards. Project reuse proponents may, therefore, be required to mitigate and/or offset PM_{10} emissions to meet the SIP requirements and ensure that there would be no interference with attainment plans and schedules. With adequate mitigation and offsetting applied as required, reuse activities would not contribute to a delay in attainment of the PM_{10} standards.

Local Scale. A summary of the EDMS analysis for the Castle Aviation Center Alternative is presented in Table 4.4-6. The modeling results indicate that, for the peak-hour airport operation scenario, the maximum 1-hour SO_2 and CO pollutant concentrations would occur at the same receptor locations as determined for the Proposed Action. The maximum PM_{10} impacts would occur at the same location as the maximum SO_2 impact (i.e., at the property boundary northwest of the end of Runway 13/31. The modeling results indicate that all of the pollutant concentrations would be below the applicable standards in the immediate area surrounding the airport and would have no adverse impact on local air quality.

Cumulative Impact. Due to the distance between the reuse alternative and the Navy-directed realignment action, no cumulative impacts to local ambient air quality in the area are expected. However, the proposed Navy realignment, in combination with the redevelopment of Castle AFB, may cause cumulative impacts to regional air quality in the SJVAB. This could result in competing Navy and reuse demand for air credits and conformity offsets for permits and conformity determinations to ensure that SIP attainment goals are achieved.

As shown in Table 4.4-7, ROG, NO_x, and PM_{10} emissions requiring conformity offsets would peak at 96 tons per year of ROG in 1998, 367

Table 4.4-6. Air Quality Modeling Results for Airport Operations and Vehicle Traffic Associated with the Castle Aviation Center Alternative ($\mu g/m^3$)

Pollutant	Averaging Time	Castle AFB: Preclosure Conditions	Base Reuse: Reuse-Related Impact[a] 2000	Base Reuse: Reuse-Related Impact[a] 2005	Preclosure Background Concentration[b]	Limiting Standard[c]
PM_{10}	Annual (Arithmetic)	322	0.1	0.2	47	50
	Annual (Geometric)	322	0.1	0.2	38	30
	24-hour	1,288	0.6	0.8	149	50
Sulfur dioxide	Annual	17.6	0.5	0.7	1	80
	24-hour	70.4	1.9	2.9	9	105
	3-hour	158.4	4.3	6.6	80	1,300
	1-hour	176.0	4.7	7.4	80	655
Carbon monoxide	8-hour	2,807	994	1,134	1,392	10,000
	1-hour	4,010	1,420	1,620	2,320	23,000

Notes: (a) Projected pollutant concentrations were determined from Emissions and Dispersions Modeling System modeling results. Concentrations represent incremental increase due to airport operations and related traffic.
(b) Background concentrations of carbon monoxide and sulfur dioxide are assumed to equal the mean of first-high values monitored at the Crows Landing monitoring station from 1989 to 1991. Background concentrations for PM_{10} were obtained from the Los Banos and Merced monitoring stations (refer to Table 3.4-3).
(c) Limiting standard is equal to the more stringent of the CAAQS or NAAQS (refer to Table 3.4-1). Impacts were determined by comparing the aggregate of reuse-related impact and background concentrations to the limiting standard.

CAAQS = California Ambient Air Quality Standards.
$\mu g/m^3$ = Micrograms per cubic meter
NAAQS = National Ambient Air Quality Standards.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.

Table 4.4-7. Availability of Conformity Offset Emissions, Castle Aviation Center Alternative (tons per year)

	ROG	NO_x	PM_{10}
Available conformity offsets	2410.5	1009.8	151.6
Reuse-related aircraft emissions (2005)	4.7	46.4	3.3
Navy request for offsets[a]			
Peak	96.3[b]	367.1[b]	186.8[c]
Long-term (2000)	87.1	346.4	99.2

Notes: (a) Source: Dennis, 1994.
(b) 1998.
(c) 1997.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.

tons per year of NO_x in 1998, and 187 tons per year of PM_{10} in 1997. Emissions would decline slightly thereafter, to a steady state of approximately 87, 346, and 99 tons per year of ROG, NO_x, and PM_{10}, respectively.

The Navy has expressed interest in obtaining available conformity offsets from the closure of Castle AFB in order to demonstrate no net emission increases from their realignment action. The potential conformity offsets available from the closure of Castle AFB are shown in Table 4.4-7. In the event that the Navy's emission offset request is met, then their short- and long-term ROG and NO_x emissions, as well as their long-term PM_{10} emissions, would be completely offset and their short-term (construction-related) PM_{10} emissions would be partially offset. The Navy would be required to obtain additional offsets or ERCs, develop mitigations, or implement other conformity criteria options to demonstrate conformity for PM_{10} emissions. However, surplus ROG and NO_x conformity offset emissions would be available for other purposes.

Federal agencies involved in the reuse of Castle AFB, such as the FAA, would also be required to evaluate their direct and indirect emissions to determine the conformity requirements for reuse actions. In lieu of specific emission estimates for the Proposed Action, aircraft emissions are provided as an indicator for potential civil airport offset requirements. The total civil aviation offset requirements, which include other airport-related emission offset needs, are expected to be slightly higher that the indicator amount. Table 4.4-7 provides a comparison of the potentially competing requirements for conformity offsets.

The demand for conformity offsets to achieve positive conformity for the Navy realignment and conformity determinations required to support the reuse alternative may result in a shortfall. This shortfall in conformity offsets and emission credits may cause cumulative adverse air quality impacts unless mitigated.

Mitigation Measures. The construction-related mitigation measures described under the Proposed Action could be used to substantially reduce air quality impacts from construction activities associated with this alternative. The project reuse proponents will likely be required to mitigate and/or offset PM_{10} emissions to meet the applicable SIP requirements and to ensure no interference with attainment plans and schedules. The mitigation measures discussed under the Proposed Action could potentially mitigate air quality impacts to non-adverse levels.

4.4.3.3 Commercial Aviation Alternative

Construction. Construction impacts from the Commercial Aviation Alternative would occur due to the generation of fugitive dust during development of the aviation support, industrial, institutional/educational, commercial, residential, recreation, and agricultural land use areas. It is estimated that a total of 475 acres would be disturbed by construction, with an average disturbance of 1.15 acres per day during the period 1995 to 2000, and 0.77 acres per day from 2000 to 2005. These levels of disturbance would release an estimated 63.5 pounds (0.032 tons) per day, and 42.5 pounds (0.021 tons) per day of PM_{10} during the two periods, respectively. The impact of these emissions would cause elevated concentrations of particulates close to the construction areas. The concentrations would decrease rapidly with distance from the site.

Combustive emissions from construction equipment associated with the Commercial Aviation Alternative were calculated based on the same average emission factors and assumptions as previously described for the Proposed Action and the Castle Aviation Center Alternative. During the time period from 1995 to 2000, the total combustive emissions due to construction were determined to be 61.1 tons per year of CO, 17.5 tons per year of NO_x, 1.4 tons per year of PM_{10}, 4.6 tons per year of ROG, and 1.6 tons per year of SO_x. Emissions of CO, NO_x, PM_{10}, ROG, and SO_x from 2000 to 2005 would be 42.4 tons per year, 12.2 tons per year, 0.9 ton per year, 3.2 tons per year, and 1.1 tons per year, respectively.

Operation. Table 4.4-8 summarizes the results of the construction and emission calculations associated with the Commercial Aviation Alternative for 2000 to 2005. Under the Commercial Aviation Center alternative, the majority of direct emission sources would be aircraft operations; including 0.071 tons per day of ROG, 2.9 tons per day of NO_x, 2.8 tons per day of CO, 0.08 tons per day of SO_2, and 0.004 tons per day of PM_{10}. The proposed pilot and crew training flight activity is the greatest contributor to the aircraft emissions, accounting for 69, 99, 57, 99, and 50 percent of the ROG, NO_x, CO, SO_2, and PM_{10}, respectively.

Table 4.4-8. Emissions Associated with the Commercial Aviation Alternative (tons/day)

Pollutant	Merced County[a] Preclosure 1989	Base-Related Emissions[b] Preclosure	Closure 1995	Reuse-Related Emissions Increase 2000	2005	Total Reuse-Related Emissions[b] 2000	2005
ROG	32.8	8.81	0.02	0.67	1.12	0.69	1.14
Nitrogen oxides	34.8	6.00	0.02	3.43	4.08	3.45	4.10
PM_{10}	79.8	5.57	0.04	1.40	2.75	1.44	2.79
Sulfur dioxide	5.0	0.83	0.01	0.23	0.39	0.24	0.40
Carbon monoxide	178.9	27.58	0.16	8.14	13.97	8.30	14.13

Notes: (a) Emissions are from the 1989 Emission Inventory (ARB, 1991c).
(b) Emissions are total emissions from both direct and indirect sources, as described in Appendix M.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.

Regional Scale. The Commercial Aviation Alternative would generate emissions of ozone precursors and would, therefore, impact regional ozone levels. However, with the required application of control measures identified in the 1991 AQAP, this alternative would be consistent with the local district's efforts to reach attainment of the ozone standard.

Ozone Precursors. Table 4.4-8 shows that total reuse-related emissions of ROG in 2005 would increase by 1.12 tons per day over closure conditions, but would remain below preclosure emission levels throughout the 10-year analysis period. By 2005, the total reuse-related ROG emissions would be about 13 percent of the total preclosure emissions associated with Castle AFB. Reuse-related NO_x emissions in 2005 would increase by 4.08 tons per day over closure levels and would be approximately 68 percent of base-related preclosure levels. Without consideration of conformity offset allocation, which is discussed in the Cumulative Impacts section, ROG and NO_x emissions would be reduced from preclosure conditions and the Commercial Aviation Alternative would, therefore, not interfere with the attainment of the ozone standard.

NO_2, PM_{10}, SO_2, and CO. Total reuse-related emissions of these criteria pollutants would increase from closure levels as shown in Table 4.4-8. Total reuse-related emissions would be less than total preclosure emission levels for each pollutant in 2000 and 2005. Without consideration of conformity offset allocation, which is discussed in the Cumulative Impacts section, reuse-related emissions would be insufficient to change the present attainment status for NO_2, SO_2, or CO, or hinder progress toward attainment of the PM_{10} standards. Air quality impacts from these primary pollutants are, therefore, expected to be minor under the Commercial Aviation Alternative.

Local Scale. A summary of the EDMS analysis for the Commercial Aviation Alternative is presented in Table 4.4-9. The modeling results indicate that for the peak-hour airport operation scenario, the maximum 1-hour SO_2 and CO pollutant concentrations would occur at the same receptor locations as determined for the Proposed Action. Maximum PM_{10} impacts would occur at the property boundary northwest of the end of Runway 13/31, the same location as the maximum SO_2 impact. The modeling results indicate that all of the pollutant concentrations would be below the applicable standards in the immediate area surrounding the airport and, therefore, would have no adverse impact on the local air quality.

Cumulative Impacts. Due to the distance between the reuse alternative and the Navy-directed realignment action, no cumulative impacts to local ambient air quality in the area are expected. However, the proposed Navy realignment, in combination with the redevelopment of Castle AFB, may cause cumulative impacts to regional air quality in the SJVAB. This could result in competing Navy and reuse demand for air credits and conformity offsets for permits and conformity determinations to ensure that SIP attainment goals are achieved.

Table 4.4-9. Air Quality Modeling Results for Airport Operations and Vehicle Traffic Associated with the Commercial Aviation Alternative ($\mu g/m^3$)

Pollutant	Averaging Time	Castle AFB Preclosure Conditions	Base Reuse Reuse-Related Impact[a] 2000	Base Reuse Reuse-Related Impact[a] 2005	Preclosure Background Concentration[b]	Limiting Standard[c]
PM_{10}	Annual (Arithmetic)	322	0.07	0.08	47	50
	Annual (Geometric)	322	0.07	0.08	38	30
	24-hour	1,288		0.3	149	50
Sulfur dioxide	Annual	17.6	1.3	1.5	1	80
	24-hour	70.4	5	6	9	105
	3-hour	158.4	12	13	80	1,300
	1-hour	176.0	13	15	80	655
Carbon monoxide	8-hour	2,807	826	1,029	1,392	10,000
	1-hour	4,010	1,180	1,470	2,320	23,000

Notes: (a) Projected pollutant concentrations were determined from Emissions and Dispersions Modeling System modeling results. Concentrations represent incremental increase due to airport operations and related traffic.

(b) Background concentrations of carbon monoxide and sulfur dioxide are assumed to equal the mean of first-high values monitored at the Crows Landing monitoring station during the period from 1989 to 1991. Background concentrations for PM_{10} were obtained from the Los Banos and Merced monitoring stations (refer to Table 3.4-3).

(c) Limiting standard is equal to the more stringent of the CAAQS or NAAQS (refer to Table 3.4-1). Impacts were determined by comparing the aggregate of reuse-related impact and background concentrations to the limiting standard.

CAAQS = California Ambient Air Quality Standards.
$\mu g/m^3$ = Micrograms per cubic meter.
NAAQS = National Ambient Air Quality Standards.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.

As shown in Table 4.4-10, ROG, NO_x, and PM_{10} emissions requiring conformity offsets would peak at 96 tons per year of ROG in 1998, 367 tons per year of NO_x in 1988, and 187 tons per year of PM_{10} in 1997. Emissions would decline slightly thereafter, to a steady state of approximately 87 and 99 tons per year of ROG, NO_x, and PM_{10}, respectively.

The Navy has expressed interest in obtaining available conformity offsets from the closure of Castle AFB in order to demonstrate no net emission increases from their realignment action. The potential conformity offsets available from the closure of Castle AFB are shown in Table 4.4-10. In the event that the Navy's emission offset request is met, then their short- and long-term ROG and NO_x emissions, as well as their long-term PM_{10} emissions would be completely offset and their short-term (construction-related) PM_{10} emissions would be partially offset. The Navy would be required to obtain additional offsets or ERCs develop mitigations, or implement other conformity criteria options to demonstrate conformity for PM_{10} emissions.

Table 4.4-10. Availability of Conformity Offset Emissions, Commercial Aviation Alternative (tons per year)

	ROG	NO_x	PM_{10}
Available conformity offsets	2410.5	1009.8	151.6
Reuse-related aircraft emissions (2005)	25.9	1059.2	1.5
Navy request for offsets[a]			
Peak	96.3[b]	367.1[b]	186.8[c]
Long-term (2000)	87.1	346.4	99.2

Notes: (a) Source: Dennis, 1994.
(b) 1998.
(c) 1997.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.

However, surplus ROG and NO_x conformity offset emissions would be available for other purposes.

Federal agencies involved in the reuse of Castle AFB, such as the FAA, would also be required to evaluate their direct and indirect emissions to determine the conformity requirements for reuse actions. In lieu of specific emission estimates for the Proposed Action, aircraft emissions are provided as an indicator for potential civil airport offset requirements. The total civil aviation offset requirements, which include other airport-related emission offset needs, are expected to be slightly higher that the indicator amount. Table 4.4-10 provides a comparison of the potentially competing requirements for conformity offsets.

The demand for conformity offsets to achieve positive conformity for the Navy realignment and conformity determinations required to support the reuse alternative may result in a shortfall. This shortfall in conformity offsets and emission credits may cause cumulative adverse air quality impacts unless mitigated.

Mitigation Measures. Construction-related mitigation measures would be similar to those described under the Proposed Action.

4.4.3.4 Aviation with Mixed Use Alternative

Construction. Construction impacts from the Aviation with Mixed Use Alternative would occur due to the generation of fugitive dust during development of the aviation support, industrial, institutional/educational, commercial, residential, and recreation land use areas. It is estimated that a total of 269 acres would be disturbed by construction in the 10 years after closure, with an average disturbance of 1.41 acres per day during the period from 1995 to 2000, and 0.46 acre per day from 2000 to 2005. These levels of disturbance would release an estimated 77.7 pounds (0.039 ton) per day and 25.3 pounds (0.013 ton) per day of PM_{10} during the two periods, respectively. The impact of these emissions would cause elevated concentrations of particulates at receptors close to the construction areas, decreasing rapidly with distance from the site.

Combustive emissions from construction equipment associated with the Aviation with Mixed Use Alternative were calculated based on the same average emission factors and assumptions as previously described for the other alternatives. During the time period from 1995 to 2000, the total combustive emissions due to construction were determined to be 77.5 tons per year of CO, 22.2 tons per year of NO_x, 1.7 tons per year of PM_{10}, 5.9 tons per year of ROG, and 2.0 tons per year of SO_x. Emissions of CO, NO_x, PM_{10}, ROG, and SO_x from 2000 to 2005 would be 25.2 tons per year, 7.2 tons per year, 0.06 ton per year, 1.9 tons per year, and 0.7 ton per year, respectively.

Operation. Table 4.4-11 summarizes the results of the construction and operation emission calculations associated with the Aviation with Mixed Use Alternative for the years 2000 and 2005.

Table 4.4-11. Emissions Associated with the Aviation with Mixed Use Alternative (tons/day)

Pollutant	Merced County[a] Preclosure 1989	Base-Related Emissions[b] Preclosure	Base-Related Emissions[b] Closure 1995	Reuse-Related Emissions Increase 2000	Reuse-Related Emissions Increase 2005	Total Reuse-Related Emissions[b] 2000	Total Reuse-Related Emissions[b] 2005
ROG	32.8	8.81	0.02	0.73	1.06	0.75	1.08
Nitrogen oxides	34.8	6.00	0.02	0.96	1.32	0.98	1.34
PM_{10}	79.8	5.57	0.04	1.66	2.73	1.70	2.77
Sulfur dioxide	5.0	0.83	0.01	0.19	0.31	0.20	0.32
Carbon monoxide	178.9	27.58	0.16	7.30	11.61	7.46	11.77

Notes: (a) Emissions are from the 1989 Emission Inventory (ARB, 1991c).
(b) Emissions are total emissions from both direct and indirect sources, as described in Appendix M.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.

Regional Scale. The evaluation of regional-scale impacts from the Aviation with Mixed Use Alternative considered the effect that reuse-related air emissions would have on the air quality attainment status of pollutants in Merced County. As with the Proposed Action, emissions of ozone precursors from this alternative may impact regional ozone levels; however, this alternative would be consistent with the district's efforts to reach attainment of the ozone standard.

Ozone Precursors. Table 4.4-11 shows that direct and indirect reuse-related emissions of ROG in 2005 would increase by 1.06 tons per day over closure conditions, but would remain below preclosure emission levels throughout the 10-year analysis period. By 2005, the total reuse-related ROG emissions would be about 12 percent of the total preclosure emissions associated with Castle AFB. Reuse-related NO_x emissions in 2005 would increase by 1.32 tons per day over closure levels and would be approximately 22 percent of base-related preclosure levels. Without the consideration of conformity offset allocation, which is discussed in the Cumulative Impacts section, ROG and NO_x emissions would be reduced from preclosure conditions and the Aviation with Mixed Use Alternative would, therefore, not interfere with the attainment of the ozone standard.

NO_2, PM_{10}, SO_2, and CO. Direct and indirect reuse-related emissions of these criteria pollutants would increase from closure levels as shown in Table 4.4-11. Total reuse-related emissions would be less than total preclosure emission levels for each pollutant. Without consideration of conformity offset allocation, which is discussed in the Cumulative Impacts section, reuse-related emissions would be insufficient to change the present attainment stations for NO_2, SO_2, or CO, or hinder progress toward attainment of the PM_{10} standards. Air quality impacts from these primary pollutants are, therefore, expected to be minor under the Aviation with Mixed Use Alternative.

Local Scale. A summary of the EDMS analysis for the Aviation with Mixed Use Alternative is presented in Table 4.4-12. The modeling results show that for the peak-hour airport operation scenario, the maximum 1-hour pollutant concentrations would occur at the same receptor locations as determined for the Proposed Action. The reuse-related impact concentrations would not exceed the CAAQS or NAAQS in the immediate area surrounding the airport, and would have no adverse impact on the local air quality.

Cumulative Impacts. Due to the distance between the reuse alternative and the Navy-directed realignment action, no cumulative impacts to local ambient air quality in the area are expected. However, the proposed Navy realignment, in combination with the redevelopment of Castle AFB, may cause cumulative impacts to regional air quality in the SJVAB. This could result in competing Navy and reuse demand for air credits and conformity offsets for permits and conformity determinations to ensure that SIP attainment goals are achieved.

As shown in Table 4.4-13, ROG, NO_x, and PM_{10} emissions requiring conformity offsets would peak at 96 tons per year of ROG in 1998, 367 tons per year of NO_x in 1988, and 187 tons per year of PM_{10} in 1997. Emissions would decline slightly thereafter, to a steady state of approximately 87 and 99 tons per year of ROG, NO_x, and PM_{10}, respectively.

The Navy has expressed interest in obtaining available conformity offsets from the closure of Castle AFB in order to demonstrate no net emission

Table 4.4-12. Air Quality Modeling Results for Airport Operations and Vehicle Traffic Associated with the Aviation with Mixed Use Alternative ($\mu g/m^3$)

Pollutant	Averaging Time	Castle AFB Preclosure Conditions	Base Reuse Reuse-Related Impact[a] 2000	Base Reuse Reuse-Related Impact[a] 2005	Preclosure Background Concentration[b]	Limiting Standard[c]
PM_{10}	Annual (Arithmetic)	322	0.05	0.06	47	50
	Annual (Geometric)	322	0.05	0.06	38	30
	24-hour	1,288	0.2	0.2	149	50
Sulfur dioxide	Annual	17.6	0.5	0.8	1	80
	24-hour	70.4	2.0	3.2	9	105
	3-hour	158.4	4.6	7.3	80	1,300
	1-hour	176.0	5.1	8.1	80	655
Carbon monoxide	8-hour	2,807	510	861	1,392	10,000
	1-hour	4,010	729	1,230	2,320	23,000

Notes: (a) Projected pollutant concentrations determined were from Emissions and Dispersions Modeling System modeling results. Concentrations represent incremental increase due to airport operations and related traffic.
(b) Background concentrations of carbon monoxide and sulfur dioxide are assumed to equal the mean of first-high values monitored at the Crows Landing monitoring station from 1989 to 1991. Background concentrations for PM_{10} were obtained from the Los Banos and Merced monitoring stations (refer to Table 3.4-3).
(c) Limiting standard is equal to the more stringent of the CAAQS or NAAQS (refer to Table 3.4-1). Impacts were determined by comparing the aggregate of reuse-related impact and background concentrations to the limiting standard.

CAAQS = California Ambient Air Quality Standards.
$\mu g/m^3$ = Micrograms per cubic meter.
NAAQS = National Ambient Air Quality Standards.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.

Table 4.4-13. Availability of Conformity Offset Emissions, Aviation with Mixed Use Alternative (tons per year)

	ROG	NO_x	PM_{10}
Available conformity offsets	2410.5	1009.8	151.6
Reuse-related aircraft emissions (2005)	4.7	61.7	0.4
Navy request for offsets[a]			
Peak	96.3[b]	367.1[b]	186.8[c]
Long-Term (2000)	87.1	346.4	99.2

Notes: (a) Source: Dennis, 1994.
(b) 1998.
(c) 1997.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.

increases from their realignment action. The potential conformity offsets available from the closure of Castle AFB are shown in Table 4.4-13. In the event that the Navy's emission offset request is met, then their short- and long-term ROG and NO_x emissions, as well as their long-term PM_{10} emissions would be completely offset and their short-term (construction-related) PM_{10} emissions would be partially offset. The Navy would be required to obtain additional offsets or ERCs develop mitigations, or implement other conformity criteria options to demonstrate conformity for PM_{10} emissions. However, surplus ROG and NO_x conformity offset emissions would be available for other purposes.

Federal agencies involved in the reuse of Castle AFB, such as the FAA, would also be required to evaluate their direct and indirect emissions to determine the conformity requirements for reuse actions. In lieu of specific emission estimates for the Proposed Action, aircraft emissions are provided as an indicator for potential civil airport offset requirements. The total civil aviation offset requirements, which include other airport-related emission offset needs, are expected to be slightly higher that the indicator amount. Table 4.4-13 provides a comparison of the potentially competing requirements for conformity offsets.

The demand for conformity offsets to achieve positive conformity for the Navy realignment and conformity determinations required to support the reuse alternative may result in a shortfall. This shortfall in conformity offsets and emission credits may cause cumulative adverse air quality impacts unless mitigated.

Mitigation Measures. Construction and operational mitigation measures would be similar to those described under the Proposed Action.

4.4.3.5 Non-Aviation Alternative

Construction. Construction impacts from the Non-Aviation Alternative would occur due to the generation of fugitive dust during development of the industrial, institutional/educational, commercial, residential, recreation, and agricultural land use areas. It is estimated that a total of 417 acres would be disturbed by construction in the 10 years after closure, with an average disturbance of 1.46 acres per day during the period from 1995 to 2000, and 1.44 acres per day from 2000 to 2005. These levels of disturbance would release an estimated 80.3 pounds (0.040 ton) per day and 79.2 pounds (0.040 ton) per day of PM_{10} during the two periods, respectively. The impact of these emissions would cause elevated concentrations of particulates at receptors close to the construction areas. The concentrations would decrease rapidly with distance from the site.

Combustive emissions from construction equipment associated with the Non-Aviation Alternative were calculated based on the same average emission factors and assumptions as previously described for the other alternatives. During the time period from 1995 to 2000, the total combustive emissions due to construction were determined to be 80.2 tons per year of CO, 23.0 tons per year of NO_x, 1.8 tons per year of PM_{10}, 6.1 tons per year of ROG, and 2.1 tons per year of SO_x. Emissions of CO, NO_x, PM_{10}, ROG, and SO_x from 2000 to 2005 would be 79.1 tons per year, 22.7 tons per year, 1.8 tons per year, 6.0 tons per year, and 2.1 tons per year, respectively.

Operation. Table 4.4-14 summarizes the results of the construction and operation emission calculations associated with the Non-Aviation Alternative for the years 2000 and 2005.

Table 4.4-14. Emissions Associated with the Non-Aviation Alternative (tons/day)

	Merced County[a]	Base-Related Emissions[b]		Reuse-Related Emissions Increase		Total Reuse-Related Emissions[b]	
Pollutant	Preclosure 1989	Preclosure	Closure 1995	2000	2005	2000	2005
ROG	32.8	8.81	0.02	0.15	0.71	0.17	0.73
Nitrogen oxides	34.8	6.00	0.02	0.24	0.84	0.26	0.86
PM_{10}	79.8	5.57	0.04	0.35	1.84	0.39	1.88
Sulfur dioxide	5.0	0.83	0.01	0.04	0.21	0.05	0.22
Carbon monoxide	178.9	27.58	0.16	1.55	7.59	1.71	7.75

Notes: (a) Emissions are from the 1989 Emission Inventory (ARB, 1991c).
(b) Emissions are total emissions from both direct and indirect sources as described in Appendix M.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.

Regional Scale. The Non-Aviation Alternative would generate emissions of ozone precursors and would, therefore, impact regional ozone levels. However, with the required application of control measures identified in the 1991 AQAP, this alternative would be consistent with the district's efforts to reach attainment of the ozone standard.

Ozone Precursors. Table 4.4-14 shows that total reuse-related emissions of ROG in 2005 would increase by 0.71 ton per day over closure conditions. However, the ROG emissions would remain below total base-related preclosure emission levels throughout the 10-year analysis period. By 2005, the total reuse-related ROG emissions would be about 8 percent of the total preclosure emissions associated with Castle AFB. Reuse-related NO_x emissions in 2005 would increase by 0.84 ton per day over closure levels and would be approximately 14 percent of preclosure levels. Without consideration of conformity offset allocation, which is discussed in the Cumulative Impacts section, ROG and NO_x emissions under reuse would be less than emissions under preclosure conditions, and therefore, the

Non-Aviation Alternative would not interfere with the attainment of the ozone.

NO_2, PM_{10}, SO_2, and CO. Total reuse-related emissions of these criteria pollutants would increase from closure levels as shown in Table 4.4-14. Total reuse-related emissions would be less than total preclosure emission levels for each pollutant. Without consideration of conformity offset allocation, which is discussed in the Cumulative Impacts section, reuse-related emissions would be insufficient to change the present attainment status for NO_2, SO_2, or CO, or hinder progress toward attainment of the PM_{10} standards. Air quality impacts from these primary pollutants are therefore expected to be minor.

Local Scale. A summary of the EDMS analysis for the Non-Aviation Alternative is presented in Table 4.4-15. The modeling results indicate that for the peak-hour vehicle traffic scenario, the maximum 1-hour CO pollutant concentration would occur in an area near the intersection of three major roadways, i.e., Santa Fe Drive, Buhach Road, and Bellevue Road. The modeling results indicate that concentrations of CO would be below the applicable standard in the immediate area surrounding the base and would have no adverse impact on the local air quality. Emissions of SO_2 and PM_{10} from vehicle traffic would be negligible.

Table 4.4-15. Air Quality Modeling Results for Vehicle Traffic Associated with the Non-Aviation Alternative ($\mu g/m^3$)

Pollutant	Averaging Time	Castle AFB Preclosure Conditions	Base Reuse Reuse-Related Impact 2000	Base Reuse Reuse-Related Impact 2005	Preclosure Background Concentration[b]	Limiting Standard[c]
Carbon monoxide[a]	8-hour	2,807	293	363	1,392	10,000
	1-hour	4,010	418	519	2,320	23,000

Notes: (a) Projected pollutant concentrations were determined from Emissions and Dispersion Modeling System modeling results. Concentrations represent incremental increase due to peak hour traffic. Emissions of sulfur dioxide and PM_{10} from vehicle traffic are negligible.
(b) Background concentrations of carbon monoxide are assumed to equal the mean of first-high values monitored at the Crows Landing monitoring station during the period from 1989 to 1991 (refer to Table 3.4-3).
(c) Limiting standard is equal to the more stringent of the CAAQS or NAAQS (refer to Table 3.4-1). Impacts were determined by comparing the aggregate of reuse-related impact and background concentrations to the limiting standard.

CAAQS = California Ambient Air Quality Standards.
$\mu g/m^3$ = Micrograms per cubic meter.
NAAQS = National Ambient Air Quality Standards.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.

Cumulative Impacts. Similar to the Proposed Action, cumulative impacts to local ambient air quality in the area are not expected. However, the proposed Navy realignment, in combination with the redevelopment of Castle AFB, may cause cumulative impacts to regional air quality in the SJVAB. This could result in competing Navy and reuse demand for air credits and conformity offsets for permits and conformity determinations to ensure that SIP attainment goals are achieved. As shown in Table 4.4-16, ROG, NO_x, and PM_{10} emissions requiring conformity offsets would peak at 96 tons per year of ROG in 1998, 367 tons per year of NO_x in 1998, and 187 tons per year of PM_{10} in 1997. Emissions would decline slightly thereafter, to a steady state of approximately 87, 346, and 99 tons per year of ROG, NO_x, and PM_{10}, respectively.

Table 4.4-16. Availability of Conformity Offset Emissions, Non-Aviation Alternative (tons per year)

	ROG	NO_x	PM_{10}
Available conformity offsets	2410.5	1009.8	151.6
Navy request for offsets[a]			
Peak	96.3[b]	367.1[b]	186.8[c]
Long-term (2000)	87.1	346.4	99.2

Notes: (a) Source: Dennis, 1994.
(b) 1998.
(c) 1997.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.

The Navy has expressed interest in obtaining available conformity offsets from the closure of Castle AFB in order to demonstrate no net emission increases from their realignment action. The potential conformity offsets available from the closure of Castle AFB are shown in Table 4.4-16. In the event that the Navy's emission offset request is met, then their short- and long-term ROG and NO_x emissions, as well as their long-term PM_{10} emissions, would be completely offset and their short-term (construction-related) PM_{10} emissions would be partially offset. The Navy would be required to obtain additional offsets or ERCs, develop mitigations, or implement other conformity criteria options to demonstrate conformity for PM_{10} emissions. However, surplus ROG and NO_x conformity offset emissions would be available for other purposes.

Federal agencies involved in the reuse of Castle AFB would also be required to evaluate their direct and indirect emissions to determine the conformity requirements for reuse actions.

The demand for conformity offsets to achieve positive conformity for the Navy realignment and conformity determinations required to support the reuse alternative result in a shortfall. This shortfall in conformity offsets and emission credits may cause cumulative adverse air quality impacts in the absence of mitigation.

Mitigation Measures. Construction-related mitigation measures would be similar to those described under the Proposed Action.

4.4.3.6 No-Action Alternative. The No-Action Alternative would generate emissions as described under closure baseline conditions. Due to the low level of activity under this alternative, negligible amounts of emissions would be produced and no adverse air quality impacts would occur.

4.4.3.7 Other Land Use Concepts. Potential changes in air quality resulting from implementation of one or more of the land use concepts in conjunction with the Proposed Action or alternatives are described below. Neither of the independent land use proposals is expected to affect the attainment status of the region if control measures recommended in the 1991 AQAP are implemented.

Federal Correctional Complex. Emissions would be generated during both the construction and operation phases associated with this land use concept. Construction impacts would occur due to the generation of fugitive dust during earth-moving activities, facility construction, and infrastructure improvement activities. Although construction of the facilities may occur during two phases spanning a 25-year period after closure, it was assumed (as a worst case) that all construction activity would occur between 1995 and 2000. It is estimated that an additional 248 acres would be disturbed by construction for this proposed use in the 5 years after closure, with an average disturbance of 1.73 acres per day. An estimated 94.9 pounds (0.047 ton) per day of PM_{10} would be released during the 1995 to 2000 time period. The impact of these emissions would cause elevated concentrations of particulates at receptors close to the construction areas. The concentrations would decrease rapidly with distance from the site.

The activities associated with this land use concept during operation would generate emissions from incineration, heating, power equipment, and motor vehicles of employees and visitors. Implementation of this concept would result in a net increase of emissions under the Proposed Action or other reuse alternatives. However, total emissions would not be expected to exceed preclosure emission levels under any alternative, with the exception of the Castle Aviation Center Alternative in 2005. Impacts and mitigations would be similar to those described under the reuse alternatives, excluding aviation-related mitigations.

The Federal Bureau of Prisons would be required to evaluate the conformity requirements of their proposed actions. If the conformity applicability analysis results in total direct and indirect emissions at or above the de minimis thresholds, a conformity determination must be prepared before taking the action.

Private Recreational Facility. Emissions would be generated during both the construction and operation of this land use concept. Construction impacts would occur due to the generation of fugitive dust during earth-moving activities, demolition, facility construction, and infrastructure improvements. It is estimated that an additional 135 acres would be disturbed by construction of this land use concept during the 5-year period after closure, with an average disturbance of 0.94 acre per day from 1995 to 2000. As a result, an estimated 51.7 pounds (0.026 ton) per day of PM_{10} in the form of fugitive dust would be released during construction activities. The impact of these emissions would cause elevated concentrations of particulates at receptors close to the construction areas, but these elevated concentrations would decrease rapidly with distance from the site.

Emissions associated with the operation of this land use concept would primarily occur from motor vehicles. Facility operations would generate an average of about 460 trips per day by 2015, and approximately 2,850 trips on special event days. However, emissions from these trips would be minimal compared to existing background vehicular emissions and would be spread over a large geographic area. Eighty acres of ground would be disturbed for a 1-week period each year to reclaim spent bird shot. With watering used as a mitigation, this activity would produce 5.5 tons of fugitive dust in the form of PM_{10} during this time period. The impact of these emissions would cause elevated concentrations of particulates at receptors close to the disturbed areas. These elevated concentrations would decrease rapidly with distance from the site.

Emissions from this land use concept are expected to be minimal and are not expected to affect the attainment status of the region. With the exception of the Castle Aviation Center Alternative, implementation of the concept in conjunction with any other alternative would not increase total emissions beyond the preclosure emission levels associated with Castle AFB. Impacts and mitigations would be similar to those described under the reuse alternatives, excluding aviation-related mitigations.

4.4.4 Noise

Environmental impact analysis related to noise includes the potential effects on the local human and animal populations. This analysis will estimate the extent and magnitude of noise levels generated by the Proposed Action and alternatives, using the predictive models discussed below. The baseline noise conditions and predicted noise levels will then be assessed with respect to land-use impacts. Other effects of noise such as potential annoyance, speech interference, sleep disturbance, hearing loss, and health will also be discussed.

Metrics used to evaluate noise are DNL, CNEL, and L_{eq}, which are supplemented occasionally by sound exposure level (SEL) and the A-weighted maximum sound level (L_{max}). These metrics are measured in units of A-weighted decibels. Similarities between DNL and CNEL are discussed in Section 3.4.4. The two metrics, DNL and CNEL, are typically equal to within 1 dB, and DNL criteria are commonly accepted when using CNEL. The metric CNEL is used in this report to determine land use impacts and

SEL is used when discussing sleep interference effects. See Appendix J for an expanded discussion of these metrics.

Methods used to quantify the effects of noise such as annoyance, speech interference, sleep disturbance, health, and hearing loss have undergone extensive scientific development during the past several decades. The most reliable measures at present are noise-induced hearing loss and annoyance. Extra-auditory effects (those not directly related to hearing capability) are also important, although they are not as well understood. The current scientific consensus is that "evidence from available research reports is suggestive, but it does not provide definitive answers to the question of health effects, other than to the auditory system, of long-term exposure to noise" (National Academy of Sciences, 1981). The effects of noise are summarized within this section and a detailed description is provided in Appendix J.

Annoyance. Noise annoyance is defined by the U.S. EPA as any negative subjective reaction to noise on the part of an individual or group. Table 4.4-17 presents the results of over a dozen studies of transportation modes, including airports, investigating the relationship between noise and annoyance levels. This relationship has been suggested by the National Academy of Sciences (1977) and recently reevaluated (Fidell et al., 1989) for use in describing people's reactions to semi-continuous (transportation) noise. These data are shown to provide a perspective on the level of annoyance that might be anticipated. For example, 15 to 25 percent of persons exposed to DNL of 65 to 70 dB would be highly annoyed by the noise levels.

Table 4.4-17. Percentage of Population Highly Annoyed by Noise Exposure

DNL Interval in dB	Percentage of Persons Highly Annoyed
<65	<15
65-70	15-25
70-75	25-37
75-80	37-52

dB = Decibel.
DNL = Day-night average sound level.

Source: Adapted from National Academy of Sciences, 1977.

Speech Interference. One of the ways that noise affects daily life is by prevention or impairment of speech communication. In a noisy environment, understanding speech is diminished when speech signals are masked by intruding noises. Reduced intelligibility of speech may also have other effects; for example, if the understanding of speech is interrupted, performance may be reduced, annoyance may increase, and learning may be impaired. Research suggests that aircraft flyover noises that exceed approximately 60 dB instantaneous sound level interfere with speech communication (Bennett and Pearsons, 1981; Crook and Langdon, 1974).

Increasing the level of the flyover noise maximum to 80 dB will reduce the intelligibility to zero, even if the person speaks in a loud voice. This interference lasts as long as the event, which is momentary for a flyover.

Sleep Disturbance. The effects of noise on sleep are of concern, primarily in assuring suitable residential environments. DNL incorporates consideration of sleep disturbance by assigning a 10 dB penalty to nighttime noise events. SEL may be used to supplement DNL in evaluating sleep disturbance. When SEL is used to evaluate sleep disturbance, SEL values are translated to percent of people awakened. The relationship between percent awakened and SEL is presented in Appendix J. Most of these relationships, however, do not reflect habituation and, therefore, would not address long-term sleep disturbance effects. SEL takes into account an event's sound intensity, frequency content, and time duration, by measuring the total A-weighted sound energy of the event and incorporating it into a single number. Unlike DNL, which describes the daily average noise exposure, SEL describes the normalized noise from a single flyover, called an event.

Studies (Goldstein and Lukas, 1980; Lukas, 1975) show great variability in the percentage of people awakened by exposure to noise. A recent review (Pearsons et al., 1989) of the literature related to sleep disturbance, including field as well as laboratory studies, suggests that habituation may reduce the effect of noise on sleep. The authors point out that the relationship between noise exposure and sleep disturbance is complex and affected by the interaction of many variables. The large differences between the findings of the laboratory and field studies make it difficult to determine the best relationship to use. The method developed by Lukas would estimate seven times more awakening than the field results reported by Pearsons.

Land Use Compatibility. Estimates of total noise exposure resulting from aircraft operations, as expressed using DNL or CNEL, can be interpreted in terms of the compatibility with designated land uses. The Federal Interagency Committee on Urban Noise developed land-use compatibility guidelines for noise (U.S. DOT, 1980). Based upon these guidelines, suggested compatibility guidelines for evaluating land uses in aircraft noise exposure areas were developed by the FAA. The California Department of Health, Office of Noise Control (California Office of Planning and Research, 1987) has also developed land-use compatibility guidelines. Both the federal and state guidelines are presented in Section 3.4.4. The land use compatibility guidelines are based on annoyance and hearing loss considerations previously described. Compatible or incompatible land use is determined by comparing the predicted CNEL level at a site with the recommended land uses.

Noise Modeling. In order to define the noise impacts from aircraft takeoff, landing, and touch-and-go operations at Castle AFB, the FAA-developed Integrated Noise Model (INM) version 3.10 was utilized to predict 60, 65, 70, and 75 CNEL noise contours and SEL values for noise-sensitive receptors. The FAA-approved NOISEMAP version 6.1 was used to calculate noise levels associated with engine runup activity. These descriptors are defined in Appendix J. The contours were generated for the Proposed Action and other aviation alternatives for the baseline year (closure) and three future year projections (5, 10, and 20 years after closure). These contours were overlaid on a U.S. Geological Survey map of the base and vicinity. Input data to INM 3.10 include information on aircraft types; runway use; takeoff and landing flight tracks; aircraft altitude, speeds, and engine power settings; and number of daytime (7 a.m. to 7 p.m.), evening (7 p.m. to 10 p.m.), and nighttime (10 p.m. to 7 a.m.) operations.

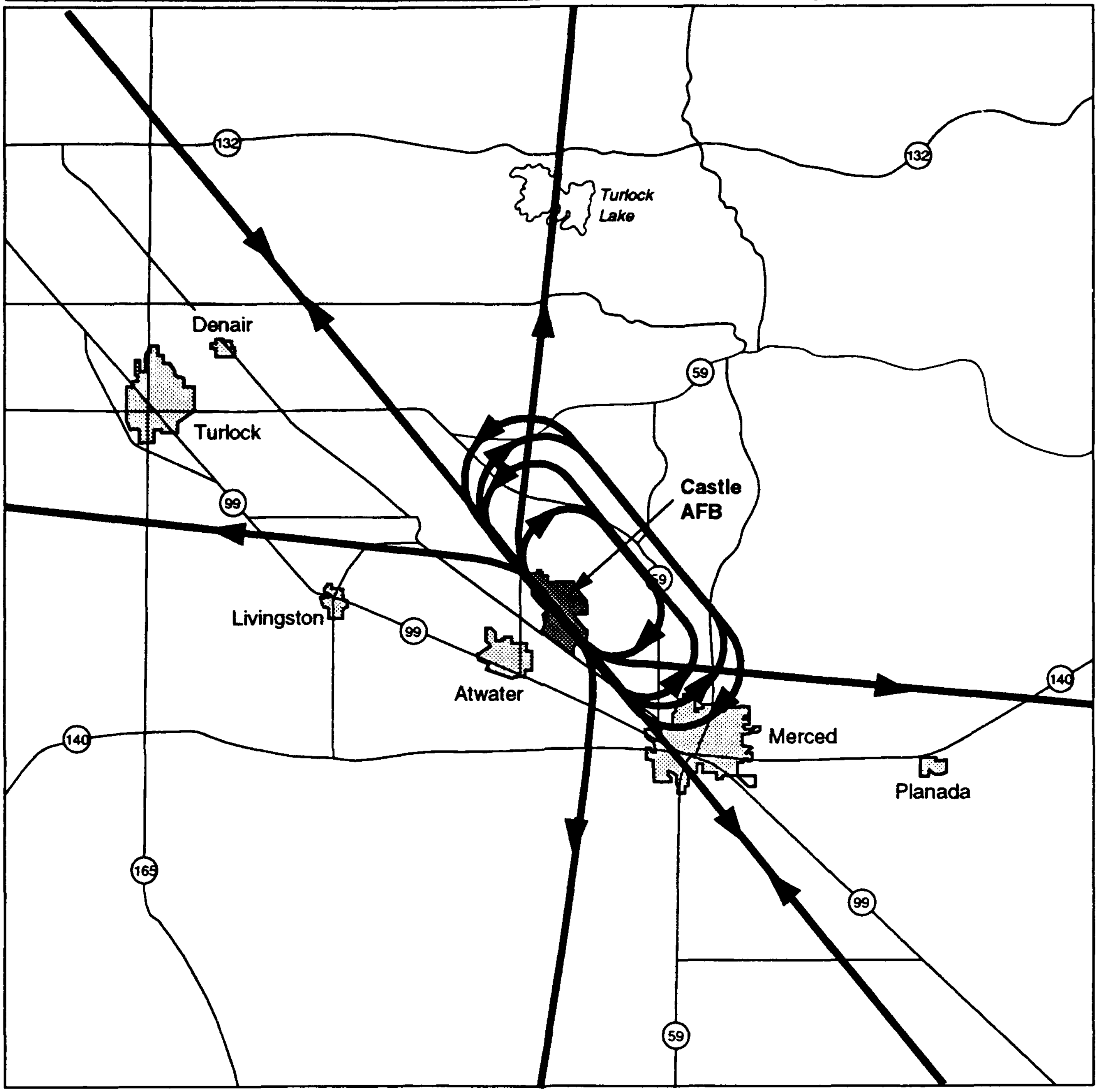
Surface vehicle traffic-noise levels for roadways in the vicinity of Castle AFB were analyzed using the Federal Highway Administration's Highway Noise Model (1978). This model incorporates vehicle mix, traffic volume projections, and speed to generate CNEL.

Rail noise levels were predicted for the Southern Pacific and AT&SF railroads in the vicinity of Castle AFB. The rail noise levels were predicted from published models and data (Nelson, 1987; Remington et al., 1980; Swing and Pies, 1973).

Major Assumptions. Half of all aircraft operations were assumed to be takeoffs and half landings. Operations are presented in Appendix J in detail. Flight tracks (incoming and outgoing), aircraft operations, and mix are included in Appendix J. Vicinity flight tracks assumed for modeling are shown in Figures 4.4-1 and 4.4-8. All operations were assumed to follow standard glide slopes and takeoff profiles provided by the INM. The phasing out of Stage 2 aircraft and subsequent replacement with Stage 3 aircraft are reflected in the aircraft operations.

Major roads leading to or around the base were analyzed. Traffic data used to project future noise levels were derived from information gathered in the traffic analysis presented in Section 4.2.3. Traffic data used in this analysis are presented in Appendix J.

Noise impacts from all aviation-related reuses are projected to be lower than the preclosure reference. This is due to the fact that preclosure zoning surrounding the base and under the flight tracks was guided by the AICUZ for the base and that the noise associated with any of the reuse alternatives is much lower than the preclosure noise contour. The result is lower reuse-generated aircraft noise levels impacting land uses guided by zoning that anticipated much higher levels of aircraft-generated noise. Should aircraft noise become an issue in the future, then a noise compatibility planning



EXPLANATION

Direction of Travel on Flight Path

99 State Highway

0 1.25 2.5 5 Nautical Miles

Primary Flight Tracks - Proposed Action, Castle Aviation Center Alternative, and Aviation with Mixed Use Alternative

Figure 4.4-1

program could be carried out by the airport operator in conjunction with local and state officials, following the guidelines contained in FAA Regulation Part 150 and FAA Advisory Circular 150/5020.1, Noise Control and Compatibility Planning for Airports.

Appendix J contains the data and assumptions made for the rail traffic analysis. These data include number and types of trains, number of locomotives and cars per train, day-evening-night operations, and train speed.

4.4.4.1 **Proposed Action.** The results of the aircraft noise modeling for the Proposed Action are presented as noise contours in Figures 4.4-2 through 4.4-4. The contribution from runup noise is evident as separate contours to the southwest of Runway 31.

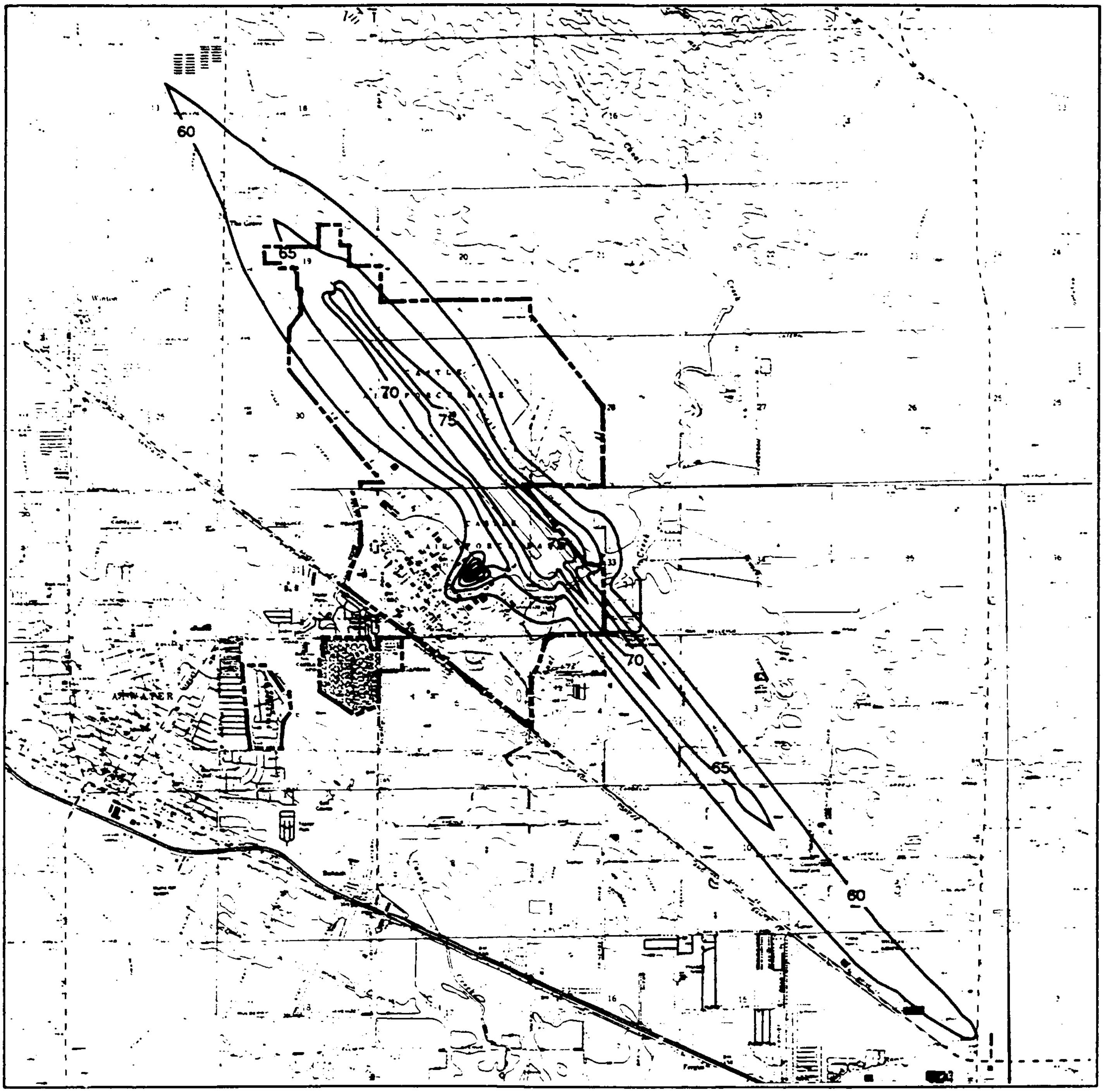
Table 4.4-18 presents the approximate number of acres and estimated population within each CNEL range for each of the study years. Compared to the preclosure reference, this represents a decrease of 134,647 acres within CNEL 60 dB in 2000, 134,691 acres in 2005, and 134,764 acres in 2015. The maximum exposure is projected for 2015.

Table 4.4-18. CNEL Exposure Due to Aircraft for the Alternative Reuse Plans

		CNEL in dB							
		60-65		65-70		70-75		>75	
Year	Alternative	Acres	Population	Acres	Population	Acres	Population	Acres	Population
2000	Proposed Action	1,701	211	558	35	279	0	191	0
	Castle Aviation Center	612	5	299	0	140	0	59	0
	Commercial Aviation	2,994	230	1,247	40	547	0	215	0
	Aviation with Mixed Use	337	0	138	0	68	0	31	0
2005	Proposed Action	1,616	217	691	32	264	0	206	0
	Castle Aviation Center	702	5	326	0	153	0	66	0
	Commercial Aviation	3,620	230	1,526	60	646	0	273	0
	Aviation with Mixed Use	507	0	198	0	95	0	44	0
2015	Proposed Action	1,660	228	691	35	294	0	206	0
	Castle Aviation Center	773	5	356	0	169	0	75	0
	Commercial Aviation	3,164	230	1,322	60	574	0	231	0
	Aviation with Mixed Use	653	0	290	0	138	0	68	0

CNEL = Community Noise Equivalent Level.
dB = Decibel.

The criteria that define Stage 2 and Stage 3 aircraft are described in FAA Part 36 (FAA, 1988). Noise level limits are defined for takeoff, approach,



EXPLANATION

CNEL Noise Contours (in 5 dB intervals)

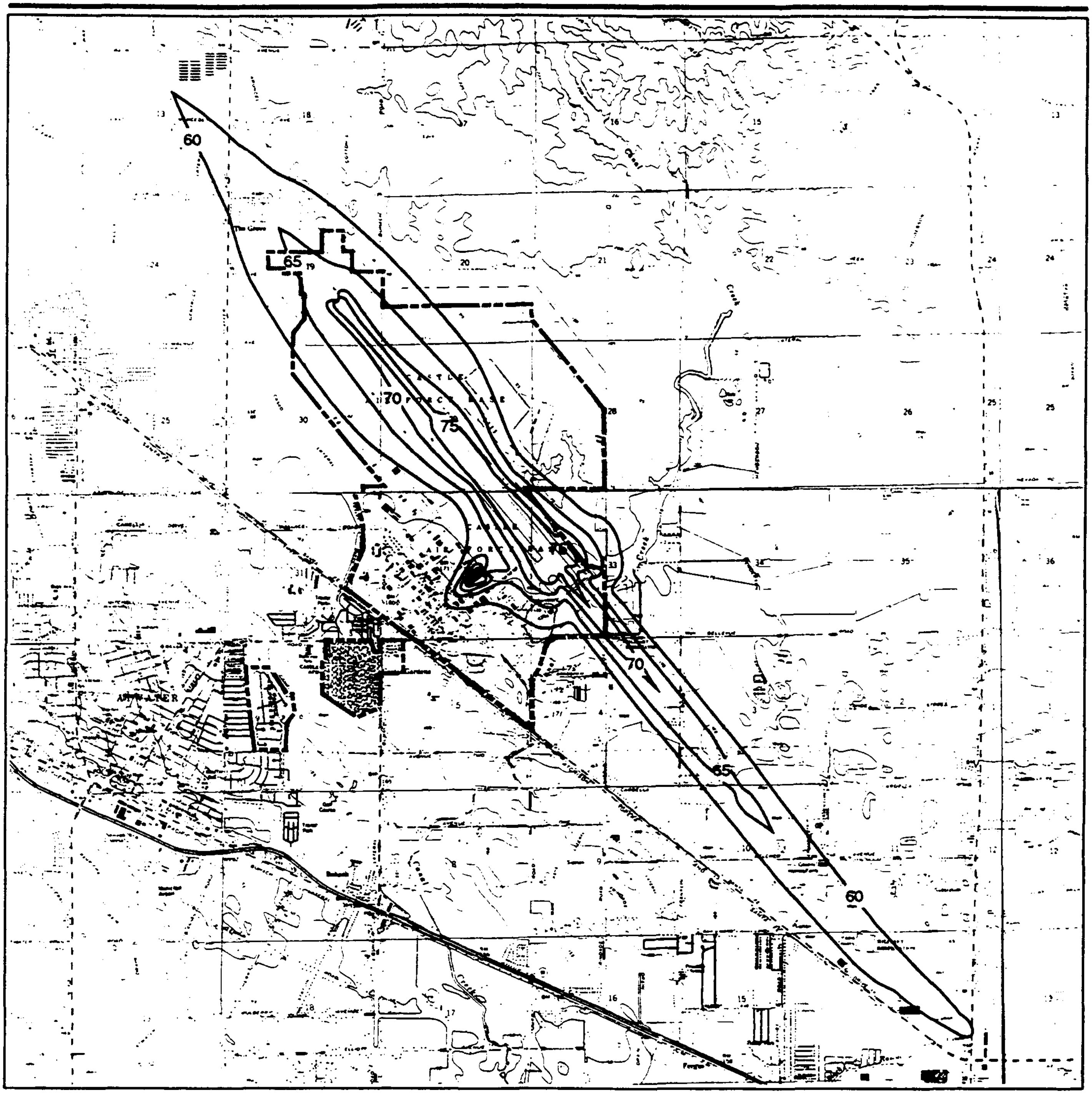
Base Boundary

0 900 1800 3600 Feet

Map Sources: U.S. Geological Survey, 1987a, 1987c, 1987d, 1987e.

CNEL Noise Contours-Proposed Action (2000)

Figure 4.4-2



EXPLANATION

CNEL Noise Contours (in 5 dB intervals)

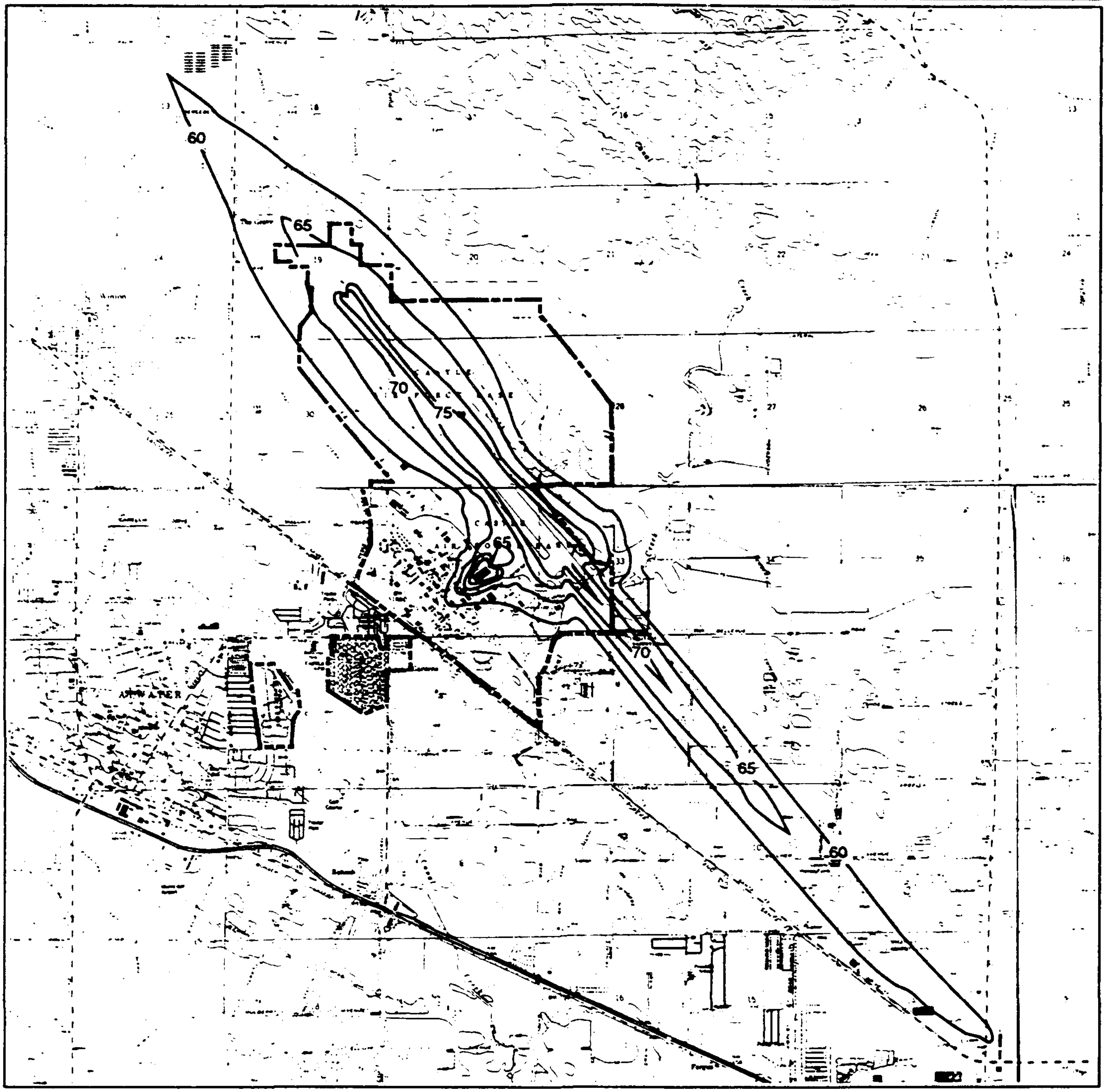
Base Boundary

0 900 1800 3600 Feet

Map Sources: U.S. Geological Survey, 1987a, 1987c, 1987d, 1987e.

CNEL Noise Contours-Proposed Action (2005)

Figure 4.4-3



EXPLANATION

——— CNEL Noise Contours (in 5 dB intervals)

— • • — Base Boundary

CNEL Noise Contours-Proposed Action (2015)

0 900 1800 3600 Feet

Map Sources: U.S. Geological Survey, 1987a, 1987c, 1987d, 1987e.

Figure 4.4-4

and sideline measurements. Since all modeled operations take place after the year 2000, no Stage 2 aircraft are included in the analysis.

SEL was calculated at representative residential locations for the noisiest and most common jet aircraft; the results are presented in Table 4.4-19. The analysis suggests that, for the Proposed Action, aircraft overflights could affect the sleep of some residents in the area.

Table 4.4-19. Sound Exposure Levels at Representative Noise Receptors, All Reuse Alternatives

			Sound Exposure Level (dB) Aircraft Type		
No.	Community	Receptor Location	747-400	Gulfstream IV	F-16
1	On Base	NE corner of Castle Gardens	79	71	82
2		SE corner of Castle Gardens	77	68	80
3		SW corner of Castle Vista	70	59	72
4		Base Hospital	81	73	84
5	Atwater	Residential area at Bellevue Rd across from Bellevue School	75	65	78
6		Residential area at Winton Way and Bridget St	72	60	75
7		Residential area at Shaffer Rd and Cedar Rd	68	56	71
8		Trailer Court west of SH 99 and Business 99 Overpass	64	50	65
9		Atwater Hospital	67	54	69
10	Merced	Residential area at Olive Ave and Larkspur	72	62	76
11		Mercy Hospital	78	70	86
12		Merced Hospital	83	73	87
13		Residential area at 8th St and V St	78	71	87
14	Rural Merced County	Residential area at SH 59 and Pettinotti	83	77	93
15	Winton	Residential area at Winton Way and Lawrence St	81	75	90
16	The Grove	Residential area at Shaffer Rd and Eucalyptus	95	86	107
17	Amsterdam	Residential area at SH 59 and Fisher Rd	69	59	93
18	Livingston	Residential area at Main St and D St	70	58	71
19	Delhi	Residential area at Schendel Rd and Shanks	76	68	80
20	Turlock	Residential area at W Linwood Rd and Landers Ave	66	50	63
21	Cressey	Residential area at CR J-7 and Cressey Way	82	75	88
22	Fluhr	Residential area at Determine and Kelso	77	68	80
23	Fergus	Residential area at Beachwood Dr and Cabot	78	72	88

dB = Decibel.
SH = State Highway.

For all model years the noisiest and most common aircraft would be the 747-400. The noisiest aircraft were determined from L_{max} as presented in FAA Advisory Circular AC 36-3F (FAA, 1990). For aircraft not included in

Table 4.4-20. Distance to CNEL from Roadway Centerline - Proposed Action
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Year	Roadway	Segment	CNEL 60		CNEL 65		CNEL 70		CNEL 75	
			Distance (feet)							
2000	West Olive Ave	SH 59 to R St	210		100		50		40	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	150		80		40		(a)	
	Buhach Rd	Bellevue Rd to Juniper Ave	190		90		50		30	
	Buhach Rd	Juniper Ave to SH 99	160		80		40		(a)	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	200		100		50		30	
	Bellevue Rd	Buhach Rd to Castle Dr	220		110		60		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	240		120		60		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	130		60		30		(a)	
	Wallace Rd	Gate 3 to Santa Fe Dr	60		30		(a)		(a)	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,580	1,440	1,110	720	950	350	880	170
	SH 99[b]	Rail Overpass to Buhach Rd	1,450	1,460	730	760	360	410	170	260
	SH 99[b]	Buhach Rd to Franklin Rd	1,780	1,790	870	890	420	460	200	270
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	410	570	210	370	90	260	30	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	450	590	240	390	110	260	40	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	470	610	240	390	110	260	50	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	490	610	270	400	130	270	60	190
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	480	600	260	390	130	270	60	190
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	520	640	270	400	130	270	60	190
	Santa Fe Dr[b]	Beachwood Dr to SH 59	560	660	280	410	140	270	60	190
2005	West Olive Ave	SH 59 to R St	240		120		60		40	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	180		90		50		30	
	Buhach Rd	Bellevue Rd to Juniper Ave	220		110		50		30	
	Buhach Rd	Juniper Ave to SH 99	190		90		50		30	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	220		110		60		40	
	Bellevue Rd	Buhach Rd to Castle Dr	250		120		60		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	270		130		60		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	160		80		40		(a)	
	Wallace Rd	Gate 3 to Santa Fe Dr	60		30		20		(a)	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,680	1,570	1,130	790	950	380	880	180
	SH 99[b]	Rail Overpass to Buhach Rd	1,580	1,590	800	830	390	440	190	270
	SH 99[b]	Buhach Rd to Franklin Rd	1,970	1,970	960	980	460	490	220	280
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	420	570	220	380	100	260	40	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	470	600	250	390	110	260	50	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	500	620	250	400	120	270	50	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	520	630	280	400	140	270	60	190
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	500	610	280	400	140	270	70	190
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	550	660	280	410	140	270	60	190
	Santa Fe Dr[b]	Beachwood Dr to SH 59	600	690	300	420	150	270	70	200

Notes: (a) Contained within the roadway.
(b) Indicates roadways that are parallel to rail lines; distances are for combined noise from roadway and rail traffic. Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

Table 4.4-20. Distance to CNEL from Roadway Centerline - Proposed Action
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Year	Roadway	Segment	Distance (feet) CNEL 60		CNEL 65		CNEL 70		CNEL 75	
2015	West Olive Ave	SH 59 to R St	300		140		70		40	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	200		100		50		30	
	Buhach Rd	Bellevue Rd to Juniper Ave	240		120		60		30	
	Buhach Rd	Juniper Ave to SH 99	210		100		50		30	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	240		120		60		40	
	Bellevue Rd	Buhach Rd to Castle Dr	280		140		70		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	320		150		70		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	180		80		40		(a)	
	Wallace Rd	Gate 3 to Santa Fe Dr	70		30		20		(a)	
			North	South	North	South	North	South	North	South
	SH 99(b)	Atwater to Rail Overpass	1,900	1,840	1,180	950	960	460	880	220
	SH 99(b)	Rail Overpass to Buhach Rd	1,850	1,850	950	970	470	500	220	280
	SH 99(b)	Buhach Rd to Franklin Rd	2,320	2,320	1,150	1,160	550	570	260	310
	Santa Fe Dr(b)	Chestnut Ln to Shaffer Rd	450	590	230	380	100	260	40	190
	Santa Fe Dr(b)	Shaffer Rd to Wallace Rd	500	620	270	400	130	270	50	190
	Santa Fe Dr(b)	Wallace Rd to Buhach Rd	540	650	280	410	130	270	60	190
	Santa Fe Dr(b)	Buhach Rd to Bellevue Rd	560	660	310	420	150	280	70	200
	Santa Fe Dr(b)	Bellevue Rd to Gate 2	530	630	300	410	150	270	70	200
	Santa Fe Dr(b)	Gate 2 to Gurr Rd	590	690	300	420	150	270	70	200
	Santa Fe Dr(b)	Beachwood Dr to SH 59	660	740	330	440	160	280	70	200

Notes: (a) *Contained within the roadway.*
(b) Indicates roadways that are parallel to rail lines, distances are for combined noise from roadway and rail traffic. Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

AC 36-3F, data from the aircraft noise models (i.e., INM and NOISEMAP) were used to determine noisiest aircraft.

Surface traffic noise levels and number of residents exposed to CNEL 60 or greater for several road segments are presented in Tables 4.4-20 and 4.4-21 respectively. The levels are presented in terms of CNEL as a function of distance from the centerline of the roadways analyzed. There would be an estimated 3,201 residents in areas exposed to noise levels of CNEL 60 or greater due to surface traffic by the year 2015. This number represents an increase of 358 people over No-Action Alternative conditions in that year.

Mitigation Measures. Measures that could be considered to reduce the effects of airport noise include:

- **Operational measures** - Change takeoff, climbout, or landing procedures; change flight tracks, limit or rotate primary runway

Table 4.4-21. Number of People Impacted by Surface Traffic Noise - Proposed Action

Year	Roadway	Segment	Population Impacted CNEL 60-65	CNEL 65-70	CNEL 70-75	CNEL >75
2000	West Olive Ave	SH 59 to R St	64	0	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	9	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	46	29	0	0
	Buhach Rd	Juniper Ave to SH 99	32	0	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	72	43	6	0
	Bellevue Rd	Castle Dr to Shaffer Rd	66	52	29	0
	Juniper Ave	Buhach Rd to Shaffer Rd	92	9	0	0
	Wallace Rd	Gate 3 to Santa Fe Dr	0	0	0	0
	SH 99[a]	Atwater to Buhach Rd	843	274	14	0
	SH 99[a]	Buhach Rd to Franklin Rd	58	40	32	0
	Santa Fe Dr[a]	Chestnut Ln to Shaffer Rd	14	32	12	0
	Santa Fe Dr[a]	Shaffer Rd to Wallace Rd	0	3	0	0
	Santa Fe Dr[a]	Wallace Rd to Buhach Rd	101	64	55	0
	Santa Fe Dr[a]	Buhach Rd to Bellevue Rd	17	9	6	0
	Santa Fe Dr[a]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[a]	Gate 2 to Gurr Rd	12	9	3	3
	Santa Fe Dr[a]	Beachwood Dr to SH 59	20	23	6	0
2005	West Olive Ave	SH 59 to R St	87	3	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	23	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	69	38	0	0
	Buhach Rd	Juniper Ave to SH 99	52	0	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	92	43	6	0
	Bellevue Rd	Castle Dr to Shaffer Rd	81	52	0	0
	Juniper Ave	Buhach Rd to Shaffer Rd	75	35	3	0
	Wallace Rd	Gate 3 to Santa Fe Dr	0	0	0	0
	SH 99	Atwater to Buhach Rd	980	327	32	0
	SH 99	Buhach Rd to Franklin Rd	58	43	38	0
	Santa Fe Dr[a]	Chestnut Ln to Shaffer Rd	12	29	17	0
	Santa Fe Dr[a]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[a]	Wallace Rd to Buhach Rd	81	78	61	0
	Santa Fe Dr[a]	Buhach Rd to Bellevue Rd	26	9	6	0
	Santa Fe Dr[a]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[a]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[a]	Beachwood Dr to SH 59	23	0	9	0
2015	West Olive Ave	SH 59 to R St	69	20	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	32	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	48	35	3	0
	Buhach Rd	Juniper Ave to SH 99	46	6	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	92	52	0	0
	Bellevue Rd	Castle Dr to Shaffer Rd	118	38	46	0
	Juniper Ave	Buhach Rd to Shaffer Rd	84	38	0	0
	Wallace Rd	Gate 3 to Santa Fe Dr	3	0	0	0
	SH 99[a]	Atwater to Buhach Rd	1,398	422	75	0
	SH 99[a]	Buhach Rd to Franklin Rd	55	52	43	0
	Santa Fe Dr[a]	Chestnut Ln to Shaffer Rd	14	29	17	0
	Santa Fe Dr[a]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[a]	Wallace Rd to Buhach Rd	87	87	61	0
	Santa Fe Dr[a]	Buhach Rd to Bellevue Rd	29	9	6	0
	Santa Fe Dr[a]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[a]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[a]	Beachwood Dr to SH 59	29	23	9	0

Note: (a) Indicates roadways that are parallel to rail lines, population impacted are for combined noise from roadway and rail traffic.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

usage; enforce prescribed flight track use and fan out departure flight tracks.

- **Preventive measures** - Acquire undeveloped land adjacent to the runway that is exposed to aircraft noise of CNEL 65 or greater; restrict residential and hospital development to areas outside the CNEL 65 contour.

- **Management measures** - Impose curfews, impose noise-related landing fees, develop noise monitoring systems, establish a community relations office.

- **Remedial measures** - Acquire mobile home sites and single-family housing areas exposed to aircraft noise of CNEL 70 or greater; redevelop mobile home sites to other compatible uses; establish and conduct a sound attenuation program for single-family residences.

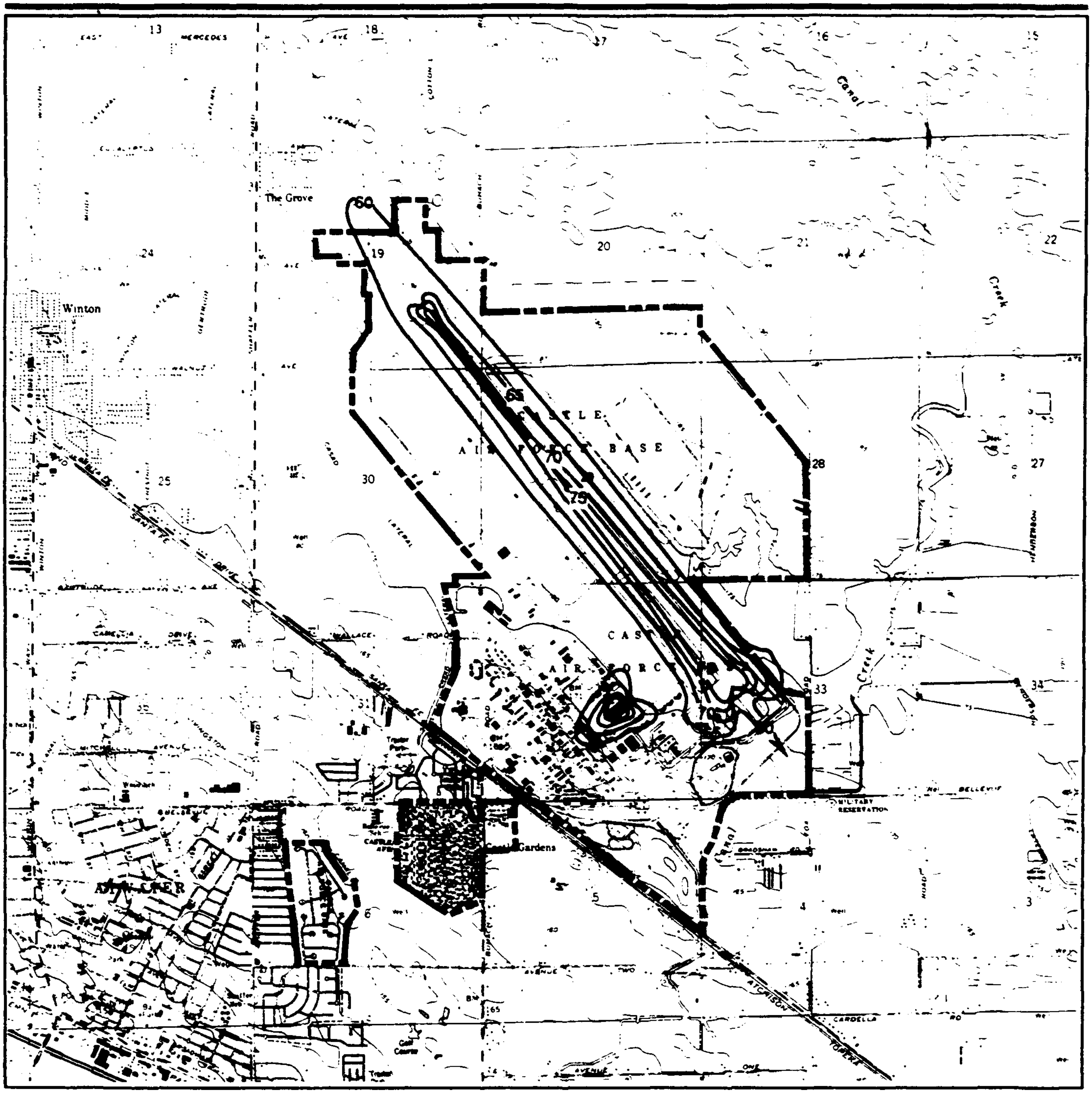
Barrier walls could be used to mitigate surface traffic noise impacts along roadways. A noise barrier analysis would be necessary to determine the optimum locations, height, and/or feasibility of the barrier walls. Other mitigation measures, such as a sound insulation program, could be implemented to reduce interior noise levels for sensitive receptors exposed to CNEL 60 dB or greater. For future development, land use planning should incorporate noise compatibility measures when establishing residential zoning. Measures such as restricting residential development to areas outside CNEL 60 dB and incorporating barriers and buffer zones into community development can be used. The effectiveness of the operational and management noise mitigation measures presented here cannot be completely determined without extensive modeling and/or noise measurements.

4.4.4.2 Castle Aviation Center Alternative. The results of the aircraft noise modeling for the Aviation Center Alternative are presented as noise contours in Figures 4.4-5 through 4.4-7. The contribution from runup noise is evident as separate contours to the southwest of the start of Runway 31.

Table 4.4-18 presents the approximate number of acres and estimated population within each CNEL range for each of the study years. Compared to the preclosure reference, this represents a decrease of 132,526 acres within CNEL 60 dB in 2000, 132,598 acres in 2005, and 132,684 acres in 2015. The maximum exposure is projected for 2015.

Since all modeled operations would take place after 2000, no Stage 2 aircraft are included in the analysis.

SEL was calculated at representative residential locations for the noisiest and most common jet aircraft; the results are presented in Table 4.4-19.



EXPLANATION

——— CNEL Noise Contours (in 5 dB intervals)

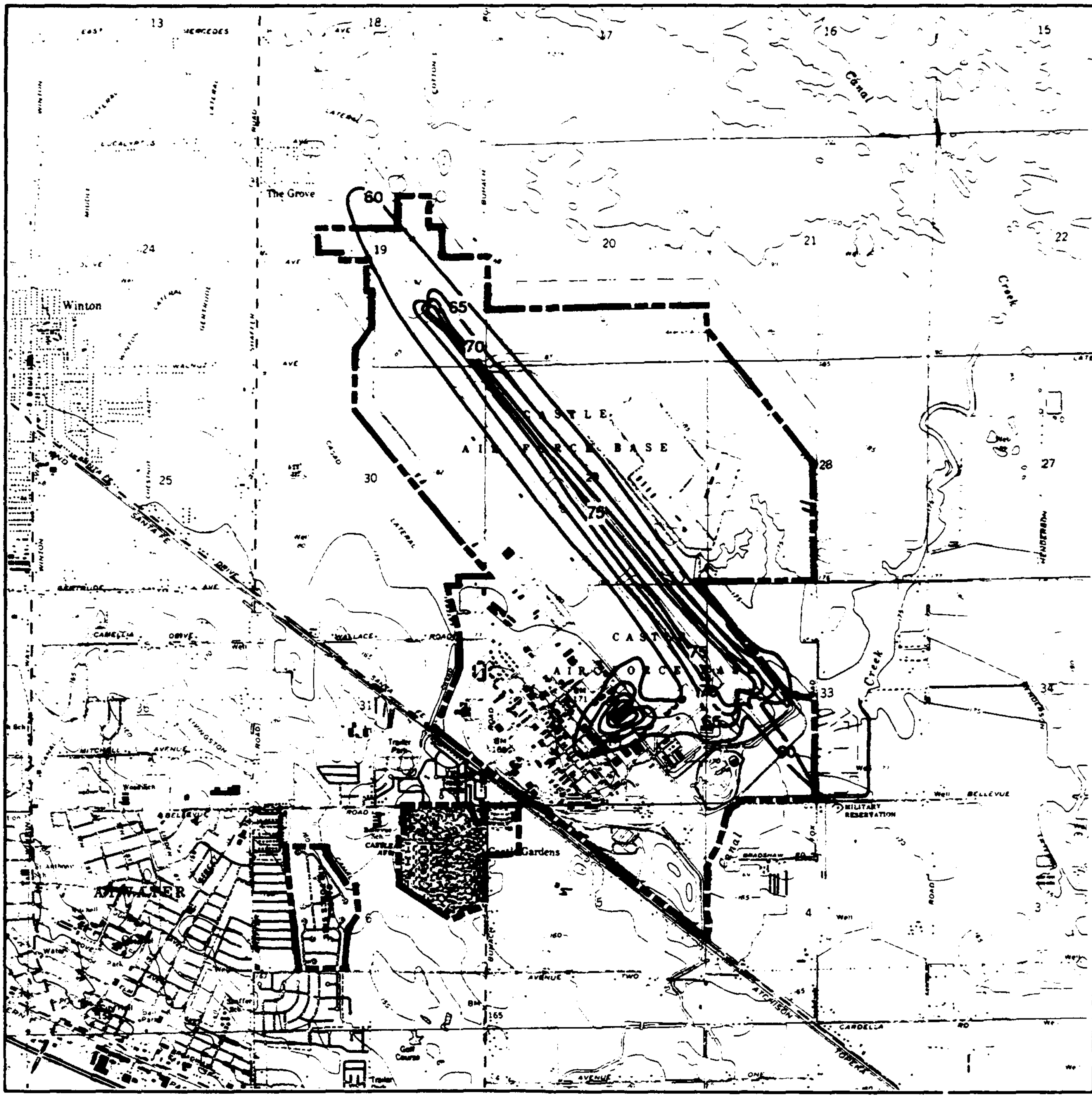
— • • — Base Boundary

0 900 1800 3600 Feet

Map Sources: U.S. Geological Survey, 1987a, 1987d.

CNEL Noise Contours-Castle Aviation Center Alternative (2000)

Figure 4.4-5



EXPLANATION

——— CNEL Noise Contours (in 5 dB intervals)

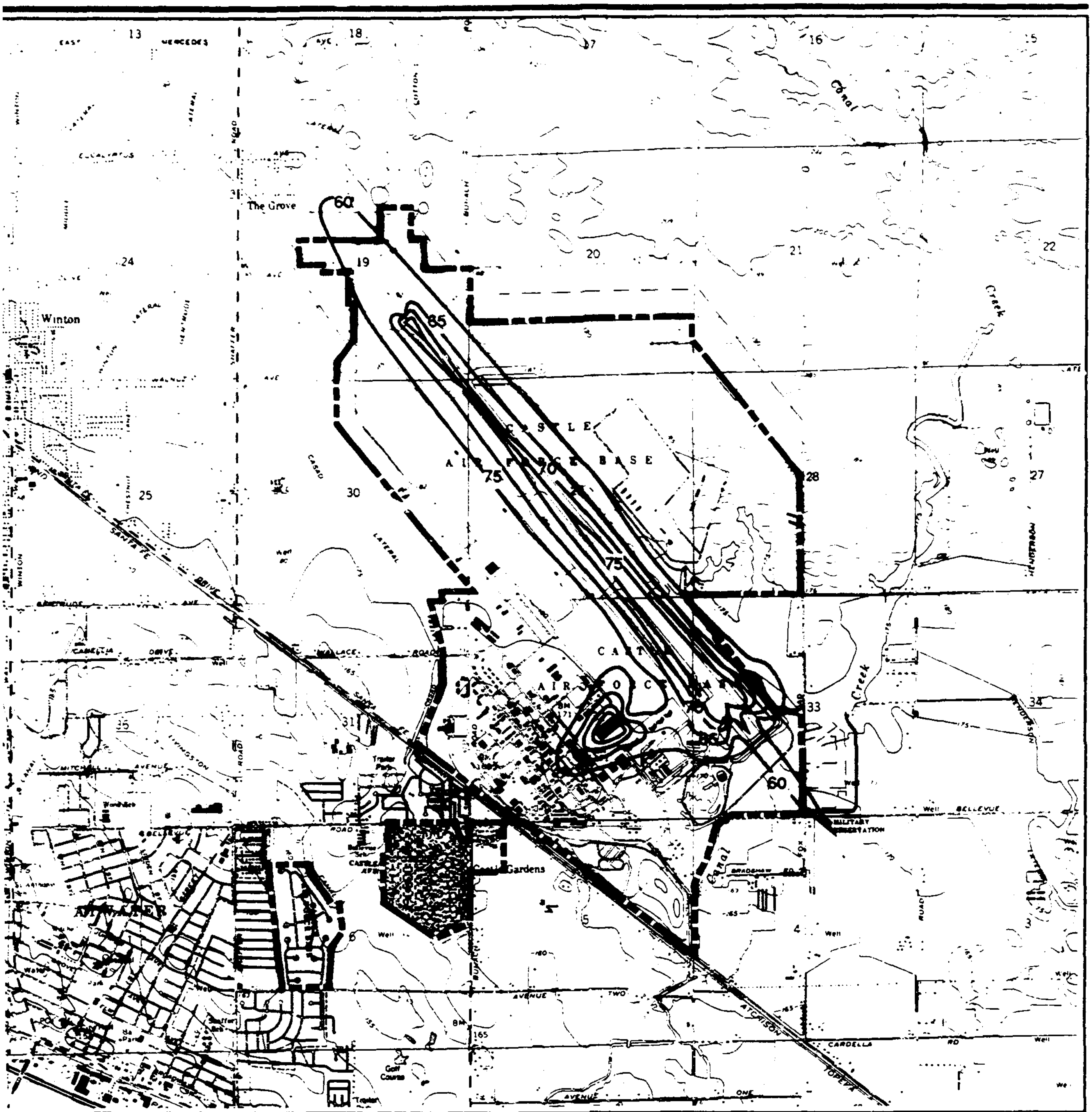
— • • — Base Boundary

CNEL Noise Contours-Castle Aviation Center Alternative (2005)

0 900 1800 3600 Feet

Map Sources: U.S. Geological Survey, 1987a, 1987d.

Figure 4.4-6



XPLANATION

- CNEL Noise Contours (in 5 dB intervals)
- Base Boundary

CNEL Noise Contours- Castle Aviation Center Alternative (2015)

900 1800 3600 Feet

Map Sources: U.S. Geological Survey, 1987a, 1987d.

Figure 4.4-7

The analysis suggests that, for the Castle Aviation Center Alternative aircraft overflights could affect the sleep of some residents in the area.

For all model years the noisiest and most common jet aircraft would be the 747-400. The noisiest military aircraft for all years is the F-16. The noisiest aircraft were determined from L_{max} as presented in FAA Advisory Circular AC 36-3F (FAA, 1990). For aircraft not included in AC 36-3F, data from the aircraft noise models (i.e., INM and NOISEMAP) were used to determine noisiest aircraft.

Surface traffic noise levels and number of residents exposed to noise levels of CNEL 60 or greater for several road segments are presented in Tables 4.4-22 and 4.4-23, respectively. The levels are presented in terms of CNEL as a function of distance from the centerline of the roadways analyzed. There would be an estimated 3,535 residents in areas exposed to noise levels of CNEL 60 dB or greater due to surface traffic by the year 2015. This represents an increase of 692 people over No-Action Alternative conditions in that year.

Mitigation Measures. No mitigation measures for aircraft noise would be necessary, since no incompatible land uses have been identified. For surface traffic noise, the mitigation measures described under the Proposed Action would be appropriate.

4.4.4.3 Commercial Aviation Alternative. The primary flight tracks for the Commercial Aviation Alternative are presented in Figure 4.4-8. The results of the aircraft noise modeling for the Commercial Aviation Alternative are presented as noise contours in Figures 4.4-9 through 4.4-11. The contribution from runup noise is evident as separate contours to the southwest of the start of Runway 31.

Table 4.4-18 presents the approximate number of acres and estimated population within each CNEL range for each of the study years. Compared to the preclosure reference, this represents a decrease of 134,908 acres within CNEL 60 dB in 2000, 135,078 acres in 2005, and 135,534 acres in 2015. The maximum exposure is projected for 2015.

Since all modeled operations take place after 2000, no Stage 2 aircraft are included in the analysis.

SEL was calculated at representative residential locations for the noisiest and most common jet aircraft; the results are presented in Table 4.4-19. The analysis suggests that, for the Commercial Aviation Alternative, aircraft overflights could affect the sleep of some residents in the area.

For all model years the noisiest and most common jet aircraft would be the 747-400. The noisiest aircraft were determined from the A-weighted

Table 4.4-22. Distance to CNEL from Roadway Centerline - Castle Aviation Center Alternative
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Year	Roadway	Segment	Distance (feet) CNEL 60		CNEL 65		CNEL 70		CNEL 75	
2000	West Olive Ave	SH 59 to R St	230		110		60		40	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	190		100		50		30	
	Buhach Rd	Bellevue Rd to Juniper Ave	220		100		50		30	
	Buhach Rd	Juniper Ave to SH 99	190		90		50		30	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	210		110		60		40	
	Bellevue Rd	Buhach Rd to Castle Dr	250		120		60		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	260		130		60		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	130		60		40		[a]	
	Wallace Rd	Gate 3 to Santa Fe Dr	80		40		20		[a]	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,590	1,160	1,110	730	950	350	880	170
	SH 99[b]	Rail Overpass to Buhach Rd	1,470	1,480	740	770	360	410	170	260
	SH 99[b]	Buhach Rd to Franklin Rd	1,820	1,830	890	910	430	470	200	270
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	420	570	220	380	100	260	40	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	470	600	240	390	110	260	50	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	490	610	250	390	110	270	50	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	500	620	270	400	130	270	60	190
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	480	600	270	390	130	270	60	190
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	530	640	270	400	130	270	60	190
	Santa Fe Dr[b]	Beachwood Dr to SH 59	580	680	300	420	140	270	60	200
2005	West Olive Ave	SH 59 to R St	260		120		60		40	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	200		100		50		30	
	Buhach Rd	Bellevue Rd to Juniper Ave	240		110		60		30	
	Buhach Rd	Juniper Ave to SH 99	200		100		50		30	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	230		110		60		40	
	Bellevue Rd	Buhach Rd to Castle Dr	270		130		70		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	290		140		70		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	140		70		40		[a]	
	Wallace Rd	Gate 3 to Santa Fe Dr	80		40		20		[a]	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,680	1,580	1,130	800	950	380	880	180
	SH 99[b]	Rail Overpass to Buhach Rd	1,590	1,600	810	830	390	440	190	270
	SH 99[b]	Buhach Rd to Franklin Rd	1,990	1,990	980	990	470	500	220	280
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	430	580	220	380	100	260	40	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	480	610	250	390	120	270	50	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	510	630	260	400	120	270	50	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	530	630	290	410	140	270	70	200
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	500	610	280	400	140	270	70	190
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	560	660	290	410	140	270	60	190
	Santa Fe Dr[b]	Beachwood Dr to SH 59	620	710	310	430	150	280	70	200

Notes: (a) Contained within the roadway.
(b) Indicates roadways that are parallel to rail lines; distances are for combined noise from roadway and rail traffic. Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

Table 4.4-22. Distance to CNEL from Roadway Centerline - Castle Aviation Center Alternative
Page 2 of 2

Year	Roadway	Segment	Distance (feet)							
			CNEL 60		CNEL 65		CNEL 70		CNEL 75	
2015	West Olive Ave	SH 59 to R St	310		150		70		40	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	220		110		60		30	
	Buhach Rd	Bellevue Rd to Juniper Ave	260		120		60		30	
	Buhach Rd	Juniper Ave to SH 99	220		110		50		30	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	250		130		70		40	
	Bellevue Rd	Buhach Rd to Castle Dr	300		150		80		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	330		160		80		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	160		80		40		(a)	
	Wallace Rd	Gate 3 to Santa Fe Dr	90		40		20		(a)	
			North	South	North	South	North	South	North	South
	SH 99(b)	Atwater to Rail Overpass	1,910	1,850	1,180	950	960	460	880	220
	SH 99(b)	Rail Overpass to Buhach Rd	1,860	1,860	960	970	470	500	220	280
	SH 99(b)	Buhach Rd to Franklin Rd	2,340	2,340	1,160	1,170	550	580	260	310
	Santa Fe Dr(b)	Chestnut Ln to Shaffer Rd	450	590	230	390	110	260	40	190
	Santa Fe Dr(b)	Shaffer Rd to Wallace Rd	510	630	270	400	130	270	60	190
	Santa Fe Dr(b)	Wallace Rd to Buhach Rd	550	660	280	410	130	270	60	190
	Santa Fe Dr(b)	Buhach Rd to Bellevue Rd	570	660	310	420	150	280	70	200
	Santa Fe Dr(b)	Bellevue Rd to Gate 2	530	630	300	410	150	270	70	200
	Santa Fe Dr(b)	Gate 2 to Gurr Rd	600	690	310	420	150	270	70	200
	Santa Fe Dr(b)	Beachwood Dr to SH 59	680	750	340	440	160	280	80	200

Notes: (a) Contained within the roadway.
(b) Indicates roadways that are parallel to rail lines; distances are for combined noise from roadway and rail traffic. Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

maximum sound level (L_{max} as presented in FAA Advisory Circular AC 36-3F (FAA, 1990). For aircraft not included in AC 36-3F, data from the aircraft noise models (i.e., INM and NOISEMAP) were used to determine the noisiest aircraft.

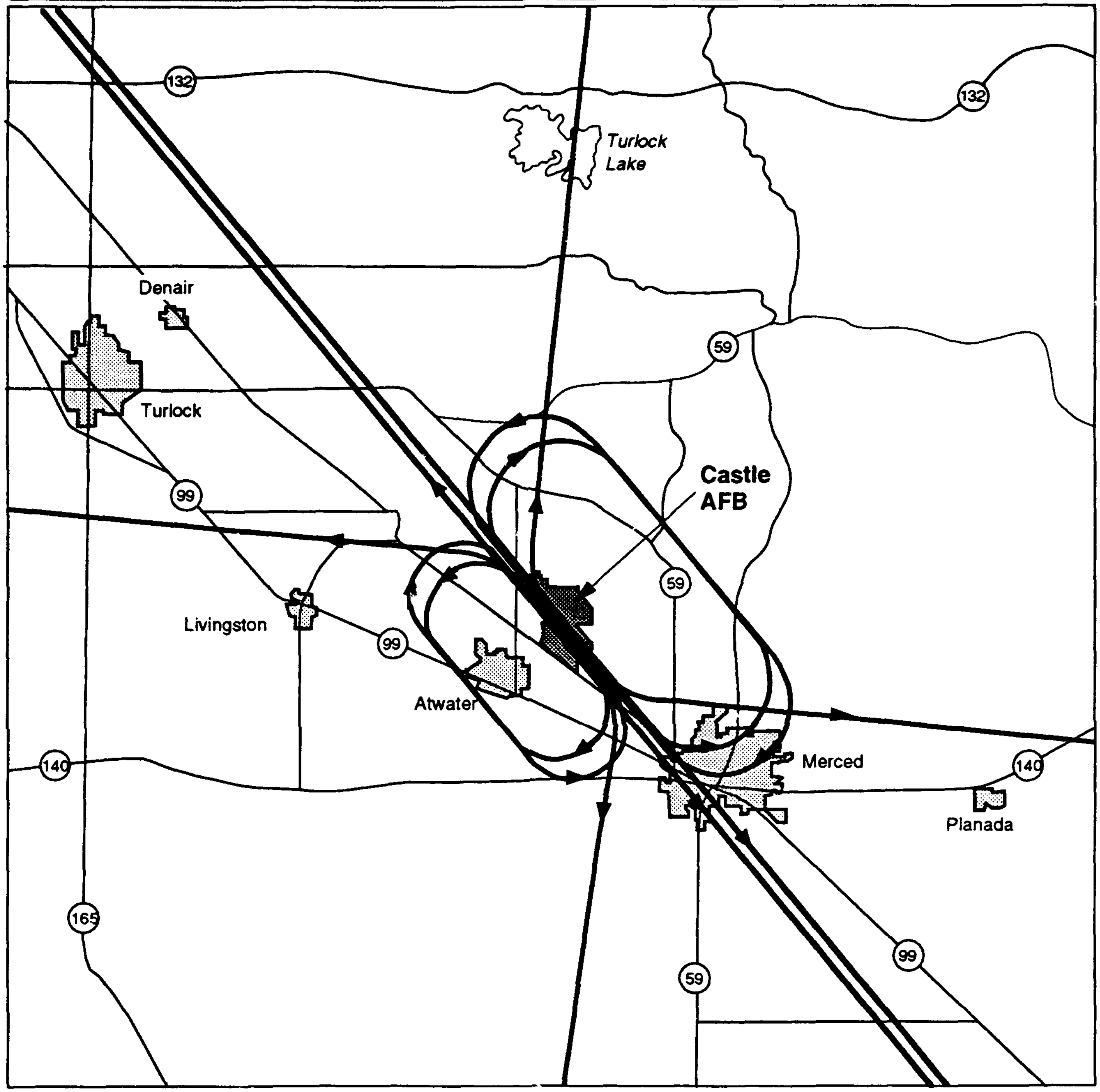
Surface traffic noise levels and number of residents exposed to noise levels of CNEL 60 dB or greater for several road segments are presented in Tables 4.4-24 and 4.4-25, respectively. The levels are presented in terms of CNEL as a function of distance from the centerline of the roadways analyzed. There would be an estimated 3,226 residents in areas exposed to noise levels of CNEL 60 dB or greater due to surface traffic by the year 2015. This represents an increase of 383 people over the No-Action Alternative in that year.

Mitigation Measures. The mitigation measures described for both surface traffic and aircraft noise under Proposed Action would be appropriate.

Table 4.4-23. Number of People Impacted by Surface Traffic Noise - Castle Aviation Center Alternative

Year	Roadway	Segment	Population Impacted			
			CNEL 60-65	CNEL 65-70	CNEL 70-75	CNEL >75
2000	West Olive Ave	SH 59 to R St	90	0	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	29	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	69	38	0	0
	Buhach Rd	Juniper Ave to SH 99	52	0	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	92	43	6	0
	Bellevue Rd	Castle Dr to Shaffer Rd	75	52	29	0
	Juniper Ave	Buhach Rd to Shaffer Rd	92	6	3	0
	Wallace Rd	Gate 3 to Santa Fe Dr	3	0	0	0
	SH 99	Atwater to Buhach Rd	867	289	14	0
	SH 99	Buhach Rd to Franklin Rd	55	40	35	0
	Santa Fe Dr[a]	Chestnut Ln to Shaffer Rd	12	29	17	0
	Santa Fe Dr[a]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[a]	Wallace Rd to Buhach Rd	101	58	61	0
	Santa Fe Dr[a]	Buhach Rd to Bellevue Rd	20	9	6	0
	Santa Fe Dr[a]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[a]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[a]	Beachwood Dr to SH 59	23	20	9	0
2005	West Olive Ave	SH 59 to R St	87	3	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	32	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	78	35	3	0
	Buhach Rd	Juniper Ave to SH 99	46	6	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	92	6	6	0
	Bellevue Rd	Castle Dr to Shaffer Rd	98	35	46	0
	Juniper Ave	Buhach Rd to Shaffer Rd	87	14	3	0
	Wallace Rd	Gate 3 to Santa Fe Dr	3	0	0	0
	SH 99	Atwater to Buhach Rd	992	327	32	0
	SH 99	Buhach Rd to Franklin Rd	58	40	40	0
	Santa Fe Dr[a]	Chestnut Ln to Shaffer Rd	12	29	17	0
	Santa Fe Dr[a]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[a]	Wallace Rd to Buhach Rd	84	78	61	0
	Santa Fe Dr[a]	Buhach Rd to Bellevue Rd	26	9	6	0
	Santa Fe Dr[a]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[a]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[a]	Beachwood Dr to SH 59	29	20	9	0
2015	West Olive Ave	SH 59 to R St	61	32	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	40	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	84	35	3	0
	Buhach Rd	Juniper Ave to SH 99	6	6	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	81	55	14	0
	Bellevue Rd	Castle Dr to Shaffer Rd	440	38	58	0
	Juniper Ave	Buhach Rd to Shaffer Rd	75	35	3	0
	Wallace Rd	Gate 3 to Santa Fe Dr	6	0	0	0
	SH 99	Atwater to Buhach Rd	1,401	428	75	0
	SH 99	Buhach Rd to Franklin Rd	52	55	43	0
	Santa Fe Dr[a]	Chestnut Ln to Shaffer Rd	14	23	23	0
	Santa Fe Dr[a]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[a]	Wallace Rd to Buhach Rd	92	87	61	0
	Santa Fe Dr[a]	Buhach Rd to Bellevue Rd	17	9	6	0
	Santa Fe Dr[a]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[a]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[a]	Beachwood Dr to SH 59	32	23	9	0

Note: (a) Indicates roadways that are parallel to rail lines, population impacted are for combined noise from roadway and rail traffic.
CNEL = Community Noise Equivalent Level.
SH = State Highway.



EXPLANATION

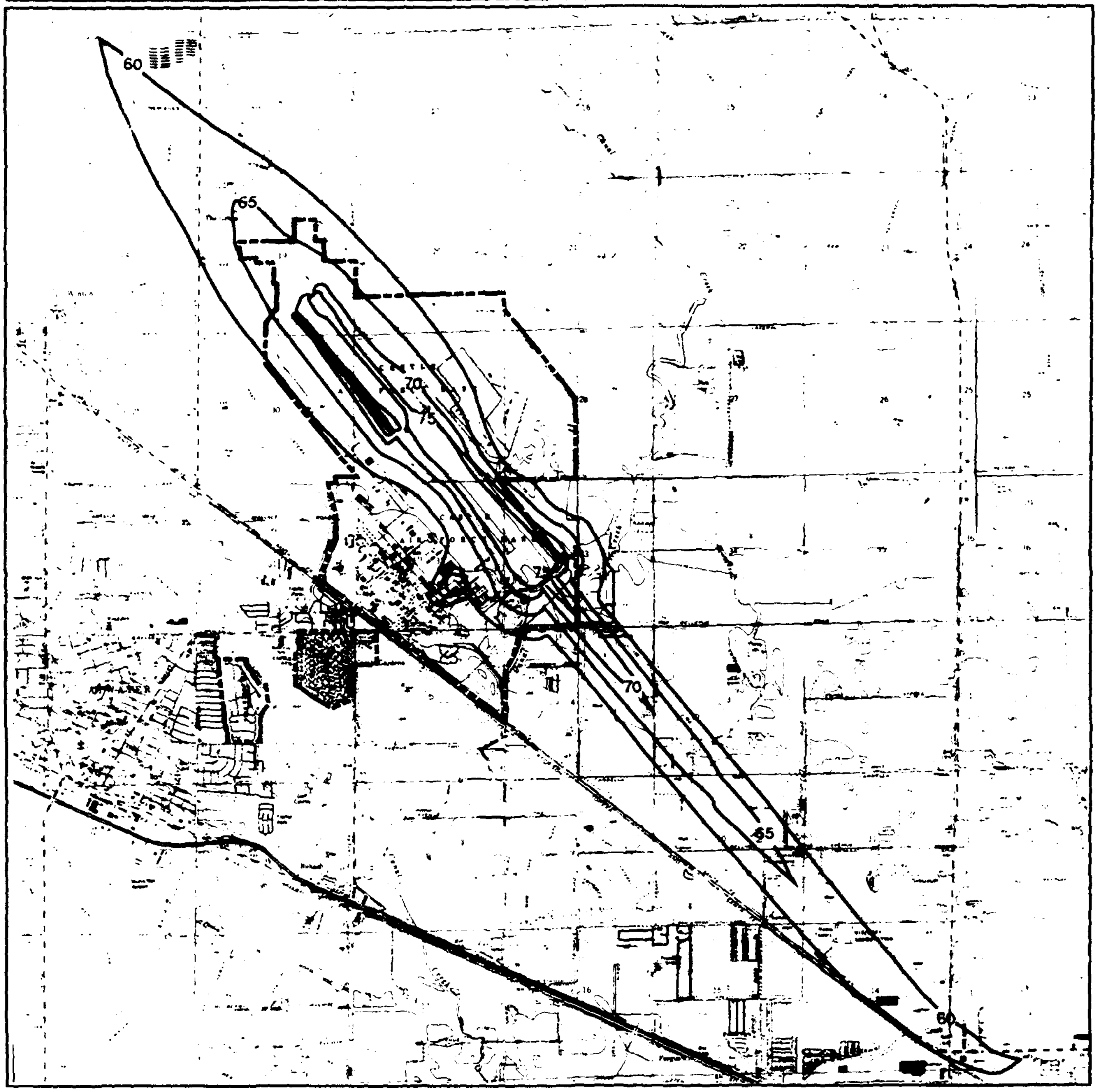
Direction of Travel on Flight Path

(99) State Highway

0 1.25 2.5 5 Miles

Primary Flight Tracks - Commercial Aviation Alternative

Figure 4.4-8



EXPLANATION

CNEL Noise Contours (in 5 dB intervals)

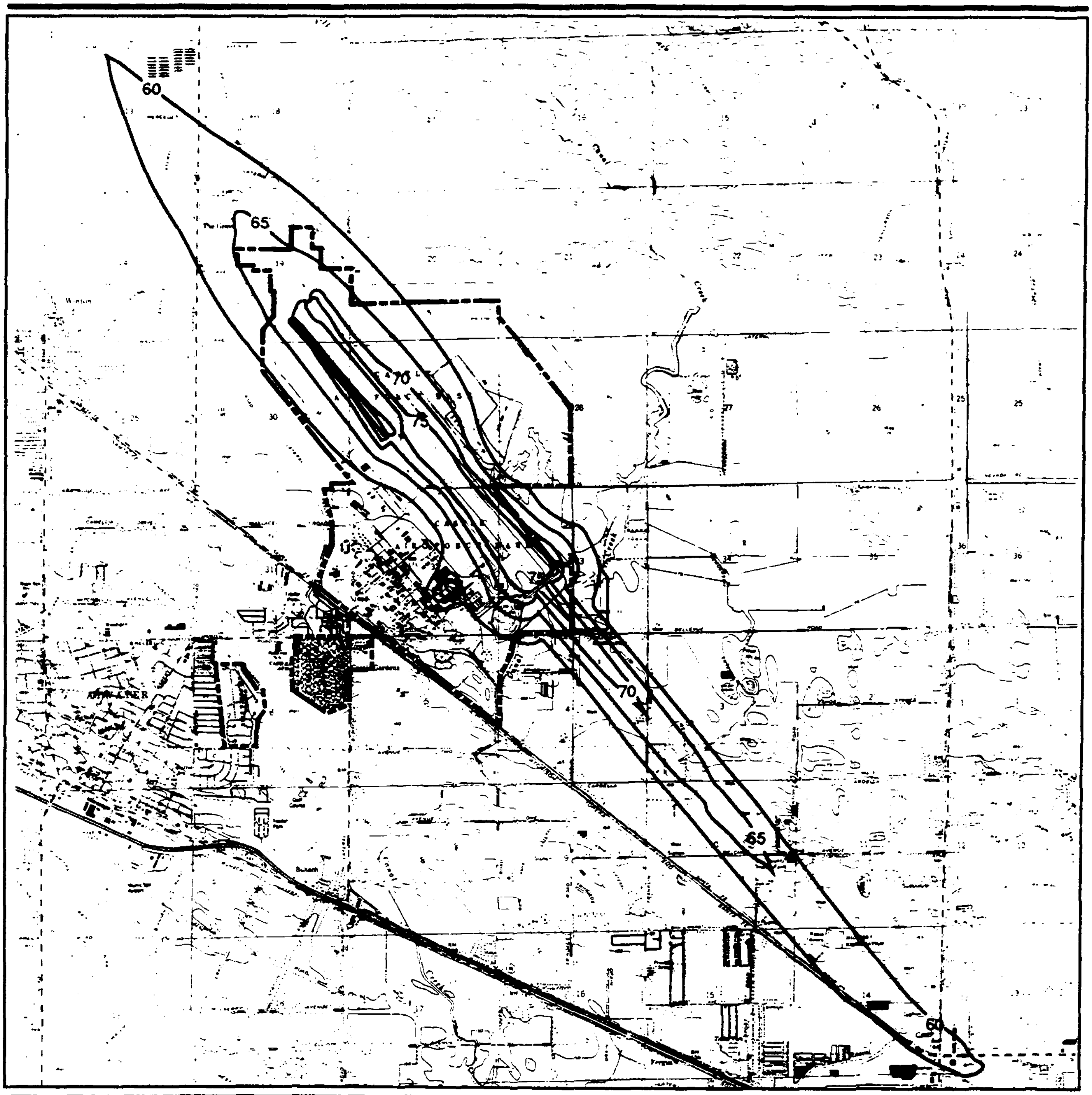
Base Boundary

CNEL Noise Contours-Commercial Aviation Alternative (2000)

0 0.25 .5 1 mile

Map Sources: U.S. Geological Survey, 1987a, 1987c, 1987d, 1987e.

Figure 4.4-9



EXPLANATION

CNEL Noise Contours (in 5 dB intervals)

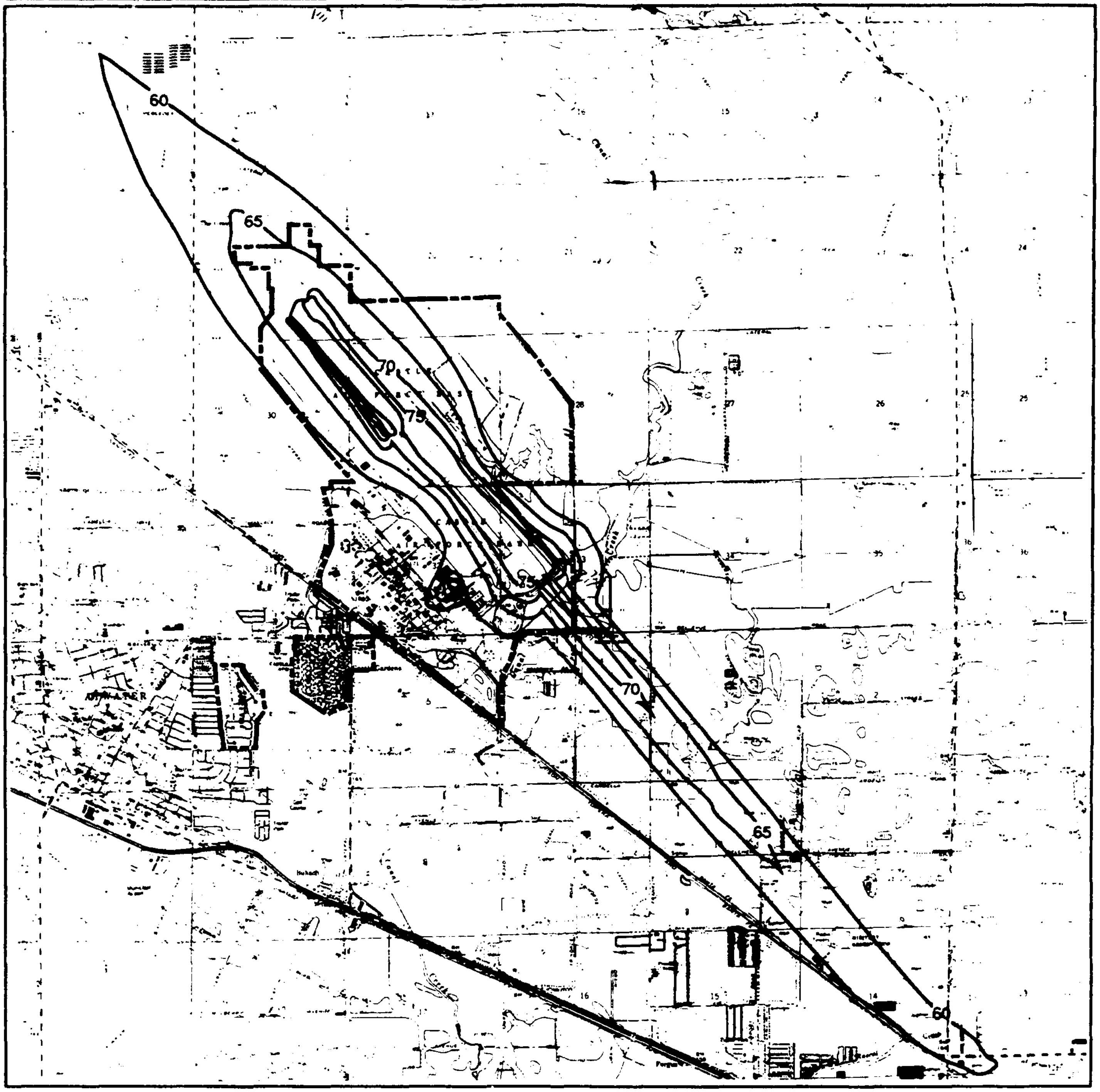
Base Boundary

CNEL Noise Contours- Commercial Aviation Alternative (2005)

0 0.25 .5 1 mile

Map Sources: U.S. Geological Survey, 1987a, 1987c, 1987d, 1987e.

Figure 4.4-10



EXPLANATION

CNEL Noise Contours (in 5 dB intervals)

Base Boundary

CNEL Noise Contours-Commercial Aviation Alternative (2015)

0 0.25 .5 1 mile

Map Sources: U.S. Geological Survey, 1987a, 1987c, 1987d, 1987e.

Figure 4.4-11

Table 4.4-24. Distance to CNEL from Roadway Centerline - Commercial Aviation Alternative
Page 1 of 2

Year	Roadway	Segment	Distance (feet) CNEL 60		CNEL 65		CNEL 70		CNEL 75	
2000	West Olive Ave	SH 59 to R St	200		100		50		30	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	170		80		40		[a]	
	Buhach Rd	Bellevue Rd to Juniper Ave	180		90		40		30	
	Buhach Rd	Juniper Ave to SH 99	160		80		40		[a]	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	180		90		50		[a]	
	Bellevue Rd	Buhach Rd to Castle Dr	220		110		60		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	240		120		60		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	110		60		30		[a]	
	Wallace Rd	Gate 3 to Santa Fe Dr	60		30		[a]		[a]	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,570	1,440	1,110	720	950	350	890	170
	SH 99[b]	Rail Overpass to Buhach Rd	1,450	1,450	730	760	350	410	170	260
	SH 99[b]	Buhach Rd to Franklin Rd	1,780	1,780	880	890	420	460	200	270
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	400	560	210	370	90	260	30	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	450	590	230	380	110	260	40	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	470	600	240	390	110	260	40	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	490	610	260	400	130	270	50	190
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	460	590	250	390	120	270	60	190
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	490	620	250	390	120	270	50	190
	Santa Fe Dr[b]	Beachwood Dr to SH 59	540	650	280	410	130	270	60	190
2005	West Olive Ave	SH 59 to R St	240		120		60		40	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	190		100		50		30	
	Buhach Rd	Bellevue Rd to Juniper Ave	210		100		50		30	
	Buhach Rd	Juniper Ave to SH 99	190		90		50		30	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	210		110		60		40	
	Bellevue Rd	Buhach Rd to Castle Dr	250		130		70		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	270		130		70		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	130		60		30		[a]	
	Wallace Rd	Gate 3 to Santa Fe Dr	70		40		20		[a]	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,670	1,570	1,130	[illegible]	960	380	880	180
	SH 99[b]	Rail Overpass to Buhach Rd	1,580	1,580	800	820	390	440	190	270
	SH 99[b]	Buhach Rd to Franklin Rd	1,950	1,960	960	980	460	490	220	280
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	420	570	220	380	100	260	40	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	470	600	250	390	120	260	50	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	500	620	260	400	120	270	50	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	520	630	280	400	140	270	60	190
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	490	600	270	400	140	270	60	190
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	530	640	270	410	130	270	60	190
	Santa Fe Dr[b]	Beachwood Dr to SH 59	590	690	300	420	140	270	70	200

Notes: (a) Contained within the roadway.
(b) Indicates roadways that are parallel to rail lines; distances are for combined noise from roadway and rail traffic. Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

Table 4.4-24. Distance to CNEL from Roadway Centerline - Commercial Aviation Center Alternative
Page 2 of 2

Year	Roadway	Segment	Distance (feet)							
			CNEL 60		CNEL 65		CNEL 70		CNEL 75	
2015	West Olive Ave	SH 59 to R St	310		150		70		40	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	220		110		60		30	
	Buhach Rd	Bellevue Rd to Juniper Ave	260		120		60		30	
	Buhach Rd	Juniper Ave to SH 99	220		100		50		30	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	250		130		70		40	
	Bellevue Rd	Buhach Rd to Castle Dr	290		150		80		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	330		160		80		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	150		70		40		(a)	
	Wallace Rd	Gate 3 to Santa Fe Dr	80		40		20		(a)	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,900	1,850	1,180	950	960	460	880	220
	SH 99[b]	Rail Overpass to Buhach Rd	1,850	1,850	950	970	470	500	230	280
	SH 99[b]	Buhach Rd to Franklin Rd	2,310	2,320	1,140	1,150	550	570	260	310
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	450	590	230	390	110	260	40	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	510	630	270	400	130	270	60	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	550	660	280	410	130	270	60	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	570	660	310	420	150	280	70	200
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	530	630	300	410	150	270	70	200
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	590	690	310	420	150	280	70	200
	Santa Fe Dr[b]	Beachwood Dr to SH 59	670	750	340	440	160	280	80	200

Notes: (a) Contained within the roadway.
(b) Indicates roadways that are parallel to rail lines; distances are for combined noise from roadway and rail traffic. Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

4.4.4.4 Aviation with Mixed Use Alternative. The results of the aircraft noise modeling for the Aviation with Mixed Use Alternative are presented as noise contours in Figures 4.4-12 through 4.4-14. The contribution from runup noise is evident as separate contours to the southwest of the start of Runway 3.

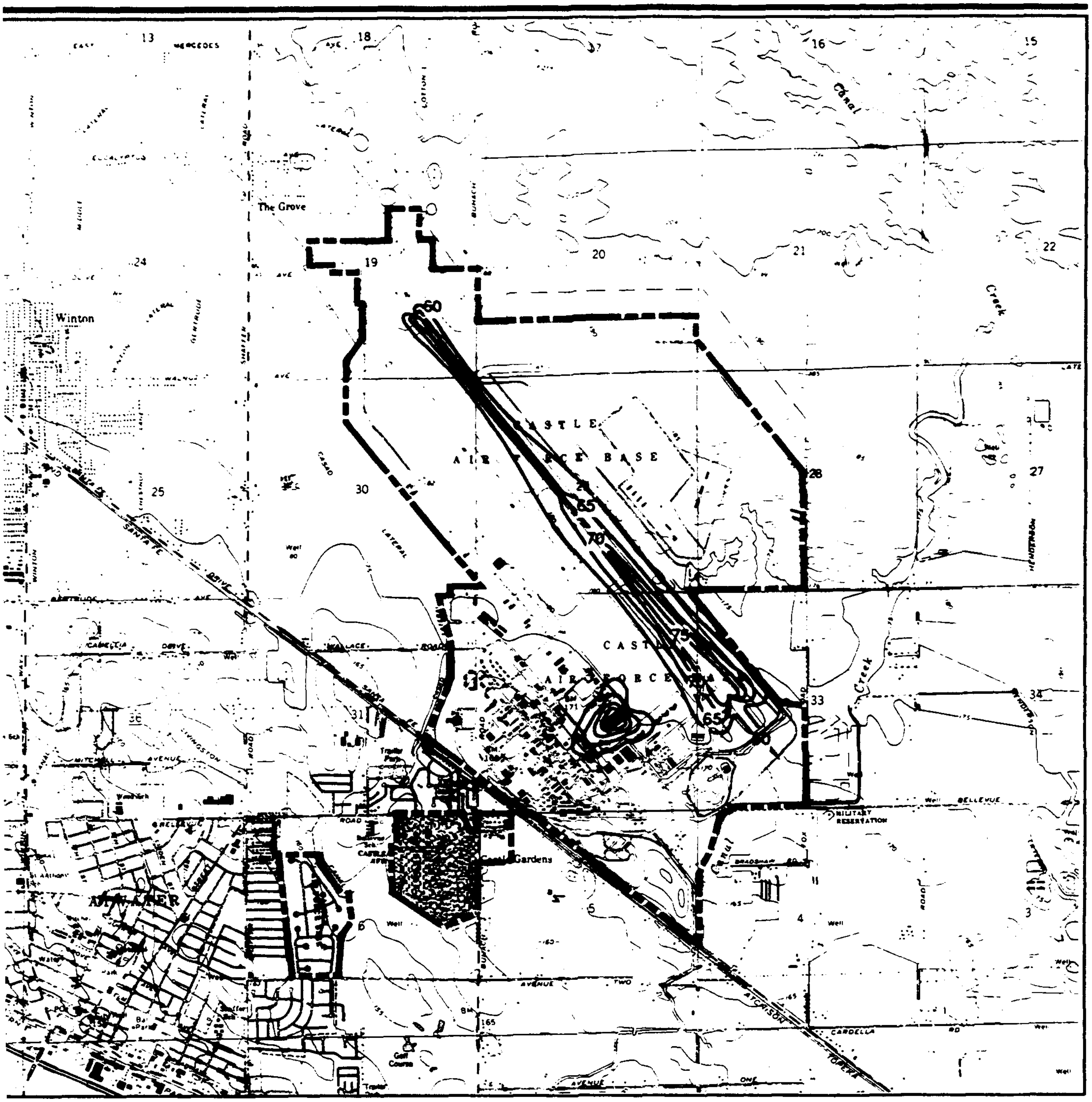
Table 4.4-18 presents the approximate number of acres and estimated population within each CNEL range for each of the study years. Compared to the preclosure reference, this represents a decrease of 132,251 acres within CNEL 60 dB in 2000, 132,365 acres in 2005, and 132,565 acres in 2015. The maximum exposure is projected for 2015.

Since all modeled operations would take place after 2000, no Stage 2 aircraft are included in the analysis.

Table 4.4-25. Number of People Impacted by Surface Traffic Noise - Commercial Aviation Alternative

Year	Roadway	Segment	Population Impacted			
			CNEL 60-65	CNEL 65-70	CNEL 70-75	CNEL >75
2000	West Olive Ave	SH 59 to R St	52	0	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	14	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	46	29	0	0
	Buhach Rd	Juniper Ave to SH 99	35	0	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	72	43	6	0
	Bellevue Rd	Castle Dr to Shaffer Rd	66	52	29	0
	Juniper Ave	Buhach Rd to Shaffer Rd	78	9	0	0
	Wallace Rd	Gate 3 to Santa Fe Dr	0	0	0	0
	SH 99	Atwater to Buhach Rd	865	274	14	0
	SH 99	Buhach Rd to Franklin Rd	55	43	32	0
	Santa Fe Dr[(a)]	Chestnut Ln to Shaffer Rd	14	32	12	0
	Santa Fe Dr[(a)]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[(a)]	Wallace Rd to Buhach Rd	101	64	55	0
	Santa Fe Dr[(a)]	Buhach Rd to Bellevue Rd	17	9	6	0
	Santa Fe Dr[(a)]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[(a)]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[(a)]	Beachwood Dr to SH 59	20	23	6	0
2005	West Olive Ave	SH 59 to R St	87	3	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	29	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	61	380	0	
	Buhach Rd	Juniper Ave to SH 99	52	0	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	84	52	6	0
	Bellevue Rd	Castle Dr to Shaffer Rd	81	35	46	0
	Juniper Ave	Buhach Rd to Shaffer Rd	92	9	0	0
	Wallace Rd	Gate 3 to Santa Fe Dr	3	0	0	0
	SH 99	Atwater to Buhach Rd	975	327	32	0
	SH 99	Buhach Rd to Franklin Rd	58	43	38	0
	Santa Fe Dr[(a)]	Chestnut Ln to Shaffer Rd	12	29	17	0
	Santa Fe Dr[(a)]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[(a)]	Wallace Rd to Buhach Rd	81	78	61	0
	Santa Fe Dr[(a)]	Buhach Rd to Bellevue Rd	26	9	6	0
	Santa Fe Dr[(a)]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[(a)]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[(a)]	Beachwood Dr to SH 59	23	20	9	0
2015	West Olive Ave	SH 59 to R St	61	32	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	40	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	84	35	3	0
	Buhach Rd	Juniper Ave to SH 99	52	6	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	81	55	14	0
	Bellevue Rd	Castle Dr to Shaffer Rd	110	38	57	0
	Juniper Ave	Buhach Rd to Shaffer Rd	87	14	3	0
	Wallace Rd	Gate 3 to Santa Fe Dr	3	0	0	0
	SH 99	Atwater to Buhach Rd	1,398	422	75	0
	SH 99	Buhach Rd to Franklin Rd	55	52	43	0
	Santa Fe Dr[(a)]	Chestnut Ln to Shaffer Rd	14	23	0	0
	Santa Fe Dr[(a)]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[(a)]	Wallace Rd to Buhach Rd	92	87	61	0
	Santa Fe Dr[(a)]	Buhach Rd to Bellevue Rd	29	9	6	0
	Santa Fe Dr[(a)]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[(a)]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[(a)]	Beachwood Dr to SH 59	32	23	9	0

Note: (a) Indicates roadways that are parallel to rail lines, population impacted are for combined noise from roadway and rail traffic.
CNEL = Community Noise Equivalent Level.
SH = State Highway.



EXPLANATION

——— CNEL Noise Contours (in 5 dB intervals)

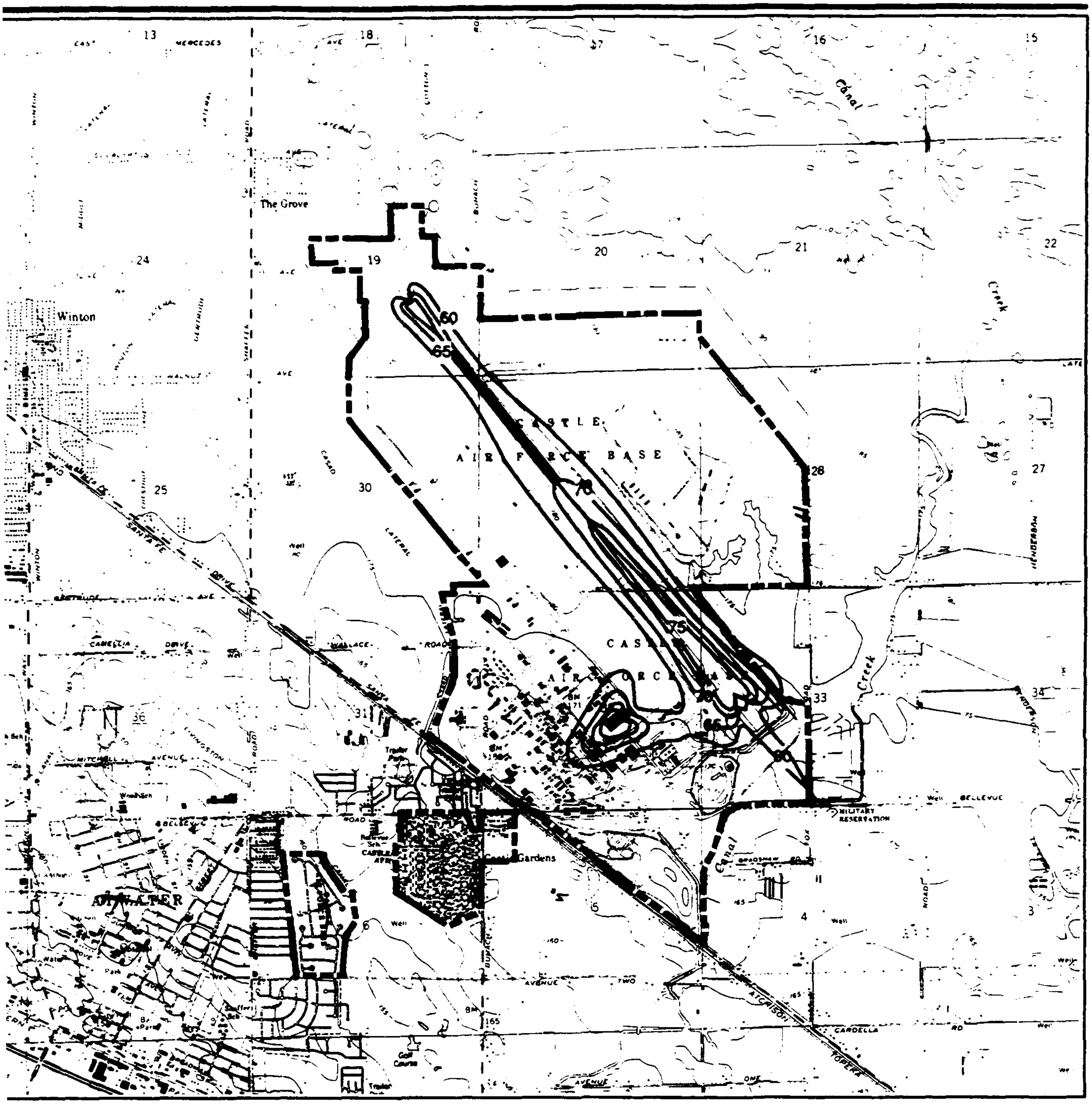
— • • — Base Boundary

CNEL Noise Contours-Aviation with Mixed Use Alternative (2000)

0 900 1800 3600 Feet

Map Sources: U.S. Geological Survey, 1987a, 1987d.

Figure 4.4-12



EXPLANATION

CNEL Noise Contours (in 5 dB intervals)

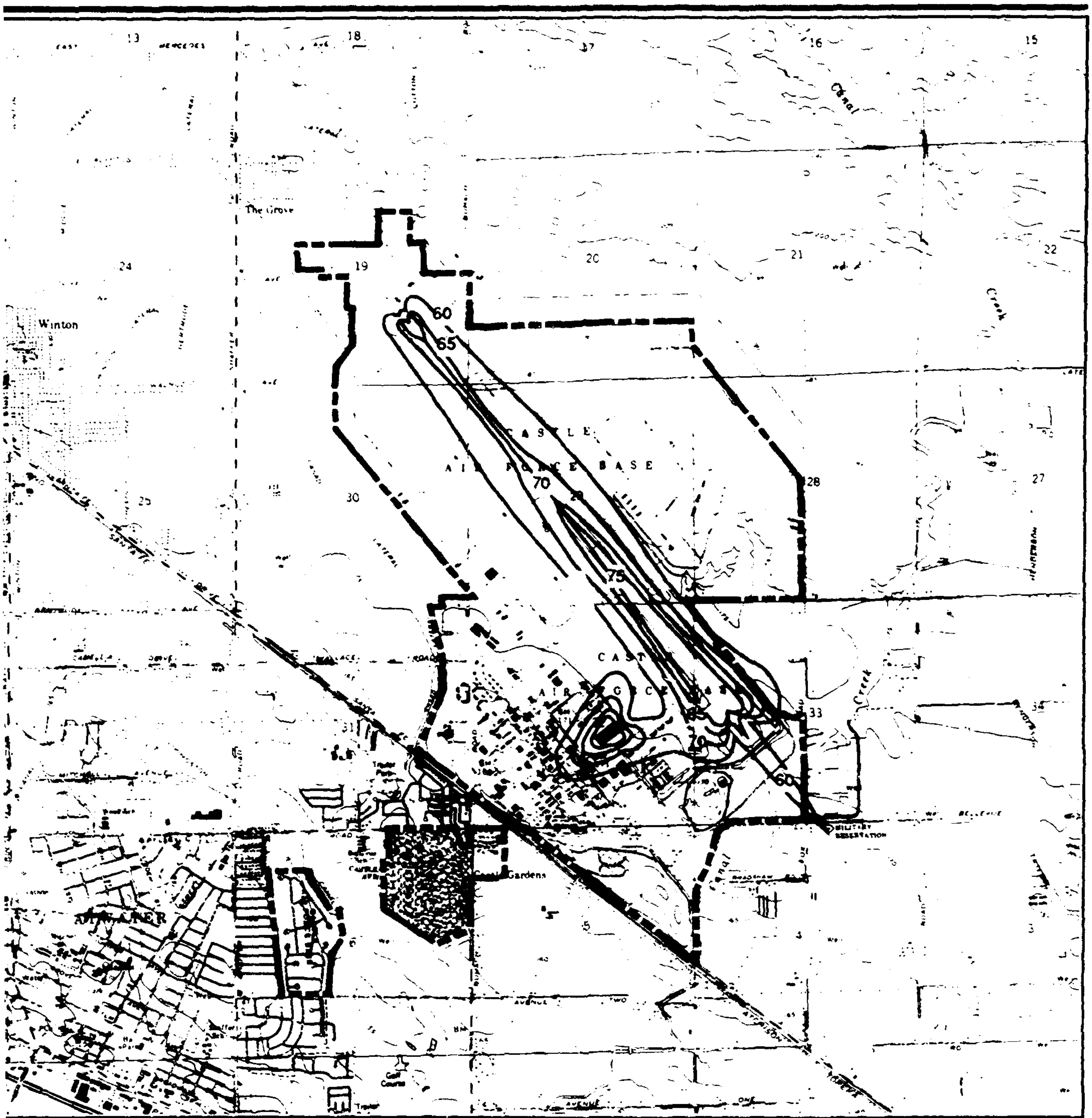
Base Boundary

CNEL Noise Contours-Aviation with Mixed Use Alternative (2005)

0 900 1800 3600 Feet

Map Sources: U.S. Geological Survey, 1987a, 1987d.

Figure 4.4-13



PLANATION

CNEL Noise Contours (in 5 dB intervals)

Base Boundary

CNEL Noise Contours-Aviation with Mixed Use Alternative (2015)

900 1800 3600 Feet

Map Sources: U.S. Geological Survey, 1987a, 1987d.

Figure 4.4-14

SEL was calculated at representative residential locations for the noisiest and most common jet aircraft; the results are presented in Table 4.4-19. The analysis suggests that, for the Aviation with Mixed Use Alternative, aircraft overflights could affect the sleep of some residents in the area.

For all modeled years the noisiest aircraft would be the 747-400. The most common jet aircraft for 2000 and 2005 would be the 747-400 and Gulfstream IV, and for 2015 the Gulfstream IV for 2015. The noisiest aircraft were determined from L_{max} as presented in FAA Advisory Circular AC 36-3F (FAA, 1990). For aircraft not included in AC 36-3F, data from the aircraft noise models (i.e., INM and NOISEMAP) were used to determine noisiest aircraft.

Surface traffic noise levels and number of residents exposed to noise levels of CNEL 60 dB or greater for several road segments are presented in Tables 4.4-26 and 4.4-27, respectively. The levels are presented in terms of CNEL as a function of distance from the centerline of the roadways analyzed. There would be an estimated 3,208 residents in areas exposed to noise levels of CNEL 60 dB or greater due to surface traffic by 2015. This represents an increase of 365 people over No-Action Alternative conditions in that year.

Mitigation Measures. No mitigation measures would be necessary for aircraft noise, since there are no incompatible land uses identified. For surface traffic noise, the mitigation measures described under the Proposed Action would also be appropriate.

4.4.4.5 **Non-Aviation Alternative.** For this alternative, there would be no airport activity and, therefore, no aircraft noise impacts.

Surface traffic noise levels and number of residents exposed to noise levels for several road segments are presented in Tables 4.4-28 and 4.4-29, respectively. The levels are presented in terms of CNEL as a function of distance from the centerline of the roadways analyzed. As in the Proposed Action, distances cannot be presented for SH 99 and Santa Fe Drive independent of the rail contribution. For these roadways, distances from the roadway centerline to the CNEL are derived from a composite of both roadway and rail traffic noise. By the year 2000, approximately 1,650 people are estimated to reside within areas exposed to CNEL 60 dB and above due to roadway and rail noise; this number would increase to 3,139 people by 2015. This represents an increase of 296 people over No-Action Alternative conditions in that year.

Mitigation Measures. Barrier walls could be used to mitigate surface traffic noise impacts along roadways. A noise barrier analysis would be necessary to determine the optimum locations, height, and/or feasibility of the barrier wall.

Table 4.4-26. Distance to CNEL from Roadway Centerline - Aviation with Mixed Use Alternative
Page 1 of 2

Year	Roadway	Segment	Distance (feet) CNEL 60		CNEL 65		CNEL 70		CNEL 75	
2000	West Olive Ave	SH 59 to R St	210		100		50		(a)	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	150		80		40		(a)	
	Buhach Rd	Bellevue Rd to Juniper Ave	170		80		40		(a)	
	Buhach Rd	Juniper Ave to SH 99	150		70		40		(a)	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	190		100		50		(a)	
	Bellevue Rd	Buhach Rd to Castle Dr	220		110		60		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	240		110		60		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	110		50		30		(a)	
	Wallace Rd	Gate 3 to Santa Fe Dr	50		20		(a)		(a)	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,570	1,430	1,110	720	950	340	880	170
	SH 99[b]	Rail Overpass to Buhach Rd	1,440	1,460	730	760	350	410	170	260
	SH 99[b]	Buhach Rd to Franklin Rd	1,780	1,770	860	880	420	460	250	270
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	400	560	200	370	90	260	30	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	440	580	230	380	110	260	40	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	460	600	240	390	110	260	40	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	490	610	260	400	130	270	60	190
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	470	590	260	390	130	270	60	190
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	500	620	260	400	120	270	50	190
	Santa Fe Dr[b]	Beachwood Dr to SH 59	540	650	280	410	130	270	60	190
2005	West Olive Ave	SH 59 to R St	240		110		60		40	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	170		90		50		30	
	Buhach Rd	Bellevue Rd to Juniper Ave	200		100		50		30	
	Buhach Rd	Juniper Ave to SH 99	180		80		40		30	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	210		110		60		40	
	Bellevue Rd	Buhach Rd to Castle Dr	250		120		60		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	270		130		60		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	130		60		30		(a)	
	Wallace Rd	Gate 3 to Santa Fe Dr	60		30		20		(a)	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,670	1,560	1,130	790	950	380	880	180
	SH 99[b]	Rail Overpass to Buhach Rd	1,570	1,580	800	820	390	440	190	270
	SH 99[b]	Buhach Rd to Franklin Rd	1,940	1,950	950	970	460	490	220	280
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	420	570	210	380	90	260	40	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	460	590	240	390	110	260	50	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	490	620	250	390	120	270	50	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	510	620	280	400	130	270	60	190
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	490	600	270	400	140	270	60	190
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	520	640	270	400	130	270	60	190
	Santa Fe Dr[b]	Beachwood Dr to SH 59	580	680	300	420	140	270	60	200

Notes: (a) Contained within the roadway.
(b) Indicates roadways that are parallel to rail lines; distances are for combined noise from roadway and rail traffic. Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

Table 4.4-26. Distance to CNEL from Roadway Centerline - Aviation with Mixed Use Alternative Page 2 of 2

Year	Roadway	Segment	Distance (feet)							
			CNEL 60		CNEL 65		CNEL 70		CNEL 75	
2015	West Olive Ave	SH 59 to R St	300		140		70		40	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	200		100		50		30	
	Buhach Rd	Bellevue Rd to Juniper Ave	240		110		60		30	
	Buhach Rd	Juniper Ave to SH 99	210		100		50		30	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	240		120		60		40	
	Bellevue Rd	Buhach Rd to Castle Dr	290		150		70		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	320				80		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	150		70		40		(a)	
	Wallace Rd	Gate 3 to Santa Fe Dr	70		30		20		(a)	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,900	1,840	1,180	940	960	460	880	220
	SH 99[b]	Rail Overpass to Buhach Rd	1,840	1,850	950	970	470	500	220	280
	SH 99[b]	Buhach Rd to Franklin Rd	2,010	2,010	980	1000	470	500	220	280
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	440	590	230	380	100	260	40	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	500	620	270	400	130	270	50	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	540	650	280	410	130	270	50	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	560	650	310	420	150	280	70	200
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	520	630	300	410	150	270	70	200
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	590	680	300	420	140	270	70	200
	Santa Fe Dr[b]	Beachwood Dr to SH 59	650	740	330	440	160	280	70	200

Notes: (a) Contained within the roadway.
(b) Indicates roadways that are parallel to rail lines; distances are for combined noise from roadway and rail traffic. Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

4.4.4.6 No-Action Alternative. There would be no airport activity and minimal surface traffic under the No-Action Alternative; therefore, there would be fewer noise impacts.

Surface traffic noise levels and number of residents exposed to noise levels of CNEL 60 dB or greater for several road segments are presented in Tables 4.4-30 and 4.4-31, respectively. The levels are presented in terms of CNEL as a function of the centerline of the roadways analyzed. In 2000, approximately 2,843 people are estimated to reside within areas exposed to CNEL 60 and above due to roadway and rail noise. This number would increase to 2,380 by 2015.

Mitigation Measures. Mitigation measures for aircraft noise would not be required under the No-Action Alternative because there would be no aircraft

Table 4.4-27. Number of People Impacted by Surface Traffic Noise - Aviation with Mixed Use Alternative

Year	Roadway	Segment	Population Impacted			
			CNEL 60-65	CNEL 65-70	CNEL 70-75	CNEL >75
2000	West Olive Ave	SH 59 to R St	64	0	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	9	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	49	17	0	0
	Buhach Rd	Juniper Ave to SH 99	35	0	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	72	43	6	0
	Bellevue Rd	Castle Dr to Shaffer Rd	69	49	29	0
	Juniper Ave	Buhach Rd to Shaffer Rd	84	3	0	0
	Wallace Rd	Gate 3 to Santa Fe Dr	0	0	0	0
	SH 99	Atwater to Buhach Rd	865	274	14	0
	SH 99	Buhach Rd to Franklin Rd	61	38	32	0
	Santa Fe Dr(a)	Chestnut Ln to Shaffer Rd	14	32	12	0
	Santa Fe Dr(a)	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr(a)	Wallace Rd to Buhach Rd	101	64	55	0
	Santa Fe Dr(a)	Buhach Rd to Bellevue Rd	17	9	6	0
	Santa Fe Dr(a)	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr(a)	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr(a)	Beachwood Dr to SH 59	20	23	6	0
2005	West Olive Ave	SH 59 to R St	90	0	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	14	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	43	38	0	0
	Buhach Rd	Juniper Ave to SH 99	43	0	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	92	43	6	0
	Bellevue Rd	Castle Dr to Shaffer Rd	81	52	29	0
	Juniper Ave	Buhach Rd to Shaffer Rd	92	9	0	0
	Wallace Rd	Gate 3 to Santa Fe Dr	3	0	0	0
	SH 99	Atwater to Buhach Rd	963	327	32	0
	SH 99	Buhach Rd to Franklin Rd	52	43	38	10
	Santa Fe Dr(a)	Chestnut Ln to Shaffer Rd	14	32	12	0
	Santa Fe Dr(a)	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr(a)	Wallace Rd to Buhach Rd	101	58	61	0
	Santa Fe Dr(a)	Buhach Rd to Bellevue Rd	20	9	6	0
	Santa Fe Dr(a)	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr(a)	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr(a)	Beachwood Dr to SH 59	23	20	9	0
2015	West Olive Ave	SH 59 to R St	69	20	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	32	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	78	35	3	0
	Buhach Rd	Juniper Ave to SH 99	46	6	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	81	64	6	0
	Bellevue Rd	Castle Dr to Shaffer Rd	118	26	58	0
	Juniper Ave	Buhach Rd to Shaffer Rd	87	14	3	0
	Wallace Rd	Gate 3 to Santa Fe Dr	3	0	0	0
	SH 99	Atwater to Buhach Rd	1,404	422	75	0
	SH 99	Buhach Rd to Franklin Rd	58	40	40	0
	Santa Fe Dr(a)	Chestnut Ln to Shaffer Rd	14	29	17	0
	Santa Fe Dr(a)	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr(a)	Wallace Rd to Buhach Rd	87	87	61	0
	Santa Fe Dr(a)	Buhach Rd to Bellevue Rd	29	9	6	0
	Santa Fe Dr(a)	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr(a)	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr(a)	Beachwood Dr to SH 59	29	23	9	0

Note: (a) Indicates roadways that are parallel to rail lines, population impacted are for combined noise from roadway and rail traffic.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

Table 4.4-28. Distance to CNEL from Roadway Centerline - Non-Aviation Alternative
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Year	Roadway	Segment	Distance (feet)							
			CNEL 60		CNEL 65		CNEL 70		CNEL 75	
2000	West Olive Ave	SH 59 to R St	190		90		50		(a)	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	130		70		40		(a)	
	Buhach Rd	Bellevue Rd to Juniper Ave	140		70		40		(a)	
	Buhach Rd	Juniper Ave to SH 99	130		70		40		(a)	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	160		80		50		(a)	
	Bellevue Rd	Buhach Rd to Castle Dr	200		100		50		(a)	
	Bellevue Rd	Castle Dr to Shaffer Rd	220		110		60		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	100		50		30		(a)	
	Wallace Rd	Gate 3 to Santa Fe Dr	30		20		(a)		(a)	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,570	1,420	1,110	710	950	340	880	160
	SH 99[b]	Rail Overpass to Buhach Rd	1,430	1,450	720	760	350	410	170	260
	SH 99[b]	Buhach Rd to Franklin Rd	1,510	1,520	740	770	350	410	170	260
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	390	560	200	370	90	260	30	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	430	570	220	380	100	260	40	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	450	590	230	380	100	260	40	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	480	600	250	390	120	270	60	190
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	440	580	240	380	120	260	50	190
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	460	600	240	390	110	260	50	190
	Santa Fe Dr[b]	Beachwood Dr to SH 59	520	630	260	400	120	270	60	190
2005	West Olive Ave	SH 59 to R St	230		110		60		40	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	150		70		40		(a)	
	Buhach Rd	Bellevue Rd to Juniper Ave	180		90		40		30	
	Buhach Rd	Juniper Ave to SH 99	150		70		40		(a)	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	210		100		50		40	
	Bellevue Rd	Buhach Rd to Castle Dr	230		120		60		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	260		120		60		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	120		60		30		(a)	
	Wallace Rd	Gate 3 to Santa Fe Dr	40		20		(a)		(a)	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,660	1,560	1,130	780	950	380	880	180
	SH 99[b]	Rail Overpass to Buhach Rd	1,560	1,570	800	820	390	430	190	270
	SH 99[b]	Buhach Rd to Franklin Rd	1,660	1,670	810	840	390	430	180	270
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	410	570	210	380	90	260	30	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	450	590	240	390	110	260	40	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	480	610	250	390	110	260	50	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	500	620	270	400	130	270	60	190
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	480	600	270	400	130	270	60	190
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	530	640	270	400	130	270	60	190
	Santa Fe Dr[b]	Beachwood Dr to SH 59	570	670	290	410	140	270	60	190

Notes: (a) Contained within the roadway.
(b) Indicates roadways that are parallel to rail lines; distances are for combined noise from roadway and rail traffic. Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

Table 4.4-28. Distance to CNEL from Roadway Centerline - Non-Aviation Alternative
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			Distance (feet)							
Year	Roadway	Segment	CNEL 60		CNEL 65		CNEL 70		CNEL 75	
2015	West Olive Ave	SH 59 to R St	290		140		70		40	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	180		90		50		30	
	Buhach Rd	Bellevue Rd to Juniper Ave	220		100		50		30	
	Buhach Rd	Juniper Ave to SH 99	190		90		50		30	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	240		120		60		40	
	Bellevue Rd	Buhach Rd to Castle Dr	280		140		70		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	310		150		70		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	140		70		40		(a)	
	Wallace Rd	Gate 3 to Santa Fe Dr	50		30		(a)		(a)	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,890	1,840	1,180	940	960	460	880	220
	SH 99[b]	Rail Overpass to Buhach Rd	1,840	1,850	950	960	460	500	220	280
	SH 99[b]	Buhach Rd to Franklin Rd	1,990	1,990	980	1,000	470	500	220	280
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	440	580	230	380	100	260	40	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	490	610	260	400	120	270	50	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	530	640	270	400	130	270	50	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	550	650	300	410	150	270	70	200
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	520	620	290	410	150	270	70	200
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	580	680	300	420	140	270	60	200
	Santa Fe Dr[b]	Beachwood Dr to SH 59	650	730	330	430	160	280	70	200

Notes: (a) Contained within the roadway.
(b) Indicates roadways that are parallel to rail lines; distances are for combined noise from roadway and rail traffic. Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

operations. For surface traffic noise, the mitigation measures described under the Proposed Action would be appropriate.

4.4.4.7 Other Land Use Concepts

Federal Correctional Complex. No noise impacts would be associated with this proposal.

Private Recreational Facility. The CGSTA trapshooting activities would produce noise. However, no significant noise impacts are anticipated.

Table 4.4-29. Number of People Impacted by Surface Traffic Noise - Non-Aviation Alternative

Year	Roadway	Segment	Population Impacted CNEL 60-65	CNEL 65-70	CNEL 70-75	CNEL >75
2000	West Olive Ave	SH 59 to R St	52	0	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	0	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	55	29	0	0
	Buhach Rd	Juniper Ave to SH 99	35	0	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	72	29	0	0
	Bellevue Rd	Castle Dr to Shaffer Rd	46	49	29	0
	Juniper Ave	Buhach Rd to Shaffer Rd	78	3	0	0
	Wallace Rd	Gate 3 to Santa Fe Dr	0	0	0	0
	SH 99	Atwater to Buhach Rd	841	271	14	0
	SH 99	Buhach Rd to Franklin Rd	69	26	23	0
	Santa Fe Dr[a]	Chestnut Ln to Shaffer Rd	12	32	12	0
	Santa Fe Dr[a]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[a]	Wallace Rd to Buhach Rd	107	49	55	0
	Santa Fe Dr[a]	Buhach Rd to Bellevue Rd	20	6	6	0
	Santa Fe Dr[a]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[a]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[a]	Beachwood Dr to SH 59	14	23	6	0
2005	West Olive Ave	SH 59 to R St	90	0	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	9	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	46	29	0	0
	Buhach Rd	Juniper Ave to SH 99	35	0	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	84	43	6	0
	Bellevue Rd	Castle Dr to Shaffer Rd	75	52	29	0
	Juniper Ave	Buhach Rd to Shaffer Rd	84	9	0	0
	Wallace Rd	Gate 3 to Santa Fe Dr	0	0	0	0
	SH 99	Atwater to Buhach Rd	958	324	32	0
	SH 99	Buhach Rd to Franklin Rd	64	29	29	0
	Santa Fe Dr[a]	Chestnut Ln to Shaffer Rd	14	32	12	0
	Santa Fe Dr[a]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[a]	Wallace Rd to Buhach Rd	101	64	55	0
	Santa Fe Dr[a]	Buhach Rd to Bellevue Rd	20	9	6	0
	Santa Fe Dr[a]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[a]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[a]	Beachwood Dr to SH 59	20	20	9	0
2015	West Olive Ave	SH 59 to R St	69	20	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	23	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	69	38	0	0
	Buhach Rd	Juniper Ave to SH 99	52	0	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	92	52	6	0
	Bellevue Rd	Castle Dr to Shaffer Rd	116	38	46	0
	Juniper Ave	Buhach Rd to Shaffer Rd	87	14	3	0
	Wallace Rd	Gate 3 to Santa Fe Dr	0	0	0	0
	SH 99	Atwater to Buhach Rd	1,367	428	66	0
	SH 99	Buhach Rd to Franklin Rd	58	40	40	0
	Santa Fe Dr[a]	Chestnut Ln to Shaffer Rd	14	29	17	0
	Santa Fe Dr[a]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[a]	Wallace Rd to Buhach Rd	87	78	61	0
	Santa Fe Dr[a]	Buhach Rd to Bellevue Rd	29	9	6	0
	Santa Fe Dr[a]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[a]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[a]	Beachwood Dr to SH 59	32	20	9	0

Note: (a) Indicates roadways that are parallel to rail lines, population impacted are for combined noise from roadway and rail traffic.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

Table 4.4-30. Distance to CNEL from Roadway Centerline - No-Action Alternative
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Year	Roadway	Segment	Distance (feet) CNEL 60	CNEL 65	CNEL 70	CNEL 75
2000	West Olive Ave	SH 59 to R St	180	90	50	(a)
	Buhach Rd	Santa Fe Dr to Bellevue Rd	110	60	30	(a)
	Buhach Rd	Bellevue Rd to Juniper Ave	120	60	30	(a)
	Buhach Rd	Juniper Ave to SH 99	120	60	30	(a)
	Bellevue Rd	Santa Fe Dr to Buhach Rd	150	80	40	(a)
	Bellevue Rd	Buhach Rd to Castle Dr	180	90	50	(a)
	Bellevue Rd	Castle Dr to Shaffer Rd	210	100	50	(a)
	Juniper Ave	Buhach Rd to Shaffer Rd	80	40	(a)	(a)
	Wallace Rd	Gate 3 to Santa Fe Dr	20	(a)	(a)	(a)

Year	Roadway	Segment	CNEL 60 North	CNEL 60 South	CNEL 65 North	CNEL 65 South	CNEL 70 North	CNEL 70 South	CNEL 75 North	CNEL 75 South
2000	SH 99[b]	Atwater to Rail Overpass	1,560	1,410	1,110	710	950	340	880	160
	SH 99[b]	Rail Overpass to Buhach Rd	1,420	1,440	720	750	350	410	170	260
	SH 99[b]	Buhach Rd to Franklin Rd	1,490	1,500	730	760	350	410	170	260
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	380	550	200	370	80	260	30	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	420	570	220	380	100	260	40	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	440	590	230	380	100	260	40	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	470	600	250	390	120	270	50	190
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	430	570	230	380	110	260	50	190
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	440	590	230	380	100	260	50	190
	Santa Fe Dr[b]	Beachwood Dr to SH 59	500	620	260	400	120	270	50	190

Year	Roadway	Segment	CNEL 60	CNEL 65	CNEL 70	CNEL 75
2005	West Olive Ave	SH 59 to R St	210	100	50	(a)
	Buhach Rd	Santa Fe Dr to Bellevue Rd	120	60	40	(a)
	Buhach Rd	Bellevue Rd to Juniper Ave	130	60	30	(a)
	Buhach Rd	Juniper Ave to SH 99	130	60	40	(a)
	Bellevue Rd	Santa Fe Dr to Buhach Rd	160	80	50	(a)
	Bellevue Rd	Buhach Rd to Castle Dr	200	100	50	(a)
	Bellevue Rd	Castle Dr to Shaffer Rd	230	110	60	40
	Juniper Ave	Buhach Rd to Shaffer Rd	90	50	30	(a)
	Wallace Rd	Gate 3 to Santa Fe Dr	30	(a)	(a)	(a)

Year	Roadway	Segment	CNEL 60 North	CNEL 60 South	CNEL 65 North	CNEL 65 South	CNEL 70 North	CNEL 70 South	CNEL 75 North	CNEL 75 South
2005	SH 99[b]	Atwater to Rail Overpass	1,650	1,540	1,120	770	950	370	880	180
	SH 99[b]	Rail Overpass to Buhach Rd	1,540	1,550	780	810	380	430	180	260
	SH 99[b]	Buhach Rd to Franklin Rd	1,630	1,640	800	820	380	430	180	260
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	390	560	200	370	90	260	30	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	430	580	230	380	100	260	40	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	460	600	240	390	110	260	40	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	490	610	260	400	130	270	60	190
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	450	580	240	390	120	760	50	190
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	460	600	240	390	110	260	50	190
	Santa Fe Dr[b]	Beachwood Dr to SH 59	530	640	270	400	130	270	60	190

Notes: (a) Contained within the roadway.
(b) Indicates roadways that are parallel to rail lines; distances are for combined noise from roadway and rail traffic. Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

Table 4.4-30. Distance to CNEL from Roadway Centerline - No-Action Alternative
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Year	Roadway	Segment	CNEL 60		CNEL 65		CNEL 70		CNEL 75	
			Distance (feet)							
2015	West Olive Ave	SH 59 to R St	270		130		60		40	
	Buhach Rd	Santa Fe Dr to Bellevue Rd	150		70		40		[a]	
	Buhach Rd	Bellevue Rd to Juniper Ave	160		80		40		[a]	
	Buhach Rd	Juniper Ave to SH 99	160		80		40		[a]	
	Bellevue Rd	Santa Fe Dr to Buhach Rd	190		100		50		[a]	
	Bellevue Rd	Buhach Rd to Castle Dr	240		120		60		40	
	Bellevue Rd	Castle Dr to Shaffer Rd	280		130		70		40	
	Juniper Ave	Buhach Rd to Shaffer Rd	110		50		30		[a]	
	Wallace Rd	Gate 3 to Santa Fe Dr	30		20		[a]		[a]	
			North	South	North	South	North	South	North	South
	SH 99[b]	Atwater to Rail Overpass	1,870	1,810	1,170	930	960	450	880	210
	SH 99[b]	Rail Overpass to Buhach Rd	1,790	1,820	940	950	460	490	220	280
	SH 99[b]	Buhach Rd to Franklin Rd	1,980	1,950	950	970	460	490	220	280
	Santa Fe Dr[b]	Chestnut Ln to Shaffer Rd	420	570	210	380	90	260	40	190
	Santa Fe Dr[b]	Shaffer Rd to Wallace Rd	470	600	250	390	110	260	50	190
	Santa Fe Dr[b]	Wallace Rd to Buhach Rd	510	630	260	400	120	270	50	190
	Santa Fe Dr[b]	Buhach Rd to Bellevue Rd	540	640	290	410	140	270	70	200
	Santa Fe Dr[b]	Bellevue Rd to Gate 2	480	600	270	390	130	270	60	190
	Santa Fe Dr[b]	Gate 2 to Gurr Rd	510	630	260	400	120	270	60	190
	Santa Fe Dr[b]	Beachwood Dr to SH 59	590	680	300	420	140	270	70	200

Notes: (a) Contained within the roadway.
(b) Indicates roadways that are parallel to rail lines; distances are for combined noise from roadway and rail traffic. Distances are offset from the centerline of roadway due to the contribution from rail traffic noise.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

4.4.5 Biological Resources

The Proposed Action and reuse alternatives (except the No-Action Alternative) could potentially affect biological resources through alteration or loss of vegetation and wildlife habitat. These impacts are described below for each alternative.

In the absence of specific site development plans, certain assumptions were generated to consistently analyze the effects of the Proposed Action and alternatives. These assumptions include:

- All staging and other areas disturbed temporarily by construction would be placed in previously disturbed areas (e.g., paved or cleared areas) to the fullest extent possible.

Table 4.4-31. Number of People Impacted by Surface Traffic Noise - No-Action Alternative

Year	Roadway	Segment	Population Impacted			
			CNEL 60-65	CNEL 65-70	CNEL 70-75	CNEL >75
2000	West Olive Ave	SH 59 to R St	52	0	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	0	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	35	3	0	0
	Buhach Rd	Juniper Ave to SH 99	20	0	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	61	29	0	0
	Bellevue Rd	Castle Dr to Shaffer Rd	43	64	9	0
	Juniper Ave	Buhach Rd to Shaffer Rd	35	3	0	0
	Wallace Rd	Gate 3 to Santa Fe Dr	0	0	0	0
	SH 99	Atwater to Buhach Rd	853	268	14	0
	SH 99	Buhach Rd to Franklin Rd	69	26	23	0
	Santa Fe Dr[a]	Chestnut Ln to Shaffer Rd	12	40	35	0
	Santa Fe Dr[a]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[a]	Wallace Rd to Buhach Rd	107	49	55	0
	Santa Fe Dr[a]	Buhach Rd to Bellevue Rd	20	6	6	0
	Santa Fe Dr[a]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[a]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[a]	Beachwood Dr to SH 59	14	23	6	0
2005	West Olive Ave	SH 59 to R St	64	0	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	0	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	61	38	0	0
	Buhach Rd	Juniper Ave to SH 99	20	0	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	72	29	0	0
	Bellevue Rd	Castle Dr to Shaffer Rd	52	49	29	0
	Juniper Ave	Buhach Rd to Shaffer Rd	66	3	0	0
	Wallace Rd	Gate 3 to Santa Fe Dr	0	0	0	0
	SH 99	Atwater to Buhach Rd	958	312	26	0
	SH 99	Buhach Rd to Franklin Rd	66	0	29	0
	Santa Fe Dr[a]	Chestnut Ln to Shaffer Rd	12	32	12	0
	Santa Fe Dr[a]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[a]	Wallace Rd to Buhach Rd	101	64	55	0
	Santa Fe Dr[a]	Buhach Rd to Bellevue Rd	17	9	6	0
	Santa Fe Dr[a]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[a]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[a]	Beachwood Dr to SH 59	17	23	6	0
2015	West Olive Ave	SH 59 to R St	81	9	0	0
	Buhach Rd	Santa Fe Dr to Bellevue Rd	9	0	0	0
	Buhach Rd	Bellevue Rd to Juniper Ave	49	17	0	0
	Buhach Rd	Juniper Ave to SH 99	35	0	0	0
	Bellevue Rd	Santa Fe Dr to Buhach Rd	0	0	0	0
	Bellevue Rd	Buhach Rd to Castle Dr	84	43	6	0
	Bellevue Rd	Castle Dr to Shaffer Rd	87	35	46	0
	Juniper Ave	Buhach Rd to Shaffer Rd	84	3	0	0
	Wallace Rd	Gate 3 to Santa Fe Dr	0	0	0	0
	SH 99	Atwater to Buhach Rd	1,239	413	66	0
	SH 99	Buhach Rd to Franklin Rd	58	43	38	0
	Santa Fe Dr[a]	Chestnut Ln to Shaffer Rd	14	32	12	0
	Santa Fe Dr[a]	Shaffer Rd to Wallace Rd	0	6	0	0
	Santa Fe Dr[a]	Wallace Rd to Buhach Rd	84	78	61	0
	Santa Fe Dr[a]	Buhach Rd to Bellevue Rd	26	9	6	0
	Santa Fe Dr[a]	Bellevue Rd to Gate 2	0	0	0	0
	Santa Fe Dr[a]	Gate 2 to Gurr Rd	3	9	3	3
	Santa Fe Dr[a]	Beachwood Dr to SH 59	23	20	9	0

Note: (a) Indicates roadways that are parallel to rail lines, population impacted are for combined noise from roadway and rail traffic.
CNEL = Community Noise Equivalent Level.
SH = State Highway.

- The proportion of disturbance associated with each land use category was determined based on accepted land use planning concepts. Development within each parcel could occur at one or more locations anywhere within that category, unless designated as vacant land on the project maps.

The areas with the highest potential for impact under any alternative include the fairy shrimp habitat consisting of vernal pools and other areas of standing water in the northeast portion of the base (as described in Section 3.4.5.3), and the wetlands, considered sensitive habitat, as described in Section 3.4.5.4. Potential impact is greatest in these areas because the habitat value is highest there.

One federally listed threatened species, the vernal pool fairy shrimp, occurs on Castle AFB. If portions of the property that are known to contain this species are transferred to another federal agency, that agency would be required to conduct additional consultation under Section 7 of the Endangered Species Act prior to irreversible or irretrievable commitment of resources to any project that could adversely affect the species. Formal consultation under Section 7 of the Endangered Species Act is required if the federal agency determines that its action may affect listed species. Formal consultation is a process between the USFWS and the federal agency that concludes with the USFWS's issuance of a biological opinion stating whether or not the federal action is likely to jeopardize the continued existence of listed species. A no-jeopardy opinion may include restrictions on the amount of incidental adverse effects to listed species. A USFWS opinion that the project could jeopardize the continued existence of a listed species, known as a jeopardy opinion, would also include reasonable and prudent alternatives, if any, that the federal agency could implement to avoid jeopardizing the listed species. If a jeopardy opinion is issued, the federal agency will either alter or cease its action to comply with the no-jeopardy mandate in Section 7(a)(2) of the Endangered Species Act or seek an exemption from this mandate under Section 7(h) of the Act.

Non-federal and private parties who receive base property would be subject to the prohibitions listed in Section 9 of the Endangered Species Act (16 U.S.C. §1538) and 50 CFR 17 Subparts C, D, F, and G. For certain activities involving the export, possession, taking, sale, or transport of threatened or endangered animal species, non-federal and private parties would be required to obtain a permit under Section 10 of the Endangered Species Act (16 U.S.C. §1539) and 50 CFR 17 Subparts C and D. Reuse of the facilities and resultant potential impacts on state-listed species would be subject to compliance with Article 5, Chapter 1.5, Division 3, Section 2090 et seq. of the State of California Fish and Game Code. If CDFG determines state-listed species will be affected by a project, a take permit (defined under Article 5, Chapter 1.5, Division 3, Section 2083 et seq. of the California Fish and Game Code) would be required.

In addition to the federal Endangered Species Act, property recipients would have to comply with the California Endangered Species Act. In compliance with the California act, the CDFG may require additional surveys for species not listed by the USFWS. These surveys would be the responsibility of the property recipients.

Coordination would be required between the property recipient and the U.S. Army Corps of Engineers, as mandated by Section 404 of the Clean Water Act, due to possible impacts to wetlands.

4.4.5.1 Proposed Action. Development of the civilian airport and associated facilities under the Proposed Action could adversely affect biological resources primarily through a potential loss of 450 acres of vegetation and wildlife habitat. Direct losses to some species may occur from construction and other activities in newly developed areas. Urban development could increase runoff of storm water and pollutants from developed areas into nondeveloped areas. Development of the northeastern portion of the base could affect grasslands and wetlands (vernal pools) that support several sensitive plant and animal species. Wetlands (freshwater marsh) northwest of the runway would not be impacted directly under this alternative, although they may be impacted indirectly by adjacent activities.

Vegetation. Overall, the Proposed Action could result in a maximum loss of 450 acres of vegetation, including 259 acres of grassland. Impacts to grassland areas could include direct conversion to developed and/or landscaped vegetative type in the industrial area proposed northeast of the airfield. Southeast of this site, a public facilities/recreation land use has been identified, which could further directly impact grasslands by increasing vehicle and foot traffic to the area. This increased traffic would result in increased trampling of some grassland areas. A beneficial impact in the public facilities/recreation area northeast of the airfield would be that grasses present there could be allowed to grow to a more natural height, thus allowing for propagation and dissemination of seed. Loss of and wetland vegetation is discussed under Sensitive Habitats. The remainder of the base would experience minimal impacts in that the baseline biological value of these areas is low.

Wildlife. Direct impacts from implementation of the Proposed Action could occur through individual mortality as a result of construction or operational activities. Less-mobile species (small mammals, reptiles, amphibians, and invertebrates) would be most affected by these types of activities, although the increased presence of equipment, aircraft, or vehicles could also lead to accidental mortality of larger birds or mammals. Losses of birds to aircraft collisions are expected to be somewhat higher than preclosure conditions. The western spade-foot toad (CSC) could be affected by the potential loss of wetlands (as described under Sensitive Habitats within this section).

Additional effects on wildlife could occur through habitat degradation and loss. Industrial development on the parcel northeast of the airfield could result in a loss of up to 263 acres of quality grassland and fairy shrimp habitat (as described under Threatened and Endangered Species within this section).

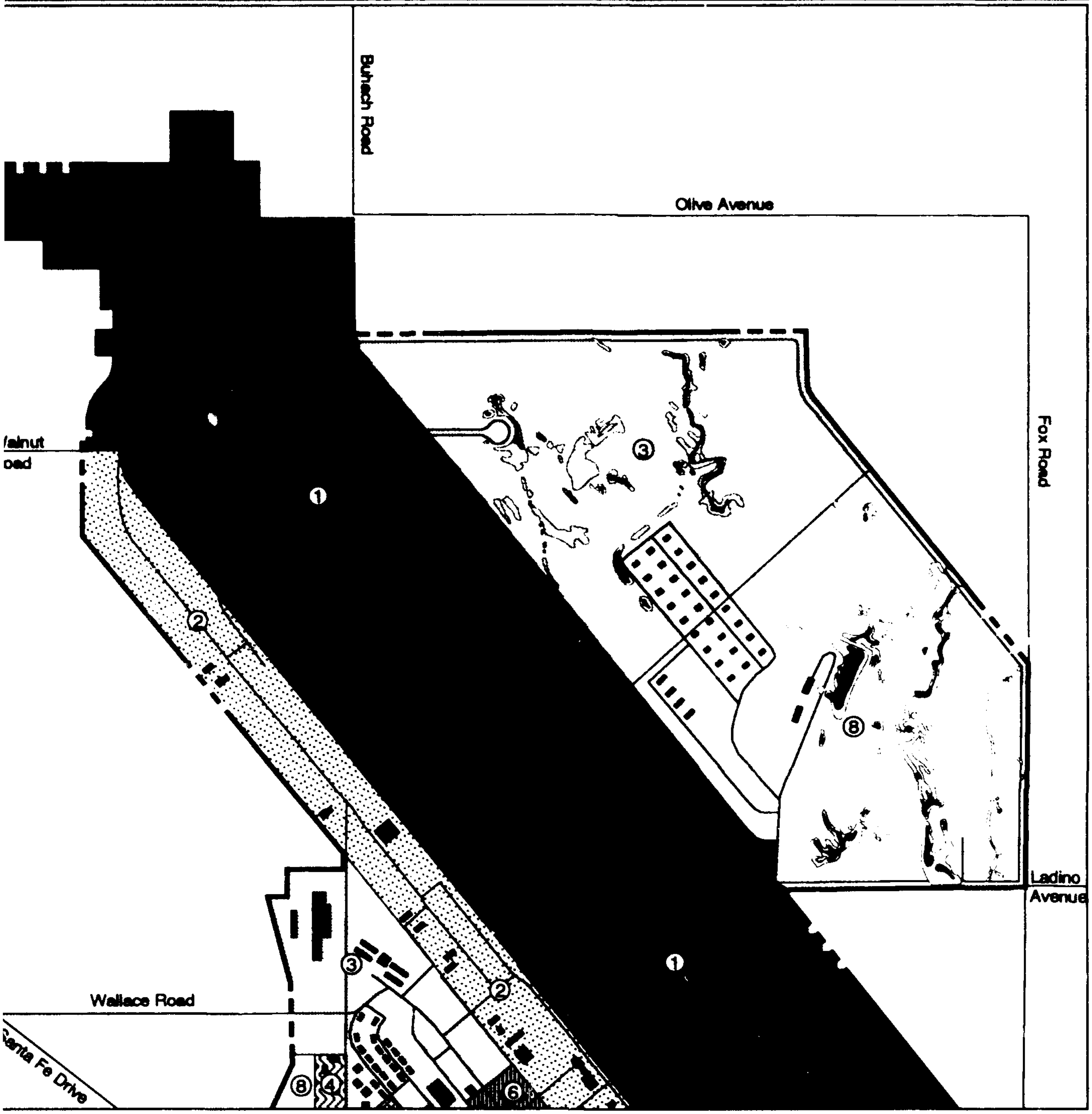
Development would displace mobile species (birds, large mammals) to surrounding sites. Most of these displaced animals would not be able to survive within the orchards and other agricultural areas adjacent to the base because of their limited habitat value. Species displaced could include the less-mobile birds (e.g., American kestrel, western meadowlark, and burrowing owl, all CSC) and mammals (e.g., black-tailed hare), and some reptiles. Wider ranging species including red-tailed hawk, Cooper's hawk (CSC), black-shouldered kite, coyote, and red fox could be impacted to a lesser degree. The ultimate effect of this alternative would be a decrease in populations of most local wildlife species.

The proposed aircraft component (fleet mix and operations) of this alternative would produce less noise than preclosure conditions, but more than the closure baseline. However, the local species are familiar with aircraft noise and can be assumed to be tolerant of this disturbance. Other noise produced by construction and ground operations activities may cause short-term, minor stress on wildlife species. Activity on the trapshooting range may drive away species intolerant of gunshots during operational periods. The overall impact of noise on wildlife populations at or near the base would be minimal.

Threatened and Endangered Species. Direct impacts to the threatened vernal pool fairy shrimp (referred to herein as fairy shrimp) could result from operational or construction activities, resulting in direct mortality and habitat loss. Indirect impacts, including alteration of hydrology and increased sedimentary and chemical runoff, can result from activities occurring adjacent to actual fairy shrimp habitat.

Airfield, industrial, and public facilities/recreation land uses are proposed in the vicinity of the fairy shrimp habitat as demonstrated in Figure 4.4-15. Table 4.4-32 illustrates that ample land is available to avoid disturbance of the fairy shrimp habitat based on the analysis discussed below.

Under the Proposed Action, development within the industrial land use areas would total 260 acres of land. This overall disturbance would support new development, redevelopment, or demolition of existing facilities. The industrial land use category contains 447 acres in two parcels, a 335-acre parcel northeast of the runway (which contains 19.9 acres of fairy shrimp habitat), and a 112-acre parcel (which does not contain habitat for the species) in the cantonment. In the absence of a specific site development plan, it was assumed that the 260 acres of disturbance would occur on a



XPLANATION

1 Airfield
2 Aviation Support
3 Industrial
4 Institutional (Medical)
5 Institutional (Educational)
6 Commercial
7 Residential
8 Public Facilities/ Recreation
9 Agriculture
10 Vacant Land
Base Boundary
Fairy Shrimp Habitat Boundary
Wetlands

450 900 1800 Feet

Proposed Land Uses in the Vicinity of Fairy Shrimp Habitat and Wetlands - Proposed Action

Figure 4.4-15

Table 4.4-32. Fairy Shrimp Habitat, Direct Impacts - Proposed Action

	Land Use[a] (in Acres)				
	Industrial		Public Facilities/Recreation		Airfield
	Cantonment	Northeast Parcel	Cantonment	Northeast Parcel	
Total	112	335	108	325	1,033
Disturbed	65	195	8	23	0
Fairy shrimp habitat	0	19.9	0	25.5	1.1
Non-fairy shrimp habitat	112	315.1	108	299.5	1,031.9
Likely fairy shrimp habitat	0	0	0	0	0

Note: (a) Numbers based on information provided in Tables 2.2-1 and 2.2-3.

proportional basis within this land use category. Based on this assumption, 65 acres would be disturbed in the 112-acre cantonment parcel and 195 acres in the 335-acre parcel northeast of the runway. In the 335-acre parcel, 140 acres would be left undisturbed and available for habitat impact avoidance.

Based on the available acres of habitat and the level of proposed overall disturbance, 19.9 acres of fairy shrimp habitat could be disturbed (as part of the 195 acres of overall disturbance) in the 335-acre parcel, if avoidance is not considered. However, given that practicable infrastructure and facility siting alternatives are available (i.e., 140 acres would be left undisturbed after 20 years), it is anticipated that no fairy shrimp habitat would be impacted.

Development within the public facilities/recreation land use areas would total 31 acres (see Table 4.4-32) of the available 433 acres. Of the seven public facilities/recreation parcels (see Figure 4.4-15), six are located in the cantonment and do not contain fairy shrimp habitat. The seventh parcel is a 325-acre area northeast of the runway, which contains 25.5 acres of fairy shrimp habitat. Based on the analytical assumptions described above, it was assumed that 23 acres of disturbance would occur in this 325-acre parcel, and 302 acres would be left undisturbed and available for habitat impact avoidance. Based on the acreage of fairy shrimp habitat and the level of proposed overall land disturbance, 23 acres of fairy shrimp habitat could be disturbed (all within the 23 acres of overall disturbance) in this parcel, if avoidance is not considered. However, given that practicable infrastructure and facility siting alternatives are available (i.e., 302 acres would be left undisturbed after 20 years), it is anticipated that no fairy shrimp habitat would be impacted.

No disturbance is proposed within the airfield land use; therefore, no impacts to the 1.1 acres of fairy shrimp habitat within this land use would occur.

Indirect impacts can result from activities that indirectly cause mortality through disturbance of fairy shrimp habitat. Storm water runoff may impact fairy shrimp habitat by increasing the sediment levels and/or pollutant content of water transported to these low-lying areas. Alteration of drainage patterns on the base may also affect the hydrologic factors necessary to sustain this habitat. Sedimentation associated with siting construction in areas adjacent to vernal pools and associated drainages and storm water runoff could alter the chemical and physical parameters of vernal pools making them unsuitable habitat for the threatened fairy shrimp. These indirect effects could carry over to other or all fairy shrimp habitat.

Sensitive Habitats. The types of impacts to sensitive habitats could include disturbance to wetlands (vernal pool and freshwater), which are regulated under the Clean Water Act and Executive Order 11990. Impacts to fairy shrimp habitat (regulated under the Endangered Species Act) are discussed above under Threatened and Endangered Species.

Wetlands can be disturbed through direct and indirect impacts. Direct impacts can result from potential filling, dredging, or flooding associated with initial development. Indirect impacts can occur from disturbance on adjacent lands resulting in increased chemical and sedimentary runoff that degrades water quality.

Section 404 of the Clean Water Act provides the regulatory mechanism necessary to preclude wetland impacts resulting from reuse. Under Section 404, any action implemented by reusers that would directly involve the placement of fill material in, dredging from, or flooding of wetlands or other waters of the United States requires permitting prior to implementation. According to the U.S. EPA regulations issued under Section 404(b)(1), the permitting of fill activities will not be approved unless the following conditions are met: no practicable, less environmentally damaging alternative to the action exists; the activity does not cause or contribute to violations of state water quality standards or jeopardize endangered or threatened species; the activity does not contribute to significant degradation of waters of the United States; and all practicable and appropriate steps have been taken to minimize potential adverse impacts to the aquatic ecosystem (40 CFR 230.10). Further, the guidelines establish a rebuttable presumption, that for non-water-dependent projects, a practicable alternative to filling of wetlands exists.

Federal agency responsibility to protect wetlands is discussed in Executive Order 11990. Section (2)1 of the order states that a federal agency, to the extent permitted by law, shall avoid providing assistance for new construction in wetlands unless the head of the agency concludes that there is no practicable alternative to such construction, and that the proposed project includes all practicable measures to minimize harm to wetlands that may result from such use. In determining whether an alternative is practicable, the agency may consider costs, existing technology, logistics, environmental effects, and the purpose of the project that causes the discharge of fill or dredged material into the affected wetlands.

Airfield, industrial, and public facilities/recreation land uses are proposed in the vicinity of the wetlands as demonstrated in Figure 4.4-15. Table 4.4-33 illustrates that ample land is available to avoid disturbance of the wetlands based on the analysis discussed below.

Table 4.4-33. Wetlands, Direct Impacts - Proposed Action

	Land Use[a] (in acres)				
	Industrial		Public Facilities/Recreation		Airfield
	Cantonment	Northeast Parcel	Cantonment	Northeast Parcel	
Total	112	335	108	325	1,033
Disturbed	65	195	8	23	0
Wetland	0	5.5	0	15.9	0.5
Non-wetland	112	329.5	108	309.1	1,032.5
Likely wetland impact	0	0	0	0	0

Note: (a) Numbers based on information provided in Tables 2.2-1 and 2.2-3.

Under the Proposed Action, development within the industrial land use areas would total 260 acres of land. This overall disturbance would support new development, redevelopment, or demolition of existing facilities. Under the Proposed Action, the industrial land use category contains 447 acres. Two industrial parcels occur at the base, a 335-acre parcel northeast of the runway (which contains 5.5 acres of wetlands) and a 112-acre parcel (which does not contain wetlands) located in the cantonment. In the absence of a specific site development plan, it was assumed that the 260 acres of disturbance would occur on a proportional basis within this land use category. Based on this assumption, 65 acres of disturbance would occur in the 112-acre cantonment parcel and 195 acres of disturbance would occur in the 335-acre parcel northeast of the runway. In this northeast industrial parcel, 140 acres would be left undisturbed and available for wetland impact avoidance.

Based on wetland acreage present and the level of proposed overall disturbance, 5.5 acres of wetlands could be disturbed (as part of the 195 acres of overall disturbance) in the 335-acre parcel, if avoidance is not considered. However, given that practicable infrastructure and facility siting alternatives are available (i.e., 140 acres would be left undisturbed in this parcel after 20 years), it is anticipated that no wetlands would be impacted.

Development within the public facilities/recreation land use areas would total 31 acres of land (Table 4.4-33), in a category that contains 433 acres. Of the seven public facilities/recreation parcels at the base (see Figure 4.4-15) six are located in the cantonment and do not contain wetlands. The seventh parcel is a 325-acre area located northeast of the runway, which contains 15.9 acres of wetlands. Based on the analytical assumptions described above, it was assumed that 23 acres of disturbance would occur in this 325-acre parcel, and 302 acres would be left undisturbed and available for wetland impact avoidance. Based on wetland acreage present and the level of proposed overall land disturbance, 15.9 acres of wetlands could be disturbed (as part of the 23 acres of overall disturbance) in this parcel if avoidance is not considered. However, given that practicable infrastructure and facility siting alternatives are available (i.e., 302 acres would be left undisturbed in this parcel after 20 years), it is anticipated that no wetlands would be impacted.

No disturbance is proposed within the airfield land use; therefore, no impacts to the 0.5 acre of wetlands within this land use would occur.

Indirect impacts might occur from siting of facilities adjacent to wetland areas. If facilities were sited in adjacent mounds, an increase in chemical and/or sediment-containing runoff could adversely affect the vegetation, wildlife, and hydrology of wetland areas.

Mitigation Measures. Mitigation measures for impacts to the threatened fairy shrimp and to wetlands are similar in nature; however, both are discussed in detail in this section.

Under the Proposed Action, avoidance of fairy shrimp habitat is identified as the preferred mitigation for the protection of the threatened species, avoidance measures should be implemented early in the site planning process to reduce or eliminate direct and indirect impacts.

Direct impacts from disturbances resulting in mortality of this species could be avoided by siting development on uplands. Indirect impacts that result in loss of habitat for the fairy shrimp could be avoided by siting development in areas that are not adjacent to and that do not contain drainages with standing water and vernal pools. Avoidance of disturbance could include controlling runoff from demolition and construction sites into drainages through the use of berms, silt curtains, and other appropriate techniques that do not create additional impacts. Equipment could be washed in areas where wash water could be contained, treated, or evaporated. Additional mitigation to ensure avoidance of impacts to fairy shrimp could include buffer zones that exclude development from areas above and beyond those where disturbance could directly impact the species. Consultation with the USFWS and/or CDFG to determine the need for and size of these buffer zones would be the responsibility of the property recipient.

Reuse activities that impact threatened species would be subject to the Endangered Species Act and its implementing regulations found at 50 CFR 17. If portions of the property containing habitat for the threatened fairy shrimp are transferred to another federal agency, the receiving agency would be required to conduct additional consultation under Section 7 of the Endangered Species Act prior to committing resources to any project that could adversely impact the species.

Activities under which there is discretionary federal involvement or control (e.g., disposal of property) are regulated under 50 CFR 402.03, which requires compliance with Section 7 of the Endangered Species Act. For properties conveyed to non-federal and private parties, those parties would be subject to the prohibitions listed in Section 9(2)(a) of the Endangered Species Act. Additionally, non-federal and private parties that engage in activities that may damage or destroy the threatened fairy shrimp after the property is no longer subject to federal jurisdiction must comply with applicable state protection laws for threatened and endangered species.

Avoidance of development is also the preferred mitigation for minimizing impacts in or adjacent to wetlands, and should be implemented early in the site planning process to reduce or eliminate direct and indirect impacts. In the unlikely event that avoidance of wetlands proves infeasible, other mitigation measures may be necessary to minimize impacts. Reuse activities affecting federal jurisdictional wetlands would be subject to Section 404 of the Clean Water Act. In addition to avoidance, mitigation measures could include: (1) at-site (if possible) replacement of any sensitive habitat lost by creation or expansion of existing sensitive habitat at a ratio determined through consultation with the USFWS or Corps of Engineers; (2) recreation of sensitive habitat elsewhere within the site, or purchase and fencing of sensitive habitat away from the site as replacement; and (3) monitoring (until the sensitive habitat becomes established) of any replacement habitat required to determine the effectiveness of replacement and necessary remedial measures.

Executive Order 11990 states that, when federally owned wetlands or portions of wetlands are proposed for disposal to non-federal or private parties, the Air Force shall (a) reference in the conveyance those uses that are restricted under federal, state, or local wetlands regulations; and (b) attach other appropriate restrictions to the uses of properties by recipients (except where prohibited by law); or (c) withhold such properties from disposal.

If the Proposed Action were implemented, the Air Force would reference in conveyance documents those uses that are restricted under federal, state, and local wetlands regulations. This reference would be made in accordance with the provisions of Section 4 of Executive Order 11990.

The Air Force would also impose other restrictions on property recipients, as appropriate. Such restrictions could include conservation easements or deed restrictions for wetlands which might allow for public enjoyment and wildlife usage, while protecting wetlands and threatened species habitat from development. Conservation easements would be managed by responsible agencies or entities that would maintain and monitor the sensitive areas. Deed restrictions would place the responsibility for protection of sensitive habitat under the management of property recipients. These easements and/or restrictions would help to minimize potential direct and indirect impacts to sensitive habitat.

Indirect impacts could be minimized by controlling runoff from demolition and construction sites into drainages through the use of berms, silt curtains, and other appropriate techniques. Equipment could be washed in areas where wash water could be contained, treated, or evaporated.

4.4.5.2 Castle Aviation Center Alternative. Under this alternative, a total of 146 acres could potentially be disturbed by facility renovation, infrastructure improvements, landscaping, and maintenance activities. The major areas of disturbance would be in the previously disturbed cantonment and WSA. Recreational use of the large open grassland northeast of the airfield would have a low potential for impacting vernal pool species.

Vegetation. Impacts to the grassland/vernal pool vegetation under this alternative differ from the Proposed Action, in that industrial activity is planned only for the 54 acres of developed area in the northeast portion of the base, thereby conserving 593 acres of grassland and 20.9 acres of wetlands. Vegetation in the area could, however, be affected by increased human activities. In other plant communities on the base, the impacts would be minimal.

Wildlife. Impacts to wildlife would be less than those discussed under the Proposed Action, as species dependent on the grassland habitat in the northeast section of the base would only minimally be impacted. Increased human presence during filming operations would temporarily stress the species in the area. The area would be open to joggers, bicyclists, and pets, which could cause localized disturbances to wildlife and vegetation loss in vernal pools and grassland areas. However, the overall effect of cessation of mowing grasses in this area would probably increase the cover and available forage, resulting in beneficial effects to grassland-inhabiting species. Impacts to wildlife in other areas of the base would be minimal.

Threatened and Endangered Species. Direct and indirect impacts to the threatened fairy shrimp would be similar to those described for the Proposed Action.

Airfield, industrial, and public facilities/recreation land uses are proposed in the vicinity of the fairy shrimp habitat as demonstrated in Figure 4.4-16. Table 4.4-34 illustrates that ample land is available to avoid disturbance of the fairy shrimp habitat based on the analysis discussed below.

Table 4.4-34. Fairy Shrimp Habitat, Direct Impacts - Castle Aviation Center Alternative

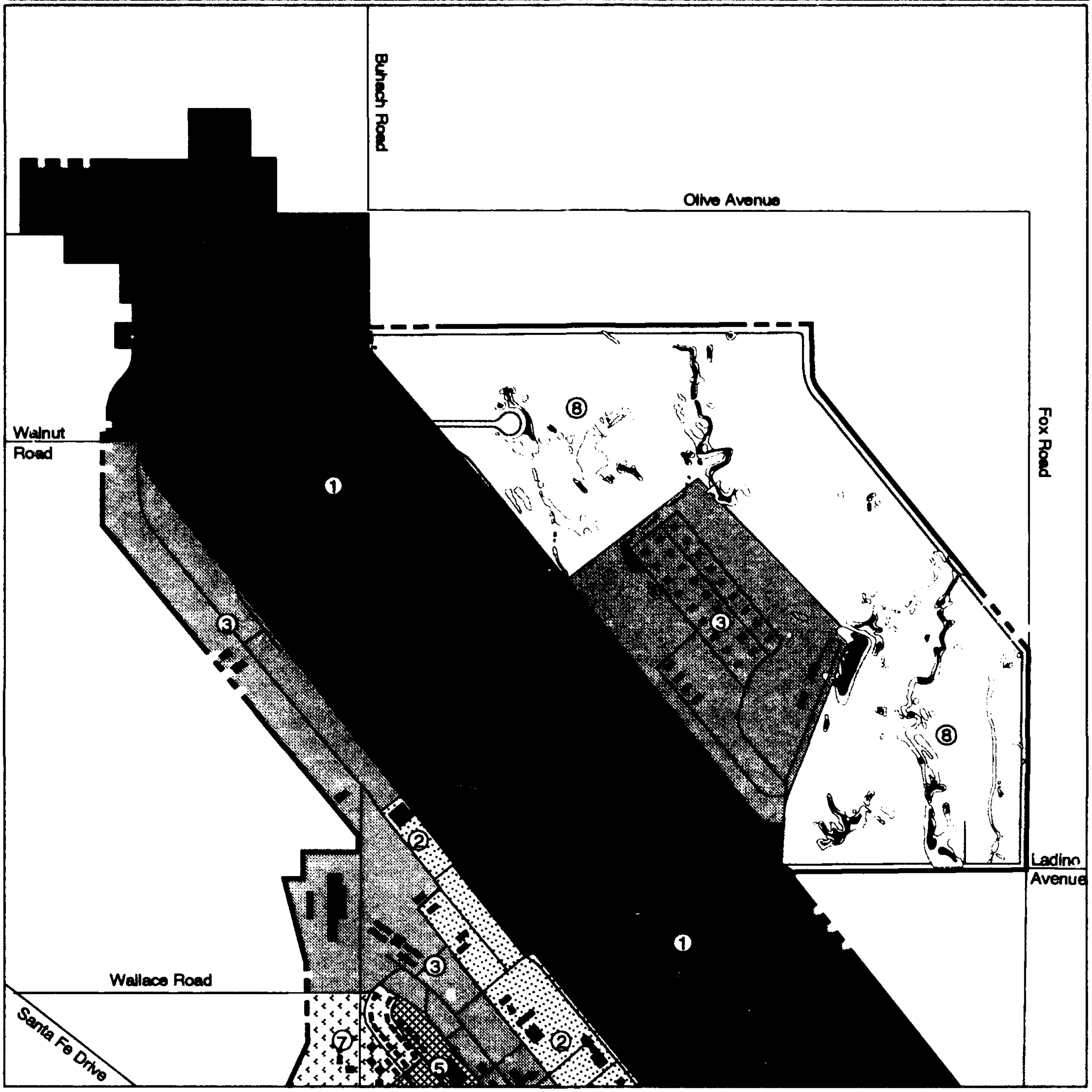
	Land Use[a] (in acres)			
	Industrial		Public Facilities/ Recreation	Airfield
	Northeast Parcel	Cantonment	Northeast Parcel	
Total	641	64	500	1,033
Disturbed	64	6	50	0
Fairy shrimp habitat	3	0	42.4	1.2
Non-fairy shrimp habitat	641	64	554.6	1,031.84
Likely fairy shrimp habitat	0	0	0	0

Note: (a) Numbers based on information provided in Tables 2.3-1 and 2.3-3.

Under this alternative up to 64 acres of land could be lost to development in an Industrial land use category that occupies 641 acres of the base. Approximately, 160 acres of currently developed land in the former WSA would constitute the only use of land in the northeast parcel where fairy shrimp occur. No impacts to fairy shrimp habitat are expected from activities associated with this land use.

No disturbance is proposed within the airfield land use; therefore, no impacts to the 1.1 acres of fairy shrimp habitat within this land use would occur.

Development within the public facilities/recreation land use areas would total 56 acres (see Table 4.4-34) in a category that contains 564 acres. Four of the five public facilities/recreation parcels are located in the cantonment and do not contain fairy shrimp habitat. The fifth parcel is a 500-acre area located northeast of the runway, which contains 42.4 acres of fairy shrimp habitat. Based on the analytical assumptions described for the Proposed Action, it was assumed that 50 acres of disturbance would occur in this 500-acre parcel, and 450 acres would be left undisturbed and available for habitat impact avoidance. Based on the acreage of fairy shrimp habitat and the level of proposed overall land disturbance, 42.4 acres of fairy shrimp habitat could be disturbed in this parcel, if avoidance is not considered. However, given that practicable infrastructure and facility siting alternatives are availat'' (i.e., there would be 450 acres left undisturbed in this parcel after 20 years), it is anticipated that no fairy shrimp habitat would be impacted.



EXPLANATION

- 1 Airfield
- 2 Aviation Support
- 3 Industrial
- 4 Institutional (Medical)
- 5 Institutional (Educational)
- 6 Commercial
- 7 Residential
- 8 Public Facilities/ Recreation
- 9 Agriculture
- 10 Vacant Land
- Base Boundary
- Fairy Shrimp Habitat Boundary
- Wetlands

0 450 900 1800 Feet

Proposed Land Uses in the Vicinity of Fairy Shrimp Habitat and Wetlands - Castle Aviation Center Alternative

Figure 4.4-16

Regulatory requirements for construction or other ground-disturbing activities within the fairy shrimp habitat are the same as those described for the Proposed Action.

Sensitive Habitats. The types of impacts that could occur to sensitive habitats under this alternative are the same as those described for the Proposed Action.

Airfield, industrial, and public facilities/recreation land uses are proposed in the vicinity of the wetlands as demonstrated in Figure 4.4-16. Table 4.4-35 illustrates that ample land is available to avoid disturbance of the wetlands based on the analysis described below.

Table 4.4-35. Wetlands, Direct Impacts - Castle Aviation Center Alternative

	Land Use[a] (in acres)			
	Industrial		Public Facilities/ Recreation	Airfield
		Cantonment	Northeast Parcel	
Total	641	64	500	1,033
Disturbed	64	6	50	0
Wetland	2.9	0	18.5	0.5
Non-wetland	641	64	578.6	1,032.5
Likely wetland impact	0	0	0	0

Note: (a) Numbers based on information provided in Tables 2.3-1 and 2.3-3.

Under this alternative up to 64 acres of land could be lost to development in the Industrial land use category (see Table 2.3-3) which occupies 641 acres of the base (see Figure 4.4-16). Approximately, 160 acres of developed land, containing 2.9 acres of wetlands, in the former WSA would constitute the only land use in the northeast parcel where wetlands occur. No impacts to wetlands are expected from activities in this land use category.

Development within the public facilities/recreation land use areas would total 56 acres (Table 4.4-35), in a category that contains 564 acres. Four of the five public facilities/recreation parcels are located in the cantonment, and do not contain wetlands. The fifth parcel is a 500-acre area northeast of the runway, which contains 18.5 acres of wetlands. Based on the analytical assumptions described for the Proposed Action, it was assumed that 50 acres of disturbance would occur in this 500-acre parcel, and 450 acres would be left undisturbed and available for wetland impact avoidance. Based on the acreage of wetlands and the level of proposed overall land disturbance, 18.5 acres of wetlands could be disturbed in this parcel, if avoidance is not considered. However, given that practicable infrastructure and facility siting alternatives are available (i.e., 450 acres would be left undisturbed in this parcel after 20 years), it is anticipated that no wetlands would be impacted.

No disturbance is proposed within the airfield land use; therefore, no impacts to the 0.5 acre of wetlands within this land use would occur.

Regulatory requirements for construction or other ground-disturbing activities within the wetlands are the same as those described for the Proposed Action.

Mitigation Measures. Mitigation measures, for impacts to the threatened fairy shrimp and to wetlands, if required, would be the same as for the Proposed Action.

4.4.5.3 Commercial Aviation Alternative. Under this alternative, a total of 475 acres could potentially be disturbed by facility renovation, infrastructure improvements, landscaping, and maintenance activities. Industrial use of the area northeast of the airfield would have a high potential for impacting vernal pool species. Agricultural use northwest of the runway could directly or indirectly impact the 0.5 acre of wetlands in the area.

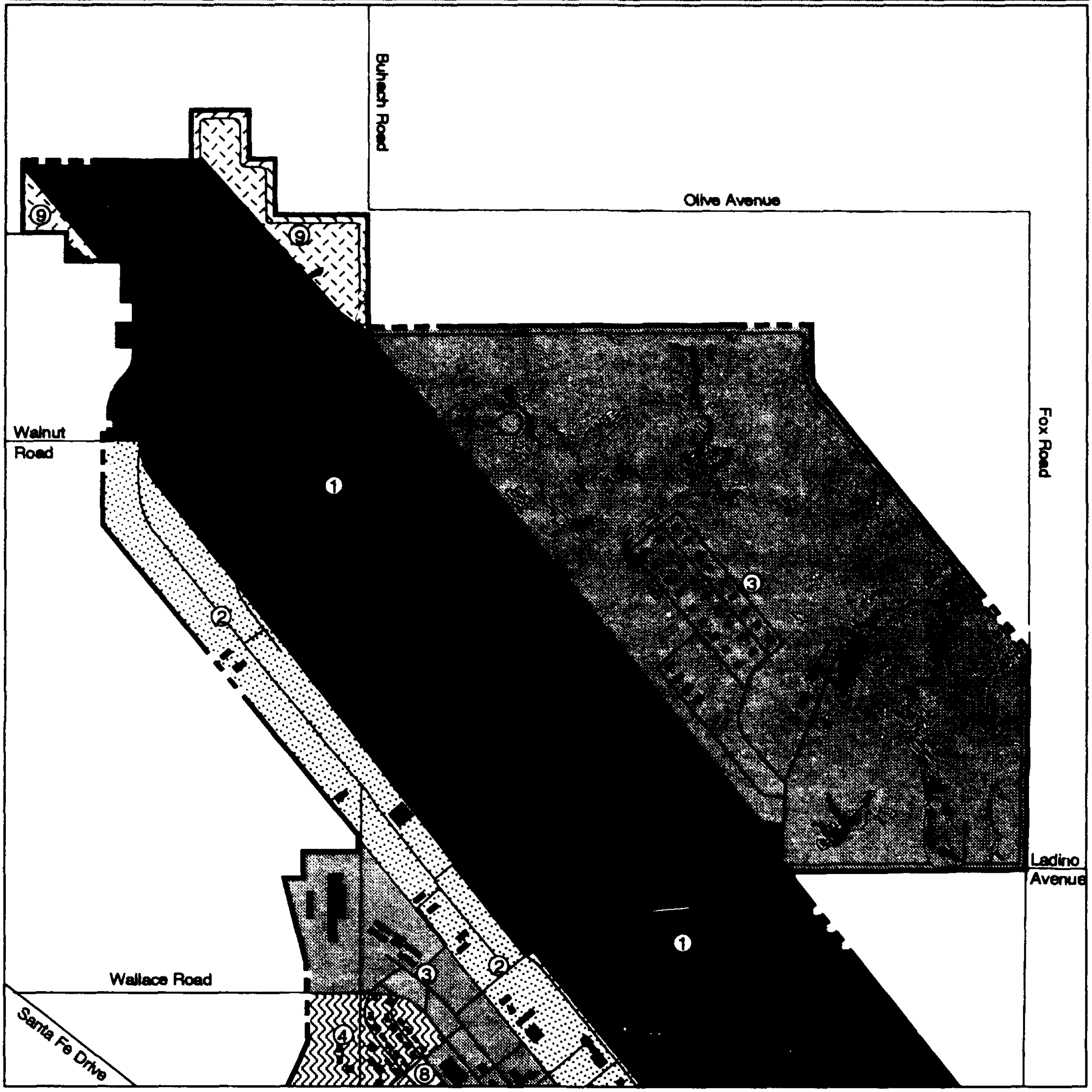
Vegetation. Impacts to the grassland vegetation under this alternative would be similar to those described under the Proposed Action. While disturbed acreage would be greater than in the Proposed Action, most disturbance would be limited to developed or landscaped portions of the base.

Wildlife. Impacts to wildlife from construction and demolition activities would be similar to those discussed under the Proposed Action. Although the wildlife in the area has been exposed to aircraft activities, the large increase in flights over preclosure conditions may cause enough stress to displace some of the more sensitive species remaining in the area, such as black-shouldered kites. Although bird/aircraft collisions would be expected to increase proportionately to the increase in the number of flights, the effects on the overall populations of birds is expected to be minimal.

Threatened and Endangered Species. Direct and indirect impacts to the threatened fairy shrimp would be similar to those described for the Proposed Action.

Airfield, industrial, and agricultural land uses are proposed in the vicinity of the fairy shrimp habitat as demonstrated in Figure 4.4-17. Table 4.4-36 illustrates that ample land is available to avoid disturbance of the fairy shrimp habitat based on the analysis discussed below.

Under this alternative, development within the industrial land use areas would total 138 acres of land. This overall disturbance would support new



EXPLANATION

1 Airfield
2 Aviation Support
3 Industrial
4 Institutional (Medical)
5 Institutional (Educational)
6 Commercial
7 Residential
8 Public Facilities/ Recreation
9 Agriculture
10 Vacant Land
Base Boundary
Fairy Shrimp Habitat Boundary
Wetlands

0 450 900 1800 Feet

Proposed Land Uses in the Vicinity of Fairy Shrimp Habitat and Wetlands - Commercial Aviation Alternative

Figure 4.4-17

Table 4.4-36. Fairy Shrimp Habitat, Direct Impacts - Commercial Aviation Alternative

	Land Use[a] (in acres)			
	Industrial		Airfield	Agricultural
	Cantonment	Northeast Parcel		
Total	184	691	1,033	56
Disturbed	29	109	0	50
Fairy shrimp habitat	0	45.4	0.6	0.5
Non-fairy shrimp habitat	184	645.6	1,031.8	55.5
Likely fairy shrimp habitat	0	0	0	0

Note: (a) Numbers based on information provided in Tables 2.3-6 and 2.3-8.

development, redevelopment, or demolition of existing facilities. The industrial land use category contains 875 acres. The three industrial parcels include a 691-acre parcel northeast of the runway (which contains 45.4 acres of fairy shrimp habitat), and two parcels totaling 184 acres in the cantonment (which contain no habitat for the species). Using the analytical assumptions described in the Proposed Action, 29 acres of disturbance would occur in the 184-acre cantonment parcels, and 109 acres of disturbance would occur in the 691-acre parcel northeast of the runway. In this northeast industrial parcel, 582 acres would be left undisturbed and available for habitat impact avoidance.

Based on the acreage of habitat and the level of proposed overall disturbance, 45.4 acres of fairy shrimp habitat could be disturbed in the 691-acre parcel, if avoidance is not considered. However, given that practicable infrastructure and facility siting alternatives are available (i.e., 582 acres would be left undisturbed after 20 years), it is anticipated that no fairy shrimp habitat would be impacted.

The agricultural land use category contains 56 acres (see Table 4.4-36). There are three agricultural parcels (see Figure 4.4-17): two parcels north of the runway (which contains 0.5 acre of fairy shrimp habitat), and one parcel southeast of the runway (which contains no fairy shrimp habitat). A total of 50 acres would be disturbed in all parcels. In the northern parcels, up to 6 acres would be left undisturbed, and available for habitat impact avoidance.

Based on the acreage of fairy shrimp habitat and the level of proposed overall disturbance, 0.5 acre of fairy shrimp habitat could be disturbed in the 56-acre parcels, if avoidance is not considered. However, given that practicable siting alternatives are available (i.e., 6 acres would be left undisturbed in this parcel after 20 years), it is anticipated that no fairy shrimp habitat would be impacted.

No disturbance is proposed within the airfield land use; therefore, no impacts to the 0.6 acre of fairy shrimp habitat located within this land use would occur.

Regulatory requirements for construction or other ground-disturbing activities within the fairy shrimp habitat are the same as those described for the Proposed Action.

Sensitive Habitats. Direct and indirect impacts to wetlands would be similar to those described for the Proposed Action.

Industrial, airfield, and agricultural land uses are proposed in the vicinity of the wetlands as demonstrated in Figure 4.4-17. Table 4.4-37 illustrates that ample land is available to avoid disturbance of the wetlands based on the analysis described below.

Table 4.4-37. Wetlands, Direct Impacts - Commercial Aviation Alternative

	Land Use[a] (in acres)			
	Industrial		Airfield	Agricultural
	Cantonment	Northeast Parcel		
Total	184	691	1,033	56
Disturbed	29	109	0	50
Wetlands	0	21.4	0.3	0.2
Non-wetland	184	669.6	1,031.84	55.5
Likely wetland impact	0	0	0	0

Note: Numbers based on information provided in Tables 2.3-6 and 2.3-8.

Under this alternative, development within the industrial land use areas would total 138 acres. This overall disturbance would support new development, redevelopment, or demolition of existing facilities. The industrial land use category contains 875 acres in three parcels (see Figure 4.4-17): a 691-acre parcel northeast of the runway (which contains 21.4 acres of wetlands) and two additional parcels (which contain no wetlands) totaling 184 acres in the cantonment. Using the analytical assumptions described in the Proposed Action, 29 acres of disturbance would occur in the 184-acre cantonment parcels, and 109 acres of disturbance would occur in the 691-acre parcel northeast of the runway. In this northeast industrial parcel, 582 acres would be left undisturbed and available for wetland impact avoidance.

Based on the acreage of wetlands present and the level of proposed overall disturbance, 21.4 acres of wetlands could be disturbed in the 691-acre parcel, if avoidance is not considered. However, given that practicable infrastructure and facility siting alternatives are available (i.e., 582 acres would be left undisturbed in this parcel after 20 years), it is anticipated that no wetlands would be impacted.

No disturbance is proposed within the airfield land use; therefore, no impacts to the 0.3 acre of wetlands located within this land use would occur.

The agricultural land use category contains 56 acres (see Table 4.4-37) in three parcels (see Figure 4.4-17): two parcels north of the runway (which contains 0.2 acre of wetlands) and one parcel southeast of the runway (which contains no wetlands). A total of 50 acres would be disturbed in the agricultural land use. In the northern parcels, up to 6 acres would be left undisturbed, and available for wetland impact avoidance.

Based on the acreage of wetlands and the level of proposed overall disturbance, 0.2 acre of wetlands could be disturbed in the agricultural land use if avoidance is not considered. However, given that practicable siting alternatives are available (i.e., 6 acres would be left undisturbed in this parcel after 20 years), it is anticipated that no wetlands would be impacted.

Mitigation Measures. Mitigation measures for impacts to the threatened fairy shrimp and the wetlands, if required, would be the same as for the Proposed Action.

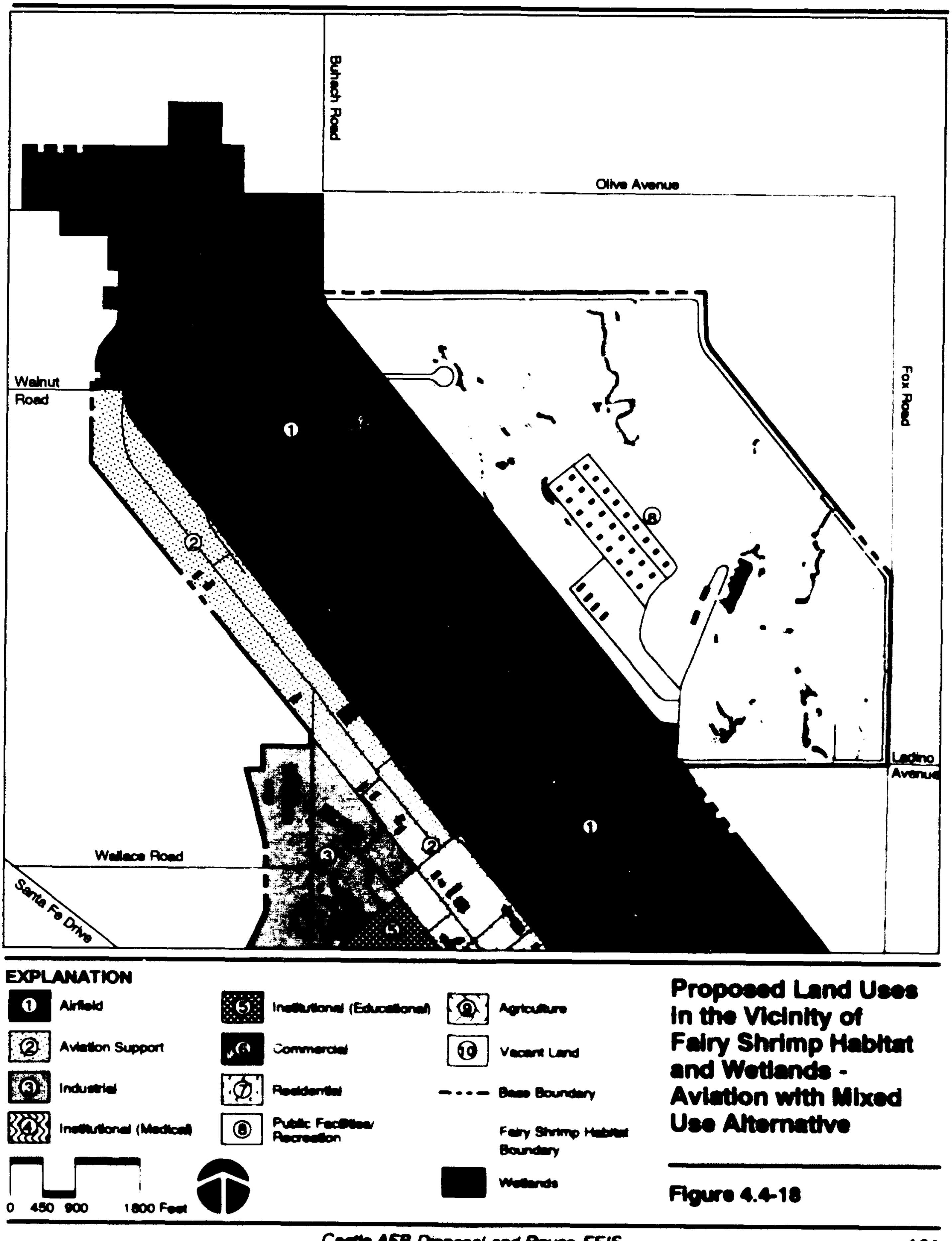
4.4.5.4 Aviation with Mixed Use Alternative. Under this alternative, a total of 360 acres could potentially be disturbed by facility renovation, construction, infrastructure improvements, landscaping, and maintenance activities. The large open grassland with scattered vernal pool communities would be used for passive outdoor recreation and open space conservation.

Vegetation. Impacts to vegetation would be similar to those described under the Castle Aviation Center Alternative in that some trampling and or crushing of vegetation could occur in the area northeast of the airfield.

Wildlife. Impacts to wildlife would be similar to those described under the Castle Aviation Center Alternative, with the exception that filming activities are not included in this alternative, thus overall use of the area would be less intensive. Aircraft activity would be similar to preclosure, thus no impact to wildlife from flight operations is expected.

Threatened and Endangered Species. Direct and indirect impacts to the threatened fairy shrimp would be similar to those described for the Proposed Action.

Airfield and public facilities/recreation land uses are proposed in the vicinity of the fairy shrimp habitat as demonstrated in Figure 4.4-18. Table 4.4-38 illustrates that ample land is available to avoid disturbance of the fairy shrimp habitat based on the analysis discussed below.



Proposed Land Uses in the Vicinity of Fairy Shrimp Habitat and Wetlands - Aviation with Mixed Use Alternative

Figure 4.4-18

Table 4.4-38. Fairy Shrimp Habitat, Direct Impacts - Aviation with Mixed Use Alternative

	Land Use[a] (in acres)	
	Public Facilities/Recreation[b]	Airfield
Total	660	1,033
Disturbed	0	0
Fairy shrimp habitat	45.4	1.1
Non-fairy shrimp habitat	514.6	1,031.84
Likely fairy shrimp habitat	0	0

Notes: (a) Numbers based on information provided in Tables 2.3-11 and 2.3-13.
(b) Only northeast parcel considered because land use will not impact fairy shrimp habitat.

Under this alternative, proposed uses for a 660-acre undeveloped parcel northeast of the runway containing 45.4 acres of fairy shrimp habitat include passive outdoor recreation or open space conservation. No impacts to fairy shrimp habitat are anticipated.

No disturbance is proposed within the airfield land use; therefore, no impacts to the 1.16 acres of fairy shrimp habitat within this land use would occur.

Regulatory requirements for construction or other ground-disturbing activities within the fairy shrimp habitat are the same as those described for the Proposed Action.

Sensitive Habitats. Direct and indirect impacts to wetlands would be similar to those described for the Proposed Action.

Airfield and public facilities/recreation land uses are proposed in the vicinity of the wetlands as demonstrated in Figure 4.4-18. Table 4.4-39 illustrates that ample land is available to avoid disturbance of the wetlands based on the analysis described below.

Table 4.4-39. Wetlands, Direct Impacts - Aviation with Mixed Use Alternative

	Land Use[a] (in acres)	
	Public Facilities/ Recreation	Airfield
Total	660	1,033
Disturbed	0	0
Wetland	21.4	0.5
Non-wetland	638.6	1,032.5
Likely wetland impact	0	0

Notes (a) Numbers based on information provided in tables 2.3-11 and 2.3-13.
(b) Only northeast parcel considered because land use will not impact wetlands.

Proposed uses for a 660-acre public facilities/recreation land use parcel northeast of the runway (containing 21.4 acres of wetlands) include passive outdoor recreation or open space conservation. No impacts to wetlands are anticipated.

No disturbance is proposed within the airfield land use; therefore, no impacts to the 0.5 acre of wetlands located within this land use would occur.

Mitigation Measures. Mitigation measures for impacts to the threatened fairy shrimp and the wetlands, if required, would be the same as for the Proposed Action.

4.4.5.5 Non-Aviation Alternative. Under this alternative, a total of 644 acres would potentially be disturbed by facility construction, renovation, infrastructure improvements, landscaping, agriculture, and maintenance. The conservation and open space use of the large open grassland and vernal pool areas northeast of the airfield would have minimal impacts on these areas.

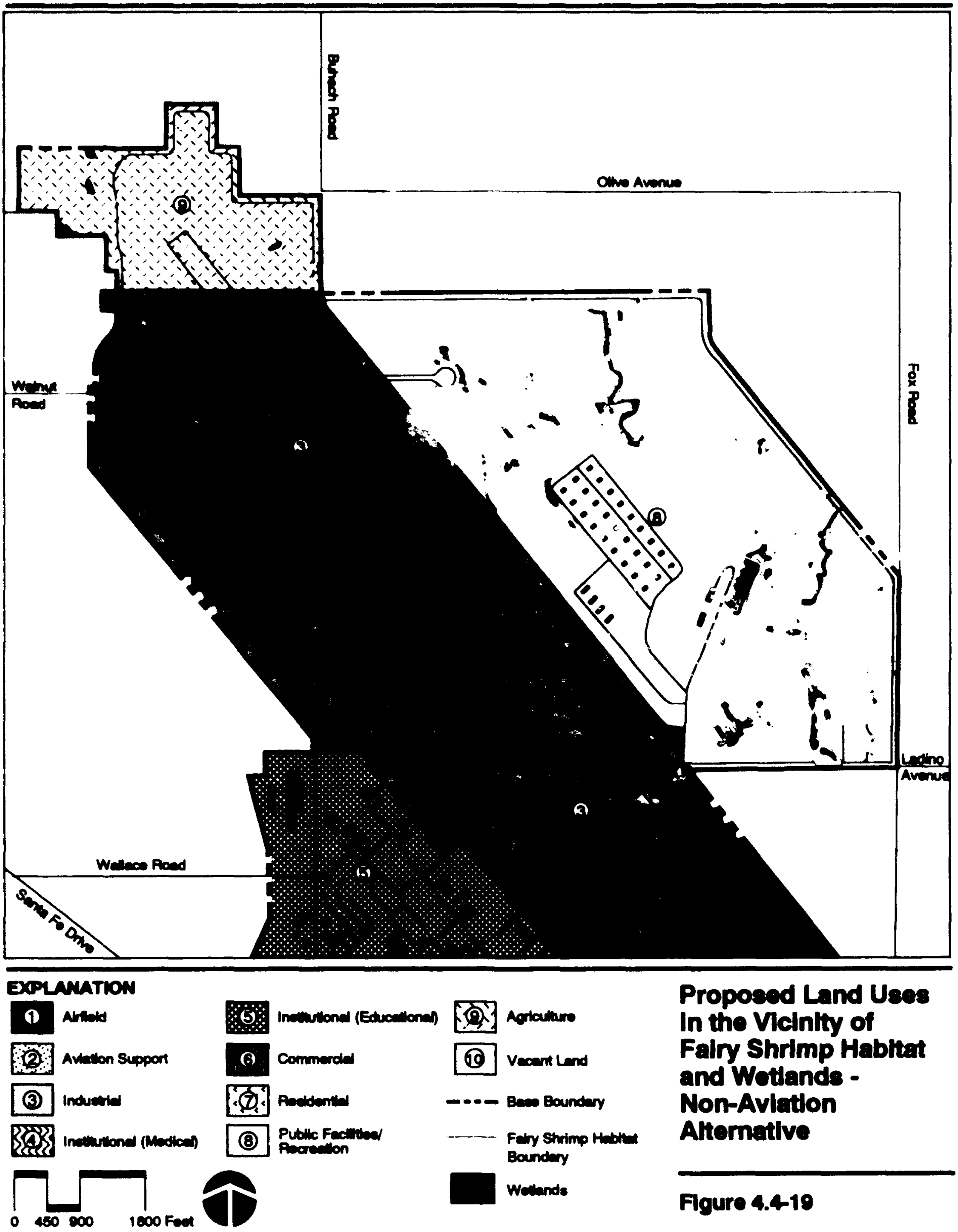
Vegetation. Impacts to vegetative communities would be similar to those described for the Aviation with Mixed Use Alternative, with the exception of the effects of agricultural use of the 0.5 acre of wetlands at the northwestern end of the runway. These effects are discussed under Sensitive Habitats, below.

Wildlife. Impacts to wildlife would be similar to those described for the Aviation with Mixed Use Alternative, with the exception of the effects of agricultural development on the aquatic species living in the marshy area north of the runway. These effects are discussed under Sensitive Habitats, below. There would be no noise impacts or bird/aircraft collisions from flight activities, although localized traffic noise would still occur under this alternative.

Threatened and Endangered Species. Direct and indirect impacts to the threatened fairy shrimp would be similar to those described for the Proposed Action.

Industrial, public facilities/recreation, and agricultural land uses are proposed in the vicinity of the fairy shrimp habitat as demonstrated in Figure 4.4-19. Table 4.4-40 illustrates that ample land is available to avoid disturbance of the fairy shrimp habitat based on the analysis discussed below.

Development within the industrial land use areas would total 168 acres of land, in a category that contains 991 acres. Based on the analytical assumptions described for the Proposed Action, the acreage of fairy shrimp habitat and the level of proposed overall land disturbance, 0.6 acre of fairy shrimp habitat could be disturbed in this parcel, if avoidance is not



Proposed Land Uses in the Vicinity of Fairy Shrimp Habitat and Wetlands - Non-Aviation Alternative

Figure 4.4-19

Table 4.4-40. Fairy Shrimp Habitat, Direct Impacts - Non-Aviation Alternative

	Land Use[a] (in acres)		
Facilities	Industrial	Agricultural	Public Facilities/ Recreation
Total	991	165	696
Disturbed	168	142	0[b]
Fairy shrimp habitat	0.6	0.5	45.4
Non-fairy shrimp habitat	990.4	164.5	650.6
Likely fairy shrimp habitat	0	0	0

Notes: (a) Numbers based on information provided in Tables 2.3-15 and 2.3-16.
(b) No impacts expected in parcel containing fairy shrimp habitat.

considered. However, given that practicable infrastructure and facility siting alternatives are available (i.e., 823 acres would be left undisturbed in this parcel after 20 years), it is anticipated that no fairy shrimp habitat would be impacted.

The agricultural land use category contains 165 acres (see Table 4.4-40) in two parcels (see Figure 4.4-19). The parcel north of the runway contains 0.54 acre of fairy shrimp habitat, and the parcel southeast of the runway contains no fairy shrimp habitat. A total of 142 acres would be disturbed for this agricultural land use. In the northern parcel, up to 23 acres would be left undisturbed and available for habitat impact avoidance.

Based on the acreage of fairy shrimp habitat present and the level of proposed overall disturbance, 0.5 acre of fairy shrimp habitat could be disturbed in the northern agricultural land use parcel, if avoidance is not considered. However, given that practicable siting alternatives are available (i.e., 23 acres would be left undisturbed in this parcel after 20 years), it is anticipated that no fairy shrimp habitat would be impacted.

The 660-acre undeveloped parcel containing 45.4 acres of fairy shrimp habitat proposed for public facilities/recreation land uses would be the same as for the Aviation with Mixed Use Alternative. No impacts to fairy shrimp habitat are anticipated in this land use.

Regulatory requirements for construction or other ground-disturbing activities within the fairy shrimp habitat are the same as those described for the Proposed Action.

Sensitive Habitats. Direct and indirect impacts to wetlands would be similar to those described for the Proposed Action.

Industrial, public facilities/recreation, and agricultural land uses are proposed in the vicinity of the wetlands as demonstrated in Figure 4.4-19. Table 4.4-41 illustrates that ample land is available to avoid disturbance of the wetlands based on the analysis described below.

Table 4.4-41. Wetlands, Direct Impacts - Non-Aviation Alternative

	Land Use[a] (in acres)		
Facilities	Industrial	Agricultural	Public Facilities/ Recreation
Total	991	165	696
Disturbed	168	142	0[b]
Wetland	0.3	0.5	21.1
Non-wetland	990.8	164.5	674.6
Likely wetland impact	0	0	0

Notes: (a) Numbers based on information provided in Tables 2.3-15 and 2.3-16.
(b) No impacts expected in parcel containing fairy shrimp habitat.

Development within the industrial land use areas would total 168 acres of land, in a category that contains 991 acres. Based on the analytical assumptions described for the Proposed Action, the acreage of wetlands present and the level of proposed overall land disturbance, 0.3 acre of wetlands could be disturbed in this parcel, if avoidance is not considered. However, given that practicable infrastructure and facility siting alternatives are available (i.e., 823 acres would be left undisturbed in this parcel after 20 years), it is anticipated that no wetlands would be impacted.

The agricultural land use category contains 165 acres (see Table 4.4-41) in two parcels (see Figure 4.4-19). One parcel north of the runway contains 0.5 acre of wetlands, and one parcel southeast of the runway contains no wetlands. A total of 142 acres of disturbance would occur in all parcels. In the northern parcel, up to 23 acres would be left undisturbed and available for wetland impact avoidance.

Based on the acreage of wetlands and the level of proposed overall disturbance, 0.5 acre of wetlands could be disturbed in the northern agricultural land use parcel, if avoidance is not considered. However, given that practicable siting alternatives are available (i.e., 23 acres would be left undisturbed in this parcel after 20 years), it is anticipated that no wetlands would be impacted.

The 660-acre undeveloped parcel containing 21.1 acres of wetlands proposed for public facilities/recreation land use would be the same as for the Aviation with Mixed Use Alternative. No impacts to wetlands are anticipated in this land use.

Mitigation Measures. Mitigation measures for impacts to the threatened fairy shrimp and the wetlands, if required, would be the same as for the Proposed Action.

4.4.5.6 No-Action Alternative. Maintenance of the base under the OL would have minimal adverse effects on biological resources. A reduction in human activity and a cessation of aircraft flights would reduce disturbance (particularly from noise and continued alteration of habitat) to wildlife on and in the vicinity of the base. Habitat quality for wildlife could improve if mowing of nonlandscaped areas were terminated, thereby allowing vegetation to grow to its natural height. This would allow populations of many wildlife species to increase, and would have an overall positive effect on biological resources at Castle AFB.

4.4.5.7 Other Land Use Concepts. As described in Section 2.3.3, one federal transfer and one independent land use concept have been identified. These actions may take place alone or in addition to one of the integrated reuse alternatives.

Federal Correctional Complex. Under this alternative, approximately 248 acres of the base would be developed into a federal correctional complex containing a minimum of two facilities. Development would occur in the 660-acre parcel of undeveloped land northeast of the runway which contains 45.4 acres of fairy shrimp habitat (of which 21.4 acres are also considered wetlands).

After development, approximately 412 acres would remain undeveloped within the 660-acre parcel (containing 45.4 acres of fairy shrimp habitat). Based on the habitat acreage present and the development activities proposed for the northeast parcel, disturbance to fairy shrimp habitat could include up to 45.4 acres, if avoidance is not considered. However, given that practicable infrastructure and facility siting alternatives are available (i.e., 412 acres would be left undisturbed in this parcel after 20 years), it is anticipated that fairy shrimp habitat would not be impacted.

Based on the analytical assumptions described for the Proposed Action, the acreage of wetlands present, and the level of proposed overall land disturbance, 21.4 acres of wetlands could be disturbed in this parcel, if avoidance is not considered. However, given that practicable infrastructure and facility siting alternatives are available (i.e., 412 acres would be left undisturbed in this parcel after 20 years), it is anticipated that wetlands would not be impacted.

Regulatory requirements for construction or other ground-disturbing activities within the wetlands are the same as for the Proposed Action.

Mitigation Measures. Mitigation measures for impacts to the threatened fairy shrimp and the wetlands, if required, would be the same as for the Proposed Action.

Private Recreational Facility. Under this alternative, approximately 110 acres of the base would be developed into a trapshooting range and gun club. Development would occur in a 325-acre parcel of undeveloped land northeast of the runway that contains 28 acres of fairy shrimp habitat (of which 17 acres are considered wetlands).

After development, approximately 215 acres would remain undeveloped within the 325-acre parcel (containing 28 acres of fairy shrimp habitat). Based on the habitat acreage and the development activities proposed for the northeast parcel, disturbance to fairy shrimp habitat could include up to 28 acres, if avoidance is not considered. However, given that practicable infrastructure and facility siting alternatives are available (i.e., 215 acres would be left undisturbed in this parcel after 20 years), it is anticipated that fairy shrimp habitat would not be impacted.

Based on the analytical assumptions described for the Proposed Action, the acreage of wetlands present, and the level of proposed overall land disturbance, 17 acres of wetlands could be disturbed in this parcel, if avoidance is not considered. However, given that practicable infrastructure and facility siting alternatives are available (i.e., 215 acres would be left undisturbed in this parcel after 20 years), it is anticipated that wetlands would not be impacted.

Regulatory requirements for construction or other ground-disturbing activities within the fairy shrimp habitat are the same as for the Proposed Action.

Mitigation Measures. Mitigation measures for impacts to the threatened fairy shrimp and the wetlands, if required, would be the same as for the Proposed Action.

4.4.6 Cultural Resources

Potential impacts were assessed by (1) identifying types and possible locations of reuse activities that could directly or indirectly affect cultural resources, and (2) identifying the nature and potential significance of cultural resources in potentially affected areas. Pursuant to the NHPA, consultation, as directed by the Section 106 review process, has been initiated with the California SHPO.

Historic properties, under 36 CFR 800, are defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP. This term includes, for the purposes of these regulations, artifacts, records, and remains that are related to and located within such properties. The term 'eligible for inclusion in the National Register' includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet National Register listing criteria." Therefore, sites not yet evaluated are considered potentially eligible to the NRHP and, as such, are afforded the same regulatory consideration as nominated historic properties.

As a federal agency, the Air Force is responsible for identifying any historic properties at Castle AFB. This identification process includes not only field surveys and recording of cultural resources, but also evaluations to develop determinations of significance in terms of NRHP criteria. (NRHP criteria and related qualities of significance are discussed in Appendix E, Methods of Analysis.) Completion of this process results in a listing of historic properties subject to federal regulations regarding the treatment of cultural resources.

The identification process as defined by the NHPA is currently ongoing at Castle AFB. The reconnaissance surveys to examine undeveloped areas is complete. A design for subsurface investigations of the historic farmlands, CAFB-2H and CAFB-3H, is being developed The evaluation of these sites, if necessary, and any historic structures considered potentially significant under the Cold War theme is expected to be completed prior to disposal.

Although the evaluation of CAFB-1H resulted in the determination that the trash dump is not eligible to the NRHP, the site must be considered potentially eligible for analytical purposes until SHPO concurrence is received.

Regulations implementing Section 106 of the NHPA indicate that the conveyance of a historic property without adequate measures to ensure preservation is procedurally considered to be an adverse impact, thereby ensuring full regulatory consideration in federal project planning and execution. All confirmed and potential historic properties on base could be impacted by conveyance.

Any identified historic properties will be managed in accordance with directives set forth in 36 CFR 800. Mitigation developed in coordination with the SHPO will be implemented as required to minimize or eliminate any adverse impact. Mitigation measures will be designed on a site-specific basis and could include archaeological data recovery, property recipients, adherence to guidelines equivalent to Section 106, or Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) documentation. Preservation covenants placed on disposal documents will outline mitigation measures that will become the responsibility of the new user/owner.

4.4.6.1 Proposed Action. Under the Proposed Action, the Riise-McVey site (CAFB-2H), the Harris site (CAFB-3H), and CAFB-1H would be located within the airfield boundary on vacant land not proposed for development. Construction of the western Olive Avenue access point, however, constitutes a possible impact to CAFB-1H and the Riise-McVey site. The airfield would likely be conveyed to an airport authority, which would manage the development and operations of the airport in accordance with FAA statutes and all applicable federal regulations. If, however, the airport is not subject to FAA regulations, the conveyance of this site from federal control could be considered an adverse impact.

Any demolition, renovation, or deterioration of any structures deemed eligible following the Cold War architectural and historic evaluation could constitute an adverse effect. Due to the lack of paleontological resources on Castle AFB, reuse under the Proposed Action would have no effect on this type of cultural resource. Impacts to prehistoric resources and traditional resources are not anticipated; however, a final assessment can only be made following the completion of all cultural resource investigations.

Mitigation Measures. If buildings or sites are determined to be eligible for listing on the NRHP and the land is conveyed to a non-federal entity (state, local, or private), preservation covenants could be placed on the disposal document to reduce the impact associated with conveyance to a nonadverse level. Any minor development within the designated parcels that could impact historic properties would, therefore, fall under the requirements of Section 106 of the NHPA. Other mitigation measures may be developed that meet the Secretary of the Interior's Standards and Guidelines for Historic Preservation Projects (36 CFR 68), or Archaeology and Historic Preservation (Federal Register, Vol. 48, No. 190, September 29, 1983, pages 44716-44742). These mitigation measures could include avoidance, stabilization, preservation in place, or data recovery. Documentation of the historic structures may be considered adequate data recovery; documentation should include, but not be limited to, as-built and alteration drawings and historic photographs.

The Air Force will consult with the SHPO and the Advisory Council on Historic Preservation to develop acceptable mitigation alternatives, if required, and implement them through preservation covenants. Consultation will proceed in compliance with Section 106 of the NHPA and its implementing regulations (36 CFR 800). A Memorandum of Agreement may be developed to document the accepted mitigations. A Memorandum of Agreement for cultural resources must be coordinated with, at a minimum, the SHPO, the Advisory Council on Historic Preservation, and the Air Force. Other parties (e.g., the airport authority) may be included as appropriate.

4.4.6.2 Castle Aviation Center Alternative. Under this alternative, impacts to cultural resources would be the same as those discussed under the Proposed Action.

Mitigation Measures. Appropriate mitigation measures would be the same as those outlined for the Proposed Action.

4.4.6.3 Commercial Aviation Alternative. Under this alternative, impacts to cultural resources would be the same as those discussed under the Proposed Action. However, Castle AFB lies partially within the agricultural land use.

Mitigation Measures. Appropriate mitigation measures would be the same as those outlined for the Proposed Action.

4.4.6.4 Aviation with Mixed Use Alternative. Under this alternative, impacts to cultural resources would be the same as those discussed under the Proposed Action.

Mitigation Measures. Appropriate mitigation measures would be the same as those outlined for the Proposed Action.

4.4.6.5 Non-Aviation Alternative. Under this alternative, CAFB-1H and the Riise-McVey site would be located within agricultural land uses north of the former runway. The Harris site would be located within industrial land at the site of the former airfield. Potential impacts include disturbances associated with demolition of the runway, if required, construction of new access points and facilities, and agricultural practices. The remainder of the impacts discussion under the Proposed Action (i.e., conveyance to a non-federal entity, impacts to historic structures, and no effect on other types of cultural resources) is applicable to this alternative.

Mitigation Measures. Appropriate mitigation measures would be the same as those outlined for the Proposed Action.

4.4.6.6 No-Action Alternative. There would be no effect on cultural resources resulting from the implementation of the No-Action Alternative if Castle AFB remains under federal jurisdiction. The Air Force would maintain structures (and/or sites) to prevent deterioration and maintain any historic character. The OL would continue to ensure adequate security to discourage illegal looting of the archaeological site, and thus inadvertent violation of the Archaeological Resources Protection Act.

Mitigation Measures. Since there would be no effect on cultural resources, mitigation measures would not be required.

4.4.6.7 Other Land Use Concepts. Neither the federal transfer nor the independent land use concept would have an impact on cultural resources.

4.5 LOCAL AIRPORT CLOSURES

This section summarizes the environmental consequences associated with the potential closures of Merced, Turlock, and Atwater municipal airports.

4.5.1 Merced Municipal Airport

The potential closure of Merced Municipal Airport is evaluated under the Commercial Aviation Alternative.

Community Setting. The closure of Merced Municipal Airport could result in the loss of approximately 45 jobs. It is anticipated that this job loss would be at least partially compensated by a corresponding gain in jobs at Castle AFB.

Land Use and Aesthetics. Closure of Merced Municipal Airport would remove specific airport-related land use restrictions (height limitations, clear zones) from the area surrounding the airport. The airport currently occupies 450 acres, which could be rezoned for redevelopment consisting of industrial or agricultural use following closure.

Transportation. Closure of Merced Municipal Airport would reduce ground traffic currently generated by airport activities. Because of the irregular schedule of aircraft traffic, and associated light traffic loads, this reduction would be minimal. The increase in traffic associated with the relocation of aircraft operations to Castle AFB from Merced Municipal has been included in the analysis of the Commercial Aviation Alternative.

Aircraft currently based at Merced Municipal Airport would need to be relocated to another airport in the region. The most likely destination would be a civilian airport at Castle AFB due to the space required to accommodate Merced Municipal activity. Relocation of aircraft to Castle AFB would cause little inconvenience to Merced pilots due to the proximity of Castle AFB (less than 6 miles away). Since the Merced airport is the only regionally significant civilian airport in the county, its closure would have a negative impact upon the residents of the county unless commercial passenger service was established at Castle AFB. The air cargo operation at Merced Municipal could also relocate to Castle AFB. The analysis of general aviation aircraft relocated to Castle AFB, as well as passenger and cargo service, has been included in the Commercial Aviation Alternative.

Utilities. Relocation of airport activity from Merced Municipal to Castle AFB would result in a shift in utility consumption to Castle AFB. Electricity and telephone service would be provided by the same purveyors; however, water and wastewater services would be shifted to the systems at Castle AFB.

Hazardous Materials and Hazardous Waste Management. Hazardous materials currently used at Merced Municipal would be similar to those used at Castle AFB if the relocation were to occur. The existing terminal building and several other facilities at Merced Municipal were constructed between 1937 and 1982, and may contain lead-based paint and ACM. Lead, radon, and asbestos surveys should be conducted for all applicable buildings following relocation of airport activities.

Natural Environment

Soils and Geology. Closure of Merced Municipal would not affect the soils and geology of the site. Soil disturbance could, however, occur as a result of redevelopment activities. Proper construction management practices would limit soil erosion and dust generation during ground disturbance.

Water Resources. With the closure of Merced Municipal, the potential for contamination of surface or groundwater from airport-related activities or accidental spills would be eliminated. The increase in these activities at Castle AFB has been included in the analysis of the Commercial Aviation Alternative.

Air Quality. There would be little change, if any, in the regional air quality due to the relocation of airport activities from Merced Municipal to Castle AFB. Ground traffic and aircraft operations would be expected to remain unchanged within the SJVAB as a result of this action. The relocation of aviation operations to Castle AFB has been included in the air quality analysis of the Commercial Aviation Alternative.

Noise. The noise generated by aircraft operations at Merced Municipal would cease, which would have little effect since there is little adverse effect due to current operations. The relocation of aircraft operations from Merced Municipal to Castle AFB has been included in the noise analysis of the Commercial Aviation Alterative. The relocation of these smaller aircraft would have little effect on the overall noise environment at Castle AFB.

Biological Resources. No rare, endangered, or threatened plant or animal species are known to inhabit the Merced airport. Impacts to biological resources as a result of the closure of Merced Municipal Airport would be minimal.

Cultural Resources. One potential burial site within the airport boundary could possibly be affected by the relocation of Merced Municipal Airport and its subsequent redevelopment (Hodges & Shutt, 1990).

4.5.2 Turlock Municipal Airport

The potential closure of Turlock Municipal Airport is evaluated under the Commercial Aviation Alternative.

Community Setting. Due to the minimal number of jobs associated with Turlock Municipal Airport, any loss in employment could be compensated by a corresponding gain in jobs at Castle AFB.

Land Use and Aesthetics. Land use surrounding the airport is predominantly agricultural. Closure of the airport would remove land use restrictions associated with airport activity and allow airport property to be redeveloped for use as agricultural, residential, or industrial.

Transportation. Ground traffic due to aircraft activities at Turlock Municipal Airport would cease with closure, resulting in a reduction in overall ground traffic in the immediate area. Closure of Turlock Municipal and relocation of Turlock-based aircraft to Castle AFB would place aircraft approximately 10 miles to the southeast. The additional distance may cause some pilots to relocate to other civil airports in the region. However, the improved facilities at Castle AFB may more than compensate for the increased distance. The increase in traffic associated with the relocation of aircraft operations to Castle AFB from Turlock Municipal has been included in the analysis of the Commercial Aviation Alternative.

Utilities. Relocation from Turlock Municipal to Castle AFB would result in little overall change in utility consumption or waste generation. Electrical, telephone, water, and wastewater services would be shifted to the systems at Castle AFB.

Hazardous Materials and Hazardous Waste Management. Hazardous materials currently used at Turlock Municipal would be shifted to Castle AFB. The facility that contains the FBO was built in the mid-1940s; therefore it may contain lead-based paint and ACM. A lead, radon, and asbestos survey should be conducted at all applicable buildings prior to relocation of airport activities.

Natural Environment

Soils and Geology. Closure of Turlock Municipal would not affect the soils and geology of the site. Soil disturbance could, however, occur as a result of redevelopment activities. Proper construction management practices would limit soil erosion and dust generation during ground disturbance.

Water Resources. The closure of Turlock Municipal would eliminate the potential for contamination of surface water or groundwater from airport-related activities or accidental spills. The increase in these activities at

Castle AFB has been included in the analysis of the Commercial Aviation Alternative

Air Quality. There would be little change, if any, in the regional air quality due to the relocation of airport activities from Turlock Municipal to Castle AFB Ground traffic and aircraft operations would be expected to remain unchanged within the SJVAB as a result of this action. The relocation of aviation operations to Castle AFB has been included in the air quality analysis of the Commercial Aviation Alternative.

Noise. The noise generated by aircraft operations at Turlock Municipal would cease, which would have little effect. The relocation of aircraft operations from Turlock Municipal to Castle AFB has been included in the noise analysis of the Commercial Aviation Alterative. The relocation of smaller aircraft to Castle AFB would have little effect on the overall noise environment

Biological Resources. No impacts to biological resources can be identified due to the lack of survey data.

Cultural Resources. No impact to cultural resources can be identified due to the lack of survey data.

4.5.3 Atwater Municipal Airport

The potential closure of Atwater Municipal Airport is evaluated under the Proposed Action, the Commercial Aviation Alternative, and the Aviation with Mixed Use Alternative.

Community Setting. Due to the minimal number of jobs associated with Atwater Municipal Airport, any loss in employment could be compensated by a corresponding gain in jobs at Castle AFB.

Land Use and Aesthetics. Land use surrounding the airport is predominantly agricultural. Closure of Atwater Municipal Airport would remove land use restrictions associated with airport activity. Closure would also allow redevelopment of airport land as industrial for expansion of the ARWTP or for agricultural or residential use.

Transportation. Ground traffic due to airport activities at Atwater Municipal would cease with closure, resulting in a reduction in traffic in the immediate area. Relocation of aircraft to Castle AFB would not cause any inconvenience to Atwater pilots due to the proximity of Castle AFB (less than 4 miles away). The additional distance would be offset partially by the better facilities that a civil airport at Castle AFB would provide. The increase in traffic associated with the relocation of aircraft operations to Castle AFB from Atwater Municipal has been included in the analysis of the Proposed

Action and the Commercial Aviation and Aviation with Mixed Use alternatives

Utilities. Relocation of airport activity from Atwater Municipal Airport to Castle AFB would result in little overall change in utility consumption or waste generation Electricity, telephone, and wastewater service would be provided by the same purveyors; however, water service would be shifted to the systems at Castle AFB.

Hazardous Materials and Hazardous Waste Management. Hazardous materials currently used at Atwater Municipal Airport would be shifted to Castle AFB if relocation were to occur. Lead, radon, and asbestos surveys should be conducted of all applicable buildings following relocation of airport activities.

Natural Environment

Soils and Geology. Closure of Atwater Municipal Airport would not affect the soils and geology of the site. Soil disturbance could, however, occur as a result of redevelopment activities. Proper construction management practices would limit soil erosion and dust generation during ground disturbance.

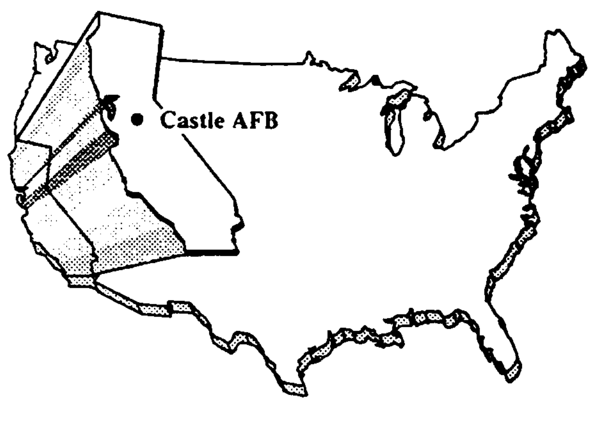
Water Resources. The closure of Atwater Municipal Airport would eliminate the potential for contamination of surface or groundwater from airport-related activities or accidental spills. The increase in these activities at Castle AFB has been included in the analysis of the Proposed Action and the Commercial Aviation and Aviation with Mixed Use alternatives.

Air Quality. There would be little change, if any, in the regional air quality due to the relocation of airport activities from Atwater Municipal Airport to Castle AFB. Ground traffic and aircraft operations would be expected to remain unchanged within the SJVAB as a result of this action. The relocation of aviation operations to Castle AFB from Atwater Municipal Airport has been included in the air quality analysis of the Proposed Action and the Commercial Aviation and Aviation with Mixed Use alternatives.

Noise. The noise generated by aircraft operations at Atwater Municipal would cease, which would have little effect. The relocation of aircraft operations from Atwater Municipal to Castle AFB has been included in the noise analysis of the Proposed Action and the Commercial Aviation and Aviation with Mixed Use alternatives. The relocation of these smaller aircraft to Castle AFB would have little effect on the overall noise environment.

Biological Resources. No impacts to biological resources can be identified due to the lack of survey data.

Cultural Resources. No impacts to cultural resources can be identified due to the lack of survey data.



CHAPTER 5
CONSULTATION AND COORDINATION

5.0 CONSULTATION AND COORDINATION

The federal, state, and local agencies and private agencies/organizations that were contacted during the course of preparing this Environmental Impact Statement are listed below.

FEDERAL AGENCIES

United States Department of Agriculture, Soil Conservation Service
United States Department of the Army, Construction Engineering Research Laboratory
United States Department of the Interior, Fish and Wildlife Service
United States Department of Justice, Federal Bureau of Prisons
United States Department of Transportation, Federal Aviation Administration - Western Pacific Region
United States Environmental Protection Agency (Region IX)

STATE AGENCIES

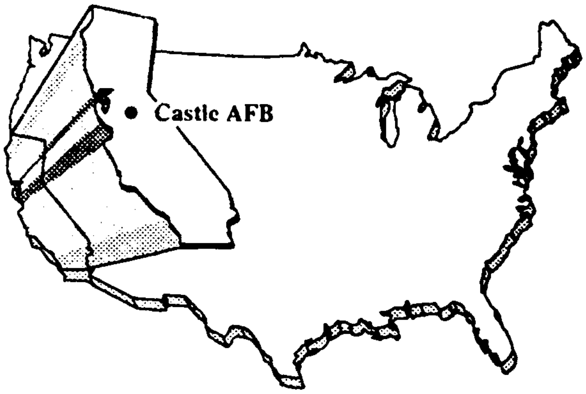
California Department of Fish and Game
California Department of Transportation, District 10
California Department of Transportation, Division of Aeronautics
California Department of Water Resources, Fresno Office
California Employment Development Department
California Environmental Protection Agency
California Regional Water Quality Control Board
San Joaquin Valley Unified Air Pollution Control District
State Office of Historic Preservation

LOCAL/REGIONAL AGENCIES

City of Atwater
City of Merced
City of Turlock
Fresno Air Terminal
Merced County
Merced County Association of Governments
Merced Irrigation District
Merced Sheriff Department
Modesto City-County Airport
Stanislaus Area Association of Governments
Stanislaus County
Winton Water District

PRIVATE ORGANIZATIONS AND INDIVIDUALS

Amtrak
Atwater Historical Society
Central Valley Skyways
Meadowbrook Water Company
Pacific Gas & Electric Company



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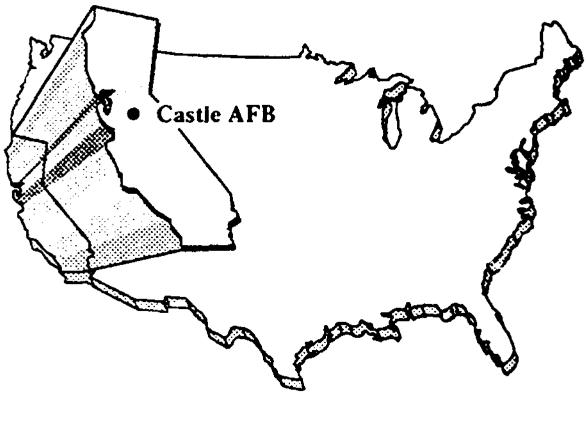

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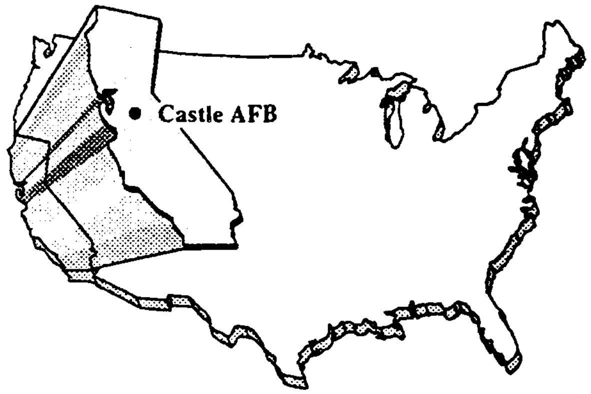

CHAPTER 8
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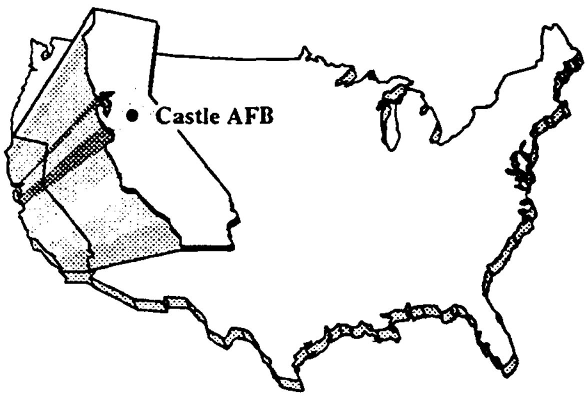
8.0 INDEX



CHAPTER 9
PUBLIC COMMENTS AND RESPONSES

9.0 PUBLIC COMMENTS AND RESPONSES

INTRODUCTION

The Air Force has complied with the NEPA mandate of public participation in the environmental impact analysis process primarily in two ways:

- A public hearing was held in Merced, California, on February 2, 1994 at which the Air Force presented the findings of the DEIS for the disposal and reuse of Castle AFB and invited public comments.

- The subject DEIS was made available for public review and comment in January-March 1994.

Public comments received both verbally at the public meeting and in writing during the response period have been reviewed and are addressed by the Air Force in this section.

ORGANIZATION

This Public Comment and Response chapter is organized into several subsections, as follows:

- This Introduction, which describes the process, organization, and approach taken in addressing public comments

- A consolidated comment-response document

- An index of commentors

- A transcript of the public hearing

- Photocopies of all written comments received.

These sections are described below.

Comments received that are similar in nature or address similar concerns have been consolidated to focus on the issue of concern, and a response is provided that addresses all of the similar comments. Some comments simply state a fact or an opinion, for example, "the DEIS adequately assesses the impacts on [a resource area]." Such comments, although appreciated, do not require a specific response and are not called out herein. The comments and responses are grouped by area of concern, as follows:

1.0 Air Force Policy

2.0 Purpose of and Need for Action

3.0 Alternatives Including the Proposed Action

4.0 Land Transfer/Disposal

5.0 Local Community

6.0 Land Use/Aesthetics

7.0 Transportation

8.0 Airspace

9.0 Utilities

10.0 Hazardous Materials/Waste Management

11.0 Soils and Geology

12.0 Water Resources

13.0 Air Quality

14.0 Noise

15.0 Biological Resources

16.0 Cultural Resources

17.0 Local Airport Closures

18.0 Socioeconomic Impacts

19.0 Editorial Comments

Within each area, each consolidated comment-response is numbered sequentially. For example, under 9.0 Utilities, individual comments-responses are numbered 9.1, 9.2, etc. At the end of each numbered comment is a set of numbers that refer to the specific comment in the documents received that were combined into that consolidated comment. The numbers of the individual comments are indicated in parentheses, e.g. (6-8, 11-13, 15-6, 15-22). Comment 6-8, for example, refers to document 6, comment number 8. A reader who wishes to read the specific comment(s) received may turn to the photocopies of the documents included in this section. Below each comment number is the number of the consolidated comment in which the specific comment has been encompassed, e.g., 7.5. Thus, the reader may reference back and forth between the consolidated comments-responses and the specific comment documents as they were received.

It should be further noted that some comments in the documents received are not included in the consolidated comment-response document. These comments fall into two categories:

- Comments to which no response is required, as explained above
- Comments regarding the SIAS.

Effects upon the physical or natural environment that may result from projected changes in certain socioeconomic factors that are associated with or caused by the disposal or reuse of the base are addressed within this EIS. Other socioeconomic issues, such as the region's employment base, school budgets, municipal/state tax revenues, municipal land planning, medical care for military retirees and dependents, local governments and services, real estate, and economic effects on utility systems and specific businesses are beyond the scope of NEPA and CEQ requirements. Analysis of impacts associated with these issues is provided in the SIAS; that public document will also support the base reuse decision-making process. All comments pertaining solely to issues addressed in the SIAS were considered beyond the scope of this EIS, and so are not addressed in this comment and response chapter. Comments concerning socioeconomic issues addressed in the SIAS only are indicated with an S on the comment documents. Comments related to socioeconomic factors that are addressed in this EIS (e.g., population, employment) have been included in this comment-response section.

Finally, it should be emphasized that not only have responses to EIS comments been addressed in this comment-response section, as explained, but the text of the EIS itself has also been revised, as appropriate, to reflect the concerns expressed in the public comments.

The list of commentors includes the name of the commentor, the identifying document number that has been assigned to it, and the page number in this section on which the photocopy of the document is presented.

1.0 POLICY

1.1 Comment: The community reuse authority needs to have more time to analyze the document. (1-3)

Response: The 45-day review period was chosen because it is the standard promulgated by the CEQ guidelines. Additional review time would delay the release of the FEIS and the ROD.

1.2 Comment: The community reuse authority participated in the scoping process and through the community's reuse plan and that was it. The EIS would have benefitted from community involvement throughout the process. (1-4)

Response: The community reuse authority participated in the scoping process and provided their preliminary community reuse plan in November 1992 and received a briefing of the Description of the Proposed Action and Alternatives (DOPAA) in February 1993. This is the standard level of community participation for all closing Air Force bases. Additionally, revisions to the Proposed Action and an additional alternative, the Commercial Aviation Alternative, were added to the DOPAA during the summer of 1993 at the request of the community reuse authority.

1.3 Comment: The DEIS does not fully comply with NEPA with regard to cumulative impacts. The DEIS contains minimal discussion of cumulative impacts and does not provide information to support many of its conclusions. In addition, direct and indirect growth is not addressed. (2-3)

Response: At the time the Draft EIS was released, there were no reasonably foreseeable actions which were identified as contributing to a potential cumulative impact on the disposal and reuse of Castle AFB. In April 1994, the U.S. Navy requested allocations of conformity offsets from Castle AFB to NAS Lemoore to support their BRAC-directed realignment. In response to this request, analysis of this request was incorporated into Sections 2.6, Other Future Actions in the Region, and 4.4.3, Air Quality, of this EIS.

With the exception of the realignment of NAS Lemoore, no other reasonably foreseeable actions were identified that could be considered as contributing to a potential cumulative impact on the disposal and reuse of Castle AFB.

1.4 Comment: The DEIS does not adequately demonstrate how existing resources would accommodate project-related growth in the ROI. (2-4)

Response: The analysis conducted as part of the DEIS did not reveal any existing resources that would not be able to accommodate the Proposed Action or any of its alternatives.

1.5 Comment: The U.S. EPA believes that the FEIS should contain additional information to ensure that the public and decision makers arrive at well informed decisions on the future reuse of Castle AFB. (2-7)

Response: The Air Force believes that sufficient information has been provided in the DEIS to ensure that the decision maker arrives at well informed decisions regarding the disposal of Castle AFB. Where applicable, however, additional information has been incorporated into the FEIS. For example, information from the U.S. Army Corps of Engineers wetlands delineation for Castle AFB, released in March 1994, has been incorporated into the FEIS.

1.6 Comment: The summary should be modified to include the role of the NEPA process in the disposition of Castle AFB. (2-8)

Response: The role of the NEPA process in the disposition of Castle AFB is fully described in Section 1.4, Environmental Impact Analysis Process.

1.7 Comment: The DEIS lacks an analysis of cumulative effects that could result from the Proposed Action or its alternatives. (2-9)

Response: See response to comment 1.3.

1.8 Comment: The DEIS lacks an analysis of the growth-inducing effects that could result from the Proposed Action or its alternatives. (2-10)

Response: See response to comment 1.3.

1.9 Comment: The summary of the FEIS should be revised to reflect the severity of impact as described in Chapter 4 of the DEIS. (2-12)

Response: Where necessary, the summary has been revised to more fully explain the impacts described in Chapter 4, Environmental Consequences, of the FEIS.

1.10 Comment: The DEIS is lacking a cumulative effects analysis. (3-1)

Response: See response to comment 1.3.

1.11 Comment: The FEIS should discuss in some detail the mechanisms devised to identify and commit budgetary and organizational resources to both the monitoring and adaptive management of these resources. (3-2)

Response: The commitment of budgetary and organizational resources to monitoring and adaptive management of resources will be the responsibility of the reuse proponent and, as such, is outside the scope of the EIS.

1.12 Comment: The DEIS does not provide sufficient direction on the overall issue of mitigation. The mitigation measures do not provide the detail necessary to assist local agencies in understanding the extent of infrastructure improvements and costs, which must be incurred from base closure and reuse. For example, the DEIS indicates that traffic impacts could be mitigated but only general mitigation measures are given. If the analysis cannot be refined sufficiently to determine specific mitigation due to the generalized assumptions of a plan-level environment document, then the mitigation measure should describe that a future project-specific analysis needs to be conducted either before any new uses are proposed, or when the ADT reaches a certain level. (9-7)

Response: The conceptual nature of the EIS only allows the presentation of mitigation measures in general terms. Where applicable, the need for project-specific analysis to be conducted by the reuse proponent has been added to the mitigation sections of the FEIS.

1.13 Comment: The DEIS does not discuss the cumulative effects of other proposed projects in the vicinity, like a new University of California campus or the city of Merced's northerly development. A list of other pending projects should be included in the FEIS, with an analysis of how their growth-inducing and cumulative impacts may intensify reuse impacts. (9-8)

Response: There has been no formal decision to select Merced as the site of the new University of California campus. Sites currently being considered are Merced, Modesto, and Fresno. Northerly development of the city of Merced is governed by the zoning and land use policies of the city and/or county of Merced. It is impossible to determine where growth associated with the reuse of Castle AFB will take place. It is assumed that growth associated with reuse does not have growth-inducing impacts if the projected level of growth does not substantially exceed the anticipated level of growth under the No-Action Alternative. The greatest difference between growth rates of the No-Action Alternative and any reuse alternative is 0.1 percent per year, which is not considered a significant difference.

1.14 Comment: The community reuse authority strongly believes that a better EIS document would result from continuous community participation in drafting the document as opposed to the current exclusionary policy. (9-22)

Response: See response to comment 1.2.

2.0 PURPOSE OF AND NEED FOR ACTION

No comments received on this section.

3.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

No comments received on this section.

4.0 LAND TRANSFER/DISPOSAL

4.1 Comment: The community reuse authority hopes that deed restrictions that limit reuse options in perpetuity could be minimized. (1-5, 9-20)

Response: The DEIS does not make reference to deed restrictions that limit reuse options in perpetuity. Text in Section 4.3 states that land use restrictions and delays in property disposal and reuse may occur as a result of ongoing site investigation and remediation. Upon completion of all or acceptable levels of remediation efforts, land use restrictions would be removed. In accordance with CERCLA, all base property requiring remediation will be remediated, thus supporting future development of the property.

4.2 Comment: The EIS was developed without the benefit of the community's airport layout plan, which is under development. We hope that there will be great flexibility in using the EIS when the actual disposal package is constructed. A major challenge for the community reuse authority will be to get enough revenue-generating property inside the airport boundary so the airport does not become a financial burden to the community. (1-6)

Response: The airport boundary presented in the Proposed Action was developed from data provided in the CJPA Preliminary Reuse Plan. Airport boundaries of other alternatives were developed based on conceptual land uses associated with each alternative. Since the boundaries of the civilian airport affect the fiscal strength of the airport, rather than the environmental impacts, the analysis presented in the EIS should adequately cover potential reuses even if the airport boundary changes.

4.3 Comment: The U.S. EPA recommends that any post-closure changes in land use be made after specific reuse options have been decided through NEPA and the reuse selection process. (2-6)

Response: As required by NEPA, the decision maker will select specific disposal and reuse options prior to the implementation of any post-closure changes in land use.

4.4 Comment: Language should be added to the mitigation measures on pages 4-52 and 4-53, and elsewhere for proposed alternatives, to commit the Air Force to use appropriate measures, including deed restrictions on conveyances and lease restrictions, to ensure that potential land use conflicts or hazards do not foreseeable arise. (2-45)

Response: Text in Section 4.3 states that land use restrictions and delays in property disposal and reuse may occur as a result of ongoing site investigation and remediation. Future property development would be conducted after the property is either certified as remediated or remediation efforts approved by the appropriate regulatory agencies are under way (e.g., groundwater pum[illegible]nd-treat). These remediation efforts will be coordinated with and approved by the appropriate regulatory agencies at the time metr[illegible]dologies have been identified.

4.5 Comment: The DEIS refers to "lease/deed restrictions that might limit reuse options at certain locations within the base" due to environmental remediation. The community reuse authority strongly believes that restrictions limiting a site in perpetuity should be held to an absolute minimum. Remediation sufficient to support future development should occur on virtually all base property. (1-5, 9-20)

Response: See response to comment 4.1.

5.0 LOCAL COMMUNITY

5.1 Comment: We question the size of the ROI shown on page 3-2. Most of the economic impact will be on Merced County, yet all of Stanislaus County and parts of seven other counties are included in the ROI. (1-1)

Response: The figure shown on page 3-2 is a Regional Map. The ROI is described in Section 3.2.1 as the counties of Merced and

Stanislaus. For a discussion of the ROI, please see response to comment 5.3.

5.2 Comment: Please clarify that the Proposed Action and its alternatives would result in annual increases in regional employment that is a function of overall employment projections for the Castle AFB ROI. (2-48)

Response: The text of the Summary has been revised to reflect this comment.

5.3 Comment: The DEIS reflects population/employment figures based on an ROI that includes Stanislaus County. Therefore, Air Force projections under each proposed reuse alternative do not reflect the real impacts to be experienced in Merced County when the base closes. (9-1)

Response: Stanislaus County is included in the ROI so that the closure effects of Castle AFB can be captured, described, and analyzed. These effects, in addition to the direct on-base job losses, include the reduction of base spending on goods and services, which topped $26 million in 1991. This is the ROI that has been used by the Base Closure and Realignment Commission, and is smaller than the ROI identified in the Castle AFB Economic Resource Impact Statement.

In the SIAS developed to provide detailed socioeconomic information in support of the EIS, Merced County is treated separately and equally in all tables so that readers can locate data and make their own conclusions or interpretations of the closure effects. The majority of effects will occur in Merced County (refer to SIAS page 3-15, second paragraph).

6.0 LAND USE/AESTHETICS

6.1 Comment: The Federal Correctional Complex that is depicted on page 2-50 is not the same as the original request. The original request was for 530 acres and did not include the WSA. The new request is for 660 acres. (1-7, 9-19)

Response: In order to analyze a range of impacts, two potential prisons were analyzed. The Proposed Action contains a 335-acre parcel of land proposed for light industrial development, which could be developed as a prison site. A land use overlay was also developed which proposes a federal correctional complex to be developed on 660 acres of base property. The final decision regarding the development of the prison site will be made in the

ROD, to be released no less than 30 days after the publication in the Federal Register of the availability of the FEIS for the disposal and reuse of Castle AFB.

6.2 Comment: The FEIS should expand on the discussion on agricultural land and consider agricultural use of portions of the base as a reuse alternative. (2-39)

Response: The DEIS includes up to 142 acres of agricultural development as part of the reuse of Castle AFB. Extensive agricultural development was not considered to be the highest and best ultimate use of the base. In addition, agricultural development is constrained by the extensive development of the base and the presence of vernal pools and federally threatened species in the largest single parcel of undeveloped property.

6.3 Comment: The DEIS states that some off-base land uses in the Castle AFB vicinity may not conform with existing zoning ordinances. The FEIS should identify where such zoning inconsistencies occur, how they were able to occur, whether they would continue to occur after implementation of the Proposed Action, and which land uses are incompatible. (2-40)

Response: Off-base land uses are inconsistent with existing zoning ordinances and do not influence potential environmental impacts associated with reuse of the base property. These issues are considered to be outside the scope of the EIS.

6.4 Comment: The DEIS states that Merced County would have to amend its zoning ordinance to conform to FAA Regulations in order to establish zoning policies for the airfield and adjacent areas. The DEIS does not contain any analysis of FAA Regulation Part 150 and how it would affect present and future land use in the area, nor does the DEIS verify whether the Proposed Action and its alternatives are compatible with the guidelines. Furthermore, it is not clear why the city of Merced seems to be exempt from having to amend zoning ordinances, while the county is not. (2-42)

Response: Zoning surrounding Castle AFB was influenced by the Castle AFB AICUZ. If Merced County retains its current zoning, then development of land uses incompatible with the civilian airport would be prevented. If Merced County modifies its current zoning surrounding the base by removing some current restrictions associated with AICUZ recommendations and replacing them with the land use recommendations in FAA Regulation Part 150, then minimal land use conflicts would arise. As shown on Figures 3.2-1 and 3.2-4, the city of Merced is not adjacent to the base and therefore may not require an analysis of its land use. Conducting an FAA Regulation Part 150 noise analysis is outside the scope of the EIS, and is premature during these early planning stages. An FAA Regulation Part 150 study, if required, would be the responsibility of the reuse proponent. Sections 4.2.2.1 through 4.2.2.4 and 4.4.4 of the FEIS have been modified to reflect the above response.

6.5 Comment: The DEIS reports that most of the proposed land uses for Castle AFB would be compatible with one another. The FEIS should include a more thorough analysis of potential land use conflicts and resolutions. (2-43)

Response: Text regarding the resolution of incompatible land uses has been included in Sections 4.2.2.1 through 4.2.2.5 of the FEIS.

6.6 Comment: What will become of the over 40 residential units currently located in the AICUZ APZs? (2-44)

Response: The closure of the base in September 1995 would result in the elimination of the APZs. If the decision is made to redevelop the base as a civilian airport, then the appropriate land use analysis would be conducted as part of the Airport Master Plan which would identify both on- and off-base land use restrictions.

6.7 Comment: Several of the reuse alternatives do not appear to consider the current environmental condition of property and future remediation options. For example, the statement is made in Section 4.3.1.3 that residential development over IRP landfills is generally not appropriate, yet in the Commercial Aviation Alternative residential development is proposed in an area where a landfill is currently located. Please discuss how reuse alternatives and remedial actions will be reconciled. (7-1)

Response: Future property development would be conducted after the property is either certified as remediated or remediation efforts are under way (e.g., groundwater pump-and-treat) which have been approved by the appropriate regulatory agencies.

6.8 Comment: Since the DEIS was prepared in advance of the ALP, the FEIS should provide disposal decision makers with considerable latitude to adjust the ultimate Castle Civil Airport boundaries. (9-18)

Response: See response to comment 4.2.

6.9 Comment: The WSA was not included in the Federal Bureau of Prisons' original request for base property. The FEIS should include an option with the WSA outside the boundaries of the proposed federal correctional complex. (9-19, 1-7)

Response: The boundaries of the parcel analyzed for the Federal Bureau of Prisons federal correctional complex overlay was coordinated with that agency and the U.S. Air Force during the development of the DEIS.

7.0 TRANSPORTATION

7.1 Comment: Limiting or phasing development as a mitigation measure to minimize traffic congestion should be discussed in the FEIS. (2-51)

Response: The development proposed for each alternative is phased over the 20-year analysis period based on the most realistic information available on project build out. The phasing discussed in the EIS is based on information provided by the reuse agencies and the results of real estate and market studies conducted as part of the preparation of the Description of Proposed Action and Alternatives. As specific development proposals are planned in more detail by the property recipient, additional phasing is possible through the appropriate city and county planning offices by restricting building permits or delaying development proposals until required transportation improvements are implemented to meet regional and local objectives or levels of service.

7.2 Comment: The traffic information presented in the DEIS does not necessarily reflect real conditions when comparing the LOS results presented in the DEIS with the LOS results of the 1993 CMP self-certification. Table 3.2-4 of the DEIS indicates the LOS of Santa Fe Drive between Beachwood Drive and Highway 59 to be A; the CMP certification indicates the LOS for the same segment to be B for both 1989 and 1993. (9-10)

Response: The 1993 CMP self certification was not available at the time the analysis was prepared for the DEIS. LOS A for the segment of Santa Fe Drive between Beachwood Drive and Highway 59 shown in Table 3.2-4 was based on Merced County Traffic Model and LOS criteria from the MCAG 1992 CMP. The analysis resulted in a volume/capacity ratio of 0.59, which is at the high end of the MCAG criteria. We have reviewed the results of the CMP 1993 self certification as a result of this comment. The CMP self certification is based on criteria from the 1985 HCM, Chapter 7, Table 7-13. Table 7-13 was deleted by a revision to the HCM dated May 1992. Based on the revised HCM and the preclosure volume, the LOS would be A.

7.3 Comment: The trip generation that was determined for the various scenarios seems excessive. The traffic study prepared for the DEIS should be contained in an appendix. What methodology was used to prevent double-counting of trips? How many of the generated trips remain internal to the site? What trip rates were used for the various uses? (9-11)

Response: Double counting of traffic for determining the LOS expected on the street system adjacent to the project was minimized by using the peak hour of the adjacent street and determining the hourly volume of traffic for each generator at that peak hour. Project land uses were reviewed and adjustments made to account for on-site stops related to services typically found in a home-to-work trip. Residential driveway counts within the project boundary are also subtracted from the adjacent street peak-hour trip generation counts. This methodology provides the most accurate estimate of traffic on the local streets of concern during the time in which the street will most likely be impacted.

7.4 Comment: The trip distribution percentages need to be shown for validation. (9-12)

Response: Trips generated by the Proposed Action and alternatives were distributed to the local road system using the zip codes of the residences of the preclosure employees. The resulting peak-hour volumes were added to the expected peak-hour volumes on the affected street and shown in Tables 4.2-2 through 4.2-7 to show meaningful impact data on each road segment. The trip distribution percentages can be determined by subtracting the project alternative traffic from the No-Action Alternative traffic for any given road segment and dividing by the total peak-hour traffic for the alternative. For example, the trip distribution percentage on SH 99 southeast of Buhach Road is calculated as 8,700 vehicles (Table 4.2-2) minus 8,250 vehicles (Table 4.2-7) divided by 4,150 vehicles (the total peak hour volume for the Proposed Action, Section 4.2.3.1). The trip distribution percentage on this section of SH 99 is 10.8 percent.

7.5 Comment: The proposed ten access points should not have been used in the analysis. The number of access points into the site from Santa Fe Drive may be excessive. (9-13)

Response: Access points are based on providing adequate access to the base, to disperse the traffic, and to integrate the base road network to the community's road network. The ten access points were selected for analysis purposes and were presented in the

Description of Proposed Action and Alternatives briefed to the CJPA in February 1993.

7.6 Comment: Intersection LOS analysis needs to be done for critical intersections on the local roads and project interior roads. (9-14)

Response: The Proposed Action and alternatives analyzed in the DEIS do not provide project information in sufficient detail for operational analysis of intersections. Detailed information needed to estimate delay such as signalization and vehicle type distributions is not available. Information on intersection geometrics and turning movements is used to provide broad results that allow a projection of whether or not the intersection is likely to be oversaturated. This information is combined with LOS results for the roadway segments to predict an expected LOS for the roadway. Inasmuch as delay estimates cannot be made in planning analysis, specific LOS at each intersection cannot be addressed in this document. As the detailed information becomes available for the projects selected by the decision maker, an operational analysis should be required by regional and local planning agencies to determine specific intersection LOS expected by project implementation and recommend appropriate intersection improvements or mitigations required to maintain acceptable LOS.

7.7 Comment: It is impossible to validate the data summarized in Tables 4.2-1, 4.2-2, and J-7a, b, c without the support of the traffic study. (9-15)

Response: The narrative description and tabular data presented in the transportation analysis are based on analysis and supporting data. The transportation methodology used for the EIS is presented in Appendix E. The average daily traffic numbers presented in Table 4.2-1 resulted from the application of the Institute of Transportation Engineers Trip Generation methods and data to the projected land uses for the Proposed Action and alternatives. The peak-hour traffic volumes shown in Table 4.2-2 reflect the results of the trip distribution of the Proposed Action and alternatives using expected destinations based on zip codes of preclosure employees. Similar zip code distributions were used for the ADTs shown in Appendix J (Tables J-7a, b, c, which provide the basis of the surface traffic noise analysis).

7.8 Comment: The mitigation measures that have been identified for transportation impacts are too generic and are exactly the same for each alternative. (9-16)

Response: The analysis cannot be refined sufficiently to determine specific mitigation due to the generalized assumptions of this plan-level environmental document. Mitigation measures described in the FEIS would be adjusted by future project-specific analysis which would need to be conducted either before any new uses are proposed or when the ADT reaches a certain level. The text of the FEIS has been modified to reflect the above response.

8.0 AIRSPACE

No comments received on this section.

9.0 UTILITIES

9.1 Comment: The FEIS should include a brief discussion on the opportunities available for pollution preventing, energy conservation, and waste minimization. (2-32)

Response: While the U.S. Air Force may encourage proactive steps toward pollution prevention, energy conservation, and waste minimization, it is up to the reusers of the base to formulate strategies as to how they will comply with various state laws (e.g., Assembly Bill 939) mandating such procedures.

9.2 Comment: Is the "county landfill" mentioned on page 3-40 the same as the Highway 59 landfill? (2-33)

Response: Yes, this change has been made in the FEIS.

9.3 Comment: A current update on the general status of the Highway 59 Landfill's remaining capacity and expansion proposal should be clearly presented in the FEIS. (2-34)

Response: Additional information regarding solid waste disposal in Merced County has been included in Section 3.2.4.3 of the FEIS.

9.4 Comment: The conclusion that no solid waste impacts would occur is based on the assumption that the Highway 59 Landfill will receive the proposed expansion in a timely manner. Additionally, even if the Highway 59 Landfill were to operate until 2015, solid waste impacts would only be temporarily avoided until the build out year of the project. The FEIS should include an updated and complete analysis of solid waste impacts. (2-35)

Response: An updated analysis of solid waste impacts has been included in Sections 4.2.4.1 through 4.2.4.5 of the FEIS.

9.5 Comment: The U.S. EPA considers the reuse of Castle AFB to be an opportunity to establish mandatory waste management recycling programs within the development process. Further discussion on the mechanisms for promoting recycling and reuse, and the extent to which the Air Force will encourage or mandate such practices, should be included in the FEIS. (2-36)

Response: See response to comment 9.1

9.6 Comment: The FEIS should contain a range of potential energy conservation measures in the utilities mitigation measures. (2-52)

Response: See response to comment 9.1

9.7 Comment: The DEIS does not identify how off-site wells with filters will be maintained. (8-2)

Response: The maintenance of the filters would be conducted by the OL established at the base. The use of the filters would only be required until the TCE plume is remediated.

9.8 Comment: The FEIS should specifically state how the wastewater facility will be closed. Closure should include removal of equipment and sludge. (8-3)

Response: The facility will be closed when the trunk line is completed to the ARWTP. The facility will then be evaluated and closed out under the IRP since the sewer lines (domestic and industrial) are currently considered IRP sites.

10.0 HAZARDOUS MATERIALS/WASTE MANAGEMENT

10.1 Comment: The Air Force should consider placing deed or lease restrictions on the EOD and grenade ranges due to the possibility that unexploded ordnance may be unearthed in the future. School, playground, and residential uses may not be appropriate for those sites. In addition, the earthen berms surrounding the small arms range are apparently riddled with lead bullets that must be removed on a regular basis during the future reuse period of the site. (2-37)

Response: Section 3.3.10 of the DEIS states that the EOD, grenade, and small arms ranges will be cleared prior to disposal. Text in Section 4.3 of the DEIS states that land use restrictions and delays in property disposal and reuse may occur as a result of ongoing site investigation and remediation. Upon completion of remediation efforts, land use restrictions would be removed.

Chapter 2, Alternatives Including the Proposed Action, of the DEIS reveals that the areas containing these ranges are planned for industrial or public facilities/recreation land uses. No plans have been received or developed to place educational (school or playground) or residential land uses in these areas.

In regard to the future reuse of the small arms range, regulating future reusers is not within the scope of this EIS. Future reusers of the small arms range would be required to operate within existing federal and state laws governing the operation of small arms ranges.

10.2 Comment: In the discussion of the EOD Range in Section 4.3.1.10, it states that the range will be cleared of unexploded ordnance. It is our understanding that this range will be "safed" to a depth of 3 feet. Please include this information in the FEIS. (7-2)

Response: The text has been revised to reflect that the EOD Range will be cleared to a depth of 3 feet prior to closure of the base.

10.3 Comment: Figures 3.3-1a and 4.3-4b do not show the full extent of the off-base groundwater contamination. (8-4)

Response: As noted on the figures, the information is current as of October 19, 1993.

10.4 Comment: Page 3-55 states "In October 1984, trace amounts of TCE were detected in off-base wells in the vicinity of Wallace and Santa Fe Roads." This office detected off-base TCE levels exceeding 5.0 ppb in 1980. The Air Force did not supply bottled water to affected parties until 1986. The DEIS also states "Residents affected by the TCE contamination now obtain water from either the base or City of Atwater water systems." Residents also have filters installed by the DOD for TCE removal. (8-5)

Response: The FEIS text has been revised to reflect this information.

10.5 Comment: Page 3-77, of the DEIS states, "Blood lead levels in excess of 30 micrograms per deciliter are of concern in adults and can cause various ailments according to the Centers for Disease Control." Blood levels above 10 micrograms per deciliter in children require follow-up according to Centers for Disease Control. (8-6)

Response: Section 3.3.11 of the FEIS has been revised to reflect this information.

10.6 Comment: The FEIS should discuss how the DOD will comply with state UST regulations. The County of Merced Department of Public Health strongly recommends closure and removal of all USTs not meeting post-1984 standards. (8-8)

Response: As stated in Section 3.3.4 of the DEIS, it is Air Force policy to remove all USTs which are not in compliance with the 1984 standards and have not been identified for reuse following disposal of the base.

10.7 Comment: The FEIS should include the cost of capping and monitoring on-base landfills, a comprehensive complete listing of all landfill sites, the proposed reuse of these landfill sites, and the impact of these sites on adjacent parcels. The County of Merced Department of Public Health recommends the removal of landfill materials and the backfilling of the sites with clean, native soil. (8-9)

Response: The cost of capping and monitoring the landfills is outside the of scope of this EIS. A comprehensive listing of all landfill sites was included in the DEIS as part of the comprehensive table of IRP sites (see Table 3.3-3). While general land uses have been proposed, specific remediation and reuse of these landfill sites are unknown, therefore it is not possible to assess the impacts to adjacent properties at this time. The identification of potential remediation efforts is premature at this time and is outside the scope of this document.

11.0 SOILS AND GEOLOGY

11.1 Comment: The FEIS should also evaluate loss of prime agricultural land and identify the loss and treat it as a significant environmental impact of the project. (6-1)

Response: The Proposed Action and its alternatives have been assessed according to the Farmland Protection Policy Act and its Department of Agriculture implementing regulations, including Form AD-1006 (Appendix I). The response letter from the U.S. Department of Agriculture, Soil Conservation Service, dated May 20, 1994, is contained in Appendix K.

Most of the prime farmland soils and statewide-important soils are located within areas of the base that are heavily disturbed (i.e., adjacent to and under the base runway and taxiways); very little of these soils are in undisturbed areas. The text has been modified to clarify this situation.

11.2 Comment: What are the types and relative yields of crops grown in the affected areas, or in the areas of similar soils under good agricultural management. (6-2)

Response: Other than the 6-acre agricultural plot, which currently grows fodder type grasses, no other crops are grown at Castle AFB. Most of the soils mapped on base are best suited for use as pasture land; some are suitable for dry farming.

11.3 Comment: What is the agricultural potential of the area's soils, as defined by the Department of Conservation's Import Farmland Series map designations. (6-3)

Response: According to the maps provided by the Department of Conservation, all land at Castle AFB is either "D" type (urban and built-up land) or "X" type (other land), except for the 6-acre parcel located in the southeast corner of the base, which is designated as an "L" type land (farmland of local importance). Figure 3.2-5 shows the current on-base land use. The agricultural potential of the lands on base have been evaluated under U.S. Department of Agriculture's Farmland Conversion Impact Rating (Form AD-1006). Farmland adjacent to the base is mapped by the Department of Conservation as "P" (Prime Farmland), "U" (Unique Farmland), and "L." A wide variety of crops are grown in the vicinity of Castle AFB, including citrus, fruit, almonds, grapes, and truck and fodder crops.

11.4 Comment: What type, amount, and location of farmland conversion would result from implementation of the project. (6-4)

Response: The 6 acres of farmland within the base boundary would remain as agricultural land under any of the proposed reuses of Castle AFB. No conversion of farmland to nonfarm uses would take place under any of the alternatives. Various alternatives propose to convert nonagricultural land to agricultural uses.

11.5 Comment: What would be the impact on current and future agricultural operations. (6-5)

Response: There would be no impact on current or future agricultural operations within the base boundary since none of the alternatives propose conversion of the 6 acres of existing agricultural land to nonagricultural uses.

11.6 Comment: What are the cumulative and growth-inducing impact of the projects on farmland in the project area. (6-6)

Response: See response to comment 1.3.

12.0 WATER RESOURCES

12.1 Comment: Water resources need to be more fully evaluated, including maintenance of on-base water systems that provide resources to off-base areas and the filtering systems on private properties. (1-2)

Response: Maintenance of the water system would be conducted by the OL established for Castle AFB, by the CJPA, and by the appropriate recipients of the property. Specific maintenance activity is considered to be outside the scope of the EIS.

12.2 Comment: The FEIS should include a revised Summary of Impacts table that reflects potential impact to regional water supply. (2-28)

Response: The text in Table S-2 of the FEIS has been changed to read "--- percent increase in ROI water demand would contribute to an incremental increase in aquifer depletion."

12.3 Comment: In 1990, wastewater generation is approximately 43 percent of water consumption, but the following year water consumption decreases while wastewater generation remains the same. The FEIS should discuss the reasons for this variation. (2-29)

Response: Variation in annual water consumption without variation in wastewater generation is fairly common. Over 40 percent of the water consumed at Castle AFB is due to landscape irrigation; therefore, water consumption is dependent upon the amount of annual rainfall received. Annual wastewater generation is relatively constant, however, because it is dependent upon the number of people at Castle AFB; variation in wastewater generation between wet and dry years is minimal. Additional variation in water consumption can be attributed to water conservation efforts by base personnel.

12.4 Comment: Water consumption figures presented on Table 4.2-8 are inconsistent with the text on pages 4-96 through 4-99. (2-30)

Response: The figures presented on Table 4.2-8 are for total projected water demand in the ROI for each alternative. They include the direct, project-related demands and the indirect, secondary-related demands within the ROI. The figures presented in Sections 4.4.2.1 through 4.4.2.7 are direct, on-base project-related demands for each alternative.

12.5 Comment: Because the regional aquifer is in a state of overdraft, any increase in water use would be a significant, even if only an incremental, impact. An analysis of the action's potential cumulative significance should be addressed in the FEIS. (2-31)

Response: According to the Merced Irrigation District, the regional aquifer is not in a state of overdraft. Text has been added to the FEIS stating that the Proposed Action or any of its alternatives may contribute to an incremental increase in the depletion of the aquifer.

12.6 Comment: Page 3-89 of the DEIS states, "General natural water quality in the three upper water bearing units is good, with only moderate hardness and little or no chemical differences to distinguish the waters taken from different units." This statement is incorrect, the upper three water bearing stratas contain high levels of 1,2 dibromo 3-chloropropane and nitrates exceeding the state maximum contaminant levels. (8-7)

Response: The referenced statement refers to the general water quality of the area. Elevated levels of nitrates in the shallow aquifer throughout the county have been reported and the potability of this aquifer is questionable. The hydraulic continuity of this aquifer has not been established; however the vertical permeability of the lower aquifer is rather high, possibly indicating significant leakage from the shallow aquifers to the deeper, confined aquifer.

12.7 Comment: The issue of storm drainage for the project site has not been addressed in adequate detail. Where does the storm drainage go? What types of treatment are necessary for storm water discharge? Are there any storm drainage retention ponds on site? Will the Merced Irrigation District continue to accept storm drainage discharge for reuse facilities? (9-17)

Response: Storm drainage is controlled through a series of aboveground storm drainage ditches and canals. Most of the storm water from the base is discharged into Canal Creek below the Livingston Canal diversion. The outlet from the base is located in the southwest corner of the base. For more detail refer to Section 3.4.2.3, Surface Water Drainage, and Figure 3.4-3, Surface Hydrology.

Storm water discharge from the base is not treated. The storm water discharge is permitted as part of the basewide NPDES permit for the discharge of storm water and treated wastewater effluent.

There are no storm drainage detention or retention ponds on the base. Retention ponds are located on base; however, they are associated with the on-base treatment of wastewater. There is a weir across the drainage ditch located at the extreme southern portion of the installation that retains a small amount of treated wastewater and/or storm water.

The Merced Irrigation District is currently reevaluating its policies regarding storm water discharge into tne canals and drains within the district. The Merced Irrigation District accepts discharge that is in compliance with state and federal regulations governing such discharge. It is likely that reuse-related non-point pollution loads would be required to be managed to acceptable levels under the post-closure NPDES permits and would therefore continue to be accepted by the Merced Irrigation District. The Merced Irrigation District would review any such permits prior to accepting any post-closure storm water discharge.

13.0 AIR QUALITY

13.1 Comment: The EPA does not believe the DEIS has demonstrated full compliance with the conformity requirements of Section 176 (c) of the CAA. (2-5)

Response: The text of Section 4.4.3 of the DEIS has been revised to reflect the final conformity rules recently enacted. The EIS adequately analyzed the potential air quality impacts associated with disposal and reuse of the property, including the potential impacts to the ambient air quality and to the region's progress to reach and maintain federal standards.

13.2 Comment: The Castle Aviation Center Alternative would exceed preclosure emission levels for PM_{10}, SO_2, and CO. This should be identified in Table S-2 of the FEIS. (2-16)

Response: The summary in Table S-2 for the Castle Aviation Center Alternative has been revised in response to the comment.

13.3 Comment: The summary discussion of air quality impacts should distinguish between state and federal non-attainment status, as presented on page 3-93. (2-17)

Response: The text of the FEIS Summary has been revised in response to the comment.

13.4 Comment: Reconcile conflicting statements regarding whether or not the Castle Aviation Center Alternative would have reuse-related emissions above preclosure levels. (2-18)

Response: The text of the FEIS Summary has been revised in response to the comment.

13.5 Comment: The current attainment status for criteria pollutants in the region should be verified. (2-19)

Response: The FEIS has been revised to reflect the following information: The Merced County portion of the SJVAB is designated by the U.S. EPA as being in attainment of the NAAQS for CO and NO_2, in nonattainment for ozone and PM_{10}, and unclassified for SO_2 (40 CFR 81.305, July 1, 1993)."

13.6 Comment: Address the issue of how the proposed reuse of Castle AFB and the antecedent review and decision-making process would be affected by the timing and outcome of the pending SIP update. (2-20)

Response: It is assumed in the EIS that reuse proponents will be subject to all requirements of an adopted SIP. If SIP updates are approved, the reuse proponents become subject to those updates at the time of adoption. The timing and outcome of the pending SIP updates should not affect the review and decision-making process related to the proposed reuse alternatives, since all alternatives would be subject to the SIP measures. Some alternatives may be affected to a greater degree than others by specific new control measures implemented in the applicable SIP. However, until more source-specific reuse plans are made available as reuse begins, it would not be possible to quantify this difference.

13.7 Comment: Is the term "conformity determines" on page 4-104 intended to read "conformity determination"? (2-21)

Response: Text of the FEIS has been revised.

13.8 Comment: The air quality analysis should include a general discussion of the following PM_{10} issues: general quantity and locations of construction sites, distance of the referenced receptors to those construction sites, a distinction of which receptors are "sensitive," if any, and the distance at which "short-term concentrations" of PM_{10} would "fall off." (2-22)

Response: The term "receptors" as used in Section 4.4.3 is not meant to refer to specific locational receptors. Rather, the term is meant to imply the general area around a construction site. As an example of how concentrations would fall off with distance from a construction site, a 100- by 100-foot area was modeled as a ground-level area source with the SCREEN2 model. An emission rate of 3.44 pounds of PM_{10} per acre per hour was used in the modeling (assumes a basic emission rate of 55 pounds per acre per working day, 50 percent reduction due to application of water, and an 8-hour working day). The PM_{10} emission rate represents the total combined effects of numerous ground-disturbing activities that would occur within the 2,777 acres of property, averaged over a 5-year period. The results of the modeling indicate that PM_{10} 1-hour concentrations would be approximately 1,100 $\mu g/m^3$ at a distance of 50 meters from the construction area, but would fall off to concentrations of approximately 800 $\mu g/m^3$, 500 $\mu g/m^3$, 170 $\mu g/m^3$, and 60 $\mu g/m^3$ at distances of 100, 200, 500, and 1,000 meters, respectively. Maximum 24-hour impacts associated with the construction would be one-third of the 1-hour concentrations if the wind direction remains constant along one vector for the entire 8-hour construction day. However, this is not likely, and actual 24-hour concentrations would be less than one-third of the 1-hour results.

13.9 Comment: The impact analysis concludes that the Proposed Action would not delay progress toward attainment of the ozone NAAQS, based on the 1991 AQAP. Additional consideration should be given to the region's post-1991 emission inventories and rate of progress compared to the 1991 AQAP milestones. (2-23)

Response: The FEIS has been revised to clarify that the Proposed Action, without any consideration of emission offset allocations, would not delay progress toward attainment of the federal ozone standards. The potential cumulative impacts associated with competing demands for offsets and emission reductions are further described in the Cumulative Impact sections of Section 4.4.3.

Ozone precursors emitted from reuse-related sources and all other precursor sources in the SJVAB will be subject to control measures adopted as part of the AQAP process. Should the AQAP fall behind schedule, ozone precursors emitted from all precursor sources in the basin could be considered to be contributing to a cumulative significant impact. However, the AQAP process provides for mandatory updating every 3 years. Therefore, any slip in the rule development schedule, failure of a measure to realize expected reductions, or unexpected growth leading to excess emissions would have to be accounted for at the time of update. The revised AQAP would therefore have to contain new measures and/or accelerated rule development schedules to compensate for deficiencies in the progress in meeting emission reduction requirements put the process back on schedule.

13.10 Comment: Project air quality modeling is based on the assumption that background ambient air conditions would remain constant over the next 10 years. This may not be a reliable assumption given AQAP compliance efforts, regional growth projections, and changes in effects from nonstationary sources. These issues should be addressed in the FEIS. (2-24)

Response: It is possible that regional growth projections may exceed expectations and the resulting emissions from non-PSD sources, such as automobiles, could increase and contribute to increased background concentrations. However, since background concentrations plus project impacts of SO_2 and CO emissions are well below the limiting ambient air quality standards, increased SO_2 or CO background concentrations would not result in a violation of the standards unless the background concentrations were to increase by approximately an order of magnitude, an unlikely amount of increase. Maximum background concentrations of PM_{10} are currently almost equal to, or are in exceedance of, ambient standards. However, it is not likely that PM_{10} background concentrations will increase in the future because of the effect of emission reductions caused by control measures that will be contained in the PM_{10} attainment demonstration plan. The PM_{10} attainment demonstration plan will be designed to reduce emissions of PM_{10} to ensure that adequate progress toward attainment is being maintained.

13.11 Comment: The Air Quality Modeling tables should include an impact column adding background and reuse-related impact conditions which could then be compared to the limiting standard column. (2-25)

Response: The Air Quality Modeling tables include footnotes to clarify each table's contents and how to compare the results against the limiting standards.

13.12 Comment: The obligations of future site users to conform to local and regional air quality goals should be discussed in greater detail in the FEIS. (2-26)

Response: The FEIS has been revised to clarify and detail the conformity requirements for future federal actions associated with base reuse. Sections 3.4.3 and 4.4.3 provide additional regulatory requirements and control measures to which the reuse emission source will be subject in order to be consistent with the AQAP goals. For example, Section 4.4.3 clearly indicates that new or modified major sources emitting more than 50 tons per year in a serious ozone nonattainment area would have to comply with the New Source Review provisions of the CAA to achieve the lowest reasonable emission rate, and procurement of offsets representing emission reductions from other sources at a ratio of at least 1.2 to 1.0. However, it should be pointed out that the reuse-related PM_{10} emissions are not entirely new or modified major source emissions.

13.13 Comment: No rationale is given as to how the Castle Aviation Center Alternative would not hinder progress toward PM_{10} standard attainment. (2-27)

Response: Section 4.4.3.2 of the FEIS has been revised to clarify that reuse proponents may be required to mitigate and/or offset PM_{10} emissions to meet SIP requirements and not interfere with attainment plans and schedules. The FEIS includes potential mitigations to reduce PM_{10} emissions.

13.14 Comment: The FEIS should indicate how air pollution credits will be allocated. (8-10)

Response: The FEIS has been revised to discuss potential emission offsets that could result from the emission reductions from base closure. Allocation of emission offsets are also discussed under Cumulative Impacts and Mitigations for each alternative in Section 4.4.3.

13.15 Comment: The San Joaquin Valley metropolitan area of Fresno, Modesto, and Stockton is designated as being nonattainment/moderate for CO by the U.S. EPA. (12-1)

Response: The nonattainment status has been incorporated into Section 3.4.3.1 of the FEIS.

13.16 Comment: The Air Force should discuss the proposed mitigation in more detail and provide a framework from which the beneficiaries of Castle AFB can implement the programs mentioned to lessen air quality impacts. (12-2)

Response: Recommended mitigation measures were incorporated into Section 4.4.3 of the FEIS.

14.0 NOISE

14.1 Comment: Mitigation for noise impacts shall include conducting an FAA Regulation 150; however, FAA Regulation Part 150 and its relevant components are not adequately described in the document. (2-38)

Response: The text in Section 4.4.4 of the FEIS has been revised in response to the comment.

14.2 Comment: The DEIS text states that California state guidelines establish 60 dB as the maximum normally acceptable exterior noise level compatible with residential land uses; however, the table on page 3-109 indicates that 65 dB is compatible with multi-family residential land uses. (2-41)

Response: As Table 3.4-9 states, 60 dB is the maximum normally acceptable exterior noise level compatible with low-density single-family, duplex, and mobile home land use categories. The maximum exterior noise level normally acceptable for multi-family residential land uses is 65 dB.

14.3 Comment: Mitigation measures should be presented in such a way as to fully commit the Air Force or future land users to reducing or eliminating substantial and significant noise impacts. (2-46)

Response: Section 4.4.4 of the FEIS has been revised in response to the comment. Section 4.4.4 points out that, should aircraft noise become an issue in the future, a noise compatibility program could be carried out by the airport operator in conjunction with local and state officials and would follow the guidelines contained in FAA Regulation Part 150 and FAA Advisory Circular 150/5020.1, Noise Control and Compatibility Planning for Airports.

14.4 Comment: The FEIS should include a discussion of noise mitigation strategies as identified in the Air Force's AICUZ program. (2-47)

Response: The AICUZ program only applies to military airfields. In September 1995, Castle AFB will close, and military airfield operations would be terminated, removing all land use constraints associated with the AICUZ program. After the closure of Castle AFB, FAA criteria established for civilian airports would apply if the base is redeveloped as a civilian airport.

15.0 BIOLOGICAL RESOURCES

15.1 Comment: The DEIS does not contain adequate mitigation measures to protect wetlands and vernal pools as required by EO 11990. (2-1)

Response: Due to the conceptual nature of this EIS and the general reuses proposed, specific impacts are difficult to predict. However, text has been added to Section 4.4.5 of the FEIS to clarify that, prior to any development which would impact vernal pools, formal consultation between the land recipient and the USFWS due to the presence of federally threatened species within the vernal pools. In addition, coordination would be required between the land recipient and the U.S. Army Corps of Engineers, as mandated by Section 404 of the Clean Water Act, due to possible impacts to wetlands.

15.2 Comment: The FEIS should include alternatives that maximize and preserve natural resources. (2-2)

Response: At Castle AFB, the largest undeveloped area, which also contains the majority of the vernal pools, is the land northeast of the runway. Two alternatives, Aviation with Mixed Use and Non-Aviation, a[illegible]nd use of public facilities/recreation to this area thereb[illegible]ing the majority of the area as an open space or park. A third alternative, Castle Aviation Center, proposes to preserve the undeveloped area in the northeast parcel as public facilities/recreation and reuse the industrial facilities located within it. A fourth alternative, the Proposed Action, proposes to place one-half of the northeast parcel in public facilities/recreation land use. All specific development proposed for this area would require a project-specific consultation with the USFWS due to the presence of federally threatened species within it. In addition, coordination would be required between the land recipient and the U.S. Army Corps of Engineers, as mandated by Section 404 of the Clean Water Act, due to possible impacts to wetlands.

15.3 Comment: According to the summary, the Proposed Action would directly affect vernal pools but would not directly affect wetlands. This implies that vernal pools and wetlands are separate and distinct habitat. Vernal pools, in fact, are a type of wetland. The FEIS should clearly and consistently indicate whether and to what extent vernal pools would be affected by the Proposed Action. (2-11)

Response: The text throughout the FEIS has been revised to refer to vernal pools as wetlands and to include impacts to wetlands, including vernal pools, associated with all alternatives.

15.4 Comment: Mitigation measures for impacts to biological resources should include use of deed restrictions and transfer conditions designed to avoid impacts to unique and sensitive resources, especially vernal pools. (2-13)

Response: Restriction and conditions to avoid impacts to such resources would not be necessary since any potential reuser would be subject to federal regulations regardless of the disposal mechanism. If a federal transfer occurs, the recipient agency would continue to be required to conform to the same federal regulations now applied to the U.S. Air Force. If the property were conveyed to a non-federal party, Sections 9 and 10 of the Endangered Species

Act and Section 404 of the Clean Water Act would serve to restrict impacts to sensitive species and wetlands, respectively.

15.5 Comment: Mitigation measures for impacts to biological resources should include recommended methods to reduce or avoid aircraft collisions with birds. (2-14)

Response: According to Castle AFB Bird Aircraft Strike Hazard (BASH) Plan information, Castle AFB aircraft experience an average of approximately 100 bird air strikes annually; this is considered a minimal impact to biological resources. Approximately two-thirds of these bird air strikes occur during low-level military training missions, and approximately one-third occur during operations in Castle AFB airspace. Depending upon the reuse alternative selected, a BASH plan may be developed by the civilian airport agency. The goal of this BASH plan would be to minimize bird air strikes in order to protect human health and property, not biological resources. The development of a BASH plan is outside the scope of this EIS.

15.6 Comment: The FEIS should include any specific undertakings that could be accomplished to enhance biodiversity at Castle AFB. (2-15)

Response: Specific undertakings to enhance biodiversity at Castle AFB would be the responsibility of property recipients and is outside the scope of this EIS.

15.7 Comment: The FEIS should expand the section pertaining to listed and potentially listed species. Mitigation and monitoring plans should be created for each listed and potentially listed species. (3-3)

Response: Section 3.4.5.3 of the FEIS has been expanded to include additional information regarding sensitive species found within Castle AFB. General mitigations are included within the DEIS. Specific mitigation and monitoring plans will be the responsibility of property recipients who will be required to consult with the USFWS, as mandated by the Endangered Species Act, as part of the development of specific reuse concepts.

15.8 Comment: The biological resources analysis should be expanded to include a survey for state-listed species because reuse options will be dependent upon compliance with both federal and state endangered species acts. (9-9)

Response: In addition to the federal Endangered Species Act, property recipients would have to comply with the California Endangered Species Act. In compliance with the California Endangered Species Act, the CDFG may require additional surveys for species not listed by the USFWS. These surveys would be the responsibility of the property recipients.

16.0 CULTURAL RESOURCES

16.1 Comment: The Department of Public Health has no records relating to the "historic trash dump designated as CAFB-1H." The location, volume, and type of waste landfilled should be provided. (8-1)

Response: The historic trash dump is not an abandoned landfill, but a cultural resource. It is the site of an early twentieth century occupation. Remains consist of a light surface scatter of domestic debris (e.g., tin cans, glass fragments, etc.). Investigation has determined that the site is not eligible for listing on the NRHP.

17.0 LOCAL AIRPORT CLOSURES

No comments received on this section.

18.0 SOCIOECONOMIC IMPACTS

18.1 Comment: The population ROI combines Stanislaus County's 350,000+ population with Merced's 190,000. Then, the loss of base population is compared as a percentage of total population. (9-2)

Response: See response to comment 5.3.

18.2 Comment: Ninety-nine percent of those departing the area due to base closure live in Merced County, yet that loss is diluted in terms of impacts on housing and public services required. (9-3)

Response: The detailed data from the SIAS were used to develop the conclusions made in the DEIS. The data in Table 3.3.4 of the SIAS indicate that 97.9 percent of the ROI out-migrants will leave Merced County (18,675 ÷ 19,074 = 0.9791). Corresponding housing effects in Table 3.3.4 indicate a 97.2 percent share for Merced County (3,523 ÷ 3,623 = 0.9724). The small difference between these two percentages is attributed to common analytical limitations, including different data set sizes, application of factors, and rounding. The effects are not diluted. Public service effects to jurisdictions not mentioned in Sections 3.5 and 4.5 of the SIAS were determined to be minimal and, therefore, were not included for further analysis in the SIAS.

18.3 Comment: Employment figures in the general discussion reflect growth in the entire ROI. Then in specific proposal options, it discusses potential jobs to be created on base by each option. The overall impression is that the region will sustain job growth but the reuse of Castle AFB under any option will not produce enough jobs to replace the departing miliary and civilian workforce. (9-4)

Response: Although it is not apparent within the data, the job growth in Merced County is expected to outpace Stanislaus County based on 1992 MCAG and Stanislaus Area Association of Governments projections.

18.4 Comment: The fiscal position and projections for Merced County were based on 1989-1991 data that showed for 1991 a Fund Balance figure of $23,237,240. This figure was misinterpreted because it included restricted funds which are not usable as general use dollars, e.g., $8.5 million in food stamp reserves. The correct figure for 1991 is $534,099 and for 1993 the fund reflects a deficit of $114,802. The report estimates a negative $12,000,000 fiscal impact on county revenues and assumes this negative will have to be absorbed in service reductions and reduction in fund balances. (9-5)

Response: The report does not assume that the negative fiscal impact "will have to be absorbed in service reductions and reduction in fund balances." As the first sentence of Page 3-39 of the SIAS indicates, increases in revenues and/or decreases in services may be required to maintain a balanced fiscal position.

18.5 Comment: The report does not address historical or current unemployment (15 to 20 percent) in Merced County or the percent of existing population already receiving some form of public assistance (38 percent). Further, the report does not factor in potential closure impacts on our federally ignored refugee population. (9-6)

Response: Unemployment rates play an integral role in the analysis as they are factored into the development of the out- and in-migrating employee assumptions. Given the dynamic and unpredictable nature of unemployment rates, they are not discussed in the text. Characteristics such as refugee populations and higher-than-average numbers of area residents dependent upon federal assistance are considered exogenous to base closure and thus are not applicable to a study of this nature.

19.0 EDITORIAL COMMENTS

19.1 Comment: On page S-2, "Caste Aviation Center Alternative" should be changed to read "Cast[illegible]tion Center Alternative." (2-49)

Response: Change made in FEIS.

19.2 Comment: A definition of the term "baseline" should be provided in the FEIS. (2-50)

Response: Term added to Appendix A, Glossary of Terms and Acronyms/Abbreviations, of the FEIS.

19.3 Comment: The references in the FEIS should include specific dates for personal communications. (2-53)

Response: Specific dates for personal communications have been added to the FEIS.

19.4 Comment: A definition of the term "vernal pool" should be included in the FEIS. (2-54)

Response: The definition has been added to Appendix A.

19.5 Comment: The DEIS incorrectly identifies 29 January 1990 as the date of base closure announcement for Castle AFB. The correct date is 12 April 1991. (9-21)

Response: Change made in FEIS.

INDEX OF COMMENTORS

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UNITED STATES AIR FORCE PUBLIC HEARING

on the

DRAFT ENVIRONMENTAL IMPACT STATEMENT

for

DISPOSAL AND REUSE

of

CASTLE AIR FORCE BASE

Held on February 2, 1994
at Merced County Fairgrounds
Merced, California

REPORTER'S TRANSCRIPT

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PRESENT:

Presiding Officer: COLONEL JAMES REUPEL
United States Air Force

Panel Members:

MS. LYNE HUNTER
Air Force Base Conversion Agency

LT. COL. TERRY ARMSTRONG
Programs Management Team Leader
Environmental Planning Division
Air Force Center for Environmental Excellence

RICHARD DYKAS
Federal Aviation Agency

MR. KEVIN MCMAHON
Federal Bureau of Prisons

Speakers: ANN KLINGER
Merced County Supervisor

RICHARD D. MARTIN
Executive Director
Community Reuse Organization
Castle Joint Powers Authority

DAVE ADAMS
Atwater City Manager

Reported by Vina Jacobson
CSR No. 2570

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I N D E X

FEBRUARY 2, 1994

SPEAKERS

DOCUMENTS SUBMITTED

Letter dated October 16, 1992, to Richard Martin, Castle Joint Powers Authority, from Patricia Sledge, Chief, Site Selection and Environmental Review Branch, with copy attached of letter dated 10/10/92 to John Carr, AFBCA/BCR, Closure Implementation Office

Letter dated December 21, 1993, to Thomas F. Adamcyk, Regional Economist, Environmental Resources Branch, U.S. Air Force Center for Environmental Excellence.

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UNITED STATES AIR FORCE PUBLIC MEETING

DISPOSAL AND REUSE - CASTLE AIR FORCE BASE

WEDNESDAY, FEBRUARY 2, 1994 7:00 P.M.

COLONEL REUPEL: Good evening, Ladies and Gentlemen. Thank you for coming out tonight. This is the public hearing on the draft environmental statement for the disposal and reuse of Castle Air Force Base.

I'm Colonel Jim Reupel, and I'll be the presiding officer for tonight's meeting.

This hearing is being conducted in accordance with the provisions of the National Environmental Policy Act and the implementing regulations. The act requires Federal agencies to analyze the potential environmental impacts of certain Federal actions and their alternatives and to consider the findings of those analyses in deciding how to proceed.

On November 6th of 1991, a scoping meeting was held here in Merced to receive your suggestions concerning what you felt should be covered in the Environmental Impact Statement, or EIS. Throughout tonight you'll hear us refer to the EIS, or perhaps the DEIS, which is the Draft Environmental Impact

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Statement. That's the terminology that is used.

Since that meeting back in 1991, the Air Force has examined the environmental concerns that you raised, as well as other concerns that have been raised since, and has prepared the Draft Environmental Impact Statement that is the subject of tonight's hearing.

The purpose of tonight's hearing is to receive your comments, suggestions, and criticisms of the Draft EIS. Now, those of you who have not had an opportunity to read the Draft Environmental Impact Statement -- I know it's been mailed out to many people. It's in public libraries in the area. But if you haven't had an opportunity to read it, you may want to read the summary of the Draft Environmental Impact Statement that is contained in the small pamphlet.

It summarizes the major findings of the EIS. Now, these findings will also be addressed by panel members during their presentations.

Before introducing the members of the panel, I want to explain my role in this hearing tonight. I'm a military judge, and I primarily serve as a trial judge in military criminal trials, so I'm not here as an expert on this Draft Environmental Impact

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Statement, nor have I had any connection with its development, and I'm not here to act as a legal advisor to the Air Force representatives who will address these proposals.

My purpose is to insure that we have a fair, orderly hearing and that all who wish to speak have a fair chance to speak.

Now, at this time, I will introduce the members of the public hearing panel. On my immediate right is Ms. Lyne Hunter representing the Air Force Base Conversion Agency. She will describe the Air Force base disposal process.

To her right is Lieutenant Colonel Terry Armstrong. Colonel Armstrong is the Programs Management Team Leader for the Environmental Planning Division at the Air Force Center for Environmental Excellence which is located at Brooks Air Force Base, Texas.

He will brief you on the environmental impact analysis process and summarize the results that are reported in the Draft EIS.

To Colonel Armstrong's right is Mr. Dick Dykas representing the Federal Aviation Agency or FAA. The FAA is a cooperating agency in the preparation of the Draft Environmental Impact Statement.

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And on the far right is Mr. Kevin McMahon representing the Office of Site Selection and Environmental Review of the Federal Bureau of Prisons. The Federal Bureau of Prisons is also a cooperating agency in the preparation of the Draft Environmental Impact Statement.

Mr. Dykas and Mr. McMahon are here to provide clarification, as required, on any issues pertaining to their respective agencies.

This meeting is intended to provide a continuing public forum for two-way communication about the Draft Environmental Impact Statement, with a view towards improving the overall decision-making process.

You will notice I said two-way communication. In the first part of the hearing process this evening, our most knowledgeable people will brief you on details of the actions and the anticipated environmental impacts.

The second part of the process will give you an opportunity to provide information and to make statements for the record. This input insures that the decision-makers may benefit from your knowledge of the local area and any adverse environmental effects that you believe may result from the proposed action

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or alternatives.

Also, if you have any questions regarding the environmental impact analysis process or the environmental impacts that are presented in the Draft Environmental Impact Statement, please ask the panel members and they will try to clarify those questions to the extent that they can.

If your question is a technical one that requires further research and can't reasonably be answered tonight, then the Air Force will make sure your question is answered, either in the final EIS itself, or in a separate comment and response section.

Tonight's hearing is designed to give you an opportunity to comment on the adequacy of the Air Force's Environmental Impact Statement.

Keep in mind that the Environmental Impact Statement is simply intended to insure that future decision-makers will be fully apprised of the environmental impacts associated with the various reuse alternatives before they decide on a course of action. As a result of that, because we're emphasizing the environmental impacts, comments tonight on issues unrelated to the Environmental Impact Statement are really beyond the scope of this hearing and ought not be addressed.

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Now, when you came in tonight, you were given an attendance card and asked to indicate on it if you wished to speak tonight, there's a little block to check. After Ms. Funter and Colonel Armstrong have finished their presentations, we will have a brief recess and we will collect all the cards.

Following the recess, I will recognize elected public officials who wish to speak, to be followed, then, in a random order, by the public at large. I'll shuffle the cards, however many cards we have, and take people in a random order.

So, if you came in tonight and you didn't indicate you want to speak, and you subsequently decide after hearing part of the presentation tonight that you would like to speak, go back at the recess, just get another card, put your name on it and indicate you do want to speak and we will make sure you get an opportunity to do that. Just turn it in during that recess.

On the other hand, if you don't want to stand up at the microphone this evening to make a statement, you have until March 2nd of this year to submit a statement for the Air Force's consideration prior to the Air Force publishing the final Environmental Impact Statement.

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Now, the Air Force will continue to accept comments after March 2nd, but cannot guarantee that late comments will be included in the final Environmental Impact Statement. Now, again, there are sheets in the back if you wish to use them to put any comments on if you would like to have those considered.

The address where comments need to be sent is listed at the bottom of this form, and that's also listed at the bottom of this little pamphlet. You're certainly not required to use this sheet. You can use comments in really any kind of written form you would want to send in, but this is provided for your use if you wish to use it.

Your comments, whether they're spoken tonight, or whether they're submitted in writing tonight, or whether they're submitted later to the Air Force by March 2nd, will all have the same impact and receive the same consideration.

I would urge you not to be shy about making a statement. I want to make sure that everybody who wishes to speak will have a fair chance to be heard. We do have a Court Reporter who is here tonight taking down word for word everything that is said during the hearing.

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The transcript will be produced and the entire transcript of the hearing will become a part of the final Environmental Impact Statement for consideration. I would point out that the Court Reporter can only make a complete record if she can hear everything that we're saying and everything that you're saying, so with that in mind, when we get into the presentation by you, I would ask that you do several things:

I will recognize each speaker, ask you to come up to the microphone, address your remarks to me. If you have a written statement that you want to read, that's fine, go ahead and read that.

I would ask you to speak slowly enough that everybody can understand what you are saying, because we tend to speed up when we're reading. If you don't have a written statement, that's fine, too. If you have just some questions you want to ask, that's fine, too.

I would ask you to come up, state your name, and just state what city you're from, and also state in what capacity you're speaking, if you're an elected public official, perhaps you're a member an organization, or just speaking in your own capacity as a private citizen.

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Each person will be recognized for five minutes, and that includes public officials as well as representatives of organizations and private citizens. I'm going to try to use the flag, and at four-and-a-half minutes I'll hold up the flag, and at five minutes I'll hold up the red flag and ask you to go ahead and finish your remarks so we can get to the other speakers. If you've got more comments than can be made in five minutes, I would just ask you to prioritize your comments.

The last thing is, I have noted several signs and some of the walls not to smoke in the building. I would ask you not to do that.

I would note that there are facilities just as I look back toward the back doors on the left for the ladies and for the men back here. If you haven't found those, they're there during the break.

The biggest thing that I would just emphasize for you is that you may have information about environmental impacts that are unknown to the Air Force.

We're most interested in having and analyzing all potential environmental impacts of the proposed actions and alternatives. You have experience that comes from living in this area, so the second part of

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the communication tonight, that that comes from you to us, is most important and we would like you to be a part of the proceedings.

At this time it's my pleasure to introduce Lyne Hunter, who will describe the Air Force disposal process.

MS. HUNTER: Thank you, Colonel Heupel.

My name is Lyne Hunter and I work for the Air Force Base Conversion Agency, an office that was created to manage the cleanup and disposal of the Air Force bases closed under the authority of the base closure and realignment laws.

In discussing the Air Force's proposed action of disposing of Castle Air Force Base, I'm going to cover four general topics.

First is disposal planning; second, the disposal objective used by the Air Force to guide its planning; third, disposal considerations we will use to arrive at a decision; and lastly, the Air Force decision, itself, that is, what actions the Air Force will take based on the findings in the Environmental Impact Statement and other considerations.

The Secretary of the Air Force has been delegated the authority under the 1988 Base Closure and Realignment Act, and the Defense Base Closure and

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Realignment Act of 1990, to act as a federal disposal agent to utilize or dispose of the Federal property which makes up the Air Force's closed bases. Usually this responsibility rests with the General Services Administration or the GSA.

Despite this change, the traditional statutes for disposal of Federal property are still in effect. The Air Force must adhere to those laws and GSA regulations that are in place at the time the passage of the closure acts occurred. The Air Force has also issued additional policy and procedures required to implement our delegated authority.

Another provision of the 1988 and 1990 acts requires us to consult with the State Governor and heads of local governments for the purpose of considering any plan for the use of such property by the local community concerned. We are meeting this consultation requirement by working with the Castle Joint Powers Authority.

Finally, our planning recognizes that the Secretary of the Air Force has full discretion in deciding how the Air Force will dispose of the property.

The Air Force recognizes the significant economic impact the closure will have on the local

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communities involved, and it is the Air Force's goal to complete closures as quickly and efficiently as possible. The Federal Government and the Air Force are committed to assisting the communities in their efforts to replace the departing military activities with viable public and private enterprises.

We're in the process of developing a comprehensive disposal plan which attempts to balance the needs of the community, the environmental consequences of our disposal decision, and the needs of the Air Force.

However, Congress has only provided startup capital for the implementation of the realignments and closures. Revenues from property sales will be used to offset the funding shortfall.

The disposal of property is accomplished in a three-part planning process. The first part is the Air Force's preparation of this Environmental Impact Statement which analyzes the various reasonable disposal and reuse alternatives for Castle Air Force Base.

The second is the community's plan for the future use of the property. And the third part is the Air Force's disposal plan which analyzes the various disposal options. The disposal plan is based on a

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thorough real estate analysis of the base and the region, results from the Environmental Impact Statement, interest shown by other federal agencies, and input from the Community Reuse Organization.

The Environmental Impact Statement process culminates with the issuance of a Record of Decision which documents the decisions for the disposal of the real property. That Record of Decision also specifies what environmental mitigations may be needed to protect human health and the environment as a result of the disposal and reuse decisions selected.

Under current law, other federal agencies and homeless assistance providers must be given priority consideration in the use and acquisition of excess base real property.

It is the Air Force's policy to inform the local community representatives of any expressed interest from federal agencies or homeless assistance providers. We encourage all parties to communicate openly with each other during the disposal planning process.

It should be noted that the federal agencies generally work with the communities to solicit support for their proposal to acquire property. Moreover, it has been the Air Force's experience that such uses for

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a portion of the property and facilities can be accommodated within the overall community's planned future uses for the entire base.

In general, the disposal options are the following: Federal agency transfers; public benefit conveyance to states and eligible nonprofit institutions; negotiated sales to public agencies; and competitive sales to the general public. The laws and regulations governing disposal do not establish a rigid priority for disposal, but provide the federal disposal agent with the ability to insure that all federal real property interests are disposed of in an efficient and effective manner.

The Secretary of the Air Force will decide on the actual disposal plan and the final disposal decisions will be documented in the Record of Decision.

The last subject to a address is that of environmental cleanup. The Air Force is committed to cleaning up all areas contaminated by past Air Force activities and protecting the health and safety of the public and any future owners of Castle Air Force Base. Cleanup activities are continuing and additional studies are underway which fully characterize contamination of all other sites to determine the best

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means to clean them up.

It should be understood that if contaminated areas are not ready for disposal at the time of closure, the Air Force will retain ownership until the property is cleaned up. Other areas may require easements and rights of entry to prevent longterm groundwater monitoring and treatment.

Despite the Air Force's commitments to cleaning up all past contaminated areas and protecting the public, we do not expect any cleanup activities to delay the reuse of uncontaminated property at Castle Air Force Base.

Thank you for the opportunity to meet with you this evening; and I'll turn the meeting now over again to Colonel Heupel.

COLONEL HEUPEL: Thank you Ms. Hunter.

At this time Colonel Armstrong will brief you on the environmental impact analysis process.

COLONEL ARMSTRONG: Thank you, Colonel Heupel.

Good evening. I'm Lieutenant Colonel Terry Armstrong from the Environmental Planning Division Air Force Center for Environmental Excellence located at Brooks Air Force Base, Texas. Our organization is conducting an environmental impact analysis process for the disposal and reuse of Castle Air Force Base

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and the other major installations mandated to close during Round II under the Base Closure And Realignment Act.

Tonight I'll present the schedule for this environmental impact analysis process and show how the public comment period fits into this schedule. I'll also discuss the scope of the study and the relationship between the Environmental Impact Statement and the socioeconomic study, and I'll present the results of our analysis by resource category.

This environmental effort was begun in October 1991, with a Notice of Intent to prepare an Environmental Impact Statement or EIS for base disposal and reuse. A scoping meeting was held here on November 6, 1991, to receive public input on the scope of issues to be addressed in the EIS, and to identify reuse alternatives and issues related to property disposal.

During the scoping process, our office received a preliminary reuse plan from the Castle Joint Powers Authority. The preliminary reuse plan proposes airfield, aviation support, industrial, medical, educational, commercial, residential, and public facilities and recreational development with the

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overall goal of establishing a regional airport at Castle Air Force Base.

Other alternatives analyzed in the EIS include three other airports with varying levels of flight operations and varying land uses, one non-aviation alternative, and a no-action alternative.

After scoping, we collected the necessary data and conduct the environmental analysis. The Draft EIS was filed with the Environmental Protection Agency on January 7, 1994.

In addition to tonight's hearing, written comments from the Draft EIS will continue to be accepted at this address until March 2, 1994. After the comment period is over, we will evaluate all comments, both written and verbal, and perform additional analysis or change the EIS where necessary. Again, as in the scoping process, equal consideration will be given to all comments, whether they are presented here tonight or mailed prior to March the 2nd.

Once the review process is complete, we will produce the final EIS, scheduled for completion in July of 1994 and mail it to all those on the original Draft EIS distribution list. If you are not on our mailing list, you can request a copy by writing to

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this address. The final EIS will include comments received during the public review period and our response to those comments.

If appropriate, we will group comments into categories and respond accordingly. The EIS will serve as input for the Record of Decision, which will document the decision by the Air Force. As you just heard from Ms. Hunter, other studies and consideration of issues besides those addressed in the EIS will enter into the final disposal decision. We expect to accomplish the Record of Decision in August of this year.

The Draft EIS was prepared to comply with the National Environmental Policy Act or NEPA, and The Council on Environmental Quality Regulations. Efforts were made to reduce needless bulk, write in plain language, focus only on those issues that are clearly related to the environment, and to integrate with other documents required as part of the decision-making process.

Reuse alternatives that were developed during the scoping process were individually analyzed to provide an environmental comparison.

This analysis focuses on impacts to the natural environment that may occur as a direct result of the

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base disposal and reuse, or indirectly through changes in the community.

Resources evaluated are soils and geology, water, both surface and groundwater, air quality, noise, biological resources, and cultural resources.

Indirect changes to the community that provide measures against which environmental impacts could be analyzed include changes to the local population, land use and aesthetics, transportation, and community utility services.

In addition, issues relating to current and future use, storage and management of hazardous materials, are discussed in the document. These issues include hazardous materials and wastes, the Air Force's installation restoration program, storage tanks, asbestos, pesticides, polychlorinated biphenyls, or PCB's, Radon, medical and biohazardous waste management, ordnance and lead.

If our analysis showed that a reuse alternative would result in adverse environmental impacts, potential mitigation measures were identified and included in the document.

As I mentioned earlier, this Draft EIS focuses on the impacts to the natural environment that would occur, either directly or indirectly, from the

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disposal and reuse of Castle Air Force Base. It also addresses socioeconomic factors where there is a relationship between base disposal and changes to socioeconomic conditions that would result in impacts to the natural environment.

Our organization is also producing a separate socioeconomic study. It will describe in detail how disposal and reuse of Castle Air Force Base will affect the economies of the surrounding areas.

Specifically, the socioeconomic study addresses the following factors for each of the reuse alternatives: Population, employment, housing, public finance, education, government, police and fire, medical, transportation, and utilities. Copies of this document will be provided to key federal, state, and local officials and will be available for review. The document will be forwarded to the decision-maker for input into this disposal process.

Now I'll present an overview of the proposed action and alternatives that have been analyzed. Afterwards, I'll present a synopsis of the results of our analysis.

Please note that the title of each alternative is presented only to give the reader a general idea of the redevelopment concepts. However, there may be

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numerous plans and activities that are not included in the title.

This slide briefly outlines specific reuse components of the proposed action. Under the proposed action, Castle Air Force Base would become a major civilian airport concentrating on major aircraft maintenance.

This figure shows the land uses for the proposed action. The proposed action features reuse of the airfield and aviation support areas for major aircraft maintenance, maintenance training, pilot and crew proficiency training, and general aviation. Non-aviation land uses include industrial, medical, educational, commercial, residential, public facilities and recreation, and agricultural land uses. No property would be retained by the Air Force.

The airfield is depicted in brown, aviation support in blue, industrial in gray, medical in purple, educational in pink, commercial in red, residential in yellow, public facilities and recreation in dark green, and agricultural in green.

This slide briefly outlines specific reuse components in the Castle Aviation Center Alternative. Under this reuse alternative, Castle Air Force Base would become an integrated general aviation support

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center.

This map shows land uses for the Castle Aviation Center Alternative. The focus of this alternative is an integrated general aviation support center which would provide general aircraft maintenance and repair, classic aircraft restoration, aircraft storage, sales, testing, and support for air shows.

Non-aviation land uses include industrial, medical, educational, commercial, residential, public facilities and recreation, and agricultural. No property would be retained by the Air Force.

The airfield is depicted in brown, aviation support in blue, industrial in gray, medical in purple, educational in pink, commercial in red, residential in yellow, public facilities and recreation in dark green, and agricultural in green.

This slide briefly outlines the specific reuse components of the Commercial Aviation Alternative. Under this reuse alternative, Castle Air Force Base would become a major commercial and general aviation airport.

The Commercial Aviation Alternative proposes a general aviation airport with commercial passenger service, airline pilot proficiency training, and air

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cargo operations. This alternative would have the largest number of flight operations of any of the aviation-related reuse scenarios. Non-aviation land uses include industrial, medical, commercial, residential, public facilities and recreation, and agricultural. No property would be retained by the Air Force.

The airfield is depicted in brown, aviation support in blue, industrial in gray, medical in purple, commercial in red, residential in yellow, public facilities and recreation in dark green, and agricultural in green.

This slide briefly outlines specific reuse components of the Aviation with Mixed Use Alternative. Under this reuse alternative, Castle Air Force Base would become a general aviation airport.

The Aviation with Mixed Use Alternative proposes airfield/aviation support land use similar to the proposed action, although the number of aircraft operations is substantially lower under this alternative.

Non-aviation land uses include industrial, medical, educational, commercial, residential, public facilities and recreation, and agricultural land uses. No property would be retained by the Air Force.

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The airfield is depicted in brown, aviation support in blue, industrial in gray, medical in purple, educational in pink, commercial in red, residential in yellow, public facilities and recreation in dark green, and agricultural in green.

This slide briefly outlines specific reuse components of the Non-Aviation Alternative. Under this reuse alternative, Castle Air Force Base would become a center for industrial research and development and a major educational campus. The non-aviation alternative proposes an extensive industrial research and development area on the existing airfield and aviation support acreage. Other land use includes a major educational campus, as well as commercial, residential, public facilities and recreation, and agricultural.

The industrial land use is depicted in gray, educational in pink, commercial in red, residential in yellow, public facilities and recreation in dark green, and agricultural in green.

As required by the National Environmental Policy Act, the no-action alternative was evaluated. Under the no-action alternative, the base conditions at the time of closure would remain unchanged in the long term. The base property would remain in a

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caretaker status with no civilian reuse. The caretaker activities would consist of resource protection, grounds maintenance, and existing utilities operations as necessary, and building care.

Along with the six alternatives I have just described, two other land use concepts have been proposed which are not part of any specific reuse alternative, but could be initiated on an individual basis. You may think of these concepts as overlays that could be used with any of the alternatives. These overlays would conflict with each other; therefore only one of them could be implemented at Castle Air Force Base.

The first figure shows the area that was analyzed as a potential location for a proposed Federal Bureau of Prisons correctional complex. This complex would occupy approximately 660 acres and would consist of two 388,000 square foot facilities which would house approximately 1,600 inmates each.

The second figure shows the area that was analyzed as a potential location for a proposed private recreational facility. This facility would occupy approximately 325 acres and would consist of a private trapshooting range.

I'll now discuss the results of our analysis

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which were presented in the Draft EIS. The proposed action and all alternatives were analyzed to the same level of detail. The baseline used was Castle Air Force Base at closure in 1995. The following slides show a comparison of impacts among the reuse alternatives, excluding the no-action alternative.

The EIS documents the analysis of impacts to various resources, broadly grouped into the categories of local community, hazardous materials and hazardous waste management, and the natural environment.

In several of these resource areas, the analysis indicated that there would be no or few impacts. These resources are highlighted on this slide, and I'll summarize the analysis results briefly.

Although there would be changes to land uses and the visual character of the base, these would be minor and could be controlled through the use of standard land use planning techniques to guide development.

Reuse-related hazardous materials and waste management activities would be the responsibility of the new users and would be subject to applicable regulations. Storage tanks not planned for reuse would be removed. Asbestos in structures would be

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removed if it poses a health threat, otherwise it will be managed in place in accordance with federal and state regulations and guidelines.

Pesticide usage under reuse would be subject to federal and state regulations. No Air Force-owned polychlorinated biphenyl containing equipment is currently in place at Castle Air Force Base. Testing for radon and naturally occurring radioactive gas found no instances where radon occurred above the EPA recommended exposure level of 4 picocuries per liter. Medical and biohazardous waste generated under various reuse alternatives would be managed in accordance with state regulations.

The explosive ordnance disposal range will be cleared of unexploded ordnance and disposed of related debris. Lead projectiles will be removed from the small arms firing range as part of the base closure process. Lead-based paint which may exist on facilities will be managed in accordance with applicable federal and state regulations.

Construction-related soil erosion would be minor because of the relatively flat terrain and because of standard engineering practices to minimize erosion during construction.

There would be no effect on prehistoric, native

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American, or paleontological resources.

The environmental analysis has indicated a potential for impacts on the remaining resources, and I'll speak about each of these resources in more detail.

This slide shows the potential or possible increase in employment in Merced and Stanislaus Counties due solely to reuse related activities projected through the year 2015. These increases include the direct jobs generated on the site and the secondary jobs created within the region. Positive economic benefits will result from the increased regional earnings, income, and spending compared to closure baseline conditions.

Depending on the alternative implemented, reuse activities at the base could result in an additional 4,101 to 10,554 direct and secondary jobs in the region by 2015. This increase translates to an increased growth in the local job market of about 0.1 percent annually between closure and 2015.

Population increases are expected under the reuse alternatives as workers and their families move into the region to fill some of the jobs created by reuse. Depending on the alternative selected, 4,105 to 9,979 people would enter the region by 2015. This

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represents an average annual increase in the region's projected population growth of 0.1 percent from closure to 2015.

The redevelopment of Castle Air Force Base will affect local and regional transportation networks. Reuse of the base will increase traffic on the local roads near the base, particularly State Highway 99, Santa Fe Drive, and Bellevue Road.

The figure shows the estimated number of average daily trips projected to be generated by each of the reuse alternatives. The number of daily trips to and from the site due to reuse would range from approximately 34,750 to 54,200 by 2015.

Most roadways will generally maintain acceptable levels of service under each reuse alternative. However, traffic volumes on segments of State Highway 99, Santa Fe Drive, and Bellevue Road could exceed these road's capabilities by 2008, 2001 and 2011 respectively.

With no reuse, road capabilities would be exceeded by the year 2010 on State Highway 99 and Santa Fe Drive, and by the year 2015 on Bellevue Road.

Redevelopment plans would incorporate appropriate transportation planning measures to accommodate the reuse activities and provide

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acceptable levels of service within the on-base road network and from the access points to the local network.

This figure shows the number of annual air operations projected through 2015 under the proposed action, the Castle Aviation Center alternative, the commercial aviation alternative, and the aviation with mixed use alternative.

For reference, approximately 43,594 flight operations, consisting primarily of B-52's and KC-135's occurred at Castle Air Force Base in 1992. At closure, military flight operations would cease. By 2015, the number of annual civilian flight operations would reach 115,319 under the proposed action; 11,110 under the Castle Aviation Center Alternative; 234,437 under the Commercial Aviation Alternative; and 40,800 under the Aviation with Mixed Use Alternative. No adverse impacts to the region's airspace are anticipated under any reuse alternative.

Utility demand under reuse would increase from closure conditions, but would be within the capability of the regional systems. Additionally, at closure, the wastewater treatment plant is assumed to have been connected to the Atwater Regional Wastewater Treatment Plant.

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By 2015, depending on the reuse alternative, water consumption would range from 1.18 to 2.34 million gallons per day; electrical consumption would range from 94.7 to 135.6 megawatt hours per day; and natural gas consumption would range from 4,100 to 7,100 therms per day. Wastewater production would range from 0.50 to 1.02 million gallons per day, and solid waste generation would range from 16.4 to 28.6 tons per day.

The Air Force is conducting investigations to identify, characterize, and remediate environmental contamination on Castle Air Force Base that has resulted from past actions. This comprehensive effort is called the Installation Restoration Program, or IRP.

The IRP includes procedures for identifying sites of contamination, determining appropriate remediation techniques, and remediating and monitoring as necessary to insure the site is clean. The proposed plan for cleanup of a site is distributed to relevant regulatory agencies for review and comment. A schedule is prepared for each part of the process at each site.

Congress has committed funding for the IRP and the program is in progress at Castle Air Force Base.

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The Air Force makes information about the IRP available to the public through published information available at the base Public Affairs Office, the Base Conversion Agency operating location, and through public meetings and notices.

In addition to the IRP, Castle Air Force Base is conducting ongoing investigations to identify the presence or absence of potential hazardous waste sites under the Resource Conservation and Recovery Act, or RCRA. If site contamination is found, remediation and close-out will be conducted under RCRA.

All clean-up activities will be accomplished in accordance with applicable federal and state laws and regulations. Remedial actions and monitoring will continue after base closure. Long term access to certain sites may be required to insure the success of the remediation efforts.

The Air Force will take all necessary actions for environmental cleanup of the base to protect public health and the environment. Deeds of property transfer will contain this assurance, and all property transfers will be conducted in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act, otherwise known as CERCLA.

In order to comply with federal disclosure laws

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regarding disposal of property, the Air Force has conduced an environmental baseline survey of Castle Air Force Base. This effort is designed to identify areas of the base that may contain constraints to the transfer of real property.

Types of constraints may include contaminated sites that require remediation and the presence of hazardous materials, such as asbestos, that must be properly managed to minimize health threats. This report is available for public review from the base public affairs office and the Base Conversion Agency operating location.

Air emissions would increase under all reuse alternatives when compared to the closure baseline. However, these emissions would not affect the region's progress toward attainment of the ozone or PM10 standard. Concentrations would not increase the frequency or the severity of violations of the ozone or PM10 standards. There would not be any adverse impacts to other criteria pollutants.

Aircraft-generated noise levels of community noise equivalent level 60 decibels or greater would impact up to 290 residents, depending upon the reuse alternative. Increased traffic generated noise in excess of Community Noise Equivalent Level 60 decibels

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would impact between 290 and 692 residents, dependin on the reuse alternative.

There are no known endangered or threatened species found at Castle Air Force Base. Surveys for the endangered San Joaquin Kit Fox are currently being conducted at Castle Air Force Base, though none have been sighted within the vicinity of the base. Two proposed endangered species of Fairy Shrimp are found on the base. With the exception of the no-action alternative, all alternatives have potential to cause direct or indirect impacts to the proposed endangered species habitat due to the development of currently vacant land.

Selective siting of improvements and the restriction of operations to non-sensitive sites will avoid direct impacts to proposed endangered species habitat. Consultation to develop and implement mitigation strategies is ongoing with the United States Fish & Wildlife Service.

An archaeological reconnaissance survey has been performed at Castle Air Force Base and additional archaeological work is scheduled. An initial survey of potential historic buildings is being conducted and evaluation for eligibility to the National Register of Historic Places is being conducted.

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Any of the reuse alternatives could have possible adverse effects to a number of historic properties which are potentially eligible for the National Register of Historic Places. These properties may be conveyed to non-federal owners with preservation covenants within the deeds. Consultation with the State Historic Preservation Officer to develop and implement mitigation strategies is ongoing.

In closing, I remind you that the study is in a draft stage. Our goal is to provide Air Force decision-makers with accurate information on the environmental consequences of this proposal. To do this, we're soliciting your comments on the Draft EIS. This information will support informed Air Force decision-making.

Now I'd like to turn the meeting back over to Colonel Heupel.

COLONEL HEUPEL: Thank you, Colonel Armstrong. We will take a brief recess, approximately ten minutes, give you a chance, if you've decided during the briefing that you would like to ask some questions or make a statement, having indicated that previously on one of the cards, give you an opportunity to do that, and then we will start in.

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Right now, I have just kind of been briefly advised that we have a very small number of cards, so if you would like to speak, then certainly that isn't going to be a problem with the number of people we have here. I don't think we're talking about a long period. So if you would like to ask some questions or make a brief comment, go ahead and indicate that, and we will start back up within ten minutes at the latest.

Thank you.

(Brief recess)

COLONEL HEUPEL: All right. Ladies and Gentlemen, at this point I have three people who have indicated they want to speak, and I have one elected official who wants to go in with everybody else, so I'm going to just start shuffling the cards and pick those three people out.

And then if there are some other questions people may have, if they haven't signed up, I'll give people an opportunity to ask those questions, and see if there is something that we can answer.

Okay. The names are on the front.

Well, I have got Merced County Supervisor Ann Klinger, District 2. She wanted to go in with everybody else, but she still came out on the draw.

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And frankly, let me say that I have done a number of these hearings and we often do not have elected public officials who want to speak, so we're very happy to have you speaking, Ma'am.

MS. KLINGER: Thank you. Most of the elected officials I know, Colonel, you can't get them away from a microphone. People are grateful when I finally sit down. But thank you for being in our county and community and here tonight making this very important presentation.

We're very proud of our relationship with "Cy Johnson, the Wing Commander. All of his Team Castle. We have a terrific working relationship with those individuals and we're very pleased about that. I know that may not be what you hear across all parts of the country, but we're reasonable people in this county and we know that working together, we can find solutions.

I'm here representing the County of Merced, although I serve on the Castle JPA. And Merced County is involved in a comprehensive review of the Environmental Impact Study, as well as the Socioeconomic Impact Aanalysis Study, the Castle Wetlands Delineation Study, and the Environmental Baseline Study.

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I understand we're here tonight to talk about the EIS. We will be submitting our written comments prior to March 3rd, but there are two or three things we wanted to present for your consideration this evening.

1 5.1 The first is that we strongly question the choice and geographical size of the Region of Influence that is reflected in the map on Page 32. There may be federal guidelines that require you to put in such a large, huge area, but 99 percent of those who are departing live in Merced County.

Most of the economic impact of Castle's closure will be on Merced County and the cities of Atwater, which will be most impacted, and the City of Merced, yet all of Stanislaus County is included in the Region of Influence as are parts of -- I think I found 5, 6, 7 other counties, just small corners of them, but all of Stanislaus County is, and that totally changes the reality for us.

For example, based upon the real impact area, if you were using the population that we believe is impacted, if we close McClelland four times in Sacramento, that would be the similar proportional impact of Castle's closure in the County of Merced. It would be proportionately equal to the loss of

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65,000 jobs in Sacramento County.

When you include a huge geographic area as has been done in this case, then, of course, we believe that that is flawed and distorts reality.

I know that the hearing tonight is not on the socioeconomic study. I understand that you don't even have to do one and that it's not technically a part of the EIS. Nevertheless, since the document exists, or at least the draft document exists, and is included as a part of this, there is some information that I would like to just put into the record.

S The available fund balance figures from Merced County that were sent in were misinterpreted. For example, they indicated that the available fund balance in Merced County in 1991 was in excess of $23 million. The real figure for that year was 1.5 million. And in 1993, I regret to inform you that that would really reflect a deficit of $114,000.

I won't complain about our governor taking our property tax to use, since I understand there's not a thing we can do about it, but that is something that has occurred here since you did the analysis in 1991. Merced County's economy is roughly twice the order of magnitude compared to the overall California economy.

Let me tell you what I mean by that. In

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California, one in six people are on Medi-Caid. In Merced County, one in three are. The unemployment rate in California was peaked at a little over ten percent this year. Merced County's peaked at 20.8 percent. So as a rule of thumb, you can usually say our unemployment stats are twice the federal and state averages on an annualized basis, and we do have some high peaks because of the nature of our agricultural economy.

S We really believe that those are very important points that need to be recognized. And my reason for bringing this up this evening is my perception is that Los Angeles County, with this earthquake and its dramatic impact of not only base closures, but also defense downsizing, is perceived to be dramatically impacted.

And, of course, we have a very important gentleman in the Bay Area who has just a little bit to do with the armed services, and the bases in the district he represents and nearby are perceived to be dramatically impacting that area.

We know that that's small potatoes compared to the impact of Castle Air Force Base closing in Merced County. We understand we're rural, small, and have one congressman to serve more than the one county,

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unlike the areas of LA and San Francisco. We feel we need to put on the record very clearly, so that our Senators and others who are making important policy decisions in Washington understand the impact here is even far greater, small though we may be in comparison to the nine million folk who live in LA County.

S One other point I want to just give you an idea of reality for us, is that 39 percent -- 38 percent today, it peaked at 39.4 percent in May -- of all the people who live in Merced County are on some form of public assistance, either Medi-cal, food stamps, or welfare. That's before the base closes and we lose 14 to 16,000 of our most affluent residents.

So, I want to be sure that we're on the record so that we can say we told you so in the future when we need to be able to say that. Environmentally, I know that there has been tremendous hard work go into this report, and hard work going into remediating problems at Castle Air Force Base that need to be cleaned up as a Superfund site certainly not, unlike many bases around the Country.

2 12.1 There is one issue in the EIS that we think needs to have a greater look, and that's water issues, a great concern to us. We came out of a long, damaging drought this last year, and we think there

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2 12.1 needs to be some addressing of the maintenance of the on-base water systems that provide resources to off-base areas. And we probably need to be addressing the actions planned or required regarding the base installed watering filtering systems on private citizen property.

But those are technicalities that the technicians, the environmental health folks who understand these things will be putting on paper for you and sending to you for your consideration.

I want to thank you again. I know I have taken up my five minutes, at least. I want to thank you again for being here. We greatly appreciate the professionalism of the Air Force, all of the base closure people we have worked with, and it was good to see all of you. Thank you.

MR. SEUPEL: Thank you. I'm giving a little bit of latitude on the time for everybody since I only have three speakers. I don't see any reason to stop them right now just at five minutes.

Now, two remaining cards left.

Mr. Lawrence Silva.

MR. SILVA: I have no comments to make.

COLONEL SEUPEL: Very well, thank you.

Then that leaves Mr. Richard Martin. Mr.

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Martin?

MR. MARTIN: Thank you very much, Colonel Seupel.

My name is Dick Martin. I serve as the Executive Director of the Community Reuse Organization, the Castle Joint Powers Authority, and I appreciate the opportunity to comment tonight.

Looking at this Environmental Impact Statement, we think the Air Force has done a good job with its contract team, and it's a useable document that has benefited us by structuring a range of creative alternatives that we hope we can mix and match things as we go with reuse options and have the proper environmental work to support the Secretarial decision that would enable us to do those. So we thank you for putting those in there and evaluating them as alternatives.

A few general observations for the record:

3 1.1 First of all, the EIS is a massive document that was developed by a large contract team with high expertise over a two-year-period. We got it two weeks ago. We need more time to analyze this document. I recognize that we can comment up until March 2nd, and we will, but I think the issue for you all and for communities who undergo this process in the future, the question

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becomes: Do you want to have a hearing, or do you want to have a meaningful hearing after the communities have had enough time to react and formulate some views on the documents. So, I would suggest that that time period be increased.

Also, it would have benefited us in our opinion if we had been collaborators and participants in the process as the document was developed. We obviously could have helped you to cleanup minor errors, such as the one on Page 1 where the base closure announcement was identified a year and four months off from when it actually occurred, and those kinds of minor things.

4 1.2 The community participation occurred during the scoping process and through the community's reuse plan and that was it. So I would urge you to open that process and let the people who are going to be impacted by whatever happens with the EIS to participate as the train rolls along. We think you will get a better document for the Air Force and for the community.

5 A few specific things that concern us:

4.1 Throughout the document the issue of deed restrictions that limit reuse options are talked about. That's a bad news telegram for us. We would hope that those cases, those sites where deed restrictions that limit

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4.1 reuse options in perpetuity could be absolute minimized so that 500 years from now we're not living with a problem that was caused in our generation, and the deed restriction still exists that precludes something from occurring that needs to occur because of a deed restriction that the Air Force imposed when it transferred the property upon disposal.

6 Also, the regrettable part of this process is the EIS had to go forward without benefit of the community's airport layout plan, which is under development, so a notional airport -- correction -- a notional Air Force-developed airport layout plan was used to do the aviation analysis. 4.2 We hope that because that occurred out of necessity, that there would be great flexibility in the use of this document when the actual disposal package is constructed.

A major challenge for us will be to get enough property, enough revenue-generating property inside the airport boundary to have a viable airport that will not require subsidy in the near term or long term.

So we absolutely have to get enough aviation and aviation support revenue-generating property inside those boundaries so that the airport does not become an albatross for the community and subject to

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the possibility of overall failure.

So I would urge that we use the document, but use it with flexibility. We know as our airport layout plan comes in from the aviation consultant funded by Mr. Dykas and his colleagues at the FAA here in a month or two with the economics that back it up, that adjustments are absolutely going to be required to get that right.

7 Next: The Federal Correctional Complex option that is in the document as depicted on Page 2 - 50 is new information for us. The original request from the 6.1 Bureau that we acted upon in the City of Atwater and the JPA supported, involved 530 acres of the lands east of the runway. It did not include the weapon storage area. The 660 acre option depicted in this document is new information. It's a surprise to us.

And for the record, I would like to submit and have you include the original request of the Federal Bureau of Prisons that we acted on some time ago.

Also, finally, for purposes of public understanding of this document, we feel it's important to emphasize the use of the zero baseline throughout the document. In other words, the Castle that we know and love, with people coming and going with airplanes and flying and activity is not the comparison that's

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going to be used to consider and analyze alternatives. It's Castle quiet, with the people and planes gone, and just no activity at all, and we're going to build from there. We think that argues persuasively also for great flexibility in how we use this document, and that we're not adding to the problems of Castle as it exists today; we're drawing down the impacts of Castle as it exists today to zero, and now we're going to start—back up with consideration of some kinds of these alternatives.

That argues for flexibility, and we would urge that we be granted flexibility as we try to do some of these things and work through the massive challenges that this document and all it includes represents.

And I thank you very much.

COLONEL HEUPEL: Thank you.

If you have those documents, I'll be happy to take those and have those become a part of the record.

That's all the cards I have. Let me just ask: Is there anybody else out here that has anything else with regard to anything that was briefed regarding environmental issues, or whether you have a question that you want to ask.

Does anybody else have something --

Sir, if you could come up to the microphone and

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just indicate your name.

MR. ADAMS: Thank you. My name is Dave Adams. I'm the City Manager for the City of Atwater. I hadn't planned to speak tonight, but just a couple of brief comments if I could.

First of all, welcome to Merced County. We hope that your stay has been pleasant here. I would like to add to Supervisor Klinger's comment about our concerns about the socioeconomic studies. The gist of S the report is because, in Atwater's case, 10 to 15 percent of the population will be leaving, therefore we can reduce our police and fire and all that type of staff 10 to 15 percent we think is a ludicrous assumption, and we will be making comments to that fact as part of the process.

Only two other comments I'd like to make that concern our city, specifically, while we all share some common concerns, is the base housing. There'll be, upon base closure, over 900 homes sitting vacant unless we can all work together and move very quickly on this.

And unlike most bases, the housing is outside the base fence and it's within city limits. We therefore assume responsibility for providing services out there and we have grave concerns about what could

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happen in the interim while those houses sit empty.

So, what ever assistance you can provide us in dealing with the Pentagon or federal government in keeping purchase price, or whatever the final determination is made as to how that property could be transferred reasonably would be greatly appreciated by the City of Atwater.

We certainly know the need for the Air Force to generate as many of dollars as it can to help take care of the long term problems, but to hold that process up and have the possibility of almost a thousand homes sitting empty for a considerable amount of time is of grave concern to us.

Once again, thank you for the opportunity to comment. We, like Mr. Martin and Supervisor Klinger, are committed to getting this thing going, working as closely as we can, and we just ask that same cooperation from folks at the federal level.

Thank you.

COLONEL HEUPEL: Okay. Thank you, sir.

Is there anybody else that has a comment or a question for us?

MS. KLINGER: I would like to enter this in the record. It's just a letter of correction.

COLONEL HEUPEL: Thank you, ma'am. That will

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be part of the record.

Anybody else?

Ladies and Gentlemen, thank you very much for coming out tonight. We appreciate your attention. We appreciate the comments, those of you that spoke.

This hearing is adjourned.

(Whereupon the hearing was adjourned at 8:30 p.m.)

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REPORTER'S CERTIFICATE

STATE OF CALIFORNIA)
) ss.
COUNTY OF TUOLUMNE)

I, VINA JACOBSON, CSR #2570, hereby certify that I was duly appointed and qualified to take the foregoing matter:

That action as such reporter, I took down in stenotype notes the testimony given and proceedings had;

That I thereafter transcribed said shorthand notes into typewritten longhand, the above and foregoing pages being a full, true and correct transcription of the testimony given and proceedings had.

VINA JACOBSON, CSR No. 2570

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U. S. Department of Justice

Federal Bureau of Prisons

Washington, D.C. 20534

October 16, 1992

Mr. Richard Martin
Castle Joint Powers Authority
2721 Winton Way
P.O. Box 547
Atwater, California 95301-0547

Dear Dick:

Enclosed is a copy of the letter we forwarded you last week. I want to again express our interest in Castle Air Force Base and our appreciation of the support we have received from you and the Castle Joint Powers Authority.

As you can see, we have asked that the parcel of land we requested be transferred to the Bureau of Prisons as expeditiously as possible. Dick, if there is anything you can do to accelerate the process, we would certainly appreciate it.

Please let me or Kevin McMahon know if we can help in any way.

Sincerely,

Patricia K. Sledge

Patricia K. Sledge, Chief
Site Selection and Environmental Review Branch

Enclosure

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U.S. Department of Justice

Federal Bureau of Prisons

Washington, DC 20534

October 10, 1992

Mr. John Carr
AFESC/BCR
Closure Implementation Office
The Pentagon, Room 5D-256
Washington, D. C. 20330-5140

Dear Mr. Carr:

Please consider this letter as the Bureau of Prisons'(BOP) formal request for land at Castle Air Force Base. As we discussed, find enclosed information for a proposed Federal Correctional Complex to be included in the EIS you are preparing for reuse of Castle Air Force Base, California.

We appreciate the opportunity to participate as a cooperating agency in the Environmental Impact Statement for Castle. We are also requesting to be included in the document review process.

Based on recent conversations between our respective offices, we understand that the record of decision is expected in September 1994. We ask that you consider any and all options that may be available to expedite transfer of the requested parcel of land to BOP at an earlier date. We are prepared to explore this request further with you at your convenience.

If you have any questions or need further assistance, please let us know.

Sincerely,

COPY

Patricia K. Sledge, Chief
Site Selection and Environmental Review Branch

Enclosure

Document 1

U. S. Department of Justice, Federal Bureau of Prisons

The Federal Bureau of Prisons has submitted a request for land at Castle Air Force Base, California. The proposed project site is an approximate 530 acre parcel. The location of which is shown on the attached map (See Enclosure #1).

The proposal by the Bureau of Prisons involves the potential construction and operation of a Federal Correctional Complex (FCC) which would house approximately 3200 Federal inmates in two separate facilities. The projected construction cost is $50 - $100 million. The project would be expected to create 500 jobs and operate at an approximate annual budget of $25 million. The construction of the FCC is proposed as one means of alleviating overcrowding at other federal correctional facilities and meeting the anticipated growth of federal inmates in the western region.

The proposed facilities would make a major contribution to programs and goals of the Federal Bureau of Prisons. Beneficial impacts of the proposed facilities would also result from contributions to the local economy and creation of employment opportunities during both the expansion, construction, and operational phases of the project.

History

Prior to the establishment of the Federal Bureau of Prisons in 1930, there were seven federal prisons, each funded separately by Congress and operated under policies and regulations established individually by each warden. At the time of the Federal Bureau of Prisons' creation, there were 12,000 offenders in federal institutions and an equal number in state and local facilities. Prisons were overcrowded and understaffed. Rigid rules governed every aspect of prisoners' lives. Little thought was given to educational and vocational training for offenders.

In 1929, a Congressional committee was established to study conditions in the existing federal prisons. In the same year, a study group developed a penal philosophy which outlined practical steps for improving the federal prisons. Based upon recommendations of the Congressional committee, legislation was enacted by Congress to establish the Federal Bureau of Prisons. On May 14, 1930, President Hoover signed the bill into law, directing the Bureau to develop an integrated system of prisons to provide custody and programs based on the individual needs of the offenders. Subsequent legislation approved minimum security camps, the construction of new institutions and a program of diversified industrial employment (UNICOR) within the institutions.

Document 1

The Federal Bureau of Prisons is responsible for carrying out judgments of federal courts whenever a period of confinement is ordered. At the present time, over 70,000 inmates are housed within the 68 federal institutions which have levels of security ranging from minimum to high. All sentenced offenders who are medically able are required to complete daily work assignments. All offenders have opportunities to participate in self-improvement programs including education, vocational training, religion, and counseling.

Inmate Population

The inmate population of the Federal Bureau of Prisons (FBOP) has been increasing at an unprecedented rate. Since January 1981, the number of prisoners incarcerated has increased from 23,779, to 70,666 as of September 1992.

Federal court sentencing guidelines are resulting in longer terms of confinement for serious crimes. An increase in the number of immigration offenders and the effort to combat organized crime and drug trafficking are also contributing to a continuing inmate population increase.

Several measures have been taken to alleviate the population pressures, including construction of new institutions, acquisitions and conversions of facilities originally intended for other purposes, the expansion of existing prison facilities, the addition of medical beds at existing medical centers, the construction of new medical facilities, and the expanded use of contract confinement and halfway houses.

Construction, Renovation and Resources

The Bureau of Prisons is in the midst of expanding its capacity through an active construction program for the development of FCC's and other correctional institutions. If the proposed action is taken, the Federal Bureau of Prisons proposes to expand, construct and operate facilities at Castle Air Force Base which would incorporate all necessary security features. The facility will be a FCC to house 3200 inmates. The FCC would have a staff of approximately 500 employees who would provide 24-hour care and supervision for U.S. Marshal inmates.

Facility Operation

The mission of the proposed FCC facility would be to provide a safe, secure, and humane environment for the care and custody of federal inmates. Security would be as unobtrusive as possible and achieved by a combination of methods, such as perimeter

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security which would be provided by two 12-foot-high chain link fences. Coils of barbed tape concertina wire would be mounted on the fences, as well as placed between the two fences. Energy-efficient high mast lighting would be utilized to provide ground illumination of the compound and secure perimeter. This lighting would be supplemented by common walkway and roadway lighting. In all cases, special attention is given to the avoidance of excessive illumination of adjacent surroundings. Search lights or similar flood lighting associated with traditional prison security would not be used. An electronic alarm system would be installed on or at the fences to detect any movement or attempted escape. Staff in vehicles would be assigned to patrol the perimeter and respond to automatic alarms received from the electronic detection system.

Following the procedures established at similar Bureau of Prisons facilities, inmates would be formally counted and physically identified five times a day. In addition to the formal counts, staff members would be required to verify the location of each inmate throughout the work day. Inmate quarters are supervised 24 hours a day and are checked often for contraband material. An intensive urinalysis program, involving both specific and random sampling, would be carried out to detect and deter drug or alcohol use by inmates.

The entire Bureau of Prisons facilities would rely on its own staff or other federal law enforcement personnel to ensure overall security. It is the responsibility of the U.S. Marshals Service and the Federal Bureau of Investigation to assist the Bureau of Prisons, if necessary, in the event an inmate is reported missing. State and local law enforcement agencies would be advised. In addition, the local media would be contacted to inform the public. Federal law enforcement personnel would be responsible for removing any person involved in breaking a federal law, such as trespassing, damaging federal property or possessing contraband on the property.

Inmate Housing

Inmates within the Federal Correctional Center would be housed in general living units. General living units within the FCC would be separated into sections with individual rooms, usually two inmates per room. The buildings would consist of one-story to possibly multi-story structures and would also contain recreational spaces for inmates and office spaces for staff assigned to the units.

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The Bureau of Prisons uses a decentralized method of managing institutions. Under this method, correctional officers, unit managers, case managers, counselors, and secretaries work in the inmate housing areas.

Other staff such as psychologists, teachers, and chaplains would periodically go to the housing units and meet with inmates in their rooms. This system permits greater contact, communication, and interaction between staff and inmates. The first consideration for all staff, regardless of their position, is security and supervision of inmates.

Each of the individual housing units and medical units would also include centrally located multi-purpose space devoted to general leisure-time activities such as watching television, playing table games and group meetings. Small activity rooms located adjacent to the central multi-purpose area would be provided for quiet activities such as reading and would be used for group and individual counseling sessions.

Separation of an inmate from the rest of the prisoner population is referred to as housing in "segregation." The movement of inmates housed in the Special Housing Unit is strictly limited and controlled. Most activities of inmates housed in segregation take place in the segregation building. For example, meals prepared in the main kitchen are delivered to the segregation unit and served to the inmates in their rooms.

The proposed design for the Special Housing Unit would be composed of two wings; one for housing administrative detention inmates and the other for disciplinary segregation inmates. Unlike the general housing units, there is no need for a large, central multi-use space because inmates are confined to their rooms most of the time and are not allowed to congregate. Minimal office space is required since unit managers, case managers and counselors are not based in the unit. Since inmates are housed in segregation temporarily, staff from their original units visit them in the segregation building.

Administrative detention is a category of special housing which refers to separate housing provided for inmates who, among other things, are being investigated for rule infractions or being held for non-disciplinary reasons. Since inmates in administrative detention usually have not yet had a hearing as prescribed by disciplinary policy, they are kept separate from inmates in disciplinary segregation.

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Disciplinary segregation is a status of confinement assigned to those inmates who have violated institution rules or regulations, have had a hearing by a disciplinary committee, and have been assessed a sanction by that committee. Inmates are usually confined to disciplinary segregation for not more than 60 days.

Security and Control Programs

Design of the proposed FCC would provide internal control while permitting relatively restricted movement within the secure perimeter of the institution. The rooms in all units would have locking devices that enable staff in the unit to provide necessary controls when an inmate requires restraint. As described earlier, physical perimeter security would be maintained by a double fence around the FCC and by vehicular roving patrols along the perimeter road outside the fence. The perimeter fence would be alarmed by an electronic sensor system to enable the roving patrol to know when and where perimeter intrusion has been attempted.

Special Features

The proposed correctional facilities would be designed and adapted to foster positive interpersonal relationships between inmates and staff. The institutional atmosphere would be as stress-free as possible for the welfare of inmates and staff. Staff would interact directly with inmates without separation by architectural barriers. Space will be provided in the FCC for administration and a variety of activities and programs. The administration area would be located at the front entrances of the FCC where they would be readily accessible to the public. Offices for the warden and other administrative staff would be included in this area. In addition, office space for other departments such as financial management and personnel would be located in this building. Areas for visiting would be located within the secure perimeter near the facilities' front entrance. The rooms would be designed so that they could also be used for other activities. Multi-purpose activity space would be provided for group meetings and general assembly services.

Indoor and outdoor recreation areas would also be constructed. Program space for educational, vocational training, and arts and crafts activities would be provided, as well as a chapel that would be used exclusively for religious services. Inmate health care services would be obtained from clinic areas within the FCC. The Federal Bureau of Prisons may decide to construct a staff training facility. Types of training would include self-defense and physical fitness courses as well as classroom instruction. Its location would be visually apart from the FCC.

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A single road for controlled access to the property is planned with branch roads for service. The parking lots would be located outside the fenced areas near the public entrances to the facilities. Public and service vehicular traffic would be separated from patrol traffic on the perimeter road surrounding the fenced facilities.

Inmate Profiles

The Federal Bureau of Prisons utilizes a classification system to determine an inmate's security level. This system relies upon such factors as severity of the offense, expected length of incarceration, type of prior offenses, history of violence, history of prior commitments and history of prior escapes/attempts.

The inmate classification system has proven effective in that it has enabled the Bureau to separate violent offenders from the rest of the inmate population, keep the inmate population in better balance, and make better use of available resources. The system is designed to place inmates in the appropriate institution that is closest to the U.S. District Court where they will receive sentencing or where they are awaiting trial and to place inmates in the appropriate institution that is closest to their homes. The largest offense categories for inmates are drug related offenses.

Institution Programs

Inmates spend their initial two weeks in orientation where their needs, requirements and interests are identified and where they learn about rules, programs and, if appropriate, work opportunities. After orientation, inmates generally receive program and work assignments which are periodically reviewed and changed, if necessary, through inmate unit team consultations.

Program opportunities may include formal education from adult basic education through post-secondary courses, vocational training, social education programs to enhance self-confidence, library services including a law library, athletic and leisure programs, group and individual counseling, chaplaincy services, and inmate organizations. While the majority of the programs are voluntary, inmates not able to read at the twelfth grade level must participate in mandatory adult basic education classes.

Community involvement in inmate programs within the facilities is encouraged. Local, civic and veterans groups often form chapters within the facilities. Competitions at the institutions with

Document 1

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visiting sports teams, as well as participation with religious groups and service organizations such as Alcoholics Anonymous, are usually arranged on an ongoing basis.

Work Assignments

Federal Prison Industries, Inc. (trade name UNICOR), a wholly-owned, self supporting government corporation is part of the Bureau of Prisons and is perhaps the most important of all correctional programs. UNICOR provides training for inmates in skills that are transferable to jobs in the community while also producing goods and/or services for sale only to federal government agencies. UNICOR does not compete with local private industry or other government agencies in the marketplace. A few examples of industrial training programs at federal institutions are printing and sign manufacturing, textile cut and sew operations, and cable assembly. Although a decision has not been made on the specific industrial programs to be established at the proposed facilities at the time of this writing, the operation (like those at other Bureau of Prisons' facilities) would be generally non-polluting. Any hazardous materials generated would be disposed of in accordance with all U.S. Department of Justice and other applicable regulations.

Inmates not working in UNICOR will be assigned jobs elsewhere in the facility. All inmates who are medically able are required to work. Work assignments reduce idleness and tension and create a more easily managed environment. Institution work assignments may be in food service, the business office, carpentry and electrical maintenance or any other work necessary for the upkeep and operation of the facility. Efforts are made to place inmates in job assignments where they can use previously acquired skills or can receive on-the-job training in an employable skill.

Physical Characteristics of the Proposed Institution

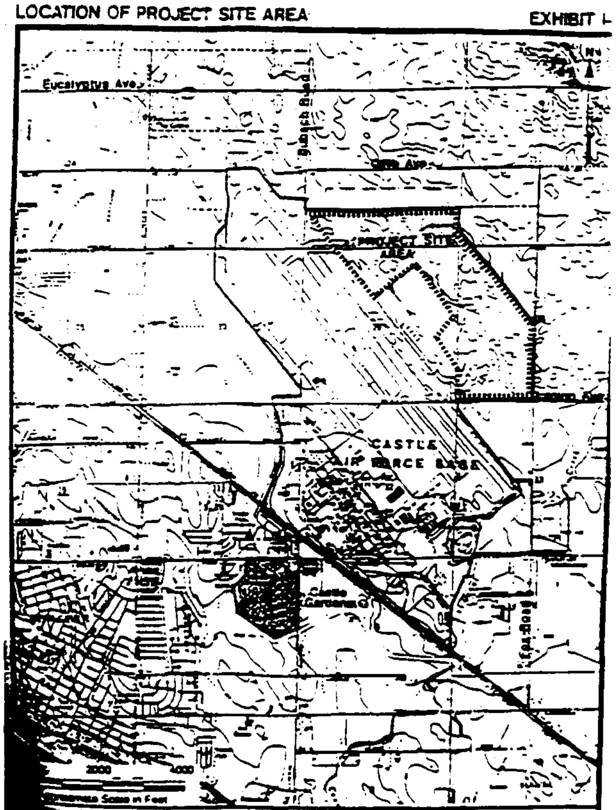
The general design of the proposed FCC will be of residential scale, not unlike a college campus. Buildings will be either one-story or multi-story structures. The buildings would provide multi-purpose space, with areas divided according to function. Basic groupings will include administration and service, housing, religion and education/recreation. The Bureau of Prisons staff will supervise the design of the facilities and Bureau representatives will be on site during expansion and construction.

The proposed project provides for fire-resistive structures. All applicable building code requirements, as well as the National Fire Protection Association 101 Life Safety Code, will be applied to this project.

Document 1

LOCATION OF PROJECT SITE AREA

EXHIBIT I-



U.S.G.S.; Castle AFB Comprehensive Plan Base Layout.

Leeds Berger & Associates, Inc.

Document 1

A buffer zone of undeveloped acreage surrounding the property would provide a visual setback from the property boundaries.

The Bureau of Prisons is committed to use less energy due to high energy costs and the basic need for conservation. The facilities will be adapted and designed to be energy efficient and will use energy conserving equipment.

Document 1

ADMINISTRATIVE DEPARTMENT

MERCED, CALIFORNIA

CLARK G. CHANNING
County Administrator

F/RF

December 21, 1993

Mr. Thomas F. Adamcyk
Regional Economist
Environmental Resources Branch
U.S. Air Force Center for
Environmental Excellence
Brooks Air Force Base
San Antonio TX 78235

Dear Mr. Adamcyk:

Thank you for the opportunity to meet with you, and Ms. Andres, on the Castle Air Force Base Socioeconomic Impact Analysis Study.

Needless to say, there is a great deal of concern that your study portrays a picture which does not accurately reflect the real socio-economic conditions that exist in Merced County today or in the future.

S Over the past two years, California's general economy has been in a deep economic recession with more than half a million defense related jobs lost. Merced County has suffered as well, with unemployment reaching 20 percent in May, 1993. Thirty-one percent of all county residents received some form of public assistance during that same month, and we are now the most impacted County, nationally, in regard to the secondary migration of Southeast Asian refugees. Today, more than 17,000 refugees seek county assistance (approximately nine percent of the total population). It is important to note that these figures are absent any closure activity at Castle.

Sadly, Statewide and County economic conditions are not projected to improve until the turn of the century. For Merced County, the closure of Castle starting in 1994 will mean far greater demands on public assistance and public services (excluding public safety areas) than ever before. The closure of Castle will also remove between 13,000 and 16,000 of the County's most affluent residents. This out-migration will directly impact smaller businesses employing 2-10 people. Many of these businesses will close and, as a minimum, officials expect that unemployment and public assistance rolls will increase at least five percent over current rates.

AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER

Document 1

December 21, 1993
Page Two

Knowing the current economic facts and the dramatic differences between rural, agricultural Merced County and the more populous, industrialized Stanislaus County, nothing in your study is more troublesome than the combining of the two vastly different areas into a general Region of Influence (ROI). Clearly, the overwhelming population base and the more affluent, industrialized economy found in Stanislaus seriously dilute the significance of closure and lessen the real impact in Merced County.

S Compounding the ROI assumption flaw is a misunderstanding of the Public Finance data we provided and that is used in the Public Finance Section (pgs. 25-27) and on Table 3-4 to draw conclusions regarding the County's financial picture. The financial statement (Table 3-4) does not demonstrate the County's true financial situation as it includes Special Revenue Funds. The use of these funds is restricted to special purposes such as food stamps, federal road funds and indigent health care. Overall, there are approximately 15 specific restricted categories. These funds cannot be used to finance general government purposes. Enclosed, you will find a recomputed table that shows the County's actual financial history. It should also be noted that for FY94 the State has reduced our property tax dollars by an additional $8.9 million and, in November, the public rejected a sales tax increase that would have offset half of the property tax loss. As a result, services are now being cut, libraries and parks closed, salaries reduced by five percent and over 100 people are being laid off.

Merced County believes our story must not be lost in the assemblage of data from broader sources. The significance of closure is within our County's borders where 99 percent of those scheduled to depart now live. Our public must understand the full impact of what will occur in 1995, face the true realities of the situation and move on, as best as possible, toward a positive future. The Air Force's Socioeconomic Study will provide one of the important foundations upon which we build for that future. It must, therefore, be absolutely accurate in its findings and void of dilutions which tend to shade the true picture.

I strongly urge the Air Force to revise the socioeconomic study for Castle Air Force Base and ask that you include our verbal and written comments into the final document.

Sincerely,

Clark G. Channing

Clark G. Channing
County Administrative Officer

Enclosures

cc: Hon. Gary Condit, Member, U.S. House of Representatives
Hon. Mike Bogna, Chairman, Merced County Board of Supervisors
Sandra E. Andres, Senior Project Environmental Professional,
The Earth Technology Corp.
Michael G. Miller, Department of Defense Base Transition Coordinator
Richard D. Marcus, Executive Director, Castle Joint Powers Authority
LTC Bruce Mank, 93 BMW/CVC

Document 1

COUNTY OF MERCED
STATEMENT OF REVENUES, EXPENDITURES AND FUND BALANCE AVAILABLE
ON THE BUDGETARY BASIS
FOR THE FIVE YEARS ENDED JUNE 30, 1989, 1990, 1991, 1992, 1993

	1989	1990	1991	1992	1993
REVENUES:					
Taxes	19,363,955	21,674,419	23,954,638	24,004,371	23,431,009
Licenses, permits and franchises	1,172,626	1,490,211	1,741,362	1,952,398	2,146,034
Fines, forfeitures and penalties	1,126,626	505,766	690,565	422,829	978,954
Use of money and property	2,489,812	2,996,423	3,108,040	1,065,453	1,728,835
Intergovernmental	91,124,621	103,619,538	110,756,010	128,282,375	126,570,750
Charges for services	6,865,690	7,600,458	10,785,614	11,035,791	11,497,389
Miscellaneous	1,786,351	471,858	1,050,279	3,133,927	5,149,027
Total	123,039,681	138,258,673	152,006,508	170,797,144	171,501,998
EXPENDITURES:					
General government	9,612,202	10,136,885	11,221,248	11,948,613	13,393,430
Public Protection	22,760,319	24,194,520	29,005,332	31,000,818	32,474,758
Public ways and facilities	0	0	0	0	0
Health and sanitation	9,958,905	11,020,307	12,771,335	15,570,677	15,719,689
Public assistance	77,853,922	88,010,811	96,198,372	108,316,505	109,579,497
Education	1,494,371	1,550,138	1,559,002	1,698,238	1,511,726
Recreational and cultural services	1,327,164	1,311,659	1,402,245	1,645,803	1,377,235
Miscellaneous	99,013	196,541	257,102	213,038	227,901
Total	123,105,898	136,420,867	153,214,636	171,293,690	174,284,234
BEGINNING FUND BALANCE	2,087,219	1,483,699	1,734,736	1,534,099	2,126,174
ENDING FUND BALANCE	1,483,699	1,734,736	1,534,099	2,126,174	(114,802)

NOTE: The above is the general fund revenues, expenditures and fund balance available on the modified accrual budget basis. Fund balance available does not include encumbrance carryover nor does it include increase in reserves. It does not include Special Revenue Funds who's use are restricted to specific purposes. It also does not include compensated absences which are paid for when incurred and not earned

Document 2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, Ca. 94105-3901
March 2, 1994

Lt. Col. Gary Baumgartel
Chief of Environmental Planning Division, AFCEE-ESE
8106 Chennault Road
Brooks Air Force Base, Texas 78235-5318

Dear Colonel Baumgartel:

The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the project entitled Disposal and Reuse of Castle Air Force Base, California. Our review is provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500 - 1508) and Section 309 of the Clean Air Act.

On 29 January, 1990, the Secretary of Defense announced the closure of Castle Air Force Base (Castle AFB) pursuant to the Base Closure and Realignment Act. Base closure is scheduled to be completed by September 1995, and would entail the disposal of all Castle AFB property through transfer and/or conveyance to other government agencies or private parties. At the time of base closure, all hazardous waste generated by base functions will have been collected and disposed off site to a permitted facility, in accordance with RCRA.

The DEIS presents analysis of the potential environmental consequences of base disposal and reuse alternatives. The Proposed Action includes general aviation, training and maintenance uses of the site airfield and support areas, as well as industrial, institutional, commercial, residential, public, and agricultural uses of non-aviation areas. The Proposed Action was developed by the Castle Joint Powers Authority (CJPA), which is comprised of Merced County and the cities of Atwater and Merced. Five additional alternatives are evaluated in the DEIS: the Castle Aviation Center Alternative; the Commercial Aviation Alternative; the Aviation with Mixed Use Alternative; the Non-Aviation Alternative; and, the No-Action Alternative. Independent land use concepts included in the analysis are a proposed Federal Correctional Complex and a proposed private recreational facility (trapshooting range).

1
EPA is concerned that the DEIS does not contain adequate mitigation measures to protect wetlands, and in particular,
15.1 vernal pools. Executive Order 11990, Section 1(a) requires that the Air Force take action to minimize the destruction, loss, and degradation of wetlands, and to preserve and enhance the natural

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Document 2

1 and beneficial values of wetlands in carrying out the Air Force's responsibilities in disposing of federal lands and facilities. Section 4 of Executive Order 11990 specifically requires the Air
15.1 Force to "attach appropriate restrictions to the uses of properties by the purchaser. . ." EPA believes that the DEIS does not contain mitigation that would ensure full adherence to Executive Order 11990.

2 The Air Force should consider the transfer of sensitive or especially valuable habitat and natural resources to resource agencies (e.g. Fish and Wildlife Service, National Park Service) in order to provide for their management and protection. If this cannot be accomplished, EPA recommends that preservation of
15.2 existing vernal pool and wetland resources be stipulated as a condition of transfer to the private sector, if legally feasible. Other preservation options are easements, dedication of special areas, and sales agreements that include protection and preservation. We encourage the Air Force to include alternatives in the reuse FEIS that will continue to maximize and preserve natural resources.

3 We do not believe compliance with NEPA is fully demonstrated in the DEIS with regard to analysis of cumulative impacts. NEPA requires discussion of cumulative effects and appropriate mitigation measures not already included in the alternatives (40 CFR Section 1502.14 f, 1502.16 h, 1508.7). The DEIS contains
1.3 minimal discussion of these items and does not provide information to support many of its conclusions. In addition, growth which could result from the proposed project directly (such as utility line upgrades and intensification of urban development in an agricultural area) or indirectly (such as the closure and reuse of other regional airports under specified alternatives), has not been addressed.

4 The DEIS does not adequately demonstrate how existing resources would accommodate project-related growth in the Region
1.4 of Influence (ROI). Such resources include groundwater supply, which is currently in a state of overdraft, and landfill space at the County Landfill, which has been scheduled to close by 1996.

5 Castle AFB is in a nonattainment area for ozone, CO and fine particulates (PM_{10}). Federal agencies are required by the Clean Air Act to assure that actions conform to an approved
13.1 implementation plan and will not cause or contribute to any new violation of any standard, increase the frequency or severity of any existing violation, or delay timely attainment of standards (Clean Air Act, Section 176(c)). EPA does not believe the DEIS has demonstrated full compliance with this requirement.

6 We recommend that any post-closure changes in land use be made after specific reuse options have been decided through the
4.3 NEPA and reuse selection process. It is important to include Federal and State environmental and resource agencies in the base reuse planning process. As stated in the DEIS (4-42), the

Document 2

6 duration and timing of hazardous waste cleanup operations may affect the timing of the reuse and the areas available for reuse. Given the complexity of ongoing hazardous waste cleanups at
4.3 Castle AFB, it is important that the local communities clearly understand potential environmental constraints on base reuse options caused by hazardous waste sites and cleanup actions.

7 Based upon our review, we have classified this DEIS as category EC-2, Environmental Concerns - Insufficient Information
1.5 (see attached *Summary of the EPA Rating System*). EPA believes that the FEIS should contain additional information, as noted, to ensure that the public and decision-makers arrive at well-informed decisions on future reuse of Castle AFB. Our detailed comments are enclosed.

We appreciate the opportunity to comment on the proposed project and request that three copies of the Final Environmental Impact Statement (FEIS) be sent to this office at the same time it is filed with our Washington, D.C. office. We also request notification of any meetings to be held regarding this activity. If you have any questions, please contact me at (415) 744-1574 or have your staff contact Mr. Jeff Philliber at (415) 744-1579.

Sincerely,

David J. Farrel, Chief
Environmental Review Section
Office of Federal Activities

Enclosures: (2)

2096DS.JP
cc: Castle AFB, Base Commander
FAA, Howard Yoshioka
Bureau of Prisons, Patrick Sledge
San Joaquin Valley UAPCD
Merced County
City of Merced
City of Atwater
Castle Joint Powers Authority

Document 2

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION

Environmental Impact of the Action

LO-Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC-Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO-Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU-Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of environmental quality, public health or welfare. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1-Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2-Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3-Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From: EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

Document 2

NEPA COMMENTS

8 1. (p. S-1) The Summary section entitled *Purpose of and Need
for Action* includes an assertion that after completion and
consideration of the Draft Environmental Impact Statement (DEIS),
"the Air Force will prepare decision documents stating what
property is excess and surplus, and the terms and conditions
under which the disposition will be made. These decisions may
affect the environment by influencing the nature of the future
use of the property." This statement does not make clear the
relationship between the Air Force's EIS (and its disclosure of
1.6 environmental consequences) and the terms and conditions that are
to be prepared for the disposition of Air Force property. The
summary section should be modified in the Final Environmental
Impact Statement (FEIS) to specifically account for the role of
the NEPA process in the disposition of Castle Air Force Base.

The EPA maintains that the Air Force, through proactive planning
and the placement of appropriate conditions on the property
conveyance, can help ensure that micro-scale environmental
conditions of the property are maintained in a positive manner
regardless of its future use.

9 2. (p. 4-8) The DEIS lacks an analysis of cumulative affects
that could result from the Proposed Action or its alternatives.
For example, the DEIS does not contain a list of pending and
approved projects in the Region of Influence (ROI) that, along
with the Proposed Action or alternative, could each contribute
incrementally to significant cumulative impacts in the ROI. In
1.7 addition, the DEIS does not contain a map of such projects,
which, along with the Proposed Action or alternative, could
better help determine future traffic impacts at particular
intersections and roadways rather than the strict averaging
method employed in the Transportation Section (refer to page 4-
33). The FEIS should include additional details on cumulative
impacts, including those related to traffic issues.

10 3. (p. 4-8) The DEIS lacks an analysis of growth inducing
affects that could result from the Proposed Action or its
alternatives. For example, although the DEIS does address the
short-term on-site impacts of regional airport closures (Merced,
Turlock and Atwater municipal airports) that would take place
1.8 under the Commercial Alternative and Aviation with Mixed Use
Alternative, the DEIS does not discuss the growth inducing
effects of closing and reusing those airport lands under those
alternatives. Also omitted from discussion are the utility line

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Document 2

10 extensions required to serve intensified land uses on Castle AFB
under the Proposed Action or alternatives. Given the quantity of
1.8 agricultural land that surrounds the site, the issue of growth
inducement of the proposed project should be addressed in detail
in the FEIS.

BIOLOGICAL RESOURCES AND WETLANDS COMMENTS

11 1. (p. S-23) According to the Summary of Environmental Impacts,
the Proposed Action would directly affect vernal pools but would
not directly affect wetlands on the Castle AFB site. This
implies that vernal pools and wetlands are separate and distinct
habitat. Vernal pools, in fact, are a type of wetland. This
should be clarified on page S-23 and throughout the DEIS, as
appropr: ∗.

Under the discussion of the Proposed Action's sensitive habitats
effects on pages 4-165 through 4-166, the loss of vernal pools
15.3 seems imminent: "(D)irect losses of vernal pool habitat would
primarily result from industrial development proposed northeast
of the airfield." This statement seems to contradict that which
is presented in the summary (page S-23). The FEIS should clearly
and consistently indicate whether vernal pools would be affected
by the Proposed Action.

The DEIS also states that direct impacts to vernal pools could be
avoided through proper fence placement. The corresponding text
on page 4-166 actually indicates that although fencing of vernal
pools could prevent inadvertent trespass, direct impacts may be
unavoidable due to the siting of industrial development northeast
of the airfield. The summary discussion should ᐧs revised to
reflect more accurately the severity of potential impacts to
vernal pools.

12 2. (p. S-29) Potential biological resources impacts that would
result from the Commercial Aviation Alternative are identified as
"minimal" due to previous development and soil disturbance
throughout the base site. The discussion of potential Commercial
1.9 Aviation Alternative impacts to biological resources on pages 4-
167 through 4-168, however, indicates that those effects would be
more substantial, that they "would have a high potential for
impacting vernal pool species. . . (and) could directly or
indirectly impact the wetland in the area." The potential
impacts to grassland and 13 acres of vernal pool vegetation and
wildlife would be similar to those identified for the Proposed

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Document 2

12 Action. It is the EPA's position that wetlands, including vernal
pools, are a scarce and valuable resource in California. As
approximately 90 percent of such habitat has been lost in the
1.9 State during modern times, every effort should be taken to ensure
remaining wetlands/vernal pools are retained. Consequently, such
potential habitat loss should not be described as a "minimal"
biological resources impact. The summary of the FEIS should be
revised as appropriate to reflect the severity of impact as
described in the DEIS Environmental Consequences section.

13 3. (p. 4-166) Mitigation measures for impacts to biological
resources should include use of deed restrictions and transfer
conditions designed to avoid impacts to unique and sensitive
resources, particularly vernal pools. Executive Order 11990,
Section 1(a) requires the Air Force to take action to minimize
the destruction, loss, and degradation of wetlands, and to
preserve and enhance the natural and beneficial values of
15.4 wetlands in carrying out the Air Force's responsibilities in
disposing of federal lands and facilities. Section 4 of
Executive Order 11990 specifically requires the Air Force to
"attach appropriate restrictions to the uses of properties by the
purchaser. . ." The Air Force should include such language in
the FEIS to ensure that future uses of Castle AFB must conform to
preservation efforts for the important biological resources,
including vernal pools and other wetlands.

14
4. (p. 4-166) Mitigation measures for impacts to biological
15.5 resources should include recommended methods to reduce or avoid
aircraft collisions with birds, which are projected to increase
under the Proposed Action. These should be included as
recommendations in the *FEIS*.

15
5. (p. 4-167) In terms of plant and animal habitat, the FEIS
15.6 should include any specific undertakings that could be
accomplished to enhance biodiversity within the boundaries and
environs of Castle AFB.

16 **AIR QUALITY COMMENTS**

1. (p. S-17) Table S-2 contains the following summary of
13.2 potential Air Quality impacts from the proposed Castle Aviation
Center Alternative: "Increased air pollutant emissions during
construction and operations would not affect the region's
progress toward attainment of the ozone or PM_{10} standard. No
adverse impacts. . .(would result from) other criteria

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Document 2

16 pollutants." The rationale used in the DEIS for claiming that
reuse-related emissions would not *affect the region's progress*
toward achieving attainment goals is that regional attainment
goals were set prior to base closure plans (Castle AFB-related
emissions of criteria pollutants are historically higher than
13.2 they would be under most of the proposed alternatives). The
Castle Aviation Center Alternative would exceed preclosure
emission levels for PM_{10}, SO_2 and CO, however, so this rationale
would not apply. This should be identified in Table S-2 of the
FEIS.

17
2. (p. S-22) The summary discussion of air quality impacts
13.3 should distinguish between state and federal non-attainment
status, as presented on page 3-93.

18 3. (p. S-25) The Summary of Environmental Impacts section
includes an assertion that Castle Aviation Center Alternative
reuse activities would not cause any emissions of criteria
pollutants that would equal or exceed preclosure levels through
the 10-year analysis period. However, the Castle Aviation Center
13.4 Alternative Air Quality analysis on page 4-111 includes the
following sentence: "By the year 2005 the reuse-related
emissions of PM_{10}, SO_2, and CO would increase to above preclosure
levels." These two statements should be reconciled in the FEIS.

19 4. (p. 3-95) The DEIS figures for National Ambient Air Quality
Standards for criteria pollutants in the Region of Influence are
13.5 from a 1992 telephone conversation. The FEIS should include
updated regional figures, if available.

20 5. (p. 4-104) The FEIS should explain how the proposed reuse of
Castle AFB, and the antecedent review and decision-making process
would be affected by the timing and outcome of the pending State
13.6 Implementation Plan (SIP) update. Will decision-making be
delayed until the SIP is formally adopted? If not, would plans
for Castle AFB reuse be subject to revision pursuant to SIP when
it is formally enacted? Please address these issues in the FEIS.

21
6. (p. 4-104) Is the term "conformity determines" in the last
13.7 paragraph actually intended to be "conformity determinations?"

4

Document 2

22 13.8 7. (p. 4-105) According to the DEIS, construction-related air quality impacts would elevate "short-term concentrations (of PM_{10}) at receptors located close to the construction areas. However, the elevated concentrations would be temporary and would fall off rapidly with distance from the site." Additional information should be included in the FEIS, including: the general quantity and locations of the construction sites; the distance of the referenced receptors to those construction sites; a distinction of which receptors are "sensitive," if any; the distance at which "short-term concentrations (of PM_{10}) would affect nearby receptors;" and, the distances at which PM_{10} concentrations would "fall off." This information need not be discussed as quantitatively as the operationally-related air quality impacts, but the analysis should include a general discussion of the issues listed above.

23 8. (p. 4-106) According to the DEIS, the Proposed Action would not delay regional progress toward attainment of the ozone standard even though it would create new sources of ozone precursors in a "severe" ozone nonattainment zone. The reason given is that the net reuse-related increase in ozone precursors would be lower than the rate maintained during the preclosure era of Castle AFB. Because the 1991 AQAP was devised assuming preclosure emission rates from Castle AFB, the Air Quality Attainment Plan (AQAP) should not be affected adversely. This reasoning has two potential problems, which should be addressed in the FEIS:

13.9 a. The appropriateness of this rationale is contingent on whether the 1991 AQAP plan is currently on schedule. The DEIS does not provide any information to update the progress of the 1991 AQAP for 1993 or 1994. If the 1991 AQAP is behind schedule and ambient ozone concentrations are currently higher than projected in the Plan, the additional ozone precursors that would be generated by the Proposed Action could be considered significant adverse impacts, or, at the very least, significant cumulative impacts.

b. According to the text on page S-3, "the baseline against which the Proposed Action and alternatives are analyzed consists of the conditions projected at base closure in 1995. Although the baseline assumes a closed base, a reference to preclosure conditions is provided in several sections (e.g., air quality and noise) to allow a comparative analysis over time." It seems that the DEIS is reporting that Proposed Action air quality affects should be

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Document 2

23 13.9 understood in contrast to historic conditions, but should be analyzed in contrast to the baseline (closure) conditions. However, the DEIS analysis appears to assess air quality impacts based on historic rather than baseline conditions. The FEIS should clarify its significance criteria or better analyze the effects of adding ozone precursors to a severe ozone nonattainment area.

24 13.10 9. (p. 4-107) Project air quality modelling is based on the assumption that background ambient air conditions would remain constant over the next ten years. This may not be a reliable assumption given various factors, including AQAP compliance efforts, regional growth projections, and changes in effects from non-stationary sources such as automobiles, which are not provided for under the PSD (page 4-104). These issues should be addressed in the FEIS.

25 13.11 10. (p. 4-108) Table 4.4-2 and the corresponding alternative Air Quality Modeling tables might be more useful if they were to include an impact column that adds background and reuse-related impact conditions which could then be compared to the limiting standard column. We recommend that Table 4.4-2 be modified accordingly.

26 13.12 11. (p. 4-109) According to Table 4.4-2, reuse-related PM_{10} impacts would contribute to background concentrations that already exceed state PM_{10} standards. The subsequent conclusion in the DEIS is that because reuse-related contributions would be relatively small, and because background PM_{10} concentrations are projected to decrease in the future due to the implementation of AQAP measures, "mitigation of reuse-related PM_{10} operational emissions would. . . not be required." This conclusion does not take into account the significant cumulative impact of any increase in PM_{10} concentration, nor does it require that the proposed action comply with AQAP measures. Moreover, according to the discussion on page 3-97: "Any new or modified major source emitting more than 50 tons per year of . . . PM_{10} in a serious nonattainment area must satisfy technology standards reflecting the lowest achievable emission rate and must provide offsets representing emission reductions from other sources at a ratio of at least 1.2 to 1.0." Because reuse-related PM_{10} emissions would exceed 50 tons per year (refer to Table 4.4-1), the new site user would be obligated to use the best technology available to achieve the lowest feasible emission rate. Although page 4-107 presents a rationalization as to why the PM_{10} projections would not slow progress towards attaining standards in the future under

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Document 2

26 13.12 the AQAP, this does not absolve the proposed reused activities from the above requirement. The obligations of future site users to conform to local and regional air quality goals should be discussed in greater detail in the FEIS.

27 13.13 12. (p. 4-111) Under the Castle Aviation Center Alternative, PM_{10}, SO_2 and CO concentrations would increase to above preclosure levels. The DEIS identifies this as "insufficient to change the present attainment status for NO_2, SO_2 or CO, or hinder progress toward attainment of the [illegible] standards." Because the PM_{10} concentrations for the [illegible] are currently in serious nonattainment, and because the proposed Castle Aviation Center Alternative would result in a net increase in regional PM_{10} concentrations, no rationalization is given as to how the alternative would not hinder progress toward PM_{10} standard attainment. Please clarify this issue in the FEIS.

WATER QUALITY COMMENTS

28 12.2 1. (p. S-15) The Summary of Environmental Impacts Table presents Region of Influence (ROI) water demand figures ranging from 2.2 percent to 4.5 percent for the various alternatives. In each case, the increase is identified as one that "would not affect water supply." This is not corroborated in the Environmental Consequences discussion, however. On page 4-96, the discussion on groundwater resources acknowledges that "because the regional aquifer is in a state of overdraft, this water use would be an incremental impact to aquifer depletion." Furthermore, the water demand discussion on page 4-34 includes a caveat that new water supply sources will be needed by 2015 regardless of the outcome of the Castle Air Force Base closure and reuse Under those circumstances, any increase in water demand will have an adverse although perhaps incremental effect on available water supply. The FEIS should include a revised Summary of Impacts Table that reflects potential impact to regional water supply.

29 12.3 2. (p. 3-37) Table 3.2-7 contains Region of Influence (ROI) water consumption and wastewater treatment data and projections for a five-year period beginning in 1990. The correlation between water consumption and wastewater generation changes over the three years (1990 - 1992) that are based on actual records. In 1990, wastewater generation (treatment) is approximately 43 percent of water consumption, but the following year water

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Document 2

29 12.3 consumption decreases while wastewater generation remains the same, which increases the correlation to almost 48 percent. The FEIS should discuss the reasons for this variation.

30 12.4 3. (p. 4-33) Water consumption figures presented on table 4.2-8 are inconsistent with the text on pages 4-96 through 4-99. According to Table 4.2-8, the difference between water consumption figures under the No Action Alternative and the action alternatives (i.e.- projected water demand figures) are as follows: Proposed Action: 1.41 MGD; Castle Aviation Center: 2.34 MGD; Commercial Aviation Alternative: 1.38 MGD; Aviation with Mixed Use Alternative: 1.41 MGD; Non-Aviation Alternative: 1.18 MGD. According to the text on page 4-96 through 4-99, projected water demand figures are as follows: Proposed Action: 0.93 MGD; Castle Aviation Center: 1.02 MGD; Commercial Aviation Alternative: 1.04 MGD; Aviation with Mixed Use Alternative: 0.93 MGD; Non-Aviation Alternative: 1.02 MGD. These differences should be reconciled in the FEIS.

31 12.5 4. (p. 4-95) Refer to comment for page S-15. Because the regional aquifer is in a state of overdraft, any increase in water use would be a significant, even if only an incremental, impact. In addition, an analysis of the action's potential cumulative significance should be addressed in the FEIS.

SOLID WASTE / HAZARDOUS WASTE COMMENTS

32 9.1 1. (p. 1-3) The FEIS should include a brief discussion on the opportunities available for pollution prevention, energy conservation, and waste minimization. It is the EPA's position that those objectives should be integrated into the analysis as part of the physical, economic and political aspects of the proposed action.

33 9.2 2. (p. 3-40) The discussion on solid waste indicates that on-base refuse is hauled to a "county landfill." The following paragraphs focus on the Highway 59 Landfill north of Merced. If the unidentified "county landfill" and the Highway 59 landfill are the same, this information should be clearly stated in the text of the FEIS.

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Document 8

-2-

Theresa Green
AFCEE/ESEM
8106 Chennault Road
Brooks AFB, TX 78235-5318

February 4, 1994

RE: CASTLE AIR FORCE BASE
"DRAFT" ENVIRONMENTAL IMPACT STATEMENT COMMENTS

5 | 5). Page 3 - 55
The following statement is made: *"In October 1984, trace amounts of TCE were detected in off-base wells in the vicinity of Wallace and Santa Fe Roads."*

10.4 | This office detected off-base TCE levels exceeding 5.0 ppb in 1980. The Air Force did not supply bottled water to affected parties until 1986.

The following statement is also made: *"Residents affected by the TCE contamination now obtain water from either the base or City of Atwater water systems."*

Residents also have filters installed by the DOD on wells for TCE removal.

6 6) Page 3 - 77

10.5 *"Blood lead levels in excess of 30 micrograms per deciliter are of concern in adults and can cause various ailments according to the Centers of Disease Control."*

Comment: Blood lead levels above 10 ug/dl in children require follow-up according to CDC.

7 7) Page 3 - 89

12.6 *"General natural water quality in the three upper water bearing units is good, with only moderate hardness and little or no chemical differences to distinguish the waters taken from different units."*

This statement is incorrect, the upper 3 water bearing stratas contain high levels of DBCP and nitrates exceeding the state maximum contaminant levels.

8 8) Page 4 - 51 Underground Storage Tanks

10.6 Because the vast majority of underground tanks are over 20 years old, and have single wall construction, this office strongly recommends closure and removal of all underground storage tanks not meeting post-1984 standards. The EIS does not discuss how the DOD will comply with state underground storage tank regulations.

Document 8

-3-

Theresa Green
AFCEE/ESEM
8106 Chennault Road
Brooks AFB, TX 78235-5318

February 4, 1994

RE: CASTLE AIR FORCE BASE
"DRAFT" ENVIRONMENTAL IMPACT STATEMENT COMMENTS

9 | 9). Solid Waste Landfills

The EIS does not address the following solid waste landfill issues:

1. The cost of capping and monitoring the landfills.
2. A comprehensive complete listing of all landfill sites.
3. The reuse of the landfill sites and impact of these sites on adjacent parcels.

10.7 Because of these issues it is the strong recommendation of this office that the landfill materials be removed from the site and the site backfilled with clean native soil.

The advantages to this are:

1. The removal of the landfill would increase the value and reuse of the landfill area and adjacent property.
2. The cost savings from long - term monitoring and closure of the site.

10 | 10). The EIS does not indicate how air pollution credits will be allocated. Merced County recommends all credits be retained by the Castle JPA. The credits will
13.14 | then be utilized when applicable for new businesses locating at the base.

If you have any questions please feel free to call me at (209) 385-7391.

Very truly yours,

Jeff Palsgaard, M.S., Director
Division of Environmental Health

JP:vm

cc: Dick Martin, CAFB JPA
Bob Smith, County Planning
Victor Izzo, RWQCB
Jim Austreng, Cal-EPA, Toxics
Lt. Col. Minns, CAFB
DOD Transition Team
Bldg. 1200
CAFB, CA 95342 5000

Document 9

CASTLE JOINT POWERS AUTHORITY

• Civil Reuse of Castle Air Force Base •

March , 1994

Lt Col Gary Baumgartel
Chief, Environmental Planning
AFCEE ESE
8106 Chennault Road
Brooks AFB, TX 78235-5318

Subject: Draft Environmental Impact Statement (EIS) - Disposal and Reuse of Castle Air Force Base, CA January 1994

Dear Col Baumgartel:

The following comments related to subject document are provided for your consideration.

5.3 The EIS reflects population/employment figures based on a Region of Influence (ROI) that includes Stanislaus County. Therefore, Air Force projections under each proposed reuse option examined do not reflect the real impacts to be experienced in Merced County when the base closes.

Specific Discrepancies

2 | 1. The population ROI combines Stanislaus County's 350,000+ population with Merced's
18.1 | 190,000. Thus, the loss of base population is compared as a percentage of total population.

3 | 2. Ninety-nine percent of those departing the area due to base closure live in Merced
18.2 | County, yet, this loss is diluted in terms of impacts on housing and public services required.

4 | 3. Employment figures in the general discussion reflect growth in the entire ROI. There is specific proposed options, a discussion potential jobs to be created on base by each option.
18.3 | The overall impression is that the region will sustain jobs growth (thanks to industrialized Stanislaus County) but the reuse of Castle under any option will not produce enough jobs to replace the departing military and civilian workforce.

5 | 4. The fiscal premises and projections for Merced County were based on 1989-91 data which showed for 1991 a Fund Balance figure of $23,237,240. This figure was
18.4 | misinterpreted because it included restricted funds which are not usable as general use

Document 9

5 dollars, e.g. $8.5 million in food stamp reserves. The correct figure for 1991 is $534,099 and for 1993 the fund reflects a deficit of $114,802. The report estimates a negative
18.4 | $12,000,000 fiscal impact on County revenues and assumes this negative will have to be absorbed in service reductions and reduction in fund balances.

6 | 5. The report does not address historical or current unemployment (15-20 percent) in Merced County or the percent of existing population already receiving some form of
18.5 public assistance (38%). Further, the report does not factor in potential closure impacts on our federally ignored refugee population.

7 | Mitigation Measures

The mitigation measures do not provide the detail necessary to assist local agencies in understanding the extent of infrastructure improvements and other which must be incurred from base closure and reuse. While we can expect a plan-level environmental analysis such as this EIS to defer certain project-specific studies to the time when individual projects come forward for consideration, it should be recognized that these projects will require mitigation. The draft EIS does not provide sufficient direction on the overall [illegible] of mitigation.

For example, the EIS traffic section recommends as mitigation that improvements to Santa Fe Drive would be required before the year 2000, and suggests a range of alternatives such as street widening, access controls and intersection upgrades. These suggested improvements do not reflect the results of an in-depth transportation analysis, such as we would expect to find in a document of this scale. A more appropriate mitigation measure would be to define exactly which of these improvements should occur, with specifications for number of lanes, lane widths, length of acceleration lanes, exact location of where the improvements are to be and when. Timing for placement of improvements would be based on a specific date, or a threshold for average daily trips (ADT) volume. If the analysis cannot be refined sufficiently to determine specific mitigation due to the general assumptions of a plan-level environmental document, then the mitigation measure should describe that a future project-specific analysis needs to be conducted either before any [illegible] are proposed, or when the ADT reaches a certain level.

8 | Other Projects.

The degree of some expected impacts, such as on roads, may be greater due to other proposed projects in the vicinity, such as a new University of California campus, and the City of Merced's northerly developments. A list of these other pending projects should be included in the [illegible] with
1.13 | an analysis of how they may intensify reuse impacts. The analysis would demonstrate that the cumulative impacts that are occurring in the future are not the responsibility of reuse actions, but can be attributed to the outside projects. These "growth-inducing" and "cumulative" impacts should be addressed in the EIS.

Document 9

Lt Col Baumgartel   March 1, 1994   pg. 3

9 **Biological Resources**

15.8 The biological resources analysis should be expanded to include a survey, based on State Fish and Game methodology, for State- listed species. Reasonable options for base reuse will be dependent upon compliance with both Federal and State Endangered Species acts.

10 **Traffic**

The EIS indicates that the 1990 MCAG traffic model was used as a base to determine existing traffic conditions. Since the MCAG model is a gravity model that has gone through a calibration process, the traffic volumes that the gravity model produces do not necessarily reflect real

7.2 conditions. It seems to us that the size and importance of this issue becomes apparent when comparing the results of the Level-of- Service (LOS) results presented in the EIS with the LOS results of the 1993 congestion management program (CMP) self-certification. Table 3.2.4 of the EIS indicates the 1990 LOS of Santa Fe Drive between Beachwood Drive and HWY. 59 to be "A"; the 1993 CAMP certification indicates the LOS for the same segment of road to be "B" for both 1989 and 1993.

11 The trip generation that was determined for the various scenarios seems excessive. The traffic study that was done for the EIS should be contained in an appendix to provide for a complete

7.3 document. What methodology was used to prevent possible doubling-counting of trips? How many of the generated trips remain internal to the site? What trip rates were used for the various uses?

12

7.4 The trip distribution percentages need to be shown for validation.

13 The proposed ten access points should not have been used in the analysis. The number of access

7.5 points into the site from Santa Fe Drive may be excessive.

14 Intersection LOS analysis needs to be done for critical intersections on the local roads and

7.6 project interior roads.

15 It is impossible to validate the data summarized in Table 4.2-1, 4.2-2, and Table J-7 a,b,c

7.7 without the support of the traffic study.

16 The mitigation measures that have been identified for transportation impacts are too generic. The

7.8 mitigation measures for transportation for the various scenarios are exactly the same. This will not assist a decision maker in choosing the appropriate alternative?

Document 9

Lt Col Baumgartel   March 1, 1994   pg. 4

17 **Storm Drainage**

The issue of storm drainage for the project site has not been addressed in adequate detail. Where

12.7 does storm drainage go? What types of treatments, if any, are necessary for storm water discharge? Are there any storm drainage detention or retention ponds on the site? Will the Merced Irrigation District continue to accept storm drainage discharge for the reuse facilities?

18 **Airport Boundary**

6.8 Since the EIS was prepared in advance of the availability of the FAA funded Airport Layout Plan, the EIS should provide disposal decision makers considerable latitude to adjust ultimate Castle Civil Airport boundaries.

19 **Federal Correction Complex**

The federal correctional complex alternative includes the WSA storage bunkers. The bunkers

6.9 were not in the Bureau of Prison's original request for base property. The EIS should include an option with the WSA storage bunkers outside the federal correctional complex.

20 **Lease-Deed Restrictions**

The EIS refers repeatedly to "lease/deed restrictions that might limit reuse options at certain locations within the base" due to environmental remediation. The community strongly believes

4.5 that such restrictions limiting a site in perpetuity should be held to an absolute minimum. Remediation sufficient to support future development and vertical construction should occur on virtually all base property.

21 **Base Closure Announcement Date**

19.5 The draft EIS incorrectly identifies January 29, 1990 as the date of base closure announcement for Castle AFB. The correct date is April 12, 1991.

22 **Community Participation**

1.14 The community strongly believes a better EIS document would result from continuous community participation in drafting the document as opposed to the current exclusionary policy

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Lt Col Baumgartel   March 1, 1994   pg. 5

The opportunity to comment is appreciated.

Sincerely,

Richard D. Martin
Executive Director

Document 10

MERCED UNION HIGH SCHOOL DISTRICT

February 22, 1994

Lt. Col. Gary Baumgartel
Chief of Environmental Planning Division
AFCEE ESE
8106 Chennault Road
Brooks Air Force Base, Texas 78235-5318

REF: Draft EIS Reuse of Castle AFB, Merced, California

Dear Lt. Baumgartel:

In response to the notice of a comment and inquiry period regarding the Draft Environmental Impact Statement on the Disposal and Reuse of Castle Air Force Base, Merced County, California, the Merced Union High School District wants to provide you the following information for inclusion in the final EIS.

The Merced Union High School District Board of Trustees acted to cooperate with the local Joint Powers Authority preparing the base reuse plan in September 1993 for the purpose of obtaining real property and facilities at Castle Air Force Base (CAFB) for school district use. Attached is a copy of the staff report and minutes indicating the action of the board for that meeting.

Subsequently the school district learned that appropriate action to acquire CAFB property is to apply to the Federal Department of Education. The district has communicated its interest to the Department of Education and received an application packet to request facilities at CAFB. The high school district board of trustees is scheduled to act to officially apply by resolution for acquisition of property at CAFB on March 9, 1994. To provide you further definition of the district's request, the first portion of the draft district application for property is attached.

This proposal will be considered by the Castle Joint Powers Authority on Thursday, February 24, 1994 evening for the first time.

Document 10

Please take whatever steps are necessary to address the high school district proposal in the EIS so that inadequate environmental review is not an obstacle to the district achieving acquisition of facilities at CAFB. If you need more information contact me at (209) 385-6558.

Respectfully submitted,

Michael Belluomini

Michael Belluomini
Director of Facilities Planning

MB:sd

Attachments

cc: Letter only

George E. Hoops, Director Real Property Assistance U.S. Dept. of Education (206) 220-7815
Dick Martin, Administrator, CAFB JPA (209) 357-3370
Lt. Col. Bruce Munk, Project Director, Base Closure and Realignment (209) 726-4748
Ron Tiffee, County Superintendent of Schools (209) 385-8300
Bill Tilley, Superintendent, MUHSD (209) 385-6412
Jan Moser, President, Merced Junior College (209) 384-6000

Document 11

worldwide aeros corporation

February 23, 1994

Mr. Gary Baumgartel
Chief of Environmental Planning Division
AFCEE-ESE,
8106 Chennault Road
Brooks Air Force Base
Texas 78235-5318

Dear Mr. Baumgartel:

We have carefully studied the report on the alternative uses of Castle Air Force Base and we appreciate the comprehensive analysis done on this issue.

We would like to offer for your consideration yet another viable alternative use for the AFB.

We believe that it would be practical to create the airship development, construction and testing center at Castle AFB.

Worldwide Aeros Corporation have many years of experience in the design and manufacture of airships and aerostats which have multi-functional uses and applications. Among other technologies, Aeros designed and developed airborne platforms for ecological monitoring in Eastern Europe which were used to study transboundary air pollution, and systems for radiation monitoring in the area of Chernobyl accident.

Currently, Aeros has six branches operating in Europe and the main facility located in Atwater, California, where we are setting up the production of airships and aerostats.

Relocation of our manufacturing facility to Castle would considerably increase our production volume because of the many advantages the AFB has, such as hangars and other buildings, suitable for the airship manufacture, testing grounds, runways, maintenance personnel which could be involved in the airship construction.

We would like to emphasize that the location of the airship manufacturing center at Castle would constitute no hazard to the environment because this technology is environmentally sound.

Recently Worldwide Aeros Corporation developed two airship modifications. Each of them can be customized according to its future use.

aeros

Document 11

The first airship is a cargo and passenger carrier the other has been designed for the ecological research. Both models have similar structure but the interior design and equipment installed are different.

The second airship will house an ecological laboratory which will have many applications in the area of atmosphere monitoring, transboundary air pollution control, identification of sources of pollution, creation of the ecological maps for air certification in different regions.

With the establishment of the airship production center at Castle another alternative use of the AFB will become possible: to create the world's first atmosphere certification center to determine horizontal and vertical distribution of pollutants and establish the compliance of each region with the required norms, effective in the region being certified. The center will also help create spatial ecological maps of different regions and will be issuing certificates indicating the level of pollution in each region, thus placing it in a specific category.

The certificate will be a legal document the breach of which will be punished according to the laws effective in that particular region. The center will also direct the research focused on identifying sources of pollution grouped or scattered within a certified region frontiers, as well as on determining the level of pollution coming from the outer sources.

Several attempts have already been made to create a flying ecological laboratory, including those of the United Nations, but they have never been implemented.

Today this important issue can and should be addressed because the possibilities of the AFB reuse are becoming real. It has also become possible to use the experience of Worldwide Aeros Corporation - airship designer and manufacturer, as well as receive support and assistance from the EPA specialists and scientists from California universities.

We hope that you will find our proposal interesting and give us an opportunity to present it to your Office.

We will be happy to provide you with a comprehensive business plan for your review at your earliest request.

Very truly yours,

Aron [illegible], Ph.D., Professor
Head of Ecological Department

Igor Pasternak
President

Document 12

San Joaquin Valley
Unified Air Pollution Control District

April 20, 1994

Lt. Col. Gary Baumgartel
Chief of Environmental Planning Division
AFCEE-ESE, 8106 Chennault Road
Brooks Air Force Base, Texas, 78235-5318

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT DISPOSAL AND REUSE OF CASTLE AIR FORCE BASE, CALIFORNIA

The San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) has reviewed the above referenced DEIS and offers the following comments.

13.15 Page 3-95 "Currently the entire SJVAB is designated by the U.S. EPA as being in attainment of the NAAQS for SO_2, CO and NO_2 ..." The following San Joaquin Valley metropolitan areas of Fresno, Modesto and Stockton are designated as being nonattainment/moderate for CO by the U.S. EPA. Changes should be made to reflect this status in the FEIS.

Based on a comparison of reuse related transportation impacts on Page S-5, Table S-1 the Non-Aviation Alternative would allow for the least number of trips associated with the reuse of the base. The Aviation with Mixed Use Alternative is similar in the number of Average Daily Trips (ADT) for the year 2015 however, there is a significant difference (nearly a 2-to-1 ratio) in ADT for the analysis year 2000. The Proposed Action results in nearly 60% more trip generation over the Non-Aviation Alternative for the year 2000.

The analysis for the years 2005 and 2015 show the Proposed Action as resulting in 35% and 13% more trip generation respectively, when compared to the Non-Aviation Alternative. Based on the information provided, the Castle Aviation Alternative and the Commercial Aviation Alternative would each result in significantly higher trip generation rates and from an air quality perspective be excessive unless a considerable effort was made to reduce corresponding trips.

Reuse-related emissions in Table S-2, page S-16 show that the option with the least detrimental impact on air quality is the Non-Aviation Alternative. If implemented, this alternative will result in 53% less ROG, 81% less NO_x, 52% less PM_{10}, and 54% less carbon monoxide emissions. The Non-Aviation Alternative is substantially superior to the Proposed Action from an air quality standpoint. The Non-Aviation Alternative is also superior to the Commercial Aviation and the Aviation with Mixed Use Alternatives.

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The Castle Aviation Center Alternative involves an even greater amount of air pollution when compared to the Proposed Action and therefore would be the most detrimental of all the possible project scenarios to the San Joaquin Valley Air Basin (SJVAB).

2
13.16 While the USAF states that mitigation will be "borne by future property recipients or local government agencies", the USAF should discuss the proposed mitigation in more detail and provide a framework from which the beneficiaries of Castle AFB can implement the programs mentioned to lessen air quality impacts. Doing this will allow for a more defined set of mitigation measures to go forward from the FEIS and allow for a smoother conversion and reuse process.

Although reuse related emissions are shown to be less than preclosure conditions (with the exception of the CAC Alternative), a concerted effort should be made to reduce project emissions when development occurs, as outlined below:

The following items are rules that have been adopted by the SJVUAPCD to reduce emissions throughout the San Joaquin Valley, and are required (see enclosed):

- District Rule 4901 - Residential Wood Burning regulates the sale, installation and transfer of wood burning devices, and establishes a public education and voluntary wood burning curtailment program intended to reduce emissions of carbon monoxide and PM_{10}.
- District Rule 4902 - Residential Water Heaters regulates the sale and installation of natural gas-fired water heaters to limit the emissions of oxides of nitrogen.
- District Regulation VIII - Fugitive Dust Rules is a series of rules designed to reduce PM_{10} emissions generated by human activity, including but not limited to construction, road building, bulk materials storage and landfill operations.

The following items are suggested, but not required by the SJVUAPCD to further reduce emissions that may ultimately result from development enabled by this project application. The applicant should be provided a copy of these measures and encouraged to incorporate those that are feasible into the project design:

- Housing units should be oriented to utilize passive solar cooling and heating to the fullest extent possible
- Conventional open-hearth and zero-clearance fireplaces that do not meet EPA Phase II certification should be discouraged.

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2
13.16
- Trees should be carefully selected and located (generally on the southern and western exposure) to shade structures during the hot summer months. Deciduous trees should be used since they help cool in the summer and allow sun to reach the house during cold winter months.
- Natural gas lines (if applicable) and electrical outlets should be installed in backyards or patio areas to encourage use of gas and/or electric barbecues.
- Electrical outlets should be installed around the exterior of the home to encourage electric lawn mowers, edgers, etc.

The following Air Quality Mitigation Measures for industrial, retail and service, office and institutional projects should be included:

- Pedestrian Access - Provide direct pedestrian access to the main entrance of the project from existing or potential public transit stops and the sidewalk. Such access should consist of paved walkways, ramps, or stairways and should be physically separated from parking areas and vehicle access routes.
- Preferential Parking for Ridesharers - Provide priority parking for employees who rideshare
- Bicycle Enhancements - Provide bicycle racks, and consider enclosed and locked bicycle storage.
- Showers and Lockers - Employee shower and locker areas should be constructed for bicycle and pedestrian commuters. Consider providing one full size locker per ten employees.
- Eating Areas - Provide on-site cafeteria services, lounge, and eating areas.
- On-site Banking and Postal Services - Provide on-site automatic teller machines (ATMs) and postal services.
- On-site Child Care - Provide on-site child care facilities.
- On-site Bus Turnouts - Where transit service exist, construct on-site bus turnouts and loading areas with shelters acceptable to the local transit provider at a location acceptable to the provider. Shelters should include benches and bus schedules.
- Transit Easements - Where transit does not exist, but the project is within the transit district's sphere of influence, provide a site at a location acceptable to the transit provider for bus turnouts and shelters.

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2
13.16 The SJVUAPCD suggests that the project applicant take all feasible measures to reduce the amount of dust (fine particulate matter-PM_{10}) in addition to Regulation VIII. Feasible measures should also be taken to minimize ozone precursors (Reactive Organic Gases (ROG) and Oxides of Nitrogen (NO, NO_x)) that will result from construction of this project. Specifically, the District suggests that the following Mitigation Measures be included as part of project approval

- All material excavated, graded or otherwise disturbed should be sufficiently watered to prevent excessive amounts of dust. Watering should occur at least twice daily with complete coverage, preferably in the late morning and after work is done for the day
- All clearing, grading, earth moving, or excavation activities should cease when wind speeds are equal to or greater than 20 mph
- On-site vehicle speed should be limited to 15 mph

Ozone Precursors-Ozone precursor emissions should be controlled by the following methods

- All internal combustion engine driven equipment should be properly maintained and tuned according to manufacturers specifications
- Idling of all internal combustion equipment shall be limited to ten minutes at any given time
- Use of building materials that do not require the use of paints solvents

The California Clean Air Act (CCAA) mandates the SJVUAPCD as a nonattainment area for ozone, PM_{10} and CO to reduce these pollutants by five percent annually until standards are met, or to take all feasible measures to reach attainment as soon as is practicable. District staff is available to confer with interested parties to further identify appropriate mitigation measures that may be feasible for short-term (construction) and long-term (operational) phases of reuse activities.

Thank you for the opportunity to comment on this project. If you have any questions or require further information, please call me at 545-7000

Sincerely,

David J. Stagnaro
Environmental Planner
Northern Region

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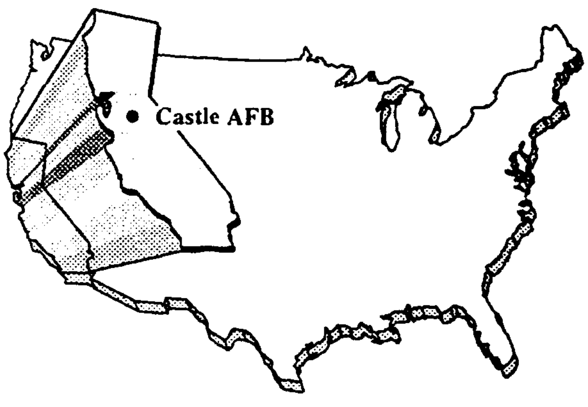
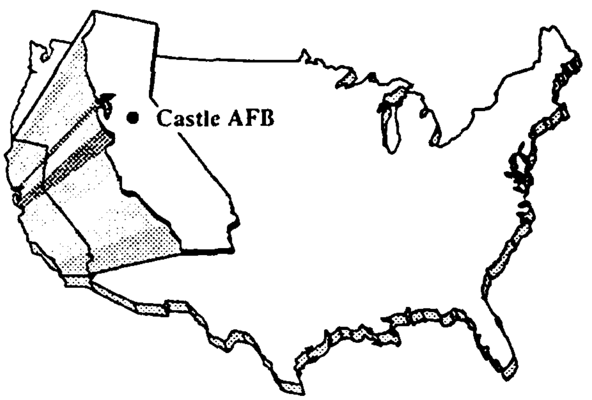


APPENDICES



APPENDIX A

APPENDIX A

GLOSSARY OF TERMS AND ACRONYMS/ABBREVIATIONS

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GLOSSARY OF TERMS AND ACRONYMS/ABBREVIATIONS

GLOSSARY OF TERMS

Acoustics. The science of sound that includes the generation, transmission, and effects of sound waves, both audible and inaudible.

Accredited Asbestos Professional. Air Force Bioenvironmental Engineer or any other professional who is accredited through U.S. Environmental Protection Agency's asbestos model accreditation plan or other equivalent method.

Advisory Council on Historic Preservation. A 19-member body appointed, in part, by the President of the United States to advise the President and Congress and to coordinate the actions of federal agencies on matters relating to historic preservation, to comment on the effects of such actions on historic and archaeological cultural resources, and to perform other duties as required by law (Public Law 89-655; 16 U.S. Code §470).

Aesthetics. Referring to the perception of beauty.

Aggregate. Materials such as sand, gravel, or crushed stone used for mixing with a cementing material to form concrete or alone as railroad ballast or graded fill.

Aircraft operation. A takeoff or landing at an airport.

Airport Traffic Area. Airspace within a radius of 5 statute miles of an airport with an operating control tower, encompassing altitudes between the surface and 3,000 feet above ground level, in which an aircraft cannot operate without prior authorization from the control tower.

Alluvium. Clay, silt, sand, gravel or similar material deposited by running water.

Ambient air quality standards. Standards established on a state or federal level that define the limits for airborne concentrations of designated "criteria" pollutants (nitrogen dioxide, sulfur dioxide, carbon monoxide, total suspended particulates, ozone, and lead) to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility, and materials (secondary standards).

Aquifer. The water-bearing portion of subsurface earth material that yields or is capable of yielding useful quantities of water to wells.

Arterial. Signalized street that serves primarily through-traffic and provides access to abutting properties as a secondary function.

Asbestos. A group of naturally occurring minerals that separate into fibers, including chrysotile, amosite, crocidolite, asbestiform anthophyllite, asbestiform tremolite, and asbestiform actinolite.

Asbestos-containing material (ACM). Any material containing more than one percent asbestos.

Attainment area. A region that meets the National Ambient Air Quality Standards for a criteria pollutant under the Clean Air Act or meets state air quality standards.

Average annual daily traffic (AADT). For a 1-year period, the total volume passing a point or segment of a highway facility in both directions, divided by the number of days in the year.

A-weighted sound level. A number representing the sound level that is frequency weighted according to a prescribed frequency response established by the American National Standards Institute (ANSI S1.4-1971) and accounts for the response of the human ear.

Baseline. A line that serves as the basis for comparison.

Biophysical. Pertaining to the physical and biological environment, including the environmental conditions crafted by man.

Biota. The plant and animal life of a region.

Capacity. The maximum rate of flow at which vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic, and control conditions.

Carbon monoxide (CO). A colorless, odorless, poisonous gas produced by incomplete fossil-fuel combustion. One of the six pollutants for which there is a national ambient standard. See criteria pollutants.

Class I, II, and III Areas. Area classifications, defined by the Clean Air Act, for which there are established limits to the annual amount of air pollution increase. Class I areas include international parks and certain national parks and wilderness areas; allowable increases in air pollution are very limited. Air pollution increases in Class II areas are less limited, and are least limited in Class III areas. Areas not designated as Class I start out as Class II and may be reclassified up or down by the state, subject to federal requirements.

Commercial aviation. Aircraft activity licensed by state or federal authority to transport passengers and/or cargo for hire on a scheduled or nonscheduled basis.

Community Noise Equivalent Level (CNEL). Noise Compatibility level established by California Administrative Code, Title 21, Section 5000. The 24-hour average A-weighted sound level with a 5 decibel (dB) weighting added to levels occurring between 7:00 p.m. and 10:00 p.m., and a 10 dB weighting added to levels occurring between 10:00 p.m. and 7:00 a.m.

Conference. The U.S. Fish and Wildlife Service coordination process required for a federal agency action that may affect any species proposed for formal federal threatened or endangered status.

Conformity Offsets. Conformity offsets include emission reduction credits (ERCs) and emission reductions that may not qualify as ERCs under local air district rules. Conformity offsets can include emission reductions from additional sources other than ERCs, such as aircraft operations and employee motor vehicle commutes to and from work. Conformity offsets generally cannot be derived from emission sources that are beyond an agency's control, such as off-duty employee motor vehicle trips for shopping or other personal errands.

Consultation. The U.S. Fish and Wildlife Service coordination process required for a federal agency action that may affect any federally threatened or endangered species or its critical habitat.

Contaminants. Undesirable substances rendering something unfit for use

Continental Control Area The airspace of the 48 contiguous states, the District of Columbia, and Alaska (excluding the Alaska peninsula west of longitude 160° 00'00" W), at and above 14,500 feet above mean sea level, not including (1) the airspace less than 15,000 feet above the surface of the earth or (2) prohibited and restricted areas, other than those listed in Federal Aviation Regulation Part 71

Control Zone. Controlled airspace that extends upward from the surface of the earth and terminates at the base of the continental control area. Control zones that do not underlie the continental control area have no upper limit. A control zone may include one or more airports and is normally a circular area with a radius of 5 statute miles and any extensions necessary to include instrument approach and departure paths.

Convey. To deliver title of property.

Corrosive. A material that has the ability to cause visible destruction of living tissue and has a destructive effect on other substances. An acid or a base.

Council on Environmental Quality (CEQ). Established by the National Environmental Policy Act (NEPA), the CEQ consists of three members appointed by the President. CEQ regulations (40 CFR 1500-1508, as of July 1, 1986) describe the process for implementing NEPA, including preparation of environmental assessments and environmental impact statements, and the timing and extent of public participation.

Criteria pollutants. The Clean Air Act required the U.S. Environmental Protection Agency to set air quality standards for common and widespread pollutants after preparing "criteria documents" summarizing scientific knowledge on their health effects. Today there are standards in effect for six "criteria pollutants:" sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter equal to or less than 10 microns in diameter (PM_{10}), nitrogen dioxide (NO_2), ozone (O_3), and lead (Pb).

Cultural resources. Prehistoric and historic districts, sites, buildings, objects, or any other physical evidence of human activity considered important to a culture, subculture, or a community for scientific, traditional, religious, or any other reason.

Cumulative impacts. The combined impacts resulting from all activities occurring concurrently at a given location.

Day-Night Average Sound Level (DNL). The 24-hour average-energy sound level expressed in decibels, with a 10-decibel penalty added to sound levels between 10:00 p.m. and 7:00 a.m. to account for increased annoyance due to noise during night hours.

Decibel (dB). A unit of measurement on a logarithmic scale that describes the magnitude of a particular quantity of sound pressure or power with respect to a standard reference value.

Defense Environmental Restoration Account (DERA). Department of Defense account from which Installation Restoration Program (IRP) activities are funded.

Disposal. Legal transfer of Air Force property to other ownership.

Easement. A right or privilege (agreement) that a person may have on another's property.

Effluent Waste material discharged into the environment

Emission Reduction Credits (ERCs) ERCs as a subset of conformity offsets are emission reductions traditionally derived from the shutdown or reduced operation of stationary sources and in limited circumstances from certain mobile sources such as scrapped motor vehicles

Endangered species A species that is threatened with extinction throughout all or a significant portion of its range

Enplanement One person boarding an aircraft for the purpose of air travel Includes both originating and connecting passengers

Environmental Impact Analysis Process (EIAP) The process of conducting environmental studies as outlined in Air Force Regulation 19-2

Erosion. Wearing away of soil and rock by weathering and the action of streams wind and underground water

Excess Property. Property that is reported to the General Services Administration as no longer required by a federal agency This property is then made available to all other federal agencies

Fault. Fracture in earth's crust accompanied by a displacement of one side of the fracture with respect to the other and in a direction parallel to the fracture

Fleet mix. Combination of aircraft used by a given agency.

Frequency. The time rate (number of times per second) that the wave of sound repeats itself, or that a vibrating object repeats itself--now expressed in Hertz (Hz), formerly in cycles per second (cps).

Friable. Easily crumbled or reduced to powder.

Fungicide. Any substance that kills or inhibits the growth of fungi.

General aviation. All aircraft which are not commercial or military aircraft.

Groundwater. Water within the earth that supplies wells and springs.

Groundwater basin. Subsurface structure having the character of a basin with respect to collection, retention, and outflow of water.

Habituate. To become accustomed to frequent repetition or prolonged exposure.

Hazardous material. Generally, a substance or mixture of substances that has the capability of either causing or significantly contributing to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or posing a substantial present or potential risk to human health or the environment.

Hazardous waste. A waste, or combination of wastes, which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either cause or significantly contribute to, an increase in mortality or an increase in serious irreversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated stored transported disposed of, or otherwise managed. Regulated under the Resource Conservation and Recovery Act (RCRA).

Herbicide. A pesticide either organic or inorganic, used to destroy unwanted vegetation, especially various types of weeds, grasses, and woody plants.

Hydrocarbons. Any of a vast family of compounds containing hydrogen and carbon. Used loosely to include many organic compounds in various combinations; most fossil fuels are composed predominately of hydrocarbons. When hydrocarbons mix with nitrogen oxides in the presence of sunlight, ozone is formed; hydrocarbons in the atmosphere contribute to the formation of ozone.

Impacts (effects). An assessment of the meaning of changes in all attributes being studied for a given resource; an aggregation of all the adverse effects, usually measured using a qualitative and nominally subjective technique. In this EIS, as well as in the CEQ regulations, the word impact is used synonymously with the word effect.

Infrastructure. The basic installations and facilities on which the continuance and growth of a local community depend (e.g., roads, schools, powerplants, transportation and communication systems, etc.).

Interstate. The designated National System of Interstate and Defense Highways located in both rural and urban areas; they connect the East and West coasts and extend from points on the Canadian border to various points on the Mexican border.

Lead (Pb). A heavy metal used in many industries, which can accumulate in the body and cause a variety of negative effects. One of the six pollutants for which there is a national ambient air quality standard. See *criteria* pollutants.

L_{eq}. The equivalent steady state sound level that, in a stated period of time, would contain the same acoustical energy as time-varying sound level during the same period.

Level of Service (LOS). In transportation analyses, a qualitative measure describing operational conditions within a traffic stream and how they are perceived by motorists and/or passengers. In public services, a measure describing the amount of public services (e.g., fire protection and law enforcement services) available to community residents, generally expressed as the number of personnel providing the services per 1,000 population.

Lithic. Pertaining to stone material.

L_{max}. The highest A-weighted sound level observed during a single event of any duration.

Loam, loamy. Rich, permeable soil composed of a mixture of clay, silt, sand, and organic matter.

Loudness. The qualitative judgment of intensity of a sound by a human being.

Magnitude. Richter scale logarithmic measurement of the energy released by an earthquake.

Masking. The action of bringing one sound (audible when heard alone) to inaudibility or to unintelligibility by the introduction of another sound.

Military Operations Areas. Airspace areas of defined vertical and lateral limits established for the purpose of separating certain training activities, such as air combat maneuvers, air intercepts, and acrobatics, from other air traffic operating under instrument flight rules.

Mineral. Naturally occurring inorganic element or compound.

Mineral resources. Mineral deposits that may eventually become available, known deposits not recoverable at present or yet undiscovered.

Mitigation. A method or action to reduce or eliminate program impacts.

Multi-family housing. Townhouse or apartment units that accommodate more than one family though each dwelling unit is only occupied by one household.

National Ambient Air Quality Standards (NAAQS). Section 109 of the Clean Air Act requires the U.S. EPA to set nationwide standards, the National Ambient Air Quality Standards, for widespread air pollutants. Currently, six pollutants are regulated by primary and secondary NAAQS: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter (PM_{10}), and sulfur dioxide. See criteria pollutants.

National Environmental Policy Act (NEPA). Public Law 91-190, passed by Congress in 1969. The Act established a national policy designed to encourage consideration of the influences of human activities (e.g., population growth, high-density urbanization, industrial development) on the natural environment. NEPA also established the CEQ. NEPA procedures require that environmental information be made available to the public before decisions are made. Information contained in NEPA documents must focus on the relevant issues in order to facilitate the decision-making process.

National Priorities List (NPL). A list of sites (federal and state) where releases of hazardous materials may have occurred and may cause an unreasonable risk to the health and safety of individuals, property, or the environment.

National Register of Historic Places (NRHP). A register of districts, sites, buildings, structures, and objects important in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior under authority of Section 2(b) of the Historic Sites Act of 1935 and Section 101(a)(1) of the National Historic Preservation Act of 1966, as amended.

Native Americans. Used in a collective sense to refer to individuals, bands, or tribes who trace their ancestry to indigenous populations of North America prior to Euro-American contact.

Native vegetation. Plant life that occurs naturally in an area without agricultural or cultivational efforts. It does not include species that have been introduced from other geographical areas and have become naturalized.

Nitrogen dioxide (NO_2). Gas formed primarily from atmospheric nitrogen and oxygen when combustion takes place at high temperature. NO_2 emissions contribute to acid deposition ("acid rain") and formation of atmospheric ozone. One of the six pollutants for which there is a national ambient standard. See criteria pollutants.

Nitrogen oxides (NO_x). Gases formed primarily by fuel combustion, which contribute to the formation of acid rain. Hydrocarbons and nitrogen oxides combine in the presence of sunlight to form ozone, a major constituent of smog.

Noise. Any sound that is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying (unwanted sound).

Noise attenuation. The reduction of a noise level from a source by such means as distance, ground effects, or shielding.

Noise contour. A line connecting points of equal noise exposure on a map. Noise exposure is often expressed using the average day-night sound level (DNL).

Nonattainment area. An area that has been designated by the U.S. Environmental Protection Agency or the appropriate state air qualitv agency, as exceeding one or more national or state ambient air quality standards.

100-year flood zone. Land area having a 1-percent chance of being flooded during a given year.

Operating Location (OL). An organizational element of the Air Force Base Conversion Agency located at a closing base. The OL is responsible for the care and custody of closed areas of the base, disposal of real and related personal property and environmental cleanup. This office is the primary point of contact for local community reuse organizations and the general public who deal with the disposal and reuse of the base.

Outlease. Contract by which the government transfers exclusive possession of real estate or facilities for a specified term.

Ozone (ground level). A major ingredient of smog. Ozone is produced from reactions of hydrocarbons and nitrogen oxides in the presence of sunlight and heat. Some 68 areas, mostly metropolitan areas, did not meet a December 31, 1987 deadline in the Clean Air Act for attaining the ambient air quality standard for ozone.

PCB-contaminated equipment. Equipment which contains a concentration of polychlorinated biphenyls (PCBs) (see definition) from 50 to 499 parts per million (ppm). Disposal and removal are regulated by the U.S. EPA.

PCB equipment. Equipment that contains a concentration of PCBs of 500 ppm or greater. Disposal and removal are regulated by the U.S. EPA.

PCB items. Fluids containing 5 to 49 ppm of PCBs. Regulated in California under Title 22, Chapter 30 of the CCR and Chapter 6.5 of the California Health and Safety Code.

Permeability. The capacity of a porous rock or sediment to transmit a fluid.

Pesticides. Any substance, organic or inorganic, used to destroy or inhibit the action of plant or animal pests; the term thus includes insecticides, herbicides, fungicides, rodenticides, miticides, fumigants, and repellents. All pesticides are toxic to humans to a greater or lesser degree. Pesticides vary in biodegradability.

pH. A measure of acidity or alkalinity of a substance on a scale of 0-14. Pure water (neutral) has a pH of 7. Acids have a pH less than 7; bases have a pH greater than 7.

Physiographic province. A region in which all parts are similar in geologic structure and climate.

Picocurie. Unit of radioactivity. A curie is equal to 3.7×10^{10} radioactive decay events per second; a picocurie is 1 trillionth of that amount, or 3.7×10^{-2} events per second.

Pitchblende. A mineral formed by radioactive decay, often found in sulfur-bearing veins.

Plume. An elongated mass of contaminated fluid moving with the flow of groundwater.

Polychlorinated biphenyls (PCBs). Any of a family of industrial compounds produced by chlorination of biphenyl. These compounds are noted chiefly as an environmental pollutant that accumulates in organisms and concentrates in the food chain with resultant pathogenic and teratogenic effects. They also decompose very slowly.

Potable water. Suitable for drinking.

Prehistoric. The period of time before the written record.

Prevention of Significant Deterioration (PSD). In the 1977 Amendments to the Clean Air Act, Congress mandated that areas with air cleaner than required by National Ambient Air Quality Standards must be protected from significant deterioration. The Clean Air Act's PSD program consists of two elements: requirements for best available control technology on major new or modified sources, and compliance with an air quality increment system.

Prevention of Significant Deterioration Area. A requirement of the Clean Air Act that limits the increases in ambient air pollutant concentrations in attainment areas to certain increments even though ambient air quality standards are met.

Primary roads. A consolidated system of connected main roads important to regional, statewide, and interstate travel; they consist of rural arterial routes and their extensions into and through urban areas of 5,000 or more population.

Prime farmland. Agricultural lands protected from conversion by the U.S. Department of Agricultural due to their optimal physical and chemical characteristics for production of crops.

Quartz. A hard, crystalline, vitreous mineral silicon dioxide (SiO_2) occurring abundantly as a component of granite and sandstone or as various pure crystals.

Quaternary. One most recent geologic period, beginning approximately 2 million years before the present.

Recent. The geologic time period from approximately 10,000 years ago to the present and the rocks and sediment deposited during that time.

Riparian. Of or on the bank of a natural course of water.

Sediment. Material deposited by wind or water.

Seismicity. Relative frequency and distribution of earthquakes.

Single-Family Housing. A conventionally built house consisting of a single dwelling unit occupied by one household.

Site. As it relates to cultural resources, any location where humans have altered the terrain or discarded artifacts.

Sludge. A heavy, slimy deposit, sediment, or mass resulting from industrial activity; solids removed from wastewater.

Soil association. Two or more soils occurring together in a characteristic pattern.

Soil series. A group of soils having similar parent materials, genetic horizons, and arrangement in the soil profile.

Solvent. A substance that dissolves or can dissolve another substance.

State Historic Preservation Officer (SHPO). The official within each state, authorized by the state at the request of the Secretary of the Interior, to act as liaison for purposes of implementing the National Historic Preservation Act.

Sulfur dioxide (SO_2). A toxic gas that is produced when fossil fuels, such as coal and oil, are burned. SO_2 is the main pollutant involved in the formation of acid rain. SO_2 also can irritate the upper respiratory tract and cause lung damage. During 1980, some 27 million tons of sulfur dioxide were emitted in the United States, according to the Office of Technology Assessment. The major source of SO_2 in the United States is coal-burning electric utilities.

Surplus property. Property designated as excess that is of no interest to any federal agency. These properties are made available to state, local or non-profit organizations or sold to private organizations.

Terminal Control Area (TCA). Controlled airspace extending upward from the surface or higher to specified altitudes, within which all aircraft are subject to operating rules (i.e., altitudes, direction of flight, etc.) and equipment requirements.

Therm. A measurement of units of heat.

Threatened Species. Plant and wildlife species likely to become endangered in the foreseeable future.

Total Suspended Particulates (TSP). The particulate matter in the ambient air. The previous national ambient air quality standard for particulates was based on TSP levels; it was replaced in 1987 by an ambient standard based on PM_{10} levels.

Transfer. Deliver U.S. government property accountability to another federal agency.

Transition area. Controlled airspace extending 700 feet or more upward from the surface of the earth when designated in conjunction with an airport for which an approved instrument approach procedure has been prescribed; or from 1,200 feet or more above the surface of the earth when designated in conjunction with airway route structures or segments. Unless otherwise specified, transition areas terminate at the base of the overlying controlled airspace.

Unique Farmland. Agricultural lands protected from conversion by the U.S. Department of Agricultural due to their value for production of specific or high economic value crops.

U.S. Environmental Protection Agency (U.S. EPA). The independent federal agency, established in 1970. that regulates federal environmental matters and oversees the implementation of federal environmental laws.

Vernal pool. An ephemeral natural community occurring in a topographically shallow depression underlain by an impervious hardpan. Vernal pools support a unique collection of plants and animals specially adapted to a seasonal cycle of inundation and desiccation.

Waters of the United States. Waters that are subject to Section 404 of the Clean Water Act. These include both deep water aquatic habitats and special aquatic sites, including wetlands. Jurisdictional wetlands include those that are isolated, part of intermittent streams, or that are adjacent to waters that are, or eventually flow into, interstate or navigable waters.

Wetlands. Areas that are inundated or saturated with surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil. This classification includes swamps, marshes, bogs, and similar areas. Jurisdictional wetlands are those wetlands that meet the vegetation, hydric soils, and wetland hydrology criteria under normal circumstances (or meet the special circumstances as described in the U.S. Army Corps of Engineers 1987 wetland delineation manual where one or more of these criteria may be absent) and are a subset of "waters of the United States."

Zoning. The division of a municipality (or county) into districts for the purpose of regulating land use, types of building, required yards, necessary off-street parking, and other prerequisites to development. Zones are generally shown on a map and the text of the zoning ordinance specifies requirements for each zoning category.

ACRONYMS/ABBREVIATIONS

AADT	average annual daily traffic
AAFES	Army Air Force Exchange System
ACC	Air Combat Command
ACM	asbestos-containing material
ADT	average daily traffic
AFB	Air Force Base
AFBCA	Air Force Base Conversion Agency
AFR	Air Force Regulation
AHERA	Asbestos Hazard Emergency Response Act
AICUZ	Air Installation Compatible Use Zone
ALP	Airport Layout Plan
ALUC	Airport Land Use Commission
APE	Area of Potential Effect
APZ	Accident Potential Zone
AQAP	Air Quality Attainment Plan
ARB	Air Resources Board
ARSA	Airport Radar Service Area
ARTCC	Air Route Traffic Control Center
ARWTP	Atwater Regional Wastewater Treatment Plant
ASR	airport surveillance radar
AT&SF	Atchison, Topeka and Santa Fe Railway
ATC	air traffic control
ATCAA	air traffic control assigned area
B.P.	before present (1950)
BACT	best available control technology
BARCT	best available retrofit control technology
BASH	Bird Aircraft Strike Hazard
BMP	Best Management Practice
BMW	Bombardment Wing
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAAQS	California Ambient Air Quality Standards
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGSTA	California Golden State Trapshooting Association
CJPA	Castle Joint Powers Authority
CMP	Congestion Management Plan
CNDDB	California Natural Diversity Data Base

CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CPSC	Consumer Product Safety Commission
CSC	California Department of Fish and Game Species of Special Concern
CZ	Clear Zone
dB	decibels
DBCP	1,2-dibromo, 3-chloropropane
DBCRA	Defense Base Closure and Realignment Act
DD	Decision Document
DEIS	Draft Environmental Impact Statement
DERP	Defense Environmental Restoration Program
DHS	Department of Health Services (California)
DNL	day-night weighted average sound level
DOD	Department of Defense
DOPAA	Description of the Proposed Action and Alternatives
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
DTSC	Department of Toxic Substances Control (California)
°F	degree Fahrenheit
EDMS	Emissions and Dispersions Modeling System
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ERC	emission reduction credit
FAA	Federal Aviation Administration
FBO	fixed base operator
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FFA	Federal Facility Agreement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FPMR	Federal Property Management Regulations
FS	Feasibility Study
GSA	General Services Administration
HABS/HAER	Historic American Building Survey/Historic American Engineering Record
HAPs	hazardous air pollutants
HCM	Highway Capacity Manual
HHS	U.S. Department of Health and Human Services
HIRL	High Intensity Runway Lighting
HMTA	Hazardous Materials Transportation Act
HUD	U.S. Department of Housing and Urban Development
IFR	instrument flight rules
ILS	Instrument Landing System

INM	Integrated Noise Model
IRP	Installation Restoration Program
kV	kilovolt
kw	kilowatt
L_{dn}	day-night average sound level
L_{eq}	equivalent sound level
L_{max}	A-weighted maximum sound level
LOS	Level of Service
MARTS	Merced Area Regional Transit Service
MCAG	Merced County Association of Governments
$\mu g/m^3$	micrograms per cubic meter
MGD	million gallons per day
MIRL	medium intensity runway lighting
mph	miles per hour
MRDS	Mineral Resources Data System
MSL	mean sea level
MVA	megavolt ampere
MWH	megawatt-hours
MWTP	Merced Wastewater Treatment Plant
NAAQS	National Ambient Air Quality Standards
NAS	Naval Air Station
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NLR	Noise Level Reduction
NO	nitric oxide
NO_2	nitrogen dioxide
NO_3	nitrogen trioxide
N_2O	nitrous oxide
N_2O_3	nitrous anhydride
N_2O_4	nitrogen tetroxide
N_2O_6	nitric anhydride
NOI	Notice of Intent
NOISEMAP	Noise Exposure Model
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
O_3	ozone
OL	Operating Location
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PA	Preliminary Assessment

PAPI	Precision Approach Path Indicator
PA/SI	Preliminary Assessment/Site Investigation
PCB	polychlorinated biphenyl
pCi/l	picocuries per liter
PEL	permissible exposure limit
PG&E	Pacific Gas and Electric Company
P.L.	Public Law
PM_{10}	respirable particulate matter equal to or less than 10 microns in diameter
POL	petroleum, oil, and lubricants
PP	Proposed Plan
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
RA	Remedial Action
RAPCON	Radar Approach Control
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
REIL	Runway End Identifier Lighting
RI/FS	Remedial Investigation/Feasibility Study
RI	Remedial Investigation
ROD	Record of Decision
ROG	reactive organic gases
ROI	Region of Influence
RPZ	runway protection zone
RTP	Regional Transportation Plan
RVR	Runway Visual Range
SAC	Strategic Air Command
SARA	Superfund Amendments and Reauthorization Act
SCOU	Source Control Operable Unit
SCS	Soil Conservation Service
SEL	Sound Exposure Level
SH	State Highway
SHPO	State Historic Preservation Officer
SI	Site Investigation
SIAS	Socioeconomic Impact Analysis Study
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SO_2	sulfur dioxide
SO_x	sulfur oxides
SP	Southern Pacific
SPR	Spill Prevention and Response
SWMP	Solid Waste Management Plan
SWMU	Solid Waste Management Unit

TACAN	tactical air navigation
TCE	trichloroethylene
TD	Technology Development
TDM	Traffic Demand Management
TLF	temporary lodging facility
TRACON	terminal radar approach control
TSCA	Toxic Substances and Control Act
TSD	treatment, storage, or disposal
TSP	total suspended particulates
U.S.C.	U.S. Code
UAPCD	Unified Air Pollution Control District
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VFR	visual flight rules
VOC	volatile organic compound
VOQ	Visiting Officers' Quarters
VOR/DME	very high frequency omnidirectional range/distance measuring equipment
VPH	vehicles per hour
WAPA	Western Area Power Administration
WSA	Weapons Storage Area
WSD	Water and Sanitary District
WWTP	wastewater treatment plant

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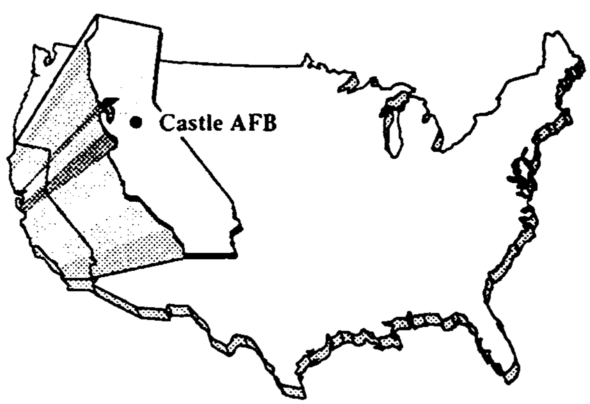

APPENDIX B

APPENDIX B

NOTICE OF INTENT

APPENDIX B

NOTICE OF INTENT

The following notice of intent was circulated and published by the Air Force in the October 9, 1991 Federal Register in order to provide public notice of the Air Force's intent to prepare an Environmental Impact Statement for Disposal and Reuse of Castle Air Force Base. This Notice of Intent has been retyped for clarity and legibility.

Please note: The point of contact for information on the disposal and reuse EISs has been changed. The new point of contact is:

Lt. Colonel Terry Armstrong
HQ AFCEE/EC
8106 Chennault Road
Brooks AFB, Texas 78235-5318

NOTICE OF INTENT
TO PREPARE ENVIRONMENTAL IMPACT STATEMENTS
FOR DISPOSAL AND REUSE OF THIRTEEN AIR FORCE BASES

The United States Air Force will prepare thirteen environmental impact statements (EISs) to assess the potential environmental impacts of disposal and reuse of the following Air Force bases recently directed to be closed under the provisions of the Defense Base Closure and Realignment Act of 1990 (Public Law 101-510, Title XXIX):

Closing Base

Bergstrom AFB, Austin, Texas

Carswell AFB, Fort Worth, Texas

Castle AFB, Merced, California

Eaker AFB, Blytheville, Arkansas

England AFB, Alexandria, Louisiana

Grissom AFB, Peru, Indiana

Loring AFB, Limestone, Maine

Lowry AFB, Denver, Colorado

Myrtle Beach AFB, Myrtle Beach, South Carolina

Richards Gebaur ARS, Kansas City, Missouri

Rickenbacker AGB, Columbus, Ohio

Williams AFB, Chandler, Arizona

Wurtsmith AFB, Oscoda, Michigan

Each EIS will address the disposal of the property to public or private entities and the potential impacts of reuse alternatives. All available property will be disposed of in accordance with provisions of Public Law 101-510 and applicable federal property disposal regulations.

The Air Force plans to conduct a scoping and screening meeting within the local area for each base during October and November 1991. Notice of the time and place of each meeting will be made available to public officials and local news media outlets once it has been finalized. The purpose of each meeting is to determine the environmental issues and concerns to be analyzed for the base disposal and reuse in that area, to solicit comments on the proposed action and to solicit proposed disposal and reuse alternatives that should be addressed in the EIS for that base. In soliciting disposal and reuse inputs, the Air Force intends to consider all reasonable alternatives offered by any federal, state, or local government agency and any federally-sponsored or private entity or individual with an interest in acquiring available property at one of the listed closing bases. The resulting environmental impacts will be considered in making disposal decisions to be documented in the Air Force's final disposal plan for each base.

To ensure the Air Force will have sufficient time to consider public inputs on issues to be included in the EISs, and disposal alternatives to be included in the final disposal plans, comments and reuse proposals should be forwarded to the address listed below by December 1, 1991. However, the Air Force will accept comments at the address below at any time during the environmental impact analysis process.

For further information concerning the study of these base disposal and reuse EIS activities, contact:

Lt. Colonel Tom Bartol
AFCEE/ESE
Norton AFB, California 92409-6448

Note: Comment date was extended from December 1, 1991 to January 2, 1992 after processing and publication of this Notice of Intent.

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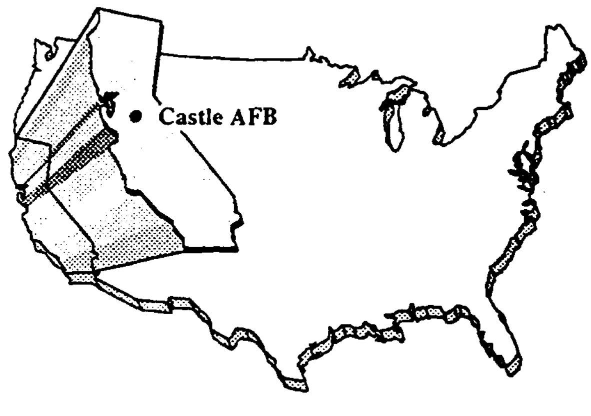

APPENDIX C

APPENDIX C

FINAL ENVIRONMENTAL IMPACT STATEMENT MAILING LIST

APPENDIX C

FINAL ENVIRONMENTAL IMPACT STATEMENT MAILING LIST

This list of recipients includes interested federal, state, and local agencies and individuals who have expressed an interest in receiving the document. This list also includes the governor of California, as well as United States senators and representatives and state legislators.

ELECTED OFFICIALS

Federal Officials

U.S. Senate

The Honorable Barbara Boxer
The Honorable Diane Feinstein

U.S. House of Representatives

The Honorable Gary Condit

State of California Officials

Governor

The Honorable Pete Wilson

State Legislature

The Honorable Dan McCorquodale
The Honorable Sal Canella

Regional/Local Officials

The Honorable Curt Andre, Mayor of Turlock
The Honorable Joan Darrah, Mayor of Stockton
The Honorable Thomas DuBose, Mayor of Chowchilla
The Honorable Joe Frontella, Mayor of Atwater
The Honorable Karen Humphrey, Mayor of Fresno
The Honorable Richard Lang, Mayor of Modesto
The Honorable Richard Bernasconi, Mayor of Merced
The Honorable Richard McBride, Mayor of Ceres
Mayor Pro Tem of Livingston

Atwater City Council, Chairman
Merced City Council, Chairman
Merced County Board of Supervisors, Mike Bogna, Chairman

GOVERNMENT AGENCIES

Federal Agencies

Administrative Services and Property Management
Office of the Secretary of Transportation
Deputy Director

Advisory Council on Historic Preservation

Bureau of Mines
Director

Center for Environmental Health & Injury Control
Special Programs Group (F29)
Centers for Disease Control

Council of Economic Advisors

Department of Agriculture
U.S. Forest Service
Environmental Coordination Office

Department of Commerce
Director, Office of Intergovernmental Affairs

Department of Commerce
Director, Economic Adjustment Division
Economic Development Authority

Department of Education
Assistant to the Deputy Under Secretary for
Intergovernmental and Interagency Affairs

Department of Energy
Division of Intergovernmental Affairs (CP-23)

Department of Health and Human Services
Office of Human Development Services

Department of Housing and Urban Development
Director, Community Management Division (CPD)

Department of Justice, Federal Bureau of Prisons
Chief, Facilities Development and Operations

Department of the Interior
National Park Service

Department of the Interior
Director, Office of Environmental Affairs

Federal Agencies (Continued)

Department of Labor
Intergovernmental Affairs

Department of Veterans Affairs
Office of the Secretary

Environmental Protection Agency
Director, Office of Federal Activities

Farmers Home Administration
Deputy Administrator for Program Operations

Federal Aviation Administration
Director, Office of Environment and Energy

General Services Administration
Assistant Commissioner
Office of Real Estate Policy and Sales (FPRS)

Small Business Administration
Director, Office of Procurement

Department of Defense

Army Corps of Engineers, Commander

Defense Technical Information Center

Department of Defense
Director, Office of Economic Adjustment

Regional Offices of Federal Agencies

Advisory Council on Historic Preservation
Director, Western Office of Project Review

Department of Commerce
Economic Development Authority
Jonathan Markley

Department of Commerce
Regional Director, Economic Development Administration

Department of Education

Department of Health and Human Services, Region IV
Community Planning and Development Division

Department of Housing and Urban Development
Environmental Officer

Regional Offices of Federal Agencies (Continued)

Department of Housing and Urban Development, Region IV
Community Planning and Development Division

Department of the Interior
Office of Environmental Affairs

Department of Transportation
Federal Aviation Administration, Western Region

Environmental Protection Agency, Region IX

Federal Emergency Management Agency

Federal Energy Regulating Commission
Regional Director

Fish and Wildlife Service
Director

General Services Administration, Region IX
Regional Office of Real Estate Sales
Director, Real Estate Division

Soil Conservation Service

U.S. Postal Service
Western Regional Headquarters

State of California Agencies

Adjutant General, Military Department
California National Guard

Air National Guard
TAG California

Air Resources Board

California Highway Patrol
Long Range Planning Section

California Research Bureau
Ms. Helen Roland

Coastal Commission

Department of Commerce

Department of Conservation

State of California Agencies (Continued)

Department of Environmental Affairs

Department of Fish and Game

Department of Forestry

Department of General Services

Department of Health Services

Department of Housing and Community Development
Planning and Review Section, Research Department

Department of Transportation, Director
Region 10

Department of Transportation
Division of Highways

Department of Water Resources
Reports Review

Environmental Protection Agency
Toxic Substances Control Program
Department of Toxic Substances Control

Governor's Office of Planning and Research

Heritage Preservation Commission

Native American Heritage Commission

Parks and Recreation Department
Planning Division

Public Utilities Commission

Regional Water Quality Control Board
Central Valley Region

Resources Agency

San Joaquin Valley Unified Air Pollution Control District,
Northern Region

San Joaquin Valley Unified Air Pollution Control District

State Clearinghouse
Office of Planning and Research

State of California Agencies (Continued)

State Historic Preservation Officer
Office of Historic Preservation

State Lands Commission

Veterans Affairs Department

Waste Management Board

Water Resources Control Board
Division of Water Quality

Local Government Agencies

Atwater City Manager
Mr. David Adams

Atwater Fire Chief
Mr. Dennis Sparks

Castle Joint Powers Authority
Mr. Richard Martin, Chairman

Merced City Manager
Mr. James Marshall

Merced County
Sheriff Tom Sawyer

Merced County
Chief Administration Officer

Merced County Community Action Agency

Merced County Health Department
Mr. Jeff Palsgaard

Libraries

Atwater Public Library
Colorado State University, Library Documents Department
Merced Public Library
Turlock Public Library

OTHERS

Other Organizations

American Operation Remediation
Kristi Field

Other Organizations (Continued)

Atwater Chamber of Commerce

Atwater Christian Center

Charles Salter Associates

Coffman Associates

Defense Environment Alert

EDAW

Merced Chamber of Commerce

Merced County Chamber of Commerce

Merced Municipal Airport
Dan Oates, Airport Manager

Pacific Gas & Electric

Rand Corporation

Silva Environmental Services

Socio Technical Research Applications

Sun Star Newspaper

Uribe & Associates

Wildan Associates

Winton Chamber of Commerce

World Farm Foundation

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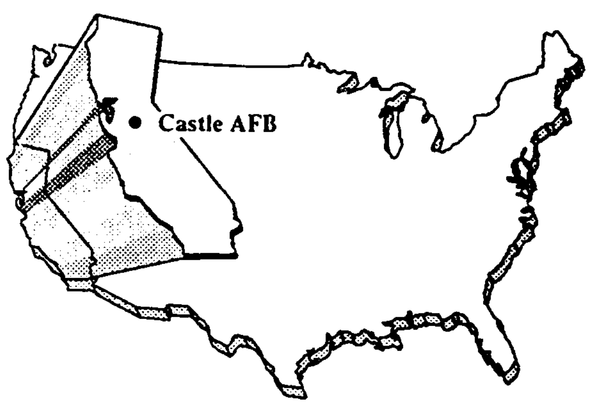

APPENDIX D

APPENDIX D

CASTLE AFB INSTALLATION RESTORATION PROGRAM (IRP) BIBLIOGRAPHY

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CASTLE AFB INSTALLATION RESTORATION PROGRAM (IRP) BIBLIOGRAPHY

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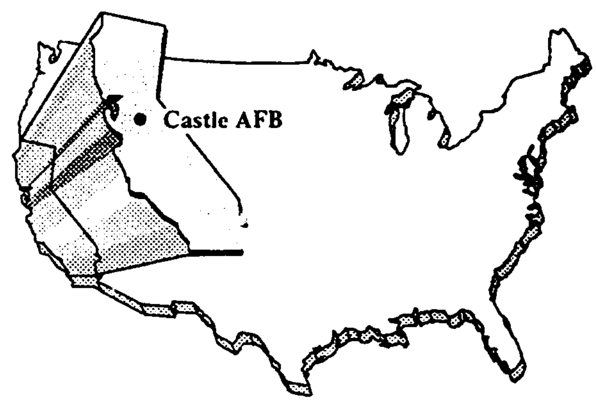


APPENDIX E

APPENDIX E

METHODS OF ANALYSIS

APPENDIX E

METHODS OF ANALYSIS

1.0 INTRODUCTION

This section describes the methods used in preparing this environmental impact statement (EIS). These methods were designed and implemented to evaluate the potential environmental impacts of disposal and reuse of Castle Air Force Base (AFB). Since future reuse of the site is uncertain in its scope, activities, and timing, the analysis considered several alternative reuse scenarios and evaluated their associated environmental impacts. The reuse scenarios analyzed in this EIS were defined for this study to span the anticipated range of reuse activities that are reasonably likely to occur due to disposal of the base. They were developed based on proposals put forth by affected local communities, interested individuals, and the Air Force, and considered general land use planning objectives.

The various analysis methods used to develop this EIS are summarized here by resource. In some instances, more detail is included in another appendix. These instances are noted for each resource in its respective subsection below.

2.0 LOCAL COMMUNITY

2.1 COMMUNITY SETTING

The section on community setting was developed to provide the context within which other biophysical impacts could be assessed. Community setting impacts were based on projected direct and secondary employment, and resulting population changes related to reuse of Castle AFB. These projections were used to quantify and evaluate changes in demand on community services, demand on transportation systems, air quality, and noise. A complete assessment of socioeconomic effects was conducted through a separate Socioeconomic Impact Analysis Study (SIAS) for the Disposal and Reuse of Castle AFB, which is the source for baseline and projected population and employment statistics used in this EIS.

The SIAS used information from sources including the U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics, U.S. Council of Economic Advisors, and the California Employment Development Department. The analysis used the Regional Interindustry Multiplier System (RIMS II) model to generate demographic and economic projections associated with the Proposed Action and alternatives.

2.2 LAND USE AND AESTHETICS

Potential land use impacts were projected based on compatibility of land uses associated with the Proposed Action and alternatives with adjacent land uses and zoning; consistency with general plans and other land use plans, regulations, regional plans, and policies; and effects of aircraft noise and safety restrictions on land uses.

The Region of Influence (ROI) for the majority of direct land use impacts for this study consisted of Castle AFB, the city of Atwater, and portions of Merced County. Noise-related land use impacts were determined by the extent of noise contours created by reuse activities.

Maps and windshield surveys were used to characterize on- and off-base land uses. Applicable policies, regulations, and land use restrictions were identified from the available land use plans and ordinances of Merced County and the city of Atwater. The proposed and alternative reuse plans were compared to existing land use and zoning to identify areas of conflict, as well as to local planning goals and objectives as set forth in community general plans. The other land use concepts were also examined for compatibility with adjacent land uses and with the Proposed Action and alternatives using the same process.

The Proposed Action and aviation alternatives were examined for consistency with Federal Aviation Administration (FAA) regulations and recommended land uses in the vicinity of airfields. Impacts of airfield-generated noise were assessed by comparing the extent of noise-affected areas and receptors under different reuse alternatives against preclosure baseline conditions.

For aesthetics analysis, the affected environment was described based upon the visual sensitivity of areas within and visible from the base. These areas were categorized as high, medium, or low sensitivity. The Proposed Action and alternatives were then evaluated to identify land uses to be developed, visual modifications that would occur, and new areas of visual sensitivity and to determine whether modification of unique or otherwise irreplaceable visual resources would occur and detract from the visual qualities or setting. Consistency with applicable plans that protect visual resources was also examined.

2.3 TRANSPORTATION

Potential impacts to transportation due to the Proposed Action and alternative reuse plans for Castle AFB focus on key roads, local airport use, and passenger rail service in the area, including those segments of the transportation networks in the region that serve as direct or indirect linkages to the base. The need for improvements to on-base roads, off-base access, and regional arterials was considered. The analysis was developed using information from state and local government agencies, including the California Department of Transportation, the Merced County Association of Governments, local airport authorities, and railroad companies. Other data sources used for the roadway analysis include planning guides prepared by the Institute of Transportation Engineers and the Transportation Research Board. The ROI for the transportation analysis includes the existing principal road, air, and rail networks that serve the cities of Merced and Atwater and the local communities of Winton and Franklin/Beachwood, with emphasis on the area surrounding Castle AFB.

The number of vehicle trips expected as a result of specific land uses on the site was estimated for 1995, 2000, 2005, and 2015 on the basis of direct on-site jobs and other attributes of on-site land uses (such as the number of dwelling units, projected airport passenger volume, commercial and industrial development, and other factors). Trip Generation Data from the Institute of Transportation Engineers were used to determine vehicle trips. Vehicle trips were then allocated to the local road network using prior patterns and expected destinations and sources of trips. When appropriate, the local road network was adjusted to account for changes over time from presently planned road capacity improvements and improvements required by the proposed reuse scenarios. Changes in work and associated travel patterns were derived by assigning or removing traffic to or from the most direct commuting routes. Freeway-bound traffic was determined as a percentage of total trips, then distributed to key regional roads based on trip length distribution. Changes in traffic volumes arising from reuse alternatives at Castle AFB were estimated and resulting volume changes on key local, regional, and on-base roadway segments were then determined.

The transportation network in the ROI was then examined to identify potential impacts to Levels of Service (LOS) arising from future baseline conditions and effects of reuse alternatives. Planning computations from the Highway Capacity Manual were used to determine a given LOS. These computations provided estimates of traffic and anticipated LOS where the amount of detail or the accuracy of information was limited. The planning procedures used in this analysis were based on forecasts of average daily traffic and on assumed traffic, roadway, intersection, and control conditions. The results provided a basic assessment of whether or not capacity was likely to be exceeded for a given volume. Intersection analysis was then integrated into the planning capacity analysis for each roadway section analyzed, and the results provided an estimate of the changes in LOS ratings expected as a result of traffic volume changes on key local, regional, and on-base roadway segments.

Airspace use in the vicinity of an airport is driven primarily by such factors as runway alignment, surrounding obstacles and terrain, air traffic control and navigational aid capabilities, proximity of other airports/airspace uses in the area, and noise considerations. These same factors normally apply regardless of whether the airport is used for military or civil aircraft operations. For this reason, a preclosure reference was used in characterizing these factors related to airspace use at Castle AFB.

Historic data on military aircraft operations used to characterize airspace use at and around Castle AFB were obtained from the base. The California Department of Transportation and airport owners/operators were contacted to obtain information on civil airport use. Aviation forecasts were derived from the California Department of Transportation studies and, where necessary, assumptions were made based on other similar airport operational environments.

The ROI for the airspace analysis is an area from the surface up to 10,000 feet above mean sea level and covering a 30-nautical mile radius from Castle AFB. This airspace represents the different airspace areas that were associated with preclosure operations at Castle AFB.

The types and levels of aircraft operations projected for the Proposed Action and alternatives were evaluated and compared to the way airspace was configured and used under the preclosure reference. The capacity of the airport to accommodate the projected aircraft fleet and operations was assessed by calculating the airport service volume, using the criteria in the FAA Advisory Circular 150/5060-5. Potential effects on airspace use were assessed, based on the extent to which projected operations could (1) require modifications to the airspace structure or air traffic control systems and/or facilities; (2) restrict, limit, or otherwise delay other air traffic in the region; or (3) encroach on other airspace areas and uses. It was recognized throughout the analysis process that a more in-depth study would be conducted by the FAA, once a reuse plan is selected, to identify any impacts of the reuse activities and what actions would be required to support the projected aircraft operations. Therefore, this analysis was used only to consider the level of operations that likely could be accommodated under the existing airspace structure, and to identify potential impacts if operational capacities were exceeded.

Data addressing private, passenger, and cargo air service in the region were acquired directly from air transportation studies of the area. The effect of base closure on local airports was derived by subtracting current base-related enplanements from current total enplanements.

Information regarding existing rail transportation was obtained from Amtrak.

2.4 UTILITIES

Utility usage was determined based on land uses and projected area population increases. The utility systems addressed in this analysis include the facilities and infrastructure used for potable water (pumping, treatment, storage, and distribution), wastewater (collection and treatment), solid waste (collection and disposal), and energy generation and distribution (electricity and natural gas). Historic consumption data, service curtailment data, peak demand characteristics, storage and distribution capacities, and related information for base utilities (including projections of future utility demand for each utility provider's particular service area) were obtained from various engineering reports and Castle AFB personnel. Information was also obtained from public and private utility providers and related county and city agencies.

The ROI for this analysis comprised the service areas of the local purveyors of potable water, wastewater treatment, and energy to Castle AFB and the surrounding area. It was assumed that these providers would continue services within the area of the existing base after disposal/reuse.

The potential effects of reuse alternatives were evaluated by estimating and comparing the additional direct and indirect demand associated with each alternative to the baseline and to the existing and projected operating capabilities of each utility system. Estimates of direct utility demands on site were used to identify the effects of the reuse activities on site-related utility systems. All long-term forecasts were based on estimated reuse-related population changes in the region and the preclosure per capita demand rates derived from the purveyor's data. It was assumed that the regional per capita demand rates were representative of the reuse activities, based on assumed similarities between proposed land uses and existing or projected uses in the region. Projections in the utilities analysis include direct demand associated with activities planned on base property, as well as resulting changes in domestic demand associated with population changes in the region.

3.0 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

Two categories of hazardous materials and hazardous waste management issues were addressed for this analysis: (1) impacts of hazardous materials utilized and hazardous wastes generated by each reuse proposal and (2) residual impacts associated with past Air Force practices including delays due to Installation Restoration Program (IRP) site remediation. IRP sites were identified as part of the affected environment (Chapter 3), while remediation impacts associated with these sites were addressed as environmental consequences (Chapter 4). Impacts of wastes generated by each reuse proposal were also addressed in Chapter 4. Primary sources of data were existing published reports such as IRP documents, management plans for various toxic or hazardous substances (e.g., spill response, hazardous waste, asbestos), and survey results (e.g., radon). Pertinent federal, state, and local regulations and standards were reviewed for applicability to the Proposed Action and alternatives. Hazardous materials and waste management plans and inventories were obtained from Castle AFB. Interviews with personnel associated with these on-base agencies provided the information necessary to fill any data gaps. City and county agencies were also contacted regarding regulations that would apply to both current and post-closure activities for Castle AFB.

The ROI includes the current base property and all geographic areas that have been affected by on-base release of a hazardous material or hazardous waste. The ROI for known contaminated sites is within the existing base boundaries, with the exception of two trichloroethylene (TCE) groundwater contamination plumes, which originate in the central and western base areas and migrate off base to the southwest.

Preclosure baseline conditions as defined for this study include current hazardous materials/waste management practices and inventories pertaining to the following areas: hazardous materials, hazardous waste, IRP sites, aboveground and underground storage tanks, asbestos, pesticides, polychlorinated biphenyls (PCBs), radon, and medical/biohazardous waste. The impact analysis considered (1) the amount and type of hazardous materials/waste currently associated with specific facilities and/or areas proposed under each reuse alternative; (2) the regulatory requirements or restrictions associated with property transfer and reuse; (3) delays to development due to IRP remediation activities; and (4) remediation schedules of specific hazardous materials/waste (e.g., PCBs, medical/biohazardous waste currently used by the Air Force.

4.0 NATURAL ENVIRONMENT

4.1 SOILS AND GEOLOGY

Evaluation of soils impacts addressed erosion potential, construction-related dust generation, and other soils problems (low soil strength, expansive soils, etc.), and disturbance of unique soil types. Information was obtained from several federal, state, and local agencies. Assessment of potential impacts to geology from the reuse alternatives included evaluation of resource potential (especially aggregates), geologic hazards (particularly potential for seismicity, liquefaction, and subsidence), and flooding potential.

The soils analysis was based on a review of Soil Conservation Service (SCS) documents for soil properties. The soils in the ROI were then evaluated to determine erosion potential, permeability, evidence of hardpans, expansive soil characteristics, etc., as these relate to construction problems and erosion potential during construction. Mitigations were evaluated based on county ordinances and SCS recommendations. Common engineering practices were reviewed to identify poor soil characteristics and recommended mitigation measures.

The ROI for the geologic analysis included the region surrounding Castle AFB relative to seismic activity, aggregate resources, and flooding potential. The ROI for the soils analysis was limited to the base and specific areas designated for construction or renovation.

The geologic analysis was based on a review of existing literature for construction problems associated with geologic hazards, availability of construction aggregate, and whether reuse would impact the availability of known mineral resources.

4.2 WATER RESOURCES

Analysis of impacts of the reuse alternatives on water resources considered groundwater quality and quantity, surface water quality (effects from erosion or sedimentation and contamination), surface water drainage diversion, and non-point source surface runoff to Canal Creek. Impacts to water quality resources resulting from IRP activities are addressed under Hazardous Materials and Hazardous Waste Management. Information was obtained from several federal, state, and local agencies. The ROI for water resources included the groundwater basin underlying the base, the surface drainage directly affected by runoff from the base, and the 100-year floodplain in the vicinity of the base.

Existing surface water conditions were evaluated for flood potential, non-point source discharge or transportation of contaminants, and surface water quality. Groundwater resources were evaluated as they pertained to adequate water supplies for each of the reuse alternatives. Groundwater quality and its potential as a potable water source for each reuse alternative were documented. The existing storm water drainage system was evaluated based on available literature, and the impacts to this system from each of the reuse alternatives were determined.

4.3 AIR QUALITY

The air quality resource is defined as the condition of the atmosphere, expressed in terms of the concentrations of air pollutants occurring in an area as the result of emissions from natural and/or man-made sources. Reuse alternatives have the potential to affect air quality depending on net changes in the release of both gaseous and particulate matter emissions. The impact significance of these emission changes was determined by comparing the resulting atmospheric concentrations to state and federal ambient air quality standards. The analysis drew from baseline emission inventory information, construction scheduling information, reuse-related source information, and transportation data. Principal sources of these data were the U.S. Environmental Protection Agency, the Castle AFB environmental coordinators, and the base civil engineer.

The ROI was determined by emissions from sources associated with construction and operation of the reuse alternatives. For inert pollutant emissions (all pollutants other than ozone and its precursors), the measurable ROI is limited to a few miles downwind of the source (i.e., the immediate area of Castle AFB). The ROI for ozone impacts from project emissions included the San Joaquin Valley Air Basin.

Emissions predicted to result from the proposed alternatives were compared to existing baseline emissions to determine the potential for adverse air quality impact. Impacts were also assessed by modeling, where appropriate, and compared to air quality standards and attainment levels for complying with these standards. Appendix M contains the projected emissions inventory information and methods. Background concentrations were added to the project impacts for comparison with the standards and attainment levels. Impacts were considered significant if project emissions would (1) increase an off-site ambient pollutant concentration from below to above a federal, state, or local standard; (2) contribute a measurable amount to an existing or projected air quality standard exceedance; (3) be inconsistent with measures in air quality attainment plans of the San Joaquin Valley Unified Air Pollution Control District; or (4) expose sensitive receptors (such as schools or hospitals) to substantial pollutant concentrations. All other air quality impacts were considered insignificant.

Methods used to analyze noise impacts under each reuse scenario are presented in detail in Appendix M of this EIS.

4.4 NOISE

The noise analysis addressed potential noise impacts from reuse-generated aircraft operations, surface traffic, and other identified noise sources on communities surrounding Castle AFB. Most of the data were obtained from the aircraft operations and traffic data prepared for the reuse alternatives. Day-night levels (DNL) were used to determine noise impacts. A single-event noise analysis using sound exposure levels (SEL) was also performed. Scientific literature on noise effects was also referenced.

The ROI for noise sources at Castle AFB was defined using compatibility guidelines developed by both the FAA and the state of California. The area most affected by noise due to the base disposal and reuse is limited to the area in and around the base within the 60-dB Community Noise Equivalent Level (CNEL) contour. This includes, but is not limited to, portions of the communities of Merced, Atwater, and Winton. The ROI for surface traffic noise impacts incorporated key road segments identified in the transportation analysis.

Preclosure noise levels were modeled using the FAA-approved Noise Exposure Model (NOISEMAP) version 6.1. Noise levels from reuse-related aircraft operations were estimated using the FAA-developed Integrated Noise Model (INM) version 3.10. Additionally NOISEMAP version 6.1 was used to calculate reuse-related aircraft engine runup activity. Noise contours for CNEL 60 dB and above were depicted. Noise levels due to surface traffic were estimated using the Federal Highway Administration's Highway Noise Model (1978). Potential noise impacts were identified by overlaying the noise contours with land use and population information to determine the number of residents who would be exposed to CNEL of 60 dB or greater.

SELs related to reuse alternatives were provided for representative noise-sensitive receptors exposed to aircraft noise from the Castle airfield. The SELs presented were outdoor levels and took into account the location of the receptors relative to the various flight tracks and aircraft profiles used. Noise reduction effects for common construction were included in the sleep interference analysis; however, evaluation of sensitive receptors relative to noise reduction levels of specific structures was not performed.

Methods used to analyze noise impacts under each reuse scenario are presented in detail in Appendix J of this EIS.

4.5 BIOLOGICAL RESOURCES

Biological resources addressed in relation to disposal and reuse of Castle AFB included vegetation, wildlife, threatened and endangered species, and sensitive habitats (e.g., wetlands). Primary sources of data for the analysis included published literature and reports, field surveys of the base (September 1992, March 1993, May 1993, November 1993, and May 1994), and contacts with agencies such as the U.S. Fish and Wildlife Service and the California Department of Fish and Game. Vegetation and sensitive biological resources were mapped using aerial photographs and field visits. The ROI for the biological resources assessment comprised Castle AFB and other areas that could be directly or indirectly affected by the reuse alternatives. Wetlands on the base were identified using the methods set forth in the Wetland Delineation for Castle Air Force Base, California (U.S. Army Corps of Engineers, 1994). The resulting maps were entered into a computerized geographic information system (GIS).

Acreages of each habitat type that could be disturbed by the proposed reuse alternatives were determined by overlaying project maps with vegetation and sensitive habitat maps. The total acreage of disturbance for each land use type was assumed to occur anywhere within a given land use area unless more specific locational information was available on reuse-related activities. Other impacts were qualitatively assessed based on literature data and scientific judgment on the responses of plants and animals to project-related disturbances such as noise, landscaping, and vegetation maintenance. Reasonable assumptions were made as to potential impacts of land use types based on project descriptions given in Chapter 2. Feasible mitigation measures were suggested to decrease impacts.

4.6 CULTURAL RESOURCES

Cultural resources generally include three main categories: prehistoric resources, historic structures and resources, and traditional resources. For the purposes of this EIS, cultural resources were defined to also include paleontological resources: the fossil evidence of past plant and animal life. Prehistoric resources are places where human activity has measurably altered the earth or left deposits of physical remains. Historic structures and resources include standing structures and other physical remains of historic significance. Traditional resources are topographical areas, features, habitats, plants, animals, minerals, or archaeological sites that contemporary Native Americans or other groups value presently, or did so in the past, and consider essential for the persistence of their traditional culture. Cultural resources of particular concern include properties listed on the National Register of Historic Places (NRHP), properties potentially eligible for the NRHP, and sacred Native American sites and areas.

Data used to compile information on these resources were obtained from existing environmental documents; material on file at Castle AFB; recent cultural resource reports pertaining to the base; and interviews with individuals familiar with the history, archaeology, or paleontology of the area. The ROI for cultural resources includes all areas within the boundaries of Castle AFB.

According to NRHP criteria (36 CFR 60.4), the quality of significance is present in districts, sites, buildings, structures, and objects that:

(a) Are associated with events that have made a significant contribution to the broad patterns of history

(b) Are associated with the lives of persons significant in the past

(c) Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic value; or represent a significant and distinguishable entity whose components may lack individual distinction

(d) Have yielded, or may be likely to yield, information important in prehistory or history.

To be listed in or considered eligible for listing in the NRHP, a cultural resource must meet at least one of the above criteria and must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. Integrity is defined as the authenticity of a property's historic identity, as evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric occupation or use. If a resource retains the physical characteristics it possessed in the past, it has the capacity to convey information about a culture or people, historical patterns, or architectural or engineering design and technology.

Compliance with requirements of cultural resource laws and regulations ideally involves four basic steps: (1) identification of significant cultural resources that could be affected by the Proposed Action or its alternatives, (2) assessment of the impacts or effects of these actions, (3) determination of significance of potential historic properties within the ROI, and (4) development and implementation of measures to eliminate or reduce adverse impacts. The primary law governing cultural resources in terms of their treatment in an environmental analysis is the National Historic Preservation Act (NHPA), which addresses the protection of historic and cultural properties. In compliance with the NHPA, the Air Force has initiated consultation with the State Historic Preservation Officer, as required under Section 106 of the NHPA.

There are a number of laws which establish the importance of Native American resources. These criteria are established through consultation with Native Americans according to the requirements of laws including the American Indian Religious Freedom Act, the Archaeological Resource Protection Act, the Native American Graves Protection and Repatriation Act, and the Department of Defense Legacy Resource Management Program Act.

Adverse effects that may occur as a result of base reuse are those that have a negative impact on characteristics that make a resource eligible for listing on the NRHP. Actions that can diminish the integrity, research potential, or other important characteristics of a historic property include the following (36 Code of Federal Regulations 800.9):

- Physical destruction, damage, or alteration of all or part of the property
- Isolating the property from its setting or altering the character of the property's setting when that character contributes to the property's qualification for the NRHP
- Introduction of visual or auditory elements that are out of character with the property or that alter its setting
- Conveyance of a federally owned property without adequate conditions or restrictions regarding its preservation, maintenance, or use
- Neglect of a property, resulting in its deterioration or destruction.

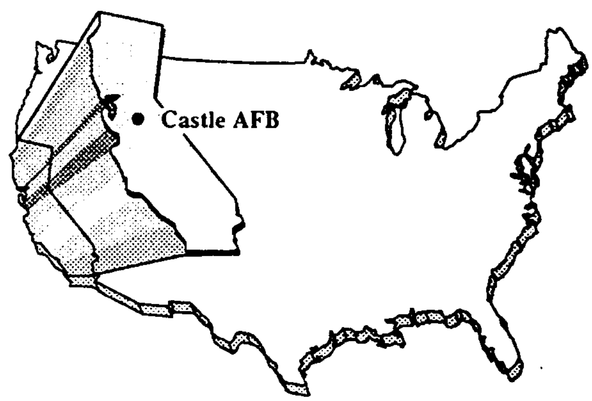
Regulations for implementing Section 106 of the NHPA indicate that the transfer, conveyance, lease, or sale of an historic property are procedurally considered to be adverse effects, thereby ensuring full regulatory consideration in federal project planning and execution. However, effects of a project that would otherwise be found to be adverse may not be considered adverse if one of the following conditions exists:

- When the historic property is of value only for its potential contribution to archaeological, historical, or architectural research, and when such value can be substantially preserved through the conduct of appropriate research, and such research is conducted in accordance with applicable professional standards and guidelines

- When the undertaking is limited to the rehabilitation of buildings and structures and is conducted in a manner that preserves the historical and architectural value of the affected historic property through conformance with the Secretary's Standards for Rehabilitation and Guidelines for Rehabilitation of Historic Buildings

- When the undertaking is limited to the transfer, conveyance, lease, or sale of an historic property, and adequate restrictions or conditions are included to ensure preservation of the property's significant historic features.

The treatment of paleontological resources is governed by Public Law 74-292 (the National Natural Landmarks Program, implemented by 36 Code of Federal Regulations 62). Only paleontological remains determined to be significant are subject to consideration and protection by a federal agency. Among the criteria used for National Natural Landmark designation are illustrative character, present condition, diversity, rarity, and value for science and education.



APPENDIX F

APPENDIX F

ENVIRONMENTAL PERMITS HELD BY CASTLE AFB

APPENDIX F

Environmental Permits Held by Castle AFB
Page 1 of 2

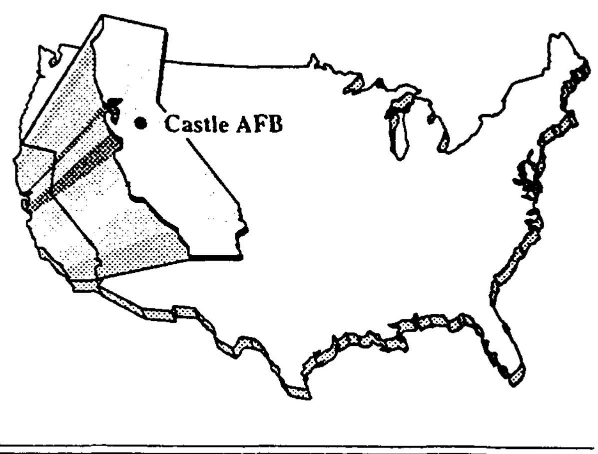
Permitted Facility/ Equipment	Permit No.	Date of Expiration	Issuing Agency	Conditions
Air Quality				
Bldg. 1350 - Liquid Oxygen Station	8100010203	9/30/92	SJVUAPCD	Use solvents on application
Bldg. 556 - Crafts Center Cyclone	2040050101	9/30/92	SJVUAPCD	-
Bldg. 1182 - Hospital Incinerator	4.07004E+11	9/30/92	SJVUAPCD	Use manufacturer's instructions
Bldg. 1354 - Paint Booth	8020060101	9/30/92	SJVUAPCD	5 gal/day limit, log
Bldg. 325 - Paint Booth	8020060201	9/30/92	SJVUAPCD	2 gal/day limit, log
Bldg. 340 - Paint Booth	8020060103	9/30/92	SJVUAPCD	5 gal/day limit, log
Bldg. 1350 - Degreaser, 5 gal	8100010201	9/30/92	SJVUAPCD	Use solvents on application
Bldg. 1350 - Degreaser, 200 gal	8100010202	9/30/92	SJVUAPCD	Use solvents on application. Fiberglass shop
Bldg. 949 - Noise Suppression	3070010101	9/30/92	SJVUAPCD	24 test/day, 1000 test/yr, records
Bldg. 785 - Base Exchange Service Station	8040510101	9/30/92	SJVUAPCD	Phase I & II vapor recovery
Bldg. 785 - Base Exchange Service Station	8040510102	9/30/92	SJVUAPCD	Phase I & II vapor recovery
Bldg. 785 - Base Exchange Service Station	8040510103	9/30/92	SJVUAPCD	Phase I & II vapor recovery
Wastewater Treatment Plant				
908 - Pump and Treat	NPDES 92-181		CVRWQCB	Various
Medical/Biohazardous Waste				
Base Medical Facilities	4096		Merced County	---

CVRWQCB = Central Valley Regional Water Quality Control Board.
NPDES = National Pollutant Discharge Elimination System.
SJVUAPCD = San Joaquin Valley Unified Air Pollution Control District.

Environmental Permits Held by Castle AFB
Page 2 of 2

Permitted Facility/ Equipment	Permit No.	Date of Expiration	Issuing Agency	Conditions
RCRA				
Basewide Hazardous Waste Disposal Permit	1-3669	3/09/93	DTSC, CAL EPA	---
Basewide Hazardous Waste Generator Interim Part - B Permit	-	-	DTSC, CAL EPA	---
Water Quality				
Basewide - Removal Actions	NPDES 91-198		CVRWQCB	---
Pump and Treat System Outfall	NPDES 92-193		CVRWQCB	Various
Pump and Treat System Outfall	NPDES 92-193		CVRWQCB	---
Fixed Treatment Unit Permit	CA3570024551		DTSC, CAL EPA	Notification to state

CAL EPA = California Environmental Protection Agency.
CVRWQCB = Central Valley Regional Water Quality Control Board.
DTSC = Department of Toxic Substances Control.
NPDES = National Pollutant Discharge Elimination System.
RCRA = Resource Conservation and Recovery Act.



APPENDIX G

APPENDIX G

UNDERGROUND AND ABOVEGROUND STORAGE TANKS AND OIL/WATER SEPARATORS

Table G-1. Underground Storage Tanks (as of September 1993)
Page 1 of 4

Building	Contents	Capacity (gallons)	Status	Years of Operation
54	Heating oil	2,000	Active	1944-Present
65	Unleaded	8,000	Active	1949-Present
65	Diesel	4,000	Active	1941-Present
65	JP-4	10,000	Removed	Unknown-1991
65	Waste oil	5,000	Removed	Unknown-1991
65	Waste oil	5,000	Removed	Unknown-1991
74	JP-4	500	Active	1952-Present
152	Diesel	550	Active	1952-Present
175	Hydraulic fluid	150	Active	1981-Present
325	Heating oil	2,000	Active	1956-Present
340	Waste oil	350	Active	1988-Present
360	Heating oil	10,000	Active	1958-Present
360	Heating oil	20,000	Active	1958-Present
395	Heating oil	1,000	Active	1957-Present
443	Heating oil	12,000	Active	1941-Present
501	JP-4	25,000	Removed	1950-1991
501	JP-4	25,000	Removed	1950-1991
501	JP-4	25,000	Removed	1950-1991
501	JP-4	25,000	Removed	1950-1991
501	JP-4	25,000	Removed	1950-1991
501	JP-4	25,000	Removed	1950-1991
501	JP-4	25,000	Removed	1950-1991
501	JP-4	25,000	Removed	1950-1991
501	JP-4	25,000	Removed	1950-1991
501	JP-4	25,000	Removed	1950-1991
502	Unleaded	12,000	Active	1942-Present
502	Unleaded	12,000	Active	1942-Present
502	Diesel	12,000	Active	1942-Present
502	Diesel	12,000	Active	1942-Present
502	Waste JP-4	1,200	Inactive	1949-Present
505	JP-4	25,000	Removed	1950-1991
505	JP-4	25,000	Removed	1950-1991
505	JP-4	25,000	Removed	1950-1991
505	JP-4	25,000	Removed	1950-1991
752	Heating oil	8,000	Active	1959-Present
759	Heating oil	4,000	Active	1959-Present
759	Diesel	3,000	Active	1978-Present
785	MOGAS	10,000	Active	1955-Present

MOGAS = Motor gasoline.

Table G-1. Underground Storage Tanks (as of September 1933)
Page 2 of 4

Building	Contents	Capacity (gallons)	Status	Years of Operation
785	MOGAS	10,000	Active	1955-Present
785	MOGAS	10,000	Active	1955-Present
786	Heating oil	400	Active	1956-Present
789	Heating oil	500	Active	1970-Present
871	Heating oil	8,000	Active	1981-Present
909	Residual pesticides	Unknown	Active	1991-Present
950	Waste oil	200	Removed	1956-1988
1015	Heating oil	1,000	Active	1974-Present
1038	Heating oil	2,000	Active	1982-Present
1182	Heating oil	10,000	Active	1964-Present
1182	Heating oil	20,000	Active	1964-Present
1203	Diesel	1,000	Removed	1981-1991
1210	Heating oil	10,000	Active	1953-Present
1210	Heating oil	10,000	Active	1953-Present
1210	Diesel	15,000	Active	1953-Present
1230	Heating oil	1,200	Active	1953-Present
1230	Heating oil	300	Active	1953-Present
1231	Diesel	300	Inactive	1953-Unknown
1253	Heating oil	12,000	Active	1978-Present
1260	Heating oil	3,000	Active	1955-Present
1309	Heating oil	300	Active	1957-Present
1310	Heating oil	500	Active	1957-Present
1315	Heating oil	500	Active	1957-Present
1317	Diesel	3,000	Active	1969-Present
1319	Heating oil	5,500	Active	1969-Present
1320	Heating oil	550	Active	1955-Present
1322	Heating oil	500	Active	1957-Present
1325	Heating oil	700	Active	1955-Present
1325	Diesel	10,000	Active	1968-Present
1325	JP-4	10,000	Active	1968-Present
1325	MOGAS	5,000	Active	1968-Present
1325	JP-4	10,000	Inactive	1968-Unknown
1330	Heating oil	700	Removed	1955-1990
1332	Heating oil	4,000	Active	1978-Present
1333	Heating oil	860	Active	1956-Present
1335	Heating oil	2,000	Active	1955-Present
1336	JP-4	4,000	Active	1990-Present

MOGAS = Motor gasoline.

Table G-1. Underground Storage Tanks (as of September 1993)
Page 3 of 4

Building	Contents	Capacity (gallons)	Status	Years of Operation
1337	JP-4	50,000	Closed in place	1952-1991
1337	JP-4	50,000	Closed in place	1952-1991
1337	JP-4	50,000	Closed in place	1952-1991
1337	JP-4	50,000	Closed in place	1952-1991
1337	JP-4	50,000	Closed	1952-1991
1337	JP-4	50,000	Closed	1952-1991
1337	JP-4	2,000	Closed in place	1952-1991
1340	Heating oil	2,000	Active	1953-Present
1340	Diesel	1,000	Active	1953-Present
1340	Diesel	300	Active	Unknown
1344	Heating oil	2,000	Active	1955-Present
1345	Diesel	500	Active	1953-Present
1348	JP-4	50,000	Closed in place	1957-1991
1348	JP-4	50,000	Closed in place	1957-1991
1348	JP-4	50,000	Closed in place	1957-1991
1348	JP-4	50,000	Closed in place	1957-1991
1348	JP-4	50,000	Closed in place	1957-1991
1348	JP-4	50,000	Closed in place	1957-1991
1348	JP-4	2,000	Closed in place	1957-1991
1350	Heating oil	25,000	Active	1954-Present
1350	Heating oil	25,000	Active	1954-Present
1360	Heating oil	2,000	Active	1953-Present
1401	JP-4	25,000	Closed in place	1952-1991
1401	JP-4	25,000	Closed in place	1952-1991
1401	JP-4	25,000	Closed in place	1952-1991
1401	JP-4	25,000	Closed in place	1952-1991
1401	JP-4	25,000	Closed in place	1952-1991
1401	JP-4	25,000	Closed in place	1952-1991
1401	JP-4	25,000	Closed in place	1952-1991
1401	JP-4	25,000	Closed in place	1952-1991
1401	JP-4	25,000	Closed in place	1952-1991
1401	JP-4	20,000	Closed in place	1952-1991
1401	JP-4	2,000	Removed	1952-1991
1402	JP-4	50,000	Removed	1952-1991

Table G-1. Underground Storage Tanks (as of September 1993)
Page 4 of 4

Building	Contents	Capacity (gallons)	Status	Years of Operation
1402	JP-4	50,000	Removed	1952-1991
1402	JP-4	50,000	Removed	1952-1991
1402	JP-4	50,000	Removed	1952-1991
1402	JP-4	50,000	Removed	1952-1991
1402	JP-4	2,000	Removed	1952-1991
1403	JP-4	25,000	Removed	1952-1991
1403	JP-4	25,000	Removed	1952-1991
1403	JP-4	25,000	Removed	1952-1991
1403	JP-4	25,000	Removed	1952-1991
1403	JP-4	25,000	Removed	1952-1991
1403	JP-4	25,000	Removed	1952-1991
1403	JP-4	25,000	Removed	1952-1991
1403	JP-4	25,000	Removed	1952-1991
1403	JP-4	25,000	Removed	1952-1991
1403	JP-4	20,000	Removed	1952-1991
1403	JP-4	2,000	Removed	1952-1991
1404	Heating oil	800	Active	1969-Present
1405	Heating oil	500	Active	1969-Present
1509	Heating oil	5,000	Active	1984-Present
1532	Heating oil	1,000	Active	1961-Present
1550	Heating oil	5,500	Active	1956-Present
1560	Diesel	1,000	Inactive	1953-Unknown
1567	MOGAS	5,243	Removed	Unknown-1991
1582	Heating oil	1,500	Active	1960-Present
1709	Heating oil	2,000	Active	1956-Present
1715	Heating oil	800	Active	1956-Present
1728	Diesel	5,000	Inactive	1956-Unknown
1750	Diesel	4,000	Active	1981-Present
1762	Heating oil	1,000	Inactive	1959-Unknown
1880	Diesel	1,000	Inactive	Unknown
1887	Diesel	1,000	Active	1964-Present
1905	Diesel	300	Active	1957-Present
3372	MOGAS	500	Inactive	1973-Unknown
4204	MOGAS	5,000	Active	1968-Present

MOGAS = Motor gasoline.

Table G-2. Aboveground Storage Tanks (as of September 1993)
Page 1 of 2

Building	Contents	Capacity (gallons)	Status	Years of Operation
41	Diesel	275	Active	1942 - Present
54	Diesel	9	Active	1944 - Present
71	Diesel	43	Active	1952 - Present
72	JP-4	1,400,000	Active	1957 - Present
73	JP-4	500,000	Active	1955 - Present
76	JP-4	650,000	Active	1955 - Present
83	JP-4	650,000	Active	1957 - Present
360	Diesel	275	Removed	1984 - Unknown
505	MOGAS	12,000	Active	1955 - Present
508	Diesel	9	Active	1976 - Present
545	Diesel	55	Active	Unknown - Present
704	Diesel	9	Active	1983 - Present
752	Diesel	9	Removed	1959 - Unknown
765	Diesel	9	Active	1990 - Present
	Diesel	9	Active	Unknown-Present
851	Unknown	500	Active	Unknown - Present
851	Diesel	43	Active	Unknown - Present
851	Diesel	43	Active	Unknown - Present
929	Waste oil	1,000	Active	Unknown-Present
950	JP-4	2,500	Active	Unknown - Present
952	JP-4	4,600	Active	1971 - Present
956	JP-4	2,500	Active	1987 - Present
1200	Diesel	900	Active	Unknown
1231	Diesel	275	Active	Unknown-Present
1313	Waste oil	5,000	Active	1982 - Present
1313	Waste oil	5,000	Active	1982 - Present
1313	JP-4	5,000	Active	1982 - Present
1313	JP-4	5,000	Active	1982 - Present
1313	JP-4	5,000	Active	1982 - Present
1313	JP-4	5,000	Active	1982 - Present
1319	Diesel	9	Active	1984 - Present
1330	Diesel	9	Active	1985 - Present
1336	Diesel	275	Active	1991 - Present
1344	Diesel	275	Active	1955 - Present

MOGAS = Motor gasoline.

Table G-2. Aboveground Storage Tanks (as of September 1993)
Page 2 of 2

Building	Contents	Capacity (gallons)	Status	Years of Operation
1347	Diesel	320	Active	1954 - Present
1347	Diesel	320	Active	1954 - Present
1347	Diesel	320	Active	1954 - Present
1347	Diesel	320	Active	1954 - Present
1360	Diesel	9	Active	1982 - Present
1521	Aircraft soap	8,000	Active	1955 - Present
1521	Unknown	10,000	Inactive	1955 - Present
1523	Waste oil	4,000	Unknown	1991 - Unknown
1530	Aircraft soap	10,000	Active	1987 - Present
1530	Unknown	10,000	Inactive	1987 - Present
1532	Aircraft soap	10,000	Unknown	1987 - Unknown
1535	Diesel	9	Active	1982 - Present
1550	Diesel	9	Active	1988 - Present
1560	Diesel	107	Active	1974 - Present
1576	Diesel	60	Active	1985 - Present
1582	Diesel	275	Active	Unknown - Present
1584	Diesel	500	Active	1990 - Present
1585	Diesel	500	Active	1972 - Present
1701	Diesel	14	Active	1980 - Present
1707	Diesel	9	Active	1954 - Present
1708	Diesel	275	Active	1956 - Present
1715	Unknown	500	Active	Unknown
1880	Diesel	14	Active	1952 - Present
1881	Diesel	1,000	Unknown	Unknown
1900	Diesel	14	Active	1954 - Present
1900	Diesel	350	Active	1954 - Present
1906	Diesel	14	Active	1982 - Present
1907	Diesel	14	Active	1956 - Present
4112	JP-7	420,000	Inactive	1964 - Unknown
4114	JP-7	420,000	Inactive	1964 - Unknown
4130	JP-4	600,000	Active	1991 - Present
4141	JP-4	600,000	Active	1991 - Present

Table G-3. Oil/Water Separators and Sumps at Castle AFB

Location	Capacity (gallons)	Description	Status	Year of Installation
59	100	POL Maintenance Shop	Active	1957
65	40	Vehicle Fueling Station	Inactive	1949
79	100	Vehicle Service Rack	Inactive	1973
88	300	Vehicle Maintenance Shop	Active	1957
88	Unknown	Vehicle Maintenance Shop	Active	Unknown
175	150	Weapons System Trainer	Active	1981
175	150	Weapons System Trainer	Active	1981
325	127	Vehicle Maintenance Shop	Active	1956
325	415	Vehicle Maintenance Shop	Active	1956
325	415	Vehicle Maintenance Shop	Active	1956
340	350	Auto Hobby Shop	Active	1989
340	720	Auto Hobby Shop	Active	1989
508	100	Petroleum Operations	Active	1971
554	300	Auto Wash Rack	Active	1956
850	500	Hazardous Waste Storage	Inactive	1952
929	1100	Industrial Waste Treatment	Active	1992
952	1,200	Former Jet Engine Test Cell	Inactive	Unknown
956	250	Jet Engine Test Cell	Active	1987
958	50	Industrial Waste Treatment	Active	1992
1260	1000	Jet Engine Maintenance	Active	1955
1260	900	Jet Engine Maintenance	Inactive	1955
1324	800	Vehicle Service Rack	Inactive	1973
1335	400	Former Gun Maintenance	Inactive	1955
1336	1,000	JP-4 Hydrant Pump House	Active	1991
1454	4,000	B-52 Parking Area	Inactive	Unknown
1456	3,366	Vehicle Service Rack	Inactive	1970
1509	300	Fuel Systems Maintenance	Active	1984
1509	Unknown	Fuel Systems Maintenance	Active	1984
1522	8,600	Aircraft Washrack	Active	1973
1523	8,000	Oil Recovery Unit	Inactive	1984
1541	700	Former Fuel Cell Maintenance	Inactive	Mid-1950s
1552	6,000	Former Vehicle Service Rack	Inactive	1974
1571	525	Former Runup Area	Inactive	Unknown

POL = Petroleum, oil, and lubricant.

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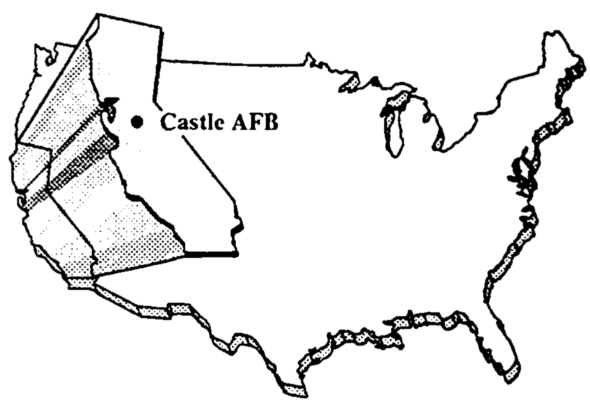

APPENDIX H

APPENDIX H

AIR FORCE POLICY FOR MANAGEMENT OF ASBESTOS-CONTAINING MATERIAL (ACM) AT CLOSURE BASES

APPENDIX H

AIR FORCE POLICY
FOR MANAGEMENT OF ASBESTOS CONTAINING MATERIAL (ACM) AT CLOSURE BASES

This policy applies specifically to property being disposed of through the Base Realignment and Closure (BRAC) process and supersedes all previous policy on this matter.

1. REFERENCES

a. Asbestos Hazard Emergency Response Act (AHERA).

b. Federal Tort Claims Act, 28 U.S.C. § 2671.

c. 40 CFR Part 61, Subpart M - National Emission Standards for Hazardous Air Pollutants (NESHAP).

d. 29 CFR Section 1910.1001 - Occupational Safety and Health Administration (OSHA) general industry standard for asbestos.

e. 29 CFR Section 1926.58 - Occupational Safety and Health Administration (OSHA) construction industry standard for asbestos.

f. 40 CFR Part 302 - Designation, Reportable Quantities, and Notification.

g. 41 CFR Section 101-47.304-13 - Federal Property Management Regulations provisions relating to asbestos.

h. AFI 32-1052, Facility Asbestos Management.

i. AFI 32-7066, Environmental Baseline Surveys in Real Estate Transactions.

2. DEFINITIONS

a. **Asbestos** - A group of naturally occurring minerals that separate into fibers, including chrysotile, amosite, crocidolite, asbestiform anthophyllite, asbestiform tremolite, and asbestiform actinolite.

b. **ACM** - Asbestos-containing Material. Any material containing more than one percent asbestos.

c. **Accredited Asbestos Professional** - Air Force Bioenvironmental Engineer or any other professional who is accredited through EPA's asbestos model accreditation plan or other equivalent method.

3. POLICY

The Air Force will ensure that at the time any property is conveyed, leased, or otherwise disposed of through the Base Realignment and Closure (BRAC) process, it does not pose a threat to human health due to ACM and that the property complies with all applicable statutes and regulations regarding ACM.

a. **Responsibilities**

(1) The Air Force Base Conversion Agency (AFBCA) conducts and funds, from BRAC accounts, any asbestos surveys and remediation needed solely for base closure; to include, but not limited to, additional asbestos surveys for environmental baseline surveys, asbestos repair or resurvey of vacated buildings.

(2) The MAJCOM's conduct and fund asbestos surveys and remediation needed to properly manage asbestos hazards, in accordance with current policy guidelines, up to the time of property management responsibility transfer to AFBCA.

b. **Surveys for ACM.** A survey of facilities for ACM will be accomplished or updated within the 6 months prior to the initial transfer, whether by lease, sale or other disposal method. Surveys will, at a minimum, identify the extent of asbestos contained in facilities and the exposure hazards. Surveys will be accomplished under the supervision of an accredited asbestos professional. These surveys will minimally include the following:

(1) A review of facility records.

(2) A visual inspection.

(3) An intrusive inspection, as directed by an accredited asbestos professional.

(4) Ambient air sampling, if directed by an accredited asbestos professional, in order to determine if any appropriate remedial actions are needed prior to the property being leased or transferred, or to protect facility occupants.

c. **Remediation of ACM.** Remediation of ACM in facilities at closure bases will be in accordance with applicable laws, regulations and standards. Remediation of ACM may be required if, in the judgment of an accredited asbestos professional, at least one of the following criteria apply:

(1) The ACM is of a type, condition, and in a location such that, through normal and expected use of the facility, it will be damaged to the extent that it will produce an asbestos fiber hazard to facility occupants.

(2) The type and condition of the ACM is such that it is not in compliance with appropriate statutes or regulations.

EXCEPTION: Remediation of ACM by AFBCA will not be accomplished if the transferee is willing to conduct remediation in accordance with applicable standards prior to beneficial occupancy as part of the transfer agreement.

d. **Full Disclosure.** AFBCA will make a full disclosure to the extent known of the types, quantities, locations, and condition of ACM in any real property to be conveyed, leased, sold, or otherwise transferred. Results of ambient air sampling will also be disclosed where available. This disclosure will normally be included in appraisal instructions, invitations for bids or offers to purchase, advertisements and contracts for sale, leases, and deeds.

e. **Management of ACM.** ACM remaining in a facility will be managed in-place using commonly accepted standards, criteria, and procedures in compliance with all applicable laws and regulations to assure the protection of human health and the environment. The responsibility for this management will be transferred to the owner or lessee by execution of the appropriate documents.

4. EFFECTIVE DATE

This policy becomes effective on the date signed and remains in effect until superseded.

/s/ 3/25/94
Alan P. Babbitt Date
Acting Deputy Assistant Secretary of the Air Force
(Environment, Safety, and Occupational Health)

This Air Force Policy for Management of Asbestos Containing Material (ACM) at Closure Bases, March 25, 1994, supersedes previous Air Force Policy on management of asbestos dated November 6, 1990 and May 1, 1992, respectively, and has been retyped for purposes of clarity and legibility.

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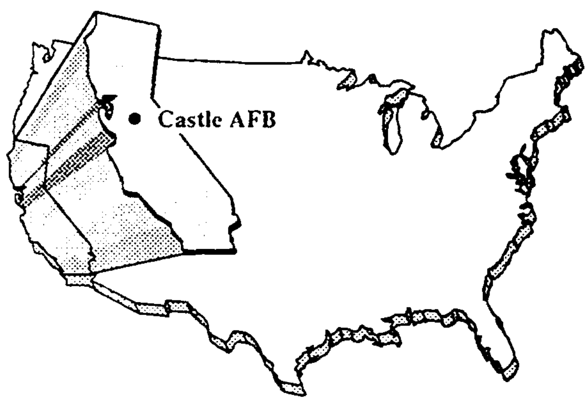

APPENDIX I

APPENDIX I

FARMLAND IMPACT CONVERSION RATING, FORM AD-1006

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request: 24 September 1993
Name Of Project: Castle AFB Disposal and Reuse	Federal Agency Involved: USAF, FAA, FBOP
Proposed Land Use: Airfield, Aviation, Mixed Use	County And State: Merced, CA
PART II *(To be completed by SCS)*	Date Request Received By SCS: 10/15/93

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply – do not complete additional parts of this form)*	Yes ☒	No ☐	Acres Irrigated: 500,400	Average Farm Size: 432 ac
Major Crop(s): Alfalfa - Cotton - Almonds	Farmable Land In Govt. Jurisdiction: Acres: 510,500 %40		Amount Of Farmland As Defined in FPPA: Acres: Data Not Available	
Name Of Land Evaluation System Used: California Storie Index	Name Of Local Site Assessment System: None		Date Land Evaluation Returned By SCS: 5/20/94 JG	

	Maximum Points	Site A	Site B	Site C	Site D
PART III *(To be completed by Federal Agency)*		Alternative Site Rating			
A. Total Acres To Be Converted Directly		2,771	2,771	2,721	2,771
B. Total Acres To Be Converted Indirectly		0	0	0	0
C. Total Acres In Site		2,771	2,771	2,721	2,771
PART IV *(To be completed by SCS)* **Land Evaluation Information**					
A. Total Acres Prime And Unique Farmland		26.2	26.2	26.2	26.2
B. Total Acres Statewide And Local Important Farmland		1.2	1.2	1.2	1.2
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		.0000537	0.0000537	.0000537	.0000537
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		N/A	N/A	N/A	N/A
PART V *(To be completed by SCS)* **Land Evaluation Criterion** Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*		72	72	72	72
PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b))*	Maximum Points				
1. Area In Nonurban Use	15	14	14	14	14
2. Perimeter In Nonurban Use	10	9	9	9	9
3. Percent Of Site Being Farmed	20	0	0	0	0
4. Protection Provided By State And Local Government	20	0	0	0	0
5. Distance From Urban Builtup Area	15	0	0	0	0
6. Distance To Urban Support Services	15	0	0	0	0
7. Size Of Present Farm Unit Compared To Average	10	10	10	10	10
8. Creation Of Nonfarmable Farmland	10	10	10	7	10
9. Availability Of Farm Support Services	5	5	5	5	5
10. On-Farm Investments	20	0	0	0	0
11. Effects Of Conversion On Farm Support Services	10	0	0	0	0
12. Compatibility With Existing Agricultural Use	10	~~XX~~ 5	5	4	5
TOTAL SITE ASSESSMENT POINTS	160	53	53	49	53
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	72	72	72	72
Total Site Assessment *(From Part VI above or a local site assessment)*	160	53	53	49	53
TOTAL POINTS *(Total of above 2 lines)*	260	125	125	121	125

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☒

Reason For Selection

(See Instructions on reverse side)

Form AD-1006 (10-83)

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request: 24 September 1993
Name Of Project: Castle AFB Disposal and Reuse	Federal Agency Involved: USAF, FAA, FBOP
Proposed Land Use: Airfield, Aviation, Mixed Use	County And State: Merced, CA
PART II *(To be completed by SCS)*	Date Request Received By SCS: 10/15/93

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply — do not complete additional parts of this form).*	Yes ☒ No ☐	Acres Irrigated: 500,400	Average Farm Size: 432 ac
Major Crop(s): Alfalfa - Cotton - Almonds	Farmable Land In Govt. Jurisdiction: Acres: 510,500 % 40	Amount Of Farmland As Defined in FPPA: Acres: Data Not Available	
Name Of Land Evaluation System Used: California Storie Index	Name Of Local Site Assessment System: None	Date Land Evaluation Returned By SCS: 5/20/94	

	Maximum Points	Alternative Site Rating: Site ~~A~~ E	Site ~~B~~ F	Site C	Site D
PART III *(To be completed by Federal Agency)*					
A. Total Acres To Be Converted Directly		2,612	2,777		
B. Total Acres To Be Converted Indirectly		0	0		
C. Total Acres In Site		2,612	2,777		
PART IV *(To be completed by SCS)* Land Evaluation Information					
A. Total Acres Prime And Unique Farmland		26.2	26.2		
B. Total Acres Statewide And Local Important Farmland		1.2	1.2		
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		.0000537	.0000537		
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		N/A	N/A	N/A	
PART V *(To be completed by SCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*		72	72		
PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use		14	14		
2. Perimeter In Nonurban Use		9	9		
3. Percent Of Site Being Farmed		0	0		
4. Protection Provided By State And Local Government		0	0		
5. Distance From Urban Builtup Area		0	0		
6. Distance To Urban Support Services		0	0		
7. Size Of Present Farm Unit Compared To Average		10	10		
8. Creation Of Nonfarmable Farmland		5	10		
9. Availability Of Farm Support Services		5	5		
10. On-Farm Investments		0	0		
11. Effects Of Conversion On Farm Support Services		0	0		
12. Compatibility With Existing Agricultural Use		3	7		
TOTAL SITE ASSESSMENT POINTS	160	46	55		
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	72	72		
Total Site Assessment *(From Part VI above or a local site assessment)*	160	46	55		
TOTAL POINTS *(Total of above 2 lines)*	260	118	127		

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☒

Reason For Selection

(See Instructions on reverse side)

Form AD-1006 (10-83)

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 – Federal agencies involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form.

Step 2 – Originator will send copies A, B and C together with maps indicating locations of site(s), to the Soil Conservation Service (SCS) local field office and retain copy D for their files. (Note: SCS has a field office in most counties in the U.S. The field office is usually located in the county seat. A list of field office locations are available from the SCS State Conservationist in each state).

Step 3 – SCS will, within 45 calendar days after receipt of form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland.

Step 4 – In cases where farmland covered by the FPPA will be converted by the proposed project, SCS field offices will complete Parts II, IV and V of the form.

Step 5 – SCS will return copy A and B of the form to the Federal agency involved in the project. (Copy C will be retained for SCS records).

Step 6 – The Federal agency involved in the proposed project will complete Parts VI and VII of the form.

Step 7 – The Federal agency involved in the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA and the agency's internal policies.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

Part I: In completing the "County And State" questions list all the local governments that are responsible for local land controls where site(s) are to be evaluated.

Part III: In completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them.

2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities) that will cause a direct conversion.

Part VI: Do not complete Part VI if a local site assessment is used.

Assign the maximum points for each site assessment criterion as shown in §658.5(b) of CFR. In cases of corridor-type projects such as transportation, powerline and flood control, criteria #5 and #6 will not apply and will be weighed zero, however, criterion #8 will be weighed a maximum of 25 points, and criterion #11 a maximum of 25 points.

Individual Federal agencies at the national level, may assign relative weights among the 12 site assessment criteria other than those shown in the FPPA rule. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total weight points at 160.

In rating alternative sites, Federal agencies shall consider each of the criteria and assign points within the limits established in the FPPA rule. Sites most suitable for protection under these criteria will receive the highest total scores, and sites least suitable, the lowest scores.

Part VII: In computing the "Total Site Assessment Points", where a State or local site assessment is used and the total maximum number of points is other than 160, adjust the site assessment points to a base of 160. Example: if the Site Assessment maximum is 200 points: and alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \times 160 = 144 \text{ points for Site "A."}$$

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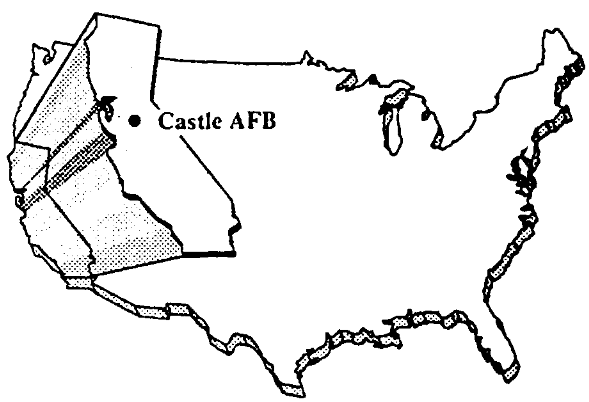


APPENDIX J

APPENDIX J

NOISE

APPENDIX J

NOISE

1. DESCRIPTION OF PROPOSED ALTERNATIVES

1.1 PRECLOSURE

Typical noise sources on and around airfields usually include aircraft, surface traffic, and other human activities.

Military aircraft operations are the primary source of noise in the vicinity of Castle Air Force Base (AFB). In order to define the noise environment due to preclosure aircraft operations, the Air Force-developed Noise Exposure Model (NOISEMAP), version 6.3 (Moulton, 1990), was used to predict aircraft noise levels. The noise contours for preclosure operations are shown in Figure 3.4-5 of this Environmental Impact Statement (EIS). In airport analyses, areas exposed to a Community Noise Equivalent Level (CNEL) of 60 decibels (dB) and greater are considered in land use compatibility planning and impact assessment; therefore, these areas were of particular interest.

The baseline surface traffic noise levels in the vicinity of the base were established in terms of CNEL by modeling the arterial roadways near the base using current traffic and speed characteristics. Annual average daily traffic (AADT) data, traffic mix, road width, speed and day/evening/night split were developed in the traffic engineering study presented in Section 3.2.3, Transportation, and were used to estimate preclosure noise levels. The traffic data used in the analysis are presented in Table J-1. The noise levels generated by surface traffic were predicted using the model published by the Federal Highway Administration (1978) and the reference noise level data were provided by the state of California (Hatano, 1985). The noise levels in the vicinity of the base due to rail traffic were predicted from published models and data (Nelson, 1987; Swing and Pies, 1973; Remington et al., 1980). The data used in this analysis are presented in Table J-2 and include number of trains, types of trains, number of locomotives and cars per train, day/evening/night split, and speeds. Due to the close proximity of roadways and rail lines, composite noise levels from both sources were determined by adding the road and rail noise. The noise levels are estimated as a function of distance from the centerline of the nearest road. Numbers of residents impacted by both rail and roadway noise were determined from aerial photographs dated March 27, 1990.

Table J-1. Surface Traffic Operations for Preclosure and Closure

Roadway	From/To	Annual Average Daily Traffic (AADT)	Speed Assumed (mph)	Rd. Width Assumed (lanes)	Day/Evening/ Night Split (percent)	Percentage Trucks Medium/Heavy
Preclosure						
SH 99	Atwater to Rail Overpass	38,500	55	4	71/12/17	4.9/19.6
SH 99	Rail Overpass to Buhach Rd.	38,500	55	4	71/12/17	4.9/19.6
SH 99	Buhach Rd. to Franklin Rd.	38,500	65	4	71/12/17	4.9/19.6
Santa Fe Dr.	Chestnut Ln. to Shaffer Rd.	7,770	55	2	84.4/4.2/11.4	2.3/1.9
Santa Fe Dr.	Shaffer Rd. to Wallace Rd.	14,050	55	2	84.4/4.2/11.4	2.3/1.9
Santa Fe Dr.	Wallace Rd. to Buhach Rd.	13,320	55	2	84.4/4.2/11.4	2.3/1.9
Santa Fe Dr.	Buhach Rd. to Bellevue Rd.	20,950	55	4	84.4/4.2/11.4	2.3/1.9
Santa Fe Dr.	Bellevue Rd. to Gate 2	20,950	55	4	84.4/4.2/11.4	2.3/1.9
Santa Fe Dr.	Gate 2 to Gurr Rd.	16,820	55	4	84.4/4.2/11.4	2.3/1.9
Santa Fe Dr.	Beachwood Dr. to SH 59	21,290	55	4	84.4/4.2/11.4	2.3/1.9
West Olive Ave.	SH 59 to R Street	14,700	40	4	84.4/4.2/11.4	2.3/1.9
Buhach Rd.	Santa Fe Dr. to Bellevue Rd.	11,080	40	4	82.3/4.1/13.6	3.7/1.2
Buhach Rd.	Bellevue Rd. to Juniper Ave.	7,810	45	4	82.3/4.1/13.6	3.7/1.2
Buhach Rd.	Juniper Ave. to SH 99	6,120	45	4	82.3/4.1/13.6	3.7/1.2
Bellevue Rd.	Santa Fe Dr. to Buhach Rd.	10,400	40	4	82.3/4.1/13.6	3.7/1.2
Bellevue Rd.	Buhach Rd. to Castle Dr.	15,700	40	4	82.3/4.1/13.6	3.7/1.2
Bellevue Rd.	Castle Dr. to Shaffer Rd.	16,410	40	4	82.3/4.1/13.6	3.7/1.2
Juniper Ave.	Buhach Rd. to Shaffer Rd.	5,910	40	4	82.3/4.1/13.6	3.7/1.2
Wallace Rd.	Gate 3 to Santa Fe Dr.	2,280	40	2	87.3/3.5/9.2	3.7/1.2
Closure						
SH 99	Atwater to Rail Overpass	45,700	55	4	71/12/17	4.9/19.6
SH 99	Rail Overpass to Buhach Rd.	45,700	55	4	71/12/17	4.9/19.6
SH 99	Buhach Rd. to Franklin Rd.	46,900	65	4	71/12/17	4.9/19.6
Santa Fe Dr.	Chestnut Ln. to Shaffer Rd.	6,200	55	2	84.4/4.2/11.4	2.3/1.9
Santa Fe Dr.	Shaffer Rd. to Wallace Rd.	11,000	55	2	84.4/4.2/11.4	2.3/1.9
Santa Fe Dr.	Wallace Rd. to Buhach Rd.	12,200	55	2	84.4/4.2/11.4	2.3/1.9
Santa Fe Dr.	Buhach Rd. to Bellevue Rd.	19,000	55	4	84.4/4.2/11.4	2.3/1.9
Santa Fe Dr.	Bellevue Rd. to Gate 2	16,400	55	4	84.4/4.2/11.4	2.3/1.9
Santa Fe Dr.	Gate 2 to Gurr Rd.	12,300	55	4	84.4/4.2/11.4	2.3/1.9
Santa Fe Dr.	Beachwood Dr. to SH 59	17,900	55	4	84.4/4.2/11.4	2.3/1.9
West Olive Ave.	SH 59 to R Street	12,700	40	4	84.4/4.2/11.4	2.3/1.9
Buhach Rd.	Santa Fe Dr. to Bellevue Rd.	6,600	40	4	82.3/4.1/13.6	3.7/1.2
Buhach Rd.	Bellevue Rd. to Juniper Ave.	4,900	45	4	82.3/4.1/13.6	3.7/1.2
Buhach Rd.	Juniper Ave. to SH 99	4,900	45	4	82.3/4.1/13.6	3.7/1.2
Bellevue Rd.	Santa Fe Dr. to Buhach Rd.	9,900	40	4	82.3/4.1/13.6	3.7/1.2
Bellevue Rd.	Buhach Rd. to Castle Dr.	14,000	40	4	82.3/4.1/13.6	3.7/1.2
Bellevue Rd.	Castle Dr. to Shaffer Rd.	15,900	40	4	82.3/4.1/13.6	3.7/1.2
Juniper Ave.	Buhach Rd. to Shaffer Rd.	3,600	40	4	82.3/4.1/13.6	3.7/1.2
Wallace Rd.	Gate 3 to Santa Fe Dr.	700	40	2	87.3/3.5/9.2	3.7/1.2

Table J-2. Daily Rail Operations for Preclosure, Closure, and All Alternatives

Rail Line	Type	No. of Trains	No. of Locomotives/Train	No. of Cars/Train	Speed	Throttle	Day/Evening/ Night Split
Atchison, Topeka & Santa Fe	Freight	22	3	65	70	Max.	50.0/12.5/37.5
	Passenger	8	1	5	79	Max.	82.5/12.5/0
Southern Pacific	Freight	20	3	65	65	Max.	50.0/12.5/37.5

1.2 CLOSURE BASELINE

At closure, it is assumed that there would be no aircraft activity. The noise levels projected for the closure baseline for surface traffic were calculated using the traffic projections at base closure. The AADTs used for the analysis are presented in Table J-1. Railway operations were assumed to be the same as for preclosure.

1.3 PROPOSED ACTION

The Proposed Action for the reuse of Castle AFB would result in a comprehensive reuse plan centered around a civil aviation facility. Primary components of the aviation portion include aircraft maintenance operations, pilot training, crew training, and general aviation operations. Non-aviation land uses include industrial, commercial, residential, educational, medical, and public/recreation.

The fleet mix and annual aircraft operations for each of the modeled years are contained in Table J-3. The CNEL contours for the proposed flight operations and the proposed flight tracks modeled are presented in Section 4.4.4, Noise. The day/evening/night split for all aircraft operations is shown in Table J-4. All aircraft departure operations are stage length 1. Stage length may affect operational parameters such as takeoff or landing profiles, engine thrust settings, and aircraft speed of some aircraft; these parameters may, in turn, affect aircraft noise exposure. Stage lengths correspond to the distance flown in increments of 500 miles (e.g., stage length 1 corresponds to flights between 1 and 500 miles).

Engine runup operations were assumed to occur adjacent to the southwest corner of the operational apron. The number of runup operations is presented in Table J-5. It was assumed that no noise suppression facilities would be available. The aircraft were assumed to have a heading of 220 degrees.

Table J-3a. Annual Aircraft Operations for Proposed Action (2000)

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Aircraft Maintenance			1,000	1
Boeing 747-400	500	50		
MD-88	250	25		
Fokker 100	250	25		
Pilot Training			50,000	49
Boeing 747-400	50,000	100		
Crew Training			11,000	11
Boeing 737-300	11,000	100		
General Aviation			40,384	39
Single-Engine Piston	33,539	83		
Baron 58P (twin-engine piston)	3,733	9		
King Air (turboprop)	1,867	5		
Gulfstream IV (corporate jet)	1,245	3		
Total			102,384	100

Table J-3b. Annual Aircraft Operations for Proposed Action (2005)

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Aircraft Maintenance			1,500	1
Boeing 747-400	630	42		
MD-88	435	29		
Fokker 100	435	29		
Pilot Training			50,000	47
Boeing 747-400	50,000	100		
Crew Training			12,100	11
Boeing 737-300	12,000	100		
General Aviation			42,930	40
Single-Engine Piston	34,443	80		
Baron 58P (twin-engine piston)	4,460	10		
King Air (turboprop)	2,169	5		
Gulfstream IV (corporate jet)	1,858	4		
Total			106,530	100

Table J-3c. Annual Aircraft Operations for Proposed Action (2015)

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Aircraft Maintenance			2,500	2
Boeing 747-400	1,000	40		
MD-88	750	30		
Fokker 100	750	30		
Pilot Training			50,000	43
Boeing 747-400	50,000	100		
Crew Training			14,641	13
Boeing 737-300	14,641	100		
General Aviation			48,178	42
Single-Engine Piston	35,783	74		
Baron 58P (twin-engine piston)	6,348	13		
King Air (turboprop)	3,173	7		
Gulfstream IV (corporate jet)	3,174	7		
Total			115,320	100

General aviation operations were divided into four types:

- Single-engine, piston-driven propeller - A composite single-engine propeller (COMSEP) plane was modeled.
- Multi-engine, piston-driven propeller - Beech Baron 58P was assumed to be a typical multi-engine propeller plane.
- Turboprop - Beech King Air was assumed to be a typical turboprop.
- Turbofan - Gulfstream IV was assumed to be a typical turbofan.

The touch-and-go patterns and the initial departure and final approach flight tracks used in the modeling are shown in Figure J-1. The departure, arrival, and touch-and-go flight tracks used are based on those in common usage at airports of similar size and purpose. Touch-and-go operations were assumed to comprise approximately 30 percent of all single-engine piston and 24 percent of all multi-engine piston general aviation operations, 95 percent of all pilot training operations, and 80 percent of all crew training operations. Daily operations assigned to each flight track and time period for the Proposed Action are provided in Table J-6 for each of the study years.

Table J-4. Day-Evening-Night Split of Aircraft Operations for Proposed Action and Alternatives (2015)

Aircraft Type	Percent Daytime	Percent Evening	Percent Nighttime
Proposed Action			
Aircraft Maintenance	90	10	0
Pilot Training	98	2	0
Crew Training	100	0	0
General Aviation			
Single-Engine Piston	78	20	2
Multi-Engine Piston	78	20	2
King Air/Gulfstream IV	73	20	7
Castle Aviation Center Alternative			
Maintenance/Refurbishing	90	10	0
Classic Aircraft Refurbishing	92	8	0
Airshow	100	0	0
General Aviation			
Piston-Engined	78	20	2
King Air/Gulfstream IV	73	20	7
Commercial Aviation Alternative			
Passenger Operations	100	0	0
Air Cargo	0	100	0
Pilot Training			
Boeing 747-400	95	5	0
Multi-Engine	100	0	0
Jetstream 31	100	0	0
General Aviation			
Single-Engine Piston	80	18	2
Multi-Engine Piston	75	22	3
King Air/Gulfstream IV	59	32	9
Aviation with Mixed Use Alternative			
Aircraft Maintenance	90	10	0
General Aviation			
Piston-Engined	76	22	2
King Air/Gulfstream IV	73	20	7

Notes: Percentages are approximate for each category. Different aircraft within each category may have different day-night splits. For actual number of operations of each aircraft for each time period refer to Table J-6. Splits for alternatives are similar to those of the Proposed Action.

Daytime operations are assumed to occur between the hours of 7:00 a.m. and 6:00 p.m. Evening operations are assumed to occur between the hours of 6:00 p.m. and 10:00 p.m. Nighttime operations are assumed to occur between the hours of 10:00 p.m. and 7:00 a.m.

Table J-5. Number of Daily Engine Runup Operations for the Proposed Action and Alternatives

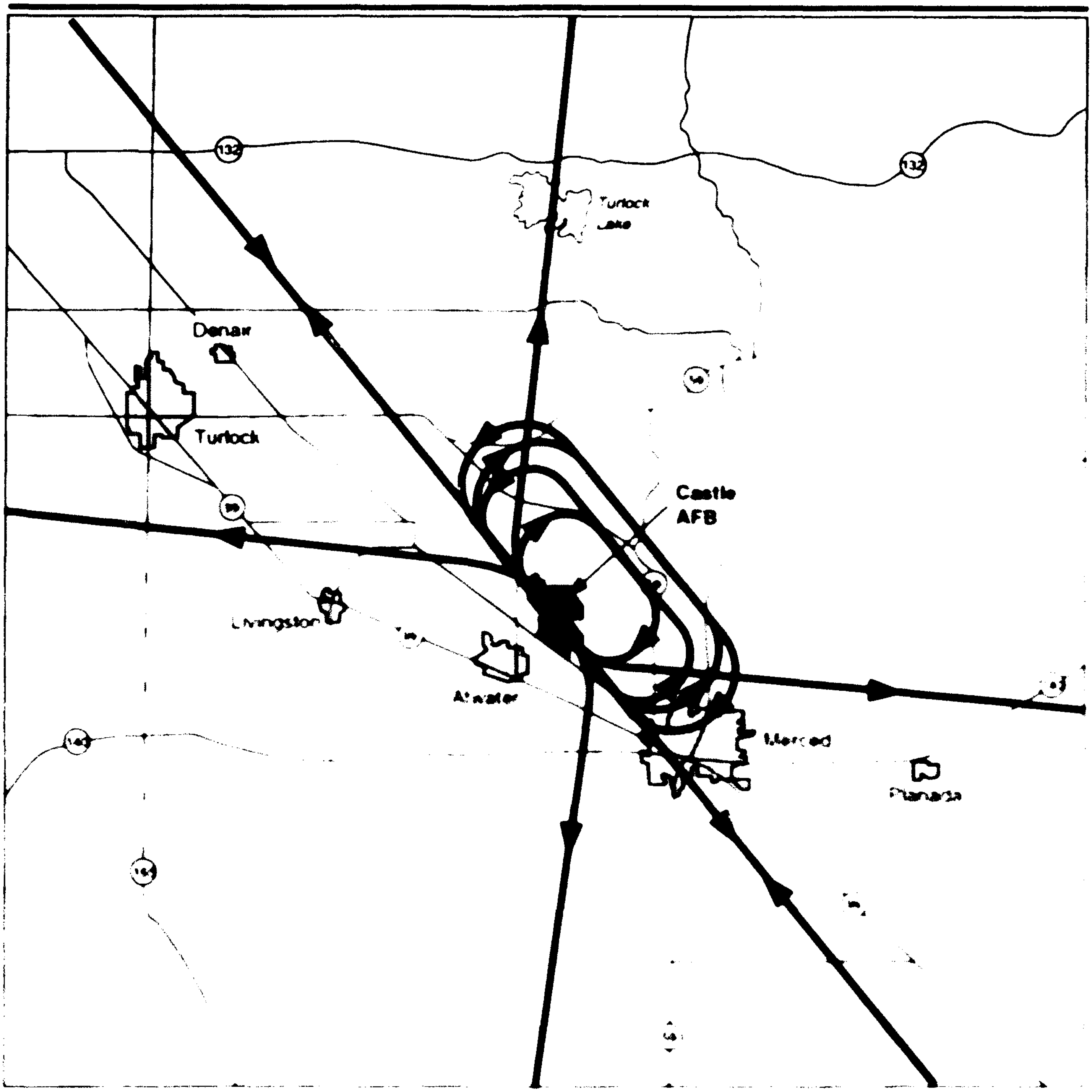
Alternative	2000	2005	2015
Proposed Action			
Boeing 757-300	0.68	1.03	1.37
Boeing 747-400	1.37	2.05	2.74
MD-88	0.34	0.68	1.03
Fokker 100	0.34	0.68	1.03
Castle Aviation Center			
Boeing 747-400	1.37	2.05	2 74
MD-88	0.14	0 34	0 68
Fokker 100	0.14	0 34	0 48
Commercial Aviation			
Boeing 747-400	1.37	2.05	2 74
Aviation with Mixed Use			
Boeing 747-400	1.37	2.05	2 74
MD-88	0 14	0 34	0 68
Fokker 100	0.14	0 34	0 48

A standard 3-degree glide slope and the takeoff profiles provided by the Federal Aviation Administration's (FAA's) Integrated Noise Model Database 3.10 (FAA, 1992) were assumed for all civilian aircraft Aircraft engine runups were modeled using the U.S. Air Force's NOISEMAP version 6 1

Surface traffic data used in the modeling were developed from the project traffic study presented in Section 4 2 3. Transportation and are shown in Table J-7. The traffic mix, day evening night split and speed were assumed to remain the same as for the preclosure reference Railway operations were assumed to remain the same as for the preclosure reference Number of residents impacted by railway and roadway noise were determined from aerial photographs dated March 27 1990

1.4 CASTLE AVIATION CENTER ALTERNATIVE

The Castle Aviation Center Alternative for the reuse of Castle AFB would be centered around aircraft maintenance facilities with no commercial passenger service As in the Proposed Action the airfield would be converted to civilian use Primary components of the aviation action include general aviation operations and maintenance operations with a support center for aircraft refurbishing, classic aircraft restoration and repairing aircraft storage, sales and testing of kit and experimental aircraft, and support for air shows



EXPLANATION

Direction of Travel on Flight Path

State Highways

5 Nautical Miles

Primary Flight Tracks - Proposed Action, Castle Aviation Center Alternative, and Aviation with Mixed Use Alternative

Figure J-1

Table J-6a Assignment of Operations for the Proposed Action (2000)

Departure Flight Tracks

Aircraft	D1 Day	D1 Eve	D1 Night	D2 Day	D2 Eve	D2 Night	D3 Day	D3 Eve	D3 Night	D4 Day	D4 Eve	D4 Night	D5 Day	D5 Eve	D5 Night	D6 Day	D6 Eve	D6 Night
Boeing 747 400	0.01			0.01			0.01			0.20	0.02		0.20	0.02		0.20	0.02	
MD 88	0.01			0.01			0.01			0.10	0.01		0.10	0.01		0.10	0.01	
Fokker 100	0.01			0.01			0.01			0.10	0.01		0.10	0.01		0.10	0.01	
Boeing 747 400	0.08			0.08			0.08			1.12	0.02		1.12	0.02		1.12	0.02	
Boeing 727 200	0.05			0.05			0.05			0.95			0.95			0.95		
Single Engine Piston	0.42	0.09	0.02	0.42	0.09	0.02	0.42	0.09	0.02	7.94	1.75	0.29	7.94	1.75	0.29	7.94	1.75	0.29
Beech Baron 58P	0.05	0.01		0.05	0.01		0.05	0.01		0.95	0.26	0.03	0.95	0.26	0.03	0.95	0.26	0.03
Beech King Air	0.01	0.01		0.01	0.01		0.01	0.01		0.59	0.16	0.06	0.59	0.16	0.06	0.59	0.16	0.06
Gulfstream IV	0.02	0.01		0.02	0.01		0.02	0.01		0.39	0.11	0.04	0.39	0.11	0.04	0.39	0.11	0.04
Total	0.66	0.12	0.02	0.66	0.12	0.02	0.66	0.12	0.02	12.34	2.34	0.42	12.34	2.34	0.42	12.34	2.34	0.42

Arrival/Touch & Go Flight Tracks

Aircraft	A1 Day	A1 Eve	A1 Night	A2 Day	A2 Eve	A2 Night	T1 Day	T1 Eve	T1 Night	T2 Day	T2 Eve	T2 Night	T3 Day	T3 Eve	T3 Night	T4 Day	T4 Eve	T4 Night
Boeing 747 400	0.03			0.59	0.02													
MD 88	0.02			0.29	0.01													
Fokker 100	0.02			0.29	0.01													
Boeing 747 400	0.18			3.35	0.07					60.41	1.21					3.18	0.06	
Boeing 727 200	0.15			2.86						11.45						0.60		
Single Engine Piston	1.25	0.28	0.05	23.83	5.24	0.87	0.96	0.11		9.25	3.18		0.05	0.02		0.49	0.17	
Beech Baron 58P	0.15	0.04	0.01	2.84	0.78	0.10	0.09	0.02		0.86	0.18					0.05	0.01	
Beech King Air	0.09	0.03	0.01	1.77	0.49	0.17												
Gulfstream IV	0.06	0.02	0.01	1.18	0.12	0.11												
Total	1.86	0.37	0.08	37.00	7.03	1.25	1.05	0.35	0.00	81.97	4.57	0.00	0.05	0.02	0.00	4.32	0.24	0.00

Note Daytime operations are assumed to occur between the hours of 7:00 a.m. and 7:00 p.m. Evening operations are assumed to occur between the hours of 7:00 p.m. and 10:00 p.m. Nighttime operations are assumed to occur between the hours of 10:00 p.m. and 7:00 a.m.

Table J-6b. Assignment of Operations for the Proposed Action (2005)

Departure Flight Tracks

	D1			D2			D3			D4			D5			D6		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.01			0.01			0.01			0.25	0.03		0.25	0.03		0.25	0.03	
MD-88	0.01			0.01			0.01			0.17	0.02		0.17	0.02		0.17	0.02	
Fokker 100	0.01			0.01			0.01			0.17	0.02		0.17	0.02		0.17	0.02	
Boeing 747-400	0.06			0.06			0.06			1.12	0.02		1.12	0.02		1.12	0.02	
Boeing 727-200	0.06			0.06			0.06			1.05			1.05			1.05		
Single-Engine Piston	0.43	0.09	0.02	0.43	0.09	0.02	0.43	0.09	0.02	8.16	1.79	0.30	8.16	1.79	0.30	8.16	1.79	0.30
Beech Baron 58P	0.06	0.02		0.06	0.02		0.06	0.02		1.13	0.31	0.04	1.13	0.31	0.04	1.13	0.31	0.04
Beech King Air	0.04	0.01		0.04	0.01		0.04	0.01		0.69	0.19	0.07	0.69	0.19	0.07	0.69	0.19	[illegible]
Gulfstream IV	0.03	0.01		0.03	0.01		0.03	0.01		0.59	0.16	0.06	0.59	0.16	0.06	0.59	0.16	[illegible]
Total	0.71	0.13	0.02	0.17	0.13	0.02	0.71	0.13	0.02	13.33	2.54	0.47	13.33	2.54	0.47	13.33	2.54	[illegible]

Arrival/Touch & Go Flight Tracks

	A1			A2			T1			T2			T3			T4		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.04			0.74	0.08													
MD-88	0.03			0.51	0.06													
Fokker 100	0.03			0.51	0.06													
Boeing 747-400	0.18			3.35	0.07					60.41	1.23					3.18	0.06	
Boeing 727-200	0.17			3.15						12.60						0.66		
Single-Engine Piston	1.29	0.28	0.05	24.47	5.38	0.90	0.99	0.34		9.50	3.25		0.05	0.02		0.50	0.17	
Beech Baron 58P	0.18	0.05	0.01	3.40	0.93	0.12	0.11	0.02		1.03	0.21		0.01			0.05	0.01	
Beech King Air	0.11	0.03	0.01	2.06	0.56	0.20												
Gulfstream IV	0.09	0.03	0.01	1.77	0.48	0.17												
Total	2.12	0.39	0.08	39.96	7.62	1.39	1.10	0.36	0.00	83.54	4.69	0.00	0.06	0.02	0.00	4.39	0.24	0.00

Note: Daytime operations are assumed to occur between the hours of 7:00 a.m. and 7:00 p.m. Evening operations are assumed to occur between the hours of 7:00 p.m. and 10:00 p.m. Nighttime operations are assumed to occur between the hours of 10:00 p.m. and 7:00 a.m.

Table J-6c. Assignment of Operations for the Proposed Action (2015)

Departure Flight Tracks

Aircraft	D1 Day	D1 Eve	D1 Night	D2 Day	D2 Eve	D2 Night	D3 Day	D3 Eve	D3 Night	D4 Day	D4 Eve	D4 Night	D5 Day	D5 Eve	D5 Night	D6 Day	D6 Eve	D6 Night
Boeing 747-400	0.02	-	-	0.02	-	-	0.02	-	-	0.39	0.04	-	0.39	0.04	-	0.39	0.04	-
MD-88	0.02	-	-	0.02	-	-	0.02	-	-	0.29	0.03	-	0.29	0.03	-	0.29	0.03	-
Fokker 100	0.02	-	-	0.02	-	-	0.02	-	-	0.29	0.03	-	0.29	0.03	-	0.29	0.03	-
Boeing 747-400	0.06	-	-	0.06	-	-	0.06		-	1.12	0.02	-	1.12	0.02	-	1.12	0.02	-
Boeing 727-200	0.07	-	-	0.07	-	-	0.07		-	1.27	-	-	1.27	-	-	1.27	-	-
Single-Engine Piston	0.44	0.10	0.02	0.44	0.10	0.02	0.44	0.10	0.02	8.40	1.85	0.31	8.40	1.85	0.31	8.40	1.85	0.31
Beech Baron 58P	0.08	0.02	-	0.08	0.02	-	0.08	0.02		1.61	0.44	0.06	1.61	0.44	0.06	1.61	0.44	0.06
Beech King Air	0.05	0.01	0.01	0.05	0.01	0.01	0.05	0.01	0.01	1.00	0.28	0.10	1.00	0.28	0.10	1.00	0.28	0.10
Gulfstream IV	0.05	0.01	0.01	0.05	0.01	0.01	0.05	0.01	0.01	1.01	0.28	0.10	1.01	0.28	0.10	1.01	0.28	0.10
Total	0.81	0.14	0.04	0.81	0.14	0.04	0.81	0.14	0.04	15.38	2.97	0.57	15.38	2.97	0.57	15.38	2.97	0.57

Arrival/Touch & Go Flight Tracks

Aircraft	A1 Day	A1 Eve	A1 Night	A2 Day	A2 Eve	A2 Night	T1 Day	T1 Eve	T1 Night	T2 Day	T2 Eve	T2 Night	T3 Day	T3 Eve	T3 Night	T4 Day	T4 Eve	T4 Night
Boeing 747-400	0.06	0.01		1.17	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-
MD-88	0.05	0.01	-	0.88	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-
Fokker 100	0.05	0.01		0.88	0.10		-		-	-	-	-	-	-	-	-	-	-
Boeing 747-400	0.18	-	-	3.35	0.07	-	-	-	-	60.41	1.23	-	-	-	-	3.18	0.06	-
Boeing 727-200	0.20	-		3.81	-				-	15.24	-	-	-	-	-	0.80	-	-
Single-Engine Piston	1.33	0.29	0.05	25.21	5.54	0.92	1.02	0.35	-	9.79	3.35	-	0.05	0.02	-	0.52	0.18	-
Beech Baron 58P	0.25	0.07	0.01	4.83	1.32	0.17	0.15	0.03	-	1.46	0.30	-	0.01	-	-	0.08	0.02	-
Beech King Air	0.16	0.04	0.02	3.01	0.83	0.29	-	-	-	-	-	-	-	-	-	-	-	-
Gulfstream IV	0.16	0.04	0.02	3.02	0.83	0.29	-	-	-	-	-	-	-	-	-	-	-	-
Total	2.44	0.47	0.10	46.16	8.92	1.67	1.17	0.38	0.00	86.90	4.88	0.00	0.06	0.02	0.00	4.58	0.26	0.00

Note: Daytime operations are assumed to occur between the hours of 7:00 a.m. and 7:00 p.m. Evening operations are assumed to occur between the hours of 7:00 p.m. and 10:00 p.m. Nighttime operations are assumed to occur between the hours of 10:00 p.m. and 7:00 a.m.

Table J-7a. Surface Traffic Operations for Total Traffic Volumes (Project and Non-Project)

Alternative/Roadway	From/To	Annual Average Daily Traffic (AADT) 2000	2005	2015	Speed Assumed (mph)	Road Width Assumed (Lanes)
Proposed Action						
SH 99	Atwater to Rail Overpass	56,270	65,700	87,520	55	4
SH 99	Rail Overpass to Buhach Rd.	56,270	65,700	87,520	55	4
SH 99	Buhach Rd. to Franklin Rd.	56,050	65,860	87,170	65	4
Santa Fe Dr.	Chestnut Ln. to Shaffer Rd.	9,820	11,710	14,720	55	2
Santa Fe Dr.	Shaffer Rd. to Wallace Rd.	16,830	19,800	24,010	55	2
Santa Fe Dr.	Wallace Rd. to Buhach Rd.	17,500	20,560	26,310	55	2
Santa Fe Dr.	Buhach Rd. to Bellevue Rd.	26,010	30,240	39,170	55	4
Santa Fe Dr.	Bellevue Rd. to Gate 2	27,920	32,820	40,530	55	4
Santa Fe Dr.	Gate 2 to Gurr Rd.	23,790	27,490	33,350	55	4
Santa Fe Dr.	Beachwood Dr. to SH 59	27,810	32,870	41,620	55	4
West Olive Ave.	SH 59 to R Street	19,440	23,830	33,150	40	4
Buhach Rd.	Santa Fe Dr. to Bellevue Rd.	12,900	16,140	19,430	40	4
Buhach Rd.	Bellevue Rd. to Juniper Ave.	12,010	15,270	17,730	45	4
Buhach Rd.	Juniper Ave. to SH 99	9,400	11,960	14,310	45	4
Bellevue Rd.	Santa Fe Dr. to Buhach Rd.	19,080	22,550	27,270	40	4
Bellevue Rd.	Buhach Rd. to Castle Dr.	22,490	26,310	32,930	40	4
Bellevue Rd.	Castle Dr. to Shaffer Rd.	22,880	26,850	34,450	40	4
Juniper Ave.	Buhach Rd. to Shaffer Rd.	8,590	12,280	14,050	40	4
Wallace Rd.	Gate 3 to Santa Fe Dr.	3,020	3,550	3,960	40	2
Aviation Center Alternative						
SH 99	Atwater to Rail Overpass	57,360	67,100	88,120	55	4
SH 99	Rail Overpass to Buhach Rd.	57,360	67,100	88,220	55	4
SH 99	Buhach Rd. to Franklin Rd.	58,100	66,460	88,220	65	4
Santa Fe Dr.	Chestnut Ln. to Shaffer Rd.	11,540	13,180	16,050	55	2
Santa Fe Dr.	Shaffer Rd. to Wallace Rd.	19,480	22,130	27,220	55	2
Santa Fe Dr.	Wallace Rd. to Buhach Rd.	19,500	22,250	27,910	55	2
Santa Fe Dr.	Buhach Rd. to Bellevue Rd.	28,330	32,470	41,280	55	4
Santa Fe Dr.	Bellevue Rd. to Gate 2	29,680	34,120	41,680	55	4
Santa Fe Dr.	Gate 2 to Gurr Rd.	24,940	28,720	34,410	55	4
Santa Fe Dr.	Beachwood Dr. to SH 59	31,300	36,230	44,500	55	4
West Olive Ave.	SH 59 to R Street	21,720	26,040	35,050	40	4
Buhach Rd.	Santa Fe Dr. to Bellevue Rd.	18,730	20,700	23,770	40	4
Buhach Rd.	Bellevue Rd. to Juniper Ave.	15,120	16,940	19,210	45	4
Buhach Rd.	Juniper Ave. to SH 99	11,650	12,960	15,230	45	4
Bellevue Rd.	Santa Fe Dr. to Buhach Rd.	20,660	23,670	28,260	40	4
Bellevue Rd.	Buhach Rd. to Castle Dr.	26,820	30,540	37,000	40	4
Bellevue Rd.	Castle Dr. to Shaffer Rd.	26,070	29,950	37,310	40	4
Juniper Ave.	Buhach Rd. to Shaffer Rd.	3,920	9,990	11,650	40	4
Wallace Rd.	Gate 3 to Santa Fe Dr.	4,990	5,460	5,780	40	2

Table J-7b. Surface Traffic Operations for Total Traffic Volumes (Project and Non-Project)

Alternative/Roadway	From/To	Annual Average Daily Traffic (AADT) 2000	2005	2015	Speed Assumed (mph)	Road Width Assumed (Lanes)
Aviation with Mixed Use Alternative						
SH 99	Atwater to Rail Overpass	55,720	64,960	87,180	55	4
SH 99	Rail Overpass to Buhach Rd.	55,720	64,960	87,180	55	4
SH 99	Buhach Rd. to Franklin Rd.	55,190	64,680	86,620	65	4
Santa Fe Dr.	Chestnut Ln. to Shaffer Rd.	9,290	11,240	14,820	55	2
Santa Fe Dr.	Shaffer Rd. to Wallace Rd.	15,990	19,100	25,260	55	2
Santa Fe Dr.	Wallace Rd. to Buhach Rd.	16,840	20,010	26,480	55	2
Santa Fe Dr.	Buhach Rd. to Bellevue Rd.	25,090	29,400	39,320	55	4
Santa Fe Dr.	Bellevue Rd. to Gate 2	26,210	31,450	40,390	55	4
Santa Fe Dr.	Gate 2 to Gurr Rd.	21,450	25,590	32,850	55	4
Santa Fe Dr.	Beachwood Dr. to SH 59	26,150	31,150	41,430	55	4
West Olive Ave.	SH 59 to R Street	18,510	22,840	33,110	40	4
Buhach Rd.	Santa Fe Dr. to Bellevue Rd.	12,230	15,850	20,420	40	4
Buhach Rd.	Bellevue Rd. to Juniper Ave.	10,450	13,360	16,910	45	4
Buhach Rd.	Juniper Ave. to SH 99	8,390	10,600	13,620	45	4
Bellevue Rd.	Santa Fe Dr. to Buhach Rd.	17,640	21,430	27,160	40	4
Bellevue Rd.	Buhach Rd. to Castle Dr.	21,980	26,790	34,730	40	4
Bellevue Rd.	Castle Dr. to Shaffer Rd.	22,430	26,970	35,490	40	4
Juniper Ave.	Buhach Rd. to Shaffer Rd.	6,510	8,530	10,650	40	4
Wallace Rd.	Gate 3 to Santa Fe Dr.	2,500	3,100	4,200	40	2
Non-Aviation Alternative						
SH 99	Atwater to Rail Overpass	55,030	64,500	86,910	55	4
SH 99	Rail Overpass to Buhach Rd.	55,030	64,500	86,910	55	4
SH 99	Buhach Rd. to Franklin Rd.	54,090	63,390	85,640	65	4
Santa Fe Dr.	Chestnut Ln. to Shaffer Rd.	8,090	10,280	13,950	55	2
Santa Fe Dr.	Shaffer Rd. to Wallace Rd.	13,950	17,340	23,380	55	2
Santa Fe Dr.	Wallace Rd. to Buhach Rd.	15,190	18,670	25,080	55	2
Santa Fe Dr.	Buhach Rd. to Bellevue Rd.	23,050	27,940	37,540	55	4
Santa Fe Dr.	Bellevue Rd. to Gate 2	21,660	30,270	39,200	55	4
Santa Fe Dr.	Gate 2 to Gurr Rd.	16,730	24,690	31,610	55	4
Santa Fe Dr.	Beachwood Dr. to SH 59	22,940	29,830	40,190	55	4
West Olive Ave.	SH 59 to R Street	16,710	21,980	32,310	40	4
Buhach Rd.	Santa Fe Dr. to Bellevue Rd.	9,920	11,940	17,090	40	4
Buhach Rd.	Bellevue Rd. to Juniper Ave.	7,800	11,010	14,930	45	4
Buhach Rd.	Juniper Ave. to SH 99	6,950	8,640	11,920	45	4
Bellevue Rd.	Santa Fe Dr. to Buhach Rd.	13,830	20,320	26,110	40	4
Bellevue Rd.	Buhach Rd. to Castle Dr.	18,620	24,420	32,630	40	4
Bellevue Rd.	Castle Dr. to Shaffer Rd.	20,220	25,430	34,260	40	4
Juniper Ave.	Buhach Rd. to Shaffer Rd.	5,540	7,270	10,010	40	4
Wallace Rd.	Gate 3 to Santa Fe Dr.	1,340	1,860	2,740	40	2

Table J-7c. Surface Traffic Operations for Total Traffic Volumes (Project and Non-Project)

Alternative/Roadway	From/To	Annual Average Daily Traffic (AADT) 2000	2005	2015	Speed Assumed (mph)	Road Width Assumed (Lanes)
No-Action Alternative						
SH 99	Atwater to Rail Overpass	54,320	62,930	84,630	55	4
SH 99	Rail Overpass to Buhach Rd.	54,320	62,930	84,630	55	4
SH 99	Buhach Rd. to Franklin Rd.	52,960	61,390	82,500	65	4
Santa Fe Dr.	Chestnut Ln. to Shaffer Rd.	7,200	8,350	11,220	55	2
Santa Fe Dr.	Shaffer Rd. to Wallace Rd.	12,780	14,810	19,900	55	2
Santa Fe Dr.	Wallace Rd. to Buhach Rd.	14,190	16,450	22,110	55	2
Santa Fe Dr.	Buhach Rd. to Bellevue Rd.	22,080	25,600	34,410	55	4
Santa Fe Dr.	Bellevue Rd. to Gate 2	18,970	21,990	29,550	55	4
Santa Fe Dr.	Gate 2 to Gurr Rd.	14,280	16,560	22,250	55	4
Santa Fe Dr.	Beachwood Dr. to SH 59	20,730	24,030	32,290	55	4
West Olive Ave.	SH 59 to R Street	15,410	18,750	27,760	40	4
Buhach Rd.	Santa Fe Dr. to Bellevue Rd.	7,700	8,920	11,990	40	4
Buhach Rd.	Bellevue Rd. to Juniper Ave.	5,680	6,590	8,850	45	4
Buhach Rd.	Juniper Ave. to SH 99	5,690	6,600	8,870	45	4
Bellevue Rd.	Santa Fe Dr. to Buhach Rd.	11,500	13,330	17,920	40	4
Bellevue Rd.	Buhach Rd. to Castle Dr.	16,220	18,800	25,270	40	4
Bellevue Rd.	Castle Dr. to Shaffer Rd.	18,460	21,400	28,750	40	4
Juniper Ave.	Buhach Rd. to Shaffer Rd.	4,160	4,820	6,480	40	4
Wallace Rd.	Gate 3 to Santa Fe Dr.	800	530	1,250	40	2

The fleet mix and annual operations for each of the modeled years are contained in Table J-8. The CNEL contours for the proposed flight operations are presented in Section 4.4.4 of the main text. The proposed flight tracks modeled are the same as for the Proposed Action and are presented in Section 4.4.4. The day/evening/night split for all aircraft operations is given in Table J-4. All aircraft departure operations are stage length 1.

Table J-8a. Annual Aircraft Operations for Castle Aviation Center Alternative (2000)

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Maintenance/Refurbishing			1,200	16
Boeing 747-400	1,000	83		
MD-88	100	8		
Fokker-100	100	8		
Classic Aircraft Refurbishment			48	1
DC-3	48	100		
Air Show			1,200	16
DC-3	750	63		
F-16	450	37		
General Aviation			4,900	67
Single-Engine Piston	3,000	62		
Baron 58P (twin engine piston)	1,000	20		
King Air (turboprop)	500	10		
Gulfstream IV (corporate jet)	400	8		
Total			7,348	100

Engine runup operations were assumed to occur at the same location as in the Proposed Action as described in Section 4.4.4. The number of runup operations is given in Table J-5. It was assumed that no noise suppression facilities would be available. The aircraft were assumed to have a heading of 220 degrees.

General aviation operations would be divided into the same four types as in the Proposed Action.

It was assumed that approximately 7 to 15 percent of the piston-engine aircraft operations and 80 percent of the air show operations would be touch-and-go (or closed loop) activities. Daily operations assigned to each flight track and time period for the Castle Aviation Center Alternative are provided in Table J-9 for each of the study years.

Table J-8b. Annual Aircraft Operations for Castle Aviation Center Alternative (2005)

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Maintenance/Refurbishing			2,000	22
B-747-400	1,500	74		
MD-88	250	13		
Fokker-100	250	13		
Classic Aircraft Refurbishment			54	1
DC-3	54	100		
Air Show			1,440	16
DC-3	950	69		
F-16	450	31		
General Aviation			5,400	61
Single-Engine Piston	3,100	57		
Baron 58P (twin-engine piston)	1,200	22		
King Air (turboprop)	600	11		
Gulfstream IV (corporate jet)	500	10		
Total			8,894	100

Table J-8c. Annual Aircraft Operations for Castle Aviation Center Alternative (2015)

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Maintenance/Refurbishing			2,850	26
Boeing 747-400	2,000	70		
MD-88	500	18		
F-100	350	12		
Classic Aircraft Refurbishment			60	<1
DC-3	60	100		
Air Show			1,800	16
DC-3	1,350	75		
Fokker-16	450	25		
General Aviation			6,400	58
Single-Engine Piston	3,100	48		
Baron 58P (twin-engine piston)	1,500	23		
King Air (turboprop)	800	13		
Gulfstream IV (corporate jet)	1,000	16		
Total			11,110	100

Table J-9a. Assignment of Operations for the Castle Aviation Center Alternative (2000)

Departure Flight Tracks

	D1			D2			D3			D4			D5			D6		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.02	-	-	0.02	-	-	0.02	-	-	0.39	0.04	-	0.39	0.04	-	0.39	0.04	-
MD-88	-	-	-	-	-	-	-	-	-	0.04	-	-	0.04	-	-	0.04	-	-
Fokker 100	-	-	-	-	-	-	-	-	-	0.04	-	-	0.04	-	-	0.04	-	-
DC-3	-	-	-	-	-	-	-	-	-	0.02	-	-	0.02	-	-	0.02	-	-
DC-3	-	-	-	-	-	-	-	-	-	0.07	-	-	0.07	-	-	0.07	-	-
F-16	-	-	-	-	-	-	-	-	-	0.04	-	-	0.04	-	-	0.04	-	-
Single-Engine Piston	0.05	0.01	-	0.05	0.01	-	0.05	0.01	-	0.86	0.22	0.03	0.86	0.22	0.03	0.86	0.22	0.03
Beech Baron 58P	0.02	-	-	0.02	-	-	0.02	-	-	0.31	0.08	0.01	0.31	0.08	0.01	0.31	0.08	0.01
Beech King Air	0.01	-	-	0.01	-	-	0.01	-	-	0.16	0.04	0.02	0.16	0.04	0.02	0.16	0.04	0.02
Gulfstream IV	0.01	-	-	0.01	-	-	0.01	-	-	0.13	0.03	0.01	0.13	0.03	0.01	0.13	0.03	0.01
Total	0.11	0.01	-	0.11	0.01	-	0.11	0.01	-	2.06	0.41	0.07	2.06	0.41	0.07	2.06	0.41	0.07

Arrival/Touch & Go Flight Tracks

	A1			A2			T1			T2			T3			T4		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.06	0.01	-	1.17	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-
MD-88	0.01	-	-	0.12	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Fokker 100	0.01	-	-	0.12	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
DC-3	-	-	-	0.05	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
DC-3	0.01	-	-	0.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F-16	0.01	-	-	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single-Engine Piston	0.14	0.03	-	2.59	0.66	0.08	0.04	0.01	-	0.41	0.11	-	-	-	-	0.02	0.01	-
Beech Baron 58P	0.05	0.01	-	0.94	0.24	0.03	0.01	-	-	0.07	0.02	-	-	-	-	-	-	-
Beech King Air	0.02	0.01	-	0.47	0.13	0.05	0.07	-	-	0.71	-	-	-	-	-	0.04	-	-
Gulfstream IV	0.02	0.01	-	0.38	0.10	0.04	0.04	-	-	0.42	-	-	-	-	-	0.02	-	-
Total	0.33	0.07	-	6.16	1.29	0.20	0.16	0.01	0	1.61	0.13	0	0	0	0	0.08	0.01	0

Note: Daytime operations are assumed to occur between the hours of 7:00 a.m. and 7:00 p.m. Evening operations are assumed to occur between the hours of 7:00 p.m. and 10:00 p.m. Nighttime operations are assumed to occur between the hours of 10:00 p.m. and 7:00 a.m.

Table J-9b. Assignment of Operations for the Castle Aviation Center Alternative (2005)

Departure Flight Tracks

	D1			D2			D3			D4			D5			D6		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.03	-	-	0.03	-	-	0.03	-	-	0.59	0.07	-	0.59	0.07	-	0.59	0.07	-
MD-88	0.01	-	-	0.01	-	-	0.01	-	-	0.10	0.01	-	0.10	0.01	-	0.10	0.01	-
Fokker 100	0.01	-	-	0.01	-	-	0.01	-	-	0.10	0.01	-	0.10	0.01	-	0.10	0.01	-
DC-3	-	-	-	-	-	-	-	-	-	0.02	-	-	0.02	-	-	0.02	-	-
DC-3	-	-	-	-	-	-	-	-	-	0.09	-	-	0.09	-	-	0.09	-	-
F-16	-	-	-	-	-	-	-	-	-	0.04	-	-	0.04	-	-	0.04	-	-
Single-Engine Piston	0.05	0.01	-	0.05	0.01	-	0.05	0.01	-	0.89	0.23	0.03	0.89	0.23	0.03	0.89	0.23	0.03
Beech Baron 58P	0.02	0.01	-	0.02	0.01	-	0.02	0.01	-	0.38	0.10	0.01	0.38	0.10	0.01	0.38	0.10	0.01
Beech King Air	0.01	-	-	0.01	-	-	0.01	-	-	0.19	0.05	0.02	.19	0.05	0.02	0.19	0.05	0.02
Gulfstream IV	0.01	-	-	0.01	-	-	0.01	-	-	0.16	0.04	0.02	0.16	0.04	0.02	0.16	0.04	0.02
Total	0.14	0.02	-	0.14	0.02	-	0.14	0.02	-	2.56	0.51	0.08	2.56	0.51	0.08	2.56	0.51	0.08

Arrival/Touch & Go Flight Tracks

	A1			A2			T1			T2			T3			T4		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.09	0.01	-	1.76	0.20	-	-	-	-	-	-	-	-	-	-	-	-	-
MD 88	0.02	-	-	0.29	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-
Fokker 100	0.02	-	-	0.29	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-
DC-3	-	-	-	0.06	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
DC-3	0.01	-	-	0.26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F-16	0.01	-	-	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single-Engine Piston	0.14	0.04	-	2.67	0.69	0.08	0.04	0.01	-	0.43	0.11	-	-	-	-	0.02	0.01	-
Beech Baron 58P	0.06	0.02	-	1.13	0.29	0.03	0.01	-	-	0.08	0.02	-	-	-	-	-	-	-
Beech King Air	0.03	0.01	-	0.57	0.16	0.06	0.10	-	-	0.93	-	-	0.01	-	-	0.05	-	-
Gulfstream IV	0.02	0.01	-	0.47	0.13	0.05	0.04	-	-	0.42	-	-	-	-	-	0.02	-	-
Total	0.40	0.09	-	7.62	1.54	0.22	0.19	0.01	0	1.86	0.13	0	0.01	0	0	0.09	0.01	0

Note: Daytime operations are assumed to occur between the hours of 7:00 a.m. and 7:00 p.m. Evening operations are assumed to occur between the hours of 7:00 p.m. and 10:00 p.m. Nighttime operations are assumed to occur between the hours of 10:00 p.m. and 7:00 a.m.

Table J-9c. Assignment of Operations for the Castle Aviation Center Alternative (2015)

Departure Flight Tracks

	D1			D2			D3			D4			D5			D6		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.04	-	-	0.04	-	-	0.04	-	-	0.78	0.09	-	0.78	0.09	-	0.78	0.09	-
MD-88	0.01	-	-	0.01	-	-	0.01	-	-	0.20	0.02	-	0.20	0.02	-	0.20	0.02	-
Fokker 100	0.01	-	-	0.01	-	-	0.01	-	-	0.13	0.02	-	0.13	0.02	-	0.13	0.02	-
DC-3	-	-	-	-	-	-	-	-	-	0.02	0.01	-	0.02	0.01	-	0.02	0.01	-
DC-3	0.01	-	-	0.01	-	-	0.01	-	-	0.12	-	-	0.12	-	-	0.12	-	-
F-16	-	-	-	-	-	-	-	-	-	0.04	-	-	0.04	-	-	0.04	-	-
Single-Engine Piston	0.05	0.01	-	0.05	0.01	-	0.05	0.01	-	0.89	0.23	0.03	0.89	0.23	0.03	0.89	0.23	0.03
Beech Baron 58P	0.02	0.01	-	0.02	0.01	-	0.02	0.01	-	0.47	0.12	0.01	0.47	0.12	0.01	0.47	0.12	0.01
Beech King Air	0.01	-	-	0.01	-	-	0.01	-	-	0.25	0.07	0.03	0.25	0.07	0.03	0.25	0.07	0.03
Gulfstream IV	0.02	-	-	0.02	-	-	0.02	-		0.31	0.09	0.03	0.31	0.09	0.03	0.31	0.09	0.03
Total	0.17	0.02	-	0.17	0.02	-	0.17	0.02	-	3.21	0.65	0.10	3.21	0.65	0.10	3.21	0.65	0.10

Arrival/Touch & Go Flight Tracks

	A1			A2			T1			T2			T3			T4		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.12	0.01	-	2.34	0.26	-	-	-	-	-	-	-	-	-	-	-	-	-
MD-88	0.03	-	-	0.59	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Fokker 100	0.02	-	-	0.39	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-
DC-3	-	-	-	0.06	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-
DC-3	0.02	-	-	0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F-16	0.01	-	-	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Single-Engine Piston	0.14	0.04	-	2.67	0.69	0.08	0.04	0.01	-	0.43	0.11	-	-	-	-	0.02	0.01	-
Beech Baron 58P	0.07	0.02	-	1.41	0.36	0.04	0.01	-	-	0.10	0.03	-	-	-	-	0.01	-	-
Beech King Air	0.04	0.01	-	0.75	0.21	0.08	0.13	-	-	1.27	-	-	0.01	-	-	0.07	-	-
Gulfstream IV	0.05	0.01	0.01	0.94	0.26	0.10	0.04	-	-	0.42	-	-	-	-	-	0.02	-	-
Total	0.50	0.09	0.01	9.62	1.94	0.30	0.22	0.01	0	2.22	0.14	0	0.01	0	0	0.12	0.01	0

Note: Daytime operations are assumed to occur between the hours of 7:00 a.m. and 7:00 p.m. Evening operations are assumed to occur between the hours of 7:00 p.m. and 10:00 p.m. Nighttime operations are assumed to occur between the hours of 10:00 p.m. and 7:00 a.m.

A standard 3-degree glide slope and the takeoff profiles provided by the FAA's Integrated Noise Model Database 3.10 were assumed for all aircraft.

Engine runups were modeled using the U.S. Air Force's NOISEMAP version 6.1.

Surface traffic data used in the modeling were developed from the project traffic study and are shown in Table J-7. The traffic mix, day/evening/night split, and speed were assumed to remain the same as for the preclosure reference. Railway operations were assumed to remain the same as for the preclosure reference. Number of residents impacted by railway and roadway noise were determined from aerial photographs dated March 27, 1990.

1.5 COMMERCIAL AVIATION ALTERNATIVE

The Commercial Aviation Alternative for the reuse of Castle AFB would be centered around general, pilot training, and commercial aviation operations with aircraft maintenance and storage. Commercial operations include both passenger and cargo service. As in the Proposed Action, the airfield would be converted to civilian use. Primary components of the aviation action include general aviation operations and pilot training. This alternative also proposes the reuse of 5,000 feet of existing taxiway as a new runway for general aviation operations.

The fleet mix and annual operations for each of the modeled years are contained in Table J-10. The CNEL contours for the proposed flight operations are presented in Section 4.4.4. The proposed flight tracks modeled (Figure J-2) are configured around two active, parallel runways, and are presented in Section 4.4.4. The day/evening/night split for all aircraft operations is give in Table J-4. All aircraft departure operations are stage length 1.

Engine runup operations were assumed to occur at the same location as in the Proposed Action as described in Section 4.4.4. The number of runup operations is given in Table J-5. It was assumed that no noise suppression facilities would be available. The aircraft were assumed to have a heading of 220 degrees.

General aviation operations would be divided into the same four types as in the Proposed Action. It was assumed that approximately 20 percent of the piston-engine aircraft operations and 80 percent of the Boeing 747-400 operations would be touch-and-go (or closed loop) operations. Daily operations assigned to each flight track and time period for the Commercial Aviation Alternative are provided in Table J-11 for each of the study years. A standard 3-degree glide slope and the takeoff profiles provided by the FAA's Integrated Noise Model Database 3.10 were assumed for all aircraft.

Table J-10a. Annual Aircraft Operations for Commercial Aviation Alternative (2000)

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Passenger Operations			2,712	2
Jetstream 31	2,712	100		
Air Cargo			1,250	1
Beech 99	400	32		
Piper Navajo	163	13		
Piper Cherokee	62	5		
Cessna Caravan	625	50		
Pilot Training			86,524	49
Boeing 747-400	52,720	61		
Multi-engine	22,536	26		
Jetstream 31	11,268	13		
General Aviation			86,440	48
Single-engine	76,640	91		
Multi-engine	7,400	7		
King Air	1,200	1		
Gulfstream IV	1,200	1		
Total			176,926	100

Table J-10b. Annual Aircraft Operations for Commercial Aviation Alternative (2005)

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Passenger Operations			2,920	2
Jetstream 31	2,920	100		
Air Cargo			1,250	1
Beech 99	521	42		
Piper Navajo	104	8		
Cessna Caravan	625	50		
Pilot Training			98,270	51
Boeing 747-400	56,015	57		
Multi-engine	28,170	29		
Jetstream 31	14,085	14		
General Aviation			90,450	46
Single-engine	79,450	91		
Multi-engine	7,800	7		
King Air	1,600	1		
Gulfstream IV	1,600	1		
Total			192,890	100

Table J-10c Annual Aircraft Operations for Commercial Aviation Alternative (2015)

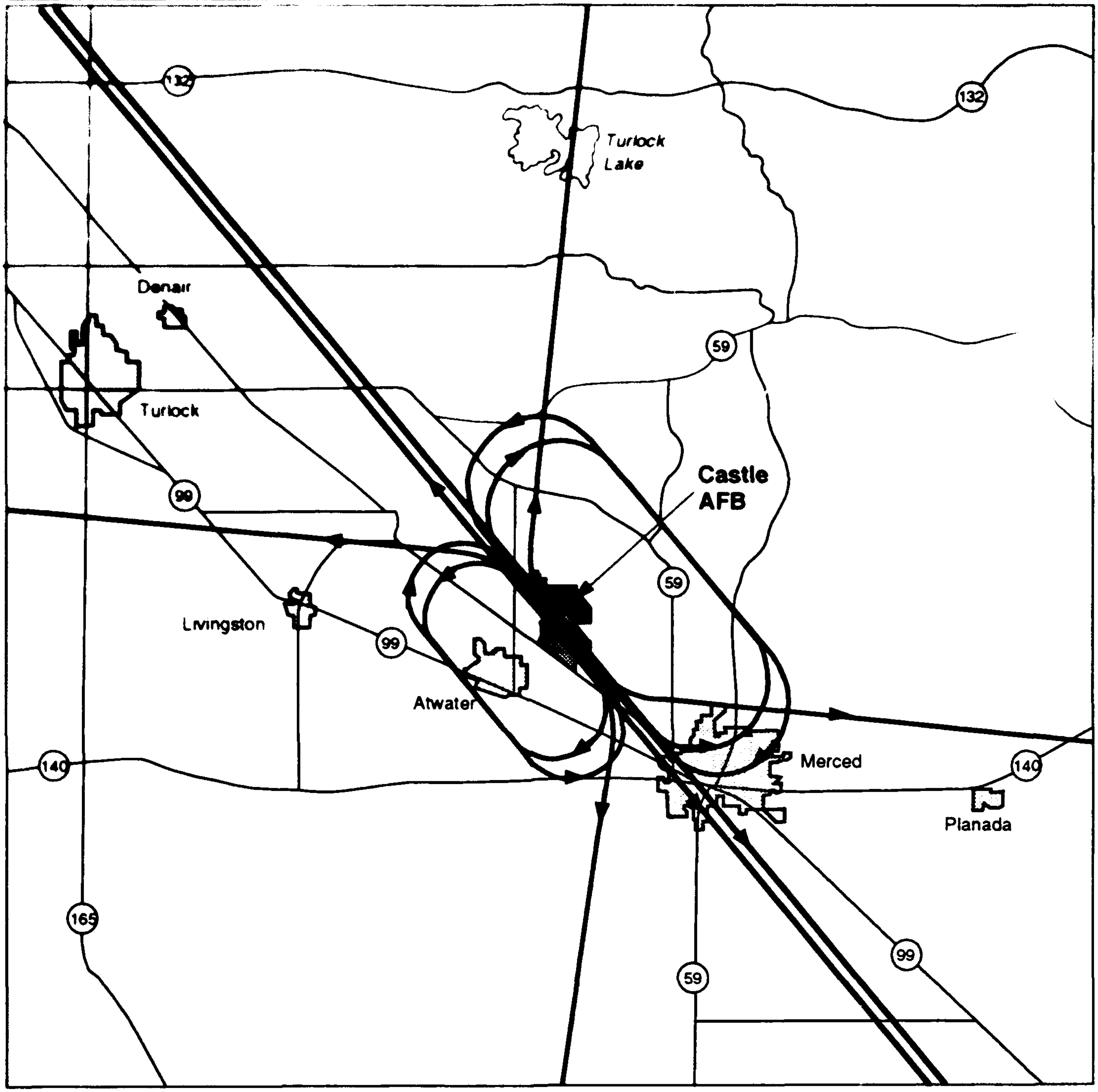
Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Passenger Operations			3 650	2
Jetstream 31	1 4[illegible]	4[illegible]		
Saab 340B	2 190	60		
Air Cargo			2 500	1
Beech 99	1 250	[illegible]		
Cessna Caravan	1 250	[illegible]		
Pilot Training			125 057	53
Boeing 747-400	65 900	53		
Multi-engine	39 438	32		
Jetstream 31	19 719	15		
General Aviation			103 230	44
Single-engine	87 480	85		
Multi-engine	9 000	10		
King Air	3 600	3		
Gulfstream IV	3 150	2		
Total			234,437	100

Surface traffic data used in the modeling were developed from the project traffic study and are shown in Table J-1. The traffic mix, day/evening/night split, and speed were assumed to remain the same as for the preclosure reference. Railway operations were assumed to remain the same as for the preclosure reference. The number of residents impacted by railway and roadway noise was determined from aerial photographs dated March 27, 1990.

1.6 AVIATION WITH MIXED USE ALTERNATIVE

Under the Aviation with Mixed Use Alternative, as in the Proposed Action, the base airfield would be converted to civilian use. Primary components of the aviation action include general aviation and maintenance operations. The airport layout would remain unchanged.

The fleet mix and annual operations for each of the modeled years are contained in Table J-12. The CNEL contours for the proposed flight operations are presented in Section 4.4.4, Noise. The proposed flight tracks modeled are the same as for the Proposed Action. The day/evening/night split for all aircraft operations are given in Table J-4. All aircraft departure operations are stage length 1.



EXPLANATION

Direction of Travel on Flight Path

(99) State Highway

Primary Flight Tracks - Commercial Aviation Alternative

0 1.25 2.5 5 Miles

Figure J-2

Table J-11a. Assignment of Operations for the Commercial Aviation Alternative (2000)

Departure Flight Tracks

	D2			D3			D4			D5		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Jetstream 31	0.09	-	-	0.09	-	-	1.76	-	-	1.76	-	-
SF 340	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-
Beech 99	-	0.01	-	-	0.01	-	-	0.26	-	-	0.26	-
Piper Navajo	-	0.01	-	-	0.01	-	-	0.11	-	-	0.11	-
Piper Cherokee	-	0.00	-	-	0.00	-	-	0.04	-	-	0.04	-
Cessna Caravan	-	0.02	-	-	0.02	-	-	0.41	-	-	0.41	-
Boeing 747-400	0.09	0.00	-	0.09	0.00	-	1.73	0.04	-	1.73	0.04	-
Beech Baron 58P	0.13	0.00	-	0.13	0.00	-	2.44	0.00	-	2.44	0.00	-
Jetstream 31	0.06	0.00	-	0.06	0.00	-	1.22	0.00	-	1.22	0.00	-
Single-Engine Piston	0.76	0.17	0.02	0.76	0.17	0.02	14.36	3.23	0.36	14.36	3.23	0.36
Beech Baron 58P	0.08	0.02	0.00	0.08	0.02	0.00	1.44	0.42	0.06	1.44	0.42	0.06
Cessna 441	0.01	0.01	0.00	0.01	0.01	0.00	0.27	0.14	0.05	0.27	0.14	0.05
Gulfstream IV	0.01	0.01	0.00	0.01	0.01	0.00	0.27	0.15	0.05	0.27	0.15	0.05

	D7			D8			D9			D10		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Jetstream 31	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-
SF 340	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-
Beech 99	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Piper Navajo	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Piper Cherokee	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Cessna Caravan	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Boeing 747-400	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
Beech Baron 58P	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
Jetstream 31	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
Single-Engine Piston	0.50	0.11	0.02	0.50	0.11	0.02	9.57	2.15	0.24	9.57	2.15	0.24
Beech Baron 58P	0.05	0.01	0.00	0.05	0.01	0.00	0.96	0.28	0.04	0.96	0.28	0.04
Cessna 441	0.01	0.01	0.00	0.01	0.01	0.00	0.18	0.10	0.03	0.18	0.10	0.03
Gulfstream IV	0.01	0.01	0.00	0.01	0.01	0.00	0.18	0.10	0.03	0.18	0.10	0.03

Table J-11a. Assignment of Operations for the Commercial Aviation Alternative (2000)

Arrival/Touch and Go

	T1			T2			T3			T4		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Single-Engine Piston	0.00	0.00	-	0.00	0.00	-	1.89	0.21	-	35.91	3.99	-
Beech Baron 58P	0.00	0.00	-	0.00	0.00	-	1.42	0.03	-	27.01	0.64	-
Cessna 441	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
Boeing 747-400	3.36	0.07	-	63.77	1.30	-	0.00	0.00	-	0.00	0.00	-
Jetstream 31	0.64	0.00	-	12.22	0.00	-	0.00	0.00	-	0.00	0.00	-

Note: Daytime operations are assumed to occur between the hours of 7:00 a.m. and 7:00 p.m. Evening operations are assumed to occur between the hours of 7:00 p.m. and 10:00 p.m. Nighttime operations are assumed to occur between the hours of 10:00 p.m. and 7:00 a.m.

Table J-11b. Assignment of Operations for the Commercial Aviation Alternative (2005)

Departure Flight Tracks

	D2			D3			D4			D5		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Jetstream 31	0.10	-	-	0.10	-	-	1.90	-	-	1.90	-	-
SF 340	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-
Beech 99	-	0.02	-	-	0.02	-	-	0.34	-	-	0.34	-
Piper Navajo	-	0.00	-	-	0.00	-	-	0.07	-	-	0.07	-
Piper Cherokee	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Cessna Caravan	-	0.02	-	-	0.02	-	-	0.41	-	-	0.41	-
Boeing 747-400	0.10	0.00	-	0.10	0.00	-	1.84	0.04	-	1.84	0.04	-
Beech Baron 58P	0.16	0.00	-	0.16	0.00	-	3.05	0.00	-	3.05	0.00	-
Jetstream 31	0.08	0.00	-	0.08	0.00	-	1.53	0.00	-	1.53	0.00	-
Single-Engine Piston	0.78	0.18	0.02	0.78	0.18	0.02	14.89	3.35	0.37	14.89	3.35	0.37
Beech Baron 58P	0.08	0.02	0.00	0.08	0.02	0.00	1.52	0.45	0.06	1.52	0.45	0.06
Cessna 441	0.02	0.01	0.00	0.02	0.01	0.00	0.36	0.19	0.06	0.36	0.19	0.06
Gulfstream IV	0.02	0.01	0.00	0.02	0.01	0.00	0.37	0.20	0.06	0.37	0.20	0.06

	D7			D8			D9			D10		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Jetstream 31	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-
SF 340	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-
Beech 99	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Piper Navajo	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Piper Cherokee	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Cessna Caravan	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Boeing 747-400	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
Beech Baron 58P	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
Jetstream 31	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
Single-Engine Piston	0.52	0.12	0.01	0.52	0.12	0.01	9.93	2.23	0.25	9.93	2.23	0.25
Beech Baron 58P	0.05	0.02	0.00	0.05	0.02	0.00	1.02	0.30	0.04	1.02	0.30	0.04
Cessna 441	0.01	0.01	0.00	0.01	0.01	0.00	0.24	0.13	0.04	0.24	0.13	0.04
Gulfstream IV	0.01	0.01	0.00	0.01	0.01	0.00	0.24	0.13	0.04	0.24	0.13	0.04

Table J-11b. Assignment of Operations for the Commercial Aviation Alternative (2005)

Arrival/Touch and Go

	T1			T2			T3			T4		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Single-Engine Piston	0.00	0.00	-	0.00	0.00	-	1.96	0.22	-	37.22	4.14	-
Beech Baron 58P	0.00	0.00	-	0.00	0.00	-	1.75	0.04	-	33.26	0.68	-
Cessna 441	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
Boeing 747-400	3.57	0.07	-	67.75	1.38	-	0.00	0.00	-	0.00	0.00	-
Jetstream 31	0.80	0.00	-	15.27	0.00	-	0.00	0.00	-	0.00	0.00	-

Note: Daytime operations are assumed to occur between the hours of 7:00 a.m. and 7:00 p.m. Evening operations are assumed to occur between the hours of 7:00 p.m. and 10:00 p.m. Nighttime operations are assumed to occur between the hours of 10:00 p.m. and 7:00 a.m.

Table J-11c. Assignment of Operations for the Commercial Aviation Alternative (2015)

Departure Flight Tracks

	D2			D3			D4			D5		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Jetstream 31	0.05	-	-	0.05	-	-	0.95	-	-	0.95	-	-
SF 340	0.08	-	-	0.08	-	-	1.43	-	-	1.43	-	-
Beech 99	-	0.04	-	-	0.04	-	-	0.81	-	-	0.81	-
Piper Navajo	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Piper Cherokee	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Cessna Caravan	-	0.04	-	-	0.04	-	-	0.81	-	-	0.81	-
Boeing 747-400	0.11	0.00	-	0.11	0.00	-	2.17	0.04	-	2.17	0.04	-
Beech Baron 58P	0.23	0.00	-	0.23	0.00	-	4.28	0.00	-	4.28	0.00	-
Jetstream 31	0.11	0.00	-	0.11	0.00	-	2.14	0.00	-	2.14	0.00	-
Single-Engine Piston	0.86	0.19	0.02	0.86	0.19	0.02	16.39	3.69	0.41	16.39	3.69	0.41
Beech Baron 58P	0.09	0.03	0.00	0.09	0.03	0.00	1.76	0.52	0.07	1.76	0.52	0.07
Cessna 441	0.04	0.02	0.01	0.04	0.02	0.01	0.81	0.43	0.14	0.81	0.43	0.14
Gulfstream IV	0.04	0.02	0.01	0.04	0.02	0.01	0.72	0.39	0.12	0.72	0.39	0.12

	D7			D8			D9			D10		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Jetstream 31	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-
SF 340	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-	-
Beech 99	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Piper Navajo	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Piper Cherokee	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Cessna Caravan	-	0.00	-	-	0.00	-	-	0.00	-	-	0.00	-
Boeing 747-400	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
Beech Baron 58P	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
Jetstream 31	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
Single-Engine Piston	0.58	0.13	0.01	0.58	0.13	0.01	10.93	2.46	0.27	10.93	2.46	0.27
Beech Baron 58P	0.06	0.02	0.00	0.06	0.02	0.00	1.17	0.34	0.05	1.17	0.34	0.05
Cessna 441	0.03	0.02	0.00	0.03	0.02	0.00	0.54	0.29	0.09	0.54	0.29	0.09
Gulfstream IV	0.03	0.01	0.00	0.03	0.01	0.00	0.48	0.26	0.08	0.48	0.26	0.08

Table J-11c. Assignment of Operations for the Commercial Aviation Alternative (2015)

Arrival/Touch and Go

	T1			T2			T3			T4		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Single-Engine Piston	0.00	0.00	-	0.00	0.00	-	2.16	0.24	-	40.98	4.55	-
Beech Baron 58P	0.00	0.00	-	0.00	0.00	-	2.42	0.04	-	45.89	0.78	-
Cessna 441	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
Boeing 747-400	4.20	0.09	-	79.71	1.63	-	0.00	0.00	-	0.00	0.00	-
Jetstream 31	1.13	0.00	-	21.38	0.00	-	0.00	0.00	-	0.00	0.00	-

Note: Daytime operations are assumed to occur between the hours of 7:00 a.m. and 7:00 p.m. Evening operations are assumed to occur between the hours of 7:00 p.m. and 10:00 p.m. Nighttime operations are assumed to occur between the hours of 10:00 p.m. and 7:00 a.m.

Table J-12a. Annual Aircraft Operations for Aviation with Mixed Use Alternative (2000)

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Maintenance/Refurbishing			1,200	4
Boeing 747-400	1,000	83		
MD-88	100	8		
Fokker 100	100	8		
General Aviation			32,450	96
Single-engine piston	26,950	83		
Baron 58P (twin-engine piston)	3,000	9		
King air (turboprop)	1,500	5		
Gulfstream IV (corporate jet)	1,000	3		
Total			33,650	100

Table J-12b. Annual Aircraft Operations for Aviation with Mixed Use Alternative (2005)

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Maintenance/Refurbishing			2,000	5
Boeing 747-400	1,500	75		
MD-88	250	13		
Fokker 100	250	13		
General Aviation			34,650	95
Single-engine piston	27,800	80		
Baron 58P (twin-engine piston)	3,600	10		
King air (turboprop)	1,750	5		
Gulfstream IV (corporate jet)	1,500	4		
Total			36,650	100

Table J-12c. Annual Aircraft Operations for Aviation with Mixed Use Alternative (2015)

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Maintenance/Refurbishing			2,850	7
Boeing 747-400	2,000	70		
MD-88	500	18		
Fokker 100	350	12		
General Aviation			37,950	93
Single-engine piston	27,950	74		
Baron 58P (twin-engine piston)	5,000	13		
King Air (turboprop)	2,500	7		
Gulfstream IV (corporate jet)	2,500	7		
Total			40,800	100

Engine runup operations were assumed to occur at the same location as in the Proposed Action as described in Section 4.4.4. The number of runup operations is given in Table J-5. It was assumed that no noise suppression facilities would be available. The aircraft were assumed to have a heading of 220 degrees.

General aviation operations would be divided into the same four types as in the Proposed Action. It was assumed that approximately 20 to 30 percent of the piston-engine operations and less than 1 percent of the turboprop general aviation operations would be touch-and-go (or closed loop) activities. Daily operations assigned to each flight track and time period for the Aviation with Mixed Use Alternative are provided in Table J-13 for each of the study years.

A standard 3-degree glide slope and the takeoff profiles provided by the FAA's Integrated Noise Model Database 3.10 were assumed for all civilian aircraft. Engine runups were modeled using the U.S. Air Force's NOISEMAP version 6.1.

Surface traffic data used in the modeling were developed from the project traffic study and are shown in Table J-7. The traffic mix, day/evening/night split, and speed were assumed to remain the same as for the preclosure reference. Railway operations were assumed to remain the same as for the preclosure reference. Number of residents impacted by railway and roadway noise were determined from aerial photographs dated March 27, 1990.

1.7 NON-AVIATION ALTERNATIVE

This alternative includes only non-aviation land uses. The airfield would be replaced with research and development-oriented industrial and multi-family residential use. Other land uses include education and recreation. Surface traffic data used in the modeling were developed from the project traffic study and are presented in Table J-7. The traffic mix, day/evening/ night split, and speed were assumed to remain the same as for the preclosure reference. Railway operations were assumed to remain the same as for the preclosure reference. Number of residents impacted by railway and roadway noise were determined from aerial photographs dated March 27, 1990.

1.8 NO-ACTION ALTERNATIVE

The No-Action Alternative would result in the Air Force retaining ownership of the property after closure. The property would not be put to further use. An Air Force Base Conversion Agency Operating Location would be provided to ensure base security and maintain the grounds and physical assets, including the existing utilities and structures. There would be no military activities/missions performed on the property identified for disposal. Surface traffic data used in the modeling were developed from the project traffic

Table J-13a. Assignment of Operations for the Aviation with Mixed Use Alternative (2000)

Departure Flight Tracks

	D1			D2			D3			D4			D5			D6		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.02	-	-	0.02	-	-	0.02	-	-	0.39	0.04	-	0.39	0.04	-	0.39	0.04	-
MD-88	-	-	-	-	-	-	-	-	-	0.04	-	-	0.04	-	-	0.04	-	-
Fokker 100	-	-	-	-	-	-	-	-	-	0.04	-	-	0.04	-	-	0.04	-	-
Single-Engine Piston	0.34	0.11	0.01	0.34	0.11	0.01	0.34	0.11	0.01	6.38	2.11	0.23	6.38	2.11	0.23	6.38	2.11	0.23
Beech Baron 58P	0.04	0.01	-	0.04	0.01	-	0.04	0.01	-	0.76	0.25	0.03	0.76	0.25	0.03	0.76	0.25	0.03
Beech King Air	0.02	0.01	-	0.02	0.01	-	0.02	0.01	-	0.47	0.13	0.05	0.47	0.13	0.05	0.47	0.13	0.05
Gulfstream IV	0.02	-	-	0.02	-	-	0.02	-	-	0.31	0.09	0.03	0.31	0.09	0.03	0.31	0.09	0.03
Total	0.44	0.13	0.01	0.44	0.13	0.01	0.44	0.13	0.01	8.39	2.62	0.34	8.39	2.62	0.34	8.39	2.62	0.34

Arrival/Touch & Go Flight Tracks

	A1			A2			T1			T2			T3			T4		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.06	0.01	-	1.17	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-
MD-88	0.01	-	-	0.12	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Fokker 100	0.01	-	-	0.12	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
Single-Engine Piston	1.01	0.33	0.04	19.14	6.32	0.70	0.77	0.07	-	7.43	0.64	-	0.04	-	-	0.39	0.03	-
Beech Baron 58P	0.12	0.04	-	2.28	0.74	0.08	0.07	-	-	0.69	0.04	-	-	-	-	0.04	-	-
Beech King Air	0.07	0.02	0.01	1.41	0.39	0.14	-	-	-	0.01	-	-	-	-	-	-	-	-
Gulfstream IV	0.05	0.01	0.01	0.94	0.26	0.10	-	-	-	-	-	-	-	-	-	-	-	-
Total	1.33	0.41	0.06	25.18	7.86	1.02	0.84	0.07	0	8.13	0.68	0	0.04	0	0	0.43	0.03	0

Note: Daytime operations are assumed to occur between the hours of 7:00 a.m. and 7:00 p.m. Evening operations are assumed to occur between the hours of 7:00 p.m. and 10:00 p.m. Nighttime operations are assumed to occur between the hours of 10:00 p.m. and 7:00 a.m.

Table J-13b. Assignment of Operations for the Aviation with Mixed Use Alternative (2005)

Departure Flight Tracks

	D1			D2			D3			D4			D5			D6		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.03	-	-	0.03	-	-	0.03	-	-	0.59	0.07	-	0.59	0.07	-	0.59	0.07	-
MD-88	0.01	-	-	0.01	-	-	0.01	-	-	0.10	0.01	-	0.10	0.01	-	0.10	0.01	-
Fokker 100	0.01	-	-	0.01	-	-	0.01	-	-	0.10	0.01	-	0.10	0.01	-	0.10	0.01	-
Single-Engine Piston	0.35	0.11	0.01	0.35	0.11	0.01	0.35	0.11	0.01	6.58	2.17	0.24	6.58	2.17	0.24	6.58	2.17	0.24
Beech Baron 58P	0.05	0.02	-	0.05	0.02	-	0.05	0.02	-	0.91	0.30	0.03	0.91	0.30	0.03	0.91	0.30	0.03
Beech King Air	0.03	0.01	-	0.03	0.01	-	0.03	0.01	-	0.53	0.16	0.06	0.53	0.16	0.06	0.53	0.16	0.06
Gulfstream IV	0.03	0.01	-	0.03	0.01	-	0.03	0.01	-	0.48	0.13	0.05	0.48	0.13	0.05	0.48	0.13	0.05
Total	0.51	0.15	0.01	0.51	0.15	0.01	0.51	0.15	0.01	9.29	2.85	0.38	9.29	2.85	0.38	9.29	2.85	0.38

Arrival/Touch & Go Flight Tracks

	A1			A2			T1			T2			T3			T4		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.09	0.01	-	1.76	0.20	-	-	-	-	-	-	-	-	-	-	-	-	-
MD-88	0.02	-	-	0.29	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-
Fokker 100	0.02	-	-	0.29	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-
Single-Engine Piston	1.04	0.34	0.04	19.75	6.51	0.72	0.80	0.07	-	7.67	0.66	-	0.04	-	-	0.40	0.03	-
Beech Baron 58P	0.14	0.05	-	2.74	0.89	0.09	0.09	-	-	0.83	0.04	-	-	-	-	0.04	-	-
Beech King Air	0.08	0.03	0.01	1.60	0.49	0.17	-	-	-	0.01	-	-	-	-	-	-	-	-
Gulfstream IV	0.08	0.02	0.01	1.43	0.39	0.14	-	-	-	-	-	-	-	-	-	-	-	-
Total	1.47	0.45	0.06	27.86	8.54	1.12	0.89	0.07	0	8.51	0.7	0	0.04	0	0	0.44	0.03	0

Note: Daytime operations are assumed to occur between the hours of 7:00 a.m. and 7:00 p.m. Evening operations are assumed to occur between the hours of 7:00 p.m. and 10:00 p.m. Nighttime operations are assumed to occur between the hours of 10:00 p.m. and 7:00 a.m.

Table J-13c. Assignment of Operations for the Aviation with Mixed Use Alternative (2015)

Departure Flight Tracks

	D1			D2			D3			D4			D5			D6		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.04	-	-	0.04	-	-	0.04	-	-	0.78	0.09	-	0.78	0.09	-	0.78	0.09	-
MD-88	0.01	-	-	0.01	-	-	0.01	-	-	0.20	0.02	-	0.20	0.02	-	0.20	0.02	-
Fokker 100	0.01	-	-	0.01	-	-	0.01	-	-	0.13	0.02	-	0.13	0.02	-	0.13	0.02	-
Single-Engine Piston	0.35	0.09	0.01	0.35	0.09	0.01	0.35	0.09	0.01	6.62	1.70	0.24	6.62	1.70	0.24	6.62	1.70	0.24
Beech Baron 58P	0.07	0.02	-	0.07	0.02	-	0.07	0.02	-	1.27	0.33	0.04	1.27	0.33	0.04	1.27	0.33	0.04
Beech King Air	0.04	0.01	-	0.04	0.01	-	0.04	0.01	-	0.78	0.21	0.08	0.78	0.21	0.08	0.78	0.21	0.08
Gulfstream IV	0.04	0.01	-	0.04	0.01	-	0.04	0.01	-	0.79	0.22	0.08	0.79	0.22	0.08	0.79	0.22	0.08
Total	0.56	0.13	0.01	0.56	0.13	0.01	0.56	0.13	0.01	10.57	2.59	0.44	10.57	2.59	0.44	10.57	2.59	0.44

Arrival/Touch & Go Flight Tracks

	A1			A2			T1			T2			T3			T4		
Aircraft	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
Boeing 747-400	0.12	0.01	-	2.34	0.26	-	-	-	-	-	-	-	-	-	-	-	-	-
MD-88	0.03	-	-	0.59	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Fokker 100	0.02	-	-	0.39	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-
Single-Engine Piston	1.05	0.27	0.04	19.86	5.09	0.73	0.80	0.21	-	7.71	1.98	-	0.04	0.01	-	0.41	0.10	-
Beech Baron 58P	0.20	0.05	0.01	3.81	0.98	0.13	0.12	0.03	-	1.15	0.29	-	0.01	-	-	0.06	0.02	-
Beech King Air	0.12	0.03	0.01	2.33	0.64	0.24	-	-	-	0.02	0.01	-	-	-	-	-	-	-
Gulfstream IV	0.12	0.03	0.01	2.36	0.65	0.24	-	-	-	-	-	-	-	-	-	-	-	-
Total	1.66	0.39	0.07	31.68	7.76	1.34	0.92	0.24	0	8.88	2.28	0	0.05	0.01	0	0.47	0.12	0

Note: Daytime operations are assumed to occur between the hours of 7:00 a.m. and 7:00 p.m. Evening operations are assumed to occur between the hours of 7:00 p.m. and 10:00 p.m. Nighttime operations are assumed to occur between the hours of 10:00 p.m. and 7:00 a.m.

study and are presented in Table J-7. The traffic mix, day/evening/night split, and speed were assumed to remain the same as for the preclosure reference. Railway operations were assumed to remain the same as for the preclosure reference. Number of residents impacted by railway and roadway noise were determined from aerial photographs dated March 27, 1990.

2. NOISE METRICS

Noise, as used in this context, refers to sound pressure variations audible to the ear. The audibility of a sound depends on the amplitude and frequency of the sound and the individual's capability to hear the sound. Whether the sound is judged as noise depends largely on the listener's current activity and attitude toward the sound source, as well as the amplitude and frequency of the sound. The range in sound pressures, which the human ear can comfortably detect, encompasses a wide range of amplitudes, typically a factor larger than a million. To obtain convenient measurements and sensitivities at extremely low and high sound pressures, sound is measured in dB units. The dB is a dimensionless unit related to the logarithm of the ratio of the measured level to a reference level.

Because the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly. However, the following shortcut method can be used to combine sound levels:

Difference between two dB values	Add the following to the higher level
0 to 1	3
2 to 3	2
4 to 9	1
10 or more	0

The ear is not equally sensitive at all frequencies of sound. At low frequencies, characterized as a rumble or roar, the ear is not very sensitive while at higher frequencies, characterized as a screech or a whine, the ear is most sensitive. The A-weighted level was developed to measure and report sound levels in a way which would more closely approach how people perceive the sound. All sound levels reported herein are in terms of A-weighted sound levels.

Environmental sound levels typically vary with time. This is especially true for areas near airports where noise levels will increase substantially as the aircraft passes overhead and afterward diminish to typical community levels. Both the Department of Defense and the FAA have specified the following three noise metrics to describe aviation noise.

Day-Night Average Sound Level (DNL) is the 24-hour energy average A-weighted sound level with a 10-dB weighting added to those levels occurring between 10 p.m. and 7 a.m. the following morning. The 10-dB weighting is a penalty representing the added intrusiveness of noise during normal sleeping hours. DNL is used to determine land use compatibility with noise from aircraft and surface traffic. The expression L_{dn} is often used in equations to designate day-night average sound level.

Community Noise Equivalent Level (CNEL) is DNL with an additional 5-dB weighting added to those levels occurring between 7 p.m. and 10 p.m. For most transportation and community noise sources, the CNEL and DNL are equal to within 1 dB. CNEL uses the same criteria as DNL to determine land use compatibility with noise from aircraft and surface traffic.

Maximum Sound Level is the highest instantaneous sound level observed during a single noise event no matter how long the sound may persist (see Figure J-3).

Sound Exposure Level (SEL) value represents the A-weighted sound level integrated over the entire duration of the event and referenced to a duration of 1 second. Hence, it normalizes the event to a 1-second event. Typically, most events (aircraft flyover) last longer than 1 second, and the SEL value will be higher than the maximum sound level of the event. Figure J-3 illustrates the relationship between the maximum sound level and SEL.

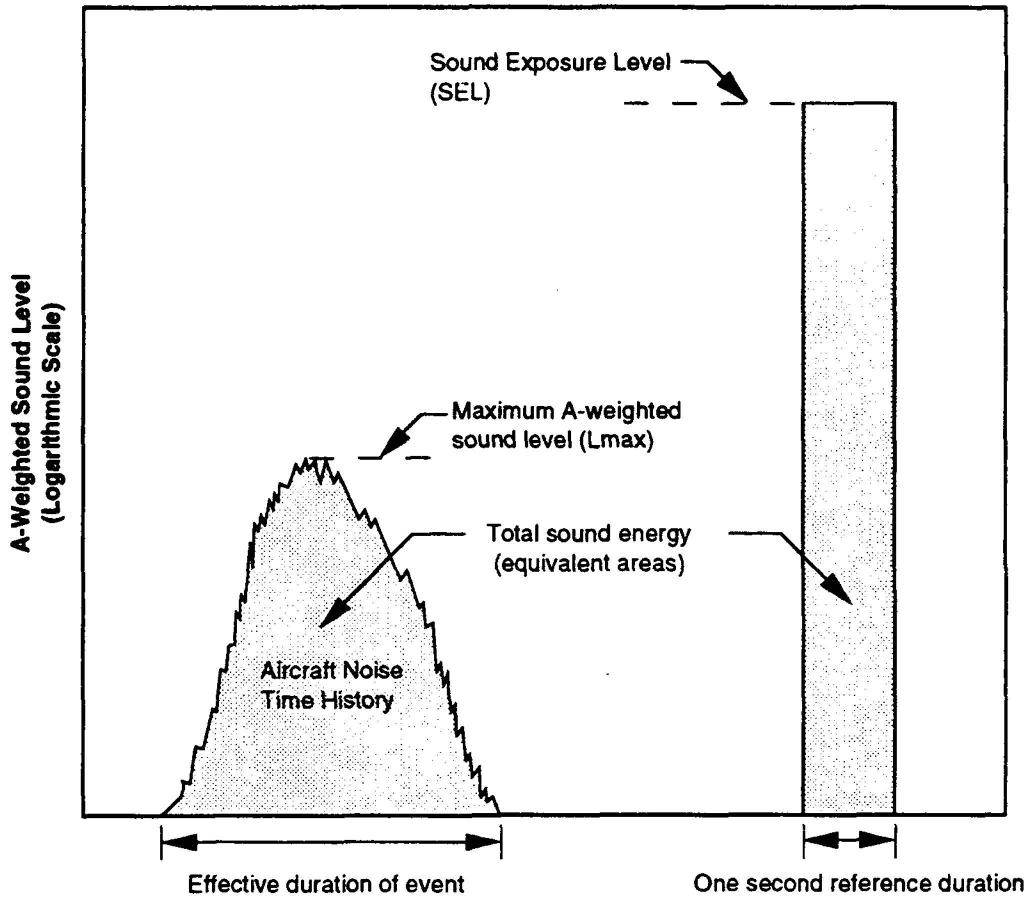
3. NOISE MODELS

3.1 AIR TRAFFIC

The FAA-approved NOISEMAP version 6.1 (Moulton, 1990) was used to predict aircraft noise levels. Since the early 1970s, the Department of Defense has been actively developing and refining the NOISEMAP program and its associated data base. The NOISEMAP computer program is a comprehensive set of computer routines for calculating noise contours from aircraft flight and ground runup operations, using aircraft unique noise data for both fixed- and rotary-wing aircraft. The program requires specific input data, consisting of runway layout, aircraft types, number of operations, flight tracks, and noise performance data, to compute a grid of CNEL values at uniform intervals. The grid is then processed by a contouring program which draws the contours at selected intervals.

3.2 SURFACE TRAFFIC

The Federal Highway Administration Highway Traffic Noise Prediction Noise Model was used to predict surface traffic noise. The model uses traffic volumes, vehicular mix, traffic speed, traffic distribution, and roadway length to estimate traffic noise levels.



Sound Exposure Level (SEL) and Comparison to Aircraft Noise Time History

Figure J-3

4. ASSESSMENT CRITERIA

Criteria for assessing the effects of noise include annoyance, speech interference, sleep disturbance, noise-induced hearing loss, possible nonauditory health effects, reaction by animals, and land use compatibility. These criteria are often developed using statistical methods. The validity of generalizing statistics devised from large populations are suspect when applied to small sample sizes as we have in the affected areas near Castle AFB. Caution should be employed when interpreting the results of the impact analysis.

4.1 ANNOYANCE DUE TO SUBSONIC AIRCRAFT NOISE

Noise-induced annoyance is an attitude or mental process with both acoustic and nonacoustic determinants (Fidell et al., 1988). Noise-induced annoyance is perhaps most often defined as a generalized adverse attitude toward noise exposure. Noise annoyance is affected by many factors including sleep and speech interference and task interruption. The level of annoyance may also be affected by many nonacoustic factors.

In communities in which the prevalence of annoyance is affected primarily by noise, reductions in exposure can be expected to lead to reductions in prevalence of annoyance. In communities in which the prevalence of annoyance is controlled by nonacoustic factors, such as odor, traffic congestion, etc., little or no reduction in annoyance may be associated with reductions in exposure. The intensity of community response to noise exposure may even, in some cases, be essentially independent of physical exposure. In the case of community response to actions, such as airport siting or scheduling of supersonic transport aircraft, vigorous reaction has been encountered at the mere threat of exposure, or minor increases in exposure.

The standard method for determining the prevalence of annoyance in noise-exposed communities is by attitudinal survey. Surveys generally solicit self-reports of annoyance through one or more questions of the form "How bothered or annoyed have you been by the noise of (noise source) over the last (time period)?" Respondents are typically constrained in structured interviews to select one of a number of response alternatives, often named categories such as "Not At All Annoyed," "Slightly Annoyed," "Moderately Annoyed," "Very Annoyed," or "Extremely Annoyed." Other means are sometimes used to infer the prevalence of annoyance from survey data (for example, by interpretation of responses to activity interference questions or by construction of elaborate composite indices), with varying degrees of face validity and success.

Predictions of the prevalence of annoyance in a community can be made by extrapolation from an empirical dosage-effect relationship. Based on the results of a number of sound surveys, Schultz (1978) developed a relationship between percent highly annoyed and DNL:

$$\% \textit{ Highly Annoyed} = 0.8553\ DNL - 0.0401\ DNL^2 + 0.00047\ DNL^3$$

Note that this relationship should not be evaluated outside the range of DNL = 45 to 90 dB. Figure J-4 presents this equation graphically. Less than 15 to 20 percent of the population would be predicted to be annoyed by DNL values less than 65 dB, whereas over 37 percent of the population would be predicted to be annoyed from DNL values greater than 75 dB. The relationship developed by Schultz was presented in the Guidelines for Preparing Environmental Impact Statements on Noise (National Academy of Sciences, 1977).

These results were recently reviewed (Fidell et al., 1989) and the original findings updated with results of more recent social surveys, bringing the number of data points used in defining the relationship to over 400. The findings of the new study differ only slightly from those of the original study.

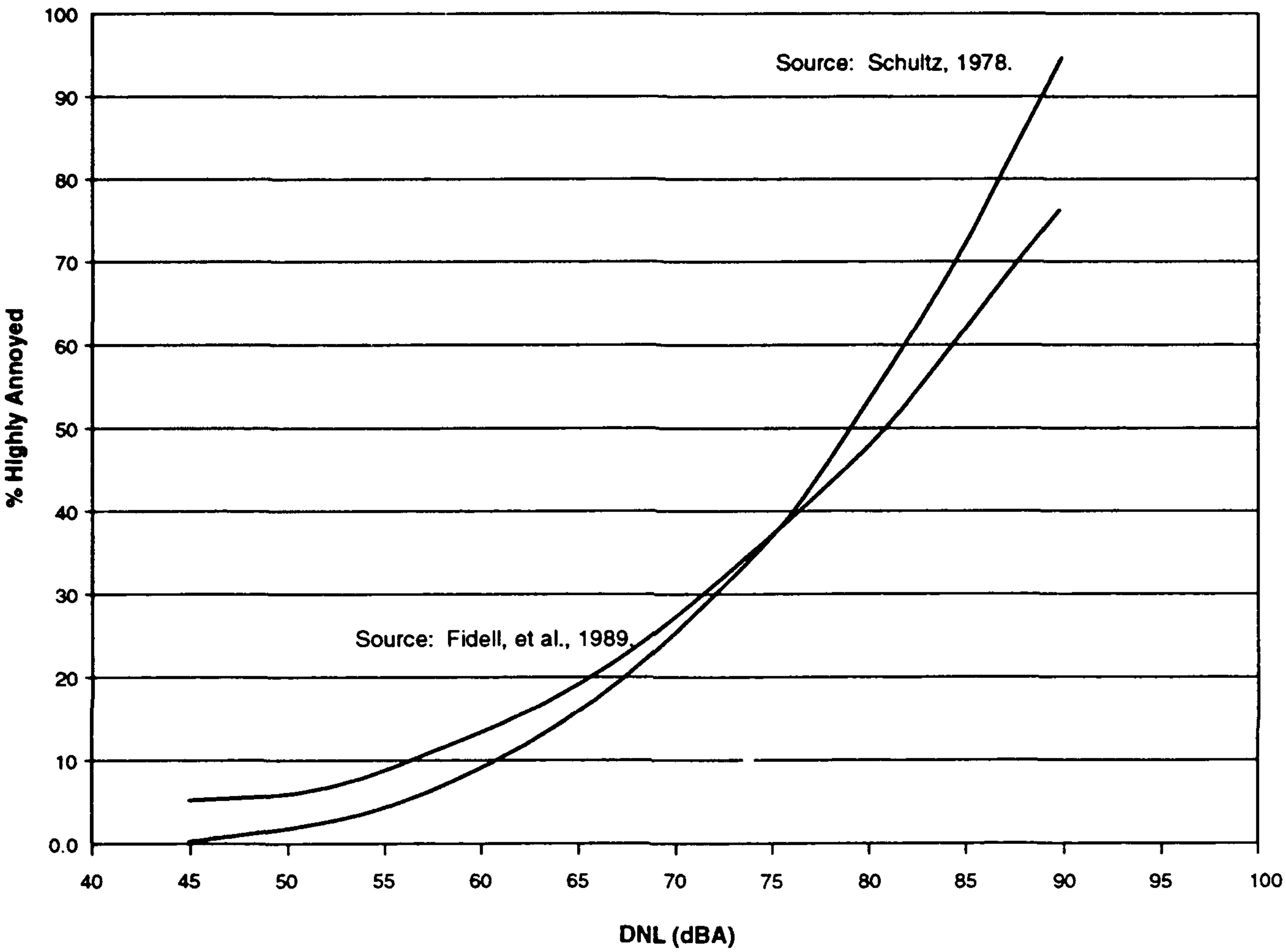
4.2 SPEECH INTERFERENCE AND RELATED EFFECTS DUE TO AIRCRAFT FLYOVER NOISE

One of the ways that noise affects daily life is by preventing or impairing speech communication. In a noisy environment, understanding of speech is diminished by masking of speech signals by intruding noises. Speakers generally raise their voices or move closer to listeners to compensate for masking noise in face-to-face communications, thereby increasing the level of speech at the listener's ear. As intruding noise levels rise higher and higher, speakers may cease talking altogether until conversation can be resumed at comfortable levels of vocal effort after noise intrusions end.

If the speech source is a radio or television, the listener may increase the volume during a noise intrusion. If noise intrusions occur repeatedly, the listener may choose to set the volume at a high level so that the program material can be heard even during noise intrusions.

In addition to losing information contained in the masked speech material, the listener may lose concentration because of the interruptions and thus become annoyed. If the speech message is some type of warning, the consequences could be serious.

Current practice in quantification of the magnitude of speech interference and predicting speech intelligibility ranges from metrics based on A-weighted sound pressure levels of the intruding noise alone to more complex metrics requiring detailed spectral information about both speech and noise intrusions. There are other effects of the reduced intelligibility of speech



Community Noise Annoyance Curves

Figure J-4

caused by noise intrusions. For example, if the understanding of speech is interrupted, performance may be reduced, annoyance may increase, and learning may be impaired.

As the noise level of an environment increases, people automatically raise their voices. The effect does not take place, however, if the noise event were to rise to a high level very suddenly.

4.2.1 Speech Interference Effects from Time-Varying Noise

Most research on speech interference due to noise has included the study of steady state noise. As a result, reviews and summaries of noise effects on speech communications concentrate on continuous or at least long duration noises (Miller, 1974). However, noise intrusions are not always continuous or of long duration, but are frequently transient in nature. Transportation noise generates many such noise intrusions, consisting primarily of individual vehicle pass-bys, such as aircraft flyovers. Noise emitted by other vehicles (motorboats, snowmobiles, and off-highway vehicles) is also transient in nature.

It has been shown, at least for aircraft flyover noise, that accuracy of predictors of speech intelligibility is ranked in a similar fashion for both steady state and time-varying or transient sounds (Williams et al., 1971; Kryter and Williams, 1966). Of course, if one measures the noise of a flyover by the maximum A-weighted level then intelligibility associated with this level would be higher than for a steady noise of the same value, simply because the level is less than the maximum for much of the duration of the flyover.

4.2.2 Other Effects of Noise Which Relate to Speech Intelligibility

Aside from the direct effects of reduction in speech intelligibility, related effects may occur that tend to compound the loss of speech intelligibility itself.

Learning. One of the environments in which speech intelligibility plays a critical role is the classroom. In classrooms of schools exposed to aircraft flyover noise, speech becomes masked or the teacher stops talking altogether during an aircraft flyover (Crook and Langdon, 1974). Pauses begin to occur when instantaneous flyover levels exceed 60 dB. Masking of the speech of teachers who do not pause starts at about the same level.

At levels of 75 dB some masking occurs for 15 percent of the flyovers and increases to nearly 100 percent at 82 dB. Pauses occur for about 80 percent of the flyovers at this noise level. Since a marked increase in pauses and masking occurs when levels exceed 75 dB, this level is sometimes considered as one above which teaching is impaired due to disruption of speech communication. The effect that this may have on learning is unclear at this time. However, one study (Arnoult et al., 1986) could find no effect of noise on cognitive tasks from jet or helicopter noise over a range from 60 to 80 dB (A-level), even though intelligibility scores indicated a continuous decline starting at the 60-dB level. In a Japanese study (Ando et al., 1975) researchers failed to find differences in mental task performance among children from communities with different aircraft noise exposure.

Although there seems to be no proof that noise from aircraft flyovers affects learning, it is reported by Mills (1975) that children are not as able to understand speech in the presence of noise as are adults. It is hypothesized that part of the reason is due to the increased vocabulary on which the adult can draw as compared to the more limited vocabulary available to the young student. Also, when one is learning a language, it is more critical that all words be heard rather than only enough to attain 95 percent sentence intelligibility, which may be sufficient for general conversations. It was mentioned above that when the maximum A-level for aircraft flyovers heard in a classroom exceeds 75 dB, masking of speech increases rapidly. However, it was also noted that pausing during flyovers and masking of speech for those teachers who continue to lecture during a flyover start at levels around 60 dB (Pearsons and Bennett, 1974).

Annoyance. Klatt, Stevens, and Williams (1969) studied the annoyance of speech interference by asking people to judge the annoyance of aircraft noise in the presence and absence of speech material. The speech material was composed of passages from newspaper and magazine articles. In addition to rating aircraft noise on an acceptability scale (unacceptable, barely acceptable, acceptable, and of no concern), the subjects were required to answer questions about the speech material. The voice level was considered to represent a raised voice level (assumed to be 68 dB). In general, for the raised voice talker, the rating of barely acceptable was given to flyover noise levels of 73 to 76 dB. However, if the speech level was reduced, the rating of the aircraft tended more toward unacceptable. The results suggested that if the speech level were such that 95 percent or better sentence intelligibility was maintained, then a barely acceptable rating or better acceptability rating could be expected. This result is in general agreement with the finding in schools that teachers pause or have their speech masked at levels above 75 dB (Crook and Langdon, 1974).

Hall, Taylor, and Birnie (1985) recently tried to relate various types of activity interference in the home, related to speech and sleeping, to annoyance. The study found that there is a 50 percent chance that people's speech would be interfered with at a level of 58 dB. This result is in agreement with the other results, considering that the speech levels in the school environment of the Cook study are higher than the levels typically used in the home. Also, in a classroom situation the teacher raises his or her voice as the flyover noise increases in intensity.

4.2.3 Predicting Speech Intelligibility and Related Effects Due to Aircraft Flyover Noise

It appears, from the above discussions that, when aircraft flyover noises exceed approximately 60 dB, speech communication may be interfered with either by masking or by pausing on the part of the talker. Increasing the level of the flyover noise to 80 dB would reduce the intelligibility to zero even if a loud voice is used by those attempting to communicate.

The levels mentioned above refer to noise levels measured indoors. The same noises measured outdoors would be 15 to 25 dB higher than these indoor levels during summer (windows open) and winter months (windows closed), respectively. These estimates are taken from U.S. Environmental Protection Agency (EPA) reviews of available data (EPA, 1974).

Levels of the aircraft noise measured inside dwellings and schools near the ends of runways at airports may exceed 60 dB inside (75 dB outside). During flyovers, speech intelligibility would be degraded. However, since the total duration is short, no more than a few seconds during each flyover, only a few syllables may be lost. People may be annoyed, but the annoyance may not be due to loss in speech communication, but rather due to startle or sleep disturbance as discussed below.

4.3 SLEEP DISTURBANCE DUE TO NOISE

The effects of noise on sleep have long been a concern of parties interested in assuring suitable residential noise environments. Early studies noted background levels in people's bedrooms in which sleep was apparently undisturbed by noise. Various levels between 25 to 50 dB (A-weighted) were observed to be associated with an absence of sleep disturbance. The bulk of the research on noise effects on which the current relationship is based was conducted in the 1970s. The tests were conducted in a laboratory environment in which awakening was measured either by a verbal response or by a button push, or by brain wave recordings (EEG) indicating stages of sleep (and awakening). Various types of noise were presented to the sleeping subjects throughout the night. These noises consisted primarily of transportation noises including those produced by aircraft, trucks, cars, and trains. The aircraft noises included flyover noises as well as sonic booms. Synthetic noises, including laboratory-generated sounds consisting of shaped noises and tones, were also studied.

Lukas (1975) and Goldstein and Lukas (1980) both reviewed data available in the 1970s on sleep-stage changes and waking effects of different levels of noise. Since no known health effects were associated with either waking or sleep-stage changes, either measure was potentially useful as a metric of sleep disturbance. However, since waking, unlike sleep-stage changes, is simple to quantify, it is often selected as the metric for estimating the effects of noise on sleep. These two reviews showed great variability in the percentage of people awakened by exposure to noise. The variability is not merely random error, but reflects individual differences in adaptation or habituation, and also interpretation of the meaning of the sounds. Such factors cannot be estimated from the purely acoustic measures in noise exposure.

Another major review, by Griefahn and Muzet (1978), provided similar information for effects of noise on waking. However, Griefahn and Muzet's results suggested less waking for a given level of noise than predicted by Lukas.

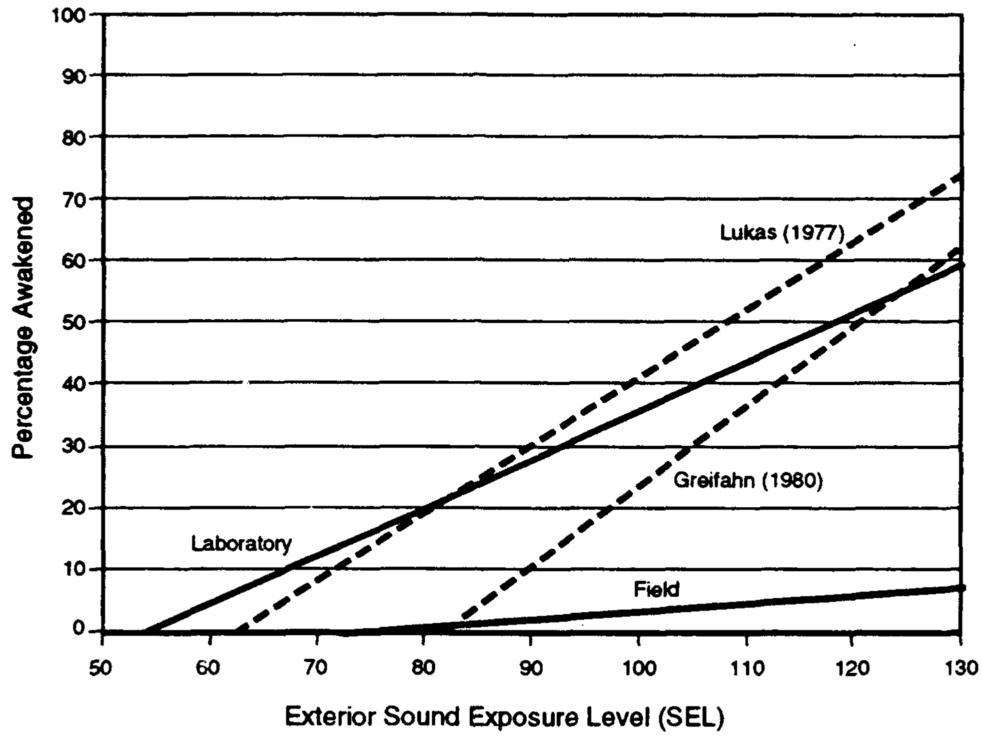
A recent review (Pearsons et al., 1989) of the literature related to sleep disturbance demonstrated that the relationship, based exclusively on laboratory studies, predicts greater sleep disturbance than that likely to occur in a real-life situation in which some adaptation has occurred. The prediction relationships developed in this review should not be considered to yield precise estimates of sleep disturbance because of the great variability in the data sets from which they were developed. The relationships include only the duration and level components of "noise exposure." Increasing the precision of prediction would depend on quantification of some of the nonacoustic factors. Further, a recent review of field, as well as laboratory studies, suggests that habituation may reduce the effect of noise on sleep (Pearsons et al., 1989).

Noise must penetrate the home to disturb sleep. Interior noise levels are lower than exterior levels due to the attenuation of the sound energy by the structure. The amount of attenuation provided by the building is dependent on the type of construction and whether the windows are open or closed. The approximate national average attenuation factors are 15 dB for open windows and 25 dB for closed windows (EPA, 1974).

Incorporating these attenuation factors, the percent awakened relationships previously discussed under summer conditions are presented in Figure J-5. In conclusion, the scientific literature does not provide a consensus on sleep disturbance. There is no recognized criteria or standard that provides guidance to assess sleep disturbance due to noise.

4.4 NOISE-INDUCED HEARING LOSS

Hearing loss is measured in decibels and refers to the permanent auditory threshold shift of an individual's hearing in an ear. Auditory threshold refers to the minimum acoustic signal that evokes an auditory sensation, i.e., the quietest sound a person can hear. When a threshold shift occurs a person's



Source: Pearsons (1985)

Sleep Disruption (Awakening)

Figure J-5

hearing is not as sensitive as before and the minimum sound that a person can hear must be louder. The threshold shift that naturally occurs with age is called presbycusis. Exposure to high levels of sound can cause temporary and permanent threshold shifts usually referred to as noise-induced hearing loss. Permanent hearing loss is generally associated with destruction of the hair cells of the inner ear.

The U.S. EPA (1974) and the Committee on Hearing, Bioacoustics, and Biomechanics (National Academy of Sciences, 1981) have addressed the risk of outdoor hearing loss. They have concluded that hearing loss would not be expected for people living outside the noise contour of 75 dB DNL. Several studies of populations near existing airports in the United States and the United Kingdom have shown that the possibility for permanent hearing loss in communities near intense commercial takeoff and landing patterns is remote. An FAA-funded study compared the hearing of the population near the Los Angeles International Airport to that of the population in a quiet area away from aircraft noise (Parnel, Nagel & Cohen, 1972). A similar study was performed in the vicinity of London Heathrow Airport (Ward, Cushing & Burns, 1972). Both studies concluded that there was no significant difference between the hearing loss of the two populations, and no correlation between the hearing level with the length of time people lived in the airport neighborhood.

4.5 NONAUDITORY HEALTH EFFECTS OF RESIDENTIAL AIRCRAFT NOISE

Based on summaries of previous research in the field (Thompson, 1981; Thompson and Fidell, 1989), predictions of nonauditory health effects of aircraft noise cannot be made. A valid predictive procedure requires: (1) evidence for causality between aircraft noise exposure and adverse nonauditory health consequences, and (2) knowledge of a quantitative relationship between amounts of noise exposure (dose) and specific health effects. Because results of studies of aircraft noise on health are equivocal, there is no sound scientific basis for making adequate risk assessments.

Alleged nonauditory health consequences of aircraft noise exposure, which have been studied, include birth defects, low birth weight, psychological illness, cancer, stroke, hypertension, sudden cardiac death, myocardial infarction, and cardiac arrhythmias. Of these, hypertension is the most biologically plausible effect of noise exposure. Noise appears to cause many of the same biochemical and physiological reactions, including temporary elevation of blood pressure, as do many other environmental stressors. These temporary increases in blood pressure are believed to lead to a gradual resetting of the body's blood pressure control system. Over a period of years, permanent hypertension may develop (Peterson et al., 1984).

Studies of residential aircraft noise have produced contradictory results. Early investigations indicated that hypertension was from two to four times higher in areas near airports than in areas located away from airports (Karagodina et al., 1969). Although Meecham and Shaw (1988) continue to report excessive cardiovascular mortality among individuals 75 years or older living near the Los Angeles International Airport, their findings cannot be replicated (Frerichs et al., 1980). In fact, noise exposure increased over the years while there was a decline in all cause, age-adjusted death rates and inconsistent changes in age-adjusted cardiovascular, hypertension, and cerebrovascular disease rates.

Studies, which have controlled for multiple factors, have shown no, or a very weak, association between noise exposure and nonauditory health effects. This observation holds for studies of occupational and traffic noise as well as for aircraft noise exposure. In contrast to the early reports of two- to six-fold increases in hypertension due to high industrial noise (Thompson and Fidell, 1989), the more rigorously controlled studies of Talbott et al. (1985) and van Dijk et al. (1987) show no association between hypertension and prolonged exposure to high levels of occupational noise.

In the aggregate, studies indicate no association exists between street traffic noise and blood pressure or other cardiovascular changes. Two large prospective, collaborative studies of heart disease are of particular interest. To date, cross-sectional data from these cohorts offer contradictory results. Data from one cohort show a slight increase in mean systolic blood pressure (2.4 millimeters of mercury) in the noisiest compared to the quietest area; while data from the second cohort show the lowest mean systolic blood pressure and highest high-density lipoprotein cholesterol (lipoprotein protective of heart disease) for men in the noisiest area (Babisch and Gallacher, 1990). These effects of traffic noise on blood pressure and blood lipids were more pronounced in men who were also exposed to high levels of noise at work.

It is clear from the foregoing that the current state of technical knowledge cannot support inference of a causal or consistent relationship, nor a quantitative dose-response, between residential aircraft noise exposure and health consequences. Thus, no technical means are available for predicting extra-auditory health effects of noise exposure. This conclusion cannot be construed as evidence of no effect of residential aircraft noise exposure on nonauditory health. Current findings, taken in sum, indicate only that further rigorous studies are needed.

4.6 DOMESTIC ANIMALS AND WILDLIFE

A recent study was published on the effects of aircraft noise on domestic animals which provided a review of the literature and a review of 209 claims pertinent to aircraft noise over a period spanning 32 years (Bowles et al., 1990). Studies since the late 1950s were motivated both by public concerns about what was at that time a relatively novel technology (supersonic flight) and by claims leveled against the U.S. Air Force for damage done to farm animals by very low-level subsonic overflights. Since that time over 40 studies of aircraft noise and sonic booms, both in the United States and overseas, have addressed acute effects, including effects of startle responses (sheep, horses, cattle, fowl), and effects on reproduction and growth (sheep, cattle, fowl, swine), parental behaviors (fowl, mink), milk letdown (dairy cattle, dairy goats, swine), and egg production.

The amount of literature on the effects of noise on domestic animals is not large, and most of the studies have focused on the relationship between dosages of continuous noise and effects (Ames, 1974; Belanovski and Omel'yanenko, 1982). Chronic noises are not a good model for aircraft noise, which lasts only a few seconds but which is often very startling. The review of claims suggest that a major source of loss was panics induced in naive animals.

Aircraft noise may have effects because it might trigger a startle response, a sequence of physiological and behavioral events that once helped animals avoid predators. There are good dose-response relations describing the tendency to startle to various levels of noise, and the effect of habituation on the startle response.

The link between startles and serious effects, i.e., effects on productivity, is less certain. Here, we will define an effect as any change in a domestic animal that alters its economic value, including changes in body weight or weight gain, numbers of young produced, weight of young produced, fertility, milk production, general health, longevity, or tractability. At this point, changes in productivity are usually considered an adequate indirect measure of changes in well being, at least until objective legal guidelines are provided.

Recent focus on the effects on production runs counter to a trend in the literature toward measuring the relationship between noise and physiological effects, such as changes in corticosteroid levels, and in measures of immune system function. As a result, it is difficult to determine the relation between dosages of noise and serious effects using only physiological measures. A literature survey (Kull and Fisher, 1986) found that the literature is inadequate to document long-term or subtle effects resulting from exposure to aircraft noise on animals. No controlled study has documented any serious accident or mortality in livestock despite extreme exposure to noise.

4.7 LAND USE COMPATIBILITY GUIDELINES

Widespread concern about the noise impacts of aircraft noise essentially began in the 1950s, which saw the major introduction of high power jet aircraft into military service. The concern about noise impacts in the communities around airbases, and also within the airbases themselves, led the Air Force to conduct major investigations into the noise properties of jets, methods of noise control for test operations, and the effects of noise from aircraft operations in communities surrounding airbases. These studies established an operational framework of investigation and identified the basic parameters affecting community response to noise. These studies also resulted in the first detailed procedures for estimating community response to aircraft noise (Stevens and Pietrasanta, 1957).

Although most attention was given to establishing methods of estimating residential community response to noise (and establishing the conditions of noise "acceptability" for residential use), community development involves a variety of land uses with varying sensitivity to noise. Thus, land planning with respect to noise requires the establishment of noise criteria for different land uses. This need was met with the initial development of aircraft noise compatibility guidelines for varied land uses in the mid-1960s (Bishop, 1964).

In residential areas, noise intrusions generate feelings of annoyance on the part of individuals. Increasing degrees of annoyance lead to the increasing potential for complaints and community actions (most typically, threats of legal actions, drafting of noise ordinances, etc.). Annoyance is based largely upon noise interference with speech communication, listening to radio and television, and sleep. Annoyance in the home may also be based upon dislike of "outside" intrusions of noise even though no specific task is interrupted.

Residential land use guidelines have developed from consideration of two related factors:

(a) Accumulated case history experience of noise complaints and community actions near civil and military airports;

(b) Relationships between environmental noise levels and degrees of annoyance (largely derived from social surveys in a number of communities).

In the establishment of land use guidelines for other land uses, the prime consideration is task interference. For many land uses, this translates into the degree of speech interference, after taking into consideration the importance of speech communication and the presence of non-aircraft noise sources related directly to the specific land use considered. For some noise-sensitive land uses where any detectable noise signals that rise above the ambient noise are unwanted (such as music halls), detectability may be the criterion rather than speech interference.

A final factor to be considered in all land uses involving indoor activities is the degree of noise insulation provided by the building structures. The land use guideline limits for unrestricted development within a specific land use assume noise insulation properties provided by typical commercial building construction. The detailed land use guidelines may also define a range of higher noise exposure where construction or development can be undertaken, provided a specified amount of noise insulation is included in the buildings. Special noise studies, undertaken by architectural or engineering specialists, may be needed to define the special noise insulation requirements for construction in these guideline ranges.

Estimates of total noise exposure resulting from aircraft operations, as expressed in DNL values, can be interpreted in terms of the probable effect on land uses. Suggested compatibility guidelines for evaluating land uses in aircraft noise exposure areas were originally developed by the FAA as presented in Section 3.4.4, Noise. Part 150 of the FAA regulations prescribes the procedures, standards, and methodology governing the development, submission, and review of airport noise exposure maps and airport noise compatibility programs. It prescribes the use of yearly DNL in the evaluation of airport noise environments. It also identifies those land use types that are normally compatible with various levels of noise exposure. Compatible or incompatible land use is determined by comparing the predicted or measured DNL level at a site with the values given in the table. The guidelines reflect the statistical variability of the responses of large groups of people to noise. Therefore, any particular level might not accurately assess an individual's perception of an actual noise environment.

While the FAA guidelines specifically apply to aircraft noise, it should be noted that DNL is also used to describe the noise environment due to other community noise sources, including motor vehicles and railroads. The use of DNL is endorsed by the scientific community to assess land use compatibility as it pertains to noise (American National Standards Institute, 1990). Hence, the land use guidelines presented by the FAA can also be used to assess the noise impact from community noise sources other than aircraft.

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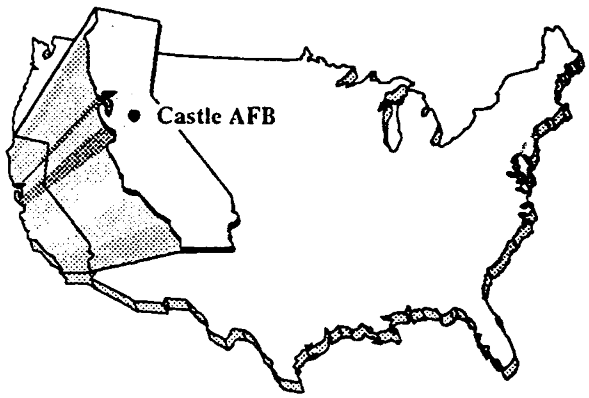

APPENDIX K

APPENDIX K

AGENCY LETTERS AND CERTIFICATIONS

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Fish and Wildlife Enhancement
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

In Reply Refer To:
1-1-92-SP-1032

June 24, 1992

Lt. Col. Gary P. Baumgartel, USAF
Chief, Environmental Planning Division
Air Force Center for Environmental Excellence (AFCEE)
Brooks Air Force Base, Texas 78235-5000

Subject: Species List for the Proposed Closure of Castle Air Force Base, Merced County, California

Dear Colonel Baumgartel:

As requested by letter from your agency dated May 26, 1992, you will find enclosed a list of the listed endangered and threatened species that may be present in the subject project area. (See Enclosure A.) To the best of our knowledge, no proposed species occur within the area. This list fulfills the requirement of the Fish and Wildlife Service to provide a species list pursuant to Section 7(c) of the Endangered Species Act, as amended.

Some pertinent information concerning the distribution, life history, habitat requirements, and published references for the listed species is also enclosed. This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Enclosure B for a discussion of the responsibilities Federal agencies have under Section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal agency or its designated non-Federal representative.

Formal consultation, pursuant to 50 CFR § 402.14, should be initiated if you determine that a listed species may be affected by the proposed project. Informal consultation may be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office.

Also, for your consideration, we have included a list of the candidate species that may be present in the project area. (See Enclosure A.) These species are currently being reviewed by our Service and are under consideration for possible listing as endangered or threatened. Candidate species have no protection under the Endangered Species Act, but are included for your consideration as it is possible that one or more of these candidates could be proposed and listed before the subject project is completed. Should the biological assessment reveal that candidate species may be adversely affected.

you may wish to contact our office for technical assistance. One of the potential benefits from such technical assistance is that by exploring alternatives early in the planning process, it may be possible to avoid conflicts that could otherwise develop, should a candidate species become listed before the project is completed.

Please contact Peggie Kohl of this office at 916/978-4866 if you have any questions regarding the enclosed list or your responsibilities under the Endangered Species Act.

Sincerely,

James J. McKevitt

for Wayne S. White
Field Supervisor

Enclosures

ENCLOSURE A

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED CLOSURE OF CASTLE AIR FORCE BASE, MERCED COUNTY, CALIFORNIA (1-1-92-SP-1032, JUNE 24, 1992)

Listed Species

Mammals
- San Joaquin kit fox, *Vulpes macrotis mutica* (E)
- Fresno kangaroo rat, *Dipodomys nitratoides exilis* (E)

Invertebrates
- valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Proposed Species

Reptiles
- giant garter snake, *Thamnophis gigas* (PE)

Invertebrates
- vernal pool fairy shrimp, *Branchinecta lynchi* (PE)
- vernal pool tadpole shrimp, *Lepidurus packardi* (PE)
- California linderiella, *Linderiella occidentalis* (PE)

Candidate Species

Amphibians
- California tiger salamander, *Ambystoma californiense* (2)
- western spadefoot toad, *Scaphiopus hammondi hammondi* (2R)

Reptiles
- southwestern pond turtle, *Clemmys marmorata pallida* (1)

Birds
- tricolored blackbird, *Agelaius tricolor* (2)

Mammals
- Pacific western big-eared bat, *Plecotus townsendii townsendii* (2)
- greater western mastiff-bat, *Eumops perotis californicus* (2)

Plants
- Henderson's bentgrass, *Agrostis microphylla* var. *hendersonii* (2)
- Hoover's rosinweed, *Calycadenia hooveri* (2)
- beaked clarkia, *Clarkia rostrata* (2)
- Colusa grass, *Neostapfia colusana* (1)
- San Joaquin orcutt grass, *Orcuttia inaequalis* (1)
- pilose orcutt grass, *Orcuttia pilosa* (1)
- fleshy owl's-clover, *Orthocarpus campestris* var. *succulentus* (2)
- Merced phacelia, *Phacelia ciliata* var. *opaca* (2)
- Greene's orcutt grass, *Tuctoria greenei* (1)

(E)--Endangered (T)--Threatened (P)--Proposed (CH)--Critical Habitat

(1)--Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.

(2)--Category 2: Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

(1R)-Recommended for Category 1 status.

(2R)-Recommended for Category 2 status.

(•)--Listing petitioned.

(*)--Possibly extinct.

ENCLOSURE B

FEDERAL AGENCIES' RESPONSIBILITIES UNDER SECTIONS 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) Consultation/Conference

Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species; 2) Consultation with FWS when a Federal action may affect a listed endangered or threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The process is initiated by the Federal agency after determining the action may affect a listed species; and 3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) Biological Assessment--Major Construction Activity[1]

Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action[2] on listed and proposed species. The process begins with a Federal agency requesting from FWS a list of proposed and listed threatened and endangered species. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may proceed; however, no construction may begin.

We recommend the following for inclusion in the BA: an on-site inspection of the area affected by the proposal which may include a detailed survey of the area to determine if the species or suitable habitat are present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirements; interviews with experts, including those within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of indirect effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

---

[1] A construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332(2)C).

[2] "Effects of the action" refers to the direct and indirect effects on an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.

VALLEY ELDERBERRY LONGHORN BEETLE

(*Desmocerus californicus dimorphus*)

CLASSIFICATION: Threatened - **Federal Register** 45:FR52803 August 8, 1980.

CRITICAL HABITAT: Federal Register 17.95(c), May 7, 1980.

California. Sacramento County.

(1) Sacramento Zone. An area in the city of Sacramento enclosed on the north by the Route 160 Freeway, on the west and southwest by the Western Pacific railroad tracks, and on the east by Commerce Circle and its extension southward to the railroad tracks.

(2) American River Parkway Zone. An area of the American River Parkway on the south bank of the American River, bounded on the north by latitude 38 37'30" N, and on the South and east by Ambassador Drive and its extension north to latitude 38 37'30" N, Goethe Park, and that portion of the American River Parkway northeast of Goethe Park, west of the Jedediah Smith Memorial Bicycle Trail, and north to a line extended eastward from Palm Drive.

(3) Putah Creek Zone. California. Solano County. R 2 W T. 8 N. Solano County portion of Section 26.

DESCRIPTION:

Horn described the valley elderberry longhorn beetle in 1881 and it was redescribed in 1921 by Fisher. Morphological description: In general, longhorn beetles are characterized by somewhat elongate and cylindrical bodies with long antennae, often in excess of 2/3 of the body length. In contrast, males of VELB are stout-bodied and their elytra (thickened, hardened forewings) are coarsely punctured, with a metallic-green pattern of 4 oblong maculations, surrounded by a bright red- orange border. The border eventually fades to yellow on museum specimens. The maculations are fused on some males, more closely resembling the nominate subspecies. Antennae are about as long as the body or slightly shorter. Body length is about 13-21 mm.

Females are more robust, elytra are subparallel, and the dark pattern is not reduced. Antennae reach to about the middle of the elytra and body length is about 18-25 mm. Both sexes of VELB are readily identified due to their distinctive appearance. As noted earlier, males with fused maculations resemble the nominate subspecies, *Desmocerus californicus dimorphus*, Fisher, 1921.

DISTRIBUTION:

VELB is endemic to moist valley oak woodlands along the margins of rivers and streams in the lower Sacramento and upper San Joaquin Valley of California, where elderberry (*Sambucus* spp.), its foodplant, grows. During the past 150 years over 90 percent of the riparian habitat in California has been destroyed by agricultural and urban development. Although the entire historical distribution of VELB is unknown, the extensive destruction or riparian forests of the Central Valley of California strongly suggests that the beetle's range may have shrunk and become greatly fragmented.

Due to the limited knowledge about the VELB's life history, and its ecological requirements, precise threats to its survival are difficult to enumerate. Clearly the primary threat to survival of the VELB has been and continues to be loss and alteration of habitat by agricultural conversion, grazing, levee construction, stream and river channelization, removal of riparian vegetation, rip-rapping of shoreline, plus recreational, industrial and urban development. Insecticide and herbicide use in agricultural areas may be factors limiting the beetle's distribution. The age and quality of individual elderberry shrubs/trees and stands as a foodplant for VELB may also be a factor in the beetle's limited distribution.

There is little information on former abundance of VELB for comparison with current population levels. A. T. McClay collected 51 adults during May 1947. Dr. John A. Chemsak, a cerambycid specialist from the University of California, Berkeley, believes that VELB has probably always been rather rare and of limited abundance.

SPECIAL CONSIDERATION:

The riparian habitat of the beetle is still being degraded by urban development and levee repair work along the rivers. There has been some successful elderberry transplantings in specific areas along the rivers. This has increased the viable habitat for the beetle.

Special recovery efforts needed: Protect the only known VELB colonies; conduct further research on life history and habitat requirements of VELB; survey areas in Central Valley of California to locate additional colonies; formulate management plans as appropriate information on VELB's biology becomes available; establish VELB at rehabilitated habitat sites within present-day range; monitor VELB colonies to determine population status and success of management actions as implemented; increase public awareness of VELB through educational and information programs. Studies on the physiological requirements of the beetle and of the elderberry plants are needed.

REFERENCES FOR ADDITIONAL INFORMATION:

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FRESNO KANGAROO RAT

(*Dipodomys nitratoides exilis*)

CLASSIFICATION: Endangered (50 **Federal Register** 4222-4226).

CRITICAL HABITAT:

Critical habitat encompasses a total of 837 contiguous acres in portions of sections 11, 12 and 13 of Township 14 South, Range 15 East, and Sections 7 and 18 of adjacent Township 14 South, Range 16 East, Fresno County, California. Designated critical habitat is bordered on its northern boundary by Whites Bridge Road.

DESCRIPTION:

The Fresno kangaroo rat is one of three recognized subspecies of the San Joaquin kangaroo rat (*Dipodomys nitratoides*). It is approximately 9 inches in length and weighs about 1.2 ounces. As with other kangaroo rats, the Fresno kangaroo rat is adapted for bipedal locomotion and survival in an arid environment. Adaptations include elongated hind limbs, a long tufted tail for balance, a shortened neck, and a dorso-ventrally flattened head with large eyes and small, rounded ears. The color is dark yellowish-buff dorsally and white ventrally. A white stripe extends along each site. The Fresno kangaroo rat may be distinguished from the Tulare kangaroo rat (*D. heermani tularensis*) with whom it is sympatric, by the presence of four toes on the hind foot.

DISTRIBUTION:

The original geographic range of the Fresno kangaroo rat extended from north-central Merced central Fresno Counties. Approximately 10,000 acres of alkali sink habitats favored by this subspecies are currently extant, principally in scattered parcels varying in size from less than 100 to over 1,000 acres.

SPECIAL CONSIDERATIONS:

The Fresno kangaroo rat is State-listed as endangered. In addition to protection afforded by its Federal status, the rodent is protected under State law. State agencies initiating actions which may affect the Fresno kangaroo rat or its habitat are required to consult with the California Department of Fish and Game.

REFERENCES FOR ADDITIONAL INFORMATION:

Culbertson, A.E. 1946. Observations on the natural history of the Fresno kangaroo rat. J. Mamm. 27:189-203.

Knapp, D.K. 1975. The Fresno kangaroo rat study. Rept. prepared for the California Dept. of Fish and Game, Spec. Wildl. Invest., Proj. W-54-R-7, Job I-1.8

SAN JOAQUIN KIT FOX

(*Vulpes macrotis mutica*)

CLASSIFICATION: Endangered (32 **Federal Register** 4001).

CRITICAL HABITAT:

No critical habitat has been designated for the San Joaquin kit fox. The Recovery Plan for this taxon divides the extant range into three distinct management zones. Zone 1, including the kit fox population in western Kern and eastern San Luis Obispo Counties, is targeted for highest recovery effort. Zone 2, including portions of Kern, San Luis Obispo, Tulare, Kings, Fresno, Monterey and San Benito Counties, is targeted for intermediate recovery effort. Zone 3, including remaining portions of the geographic range, is targeted for a modest recovery effort.

DESCRIPTION:

The San Joaquin kit fox is approximately 20 inches in total length. The prominently black-tipped tail has a length of about 12 inches. Adults weigh approximately 5 pounds. Coloration is grayish dorsally, changing from rusty brown to yellowish along the sides, and white ventrally. The body is typically lanky in appearance. Adults stand between 9 and 12 inches at the shoulder. Foraging for a variety of rodents and lagomorphs typically occurs at night, although animals have been observed stalking California ground squirrels (*Spermophilus beecheyi*) during daylight hours, and pups may be observed during the day at den sites. Dens are usually constructed on gentle slopes or level areas. As few as one or as many as 32 or more entrances may be excavated at each site. Kit fox will also opportunistically utilize man-made structures such as culverts or pipes, or may enlarge abandoned ground squirrel burrows as denning sites.

DISTRIBUTION:

The San Joaquin kit fox was historically distributed within an 8,700 square mile area in central California, extending in the north from the vicinity of Tracy in the San Joaquin Valley, south to the general vicinity of Bakersfield. Intensive agriculture, urbanization, and other land-modifying actions have eliminated extensive portions of this area. Kit fox are currently limited to remaining grassland, saltbush, open woodland, and alkaline sink valley floor habitats, and similar habitats located along western bordering foothills and adjacent valleys and plains. They occupy portions of western Kern, eastern San Luis Obispo, western Tulare, Kings, western Fresno, western Merced, western Stanislaus, southwestern San Joaquin, Alameda, Contra Costa, Santa Clara, San Benito, Monterey, and extreme northern Santa Barbara Counties.

SPECIAL CONSIDERATIONS:

The San Joaquin kit fox is listed as "threatened" by the State of California. It therefore enjoys protection afforded by State law. State agencies are required to consult with the California Department of Fish and Game on any actions which may affect this species or its habitat.

REFERENCES FOR ADDITIONAL INFORMATION:

Laughrin, L. 1970. San Joaquin kit fox, its distribution and abundance. Calif. Dept. of Fish and Game Wildlife Mgmt. Branch Admin. Rept. 70-2. 20 pp.

O'Farrell, T. P. 1983. San Joaquin Kit Fox Recovery Plan. Prepared for the U.S. Fish and Wildlife Service, Region 1, Portland, Oregon. 83 pp.

O'Farrell, T. P., P. McCue, and M. L. Sauls. 1980. Inventory of San Joaquin kit fox on BLM lands in the western San Joaquin Valley. Final report, EGG 1183-2416, EG&G, Santa Barbara Operations, U.S. Dept. of Energy, Goleta, California. 13 pp.

O'Farrell, T. P., T. Kato, P. McCue, and M. L. Sauls. 1980. Inventory of the San Joaquin kit fox on BLM lands in southern and southwestern San Joaquin Valley. Final Rept., EGG 1183-2400, EG&G, Santa Barbara Operations, U.S. Dept. of Energy, Goleta, California. 218 pp.

Swick, C. D. 1973. Determination of San Joaquin kit fox in Contra Costa, Alameda, San Joaquin, and Tulare counties. California Department of Fish and Game Special Wildlife Invest. Prog. Rept. W-54-R-4. 15 pp.

DEPARTMENT OF THE NAVY

OFFICE OF THE ASSISTANT SECRETARY
(INSTALLATIONS AND ENVIRONMENT)
WASHINGTON, D.C. 20360-5000

APRIL 8, 1994

MEMORANDUM FOR THE DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE (INSTALLATIONS)

Subj: REQUEST FOR TRANSFER OF AIR EMISSIONS AVAILABLE AS A RESULT OF THE CLOSURE OF CASTLE AIR FORCE BASE

Ref: (a) National Environmental Policy Act, 42 U.S.C. 4321-4347
(b) The Clean Air Act, as amended, 42 U.S.C. 7401 *et seq.*

As part of the FY93 round of base closures and realignments, operational forces currently located at Naval Air Station (NAS) Miramar in San Diego, California are scheduled to be realigned to Naval Air Station Lemoore, located in the San Joaquin Valley in central California. Section 176(c) of reference (b) prohibits a federal agency from taking an action in an area designated as nonattainment for air quality unless a determination is made that emissions from the action conform to the applicable air quality implementation plan for that area. The San Joaquin Valley Unified Air Pollution Control District is designated nonattainment for the pollutants Ozone (a combination of nitrogen oxides (NOx) and volatile organic compounds (VOCs)) and particulate matter (PM-10).

Studies being conducted by the Navy to satisfy reference (a) and (b) indicate that the realignment of forces from NAS Miramar to NAS Lemoore may result in air emissions of NOx, VOCs and PM-10 that will require emission reduction credits and emissions offsets to achieve a positive conformity determination. Our communications with the local air quality control district indicate that emission reductions resulting from the closure of Castle Air Force Base (AFB) could be used for the expansion of operations at NAS Lemoore.

Accordingly, I request that the Navy be given priority for any mobile and/or stationary source nitrogen oxide, volatile organic compound and PM-10 emission credits and offsets not required for Air Force operations that become available as a result of the closure of Castle AFB.

Subj: REQUEST FOR TRANSFER OF AIR EMISSIONS AVAILABLE AS A RESULT OF THE CLOSURE OF CASTLE AIR FORCE BASE

We appreciate your cooperation in this matter. In order to maintain the schedule established for this realignment action, a response is requested by 25 April 1994. If you have any questions, my point of contact is Ronald E. Tickle with CNO N45, who can be reached at (703)602-2787.

Elsie L. Munsell

ELSIE L. MUNSELL
Deputy Assistant Secretary of the Navy
(Environment and Safety)

Copy to:
SAF/GCN
OAGC (I&E)
CNO (N44, N45)
CINCPACFLT
COMNAVFACENGCOM
AFJACE
AFCEVC
AFBCA
NAS Lemoore

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

20 APR 1992

Ms. Kathryn Gualtieri
State Historic Preservation Officer
Office of Historic Preservation
PO Box 942896
Sacramento, CA 95814

RE: Castle Air Force Base (AFB), Section 106 Review

Dear Ms. Gualtieri,

The Air Force Center for Environmental Excellence (AFCEE) at Brooks AFB, Texas, is supporting the Department of Defense's decision-making process involving base closures and reuse. The AFCEE is required to conduct an Environmental Impact Analysis Process to analyze the environmental and socioeconomic impacts of reuse actions and alternatives at 14 Air Force bases scheduled for partial or complete closure. One of these bases is Castle AFB in Merced County, California.

The purpose of this correspondence is to initiate the Section 106 process at Castle AFB for this analysis. The Air Force intends to follow procedures for compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (Public Law 89-665), defined by the Advisory Council on Historic Preservation and Secretary of the Interior. In order that your comments receive full consideration within the time frame available for the preparation of the draft EIS, we ask that you submit your comments within 30 days after receipt of this letter to AFCEE/ESEM, Brooks AFB, TX 78235-5000.

We are beginning the process of gathering information concerning previous archaeological and historical studies at Castle AFB. This process will continue over the next several months. We would appreciate any assistance in helping retrieve this information and in an analysis of necessary future actions concerning protection of the cultural resources within the affected environment of the proposed action and the potential alternatives.

Thank you for your assistance in this matter. Teresa Green of my office can provide you with additional information on the project. She can be reached at (512) 536-3823.

GARY P. BAUMGARTEL, Lt Col, USAF
Chief, Environmental Planning Division

cc: HQ TAC/DEV
93 WG/CVC
93 WG/DEV
The Earth Technology Corp

DEPARTMENT OF THE AIR FORCE
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)
BROOKS AIR FORCE BASE, TEXAS 78235-5000

20 APR 1992

Ms. Claudia Nissley, Director
Western Office of Project Review
Advisory Council of Historic Preservation
730 Simmes Street
Suite 401
Golden, CO 80401

RE: Castle Air Force Base (AFB), Section 106 Review

Dear Ms. Nissley,

The Air Force Center for Environmental Excellence (AFCEE) at Brooks AFB, Texas, is supporting the Department of Defense's decision-making process involving base closures and reuse. The AFCEE is required to conduct an Environmental Impact Analysis Process to analyze the environmental and socioeconomic impacts of reuse actions and alternatives at 14 Air Force bases scheduled for partial or complete closure. One of these bases is Castle AFB in Merced County, California.

The purpose of this correspondence is to initiate the Section 106 process at Castle AFB for this analysis. The Air Force intends to follow procedures for compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (Public Law 89-665), defined by the Advisory Council on Historic Preservation and Secretary of the Interior. We are currently in the process of consulting with the State Historic Preservation Officer (see atch 1). In order that your comments receive full consideration within the time frame available for the preparation of the draft EIS, we ask that you submit your comments within 30 days after receipt of this letter to AFCEE/ESEM, Brooks AFB, TX 78235-5000.

We are beginning the process of gathering information concerning previous archaeological and historical studies at Castle AFB. This process will continue over the next several months. We would appreciate any assistance in helping retrieve this information and in an analysis of necessary future actions concerning protection of the cultural resources within the affected environment of the proposed action and the potential alternatives.

Thank you for your assistance in this matter. Teresa Green of my office can provide you with additional information on the project. She can be reached at (512) 536-3823.

GARY P. BAUMGARTEL, Lt Col, USAF
Chief, Environmental Planning Division

Atch: Ltr to Advisory Council on Historic Preservation

cc: HQ TAC/DEV
93 WG/CVC
93 WG/DEV
The Earth Technology Corp

·ATE OF CALIFORNIA — THE RESOURCES AGENCY

PETE WILSON, Governor

OFFICE OF HISTORIC PRESERVATION

DEPARTMENT OF PARKS AND RECREATION

P O BOX 942896

SACRAMENTO 94296-0001

(916) 445-8006

FAX (916) 322-6377

(916) 653-6624

FAX (916) 653-9824

May 29, 1992

USAF920424A

Mr. Gary P. Baumgartel, Lt. Col., USAF
Chief, Environmental Planning Division
Air Force Center for Environmental Excellence
Department of the Air Force
BROOKS AIR FORCE BASE TEXAS 78235-5000

Re: Castle Air Force Base Section 106 Review

Dear Col. Baumgartel:

Thank you for submitting to our office your April 20, 1992 letter outlining the Department of the Air Force's intentions regarding the closure and reuse of Castle Air Force Base in California. We appreciate your efforts to inform us of your proposed plan of action that will analyze the environmental and socioeconomic impacts that a complete or partial base closure would have on the surrounding community and its resources.

As stated in your letter, you will begin to gather information concerning previous historical and archeological studies done at Castle Air Force Base. Will this information contain the most up-to-date and complete inventories of historical and archeological resources on the base? If not, will additional studies be needed to provide updated information? Please provide us with information regarding the procedures you will undertake to ensure a complete and thorough study of base resources. In evaluating the historical significance of base resources, criteria established for the National Register of Historic Places must be applied in accordance with 36 CFR 800.4(c) of the National Historic Preservation Act.

Thank you again for seeking our comments regarding this phase of your undertaking. If you have any questions regarding this letter, please contact staff historian Clarence Caesar at (916) 653-8902.

Sincerely,

Steade R. Craigo, A.I.A., Acting
State Historic Preservation Officer

United States Department of Agriculture

Soil Conservation Service

745 W. J Street
Los Banos, CA 93635
(209) 826-5774

Date: May 20, 1994

AFCEE/ESE
Teresa Green
8106 Chennault Rd
Brooks AFB, TX 78235-5318

Dear Teresa:

Thank you for your patience. I really appreciate all the information that you supplied to me to be able to complete this AD-1006. I apologize for any inconvenience this delay may have caused you.

In order to complete this AD-1006 I needed to identify the areas that potentially can be farmed at this time. The area marked on the map is the area I identified from the maps you supplied. You may have noticed that all the information is the same for each alternative. This stems from the fact that no matter which alternative is selected, the same amount of "farmland" has the potential to be converted. Only a small percentage of this area was considered either prime or statewide important farmland.

I hope the enclosed information satisfies your request. Please feel free to call me if you need any additional information.

Sincerely,

Jennifer M. Gerstenberg

Jennifer M. Gerstenberg
Soil Conservationist

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

In Reply Refer To:
PPN 2050

July 18, 1994

Department of the Air Force
Headquarters 93 CES/CC
ATTN: Capt. Mark A. Pohlmeier
Castle Air Force Base, California 95340

Subject: U.S. Fish and Wildlife Service Review of Kit Fox Survey Data for Castle Air Force Base

Dear Capt. Pohlmeier:

This letter is in response to a request by the Air Force to comment on the adequacy and results of biological surveys for the San Joaquin kit fox (*Vulpes macrotis mutica*) on Castle Air Force Base (AFB), California. The San Joaquin kit fox is listed as endangered and is fully protected under the Endangered Species Act of 1973, as amended (Act). The biological surveys were conducted to meet the needs of the installation in preparation for the closure and reuse of Castle AFB. Specific projects are identified in the Draft Environmental Impact Statement for the disposal and reuse of Castle AFB (January 1994) and include the closure and cleanup of unexploded and disposal-related debris associated with the Explosive Ordnance Disposal (EOD) Range and the possible construction of a Federal correctional facility. Our comments are based on materials supplied by the Air Force which were received by the U.S. Fish and Wildlife Service (Service) on November 18, December 28, 1993, January 31, and June 13, 1994.

The Service has determined that it is unlikely that there will be adverse impacts to the kit fox as a result of the proposed disposal and reuse of Castle AFB including the projects listed above. Survey data and the Service's determination that it is unlikely that there will be an adverse effect on the kit fox is valid for 2 1/2 years from the date of the last survey. However, if new information reveals the presence of kit foxes on the installation, or that effects from the proposed actions may affect the species in a manner not considered, further action or consultation pursuant to the Act may be necessary.

Because of the potential that the disposal and reuse of Castle AFB would impact several federally proposed species for listing including Clousa grass (*Neostapfia colusana*), California linderilla (*Linderilla californica*), and vernal pool fairy shrimp (*Branhinecta lynchii*), the Service recommends the continuation of informal conferencing with a formal conference prior to any activity which would result in the alteration of habitat required by these species (50 CFR 402.10).

We appreciate the opportunity to review this project for potential adverse impact to endangered species. If you have any questions regarding these comments, please contact Peter Cross at (916) 978-4866 or Mark Littlefield at (916) 978-5408, ext. 355.

Sincerely,

Kori Scammell-Tinling

for Joel A. Medlin
Field Supervisor

cc: Reg. Dir., (ARD-ES), Portland, OR
AFCEE/ESE Brooks AFB, TX (Teresa Green)
CDFG, Region 4, Fresno, CA

STATE OF CALIFORNIA — THE RESOURCES AGENCY

PETE WILSON, Governor

OFFICE OF HISTORIC PRESERVATION

DEPARTMENT OF PARKS AND RECREATION

P.O. BOX 942896
SACRAMENTO 94296-0001
(916) 653-6624
FAX: (916) 653-9824

(916) 653-6624
FAX (916) 653-9824

October 7, 1994

USAF940803A

Terry D. Armstrong, Lt. Col.
Director, Environmental Conservation and Planning
Department of the Air Force
Headquarters Air Force Center for Excellence
BROOKS AIR BASE TEXAS 78235-5318

Re: Architectural and Historic Evaluation of World War II-Era Facilities, Castle Air Force Base, Merced County, California.

Dear Col. Armstrong:

Thank you for submitting to our office your August 3, 1994 letter and supporting documentation regarding the "Architectural and Historic Evaluation of World War II-era facilities at Castle Air Force Base..", Merced County, California. The aforementioned evaluation was conducted in compliance with recommendations forwarded by the 1991 Defense Base Closure and Realignment Commission (BRAC), which recommended the closure of Castle Air Force Base by September 1995. The evaluation is part of a larger effort by the Air Force to identify possible reuse options for base property following disposal.

The submitted evaluation identified 49 World War II-era structures. Of this group, 47 structures were identified as temporary wood-frame buildings and two were identified as permanent structures. You are seeking our comments on the eligibility of these structures, as described in Appendix A of the submitted evaluation report, for inclusion on the National Register of Historic Places (NRHP) in accordance with Section 106 of the National Historic Preservation Act.

Our review of the documentation leads us to concur with your determination that none of the structures described in Appendix A of the evaluation are eligible for inclusion on the NRHP under any of the criteria established by 36 CFR 60.4. We agree that none of the structures have strong associations with historic events or persons nor are they architecturally significant. All of the temporary structures have undergone moderate to extensive modification since their construction and have lost considerable integrity. The same loss of integrity is also true for the two permanent structures inventoried in the evaluation report.

We agree with your assessment that Buildings 54, 411, and 523 do not retain enough integrity to contribute to the HABS/HAER documentation contained in Stipulation 1 of the July 7, 1986 Programmatic Agreement (PA) regarding Temporary World War II Buildings. Based on our determination of eligibility, we also concur with your determination that the proposed disposal and reuse of Castle Air Force Base will have no effect on historic properties.

Thank you again for seeking our [illegible] on your project. If you have any questions, please contact staff historian Clarence Caesar at (916) 653-8902.

Sincerely,

Cherilyn Widell
State Historic Preservation Officer

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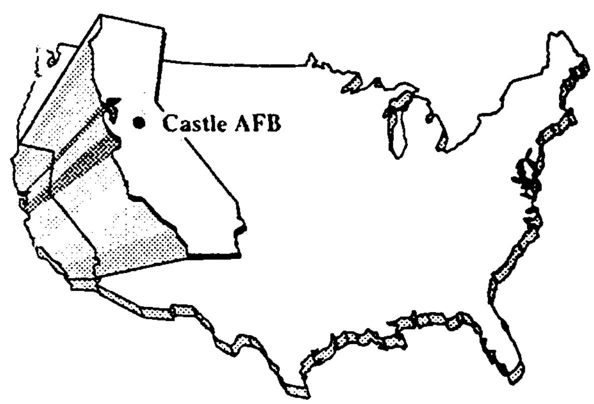

APPENDIX L

APPENDIX L

FEDERALLY OR STATE-LISTED SPECIES POTENTIALLY OCCURRING IN THE VICINITY OF CASTLE AFB

Table L-1. Candidate Species Potentially Found in the Vicinity of Castle Air Force Base
Page 1 of 2

Species Name	Federal Status	State Status	Presence
Invertebrates			
Conservancy fairy shrimp *(Brachinecta conservatio)*	E	-	Not observed on base, may occur on base
Vernal pool fairy shrimp *(Branchinecta lynchi)*	T	-	Occurs on base
California Linderiella *(Linderiella occidentalis)*	C3	-	Occurs on base
Vernal pool tadpole shrimp *(Lepidurus packardi)*	E	-	Outside of known distributions, not observed or expected on base
Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)*	T	-	No habitat present on base
Amphibians			
California tiger salamander *(Ambystoma californiense)*	C2	CSC	Not observed on base, may occur on base
Arroyo southwestern toad *(Bufo microscaphus californicus)*	C2	CSC	Found in vicinity of base, may occur on base
Reptiles			
Giant gartner snake *(Thamnophis gigas)*	T	T	Not observed on base, not likely to occur on base.
Blunt-nosed leopard lizard *(Gambelia silus)*	E	E	Not observed on base, not likely to occur on base
Southwestern pond turtle *(Clemmys marmorata pallida)*	C1	CSC	Not observed on base, not likely to occur on base
Birds			
Loggerhead shrike *(Lanius ludovicianus)*	C2	-	Occurs on base
American peregrine falcon *(Falco peregrinus anatum)*	E	E	Not observed on base, likely to forage over grasslands on base
Aleutian Canada goose *(Branta canadensis leucopareia)*	E	CSC	Not observed on base, may forage on base during migration
Tricolored blackbird *(Agelaius tricolor)*	C2	-	Occurs on base, nests in wetlands northwest of runway
Mammals			
Pacific western big-eared bat *(Plecotus townsendii)*	C2	CSC	Not observed on base, not likely to occur on base
Greater mastiff bat *(Eumops perotis californicus)*	C2	CSC	Not observed on base, not likely to occur on base
San Joaquin kit fox *(Vulpes macrotis mutica)*	E	T	Not observed on base, outside current distribution, not expected on base

Table L-1. Candidate Species Potentially Found in the Vicinity of Castle Air Force Base
Page 2 of 2

Species Name	Federal Status	State Status	Presence
Fresno kangaroo rat *(Dipodomys nitratoides exillis)*	E	E	Not observed on base, outside current distribution, not expected on base
Plants			
Henderson's bentgrass *(Agrostis microphylla var. hendersonnii)*	C2	-	Not observed on base, may occur on base
Hoover's rosinweed *(Calycadenia hooveri)*	C2	-	Not observed on base, may occur on base
Beaked clarkia *(Clarkia rostrata)*	C2	-	Not observed on base, may occur on base
Colusa grass *(Neostapfia colusana)*	PT	E	Observed on base in May 1993, not observed on base in May 1994.
San Joaquin orcutt grass *(Orcuttia inaequalis)*	PE	E	Not observed on base, may occur on base
Pilose orcutt grass *(Orcuttia pilosa)*	PE	E	Not observed on base, may occur on base
Fleshy owl's clover *Orthocarpus campestris var. succulentar)*	PT	E	Not observed on base, may occur on base
Merced phacelia *(Phacelia ciliata var. opaca)*	C2	-	Not observed on base, may occur on base
Greene's orcutt grass *(Tuctoria greenei)*	PE	R	Not observed on base, may occur on base

Notes: Federal status:
E = Listed as Endangered by the U.S. Fish and Wildlife Service (USFWS).
PE = Proposed as Endangered by the USFWS.
T = Listed as Threatened by the USFWS.
C1 = Category 1 candidate for federal listing. (Taxa for which the USFWS has sufficient biological information to support a proposal to list as Endangered or Threatened.)
C2 = Category 2 candidate for federal listing. (Taxa which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking.)
C3 = Withdrawn from candidacy for federal listing.

California status:
E = Listed as Endangered by the state of California.
T = Listed as Threatened by the state of California.
CSC = California Department of Fish and Game "Species of Special Concern."

Table L-2. Wildlife and Plant Species Occurring on Castle AFB
Page 1 of 5

	Common Name	Scientific Name
Birds		
	Red-winged blackbird	*Agelaius phoeneceus*
	Tri-colored blackbird	*Agelaius tricolor*
	Scrub jay	*Aphelocoma coerulescens*
	Mallard	*Anas platyrhynchos*
	American pipit	*Anthus americana*
	Great blue heron	*Ardea herodias*
	Canada goose	*Branta canadensis*
	Red-tailed hawk	*Buteo jamaicensis*
	Ferruginous hawk	*Buteo regalis*
	Green heron	*Butorides virescens*
	Great horned owl	*Bubo virginianus*
	Least sandpiper	*Calidris minutilla*
	House finch	*Carpodacus mexicanus*
	Great egret	*Casmerodius albus*
	Turkey vulture	*Cathartes aura*
	Killdeer	*Charadrius vociferus*
	Lark sparrow	*Chondestes grammacus*
	Northern harrier	*Circus cyaneus*
	Northern flicker	*Colaptes auratus*
	Rock dove	*Columba livia*
	American crow	*Corvus brachyrhynchos*
	Yellow-rumped warbler	*Dendroica coronata*
	Snowy egret	*Egretta thula*
	Black-shouldered kite	*Elanus leucurus*
	Horned lark	*Eremophila alpestris*
	Brewer's blackbird	*Euphagus cyanocephalus*
	American kestrel	*Falco sparverius*
	American coot	*Fullica americana*
	Common snipe	*Gallinago gallinago*
	Black-necked stilt	*Himantopus mexicanus*
	Loggerhead shrike	*Lanius ludovicianus*
	Ring-billed gull	*Larus delawarensis*
	Belted kingfisher	*Megaceryle alcyon*
	Northern mockingbird	*Mimus polyglottos*
	Savannah sparrow	*Passerculus sandwichensis*
	Black phoebe	*Sayornis nigricans*
	Burrowing owl	*Speotyto cunicularia*
	Western meadowlark	*Sturnella neglecta*

Table L-2. Wildlife and Plant Species Occurring on Castle AFB
Page 2 of 5

Common Name	Scientific Name
Birds (Continued)	
European starling	*Sturnus vulgaris*
Greater yellowlegs	*Tringa melanoleuca*
Barn owl	*Tyto alba*
Mourning dove	*Zenaida macroura*
White-crowned sparrow	*Zonotrichia leucophrys*
Mammals	
Domestic dog	*Canis familiaris*
Coyote	*Canis latrans*
Opposum	*Didelphis virginianus*
House cat	*Felis domesticus*
Black-tailed hare	*Lepus californicus*
Striped skunk	*Mephitis mephitis*
Long-tailed weasel	*Mustella frenata*
Deer mouse	*Peromyscus maniculatus*
Pocket mouse	*Perognathus* sp.
Raccoon	*Procyon lotor*
Western harvest mouse	*Rethreidontomys megalotis*
Beechey ground squirrel	*Spermophilus beechei*
Audubon's cottontail	*Sylvilagus audubonii*
Botta pocket gopher	*Thomomys bottae*
Reptiles and Amphibians	
Western toad	*Bufo boreas*
Western spadefoot toad	*Scaphiopus hammondi*
Pacific tree-frog	*Hyla regilla*
California king snake	*Lampropeltis getulus*
Gopher snake	*Pituophis melanoleucus*
Western fence lizard	*Sceloporus occidentalis*
Side-blotched lizard	*Uta stansburiana*
Plants	
Maple	*Acer* sp.
Vernal pool foxtail	*Alopecurus saccatus*
Prostrate amaranth	*Amaranthus blitoides*
Amaranth	*Amaranthus retroflexus*
Ammania	*Ammania coccinea*
Rancher's fiddleneck	*Amsinckia menziesii intermedia*
Scarlet pimpernel	*Anagallis arvensis*

Table L-2. Wildlife and Plant Species Occurring on Castle AFB
Page 3 of 5

	Common Name	Scientific Name
Plants (Continued)		
	Narrow-leaf milkweed	*Asclepias fascicularis*
	Slender wild oats	*Avena barbata*
	Wild oats	*Avena fatua*
	White brodiaea	*Brodiaea hyacintha*
	Small brodiaea	*Brodiaea minor*
	Ripgut grass	*Bromus diandrus*
	Brome	*Bromus hordaceus*
	Red brome	*Bromus matridens rubens*
	Cheatgrass	*Bromus tectorum*
	Quaking grass	*Briza minor*
	Spurge	*Chamaesyce* sp.
	Star thistle	*Centaurea solstitalis*
	Cicedenia	*Cicendia quadrangularis*
	Clarkia	*Clarkia* sp.
	Miner's lettuce	*Claytonia perfoliata*
	Horseweed	*Conyza canadensis*
	Duckweed	*Crassula aquatica*
	Bermuda grass	*Cynodon dactylon*
	Nutsedge	*Cyperus* sp.
	Tall nutsedge	*Cyperus eragrostis*
	Round nutsedge	*Cyperus rotundus*
	Jimpson weed	*Datura meteloides*
	Annual hairgrass	*Deschampsia danthonoides*
	Downingia	*Downingia bicornuta*
	Downingia	*Downingia bella*
	Spikerush	*Eleocharis macrostachya*
	Engelmann's spikerush	*Eleocharis obtusa engelmanii*
	Willowherb	*Epilobium brachycarpum*
	Fireweed	*Epilobium cleistogamum*
	Small willow herb	*Epilobium pygmaeum*
	Torrey's willow herb	*Epilobium torreyi*
	Doveweed	*Eremocarpus setigerus*
	Filaree	*Erodium botrys*
	Red-stemmed filaree	*Erodium cicutarium*
	Vasey's coyote thistle	*Eryngium vaseyi*
	Everlasting	*Gnaphalium palustre*
	Bractless hedge-hyssop	*Gratiola ebracteata*
	Gumplant	*Grindelia camporum*
	Sunflower	*Helianthus bolanderi*

Table L-2. Wildlife and Plant Species Occurring on Castle AFB
Page 4 of 5

Common Name	Scientific Name
Plants (Continued)	
Wild heliotrope	*Heliotropium currasavicum*
Fitch's tarweed	*Hemizonia fitchii*
Short pod mustard	*Hirschfeldia incana*
Low foxtail	*Hordeum depressum*
Foxtail barley	*Hordeum jubatum*
Barley	*Hordeum murinum*
Toad rush	*Juncus bufonius*
Rush	*Juncus uncialis*
Wild lettuce	*Lactuca serriola*
Fremont's goldfields	*Lasthenia fremontii*
Goldfields	*Lasthenia glaberrima*
Tidytips	*Layia fremontii*
Peppergrass	*Lepidium dictyotum*
Sweetgum	*Liquidamber styraciflua*
Italian ryegrass	*Lolium multiflorum*
Annual ryegrass	*Lolium perenne*
Trefoil	*Lotus purshianus purshianus*
Water Loosestrife	*Ludwigia peploides*
Lythrum	*Lythrum hyssopifolium*
Three-bract lythrum	*Lythrum tribracteatum*
Hairy pillwort	*Marsilea vestita vestita*
Pineappleweed	*Matricaria matricoides*
Tricolored monkeyflower	*Mimulus tricolor*
Common monkeyflower	*Mimulus guttatus*
Baker's skunkweed	*Navarettia bakeri*
European olive	*Olea europaea*
Owl's clover	*Orthocarpus* sp.
Panic grass	*Panicum* sp.
Panic grass	*Panicum capillare*
Dallis grass	*Paspalum dilitatum*
Phalaris	*Phalaris lemmonii*
Phalaris	*Phalaris paradoxa*
Pillwort	*Pilularia americana*
Pines	*Pinus* sp.
Strigose popcornflower	*Plagiobothrys glyptocarpus*
Valley popcornflower	*Plagiobothrys stipitatus*
Plantain	*Plantago coronopus*
Lanceolate plantain	*Plantago lanceolata*
Western sycamore	*Platamus racemosa*

Table L-2. Wildlife and Plant Species Occurring on Castle AFB

	Common Name	Scientific Name
Plants (Continued)		
	Kentucky bluegrass	*Poa pratensis*
	Pogogyne	*Pogogyne zizyphoroides*
	Polypogon	*Polypogon maritimus*
	Rabbit's foot grass	*Polypogon monospeliensis*
	Common knotweed	*Polygonum arenastrum*
	Willow weed	*Polygonum lapathafolium*
	Cottonwood	*Populus fremontii*
	Dwarf woolly marbles	*Psilocarphus brevissimus*
	Buttercups	*Ranunculus* sp.
	Black locust	*Robinia pseudoacacia*
	Blackberry	*Rubus ursinus*
	Curly dock	*Rumex crispus*
	Arroyo willow	*Salix lasiolepis*
	Russian thistle	*Salsola iberica*
	Knotroot bristlegrass	*Setaria gericolata*
	Yellow bristle grass	*Setarla lutescens*
	Western goldenrod	*Solidago occidentalis*
	Squirreltail	*Sitanion hystrix*
	Western goldenrod	*Solidago occidentalis*
	Prickly sow thistle	*Sonchus asper*
	Red sand-spurrey	*Spergularia rubra*
	Tamarisk	*Tamarix* sp.
	Vinegarweed	*Trichostema lanceolatum*
	Common cattail	*Typha latifolia*
	Fescue	*Vulpia bromides*
Fish		
	Mosquito fish	*Gambuzia affinis*
Invertebrates		
	Vernal pool fairy shrinp	*Branchinecta lynchi*
	California Linderiella	*Linderiella occidentalis*

Note: (a) Mammal and bird species observed during September 1992 field survey

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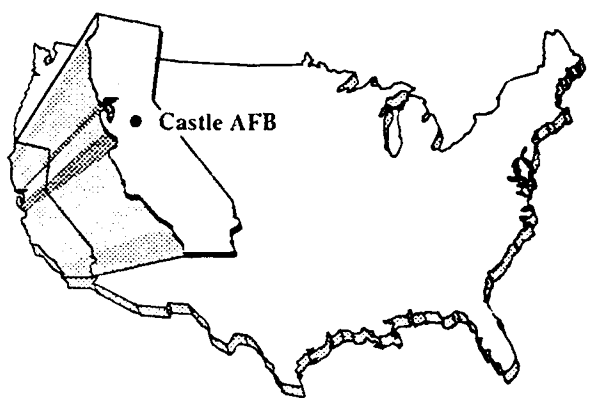


APPENDIX M

APPENDIX M

AIR QUALITY ANALYSIS METHODS AND AIR EMISSIONS INVENTORY FOR CASTLE AFB

APPENDIX M

AIR QUALITY ANALYSIS METHODS AND AIR EMISSIONS INVENTORY FOR CASTLE AIR FORCE BASE

PRECLOSURE EMISSIONS

Preclosure emissions inventory data for Castle Air Force Base (AFB) are presented in Table M-1. The preclosure inventory provides a baseline which is a composite of the most reliable data available. The aircraft operations are from 1990 and are representative of operations prior to either Operation Desert Shield/Storm or the beginning of aircraft drawdown at Castle AFB; aircraft activity levels are presented for preclosure and all reuse alternatives in Table M-2. Emissions from aircraft ground operations, incinerators, fire fighting training, heating and power production, surface coatings, fuel evaporation losses, and miscellaneous sources were obtained from the 1991 Air Emissions Inventory for Castle AFB, prepared by the Castle AFB Civil Engineering (93d BW/CE) office. Emissions from aerospace ground equipment (AGE) were obtained from the Draft Baseline Waste Generation Survey prepared for Headquarters Air Combat Command (HQ ACC) by LAW Engineering and Environmental Services. AGE operations data reflect 1993 conditions; however, these operations have remained constant since the late 1980s and are representative of preclosure conditions. Emissions from commute vehicle miles traveled (VMTs) were calculated for two categories of data. The first category, by direct employees of the base, was calculated based on the 1990 base population, the population distribution by zip code, average commute speeds obtained from Merced County, and on-base speed limits. The second category, VMTs by residents of the base, was calculated based on the average commute times and average commute speeds obtained from Merced County. Emissions from government vehicles and heavy duty vehicle operations were calculated from data maintained by Castle AFB. While the government and heavy duty vehicle operations data are from August 1993 through July 1994, the data are representative of preclosure conditions because activity levels of these vehicles have remained relatively steady since the late 1980s. In addition, Table M-1 identifies those emission sources in the base inventory which are subject to permitting under the local district's rules.

CONSTRUCTION EMISSIONS

Construction activities would generate both combustive emissions from heavy equipment usage and fugitive dust emissions from ground-disturbing activities. Fugitive dust would be generated during construction activities associated with aviation support, industrial, institutional, commercial, residential, public facilities/recreation, and agricultural land uses. These

Table M-1. Preclosure Emissions Inventory (tons/year)

Source	PM_{10}	SO_x	CO	ROG	NO_x
Castle AFB					
Aircraft flying operations	132.86	89.06	2,526.53	1,889.24	647.15
Aircraft ground operations	1.32	0.96	6.11	4.24	10.10
Aerospace ground equipment	8.77	8.31	99.65	12.07	122.84
Vehicle Miles Traveled					
Commute	4.80	0.00	2,957.58	345.45	157.68
Other	1.64	0.00	1,044.04	123.78	53.12
Government vehicles	0.48		302.26	31.38	15.39
Heavy duty equipment	0.26	0.33	4.31	0.62	3.50
Incinerators[a]	0.01	0.00	0.04	0.00	0.01
Fire fighting training	1.50	0.00	6.56	3.75	0.05
Heating and power production	0.34	0.93	3.55	1.00	17.51
Surface coatings[a]				15.25	
Fuel evaporation losses[a]				94.70	
Miscellaneous sources				39.00	
Base Total	151.98	99.60	6,950.63	2,560.48	1,027.35
SJVAB					
Stationary sources	390,185	14,600	156,950	164,250	76,650
On-road mobile sources	10,110	9,490	381,425	45,625	85,045
Other mobile sources	3,430	3,650	129,575	20,075	38,325
SJVAB Total	403,725	27,740	667,950	229,950	200,020
Merced County Total	29,130	1,825	65,300	11,970	12,700

Note: (a) Assumed permitted sources.
CO = Carbon monoxide.
NO_x = Nitrogen oxides.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.
ROG = Reactive organic gases.
SO_x = Sulfur oxides.
SJVAB = San Joaquin Valley Air Basin.

Sources: ARB, 1991c; LAW Engineering and Environmental Services, 1994; U.S. Air Force, 1992a.

emissions would be greatest during site clearing and grading activities. Uncontrolled fugitive dust (particulate matter) emissions from ground-disturbing activities are emitted at a rate of approximately 1.2 tons per acre per month, or 110 pounds per acre per day assuming 22 grading days per month (U.S. Environmental Protection Agency, 1985). The particulate matter equal to or less than 10 microns (PM_{10}) fraction of fugitive dust emissions is assumed to be 50 percent, or 55 pounds per acre per working day.

Construction for the Proposed Action would disturb a total of approximately 363 acres over the first 10-year period of reuse. Approximately 215 and 148 acres would be disturbed during the periods from 1996-2000 and 2001-2005, respectively. Assuming that the amount of disturbed area is

Table M-2. Annual Aircraft Activity Levels

Aircraft	Preclosure		Proposed Action 2005		Aviation Center 2005		Commercial Aviation 2005		Mixed Use 2005	
	LTO Ops/yr	T&G Ops/yr	LTO Ops/yr	T&G Ops/yr	LTO Ops/yr	T&G Ops/yr	LTO Ops/yr	T&G Ops/yr	LTO Ops/yr	T&G Ops/yr
A-3	58	0	0	0	0	0	0	0	0	0
A-7	292	0	0	0	0	0	0	0	0	0
B-52G	10,665	28,346	0	0	0	0	0	0	0	0
C-130H	175	0	0	0	0	0	0	0	0	0
C-141	299	796	0	0	0	0	0	0	0	0
C-5A/B	453	956	0	0	0	0	0	0	0	0
DC-9	7	0	0	0	0	0	0	0	0	0
F-111	175	0	0	0	0	0	0	0	0	0
F-16C/D	117	0	0	0	450	0	0	0	0	0
F-4E/G	58	0	0	0	0	0	0	0	0	0
KC-135A	7,866	9,424	0	0	0	0	0	0	0	0
KC-135R	3,876	34,639	0	0	0	0	0	0	0	0
OV-10	150	0	0	0	0	0	0	0	0	0
P-3	354	599	0	0	0	0	0	0	0	0
T-37	1,460	4,964	0	0	0	0	0	0	0	0
T-38	277	1,139	0	0	0	0	0	0	0	0
T-43	29	0	0		0	0	0	0	0	0
B737-300	0	0	2,422	9,678	0	0	0	0	0	0
B747-400	0	0	3,260	47,370	1,500	0	2,890	53,125	1,500	0
Beech Baron 58P	0	0	3,416	1,044	1,200	0	9,994	26,080	3,600	0
Cessna Caravan	0	0	0	0	0	0	625	0	0	0
Composite Single Engine Prop	0	0	23,629	10,814	3,100	0	47,675	31,775	27,800	0
DC-3	0	0	0	0	1,044	0	0	0	0	0
DHC-6	0	0	0	0	0	0	521	0	0	0
Fokker-100	0	0	435	0	250	0	0	0	250	0
Gulfstream IV	0	0	1,858	0	500	0	1,600	0	1,500	0
Jetstream 31	0	0	0	0	0	0	5,270	11,735	0	0
King Air Turboprop	0	0	2,169	0	600	0	1,600	0	1,750	0
MD-88	0	0	435	0	250	0	0	0	250	0
Saab 340 (Corporate)	0	0	0	0	0	0	0	0	0	0
TOTAL	26,312	80,862	37,624	68,906	8,894	0	70,175	122,715	36,650	0

LTO = Landing/Takeoff Cycle. A landing is one operation; an LTO cycle is two operations.
T&G = Touch and Go Cycle. One T&G cycle is two operations.
Ops = Operations.

spread evenly throughout these periods, an average of 43.0 and 29.6 acres per year, respectively, would be disturbed during these time periods. The analysis of fugitive dust emissions from construction activities assumes that 4 acre-days of soil are disturbed per acre, which represents the area and duration of disturbing activities for each acre. Thus, for the Proposed Action years 1996-2000, the amount of PM_{10} emissions is calculated as follows:

Average Annual PM_{10} Emissions

$$\frac{43.0 \text{ acres disturbed}}{\text{year}} \times \frac{4 \text{ acre-days of disturbance}}{\text{acre}} \times \frac{55 \text{ pounds } PM_{10}}{\text{acre-day}} = 9{,}460 \text{ pounds } PM_{10}/\text{year}$$

Therefore, the amount of PM_{10} emitted would be 9,460 pounds per year (4.7 tons per year) for 1996-2000. Similarly, 6,512 pounds per year (3.2 tons per year) would be emitted for 2001-2005. These emissions would produce elevated short-term PM_{10} concentrations, be temporary, and fall off rapidly with distance from the source. Similar calculations for fugitive dust emissions were performed for construction activities related to other alternatives.

Construction combustive emissions were estimated based on a representative construction scenario with the following pound-per-acre emission factors:

Pollutant	Pounds per Acre
Carbon monoxide	3,820
Nitrogen oxides	1,095
PM_{10}	85
Sulfuric oxide	100
Reactive organic gas	290

Construction combustive and fugitive dust emissions associated with each reuse alternative are summarized by time period in Tables M-3 through M-7 under the Construction category. These construction emissions were subtracted from the countywide emissions inventory to obtain countywide emissions estimates, which do not include emissions from construction. Aircraft operation emissions occurring at Castle AFB were also deducted from the county total prior to developing per capita emission factors, which were used to calculate Other Base Operations Emission, as described below.

AIRCRAFT OPERATIONS

Emissions for the following aircraft activities were calculated from fleet mix and operational information inherent to each reuse alternative: touch and go, airplane queuing, takeoff and landings, and engine runups. All aircraft emissions were calculated with the Emissions and Dispersion Modeling System (EDMS) model (Segal, 1991), which contains a built-in data base of

Table M-3. ROG Emissions Data (tons/day)

	1989[a]	1990[c]	1994[b]	1995[c]	1997[b]	2000[b]	2005[d]	2015[d]
San Joaquin Valley Air Basin	630.0	631.0	634.9	606.1	548.6	538.7	538.7	538.7
Merced County[e]	32.8	32.9	NA	31.6	NA	28.0	28.0	28.0
Merced County Government Aircraft[f]	5.3	5.3	NA	5.3	NA	5.3	5.3	5.3
Construction	---	---	NA	---	NA	---	---	---
Merced County without Government Aircraft and Construction	27.5	27.6	NA	26.3	NA	22.7	22.7	22.7
Per Capita Emission Factor[g]	NA	0.000153	NA	0.000126	NA	0.000096	0.000086	0.000071

Notes: (a) Source: ARB, 1991c.
(b) Source: San Joaquin Valley Unified Air Pollution Control District, 1992b.
(c) Values interpolated.
(d) Emissions ' ,'ond the year 2000 assumed to remain constant.
(e) Merced County portion of total SJVAB emissions in years 1991 and beyond assumed equal to 1989 portion, i.e., 328/630 = 5.21 percent.
(f) Government aircraft emissions in years 1991 and beyond assumed equal to 1989 emissions.
(g) Per capita emission factor for "Other Base Operations" is Merced County Emissions without Government Aircraft and Construction divided by Merced County population.
NA = Not applicable.

Table M-4. NO_x Emissions Data (tons/day)

	1989[a]	1990[c]	1994[b]	1995[c]	1997[b]	2000[b]	2005[d]	2015[d]
San Joaquin Valley Air Basin	543.0	534.7	431.7	459.3	414.6	418.2	418.2	418.2
Merced County[e]	34.8	34.0	NA	29.2	NA	26.6	26.6	26.6
Merced County Government Aircraft[f]	2.0	2.0	NA	2.0	NA	2.0	2.0	2.0
Construction	---	---	NA	---	NA	---	---	---
Merced County without Government Aircraft and Construction	32.8	32.0	NA	27.2	NA	24.6	24.6	24.6
Per Capita Emission Factor[g]	NA	0.000177	NA	0.000130	NA	0.000104	0.000093	0.000077

Notes: (a) Source ARB, 1991c.
(b) Source: San Joaquin Valley Unified Air Pollution Control District, 1992b.
(c) Values interpolated.
(d) Values extrapolated.
(e) Merced County portion of total SJVAB emissions in years 1991 and beyond assumed equal to 1989 portion, i.e., 34.8/548 = 6.35 percent.
(f) Government aircraft emissions in years 1991 and beyond assumed equal to 1989 emissions.
(g) Per capita emission factor for "Other Base Operations" is Merced County Emissions without Government Aircraft and Construction divided by Merced County population.
NA = Not applicable.

Table M-5. CO Emissions Data (tons/day)

	1989[a]	1990	1994	1995	1997	2000	2005	2015
San Joaquin Valley Air Basin	1830.0	NA	NA	NA	NA	NA	NA	NA
Merced County[b]	178.9	180.2	NA	207.8	NA	235.5	263.1	318.4
Merced County Government Aircraft[c]	23.0	23.0	NA	23.0	NA	23.0	23.0	23.0
Construction	---	---	NA	---	NA	---	---	---
Merced County without Government Aircraft and Construction	155.9	157.2	NA	184.8	NA	212.5	240.1	295.4
Per Capita Emission Factor[d]	NA	0.000870	NA	0.000887	NA	0.000900	0.000910	0.000926

Notes: (a) Source: ARB, 1991c.
(b) Merced County emissions in years 1991 and beyond assumed to grow in proportion to population.
(c) Government aircraft emissions in years 1991 and beyond assumed equal to 1989 emissions.
(d) Per capita emission factor for "Other Base Operations" is Merced County Emissions without Government Aircraft and Construction divided by Merced County population.
NA = Not applicable.

Table M-6. SO_2 Emissions Data (tons/day)

	1989[a]	1990	1994	1995	1997	2000	2005	2015
San Joaquin Valley Air Basin	76.0	NA	NA	NA	NA	NA	NA	NA
Merced County[b]	5.0	5.0	NA	5.8	NA	6.6	7.4	8.9
Merced County Government Aircraft[c]	0.6	0.6	NA	0.6	NA	0.6	0.6	0.6
Construction	---	---	NA	---	NA	---	---	---
Merced County without Government Aircraft and Construction	4.4	4.4	NA	5.2	NA	6.0	6.8	8.3
Per Capita Emission Factor[d]	NA	0.000025	NA	0.000025	NA	0.000025	0.000026	0.000026

Notes: (a) Source: ARB, 1991c. All SO_x assumed to be SO_2.
(b) Merced County emissions in years 1991 and beyond assumed to grow in proportion to population.
(c) Government aircraft emissions in years 1991 and beyond assumed equal to 1989 emissions.
(d) Per capita emission factor for "Other Base Operations" is Merced County Emissions without Government Aircraft and Construction divided by Merced County population.

Table M-7. PM_{10} Emissions Data (tons/day)

	1989(a)	1990	1994	1995	1997	2000	2005	2015
San Joaquin Valley Air Basin	1,106.0	NA	NA	NA	NA	NA	NA	NA
Merced County[b]	79.8	80.4	NA	92.7	NA	105.0	117.4	142.0
Merced County Government Aircraft[c]	3.2	3.2	NA	3.2	NA	3.2	3.2	3.2
Construction[b]	3.9	3.9	NA	4.5	NA	5.1	5.7	6.9
Other Non-Applicable Sources[b][d]	33.4	33.6	NA	38.8	NA	44.0	49.1	59.4
Merced County without Government Aircraft, Construction, and Other Non-Applicable Sources	39.3	39.6	NA	46.2	NA	52.7	59.3	72.4
Per Capita Emission Factor[e]	NA	0.000219	NA	0.000222	NA	0.000223	0.000225	0.000227

Notes: (a) Source: ARB, 1991c.
(b) Emissions in the year 1991 and beyond assumed to grow in proportion to population.
(c) Government aircraft emissions in years 1991 and beyond assumed equal to 1989 emissions.
(d) Other Non-Applicable Sources include emissions from farming operations, entrained road dust (unpaved roads), natural sources, and mineral processes.
(e) Per capita emission factor for "Other Base Operations" is Merced County Emissions without Government Aircraft, Construction, and Other Non-Applicable Sources divided by Merced County population.

Table M-8. Population Data

	1989[a]	1990[b]	1994[c]	1995[c]	1997[c]	2000[b]	2005[d]	2015[d]
San Joaquin Valley Air Basin	2,634,062	2,771,100	3,093,180	3,173,700	3,334,740	3,576,300	3,978,900	4,784,100
Merced County	179,311	180,600	202,760	208,300	219,380	236,000	263,700	319,100

Notes: (a) Source: San Joaquin Valley Unified Air Pollution Control District, 1992b; ARB, 1991c.
(b) Source: San Joaquin Valley Unified Air Pollution Control District, 1992b.
(c) Values interpolated.
(d) Values extrapolated.

U.S. Environmental Protection Agency (EPA) AP-42 emission factors for various types of aircraft. However, EDMS does not provide PM_{10} emission factors for two of the military aircraft in the preclosure fleet mix, the KC-135R and the F-16. The EDMS data base was therefore modified to include PM_{10} emission factors for these two aircraft. Surrogate engines were selected based on their high degree of similarity to those currently used on the KC-135R and the F-16. For the KC-135R, the CFM56-2B engine PM_{10} emission factors were selected. For the F-16, F100-P-100 engine PM_{10} emission factors were selected. Standard emission factors were used for the civilian aircraft emission calculations. EDMS was also used to calculate downwind pollutant concentrations that would result from aircraft operations associated with each alternative.

OTHER BASE OPERATIONS EMISSION CALCULATIONS

Although the data in Table M-1 provide an adequate estimate of on-base preclosure emissions, they are difficult to compare to emissions from future reuse scenarios that required calculation by different forecasting methods (for both direct and indirect emissions). Therefore, to more adequately compare emissions from preclosure, closure, and reuse, all emissions were calculated using the same methodology. The following is a presentation of the methods used to calculate these emissions.

To calculate emissions from other base operations (i.e., all emissions with *the exception* of construction fugitive dust, construction combustive emissions, and aircraft emissions), a per capita approach was used. Other base operations emissions include emissions from point, area, non-road mobile, and on-road mobile sources. Data used in the calculations included population data and total San Joaquin Valley Air Basin (SJVAB) and Merced County emissions of reactive organic gases (ROG), nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), and PM_{10} for the baseline year (1989) and projections for future years (1994, 1997, and 2000). The population data are provided in Table M-8. The county emissions and per-capita factors are provided for each pollutant in Tables M-3 to M-7. The 1989 baseline data were obtained from the California Air Resources Board's (ARB) 1989 Emission Inventory (ARB, 1991c). Emission projections for the SJVAB for 1994, 1997, and 2000 were obtained from the 1991 Air Quality Attainment Plan (AQAP) (San Joaquin Valley Unified Air Pollution Control District [UAPCD], 1992b). The Merced County fraction of the total SJVAB emissions in future years was assumed to remain the same as the 1989 fraction. Population projections for the years 1990 and 2000 were also obtained from the 1991 AQAP. Data used to calculate emissions for preclosure conditions, closure conditions (1995), and future reuse alternative conditions in 2000 and 2005 were interpolated or extrapolated from these data, as appropriate. The emission inventory projections for future years reflect a reduction in ROG and NO_x emissions as a result of the mandates of the California Clean Air Act (CCAA), which requires the UAPCD to apply all feasible measures to attain the state ozone (O_3) standard as expeditiously as possible (see the "Mandates of the CCAA" section of this appendix). Reuse-related emissions from sources other than aircraft and construction activities were adjusted to reflect the expected emission reductions from the UAPCD control measures identified in the 1991 AQAP.

Countywide emissions (excluding construction emissions, government aircraft sources, farming operation emissions, entrained road dust, natural particulate matter sources, and mineral processes) were divided by the total county population for the year of interest to derive a county per capita emission factor that is assumed to be the same for project-related personnel. This factor was then multiplied by the total site-related population of each project scenario to generate total other base operations emissions. The site-related population includes the following on- or off-base personnel associated with Castle AFB and is presented in Table M-9 for each project scenario: (1) military personnel and their dependents, (2) direct employees and their dependents, and (3) secondary employees and their dependents. Retirees are excluded. Each alternative would have differing amounts of site-related population, as shown in Table M-9.

The total other base operations emissions of ROG, NO_x, CO, SO_2, and PM_{10} for each reuse alternative are presented in Tables M-10 through M-14. (Note that Section 4.4.3 of the Environmental Impact Statement presents the increase of emissions over the closure conditions, or the total reuse emissions minus the closure baseline emissions.) Emission categories for each reuse alternative include aircraft operations, construction, and other base operations.

MANDATES OF THE CALIFORNIA CLEAN AIR ACT

The CCAA requires that areas in nonattainment of the state O_3, nitrogen dioxide (NO_2), CO, or SO_2 standards adopt a plan that will lead to the attainment of these standards by the earliest practical date. Since the UAPCD is in nonattainment of the state O_3 standard, the UAPCD is required to reduce emissions of ROG and NO_x by 5 percent annually from the 1987 basin inventory until the standard is attained or, failing this, implement all feasible emission control measures possible. The mandates of the federal Clean Air Act Amendments (CAAA) also apply to the UAPCD, and require areas in nonattainment of the national O_3 standard to reduce basinwide volatile organic compound (VOC) emissions by 15 percent over a 6-year period (ending November 15, 1996). Since the requirements of the CCAA are more stringent than the requirements of the CAAA, the regulatory focus in California has shifted towards compliance with the CCAA. Ozone emission reductions in the form of ROG and NO_x control measures are included in the UAPCD's 1991 AQAP. The AQAP does not meet the annual 5-percent emission reduction requirements of the CCAA. Instead, the AQAP identifies all feasible emission control measures to reduce basinwide O_3

Table M-9. Total Site-Related Population Used to Derive Other Base Operations Emissions

Preclosure	23,710
Closure	
1995	181
Proposed Action	
2000	11,915
2005	17,171
Castle Aviation Center Alternative	
2000	23,797
2005	33,800
Commercial Aviation Center Alternative	
2000	6,257
2005	12,276
Aviation with Mixed Use Alternative	
2000	7,412
2005	12,242
Non-Aviation Alternative	
2000	1,511
2005	8,130

levels. Once approved by the ARB, the AQAP control measures will be included in the California State Implementation Plan (SIP).

STATE IMPLEMENTATION PLAN STATUS

The primary purpose of the AQAP is to reduce ROG and NO_x emissions to reach attainment of the state O_3 standard within the SJVAB. Since the state O_3 standard is more stringent than the federal standard, attainment of the state standard will also result in attainment of the federal standard. For a reuse alternative to conform with the SIP, emission control measures identified in the SIP must be implemented by the reuse alternative sources.

An attainment plan to address the "serious" PM_{10} nonattainment status of the SJVAB has not yet been prepared by the UAPCD. The PM_{10} attainment demonstration plan is not due to the U.S. EPA until February 8, 1997. However, the UAPCD has prepared and adopted a Best Available Control Measure (BACM) Plan which quantifies all particulate matter (PM) control measures which will be adopted by the UAPCD, and a schedule for doing so. This plan, which will feed into preparation of the PM_{10} attainment demonstration plan, has been sent to U.S. EPA for approval.

Table M-10. Castle AFB - Emissions Inventory for Reactive Organic Gases (tons/day)

	Preclosure	Closure	Proposed Action		Castle Aviation Center Alternative		Commercial Aviation Alternative		Aviation with Mixed Use Alternative		Non-Aviation Alternative	
Source		1995	2000	2005	2000	2005	2000	2005	2000	2005	2000	2005
Aircraft Operations w/o Pilot & Crew Training	5.188	0.000	0.011	0.014	0.010	0.013	0.021	0.022	0.010	0.013	0.000	0.000
Pilot & Crew Training Aircraft Operations	NA	NA	0.029	0.030	NA	NA	0.043	0.049	NA	NA	NA	NA
Construction	NA	NA	0.027	0.019	0.015	0.003	0.020	0.014	0.026	0.008	0.026	0.026
Other Base Operations	3.617	0.023	1.148	1.481	2.293	2.915	0.603	1.059	0.714	1.056	0.146	0.701
Total	8.805	0.023	1.215	1.543	2.318	2.932	0.687	1.144	0.750	1.077	0.172	0.727

Table M-11. Castle AFB - Emissions Inventory for Oxides of Nitrogen (tons/day)

	Preclosure	Closure	Proposed Action		Castle Aviation Center Alternative		Commercial Aviation Alternative		Aviation with Mixed Use Alternative		Non-Aviation Alternative	
Source		1995	2000	2005	2000	2005	2000	2005	2000	2005	2000	2005
Aircraft Operations w/o Pilot & Crew Training	1.801	0.000	0.073	0.100	0.082	0.127	0.013	0.017	0.108	0.169	0.000	0.000
Pilot & Crew Training Operations	NA	NA	2.640	2.655	NA	NA	2.705	2.885	NA	NA	NA	NA
Construction	NA	NA	0.102	0.070	0.057	0.013	0.076	0.053	0.097	0.031	0.100	0.099
Other Base Operations	4.196	0.024	1.240	1.599	2.476	3.148	0.651	1.143	0.771	1.140	0.157	0.757
Total	5.997	0.024	4.055	4.425	2.615	3.287	3.446	4.098	0.976	1.341	0.257	0.856

Table M-12. Castle AFB - Emissions Inventory for Carbon Monoxide (tons/day)

	Preclosure	Closure	Proposed Action		Castle Aviation Center Alternative		Commercial Aviation Alternative		Aviation with Mixed Use Alternative		Non-Aviation Alternative	
Source		1995	2000	2005	2000	2005	2000	2005	2000	2005	2000	2005
Aircraft Operations w/o Pilot & Crew Training	6.939	0.000	0.487	0.545	0.227	0.284	1.148	1.198	0.450	0.514	0.000	0.000
Pilot & Crew Training Operations	NA	NA	0.108	0.114	NA	NA	1.254	1.571	NA	NA	NA	NA
Construction	NA	NA	0.357	0.246	0.198	0.045	0.266	0.184	0.337	0.110	0.349	0.344
Other Base Operations	20.636	0.161	10.726	15.634	21.423	30.774	5.633	11.177	6.673	11.146	1.360	7.402
Total	27.575	0.161	11.678	16.539	21.848	31.103	8.301	14.130	7.460	11.769	1.709	7.746

w/o = Without.
NA = Not applicable.

Table M-13. Castle AFB - Emissions Inventory for Sulfur Dioxide (tons/day)

Source	Preclosure	Closure	Proposed Action		Castle Aviation Center Alternative		Commercial Aviation Alternative		Aviation with Mixed Use Alternative		Non-Aviation Alternative	
		1995	2000	2005	2000	2005	2000	2005	2000	2005	2000	2005
Aircraft operations w/o Pilot & Crew Training	0.247	0.000	0.003	0.004	0.003	0.004	0.001	0.001	0.004	0.006	0.000	0.000
Pilot & Crew Training Aircraft Operations	NA	NA	0.077	0.058	NA	NA	0.075	0.080	NA	NA	NA	NA
Construction	NA	NA	0.009	0.006	0.005	0.001	0.007	0.005	0.009	0.003	0.009	0.009
Other Base Operations	0.582	0.005	0.302	0.440	0.603	0.866	0.159	0.314	0.188	0.314	0.038	0.208
Total	0.829	0.005	0.391	0.528	0.611	0.871	0.242	0.401	0.200	0.322	0.047	0.217

Table M-14. Castle AFB - Emissions Inventory for PM_{10} (tons/day)

Source	Preclosure	Closure	Proposed Action		Castle Aviation Center Alternative		Commercial Aviation Alternative		Aviation with Mixed Use Alternative		Non-Aviation Alternative	
		1995	2000	2005	2000	2005	2000	2005	2000	2005	2000	2005
Aircraft operations w/o Pilot & Crew Training	0.368	0.000	0.001	0.001	0.007	0.009	0.002	0.002	0.001	0.001	0.000	0.000
Pilot & Crew Training Aircraft Operations	NA	NA	0.000	0.000	NA	NA	0.002	0.002	NA	NA	NA	NA
Construction	NA	NA	0.049	0.034	0.027	0.006	0.037	0.025	0.046	0.015	0.048	0.047
Other Base Operations	5.200	0.040	2.663	3.861	5.318	7.601	1.398	2.761	1.656	2.753	0.338	1.828
Total	5.568	0.040	2.712	3.896	5.352	7.616	1.438	2.790	1.703	2.769	0.386	1.876

w/o = Without.
NA = Not applicable.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.

AQAP CONTROL MEASURES APPLICABLE TO THE REUSE ALTERNATIVES

The Proposed Action and alternatives would implement all PM_{10} emission control measures adopted by the UAPCD. However, as Table M-14 indicates, there is a possibility that PM_{10} emissions may eventually exceed preclosure levels if the Castle Aviation Center Alternative is selected. The emission forecasts for the reuse alternatives are based on the adopted control measures which were in place at the time of analysis and, therefore, do not reflect SIP control measures pending EPA approval.

The AQAP identifies numerous emission control strategies that target both stationary and mobile sources. Upon approval, these control measure will be included in the SIP. The following are some of the specific measures that would affect reuse stationary emission sources (San Joaquin Valley UAPCD, 1992b). Controls on these source types would be implemented by the UAPCD's Regulation IV:

- Adhesives
- Aircraft fuel storage and refueling
- External combustion devices
- Coatings - aircraft and aerospace exteriors
- Coatings - architectural
- Dry cleaners - perchloroethylene solvents
- Gasoline dispensing - small service stations and tanks
- Heaters, residential and commercial water/space heaters
- Organic liquid storage
- Organic solvents
- Piston engines, stationary and portable
- Stationary gas turbine engines
- Tank cleaning and venting
- Woodburning, residential fireplaces, and wood stoves

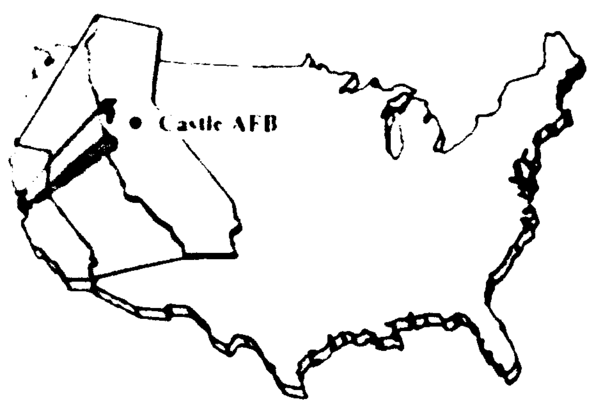
The AQAP also identifies the following transportation control measures (TCMs) that would be implemented to reduce emissions from existing mobile sources:

- Traffic flow improvements
- Public transit
- Passenger rail and support facilities
- Rideshare programs
- Park and ride lots
- Bicycling program
- Trip reduction program
- Parking management
- Telecommunications
- Alternative work schedules
- Fleet operator alternative fuels

In contrast to the above specificity of what will be included in the SIP, the land uses that would be a part of the proposed reuse alternatives are defined only in very general terms. These land uses include the following:

- Airport with aviation support
- Industrial
- Institutional (medical and educational)
- Commercial
- Residential
- Recreational
- Agricultural

Specific businesses (i.e. specific emission source types) within these general land uses are not defined for the proposed reuse alternatives. Therefore, it is not possible to determine at this time the specific SIP control measures would apply; however, many could potentially apply, depending on the specific land uses (i.e., business types) associated with the eventual reuse alternative. The land uses that are eventually selected for the reuse of Castle AFB would need to comply with all applicable control measures in the SIP, including TCMs, at that time.



APPENDIX N

APPENDIX N

INFLUENCING FACTORS AND ENVIRONMENTAL IMPACTS BY LAND USE CATEGORY

APPENDIX N

INFLUENCING FACTORS AND ENVIRONMENTAL IMPACTS BY LAND USE CATEGORY

INTRODUCTION

The purpose of this appendix is to quantify the environmental impacts of each land use category identified for the Proposed Action and four alternatives evaluated in this Environmental Impact Statement (EIS). The data in Tables N-1 through N-16 present the impacts of individual land use activities, such as industrial, commercial, or institutional, on their respective Regions of Influence and allow comparison of the impacts of the Proposed Action and alternatives for three benchmark years, 2000, 2005, and 2015, where applicable.

Tables N-1 through N-4 present data on the influencing factors (factors that drive environmental impacts); Tables N-5 through N-16 list the impacts on individual environmental resources evaluated in the EIS. These resources include transportation, utilities, hazardous materials and hazardous waste management, soils and geology, noise, biological resources, and cultural resources. Included in this appendix is at least one table for each resource area, except water resources and air quality. Data on water demand are presented as part of the utilities analysis; the effects on surface and groundwater resources in and around the base have not been quantified in the EIS and have not been included in this appendix. The air emissions associated with each alternative for each benchmark year are described in detail in Appendix M and have not been included in this appendix.

No quantification is provided in Table N-11, Hazardous Materials Usage, because quantities generated will depend on the type and intensity of industrial and commercial activities developed on the site. Table N-11 presents a generalized description of the hazardous materials used under individual land use categories. Table N-12 summarizes the number of Installation Restoration Program (IRP) sites identified on the base as of 1993, but does not give the likely status of these sites in 2000, 2005, and 2015.

Table N-1. Direct Employment by Land Use Category, Castle AFB Reuse

	1995-2000					2000-2005				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	NA	138	NA	NA	NA	NA	124	NA	NA	NA
Aviation Support	300	1,567	205	266	NA	412	2,252	192	385	NA
Industrial	499	2,259	400	360	NA	669	3,162	960	938	394
Institutional (Medical)	175	184	230	219	NA	129	186	216	192	NA
Institutional (Educational)	25	NA	NA	31	242	51	NA	NA	72	511
Commercial	1,473	231	425	673	NA	1,286	248	1,008	794	805
Residential	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Public Facilities/Recreation	25	231	22	17	49	25	248	24	25	27
Agriculture	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	2,497	4,610	1,282	1,566	291	2,572	6,200	2,400	2,406	1,737

	2005-2015				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	NA	124	NA	NA	NA
Aviation Support	558	2,232	385	761	NA
Industrial	1,229	3,162	2,228	2,324	1,024
Institutional (Medical)	149	186	405	211	NA
Institutional (Educational)	75	NA	NA	148	796
Commercial	1,825	248	1,013	761	807
Residential	NA	NA	NA	NA	NA
Public Facilities/Recreation	38	248	20	20	27
Agriculture	NA	NA	NA	NA	NA
Total	3,814	6,200	4,051	4,225	2,654

Note: Includes total on-site construction and operational jobs.
NA = Not applicable.
Alt. 1 = Castle Aviation Center.
Alt. 2 = Commercial Aviation.
Alt. 3 = Aviation with Mixed Use.
Alt. 4 = Non-Aviation.

Table N-2. Total Employment by Land Use Category, Castle AFB Reuse

	1995-2000					2000-2005				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	NA	235	NA	NA	NA	NA	212	NA	NA	NA
Aviation Support	469	2,663	165	420	NA	735	3,822	308	624	NA
Industrial	782	3,838	680	569	417	1,186	5,414	1,542	1,520	982
Institutional (Medical)	274	313	165	346	NA	230	318	347	312	NA
Institutional (Educational)	39	NA	NA	49	NA	92	NA	NA	117	777
Commercial	2,307	392	1,009	1,063	NA	2,298	425	1,620	1,286	805
Residential	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Public Facilities/Recreation	40	391	40	26	85	54	425	39	39	26
Agriculture	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	3,911	7,832	2,059	2,473	502	4,595	10,616	3,856	3,898	2,590

	2005-2015				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	NA	212	NA	NA	NA
Aviation Support	947	3,822	1,642	1,281	NA
Industrial	2,082	5,414	2,006	3,914	2,065
Institutional (Medical)	252	318	1,076	356	NA
Institutional (Educational)	126	NA	NA	249	1,249
Commercial	2,839	425	1,990	1,281	807
Residential	NA	NA	NA	NA	NA
Public Facilities/Recreation	193	425	46	36	42
Agriculture	NA	NA	NA	NA	NA
Total	6,313	10,616	6,760	7,117	4,163

Note: Total employment includes direct and secondary employment.
NA = Not applicable.
P.A. = Proposed Action.
Alt. 1 = Castle Aviation Center.
Alt. 2 = Commercial Aviation.
Alt. 3 = Aviation with Mixed Use.
Alt. 4 = Non-Aviation.

Table N-3. Population In-Migration by Land Use Category, Castle AFB Reuse

	1995-2000					2000-2005				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	NA	193	NA	NA	NA	NA	200	NA	NA	NA
Aviation Support	401	2,691	133	353	NA	775	3,092	270	549	NA
Industrial	668	2,658	550	478	234	1,259	4,789	1,352	1,338	473
Institutional (Medical)	234	258	133	291	NA	242	299	304	274	NA
Institutional (Educational)	33	NA	NA	42	NA	97	NA	NA	103	710
Commercial	1,969	322	816	894	NA	2,421	399	1,419	1,132	1,159
Residential	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Public Facilities/Recreation	33	323	34	20	48	48	363	34	34	23
Agriculture	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	3,338	6,445	1,666	2,078	282	4,842	9,142	3,379	3,430	2,366

	2005-2015				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	NA	200	NA	NA	NA
Aviation Support	917	3,592	606	1,207	NA
Industrial	2,018	5,089	3,505	3,689	1,560
Institutional (Medical)	245	299	637	335	NA
Institutional (Educational)	122	NA	NA	235	1,231
Commercial	2,751	399	1,593	1,207	1,273
Residential	NA	NA	NA	NA	NA
Public Facilities/Recreation	61	400	32	35	41
Agriculture	NA	NA	NA	NA	NA
Total	6,114	9,979	6,373	6,708	4,105

NA = Not applicable.
P.A. = Proposed Action.
Alt. 1 = Castle Aviation Center.
Alt. 2 = Commercial Aviation.
Alt. 3 = Aviation with Mixed Use.
Alt. 4 = Non-Aviation.

Table N-4. Land Use Impacts by Land Use Category, Castle AFB Reuse

	1995-2000					2000-2005				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	1,032	1,032	997	1,032	NA	1,032	1,032	997	1,032	NA
Aviation Support	236	111	27	77	NA	425	158	54	116	NA
Industrial	179	449	61	31	NA	313	641	149	82	99
Institutional (Medical)	23	20	28	20	NA	23	20	57	20	NA
Institutional (Educational)	16	70	NA	23	55	31	70	NA	46	273
Commercial	122	45	30	50	0	144	45	59	59	47
Residential	94	188	190	94	133	188	188	249	188	133
Public Facilities/Recreation	433	564	81	724	696	433	564	81	724	696
Agriculture	7	7	56	7	165	7	7	56	7	165
Total	2,142	2,486	1,470	2,058	1,049	2,596	2,725	1,702	2,274	1,413

	2005-2015				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	1,032	1,032	997	1,032	NA
Aviation Support	472	158	116	232	NA
Industrial	447	641	350	206	297
Institutional (Medical)	23	20	113	20	NA
Institutional (Educational)	31	70	NA	92	436
Commercial	144	45	59	59	47
Residential	188	188	342	188	233
Public Facilities/Recreation	433	564	81	724	696
Agriculture	7	7	56	7	165
Total	2,777	2,725	2,114	2,560	1,874

Note: Total acres based on estimate.
NA = Not applicable.
P.A. = Proposed Action.
Alt. 1 = Castle Aviation Center.
Alt. 2 = Commercial Aviation.
Alt. 3 = Aviation with Mixed Use.
Alt. 4 = Non-Aviation.

Table N-5. Transportation Impacts by Land Use Category, Castle AFB Reuse (average daily vehicular traffic)

	1995-2000					2000-2005				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield										
Aviation Support	884	4,693	376	1,680	NA	1,623	6,704	751	2,520	NA
Industrial	1,915	6,723	1,167	701	0	3,423	9,604	2,834	1,871	915
Institutional (Medical)	1,516	1,768	1,016	1,768	NA	1,543	1,768	2,020	1,768	NA
Institutional (Educational)	68	2,574	NA	126	695	140	2,574	NA	253	4,474
Commercial	20,040	11,712	11,747	12,834	0	24,062	11,712	26,404	15,404	10,350
Residential	3,330	12,871	11,551	3,892	7,176	6,794	12,871	13,286	7,783	7,425
Public Facilities/Recreation	572	2,439	669	606	410	584	2,439	669	606	510
Agriculture	20	20	180	20	550	20	20	180	20	550
Total	28,345	42,798	26,706	21,626	8,831	38,189	47,691	46,144	30,224	24,225

	2005-2015				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield					
Aviation Support	1,787	6,704	1,502	5,039	NA
Industrial	5,151	9,604	6,670	4,677	2,747
Institutional (Medical)	1,529	1,768	4,039	1,768	NA
Institutional (Educational)	138	2,574	NA	505	7,158
Commercial	23,839	11,712	26,404	15,404	10,350
Residential	6,731	12,871	14,373	7,783	12,995
Public Facilities/Recreation	579	2,439	669	606	510
Agriculture	20	20	180	20	550
Total	39,774	47,691	53,838	35,802	34,310

Notes: Vehicle trips shown are from direct on-site employment only. Trips generated by construction and secondary employment are not included.
NA = Not applicable.
P.A. = Proposed Action.
Alt. 1 = Castle Aviation Center.
Alt. 2 = Commercial Aviation.
Alt. 3 = Aviation with Mixed Use.
Alt. 4 = Non-Aviation.

Table N-6. Water Consumption by Land Use Category, Castle AFB Reuse (million gallons per day)

	1995-2000					2000-2005				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	0.32	0.48	0.37	0.34	NA	0.35	0.48	0.37	0.34	NA
Aviation Support	0.07	0.06	0.02	0.03	NA	0.14	0.08	0.04	0.04	NA
Industrial	0.05	0.21	0.02	0.009	NA	0.09	0.30	0.06	0.02	0.037
Institutional (Medical)	0.009	0.009	0.01	0.009	NA	0.01	0.009	0.02	0.009	NA
Institutional (Educational)	0.004	0.04	NA	0.008	0.02	0.009	0.04	NA	0.02	0.1
Commercial	0.04	0.03	0.02	0.02	NA	0.05	0.03	0.02	0.02	0.01
Residential	0.03	0.11	0.11	0.03	0.05	0.07	0.11	0.12	0.06	0.05
Public Facilities/Recreation	0.13	0.26	0.03	0.24	0.26	0.14	0.26	0.03	0.24	0.26
Agriculture	NA	NA	0.02	NA	0.06	NA	NA	0.02	NA	0.06
Total	0.65	1.20	0.6	0.69	0.39	0.89	1.3	0.68	0.75	0.52

	2005-2015				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	0.34	0.48	0.37	0.34	NA
Aviation Support	0.15	0.08	0.08	0.08	NA
Industrial	0.14	0.30	0.13	0.06	0.11
Institutional (Medical)	0.009	0.009	0.04	0.009	NA
Institutional (Educational)	0.009	0.04	NA	0.03	0.16
Commercial	0.05	0.03	0.02	0.02	0.01
Residential	0.07	0.11	0.12	0.06	0.08
Public Facilities/Recreation	0.14	0.26	0.03	0.24	0.26
Agriculture	NA	NA	0.02	NA	0.06
Total	0.91	1.31	0.81	0.84	0.68

Note: Numbers represent reuse-related demand.
NA = Not applicable.
P.A. = Proposed Action.
Alt. 1 = Castle Aviation Center.
Alt. 2 = Commercial Aviation.
Alt. 3 = Aviation with Mixed Use.
Alt. 4 = Non-Aviation.

Table N-7. Wastewater Generation by Land Use Category, Castle AFB Reuse (million gallons per day)

	1995-2000					2000-2005				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	0.09	0.25	0.18	0.14	NA	0.14	0.25	0.18	0.14	NA
Aviation Support	0.02	0.03	0.01	0.01	NA	0.05	0.04	0.02	0.02	NA
Industrial	0.02	0.11	0.01	0.005	NA	0.05	0.15	0.03	0.01	0.02
Institutional (Medical)	0.002	0.005	0.005	0.004	NA	0.004	0.005	0.01	0.004	NA
Institutional (Educational)	0.012	0.02	NA	0.003	0.008	0.004	0.02	NA	0.006	0.04
Commercial	0.014	0.02	0.01	0.005	NA	0.02	0.01	0.01	0.009	0.004
Residential	0.012	0.06	0.05	0.015	0.02	0.02	0.	0.06	0.03	0.02
Public Facilities/Recreation	0.04	0.14	0.02	0.1	0.1	0.06	0.14	0.02	0.1	0.1
Agriculture	NA	NA	0.01	NA	0.02	NA	NA	0.01	NA	0.02
Total	0.21	0.63	0.30	0.28	0.15	0.35	0.68	0.34	0.32	0.18

	2005-2015				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	0.13	0.25	0.18	0.14	NA
Aviation Support	0.06	0.04	0.04	0.03	NA
Industrial	0.06	0.15	0.06	0.03	0.05
Institutional (Medical)	0.003	0.005	0.02	0.004	NA
Institutional (Educational)	0.003	0.02	NA	0.012	0.06
Commercial	0.02	0.01	0.01	0.009	0.004
Residential	0.02	0.06	0.06	0.03	0.04
Public Facilities/Recreation	0.06	0.14	0.0?	0.1	0.1
Agriculture	NA	NA	0.01	NA	0.02
Total	0.36	0.68	0.40	0.36	0.27

Note: Numbers represent reuse-related wastewater generation.
NA = Not applicable.
P.A. = Proposed Action.
Alt. 1 = Castle Aviation Center.
Alt. 2 = Commercial Aviation.
Alt. 3 = Aviation with Mixed Use.
Alt. 4 = Non-Aviation.

Table N-8. Solid Waste Disposal by Land Use Category, Castle AFB Reuse (tons per day)

	1995-2000					2000-2005				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	4.9	8.66	7.3	5.7	NA	5.5	8.66	7.3	5.7	NA
Aviation Support	1.1	0.98	0.36	0.42	NA	2.3	1.4	0.7	0.64	NA
Industrial	0.86	3.8	0.5	0.12	NA	1.6	5.4	1.1	0.44	0.57
Institutional (Medical)	0.13	0.16	0.2	0.15	NA	0.14	0.16	0.4	0.15	NA
Institutional (Educational)	0.07	0.70	NA	0.12	0.31	0.14	0.70	NA	0.25	1.6
Commercial	0.67	0.47	0.4	0.31	NA	0.86	0.47	0.4	0.37	0.16
Residential	0.47	2.1	2.1	0.51	0.76	1.0	2.1	2.4	1.02	0.76
Public Facilities/Recreation	2.2	4.7	0.6	4.0	3.9	2.4	4.7	0.6	4.0	3.9
Agriculture	NA	NA	1.2	NA	0.9	NA	NA	1.2	NA	0.9
Total	10.4	21.6	12.7	11.3	5.9	13.9	23.6	14.1	12.6	7.9

	2005-2015				
Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	5.6	8.66	7.3	5.7	NA
Aviation Support	2.5	1.4	1.5	1.3	NA
Industrial	2.4	5.4	2.6	1.1	1.7
Institutional (Medical)	0.15	0.16	0.8	0.15	NA
Institutional (Educational)	0.15	0.70	NA	0.50	2.5
Commercial	0.89	0.47	0.4	0.37	0.16
Residential	1.0	2.1	2.4	1.02	1.33
Public Facilities/Recreation	2.4	4.7	0.6	4.0	3.9
Agriculture	NA	NA	1.2	NA	0.9
Total	15.1	24	16.8	11.1	10.5

Note: Numbers represent reuse-related waste generation (including demolition debris).
NA = Not applicable.
P.A. = Proposed Action.
Alt. 1 = Castle Aviation Center.
Alt. 2 = Commercial Aviation.
Alt. 3 = Aviation with Mixed Use.
Alt. 4 = Non-Aviation.

Table N-9. Electricity Consumption by Land Use Category, Castle AFB Reuse (megawatt-hours per day)

Land Use Category	1995-2000					2000-2005				
	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	23.7	38	43	38.7	NA	31.8	38	43	38.7	NA
Aviation Support	5.4	4.3	2.1	2.9	NA	13.2	6.2	4.3	4.4	NA
Industrial	4.1	16.8	2.7	1.1	NA	9.6	24	6.5	2.9	3.8
Institutional (Medical)	0.64	0.72	1.2	1.0	NA	0.86	0.72	2.4	1.0	NA
Institutional (Educational)	1.29	3.1	NA	0.84	2.1	0.86	3.1	NA	1.7	10.5
Commercial	3.2	2.0	2.4	2.1	NA	5.1	2.0	2.4	2.5	1.1
Residential	2.3	9.2	12.6	3.7	10.4	6.0	9.2	14	7.3	10.4
Public Facilities/Recreation	10.3	20	3.6	27	26	13.8	20	3.6	27	26
Agriculture	NA	NA	2.4	NA	6.3	NA	NA	2.4	NA	6.3
Total	50.9	94	70	77.3	45	81.3	103	81	85.5	58.1

Land Use Category	2005-2015				
	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	33.4	38	43	38.7	NA
Aviation Support	15.3	6.2	9.2	8.8	NA
Industrial	14.6	24	15.2	7.3	11
Institutional (Medical)	0.91	0.72	4.8	1.0	NA
Institutional (Educational)	0.91	3.1	NA	3.4	17
Commercial	5.4	2.0	2.4	2.5	1.1
Residential	6.3	9.2	14	7.3	18.2
Public Facilities/Recreation	14.4	20	3.6	27	26
Agriculture	NA	NA	2.4	NA	6.3
Total	91.2	103.2	94.3	96	80

Note: Numbers represent reuse-related demand.
NA = Not applicable.
P.A. = Proposed Action.
Alt. 1 = Castle Aviation Center.
Alt. 2 = Commercial Aviation.
Alt. 3 = Aviation with Mixed Use.
Alt. 4 = Non-Aviation.

Table N-10. Natural Gas Consumption by Land Use Category, Castle AFB Reuse (therms per day)

Land Use Category	1995-2000					2000-2005				
	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	748	1,214	1,598	1,178	NA	1,027	1,214	1,598	1,178	NA
Aviation Support	172	138	80	89	NA	425	197	160	134	NA
Industrial	129	529	99	33	NA	311	755	242	89	118
Institutional (Medical)	20	23	44.5	32	NA	28	23	89	32	NA
Institutional (Educational)	10	98	NA	25	65	28	98	NA	51	327
Commercial	103	66	89	63.5	NA	167	66	89	76	33
Residential	71	295	480	111.5	157	195	295	533	223	157
Public Facilities/Recreation	324	656	133	827.6	816	445	656	133	828	816
Agriculture	NA	NA	89	NA	196	NA	NA	89	NA	196
Total	1,577	3,019	2,612.5	2,360	1,038	2,626	3,304	2,933	2,611	1,647

Land Use Category	2005-2015				
	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	1,057	1,214	1,598	1,178	NA
Aviation Support	486	197	340	268	NA
Industrial	456	755	568	223	353
Institutional (Medical)	29	23	178	32	NA
Institutional (Educational)	29	98	NA	102	522
Commercial	172	66	89	76	33
Residential	200	295	533	223	274
Public Facilities/Recreation	457	656	133	828	816
Agriculture	NA	NA	89	NA	196
Total	2,886	3,304	3,528	2,930	2,194

Note: Numbers represent reuse-related demand.
NA = Not applicable.
P.A. = Proposed Action.
Alt. 1 = Castle Aviation Center.
Alt. 2 = Commercial Aviation.
Alt. 3 = Aviation with Mixed Use.
Alt. 4 = Non-Aviation.

Table N-11. Hazardous Material Usage by Land Use Category, Castle AFB Reuse
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Land Use Category	Proposed Action	Castle Aviation Center Alternative
Airfield	Aviation fuels, POL, hydraulic fluids, heating oils	Aviation fuels, POL, heating oils, hydraulic fluids
Aviation Support	Fuels, solvents, paints, POL, hydraulic fluids, degreasers, corrosives, heavy metals, reactives, thinners, paints, glycols, ignitibles, heating oils, cyanides, pesticides	Fuels, solvents, paints, POL, hydraulic fluids, degreasers, corrosives, heavy metals, reactives, thinners, paints, glycols, ignitibles, heating oils, cyanides, pesticides, plating chemicals
Industrial	Solvents, heavy metals, POL, corrosives, catalysts, aerosols, fuels, heating oils, ignitibles, pesticides	Solvents, heavy metals, fuels, POL, corrosives, catalysts, aerosols, fuels, heating oils, ignitibles, pesticides
Institutional (Medical)	Pharmaceuticals, radiological sources, heavy metals, pesticides, household chemicals	Pharmaceuticals, radiological sources, heavy metals
Institutional (Educational)	Fuels, POL, corrosives, ignitibles, solvents, heating oils, cleaners, pesticides, paints, thinners, household chemicals	Fuels, POL, corrosives, ignitibles, solvents, heating oils, cleaners, pesticides, paints, thinners, household chemicals
Commercial	Fuels, solvents, corrosives, POL, ignitibles, heating oils, pesticides, cleaners, aerosols, paints, thinners, household chemicals, pesticides	Fuels, POL, solvents, corrosives, heating oils, pesticides, cleaners, aerosols, paints, thinners, ignitibles
Residential	Pesticides, fertilizers, fuels, oils, chlorine, household chemicals	Pesticides, fertilizers, fuels, oils, chlorine, household chemicals
Public Facilities/Recreation	Pesticides, fertilizers, chlorine, heating oils, paints, thinners, cleaners, solvents, aerosols, POL, fuels	Pesticides, fertilizers, chlorine, heating oils, paints, thinners, cleaners, solvents, aerosols, POL, fuels
Agriculture	Fertilizers, fuels, pesticides, POL	Fertilizers, fuels, pesticides, POL

Note: Quantities of hazardous materials used will depend on specific development and are not reported here.
POL = Petroleum, oil, and lubricants.

Table N-11. Hazardous Material Usage by Land Use Category, Castle AFB Reuse
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Land Use Category	Commercial Aviation Alternative	Aviation with Mixed Use Alternative
Airfield	Aviation fuels, POL, hydraulic fluids, heating oils	Aviation fuels, POL, heating oils, hydraulic fluids
Aviation Support	Fuels, solvents, paints, POL, hydraulic fluids, degreasers, corrosives, heavy metals, reactives, thinners, paints, glycols, ignitibles, heating oils, cyanides, pesticides, plating chemicals	Fuels, solvents, paints, POL, hydraulic fluids, degreasers, corrosives, heavy metals, reactives, thinners, paints, glycols, ignitibles, heating oils, cyanides, pesticides
Industrial	Solvents, heavy metals, POL, corrosives, aerosols, fuels, heating oils, ignitibles, pesticides	Solvents, heavy metals, POL, corrosives, catalysts, aerosols, fuels, heating oils, ignitibles, pesticides
Institutional (Medical)	Pharmaceuticals, radiological sources, heavy metals, pesticides, household chemicals	Pharmaceuticals, radiological sources, heavy metals, pesticides
Institutional (Educational)	NA	Fuels, POL, corrosives, ignitibles, solvents, heating oils, cleaners, pesticides, paints, thinners, household chemicals
Commercial	Fuels, solvents, corrosives, POL, ignitibles, heating oils, pesticides, cleaners, aerosols, paints, thinners, household chemicals, pesticides	Heating oils, pesticides, fertilizers, fuels, oils, chlorine, household chemicals
Residential	Pesticides, fertilizers, fuels, oils, chlorine, household chemicals	Pesticides, fertilizers, chlorine, heating oils, paints, thinners, cleaners, solvents, aerosols, POL, fuels
Public Facilities/Recreation	Pesticides, fertilizers, chlorine, heating oils, paints, thinners, cleaners, solvents, aerosols, POL, fuels	Pesticides, fertilizers, fuels, POL
Agriculture	Pesticides, fertilizers, fuels, POL	Pesticides, fertilizers, fuels, POL

Note: Quantities of hazardous materials used will depend on specific development and are not reported here.
NA = Not applicable.
POL = Petroleum, oil, and lubricants.

Table N-11. Hazardous Material Usage by Land Use Category, Castle AFB Reuse
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Land Use Category	Non-Aviation Alternative
Airfield	NA
Aviation Support	NA
Industrial	Solvents, heavy metals, fuels, POL, corrosives, catalysts, aerosols, fuels, heating oils, ignitibles, pesticides
Institutional (Medical)	NA
Institutional (Educational)	Fuels, corrosives, ignitibles, solvents, heating oils, POL, cleaners, pesticides, paints, thinners, household products
Commercial	Fuels, solvents, corrosives, POL, ignitibles, heating oils, pesticides, paints, thinners, cleaners, aerosols,
Residential	Pesticides, fertilizers, fuels, oils, chlorine, household chemicals
Public Facilities/Recreation	Pesticides, fertilizers, chlorine, heating oils, paints, thinners, cleaners, solvents, aerosols, POL
Agriculture	Pesticides, fertilizers, fuels, POL

Note: Quantities of hazardous materials used will depend on specific development and are not reported here.
NA = Not applicable.
POL = Petroleum, oil, and lubricants.

Table N-12. Number of Installation Restoration Program (IRP) Sites by Land Use Category, Castle AFB Reuse

Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	6	6	6	6	NA
Aviation Support	20	4	10	12	NA
Industrial	4	18	9	10	12
Institutional (Medical)	2	2	4	2	NA
Institutional (Educational)	2	1	NA	3	16
Commercial	4	3	8	5	1
Residential	1	4	7	1	7
Public Facilities/Recreation	9	7	1	8	6
Agriculture	NA	NA	NA	NA	NA

Note: Summarized above are identified IRP sites as of 1992. The number of sites over the 1992-2015 period would change as remediation measure are implemented for individual sites. IRP sites may overlap land use categories and, therefore, may be counted more than one time.
NA = Not applicable.
P.A. = Proposed Action.
Alt. 1 = Castle Aviation Center.
Alt. 2 = Commercial Aviation.
Alt. 3 = Aviation with Mixed Use.
Alt. 4 = Non-Aviation.

Table N-13. Soils and Geology Impacts by Land Use Category, Castle AFB Reuse, 1995-2015 (acres of ground disturbance)

Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	0	0	0	0	0
Aviation Support	71	8	50	59	0
Industrial	260	64	138	76	168
Institutional (Medical)	0	0	17	0	0
Institutional (Educational)	6	0	NA	32	194
Commercial	34	0	23	28	37
Residential	48	18	178	48	77
Public Facilities/Recreation	31	56	13	117	25
Agriculture	NA	NA	50	0	142
Total	450	146	469	360	644

NA = Not applicable.
P.A. = Proposed Action.
Alt. 1 = Castle Aviation Center.
Alt. 2 = Commercial Aviation.
Alt. 3 = Aviation with Mixed Use.
Alt. 4 = Non-Aviation.

Table N-14. Expected Noise Levels by Land Use Category, Castle AFB Reuse (acres within CNEL 60 dB or greater)

Land Use Category	Proposed Action	Castle Aviation Center	Commercial Aviation	Aviation with Mixed Use	Non-Aviation
Airfield	965.7	613.0	991.0	494.0	NA
Aviation Support	146.7	73.4	169.1	104.2	NA
Industrial	104.9	10.8	322.6	0.6	NA
Institutional (Medical)	0.0	0.0	1.1	0.0	NA
Institutional (Educational)	1.3	0.5	NA	7.8	NA
Commercial	0.0	0.0	0.0	0.0	NA
Residential	0.0	6.1	0.0	0.0	NA
Public Facilities/Recreation	46.6	20.3	0.0	0.3	NA
Agriculture	0.0	0.0	53.8	0.0	NA
Total	1,265.2	724.1	1,537.6	606.9	NA

NA = Not applicable.
CNEL = Community Noise Equivalent Level.
dB = Decibel.

Table N-15. Biological Resource Impacts, Castle AFB Reuse (acres of habitat within each land use)

Land Use	Proposed Action	Castle Aviation Center	Commercial Aviation	Aviation with Mixed Use	Non-Aviation
Fairy Shrimp Habitat within Each Alternative					
Airfield	1.1	1.1	0.6	1.1	0.6
Aviation Support	0.0	0.0	0.0	0.0	0.0
Industrial	19.9	3.0	45.4	0.0	0.0
Institutional Medical	0.0	0.0	0.0	0.0	0.0
Institutional Educational	0.0	0.0	0.0	0.0	0.0
Commercial	0.0	0.0	0.0	0.0	0.0
Residential	0.0	0.0	0.0	0.0	0.0
Public Facilities/Recreational	25.5	42.4	0.0	45.4	45.4
Agricultural	0.0	0.0	0.5	0.0	0.5
Total	46.5	46.5	46.5	46.5	46.5
Wetlands within Each Alternative					
Airfield	0.5	0.5	0.3	0.5	0.0
Aviation Support	0.0	0.0	0.0	0.0	0.0
Industrial	5.5	2.9	21.4	0.0	0.3
Institutional Medical	0.0	0.0	0.0	0.0	0.0
Institutional Educational	0.0	0.0	0.0	0.0	0.0
Commercial	0.0	0.0	0.0	0.0	0.0
Residential	0.0	0.0	0.0	0.0	0.0
Public Facilities/Recreational	15.9	18.5	0.0	21.4	21.1
Agricultural	0.0	0.0	0.2	0.0	0.5
Total	21.9	21.9	21.9	21.9	21.9

Table N-16. Cultural Resource by Land Use Category, Castle AFB Reuse (number of sites)

Land Use Category	P.A.	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Airfield	3	3	3[a]	3	NA
Aviation Support	0	0	0	0	NA
Industrial	0	0	0	0	1
Institutional (Medical)	0	0	0	0	NA
Institutional (Educational)	0	0	NA	0	0
Commercial	0	0	0	0	0
Residential	0	0	0	0	0
Public Facilities/Recreation	0	0	0	0	0
Agriculture	NA	NA	2[a]	NA	2

Note: (a) Portions of two sites would be found in both airfield and agricultural land uses.

NA = Not applicable.
P.A. = Proposed Action.
Alt. 1 = Castle Aviation Center.
Alt. 2 = Commercial Aviation.
Alt. 3 = Aviation with Mixed Use.
Alt. 4 = Non-Aviation.