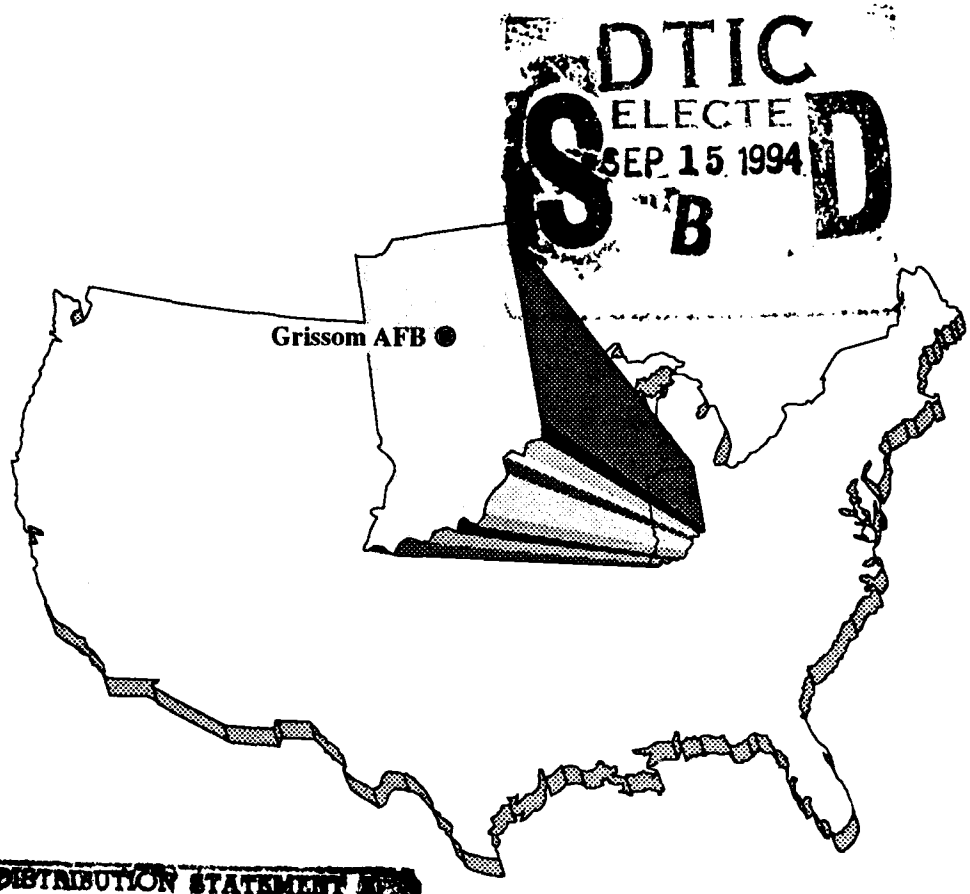
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FINAL
ENVIRONMENTAL IMPACT STATEMENT
September 1994

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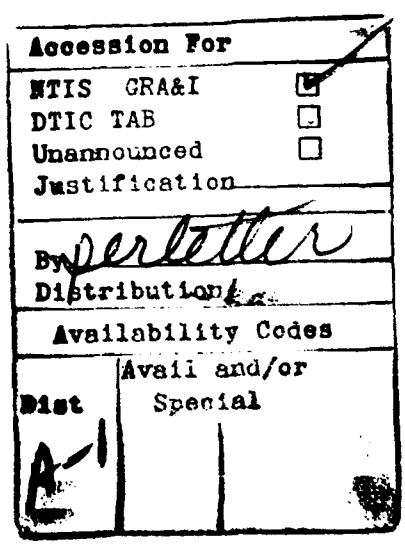
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FINAL

ENVIRONMENTAL IMPACT STATEMENT

DISPOSAL AND REUSE OF PORTIONS OF GRISSOM AIR FORCE BASE, INDIANA

SEPTEMBER 1994



DTIC QUALITY INSPECTED 3

COVER SHEET

FINAL ENVIRONMENTAL IMPACT STATEMENT
DISPOSAL AND REUSE OF PORTIONS OF GRISSOM AIR FORCE BASE, INDIANA

a. Lead Agency: U.S. Air Force

b. Proposed Action: Disposal and Reuse of Portions of Grissom Air Force Base (AFB), Miami and Cass counties, Indiana.

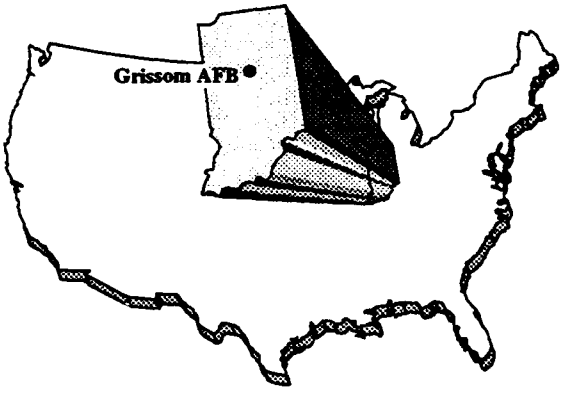
c. Inquiries on this document should be directed to: Chief of Environmental Planning Division, AFCEE-EC, 8106 Chennault Road, Building 1155, Brooks AFB, Texas, 78235-5318, (210) 536-3907.

d. Designation: Final Environmental Impact Statement.

e. Abstract: Pursuant to the Base Closure and Realignment Act of 1990, Grissom AFB is scheduled for realignment in September 1994. This Environmental Impact Statement 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 and hazardous waste management, soils and geology, water resources, air quality, noise, biological resources, and cultural resources. Two reuse alternatives were examined: a Proposed Action that includes industrial and commercial development, and a Joint Use Aviation Alternative that features a civilian aircraft component along with commercial and industrial development. All alternatives include a retained military cantonment to be used by the Air Force Reserve 434th Air Refueling Wing. A No-Action Alternative, which would entail no reuse of base property outside of the military cantonment, was also evaluated.

Potential environmental impacts are increased traffic-related noise levels, traffic, and emissions of air pollutants over realignment baseline conditions. Roadway improvements may be needed to prevent unacceptable traffic congestion. Increased air pollutant emissions would not affect the region's attainment status. Redevelopment activities could alter drainage patterns and increase erosion, which could be mitigated through proper engineering designs. Wetland areas could be lost due to implementation of the reuse alternatives. If avoidance of impacts is not viable, mitigation in the form of replacement, restoration, or enhancement is possible. Cultural resources could be impacted by conveyance of the property to a nonfederal entity. Preservation covenants within disposal documents could eliminate or reduce these effects to a non-adverse level. Impacts from the Joint Use Aviation Alternative would be similar to those for the Proposed Action. There would be no adverse effects from the No-Action Alternative. Because the Air Force is disposing of property, some of the mitigation measures are beyond the control of the Air Force. Remediation of hazardous waste sites is and will continue to be the responsibility of the Air Force.

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SUMMARY

SUMMARY

PURPOSE OF AND NEED FOR ACTION

Grissom Air Force Base (AFB), Indiana, was one of the bases recommended by the 1991 Defense Base Closure and Realignment Commission for realignment. The Commission's recommendations were accepted by the President and submitted to Congress on July 12, 1991. Since 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. Grissom AFB is scheduled to be realigned in September 1994 with the Air Force Reserve (AFRES) 434th Air Refueling Wing (ARW) and the U.S. Army Reserves retained within a military cantonment. Within this document, the 434th ARW includes operations of both the U.S. Army Reserves and the 434th ARW.

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 to be excessed. This environmental impact statement (EIS) has been prepared to provide information on the potential environmental impacts resulting from disposal and proposed reuse of this base property. DBCRA exempts from NEPA consideration all decisions to close, realign, or transfer military functions and installations. Therefore, the decision to realign the portion of the base retaining the existing reserve units is exempt from NEPA, and its environmental consequences are only studied as they relate to cumulative impacts associated with reuse. Two alternative reuse concepts are studied to identify the range of potential direct and indirect environmental consequences of disposal and reuse of the property to be excessed.

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

Grissom AFB is composed of 2,722 acres of federal government fee-owned property. Up to 1,270 acres will be available for disposal for civilian reuse, and at least 1,452 acres will be retained by the AFRES 434th ARW as a military cantonment. Within this military cantonment, the existing U.S. Army Reserves would continue to operate in Building 639. The land uses

within the current base boundary include airfield, aviation support, industrial, institutional (medical and educational), commercial, residential, public/recreation, and vacant (open space) areas.

For the purpose of evaluating potential environmental impacts resulting from the reuse of this land, the Proposed Action is based on the community's reuse plan, presented by the Grissom Redevelopment Authority (formerly the Grissom Community Redevelopment Authority). The Proposed Action is a comprehensive plan for redevelopment of those portions of the base that will become excess for industrial, institutional (educational), commercial, and public/recreation uses. Under the Proposed Action, only the military would use the airfield. The existing housing area, golf course, weapons storage area (WSA), and parts of the aircraft parking apron would be redeveloped for industrial uses. An educational area would be developed east of the military cantonment with commercial areas being developed south of base housing and along the southern and eastern boundaries of the base with frontage on U.S. Highway (U.S.) 31. The existing indoor swimming pool, gymnasium, and bowling center, along with the Grissom AFB Heritage Museum, would be utilized for public/recreation uses.

The following alternatives to the Proposed Action are being considered:

- **Joint Use Aviation Alternative.** This alternative includes a civilian aviation component including general aviation, airline flight training, air cargo, and an aviation school. Under this alternative, the airfield could be operated by the military with a joint use agreement to allow for civilian aviation, or it could be operated with the 434th ARW as a tenant. This alternative assumes that the existing Peru Municipal Airport would be closed and all operations would be relocated to Grissom AFB. In addition, on the property to be excessed, a variety of non-aviation uses would be developed including industrial and commercial. The nine-hole golf course would be retained for public use and most of the housing units would be available for residential use.

- Under the **No-Action Alternative**, the 434th ARW would continue to operate the airfield and military cantonment. The airfield would also be used by other transient military aircraft. The remainder of the base property would remain under caretaker status with no civilian reuse in the long term.

Other Land Use Concepts. One other land use concept has been identified as being a possible component of the Proposed Action, Joint Use Aviation Alternative, or No-Action Alternative under consideration. The state of Indiana is proposing to establish a Public Safety Training Institute to provide for safety and emergency training for both private and public agencies.

SCOPE OF STUDY

The Notice of Intent to prepare an EIS for the disposal and reuse of (portions of) Grissom AFB was published in the Federal Register on October 9, 1991. Issues related to the disposal and reuse of excessed property at Grissom AFB were identified during an ensuing scoping period. A public scoping meeting was held on November 13, 1991, at the Maconaquah High School Auditorium, Bunker Hill, Indiana. The comments and concerns expressed at this 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. 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 utility services are discussed as reuse-related influencing factors. Issues related to current and future management of hazardous materials and hazardous 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 realignment in 1994. Although the baseline assumes a realigned base with a military cantonment associated with the 434th ARW, a reference to prerealignment conditions is provided in several sections (e.g., air quality, 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 disposal and reuse of the properties to be excessed at Grissom AFB, in understanding potential long-term trends in comparison to historic conditions when the installation was completely active.

The Air Force has also prepared a separate Socioeconomic Impact Analysis Study (SIAS) on the economic impacts expected in the region as a result of the realignment, and various alternatives for disposal and reuse of portions of Grissom AFB. That document, although not required by NEPA, will assist the local community in planning for the transition of the available parcels 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 portions of the installation and portrays potential land uses to cover reasonable future uses of the property and facilities by others. Two alternative scenarios, including the community's proposed plan, were used to group reasonable land uses and to examine the environmental effects of likely reuse.

Environmental impacts of the Proposed Action and reasonable alternative are briefly described below. Reuse-related factors include projections of the reuse activities that would likely affect 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 are summarized over a 10-year period due to the speculative nature of projecting pollution concentrations far in the future. Table S-2 includes a summary of realignment baseline conditions to provide a basis for comparison of reuse-related changes and associated impacts.

Table S-1. Summary of Reuse-Related Factors Compared to No-Action Alternative

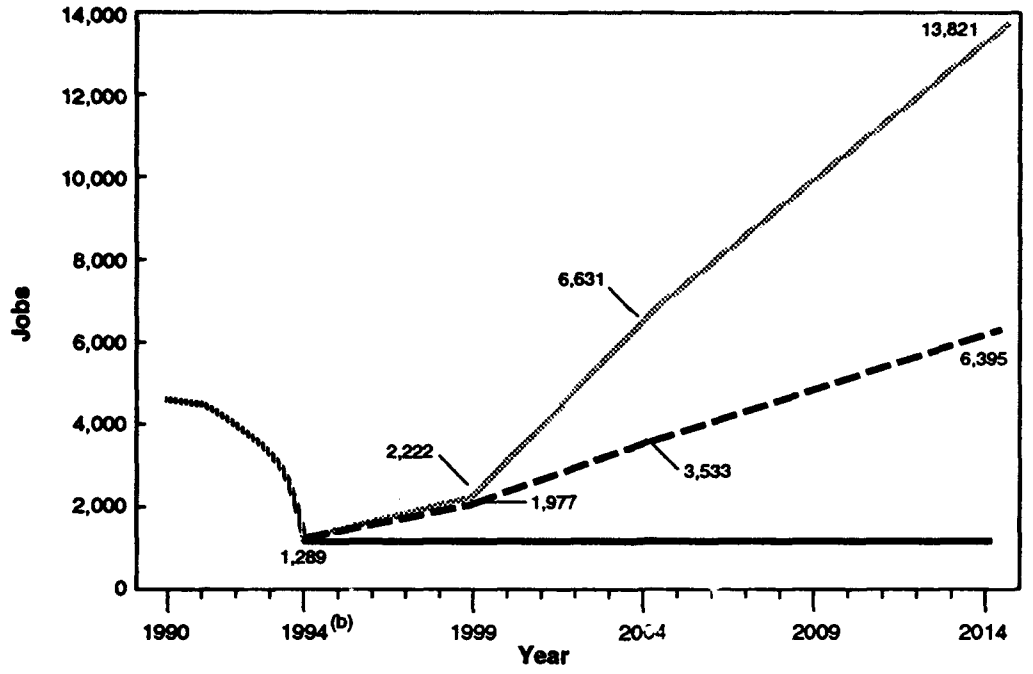
	Proposed Action			Joint Use Aviation Alternative		
Factor	1999	2004	2014	1999	2004	2014
Ground Disturbance (acres, by phase)	36	208	366	64	34	68
Direct Employment	633	3,098	6,991	454	1,622	3,709
Secondary Employment	300	2,244	5,541	234	622	1,397
Population Increase	908	5,462	13,729	760	2,745	6,817
Traffic (average daily vehicular traffic)	8,300	28,900	55,900	2,850	13,200	29,800
Aircraft Operations (annual)						
Civilian	0	0	0	24,620	28,910	38,520
Military[a]	16,100	16,100	16,100	16,100	16,100	16,100
Total	16,100	16,100	16,100	40,720	44,810	54,620
Water Consumption (MGD)	0.05	0.3	0.74	0.04	0.15	0.38
Wastewater Treatment (MGD)	0.04	0.24	0.57	0.03	0.12	0.29
Solid Waste Disposal (tons/day)	1.2	6.6	19.1	0.9	3.2	7.6
Electrical Consumption (MWH/day)	12.9	78.2	231.1	10.5	37.6	91.9
Natural Gas Consumption (therms/day)	0.9	7.7	20.2	0.7	2.6	6.3

Notes: Values shown represent increases over the projected No-Action Alternative/realignment conditions in each year as a result of implementing that alternative except for military aircraft operations.

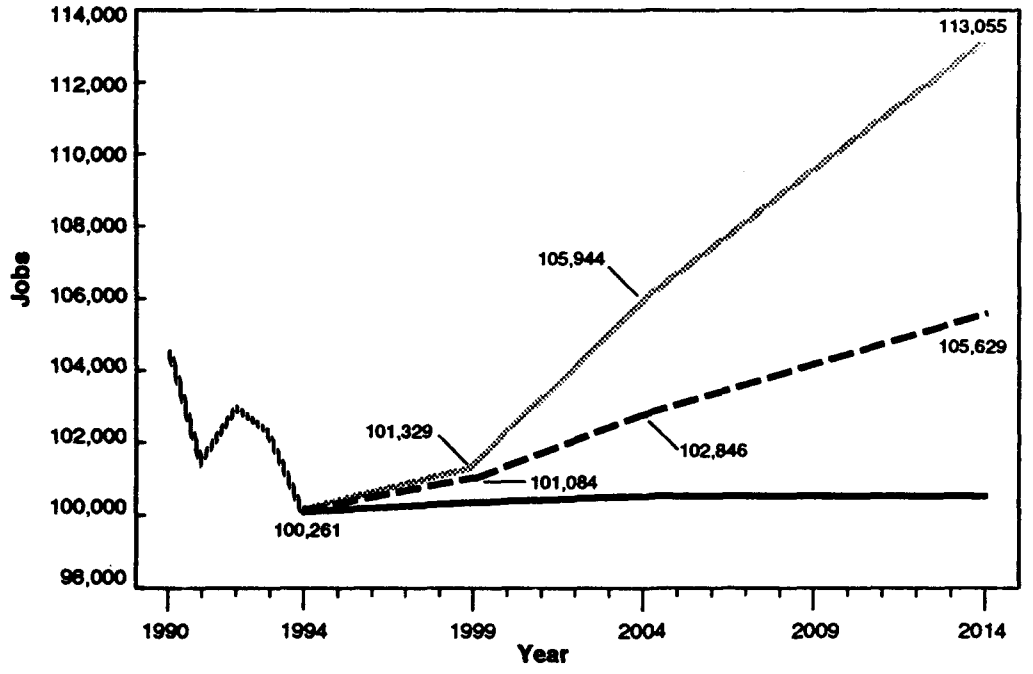
(a) Aircraft operations associated with the 434th ARW and military transients are the same as realignment conditions and are not part of the proposed reuses.

MGD = million gallons per day.

MWH = megawatt-hours.



Total Employment On-Base (a)



Total ROI Employment Including Reuse-Related Effects

EXPLANATION

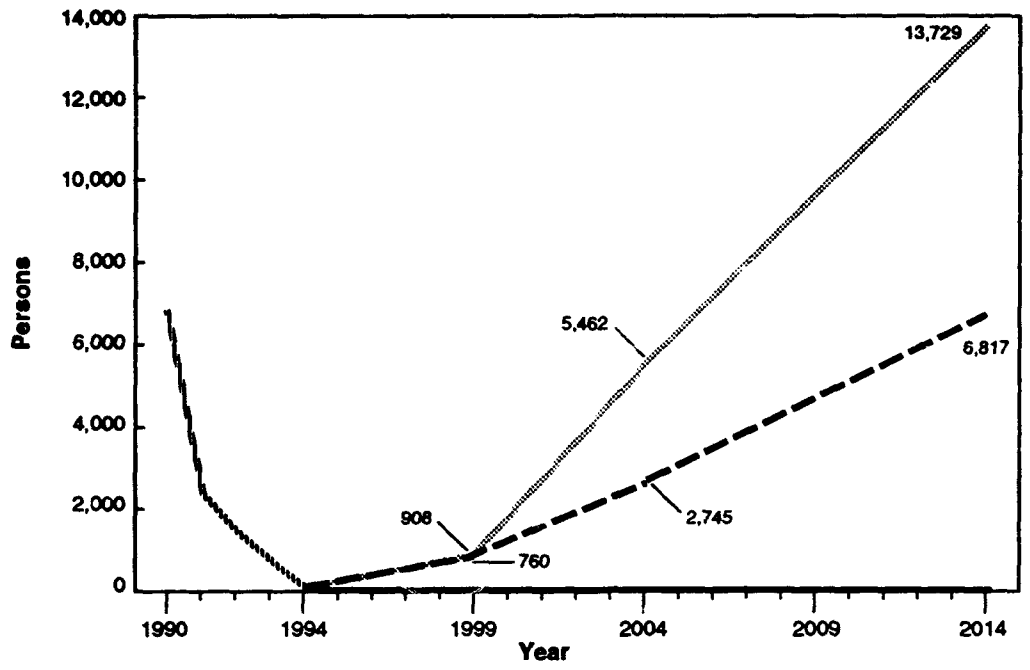
- Prerealignment
- Proposed Action
- Joint Use Aviation Alternative
- No-Action Alternative

Reuse-Related Employment Effects

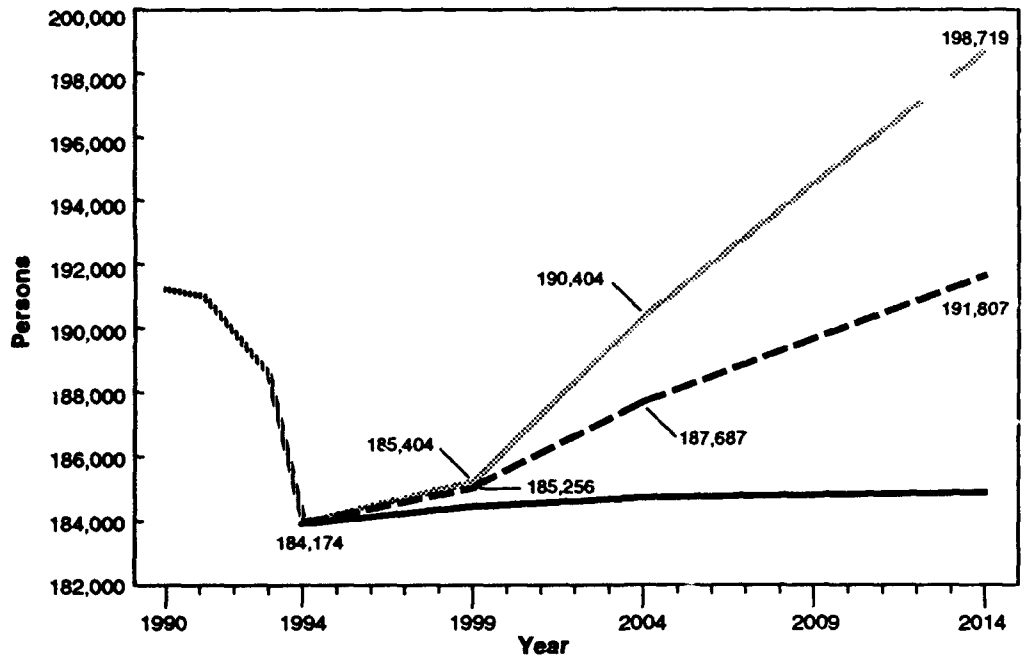
(a) Total employment includes both the existing military cantonment personnel and reuse-related effects of on-base development. Employment effects include both direct and secondary employment.

(b) The 1994 values represent total base-related employment under the realignment baseline.

Figure S-1



ROI Reuse-Related Population Effects



Total ROI Population Including Reuse

EXPLANATION

- Prerealignment
- Proposed Action
- Joint Use Aviation Alternative
- No-Action Alternative

Reuse-Related Population Effects

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

Figure S-2

Table S-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 1 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Local Community				
• Land Use and Aesthetics	Conditions: Continued activities within retained military cantonment and airfield. Other portions of the base property placed under caretaker status	• Impacts: Civilian redevelopment of 1,270 acres. Proposed reuses would not have land use controls. Visual quality could be impacted by proposed development activities • Mitigations: Modification of local community/county general plans; amendments to zoning ordinances to reflect redevelopment plans Use of landscape screening	• Impacts: Civilian redevelopment of 1,270 acres. Proposed reuses would not have land use controls. Impacts to visual quality would be less than the Proposed Action • Mitigations: Modification of local community/county general plans; amendments to zoning ordinances to reflect redevelopment plans Use of landscape screening	• Impacts: No change in on-base land use. Vacant land could enhance visual quality in the long term
• Transportation	Conditions Surface: 2,950 daily trips. Access limited to Main Gate and West Gate	• Impacts: Increase of 55,900 daily vehicular trips. Four new base-access points provided. Reuse-generated traffic would decrease LOS to F on Old U.S. 31 • Mitigations: Road improvements could raise LOS to meet transportation planning criteria	• Impacts: Increase of 29,800 daily vehicular trips. Four new base-access points provided. Roadway segments would maintain acceptable LOS	• Impacts: No changes in base-related traffic
	Conditions Airspace: 16,100 annual military aircraft operations associated with 434th ARW	• Impacts: No change in aircraft operations from realignment baseline. No airspace conflicts or air transportation impacts	• Impacts: Increase of 38,520 annual civilian aircraft operations over realignment baseline. No airspace conflicts or air transportation impacts	• Impacts: No changes in base-related aircraft operations

Note: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
ARW = Air Refueling Wing.
LOS = level of service.
U.S. # = U.S. Highway.

Table S-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 2 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Local Community (Continued)				
• Utilities Use	Conditions: Water: 0.22 MGD Wastewater: 0.30 MGD Solid Waste: 3.0 tons/day Electricity: 35 MWH/day Natural Gas: 1,900 therms/day	• Impacts: Up to 77 percent increase in ROI utility use. Current systems able to accommodate these increased demands. Interconnection of utility systems required to provide service to on-base users. Pretreatment of industrial wastewater may be required. Potential for the Grissom AFB wastewater treatment plant to operate below minimum biological oxygen demand loading requirements • Mitigations: Modify wastewater treatment plant as required to ensure wastewater treatment is in accordance with applicable permit requirements. Recycle solid waste to reduce levels to landfills	• Impacts: Up to 30.6 percent increase in ROI utility use. Current systems able to accommodate these increased demands. Interconnection of utility systems required to provide service to on-base users. Pretreatment of industrial wastewater may be required. Potential for Grissom AFB wastewater treatment plant to operate below minimum biological oxygen demand loading requirements • Mitigations: Modify wastewater treatment plant as required to ensure wastewater treatment is in accordance with applicable permit requirements. Recycle solid waste to reduce levels to landfills	• Impacts: No changes in base-related utility use. Potential for the Grissom AFB wastewater treatment plant to operate below minimum biological oxygen demand loading requirements • Mitigations: Modify wastewater treatment plant as required to ensure wastewater treatment is in accordance with applicable permit requirements. Recycle solid waste to reduce levels to landfills
Hazardous Materials and Hazardous Waste Management				
• Hazardous Materials Management	Conditions: Materials used for retained military activities and caretaker activities will be managed in compliance with applicable regulations	• Impacts: Similar types and an increase in quantities of materials used. Compliance with applicable regulations would preclude unacceptable impacts • Mitigations: Establish cooperative planning body	• Impacts: Similar types and an increase in quantities of materials used. Compliance with applicable regulations would preclude unacceptable impacts • Mitigations: Establish cooperative planning body	• Impacts: No change in types and quantities used

Note: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
MGD = million gallons per day.
MWH = megawatt-hours.
ROI = Region of Influence.

Table S-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 3 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)				
• Hazardous Waste Management	Conditions: Wastes generated by retained military activities and caretaker activities will be managed in accordance with applicable regulations. POI/PAC investigations and potential remediation activities will proceed until complete regardless of base realignment and reuse	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts. Possible redevelopment delays and land use restrictions due to remediation of POI/PAC sites • Mitigations: Educational programs on recycling, waste minimization, and waste disposal	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts. Possible redevelopment delays and land use restrictions due to remediation of POI/PAC sites • Mitigations: Collection of hazardous household products; educational programs on recycling, waste minimization, and waste disposal	• Impacts: No change in quantities of wastes generated. POI/PAC investigations and potential remediation activities completed or continued as needed
• Installation Restoration Program	Conditions: IRP activities will proceed until complete regardless of base realignment and reuse. IRP remediation activities will continue in accordance with applicable regulations	• Impacts: Possible redevelopment delays and land use restrictions due to remediation • Mitigations: Coordination between OL, 434th ARW, and planning agencies to address potential problems	• Impacts: Possible redevelopment delays and land use restrictions due to remediation • Mitigations: Coordination between OL, 434th ARW, and planning agencies to address potential problems	• Impacts: IRP remediation activities completed or continued as needed. Possible short-term impacts to military activities

Note: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
ARW = Air Refueling Wing.
IRP = Installation Restoration Program.
OL = Operating Location.
PAC = Potential Areas of Concern.
POI = Points of Interest.

Table S-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 4 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)				
• Storage Tanks	Conditions: Storage tanks used by retained military activities will be managed in accordance with applicable regulations. Unused tanks will be removed or maintained in place in accordance with applicable regulations	• Impacts: Storage tanks required by new owners/operators would be subject to all regulations to avoid unacceptable impacts • Mitigations: Appropriate precautions to avoid damage to remaining USTs and piping systems during construction	• Impacts: Storage tanks required by new owners/operators would be subject to all regulations to avoid unacceptable impacts • Mitigations: Appropriate precautions to avoid damage to remaining USTs and piping systems during construction	• Impacts: Storage tanks would be removed or maintained in place according to applicable regulations
• Asbestos	Conditions: Asbestos posing a health risk will be removed. Remaining asbestos will be managed in accordance with Air Force policy	• Impacts: Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos would be managed in accordance with applicable regulations to minimize potential risk to human health or the environment • Mitigations: Coordination of asbestos removal or management during renovation and demolition activities	• Impacts: Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos would be managed in accordance with applicable regulations to minimize potential risk to human health or the environment • Mitigations: Coordination of asbestos removal or management during renovation and demolition activities	• Impacts: Continued management of asbestos in accordance with Air Force policy

Note: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
UST = underground storage tank.

Table S-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 5 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)				
• Pesticide Usage	Conditions: Pesticides used by retained military activities and caretaker activities will be managed in compliance with applicable standards	• Impacts: Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptable impacts	• Impacts: Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptable impacts	• Impacts: No change in usage or management practices
• Polychlorinated Biphenyls (PCBs)	Conditions: All federally regulated PCBs have been removed and properly disposed of	• Impacts: All federally regulated PCBs have been removed	• Impacts: All federally regulated PCBs have been removed	• Impacts: All federally regulated PCBs have been removed
• Radon	Conditions: Affected facilities occupied within the military cantonment would be managed and/or remediated in accordance with Air Force Policy	• Impacts: All facilities surveyed that registered elevated radon levels above 4 pCi/l are proposed for demolition under this proposal • Mitigations: Structure modification and management practices	• Impacts: Potential exposure to levels greater than the standard 4 pCi/l • Mitigations: Structure modification and management practices	• Impacts: Affected facilities occupied within the military cantonment would be managed and/or remediated in accordance with Air Force Policy

Note: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
FIFRA = Federal Insecticide, Fungicide, and Rodenticide Act.
PCB = polychlorinated biphenyl.
pCi/l = picocuries per liter.

Table S-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 6 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)				
• Medical/ Biohazardous Waste	Conditions: Existing wastes removed prior to realignment; continued small amounts generated by 434th ARW activities would be managed in accordance with applicable regulations	• Impacts: None generated under proposed reuses. Continued small amounts generated by 434th ARW activities would be managed in accordance with applicable regulations	• Impacts: None generated under proposed reuses. Continued small amounts generated by 434th ARW activities would be managed in accordance with applicable regulations	• Impacts: Continued small amounts generated by 434th ARW activities would be managed in accordance with applicable regulations
• Ordnance	Conditions: Ordnance stored will be managed in accordance with applicable regulations	• Impacts: Reuse of outdoor small arms firing range. Continued use and maintenance for retained military activities	• Impacts: None used under proposed reuses. Continued use and maintenance for retained military activities	• Impacts: Continued use and maintenance for retained military activities
• Lead-Based Paint	Conditions: Lead-based paints may exist at all facilities constructed prior to or during 1978. Facilities within the military cantonment containing lead will be managed according to applicable regulations	• Impacts: Removal and disposal of lead-based paint in facilities to be demolished or renovated would be managed in accordance with applicable regulations	• Impacts: Removal and disposal of lead-based paint in facilities to be demolished or renovated would be managed in accordance with applicable regulations	• Impacts: Facilities outside of the military cantonment containing lead-based paint will be secured to minimize potential risk to human health or the environment. Facilities within the military cantonment containing lead will be managed according to applicable regulations
Natural Environment				
• Soils and Geology	Conditions: No ground disturbance	• Impacts: Minor erosion effects from 610 acres of ground disturbance	• Impacts: Minor erosion effects from 166 acres of ground disturbance	• Impacts: No ground disturbance

Note: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
ARW = Air Refueling Wing.

Table S-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 7 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Natural Environment (Continued)				
		• Mitigations: Use techniques, such as protective cover, limit the area disturbed and length of time slopes and barren ground are left exposed, and develop and implement a soil erosion plan in coordination with local Soil Conservation Service	• Mitigations: Use techniques, such as protective cover, limit the area disturbed and length of time slopes and barren ground are left exposed, and develop and implement a soil erosion plan in coordination with local Soil Conservation Service	
• Water Resources	Conditions: No ground disturbance. Adequate water supply for limited on-base demand	• Impacts: Surface water runoff from 610 acres of ground disturbance 34.6 percent increase in ROI water demand would not affect water supply	• Impacts: Surface water runoff from 166 acres of ground disturbance 17.8 percent increase in ROI water demand would not affect water supply	• Impacts: No ground disturbance. No change in water demand
		• Mitigations: Use of proper construction techniques, control of site runoff, minimizing of surface disturbance and length of exposure time. Additional oil/water separators or other wastewater treatment may be required to meet storm water and wastewater discharge NPDES permit requirements	• Mitigations: Use of proper construction techniques, control of site runoff, minimizing of surface disturbance and length of exposure time. Additional oil/water separators or other wastewater treatment may be required to meet storm water and wastewater discharge NPDES permit requirements	

Note: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
NPDES = National Pollutant Discharge Elimination System.
ROI = Region of Influence.

Table S-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 8 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Natural Environment (Continued)				
• Air Quality	Conditions: NO_x: 0.66 ton/day VOC: 3.33 tons/day PM_{10}: 0.51 ton/day SO_2: 0.14 ton/day CO: 4.78 tons/day Air pollutant emissions generated from retained military activities and caretaker activities	• Impacts: Increase in reuse-related emissions in 2004: NO_x: 1.43 tons/day VOC: 0.20 ton/day PM_{10}: 0.23 ton/day SO_2: 0.65 ton/day CO: 0.35 ton/day Increased air pollutant emissions during construction and operations would not affect the region's attainment status • Mitigations: Control of fugitive dust and combustion emissions from construction activities. Application of transportation planning and management measures to reduce motor vehicle pollution	• Impacts: Increase in reuse-related emissions in 2004: NO_x: 0.32 ton/day VOC: 0.08 ton/day PM_{10}: 0.02 ton/day SO_2: 0.00 ton/day CO: 0.76 ton/day Increased air pollutant emissions during construction and operations would not affect the region's attainment status • Mitigations: Control of fugitive dust and combustion emissions from construction activities. Application of transportation planning and management measures to reduce motor vehicle pollution	• Impacts: No change in base-related air emissions
• Noise	Conditions: 5,799 acres and 166 residents exposed to DNL 65 dB or greater due to continued military aircraft operations 231 residents exposed to DNL 65 dB or greater due to base-related surface traffic	• Impacts: No change in aircraft noise levels from realignment baseline. 142 additional residents exposed to DNL 65 dB or greater due to increased surface traffic	• Impacts: 11 additional acres and no additional residents exposed to DNL 65 dB or greater due to civilian aircraft operations in 2014. 80 additional residents exposed to DNL 65 dB or greater due to increased surface traffic	• Impacts: No change in base-related noise levels

Note: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
CO = carbon monoxide.
dB = decibel.
DNL = day-night average sound level.
NO_x = nitrogen oxide.
PM_{10} = particulate matter equal to or less than 10 microns in diameter.
SO_2 = sulfur dioxide.
VOC = volatile organic compound.

Table S-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
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Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Natural Environment (Continued)				
		• Mitigations: Barrier walls to mitigate surface traffic noise. Use of sound insulation, barriers, and buffer zones. Continue use of AICUZ program	• Mitigations: Barrier walls to mitigate surface traffic noise. Use of sound insulation, barriers, and buffer zones. Continue use of AICUZ program	
• Biological Resources	Conditions: No ground disturbance No federal- or state-threatened or endangered species on base Approximately 8.75 acres of wetlands	• Impacts: Potential impact to approximately 5 acres of wetlands	• Impacts: Potential impact to approximately 5 acres of wetlands	• Impacts: No ground disturbance. No change in base-related activities. Potential increase in habitat value due to long-term decrease in human activity
		• Mitigations: Wetlands mitigation could include avoidance through facility design, replacement, enhancement of wetland habitat, or control of construction-related erosion into nearby wetlands	• Mitigations: Wetlands mitigation could include avoidance through facility design, replacement, enhancement of wetland habitat, or control of construction-related erosion into nearby wetlands	

Note: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
AICUZ = Air Installation Compatible Use Zone.

Table S-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
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Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Natural Environment (Continued)				
• Cultural Resources	Conditions: No ground disturbance. One homestead site and fifteen facilities potentially eligible for listing in the NRHP	• Impacts: Potential adverse effects to the homestead site and 11 facilities potentially eligible for listing in the NRHP • Mitigations: Properties may be conveyed to non-federal owners with preservation covenants. SHPO and Advisory Council on Historic Preservation would be consulted during development and implementation of procedures and mitigation strategies. Prepare agreement document to establish acceptable mitigation measures	• Impacts: Potential adverse effects to the homestead site and 11 facilities potentially eligible for listing in the NRHP • Mitigations: Properties may be conveyed to non-federal owners with preservation covenants. SHPO and Advisory Council on Historic Preservation would be consulted during development and implementation of procedures and mitigation strategies. Prepare agreement document to establish acceptable mitigation measures	• Impacts: Adequate caretaker maintenance would preclude indirect impacts to the homestead site and facilities potentially eligible for listing in the NRHP

Note: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
NRHP = National Register of Historic Places.
SHPO = State Historic Preservation Officer.

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 for affected resource areas, where appropriate, are summarized along with the environmental impacts of the Proposed Action and alternatives in Table S-2. However, remediation of hazardous waste sites under the Installation Restoration Program (IRP) and other applicable regulatory programs is and will continue to be the responsibility of the Air Force.

PROPOSED ACTION

Local Community. Redevelopment of the excessed base property under the Proposed Action would result in an increase in employment and population in the Region of Influence (ROI) compared to the No-Action Alternative. The ROI consists of the Indiana counties of Cass, Howard, Miami, and Wabash. Most of the increases would affect the communities of Peru and Bunker Hill in Miami County, and Kokomo in Howard County. Reuse activities would increase employment levels by approximately 6,991 direct jobs and 5,541 secondary jobs by 2014, resulting in a total ROI employment of 113,055 by 2014. The Proposed Action would increase ROI population by 13,729 persons, or 7 percent over post-realignment conditions by 2014.

Noticeable changes to on-base land uses would occur due to civilian redevelopment. Proposed on-base land uses would generally be compatible with each other. Proposed civilian land uses would not have land use controls except for 17 acres within the jurisdiction of the town of Bunker Hill; the development policies within the local jurisdictions would likely be revised to reflect the changes in land use as a result of the Proposed Action. Use of the golf course and removal of mature landscaping in the housing area for industrial development could reduce visual quality; however, redevelopment could visually integrate the base into a community setting and appropriate planning could enhance the overall visual character.

The Proposed Action would incorporate four new entry points to improve access to the south and east sides of the base. Traffic associated with the Proposed Action on Old U.S. 31 east of U.S. 31 would degrade the level of service (LOS) to F by 2011. Implementation of roadway improvements could improve the LOS to meet transportation planning criteria. No airspace conflicts or air transportation impacts are expected under the Proposed Action.

Utility consumption associated with the Proposed Action would represent an increase to the ROI demand and could be accommodated by existing and future system capacities. However, the upgraded wastewater treatment plant (WWTP) at Grissom AFB, which has three new sequential batch reactors and will undergo repairs to the existing activated sludge plant, may require modification to operate efficiently at low flow rates. Effluent from the WWTP would be monitored and any necessary modification would be made to ensure conformance with regulatory requirements.

Hazardous Materials and Hazardous Waste Management. The quantities of hazardous materials and hazardous waste used and generated under the Proposed Action are expected to be greater than realignment conditions. The responsibility for managing hazardous materials and hazardous wastes would shift from a single user to multiple, independent users. This may reduce the capability of responding to hazardous materials and hazardous waste spills and would increase the regulatory burden. Remediation of Points of Interest (POI)/Potential Areas of Concern (PAC) hazardous waste sites would not be affected by reuse; however, site remediation, if required, could result in short-term land use restrictions or redevelopment delays.

Reuse activities are not expected to affect remediation under the IRP, which is proceeding according to Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) regulations. However, redevelopment of some properties may be delayed or land use restrictions may be required due to the extent and type of site contamination and current and future IRP remediation activities. Based on the results of IRP investigations, the Air Force may, where appropriate, place limits on land reuse through deed restrictions on conveyances and use restrictions on leases. Prior to property disposal, existing underground storage tanks (USTs) would be deactivated and removed. Unused aboveground storage tanks would be purged and assessed, and remedial action would be taken if necessary. Oil/water separators would be pumped, cleaned, and assessed, and remedial action would be taken if necessary. Appropriate precautions to avoid damage to storage tanks and distribution lines should be implemented during construction and operations. All polychlorinated biphenyl (PCB) equipment and PCB-contaminated equipment has been removed from the base. The grenade range, firing-in butt, expended munitions disposal area, and the indoor and outdoor small arms firing ranges will be surveyed and cleared, if necessary, of all ordnance prior to disposal of the properties. If prior activities deem it necessary, an environmental site characterization of the areas will follow. The indoor and outdoor small arms firing ranges will undergo an environmental site characterization. The outdoor small arms firing range would continue to be used as a firing range in accordance with applicable regulations.

Asbestos that poses a health risk will be addressed prior to property disposal. Proper management of asbestos remaining in existing buildings will minimize the potential risk to human health and the environment.

Demolition or renovation of structures with asbestos-containing material (ACM) would be subject to applicable regulations and National Emissions Standards for Hazardous Air Pollutants (NESHAP). Increased pesticide usage due to increased landscaped areas would be subject to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and state guidelines. Residential units are proposed for demolition under the Proposed Action and therefore would not be affected by radon levels that registered above 4 picocuries per liter. However, recipients of facilities with radon levels above recommended guidelines would be notified of this fact. Recipients of facilities constructed during or prior to 1978 would be notified that lead-based paint may exist on the premises.

Natural Environment. The Proposed Action would result in minor effects on soils and water resources from ground disturbance associated with facility construction, renovations, demolition, and infrastructure improvements. There is an abundant water supply from groundwater sources in the ROI.

Air pollutant emissions generated by the Proposed Action would be greater than those by the No-Action Alternative, but would still remain below prerealignment levels and below applicable standards.

Aircraft noise associated with the Proposed Action would be the same as realignment conditions. The number of people living in areas exposed to surface traffic noise levels of day-night average sound level (DNL) 65 decibels (dB) or greater would be 49 percent (142 people) greater than under the No-Action Alternative. Use of noise barriers and proper land use planning and landscape design could reduce the effects of surface traffic noise.

Effects to biological resources would be minimal under the Proposed Action. Development could result in an impact to a 0.25-acre wetland in the southeast section of the base, and approximately 4.75 acres of wetlands in the drainage ditches in the southern section of the base. Property disposal activities could affect properties that are potentially eligible for listing in the National Register of Historic Places (NRHP). However, preservation covenants could be placed in the transfer documents to reduce impacts associated with conveyance to a nonfederal entity to a non-adverse level.

JOINT USE AVIATION ALTERNATIVE

Local Community. Redevelopment of the excessed base property under this alternative would result in an increase in employment and population in the ROI compared to the No-Action Alternative. Reuse activities would increase employment levels by approximately 3,709 direct jobs and 1,397 secondary jobs by 2014, resulting in a total ROI employment of 105,629 by 2014. The Joint Use Aviation Alternative would increase ROI population by approximately 6,817 persons, or 4 percent over post-realignment conditions by 2014.

Noticeable changes to on-base land uses would occur due to civilian redevelopment. Proposed on-base land uses would generally be compatible with each other. Proposed civilian land uses would not have land use controls except for 17 acres within the jurisdiction of the town of Bunker Hill; the development policies within the local jurisdictions would likely be revised to reflect the changes in land use as a result of this alternative. Visual impacts associated with redevelopment would be less than the Proposed Action, and may improve over realignment conditions by using appropriate planning and design.

The Joint Use Aviation Alternative would incorporate four new entry points to improve access to the south and east sides of the base. Traffic on Old U.S. 31 east of U.S. 31 would degrade to LOS E by 2007 under this alternative. However, no other adverse effects to roadway transportation are expected. No airspace conflicts or air transportation impacts are expected under the Joint Use Aviation Alternative.

Utility consumption associated with the Joint Use Aviation Alternative would be less than the Proposed Action and could be accommodated by existing and future system capacities. The upgraded WWTP at Grissom AFB, which has three new sequential batch reactors and will undergo a repair of the existing activated sludge plant, may require modification to operate efficiently at low flow rates. Effluent from the WWTP would be monitored and any necessary modification made to ensure conformance with regulatory requirements.

Hazardous Materials and Hazardous Waste Management. The quantities of hazardous materials utilized and hazardous wastes generated would be greater than under realignment conditions or the Proposed Action because of civilian aviation reuses. The responsibility for managing hazardous materials and hazardous wastes would shift from a single user to multiple, independent users. This may reduce the capability of responding to hazardous materials and hazardous waste spills and would increase the regulatory burden. Remediation of POI/PAC hazardous waste sites would not be affected by reuse; however, site remediation, if required, could result in short-term land use restrictions or redevelopment delays.

Reuse activities are not expected to affect remediation under the IRP, which is proceeding according to CERCLA regulations. However, redevelopment of some properties may be delayed or land use restrictions may be required due to the extent and type of site contamination and current and future IRP remediation activities. Based on the results of IRP investigations, the Air Force may, where appropriate, place limits on land reuse through deed restrictions on conveyances and use restrictions on leases. Prior to property disposal, existing USTs would be deactivated and removed. Unused aboveground storage tanks would be purged and assessed, and remedial action would be taken if necessary. Oil/water separators would be pumped, cleaned, and assessed, and remedial action would be taken if necessary.

Appropriate precautions to avoid damage to storage tanks and distribution lines should be implemented during construction and operations. All PCB equipment and PCB-contaminated equipment has been removed from the base. The grenade range, firing-in butt, expended munitions disposal area, and the indoor and outdoor small arms firing ranges will be surveyed, and cleared, if necessary, of all ordnance prior to disposal of the properties. If prior activities deem it necessary, an environmental site characterization of the areas will follow. The indoor and outdoor small arms firing ranges will undergo an environmental site characterization.

Asbestos that poses a health risk will be addressed prior to property disposal. Proper management of asbestos remaining in existing buildings will minimize the potential risk to human health and the environment. Demolition or renovation of structures with ACM would be subject to applicable regulations and NESHAP. Increased pesticide usage due to increased landscaped areas would be subject to FIFRA and state guidelines. Recipients of facilities with radon levels above recommended guidelines would be notified of this fact. Recipients of facilities constructed during or prior to 1978 would be notified that lead-based paint may exist on the premises.

Natural Environment. The Joint Use Aviation Alternative would result in minor effects on soils and water resources from ground disturbance associated with facility construction, renovations, demolition, and infrastructure improvements. There is an abundant water supply from groundwater sources in the ROI.

Air pollutant emissions generated by this alternative would be greater than the No-Action Alternative, but would still remain below prerealignment levels and below applicable standards.

Aircraft noise associated with the Joint Use Aviation Alternative would be slightly greater than realignment conditions but less than prerealignment conditions. No additional residents would be exposed to aircraft noise levels of DNL 65 dB or greater when compared to realignment conditions. The number of people living in areas exposed to surface traffic noise levels of DNL 65 dB or greater would be 27 percent (80 people) greater than under the No-Action Alternative. Use of noise barriers and proper land use planning and landscape design could reduce the effects of surface traffic noise.

Effects to biological resources would be minimal under the Joint Use Aviation Alternative. Development could result in an impact to a 0.25-acre wetland in the southeast section of the base, and approximately 4.75 acres of wetlands in the drainage ditches in the southern section of the base. Property disposal activities could affect properties that are potentially eligible for listing in the NRHP. However, preservation covenants could be placed in

the transfer documents to reduce impacts associated with conveyance to a nonfederal entity to a non-adverse level.

NO-ACTION ALTERNATIVE

Local Community. The 434th ARW would continue to operate within the military cantonment and existing airfield. The remainder of the base would be placed under caretaker status. Approximately 978 direct and 311 secondary jobs would remain at the base at realignment and would remain unchanged throughout the 20-year analysis period. No effects on road, air, or railroad transportation are expected. No impacts to utilities are expected except for continued use of the WWTP, which would operate below minimum biological oxygen demand loading requirements. However, effluents would be monitored and plant modifications made as required to ensure conformance with regulatory requirements.

Hazardous Materials and Hazardous Waste Management. Similar types and quantities of hazardous materials and pesticides would be used to support military cantonment operations and maintenance activities as under realignment baseline conditions. The 434th ARW and the Air Force Base Conversion Agency Operating Location (OL) would be individually responsible for hazardous materials and waste management in accordance with applicable regulations. POI/PAC and IRP investigations and remediation would continue to be managed by the OL. Storage tanks would be removed or maintained in place according to required standards. ACM would be managed in accordance with Air Force policy to protect human health and the environment. Pesticide usage would continue to be managed in accordance with FIFRA and state guidelines. Radon would continue to accumulate in facilities placed in caretaker status. The small amounts of medical/biohazardous waste generated by the 434th ARW would be managed under applicable regulations. Facilities outside the military cantonment that were constructed prior to or during 1978 may contain lead-based paint and would be secured. Facilities within the military cantonment, which are suspected to contain lead-based paint, would be managed according to applicable regulations.

Natural Environment. Little to no ground disturbance or changes in operations would occur under this alternative; therefore, impacts to soils and geology, water resources, air quality, noise, biological resources, and cultural resources would be negligible relative to realignment conditions. Biological resources may be enhanced compared to prerealignment conditions due to the reduction in human activity on property outside the military cantonment. Adequate caretaker maintenance would preclude deterioration of any properties potentially eligible for listing in the NRHP.

OTHER LAND USE CONCEPTS

One other independent proposal for portions of Grissom AFB has been included as other land use concepts in the environmental analysis. This proposal is described briefly below, and the potential environmental impacts of implementing this use in combination with the reuse proposals are summarized in Table S-3.

State of Indiana Public Safety Training Institute. The state of Indiana is proposing to establish a Public Safety Training Institute to provide safety and emergency training for both private and public agencies. The proposal involves 120 acres and includes construction of a fire training facility and use of the obstacle/confidence course, outdoor small arms firing range, and administrative facilities. This proposal would involve 75 permanent full-time and part-time instructors and up to 500 trainees per week.

SUMMARY OF PUBLIC COMMENTS

The Draft EIS (DEIS) for disposal and reuse (portions of) of Grissom AFB was made available for public review and comment in July 1993. A public hearing was held in Bunker Hill, Indiana, on August 10, 1993, at which time the Air Force presented the findings of the DEIS. 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 Chapter 9 of this EIS. In addition, the text of the EIS itself has been revised, as appropriate, to reflect the concerns expressed in the public comments. The responses to the comments in Chapter 9 indicate the relevant sections of the EIS that have been revised.

SUMMARY OF CHANGES FROM THE DEIS TO THE FEIS

Based on more recent studies or comments from the public, the following sections of the EIS have been updated or revised:

- Sections 3.3.10 and 4.3.1.10, Ordnance, have been revised to clarify that soil testing of the grenade range and indoor and outdoor small arms firing ranges would be conducted prior to property disposal.

- Section 3.3.3, Installation Restoration Program Sites, has been revised to include the schedule for IRP activities at Grissom AFB and the results of additional investigations.

- Reference to Resource Conservation and Recovery Act sites in Sections 3.3.2, 3.4.1, 4.3.1.2, 4.3.2.2, 4.3.3.2, and 4.3.4 has been revised to be Grissom AFB POI/PAC sites. The number of sites has been revised to include the results of additional investigations.

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

Resource Category	State of Indiana Public Safety Training Institute
Local Community	
Land Use and Aesthetics	Potential conflict with adjacent land uses
Transportation	650 daily trips. Potential net increase in traffic volumes would not affect level of service
Utilities	Potential net increase in utility use would not exceed system capacities
Hazardous Materials and Hazardous Waste Management	
Hazardous Materials Management	Management in compliance with applicable regulations
Hazardous Waste Management	Management in compliance with applicable regulations. Potential redevelopment delays from Points of Interest/Potential Areas of Concern site investigations
Installation Restoration Program	No impact
Storage Tanks	No impact
Asbestos	May require management of asbestos-containing material in accordance with National Emissions Standards for Hazardous Air Pollutants
Pesticides Usage	Small quantities used
Polychlorinated Biphenyls	No impact
Radon	New owners to be advised of findings
Medical/Biohazardous Waste	None generated
Ordnance	No impact
Lead-Based Paint	May require management of lead-based paint in accordance with applicable regulations
Natural Environment	
Soils and Geology	8 acres of ground disturbance
Water Resources	No adverse impacts due to potential net increase in demand
Air Quality	No adverse impacts due to potential net increases in emissions
Noise	No impact
Biological Resources	No adverse impacts due to ground disturbance
Cultural Resources	Potential impact to sites eligible for listing in the National Register of Historic Places. Preservation covenants would reduce impacts to a non-adverse level

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

- Sections 3.4.6 and 4.4.6, Cultural Resources, have been revised to include the results of additional investigations conducted after publication of the DEIS.

- Section 2.3.3, Other Land Use Concepts, has been revised to account for changes in the military cantonment boundary that affected the State of Indiana Public Safety Training Institute independent land use proposal.

- The military cantonment boundary has been revised and no longer contains the existing WSA, outdoor small arms firing range, and utility plants (central heating plant, WWTP, and water treatment facility). The WSA and outdoor small arms firing range are now considered excess property and have been changed to industrial and commercial land uses under the Proposed Action and aviation support and commercial land uses under the Joint Use Aviation Alternative. A new WSA and outdoor small arms firing range are proposed to be built by the AFRES in the 136-acre parcel on the western portion of the base, which was vacant land use under the Proposed Action and agricultural land use under the Joint Use Aviation Alternative. The existing utility plants have been changed to industrial land use under the Proposed Action and public uses under the Joint Use Aviation Alternative. It is expected that these systems would be operated by a private purveyor. Analysis in this EIS has been revised to reflect the above land use changes.

- The military flight operations at realignment and through the 20-year analysis have been revised and no longer include A-10 aircraft operations or the National Emergency Airborne Command Post 747 aircraft due to force structure changes.

- Sections 3.4.3 and 4.4.3, Air Quality, and 3.4.4 and 4.4.4, Noise, have been revised to reflect this reduction in military aircraft operations.

- Appendix H, Air Force Policy for Management of Asbestos and Buildings Surveyed for Asbestos at Grissom AFB, has been revised to include changes in Air Force policy for the management of asbestos.

- The 434th Wing has been revised to the 434th ARW.

- The references to preclosure year and closure year have been revised to prerealignment year and realignment year, respectively.

- The Military/Joint Use Aviation Alternative has been changed to the Joint Use Aviation Alternative.

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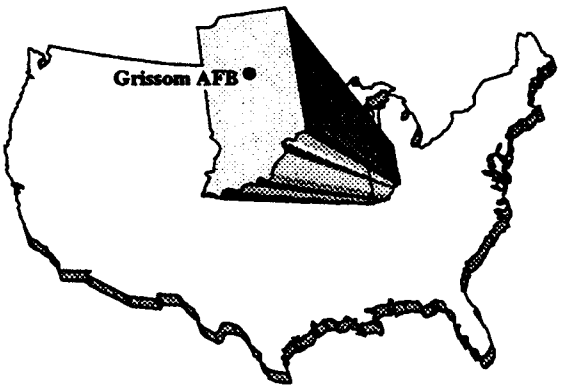


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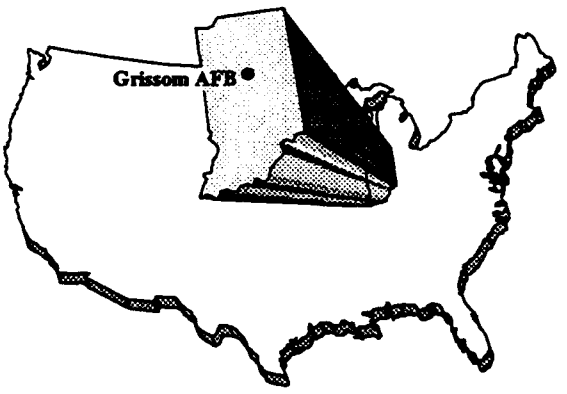
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CHAPTER 1
PURPOSE AND NEED FOR ACTION

1.0 PURPOSE 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 portions of Grissom Air Force Base (AFB), Indiana, as well as with interim activities (e.g., interim outleases) that may be allowed by the Air Force before final disposal of the properties. 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 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) is realigning and reducing its military forces. Accordingly, the Defense Base Closure and Realignment Act (DBCRA) of 1990 (Public Law [P.L.] 101-510, Title XXIX) established new procedures for closing and 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 became law.

Because Grissom AFB was on the Commission's list, the decision to realign the base is final. Grissom AFB is scheduled to realign on September 30, 1994. The Commission's list and recommendations included the retention of the existing 434th Wing (now the 434th Air Refueling Wing [ARW]) of the Air Force Reserve (AFRES) in a military cantonment. Although not part of the Commission's recommendations, the U.S. Army Reserves will also remain on Grissom AFB within Building 639 inside the military cantonment. The DBCRA exempted the decision to close or realign bases from NEPA. It did not, however, exempt property disposal and reuse decisions, or the relocation or expansion of activities at gaining installations. This EIS focuses on environmental impacts associated with the disposal and reuse of portions of Grissom AFB property and does not address the environmental impacts associated with realignment of Grissom AFB missions to other installations.

To fulfill the requirement of reducing defense expenditures, the Air Force plans to dispose of excess and surplus real property and facilities at Grissom

AFB. DBCRA requirements relating to disposal of excess and surplus property include:

- Environmental restoration of the property as soon as possible with funds made specifically 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 portions of Grissom AFB property and facilities outside the military cantonment. Usually, this action is taken by the Administrator of the U.S. General Services Administration. 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 to be considered in making interrelated decisions concerning the disposition of portions of Grissom AFB. The EIS is to provide the decision maker and the public the information required to understand the future potential environmental consequences of property disposal as they relate to reuse options at Grissom AFB.

After completion of this EIS, the Air Force will issue a Record of Decision (ROD) on the disposal and reuse of portions of Grissom AFB. The ROD will document the Air Force's decisions on the following:

- The methods of disposal available to the Air Force
- The terms and conditions of reuse
- Environmental impact mitigation measures to be implemented.

The methods of disposal granted by the Federal Property and Administrative Services Act of 1949 and the Surplus Property Act of 1944 and implemented in the Federal Property Management Regulations (FPMR) 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.

In addition, amendments in the National Defense Authorization Act for 1994 (P.L. 103-160), Chapter XXIX, authorize conveyances of surplus property to local redevelopment authorities at discounted prices when a public benefit will result.

The EIS considers potential environmental impacts of the Air Force's disposal of properties 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. Although specific land use categories were analyzed in this EIS, land uses with lesser environmental impacts (agricultural instead of industrial) could be implemented by the decision maker without additional environmental documentation. Alternative scenarios were used to group reasonable land uses and to examine the environmental effects of redevelopment of portions of Grissom 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.

Two redevelopment scenarios were considered in the preparation of this EIS. These scenarios included: (1) reuse of the property to be excessed for commercial and industrial uses, and (2) reuse of the airfield as a joint use military/civilian airport along with civilian non-aviation uses on the property to be excessed.

1.3 DISPOSAL PROCESS AND REUSE PLANNING

DBCRA requires compliance with NEPA, with some exceptions, in the implementation of the base closures and realignments. The actions 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 up to 1,270 acres of Grissom AFB property through transfer and/or conveyance to other government agencies or private parties. The Proposed Action in the EIS reflects the community's goal for base reuse, which is to redevelop the disposal property as an industrial and commercial complex in order to attract new industries and stimulate job growth in the region.

The Air Force has based the Proposed Action on plans developed by the Grissom Redevelopment Authority (GRA) (formerly the Grissom Community Redevelopment Authority [GCRA]) for the purpose of conducting the required environmental analysis. The Air Force also developed an additional reasonable alternative 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 is aware of the potential environmental impacts of multiple options regarding ultimate property disposition. The recipients of the property, planning and zoning agencies, and elected officials will ultimately determine the reuse of the property subject to the terms of transfer or conveyance and any deed covenants. In addition to the Proposed Action, two alternatives have been identified, which include a military/civilian joint aviation reuse and a No-Action Alternative that would involve no disposal and redevelopment of base property outside the military cantonment. The Air Force has also evaluated one other land use concept, which could be implemented independently or in combination with any of the alternatives, including the Proposed Action.

The Secretary of the Air Force (or his/her designee) 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 FPMR (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 GRA to meet this requirement.

In some cases, compliance with environmental laws may delay reuse of some parts of the disposal property. Until property can be disposed of or surrendered, the Air Force may execute compatible interim or long-term leases to allow reuse to begin as quickly as possible. Restrictions may be necessary to ensure protection of human health and the environment and to allow implementation of required remedial actions.

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.

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 Surplus Property Act of 1944 (50 U.S. Code [U.S.C.], Appendix 1622[g]), 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 1, 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.

The airfield at Grissom AFB could be operated by the 434th ARW or a civil airport authority. However, because of the large retained military aircraft, the Air Force Air Installation Compatible Use Zone (AICUZ) recommendations will remain in effect under all reuse scenarios. Preliminary airfield layouts are provided in Section 2.0 to illustrate the AICUZ safety zones and airfield boundary. This EIS presents the assessment of potential environmental impacts of available plans. 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.

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. Subsequently, CEQ 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, addresses implementation of NEPA as part of the Air Force planning and decision-making process.

NEPA, CEQ regulations, 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 of 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 (U.S. 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 the 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 (portions of) Grissom 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 (portions of) Grissom AFB began on October 9, 1991. A public meeting was held on November 13, 1991, at Maconaquah High School in Bunker Hill, Indiana, to solicit comments and concerns from the general public. Approximately 150 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 the local community, experience with similar decisions to be made, and NEPA requirements were used to determine the scope and direction of studies/analyses to accomplish this EIS.

1.4.2 Public Comment Process

The DEIS was made available for public review and comment in July 1993. Copies of the DEIS were made available for review in local libraries and provided to those requesting copies (Appendix C). At a public hearing held on August 10, 1993, 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 the comments offering new or 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:

- Concern was expressed regarding the potential soil contamination associated with small arms use.
- Provide an explanation of why a site inspection of a potential hazardous waste site is not necessary or make a commitment to conduct an investigation.
- Strict soil erosion control measures should be included among the mitigation measures described in the FEIS.
- Appropriate permits need to be obtained by all hazardous waste operators.

Based on more recent studies or comments from the public, the following sections of the EIS have been updated or revised:

- Sections 3.3.10 and 4.3.1.10, Ordnance, have been revised to clarify that soil testing of the grenade range and indoor and outdoor small arms firing ranges would be conducted prior to property disposal.

- Section 3.3.3, Installation Restoration Program (IRP) Sites, has been revised to include the schedule for IRP activities at Grissom AFB and the results of additional investigations.

- Reference to Resource Conservation and Recovery Act (RCRA) sites in Sections 3.3.2, 3.4.1, 4.3.1.2, 4.3.2.2, 4.3.3.2, and 4.3.4 has been revised to be Grissom AFB Points of Interest (POI)/Potential Areas of Concern (PAC) sites. The number of sites has been revised to include the results of additional investigations.

- Sections 3.4.6 and 4.4.6, Cultural Resources, have been revised to include the results of additional investigations conducted after publication of the DEIS.

- Section 2.3.3, Other Land Use Concepts, has been revised to account for changes in the military cantonment boundary, which affected the State of Indiana Public Safety Training Institute independent land use proposal.

- The military cantonment boundary has been revised and no longer contains the existing Weapons Storage Area (WSA), outdoor small arms firing range, and utility plants (central heating plant, wastewater treatment plant [WWTP], and water treatment plant). The WSA and outdoor small arms firing range are now considered excess property and have been changed to industrial and commercial land uses under the Proposed Action and aviation support and commercial land uses under the Joint Use Aviation Alternative. A new WSA and outdoor small arms firing range are proposed to be built by the AFRES in the 136-acre parcel on the western portion of the base, which was vacant land use under the Proposed Action and agricultural land use under the Joint Use Aviation Alternative. The existing utility plants have been changed to industrial land use under the Proposed Action and public uses under the Joint Use Aviation Alternative. It is expected that these systems would be operated by a private purveyor. Analysis in this EIS has been revised to reflect those land use changes.

- The military flight operations at realignment and through the 20- year analysis have been revised and no longer include A-10 aircraft operations or the National Emergency Airborne Command Post (NEACP) 747 aircraft due to force structure changes. Sections 3.4.3 and 4.4.3, Air Quality, and 3.4.4 and 4.4.4, Noise, have been revised to take into account this reduction in military aircraft operations.

- Appendix H, Air Force Policy for Management of Asbestos and Buildings Surveyed for Asbestos at Grissom AFB, has been revised to include changes in Air Force policy for the management of asbestos.

- The 434th Wing has been revised to the 434th ARW.
- The references to preclosure year and closure year have been revised to prerealignment year and realignment year, respectively.
- The Military/Joint Use Aviation Alternative has been changed to the Joint Use Aviation Alternative.

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, and reasonable alternatives to the Proposed Action, and other land use concepts that have been identified for reuse of excessed Grissom AFB property. Chapter 2 also 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 realignment, providing a basis for analyzing the impacts of the Proposed Action and alternatives. When needed for analytical comparison, a prerealignment reference is provided for certain resource areas. The prerealignment reference describes a point in time at or near the realignment announcement (1991), and depicts an active base condition. The results of the environmental analyses 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; Chapter 8 contains an index; and Chapter 9 contains the public comments and responses to the DEIS.

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 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 Grissom AFB

- Appendix G - storage tanks, oil/water separators, and pesticide storage at Grissom AFB
- Appendix H - current Air Force policy regarding management of asbestos-containing material (ACM) for excess facilities plus buildings surveyed for asbestos at Grissom AFB
- Appendix I - a detailed description of issues and assumptions related to noise effects
- Appendix J - Farmland Conversion Impact Rating, Form AD-1006
- Appendix K - biological resources
- Appendix L - cultural resources
- Appendix M - air emissions inventory for Grissom AFB
- Appendix N - agency letters and certifications regarding conditions at Grissom AFB relevant to its partial disposal and subsequent reuse
- Appendix O - environmental impacts by land use category.

1.7 FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

Representative federal permits, licenses, and entitlements that may be required of recipients of Grissom AFB properties for purposes of redevelopment are presented in Table 1.7-1. The table is presented for illustrative purpose only. It does not include state or local permits, licenses, or entitlements that may be required.

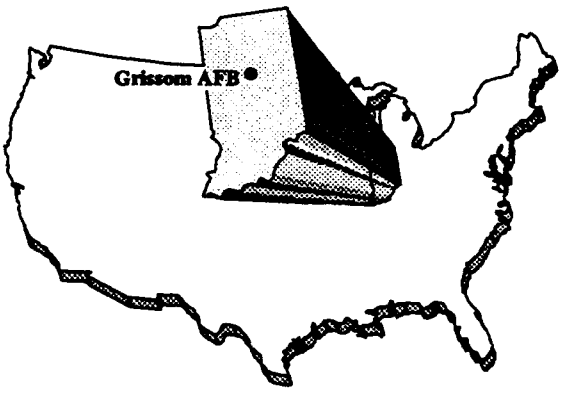
Table 1.7-1. Representative Federal Permits, Licenses, and Entitlements Potentially Required for Reusers or Developers of Disposed Base Property
Page 1 of 2

Federal Permit, License, c 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 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. EPA regulations	Title V of CAA, as amended by 1990 CAA Amendments	U.S. EPA; Indiana Department of Environmental Management
National Pollutant Discharge Elimination System 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. EPA; Indiana Department of Environmental Management
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 Clean Water Act, 33 U.S.C. §1344	U.S. Department of Defense - Army Corps of Engineers, in consultation with U.S. EPA
Hazardous waste treatment, storage, or disposal facility permit	Owners or operators of a new or existing hazardous waste treatment, storage, or disposal facility	Resource Conservation and Recovery Act as amended, 42 U.S.C. §6901; 40 CFR 270	U.S. EPA; Indiana Department of Environmental Management
U.S. EPA identification number	Generators or transporters (off-site transport) of hazardo s waste	40 CFR 262.10 (generators); 40 CFR 263, Subpart B (transporters)	U.S. EPA

Table 1.7-1. 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
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 Resources 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

CAA = Clean Air Act.
CFR = Code of Federal Regulations.
EPA = Environmental Protection Agency.
U.S.C. = United States Code.



CHAPTER 2
ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

This section describes the Proposed Action, a reasonable alternative to the Proposed Action, and the No-Action Alternative. In addition, potential conveyance of Grissom AFB properties and facilities from the Air Force to other agencies is described as independent reuse options that are not part of a complete reuse plan. The potential environmental impacts of the Proposed Action and alternatives are summarized in table form at the end of this section.

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

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

Under Title V of 42 U.S.C. Section 11411, the Stewart B. McKinney Homeless Assistance Act, federal agencies are required to report to the Secretary of the Department of Housing and Urban Development (HUD) information regarding unutilized, underutilized, excess, and surplus federal real properties that may be suitable for use as facilities to assist the homeless. These properties may be made available to states, units of local government, and nonprofit organizations operating as "homeless providers."

HUD will review the list of properties to determine their suitability to meet homeless needs. These properties will be advertised in the Federal Register and properties determined to be suitable will be held only for the purposes of assisting the homeless for a period of 60 days from the date of the Federal Register publication, during which time homeless providers will be able to express written interest to the U.S. Department of Health and Human Services (HHS) in the properties contained in the list published in the Federal

Register. This 60-day period is also effective for each subsequent publication of the property in the Federal Register.

HHS must receive completed applications for McKinney Act properties within 90 days from the date the expression of interest was received. HHS then has to make a determination of approval within 25 days of receiving the completed application. If approved, the property will be assigned to HHS from the Air Force when it becomes surplus. HHS will then transfer the property, at no cost, to the approved homeless provider.

Prior to making property available for use to assist the homeless, the Air Force may consider other federal uses and other important national needs. In deciding the disposition of surplus property, a priority of consideration will be given to uses which assist the homeless, unless it is determined that a competing request for the property that serves one of the public benefits specified under Title 40 U.S.C. Section 484(k) is so meritorious and compelling as to outweigh the needs of the homeless.

Congress has enacted legislation that provides that Indian tribes are to be treated as states or their political subdivision for the disposition of real property affected by a base closure or realignment. This includes: (a) disposal of the base, and (b) the sale of real and related personal property by negotiated transfer to a public body. Alternatively, Indian tribes may acquire excess real and related property via the Indian Self Determination Act at 25 U.S.C. Section 450. Under this statute, Indian tribes may obtain excess real and personal related property for certain beneficial uses (e.g., hospitals, schools). To obtain property under this law, the tribe must apply for a grant from the Secretary of the Interior. If the grant is approved, the Secretary of the Interior then advises the land holding agency (in this case the Air Force) to transfer the property to the Department of the Interior to be held in trust for the purposes of the Self Determination Act grant. This type of transfer is analogous to a no-cost public benefit conveyance.

Under all alternatives, the existing Air Force Base Conversion Agency (AFBCA) Operating Location (OL) will remain at Grissom AFB until all excessed properties are transferred. The responsibilities of the OL will be to serve as the Air Force local liaison to community reuse groups until environmental cleanup and lease termination or disposal of the Air Force property to be excessed has been completed. For the purposes of environmental analysis, it was assumed that this team would consist of approximately 50 direct employees at the time of realignment, conceptually composed of 10 Air Force employees and 40 nonfederal supporting personnel that would remain on base through the 20-year analysis period. The OL, as used in this document, may refer to either the AFBCA or the nonfederal personnel, or both.

In some cases, each group may have distinct responsibilities. For example, under the No-Action Alternative, the nonfederal 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 property are in compliance with pertinent regulations.

The base realignment recommendations for Grissom AFB provided for the retention of the 434th ARW of the AFRES in a military cantonment. Therefore, a portion of the base, referred to as the military cantonment, will not be available for disposal. The military cantonment will support continued operation of the 434th ARW and the U.S. Army Reserves, which are currently operating on the base as well. For purposes of analysis in this EIS, the 434th ARW will include all activities within the military cantonment including the U.S. Army Reserves. Although not part of the disposal and reuse activities, a description of military cantonment activities is included under each reuse alternative to provide a comprehensive analysis of all activities that would take place within the boundaries of Grissom AFB. These activities (military plus the proposed reuses) are used to assess potential cumulative effects on the environment. The activities associated with the military cantonment have been integrated within the realignment baseline conditions in Chapter 3.0.

In order to address the range of potential environmental impacts for disposal and reuse, the following reuse alternatives have been developed:

- The property to be excessed under the Proposed Action would be developed for civilian non-aviation mixed use. This includes primarily land uses for industrial and commercial development with smaller areas of institutional (educational), public/ recreation, and vacant (open space) land.

- The Joint Use Aviation Alternative proposes a joint use military/civilian aviation component. The airport would be complemented by a fairly even mix of these land uses: aviation support, industrial, institutional (educational), commercial, residential, and public/recreation.

- In the No-Action Alternative, the 434th ARW and other military operations would continue to operate within the airfield and military cantonment. The remainder of the base would be put into caretaker status.

In order to accomplish environmental impact analysis for each of the conceptual plans, a set of general assumptions was made. Details regarding the generation of these assumptions are found in Appendix E. Specific assumptions developed for individual reuse plans are identified in the discussion of each proposal, Sections 2.2 and 2.3.

During the development of alternatives addressed in this EIS, the Air Force considered the compatibility of potential land uses with current site conditions (e.g., a hazardous waste site) that may restrict reuse activities to protect human health and the environment. These conditions include potential contamination from releases of hazardous substances, and Air Force efforts to remediate the contamination under the IRP and other programs. IRP remediation at Grissom AFB and other environmental studies may result in lease restrictions or deed covenants that limit redevelopment at certain locations within the properties to be disposed. The Air Force may retain access rights to these sites to implement remediation (e.g., temporary or long-term easements for access to monitoring wells and other sites).

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 State Governor, heads of local governments, or equivalent political organizations for the purposes of considering any plan for the use of excess 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 Proposed Action in this EIS.

The GCRA was formed as a redevelopment authority in December 1991 by Miami County and given authority to redevelop those portions of Grissom AFB to be excessed. The GCRA originally had 9 executive members and 35 committee members from the local area. In 1993, the GCRA was dissolved and the GRA was formed to continue the redevelopment process. The GRA now consists of only three executive members.

The GRA contracted with a consulting firm to assess existing land, facilities, and infrastructure on Grissom AFB and evaluate their potential for airport and non-aviation uses. In February 1993, the GRA submitted to the Air Force a Concept Development Draft Phase II-B Report (RKG Associates, Inc., 1993). This plan addressed the following:

- Goals and objectives strategy
- Phasing strategy for redevelopment
- Preliminary land use characterization
- Projected employment.

The Air Force has used this planning document to develop the Proposed Action for environmental analysis. The Proposed Action is a comprehensive reuse plan centered around the existing military use airfield with related industrial and commercial civilian uses. Only property that is to be excessed (outside the military cantonment) was considered within the community's plan. The military cantonment activities are provided only as a reference to

assess all the activities that would take place within the base boundary under the reuse options.

The land uses presented in the Proposed Action (Figure 2.2-1) provide a framework for development of excess property with the major reuses being industrial and commercial areas, totaling 1,193 acres on the base property. The remaining 77 acres of excess property available for reuse include institutional (educational), public/recreation, and vacant land. The acreage associated with each land use category is provided in Table 2.2-1. All acreages used in this document are approximate.

Table 2.2-1. Land Use Acreage - Proposed Action

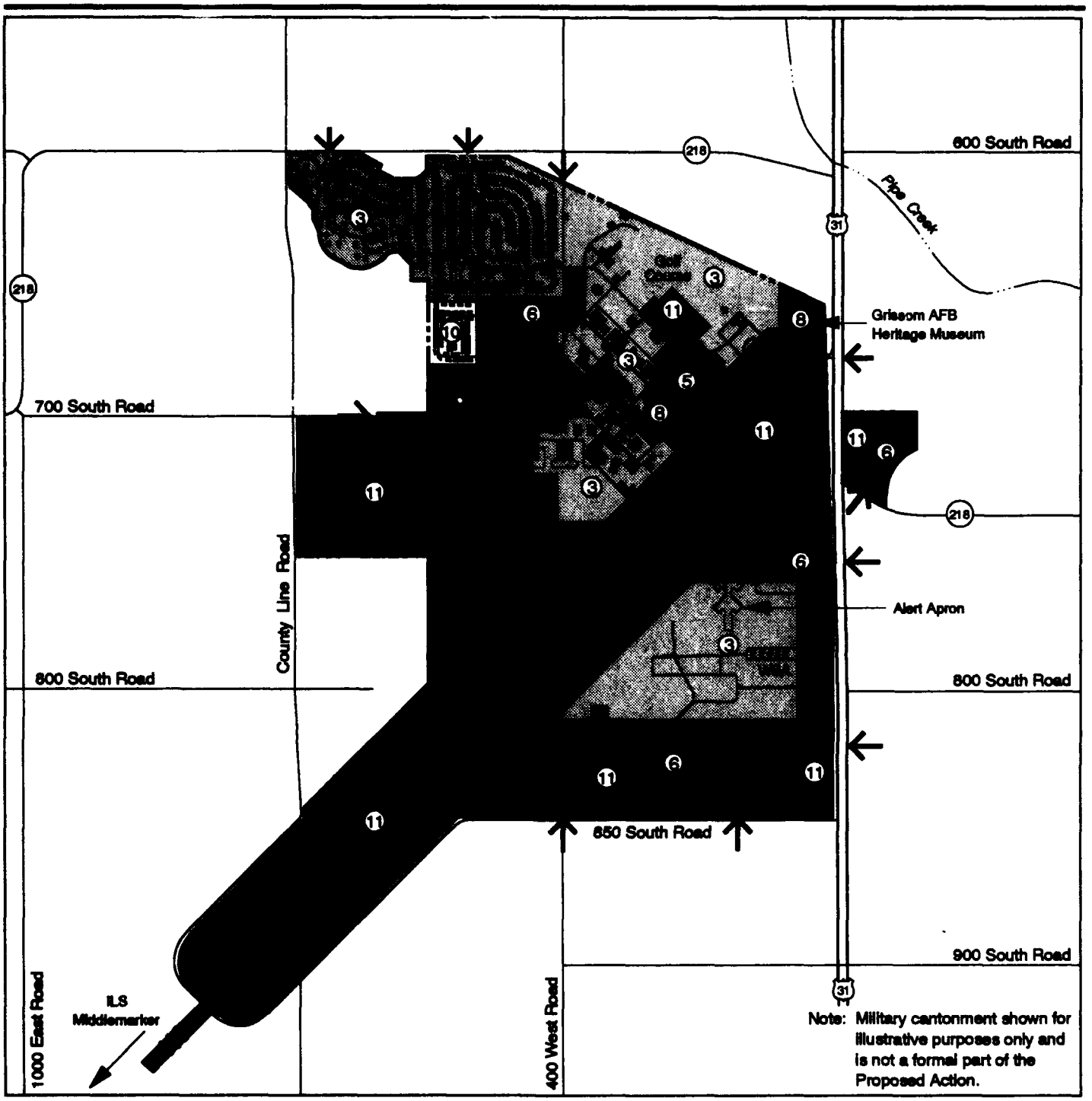
Land Use	Acreage
Industrial	774
Institutional (Educational)	23
Commercial	419
Public/Recreation	27
Vacant Land	27
Subtotal[a]	1,270
Military Cantonment[b]	1,452
Total	2,722

Notes: (a) Includes only the property that is to be excessed.
(b) Not a part of the Proposed Action; included to show cumulative effects.

Under the Proposed Action, the airfield is classified as military since the 434th ARW would continue aircraft operations. Operations associated with the military cantonment, which would include the 434th ARW and other transient military aircraft, are addressed under the military cantonment land use category (see Section 2.2.6).

To support the GRA plan, the following was developed:

- Land use acreage
- Anticipated construction/demolition activities
- Traffic generation and daily trip projections
- Utility requirement projections
- Proposed roadway access points
- Percent of area disturbed by construction activities



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
- 11 Military Cantonment
- Base Boundary
- Access Points

0 725 1450 2900 Feet

* Standard land use designation not applicable to this figure.

Proposed Action

Figure 2.2-1

- Reuse development compatible with AICUZ guidelines for height restrictions and land use

- Proposed reuse of the WSA, utility plants, outdoor small arms firing range, and an area east of U.S. Highway (U.S.) 31.

The amount of development, including existing facility demolition and retention and new facility construction, for each land use under the Proposed Action is presented in Table 2.2-2.

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)		
Industrial	1,714	558	2,098
Institutional (Educational)	0	142	0
Commercial	0	146	970
Public/Recreation	0	97	0
Vacant Land	125	0	0
Subtotal[a]	1,839	943	3,068
Military Cantonment[b]	0	1,042	0
Total	1,839	1,985	3,068

Notes: (a) Includes only the property that is to be excessed.
(b) Not part of the Proposed Action; included to show cumulative effects.

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: 1994 to 1999, 1999 to 2004, and 2004 to 2014.

Table 2.2-3. Acres Disturbed by the Proposed Action

Land Use	Acres Disturbed (by phase)			
	1994-1999	1999-2004	2004-2014	Total
Industrial	8	146	256	410
Institutional (Educational)	1	1	0	2
Commercial	2	61	110	173
Public/Recreation	1	0	0	1
Vacant Land	24	0	0	24
Subtotal[a]	36	208	366	610
Military Cantonment[b]	0	0	0	0
Total	36	208	366	610

Notes: (a) Includes only the property that is to be excessed.
(b) Not part of the Proposed Action; included to show cumulative effects.

2.2.1 Industrial

An industrial area of 774 acres, or approximately 28 percent of the base property, would occupy the residential area, golf course, the utility plants, and an area southeast of the military cantonment, including portions of the aircraft parking apron and WSA. Industrial development on the aircraft parking apron would not interfere with access to the airfield for military aircraft from the 434th ARW area. Light industrial and assembly development would occur where the current golf course is and on the parking apron. Demolition of temporary education buildings, golf course club house, outdoor sports facilities, and the two-story dormitories would occur in this area. The WSA would be utilized for warehousing or agricultural storage. Heavy industrial and manufacturing operations would be developed on the residential area and would involve demolition of the existing residential housing units. Existing facilities would be used during the first 10 years. New development would begin in 2004 and would be complete by 2014.

2.2.2 Institutional (Educational)

An institutional land use area of 23 acres would be adjacent to the airfield's northeast clear zone (CZ). The former Wing Headquarters building would be utilized for educational classrooms and offices with a projected population of 50 students. No building demolition is proposed for this land use. Reuse of existing facilities would occur in the first 10 years.

2.2.3 Commercial

The proposed commercial land use area would include three areas covering 419 acres, or 15 percent of the base area. The 36-acre area south of the existing base housing in the northwest portion of the base would include the child care center, theater, recreation center, commissary, base exchange, credit union, and a fast-food facility. The second area, covering 366 acres, would surround the former WSA on three sides, and include a portion of the alert apron. This area would include the development of new retail and office facilities and could include limited mixed uses such as residential, crafts industries, or light industrial with frontage on United States Highway (U.S.) 31. The existing outdoor small arms firing range in this area would be used as a commercial firing range. The remaining parcel includes 17 acres of the east side of U.S. 31. No building demolition is proposed within the commercial land use. Reuse of existing commercial and retail facilities would be complete by 2004. New commercial development would occur after 1999, and all development would be 70 percent complete by 2014.

2.2.4 Public/Recreation

The public/recreation land use category would include two areas totaling 27 acres. The first area, in the central portion of the base, includes the indoor swimming pool, bowling center, and gymnasium. The second area north of the main base entrance would continue to be used by the Grissom AFB Heritage Museum. Reuse of all recreation facilities would occur throughout the first 5 years.

2.2.5 Vacant Land

In the southern end of family housing an area of 27 acres, or approximately 1 percent of the base acreage, would be converted to open space. To convert this parcel to open space, residential units would be demolished during the first 5 years after base realignment.

2.2.6 Military Cantonment

The decision to realign the 434th ARW at Grissom AFB has already been made under DBCRA. The military cantonment discussion is provided only as a reference to assess all activities that would take place within the base boundary. The military cantonment activities are not part of the reuse plan for Grissom AFB.

The military cantonment retained by the 434th ARW would consist of 12 areas totaling 1,452 acres, or approximately 53 percent of the base area. The first area, in the central and southwestern portion of the base, includes the airfield, the western portion of the aircraft parking apron, six nose dock hangars, fuel storage, aircraft maintenance shops, administrative buildings, training facilities, and base supply. Five areas, in the north central portion of the base, include six dormitories, dining hall, communications facility, lighting vault, electric switch station, generator building, a radar facility, and the fire station. Four military cantonment areas, located southeast of the airfield, include the control tower, transmitter/receiver building, ceilometer radar facility, and a water well. Two other areas include the instrument landing system (ILS) middle marker approximately 4,000 feet from the southwest end of the airfield and an area east of U.S. 31 that includes a portion of the airfield CZ. If facilities within the military cantonment are not required by the 434th ARW, civilian reuse compatible with military operations may be allowed by the AFRES.

Within the military cantonment, the 434th ARW may construct a perimeter security fence, front gate house, entomology building, WSA, and an outdoor small arms firing range. The entomology building would be constructed in the center of the military cantonment. The WSA and outdoor small arms firing range, if necessary, would be in the western portion of the military cantonment. The construction of these facilities would probably occur

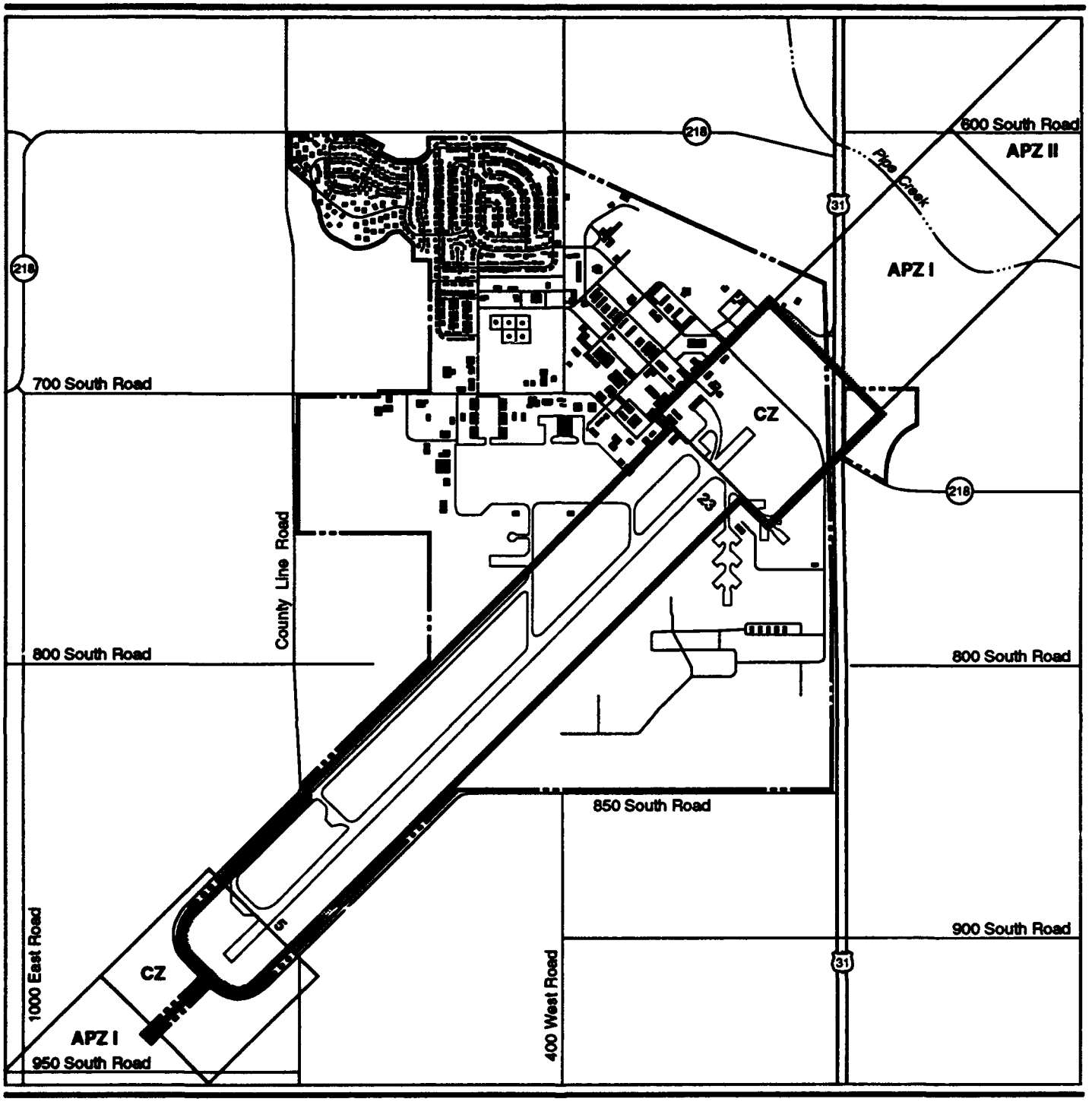
within the first 2 years following base realignment. The existing WSA and outdoor small arms firing range would be utilized until new facilities are constructed.

The 434th ARW would continue to operate the airfield according to Air Force regulations. The existing airfield layout (Figure 2.2-2) illustrates the AICUZ safety zones and airfield boundaries. Military aircraft operations would be associated with the 434th ARW, and military transient aircraft (Table 2.2-4). Approximately 75 percent of all aircraft operations are anticipated to occur between 7:00 a.m. and 10:00 p.m., with 66 percent of all takeoffs expected to occur on Runway 23 to the southwest. Some of the existing flight tracks (see Section 3.2.3.2 Airspace/Air Traffic) utilized by Grissom AFB aircraft would be eliminated upon realignment because of the reduction in active military aircraft. The 434th ARW would retain all avigation easements.

Table 2.2-4. Flight Operations - Military Cantonment[a]

Year	Operations	Function	Percent	Fleet Mix	Annual Operations[b]
1999	Military	434th ARW	59	KC-135R Jet	9,500
		Transient	17	KC-135R Jet	2,690
			1	KC-135E Jet	120
			7	F-4 Jet	1,230
			6	A-6 Jet	920
			1	C-182 Piston	100
			9	Miscellaneous Jet	1,540
				Total	16,100
2004	Military	434th ARW	59	KC-135R Jet	9,500
		Transient	17	KC-135R Jet	2,690
			1	KC-135E Jet	120
			7	F-4 Jet	1,230
			6	A-6 Jet	920
			1	C-182 Piston	100
			9	Miscellaneous Jet	1,540
				Total	16,100
2014	Military	434th ARW	59	KC-135R Jet	9,500
		Transient	17	KC-135R Jet	2,690
			1	KC-135E Jet	120
			7	F-4 Jet	1,230
			6	A-6 Jet	920
			1	C-182 Piston	100
			9	Miscellaneous Jet	1,540
				Total	16,100

Notes: (a) Realignment conditions.
(b) An aircraft operation is one takeoff or one landing.
ARW = Air Refueling Wing.



EXPLANATION

- Airfield Boundary
- APZ — Accident Potential Zone
- CZ — Clear Zone
- Base Boundary

0 725 1450 2900 Feet

Proposed Action
Military Airfield Boundary

Figure 2.2-2

The U.S. Army Reserves (199th Supply Command and 70th Division) would continue operations inside one building within the military cantonment. A total of 7 full-time personnel and 300 reservists are associated with these Army Reserve units. For discussion purposes, the U.S. Army Reserve activities have been included within the 434th ARW activities.

2.2.7 Employment and Population

The Proposed Action would generate an estimated 7,041 direct on-base jobs within the area to be redeveloped. Total on-base direct employment, including military cantonment employment, is shown in Table 2.2-5. On-base student population associated with the institutional (educational) component on the property to be excessed is projected to be 50 by 2004.

Table 2.2-5. On-Base Employment and Population - Proposed Action

	Realignment	1999	2004	2014
Direct Employment[a]	50	683	3,148	7,041
Military Cantonment	928	928	928	928
Total Employment	978	1,611	4,076	7,969
On-Base Population	0	25	50	50

Note: (a) Reuse-related.

2.2.8 Transportation

Under the Proposed Action, U.S. 31 would continue to be the major access route to the base. Access from U.S. 31 would be provided by the existing Main Gate and two new access points into the proposed commercial areas. State Highway (SH) 218 would provide access to the north side of the base through the three existing gates and an existing access to the parcel on the east side of U.S. 31. Existing access to the west side of the base would continue to be provided by 700 South Road. In addition, two new access points would be provided along the south side of the base from 850 South Road.

Based on land use and on-base employment projections, average daily vehicular traffic to and from base property would be approximately 58,850, of which 2,800 would be associated with the military cantonment by 2014. Estimated afternoon peak hour traffic would be 6,200 trips, of which 360 would be associated with the military cantonment. Because of the increase in traffic under the Proposed Action, roadway improvements may be required on Old U.S. 31 between U.S. 31 and West River Road to meet regional Level of Service (LOS) requirements.

2.2.9 Utilities

By 2014, the projected activities associated with the Proposed Action and military cantonment would generate the following on-site utility demands:

	Reuse-Related	Military Cantonment	Total
Water (million gallons per day [MGD])	0.18	0.14	0.32
Wastewater (MGD)	0.12	0.19	0.31
Solid waste (tons/day)	7.42	2.08	9.5
Electricity (megawatt-hours [MWH]/day)	88.9	26.1	115
Natural gas (therms/day)	9,889	1,320	11,209

Improvements to some utility systems would be required to maintain existing service and provide new service to proposed facilities. The base central heating plant, water treatment plant, and WWTP would initially be operated by the 434th ARW until transferred to the OL. Final operation of the utility systems would be by private purveyors. All other utilities would be provided as noted.

Water Supply. All potable water would be supplied by wells on base. Tie-ins and individual meters would be required for civilian reuse.

Wastewater. Wastewater from on-base activities would be treated at the base WWTP. Tie-ins may be required for civilian reuse.

Solid Waste. Refuse disposal services, currently provided by a private contractor, would continue. Waste would be deposited in the Byers Recycling and Disposal Facility.

Electricity. Electrical power would be provided by the Public Service Company of Indiana (PSI Energy). Individual meters would be required for civilian reuse.

Natural Gas. Natural gas would be provided by the Northern Indiana Public Service Company (NIPSCO). The base heating plant would be operated by a private purveyor. Individual meters would be required for civilian reuse.

2.3 DESCRIPTION OF ALTERNATIVES

2.3.1 Joint Use Aviation Alternative

The Joint Use Aviation Alternative (Figure 2.3-1) provides for the joint use of the Grissom AFB airfield by the 434th ARW and a variety of civilian aviation uses. Civilian aviation activities on property to be excessed would include general aviation, air cargo, airline flight training, and an aviation school. The military cantonment would comprise 1,452 acres, or 53 percent of the base property. Civilian land uses would cover the remaining 1,270 acres and include aviation support, industrial, institutional (educational), commercial, residential, and public/recreation. The total acreage of each land use category is shown in Table 2.3-1.

Table 2.3-1. Land Use Acreage - Joint Use Aviation Alternative

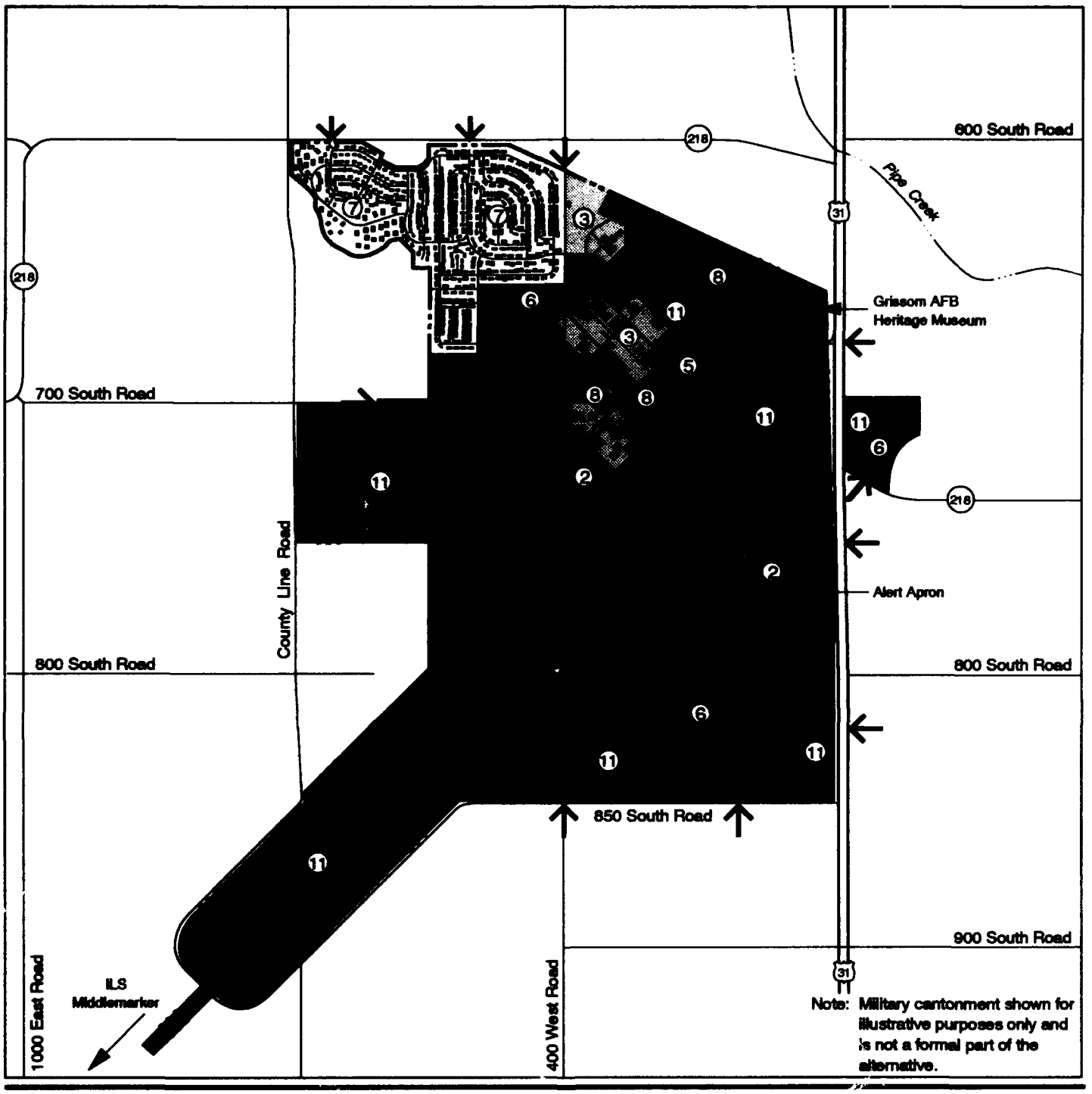
Land Use	Acreage
Aviation Support	192
Industrial	108
Institutional (Educational)	23
Commercial	491
Residential	293
Public/Recreation	163
Subtotal[a]	1,270
Military Cantonment[b]	1,452
Total	2,722

Notes: (a) Includes only the property that is to be excessed.
(b) Not a part of this alternative; included to show cumulative effects.

Under the Joint Use Aviation Alternative the area encompassing the airfield is shown as military cantonment even though there would be both civilian and military aircraft operations. Both civilian and military operations are addressed under the military cantonment land use category (see Section 2.3.1.8). Under this alternative, however, a civil airport authority could be established to operate the airport with the 434th ARW as a tenant. Under this alternative, like the Proposed Action, the military cantonment is provided as a reference and is not part of the property to be excessed.

To support the Joint Use Aviation Alternative, the following was developed:

- Amount and type of land use acreage
- Anticipated construction/demolition activities
- Employment and population projections



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 *
- 11 Military Cantonment
- Base Boundary
- Access Points

0 725 1450 2900 Feet

* Standard land use designation not applicable to this figure.

Joint Use Aviation Alternative

Figure 2.3-1

- Reuse plan phasing
- Traffic generation and daily trip projections
- Percent of area disturbed by construction activities
- Utility requirement projections
- Proposed roadway access points
- Projected flight operations and fleet mix
- Types of airfield improvements
- Reuse development compatible with AICUZ guidelines for height restriction and land use
- Closure of Peru Municipal Airport and transfer of operations to Grissom AFB.

The amount of development, including existing facility demolition and retention and new facility construction for each land use under the Joint Use Aviation Alternative, is presented in Table 2.3-2.

Table 2.3-2. Facility Development - Joint Use Aviation Alternative

Land Use	Existing Facility Demolition	Existing Facility Retention	New Facility Construction
	(in thousands of square feet of floor space)		
Aviation Support	42	222	54
Industrial	413	154	397
Institutional (Educational)	84	58	0
Commercial	99	102	452
Residential	333	1,157	0
Public/Recreation	23	95	0
Subtotal[a]	994	1,788	903
Military Cantonment[b]	0	1,042	0
Total	994	2,830	903

Notes: (a) Includes only the property that is to be excessed.
(b) Not part of this alternative; included to show cumulative effects.

The layout of the airfield under this alternative would be similar to the Proposed Action, except that a new taxiway would be constructed to allow greater airfield access. Civilian developed airport uses outside the military cantonment would include direct aviation-related uses to provide financial

support for the civilian aviation operations. Military regulations were used to develop the characteristics of airfield elements in the airfield layout. This was done because the predominant use would be the military. Figure 2.3-2 displays AICUZ safety zones and the airfield boundaries for this alternative.

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

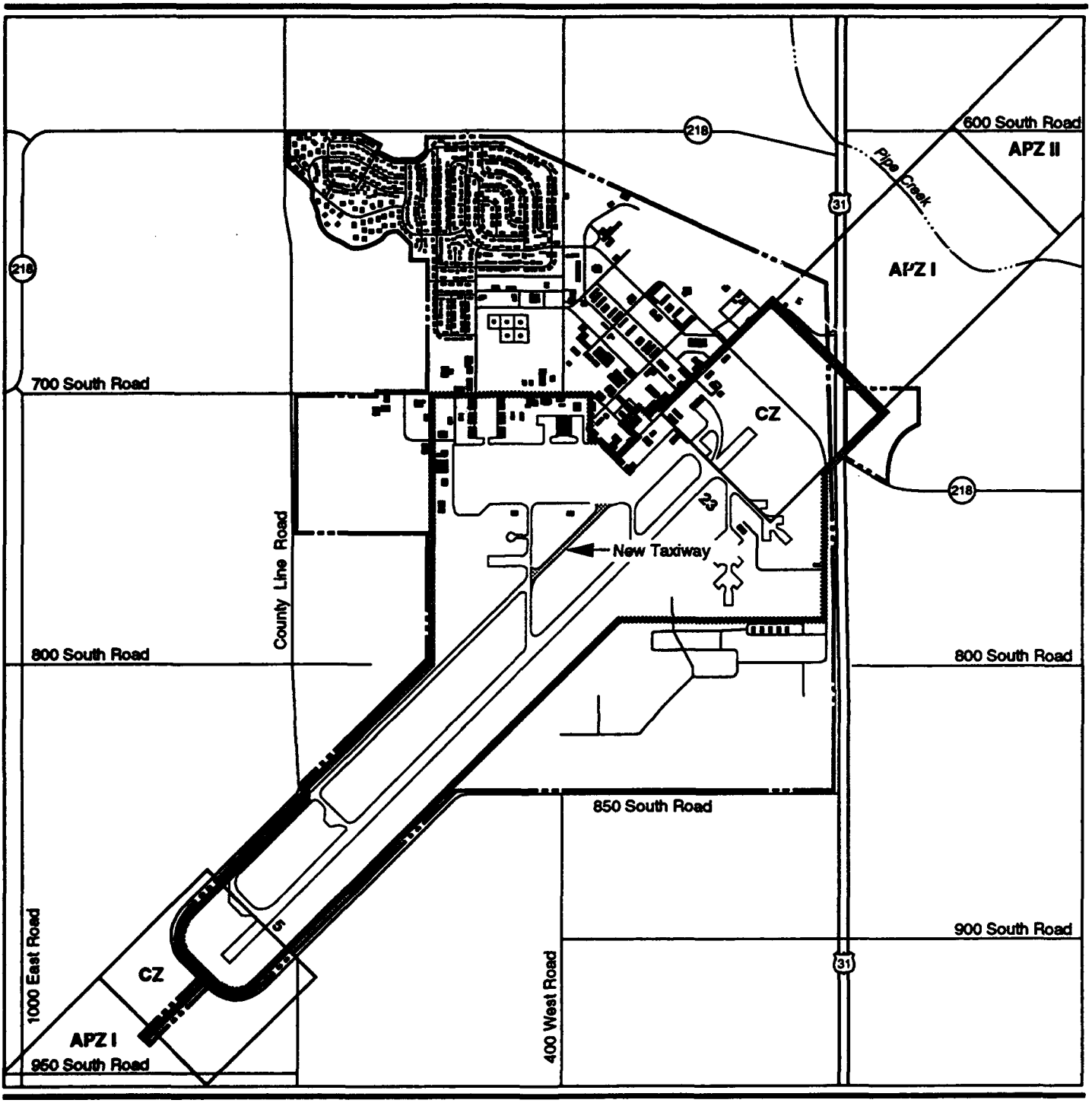
Table 2.3-3. Acres Disturbed by the Joint Use Aviation Alternative

	Acres Disturbed (by phase)			
Land Use	1994-1999	1999-2004	2004-2014	Total
Aviation Support	4	4	9	17
Industrial	10	10	30	50
Institutional (Educational)	1	1	0	2
Commercial	0	19	28	47
Residential	22	0	1	23
Public/Recreation	7	0	0	7
Subtotal[a]	44	34	68	146
Military Cantonment[b]	20	0	0	20
Total	64	34	68	166

Notes: (a) Includes only the property that is to be excessed.
(b) Not part of this alternative; included to show cumulative effects except for a new taxiway that would be constructed for civilian reuse.

2.3.1.1 **Aviation Support.** The aviation support land use would comprise 192 acres, or approximately 7 percent of the base area. A 57-acre area in the center of the aircraft parking apron would include a hangar, equipment maintenance shops, administrative offices, base operations, and warehouses. Approximately 135 acres north of the WSA, including the alert facility, would be available for redevelopment. Reuse activities and functions within the aviation support land use category would include civilian aircraft support, an airport operator (Fixed Base Operator) to support civilian aviation aircraft, cargo operations, and airline flight training. Air cargo enplaned tonnage handled is projected to be 358 tons by 2014. Existing facilities would be 100 percent reused by 2014, while new development would be 23 percent complete by 2014.

2.3.1.2 **Industrial.** Two industrial areas totaling 108 acres, or approximately 4 percent of the base area, would occupy an area northeast of the military cantonment. The planned uses are light industry, cottage industries, and assembly activity. The two-story dormitories and the base clinic would be demolished in order to accommodate new industrial



EXPLANATION

- Airport Boundary
- Base Boundary
- APZ — Accident Potential Zone
- CZ — Clear Zone
- New Airfield Pavement

0 725 1450 2900 Feet

Joint Use Aviation Alternative Airfield Layout

Figure 2.3-2

development. Development would begin in 1994 and would be 65 percent complete by 2014.

2.3.1.3 Institutional (Educational). An educational area comprising 23 acres, or approximately 1 percent of the base area, would be located east of the military cantonment. Educational use would include flight training. All facilities in this land use, except for Building 2, would be demolished between 1994 and 2004.

2.3.1.4 Commercial. The proposed commercial land use area would include three areas totaling 491 acres, or 18 percent of the base area. One area of 43 acres south of the existing base housing includes the child care center, theater, recreation center, commissary, base exchange, credit union, and a fast-food facility. For development of this area, the visiting officers' quarters (VOQ), officers' quarters, and family housing management office would be demolished. Another 431-acre area is located at the southern end of the base adjacent to 850 South Road and includes the WSA and a former landfill. This site would be developed for retail and office uses and could include mixed uses such as craft industries, residential, or light industrial. The existing WSA storage facilities would be demolished. A third parcel includes 17 acres on the east side of U.S. 31. Reuse of existing commercial and retail facilities would continue throughout the 1999-2014 period; new development would start after 2004, with 12 percent of the total retail reuse being completed by 2014.

2.3.1.5 Residential. The residential land use category would include 293 acres, or approximately 11 percent of the base area. Within the proposed residential area, approximately 275 of the 1,124 existing housing units would be demolished to reduce densities. Reuse of 176 residences, or approximately 20 percent of the retained units, would start in 2004 and would continue through 2014.

2.3.1.6 Public/Recreation. The public/recreation land use category would include 163 acres, or 6 percent of the base area. Reused facilities within this land use category would include the Grissom AFB Heritage Museum, golf course, utility plants, indoor swimming pool, bowling center, and gymnasium. Demolition would include the hobby shop and temporary educational buildings adjacent to the golf course. All reuse would occur between 1994 and 1999.

2.3.1.7 Military Cantonment. This reuse would be the same as described under Section 2.2.6, except the airfield would be jointly used by the 434th ARW and civilian aviation. Projected flight operations for the military and civilian aircraft are shown in Table 2.3-4. Approximately 75 percent of all operations are anticipated to occur between 7:00 a.m. and 10:00 p.m. as described in Section 2.2.6.

Table 2.3-4. Projected Flight Operations - Joint Use Aviation Alternative
Page 1 of 2

Year	Operations	Function	Percent	Fleet Mix[a]	Annual Operations[b]
1999	General Aviation	Private Aircraft	67	COMSEP Piston	15,480
			11	BEC-58P Piston	2,540
			11	CNA-441 Turboprop	2,540
			11	Comjet Jet	2,540
	Air Cargo	Cargo	100	Cessna P-210 Piston	520
	Aircraft Flight Training	Checkout	15	B-727-200 Jet[c]	150
			65	B-737-300/400 Jet[d]	650
			10	B-757 Jet[d]	100
			5	B-767 Jet[d]	50
			5	B-747 Jet[d]	50
				Subtotal	24,620
	Military	434th ARW	59	KC-135R Jet	9,500
		Transient	17	KC-135R Jet	2,690
			1	KC-135E Jet	120
			7	F-4 Jet	1,230
			6	A-6 Jet	920
			1	C-182 Piston	100
			9	Miscellaneous Jet	1,540
				Total	40,720
2004	General Aviation	Private Aircraft	64	COMSEP Piston	17,410
			12	BEC-58P Piston	3,260
			12	CNA-441 Turboprop	3,260
			12	Comjet Jet	3,260
	Air Cargo	Cargo	100	Cessna P - 210 Piston	520
	Aircraft Flight Training	Checkout	70	B-737-300/400 Jet[d]	700
			20	B-757 Jet[d]	200
			5	B-767 Jet[d]	50
			5	B-747 Jet[d]	50
				Subtotal	28,710
	Military	434th ARW	59	KC-135R Jet	9,500
		Transient	17	KC-135R Jet	2,690
			1	KC-135E Jet	120
			7	F-4 Jet	1,230
			6	A-6 Jet	920
			1	C-182 Piston	100
			9	Miscellaneous Jet	1,540
				Total	44,810

Notes: (a) Aircraft fleet mix was determined based on existing aircraft and projected aircraft fleet mix of those major airlines with major maintenance facilities in the region.
(b) An aircraft operation is one takeoff or one landing.
(c) Aircraft with Stage 2 engines.
(d) Aircraft with Stage 3 engines.
ARW = Air Refueling Wing.

Table 2.3-4. Projected Flight Operations - Joint Use Aviation Alternative
Page 2 of 2

Year	Operations	Function	Percent	Fleet Mix[a]	Annual Operations[b]
2014	General Aviation	Private Aircraft	61	COMSEP Piston	22,570
			13	BEC-58P Piston	4,810
			13	CNA-441 Turboprop	4,810
			13	Comjet Jet	4,810
	Air Cargo	Cargo	100	Cessna P-210 Piston	520
	Aircraft Flight Training	Checkout	60	B-737-300/400 Jet[d]	600
			30	B-757 Jet[d]	300
			5	B-767 Jet[d]	50
			5	B-747 Jet[d]	50
				Subtotal	38,520
	Military	434th ARW	59	KC-135R Jet	9,500
		Transient	17	KC-135R Jet	2,690
			1	KC-135E Jet	120
			7	F-4 Jet	1,230
			6	A-6 Jet	920
			1	C-182 Piston	100
			9	Miscellaneous Jet	1,540
				Total	54,620

Notes: (a) Aircraft fleet mix was determined based on existing aircraft and proposed aircraft fleet mix of those major airlines with major maintenance facilities in the region.
(b) An aircraft operation is one takeoff or one landing.
(c) Aircraft with Stage 2 engines.
(d) Aircraft with Stage 3 engines.

Some taxiway construction would be required to allow aircraft ground circulation between the approach end of the runway and the civilian aviation area. This construction would also allow civilian aircraft access to the aviation support facilities without encroaching on the military activity areas. Civilian airfield use would include aviation maintenance, airline flight crew training utilizing aircraft serviced at airports within the region, aviation school, general aviation, and air cargo uses.

The airfield would continue to be owned by the Air Force and operated by the 434th ARW in accordance with Air Force regulations. Alternatively, a civil airport authority could be established to operate the airport with the 434th ARW as a tenant. Military/civilian use of the airfield would be arranged through host tenant letters of agreement among the FAA (the legal airport authority) and the Air Force. The agreements would specify procedures to be followed by the military and civilian pilots when operating in and out of the area to comply with FAA procedures and requirements for safe operations. This alternative is feasible only on the assumption that the Peru Municipal Airport would be closed and all of its aviation activity relocated to Grissom AFB.

The following airfield improvements would be required for precision/non-precision runway use and would be constructed in accordance with FAA and military advisory circulars, standards, and recommendations:

- Install new runway and taxiway guidance signs
- Install a Precision Approach Path Indicator System for Runway 5/23
- Upgrade the existing ILS approach to Runway 5/23 to meet FAA standards
- Establish non-precision approaches to Runway 5/23
- Construct a new partial parallel taxiway from Taxiway 3 to the north end of Runway 5/23.

Runway 5/23 at Grissom AFB is able to accommodate up to 230,000 operations (an operation is defined as either a landing or a takeoff) per year. The existing 12,500-foot by 200-foot runway would allow operation of any existing civilian aircraft at almost any combination of payload and range. Approximately 60 percent of all takeoffs are expected to occur on Runway 23 toward the southwest under this alternative.

Some of the existing flight tracks utilized by Grissom AFB aircraft (see Section 3.2.3.2, Airspace/Air Traffic) to transition to and from the base and surrounding airspace would be eliminated upon realignment because of the reduction in active military aircraft. Flight tracks for the 434th ARW aircraft would be retained and new flight tracks for civilian aircraft would be developed based on airspace availability and traffic volume. Avigation easements currently in place at Grissom AFB would be retained by the 434th ARW. Civilian aviation activity associated with this alternative would be conducted by small general aviation aircraft and large civilian transport jets (see Table 2.3-4).

By 2000, 100 percent compliance with the FAA's Stage 3 noise standards is required. The projections provided in Table 2.3-4 account for replacement of civilian aircraft types that do not meet these standards with aircraft that comply with the established guidelines. FAA Stage 3 noise standards (see Appendix A) apply only to civilian aircraft that weigh more than 75,000 pounds. These standards do not apply to military aircraft.

2.3.1.8 Employment and Population. The Joint Use Aviation Alternative would generate an estimated 3,759 direct on-base jobs within the area to be developed. Total on-base direct employment, including 434th ARW employment, is shown in Table 2.3-5. On-base residential population would be 439 by 2014.

Table 2.3-5. On-Base Employment and Population - Joint Use Aviation Alternative

	Realignment	1999	2004	2014
Direct Employment[a]	50	504	1,672	3,759
Military Cantonment	928	928	928	928
Total Employment	978	1,432	2,600	4,687
On-base Population	0	0	110	439

Note: (a) Reuse-related.

2.3.1.9 Transportation. Under the Joint Use Aviation Alternative, access from U.S. 31 would be provided by the Main Gate and two new access points into the proposed commercial and aviation support areas. SH 218 would provide access to the north side of the base through the three existing gates and an existing access for the parcel east of U.S. 31. Existing access to the west side of the base would continue to be provided by 700 South Road. In addition, two new access points would be required along the south side of the base off of 850 South Road for the proposed southern commercial area.

Based on land use and on-base employment projections, average daily vehicular traffic to and from base property would be approximately 32,750, of which 2,800 would be associated with the military cantonment, by 2014. Estimated afternoon peak hour traffic would be 3,400 trips, of which 360 would be associated with the military cantonment. No regional roadway improvements should be required under this alternative.

2.3.1.10 Utilities. By 2014, the projected activities associated with the Joint Use Aviation Alternative and the military cantonment would generate the following on-base utility demands:

	Reuse-Related	Military Cantonment	Total
Water (MGD)	0.21	0.14	0.35
Wastewater (MGD)	0.12	0.19	0.31
Solid waste (tons/day)	6.92	2.08	9
Electricity (MWH/day)	32.9	26.1	59
Natural gas (therms/day)	4,251	1,320	5,571

Improvements to some utility systems would be required to maintain existing service and provide new service to proposed facilities. Required utility improvements and operations would generally be the same as the Proposed Action.

2.3.2 No-Action Alternative

Under the No-Action Alternative, the 434th ARW will continue to operate within the military cantonment the same as described in Section 2.2.6. The remainder of the base would be put to no further use and placed under long-term caretaker status (Figure 2.3-3). Base property outside of the military cantonment would be preserved (i.e., placed in a condition intended to limit deterioration and ensure public safety). Under the No-Action Alternative, employment on base would consist of the remaining 928 434th ARW personnel (including U.S. Army Reserves) and the 50 personnel associated with the OL caretaker operations. There would be no on-base population.

The No-Action Alternative would generate an average of approximately 2,950 daily trips, including 150 associated with the OL, throughout the 20-year analysis period. No new access points would be established.

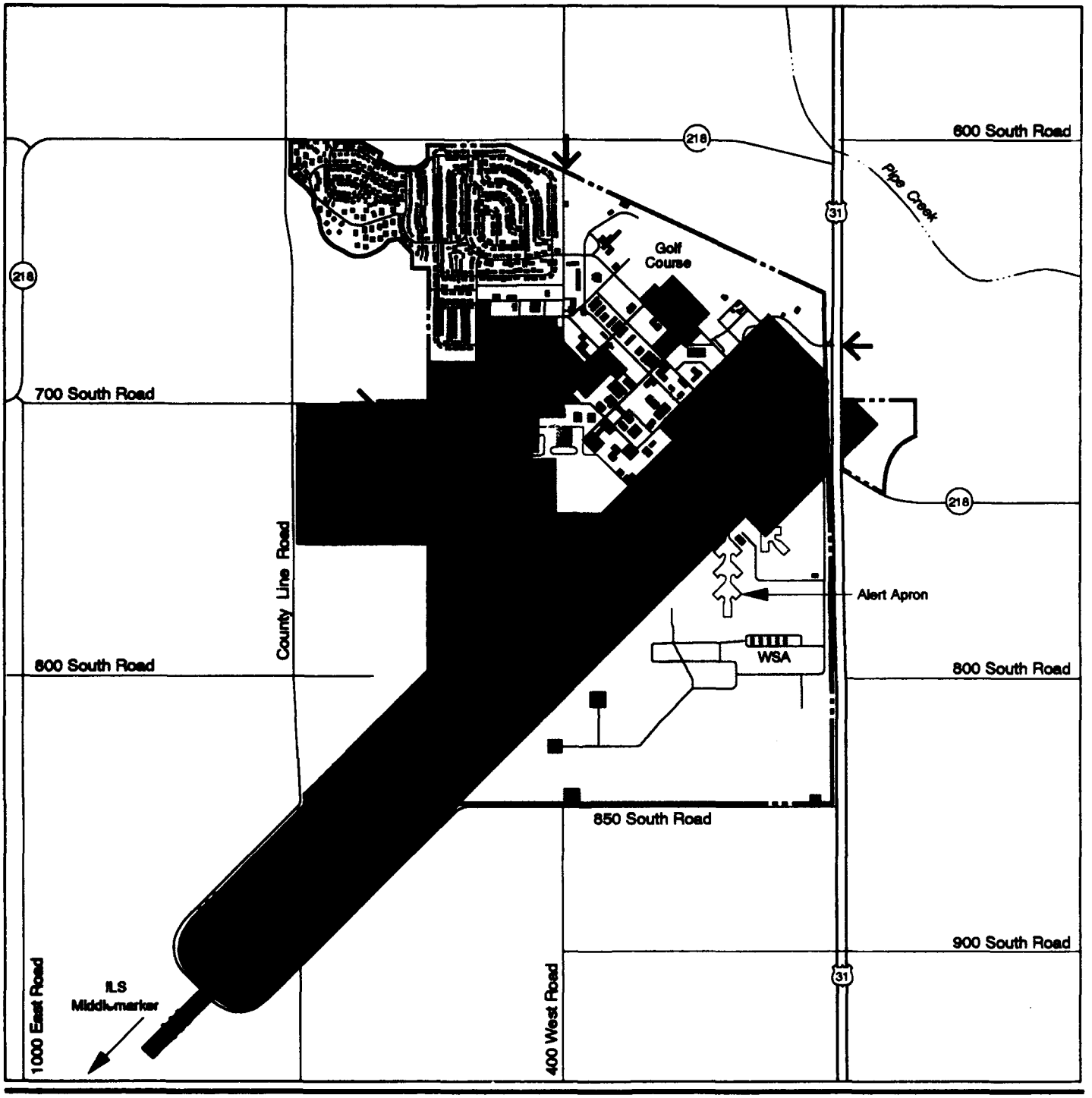
The following utility uses would also be generated by the No-Action Alternative:

	OL	Military Cantonment	Total
Water (MGD)	0.08	0.14	0.22
Wastewater (MGD)	0.11	0.19	0.3
Solid waste (tons/day)	0.92	2.08	3
Electricity (MWH/day)	8.9	26.1	35
Natural gas (therms/day)	580	1,320	1,900

The base would continue to fulfill its entire water requirements from local ground water wells, although the amount drawn would be substantially less than the other alternatives. Nonessential water lines would be drained and shut off. The on-base WWTP would be downsized to continue to provide treatment for the reduced flow of wastewater. Solid waste collection from the base would be continued, but volumes would be less than the other alternatives. The existing power and heating systems serving Grissom AFB would be utilized at levels less than the other alternatives. Electrical power would be required for the military cantonment, airfield, security lighting, and other essential systems. Natural gas would also be required for the base heating plant to provide heating for the military cantonment and limited heating during winter months to some vacant facilities to maintain their integrity.

2.3.3 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



EXPLANATION

- Caretaker Status
- Military Cantonment
- Base Boundary
- Access Points

0 725 1450 2900 Feet

No-Action Alternative

Figure 2.3-3

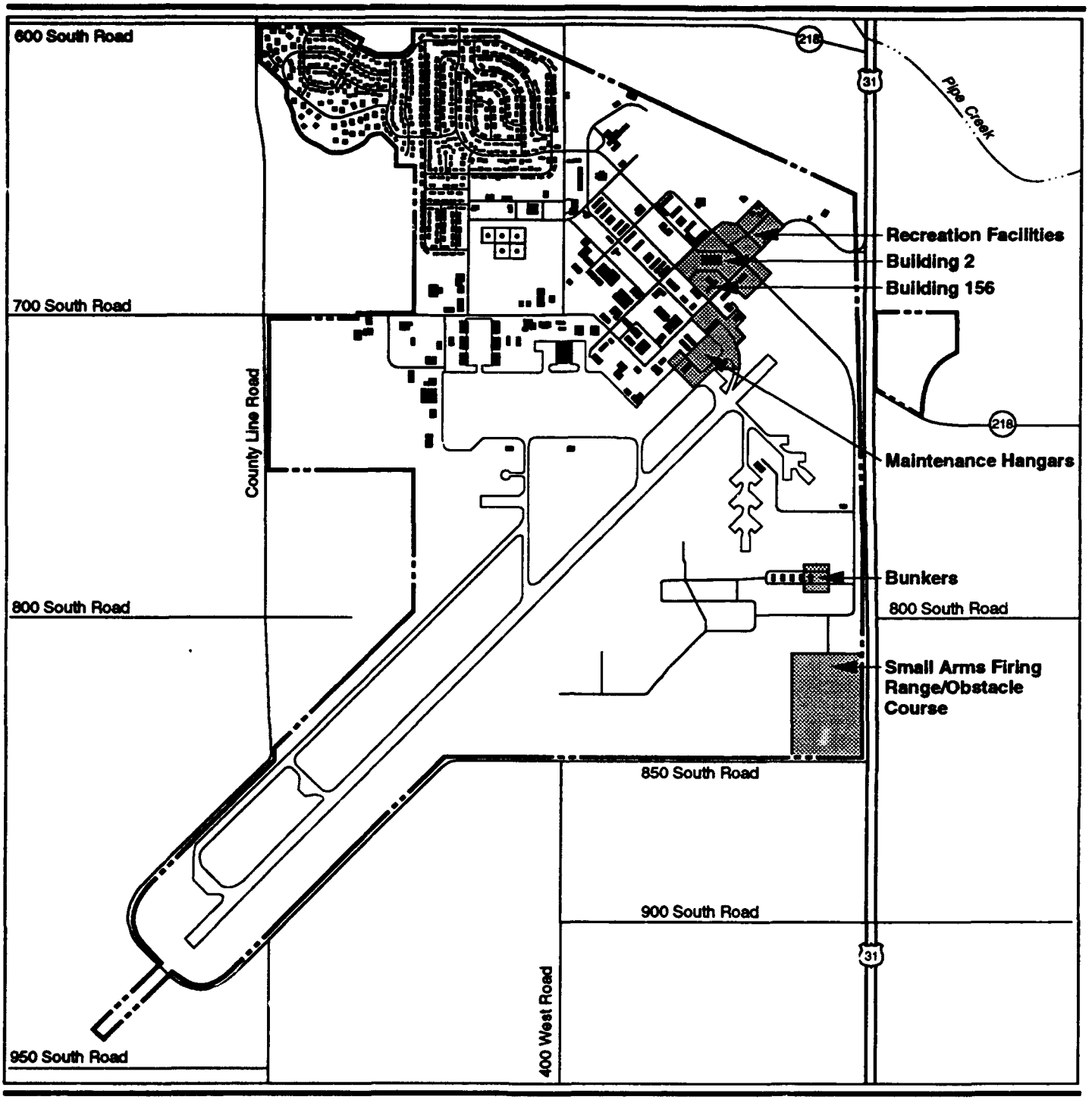
Grissom AFB. No formal proposals for federal conveyance have been identified for Grissom AFB.

One nonfederal proposal has been received by the Air Force, which has not been captured within the analysis of the reuse alternatives. The state of Indiana has proposed a Public Safety Training Institute for Grissom AFB. This section describes this independent land use proposal, which could be implemented individually or in combination with any of the alternatives, including the Proposed Action. Figure 2.3-4 shows the location of this land use concept.

State of Indiana Public Safety Training Institute. The state of Indiana has interest in 120 acres, or 4 percent of the base area, for safety training. The safety training program activities would include classroom instruction and simulated or live emergency training such as hazardous material training (using colored water), building inspections (e.g., electrical wiring, building code inspection), arson investigation, search and rescue training, structural fire fighting, smokehouse maze training, and crash fire rescue training. Activities would take place 7 days per week, would involve 200 to 500 trainees per week and up to 75 permanent full-time and part-time instructors.

Safety training support facilities include administrative offices, classrooms, academic dormitories for trainees, and staff living quarters. Safety training facilities would be located in three major areas. Outdoor training activities would take place on a 56-acre parcel on the southeast corner of the base that includes a new 200-foot diameter fire training facility and a new 50-foot by 50-foot burn tower approximately four stories tall. The fire training facility would be constructed with a rubber bladder and a fuel/water separator, which would separate and recycle the fuel and water for reuse in future burn cycles. The Grissom AFB fire training facilities located in the south central portion of the base would be used until new facilities are built. Within this area the obstacle/confidence course would be utilized for physical training for law enforcement officers and the outdoor small arms firing range would be used for fire arms training. The converted maintenance hangars located at the northeast end of the runway, along with adjacent aircraft aprons, are proposed for reuse as emergency driver training and equipment storage facilities. The use of these facilities would be scheduled so as not to conflict with aviation flight activities.

A variety of support facilities located in the east side of the central portion of the base to be used under this concept includes Building 2 and the base supply administration office, which are proposed for use as classroom, administrative offices, and training laboratories for arson inspection, building inspections, and darkrooms. To provide for outdoor recreation, the tennis courts, softball field, and picnic area located in this area would be used. Living quarters for trainees and an auditorium would be provided in Building



EXPLANATION

Public Safety Training Institute

Base Boundary

Other Land Use Concepts

0 650 1300 2600 Feet

Figure 2.3-4

156. If available, four- or five-family housing units would be moved to the southeast corner of the base to provide simulated training facilities. In addition, two bunkers within the WSA would be used for storage.

Average daily vehicular traffic for this proposal is estimated to be 650. The projected activities would generate the following on-base utility demands:

- Water - 0.06 MGD
- Wastewater - 0.04 MGD
- Solid waste - 1.4 tons/day
- Electricity - 6 MWH/day
- Natural gas - 600 therms/day.

No utility improvements would be required for this proposal, and approximately 8 acres of ground disturbance would be required.

2.4 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

No alternatives were eliminated from this study. The only reuse proposal submitted for Grissom AFB was addressed. In addition, the Air Force identified a potential reuse alternative that would be reasonable for Grissom AFB. No other reasonable alternatives have been identified.

2.5 INTERIM USES

Interim uses include predisposal short-term uses of selected base facilities and property. Predisposal interim uses are conducted under lease, and licensed and other agreements with the Air Force. The terms and conditions of each lease would be arranged to ensure that the predisposal interim uses do not prejudice future disposal and reuse plans of the base. Any continuation of an interim use beyond the final disposal of the property in use would have to be arranged through agreements with the new property owner(s). Interim use proposals that are substantially similar to those analyzed in this EIS would not require further environmental analysis. In some cases, however, additional environmental analysis may be required.

2.6 OTHER FUTURE ACTIONS IN THE REGION

Other actions within the region were evaluated to determine whether cumulative environmental impacts could result due to the implementation of the Proposed Action and alternatives in conjunction with other past, present, or reasonably foreseeable future actions. No actions within the geographic region were determined to have the ability to cause cumulative impacts in combination with the Proposed Action or alternatives.

2.7 COMPARISON OF ENVIRONMENTAL IMPACTS

A summary comparison of the reuse-related factors and environmental impacts, along with their potential mitigation, on 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, respectively. Impacts for air quality are summarized over a 10-year period due to the speculative nature of projecting pollutant emissions and concentrations far into the future under changing regulatory and climatic conditions. Table 2.7-2 also includes a summary of realignment baseline conditions to provide a basis for comparison of reuse-related changes and associated impacts. Reuse-related factors projected by the reuse scenarios are nonbiophysical elements such as population, employment, land use, aesthetics, transportation networks, and public utility systems that were used to conduct environmental analysis. Impacts to the environment are described briefly in the summary and discussed in detail in Chapter 4.0. Table 2.7-3 presents influencing factors and environmental impacts of other transfers and independent land use concepts.

Table 2.7-1. Summary of Reuse-Related Factors Compared to No-Action Alternative

Factor	Proposed Action			Joint Use Aviation Alternative		
	1999	2004	2014	1999	2004	2014
Ground Disturbance (acres, by phase)	36	208	366	64	34	68
Direct Employment	633	3,098	6,991	454	1,622	3,709
Secondary Employment	300	2,244	5,541	234	622	1,397
Population	908	5,462	13,729	760	2,745	6,817
Traffic (average daily vehicular traffic)	8,300	28,900	55,900	2,850	13,200	29,800
Aircraft Operations (annual)						
Civilian	0	0	0	24,620	28,710	38,520
Military[a]	16,100	16,100	16,100	16,100	16,100	16,100
Total	16,100	16,100	16,100	40,720	44,810	54,620
Water Consumption (MGD)	0.05	0.3	0.74	0.04	0.15	0.38
Wastewater Treatment (MGD)	0.04	0.24	0.57	0.03	0.12	0.29
Solid Waste Disposal (tons/day)	1.2	6.6	19.1	0.9	3.2	7.6
Electrical Consumption (MWH/day)	12.9	78.2	231.1	10.5	37.6	91.9
Natural Gas Consumption (therms/day)	0.9	7.7	20.2	0.7	2.6	6.3

Notes: Values shown represent increases over the projected No-Action Alternative/realignment conditions in each year as a result of implementing that alternative except for military aircraft operations.
(a) Aircraft operations associated with the 434th ARW and military transients are the same as realignment conditions and are not part of the proposed reuses.
MGD = million gallons per day.
MWH = megawatt-hours.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 1 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Local Community				
• Land Use and Aesthetics	Conditions: Continued activities within retained military cantonment and airfield. Other portions of the base property placed under caretaker status	• Impacts: Civilian redevelopment of 1,270 acres. Proposed reuses would not have land use controls. Visual quality could be impacted by proposed development activities • Mitigations: Modification of local community/county general plans; amendments to zoning ordinances to reflect redevelopment plans Use of landscape screening	• Impacts: Civilian redevelopment of 1,270 acres. Proposed reuses would not have land use controls. Impacts to visual quality would be less than the Proposed Action • Mitigations: Modification of local community/county general plans; amendments to zoning ordinances to reflect redevelopment plans Use of landscape screening	• Impacts: No change in on-base land use. Vacant land could enhance visual quality in the long term
• Transportation	Conditions Surface: 2,950 daily trips. Access limited to Main Gate and West Gate	• Impacts: Increase of 55,900 daily vehicular trips. Four new base-access points provided. Reuse-generated traffic would decrease LOS to F on Old U.S. 31 • Mitigations: Road improvements could raise LOS to meet transportation planning criteria	• Impacts: Increase of 29,800 daily vehicular trips. Four new base-access points provided. Roadway segments would maintain acceptable LOS	• Impacts: No changes in base-related traffic
	Conditions Airspace: 16,100 annual military aircraft operations associated with 434th ARW	• Impacts: No change in aircraft operations from realignment baseline. No airspace conflicts or air transportation impacts	• Impacts: Increase of 38,520 annual civilian aircraft operations over realignment baseline. No airspace conflicts or air transportation impacts	• Impacts: No change in base-related aircraft operations

Notes: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
ARW = Air Refueling Wing.
LOS = level of service.
U.S. # = U.S. Highway.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 2 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Local Community (Continued)				
• Utilities Use	Conditions: Water: 0.22 MGD Wastewater: 0.30 MGD Solid Waste: 3.0 tons/day Electricity: 35 MWH/day Natural Gas: 1,900 therms/day	• Impacts: Up to 77 percent increase in ROI utility use. Current systems able to accommodate these increased demands. Interconnection of utility systems required to provide service to on-base users. Pretreatment of industrial wastewater may be required. Potential for the Grissom AFB wastewater treatment plant to operate below minimum biological oxygen demand loading requirements • Mitigations: Modify wastewater treatment plant as required to ensure wastewater treatment is in accordance with applicable permit requirements. Recycle solid waste to reduce levels to landfills	• Impacts: Up to 30.6 percent increase in ROI utility use. Current systems able to accommodate these increased demands. Interconnection of utility systems required to provide service to on-base users. Pretreatment of industrial wastewater may be required. Potential for Grissom AFB wastewater treatment plant to operate below minimum biological oxygen demand loading requirements • Mitigations: Modify wastewater treatment plant as required to ensure wastewater treatment is in accordance with applicable permit requirements. Recycle solid waste to reduce levels to landfills	• Impacts: No changes in base-related utility use. Potential for the Grissom AFB wastewater treatment plant to operate below minimum biological oxygen demand loading requirements • Mitigations: Modify wastewater treatment plant as required to ensure wastewater treatment is in accordance with applicable permit requirements. Recycle solid waste to reduce levels to landfills
Hazardous Materials and Hazardous Waste Management				
• Hazardous Materials Management	Conditions: Materials used for retained military activities and caretaker activities will be managed in compliance with applicable regulations	• 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: No change in types and quantities used

Notes: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
MGD = million gallons per day.
MWH = megawatt-hours.
ROI = Region of Influence.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 3 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)				
		• Mitigations: Establish cooperative planning body	• Mitigations: Establish cooperative planning body	
• Hazardous Waste Management	Conditions: Wastes generated by retained military activities and caretaker activities will be managed in accordance with applicable regulations. POI/PAC investigations and potential remediation activities will proceed until complete regardless of base realignment and reuse	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts. Possible redevelopment delays and land use restrictions due to remediation of POI/PAC sites	• Impacts: Increase in quantities of wastes generated. Compliance with applicable regulations would preclude unacceptable impacts. Possible redevelopment delays and land use restrictions due to remediation of POI/PAC sites	• Impacts: No change in quantities of wastes generated. POI/PAC investigations and potential remediation activities completed or continued as needed
		• Mitigations: Educational programs on recycling, waste minimization, and waste disposal	• Mitigations: Collection of hazardous household products; educational programs on recycling, waste minimization, and waste disposal	
• Installation Restoration Program	Conditions: IRP activities will proceed until complete regardless of base realignment and reuse. IRP remediation activities will continue in accordance with applicable regulations	• Impacts: Possible redevelopment delays and land use restrictions due to remediation	• Impacts: Possible redevelopment delays and land use restrictions due to remediation	• Impacts: IRP remediation activities completed or continued as needed. Possible short-term impacts to military activities

Notes: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
IRP = Installation Restoration Program.
PAC = Potential Areas of Concern.
POI = Points of Interest.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 4 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)				
		• Mitigations: Coordination between OL, 434th ARW, and planning agencies to address potential problems	• Mitigations: Coordination between OL, 434th ARW, and planning agencies to address potential problems	
• Storage Tanks	Conditions: Storage tanks used by retained military activities will be managed in accordance with applicable regulations. Unused tanks will be removed or maintained in place in accordance with applicable regulations	• Impacts: Storage tanks required by new owners/operators would be subject to all regulations to avoid unacceptable impacts	• Impacts: Storage tanks required by new owners/operators would be subject to all regulations to avoid unacceptable impacts	• Impacts: Storage tanks would be removed or maintained in place according to applicable regulations
		• Mitigations: Appropriate precautions to avoid damage to remaining USTs and piping systems during construction	• Mitigations: Appropriate precautions to avoid damage to remaining USTs and piping systems during construction	
• Asbestos	Conditions: Asbestos posing a health risk will be removed. Remaining asbestos will be managed in accordance with Air Force policy	• Impacts: Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos would be managed in accordance with applicable regulations to minimize potential risk to human health or the environment	• Impacts: Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos would be managed in accordance with applicable regulations to minimize potential risk to human health or the environment	• Impacts: Continued management of asbestos in accordance with Air Force policy

Notes: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
ARW = Air Refueling Wing.
OL = Operating Location.
UST = underground storage tank.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 5 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)				
		• Mitigations: Coordination of asbestos removal or management during renovation and demolition activities	• Mitigations: Coordination of asbestos removal or management during renovation and demolition activities	
• Pesticide Usage	Conditions: Pesticides used by retained military activities and caretaker activities will be managed in compliance with applicable standards	• Impacts: Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptable impacts	• Impacts: Increased use associated with civilian development. Management in accordance with FIFRA and state guidelines would preclude unacceptable impacts	• Impacts: No change in usage or management practices
• Polychlorinated Biphenyls (PCBs)	Conditions: All federally regulated PCBs have been removed and properly disposed	• Impacts: All federally regulated PCBs have been removed	• Impacts: All federally regulated PCBs have been removed	• Impacts: All federally regulated PCBs have been removed
• Radon	Conditions: Affected facilities occupied within the military cantonment would be managed and/or remediated in accordance with Air Force Policy	• Impacts: All facilities surveyed that registered elevated radon levels above 4 pCi/l are proposed for demolition under this proposal • Mitigations: Structure modification and management practices	• Impacts: Potential exposure to levels greater than the standard 4 pCi/l • Mitigations: Structure modification and management practices	• Impacts: Affected facilities occupied within the military cantonment would be managed and/or remediated in accordance with Air Force Policy

Notes: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
FIFRA = Federal Insecticide, Fungicide, and Rodenticide Act.
PCB = polychlorinated biphenyl.
pCi/l = picocuries per liter.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 6 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)				
• Medical/ Biohazardous Waste	Conditions: Existing wastes removed prior to realignment; continued small amounts generated by 434th ARW activities would be managed in accordance with applicable regulations	• Impacts: None generated under proposed reuses. Continued small amounts generated by 434th ARW activities would be managed in accordance with applicable regulations	• Impacts: None generated under proposed reuses. Continued small amounts generated by 434th ARW activities would be managed in accordance with applicable regulations	• Impacts: Continued small amounts generated by 434th ARW activities would be managed in accordance with applicable regulations
• Ordnance	Conditions: Ordnance stored will be managed in accordance with applicable regulations	• Impacts: Reuse of outdoor small arms firing range. Continued use and maintenance for retained military activities	• Impacts: None used under proposed reuses. Continued use and maintenance for retained military activities	• Impacts: Continued use and maintenance for retained military activities
• Lead-Based Paint	Conditions: Lead-based paints may exist at all facilities constructed prior to or during 1978. Facilities within the military cantonment containing lead will be managed according to applicable regulations	• Impacts: Removal and disposal of lead-based paint in facilities to be demolished or renovated would be managed in accordance with applicable regulations	• Impacts: Removal and disposal of lead-based paint in facilities to be demolished or renovated would be managed in accordance with applicable regulations	• Impacts: Facilities outside of the military cantonment containing lead-based paint will be secured to minimize potential risk to human health or the environment. Facilities within the military cantonment containing lead will be managed according to applicable regulations
Natural Environment				
• Soils and Geology	Conditions: No ground disturbance	• Impacts: Minor erosion effects from 610 acres of ground disturbance	• Impacts: Minor erosion effects from 166 acres of ground disturbance	• Impacts: No ground disturbance

Note: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
ARW = Air Refueling Wing.

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

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Natural Environment (Continued)				
		• Mitigations: Use techniques such as protective cover, limit the area disturbed and length of time slopes and barren ground are left exposed, and develop and implement a soil erosion plan in coordination with local Soil Conservation Service	• Mitigations: Use techniques such as protective cover, limit the area disturbed and length of time slopes and barren ground are left exposed, and develop and implement a soil erosion plan in coordination with local Soil Conservation Service	
• Water Resources	Conditions: No ground disturbance. Adequate water supply for limited on-base demand	• Impacts: Surface water runoff from 610 acres of ground disturbance 34.6 percent increase in ROI water demand would not affect water supply	• Impacts: Surface water runoff from 166 acres of ground disturbance 17.8 percent increase in ROI water demand would not affect water supply	• Impacts: No ground disturbance. No change in water demand
		• Mitigations: Use of proper construction techniques, control of site runoff, minimizing of surface disturbance and length of exposure time. Additional oil/water separators or other wastewater treatment may be required to meet storm water and wastewater discharge NPDES permit requirements	• Mitigations: Use of proper construction techniques, control of site runoff, minimizing of surface disturbance and length of exposure time. Additional oil/water separators or other wastewater treatment may be required to meet storm water and wastewater discharge NPDES permit requirements	

Notes: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
NPDES = National Pollutant Discharge Elimination System.
ROI = Region of Influence.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 8 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Natural Environment (Continued)				
• Air Quality	Conditions: NO_x: 0.66 ton/day VOC: 3.33 tons/day PM_{10}: 0.51 ton/day SO_2: 0.14 ton/day CO: 4.78 tons/day Air pollutant emissions generated from retained military activities and caretaker activities	• Impacts: Increase in reuse-related emissions in 2004: NO_x: 1.43 tons/day VOC: 0.20 ton/day PM_{10}: 0.23 ton/day SO_2: 0.65 ton/day CO: 0.35 ton/day Increased air pollutant emissions during construction and operations would not affect the region's attainment status • Mitigations: Control of fugitive dust and combustion emissions from construction activities. Application of transportation planning and management measures to reduce motor vehicle pollution	• Impacts: Increase in reuse-related emissions in 2004: NO_x: 0.32 ton/day VOC: 0.08 ton/day PM_{10}: 0.02 ton/day SO_2: 0.00 ton/day CO: 0.76 ton/day Increased air pollutant emissions during construction and operations would not affect the region's attainment status • Mitigations: Control of fugitive dust and combustion emissions from construction activities. Application of transportation planning and management measures to reduce motor vehicle pollution	• Impacts: No change in base-related air emissions
• Noise	Conditions: 5,799 acres and 166 residents exposed to DNL 65 dB or greater due to continued military aircraft operations 231 residents exposed to DNL 65 dB or greater due to base-related surface traffic	• Impacts: No change in aircraft noise levels from realignment baseline. 142 additional residents exposed to DNL 65 dB or greater due to increased surface traffic	• Impacts: Eleven additional acres and no additional residents exposed to DNL 65 dB or greater due to civilian aircraft operations in 2014. 80 additional residents exposed to DNL 65 dB or greater due to increased surface traffic	• Impacts: No change in base-related noise levels

Notes: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
CO = carbon monoxide.
dB = decibel.
DNL = day-night average sound level.
NO_x = nitrogen oxide.
PM_{10} = particulate matter equal to or less than 10 microns in diameter.
SO_2 = sulfur dioxide.
VOC = volatile organic compound.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 9 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Natural Environment (Continued)				
		• Mitigations: Barrier walls to mitigate surface traffic noise. Use of sound insulation, barriers, and buffer zones. Continue use of AICUZ program	• Mitigations: Barrier walls to mitigate surface traffic noise. Use of sound insulation, barriers, and buffer zones. Continue use of AICUZ program	
• Biological Resources	Conditions: No ground disturbance No federal or state threatened or endangered species on base. Approximately 8.75 acres of wetlands	• Impacts: Potential impact to approximately 5 acres of wetlands	• Impacts: Potential impact to approximately 5 acres of wetlands	• Impacts: No ground disturbance. No change in base-related activities. Potential increase in habitat value due to long-term decrease in human activity
		• Mitigations: Wetlands mitigation could include avoidance through facility design, replacement, enhancement of wetland habitat, or control of construction-related erosion into nearby wetlands	• Mitigations: Wetlands mitigation could include avoidance through facility design, replacement, enhancement of wetland habitat, or control of construction-related erosion into nearby wetlands	

Notes: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
AICUZ = Air Installation Compatible Use Zone.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigation from the Proposed Action and Reasonable Reuse Alternatives
Page 10 of 10

Resource Category	Realignment Baseline	Proposed Action	Joint Use Aviation Alternative	No-Action Alternative
Natural Environment (Continued)				
• Cultural Resources	Conditions: No ground disturbance. One homestead site and fifteen facilities potentially eligible for listing in the NRHP	• Impacts: Potential adverse effects to the homestead site and 11 facilities potentially eligible for listing in the NRHP • Mitigations: Properties may be conveyed to non-federal owners with preservation covenants. SHPO and Advisory Council on Historic Preservation would be consulted during development and implementation of procedures and mitigation strategies. Prepare agreement document to establish acceptable mitigation measures	• Impacts: Potential adverse effects to the homestead site and 11 historic facilities potentially eligible for listing in the NRHP • Mitigations: Properties may be conveyed to non-federal owners with preservation covenants. SHPO and Advisory Council on Historic Preservation would be consulted during development and implementation of procedures and mitigation strategies. Prepare agreement document to establish acceptable mitigation measures	• Impacts: Adequate caretaker maintenance would preclude indirect impacts to the homestead site and facilities potentially eligible for listing in the NRHP

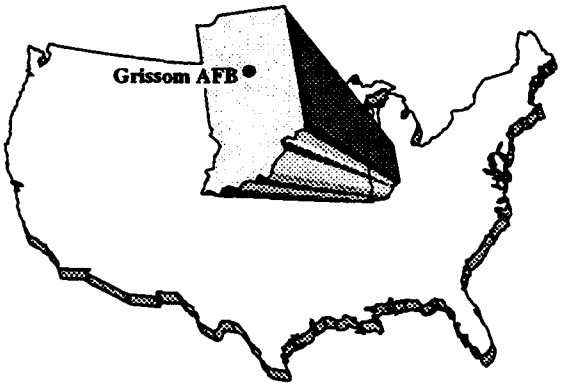
Notes: Impacts are based on the changes from realignment baseline conditions, which are projected to occur as a result of implementing that alternative.
NRHP = National Register of Historic Places.
SHPO = State Historic Preservation Officer.

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

Resource Category	State of Indiana Public Safety Training Institute
Local Community	
Land Use and Aesthetics	Potential conflict with adjacent land uses
Transportation	650 daily trips. Potential net increase in traffic volumes would not affect level of service
Utilities	Potential net increase in utility use would not exceed system capacities
Hazardous Materials and Hazardous Waste Management	
Hazardous Materials Management	Management in compliance with applicable regulations
Hazardous Waste Management	Management in compliance with applicable regulations. Potential redevelopment delays from Points of Interest/Potential Areas of Concern site investigations
Installation Restoration Program	No impact
Storage Tanks	No impact
Asbestos	May require management of asbestos-containing material in accordance with National Emissions Standards for Hazardous Pollutants
Pesticides Usage	Small quantities used
Polychlorinated Biphenyls (PCBs)	No impact
Radon	New owners to be advised of findings
Medical/Biohazardous Waste	None generated
Ordnance	No impact
Lead-Based Paint	May require management of lead-based paint in accordance with applicable regulations
Natural Environment	
Soils and Geology	8 acres of ground disturbance
Water Resources	No adverse impacts due to potential net increase in demand
Air Quality	No adverse impacts due to potential net increases in emissions
Noise	No impact
Biological Resources	No adverse impacts due to ground disturbance
Cultural Resources	Potential impact to sites eligible for listing in the National Register of Historic Places. Preservation covenants would reduce impacts to a non-adverse level.

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

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CHAPTER 3
AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the environmental conditions of Grissom AFB and its Region of Influence (ROI) as it would be at the time of base realignment. The information provided serves as a baseline from which to identify and evaluate environmental changes resulting from disposal and reuse of portions of Grissom AFB. Although this EIS focuses on the biophysical environment, some non-biophysical elements are addressed. The non-biophysical elements (influencing factors) of employment and population, land use and aesthetics, transportation networks, and public utility systems in the region and local communities are addressed. This chapter also describes the storage, use, and management of hazardous materials found on base including storage tanks, asbestos, pesticides, polychlorinated biphenyls (PCBs), radon, medical/biohazardous waste, ordnance, and lead-based paint. 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, water resources) transcend these limits.

The baseline conditions assumed for the purposes of analysis are the conditions projected at base realignment on September 30, 1994. Base realignment conditions will consist of an active military cantonment associated with the 434th ARW, with the remainder of the base in caretaker status. Impacts associated with disposal and/or reuse activities outside the military cantonment may then be addressed by comparing projected conditions under various reuses to realignment conditions. A reference to prerealignment 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 prerealignment reference point are those that depict conditions as close as possible to the realignment announcement date (1991). 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

Grissom AFB is in north-central Indiana, in Miami and Cass counties. The base, consisting of 2,722 acres, is approximately 65 miles north of Indianapolis and 6 miles southwest of Peru, Indiana (Figure 3.2-1). An ILS facility (Building 776) of 400 square feet is located outside the installation boundary, approximately 4,000 feet from the southwest end of the runway (Figure 3.2-2).

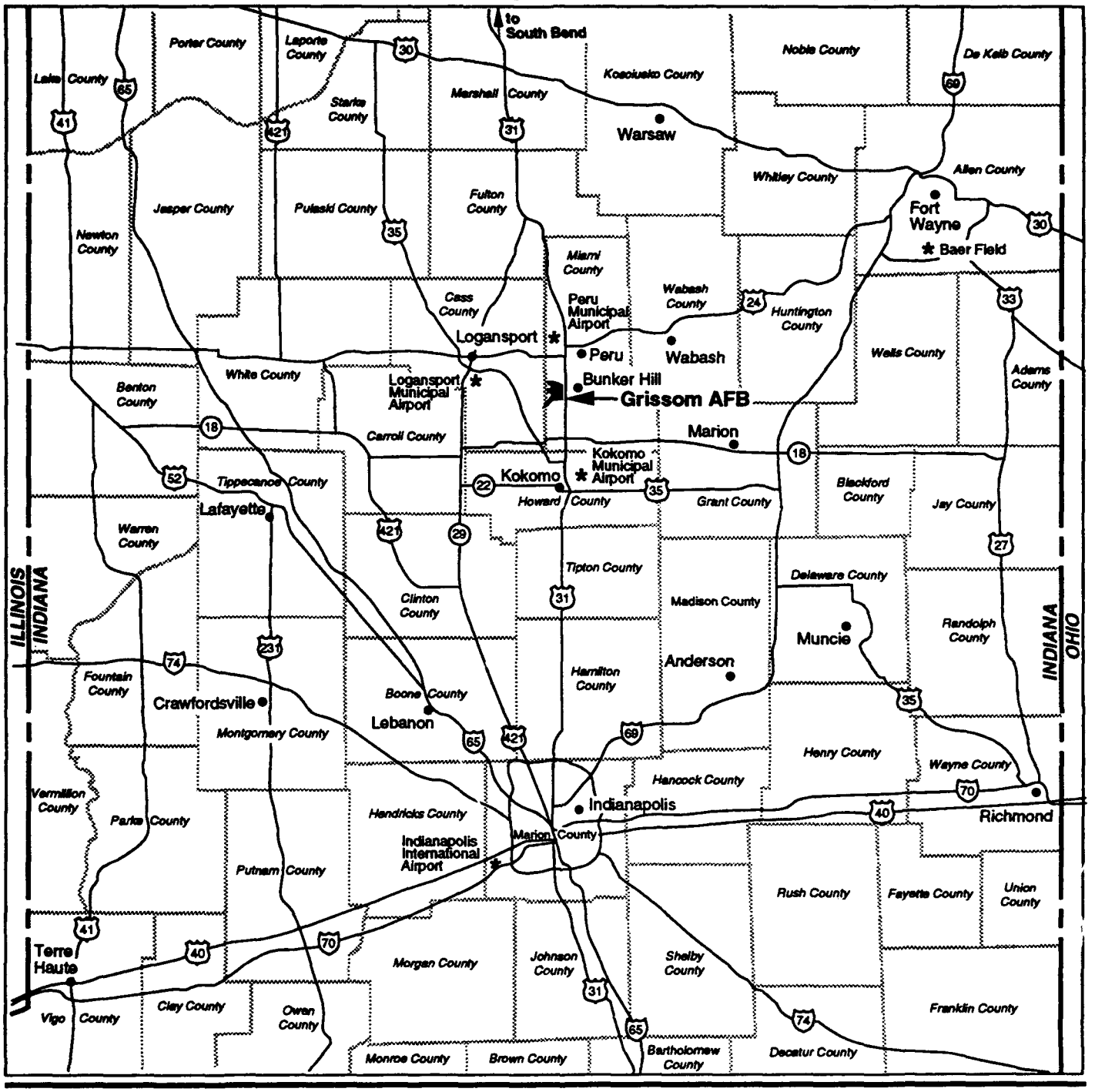
The topography of Grissom AFB and the surrounding portions of central Indiana consists of level plains or gently rolling hills, with streams and small closed depressions. Elevations at Grissom AFB average 795 feet above mean sea level (MSL) and vary only 30 feet, from approximately 780 feet above MSL near the northern base boundary to 810 feet above MSL near the southeastern base boundary.

The climate in central Indiana is temperate, with warm humid summers and cold winters. Variations in temperature are the result of maritime tropical air from the Gulf of Mexico in the summer and continental polar air from northern latitudes in the winter. The maritime tropical air produces warm, moderate humidity conditions while the continental polar air produces cold and usually low humidity conditions. The coolest month of the year is January, with a mean monthly temperature of 23 degrees Fahrenheit (°F), and the warmest month of the year is July, with a mean monthly temperature of 74°F. Precipitation in central Indiana averages 36.6 inches annually, and is evenly distributed throughout the year. Snowfall in the region occurs mainly from December through February and averages 32 inches per year.

The principal roadway serving Grissom AFB is U.S. 31, a north-south highway adjacent to the east boundary of the base, which connects the area with Indianapolis 65 miles to the south and South Bend approximately 75 miles to the north. U.S. 24, approximately 8 miles north of Grissom AFB, connects the area to Fort Wayne to the northeast and Logansport to the northwest.

Commercial airports near Grissom AFB are in Indianapolis and Fort Wayne, each located approximately 65 miles from the base. Municipal airports without commercial service are located in the towns of Peru, Kokomo, and Logansport (see Figure 3.2-1). Rail service to Grissom AFB, which was operated by Conrail, has been abandoned and all railroad track and ties have been removed.

Installation Background. Grissom AFB was established in 1942 as the Bunker Hill Naval Air Station (NAS) and remained an active naval training



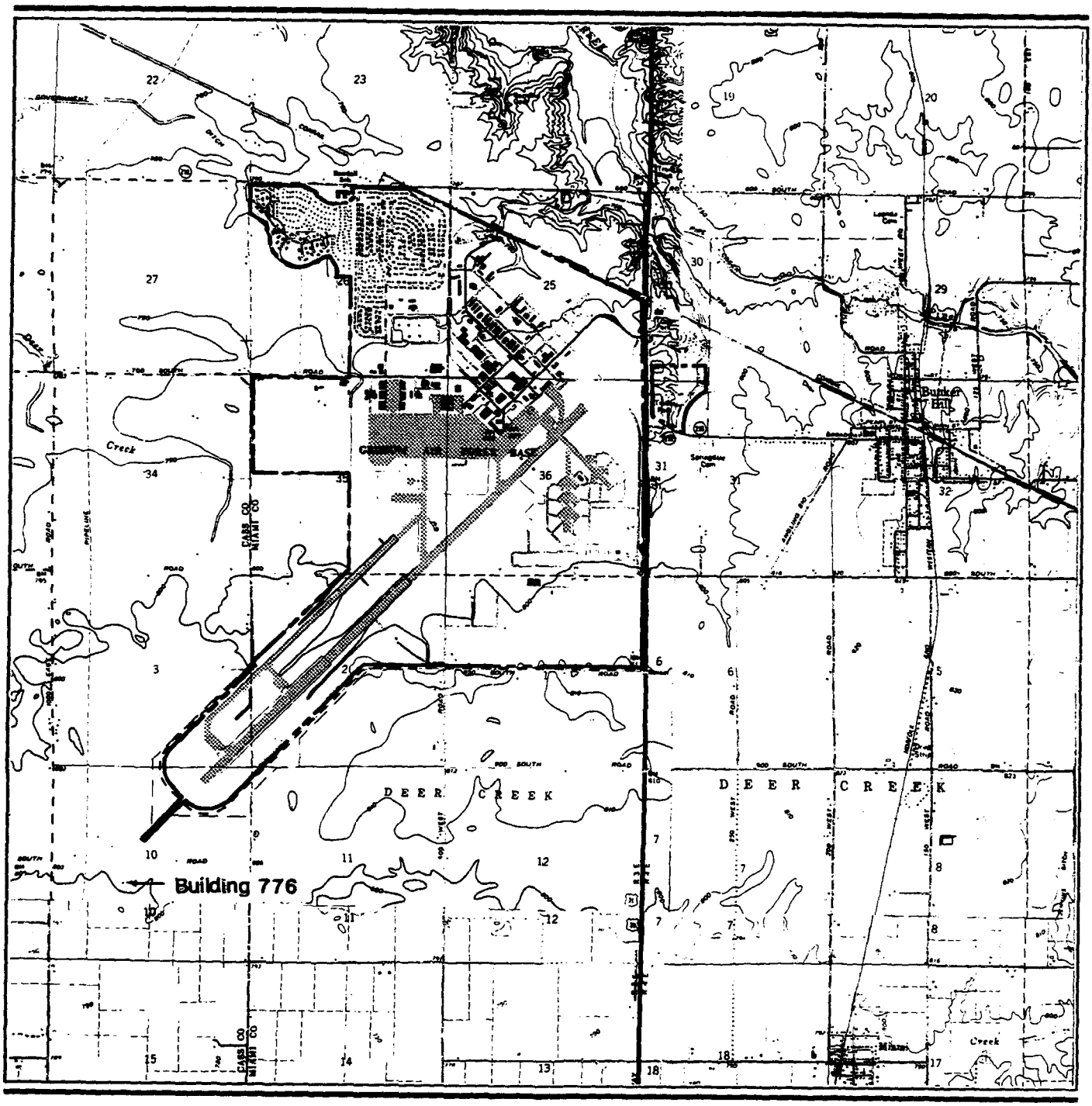
EXPLANATION

- ✱ Major Airports
- (70) Interstate Highway
- (31) U.S. Highway
- (18) State Highway
- ..... County Boundary
- — — — State Boundary

0 5 10 20 Miles

Regional Map

Figure 3.2-1



EXPLANATION

Base Boundary

Grissom AFB and Vicinity

0 1000 2000 4000 Feet

Map Source: U.S. Geological Survey, 1980.

Figure 3.2-2

site throughout World War II. Bunker Hill NAS was deactivated in 1946, and the land and facilities were leased to local business and agricultural interests.

The site was reactivated in 1954 as Bunker Hill AFB and assigned to the Tactical Air Command. The Strategic Air Command (SAC) assumed control in 1957, and the base became the home of the 4041st Air Base Group, which included the 68th Air Refueling Squadron. In 1959, the 305th Bombardment Wing was transferred to Grissom AFB and the 4041st Air Base Group was redesignated the 305th Combat Support Group. Bunker Hill AFB was renamed Grissom AFB in 1968 in honor of the late Lieutenant Colonel Virgil Ivan "Gus" Grissom, a native of Indiana and one of America's original seven astronauts.

In 1970, the 305th Bombardment Wing was deactivated and the 305th ARW was created. At present, the 305th ARW is the host unit at Grissom AFB. The base came under the control of Air Mobility Command in 1992 with the disestablishment of SAC. The AFRES 434th Wing at Grissom AFB included the 434th and the 930th Operations Groups. The 434th Wing was redesignated the 434th ARW in 1993.

3.2.1 Community Setting

The area surrounding Grissom AFB is used primarily for agriculture, with small unincorporated and incorporated communities dispersed throughout the area. The ROI for employment and population effects for communities potentially affected by base disposal and reuse of excessed property comprises the four counties of Cass, Miami, Wabash, and Howard. However, the effects of reuse are not expected to occur proportionately among all four counties. Rather, the substantial number of population and employment effects from realignment and reuse of the base are projected to occur in Miami County, primarily in the communities of Peru and Bunker Hill; and in Howard County, specifically in the community of Kokomo. These communities are, therefore, highlighted in the analysis as appropriate.

Total employment in the ROI was 104,680 in 1990, and is projected to be 100,261 at realignment. Overall employment in the ROI increased 0.6 percent annually between 1970 and 1990. The national and state average growth rates were 2.1 and 1.5 percent, respectively, during the same period. The major employment sectors in the ROI are manufacturing, services, retail trade, and government. In 1990, manufacturing provided 31.4 percent of the jobs in the ROI. While agriculture is not the dominant employment sector within the area, it is an important contribution to the economy and lifestyle.

Population in the ROI was about 191,200 in 1990 and is projected to be 184,174 at realignment. Populations in the communities of Kokomo, Peru,

and Bunker Hill were approximately 44,960, 12,840, and 1,010, respectively, in 1990 and are projected to be 44,290, 12,140, and 930, respectively, at realignment.

Total ROI housing units numbered 77,357 in 1990, having increased an average of 72 units (0.1 percent) annually since 1980. Howard County experienced the largest growth in housing stock (0.3 percent) in the ROI. Cass and Wabash counties experienced slight (0.1 percent) declines in their housing stocks from demolition of older units and removal of mobile homes. This flat trend in housing is consistent with the 0.7 percent average annual decline in population in the ROI between 1980 and 1990.

The base-related employment in 1990 consisted of 3,527 direct and 1,012 secondary jobs (U.S. Air Force, 1990). By September 1994, the direct employment associated with the base is expected to decrease to 978 military and civilian jobs. Approximately 50 of these will be associated with the caretaker activities of the OL; the remaining 928 direct employees will be associated with the military cantonment. A total of 311 secondary jobs will be associated with Grissom AFB, including 299 secondary jobs related to the military cantonment activities and 12 secondary jobs related to caretaker activities.

3.2.2 Land Use and Aesthetics

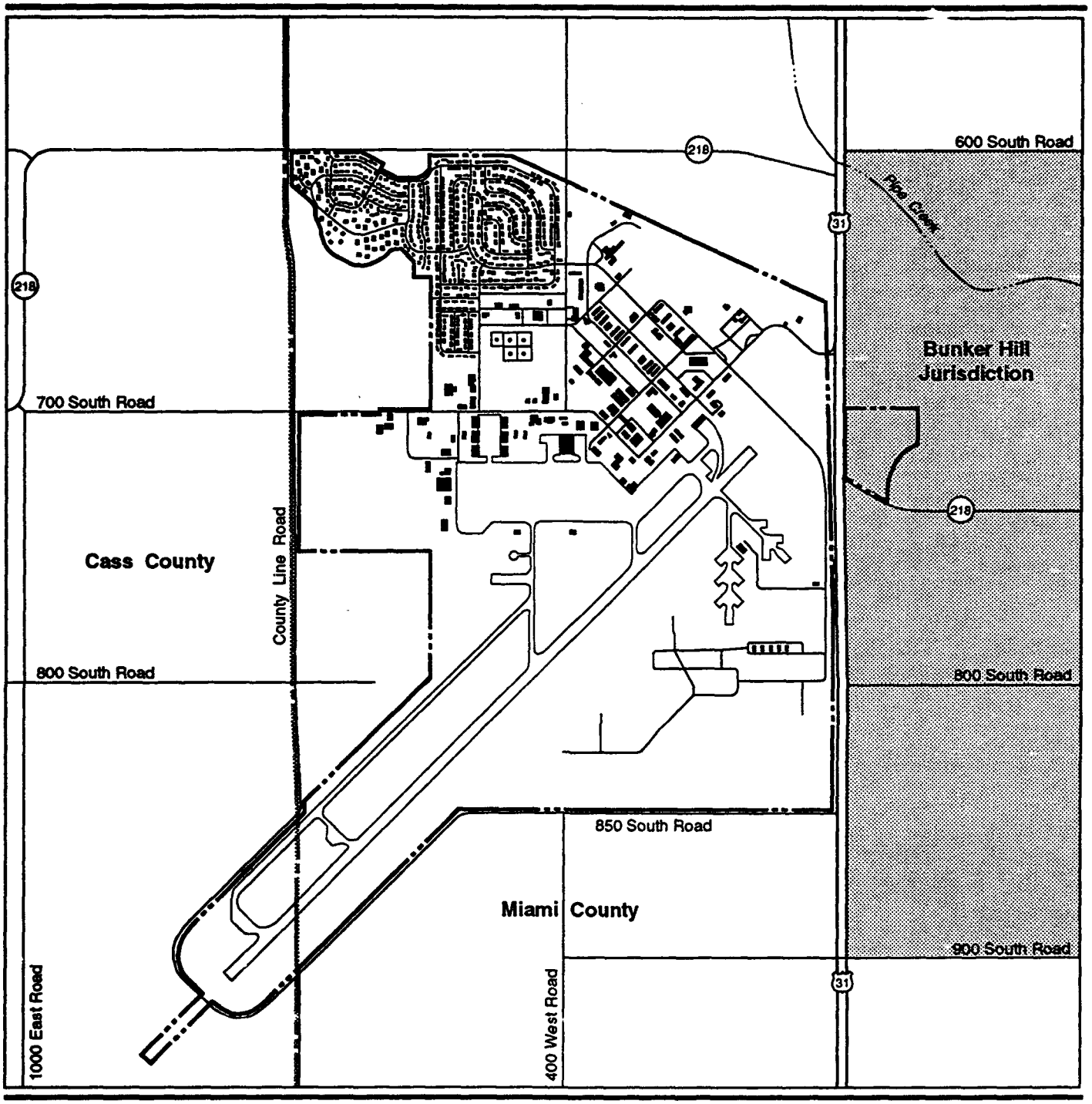
This section describes the land uses and aesthetics for the base property and the surrounding areas of Grissom AFB at base realignment. Projected land uses in the vicinity of the base at realignment are assumed to be similar to existing land uses. The ROI includes the base property and potentially affected adjacent properties within the jurisdictions of Cass and Miami counties, and the town of Bunker Hill, east of the base on SH 218.

Grissom AFB is owned by the U.S. Government. Approximately 95 percent of the base is in Miami County, while the southwest end of the runway crosses into Cass County (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 in the long term.

Of the two counties where Grissom AFB is located, only Cass County has a comprehensive plan. Cass County's 1985 Comprehensive Plan emphasizes economic development for the county, and includes the military airfield as a public land use with the adjacent off-base property as agriculture land use.



EXPLANATION

Base Boundary

Bunker Hill Planning and Zoning Jurisdiction

County Boundary

Local Boundaries

0 725 1450 2900 Feet

Figure 3.2-3

Although Miami County does not have a comprehensive plan, land use is regulated through zoning. Miami County land use planning documents do not include future reuse planning policies for the base property.

The town of Bunker Hill, which does not have a comprehensive plan, is considering annexation of Grissom AFB property and facilities. At realignment, Bunker Hill and Miami County are expected to adopt land use plans to include civilian redevelopment of the base.

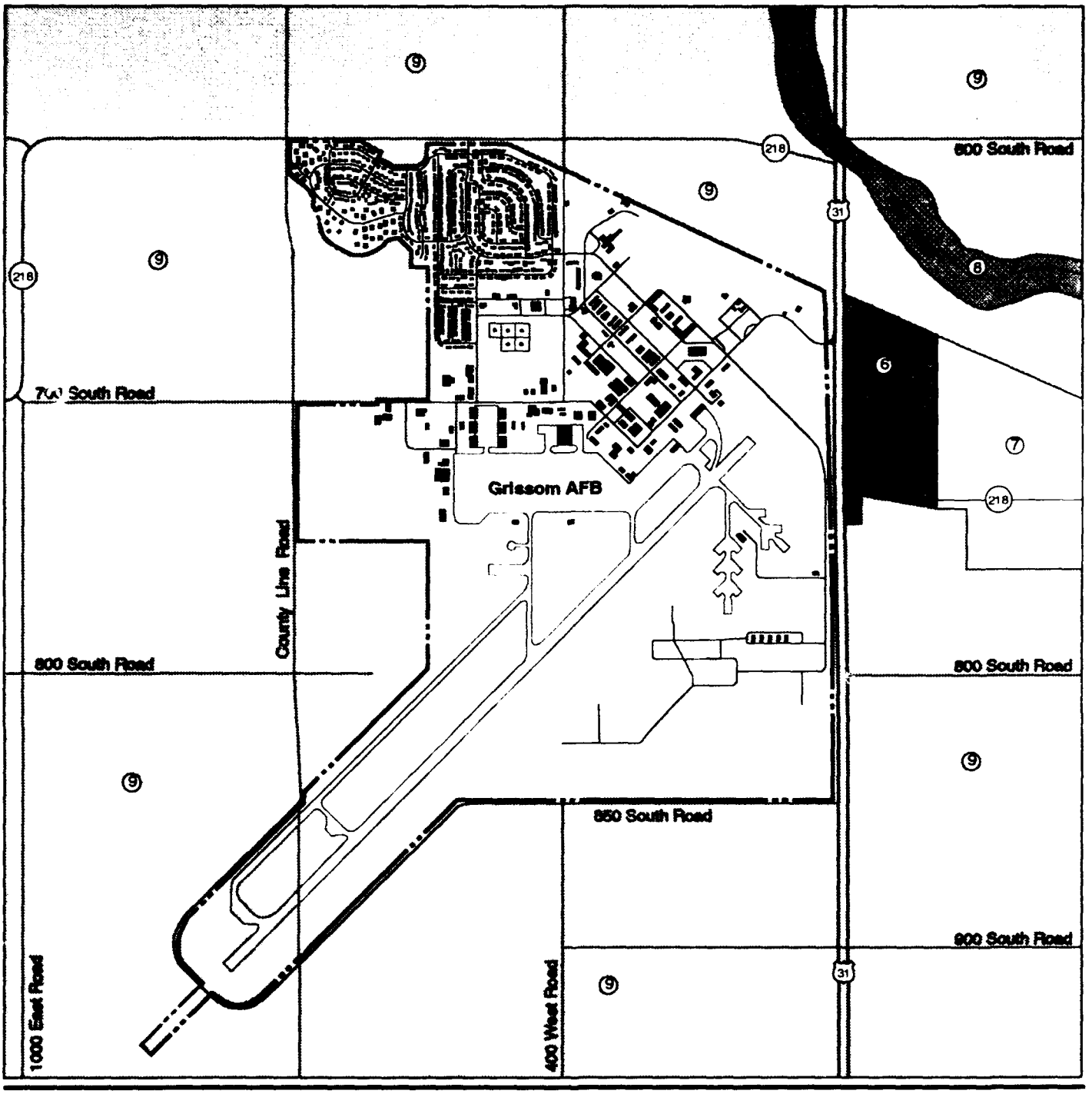
Zoning. Zoning provides for the division of the jurisdiction (in conformity with the general plan) into districts within which the height, open space, building coverage, density, and type of future land uses are set forth. Zoning is designated to achieve various community development goals. Zoning guides development and can be amended to accommodate new land uses.

The Cass County Zoning Ordinance (amended 1988) and the Miami County Zoning Ordinance (1984) have zoned approximately 90 percent of the area immediately surrounding the base for agricultural land use (Figure 3.2-4). The land along Pipe Creek, to the north and northeast of the base, is zoned as floodplain/muckland and has been classified as public/recreation land use for purposes of analysis. In 1967, Miami County adopted an ordinance allowing the town of Bunker Hill planning and zoning jurisdiction outside of the town's corporate limits. This jurisdiction extends to U.S. 31, approximately 1 mile west of Bunker Hill's corporate limits. The northern boundary of this area is 600 South Road and the southern boundary extends to 900 South Road. Bunker Hill has zoned this property for agricultural, residential, and commercial land uses.

The portion of the base within Miami County has not been zoned and is identified as federal property. The portion of the base in Cass County has been zoned for agricultural uses even though the comprehensive plan identifies military airfield use for this area. The small parcel of vacant land across U.S. 31 on the east side of the base, a former residence and mobile home park, is zoned for general business use by Bunker Hill and has been classified as commercial.

On-Base Land Use. Land use identifies the present land usage by various general categories. Existing (prerealignment) land uses on the base property are described in this section.

The airfield, including the 12,500-foot runway, bisects the base from southwest to northeast (Figure 3.2-5). On the southeast side of the airfield, land uses include aviation support; industrial uses associated with the storage of ammunition and hazardous waste; institutional (educational) land uses associated with a small arms firing range, classrooms, and obstacle course; and vacant grasslands.



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 *
- Not Zoned
- Base Boundary

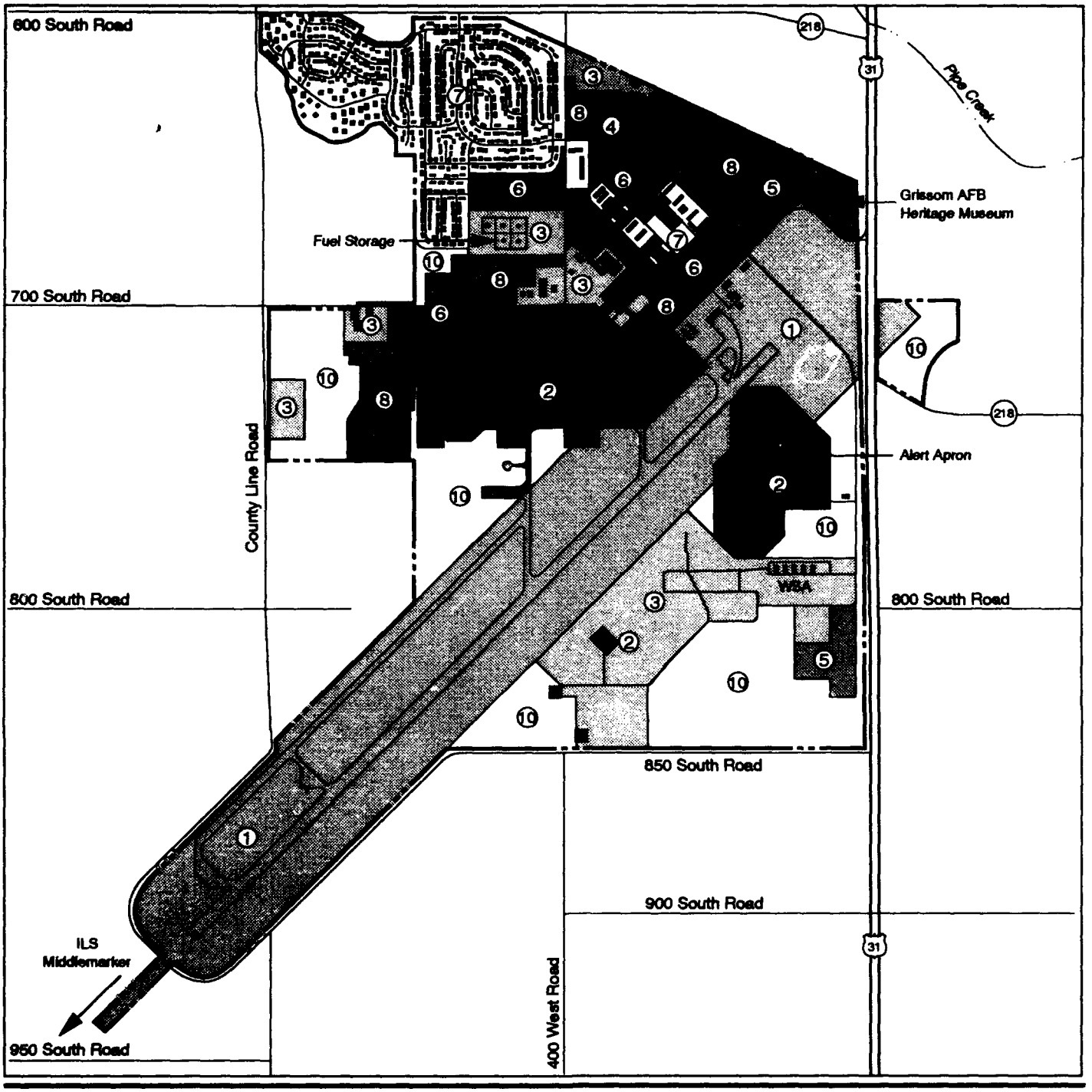
0 725 1450 2900 Feet

* Standard land use designation not applicable to this figure.

Local Zoning

Figure 3.2-4

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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
- Base Boundary

0 650 1300 2600 Feet

* Standard land use designation not applicable to this figure.

Prerealignment On-Base Land Use (1992)

Figure 3.2-5

The northwest side of the airfield is considered the developed portion of the base and includes aviation support, industrial, institutional (educational), institutional (medical), commercial, residential, public/recreation, and vacant land uses. The base also includes the parcel across U.S. 31 and maintains it as vacant land necessary for CZ requirements. The base property, totaling 2,722 acres, includes the following existing land uses and acreages:

Land Use	Acreage
Airfield	834
Aviation Support	346
Industrial	328
Institutional (Medical)	17
Institutional (Educational)	29
Commercial	156
Residential	325
Public/Recreation	237
Vacant Land	450
Total	2,722

The existing land uses for Grissom AFB are shown in Figure 3.2-5. The following text briefly describes on-base land use categories.

The airfield land use at Grissom AFB contains facilities to support an active military installation with an operational airfield. The 12,500-foot runway includes the runway and safety distances required for aircraft takeoffs and landings. The airfield land use also contains areas within the base property used for runway CZ. Included on base in the northern CZ are four administrative and four storage buildings.

The aviation support land uses include the control tower, taxiways, nose docks and hangars, fuel systems, alert apron, and aircraft parking areas. These areas are located adjacent to the main apron on both the west and east sides of the runway.

Industrial land use areas on base contain the storage facilities for ammunition and hazardous waste in the southeast part of the base, and bulk fuel storage, coal storage, and areas reserved for vehicle cleaning and storage in the center of the base. Also included in this land use are the Defense Reutilization and Marketing Office (DRMO) storage yard and a coal ash pile from heating plant operations, both on the west side of the base off County Line Road. The WWTP on the north side of the base is also used for industrial purposes.

Institutional land uses are divided into two categories: medical and educational. The medical land use consists of the Air Force medical clinic, which is used for outpatient care only, and includes medical offices,

examining rooms, and a large pharmacy. The educational land use is located in two areas on base. The first area includes the small arms firing range and the obstacle training course located in the southeast portion of the base. The second area includes portable trailer classrooms and office space in the Miller building in the northeast portion of the base near the Main Gate. Colleges that have offices and offer courses to military personnel on base include Indiana Vocational Technical College, Ball State University, and Vincennes University.

The commercial land uses are located in the central portion of the base and contain the base commissary and exchange shops, chapel, library, post office, dining halls, banquet facilities, and administrative buildings.

Residential land uses are generally in the northwest quadrant of the base where the family housing is located. Military Family Housing offers 1,116 dwellings within single family, duplex, four-plex, and six-plex units on base. In addition, the base offers temporary living facilities for up to 12 families. The base can also accommodate 1,044 unaccompanied officers and enlisted personnel in the base dormitories, officers' quarters, and VOQs located in the central portion of the base.

Public/recreation land uses include a nine-hole golf course and driving range in the northeastern portion of the base, the riding stables and adjacent land on the west side of the base, and ball fields and tennis courts located throughout the base. Also included are the gymnasium, indoor swimming pool, and bowling center. The Grissom Heritage Museum is located next to the Main Gate, and includes a display of 18 U.S. military aircraft from several eras of aviation history.

Vacant land areas are present throughout the base including 21 acres of the 33-acre parcel outside of the CZ located across U.S. 31, and undeveloped areas next to the airfield and adjacent to the east side of County Line Road.

Leases and Easements. The Air Force holds a number of leases, easements, and licenses to other agencies and organizations for use of the base property. These include roadways, utilities, and work space in base facilities. The terms of these outgrants are shown in Table 3.2-1.

In addition, the Air Force has avigational easements off base at each end of the runway. The easements include 242 acres at the northeast end of the runway and 129 acres at the southwest end. These easements, which restrict development, consist primarily of agricultural land.

Adjacent Land Use. The rural land uses surrounding Grissom AFB are generally consistent with local zoning designations. Land uses in the immediate vicinity of the base are discussed in this section and illustrated in Figure 3.2-6.

Table 3.2-1. Inventory of Easement Agreements, Licenses, Permits, and Leases in Effect at Base Realignment

Document Number	Expiration Date	Description/Location	Responsible Party
DACA-45-4-75-6007	June 30, 2024	Reserve Center and Vehicle Maintenance Shop	Department of the Army
DACA-27-2-88-71	April 6, 2013	Underground Telephone Cable	Indiana Bell
DACA-45-2-80-6244	Perpetual	Turn-off to Main Gate from U.S. 31	Indiana State Highway Commission
DA-11-032-ENG-6976	Perpetual	Road Right-of-Way	State of Indiana
DA-11-032-ENG-8170	January 31, 2011	Underground Telephone Cable Ducts	Indiana Bell
DA-11-032-ENG-10250	Perpetual	Relocated Highway	Cass County
DA-11-032-ENG-10251	Perpetual	Relocated Highway	Miami County
USAF-SAC-GRM-3-90-3	July 31, 1995	Office and Dormitory Space	Civil Air Patrol
DACW-27-4-87-202	January 1, 2013	NEXRAD Construction at Mississinewa Lake	Department of the Army
RE-D101	Perpetual	Outfall Sewer Line Pipe	Conrail

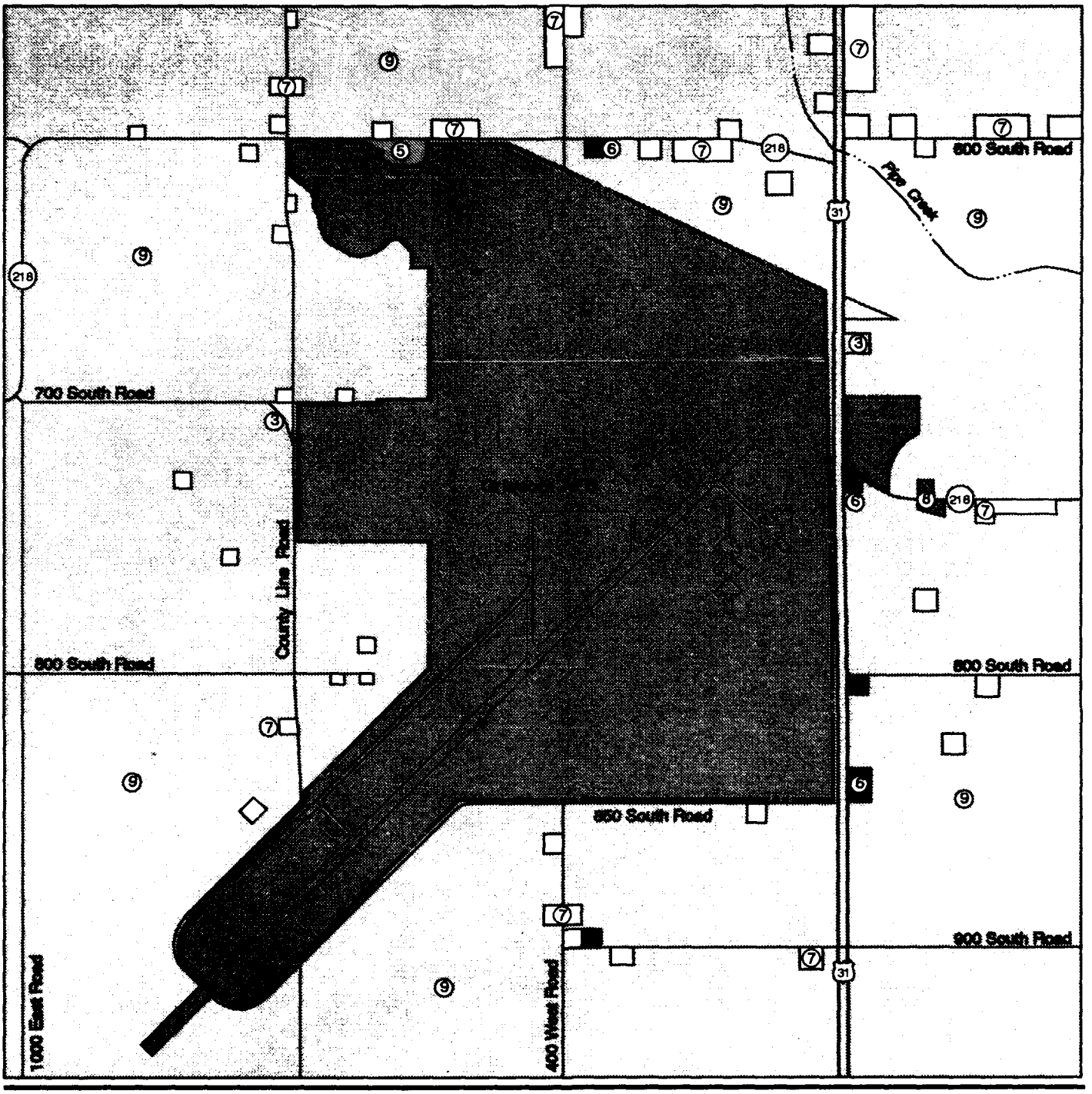
The area surrounding Grissom AFB is predominantly agricultural and is used for raising crops, such as corn and soybeans.

The area to the south of the base is generally agricultural, with a few residences and a commercial establishment. Land uses west of the base include agriculture, scattered residential sites, and a gravel pile used for county road maintenance.

On the north side of the base are agricultural, residential, institutional (educational), and commercial land uses. The wooded areas along Pipe Creek are classified as agricultural land uses.

Land east of the base is generally used for agriculture, with some residential, commercial, and industrial land uses occurring along U.S. 31. The commercial uses include a restaurant, recreational vehicle sales lot, and a gas station.

Air Force Policies Affecting Adjacent Land Uses. The Air Force has developed the 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 use districts are derived from the AICUZ noise contours, Accident Potential Zones (APZs), and lateral safety zones. Noise Zones and APZs are delineated specifically for each base, using operational information derived from the base mission. An AICUZ report for Grissom AFB was issued in June 1978.



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 *
- Base Property
- Base Boundary

0 725 1450 2900 Feet

* Standard land use designation not applicable to this figure

Existing Off-Base Land Use (1992)

Figure 3.2-6

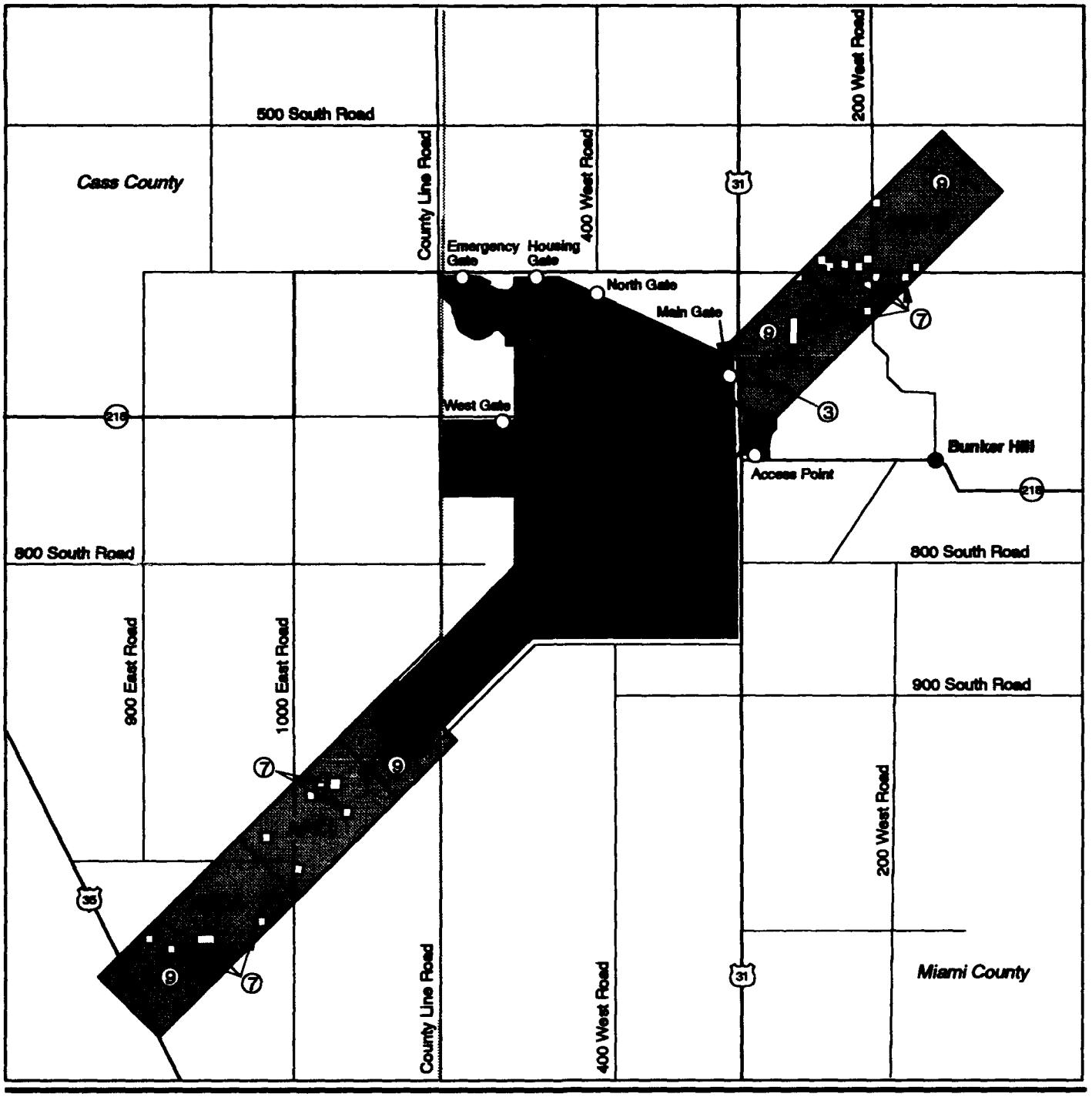
AICUZ noise contours are based on standard noise ratings that are calculated from types of aircraft, number of aircraft daily operations, time of day flown, aircraft flight patterns, power settings, air speeds, altitudes, and climatic conditions (U.S. Air Force, 1986). A day-night weighted average sound level (DNL) is used to describe the noise environment. Noise contours for prerealignment conditions at Grissom AFB are presented and discussed in Section 3.4.4. Based on the noise contours, a total of 7,075 acres of industrial, commercial, residential, public/recreation, and agricultural land uses are exposed to DNL 65 decibels (dB) and above from aircraft operations under prerealignment conditions.

CZs and APZs delineate areas at both ends of the runway where the probability of aircraft accidents is highest, based on analyses of past aircraft accidents. 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 acquire easements to preclude most land uses. Certain land use restrictions are recommended in lower risk areas, identified as APZ I and APZ II. Industrial, agricultural, recreation, some low-density commercial, and vacant land uses are compatible with APZ I, but residential and high population density land uses are discouraged. Low density residential (less than one residence per acre) and low-density commercial uses are compatible with APZ II, in addition to those uses listed for APZ I. Municipalities with jurisdiction over adjacent lands may zone this land in accordance with AICUZ recommendations, but they are not required to follow these recommendations.

At Grissom AFB, the CZ at the northeast end of the runway is contained within the base boundary and includes eight structures used for maintenance, storage, and administration purposes (Figure 3.2-7). These structures are incompatible with AICUZ guidelines. U.S. 31 also passes through this CZ. The CZ at the southwest end of the runway extends off base into approximately 129 acres of agricultural land. No land use conflicts exist within this area.

The APZ I at the northeast end of the runway includes industrial, public/recreation, and agricultural land uses with two single-family residences. The southwestern APZ I includes agricultural land and six residential units. These land uses are all compatible with APZ I restrictions. The northeastern APZ II contains agricultural and open space land uses with 11 single-family residential units scattered throughout the area. The southwestern APZ II also contains agricultural land, open space, and four single-family residences. The low-density residential (maximum of one dwelling per acre) and non-residential uses are compatible with APZ II restrictions.

Realignment Baseline. In September 1994, the installation will realign and the military activities on base will be terminated except those associated



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 *
- Base Property
- APZ Accident Potential Zone
- CZ Clear Zone
- County Line

0 .25 .5 1 Mile

* Standard land use designation not applicable to this figure.

Clear Zones and Accident Potential Zones

Figure 3.2-7

with the military cantonment and OL. The OL will coordinate the disposal activities for excess property of the base, serve as the Air Force liaison supporting community reuse, and establish a caretaker force to assure resource protection, grounds maintenance, utility operations, and building care for those facilities outside the retained military cantonment.

The 434th ARW will operate and maintain the airfield, bulk fuel storage facility, several dormitories, reserve offices, the fitness center, equipment barns, and base supply warehouses. The on-base land uses at the time of realignment are illustrated in Figure 3.2-8. Noise contours from realignment conditions at Grissom AFB are presented and discussed in Section 3.4.4. Based on noise contours, a total of 5,799 acres of industrial, commercial, public/recreation, and agricultural land uses would be exposed to DNL 65 dB and above from aircraft operations under realignment conditions. CZ and APZ requirements would be the same as prerealignment conditions.

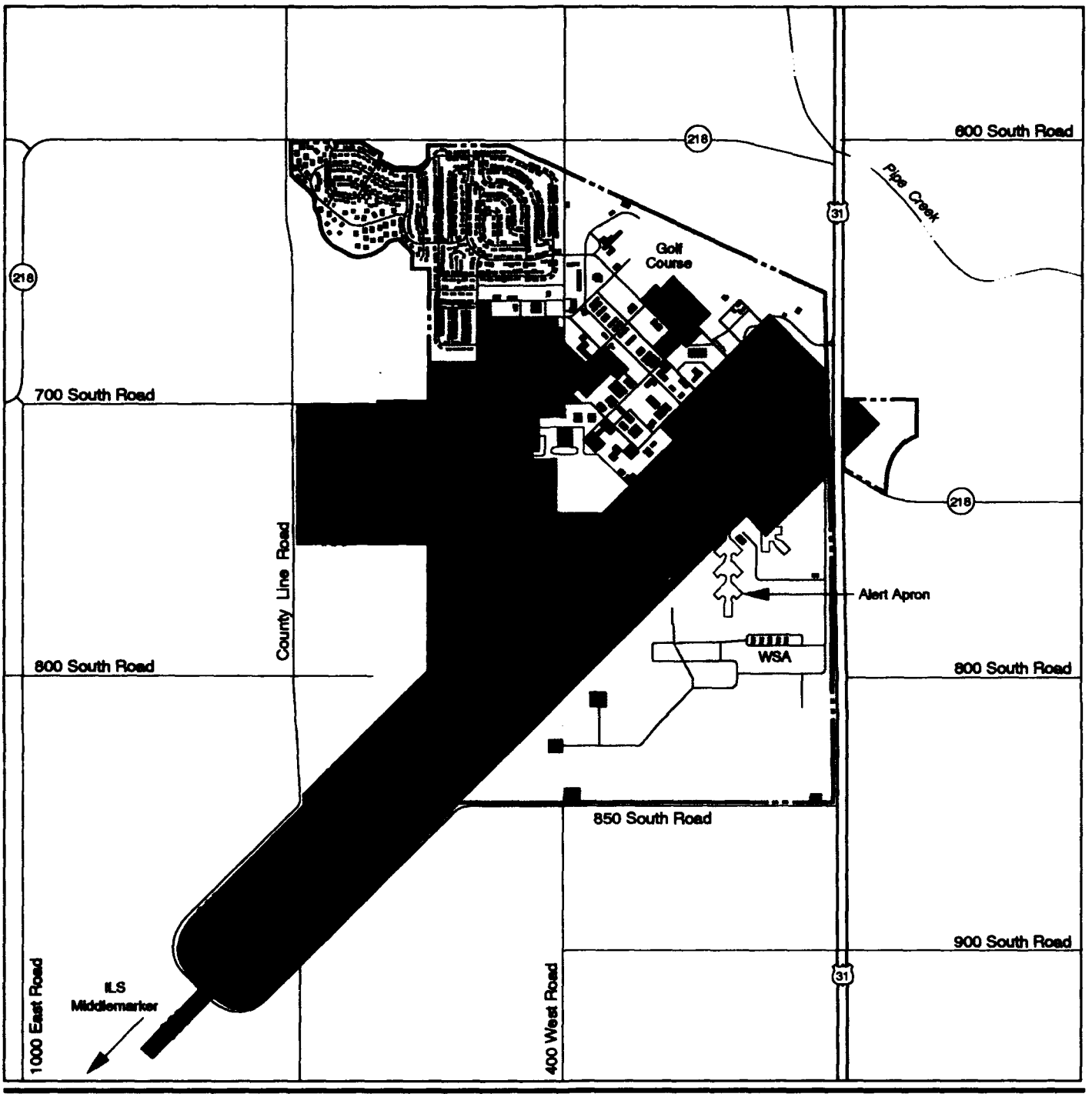
3.2.2.2 Aesthetics. Visual resources include natural and man-made features that give a particular environment its aesthetic qualities. Criteria used in the analysis of these resources include visual sensitivity, which is the degree of public interest in a visual resource and concern over adverse changes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

The present appearance of the base includes a variety of building styles from its 50-year history. Many of the buildings on base were constructed during World War II and after the Korean War and were built as temporary structures, intended for short-term use. These structures are generally one or two stories, of wood construction. There are also some vacant structures on base that need maintenance. In addition, there are a few buildings that have been left in mid-construction.



EXPLANATION

- Caretaker Status
- Military Cantonment
- Base Boundary
- Access Points

0 725 1450 2900 Feet

Realignment On-Base Land Use

Figure 3.2-8

Grissom AFB is located in an area known as the Upland Till Plain. The flat and gentle slopes of the base and surrounding area are characteristic of glacial deposits and formations. Because of the flat terrain on base, few visually sensitive areas are present except where landscaping or tree cover is present (Figure 3.2-9).

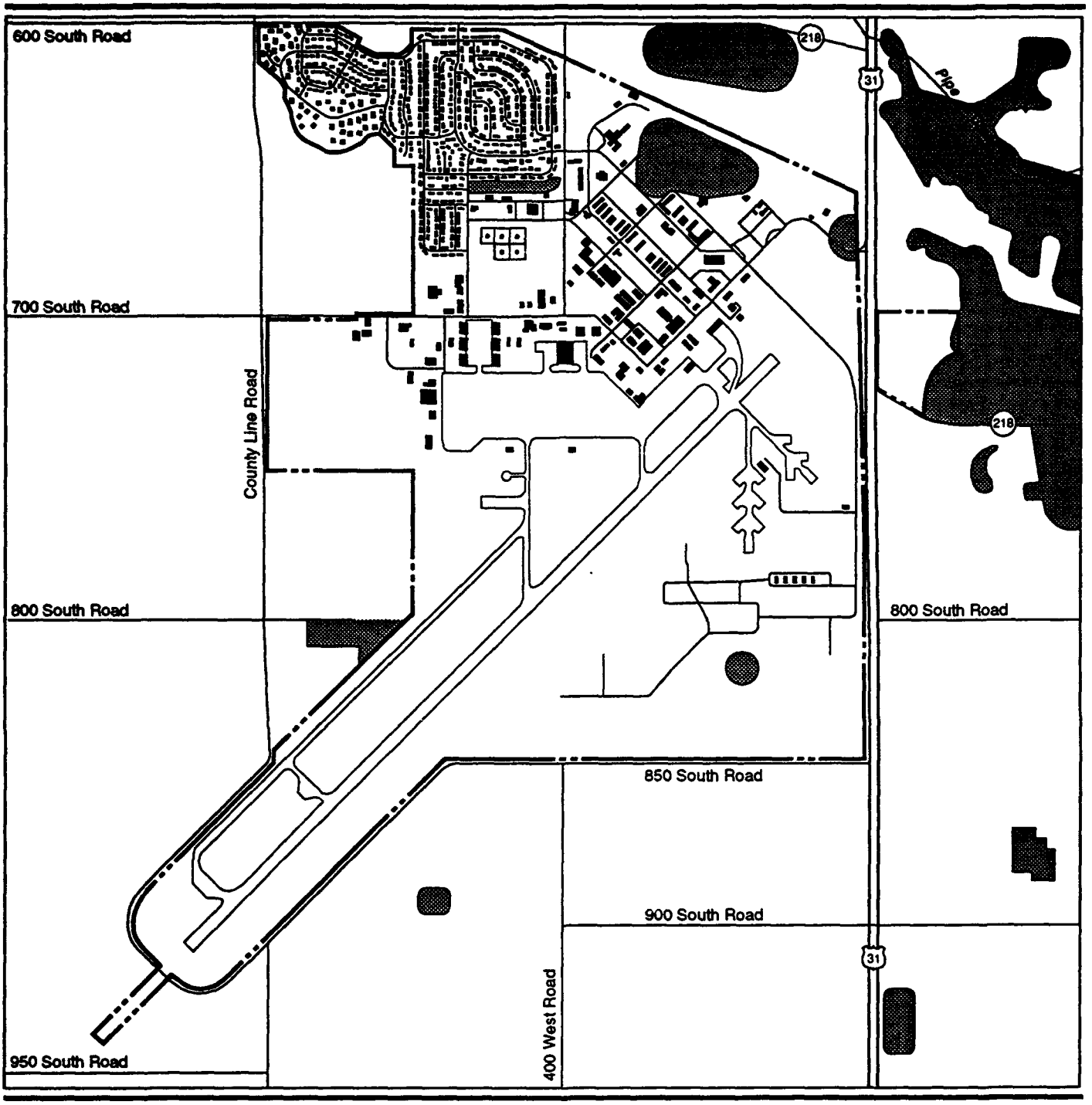
The high visual sensitivity areas on base include a remnant of a beech-maple forest near the community center and family housing area. The tree canopy is very pleasant, but more significant is the height of the trees (from 50 to 100 feet), which is important because of the species' slow growth rate. Other high visual sensitivity areas on base are the 90-acre golf course, the Main Gate area, and a stand of trees on the southeast portion of the base. Off base, the few wooded areas surrounding the base and those found along Pipe Creek are of high visual sensitivity.

3.2.3 Transportation

Transportation addresses roadways, airspace/air traffic and air transportation, and railroads. The ROI for the transportation analysis includes the existing principal road, air, and rail networks that serve the cities of Peru, Kokomo, and Logansport, and the local communities of Bunker Hill, Miami, and Walton, with emphasis on the immediate area surrounding Grissom AFB. Within this geographic area, the analysis focuses on the segments of the transportation networks that serve as direct or key indirect linkages to the base and those that are commonly used by Grissom AFB personnel.

3.2.3.1 Roadways. The evaluation of 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 physical factors. Traffic volumes typically are reported, depending on availability of data, as the daily number of vehicular movements (e.g., passenger vehicles, trucks) in both directions on a segment of roadway, averaged over a full calendar year (average annual daily traffic [AADT]), or averaged over a certain time period less than 365 consecutive days to give the average daily traffic; and/or the number of vehicular movements on a road segment during the peak hour (expressed in vehicles per hour). The peak-hour volume (PHV) 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 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



EXPLANATION

High Visual Sensitivity

Base Boundary

Visual Sensitivity

0 650 1300 2600 Feet

Figure 3.2-9

operating conditions where minor or tolerable delays are experienced by motorists. LOS D represents below-average conditions. LOS E corresponds to the maximum capacity of the roadway. LOS F represents a jammed situation. Table 3.2-2 presents the LOS designations and their associated volume/capacity ratios. These levels are based primarily on the Highway Capacity Manual (Transportation Research Board, 1985), and are adjusted for local conditions.

Table 3.2-2. Road Transportation Levels of Service

		Criteria (Volume/Capacity)		
LOS	Description	Freeway[a]	Multi-Lane Highway[b]	Two-Lane Highway[c]
A	Free flow with users unaffected by presence of others in traffic stream.	0-0.35	0.0-0.28	0-0.10
B	Stable flow, but presence of other users in traffic stream becomes noticeable.	0.36-0.54	0.29-0.45	0.11-0.23
C	Stable flow, but operation of single users becomes affected by interactions with others in traffic stream.	0.55-0.77	0.46-0.60	0.24-0.39
D	High density, but stable flow; speed and freedom of movement are severely restricted; poor level of comfort and convenience.	0.78-0.93	0.61-0.76	0.40-0.57
E	Unstable flow; operating conditions near capacity with reduced speeds, maneuvering difficulty, and extremely poor levels of comfort and convenience.	0.94-1.00	0.77-1.00	0.58-0.94
F	Forced or breakdown flow with traffic demand exceeding capacity; unstable stop-and-go traffic.	1.00	1.00	0.95-1.00

Notes: (a) Table 3-1, LOS criteria for basic freeway section.
(b) Table 7-1, LOS criteria for multilane highways four-lane arterial.
(c) Table 8-1, LOS criteria for general two-lane highway segments, rolling terrain, 20 percent no passing zones.
LOS = Level of Service.

Source: Compiled from Transportation Research Board, 1985.

The Indiana DOT generally seeks to maintain LOS C in rural areas and LOS D in urban areas, but these objectives are not rigid and vary by location.

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

Regional. Regional access to Grissom AFB is provided by U.S. 31, a major north-south, four-lane, divided highway connecting Indianapolis and South Bend, Indiana. U.S. 31 bisects the city of Kokomo, is the eastern boundary of the base, and provides access to U.S. 24 (Figure 3.2-10). U.S. 24 is the main east-west highway connecting Fort Wayne and Logansport, Indiana. U.S. 35 is the north-south highway connecting Kokomo and Logansport. Access to Grissom AFB from U.S. 31 is by the Main Gate.

U.S. 31 has a capacity of 6,000 vehicles per hour in the vicinity of Grissom AFB between Kokomo and Old U.S. 31 (business route to the city of Peru). The peak-hour traffic on U.S. 31 at the Grissom AFB Main Gate was 1,900 in 1990. On U.S. 31, north of Old U.S. 31 between the east and west U.S. 24 junction, the peak-hour traffic was 1,200 vehicles in 1990. The peak-hour traffic on U.S. 31 at the southeast corner of the base was 1,850 vehicles in 1990.

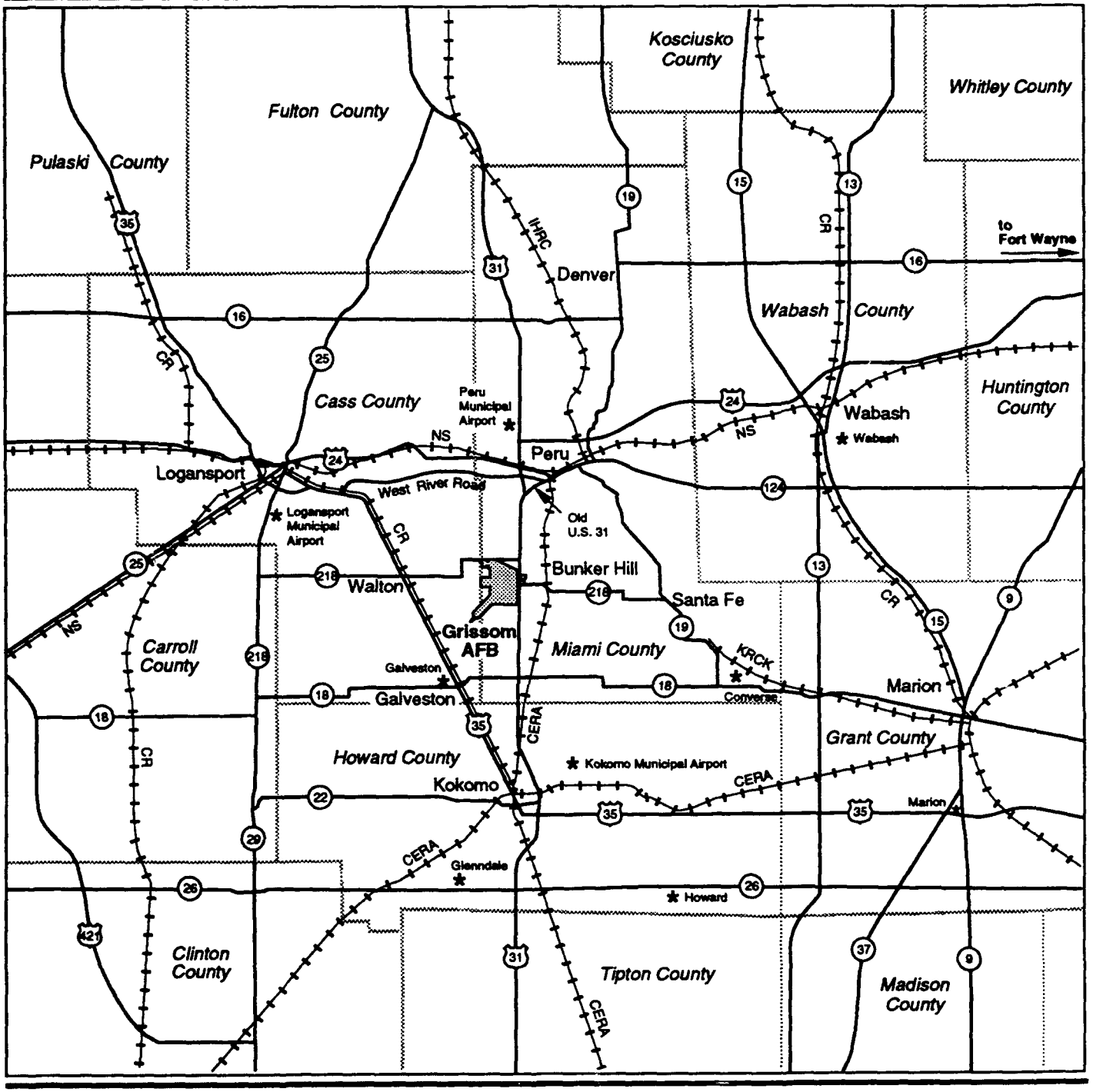
Local. Figure 3.2-11 shows the general local road network in the immediate vicinity of Grissom AFB. Primary access to the base is provided by U.S. 31 and by SH 218.

- Old U.S. 31 is a two-lane highway north of Grissom AFB that connects U.S. 31 to U.S. 24 in Peru.

- SH 218 (west of U.S. 31) is a two-lane highway providing access to the base from Walton, Galveston, and Logansport. Three active gates on the base (Housing, North, and West gates) are accessed from SH 218. SH 218 has a capacity of 2,000 vehicles per hour (VPH). The peak-hour traffic between the North Gate (400 West) and U.S. 31 was 300 vehicles in 1990. On SH 218, between the West Gate and the Cass County line, the peak-hour traffic was 150 vehicles.

- SH 218 (east of U.S. 31) is a two-lane rural highway connecting U.S. 31 to SH 19 via Bunker Hill and Santa Fe. SH 218 has a capacity of 2,000 VPH and a 1990 peak-hour traffic of 250 vehicles between U.S. 31 and Bunker Hill.

On-Base. Figure 3.2-12 shows the location of the gates that provide access to Grissom AFB and the on-base street network. The Main Gate, located just off U.S. 31, is operated on a 24-hour basis and is used by military and civilian personnel and visitors. The North Gate, located off SH 218 (about 1 mile west of U.S. 31), operates between 6:30 a.m. and 5:30 p.m. and functions as a secondary access to the base and as a primary access for trucks and base housing. The Housing Gate, located off of SH 218, provides access to the base housing area and operates from 7:00 p.m. to 10:00 p.m. during the weekends and holidays. An emergency gate, also located off SH 218, can provide access to the northwest portion of the base; however, this gate is currently inactive. West Gate, on 700 South



EXPLANATION

- U.S. Highway
- State Highway
- Airport
- County Line
- Railroad

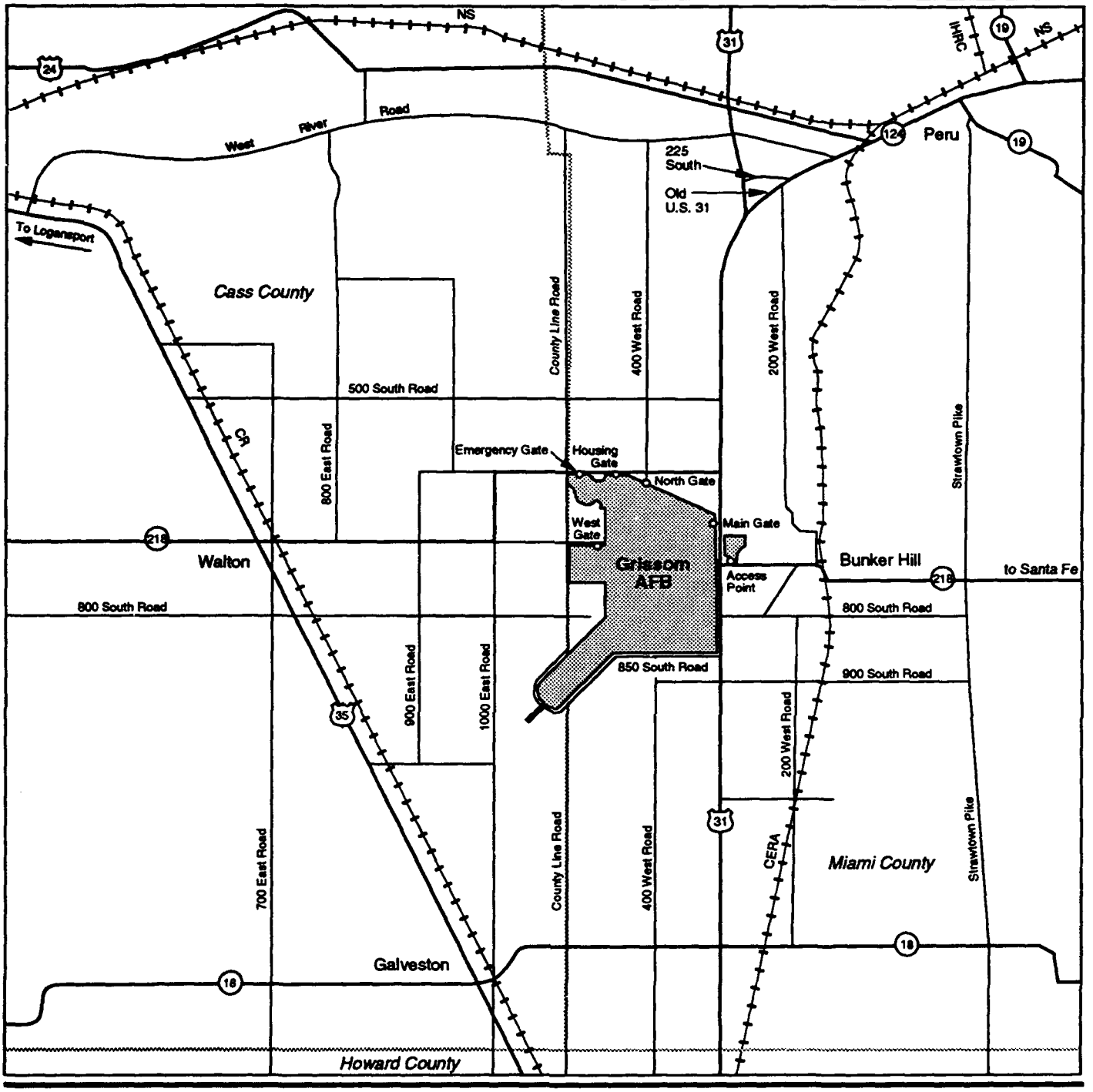
CERA - Central Railroad Co. of Indianapolis
CR - Conrail
IHRC - Indiana Hi-Rail Corp.
KRCK - Kokomo Railway Corp.
NS - Norfolk Southern

0 2 4 8 Miles

Source: Indiana Department of Transportation, 1992.

Regional Transportation System

Figure 3.2-10



EXPLANATION

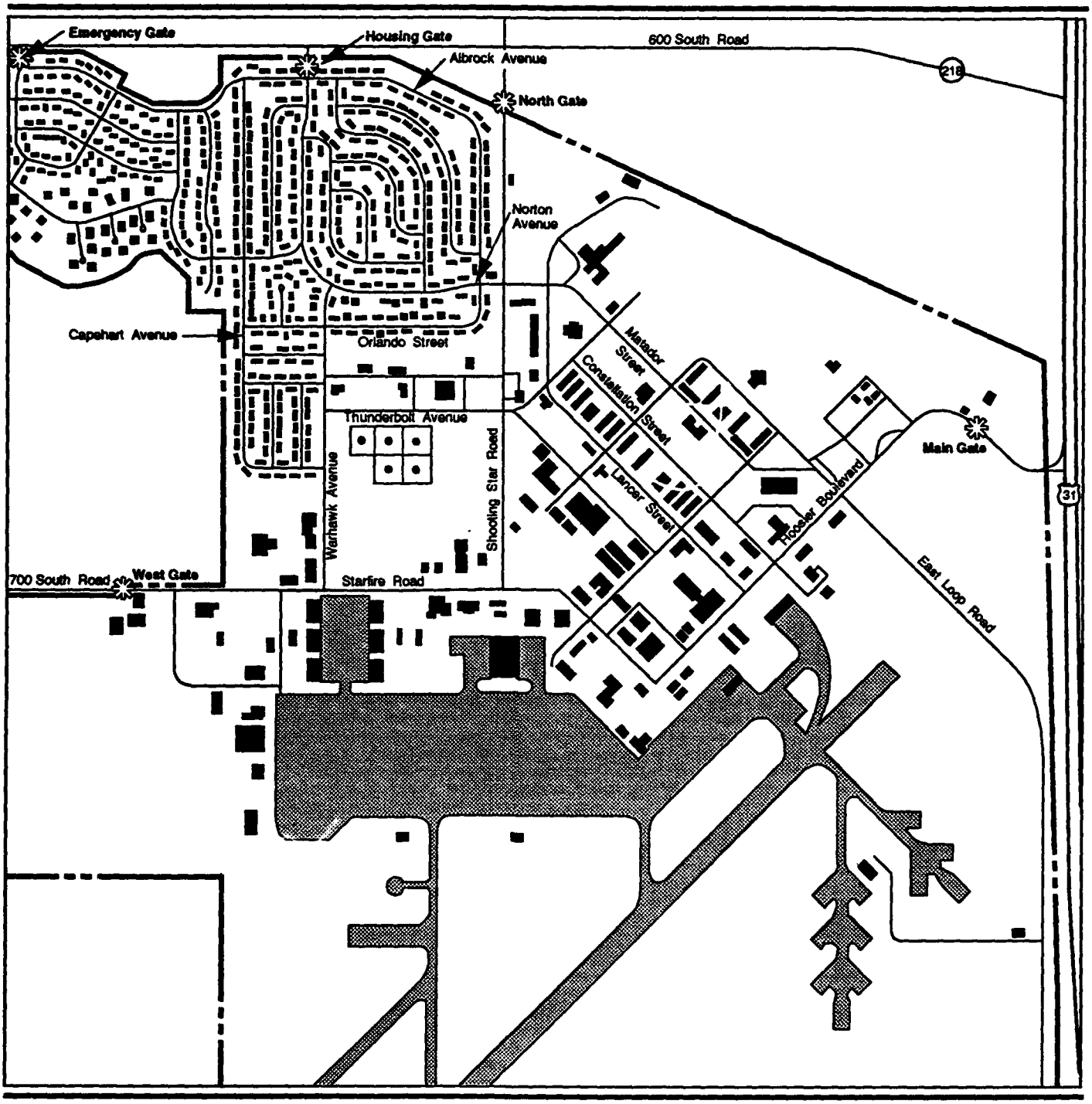
- 31 U.S. Highway
- 18 State Highway
- County Line
- Railroad

CERA - Central Railroad Co. of Indianapolis
CR - Conrail
IHRC - Indiana Hi-Rail Corp.
NS - Norfolk Southern

Local Transportation System

0 .5 1 2 Miles

Figure 3.2-11



EXPLANATION

- Airfield Pavement
- Base Gate
- Base Boundary

0 350 700 1400 Feet

Key On-Base Roads

Figure 3.2-12

Road about 0.5 mile east of County Line Road, operates between 6:30 a.m. and 7:30 a.m., and between 4:00 p.m. and 5:15 p.m. This gate functions as a relief gate and is used during peak hours for access to Walton and Galveston. Both North and West gates are closed Saturdays, Sundays, and holidays. In addition, one closed access point is provided on the 33-acre parcel east of U.S. 31.

All on-base roads are two-lane, paved, with curbs and gutters. Stop signs and speed limits on base roads are the primary means of traffic control. Traffic volume data are not maintained on base. Traffic counts performed in October 1992 reveal that about 1,000 vehicles exit the base during the afternoon peak hour, with a total of approximately 10,000 vehicles passing through the Main Gate, North Gate, and West Gate daily. The Main Gate accounted for 64 percent of total traffic, the North Gate for 26 percent, and the West Gate for 10 percent. The key on-base roads that lead to the gates are Hoosier Boulevard, Shooting Star Road, and Starfire Road.

Prerealignment Reference. Table 3.2-3 summarizes prerealignment (1990) conditions for key road segments. The table shows hourly capacity, peak-hour traffic volumes, and the corresponding LOS during peak hours.

In 1990, U.S. 31 operated at LOS A in the vicinity of the base. Old U.S. 31, a major connector highway from U.S. 31 to U.S. 24 in Peru, operated at LOS C in the vicinity of U.S. 31 and at LOS D near Peru. All other key local road segments operated at LOS B or better. On-base roads operated at LOS C or better.

Realignment Baseline. Table 3.2-3 shows the PHVs and expected LOS for key roads at realignment in 1994. Upon realignment of Grissom AFB, base traffic will consist of traffic generated by the military cantonment and OL personnel. During the peak hour, the military cantonment activities and OL are expected to generate 360 and 30 vehicles per hour, respectively. Off-base traffic on key roads is expected to change with the cumulative effects of changes in population and area commuting and other travel patterns. During the period 1990-1994, an annual rate of increase of 1 percent is assumed for traffic growth on U.S. 31 and Old U.S. 31, and 2 percent on other rural roads (Schaffer, 1992). These rates of increase take into account the effects of realignment.

As a result of the decrease in base-related traffic and changes in daily traffic associated with the cumulative effects of population changes and changes in daily traffic patterns, U.S. 31 in the vicinity of the base would continue to operate at LOS A, while both the east and west junctions of SH 218 in the immediate vicinity of U.S. 31 would improve from LOS B to LOS A. Other key local road segments would continue to operate at the same level as under prerealignment conditions.

Table 3.2-3. Peak-Hour Traffic Volumes and LOS on Key Roads

Road	Capacity[a] (VPH)	Prerealignment (1990) Traffic[b] (PHV)	LOS	Realignment (1994) Traffic[c] (PHV)	LOS
Regional					
U.S. 31					
SH 18 to 800 South	6,000	1,850	A	1,750	A
800 South to SH 218 (Jct. East)	6,000	1,850	A	1,800	A
SH 218 (Jct. East) to Main Gate	6,000	1,900	A	1,800	A
Main Gate to SH 218 (Jct. West)	6,000	1,900	A	1,850	A
SH 218 (Jct. West) to Jct. Old U.S. 31	6,000	2,000	A	1,900	A
Jct. Old U.S. 31 to U.S. 24 (Jct. West)	6,000	1,200	A	1,200	A
U.S. 24					
U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	6,000	1,450	A	1,450	A
Local					
Old U.S. 31					
U.S. 31 to 225 South	2,400	850	C	750	C
225 South to West River Road	2,400	1,000	D	900	C
SH 218 (Jct. West)					
400 West to U.S. 31	2,000	300	B	200	A
County Line Road to 400 West	2,000	150	A	150	A
900 East to 1000 East	2,000	150	A	100	A
SH 218 (Jct. East)					
U.S. 31 to 200 West	2,000	250	B	200	A
On Base					
Hoosier Boulevard, at the Main Gate	1,600	600	C	250	B
Shooting Star Road at the North Gate	1,600	250	B	100	A
Starfire Road at the West Gate	1,600	100	A	50	A

Notes: (a) Capacity figures were derived based on Transportation Research Board, 1985.
(b) Figures for 1990 and realignment are estimated from traffic volumes for 1987 obtained from Indiana Department of Transportation, 1991, Highway Traffic Statistics, assuming an annual growth rate of 1 percent on U.S. 31 and Old U.S. 31 and 2 percent on other local roads. Such percentages are suggested by Indiana Department of Transportation and are in line with Indiana state population and income trends during 1970-1990. For on-base roads, 1992 traffic figures were assumed stable and therefore applicable to 1990.
(c) These figures account for personnel drawdown and population out-migration from Grissom AFB area upon realignment. These figures also account for the 434th ARW and the OL.
LOS = Level of Service.
PHV = peak-hour volume.
SH = State Highway.
U.S. = U.S. Highway.
VPH = vehicles per hour.

Sources: Indiana Department of Transportation, 1991; Transportation Research Board, 1985.

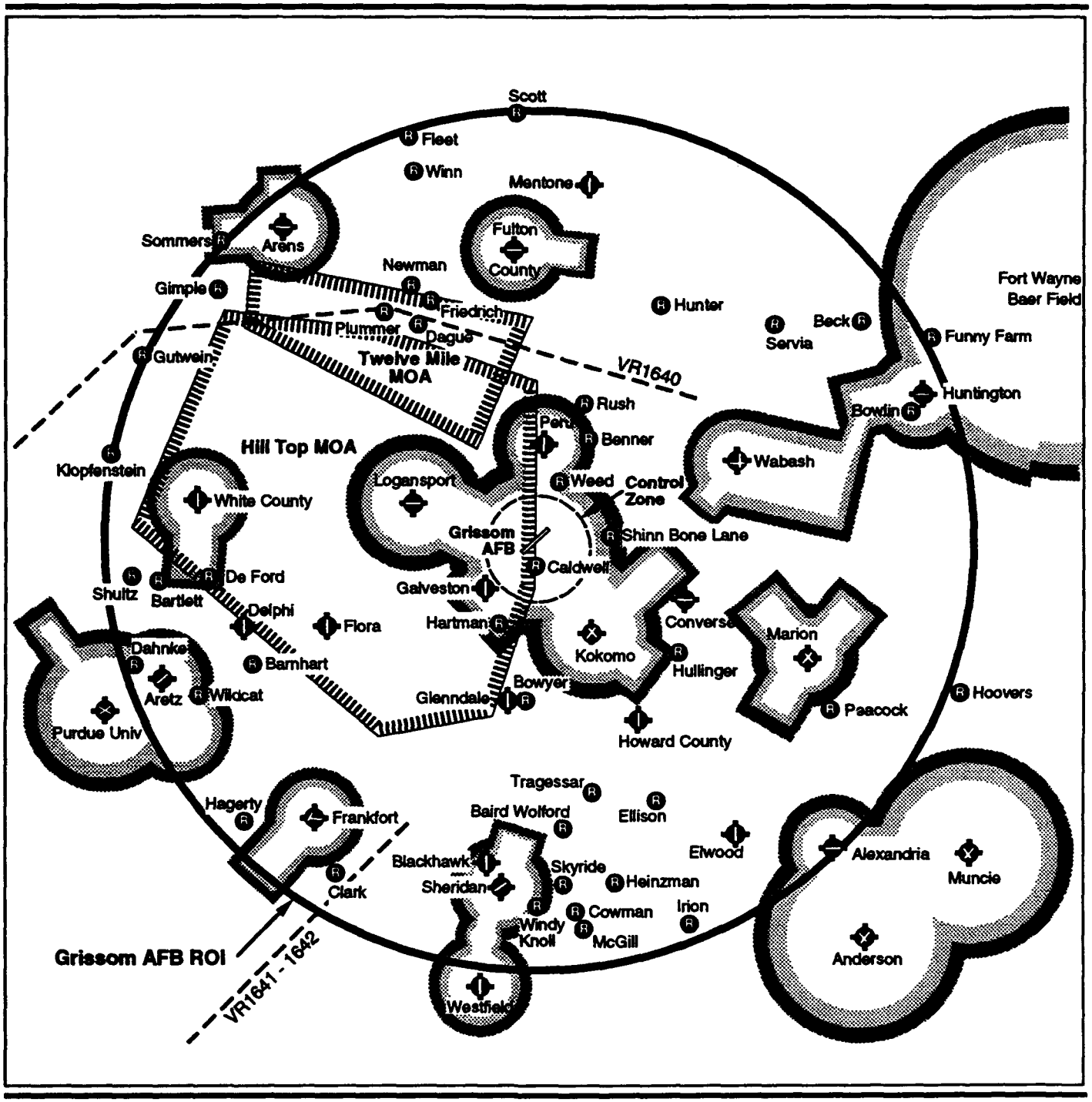
Upon realignment, traffic on key on-base roads will be limited to the movement of the OL and the military cantonment personnel. All on-base roads will operate at LOS B or better.

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 that are designed to protect aircraft while operating to or from an airport, transiting en route between airports, or operating within "special use" areas identified for defense-related purposes. Rules of flight and air traffic control (ATC) procedures have been established that govern how aircraft must operate within each type of designated airspace. All aircraft operate under either instrument flight rules (IFR) or visual flight rules (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., military operations areas [MOAs] or restricted areas).

The ROI selected for this study is an area within a 35-nautical mile (NM) radius of Grissom AFB from the surface up to 8,000 feet above MSL (Figure 3.2-13). The ROI selected for Grissom AFB encompasses the airspace delegated to the Grissom AFB Radar Approach Control (RAPCON) for providing IFR and VFR flight-following services to aircraft. Additionally, the Grissom AFB air traffic control tower (ATCT) is responsible for providing ATC within a 3-NM radius of the base. The airspace that the Grissom AFB RAPCON controls has been delegated by the Chicago Air Route Traffic Control Center (ARTCC). The airspace above 8,000 feet above MSL in the Grissom AFB delegated control area is handled by Chicago ARTCC. The ARTCC provides ATC to aircraft transitioning between terminal areas.

The Grissom AFB ROI contains controlled, uncontrolled, and other airspace. Controlled airspace within the ROI consists of control areas, control zones, and transition areas. Within these areas, some or all aircraft may be subject to ATC. Some of the factors the FAA considers when designating certain areas as controlled airspace are aviation safety, users' needs, and the volume of flight operations. Controlled airspace is supported by ground communications, navigational aids, and ATC services (FAA, 1992a).



EXPLANATION

- Public Use Airport
- Restricted/Private Use Airport
- Control Zone
- Transition Area (Controlled Airspace)
- Military Operations Area (MOA)
- Military Training Route
- ROI

0 3 6 12 Nautical Miles

ROI is 35-nautical mile radius from Grissom AFB.

Airspace Region of Influence

Figure 3.2-13

Uncontrolled airspace has fewer user needs and flight operations than controlled airspace, and aircraft operating in this airspace are not subject to any ATC. Other airspace areas located within the Grissom AFB ROI include airport advisory areas, military training routes (MTRs), airport traffic areas, and MOAs.

There are 22 public-use airports and 42 restricted/private-use airports within the Grissom AFB ROI. A public-use airport is a facility where any aircraft can land without prior permission. Restricted/private-use airports require the permission of the airport operator/owner prior to landing. As indicated in Table 3.2-4, air traffic varies greatly at public-use airports. These airports range from very small, recreational-use, general aviation airports, such as Flora, to larger general aviation airports, such as Kokomo. Restricted/private-use airports are typically owned by an individual for their sole use, and normally have fewer operations than public-use airports.

Table 3.2-4. Annual Aircraft Operations for Civil Public-Use Airports in the ROI of Grissom AFB

Airport	Annual Operations	
	1991	1994
Alexandria	3,700	3,700
Arens	5,000	5,500
Aretz	18,500	19,500
Black Hawk	100	100
Converse	100	100
Delphi	3,500	4,000
Elwood	1,600	1,800
Flora	100	100
Frankfort	12,200	13,500
Fulton County	17,000	17,000
Galveston	25	25
Glenndale	5,700	5,800
Howard County	500	500
Huntington	18,400	19,000
Kokomo	26,400	29,500
Logansport	8,700	8,700
Marion	24,000	25,000
Mentone	3,000	3,500
Peru	7,900	9,500
Sheridan	8,100	8,500
Wabash	9,600	10,500
White County	10,700	10,800

Note: An aircraft operation is one takeoff or one landing.
ROI = Region of Influence.

Sources: Individual Airport Estimates/or FAA 5010 Forms (FAA, 1991a).

Prerealignment Reference. An understanding of the ROI airspace/air traffic environment and its use under the prerealignment reference is necessary to help determine its capability and capacity to assimilate future aviation activities into the National Airspace System. The same constraints and considerations such as terrain, runway alignments, and other air traffic flows would apply under alternate aviation uses of Grissom AFB.

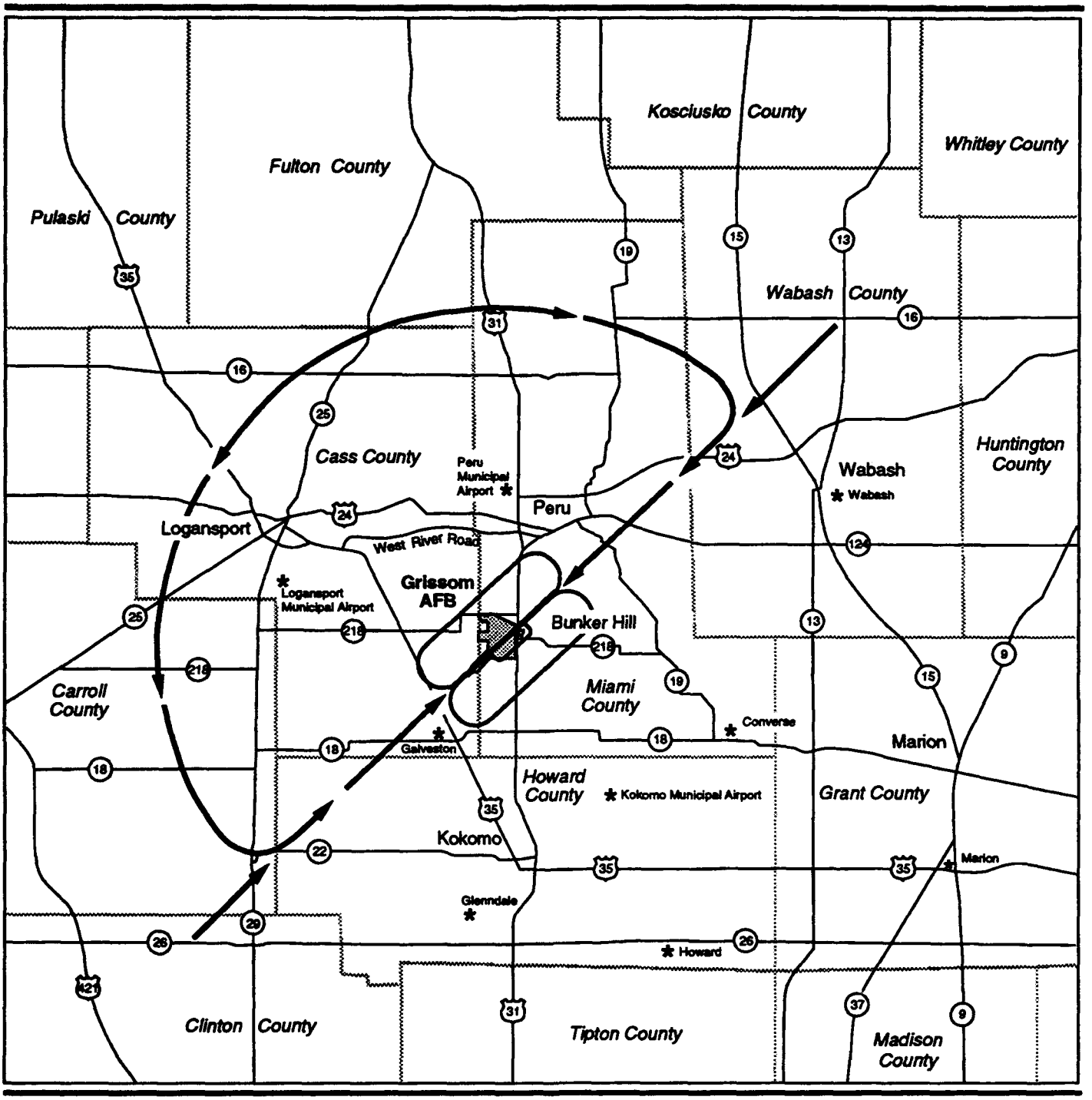
The Grissom AFB RAPCON provides radar service to all IFR aircraft within the RAPCON boundary area. The Grissom AFB ATCT provides ATC to all aircraft within its airport traffic area. The tower provides all-weather service to aircraft landing at the base, and is responsible for providing aircraft separation for all IFR, VFR, and Special VFR arrivals and departures. Due to the proximity of the public-use Galveston and private-use Caldwell airports, special operating procedures have been formalized to provide for the safe and efficient use of these airports and Grissom AFB. The Grissom AFB RAPCON provides radar coverage for Peru, Logansport, Kokomo, and Wabash airports in addition to the Twelve Mile MOA; this coverage would not be provided without the base. Table 3.2-5 lists the approximate number of operations conducted at Grissom AFB in 1990.

Table 3.2-5. Grissom AFB Annual Aircraft Operations, 1990

		Aircraft Operations		
Assignment	Type	Day	Night	Total
Aircraft Based at Grissom AFB	KC-135R	32,449	869	33,318
	KC-135E	6,442	1,215	7,657
	A-10	15,927	600	16,527
	B-747	310	0	310
	T-37	8,750	10	8,760
Primary Military Transients	F-4	928	302	1,230
	KC-135R	2,636	54	2,690
	KC-135E	115	5	120
	A-6	901	19	920
	C-182	100	0	100
Other Military Transients	Misc.	1,540	0	1,540
Totals		70,098	3,074	73,172

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

The orderly flow of aircraft to and from the base is predicated on the use of established flight procedures, traffic patterns, and directions from ATC. The primary arrival and departure flight paths are shown in Figures 3.2-14 and 3.2-15, respectively. These flight paths are based on previous studies,



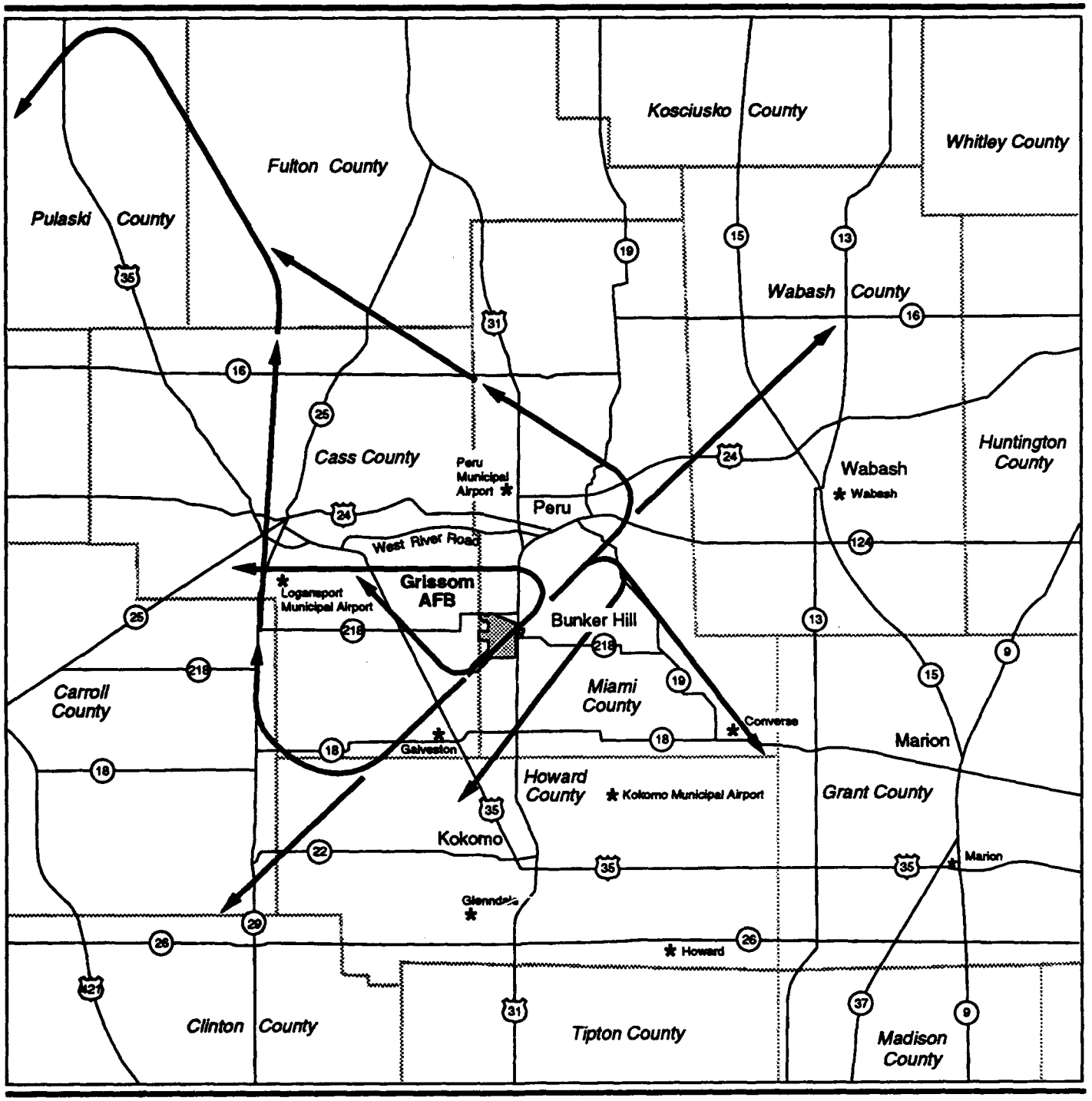
EXPLANATION

- Arriving Flight Paths for Grissom AFB
- 31 U.S. Highway
- 18 State Highway
- Airport
- County Line

0 2 4 8 Miles

Primary Arriving Aircraft Flight Paths

Figure 3.2-14



EXPLANATION

- Departing Flight Paths for Grissom AFB
- U.S. Highway
- State Highway
- Airport
- County Line

0 2 4 8 Miles

Primary Departing Aircraft Flight Paths

Figure 3.2-15

existing published arrival and departure procedures, and discussions with base personnel.

Defense-related airspace within the ROI includes the Twelve Mile MOA and MTRs VR-1640, VR-1641, and VR-1642. The Hill Top MOA is geographically located within the ROI, but is above the 8,000-foot ceiling of the airspace controlled by the base. The Twelve Mile MOA, located approximately 15 NM from the base, extends from 500 feet above ground level (AGL) up to, but not including, 9,000 feet AGL, and is in effect from 8 a.m. to 30 minutes after sunset, Tuesday to Saturday. The three MTRs within the ROI are for low-level (below 1,500 feet AGL), high-speed military flight training in VFR weather conditions. The Twelve Mile MOA, the Hill Top MOA, and the MTRs are owned by the 122nd Fighter Wing of the Air National Guard and are used primarily by F-16 aircraft.

There are numerous public and private airports in the Grissom AFB ROI. With the exception of aircraft using Caldwell and Galveston airports, aircraft operating at airports in the ROI are generally unaffected by flight operations at Grissom AFB. The Peru Municipal Airport is located approximately 4 miles northwest of the city of Peru and 9 miles north of Grissom AFB. The facility contains one hard-surface runway. The airport does not have commercial air service. The airport handles approximately 7,900 operations annually and has 22 based aircraft. Table 3.2-4 illustrates the existing aircraft operations at the various public-use airports in the ROI.

Realignment Baseline. After realignment of Grissom AFB, aviation activity would continue with operation of the 434th ARW (Table 3.2-6). All airfield pavement and the military cantonment will be retained for aviation uses. Airfield support facilities to be retained and operated by the 434th ARW include the ATCT, RAPCON, ILS, Airport Rescue and Fire Fighting (ARFF), and various other facilities. Due to the continued flight operations at the base and continued operation of the key ATC facilities, all existing airspace associated with the base will be retained.

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 air carriers.

There are no commercial service airports within the Grissom AFB ROI. Indianapolis International Airport, approximately 65 miles south of Grissom AFB, serves as a passenger hub for US Air, as well as a regional hub for Federal Express and the U.S. Postal Service. Indianapolis International Airport recorded over 2.8 million passenger boardings in calendar year 1991. During the same period, over 193,000 metric tons of cargo were loaded at this facility. Baer Field in Fort Wayne, approximately 65 miles northeast of Grissom AFB, recorded nearly 300,000 passenger boardings in 1991. The

Table 3.2-6. Grissom AFB Annual Aircraft Operations, 1994

Assignment	Aircraft Operations			
	Type	Day	Night	Total
Aircraft Based at Grissom AFB	KC-135R	3,470	6,030	9,500
Primary Military Transients	F-4	928	302	1,230
	KC-135R	2,636	54	2,690
	KC-135E	115	5	120
	A-6	901	19	920
	C-182	100	0	100
Other Military Transients	Misc.	1,540	0	1,540
Totals		9,690	6,410	16,100

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

loss of passenger traffic due to the realignment of Grissom AFB would not be measurable.

3.2.3.4 Other Transportation Modes. Rail service is not available at Grissom AFB, but an operational network exists in the region (see Figure 3.2-10). Most common commodities transported by rail are grain, vehicles, and fuels (Beck, 1992). These rail lines include:

- Norfolk Southern Railroad, adjacent and parallel to U.S. 24 through the commercial and industrial areas of the cities of Fort Wayne, Peru, and Logansport
- Central Railroad Company of Indianapolis, providing freight service between Kokomo and Peru
- Conrail, connecting Kokomo to Logansport.

Most railroad crossings in the vicinity of the base are at-grade. The nearest Amtrak service in the area is approximately 35 miles to the west of the base in Lafayette, Indiana. No noticeable change in regional rail service is expected to occur as a result of Grissom AFB realignment.

3.2.4 Utilities

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

The ROI for utilities is made up of the service areas of each utility provider servicing the base and local communities where the greatest percent change in population would occur. This includes the city of Peru, the towns of Bunker Hill and Walton, and the community of Miami.

The major attributes of utility systems in the ROI are processing, distribution, and storage capacities, and related factors, such as daily consumption and peak demand, required in making a determination of adequacy of such systems to provide services in the future. The cities of Kokomo and Logansport and the town of Galveston would be much less affected by the disposal and reuse of portions of Grissom AFB, and are therefore not within the utilities ROI.

Baseline utility demand through 1994 (Table 3.2-7) is based on estimated population changes in the communities around Grissom AFB and the 1990 rates of per capita consumption.

Table 3.2-7. Estimated Daily Utility Consumption in the ROI

	Prerealignment				Realignment[a]
	1990	1991	1992	1993	1994
Water Consumption (MGD)	2.97	2.97	3.04	2.64	2.08
Wastewater Treatment (MGD)	2.54	2.73	2.69	2.21	1.72
Solid Waste Disposal (tons/day)	32.0	32.1	35.1	28.7	24.1
Electrical Consumption (MWH/day)	670	685	672	619	539
Natural Gas Consumption (thousand therms/day)	37.9	39.0	39.8	34.8	29.6

Notes: These figures do not account for farm residences or commercial/industrial activities outside towns or city limits. The 1990, 1991, and 1992 figures were obtained from Grissom AFB utility service billings and from each utility provider; figures for the community of Miami were estimated. The 1993 and 1994 figures were estimated using the per capita rates and the projected population in the ROI, accounting for the drawdown of base personnel and their dependents.
(a) Represents estimated daily consumption at realignment in September 1994.
MGD = million gallons per day.
MWH = megawatt-hours.
ROI = Region of Influence.

Sources: Butz, 1992; Reed, 1992; Shives, 1992; U.S. Air Force, 1992c; Whybrew, 1992.

3.2.4.1 Water Supply

On-Base. Grissom AFB currently derives its potable water from seven wells located on base, with a total pumping capacity of 4.90 MGD. The groundwater pumped from four of the wells is softened, chlorinated, fluoridated, and treated for iron at the base water treatment plant and then pumped into elevated tanks. The water treatment plant was constructed in 1942, but was completely upgraded in 1986 to a capacity of 2.20 MGD. The water supply is, therefore, limited by the total capacity of the treatment plant. The other three wells each provide water to individual facilities. An eighth well provides non-potable water to the golf course.

Domestic water storage capacity at the base is 1.10 million gallons and consists of two elevated tanks of 250,000 and 400,000 gallons, and one 450,000-gallon underground tank. The main water distribution system covers the base proper and the housing area. The piping system is in good condition. No water service is supplied to the 33-acre parcel on the east side of U.S. 31.

Off-Base. Three domestic water purveyors serve the Grissom AFB area: Peru Utilities, Bunker Hill Water Company, and Walton Water Works. The city of Peru obtains domestic water from three wells at depths between 120 and 140 feet located near the Wabash River. The total water pumping capacity in Peru is 4.00 MGD. The pumped water is treated for iron, and fluoridated and chlorinated at the Peru Water Treatment Plant, which has a 6.00 MGD capacity. The Peru water storage system has a capacity of 3.10 million gallons, consisting of two elevated tanks of 300,000 gallons and 500,000 gallons, one 2-million-gallon surface reservoir, and a 300,000-gallon clear well under the treatment plant (Shives, 1992).

The town of Bunker Hill obtains domestic water from two groundwater wells at depths of 190 and 251 feet with a total pumping capacity of 0.77 MGD. The water is chlorinated and pumped to a 75,000-gallon elevated tank.

The town of Walton obtains potable water from two groundwater wells, at depths of 210 and 450 feet. The water is chlorinated at the wells and pumped to a 75,000-gallon elevated tank. The system has a total pumping capacity of 0.50 MGD (Butz, 1992).

The community of Miami depends on wells constructed by individual users for its water supply. The total capacity of the wells in Miami is unknown; however, consumption is estimated at 0.05 MGD.

Prerealignment 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 potable water pumping capacity of about 10.17 MGD and a storage capacity of 4.35 million gallons, with a

total demand of 2.97 MGD. Table 3.2-7 displays the water demand in the ROI for the prerealignment years 1990, 1991, 1992, and 1993.

In 1990, average water use for Grissom AFB was 0.99 MGD; for the city of Peru, 1.71 MGD; for Bunker Hill, 0.09 MGD (Whybrew, 1992); for Walton, 0.13 MGD; and for Miami, 0.05 MGD.

Realignment Baseline. As the drawdown of personnel occurs, water demand at Grissom AFB would decrease to an average of about 0.22 MGD at realignment, of which 0.08 MGD would be associated with the OL. This accounts for the non-potable water used by the military cantonment activities and the OL for maintenance and grounds keeping. In September 1994, the water demand in the ROI, including the base, is projected to be 2.08 MGD (see Table 3.2-7).

3.2.4.2 Wastewater

On-Base. Domestic sewage at Grissom AFB is treated by the base WWTP, which was constructed in 1942. Wastewater flows at the treatment plant are high relative to the water consumed, indicating an infiltration/inflow problem. The collection system contains a clay main gravity pipe and several force mains from lift stations on base.

The base WWTP has three sequential batch reactors that have been put into service to be used as a pretreatment facility for industrial waste. The wastewater collection system is configured such that one part collects predominately industrial waste and the remaining part collects predominately domestic wastewater. The sequential batch reactors were positioned to accept and treat the wastewater from the industrial part and discharge their effluent into the head works of the existing activated sludge treatment plant. The construction of the sequential batch reactors was the first phase of a two-phase Military Construction Program to upgrade the WWTP on Grissom AFB.

Phase two consists of a major maintenance and repair project to the existing activated sludge plant and should begin prior to base realignment. This project includes repair and maintenance of all containment vessels, pumping and aeration equipment, piping, and controls plus the addition of dechlorination equipment at the discharge. The completion of the project would result in a WWTP that produces a high quality secondary treatment effluent. Only final filtration would be needed to qualify as tertiary treatment. The rated capacity of the plant will remain at 1.20 MGD average flow and 0.30 MGD minimum flow.

The WWTP discharges through a sanitary outfall to Pipe Creek authorized under an expired National Pollutant Discharge Elimination System (NPDES) permit (Appendix F), administered by the Indiana Department of

Environmental Management (IDEM). A new permit application was submitted prior to the 1991 expiration of the existing permit. The wastewater has characteristics similar to medium-strength domestic wastewater.

The base has an industrial wastewater treatment plant (IWWTP), west of Hangar 200, to treat aircraft and maintenance wash water. Outfall from the IWWTP is directed into the WWTP. There are also eight septic tanks on base, two of which are unused. The tanks range in size from 300 to 36,000 gallons, with a total capacity of 82,950 gallons. The septic tanks are generally associated with facilities located in remote areas of the base.

No active wastewater system exists on the 33-acre parcel on the east side of U.S. 31.

Off-Base. The ROI for wastewater collection, treatment, and disposal consists of the city of Peru, the towns of Bunker Hill and Walton, and the community of Miami.

The Peru WWTP is owned and operated by Peru Utilities. The plant treats all sanitary wastewater generated within the city limits and portions of the Pipe Creek, Oakdale, and Bloomfield areas adjacent to the city boundaries. Operation of the Peru facility began in 1938, with major upgrades in 1960 and 1990. The Peru wastewater is characteristic of medium-strength municipal wastewater. The current rated average design capacity of the WWTP is 4.90 MGD; it can accommodate peak flows of 6.00 MGD. The 1990 average flow at the plant was 1.24 MGD (Binker, 1992).

The plant provides a secondary treatment (conventional activated sludge and effluent chlorination) with effluent characteristics that meet current standards; effluents are discharged directly to the Wabash River. The Peru sewer system combines storm water and sanitary sewage, with storm water estimated at 52 percent of total plant flow during 1988 (Ten Tech Engineering, Inc., 1988).

The city of Bunker Hill has a sewage plant with a capacity of 0.24 MGD, and had an average daily flow of 0.12 MGD in 1990. The Bunker Hill sewage plant discharges effluent to Pipe Creek, a tributary of the Wabash River.

Walton has a WWTP with a capacity of 0.15 MGD, and an average daily flow of 0.10 MGD in 1990. The Walton plant provides secondary treatment and discharges effluent into Phillips Ditch.

The community of Miami relies on individual septic tanks for wastewater disposal. Estimated flow in 1990 was 0.05 MGD.

Prerealignment Reference. In 1990, 1.00 MGD of sanitary wastewater was generated at Grissom AFB. In 1990, 2.54 MGD of sanitary wastewater was generated in the ROI, where there is a treatment capacity of 6.49 MGD. Table 3.2-7 displays wastewater treatment demand in the ROI for prerealignment years 1990, 1991, 1992, and 1993.

Realignment Baseline. Baseline wastewater flows at Grissom AFB would decrease in proportion to the personnel drawdown. It is estimated that 0.30 MGD of wastewater would be produced at realignment by military cantonment and OL activities, of which 0.11 MGD would be associated with the OL. Similarly, domestic wastewater flows from Peru would decrease, in proportion to population out-migration, to an average of 1.26 MGD at realignment. The total wastewater production in the ROI would be about 1.72 MGD. Table 3.2-7 displays wastewater treatment demand in the ROI for the realignment year of 1994.

Upon base realignment, the WWTP would be operating. Sewage flows would be generated mostly from the industrial activities on base; the domestic contribution would be very small because family housing would be vacant. Under these conditions, the lack of biological oxygen demand loading at the activated sludge plant could become a concern and may cause compliance problems. Effluent would be monitored and the WWTP would be modified, as necessary, to ensure permit requirements are met.

3.2.4.3 Solid Waste

On-Base. Solid waste generated by on-base organizations and residents of the military housing area is hauled off base by an independent contractor. Through early 1993, the base solid waste was disposed at T.H. Landfill in Denver. This landfill is now closed and the base solid waste is hauled to Byers Recycling and Disposal Facility in Logansport and Wabash Landfill in Wabash County. Byers Recycling and Disposal Facility has a permitted expansion program that will increase its life expectancy another 20 years, based on a 1992 disposal rate of 1,000 tons per day (Buster, 1993). The Wabash Landfill has a remaining life expectancy of approximately 10 years. The refuse generated at Grissom AFB includes paper, garbage, glass, metal, and other components of general municipal and construction refuse. The base has a solid waste management, resource, and recycling program in place to reduce the amount of refuse disposed of at local landfills.

Off-Base. The city of Peru handles its own solid waste and used the T.H. Landfill for disposal prior to its closure. The solid waste generated by the city of Peru is now hauled to Byers Recycling and Disposal Facility along with refuse produced by Bunker Hill, Walton, and Miami. With the expansion approval, Byers Recycling and Disposal Facility would become the most likely long-term disposal site in the ROI.

Prerealignment Reference. In 1990, the base produced an average of 9.5 tons per day of solid waste, which represents about 30 percent of the 32.0 tons produced daily in the ROI. Table 3.2-7 displays the volume of solid waste generated in the ROI in 1990 and annually through realignment in 1994.

Realignment Baseline. As the drawdown of base personnel proceeds, solid waste generation at realignment would be reduced to 3.0 tons per day, with 2.08 tons per day attributable to military cantonment activities and 0.92 tons per day to the OL. In the ROI, there would be a reduction in solid waste generation to 24.1 tons per day due to population out-migration (see Table 3.2-7), which represents 2.4 percent of the 1992 disposal rate of 1,000 tons per day at Byers Recycling and Disposal Facility.

3.2.4.4 Energy

Electricity

On-Base. Grissom AFB purchases its electric power from PSI Energy. The power is allocated to the base through one substation with a 7,500 kilovolt ampere (kVA) capacity, with a peak capacity of 10,500 kVA for up to 4 hours (maximum demand 10,450 kVA, 1992). The primary electrical distribution system is an overhead 12,000-volt system covering the base proper and the housing area. The electrical distribution system on the 33-acre parcel east of U.S. 31 was removed when the land was purchased for CZ requirements.

Off-Base. Electricity is supplied by Peru Utilities to the city of Peru, and by PSI Energy to Bunker Hill, Walton, and Miami. Peru Utilities is responsible for the maintenance and operation of electrical distribution lines in its service region. PSI Energy serves 69 counties in Indiana and had 586,000 customers in 1991.

Prerealignment Reference. Grissom AFB consumed an average 136 MWH per day in 1990, which represents about 20 percent of ROI consumption of 670 MWH per day. In 1990, Peru electrical usage was 495 MWH per day, while usage in Bunker Hill, Walton, and Miami was 39 MWH per day. Table 3.2-7 displays the electricity demand in the ROI for the prerealignment years 1990, 1991, 1992, and 1993.

Realignment Baseline. Upon base realignment, the demand for electricity on base would decrease to a level of approximately 35 MWH per day, 8.9 MWH of which would be associated with the OL. In the ROI, the average daily consumption would be 539 MWH per day, approximately 20 percent less than the 1990 prerealignment level. This decrease in usage upon

realignment is due to the loss of major base activities and population out-migration. Table 3.2-7 displays the electricity demand in the ROI for the realignment year of 1994.

Natural Gas

On-Base. Natural gas is supplied to Grissom AFB by NIPSCO. The system was constructed in 1975 and is considered adequate. The capacity of the system is 34.7 million therms annually (95,000 therms per day), with a peak demand of 20,000 therms per day occurring in the winter months due to heating (U.S. Air Force, 1991a).

Natural gas on base is primarily supplied to the residential area and the central heating plant. The central heating plant on base, which operates with 50 percent natural gas, provides heating and hot water for the non-residential parts of the base. Full conversion of the central heating plant to natural gas was completed in 1993, with fuel oil as a backup fuel source (utilized 10 percent of the time). The 33-acre parcel east of U.S. 31 has no natural gas distribution system.

Off-Base. NIPSCO supplies natural gas to the area surrounding the base. The ROI for natural gas is the city of Peru, the towns of Bunker Hill and Walton, and the community of Miami.

Prerealignment Reference. In 1990, NIPSCO provided Grissom AFB with an average of 8,500 therms per day of natural gas. In 1990, the ROI consumed an average of 37,900 therms per day, of which the city of Peru consumed 24,700 therms per day in 1990, with the remainder of the off-base ROI consumption at approximately 4,700 therms per day. Table 3.2-7 displays natural gas consumption in the ROI for prerealignment years 1990, 1991, 1992, and 1993.

Realignment Baseline. At base realignment, the demand for natural gas at Grissom AFB would decrease to approximately 1,900 therms per day, 580 of which would be associated with the OL to prevent building deterioration (minimum heating). The base heating plant would operate at 90 percent natural gas and 10 percent fuel oil. In the ROI, the demand for natural gas would be 29,600 therms per day, a decrease of approximately 22 percent from the 1990 prerealignment level. This decrease is due to population out-migration and the loss of base activities. Table 3.2-7 displays the natural gas consumption in the ROI for the realignment year of 1994.

3.3 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

Hazardous materials and hazardous waste management activities at Grissom AFB are governed by specific environmental regulations. For the purpose of the following analysis, the terms 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, as amended; and the Solid Waste Disposal Act, as amended by the RCRA, 42 U.S.C. §6901-6992, as amended. In general, this includes substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or welfare or the environment when released into the environment. State regulations are outlined under Title 329 of the Indiana Administrative Code (IAC) Section 3.1. Hazardous materials reporting and notification requirements are outlined under the Superfund Amendments and Reauthorization Act (SARA) Title III and administered by the Indiana Emergency Response Commission. These regulations are enforced by the IDEM Office of Hazardous Waste Management.

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, is 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. Specific geographic areas affected by past and current hazardous waste operations, including cleanup activities, are presented in detail in the following sections.

The prerealignment reference for the purposes of this analysis was established as December 1990. This date represents conditions of full mission operation prior to the initiation of drawdown activities.

3.3.1 Hazardous Materials Management

Prerealignment Reference. The hazardous materials most commonly utilized by Grissom AFB include a variety of petroleum products such as aviation and motor fuels, motor oils, lubricants and hydraulic fluids, industrial solvents, pesticides (see Section 3.3.6), paints, and thinners. Most materials are delivered to Base Supply (Building 209) and then distributed to the workplace in which they are utilized. However, many organizations on base obtain items directly from local distributors, such as bulk fuels that are delivered directly to the bulk fuel storage facility. These practices are discussed in Section 3.3.4.

The Grissom AFB Oil and Hazardous Substance Spill Prevention and Response Plan (SPR) (U.S. Air Force, 1989a) has been implemented by the Environmental Management Office (EMO). The SPR establishes

responsibilities and provides spill prevention guidelines, as well as contingency plans in the event of a hazardous materials release.

Material Safety Data Sheets (MSDSs) for all hazardous materials on base are on file and may be obtained from the Bioenvironmental Engineering Office located at the base clinic (Building 530). An MSDS is also available in the workplace for each hazardous material utilized at that particular site.

Realignment Baseline. After base realignment, the OL and the 434th ARW 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 the Air Force policy and Executive Order 12856, the parties will comply with the Federal Emergency Planning and Community Right-to-Know Act of 1986, commonly known as SARA, Title III.

The 434th ARW will continue to utilize hazardous materials within the military cantonment presently used during normal base operations. The OL will be responsible for the safe storage and handling of all hazardous materials used in conjunction with preventive and regular maintenance activities, grounds maintenance, and water and wastewater treatment on excessed base property. Hazardous materials may include 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 under 49 CFR.

3.3.2 Hazardous Waste Management

Prerealignment Reference. Normal operations at Grissom AFB currently produce wastes defined as hazardous by RCRA, 40 CFR 261-265, which are adopted by the state of Indiana under Title 329, Solid Waste Management Board IAC Article 3.1, Rule 6, Identification and Listing of Hazardous Waste (329 IAC 3.1-6). Special wastes are defined under 329 IAC 2-21-1 to 16.

Hazardous waste management at Grissom AFB is the responsibility of the EMO. The EMO has implemented the Hazardous Waste Management Program (U.S. Air Force, 1992a), which establishes procedures, assigns responsibilities, and provides handling guidelines for generators of hazardous wastes at Grissom AFB. The EMO has also implemented the SPR, which provides spill prevention and contingency guidelines in the event of a hazardous waste release.

Hazardous waste is generated at numerous facilities on base; these wastes are collected at 41 satellite accumulation points (Table 3.3-1), where up to 55 gallons of hazardous waste are stored for an indefinite period of time.

Table 3.3-1. Hazardous Waste Accumulation Points

Site	Location (Building No.)	Description
Satellite Accumulation Points (up to 55 gallons)		
1	32	Life Support
2-4	122	Pavement and Ground Maintenance, Liquid Fuels, Power Production
5	145	Auto Hobby Shop
6	159	Computer Report
7-9	190[a]	Aerospace Ground Equipment, Jet Engine Inspection/Maintenance, Propulsion Shop
10-12	221	Entomology, Environmental Engineering, Paint Shop
13	300	Computer Repair
14	404	Fuel Storage Building
15	420	Vehicle Maintenance
16-19	426[a]	Electrical Environmental, Hydraulic Shop, Metals Technology Shop, Non-Destructive Inspection Shop
20-21	427[a]	Avionics, Precision Measurement Equipment Laboratory
22-23	434[a]	Maintenance Dock
24-25	436	Maintenance Dock
26-27	437[a]	Maintenance Dock
28	438[a]	Maintenance Dock
29	439[a]	Maintenance Dock
30	453[a]	Structural Maintenance Shop
31	530	Medical Clinic
32-35	592	Loading and Release Shop, Engine Shop, Bomb Dump
36-37	593	Aerospace Ground Equipment
38-39	595	Avionics, Photocensors
40	735	Fuel Delivery Building
41	749	Munitions
Accumulation Point (90-day storage)		
1	233[a]	Hazardous Waste Accumulation Point

Notes: Data current as of October 1993.
(a) Facilities to be retained by 434th ARW following base realignment.

Once a satellite accumulation point reaches the 55-gallon limit, wastes are transferred to the hazardous waste accumulation point (Building 233) to await disposal off base. Prior to transfer to the accumulation point, hazardous wastes are sampled by Bioenvironmental Engineering. Hazardous

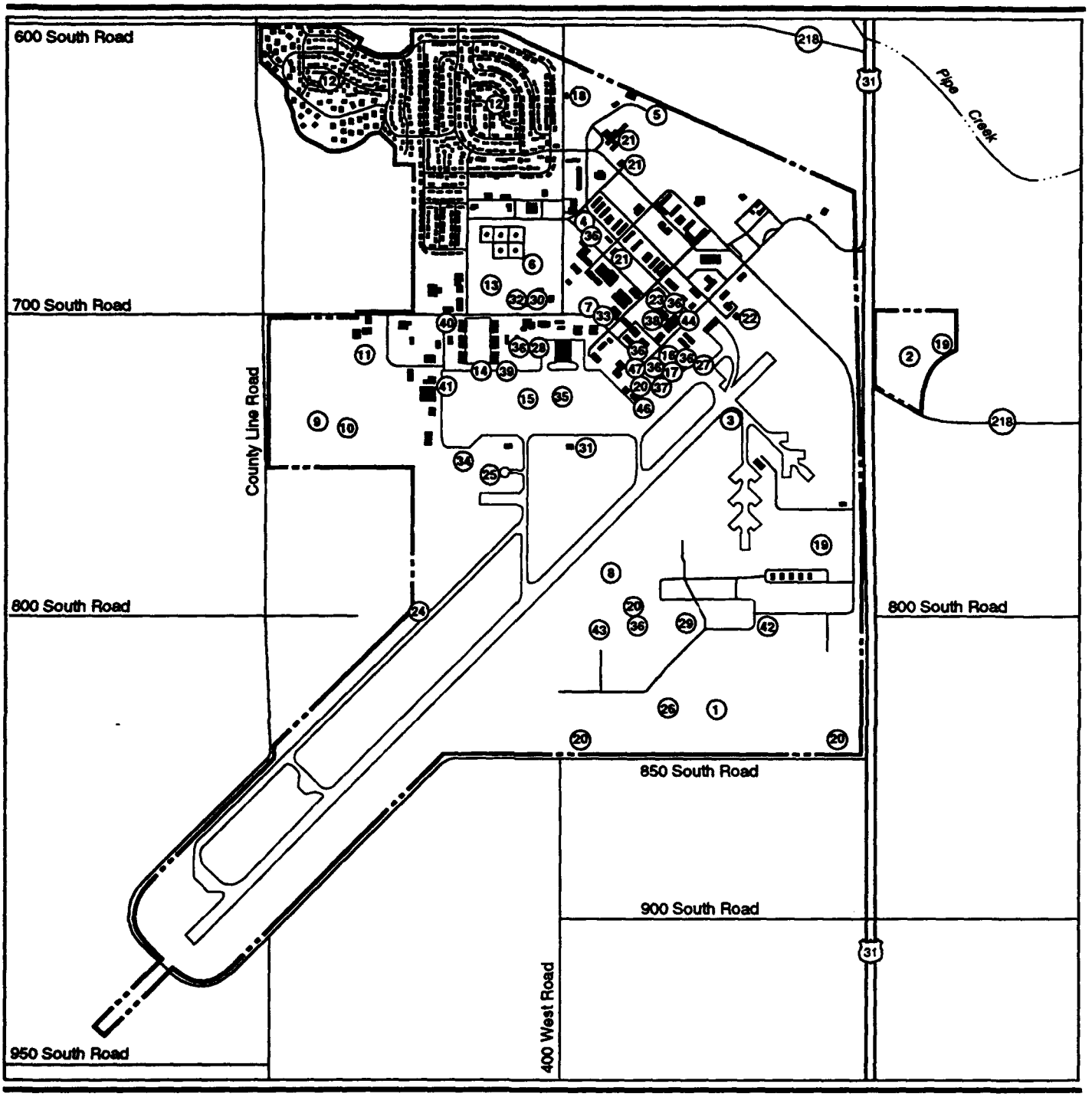
wastes may only be stored at the accumulation point for 90 days prior to final disposal off base by DRMO. The base contacts the Fort Benjamin Harrison DRMO in Indianapolis, which sends a representative to inspect the waste collection drums and contracts a permitted contractor for waste disposal. The contractor also inspects the drums prior to accepting and removing the wastes.

Grissom AFB has individual service contracts for the collection and recycling of cleaning solvents (Safety Kleen) and waste oil products. In 1990, Grissom AFB recycled 6,800 gallons of hazardous waste. With Grissom AFB's recycling practices, total hazardous waste generation in 1990 amounted to 1,500 gallons. Generation of hazardous wastes could temporarily increase over 1990 totals due to cleanup activities associated with base drawdown.

In an attempt to identify the presence or absence of past hazardous waste contamination, Grissom AFB has identified 46 active POI/PAC sites undergoing various stages of site investigation as of June 1994. If contamination is detected at a site, remediation and close-out will be conducted in accordance with the IDEM remediation standards. The IDEM Department of Solid and Hazardous Waste approved the closure of a former hazardous waste accumulation point at Building 709 (Site 29) in April 1994. Site locations are shown in Figure 3.3-1, with a site description provided in Table 3.3-2.

Realignment Baseline. At the time of base realignment, all hazardous waste generated by base functions, except for the 434th ARW, will have been collected from the accumulation point and satellite accumulation points. This hazardous waste will be disposed through DRMO to a permitted off-site facility, in accordance with RCRA. Hazardous waste generated by the OL and the 434th ARW will be tracked to ensure proper identification, storage, transportation, disposal, and implementation of waste minimization programs.

The base accumulation point would remain operational following base realignment to support flight and maintenance operations of the 434th ARW. In addition, eight facilities that contain satellite accumulation points will be used by the 434th ARW; these satellite accumulation points are identified in Table 3.3-1. The hazardous waste generated by the 434th ARW will be disposed of through DRMO at Fort Benjamin Harrison. The realignment of Grissom AFB will not affect ongoing IDEM site investigations at active POI/PAC site locations. Remediation and site closure activities will continue in accordance with IDEM regulations to protect human health and the environment. Remedial activities will continue well past the September 1994 realignment date for Grissom AFB.



EXPLANATION

(24) Site Designation

Base Boundary

Points of Interest/ Potential Areas of Concern Sites Undergoing Site Characterization

0 650 1300 2600 Feet

Note: Site 45 consists of approximately 22 oil/water separators within the cantonment.

Figure 3.3-1

Table 3.3-2. Points of Interest/Potential Areas of Concern Site Descriptions
Page 1 of 7

Site No.	Site Description	Location and Waste Description
1	Expended Munitions Disposal Area	Located in the southeast corner of the base, east of Landfill No. 2, the site covers approximately 4 acres and was active from 1958 to 1978. The site consisted of a furnace for munitions incineration and a nearby munitions burial area. The ignition source for the furnace is unknown and there is no evidence of disposal of other materials. The site was originally identified in a 1985 Phase I - Records Search. Additional site investigations are to be conducted.
2	Abandoned Propane UST Bairds Trailer Park	Located in the parcel of land east of U.S. 31, the site consists of a 1,000-gallon propane UST installed in 1957 to service the laundry facility at the trailer park that occupied this property. The UST was abandoned in 1984 and is scheduled for removal.
3	Temporary Nuclear Weapon Disposal Site	Located at the northeast end of the runway adjacent to the alert apron taxiway, nuclear material from a B-58 bomber crash in 1964 was stored at this site overnight before disposal off base. Monitoring and laboratory testing for radiation were conducted at that time with negative results. An additional site inspection is to be conducted.
4	Base Service Station	Located in the central portion of the base at the intersection of Thunderbolt Avenue and Lancer Street; unleaded fuel was released from a UST, causing soil contamination. Approximately 150 cubic yards of soil have been removed. Additional soil removal and site investigations are to be conducted upon station closure in May 1994.
5	Golf Course Pond	Located in the northern portion of the base adjacent to the WWTP, the pond is currently used as a lime-settling basin for discharge from the water treatment plant. Site inspection is to be conducted.
6	Bulk POL Loading Area	Located in the central portion of the base within the POL storage yard, JP-4 fuel may have been released as a result of fuel transfer activities. The site is currently in use, with a site inspection to be conducted.

POL = petroleum, oil, and lubricants.
U.S. = U.S. Highway.
UST = underground storage tank.
WWTP = wastewater treatment plant.

Table 3.3-2. Points of Interest/Potential Areas of Concern Site Descriptions
Page 2 of 7

Site No.	Site Description	Location and Waste Description
7	Heating Oil Storage Tank	Located in the central portion of the base adjacent to the coal storage yard; the site consists of a fuel oil storage tank (Facility 225) covered by an earthen berm, which services the central heating plant. The tank was in operation until 1992. Site inspection is to be conducted.
8	B-58 Burial Site	Located southeast of the runway at FPTA No. 1, the remains of a B-58 that crashed at Grissom AFB in 1964 were buried here. The aircraft remains were never addressed under the FPTA No. 1 IRP site investigation; therefore, a new site inspection will be conducted.
9	Petroleum-Contaminated Soil Site	Located in the western portion of the base adjacent to Landfill No. 3 and covering approximately 4 acres, the site contains soil contaminated with diesel fuel that was removed from the Arm/Disarm pad (Site 27) from 1989 to 1990. Site inspection is to be conducted.
10	Former Skeet/Trap Range	Located in the western portion of the base east of Landfill No. 3 and covering approximately 6 acres, may be contaminated with lead shot from skeet shooting activities. The time during which the range was active is unknown. Site inspection is to be conducted.
11	DRMO	Located in the western portion of the base near the West Gate entrance, the site has been used as the DRMO storage yard since the late 1960s and may be contaminated by various materials. Site was never utilized for hazardous waste storage. Site inspection is to be conducted.
12	Military Family Housing USTs	USTs are located at 382 housing units in the northwest corner of the base. These tanks were operational until 1974 when units were converted to natural gas. USTs are in place and empty. Removal of the USTs is planned.
13	Baseball Fields	Located in the central portion of the base south of the POL storage yard, covering approximately 6 acres, may contain asbestos fill material approximately 8 inches below playing fields. Site inspection is to be conducted.

DRMO = Defense Reutilization and Marketing Office.
FPTA = Fire Protection Training Area.
IRP = Installation Restoration Program.
POL = petroleum, oil, and lubricants.
UST = underground storage tank.

Table 3.3-2. Points of Interest/Potential Areas of Concern Site Descriptions
Page 3 of 7

Site No.	Site Description	Location and Waste Description
14	Contaminated Soil Nose Docks Apron Entrance	Located at the entrance to the nose docks service apron north of the operational apron, hydrocarbon-contaminated soils believed to be from apron runoff were encountered during apron construction. Site inspection to be conducted.
15	Soils Beneath the Operational Apron	The operational apron, which has underground fuel lines, is in the center of the base and is currently used for parking and refueling aircraft. Soils beneath the apron (approximately 80 acres) have the potential to be contaminated with JP-4 fuel. Moderate hydrocarbon counts have been detected. Additional site inspection is to be conducted.
16	Former Maintenance Hangar, Building 49	Located near the northeast end of the runway adjacent to taxiway No. 1, the former hangar area may contain JP-4 fuel contamination. The site is currently utilized for miscellaneous storage; site inspection is to be conducted.
17	Former Fuel Transfer Line	Located west of Building 26 (Site 16), this area contains a JP-4 fuel transfer line, which serviced the northeast flightline area in the late 1950s or early 1960s; JP-4 is the suspected contaminant. Site inspection is to be conducted.
18	Contractors Storage Area	Located in the northern portion of the base near the North Gate entrance, adjacent to Landfill No. 1, which is an IRP site. Miscellaneous construction materials are stored at this site. Site inspection is to be conducted.
19	Abandoned Waste Treatment Plants/Septic System	Domestic sewage from two small sewage treatment facilities is the suspected contaminant. The first treatment plant is located immediately south of the vehicle entrance gate to the alert apron. The plant treated sewage generated at the alert facility. The second treatment plant is located in the off-base parcel east of U.S. 31. The plant treated sewage generated by a former trailer park. Effluents are believed to have discharged to the creek running along the parcel's eastern boundary. The dates of operation for these facilities are unknown. The former dog kennel, located adjacent to the alert facility, utilized a septic system to handle sanitary wastes. Site inspections are to be conducted.

IRP = Installation Restoration Program.
U.S. = U.S. Highway.

Table 3.3-2. Points of Interest/Potential Areas of Concern Site Descriptions
Page 4 of 7

Site No.	Site Description	Location and Waste Description
20	Abandoned Water Wells	Three abandoned water wells located near Buildings 14 and 788, the southeast corner of the base, and at borehole No. 2 at Landfill No. 2. Dates of operation for these wells and their specific uses are unknown. These wells are not believed to be contaminated; however, they have not been properly abandoned. Site inspections are to be conducted.
21	Silver/Mercury Processing Facilities	The base hospital (Building 530), the base dental clinic (Building 210), and the base photo lab (Building 535) process photographic and X-ray films, and contain silver and mercury processing units. Effluents are discharged to the sanitary sewer; site inspections are to be conducted.
22	Former Aero Club, Building 33	Located north of the northeastern end of the runway, Building 33 is now used for general storage. JP-4 is the suspected contaminant. Site inspection is to be conducted.
23	Auto Hobby Shop Oil/Water Separator	Located adjacent to the Auto Hobby Shop (Building 145) in the central portion of the base. The separator was installed in 1979 and was recently removed. Waste oil from an oil/water separator and piping running southeast from the shop is the suspected contaminant. Site inspection has been conducted and results from soil sampling are pending.
24	Engine Test Cell	Located at the southern part of the base adjacent to the parallel taxiway. JP-4 fuel is used for engine run-up activities and a small oil/water separator on site collects pad run-off. Site inspection is to be conducted.
25	A-10 Run-up Pad Storm Drain	Located south of the operational apron and west of Taxiway No. 3, a storm drain channel fed by a concrete aircraft engine run-up area may have been contaminated by JP-4 and the FPTAs located on the south side of the runway. Contaminants may have been washed off the run-up pad during periods of heavy rain or released from the FPTAs. The pad was constructed and an oil/water separator was installed adjacent to it in 1982; however, contamination may have occurred prior to installation of the separator. Site inspection is to be conducted.

FPTA = Fire Protection Training Area.

Table 3.3-2. Points of Interest/Potential Areas of Concern Site Descriptions
Page 5 of 7

Site No.	Site Description	Location and Waste Description
26	Grenade Range Impact Area	Located in the southern portion of the base between Perimeter Road and 850 South Road, the range was constructed in 1990 and consists of an open area approximately 1,200 feet by 400 feet. Inert practice grenades were used during proficiency training; however, a site inspection will be conducted to ensure that no explosive materials are located on site.
27	Aircraft Disarm/Arm Pad, Taxiway No. 1	Located at the northeast end of the runway adjacent to Site 16. JP-4 is the suspected contaminant. Approximately 1,100 cubic yards of soil have been removed to the Petroleum Contaminated Soil Site (Site 9). Additional site inspection is to be conducted.
28	Hazardous Waste Storage Area and Former Wash Rack	Located in the central base area immediately west of Building 200, drums of industrial waste were stored on site until 1984. The wash rack was used between 1984 and 1986. Soil samples analyzed in 1992 had low levels of VOCs and heavy metals. A site closure plan was prepared and submitted to the state in 1992.
29	Former Hazardous Waste Accumulation Point, Building 709	Located south of the weapons storage area in Building 709, drums of industrial waste were stored here in 1991. The facility was used for less than 90-day storage. The IDEM Department of Solid and Hazardous Waste approved the site closure in April 1994.
30	Hydraulic Lift Leak	A hydraulic leak occurred in a lift at the vehicle maintenance shop (Building 420) in 1992. Contaminated soil and the lift were removed; contract to dispose of contaminated soil is in progress.
31	Pumphouse 735 JP-4 Leak	Pumphouse 735 is located south of the operational apron. In 1990 a JP-4 transfer line cracked, spilling an unknown amount of JP-4 adjacent to the building. A bioremediation action is scheduled.
32	Oil/Water Separator Removal, Building 421	Located in the central portion of the base within the Vehicle Maintenance Yard, waste oil is the suspected contaminant. Soil has been removed and is stored at the coal yard. Oil/water separator functions have been consolidated with Building 420. Land treatment plan has been submitted to IDEM.

IDEM = Indiana Department of Environmental Management.
VOC = volatile organic compound.

Table 3.3-2. Points of Interest/Potential Areas of Concern Site Descriptions
Page 6 of 7

Site No.	Site Description	Location and Waste Description
33	Oil/Water Separator Removal, Building 223	Located in the central portion of the base, the oil/water separator was associated with the steam heating facility. Soil testing results indicate possible waste oil contamination. Designated as IDEM Site No. 9309015.
34	Soil Sediments, McDowell Ditch	McDowell Ditch originates south of the fuel pump houses on the operational apron and flows off base. Benzo(a)pyrene has been detected in soil sediments within the ditch on base. Possible sources of contamination are under investigation.
35	Fuel Hydrant, Row I, Fuel Leak	Located under the operational apron, Row I is the easternmost fuel hydrant lateral. Soil contamination was discovered in the vicinity of Row I; monitoring wells are being installed to determine extent and medias of contamination. Designated as IDEM Site No. 9303181.
36	Non-Cantonment Area Oil/Water Separators	Site consists of seven oil/water separators located outside the military cantonment. Separators are being investigated for potential soil and groundwater contamination.
37	Electrical Vault, Building 17	Located in the central portion of the base, near the intersection of Hoosier Boulevard and Invader Street, oil-stained soil identified adjacent to vault. Possible sources of contamination are under investigation.
38	Aboveground Storage Tank, Building 141	Located at the northwest corner of Building 143 (indoor pool), in the central portion of the base, stressed vegetation was identified under the tank. The possibility of a release at this site is under investigation.
39	Nose Dock 2, Building 436	An aircraft maintenance hangar adjacent to the operational apron. Stressed vegetation was identified south of the building. Possibility of a release is under investigation.
40	Drum Area, Nose Dock 5, Building 437	Nose Dock 5 is an aircraft maintenance facility north of the operational apron. Stressed vegetation was identified at a Drum Storage Area immediately west of this facility. Possibility of a release is under investigation.

IDEM = Indiana Department of Environmental Management.

Table 3.3-2. Points of Interest/Potential Areas of Concern Site Descriptions
Page 7 of 7

Site No.	Site Description	Location and Waste Description
41	UST, Building 597	Building 597 is located at the western end of the operational apron. Soil staining was identified at the UST fill cap; possibility of contamination is under investigation.
42	Building 729	Located in the southeast corner of the base, stressed vegetation was identified along the eastern and southern edge of the parking area adjacent to this facility. Possible source of contamination is under investigation.
43	Firing-In Butt, Building 718	Located in the south-central portion of the base, northwest of the control tower. The possibility that bullets from B-58s and F-106s may remain in the soils at this site is under investigation.
44	Indoor Small Arms Firing Range, Building 137	Located in the central portion of the base along Hoosier Boulevard, lead contamination above action levels may be present in soil floors at this facility. Currently under investigation.
45	Reserve Cantonment Area Oil/Water Separators	Site consists of approximately 22 oil/water separators located throughout the military cantonment. Separators are being investigated for potential soil and groundwater contamination.
46	UST and Basement of Building 14	Located in the central portion of the base, east of the operational apron, the site consists of possible petroleum contamination from an UST northeast of Building 14. The basement of Building 14 may also be contaminated with petroleum. Site inspection is to be conducted.
47	UST Removal, Building 19	Located in the central base area, between Hoosier Boulevard and the eastern flightline area, residual soil contamination is suspected at the site of a removed heating oil UST at Building 19. Site inspection is to be conducted.

UST = underground storage tank.

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 SARA, codified as the Defense Environmental Restoration Program (DERP), of which the Air Force IRP is a subset, ensures that DOD has the authority to conduct its own environmental restoration programs. DOD coordinates IRP activities with U.S. EPA, IDEM, and other appropriate agencies. In addition, a Base Realignment and Closure Cleanup Team has been established at Grissom AFB that conducts regular meetings to resolve technical issues and reach consensus on decisions with state and federal regulators.

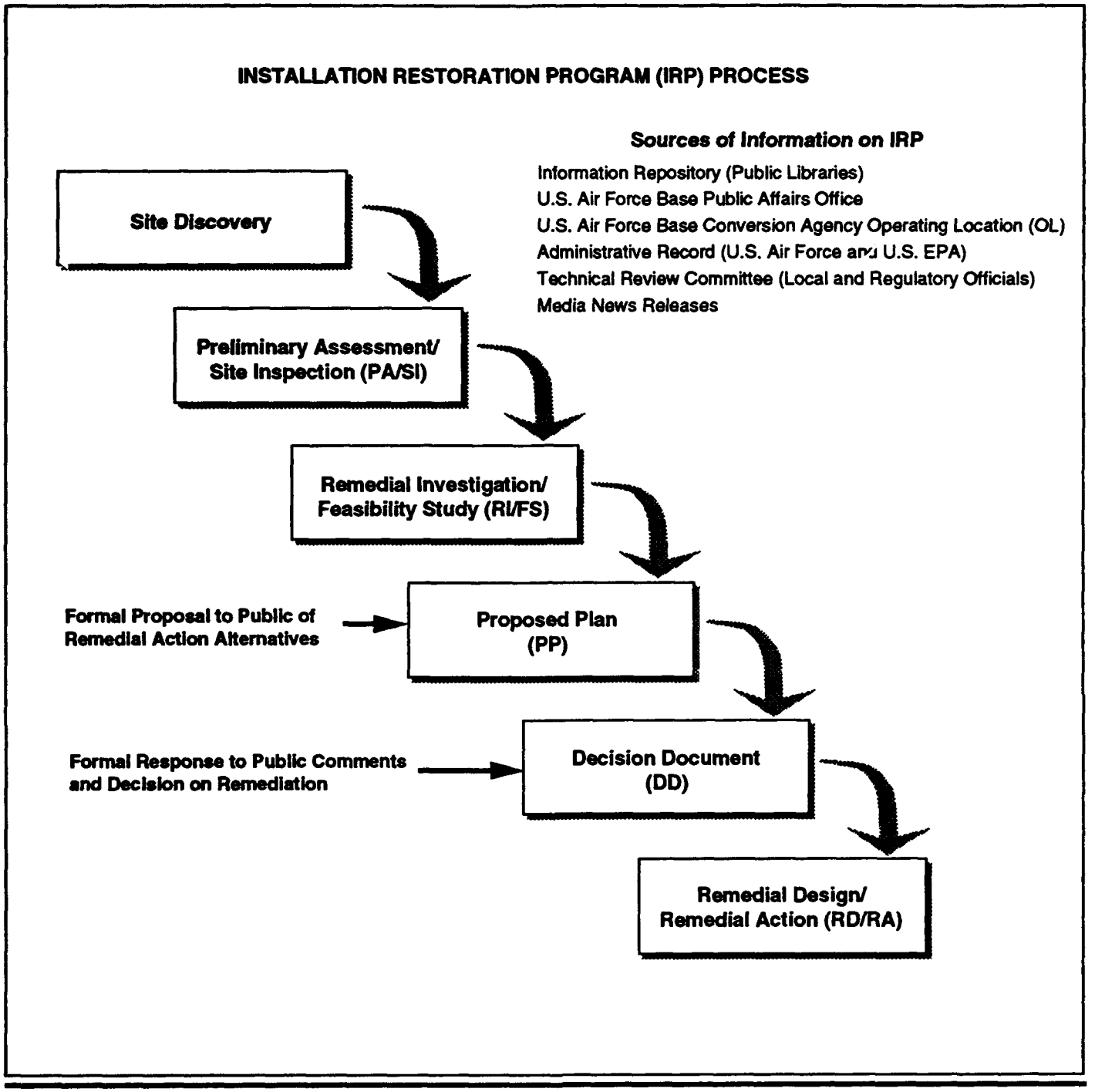
Prior to passage of SARA and the establishment of the National Contingency Plan (NCP) for hazardous waste sites, Air Force IRP procedures followed DOD policy guidelines mirroring the U.S. EPA's Superfund Program. Since SARA was passed, many federal facilities have been placed on a federal docket and the U.S. EPA has been evaluating the facilities' waste sites for possible inclusion on the National Priorities List (NPL). The U.S. EPA has not proposed Grissom AFB for listing on the NPL.

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 Air Force programs will also ensure that any site-specific land use limitations are identified and considered. A representation of the IRP management process followed at Grissom AFB 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)
- Remedial Investigation/Feasibility Study (RI/FS)
- Remedial Design/Remedial Action (RD/RA).



Pictorial Presentation of IRP Process

Figure 3.3-2

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 site inspection (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 remedial investigation (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 feasibility study (FS) and the remedial design (RD) within the third stage. The FS documents the development, evaluation, and selection 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 realignment of Grissom 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. DOD has entered into a Defense State Memorandum of Agreement with the IDEM, which addresses reimbursement of the state for costs associated with providing state services to DOD installations funded under the Defense Environmental Restoration Account. Assistance provided by the state in support of Grissom AFB IRP is covered under this agreement. A Technical Review Committee has been formed to provide guidance and protect community interests, as well as assure compliance with state and federal regulations. Committee members consist of local and regulatory officials. The IDEM acts as the lead agency.

The public may keep abreast of the IRP at Grissom 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 used 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 (see Figure 3.3-2).

Prerealignment Reference. Because the Air Force began the IRP process at Grissom AFB in 1985, prior to terminology and procedural changes, both phases and stages are contained in the IRP administrative record (Appendix D). The IRP Phase I - Records Search was published in August 1985. It initially identified seven potential contamination sources: two Fire Protection Training Areas (FPTAs), three landfills, a Waste Oil Storage Pad, and a Fuel Sludge Weathering Site. All seven sites were recommended for further evaluation (Engineering-Science, Inc. 1985) (Figure 3.3-3).

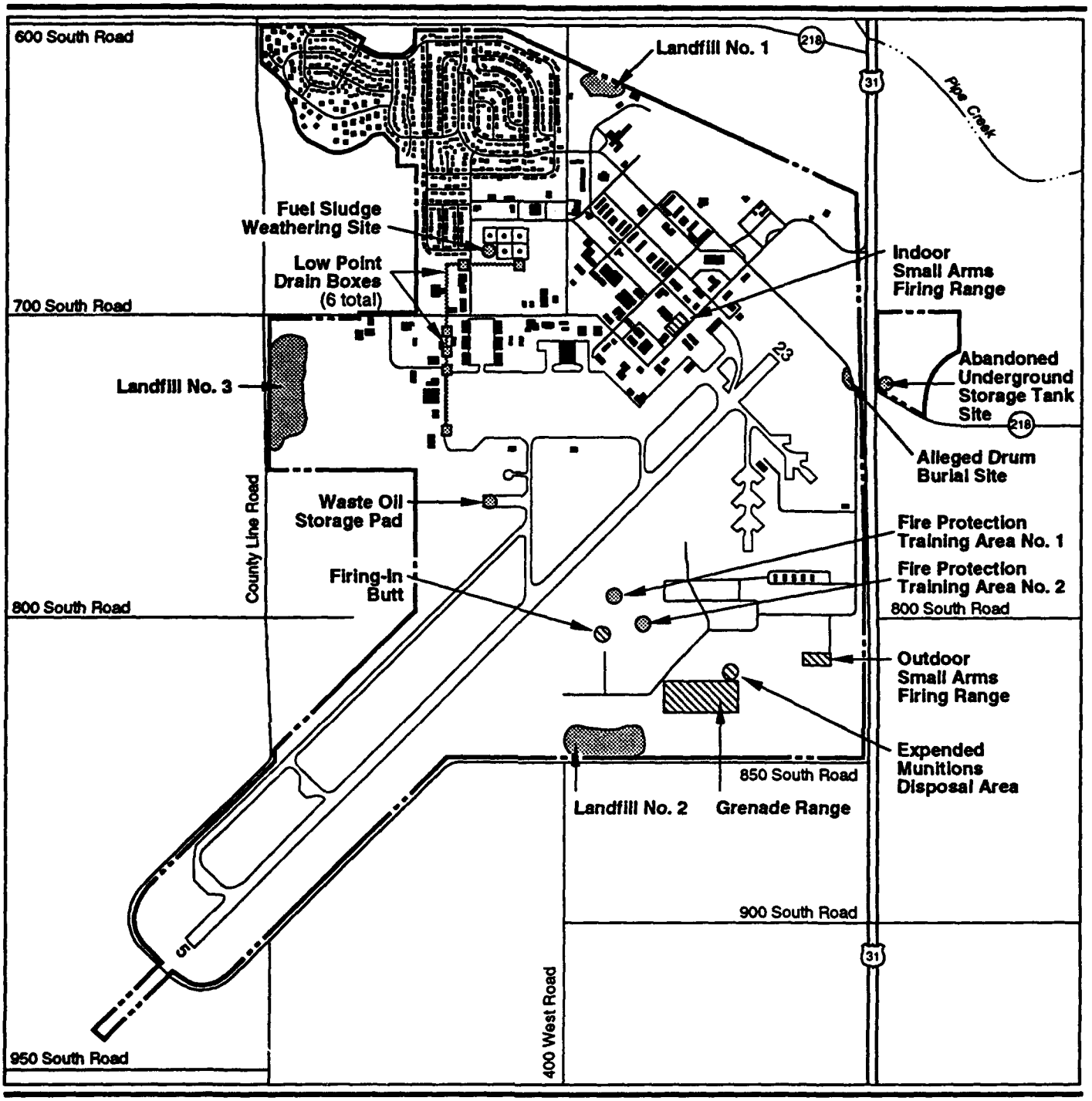
In April 1988, an SI was initiated by the Air Force to confirm the presence or absence of contamination at 14 sites on Grissom AFB. These sites include the original seven sites identified during the Phase I - Records Search, as well as an abandoned Underground Storage Tank (UST) site and six low point drain boxes, which service the JP-4 transfer pipeline. These additional sites were included in the SI at the request of Grissom AFB EMO. Methods utilized during the SI included soil gas surveys, geophysical surveys, soil sampling, and surface and groundwater monitoring.

The SI results recommended further investigation and remedial action for the Abandoned UST Site and the Waste Oil Storage Pad, while recommending RIs for both FPTAs. In addition, monitoring was recommended for the three base landfills, further investigation for the Low Point Drain Boxes, and no further action for the Fuel Sludge Weathering Site.

An RI/FS is under way at nine IRP sites at Grissom AFB. Of the 14 sites studied under the SI, the six Low Point Drain Boxes were combined into a single IRP site, while an additional records search and interviews with base personnel identified an Alleged Drum Burial Site included in the RI. A Draft No Further Action Decision Document was submitted to the U.S. EPA, Region V, and IDEM in December 1989 to close out the Fuel Sludge Weathering Site; therefore, this site was excluded from the RI. However, a risk assessment has been performed for this site and will be submitted for regulatory concurrence.

The following section provides a brief description of each IRP site including a site location, size (if known), description of contaminants, and a site history. Although the Fuel Sludge Weathering Site has been closed, it is still of interest for impact assessment. All IRP sites at Grissom AFB are within the base boundary.

Abandoned Underground Storage Tank Site. This site consists of an area where three USTs were located on residential property acquired by Grissom AFB in 1984 to expand the CZ for Runway 23. The site is east of U.S. 31 and north of SH 218. A 500-gallon gasoline tank and a 1,000-gallon diesel



EXPLANATION

IRP Site

Ordnance Area

Base Boundary

0 650 1300 2600 Feet

IRP Sites and Ordnance Areas

Figure 3.3-3

tank were located between the existing structure and SH 218. A 500-gallon heating oil tank was also located adjacent to the structure's north side. The tanks were removed in March 1990. Soil testing identified petroleum hydrocarbon contamination at the gasoline/diesel tank area; no contamination was identified at the heating oil tank.

Although not addressed during the RI, treatment of soil contamination was considered under the FS. Upon completion of the FS, Engineered Biotreatment was the recommended remediation alternative for contaminated soils. Under the treatment alternative, contaminated soils would be removed and placed in a treatment cell and cleaned through a biological process.

Alleged Drum Burial Site. Interviews with base personnel, supported by an additional record and historic photograph search, identified a site believed to contain buried 55-gallon drums containing unknown liquid wastes. This site is in an open field, adjacent to East Loop Road, and due east of the overrun area for Runway 23. The drums were estimated to have been deposited in the 1950s and 1960s. The site was identified after the SI was conducted and was included as part of the RI.

A magnetic survey and a conductivity meter survey was performed during the RI. Survey results did not indicate the presence of buried drums; therefore, the Alleged Drum Burial Site was not addressed under the FS. The base plans on submitting a No Further Action Decision Document for this site.

Fire Protection Training Area No. 1. FPTA No. 1 is south of the runway and immediately north of the control tower. The site consists of a circular sand pit where fire training exercises were conducted from 1957 to 1982. From the late 1950s through the early 1970s, waste JP-4, waste oils, paint thinners, and other combustible liquids were used as ignition sources. For training exercises, which occurred approximately three times per month, combustible liquids were dumped on site without pre-wetting the soil. Pre-wetting or saturating the soil is a practice that reduces percolation. The combustible liquids were ignited and then extinguished using a variety of extinguishing agents. Beginning in 1974, only pure JP-4 was utilized as an ignition source; pre-wetting was also practiced. An estimated 720,000 gallons of waste fuels and other combustible liquids have been discharged at this site.

An accident occurred in December 1964 that involved a B-58 bomber carrying nuclear weapons. After the incident, the weapons were recovered and disposed of according to applicable regulations; all monitoring and laboratory testing results for radiation were negative. The aircraft is believed to be buried in the vicinity of FPTA No. 1.

Tasks undertaken at the site during the SI included a soil gas survey, soil sampling, and installation of four monitoring wells. Groundwater and soil survey results identified concentrations of fuel constituents, which have the potential to migrate into the aquifer; therefore, an RI/FS was recommended.

Studies conducted during the RI identified shallow groundwater contamination (including vinyl chloride) in the area between FPTA No. 1 and No. 2. The RI also identified the storm drain located in this area as a source for the contamination, as well as influencing contamination migration by acting as a barrier to both surface and shallow groundwater migration.

Fire Protection Training Area No. 2. FPTA No. 2 is immediately southeast of FPTA No. 1. This site was utilized for fire training exercises from 1982 to 1990 when FPTA No. 1 closed. The site, which was unlined during the first year of operation, now contains a polymer-lined pit filled with sand and an aircraft mock-up. The site also contains a concrete block "smokehouse," a fuel tank and associated piping system, a fuel collection system, an oil/water separator, and a well that supplies water for training exercises. Used water was collected and treated using an oil/water separator, then discharged to an open drainage ditch. Training exercises were held approximately five times per month, and an estimated 300 gallons of JP-4 were utilized per exercise. Pre-wetting was conducted prior to each exercise to reduce percolation of fuel to the groundwater. An estimated 16,200 gallons of JP-4 have been discharged on site, and various extinguishing agents have also been introduced at this site.

Tasks undertaken at this site during the SI included a soil gas survey, soil sampling, and the installation of seven monitoring wells. Groundwater sampling and soil surveys identified concentrations of fuel constituents. Since the potential existed for these contaminants to migrate into the aquifer, it was recommended that an RI/FS be conducted at this site in combination with FPTA No. 1. The RI/FS results are discussed under FPTA No. 1.

Fuel Sludge Weathering Site. In the 1970s, an estimated 400 gallons of JP-4 fuel sludge were removed from a storage tank and placed in a trench. This material was allowed to weather (dry via exposure to air) for a period of time prior to disposal. The final sludge disposal method and location are unknown. This site is in the bulk fuels storage area adjacent to Tanks No. 406 and No. 402, an area that is presently covered with grass. Soil samples were conducted as part of the SI; these samples contained no detectable levels of petroleum hydrocarbons. In December 1989, to close out this site, Grissom AFB sent the U.S. EPA a Draft No Further Action Decision Document. In response to the decision document the U.S. EPA has requested an additional site investigation. A No Further Action Decision Document will be submitted for regulatory concurrence, as a result of a recently completed human health risk assessment conducted on this site.

Landfill No. 1. Landfill No. 1 is in the northern portion of the base, immediately west of the WWTP, and covers approximately 6 acres. The site is covered and is currently utilized for storage of construction materials. The landfill was reportedly utilized by the Navy during the 1940s. Until the landfill was closed in 1958, the Air Force continued to dispose of construction rubble, hardfill, and general refuse.

A magnetic and electromagnetic survey conducted at this site during the SI identified a number of readings that could indicate buried metallic objects. Groundwater sampling found only trace amounts of contamination at this site; however, additional testing and monitoring was recommended to confirm these findings. Groundwater samples taken during the RI identified elevated levels of nitrates and sulfates. Groundwater migration of these contaminants away from the site was not confirmed due to the sampling locations. The base plans on conducting a long-term groundwater monitoring program for this site.

Landfill No. 2. Landfill No. 2 is located along the south side of the base near the grenade range. The landfill was approximately 50 acres in size and was operated from 1958 to 1963 utilizing a trench-and-fill disposal method. Construction rubble was the main material disposed at this site; however, reports indicated that as many as 100 drums of industrial waste were also disposed on site.

A magnetic and electromagnetic survey conducted at this site during the SI identified a number of anomalies that could represent buried metallic objects. Seven groundwater monitoring wells were installed around the landfill. Groundwater samples contained only trace amounts of contamination at this site; however, additional testing and monitoring was recommended to confirm these findings. Slightly elevated levels of sulfates were detected in the groundwater during the RI. Base on these sampling results, the base will conduct a long-term groundwater monitoring program to insure that no contaminants are migrating.

Landfill No. 3. Landfill No. 3 is on the west side of Grissom AFB, on the southeast corner of 700 South Road and County Line Road. The site is within the base boundary and approximately 50 acres in size. The landfill was operated from 1963 to 1974 using the trench-and-fill method. The landfill accepted mainly general base refuse and construction rubble; however, it was reported in the IRP Phase I - Records Search that hundreds of drums of industrial waste may have been placed here. Following the landfill closure, dried water treatment plant sludge, coal ash from the central heating plant, and expended aircraft engine starter cartridges were deposited on the surface (Environmental Science and Engineering Inc., 1992).

Ten groundwater monitoring wells were installed around the landfill and a magnetic and electromagnetic survey were conducted at this site during the

SI. The magnetic surveys identified anomalies that could represent a considerable number of buried metallic objects. Groundwater samples contained only trace amounts of contamination at this site; however, additional testing and monitoring were recommended to confirm these findings. Groundwater sampling conducted during the RI detected elevated sulfate levels in two monitoring wells and an elevated lead level was observed in one monitoring well. These three monitoring wells are located immediately adjacent to the landfill boundary. Surface soil sampling detected polynuclear aromatic hydrocarbons, which can be attributed to the disposal of coal ash on site. One soil sample identified an elevated level of dinitrotoluene, which is believed to be due to an isolated, unpermitted use of a small arms range that was never operational. Based on the sampling results, a long-term groundwater monitoring program will be implemented. Additionally, investigations are underway to determine if contaminated groundwater is migrating off base.

Low Point Drain Boxes. Six low point drain boxes were located along the JP-4 pipeline, which transfers fuel from the aboveground bulk storage tanks in the central base area to the holding tanks at the pump houses south of the operational apron. These drain boxes were designed to collect and remove impurities, such as water, from the transfer line. The pipeline was constructed in 1963 and since then drain boxes No. 2 and No. 6 have been removed to accommodate other construction projects. Routine inspections and drain clean-out practices included opening valves and allowing fuel to flow from the pipeline. This procedure was stopped in 1985, and fuel is now collected and properly disposed of.

During the SI, a soil gas survey was conducted along the transfer line, and a soil gas survey and a soil boring were performed at each drain box location. Fuel constituents were detected in soil samples at drains No. 1 and No. 4, and in the approximate location of No. 2 and No. 6, with smaller amounts detected at drains No. 3 and No. 5. The soil gas survey identified fuel constituents adjacent to all six drain boxes. Further investigation was needed to identify the extent of soil contamination and to determine whether groundwater contamination exists. In 1993, free product was discovered in Low Point Drain Box No. 4. A skimmer system was installed to remove the contaminants; the skimmer is still in service. Site investigation will be conducted to determine the source of contamination. Remediation of the area will occur after the investigation is complete.

Upon completion of the FS, Engineered Biotreatment was the recommended remedial alternative for all Low Point Drain Boxes.

Waste Oil Storage Pad. This site is south of the operational apron and west of Taxiway No. 3 and was used from the 1960s to 1982 to store waste oil drums. The site consisted of a portion of a concrete pad (presently utilized as an engine run-up area) that could accommodate approximately 150

55-gallon drums; however, some drums were stored on the soil adjacent to the pad. Contamination occurred when a number of drums were left open and overflowed during rainstorms. An underground waste oil tank is currently located adjacent to this site, and was emptied on a regular basis. Sampling conducted during the SI identified soils contaminated with petroleum hydrocarbons; further investigation was required to determine if groundwater contamination exists. Studies conducted during the RI identified the presence of volatile organic compounds (VOCs) in the soil. Engineered Biotreatment is the recommended treatment alternative.

Realignment Baseline. The realignment of Grissom AFB would not affect ongoing IRP activities. These IRP activities will continue in accordance with federal, U.S. EPA, state, and local regulatory agency regulations to protect human health and the environment, regardless of the alternative chosen for reuse.

IRP remedial activities will continue well past the September 1994 realignment date for Grissom AFB. To help accelerate the remediation process, the IRP sites at Grissom AFB have been placed in nine operable units. Sites designated to each operable unit were determined by common contamination type and geographical location. Operable Unit-1 consists of FPTAs No. 1 and 2, Operable Unit-2 contains Landfill No. 1, Operable Unit-3 contains Landfill No. 2, Operable Unit-4 contains Landfill No. 3, Operable Unit-5 contains the Fuel Sludge Weathering Site, Operable Unit-6 contains the Waste Oil Storage Pad, Operable Unit-7 consists of the Low Point Drain Boxes, Operable Unit-8 contains the Abandoned UST Site, and Operable Unit-9 contains the Alleged Drum Burial Site. The current schedule for future IRP activities is presented in Table 3.3-3.

Table 3.3-3. Grissom AFB IRP Activity Schedule

Document Name	Date Initiated
RI/FS for all sites	October 1991
RD, (9 sites) FPTAs No. 1 and No. 2, Landfills No. 1, 2, and 3, Waste Oil Storage Pad, Low Point Drainage Boxes, Abandoned USTs, Alleged Drum Burial Site	June 1994
Risk Assessment, Fuel Sludge Weathering Site	June 1994
RA, (9 sites) FPTAs No. 1 and No. 2, Landfills No. 1, 2, and 3, Waste Oil Storage Pad, Low Point Drainage Boxes, Abandoned USTs, Alleged Drum Burial Site	October 1994
RA, Fuel Sludge Weathering Site	April 1995 (if necessary)

FPTA = Fire Protection Training Area.
RA = remedial action.
RD = remedial design.
RI/FS = Remedial Investigations/Feasibility Study.
UST = underground storage tank.

The OL will oversee the coordination of the contractors and assure that U.S. EPA, IDEM, and local regulatory agency concerns are addressed. The Air Force will retain easements in order to perform operations and maintenance on all remediation systems.

Prior to the transfer of any property at Grissom AFB, the Air Force must 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 substance activities and conditions on the property and, when there have been any such hazardous substance activities, 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, for all government property transfer by deed, a 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 Grissom 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 Grissom 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 reasonable date so as not to impede the economic redevelopment of the area through reuse of Grissom 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.

3.3.4 Storage Tanks

USTs are subject to federal regulations within RCRA, 42 U.S.C. 6991, and U.S. EPA implementing regulations 40 CFR 280. These regulations were mandated by the Hazardous and Solid Waste Amendments of 1984. The state of Indiana regulations pertaining to USTs can be found in the Indiana Code (IC), Title 13 Article 7 Chapter 20 (IC §13-7-20-1 et seq.) and 329 IAC 9. Aboveground tanks are regulated by the state utilizing the guidelines under Article 79 of the Uniform Fire Code, Appendix 2F - Indiana Amendments.

Prerealignment Reference. There are 77 active USTs at Grissom AFB. Of these, 35 are regulated under IC §13-7-20; the remaining 42 are not

regulated (Appendix G). Tanks exempt from state regulations are those having a capacity of 1,100 gallons or less or those tanks that store heating oil for use on the premises.

Grissom AFB has an Underground Storage Tank Management Plan (U.S. Air Force, 1992b) that addresses UST regulations and strategies, monitoring alternatives, and operating procedures. An SPR Plan has also been implemented at Grissom AFB and is discussed in Section 3.3.1.

Grissom AFB has 81 active aboveground storage tanks. Appendix G provides an inventory of aboveground storage tanks. The largest aboveground storage tanks on base are associated with the JP-4 bulk fuel storage facility and the fuel oil storage for the central heating plant. Five aboveground storage tanks totaling 3.57 million gallons make up the JP-4 bulk fuel storage facility. These tanks are supplied by tank trucks, which deliver approximately 15 loads of JP-4 daily. JP-4 is then transferred from the aboveground tanks through a 10-inch transfer line to 14 50,000-gallon underground holding tanks (Buildings 735 and 736) south of the operational apron. From this point, the JP-4 feeds into the fuel hydrant system (exempt from regulations under 40 CFR 280.2) under the apron. The aboveground storage tanks that supply fuel oil to the central heating plant boilers have capacities of 420,000 and 206,325 gallons. The smaller tank is covered with an earthen berm.

There are 31 oil/water separators operating at Grissom AFB (Appendix G). These separators vary in design and have capacities ranging from 150 gallons to 104,500 gallons. A service contract was in place for removing separator waste on an as-needed basis.

Realignment Baseline. A number of USTs, aboveground storage tanks, and oil/water separators will remain in service to support the operations associated with the military cantonment; these storage tanks and oil/water separators are identified in Appendix G. All USTs utilized in this area will comply with state spill and leak protection standards in 1994. The bulk fuel storage facility, the underground fuel hydrant system, and 22 oil/water separators will also support military operations.

USTs outside the military cantonment will be deactivated and removed. The aboveground storage tanks will be purged to minimize fire hazards at base realignment. All remaining oil/water separators will be emptied of any contents and cleaned.

3.3.5 Asbestos

ACM remediation is regulated by the U.S. EPA and the Occupational Safety and Health Administration (OSHA). The state of Indiana also has regulations pertaining to ACM remediation. 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 twelfth grade school buildings. AHERA and OSHA regulations cover worker protection for employees who work around or remediate ACM. Indiana regulations pertaining to ACM are found in IC §13-1-1 et seq., and Title 329 IAC.

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 fire proofing, and other material used for sound proofing 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 is material that contains more than 1 percent asbestos, but does not meet the rest of the criteria for friable ACM.

Prerealignment Reference. The current Air Force Policy is to manage or remove ACM in active facilities, and 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 property to be excessed 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 is in progress for Grissom AFB; however, a partial survey of 40 facilities was completed in 1987. The results of this partial survey identified the presence of asbestos in some base facilities. Appendix H provides an inventory of available asbestos survey results and a description of the ACM within each facility. The comprehensive basewide asbestos survey will be completed prior to realignment.

An Asbestos Operating Plan has been implemented at Grissom AFB. The plan provides guidance for carrying out all in-house asbestos projects. The Asbestos Management Plan was designed to establish management and organizational responsibilities as well as procedures for ensuring that personnel are not exposed to excessive levels of airborne asbestos. The development and implementation of these plans is the responsibility of the

305th Civil Engineering (CE) Office and the EMO. The Bioenvironmental Engineering Office supports CE by providing site surveys and sampling, and by monitoring in-house asbestos removal projects performed by outside contractors or by the on-base asbestos abatement team.

Realignment Baseline. Asbestos will be removed from excessed base property 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) 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. FIFRA requires that applicators of all pesticides and fungicide must be certified and licensed by the state of Indiana. Applicators must adhere to manufacturer's instructions for storage, mixing, and application of all chemicals.

All pest management activities at Grissom AFB are conducted in accordance with Air Force regulations AFR 19-21 and management recommendations, which follow FIFRA regulations.

Prerealignment Reference. The pest management program at Grissom AFB is the responsibility of the base entomologist of the 305th CE office, except for the base golf course which is managed by the Morale, Welfare, and Recreation office. On-base pesticide applications are conducted under the supervision of a DOD-certified applicator, whose certificate is recognized by the state of Indiana. Pest management at Grissom AFB is inspected annually by the Air Force. Routine inspections are conducted by the Bioenvironmental Engineering office, U.S. EPA, and IDEM.

Appendix G provides an inventory of pesticides utilized on base. These materials are stored at the Entomology Shop (Building 221), Entomology Storage (Building 122), and the golf course pesticide storage area (Building 520). Pesticides used at Grissom AFB are ordered on an as-needed basis through base supply or local merchants.

Realignment Baseline. At the time of realignment, pesticides will continue to be used for pest management and grounds maintenance by the OL on excessed base property and the 434th ARW similar to prerealignment conditions.

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. Indiana regulations regarding PCBs follow federal regulations and are found under Title 329 IAC, Article 4, PCB Waste Management.

Prerealignment Reference. In 1985, Grissom AFB conducted a PCB survey of Air Force owned electrical equipment on base. Equipment containing PCB concentrations of 50 ppm or greater was removed or replaced by 1988. The integrity of the PCB test kit used during the initial survey was questionable. Therefore, Grissom AFB retested all eligible transformers and capacitors, resulting in the identification of two transformers containing over 50 ppm PCBs; they were removed from service and disposed of off base.

The electrical substation located at the corner of Norton Avenue and Shooting Star Road is operated by PSI Energy. Testing at this site was conducted by PSI Energy in October 1992 with all transformers, circuit breakers, and voltage regulators registering PCB levels below 50 ppm.

Realignment Baseline. No federally regulated PCB equipment or PCB-contaminated equipment are left on Grissom AFB.

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. The U.S. EPA offers a pamphlet, "A Citizen's Guide to Radon" (U.S. EPA, 1992a), 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 (RAMP) 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 3.3-4 summarizes the recommended radon surveys and action levels.

Table 3.3-4. 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.

Notes: 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.

Source: U.S. EPA, 1992b.

Prerealignment Reference. Air Force policy requires a detailed radon assessment program for identified levels of 4 pCi/l or greater as a result of initial screening.

An initial screening for the RAMP was performed at Grissom AFB in December 1987. The screening was conducted by the base Bioenvironmental Engineer and consisted of 34 samples taken in military family housing (29 samples), airman's dormitories, billeting, and the child care center. Nine samples resulted in radon levels above 4 pCi/l, with the highest measuring 8.3 pCi/l; therefore, an additional screening was conducted between August 1989 and August 1990. This screening involved all living quarters and included the child care center. Over 600 samples were taken; 34 samples from military family housing units had radon levels over 4 pCi/l, with the highest measuring 11.4 pCi/l. The base Bioenvironmental Engineer then informed the residents of these housing units of the test results, with reassurance that no immediate danger exists, and provided suggestions for lowering the radon level within the home.

Realignment Baseline. The new owners of any of excessed facilities that registered radon levels above 4 pCi/l will be advised of radon conditions.

3.3.9 Medical/Biohazardous Waste

Current federal regulations do not provide for regulation of medical wastes, but do allow for states to individually regulate medical wastes. The Indiana State Board of Health regulates the storage, transport, and disposal of medical waste under the infectious waste rule (410 IAC 1-3).

Prerealignment Reference. Grissom AFB operates an outpatient clinic that serves both active and retired military personnel and their dependents. The clinic generates approximately 100 pounds of biohazardous waste per week; this includes small amounts of wastes generated at the on-base dental and veterinary clinics. Biohazardous wastes are autoclaved daily and disposed of in the local landfill. Sharps (e.g., needles, and scalpels) are autoclaved on site and sent to the Marion Veterans Administration Hospital for incineration.

Medical and dental X-ray operations, as well as photographic operations, generate photochemical wastes, which require the use of silver recovery systems. These systems remove the silver from spent photographic chemicals; the remaining solution is then diluted and disposed of through the sanitary sewer. The recovered silver is sent to DRMO for disposal.

Realignment Baseline. The clinic will be inactive with existing biohazardous waste being processed and removed prior to realignment in accordance with appropriate federal, state, and local regulations. Retained 434th ARW activities will generate small amounts of biohazardous waste from reserve personnel medical exams and first aid, and would be disposed of in accordance with applicable regulations.

3.3.10 Ordnance

Explosive ordnance exists at Grissom AFB and consists primarily of conventional weapons utilized by A-10 aircraft such as iron bombs, rockets, and 30-millimeter (mm) cannon shells. Other types of ordnance include small arms ammunitions, flares, 40-mm grenades (nonexplosive practice rounds), and explosives utilized for A-10 ejection seat mechanisms. These materials are stored at the WSA located in the southeast portion of the base. The WSA consist of 12 storage igloos, a munitions maintenance facility, and other support buildings.

The base operates an outdoor small arms firing range to qualify military personnel in small arms proficiency (see Figure 3.3-3). The range is in the southeast corner of the base, adjacent to the base obstacle course. The range was constructed in 1988 and consists of a U-shaped earthen berm, with numerous wooden noise suppression baffles installed across the width of the range. Firing bays occupy the open end of the range. Personnel fire at targets that may be placed at different intervals, and the bullets become embedded in the berm. Building 779 is located on site and contains weapons maintenance and classroom/training facilities. The former small arms firing range was an indoor range located in the base gymnasium (Building 137). Weapons were fired at an angled metal plate, which deflected the bullets into a sand pit. Activities at this range ceased upon completion of the outdoor range. This site has been identified as POI/PAC Site No. 44 (see Section 3.3.2 and Table 3.3-2).

A 40-mm grenade launching range (POI/PAC Site No. 26) also exists at Grissom AFB and is located southeast of the control tower, between the perimeter road and the base boundary (see Figure 3.3-3). The range was constructed in 1990 and consists of a launch area with an observation tower and an open field, which acts as an impact area for the practice rounds.

A firing-in butt (Building 718, POI/PAC Site No. 43), used to trap bullets fired from F-106s or B-58s, is located in the southern portion of the base adjacent to the control tower (see Figure 3.3-1). This facility was constructed in 1957 and consists of a concrete structure approximately three stories tall, open on one side and filled with soil. Aircraft would test fire their cannons into the open side of the structure. Earthen berms reinforced by timbers extend away from the structure as a safety precaution to capture any stray shells.

An expended munitions disposal area (POI/PAC Site No. 1) at the southeast corner of the base, east of Landfill No. 2, was active from 1958 to 1978. The area consisted of a metal furnace for incineration of expended munitions with a burial area nearby. Use of the site was discontinued due to the swampy nature of the area. The ignition source for the furnace is unknown,

and there is no evidence of disposal of waste material other than incinerated expended munitions (Engineering-Science, Inc. 1985).

A former skeet/trap range (POI/PAC Site No. 10) was located in the western portion of the base immediately east of Landfill No. 3. The dates of operation are unknown.

Any waste ordnance remaining after disposal would be regulated under RCRA; transportation of all ordnance is regulated by the U.S. DOT.

Prerealignment Reference. Explosive ordnance is managed through the Munitions Maintenance Squadron (MMS). Their activities include inspection, maintenance, monitoring of shelf and service life, and disposal coordination.

Ordnance designated for disposal is transferred to other Air Force facilities for proper disposal or refurbishing.

The WSA is primarily used by the 434th Wing. The specific amount of ordnance stored at the WSA varies depending on training activities. However, the amounts do not exceed the criteria on the established explosive safety zones for the WSA.

The small arms range is utilized on a regular basis; range use varies depending upon the number and type of firearm training courses. Two weeks' worth of ammunition is stored on site at any one time. Following use, brass shell casings are collected and disposed of through DRMO; any defective ammunition is sent to MMS for proper disposal. The grenade range is utilized approximately six times a year to qualify military police in grenade launching proficiency.

Realignment Baseline. Ordnance disposal practices associated with the 434th ARW would be managed similar to existing operations. However, the total amount of ordnance would be less than prerealignment conditions because of the elimination of the ordnance associated with the A-10 aircraft at Grissom AFB. The grenade range, the indoor and outdoor small arms firing range, the firing-in butt, and the expended munitions disposal area will be surveyed and cleared, if necessary, of all ordnance. If prior activities deem it necessary, an environmental site characterization of the areas will follow. The indoor and outdoor small arms firing ranges will undergo an environmental site characterization. The former skeet/trap range will remain within the military cantonment and is scheduled to undergo a site investigation.

3.3.11 Lead-Based Paint

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 dust, soils, and paint. Waste containing levels of lead exceeding a maximum concentration of 5.0 milligrams per liter, as determined using the U.S. EPA Toxic Characteristic Leaching Procedure that simulates the leaching behavior of landfill wastes, are defined as hazardous under 40 CFR 261 and Title 329 of IAC. If a waste is classified as hazardous, disposal must take place in accordance with U.S. EPA and state hazardous wastes rules.

In 1973, the Consumer Product Safety Commission established a maximum lead content in paint of 0.5 percent by weight in a dry film of newly applied paint; in 1978, under the Consumer Product Safety Act, P.L. 101-608, as implemented by 16 CFR 1303, the Consumer Product Safety Commission lowered the allowable lead level in paint to 0.06 percent. The act also restricted the use of lead-based paints in nonindustrial facilities. In 1989, the 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. Specific cleanup levels are based on the characteristics of individual sites. The Lead-Based Paint Poisoning Prevention Act, 42 U.S.C. 4821 et seq., as amended by the Residential Lead-Based Paint Hazard Reduction Act of 1992 requires that lead-based paint hazards in federal housing facilities be identified and eliminated. In 1993, the federal OSHA under 29 CFR 1926 extended the permissible exposure limit for general industrial workers of 50 micrograms per cubic meter ($\mu g/m^3$) of air to include workers in the construction field.

To ensure that any threat to human health and the environment from lead-based paints has been identified, Air Force policy requires that a lead-based paint survey of high-priority facilities be conducted at Grissom AFB. High-priority facilities consist of military family housing, transient lodging facilities, schools, and other facilities frequented by children (including day care facilities).

Prerealignment Reference. No comprehensive basewide survey to assess the presence of lead-based paint or its associated soil contamination has been performed at Grissom AFB. A lead-based paint survey of military family housing, transient lodging facilities, and schools (including day care centers and recreation areas) will be conducted. Wastes that have been identified as potentially lead-containing will be tested to see if they meet the RCRA definition of a hazardous waste.

Realignment Baseline. The presence of lead-based paint will be assumed for all facilities built prior to or during 1978 if a lead-based paint survey is not conducted by the end of 1994. Upon completion of the survey of the property outside the military cantonment, results will be made available and disclosure will be provided on property leases or transfer documents.

3.4 NATURAL ENVIRONMENT

This section describes the affected environment for natural resources: soils and geology, water resources, air quality, noise, biological resources, and cultural resources.

3.4.1 Soils and Geology

Soils, geology, seismic activity, and mineral resources are addressed in this section. The ROI for soils is localized and limited to Grissom AFB. The ROI for geology and seismic activities extends to include the regional tectonic framework that encompasses Cass and Miami counties. For mineral resources, the ROI includes the regional market for limestone, dolomite, and peat resources.

3.4.1.1 Soils. Soils on Grissom AFB are part of the Fincastle-Treaty association, which consists of deep, nearly level, poorly drained, medium textured soils formed on upland glacial till plains (U.S. Department of Agriculture, 1979). Soils on Grissom AFB consist primarily of Fincastle and Treaty silt loams containing clay, silt, and sand particles. Fincastle soils are on the higher lying broad flats and low ridges; Treaty soils are located in the drainageways. Other small areas of the base include Blount, Miami, and Shoals soil series.

The characteristics of the soils found at Grissom AFB are summarized in Table 3.4-1, and the general distribution of soils is shown in Figure 3.4-1. The permeability of the soils at Grissom AFB is moderately low, which results in moderate runoff, and the erosion potential is slight. Wetness is the main limitation of the soil, with ponding and inundation of the Treaty silt loam common in the winter and spring. In addition, the silty loams have moderate to high shrink-swell potential and high frost heaving potential. Because of the low permeability and shrinking and swelling characteristics, special building construction methods and materials are required. These include special foundations and footings, construction without basements, and engineered drainage.

The U.S. Department of Agriculture Soil Conservation Service has determined that the Grissom AFB vicinity contains prime soils for agriculture (U.S. Air Force, 1989b); however, because the base has been developed, it is no longer considered Prime Farmland. The Farmland Conversion Impact Rating Form AD-1006 is presented in Appendix J.

There are several locations on Grissom AFB where the soils are likely to be contaminated. These areas are under investigation under the IRP and the POI/PAC Program to determine the extent of contamination. Descriptions and locations of these areas are found in Section 3.3, Hazardous Materials and Hazardous Waste Management.

Table 3.4-1. Soil Summary for Grissom AFB

Unit Description	Dominant Texture	Unit Permeability (inches/hour)	Infiltration Capability
Blount silt loam	Silt loam to clay loam	0.06 - 2.0	Somewhat poor
Fincastle silt loam	Silt loam to loam	0.2 - 2.0	Somewhat poor
Miami silt loam	Silt loam to sandy loam	0.2 - 2.0	Fair
Miami clay loam	Clay loam to sandy clay loam	0.6 - 2.0	Excellent
Shoals silt loam	Silt loam to silt clay loam	0.6 - 2.0	Somewhat poor
Treaty silt loam	Silt loam to loam	0.6 - 2.0	Poor

Sources: U.S. Department of Agriculture, 1979, 1981.

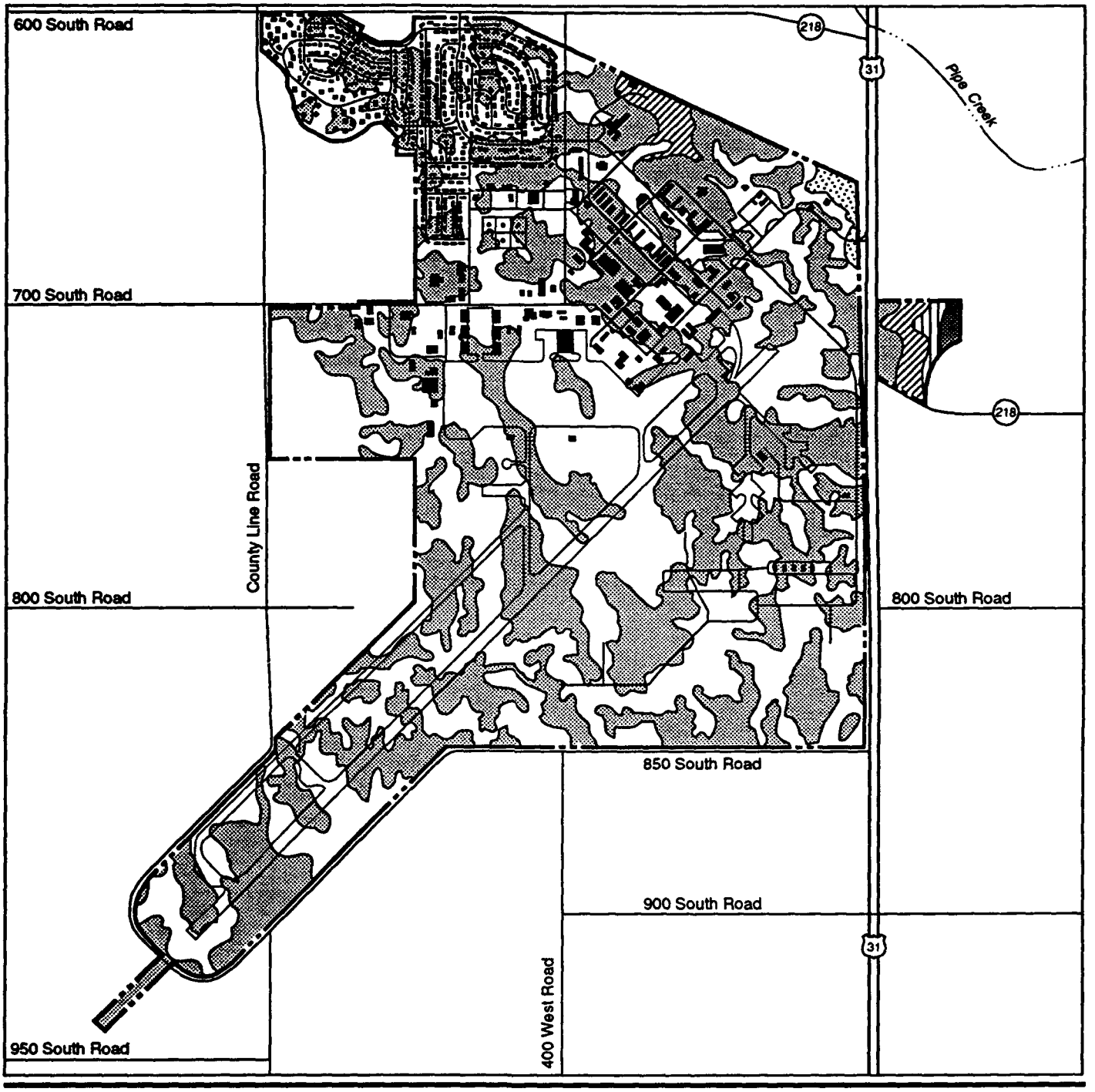
3.4.1.2 Physiography and Geology

Physiography. Grissom AFB is located in the Upland Till Plain section of the Interior Plains Division of the Central Lowlands Province of the United States. The Upland Till Plain section is characterized by nearly level plains with gently rolling hills. Elevations at the base range from 780 feet above MSL near the northern base boundary to 810 feet above MSL near the southeastern base boundary.

Geology. The geology of Grissom AFB and the surrounding area is characterized by unconsolidated Pleistocene glacial deposits and Recent alluvium underlain by shales, limestones, and dolomite deposited during the Devonian and Silurian Periods. The glacial till consists mainly of calcareous silty clays interspersed with discontinuous layers (lenses) of sands and gravel. The Recent alluvial deposits are located off base, primarily along Pipe Creek and its tributaries (Watkins and Rosenshein, 1963).

The Devonian and Silurian rocks form the bedrock surface upon which the younger unconsolidated geologic materials were deposited. The bedrock in the vicinity of Grissom AFB consists of four rock units: the Hamilton Group Limestones (absent at the base), the Kokomo Limestone, the Liston Creek Limestone, and the Mississinewa Shale. The depth below land surface to these units in the vicinity of the base varies from surface exposures along Pipe Creek to depths of over 130 feet (Watkins and Rosenshein, 1963).

The Hamilton Group consists of crystalline and massive limestone. The Kokomo Limestone consists of both limestone and argillaceous limestone. Both the Hamilton Group and Kokomo Limestones may transmit water locally.



EXPLANATION

- Blount silt loam
- Fincastle silt loam
- Miami clay loam
- Miami silt loam
- Shoals silt loam
- Treaty silt loam
- Base Boundary

0 650 1300 2600 Feet

Sources: U.S. Department of Agriculture, 1979,1981.

Soils Distribution

Figure 3.4-1

The Liston Creek Limestone consists of an upper dolomitic limestone and a lower slabby dolomitic limestone containing chert beds near the base of the formation. The Liston Creek Limestone is the chief bedrock aquifer in the vicinity of the base. The Mississinewa Shale is a confining unit that consists of calcareous and argillaceous shale.

Grissom AFB lies within a seismic risk zone that is classified as Seismic Zone 1, as defined by the Uniform Building Code (International Conference of Building Officials, 1991). Seismic Zone 1 represents a low potential risk for large seismic events. No major faults or fracture zones have been mapped near the base (Stover, 1977), and there are no special building codes regarding seismic activity.

Although sand and gravel aggregate (cement raw materials), crushed stone, and peat resources are present within the area, no mineral resources have been identified on Grissom AFB. Several cement and quarry mining operations are located in Cass County near Logansport (Schneider and Moore, 1978), and peat mining occurs in northern Indiana where workable deposits are common (Shaffer, 1984).

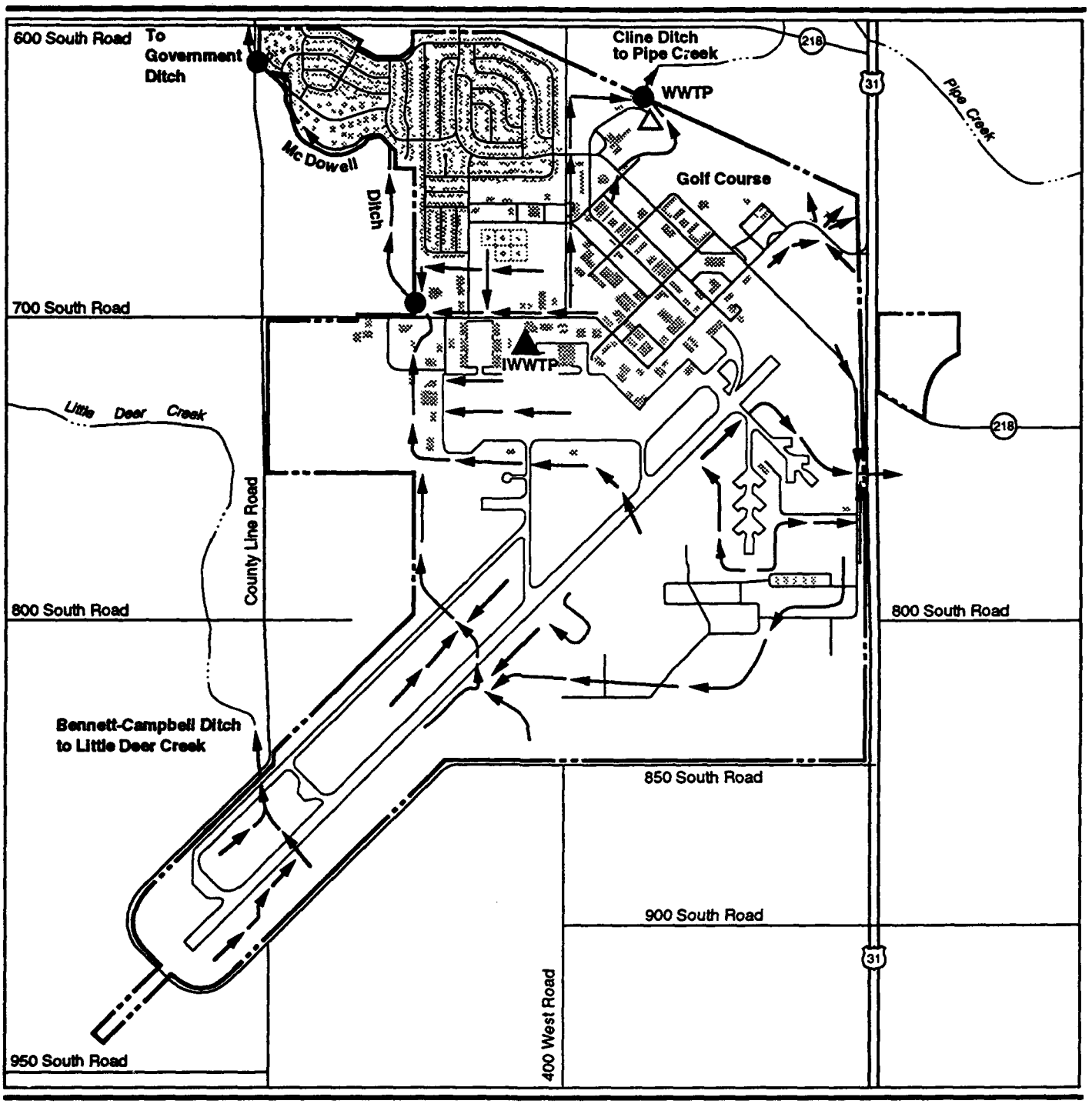
3.4.2 Water Resources

The ROI for surface water includes the watershed/drainage basin in which Grissom AFB is located; the ROI for groundwater includes the aquifer from which water is supplied. There are no wild and scenic rivers within the ROI.

3.4.2.1 Surface Water. Grissom AFB is located within the Wabash River Basin of north central Indiana, in the Pipe Creek drainage area (Wayne et al., 1966). Surface water in the vicinity of the base includes Pipe Creek, Little Deer Creek, several drainage ditches, and a small lime settling pond in the golf course area near the northeast boundary of the base. Drainages on base drain in a north and west direction and eventually reach tributaries of Pipe Creek. Pipe Creek flows in a northwesterly direction and joins the Wabash River approximately 6 miles north of the base. Grissom AFB, according to base records and the Federal Emergency Management Agency (FEMA), has no 100-year flood encroachment areas (FEMA, 1981). Generally, the surface water quality in the vicinity of Grissom AFB is good and is used for livestock watering, irrigation, and the propagation of fish and wildlife.

3.4.2.2 Wetlands. Within the Grissom AFB boundary, a 0.25-acre area southeast of the runway and approximately 8.5 acres of drainage ditches have been identified as wetlands. This area is discussed in Section 3.4.5.4, Sensitive Habitats.

3.4.2.3 Surface Drainage. Surface drainage at Grissom AFB (Figure 3.4-2) consists of open drainage courses and underground storm drains. Surface



EXPLANATION

- Direction of Flow
- Sampling Location
- Industrial Wastewater Treatment Plant (IWWTP)
- Wastewater Treatment Plant (WWTP)
- Base Boundary

0 650 1300 2600 Feet

Surface Hydrology

Figure 3.4-2

runoff not routed into the underground system drains into several systems on the base. Wastewater flows at the WWTP are high relative to the water consumed indicating an infiltration/inflow problem with the on-base system.

McDowell Ditch, west of the base, flows into Government Ditch to the northwest, eventually flowing to Pipe Creek. The golf course drains into Cline Ditch, which flows to Pipe Creek in the northeast. The WWTP drains to Pipe Creek through an underground pipe. The southwest portion of the base drains into Bennett-Campbell Ditch, then into Little Deer Creek. A storm drain flows east from the base into Pipe Creek.

The storm water and treated wastewater discharges from Grissom AFB are permitted under an NPDES permit issued and administered by the IDEM; the permit expired in 1991 (Appendix F). Application for a new permit was submitted to the IDEM 6 months prior to expiration of the existing permit; currently Grissom AFB is authorized to operate under the expired permit. Water quality in the drainages of the base is routinely monitored by the base for compliance under the terms of the expired NPDES permit. Occasionally, the pollutant content from the IWWTP at Building 461, which receives outfall from the aircraft wash rack in Hangar 200 and a maintenance facility (Building 453), has exceeded the terms of the permit for oil and grease. Grissom AFB is modifying the system to meet permit requirements. Water quality sampling locations for the NPDES permit are located on McDowell Ditch, Cline Ditch, and at the WWTP. Additionally, the Air Force samples at Pipe Creek.

3.4.2.4 Groundwater. The Liston Creek Limestone is the major bedrock aquifer in the vicinity of Grissom AFB. Groundwater in the area is abundant due to weathering and solution activity along the joints and bedding planes of the Liston Creek Formation. A well-developed secondary porosity has developed that yields ample water supplies for the base. In addition, the overlying glacial deposits, which have variable levels of permeability, store large quantities of groundwater and could offer a secondary water supply if necessary.

The uppermost aquifer underlying the base consists of sand and gravel lenses within the unconsolidated glacial till deposits. The groundwater exists under unconfined conditions and is seasonally at or above ground surface. The aquifer normally flows in a north-northeast direction. Migration rates range from slow in the clayey till zone to moderate-rapid in the sandy and gravelly interbeds. Because of the slow permeability of the clay and silty clay till, groundwater in the sand and gravel lenses are locally perched. Recharge to the uppermost aquifer is by local rainfall and from Pipe Creek, which serves as both a recharge source and discharge area for the aquifer. Other discharge from the aquifer occurs as springs, inflow to streams, horizontal migration off base, and vertical migration downward into the solution channels and joints of the bedrock. A separate hydrogeologic

unit within the till is a basal interval of high permeability sands and gravel overlying a fractured/weathered bedrock surface; this unit is known as the interface zone (Engineering-Science, Inc. 1985; Environmental Science and Engineering, Inc., 1992).

In the immediate vicinity of the base, the Liston Creek aquifer is fractured and jointed. Migration of groundwater in the Liston Creek Limestone is generally moderate, but local variation in the amount of interconnecting void space allows for rapid migration in some parts of the aquifer. Groundwater generally flows north toward Pipe Creek, which is the natural discharge point for the bedrock aquifer.

Seven on-base wells supply potable water to Grissom AFB from the Liston Creek aquifer, and Well No. 5 supplies non-potable water to the base golf course. Wells No. 6 and 7 are the heaviest-used wells on base providing water supply to the main base and housing. The remaining wells are used when extra capacity is needed or are attached to facilities not connected to the main water system. Well depths are between 125 feet and 180 feet and water quality is good, except for hardness. Iron concentrations for the base wells are slightly elevated because of the type of rocks present in the area; however, potable water is treated to remove iron (U.S. Air Force, 1991b).

The Liston Creek aquifer is heavily used in the area for domestic, agriculture, municipal, and industrial uses (Environmental Science and Engineering, Inc., 1992); however, the aquifer has not experienced overdraft and is not expected to in the future. Water supply to the area surrounding Grissom AFB is provided by wells for individual use and for municipal systems for the city of Peru and towns of Bunker Hill and Walton.

The average daily water demand for the ROI in 1990 was 2.97 MGD and is projected to decline to 2.08 MGD at realignment. The local water supplies are adequate to meet the anticipated needs and no major water resource developments are expected (see Section 3.2.4, Utilities).

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 units of 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 of Indiana has adopted the NAAQS as their representative air quality standards. The NAAQS are presented in Table 3.4-2. The main pollutants considered in this EIS are ozone (O_3), carbon monoxide (CO), nitrogen oxides (NO_x), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter equal to or less than 10 microns in diameter (PM_{10}). NO_x includes all oxides of nitrogen and is of concern because of its potential contribution to ozone formation. Only that portion of total NO_x, which is measurable as NO_2, is subject to the NAAQS. The previous NAAQS for PM_{10} 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 TSP.

Lead is not addressed in this EIS because there are no known lead emission sources in the region or proposed in 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 records from air quality monitoring stations maintained by the IDEM, Office of Air Management. 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 IDEM, U.S. EPA, and Grissom AFB. Inventory data are separated by pollutant and reported in tons per day 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 release 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 NO_x and VOCs in the form of hydrocarbons. VOCs are compounds containing carbon, excluding CO, carbon dioxide (CO_2), carbonic acid, metallic carbides, metallic carbonates, ammonium carbonate, methane, ethane, and other nonreactive methane and ethane derivatives. NO_x is the designation given to the groups of all oxygenated nitrogen species including nitric oxide (NO), NO_2, nitrous oxide (N_2O), nitric anhydride (N_2O_5), nitrogen tetroxide (N_2O_4), nitrogen trioxide (NO_3), and nitrous anhydride (N_2O_3). Although all of these compounds can exist in the air, only N_2O, NO, and NO_2 are found in any 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

Table 3.4-2. National and Indiana Ambient Air Quality Standards

Pollutant	Averaging Time	Primary[a, b]	Secondary[a, c]
Ozone	1-hour	0.12 ppm (235 $\mu g/m^3$)	Same as primary standard
Carbon monoxide	8-hour	9 ppm (10,000 $\mu g/m^3$)	---
	1 hour	35 ppm (40,000 $\mu g/m^3$)	---
Nitrogen dioxide	Annual	0.053 ppm (100 $\mu g/m^3$)	Same as primary standard
Sulfur dioxide	Annual	80 $\mu g/m^3$ (0.03 ppm)	---
	24-hour	365 $\mu g/m^3$ (0.14 ppm)	---
	3-hour	---	1,300 $\mu g/m^3$ (0.5 ppm)
PM_{10}	Annual	50 $\mu g/m^3$[d]	Same as primary standard
	24-hour	150 $\mu g/m^3$	---
Lead	Quarterly	1.5 $\mu g/m^3$	Same as primary standard

Notes: 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 standard, is equal to or less than one.

(a) Equivalent units given in parenthesis are based on a reference temperature of 25°C and a reference pressure of 760 millimeters (1,013.2 milliber) of mercury. All measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 millimeters of mercury; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

(b) National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

(c) National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

(d) Calculated as arithmetic mean.

$\mu g/m^3$ = micrograms per cubic meter.
PM_{10} = particulate matter equal to or less than 10 microns in diameter.
ppm = parts per million.

Source: CAA Title 42 U.S.C. §§7401-7671

precursor emissions on ozone levels usually occurs several hours after they are emitted 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 emissions related to the Proposed Action and alternatives 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 production is dependent upon the combustion temperature conditions 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 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, depending upon the prevailing meteorological conditions.

For the purpose of air quality analysis, the ROI for emissions of ozone precursors and NO_2 from the reuse-related construction or operational activities would be the existing air shed surrounding Grissom AFB (i.e., Miami, Cass, and Howard counties). Reuse-related emissions of VOC, NO_x, and NO_2 are therefore compared to emissions in this regional air shed. The ROI for emissions of other pollutants (CO, SO_2, and PM_{10}) is limited to the more immediate area surrounding Grissom AFB.

The federal CAA, as amended in August 1977 and November 1990, dictates that reuse-related 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 reuse alternative emissions, both separately and combined with other surrounding sources, and (2) the maximum allowable emissions from the reuse alternative.

Prior to the 1990 Amendments to the CAA, federal regulation of hazardous air emissions was very limited. Section 112, as amended in 1990, requires 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. The local climate around Grissom AFB is not influenced by the topography of the surrounding area. The land is primarily flat farmland and therefore does not affect the local weather and the air dispersion patterns. Prevailing winds are from the south during the summer and from the west for the remainder of the year.

During the summer, when temperatures and solar radiation levels are higher, ozone and its precursors, transported from other (nonattainment) regions to the south, could produce slightly elevated ozone concentrations around Grissom AFB; however, levels are below applicable standards.

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. A nonattainment designation is given to a region if the primary NAAQS for any criteria pollutant is exceeded at any point in the region for more than 3 days during a 3-year period. 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.

Grissom AFB is located in an area designated by the U.S. EPA as being unclassified for all federal and state criteria pollutants (Bureau of National Affairs, 1992). There are no air monitoring stations within the ROI. The closest air quality monitoring station is in Allen County, approximately 50 miles northeast of Grissom AFB. This site was established for monitoring the impact of an existing facility. According to the IDEM, the air monitoring station in Allen County can be used to represent the background concentrations for each of the criteria pollutants for Grissom AFB (IDEM, 1992). This station monitors all of the criteria pollutants and has been equipped with meteorological equipment since 1986. Background concentrations are listed in Table 3.4-3. The closest area in nonattainment is Marion County, approximately 50 miles south of Grissom AFB. It is in nonattainment for CO, O_3, SO_2, and lead.

Grissom AFB is in Indiana Air Quality Control Region 84. Major new or modified stationary sources in the area of Grissom AFB are subject to Prevention of Significant Deterioration (PSD) review to ensure that these sources are constructed without significant adverse deterioration of the clean air in the area. Emissions from any new or modified source must be controlled using Best Available Control Technology. The air quality impacts in combination with other PSD sources in the area must not exceed the maximum allowable incremental increases identified in Table 3.4-4. 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. No PSD Class I areas have been identified within 50 miles of the base. All of the surrounding area is designated by the U.S. EPA as Class II.

Table 3.4-3. Ambient Background Air Quality Concentration in the Area of Grissom AFB

Pollutant	Averaging Time	Background Concentration[a]
Ozone	1-Hour	0.04 ppm
		(71 $\mu g/m^3$)
Carbon monoxide	8-Hour	0.2 ppm
		(241 $\mu g/m^3$)
	1-Hour	0.3 ppm
		(344 $\mu g/m^3$)
Sulfur dioxide	Annual	0.0005 ppm
		(1 $\mu g/m^3$)
	24-Hour	0.002 ppm
		(5 $\mu g/m^3$)
	3-Hour	0.004 ppm
		(11 $\mu g/m^3$)
PM_{10}	Annual	3 $\mu g/m^3$
	24-Hour	11 $\mu g/m^3$

Note: (a) Background concentrations provided by IDEM (Lengerich, 1992). Values were collected in 1991 at the Allen County monitoring station. Ozone season is from April 1 to September 30.
$\mu g/m^3$ = micrograms per cubic meter.
PM_{10} = particulate matter equal to or less than 10 microns in diameter.
ppm = parts per million.

Table 3.4-4. Maximum Allowable Pollutant Concentration Increases under PSD Regulations - Grissom AFB

		Maximum Allowable Increment ($\mu g/m^3$)		
Pollutant	Averaging Time	Class I	Class II[a]	Class III
Total suspended particulates	Annual	5	19	37
	24-Hour	10	37	75
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.
(a) All the areas within the 50-mile radius of Grissom AFB are Class II.
$\mu g/m^3$ = micrograms per cubic meter.

Source: 40 CFR 52.21.

Prerealignment Reference. Prerealignment concentrations in the immediate vicinity of the base runways were estimated with the Emissions and

Dispersion Modeling System (EDMS). Sources modeled included aircraft, motor vehicles, and the base central heating plant. The results of the EDMS modeling are provided in Table 3.4-5. The values in Table 3.4-5 represent the maximum concentrations that occurred at a receptor located approximately 1,000 feet downwind of the end of the runway, except for

Table 3.4-5. Air Quality Modeling Results for Prerealignment Conditions in the Vicinity of the Runway at Grissom AFB ($\mu g/m^3$)

Pollutant	Averaging Time	Maximum Impact[a]	Background Concentration[b]	Limiting Standard
Carbon monoxide	8-hour	1,825	241	10,000
	1-hour	2,623	344	40,000
Sulfur dioxide	Annual	41	1	80
	24-hour	161	5	365
	3-hour	364	11	1,300
PM_{10}	Annual	15	3	50
	24-hour	58	11	150

Notes: (a) Maximum impact occurred approximately 1,000 feet downwind of the end of the runway except for SO_2, which occurred 7,000 feet downwind of central heating plant.
(b) Values from the Allen County monitoring station (Lengerich, 1992).
$\mu g/m^3$ = micrograms per cubic meter.
PM_{10} = particulate matter equal to or less than 10 microns in diameter.

the SO_2 concentration that occurred at a receptor approximately 7,000 feet downwind of the central heating plant. Modeled concentrations were well below NAAQS for all pollutants.

Realignment Baseline. It can be reasonably assumed that pollutant concentrations at base realignment would be less than prerealignment conditions. Pollutant concentrations in the area of the base itself would be less than prerealignment levels due to the reduction or elimination of numerous emission sources associated with normal base activities (e.g., all current aircraft activities except those associated with the 434th ARW and military transients). The realignment would also reduce the number of motor vehicles operating in the surrounding area.

The pollutant concentrations in the vicinity of the runways associated with the 434th ARW and military transient aircraft operations and local motor vehicle traffic at base realignment were estimated with the EDMS model and are contained in Table 3.4-6. Emissions at the receptor locations are below the limiting standard for all criteria pollutants. The relatively large difference between the concentration impacts determined for prerealignment and realignment conditions is due to the reduction of operations of high emission level aircraft, such as the KC-135, associated with the 305th ARW.

Table 3.4-6. Air Quality Modeling Results for Realignment Conditions in the Vicinity of the Runway at Grissom AFB ($\mu g/m^3$)

Pollutant	Averaging Time	Maximum Impact[a]	Background Concentration[b]	Limiting Standard
Carbon monoxide	8-hour	536	241	10,000
	1-hour	766	344	40,000
Sulfur dioxide	Annual	0.4	1	80
	24-hour	1.1	5	365
	3-hour	3.2	11	1,300
PM_{10}	Annual	0.4	3	50
	24-hour	1.2	11	150

Notes: (a) Maximum impact occurred approximately 1,000 feet downwind of the end of the runway.
(b) Values from the Allen County monitoring station (Lengerich, 1992).
$\mu g/m^3$ = micrograms per cubic meter.
PM_{10} = particulate matter equal to or less than 10 microns in diameter.

3.4.3.2 Air Pollutant Emission Sources

Prerealignment Reference. Emission inventories for Grissom AFB and the ROI (which includes Miami, Cass, and Howard counties) are presented in Table 3.4-7. The air quality emissions inventory for the ROI was provided by the IDEM for 1991. The data represent air emissions from industrial

Table 3.4-7. Prerealignment Air Emission Inventory (tons/day)

Emission Source	PM_{10}	SO_2	CO	VOC	NO_x
Cass County	1.40	35.56	2.25	0.29	10.22
Howard County	1.06	2.65	1.50	1.43	0.82
Miami County	0.02	0.74	0.01	0.82	0.16
Subtotal[a]	2.48	38.95	3.76	2.54	11.20
Grissom AFB					
Aerospace Ground Equipment	0.004[c]	0.003	0.056	0.006	0.062
Aircraft Flying Operations[b]	1.71	0.36	12.52	10.72	1.59
Aircraft Ground Operations	0.0004[c]	0.007	0.17	0.05	0.07
Fuel Evaporation	—	—	—	0.26	—
Heating and Power Production	0.02	0.97	0.09	0.007	0.28
Motor Vehicles	0.03	0.01	0.28	0.17	0.15
Surface Coating	—	—	—	0.01	—
Solvent Tank Degreasing	—	—	—	0.01	—
Grissom AFB Total	1.76	1.35	13.12	11.23	2.15

Notes: (a) Emissions are from industrial processes in the ROI. Motor vehicle activity, fuel combustion, and solid waste disposal emissions are not monitored because the area is in attainment for ozone.
(b) Aircraft flying operations were modeled using EDMS based on 1990 operations.
(c) Only TSP data available. PM_{10} fraction of TSP assumed to be 100 percent except for the heating plant, which is assumed to be 50 percent.
CO = carbon monoxide.
NO_x = nitrogen oxides.
PM_{10} = particulate matter equal to or less than 10 microns in diameter.
SO_2 = sulfur dioxide.
VOC = volatile organic compound.

Sources: IDEM, 1992; U.S. Air Force, 1991c.

processes. Stationary fuel combustion, solid waste disposal, and transportation (mobile sources) data were not available from the IDEM for the ROI.

The emissions inventory for Grissom AFB is representative of prerealignment conditions in 1990. The primary emission sources at the base include aerospace ground equipment, aircraft flying operations, aircraft ground operations, motor vehicles, fuel evaporation, surface coating, solvent tank degreasing, and heating and power production. The largest air pollutant sources for the base are aircraft flying operations.

Grissom AFB had five air emission permits issued by IDEM. Four of these permits authorize emissions from the central heating plant's boilers regardless of whether they are operating on No. 2 fuel oil or natural gas. The fifth air use permit authorizes the base to operate JP-4 fuel storage facilities.

Realignment Baseline. The emission inventory for Grissom AFB at base realignment (1994) was estimated by assuming the central heating plant would operate at 67 percent of the prerealignment capacity using 90 percent natural gas and 10 percent fuel oil, aircraft operations and fuel requirements attained from the 434th ARW, and estimated motor vehicle use on base for both the military cantonment and OL personnel. The base central heating plant has been converted to all natural gas use with fuel oil as a backup fuel source, reducing emissions from prerealignment operation using 50 percent coal and 50 percent natural gas. Realignment baseline emissions resulting from the above assumptions are presented in Table 3.4-8.

3.4.4 Noise

The ROI for noise sources at Grissom AFB is defined using FAA-developed land use compatibility guidelines. The area most affected by noise due to base disposal and reuse is limited to the area in and around the base within the DNL 65 dB contour. This includes, but is not limited to, portions of the base, rural areas, and the community of Lincoln.

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 for the measurement of sound. Table 3.4-9 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 frequency response of the human ear.

Table 3.4-8. Realignment Emission Inventory at Grissom AFB (tons/day)

Emission Source	PM_{10}	SO_2	CO	VOC	NO_x
Military Cantonment					
Aerospace Ground Equipment[a]	0.002	0.001	0.03	0.003	0.03
Aircraft Flying Operations	0.51	0.11	4.01	3.00	0.53
Aircraft Ground Operations[a]	0.0002	0.003	0.09	0.02	0.04
Fuel Evaporation[b]	—	—	—	0.24	—
Heating and Power Production[c]	0.00005	0.017	0.0002	0.00001	0.0005
Motor Vehicles	0.0003	0.00005	0.65	0.05	0.06
Surface Coating[a]	—	—	—	0.005	—
Solvent Tank Degreasing[a]	—	—	—	0.007	—
Subtotal	0.51	0.1305	4.78	3.33	0.66
Operating Location	0.0005	0.00003	0.001	0.00005	0.006
Total	0.51	0.13708	4.781	3.33	0.666

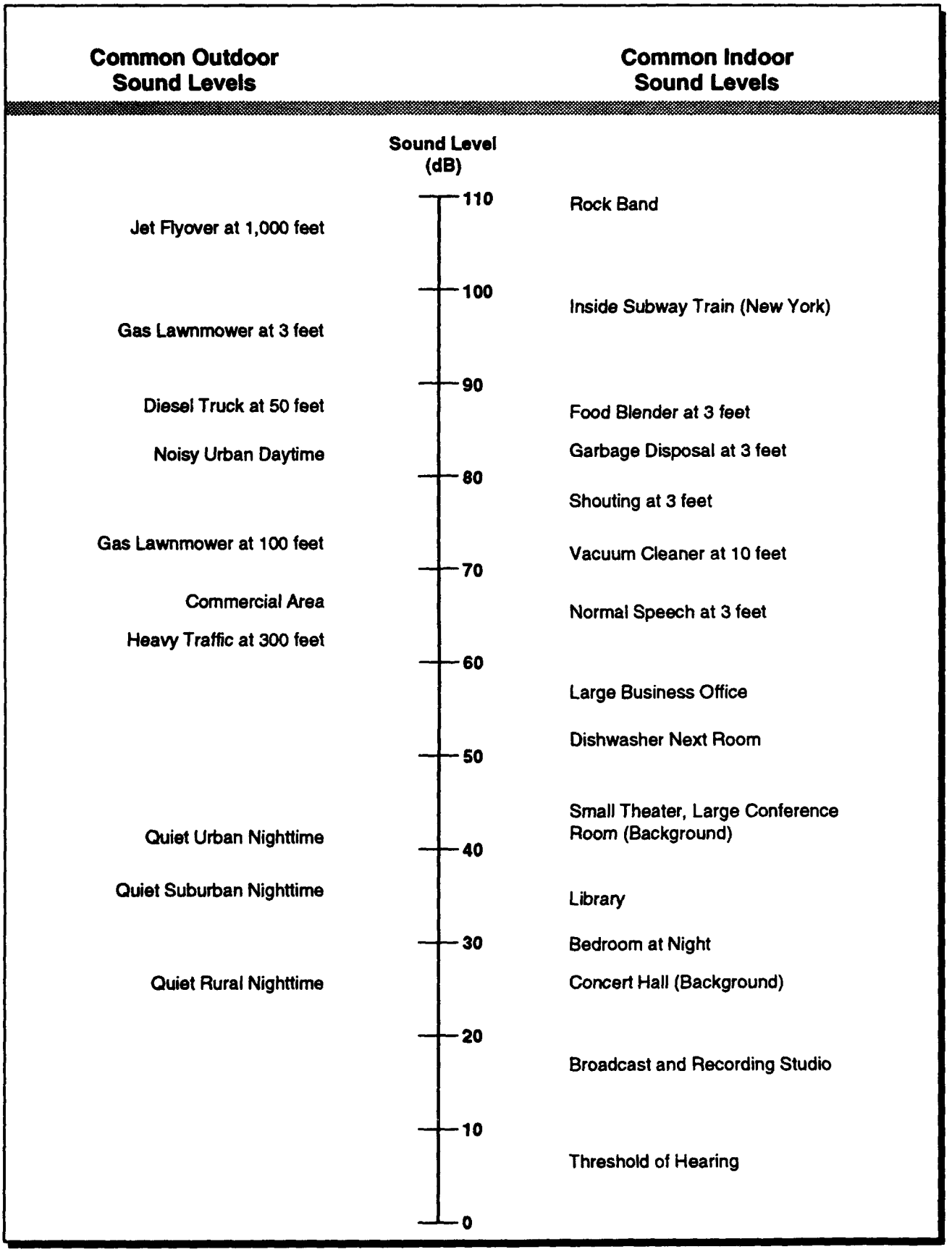
Notes: (a) Based on the assumption of a 50 percent decrease from prerealignment conditions.
(b) Based on the assumption of a 10 percent decrease in fuel usage from prerealignment conditions.
(c) Based on the assumption of two-thirds of continued operations from prerealignment conditions. At realignment, heating plant assumed to operate at 90 percent natural gas and 10 percent fuel oil.
CO = carbon monoxide.
NO_x = nitrogen oxide.
PM_{10} = particulate matter equal to or less than 10 microns in diameter.
SO_2 = sulfur dioxide.
VOC = volatile organic compound.

A-weighted sound levels represent adjusted sound levels. The adjustments, established by the American National Standards Institute (ANSI) (S1.4-1983) are applied to frequency content of 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 adjustment added to the nighttime levels (between 10:00 p.m. and 7:00 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 and has been adopted by HUD, FAA, and DOD.

Table 3.4-9. Comparative Sound Levels



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 3.4-10 provides FAA-recommended DNL ranges for various land use categories based upon the committee's guidelines. The FAA guidelines were used in this study to determine noise impacts. No state or local guidelines were identified. DNL is used in this report because it is the noise descriptor recognized by the FAA and Air Force for airfield environments. DNL is 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. Occasionally, the sound exposure level (SEL) is used to supplement DNL, especially where sleep disturbance is a concern. The SEL value represents the A-weighted sound level integrated over the entire duration of the noise event and referenced to a duration of 1 second. When an event lasts longer than 1 second, the SEL value will be higher than the highest sound level during the event. SEL is used in this report when discussing sleep disturbance effects.

Appendix I 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, and other human activities. Military aircraft operations and surface traffic on local streets and highways are the existing primary sources of noise in the vicinity of Grissom AFB. In airport analyses, areas with DNL above 65 dB are often considered in land use compatibility planning and impact assessment; therefore, the contours of DNL greater than 65 dB are of particular interest. Contours above DNL 65 dB are presented in 5 dB intervals.

Prerealignment Reference. Aircraft noise at Grissom AFB occurs during aircraft engine warmup, maintenance and testing, taxiings, takeoffs, approaches, and landings. In order to define the noise environment due to prerealignment aircraft operations (1990), the Air Force-developed Noise Exposure Model (NOISEMAP) Version 6.1 was used to predict DNL 65, 70, and 75 dB noise contours. Input data to NOISEMAP include information on aircraft types; runway use; takeoff and landing flight tracks; aircraft altitudes, speeds, and power settings; and the number of daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) operations. These noise contours reflect operations consisting of various

Table 3.4-10. Land Use Compatibility with Yearly Day-Night Average Sound Levels

Land Use	Yearly Day-Night Average Sound Level (DNL) in Decibels (dB)					
	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, 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 3.4-10. 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 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 dB.

(g) Residential buildings require an NLR of 30 dB.

(h) Residential buildings not permitted.

Source: Derived from Federal Aviation Regulation (FAR) Part 150 Airport Noise Compatibility Planning (FAA, 1989b).

military aircraft including, but not limited to, KC-135R, A-10, and T-37. These data are included in Appendix I. The results of the modeling are presented as noise contours in Figure 3.4-3.

Surface vehicle traffic noise levels for roadways in the vicinity of Grissom AFB were estimated using the Federal Highway Administration's Highway Noise Model (Federal Highway Administration, 1978). This model incorporates vehicle mix, traffic volume projections, and speed to generate DNL. 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 3.4-11. The actual distances to the DNLs 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.

Appendix I contains the data used in the surface traffic analysis. These data include AADTs, traffic mix, day/night splits, and speeds.

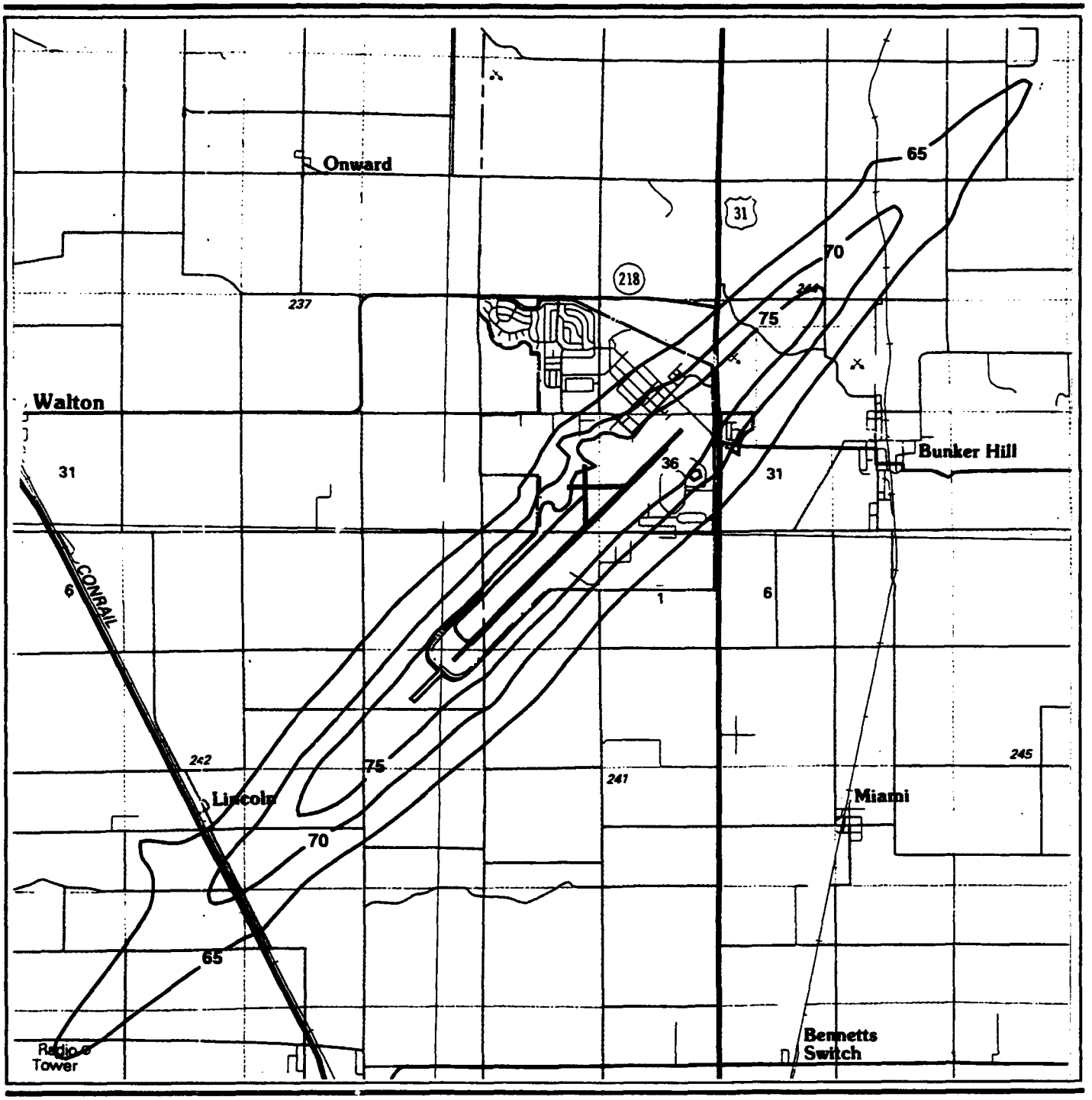
Realignment Baseline. The noise environment due to aircraft operations at realignment was defined using NOISEMAP Version 6.1 to predict DNL 65, 70, and 75 dB noise contours. These noise contours reflect operations consisting of various military aircraft including, but not limited to, KC-135R and F-4. These data are included in Appendix I. The results of the modeling are presented as noise contours in Figure 3.4-4.

The projected surface traffic noise levels for the realignment baseline were calculated using the surface traffic projections at base realignment (Appendix I). The results of the modeling for the roadways analyzed are presented in Table 3.4-11. Again, the actual distances to the DNLs 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 ROI for Grissom AFB includes noise-sensitive receptors such as rural residences that are within the DNL 65 dB contour.

Prerealignment Reference. Table 3.4-12 presents the approximate number of acres and estimated population within each DNL range due to aircraft noise, based on current land use patterns. As shown in this table, approximately 7,192 acres and 222 residents were exposed to DNL 65 dB or greater in and around Grissom AFB in 1990. Additionally, approximately 243 residents are estimated to have been exposed to DNL 65 dB or greater due to surface traffic in the region in 1990, based on information in Table 3.4-11.

Realignment Baseline. At realignment, the areas exposed to DNL 65 dB and above due to aircraft operations would decrease. This is due primarily to the



EXPLANATION

— 65 — DNL Noise Contour (in 5 dB intervals)

- - - - Base Boundary

Prerealignment Aircraft Noise Contours

0 1625 3250 6500 Feet

Map Source: U.S. Geological Survey, 1985.

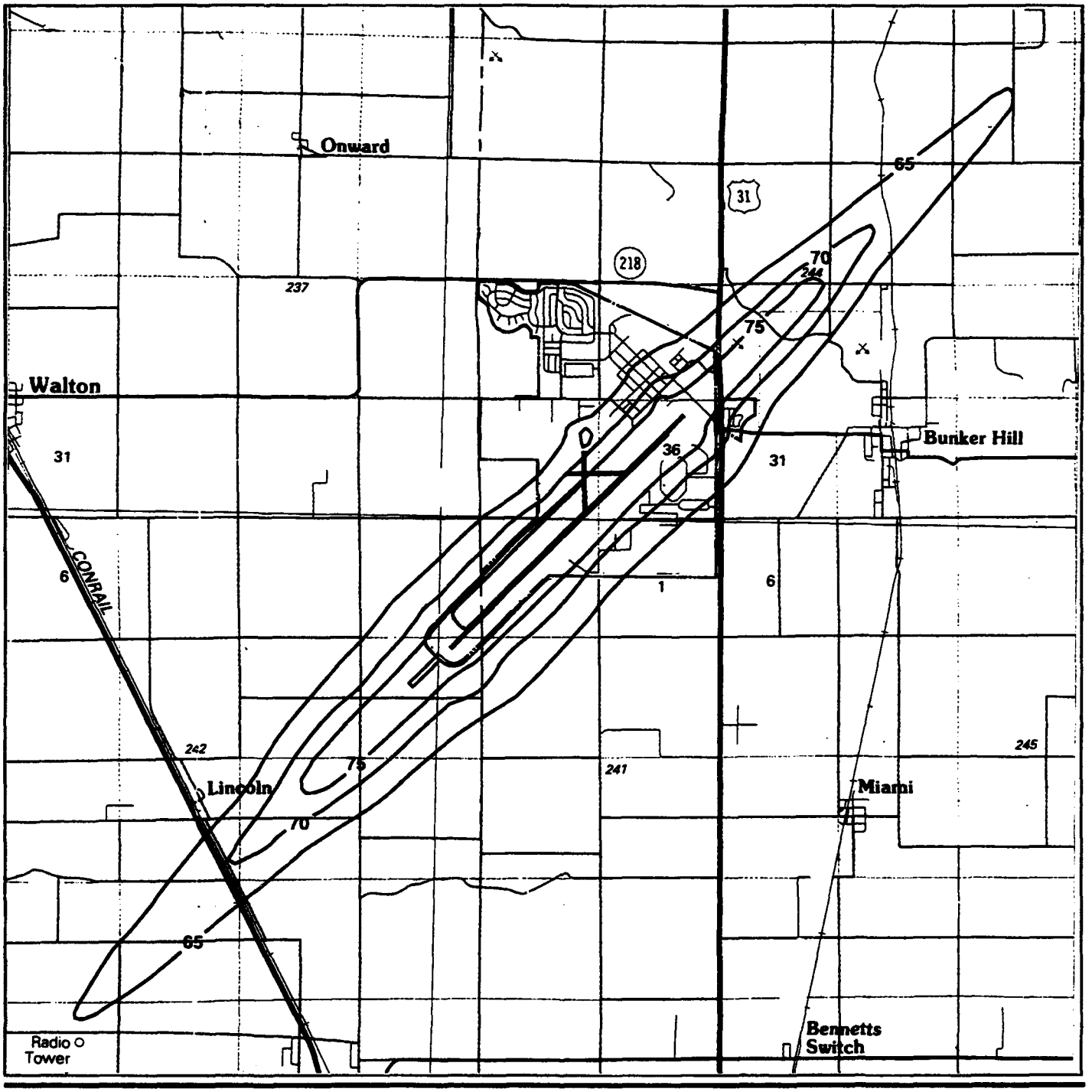
Figure 3.4-3

Table 3.4-11. Distance to DNL from Roadway Centerline for the Prerealignment Reference and Realignment Baseline

Roadway	Segment	Distance (feet) DNL 65	DNL 70	DNL 75
Prerealignment				
U.S. 31	SH 18 to 800 South	270	130	60
U.S. 31	800 South to SH 218 (Jct. East)	260	130	60
U.S. 31	SH 218 (Jct. East) to Main Gate	260	130	60
U.S. 31	Main Gate to SH 218 (Jct. West)	270	130	60
U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	260	130	60
U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	190	90	50
U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	210	100	50
Old U.S. 31	U.S. 31 to 225 South	90	40	20
Old U.S. 31	225 South to West River Road	100	50	20
SH 218 (Jct. West)	400 West to U.S. 31	30	20	(a)
SH 218 (Jct. West)	County Line Road to 400 West	20	(a)	(a)
SH 218 (Jct. West)	900 East to 1000 East	30	20	(a)
SH 218 (Jct. East)	U.S. 31 to 200 West	40	20	(a)
Realignment				
U.S. 31	SH 18 to 800 South	260	120	60
U.S. 31	800 South to SH 218 (Jct. East)	260	120	60
U.S. 31	SH 218 (Jct. East) to Main Gate	260	120	60
U.S. 31	Main Gate to SH 218 (Jct. West)	260	130	60
U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	260	120	60
U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	190	90	50
U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	210	100	50
Old U.S. 31	U.S. 31 to 225 South	80	40	20
Old U.S. 31	225 South to West River Road	90	40	20
SH 218 (Jct. West)	400 West to U.S. 31	30	20	(a)
SH 218 (Jct. West)	County Line Road to 400 West	20	(a)	(a)
SH 218 (Jct. West)	900 East to 1000 East	20	(a)	(a)
SH 218 (Jct. East)	U.S. 31 to 200 West	40	20	(a)

Notes: Values shown represent the noise levels associated with total surface traffic volume, including base-related and non-base-related traffic.
(a) Contained within roadway.
DNL = day-night average sound level.
SH = State Highway.
U.S. = U.S. Highway.

reduction in based KC-135R and A-10 flight operations. As shown in Table 3.4-12, approximately 5,799 acres and 166 residents will be exposed to DNL 65 dB or greater for realignment conditions. Additionally, an estimated 231 residents would be exposed to DNL 65 dB or greater due to surface traffic in the region at realignment, based on information in Table 3.4-11. Section 3.2.2, Land Use and Aesthetics, describes land uses on and near the base.



EXPLANATION

— 65 — DNL Noise Contour (in 5 dB intervals)

- - - - Base Boundary

Realignment Aircraft Noise Contours

0 1625 3250 6500 Feet

Map Source: U.S. Geological Survey, 1985.

Figure 3.4-4

Table 3.4-12. DNL Exposure from Aircraft Operations - Prerealignment and Realignment

	65-70 dB		70-75 dB		Over 75 dB	
	Acres	Population	Acres	Population	Acres	Population
Prerealignment (1990)	3,660	146	1,706	44	1,826	32
Realignment (1994)	3,009	102	1,346	47	1,444	17

dB = decibel.
DNL = day-night average sound level.

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 fauna), threatened and endangered species, and sensitive habitats.

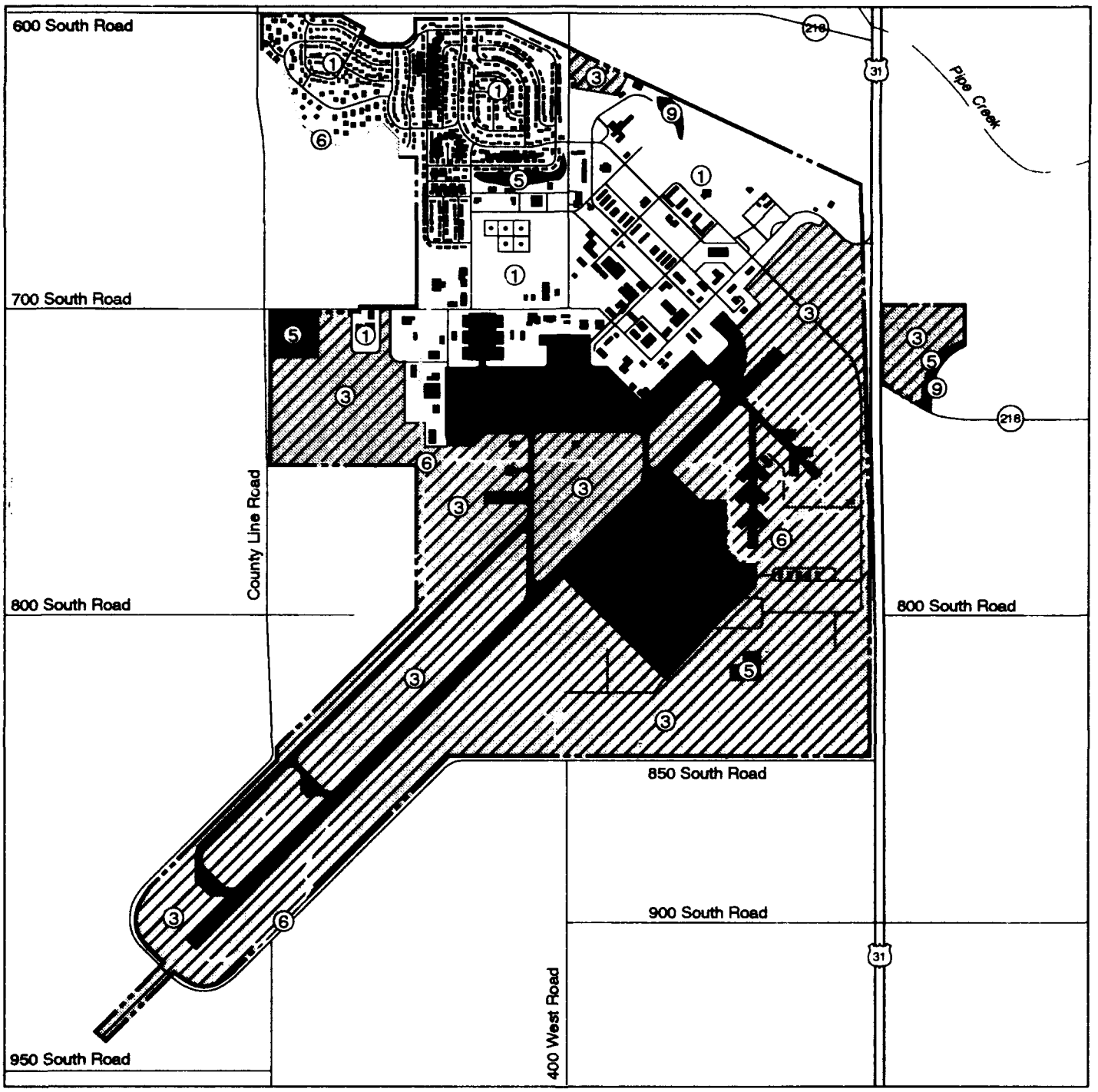
Human activities have altered the natural environment at Grissom AFB because most of the base has been developed. Most of the northern portion of the base is maintained as urban landscape, while the southern portion contains the developed airfield and surrounding disturbed grassland. The on-base areas with the greatest diversity of plants and animals include the remnant forest stands, drainage ditches, and stream habitats.

The ROI used for discussion of biological resources present and potential impacts on these resources is the base and contiguous surface water drainages that could be affected by on-base activities. The ROI includes the area within which potential impacts could occur and provides a basis for evaluating the level of impact.

Information on the biological resource environment was obtained from a literature review, records search, interpretation of color aerial photographs (February 1984), an October 1992 reconnaissance survey of the base and surrounding area, and a June 1993 threatened and endangered species and wetland survey. A species list, including scientific names of species mentioned in the text, is provided in Appendix K.

3.4.5.1 Vegetation. Grissom AFB is located in what was historically the beech-maple forest region of Indiana (Braun, 1950). Since the onset of agricultural development, much of the forest has been logged and replaced with agricultural fields (e.g., corn, soybean). All that is left of the forest in the vicinity of Grissom AFB is scattered remnant stands.

The vegetation on Grissom AFB is mostly disturbed grassland and landscaped areas (Figure 3.4-5). Most of the undeveloped areas at Grissom AFB have been seeded with grasses and are mowed regularly. Some common species of seeded grasses include Kentucky bluegrass, brome, meadow fescue, and bentgrass. There are no agricultural activities on the base.



EXPLANATION

① Landscaped	⑤ Forest	⑨ Water
② Agriculture *	⑥ Swamp/Marsh	Developed
③ Grassland	⑦ Tundra *	Disturbed
④ Shrubland *	⑧ Barren *	Base Boundary

0 650 1300 2600 Feet

* Standard vegetation type not applicable to this figure.

Vegetation Map

Figure 3.4-5

A few small wooded areas on base provide habitat for native plant and animal species. The 6-acre stand of trees behind the community center and trees in base housing contains native species such as beech, eastern cottonwood, American sycamore, white oak, and sugar maple. The understory in this group of trees is planted, regularly mowed grasses, which prohibits regeneration of native trees and shrubs. Control of the understory limits the biological value of the habitat, although the trees are native and provide habitat for several bird species.

A 4-acre, isolated, wooded area, ecologically valuable to a wide variety of plants and wildlife, is located on the southeastern side of the base (see Figure 3.4-5). This area is relatively undisturbed habitat surrounded by mowed grasses. The canopy species include black locust, eastern cottonwood, silver maple, and beech. A variety of understory plants such as strawberry, wild ryegrass, bittersweet nightshade, sedge, and climbing rose are common. In addition, willows form a relatively impenetrable stand on the western edge of this area. The fleshy hawthorn, is a state-designated rare plant that occurs in thickets, pastures, and borders of woods, and is known to occur within 7 miles of the base near the town of McGrawsville (Indiana Department of Natural Resources, 1992). It may potentially occur on base; however, none were observed during the October 1992 and June 1993 surveys.

A narrow corridor of natural riparian vegetation occurs along an unnamed creek on the eastern boundary of the 33-acre parcel adjacent to the main base on the east side of U.S. 31. American sycamore, black walnut, red-osier dogwood, osage orange, climbing rose, milkweed, strawberry, and stinging nettle line the creek, forming a fairly dense cover.

Many of the drainage ditches created in 1942 as part of base development now support a wide variety of aquatic plants and are described further in Section 3.2.5.4, Sensitive Habitats. Shallow ditches and those that do not receive as much runoff support a vegetation composition similar to that of the adjacent lawn areas, and are considered disturbed grasslands, of low biological value.

A lime settling pond is present southeast of the WWTP, at the edge of the base golf course. It has no emergent vegetation and the surrounding vegetation is limited to planted grass, patchy hardstemmed bulrush, and a few tree species. The pond has low biological value.

3.4.5.2 Wildlife. The wildlife species composition at Grissom AFB has changed with the conversion of vegetation from forest to agriculture. Species associated with open fields and grasslands such as northern bobwhite quail and eastern cottontail have increased, while forest species such as the bobcat, long-eared owl, and pileated woodpecker have decreased.

Wildlife in the vicinity of Grissom AFB includes species associated with urbanized areas, agricultural lands, beech-maple forest, and stream and wetland habitats (Appendix K). Most of the base property is developed, urbanized land or mowed lawns. Wildlife diversity is low in these areas and limited to animals tolerant of human influences. Common wildlife species include the gray squirrel, eastern cottontail, woodchuck, and blue jay. Introduced species also common to the area are the English house sparrow and European starling. A greater density of these species is found in the remnant beech-maple area south of the on-base housing area. This area has mowed lawn as the understory vegetation but provides habitat for birds and squirrels that nest and feed in the tall trees.

The trees and dense understory of the wooded area on the southeast side of the base provide food and shelter for a variety of birds and small mammals. Species observed in this area include the eastern chipmunk, white-footed mouse, white-breasted nuthatch, yellow-rumped warbler, white-throated sparrow, wood thrush, and downy woodpecker.

The riparian corridor along the east boundary of the 33-acre parcel east of U.S. 31 is considered important because it supports breeding and foraging and serves as a dispersal corridor for numerous wildlife species, many of which are restricted to riparian areas. This stream, which flows into Pipe Creek, provides shade protection, variable bottom substrate, and riffles and pools favorable for several species of fish such as creek chub, white sucker, silvery minnow, and northern redhorse (Lee et al., 1980). Amphibians such as the pickerel frog and American toad live along the banks and in the slow flowing water. Muskrats burrow in the banks of the creek and white-tailed deer, raccoons, and striped skunks live and forage in the dense vegetation. Many birds such as the song sparrow, northern cardinal, and red-tailed hawk (observed during the October 1992 field survey) find protection, food, and nesting sites in this riparian canopy.

Several of the drainage ditches on base contain water all year and provide habitat for many wildlife species, which are further described in Section 3.4.5.4, Sensitive Habitats. The ditches that are grassy have low habitat value.

The lime settling pond southeast of the sewage treatment plant contains very alkaline water and supports few wildlife species. Bullfrog and tadpoles, as well as great blue heron tracks were observed during the field surveys but no other signs of wildlife were observed. The pond has low habitat value.

A pesticide program is in place at Grissom AFB to control insects and rodents (including the house mouse, woodchuck, and gray squirrel). Larger mammals such as coyotes and grey foxes that may disrupt Air Force activities are trapped and relocated by animal control specialists.

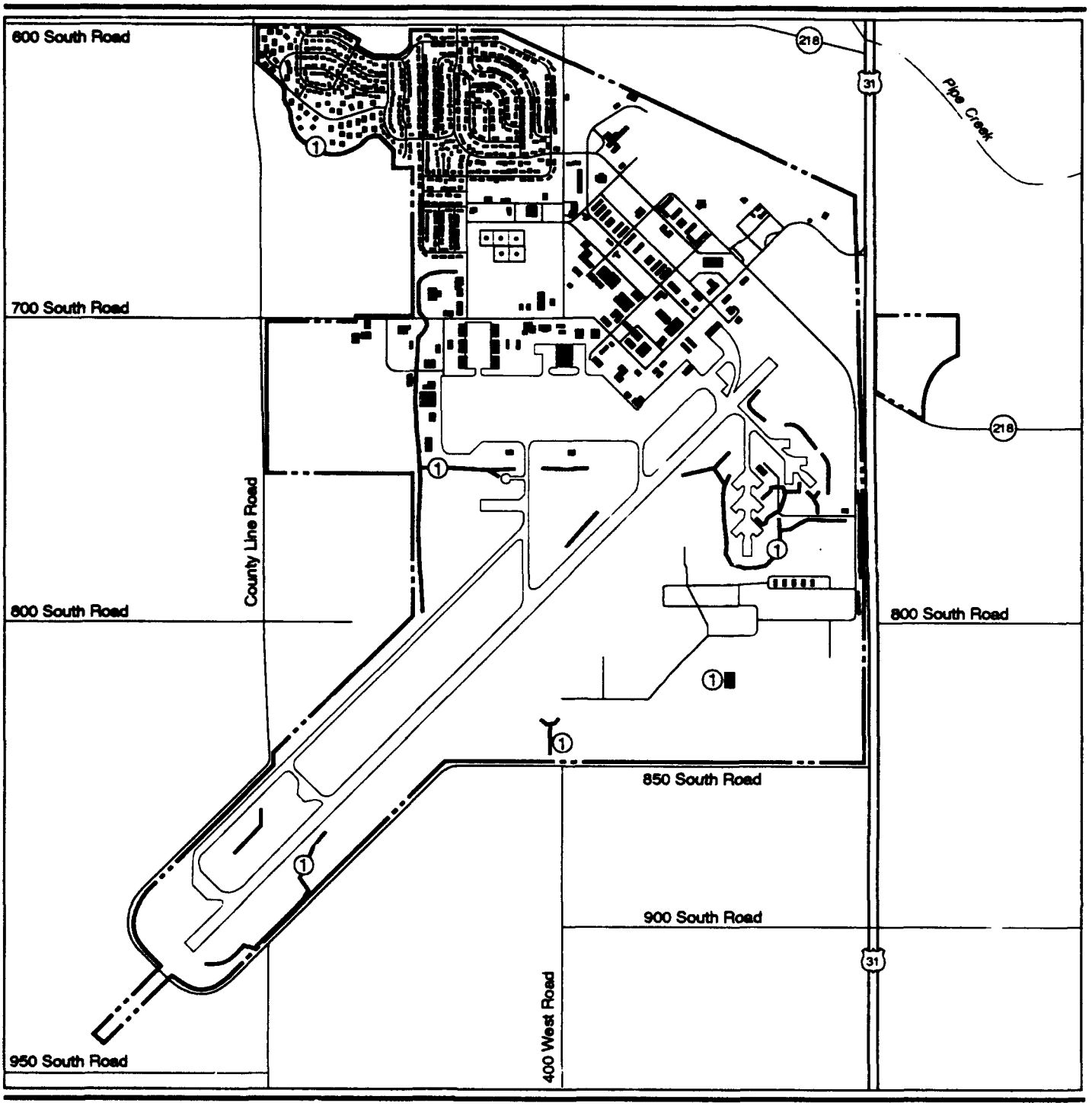
3.4.5.3 Threatened and Endangered Species. The Indiana Department of Natural Resources (IDNR) and U.S. Fish and Wildlife Service (USFWS) were consulted for information on state and federally listed threatened and endangered species, and species that are federal candidates for listing occurring in the vicinity of Grissom AFB. Appendix K lists and describes the habitat and distribution of the federal candidate for listing and state listed species occurring in the vicinity of Grissom AFB. Consultation with these agencies indicates that a total of 20 threatened, endangered, and candidate species of plants and animals potentially occur in the vicinity of Grissom AFB (Appendix K). However, none of these federally or state-listed threatened, endangered, or candidate species were observed during the October 1992 or June 1993 surveys; therefore, they are not expected to occur on Grissom AFB.

Pipe Creek, approximately 1.4 miles from Grissom AFB, receives drainage from the base, and is part of the Wabash River drainage that historically supported a diverse and abundant mussel fauna. Freshwater mussels that may be found in Pipe Creek include the eastern tanshell pearly mussel (federal and state listed as endangered), rabbitsfoot mussel (state listed as endangered), rayed bean mussel (candidate for federal listing), and snuffbox mussel (state listed as endangered and federal candidate for listing). A freshwater mussel survey conducted in June 1993 along various off-base drainages and Pipe Creek failed to reveal the species' presence.

The badger is state listed as threatened and is known to occur in the open farmlands near the base. Badgers are not expected to reside on base because of human disturbance but may utilize base land for foraging purposes.

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, crucial summer/winter habitat). The sensitive habitats at Grissom AFB (Figure 3.4-6) consist of a 0.25-acre wetland within the isolated wooded area on the southeastern side of the base and approximately 8.5 acres of wetlands within the drainage ditches.

Wetlands are defined as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Environmental Laboratory, 1987). Areas that are periodically wet but do not meet all three criteria (hydrophytic vegetation, hydric soils, and wetland hydrology) are not jurisdictional wetlands subject to Section 404 of the federal Clean Water Act. Areas that have been disturbed or that are classified as problem area wetlands, however, may not meet all three criteria as a result of natural or man-induced reasons, yet are still considered wetlands. These wetlands



EXPLANATION

1 Wetlands

Base Boundary

Sensitive Habitats

0 650 1300 2600 Feet

Figure 3.4-6

must then be classified as being part of or adjacent to "waters of the United States." They can be isolated wetlands, associated with intermittent streams, or adjacent to a water system that eventually flows into an interstate or navigable water.

The isolated wooded area on the southeastern side of the base has been considered a wetland through an aerial photography interpretation conducted by the USFWS National Wetlands Inventory in 1989. A dense stand of willows, which are indicators of wetland conditions, occurs along one edge of the area covering approximately 0.25 acre of the stand area. A survey performed in June 1993 verified that the hydrology, soils, and species composition of the willow stand met the wetland criteria. Water impoundment, hydric soils, and obligate wetland plants such as sandbar willow, spike rush, and sedge were observed along the stand, which closely hugs the northern and western periphery of the isolated wooded area.

Due to the presence of water, hydric soils, and hydrophytic vegetation, approximately 8.5 acres of the drainage ditches on base are wetlands. The vegetation of the drainage ditches varies from diverse marshy habitats with duckweed, water-milfoil, narrow-leaved cattail, waterwort, spike rush, horsetail, peppermint, rush, and bulrush to uniform wetlands dominated almost exclusively by reed canary grass. The banks of the ditches are mowed seven times annually to keep the vegetation low and unattractive to birds and mammals. However, the presence of water, aquatic vegetation, and aquatic invertebrates provides food and cover for mammals, birds, amphibians, and fish. Muskrats live and forage along the banks and raccoons, woodchucks, and long-tailed weasels forage for food within the drainage ditches. Great blue herons fish in the shallow waters, and American woodcocks and shorebirds also hunt for food along the ditches. Common amphibians expected to be present include the pickerel frog, American toad, northern leopard frog, and eastern newt. Small fish such as the golden shiner, Johnny darter, and silvery minnow live in the shallow waters.

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, religious, or any other reason. Cultural resources have been divided for ease of discussion into three main categories: prehistoric resources, historic structures and resources, and traditional resources. These types of resources are defined in Appendix E, Methods. For the purposes of this analysis, paleontological resources, 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 as defined by the National Historic Preservation Act (NHPA). The potential conveyance of federal property to a private party or nonfederal agency constitutes an undertaking, or a project that falls under the requirements of cultural resource legislative mandates, because any National Register of Historic Places (NRHP)-eligible 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 on the lease or disposal document. Reuse activities within designated parcels that may affect historic properties would require the reuser 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 NRHP-eligible 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 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 Indiana State Historic Preservation Officer (SHPO).

3.4.6.1 Prehistoric Resources. The physiography and climate of north central Indiana have supported a cultural resource chronology that extends into the past for nearly 12,000 years (Kellar, 1983). Four major prehistoric traditions in eastern North America are relevant to archaeological resources in Indiana: Paleo-Indian (12000 - 8000 B.C.), Archaic Period (8000 - 1000 B.C.), Woodland Period (1000 B.C. - A.D. 900), and Mississippian Period (A.D. 900 - A.D. 1600).

The ethnohistoric period follows the Mississippian Tradition. By A.D. 1700, the Miami, a group of closely related Algonquin-speaking tribes and relative newcomers to the area, occupied all but the northernmost region of Indiana. Accounts of the Miami indicate that they practiced a mixed subsistence strategy in which they alternated between summer farming villages and winter hunting camps (Callendar, 1978). In the 1830s, a Miami village

known as Squirrel Village was situated on the north bank of Pipe Creek, a short distance northwest of the present town of Bunker Hill. It is reported to have consisted of about a dozen log huts.

A 1989 records search indicated that no cultural resource surveys had been conducted on Grissom AFB and that no cultural resources have been recorded on the base. Approximately 320 archaeological sites have been recorded for Miami County, but none were located within 2 miles of the base.

In October 1992, an archaeological reconnaissance survey of Grissom AFB was conducted. Three historic sites (see Section 3.4.6.2), 2 prehistoric sites, and 15 isolated prehistoric artifacts were discovered (Appendix L). Ground surface visibility throughout the base was generally poor. In most areas a dense carpet of green grass covered the ground. Other areas were covered with cement, asphalt, and buildings. All undeveloped portions of the base were investigated and all areas with ground surface visibility greater than 5 percent were surveyed, as were samples of areas with visibility less than 5 percent. The number of sites and artifacts discovered during this survey despite the poor visibility of ground surfaces, coupled with the high number of sites recorded in surveyed areas of Miami County, and the proximity of known Native American and early Euro-American sites, indicated a potential for additional historic and prehistoric cultural resources to be located on Grissom AFB.

To identify any additional cultural resources and to determine the NRHP eligibility of the known sites, a second archaeological investigation was conducted in August and September 1993. This investigation included the excavation of shovel test pits in areas previously unsurveyed because of poor ground visibility and at existing sites to determine boundaries and presence of subsurface deposits. No additional prehistoric sites were discovered during the investigation. The 2 recorded prehistoric sites and 15 isolated prehistoric artifacts were considered, following further examination, to be not eligible for NRHP listing. No further evaluation is recommended. However, the preliminary determination may not be considered final until SHPO concurrence is received. All cultural material collected during the investigation will be archived at Ball State University, Indiana.

3.4.6.2 Historic Structures and Resources. White settlers first located in Pipe Creek Township of Miami County in the late 1830s. A map of Pipe Creek Township, surveyed in 1839 and 1846, shows two homesteads on the land presently occupied by Grissom AFB. An 1877 combination atlas and map of Miami County includes a map of Pipe Creek Township depicting property ownership, agricultural fields, residences, schoolhouses, churches, railroads, towns, and Indian reservations. On the property within Pipe Creek Township, which is currently occupied by Grissom AFB, 11 houses, 8 fields,

and 1 school house (titled Schoolhouse No. 1) are shown. Squirrel Village Reservation is shown east-northeast of the current base location.

During the October 1992 survey, three historic trash dumps were identified on base. The assemblages consisted mostly of brick, tile, glass, and ceramics, some dating back to the 1880s (Appendix L). No additional historic sites were discovered during the 1993 investigation. Only one of the existing historic sites, 12Mi559 (9-2H), was determined to be potentially eligible to the NRHP. A Phase II investigation to evaluate the significance of 12Mi559 was conducted during November 1993. The lack of integrity of the features and archival data indicates that this site may not eligible for the NRHP. However, SHPO concurrence on this site has not yet been received; therefore, 12Mi559 is considered eligible for the NRHP in this EIS. Disclosure of specific site locations is prohibited in public documents by law (APRA 16 U.S.C. §470hh, and 36 CFR 296).

First called Bunker Hill NAS, Grissom AFB was authorized in 1942, as a result of World War II, and was originally used as an active naval aviator training site. An inventory of the World War II semi-permanent and permanent buildings at Grissom AFB was completed in October 1992. There are 25 buildings that have been identified from the World War II period, predating 1946 (Table 3.4-13). Fifteen are considered permanent structures; however, seven had lost integrity of location, design, setting, materials, workmanship, or association. The remaining eight permanent World War II buildings were evaluated and found to be ineligible for listing on the NRHP. The remaining ten buildings are classified as World War II temporary wood-frame buildings, which are covered under the Programmatic Agreement of 1986, amended in 1991. The agreement specifies that DOD may alter or demolish these structures without further consultation since the building category types have been documented by the U.S. Army Construction Engineering Research Laboratory. Of the ten temporary buildings, eight no longer retain integrity of materials, workmanship, feeling, or association; therefore, they are not eligible for consideration for the NRHP. The U.S. Army Construction Engineering Research Laboratory was contacted regarding the remaining two buildings to verify whether their building types have been documented through the nationwide survey, in compliance with stipulations of the Programmatic Agreement. One of the buildings (156) has been documented. Building 143, an indoor swimming pool originally used for naval water survival training, has not been documented and has been determined to be potentially eligible to the NRHP.

In 1957, SAC assumed control of Grissom AFB and as part of the Cold War effort established an alert mission. Because of the importance of the Cold War, buildings at Grissom AFB were evaluated to determine which may be considered significant under this context. An examination of facilities constructed after 1955 was completed in October 1993. A preliminary inventory of 15 facilities from the Cold War period determined to be

Table 3.4-13. World War II Building Status at Grissom AFB

Facility	Original Use	Current Use
Permanent Facilities/Ineligible		
14	Base Ops/Air Traffic Control	Administration
17	Utility Vault	Storage Shed
106	Utility Vault	Storage Shed
119	Utility Vault	Storage Shed
216	Water Treatment Plant	Water Treatment Plant
218	Water Pump Station	Water Pump Station
222	Utility Vault	Utility Vault
223	Steam Heating Plant	Steam Heating Plant
225	Heating Oil Storage	Heating Oil Storage
226	Fuel Oil Pump House	Fuel Oil Pump House
228	Storage Shed	Paint Storage Shed
408	Water Pump Station	Water Pump Station
512	Wastewater Treatment Plant	Wastewater Treatment Plant
909	Loading Dock	Loading Dock
910	Pennsylvania Railroad Tracks	Unused
Temporary Facilities/Ineligible		
1	Administration	Administration
113	Spray Booth	Storage
122	Assembly and Repair	Pavement and Grounds Facility
137	Drill Hall	Gymnasium
139	Fire Station	Maintenance and Supply
219	Warehouse and Supply	Maintenance Warehouse
220	Store House	Warehouse and Supply
221	Garage and Public Works	Administration and Engineering Shop
Documented[a]/Potentially Eligible		
143	Water Survival Training	Indoor Swimming Pool
156[a]	Recreation/Administration	Vacant

Note: (a) Facility has been documented by Construction Engineering Research Laboratory under Programmatic Agreement.

Source: October 1992 survey of historic structures.

potentially eligible to the NRHP has been developed (Table 3.4-14). SHPO consultation regarding the completion of the cultural resource identification process is in progress.

Table 3.4-14. Grissom AFB Cold War Facilities

Facility	Year Constructed	Original Use
11	1956	Alert Hangar
20	1956	Crew Readiness
22	1956	Rocket Storage
300	1955	Crew Readiness
600	1986	NEACP Facility (Crew Readiness)
746	1960	Traffic Check House
747	1960	Crew Readiness
749	1960	Security Sentry House
757	1957	Multicubicle Magazine
759	1957	Multicubicle Magazine
761	1957	Multicubicle Magazine
763	1957	Multicubicle Magazine
765	1957	Multicubicle Magazine
991	1956	Alert Apron
998	1956	Alert Taxiway

NEACP = National Emergency Airborne Command Post

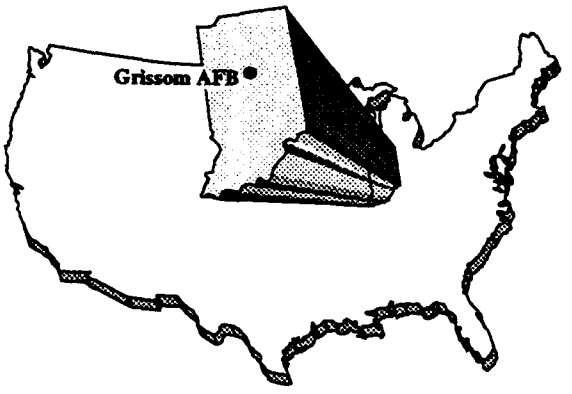
There have been no previous surveys for NRHP eligible facilities on Grissom AFB. The Historic Landmarks Foundation of Indiana has completed surveys of almost all the counties in Indiana. However, Miami County, in which most of the base is located, has not yet been surveyed.

Significance evaluations of potentially eligible structures is not yet complete. As required by cultural resource legislation, these sites must be considered eligible to the NRHP until testing is complete and SHPO concurrence has been obtained on a determination of eligibility. Therefore, for this analysis, Building 143 and those facilities listed in Table 3.4-14 are considered historic properties.

3.4.6.3 Traditional Resources. Consultation was initiated with the Native American Heritage Commission to ascertain if any Native American group or individual has concern with or can identify sacred areas within the Grissom AFB environs. A representative of the Miami Nation was also contacted regarding concerns relating to Grissom AFB. Aside from the nearby site of

Squirrel Village, there are no known sites of special concern to the Miami people on or near base property.

3.4.6.4 Paleontological Resources. No fossil remains have been identified or recorded in the ROI. No fossil remains have been found on the base; and no listed or eligible National Natural Landmarks are on the base.



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 section. 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.

Cumulative impacts result from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (Council on Environmental Quality, 1978). No actions were identified that would contribute to a potential cumulative impact from the disposal and reuse of portions of Grissom AFB.

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. 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 mitigation. Full responsibility of suggested mitigation, therefore, would be borne primarily by future property recipients or local government agencies.

Although 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.

This environmental analysis focuses on impacts due to changes from realignment baseline conditions that result from the Proposed Action and/or alternatives on the property to be excessed. These changes include civilian reuse activities. Military cantonment activities at Grissom AFB would remain constant from the realignment baseline through the 20-year analysis period. The total reuse-related activities would include both direct and indirect activities related to reuse of the excessed base property.

4.2 LOCAL COMMUNITY

This section discusses potential effects on local communities as a result of disposal and reuse of Grissom 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 for Disposal and Reuse of Grissom Air Force Base. The following discussion is limited to key employment and population effects of the Proposed Action and Joint Use Aviation Alternative in comparison to projected conditions under the No-Action Alternative.

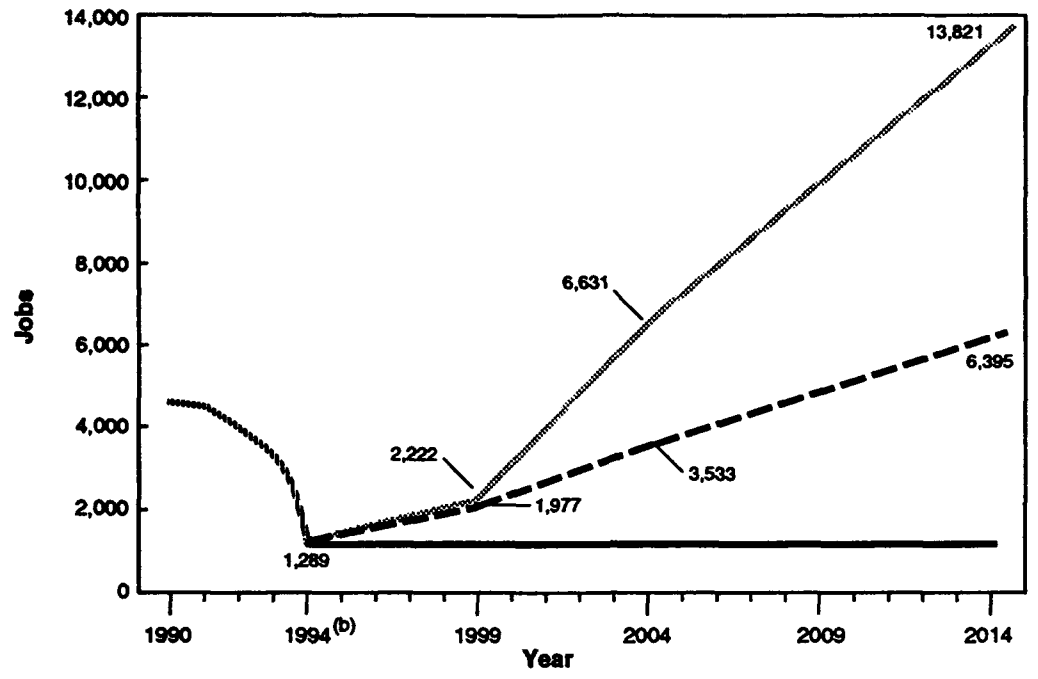
Under post-realignment conditions without base reuse (No-Action Alternative), the total employment in the ROI is forecasted to increase from 100,261 at realignment to 100,523 in 2014, an annual average growth rate of 0.01 percent per year. The total ROI population without reuse would increase from 184,174 persons at realignment to 184,990 in 2014, an average annual increase of less than 0.1 percent per year.

This analysis recognizes the potential for community impacts arising from "announcement effects" stemming from information regarding the base's realignment or reuse. Such announcements may impact community 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. Changes associated with announcement effects, while potentially important, are highly unpredictable and difficult to quantify; therefore, such effects are excluded from the quantitative analysis in this study, and are not included in numeric data presented in this report.

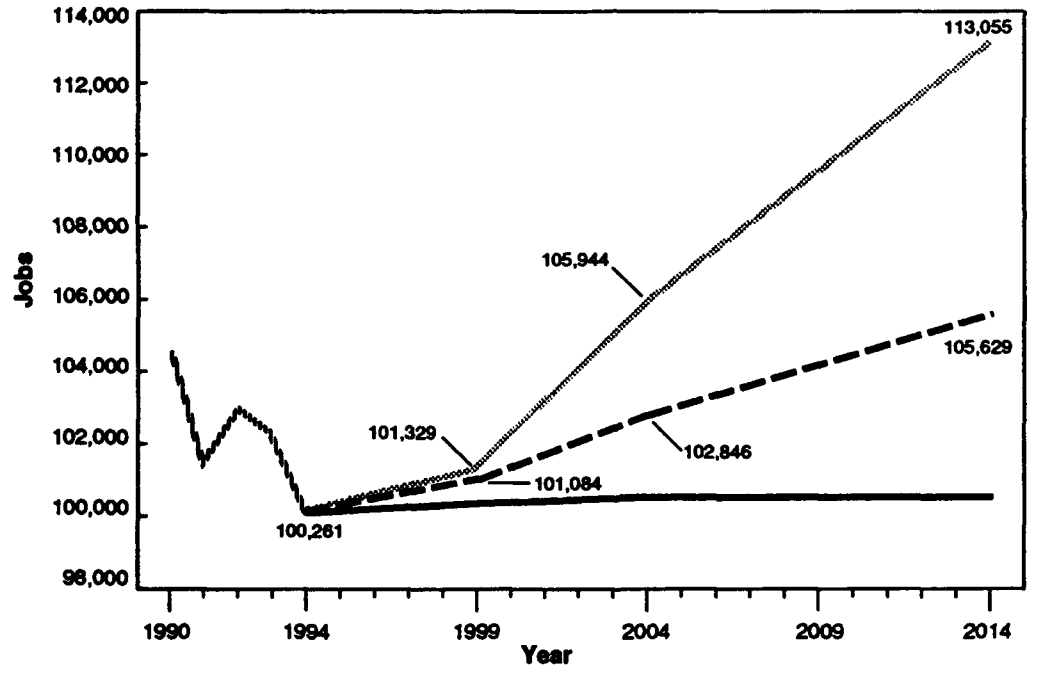
4.2.1.1 Proposed Action. Reuse activities under the Proposed Action would increase employment by 12,532 jobs (6,991 direct and 5,541 secondary) by 2014, over the 978 direct jobs and 311 secondary jobs under the No-Action Alternative. Direct jobs would be located on base property and secondary jobs would be created throughout the ROI. Approximately 50 percent of direct jobs and 10 percent of the secondary jobs are projected to be filled by in-migrants. Total employment in the ROI would be 113,055 in 2014 under the Proposed Action, an increase of 12 percent over No-Action Alternative projections for that year. ROI reuse-related employment growth is projected to average 0.6 percent annually between realignment and 2014. Figure 4.2-1 shows the effects of the Proposed Action and alternatives on employment levels in the ROI.

Population in the ROI would increase by 13,729 from realignment to 2014 as a result of new employment generated by the Proposed Action (Figure 4.2-2). Thus, ROI population is expected to increase by an average of 0.4 percent per year between realignment and 2014, to a total of 198,719; this figure represents an increase of 7 percent over No-Action Alternative projections for that year. Most of the in-migrants are expected to locate in Miami County, primarily in the city of Peru.

4.2.1.2 Joint Use Aviation Alternative. The level of economic activity under this alternative would be less than reported for the Proposed Action. Reuse under this alternative would increase employment by 5,106 jobs (3,709 direct and 1,397 secondary) in the ROI by 2014 (see Figure 4.2-1), over the 978 direct jobs and 311 secondary jobs under the No-Action



Total Employment On-Base (a)



Total ROI Employment Including Reuse-Related Effects

EXPLANATION

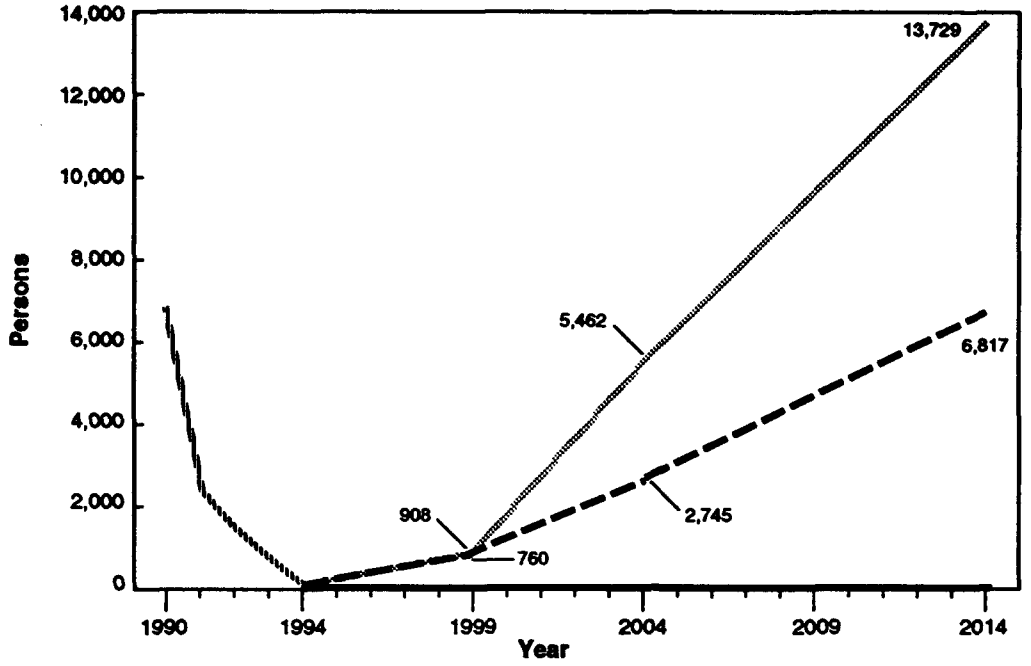
- Prerealignment
- Proposed Action
- Joint Use Aviation Alternative
- No-Action Alternative

Reuse-Related Employment Effects

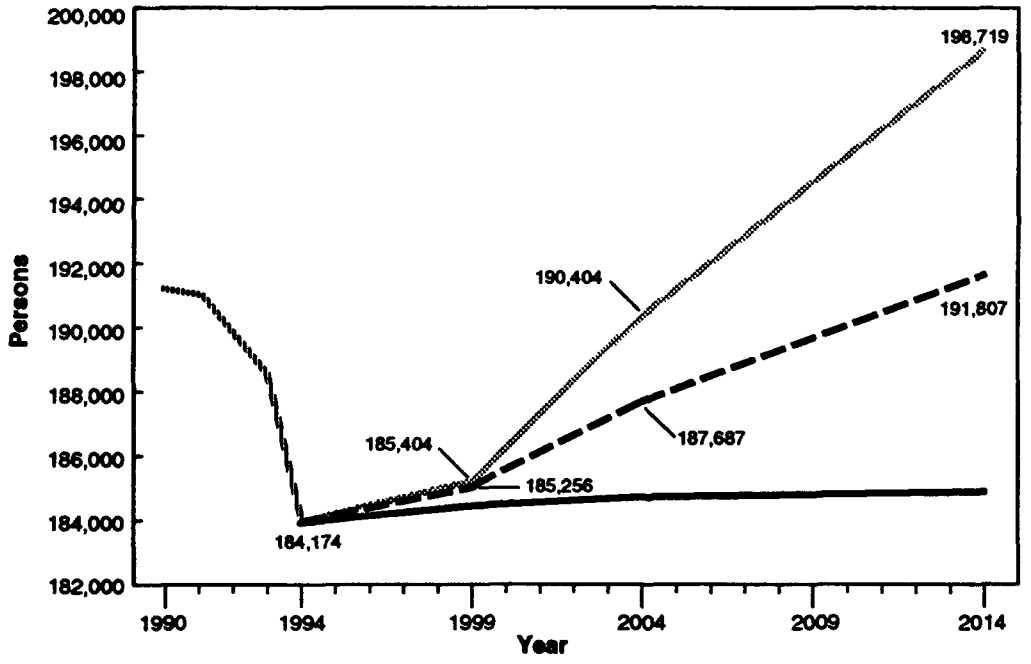
(a) Total employment includes both the existing military cantonment personnel and reuse-related effects of on-base development. Employment effects include both direct and secondary employment.

(b) The 1994 values represent total base-related employment under the realignment baseline.

Figure 4.2-1



ROI Reuse-Related Population Effects



Total ROI Population Including Reuse

EXPLANATION

- Prerealignment
- Proposed Action
- Joint Use Aviation Alternative
- No-Action Alternative

Reuse-Related Population Effects

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

Figure 4.2-2

Alternative. Approximately 50 percent of direct jobs and 10 percent of secondary jobs are projected to be filled by in-migrants. Total employment in the ROI would be 105,629 by 2014 under this alternative, an increase of 5 percent over the No-Action Alternative projections for this year. ROI employment growth is projected to average 0.3 percent per year between realignment and 2014. The geographic distribution of employment and population growth would be similar to that discussed for the Proposed Action.

Population in the ROI is projected to increase by 6,817 persons between realignment and 2014 (see Figure 4.2-2), an average growth rate of 0.2 percent annually. Total population in the ROI in 2014 would reach 191,807 with this alternative, an increase of 4 percent over the No-Action Alternative projections for that year.

4.2.1.3 No-Action Alternative. Under the No-Action Alternative, base-related employment would be similar to realignment baseline conditions throughout the 20-year analysis period. Approximately 978 direct and 311 secondary jobs would continue to be associated with the military cantonment and caretaker activities. By 2014, total employment in the ROI is projected to reach 100,523 and total population is expected to be 184,990.

4.2.1.4 Other Land Use Concepts. The State of Indiana Public Safety Training Institute would be initiated on an individual basis and not as part of any integrated reuse alternatives. The potential effects of this independent land use concept will be discussed in relation to its effects on the Proposed Action and/or other alternatives including the No-Action Alternative.

The state of Indiana has requested use of approximately 120 acres for operation of the training facility. Up to 75 permanent full-time and part-time instructors would train 200 to 500 students per week. This would result in reduction of direct employment by 98 and 7 on-base jobs, 77 and 3 secondary jobs related to industrial and commercial development, respectively, and 163 and 11 migratory population for the Proposed Action and Joint Use Aviation Alternative, respectively. The limited employment generated under this land use concept would represent a minimal increase in the employment levels under the No-Action Alternative.

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. Land use changes on base for the Proposed Action would be extensive. A large portion of the base would be converted to industrial and commercial uses. Some land use changes are expected to occur adjacent to the base as a result of anticipated development.

General Plans. Since Miami County does not have a general plan, there would be no effect from the land uses under the Proposed Action. Cass County's general plan already reflects public uses for the areas of the base airfield within the county.

Zoning. Because Miami County has not zoned the base, but identifies Grissom AFB as federal property, land being disposed of for civilian reuse within Miami County would not have land use controls except for the area being excessed east of U.S. 31. This area falls within the Town of Bunker Hill Planning and Zoning jurisdiction, and has been zoned for commercial uses, which is compatible with the Proposed Action commercial use of this area. The continuing federal land uses associated with the retained military cantonment in Cass and Miami counties would fall outside the zoning authority of the local jurisdictions.

Land Use. Changes in land use patterns on base would occur under the Proposed Action. These changes include the conversion of residential uses, golf course, and a portion of the base administrative areas to industrial uses. In addition, portions of the aviation support area and WSA would be reused for industrial development. The public/recreation land use areas would be considerably smaller, being replaced by industrial uses. Three commercial reuse areas would be created on base. Two of these areas would convert predominately vacant land to commercial uses and the other commercial area would include existing commercial and vacant land uses. Civilian development of the excessed base property may change the land use patterns by attracting investment and development in adjacent areas, especially along U.S. 31 and SH 218. These land use changes would generally be compatible with one another and the community development review and approval processes would likely ensure proper land use planning provisions to minimize potential conflicts between the industrial nature of the military cantonment and adjacent non-industrial land uses.

Under the Proposed Action, the airfield would continue to be operated by the military, and Air Force AICUZ land use guidelines would apply. The existing industrial, agricultural, and low density residential land uses occurring within APZ I and APZ II are compatible with Air Force guidelines. The proposed commercial land use on the area being excessed east of U.S. 31 is within APZ I. This area would be developed to be compatible with APZ I guidelines. Avigation easements would be retained by the 434th ARW as described under the realignment baseline.

Aesthetics. Under the Proposed Action, high visual sensitivity areas would be impacted. The impacted areas would include the golf course and the stand of beech trees in the northwest quadrant of the base, which would be replaced by industrial development. Demolition of the existing housing for new industrial development would alter the visual relationship of a pleasant wooded residential setting.

The land uses associated with the Proposed Action could create some positive effects on the visual quality of the area, as the overall character of the base could be enhanced with appropriate planning and design of civilian development.

Mitigation Measures. It is advised that Miami County and the town of Bunker Hill (i.e., if the base is annexed) adopt land use plans acknowledging the civilian reuse of the base to ensure orderly growth in the surrounding area. The base property being excessed would need to be zoned to applicable designations to allow for industrial, institutional (educational), commercial, and public/recreation land uses under civilian reuse. If the town of Bunker Hill does annex the excessed base property, it would also need to zone the base for the proposed civilian land uses. In addition, visual impacts associated with industrial development could be mitigated with landscape buffering or fences.

4.2.2.2 Joint Use Aviation Alternative. Land use changes on base for the Joint Use Aviation Alternative are not as extensive as those of the Proposed Action. Major land use changes include conversion of two areas of the base to industrial uses and the conversion of the vacant southern portion of the base to commercial use. In addition, some development is expected to occur adjacent to the base, which would result in land use changes.

General Plans. Since Miami County does not have a general plan, there would be no effect from land uses under this alternative. Cass County's general plan already reflects public uses for the portion of the base airfield within the county.

Zoning. Because Miami County has not zoned the base, but identifies Grissom AFB as federal property, land being disposed of for civilian reuse within Miami County would not have land use controls except for the parcel east of U.S. 31, which is under the jurisdiction of the town of Bunker Hill. Proposed commercial land uses for this parcel would be compatible with the town's commercial zoning designation. Continuing federal land uses associated with the retained military cantonment would fall outside the zoning authority of the local jurisdictions.

Land Use. Changes in land use patterns on base would occur under the Joint Use Aviation Alternative. Specific changes to on-base land use categories include industrial land uses in place of existing medical,

recreational, and residential (dormitory) uses. In addition, institutional land uses would more than triple in size northwest of the airfield. The WSA and adjacent vacant lands in the southern portion of the base would be replaced by aviation support and commercial land uses. The base WWTP, water treatment plant, and heating plant would change from industrial to public uses. Civilian development of the excessed base property may change the off-base land use patterns by attracting investment and development in adjacent areas, especially along U.S. 31 and SH 218. These land use changes would generally be compatible with one another and the community development review and approval processes would likely ensure proper land use planning provisions to minimize potential conflicts between the industrial nature of the military cantonment and adjacent non-industrial land uses.

The airfield would be reused as a joint military-civilian airport, using Air Force AICUZ land use recommendations. The existing land uses occurring within APZ I and APZ II are compatible with Air Force guidelines. The proposed commercial land uses east of U.S. 31 would be developed to be compatible with APZ I guidelines. Avigation easements would be retained by the 434th ARW as described under realignment baseline. If the airfield is operated by a civilian airport authority, FAA criteria would be utilized in developing the layout of airfield elements (e.g., dimensions, separations, clearances). These criteria would allow facilities located within the northern CZ on base to be developed for reuse.

Aesthetics. Visually impacted areas would include the industrial development in the northern portion of the base adjacent to residential and public/recreation land uses.

The land uses associated with the Joint Use Aviation Alternative could create some positive effects on the visual quality of the area as the overall character of the base could be enhanced with appropriate planning and design of civilian development.

Mitigation Measures. Mitigation measures would be the same as under the Proposed Action, except they would include zoning the excess property for aviation support and residential uses in Miami County.

Visual impacts associated with the industrial development could be mitigated with proper landscape buffers such as shrubs, trees, or fences.

4.2.2.3 No-Action Alternative. The No-Action Alternative would cause no physical change in on-base land use from conditions at realignment. Land use described under realignment baseline conditions would continue.

Aesthetics. The No-Action Alternative could affect the visual and aesthetic quality of the base and the surrounding area. Some landscaped portions of the base and facilities would receive less intensive maintenance.

4.2.2.4 Other Land Use Concepts. Impacts of the State of Indiana Public Safety Training Institute is 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.

The institutional (educational) nature of this concept would generally be compatible with the proposed industrial, institutional (educational), and commercial land uses under the Proposed Action and Joint Use Aviation Alternative. Approximately 20 percent of the property at the north end of the runway would be incompatible with AICUZ recommendations for civilian use. However, if the airport is operated by a civilian airport authority using FAA criteria under the Joint Use Aviation Alternative, these facilities would be available for reuse. This proposal would not affect the visual quality of any visually sensitive areas.

The land uses under the proposal would be compatible with the No-Action Alternative, except for those areas proposed in the CZ. Because the land uses would be isolated within the unused portions of the base, vehicular access routes would need to be established through the areas under caretaker status.

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 other modes of transportation, are presented in this section. Possible mitigation measures are discussed for those components likely to experience substantial adverse impacts under the Proposed Action or alternatives.

Roadways. Reuse-related effects on roadway traffic were assessed by estimating the number of trips generated by each land use considering employees, residents, visitors, and service vehicles associated with construction, and all other on-base activities for the Proposed Action and each alternative. Principal trip-generating land uses included industrial, commercial/retail, institutional (educational), residential, and aviation. The trips were assigned to the roadway system based on existing and proposed access points and existing travel patterns. This analysis is based on existing or derived data on roadway capacities; existing and projected traffic volumes (independent of the base reuse); direct and indirect traffic volumes and patterns related to each alternative reuse; and standards established by federal, state, and local transportation agencies (Indiana Department of Transportation, 1991; Transportation Research Board, 1985).

The transportation evaluation used the analysis procedure of trip generation, trip distribution, and traffic assignment. The reuse-related trip generation was based on applying the trip rates from the Institute of Transportation Trip Generation Manual (Institute of Transportation Engineers, 1991b) to the

existing and proposed land uses to obtain the daily, morning, and afternoon peak hour vehicle trips. This analysis focused on the afternoon peak hour vehicle trips. The distribution of reuse-generated trips to and from Grissom AFB was 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 reuse-related employees would correspond closely to those of the prerealignment civilian base personnel. Average daily traffic for regional and local roadways within the ROI was based on existing conditions, with truck traffic being 11 percent on regional roads and 4 percent on local roads.

After the number of trips between the base and various regions had been determined, they were assigned to appropriate routes based on the trip distribution, the existing roadways and access points, the relative location of the proposed land uses, and existing travel patterns for commuters. In particular, the new commercial/retail uses in the Proposed Action and the Joint Use Aviation Alternative, which generate a large proportion of peak hour traffic, are located on the eastern and southern parts of the base, which places the greatest amount of reuse-generated traffic directly on U.S. 31.

The resulting reuse-related traffic volumes on each key road were then added to the post-realignment traffic volume projections (background traffic volumes projected without reuse). Future traffic volumes on key roads were projected using the post-realignment ROI population growth trends. A traffic growth rate of 1 percent per year was applied to all existing traffic volumes on key roads during the 20-year period of analysis. This growth rate also accounts for the secondary traffic volumes under the various reuse plans.

Traffic impacts were determined based on LOS changes for each of the key roads (see Table 3.2-2 for LOS criteria). Intersections along key roads that would experience heavy traffic were examined for deficiencies. However, details on reuse were not sufficiently developed to permit an in-depth evaluation of intersection capacities.

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 prerealignment reference. The impact analysis considers the relationship of the projected aircraft operations to the operational capacity of the airport, using criteria 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 would have on the safe and efficient use of navigable airspace by aircraft. Such a study is based on details from the airport proponent's Airport Plan 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.

Other Transportation Modes. Because neither the Proposed Action nor any of the alternatives assumes direct use of the local railroads, effects on the rail system are expected to be minimal.

4.2.3.1 Proposed Action

Roadways. By 2014, the major traffic generators under the Proposed Action would be the projected direct employees of the industrial and commercial/retail land uses. In addition to the six existing access points, four new accesses would be provided: two on U.S. 31, and two on 850 South Road.

By 2014, it is estimated that a total of 58,850 average daily trips would be generated by the Proposed Action on an average weekday (Table 4.2-1). This would represent an increase of 55,900 average daily trips over the No-Action Alternative for 2014. By 2014, approximately 56 percent of total reuse-related daily trips would be generated by the new retail uses located on the south and east sides of the base. Based on the proposed reuse schedule, the number of daily trips generated by the Proposed Action would increase steadily during the 20-year period of analysis, reaching 52 percent of the 2014 level by 2004.

Table 4.2-1. Average Daily Trip Generation

	1999	2004	2014
Proposed Action	11,250	31,850	58,850
Joint Use Aviation Alternative	5,800	16,150	32,750
No-Action Alternative	2,950	2,950	2,950

Note: All values are rounded to the nearest 50. Daily trips shown are defined as one-way vehicle trips. Trips for the No-Action Alternative include the OL and the military cantonment.

By 2014, a weekday afternoon peak hour under the Proposed Action would generate about 6,200 trips, which represent approximately 10.5 percent of the total number of daily trips. These afternoon peak hour trips were assigned to key road segments.

Table 4.2-2 presents, for the Proposed Action, the total projected afternoon peak hour traffic and the resulting LOS for 1994 (realignment), 1999, 2004, and 2014 on key road segments.

Table 4.2-2. Peak-Hour Traffic Volumes and LOS on Key Roads - Proposed Action

		(Realignment) 1994		1999		2004		2014	
Road	Capacity (VPH)	Traffic (PHV)	LOS	Traffic (PHV)	LOS	Traffic (PHV)	LOS	Traffic (PHV)	LOS
Regional									
U.S. 31									
SH 18 to 800 South	6,000	1,750	A	2,150	A	3,000	B	4,250	C
800 South to SH 218 (Jct. East)	6,000	1,800	A	2,250	B	3,250	C	4,800	D
SH 218 (Jct. East) to Main Gate	6,000	1,800	A	2,250	B	3,250	C	4,800	D
Main Gate to SH 218 (Jct. West)	6,000	1,850	A	2,300	B	3,300	C	4,850	D
SH 218 (Jct. West) to Jct. Old U.S. 31	6,000	1,900	A	2,400	B	3,500	C	5,050	D
Jct. Old U.S. 31 to U.S. 24 (Jct. West)	6,000	1,200	A	1,350	A	1,750	A	2,300	B
U.S. 24									
U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	6,000	1,450	A	1,600	A	1,950	A	2,400	B
Local									
Old U.S. 31									
U.S. 31 to 225 South	2,400	750	C	1,050	D	1,750	E	2,800	F
225 South to West River Road	2,400	900	C	1,150	D	1,800	E	2,650	F
SH 218 (Jct. West)									
400 West to U.S. 31	2,000	200	A	400	B	850	D	1,400	E
County Line Road to 400 West	2,000	150	A	200	A	300	B	450	B
900 East to 1000 East	2,000	100	A	200	A	350	B	500	C
SH 218 (Jct. East)									
U.S. 31 to 200 West	2,000	200	A	300	B	400	B	550	C

Note: Peak-hour traffic volumes include reuse-related and baseline (No-Action Alternative) volumes. All traffic volume figures are rounded to the nearest 50. Refer to Figures 3.2-10 and 3.2-11 for the location of road segments.
LOS = Level of Service.
PHV = peak-hour volume.
SH = State Highway.
U.S.# = U.S. Highway.
VPH = vehicles per hour.

Regional. By 2014, traffic resulting from reuse would increase the afternoon peak hour traffic on U.S. 31 between 800 South Road and Old U.S. 31 by 2,700 vehicles over post-realignment conditions. This increase would degrade the operating conditions on all segments of this section of U.S. 31 to LOS D by the year 2010, as compared to LOS B under the No-

Action Alternative. All other key regional road segments would continue to operate at LOS C or better.

Local. Afternoon peak hour traffic generated by reuse on both two-lane segments of Old U.S. 31 (U.S. 31 to 225 South Road, and 225 South Road to West River Road) would increase over post-realignment traffic volumes in 2014 by 1,900 and 1,550 vehicles, respectively. By 2011, this increase would have degraded the projected LOS level to F on both segments, as compared to LOS C and D, respectively, under the No-Action Alternative.

Under the Proposed Action, traffic generated by reuse would increase the afternoon peak hour traffic in 2014 by 1,150 vehicles on SH 218 (Jct. West) between 400 West Road and U.S. 31. This increase would result in LOS E by 2011, compared to LOS B under the No-Action Alternative.

With or without reuse, all other key local road segments would operate at LOS C or better throughout the period of analysis.

On-Base. As part of the eventual development plan, internal circulation must accommodate reuse-related vehicular and pedestrian activities and provide an acceptable LOS and adequate access from the local road network. Redevelopment plans are expected to incorporate internal circulation requirements that meet local planning objectives and standards.

Airspace/Air Traffic. Aviation uses at Grissom AFB includes continued use of the airfield by the 434th ARW and military transient aircraft, the same as realignment baseline conditions. No civilian aviation reuses would occur under the Proposed Action.

No adverse impacts to the region's airspace are anticipated under the Proposed Action because there would be no change in aircraft activity at Grissom AFB from realignment conditions.

Based on FAA guidelines, Grissom AFB can accommodate 230,000 annual aircraft operations. By 2014, the operations projected for military use would account for approximately 7 percent of the total capacity.

Air Transportation. The Proposed Action does not include commercial passenger or air cargo services at Grissom AFB. Commercial service and air cargo service at other facilities in the state of Indiana would be unchanged from the realignment baseline.

Mitigation Measures. Improvements to Old U.S. 31 between U.S. 31 and West River Road would be required before 2011 to preclude this section from deteriorating to LOS F. Suggested improvements could include widening of roadways and development and/or improvement of alternate routes.

All access points along U.S. 31 would experience numerous reuse-related turning and crossing movements by 1999, exceeding prerealignment conditions and requiring effective traffic control measures. These measures could include signalization, acceleration and deceleration lanes, grade separation, and interchanges.

An adequate on-base circulation scheme has the potential of reducing conflicting movements (mainly turning and crossing vehicles) on U.S. 31 and SH 218. Such a scheme could include frontage roads, enhancement of internal accessibility and mobility, and consolidation of access points.

4.2.3.2 Joint Use Aviation Alternative

Roadways. By 2014, the major traffic generators under the Joint Use Aviation Alternative would be the projected direct employees of aviation, industrial, commercial/retail activities, and the 176 residential dwelling units. In addition to the six existing access points, four new accesses would be provided: two on U.S. 31 and two on 850 South Road.

By 2014, it is estimated that a total of 32,750 average daily trips would be generated by the Joint Use Aviation Alternative on an average weekday (see Table 4.2-1). This would represent an increase of 29,800 average daily trips over the No-Action Alternative for 2014. By 2014, approximately 61 percent of total reuse-related daily trips would be generated by the new retail use located on the south side of the base.

By 2014, on a typical weekday and during the afternoon peak hour, the Joint Use Aviation Alternative would generate about 3,400 trips, which represent approximately 10 percent of the total number of daily trips. These afternoon peak hour trips were assigned to key road segments.

Table 4.2-3 presents for the Joint Use Aviation Alternative, projected afternoon peak hour traffic and the resulting LOS for 1994 (realignment), 1999, 2004, and 2014 on key road segments.

Regional. By 2014, traffic resulting from reuse would increase the afternoon peak hour traffic on U.S. 31 between 800 South Road and Old U.S. 31 by 1,400 vehicles. This increase would degrade the projected LOS to C on this section of U.S. 31 by 2010, compared to LOS B under the No-Action Alternative. All other key regional road segments would continue to operate at LOS B or better.

Local. Traffic generated by reuse on both two-lane segments of Old U.S. 31 would increase over post-realignment traffic volumes. This increase would degrade the projected LOS to E by 2007 as compared to LOS D under the No-Action Alternative. The segment between U.S. 31 and 225 South Road would be most affected, with afternoon peak hour reuse-related traffic

Table 4.2-3. Peak-Hour Traffic Volumes and LOS on Key Roads - Joint Use Aviation Alternative

Road	Capacity (VPH)	1994 (Realignment) Traffic (PHV)	LOS	1999 Traffic (PHV)	LOS	2004 Traffic (PHV)	LOS	2014 Traffic (PHV)	LOS
Regional									
U.S. 31									
SH 18 to 800 South	6,000	1,750	A	1,950	A	2,450	B	3,250	B
800 South to SH 218 (Jct. East)	6,000	1,800	A	2,050	A	2,550	B	3,600	C
SH 218 (Jct. East) to Main Gate	6,000	1,800	A	2,050	A	2,600	B	3,500	C
Main Gate to SH 218 (Jct. West)	6,000	1,850	A	2,100	A	2,650	B	3,550	C
SH 218 (Jct. West) to Jct. Old U.S. 31	6,000	1,900	A	2,150	A	2,750	B	3,750	C
Jct. Old U.S. 31 to U.S. 24 (Jct. West)	6,000	1,200	A	1,300	A	1,550	A	1,900	A
U.S. 24									
U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	6,000	1,450	A	1,550	A	1,750	A	2,100	A
Local									
Old U.S. 31									
U.S. 31 to 225 South	2,400	750	C	900	C	1,250	D	1,900	E
225 South to West River Road	2,400	900	C	1,050	D	1,350	D	1,900	E
SH 218 (Jct. West)									
400 West to U.S. 31	2,000	200	A	250	B	400	B	600	C
County Line Road to 400 West	2,000	150	A	150	A	200	A	250	B
900 East to 1000 East	2,000	100	A	150	A	150	A	250	B
SH 218 (Jct. East)									
U.S. 31 to 200 West	2,000	200	A	250	B	350	B	400	B

Note: Peak-hour traffic volumes include reuse-related and baseline (No-Action Alternative) volumes. All traffic volume figures are rounded to the nearest 50. Refer to Figures 3.2-10 and 3.2-11 for the location of road segments.

LOS = Level of Service.
PHV = peak hour volume.
SH = State Highway.
U.S.# = U.S. Highway.
VPH = vehicles per hour.

increasing by 1,000 vehicles over the post-realignment volume of 900 vehicles by 2014. Under the Joint Use Aviation Alternative, traffic generated by reuse would increase the afternoon peak hour traffic by 350 vehicles on SH 218 (Jct. West) between 400 West Road and U.S. 31 by 2014. This increase would result in LOS C by 2008.

All other key local road segments would operate at LOS B or better throughout the 20-year period of analysis.

On-Base. As part of the eventual development plan, internal circulation must accommodate vehicular and pedestrian movements and provide an acceptable LOS and adequate access to/from the local road network. Redevelopment plans are expected to incorporate internal circulation requirements that meet local planning objectives and standards.

Airspace/Air Traffic. The Joint Use Aviation Alternative includes civilian reuse activities such as flight training, air cargo, pleasure flying, and aircraft maintenance. Due to the continued military aircraft operations, the ATCT, RAPCON, and ILS facilities would be retained and operated by either the 434th ARW or a civil airport authority; therefore, no impact to ATC services would occur.

Under the Joint Use Aviation Alternative, the airfield capacity would be the same as the Proposed Action. Compared to the prerealignment operations at the base, the Joint Use Aviation Alternative would result in approximately 18,552 (25 percent) fewer total operations in 2014. As the ROI represents a relatively unconstrained airspace area, the change in operations because of this alternative would have no adverse impact. Airport operations would only require approximately 24 percent of total airfield capacity by 2014.

Air Transportation. Implementation of the Joint Use Aviation Alternative would not provide commercial service at Grissom AFB. Under this alternative, air cargo service would be provided at Grissom AFB, but is expected to be minimal (5 days a week using small prop-type aircraft). Impacts on commercial passenger service at other facilities in the state of Indiana would be minimal. It is anticipated that air cargo service at the airports surrounding Grissom AFB, such as Kokomo and Logansport, may be impacted by the diversion of a portion of their air cargo business to Grissom AFB.

Mitigation Measures. No significant roadway traffic impacts are expected from the Joint Use Aviation Alternative, and no mitigation measures would be necessary. As part of the base circulation plan, traffic control measures would be required at all access points along U.S. 31. These measures could include signalization, acceleration and deceleration lanes, grade separation, and interchanges.

4.2.3.3 No-Action Alternative

Roadways. Under the No-Action Alternative, the expected population growth and development unrelated to reuse of Grissom AFB would lead to traffic volume increases on local roadways through 2014. It is projected that non-reuse-related traffic volumes on key roads would increase by 1 percent annually during the period of analysis. The traffic volumes generated by the OL and the military cantonment are assumed to remain the same over the 20-year analysis period.

Table 4.2-4 presents the projected baseline peak-hour traffic on key roads and the associated LOS that would result under the No-Action Alternative. Under the No-Action Alternative, afternoon peak-hour traffic by 2014 is projected to be 2,200 vehicles on U.S. 31 in the vicinity of the Main Gate, and 1,100 vehicles on Old U.S. 31 in the vicinity of U.S. 31. These volumes would bring operating conditions on U.S. 31 segments to LOS B or better, and on Old U.S. 31 to LOS D or better by 2014. All other key road segments would operate at LOS B or better during the period of analysis.

Table 4.2-4. Peak-Hour Traffic Volumes and LOS on Key Roads - No-Action Alternative

		1994 (Realignment)		1999		2004		2014	
Road	Capacity (VPH)	Traffic (PHV)	LOS	Traffic (PHV)	LOS	Traffic (PHV)	LOS	Traffic (PHV)	LOS
Regional									
U.S. 31									
SH 18 to 800 South	6,000	1,750	A	1,850	A	1,950	A	2,150	A
800 South to SH 218 (Jct. East)	6,000	1,800	A	1,900	A	1,950	A	2,200	B
SH 218 (Jct. East) to Main Gate	6,000	1,800	A	1,900	A	2,000	A	2,200	B
Main Gate to SH 218 (Jct. West)	6,000	1,850	A	1,950	A	2,050	A	2,250	B
SH 218 (Jct. West) to Jct. Old U.S. 31	6,000	1,900	A	2,000	A	2,100	A	2,350	B
Jct. Old U.S. 31 to U.S. 24 (Jct. West)	6,000	1,200	A	1,250	A	1,350	A	1,450	A
U.S. 24									
U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	6,000	1,450	A	1,500	A	1,600	A	1,750	A
Local									
Old U.S. 31									
U.S. 31 to 225 South	2,400	750	C	800	C	800	C	900	C
225 South to West River Road	2,400	900	C	950	D	1,000	D	1,100	D
SH 218 (Jct. West)									
400 West to U.S. 31	2,000	200	A	200	A	250	B	250	B
County Line Road to 400 West	2,000	150	A	150	A	150	A	200	A
900 East to 1000 East	2,000	100	A	100	A	100	A	100	A
SH 218 (Jct. East)									
U.S. 31 to 200 West	2,000	200	A	250	B	250	B	250	B

Note: Peak-hour traffic volumes account for the OL and the 434th ARW. All traffic volume figures are rounded to the nearest 50. Refer to Figures 3.2-10 and 3.2-11 for the location of road segments.
LOS = Level of Service.
PHV = Peak-hour volume.
SH = State Highway.
U.S.# = U.S. Highway.
VPH = vehicles per hour.

In the absence of any civilian reuse of the base, traffic volume on base roads would be similar to realignment conditions.

Airspace/Air Traffic. Under the No-Action Alternative, the 434th ARW and military transient aircraft would continue to conduct activities at Grissom AFB as under the realignment baseline. No adverse impacts are anticipated as discussed under the Proposed Action.

Air Transportation. Under this alternative, no adverse impacts to air transportation in the ROI would occur, and there would be no change in air passenger demand from realignment.

4.2.3.4 Other Land Use Concepts. Transportation effects are discussed in this section for the State of Indiana Public Safety Training Institute in conjunction with the Proposed Action and alternatives. The proposals would not affect airspace, air transportation, or rail transportation.

By 2014, this proposal would generate approximately 650 daily trips (50 vehicles per hour during afternoon peak hour) under the Proposed Action and alternatives, representing a 2.0 percent or less increase, in traffic. The State of Indiana Public Safety Training Institute would not affect the projected LOS on key road segments.

Mitigation measures for this land use concept in conjunction with the Proposed Action or alternatives would be the same as those discussed for each reuse.

4.2.4 Utilities

Direct and indirect changes in future regional utility demand for the Proposed Action and alternatives were estimated by applying prerealignment per capita rates based on average daily use in each of the communities in the ROI. These per capita rates were applied to projections of future residents and employees associated with the Proposed Action and each of the alternatives.

Table 4.2-5 shows the projected changes in utility demand for 5, 10, and 20 years after realignment. The figures shown for the No-Action Alternative generally reflect the change expected in utility usage in the nearby communities of Peru, Bunker Hill, Walton, and Miami without civilian redevelopment of the base, and are estimated based on projected changes in population. The overall population projections for the utilities ROI (Peru, Bunker Hill, Walton, and Miami) indicate a net total increase of approximately 3 percent over the 20-year period from 1994 to 2014 under the No-Action Alternative, and this increase is reflected in the utility projections for that alternative. The other alternatives reflect the total ROI demand anticipated with base reuse.

Table 4.2-5. Total Projected Utility Consumptions in the ROI

	1999	Percent Change	2004	Percent Change	2014	Percent Change
Water Consumption (MGD)						
No-Action[a]	2.10	---	2.12	---	2.14	---
Proposed Action	2.15	2.4	2.42	14.2	2.88	34.6
Joint Use Aviation	2.14	1.9	2.27	7.1	2.52	17.8
Wastewater Treatment (MGD)						
No-Action[a]	1.74	---	1.75	---	1.77	---
Proposed Action	1.78	2.3	1.99	13.7	2.34	32.2
Joint Use Aviation	1.77	1.7	1.87	6.9	2.06	16.4
Solid Waste Disposal (tons/day)						
No-Action[a]	24.4	---	24.6	---	24.8	---
Proposed Action	25.6	4.9	31.2	26.8	43.9	77.0
Joint Use Aviation	25.3	3.7	27.8	13.0	32.4	30.6
Electrical Consumption (MWH/day)						
No-Action[a]	544.5	---	549.8	---	555.1	---
Proposed Action	557.4	2.4	628.0	14.2	786.2	41.6
Joint Use Aviation	555.0	1.9	587.4	6.8	647.0	16.6
Natural Gas Consumption (thousand therms/day)						
No-Action[a]	29.9	---	30.2	---	30.5	---
Proposed Action	30.8	3.0	37.9	25.5	50.7	66.2
Joint Use Aviation	30.6	2.3	32.8	8.6	36.8	20.7

Notes: Values for Proposed Action and reuse alternative represent total projected demand in the ROI (Peru, Bunker Hill, Walton, and Miami).

(a) Represents total demand forecasted for the utilities ROI (including the OL and the 434th ARW) for the years indicated, based on projected changes in population and prerealignment demand obtained from local utility purveyors.

MGD = million gallons per day.
MWH/day = megawatt-hours per day.
ROI = Region of Influence.

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 (1999, 2004, 2014). On-base utility demands were estimated by applying use rates to appropriate units of land uses (employees, residents, square footage, etc.).

The following assumptions were made in the analysis of potential effects to on-base utilities:

- The base would be serviced by local utility providers.
- The existing distribution/collection systems would be available in their current condition for reuse. New utility distribution lines would need to be provided to the parcel east of U.S. 31.
- Wells on base would be available to provide water for reuse activities.
- The base WWTP, water treatment plant, and central heating plant would continue to provide service on base. All utility lines outside the military cantonment would be maintained by each independent reuse.

With the Proposed Action and Joint Use Aviation Alternative, no major infrastructure improvements or new supply sources would be required in the ROI. However, individual metering of facilities, improvements to the distribution systems, and appropriate utility corridors and easements would be required for electrical and natural gas systems in the main base area and all utilities on the parcel east of U.S. 31.

4.2.4.1 Proposed Action. Table 4.2-5 summarizes the projected utility demand under the Proposed Action at 5, 10, and 20 years after realignment. In 2014, the increase in demand would range from 32 to 77 percent for the various utilities under this alternative when compared to the No-Action Alternative conditions. Projected utility demands in 2014 would be greater than prerealignment (1990) demands for solid waste disposal, electricity, and natural gas. However, all demands would be within the capacity of existing utility systems. Under this alternative, the Grissom AFB WWTP may operate below the minimum biological oxygen demand loading necessary to function efficiently; this could cause effluents to exceed the NPDES permit requirements.

Mitigation. The base WWTP may require modification to operate efficiently because of low flow rates and possible lack of biological oxygen demand loading. Domestic waste from weekend 434th ARW reserve training activities could be held at the WWTP for appropriate mix with industrial waste during the week. Industrial users may be required to provide

pretreatment of industrial wastewater. The plant operator will monitor effluents from the WWTP to ensure NPDES permit requirements are met.

Recycling and/or reuse of inert demolition/construction and general municipal wastes such as wood, metals, concrete, asphalt, paper, and glass would decrease the potential impact to landfills.

4.2.4.2 Joint Use Aviation Alternative. Table 4.2-5 summarizes the projected utility demand under the Joint Use Aviation Alternative at 5, 10, and 20 years after realignment. In 2014, the increase in demand would range from 16 to 30.6 percent for the various utilities under this alternative when compared to the No-Action Alternative conditions. Projected utility demands in the year 2014 would be less than or approximately equal to prerealignment (1990) demands, and within the capacity of existing utility systems. Under this alternative, the WWTP may operate below the minimum biological oxygen demand loading necessary to function efficiently; this could cause effluents to exceed the NPDES permit requirements.

Mitigation. Potential mitigation measures for reducing impacts due to this alternative would be the same as those identified for the Proposed Action.

4.2.4.3 No-Action Alternative. Projected utility demand under the No-Action Alternative is presented in Table 4.2-5. Over the 20-year analysis period, utility usage would increase slightly as a result of the projected population increase in the ROI. Under the No-Action Alternative the newly upgraded base WWTP may operate below the minimum biological oxygen demand loading necessary to function efficiently; this could cause effluents to exceed the NPDES permit requirements.

Mitigation. The WWTP may require modification to operate under the No-Action Alternative. This could include holding 434th ARW weekend reserve domestic waste to mix with industrial waste produced during the week. The plant operator will monitor effluents to ensure NPDES permit requirements are met.

4.2.4.4 Other Land Use Concepts. Changes in utility use are measured by land use and employment projections associated with a given plan. Implementation of the State of Indiana Public Safety Training Institute in conjunction with the alternatives would result in a very small increase in population in the ROI. Impacts to utility systems would be the same as those described for each alternative.

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 alternatives. Hazardous materials/wastes, IRP sites, storage tanks, asbestos, pesticides, PCBs, radon, medical/biohazardous wastes, ordnance, and lead-based paint will be discussed within this section.

The U.S. Air Force is committed to the remediation of all contamination at Grissom AFB due to past Air Force activities. The OL will remain after base realignment 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 (329 IAC 3.1-6-1) 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 zones 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 realignment. The quantity of hazardous materials utilized under the Proposed Action would increase over the baseline conditions at realignment due to industrial and commercial development. The specific chemical compositions and exact use rates associated with proposed reuse activities are not known.

Table 4.3-1. Hazardous Material Usage by Land Use - *Proposed Action*

Land Use Zones	Operation Process	Hazardous Materials
Industrial	Heavy and light industry, manufacturing, research and development, warehousing, distribution, agricultural storage	Fuels, POL, corrosives, ignitibles, heating oils, pesticides, paints, thinners, heavy metals, aerosols, degreasers, solvents
Institutional (Educational)	Public education, higher education, vocational/technical training schools, research labs	Heating oils, solvents, corrosives, POL, cleaners, pesticides, paints, thinners
Commercial	Offices, warehousing, retail service industries, restaurants, banking, firing range	Heating oils, paints, thinners, cleaners, aerosols, pesticides, ordnance
Public/Recreation	Maintenance of existing recreational facilities, including the Grissom AFB Heritage Museum, undeveloped open area, gymnasium, swimming pool, bowling center, and other outdoor recreational facilities	Pesticides, heating oils, solvents, chlorine, POL, cleaners, paints, thinners, aerosols, fertilizers
Vacant Land	Groundwater monitoring wells, open space	Pesticides
Military Cantonment[a]	Airfield and airfield support, operations, light industrial, commercial, recreational, vacant lands, POL, munitions storage, billeting	Aviation fuels, motor fuels, glycols, POL, heating oil, heavy metals, paints, thinners, solvents, degreasers, hydraulic fluids, ignitibles, corrosives, pesticides, ordnance

Note: (a) Similar to realignment baseline.
POL = petroleum, oil, and lubricants.

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.

Activities associated with the military cantonment would continue to use similar types and quantities of hazardous materials as under the realignment conditions. Management of hazardous materials under the Proposed Action would be the same as discussed under the realignment baseline, and these materials would not cause any unacceptable impacts if properly managed under all applicable regulations.

4.3.1.2 Hazardous Waste Management. Under the Proposed Action, hazardous wastes generated would consist of waste fuels, petroleum, oil, and lubricants (POL), solvents, paints, thinners, heavy metals, and batteries.

These wastes would be generated from the hazardous materials and the processes which utilize those materials and would be implemented under this reuse proposal.

The military cantonment activities would continue to dispose of hazardous waste through the Fort Benjamin Harrison DRMO. Although Fort Benjamin Harrison is scheduled to close in 1997, the DRMO plans to relocate its facility within the Indianapolis area. Upon disposal of parcels, hazardous waste management 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 realignment baseline. However, hazardous waste management by all independent owners/operators in accordance with applicable regulations would preclude any unacceptable impacts. In addition, each owner/operator would be required to obtain the appropriate permits for generation and disposal of hazardous waste. Investigations to determine the presence or absence of contamination at the 46 active POI/PAC sites (see Figure 3.3-1 and Table 3.3-2) on Grissom AFB is ongoing. If contamination is detected within one of the land use areas, site remediation could result in short-term land use restrictions or redevelopment delays (Table 4.3-2).

Table 4.3-2. POI/PAC Sites within Land Use Areas - Proposed Action

Proposed Land Use	Site No.
Industrial	4, 5, 7, 8, 12, 15, 16, 17, 18, 20, 21, 28, 29, 33, 35, 36, 37, 42, 43, 46, 47
Institutional (Educational)	None
Commercial	1, 2, 19, 20, 26
Public/Recreation	23, 36, 38, 44
Vacant Land	None
Military Cantonment	3, 6, 9, 10, 11, 13, 14, 15, 22, 24, 25, 27, 30, 31, 32, 34, 39, 40, 41, 45

PAC = Potential Areas of Concern.
POI = Points of Interest.

4.3.1.3 Installation Restoration Program Sites. The Air Force is responsible for remediation of all IRP sites at Grissom AFB, and is committed to continue

IRP activities at Grissom AFB under DERP and CERCLA. Coordination and management of these activities will be the responsibility of the OL.

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. The RD, or blueprint for remediating the IRP site, considers the results of the risk assessment and the geographical extent of the contamination.

Disposal and reuse of some Grissom AFB properties may be delayed or limited by the extent and type of contamination at IRP sites and by current and future IRP remediation activities (Figure 4.3-1). Based on the results of IRP investigations, the Air Force may, where appropriate, place limits on land 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. As addressed in Section 3.3.3, IRP Sites, the Air Force will comply with provisions of CERCLA §120(h) prior to transfer of base property.

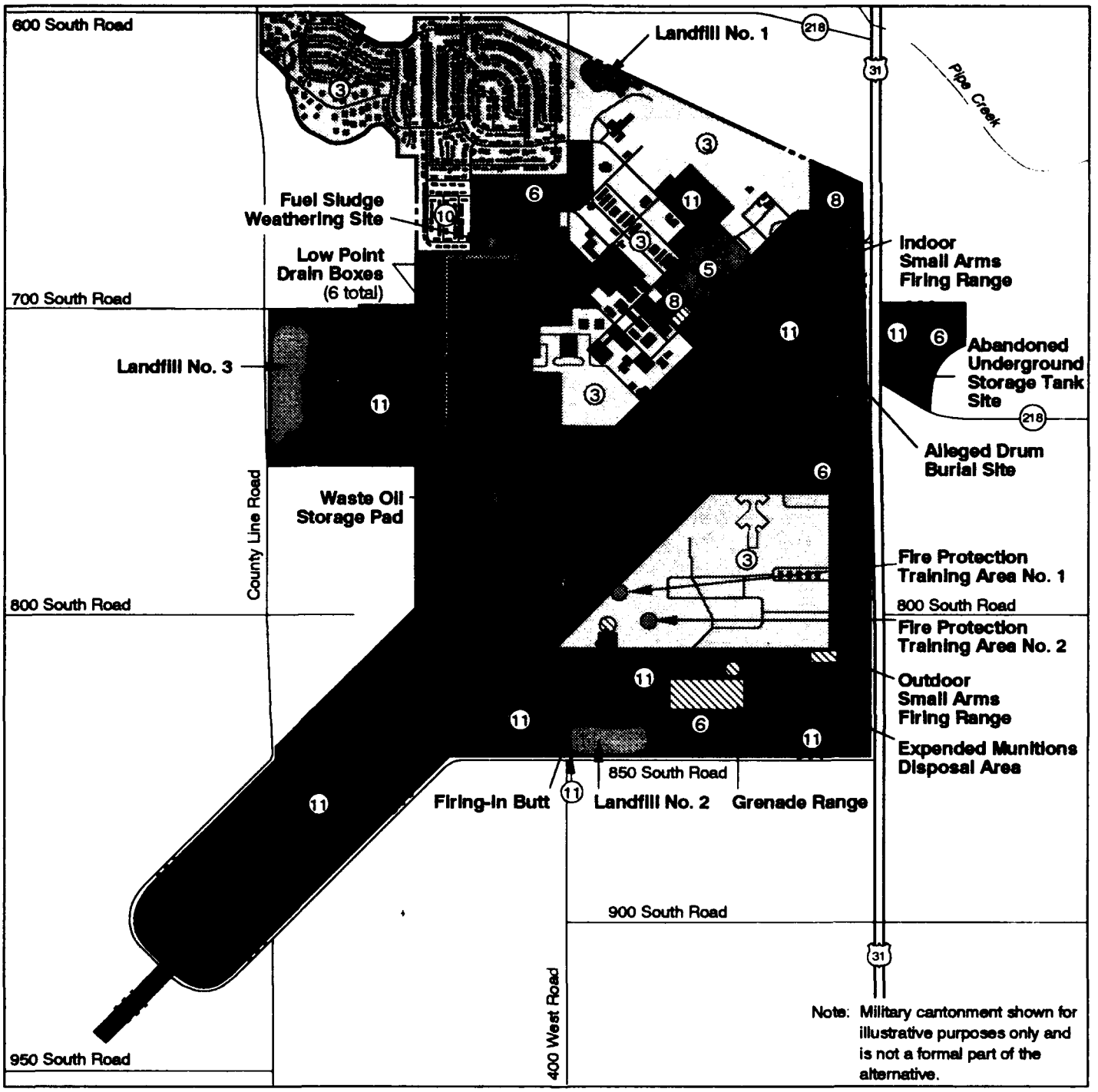
The IRP sites within certain land use areas for the Proposed Action are discussed below and summarized in Table 4.3-3.

Table 4.3-3. IRP Sites within Land Use Areas - Proposed Action

Proposed Land Use	IRP Sites
Industrial	Landfill No. 1, FPTAs No. 1 and No. 2
Institutional (Educational)	None
Commercial	Landfill No. 2, Abandoned Underground Storage Tank Site
Public/Recreation	None
Vacant Land	None
Military Cantonment	Alleged Drum Burial Site, Fuel Sludge Weathering Site, Low Point Drain Boxes, Landfills No. 2 and No. 3, Waste Oil Storage Pad

FPTA = Fire Protection Training Area.
IRP = Installation Restoration Program.

Industrial. Remediation and long-term monitoring activities associated with Landfill No. 1, in the northern portion of the base, and FPTAs No. 1 and



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
- ⑪ Military Cantonment
- IRP Site
- Ordnance Area
- Base Boundary

0 650 1300 2600 Feet

* Standard land use designation not applicable to this figure.

IRP Sites and Ordnance Areas - Proposed Action

Figure 4.3-1

No. 2 in the south-central portion of the base, could result in delays in redevelopment, as well as implementation of land use restrictions.

Institutional (Educational). No IRP sites are within this land use area.

Commercial. Delays in redevelopment and land use restrictions could result from remediation and long-term monitoring activities at the Abandoned Underground Storage Tank Site in the parcel east of U.S. 31 and Landfill No. 2, located adjacent to 850 South Road.

Public/Recreation. No IRP sites are within this land use area.

Vacant Land. No IRP sites are within this land use area.

Military Cantonment. Landfill No. 2 is in the southern portion of the base and Landfill No. 3 is in the western portion; remediation and long-term monitoring of these sites should not result in long-term impacts to military cantonment activities.

The Alleged Drum Burial Site is located within the northeast CZ; the site has been recommended for no further action; however, if remediation of this site is necessary, such activities should not result in any long-term impacts to flight operations. Additionally, remediation activities associated with the six Low Point Drain Boxes should not impact military cantonment flight operations. However, minor disruption to daily activities could occur (e.g., short-term parking lot closure).

The Fuel Sludge Weathering Site has been recommended for no further action and should not impact the 434th ARW daily activities. Remediation of the Waste Oil Storage Pad should not result in impacts to military cantonment activities.

No land use restriction would occur, since the military cantonment land use category will remain under DOD/Air Force ownership.

Determination of future civilian 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 IRP sites' presence. The regulatory review process would include notifying the 434th ARW and the property recipients concerning the construction and locations of any monitoring wells.

4.3.1.4 Storage Tanks. Reuses under the Proposed Action would require both aboveground tanks and USTs. 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 acceptable leak detection methodologies, spill and overfill protection,

cathodic protection, secondary containment for the tank systems including the piping, and liability insurance. Existing USTs would be removed and assessed, and remedial action taken, if necessary, in conformance with the appropriate federal, state, and local regulations. All oil/water separators not utilized would be pumped, cleaned and assessed, and remedial action taken, if necessary, 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. Section 79.116 of the Uniform Fire Code recommends that aboveground storage tanks out of service for 1 year be removed from the property unless a waiver is granted by the state. The permanent closure of these tanks would be subject to the requirements of the IDEM. Therefore, management under all applicable regulations would preclude unacceptable impacts.

4.3.1.5 Asbestos. Renovation and demolition of existing structures with ACM may occur 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 Pesticide Usage. Pesticide usage associated with the Proposed Action would increase from amounts used under realignment baseline conditions, as a result of the increase in landscaping associated with commercial and industrial land uses. Pesticides would continue to be used in the military cantonment to maintain the airfield and other military-retained facilities. Management practices would be subject to FIFRA and state guidelines; therefore, no unacceptable impacts would result.

4.3.1.7 Polychlorinated Biphenyls. All federally regulated PCB equipment and PCB-contaminated equipment has been removed from Grissom AFB; therefore, these materials would not create any impacts.

4.3.1.8 Radon. Extensive radon surveys conducted in the base housing area identified some facilities with radon levels above 4 pCi/l. Currently, no radon exposure guidelines or action levels have been established by federal or state regulatory agencies for buildings other than schools or residences. Comprehensive data available from the prior surveys indicate that radon would not create any unacceptable impacts under this reuse proposal. Recipients of facilities which registered above 4 pCi/l would be advised of these findings prior to property conveyance.

4.3.1.9 Medical/Biohazardous Waste. Under this alternative, there are no proposed reuses that would generate medical/biohazardous waste. The 434th ARW would continue to generate small amounts of medical/ biohazardous wastes that would be managed in accordance with applicable regulations.

4.3.1.10 Ordnance. Ordnance operations on base would be similar to those operations conducted at the time of base realignment. The grenade range (POI/PAC Site No. 26), the indoor small arms firing range (POI/PAC Site No. 44), the outdoor small arms firing range, the firing-in butt (POI/PAC Site No. 43) and the expended munitions disposal area (POI/PAC Site No. 1) will be surveyed and cleared, if necessary, of all ordnance prior to disposal of the properties. If prior activities deem it necessary, an environmental site characterization of the areas will follow. The indoor and outdoor small arms firing ranges will undergo an environmental site characterization. Remediation of any groundwater or soil contamination following base realignment could delay property disposal and reuse. The former skeet/trap range (POI/PAC Site No. 10) will be retained within the military cantonment and is scheduled to undergo a site inspection. The outdoor small arms firing range would be excessed for public use; proper management of this facility would preclude any unacceptable impacts.

4.3.1.11 Lead-Based Paint. Base reuse development proposals may involve the demolition or renovation of existing structures that may contain lead-based paint. Lead-based paint in these facilities would be removed and disposed in accordance with applicable federal, state, and local regulations to minimize potential risks to human health and the environment. Property recipients would be provided results of the lead-based paint survey, or notified of the potential of lead-based paint in facilities constructed before or during 1978, prior to property disposal.

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 waste management, and could increase recycling, minimize waste, and assist in mutual spill responses.

The scheduling of collection days for hazardous household products such as paints, pesticides, and cleaners, could mitigate publicly owned treatment works and storm water discharge concerns. Educational 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 of the IRP sites require remediation; however, all of them must be addressed and properly closed out. Active coordination between the OL, 434th ARW, and new construction planning agencies could mitigate potential problems. Remediation activities associated with Landfills No. 1, No. 2, and No. 3 may limit certain land uses within overlying areas; options could include reuse as open space, greenbelts, or parks. Access easements for long-term monitoring wells may also be necessary.

Continued use of USTs 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.

The U.S. EPA offers a "Consumer's Guide to Radon Reductions, How to Reduce Radon Levels in Your Home," which provides suggested mitigations to persons concerned about radon in their homes.

4.3.2 Joint Use Aviation Alternative

4.3.2.1 Hazardous Materials Management. The types of hazardous materials utilized under the Joint Use Aviation Alternative (Table 4.3-4) would be similar to those utilized under the Proposed Action. The quantities utilized would be greater than those utilized at realignment due to the establishment of civilian aviation support activities; residential areas; and commercial, industrial, and manufacturing operations. Use of hazardous materials under this alternative may also be greater than those used under the Proposed Action due to an increase in flight operations, aviation-related operations, and residential land use. Management of these materials, utilizing all applicable regulations, would preclude any unacceptable impacts.

4.3.2.2 Hazardous Waste Management. Hazardous wastes generated under the Joint Use Aviation Alternative would consist of waste POL, fuels, solvents, paints, thinners, heavy metals, and batteries. These hazardous wastes would be generated from the hazardous materials and processes that utilize these materials. Quantities of waste would be greater than those produced at realignment due to an increase in reuse activities. Additionally, generation of hazardous wastes would increase over the Proposed Action due to the increase in aviation-related operations. The number of independent owners/operators associated with this alternative could increase the regulatory burden of hazardous waste management. Hazardous wastes generated within the military cantonment would continue to be disposed of through DRMO in Indianapolis. Management under all applicable regulations, which would require appropriate permits be obtained, would preclude unacceptable impacts. Investigations to determine the presence or absence of contamination at the 46 active POI/PAC sites (see Figure 3.3-1 and Table 3.3-2) on Grissom AFB is ongoing. If contamination is detected within one of the land use areas, site remediation could result in short-term land use restrictions or development delays (Table 4.3-5).

4.3.2.3 Installation Restoration Program Sites. The IRP sites within each land use area for the Joint Use Aviation Alternative are identified in Figure 4.3-2 and summarized in Table 4.3-6.

Table 4.3-4. Hazardous Materials Usage by Land Use - Joint Use Aviation Alternative

Land Use	Operation Process	Hazardous Materials
Aviation Support	Aircraft maintenance and manufacturing, airline flight training, air transportation, air cargo-related industry and warehousing, air traffic control tower, airport parking, administration offices, other governmental administrative services	Aviation fuels, solvents, POL, hydraulic fluids, degreasers, corrosives, heavy metals, reactives, thinners, paints, glycols, ignitibles, heating oils, pesticides
Industrial	Light industry and assembly, manufacturing, warehousing, corporate offices	Solvents, heavy metals, POL, corrosives, aerosols, fuels, heating oils, degreasers, ignitibles, pesticides, paints, thinners
Institutional (Educational)	Aviation training facilities, vocational and technical training schools	Corrosives, ignitibles, solvents, heating oils, fuels, POL, cleaners, pesticides, paints, thinners, degreasers, hydraulic fluids
Commercial	Offices, higher value warehousing, retail, service industries, restaurants, banking	Heating oils, pesticides, paints, thinners, cleaners, aerosols
Residential	Utilization/maintenance of single-family and multi-family units, landscaping	Pesticides, fertilizers, fuels, POL, heating oils, household products
Public/Recreation	Maintenance of existing recreational facilities including the Grissom AFB Heritage Museum, golf course, gymnasium, swimming pool, bowling center, and other outdoor recreational facilities	Pesticides, chlorine, heating oils, paints, thinners, cleaners, solvents, aerosols, POL, fertilizers
Military Cantonment[a]	Airfield and airfield support, operations, light industrial, commercial, recreational, vacant lands, POL, munitions storage, billeting, aircraft refueling, anti-/de-icing, private aviation facilities	Aviation fuels, motor fuels, glycols, POL, heating oil, heavy metals, paints, thinners, solvents, degreasers, hydraulic fluids, ignitibles, corrosives, pesticides, ordnance

Note: (a) Similar to realignment baseline.
POL = petroleum, oil, and lubricants.

Table 4.3-5. POI/PAC Sites within Land Use Areas - Joint Use Aviation Alternative

Proposed Land Use	Site No.
Aviation Support	15,16,17,19,20,28,35.36,37,46,47
Industrial	18,21
Institutional (Educational)	None
Commercial	1,2,4,8,19,20,26,29,36,42,43
Residential	12
Public/Recreation	5,7,21,23,33,36,38,44
Military Cantonment	3,6,9,10,11,13,14,15,22,24, 25,27,30,31,32,34,39,40,41,45

PAC = Potential Areas of Concern.
POI = Points of Interest.

Table 4.3-6. IRP Sites within Land Use Areas - Joint Use Aviation Alternative

Proposed Land Use	IRP Sites
Aviation Support	None
Industrial	Landfill No. 1
Institutional (Educational)	None
Commercial	Landfill No. 2, FPTAs No. 1 and No. 2, Abandoned Underground Storage Tank Site
Residential	None
Public/Recreation	Landfill No. 1
Military Cantonment	Fuel Sludge Weathering Site, Landfills No. 2 and No. 3, Low Point Drain Boxes, Alleged Drum Burial Site, Waste Oil Storage Pad

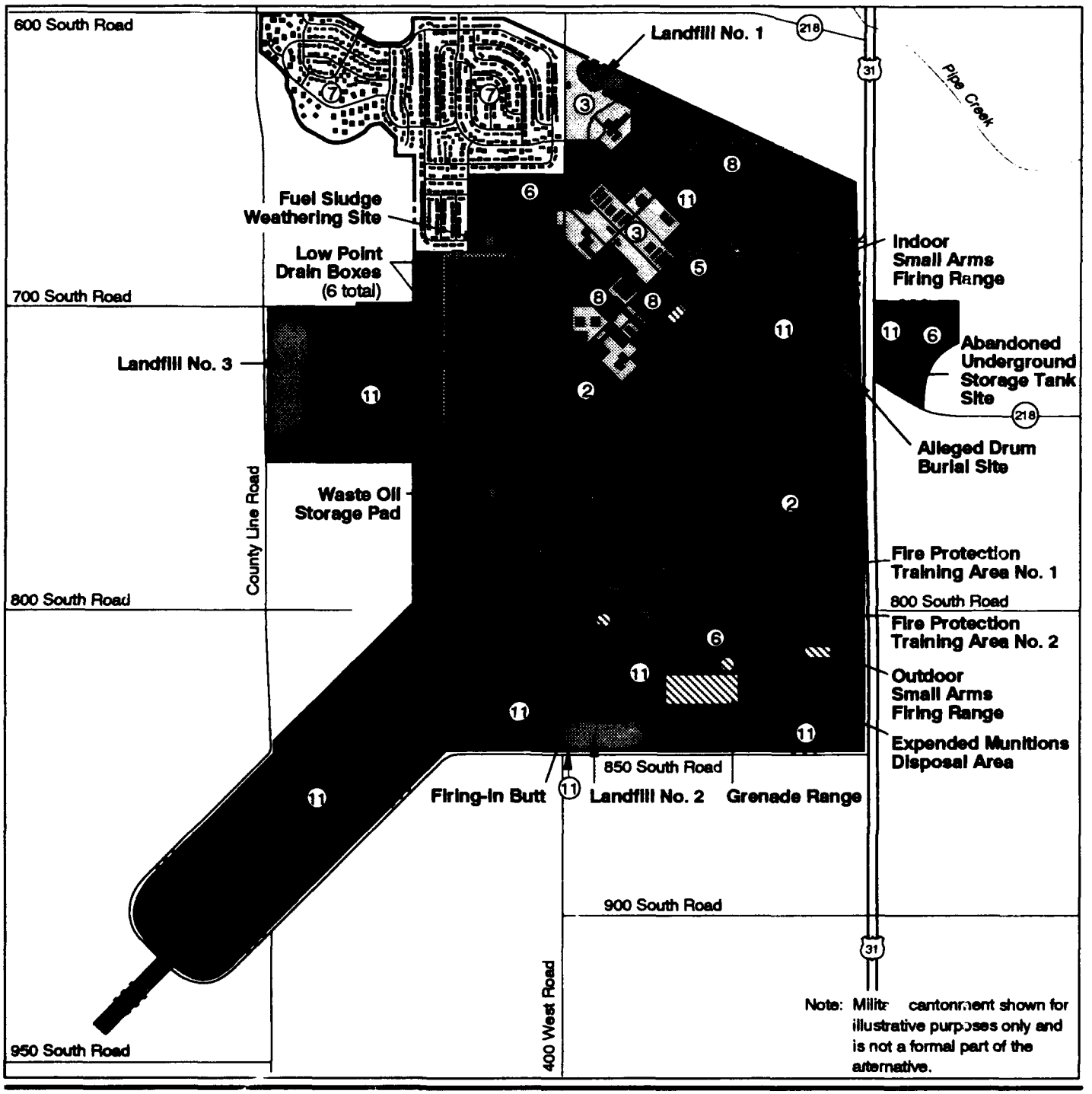
FPTA = Fire Protection Training Area.
IRP = Installation Restoration Program.

Aviation Support. No IRP sites are associated with this land use area.

Industrial. Delays in redevelopment and land use restrictions could result from remediation and long-term monitoring activities associated with Landfill No. 1.

Institutional (Educational). No IRP sites are associated with this land use area.

Commercial. Remediation and long-term monitoring activities associated with Landfill No. 2 and FPTAs No. 1 and No. 2 could impact the commercial land use area in the southern portion of the base by creating land use restrictions and delays in redevelopment. Delays in redevelopment and land use restrictions could result from remediation activities associated with the Abandoned Underground Storage Tank Site.



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 *
- ⑪ Military Cantonment
- IRP Site
- Ordnance Area
- Base Boundary

0 650 1300 2600 Feet

* Standard land use designation not applicable to this figure.

IRP Sites and Ordnance Areas - Joint Use Aviation Alternative

Figure 4.3-2

Residential. No IRP sites are associated with this land use area.

Public/Recreation. Delays in redevelopment and land use restrictions could result from remediation and long-term monitoring activities associated with Landfill No. 1.

Military Cantonment. Impacts to the military cantonment from IRP activities under the Joint Use Aviation Alternative would be the same as under the Proposed Action.

4.3.2.4 Storage Tanks. Flight and maintenance operations under the Joint Use Aviation Alternative would require both aboveground tanks and USTs. New tanks required by the new owners/operators would be subject to the same federal and state regulations as discussed under the Proposed Action.

Aboveground fuel storage tanks not utilized to support the reuse activities would be purged of fumes to preclude fire hazards. Under this alternative, the Uniform Fire Code and IDEM requirements are the same as those stated under the Proposed Action. Proper management under this alternative would preclude unacceptable impacts.

4.3.2.5 Asbestos. Renovation and demolition of existing structures with ACM may occur with reuse development. Demolition activities planned for the Joint Use Aviation Alternative are considerably less than the demolition planned under the Proposed Action. Such activities would be subject to all applicable federal, state, and local regulations to minimize the potential risk to human health and the environment.

4.3.2.6 Pesticide Usage. Under this alternative, pesticide usage would increase from amounts used under baseline conditions as a result of reuse. Furthermore, pesticide use under this alternative would increase over the Proposed Action due to reuse of the on-base residential areas and the golf course. Pesticides would also be utilized within the aviation support, industrial, institutional (educational), commercial, and vacant land use zones. Management practices would be subject to FIFRA and state guidelines and would preclude unacceptable impacts.

4.3.2.7 Polychlorinated Biphenyls. All federally regulated PCB equipment and PCB-contaminated equipment has been removed from Grissom AFB; therefore, these materials would not create any impacts.

4.3.2.8 Radon. Extensive radon surveys conducted in the base housing area identified some facilities with radon levels above 4 pCi/l. Recipients of facilities that registered above 4 pCi/l would be advised of these findings prior to property disposal.

4.3.2.9 Medical/Biohazardous Waste. Under this alternative, there are no proposed reuses that would generate medical/biohazardous waste. The 434th ARW would continue to generate small amounts of medical/ biohazardous wastes that would be managed in accordance with applicable regulations.

4.3.2.10 Ordnance. Ordnance remediation activities and management practices would be similar to those discussed under the Proposed Action except the outdoor small arms firing range would not be reused under this alternative.

4.3.2.11 Lead-Based Paint. Management practices regarding lead-based paint would be similar to those identified under the Proposed Action.

4.3.2.12 Mitigation Measures. Potential radon exposure can be mitigated through both management practices and modifications to existing structures. Other mitigation measures for this alternative are the same as the Proposed Action.

4.3.3 No-Action Alternative

4.3.3.1 Hazardous Materials Management. Hazardous materials would be utilized in preventive and regular maintenance activities, grounds maintenance, and water and wastewater treatment. Types and quantities would be similar to those described under the realignment baseline.

The OL activities and those within the military cantonment would be individually responsible for hazardous materials management handling, training, and hazardous materials communication requirements of OSHA regulations.

4.3.3.2 Hazardous Waste Management. The amounts of hazardous waste generated would be similar to those generated at realignment. 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 if the OL operates under a separate waste generator permit than the 434th ARW. The generator status within the military cantonment would remain the same as under realignment conditions. Investigations to determine the presence or absence of contamination and any required remediation at the 46 active POI/PAC sites would continue. The OL would support the utility requirements and security for any potential cleanup areas. The 434th ARW personnel would support cleanup activities within the military cantonment by allowing access to all POI/PAC sites.

4.3.3.3 Installation Restoration Program Sites. Ongoing sampling and remedial design 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. The 434th ARW personnel would support remediation activities within the military cantonment by allowing access to IRP sites and monitoring wells, and allowing for the installation of site security systems (e.g., fences).

4.3.3.4 Storage Tanks. USTs remaining at Grissom AFB, except for those utilized within the military cantonment, would be managed by the OL. Cathodic protection and leak detection systems on the USTs would be the responsibility of the OL. Storage tanks out of service for more than 1 year will be closed in accordance with all applicable federal, state, and local regulations. Under the No-Action Alternative, all oil/water separators not utilized by the OL or the 434th ARW would be pumped and cleaned.

The 434th ARW would be responsible for maintenance and regulatory compliance of all USTs, aboveground storage tanks, and oil/water separators utilized to support military cantonment activities.

Aboveground storage tanks not used within the military cantonment would be purged of fuel fumes to preclude fire hazards. The IDEM 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.

4.3.3.5 Asbestos. The impacts from the No-Action Alternative would be minimal. Vacated buildings would be secured to prevent contact with ACM. Upon completion of the asbestos survey, management of ACM by the OL and the 434th ARW would be in accordance with the Air Force Policy to minimize potential risks to human health and the environment.

4.3.3.6 Pesticide Usage. Under the No-Action Alternative, the grounds and golf course 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 realignment baseline. Application of pesticides would be conducted in accordance with FIFRA and state regulations to assure the proper and safe handling of all chemicals.

4.3.3.7 Polychlorinated Biphenyls. All federally regulated PCB equipment and PCB-contaminated equipment has been removed from Grissom AFB; therefore, these materials would not create any impacts.

4.3.3.8 Radon. Some radon levels in base housing measured above the U.S. EPA's recommended mitigation level of 4 pCi/l. Under the No-Action Alternative, base housing would not be utilized, and occupied facilities within the military cantonment would be managed in accordance with RAMP.

4.3.3.9 Medical/Biohazardous Waste. Under this alternative, the 434th ARW would continue to generate small amounts of medical/biohazardous waste that would be managed in accordance with applicable regulations.

4.3.3.10 Ordnance. Ordnance operations on base would be similar to those operations conducted at the time of base realignment. The grenade range (POI/PAC Site No. 26), the indoor small arms firing range (POI/PAC Site No. 44), the outdoor small arms firing range, the firing-in butt (POI/PAC Site No. 43), and the expended munitions disposal area (POI/PAC Site No. 1) will be surveyed and cleared, if necessary, of all ordnance prior to disposal of the properties. If prior activities deem it necessary, an environmental site characterization of the areas will follow. The indoor and outdoor small arms firing ranges will undergo an environmental site characterization. Remediation of any groundwater or soil contamination following base realignment could delay property disposal and reuse. The former skeet/trap range (POI/PAC Site No. 10) will be retained within the military cantonment and is scheduled to undergo a site inspection.

4.3.3.11 Lead-Based Paint. The impacts under the No-Action Alternative would be minimal. Vacated buildings outside of the military cantonment would be secured to prevent contact with lead-based paint. Facilities within the military cantonment would be managed according to applicable regulations.

4.3.3.12 Mitigation Measures. Under the No-Action Alternative, contingency plans developed to address spill response would be the same as realignment conditions. Implementation of such procedures could effectively mitigate any unacceptable impacts associated with the No-Action Alternative.

4.3.4 Other Land Use Concepts

This section discusses the State of Indiana Public Safety Training Institute within the framework of the IRP, POI/PAC sites, and context of the hazardous materials typically associated with the proposed reuse.

No IRP sites exist within the area designated for reuse under this proposal. However, seven POI/PAC sites exist within or adjacent to areas requested. If investigations determine the presence of contamination, remediation activities could result in short-term development delays. This concept would generate wastewater with fuel/oil, heavy metals, and/or fire extinguishing agent residue associated with fire fighting activities. A new burn pit constructed for fire training activities would be lined with a rubber bladder and a fuel/water separator would be installed. The fuel/water collection system would separate the fuel and water, which would be reused on the next burn cycle. All activities would be conducted in accordance with applicable state permitting and environmental monitoring requirements, which would preclude any unacceptable impacts. Upon completion of the

asbestos survey, management of ACM would be accomplished to minimize potential risk to human health and the environment.

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, air quality, 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 alternatives on the local soils and geology have been analyzed based on review of published literature. Soils and geology would be affected primarily during ground-disturbing activities, when local soil profiles would be altered. Soils in these areas would remain relatively stable in the long term because they would be overlain by facilities or pavement or would be managed following Soil Conservation Service recommendations to minimize erosion.

4.4.1.1 Proposed Action. Effects of the Proposed Action on the regional soils and geology would be minimal, primarily from the construction activities associated with reuse, such as grading, excavating, and recontouring the soils. These activities could alter the soil profiles and local topography. Acreages to be disturbed under the Proposed Action between realignment and 5, 10, and 20 years of redevelopment are presented in Chapter 2 (see Table 2.2-3). Approximately 610 acres would be impacted by ground-disturbing activities by 2014.

Use of sand and gravel aggregate resources (e.g., for construction material and concrete) for new facilities and roadways would not be expected to reduce the availability of these materials from local suppliers. Although unutilized limestone and dolomite resources potentially occur on the base and would not be used under the Proposed Action, the region offers adequate reserves to meet projected demands.

Impacts from soil erosion would likely be short term and minimal, as the soils have only slight erosion potential. During construction, removal of vegetative cover and grading activities would increase the potential for erosion by wind and water. However, once the construction phase is complete, disturbed areas would be covered with pavement or landscaped, thus reducing the erosion potential.

As discussed in Section 3.4.4.1, Soils, special building construction methods may be required at Grissom AFB because of the low permeability and shrinking and swelling characteristics of the soil.

Mitigation Measures. Mitigation measures are available to minimize erosion problems during the construction phase when unprotected soils are exposed. During construction, the length of time vegetation or other cover is absent should be minimized. Mitigation measures that could reduce soil erosion during site construction include:

- Add protective cover, such as mulch or straw, to all exposed soils.
- Implement site grading procedures that minimize the time that soils are exposed prior to being covered by impermeable surfaces or vegetation.
- Implement storm water diversions upslope of site areas to reduce water flow through exposed sites.
- Implement temporary impoundments immediately downslope of site to catch soil eroded from the site prior to flow into the drainage network.
- Development and implementation of Soil Erosion Plans, in coordination with the local Soil Conservation Service Office.

To minimize the problems associated with soil properties, foundations should be designed using appropriate engineering practices, and constructed where necessary. Engineering designs could include strong foundations under buildings and subgrade under roadways.

4.4.1.2 Joint Use Aviation Alternative. Types of impacts associated with soils and geology under this alternative would be similar to those under the Proposed Action, except that less land (166 acres) would potentially be disturbed by the proposed activities (see Table 2.3-3), thus reducing soil erosion.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action.

4.4.1.3 No-Action Alternative. The ground-disturbing operations associated with this alternative would be minimal and restricted to maintenance-type activities; therefore, negligible impacts to soils and geology would result from the No-Action Alternative.

4.4.1.4 Other Land Use Concepts. Effects on soils and geology as a result of the State of Indiana Public Safety Training Institute that may be implemented in conjunction with one of the integrated reuse alternatives is discussed below.

Effects on soils and geology as a result of this proposal would be minimal, with 8 acres being disturbed; therefore, impacts due to ground disturbance

would be minor. Additional impacts could be associated with runoff from the burn pit, which could contaminate soils. However, proper management practice associated with fire training activities (see Section 4.3.4) would minimize the potential for runoff from the burn pit to enter the existing storm water system, which could contaminate soils along drainage courses and ditches.

4.4.2 Water Resources

The following section describes the potential impacts on water resources as a result of the Proposed Action and alternatives.

4.4.2.1 Proposed Action

Surface Water. Under the Proposed Action, soils would be compacted during new construction and overlain by impervious surfaces (an increase of 19 percent over realignment) that would cause increased storm water runoff to local storm sewers and sewage systems. However, as the soils are only slightly permeable and the water table is seasonally at or above ground surface, most precipitation already runs off and the increase in runoff resulting from the Proposed Action would be negligible. Drainage patterns would be altered in local areas to divert water away from and drain wet soils around new facilities and airfield pavements.

Storm water from the airfield, airfield support areas, and other industrial areas that would potentially contain fuel, oil, and other contaminants could degrade surface water quality. The elimination of housing units under the Proposed Action would decrease the domestic sewage input to the WWTP, which could reduce its effectiveness at removing contaminants (see Section 4.2.4). Storm water and treated wastewater from the military cantonment will be sampled and discharged under the NPDES permit, maintained by the 434th ARW. Civilian reuse activities may also be subject to NPDES permit requirements for storm water discharges during the construction period and during operations. NPDES permit requirements are subject to the provisions in the NPDES Permit Application Regulations for Storm Water Discharges issued by the U.S. EPA as a final rule on November 16, 1990.

Surface water resources are not utilized as a potable water source in the Grissom AFB region. No impacts to amount, condition, or quality affecting the current agricultural and wildlife uses of the surface waters are expected from the Proposed Action.

The 0.25 acre wetland southeast of the runway and the approximately 8.5 acres of wetlands in the drainage ditches (see Figure 3.4-6) could be impacted by construction activities. For a detailed discussion of wetlands, see Section 4.4.5, Biological Resources.

Groundwater. Under the Proposed Action, there would be no impacts to groundwater resources. Projected water consumption in the ROI for the years 1999, 2004, and 2014 is shown in Table 4.4-1.

Table 4.4-1. Projected ROI Water Consumption - Proposed Action and Alternatives

	Projected Water Demand (MGD)			Projected Increase Over No-Action Alternative (Percent)		
	1999	2004	2014	1999	2004	2014
Proposed Action	2.15	2.42	2.88	2.4	14.2	34.6
Joint Use Aviation Alternative	2.14	2.27	2.52	1.9	7.1	17.8
No-Action Alternative (Post-Realignment Projection)	2.10	2.12	2.14	NA	NA	NA

MGD = million gallons per day.
NA = not applicable.
ROI = Region of Influence.

Water consumption in the ROI under the Proposed Action would result in an increase of groundwater usage of 34.6 percent over the No-Action Alternative by 2014. However, the water supply requirements would be met without causing any regional drawdown of the water table, so no impact to groundwater resources would result.

In 2014, on-base demand is expected to be 0.32 MGD, which is a 45-percent increase over the demand at realignment. The production capacity of the on-base wells is 4.90 MGD, which is adequate to meet anticipated needs.

Mitigation Measures. To minimize potential impacts to surface water from runoff, construction designs should incorporate provisions to reduce storm water runoff. The following measures could be implemented to reduce the impacts to surface water quality during construction:

- Create landscaped areas that are pervious to surface water
- Minimize areas of surface disturbance
- Control site runoff
- Minimize time that disturbed areas are exposed to erosion
- Provide regular street sweeping.

Mitigations regarding operation of the Grissom AFB WWTP are discussed in Section 4.2.4, Utilities.

4.4.2.2 Joint Use Aviation Alternative

Surface Water. Types of impacts associated with water resources under this alternative would be similar to those of the Proposed Action and would be minimal. Impervious surfaces on Grissom AFB would increase by 6 percent over realignment conditions because of proposed redevelopment. No major changes to drainages would result from reuse construction. New NPDES permits may be required for reuse actions not covered under the pending permit and for new construction activities.

Groundwater. Water consumption in the ROI under the Joint Use Aviation Alternative would result in an increase of groundwater usage of 17.8 percent over the No-Action Alternative by 2014 (see Table 4.4-1). However, the water supply requirements would be met without causing any regional drawdown of the water table, so no impact to groundwater resources would result.

In 2014, on-base demand is expected to be 0.35 MGD, which is an increase of 59 percent over the realignment baseline. The production capacity of the on-base wells is 4.90 MGD, which is adequate to meet anticipated needs.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action.

4.4.2.3 No-Action Alternative

Surface Water. The ground-disturbing operations associated with this alternative would be minimal and restricted to maintenance-type activities, so drainage patterns would not be altered. The continued non-use of housing units would decrease the domestic sewage input into the WWTP, which could reduce its effectiveness at removing contaminants (see Section 4.2.4). Storm water and wastewater from the military cantonment would be sampled and discharged under the NPDES permit maintained by the plant operator.

Groundwater. Groundwater usage is projected to increase by approximately 1 percent between realignment and 2014 under the No-Action Alternative, which would not result in an impact to groundwater resources.

4.4.2.4 Other Land Use Concepts. Effects on water resources as a result of the State of Indiana Public Safety Training Institute that may be implemented individually or in conjunction with one of the reuse alternatives is discussed below.

Implementation of this proposal would not create any additional impacts on water demand because it would create a minimal net increase in consumption, which could be met by existing supplies.

Additional impacts could be associated with runoff from the burn pit, which could contaminate water resources. However, proper management practices associated with fire training activities (see Section 4.3.4) would minimize the potential for runoff from the burn pit to enter the existing storm water and groundwater system.

4.4.3 Air Quality

Air quality impacts could occur during reuse activities associated with the Proposed Action and alternatives for the reuse of Grissom AFB. Reuse-related impacts could occur from: (1) mobile sources such as aircraft operation/support equipment, commercial transport vehicles, and personal vehicles; (2) point sources such as heating/power plants, generators, incinerators, and storage tanks; (3) intermittent fugitive dust due to construction activities; and (4) secondary emission sources associated with a general population increase, such as residential heating.

The methods selected to analyze impacts depend upon the type of air emission source being examined. Air quality analytical methods are summarized here and presented in detail in Appendix M. The primary emission source categories associated with the Proposed Action and alternatives include construction, aircraft, vehicles, point sources, and indirect source emissions related to population increase. Analysis for the construction phase is limited to estimating the amount of uncontrolled fugitive dust that may be emitted from disturbed areas. Analysis for point source and indirect source emissions during the operations phase consists of quantifying the emissions by estimating the changes in polluting activities from realignment conditions. Aircraft and vehicular emissions were estimated using the emission factors in EDMS. The impacts of reuse-related annual emissions were evaluated based on how these emissions would affect progress toward attainment or maintenance of the NAAQS.

The local air quality impacts of aircraft and mobile source emissions are analyzed by modeling. The EDMS is used to simulate the dispersion of emissions from aircraft and motor vehicle operations (Segal, 1991). EDMS was developed jointly by the FAA and the U.S. Air Force specifically for the purpose of generating airport and airbase emission inventories and for calculating the concentrations caused by these emissions as they disperse downwind. The EDMS model uses U.S. EPA aircraft emission factors and information on peak and annual landing and takeoff cycles to produce an emissions inventory report for the aircraft operations.

Air quality analysis is presented for the Proposed Action and alternatives through 2004. The effects of the 1990 CAA Amendments, 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 makes a 20-year emission and air quality projection too speculative.

The following assumptions were made in estimating the effects of the Proposed Action and alternatives:

- For construction, fugitive dust and combustion emissions were based on the acreage graded each year. Emission factors for dust and specific gaseous pollutants were taken from AP-42.

- EDMS was used to calculate annual aircraft emissions and ambient air concentrations for military and civilian aircraft operations. Reuse-related motor vehicle emissions and concentrations, both on and off base, were also calculated with EDMS.

- Emissions from non-aircraft industrial activity were calculated using per-employee emission factors. These emission factors were developed from industrial emissions and employment data for the ROI and were multiplied by on-base employment to arrive at emissions due to industrial activity for each reuse scenario.

- Emissions from natural gas combustion for space heating were calculated using appropriate AP-42 emission factors and estimated natural gas consumption.

- Aerospace ground equipment emissions were calculated by extrapolating from baseline aerospace ground equipment emissions, and were assumed to be proportional to aircraft operations.

The process by which a regulatory agency permits major new sources or modifications of existing sources depends on the attainment status of the source location. In an area meeting the NAAQS, or attainment area, the process called PSD limits the allowable ambient impact of emissions to specific increments (see Table 3.4-4). The increments are designed to prevent significant degradation of the area's acceptable air quality. Because Grissom AFB is in an area that is unclassified and assumed to be in attainment of all criteria pollutants, PSD requirements for major new or modified sources would apply. Emissions associated with the proposed industrial activities will be subject to review by the IDEM. The federal CAA and Indiana air quality regulations require that industrial sources obtain operating permits and institute pollution reduction measures if a source is determined to be a major source or to cause a significant environmental impact. Specific reduction requirements are determined on a case-by-case basis.

Additionally, as described in Section 3.4.3, Air Quality, by the year 2000 most medium- and large-sized sources of HAPs generated by potential reuse would be required to follow U.S. EPA regulations that will control HAPs

emissions. Because details about the specific type of industrial activities to be conducted under the reuse proposals are unknown, it is not possible to develop any inventory of HAP emissions for this analysis.

4.4.3.1 Proposed Action. Total estimated emissions of the Proposed Action are presented in Table 4.4-2 for 1999 and 2004. The table also provides a comparison of the magnitude of reuse-related emissions in relation to prerealignment and realignment emission levels.

Table 4.4-2. Emissions Associated with the Proposed Action (tons/day)

		Base-Related Emissions		Reuse-related Emissions[b]	
Pollutant	ROI[a] 1990	Prerealignment 1990	Realignment 1994	1999	2004
Oxides of nitrogen	11.2	2.15	0.666	0.935	2.10
VOC	2.54	11.23	3.33	3.35	3.53
PM_{10}	2.48	1.76	0.51	0.56	0.74
Sulfur dioxide	38.95	1.35	0.14	0.25	0.79
Carbon monoxide	3.76	13.12	4.78	4.67	5.13

Notes: (a) Includes Cass, Howard, and Miami counties. Emissions are from industrial processes only (see Table 3.4-7).
(b) Future year emissions are from both operation and construction emissions. Emissions presented include both reuse-related emissions and baseline emissions expected in the region without reuse.
PM_{10} = particulate matter equal to or less than 10 microns in diameter.
ROI = Region of Influence.
VOC = volatile organic compound.

Construction. Fugitive dust would be generated during reuse activities associated with construction; site clearing; and improvements to structures, roads, and utilities. Uncontrolled fugitive dust (particulate matter) emissions from ground-disturbing activities would be emitted at a rate of 110 pounds per acre per 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.

It is estimated that reuse-related construction on base would disturb 244 acres over the 10-year period of analysis (see Table 2.2-3). The average daily PM_{10} emissions are estimated to be 0.007 ton between 1994 and 1999, and 0.042 ton between 1999 and 2004 (see Appendix M). 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.

Combustive emissions from the operation of heavy equipment would also occur. These emissions are assumed to be directly related to the acreage disturbed.

Operations. Total estimated emissions associated with the Proposed Action are displayed in Table 4.4-2 for 1999 and 2004. Aircraft and motor vehicle emissions were calculated using EDMS. Estimates for industrial activities were calculated using on-base employment projections and emissions for other industrial activities in the ROI. Estimates for all other categories of emissions were calculated by estimating changes in polluting activities from realignment conditions.

Potential impacts to air quality as a result of air emissions from the operations under the Proposed Action were evaluated in terms of two spatial scales: regional and local. The regional-scale analysis considered the potential for project reuse-related emissions to cause or contribute to a nonattainment condition in Miami, Cass, and Howard counties. The local-scale analysis evaluated the potential for aircraft and surface traffic emissions to exceed the NAAQS in the immediate vicinity of the base.

Regional Scale. The evaluation of regional-scale impacts from the Proposed Action considered the effect any new air emissions would have on maintaining the air quality attainment status of Miami, Cass, and Howard counties. The following summarize the results of the regional-scale impact analysis on a pollutant-by-pollutant basis.

Ozone Precursors. The reuse emissions of NO_x and VOC would remain very close to realignment conditions and would, therefore, remain below the prerealignment emission levels for Grissom AFB. The regional air quality impacts associated with those emissions would be negligible.

CO, NO_2, PM_{10}, and SO_2. Projected CO, NO_2, PM_{10}, and SO_2 emissions from the Proposed Action would be lower than prerealignment emissions from Grissom AFB and all applicable standards. CO levels in 1999 would be lower than realignment levels. This is due to projected decreases in automobile fleet mix emission rates as predicted by EDMS, which would be partially offset by increased vehicular activity.

Local Scale. A summary of the EDMS analysis results is presented in Table 4.4-3. Projected ambient concentrations would be primarily due to the continued military aircraft operations. The results show that during peak-hour operations, the maximum modeled 1-hour pollutant concentration would occur approximately 1,000 feet downwind of the runway centerline. All of the projected pollutant concentrations would be below the applicable standard in the immediate area surrounding the airfield.

Mitigation Measures. Air quality impacts during construction would occur primarily from fugitive dust emissions from ground-disturbing activities.

Table 4.4-3. Air Quality Modeling Results for Aircraft and Motor Vehicles for the Proposed Action ($\mu g/m^3$)

Pollutant	Averaging Time	Prerealignment Concentrations 1990[a]	Total Impact 1999[a]	Total Impact 2004[a]	Limiting Standard
Carbon monoxide	8-Hour	2,066	480	480	10,000
	1-Hour	2,967	686	686	40,000
Sulfur dioxide	Annual	42	0.4	0.4	80
	24-Hour	166	1.1	1.1	365
	3-Hour	375	3.2	3.2	1,300
PM_{10}	Annual	18	0.4	0.4	50
	24-Hour	69	1.2	1.2	150

Notes: Modeled impact is an on-base location in proximity to roadways and parking lots. Additional impact points are located approximately 1,000 feet (300 meters) downwind of the ends of the runway.

(a) Estimated concentrations include background provided by IDEM. See Table 3.4-5.

$\mu g/m^3$ = micrograms per cubic meter.

PM_{10} = particulate matter equal to or less than 10 microns in diameter.

Water application during ground-disturbing activities could mitigate fugitive dust emissions by at least 50 percent (U.S. EPA, 1985). Decreasing the time period during which newly graded sites are exposed to the elements would further mitigate fugitive dust emissions. Implementation of these measures would substantially reduce air quality effects from construction activities associated with the Proposed Action.

Although the impacts caused by motor vehicle emissions would be minimal and well below standards, pollution prevention measures could be implemented to reduce motor vehicle emissions. These measures would probably involve land use or transportation planning and management methods to reduce vehicle miles traveled, vehicle trips, and peak-hour travel. These reductions would, therefore, reduce both regional and localized vehicle-related emissions of NO_x, VOC, and PM_{10}.

Conformity with State/Local Plans. NEPA requires that agencies identify any inconsistency of a proposed action with any approved state or local plans and laws. As stated above, emissions from the Proposed Action are not expected to have an adverse impact on local or regional air quality and, therefore, are not expected to interfere with the attainment status of the region. In relation to this issue, U.S. EPA has promulgated detailed procedures for determining conformity with state and local air quality plans for nonattainment areas (40 CFR 51.853(b)). Under the existing rule, transfers of ownership interest in property (i.e., the Air Force's actions) are exempt from the conformity requirement. However, if U.S. EPA

promulgates conformity procedures in attainment areas, property recipients may be required to prepare a conformity determination on their actions.

4.4.3.2 Joint Use Aviation Alternative. Table 4.4-4 summarizes the results of the emission calculations for the Joint Use Aviation Alternative for 1999 and 2004. This table also provides a comparison of the magnitude of the reuse-related emissions in relation to the prerealignment and realignment emission levels.

Table 4.4-4. Emissions Associated with the Joint Use Aviation Alternative (tons/day)

		Base-Related Emissions		Reuse-related Emissions[b]	
	ROI[a]	Prerealignment	Realignment		
Pollutant	1990	1990	1994	1999	2004
Oxides of nitrogen	11.2	2.15	0.666	1.24	0.99
VOC	2.54	11.23	3.33	3.40	3.41
PM_{10}	2.48	1.76	0.51	0.56	0.53
Sulfur dioxide	38.95	1.35	0.14	0.15	0.14
Carbon monoxide	3.76	13.12	4.78	5.43	5.54

Notes: (a) Includes Cass, Howard, and Miami counties. Emissions are from industrial processes only (see Table 3.4-7).
(b) Future year emissions are from both operation and construction emissions. Emissions presented include both reuse-related emissions and baseline emissions expected in the region without reuse.
PM_{10} = particulate matter equal to or less than 10 microns in diameter.
ROI = Region of Influence.
VOC = volatile organic compound.

Construction. Construction impacts from this alternative would be less than under the Proposed Action because of the smaller amount of land disturbance that would occur. It is estimated that 98 acres would be disturbed by construction over the 10-year period of analysis, releasing an estimated 0.013 and 0.006 ton of PM_{10} per working day, respectively, for the two periods of analysis. The impact of these emissions would cause elevated concentrations of particulates at receptors close to the construction areas, decreasing rapidly with distance from the construction areas. Combustive emissions proportional to acreage disturbed would also occur. The decrease in acreage disturbed from 1999 to 2004 accounts for the corresponding decrease in emission levels for this alternative.

Operations. Table 4.4-4 summarizes the results of the Joint Use Aviation Alternative for 1999 and 2004. EDMS was used to model emissions from aircraft and motor vehicles. Estimates for all other categories of emissions were calculated by estimating changes in polluting activities from realignment conditions.

Regional Scale. The evaluation of regional-scale impacts from the Joint Use Aviation Alternative considered the effect any new emissions would have on maintaining the air quality attainment status of Miami, Cass, and Howard counties. The following summarize the results of the regional-scale impact analysis on a pollutant-by-pollutant basis.

Ozone Precursors. The reuse emissions of VOC and NO_x would be lower than the prerealignment base emissions and would have no adverse effect on regional air quality.

CO, NO_2, PM_{10}, and SO_2. Table 4.4-4 shows that CO, NO_2, PM_{10}, and SO_2 emissions from the Joint Use Aviation Alternative would be lower than prerealignment emissions from Grissom AFB and all applicable standards.

Local Scale. A summary of the EDMS results is presented in Table 4.4-5. As with the Proposed Action, the results show that during peak-hour operations, the maximum modeled 1-hour pollutant concentration would occur at a receptor approximately 1,000 feet downwind of the runway centerline. Although the modeling showed some increase over realignment conditions, primarily due to civilian aircraft, the concentrations continue to be dominated by the continued military aircraft operations. All of the projected pollutant concentrations would be below the applicable standard in the immediate area surrounding the airfield.

Table 4.4-5. Air Quality Modeling Results for Aircraft and Motor Vehicles for the Joint Use Aviation Alternative ($\mu g/m^3$)

Pollutant	Averaging Time	Prerealignment Concentrations 1990[a]	Total Impact 1999[a]	Total Impact 2004[a]	Limiting Standard
Carbon monoxide	8-Hour	2,066	910	980	10,000
	1-Hour	2,967	1,300	1,400	40,000
Sulfur dioxide	Annual	42	1.2	1.2	80
	24-Hour	166	3.6	3.5	365
	3-Hour	375	10.8	10.6	1,300
PM_{10}	Annual	18	0.5	0.5	50
	24-Hour	69	1.4	1.5	150

Notes: Modeled impact is an on-base location in proximity to roadways and parking lots. Additional impact points are located approximately 1,000 feet (300 meters) downwind of the ends of the runway.
(a) Estimated concentrations include background provided by IDEM. See Table 3.4-5.
$\mu g/m^3$ = micrograms per cubic meter.
PM_{10} = particulate matter equal to or less than 10 microns in diameter.

Mitigation Measures. Mitigation measures for the Joint Use Aviation Alternative would be similar to those discussed for the Proposed Action.

Conformity with State/Local Plans. As discussed for the Proposed Action, if U.S. EPA promulgates conformity procedures in attainment areas, property recipients may be required to prepare a conformity determination on their actions.

4.4.3.3 No-Action Alternative. The No-Action Alternative would have no adverse impact on air quality. Air quality conditions at the time of realignment would not be adversely affected by continued operations within the military cantonment and maintenance of the remainder of the base at the realignment level of activity.

Mitigation Measures. Air quality mitigation measures are not required for the No-Action Alternative.

4.4.3.4 Other Land Use Concepts. Potential changes in air quality resulting from implementation of the State of Indiana Public Safety Training Institute in conjunction with the Proposed Action or alternatives is described below.

Potential changes in air quality resulting from implementation of this proposal in conjunction with the alternatives would be primarily from fire training activities. Fire training activities would occur approximately three times per month at up to 5-minute burn cycles. The U.S. EPA regulatory model SCREEN was used to estimate maximum ambient concentrations (Table 4.4-6). Maximum ambient concentrations occurred at a receptor located 581 meters from the burn site. Modeling results indicate that fire training activities would not cause an exceedance of any applicable ambient air quality standards.

Table 4.4-6. Emission Inventory of Fire Training Activities (tons/day)

	CO	PM_{10}	SO_2	NO_2	VOC
1999	0.09	0.02	0	0.001	0.05
2004	0.09	0.02	0	0.001	0.05

CO = carbon monoxide.
NO_2 = nitrogen dioxide.
PM_{10} = particulate matter equal to or less than 10 microns in diameter.
SO_2 = sulfur dioxide.
VOC = volatile organic compound.

Implementation of this concept in conjunction with any alternative would not increase total emissions beyond prerealignment emission levels associated with Grissom AFB.

4.4.4 Noise

The 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 are assessed with respect to land use impacts. Other effects of noise such as annoyance, speech interference, sleep disturbance, hearing loss, and health are discussed below or in Appendix I. The metrics used to evaluate noise are DNL and L_{eq}, which are supplemented occasionally by SEL and A-weighted maximum sound level (L_{max}). These metrics are measured in units of A-weighted dB. See Appendix I 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). Some effects of noise are summarized within this section and a detailed description is provided in Appendix I.

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 4.4-7 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 (National Academy of Sciences, 1977) and recently re-evaluated (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 are expected to be highly annoyed by the noise levels.

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

Table 4.4-7. 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.
< = less than.

Source: Adapted from National Academy of Sciences, 1977.

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 maximum level of the flyover noise 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 Interference. 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. Relationships between percent awakened and SEL are presented in Appendix I. Most of the 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.

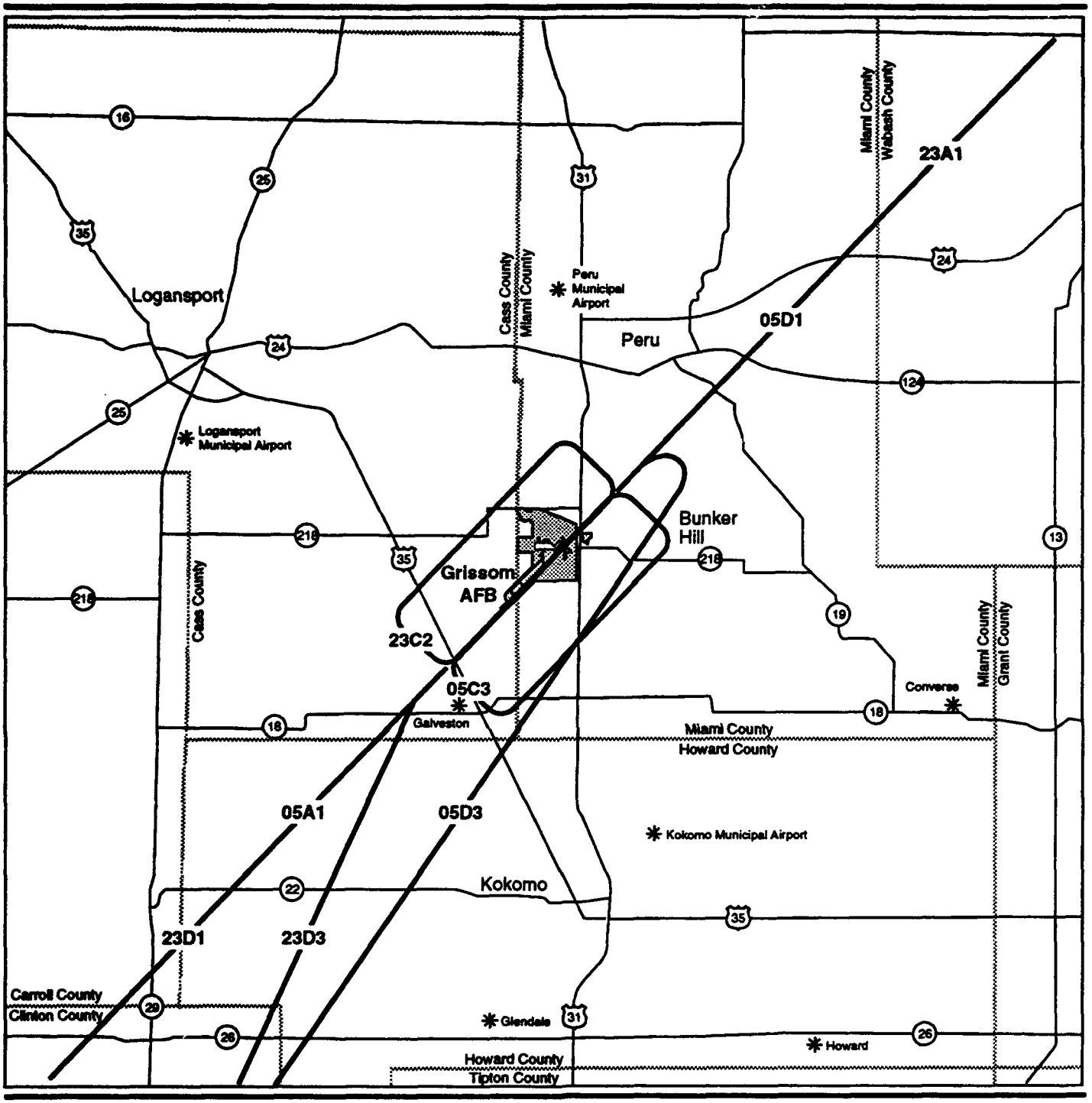
Studies (Goldstein and Lukas, 1980; Lukas, 1975) show great variability in the percentage of people awakened by exposure to noise. A recent review (Pearsons et al., 1989) of the literature related to sleep disturbance, including field and laboratory studies, suggests that habituation may reduce the effect 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, 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 and are presented in Section 3.4.4. The land use compatibility guidelines are based on annoyance and hearing loss considerations described previously and in Appendix I. Federal Aviation Regulations describe the procedures, standards and methodology governing the development, submission and review of airport noise exposure maps and airport noise compatibility programs. It prescribes 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 exposure. Compatible or incompatible land use is determined by comparing the predicted DNL 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 Grissom AFB, the Air Force-developed NOISEMAP Version 6.1 was utilized to predict DNL 65, 70, and 75 dB noise contours and SEL values for noise-sensitive receptors. Appendix I defines these descriptors. The contours were generated for the Proposed Action and Joint Use Aviation Alternative for the baseline year (1994) and for proposed future aircraft activity. These contours were overlaid on a U.S. Geological Survey map of the base and vicinity. Input data to NOISEMAP, Version 6.1 include information on aircraft types; runway use; takeoff and landing flight tracks; aircraft altitude, speeds, and engine power settings; and number of daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) operations.

Surface vehicle traffic-noise levels for roadways in the vicinity of Grissom AFB were analyzed using the Federal Highway Administration's Highway Noise Model (Federal Highway Administration, 1978). This model incorporates vehicle mix, traffic volume projections, and speed to generate DNL.

Major Assumptions. Half of all aircraft operations were assumed to be takeoffs and half were landings. Operations are presented in Appendix I in detail. Flight tracks (incoming and outgoing), aircraft operations, and mix are included in Appendix I. Vicinity flight tracks assumed for modeling are shown in Figures 4.4-1 and 4.4-2, for military and civilian operations respectively. Based military aircraft were assumed to follow glide slope and takeoff profiles provided by the Air Force. Transient military aircraft were assumed to follow standard glide slope and takeoff profiles by NOISEMAP Version 6.1. All civilian operations were assumed to follow standard glide slopes and takeoff profiles provided by the FAA's Integrated Noise Model Database 3.10. The phasing out of Stage 2 aircraft and subsequent



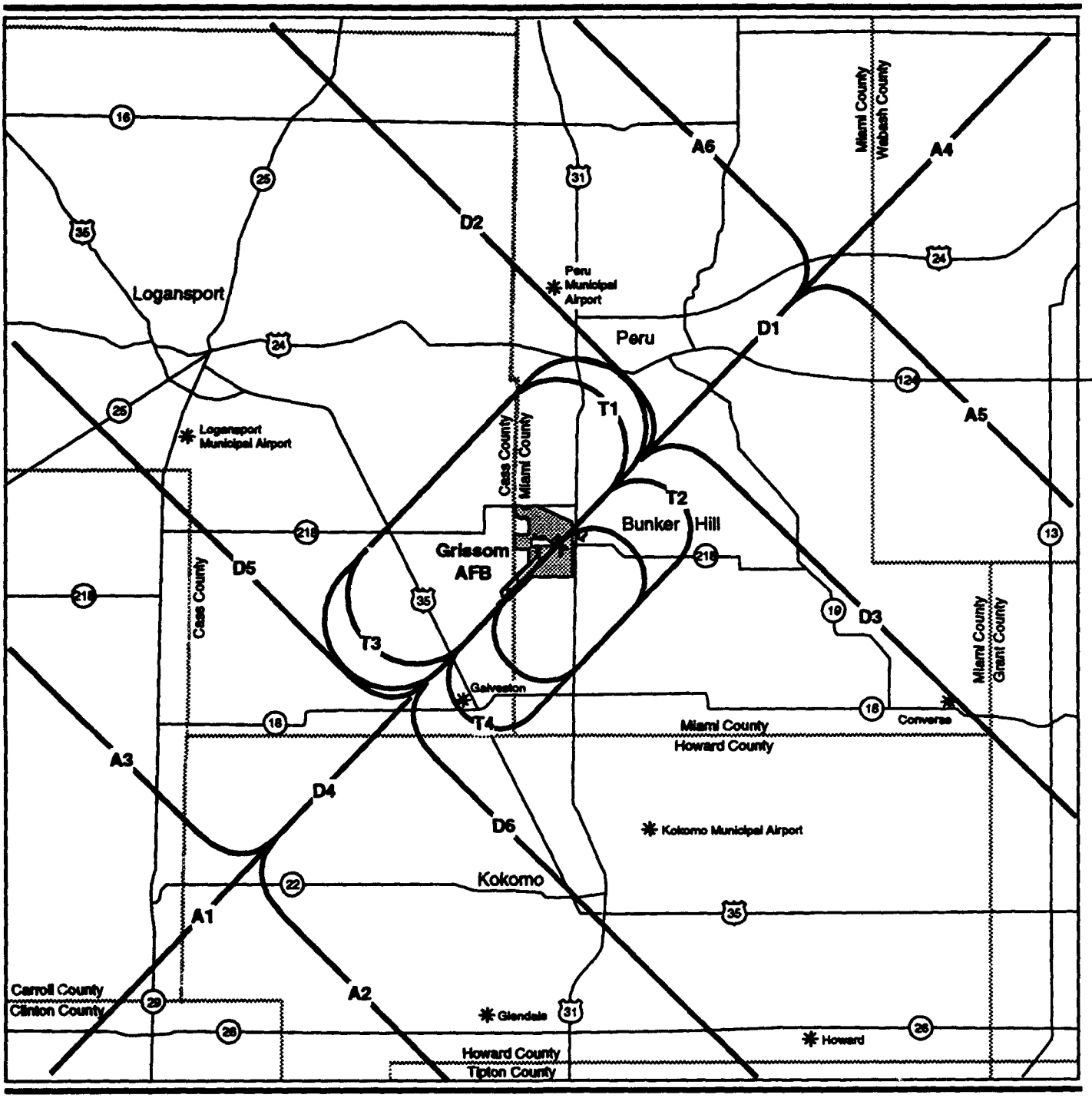
EXPLANATION

- Flight Tracks
- U.S. Highway
- State Highway
- Airport
- County Line

0 1.25 2.5 5 Miles

Military Flight Tracks

Figure 4.4-1



EXPLANATION

- Flight Tracks
- U.S. Highway
- State Highway
- Airport
- County Line

0 1.25 2.5 5 Miles

Civilian Flight Tracks

Figure 4.4-2

replacement with Stage 3 aircraft are reflected in the civilian 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 I.

4.4.4.1 Proposed Action. The results of the aircraft noise modeling for the Proposed Action are the same as those for realignment baseline, which are presented in Figure 3.4-4.

Table 4.4-8 presents the approximate number of acres and estimated population within each DNL range for aircraft activity for each of the study years and are the same as realignment conditions. Compared to the prerealignment reference, this represents a decrease of 1,393 acres within DNL 65 dB for each of the study years.

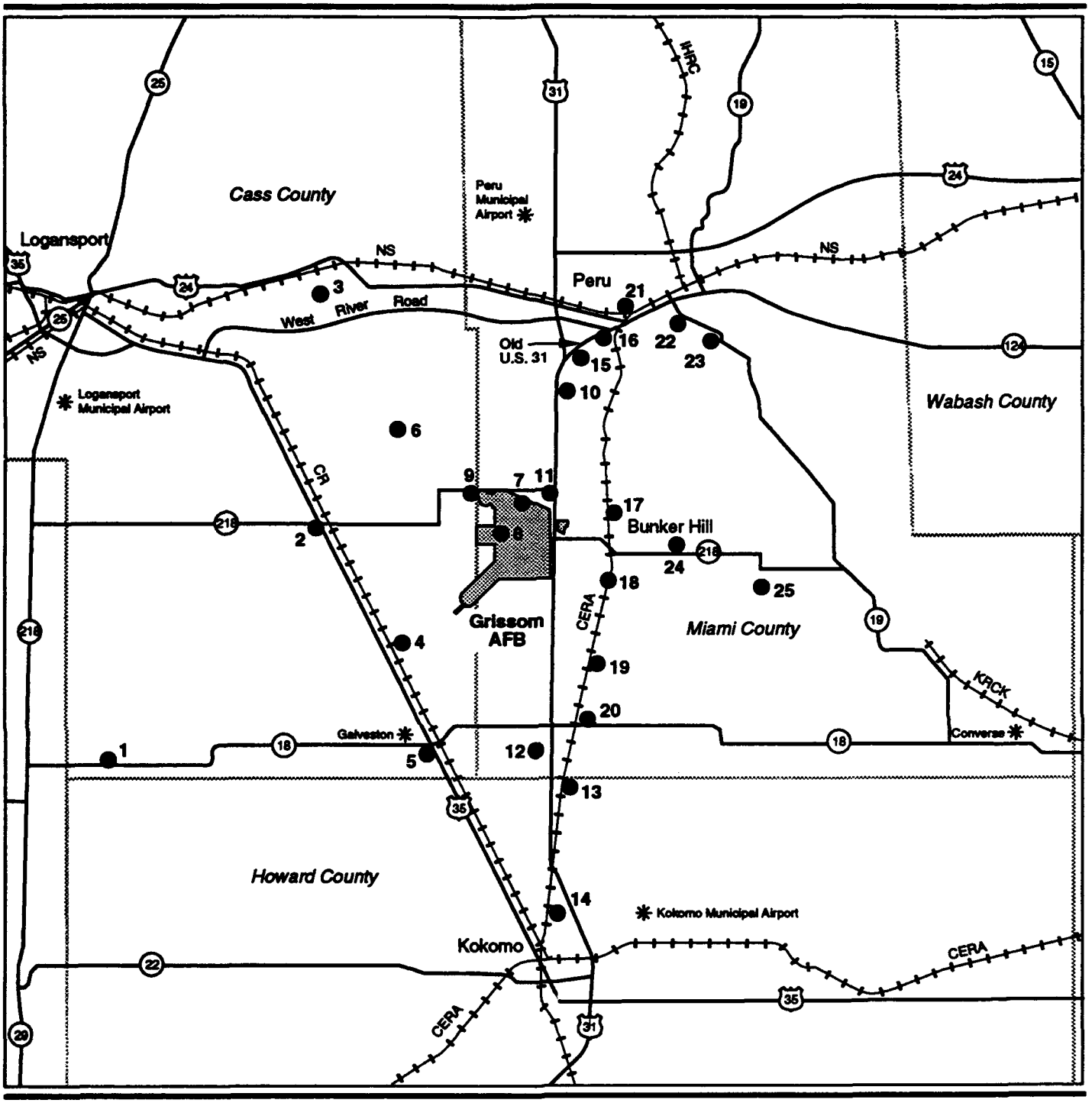
Table 4.4-8. DNL Exposure from Aircraft Operations for the Alternative Reuse Plans

		DNL in dB					
		65-70		70-75		>75	
Year	Alternative	Acres	Population[a]	Acres	Population	Acres	Population
1994	Realignment Baseline	3,009	102	1,346	47	1,444	17
1999	Proposed Action	3,009	102	1,346	47	1,444	17
	Joint Use Aviation Alternative	3,019	102	1,351	47	1,452	17
2004	Proposed Action	3,009	102	1,346	47	1,444	17
	Joint Use Aviation Alternative	3,008	102	1,347	47	1,449	17
2014	Proposed Action	3,009	102	1,346	47	1,444	17
	Joint Use Aviation Alternative	3,010	102	1,350	47	1,450	17

Note: (a) Population densities under the noise contours are not expected to increase over the 20-year analysis period because the area is zoned for agricultural development and most growth is expected to occur near local cities such as Peru.
dB = decibel.
DNL = day-night average sound level.
> = greater than.

SEL was calculated at representative residential locations as shown in Figure 4.4-3 for the noisiest and most common jet aircraft; the results are presented in Table 4.4-9. The analysis suggests that some aircraft overflights could continue to affect the sleep of some residents in the area.

For all model years, the noisiest jet aircraft would continue to be the F-4, with the most common jet aircraft being the KC-135R. The noisiest military aircraft were determined utilizing the NOISEMAP 6.1 database.



EXPLANATION

- SEL Receptor Locations
- Airport

Sound Exposure Level (SEL) Receptor Locations

0 1 2 4 Miles

Figure 4.4-3

Table 4.4-9. Sound Exposure Levels at Representative Noise Receptors for the Proposed Action

No.	Community	Receptor Location	Sound Exposure Level (dB) Aircraft Type F-4	KC-135R
1	Young America	Residential area in center of town	76	56
2	Walton	Residential area in center of town	76	71
3	Lewisburg	Residential area in center of town	69	62
4	Lincoln	Residential area in center of town	103	82
5	Galveston	Residential area in center of town	87	81
6	Onward	Residential area in center of town	75	74
7	On base	Northeast corner of housing	98	76
8	On base	South central of housing area	100	79
9	On base	Northwest corner of housing	90	79
10	Nead	Residential area in center of town	89	84
11	Rural Miami County	Trailer park northeast of Grissom AFB	103	81
12	Rural Miami County	Maple Lawn Trailer Court	75	71
13	Cassville	Residential area in center of town	68	66
14	Kokomo	Residential area in north central part of town	60	60
15	Wells	Residential area in center of town	84	69
16	Flora	Residential area in center of town	85	66
17	Bunker Hill	Residential area in north central part of town	100	80
18	Bunker Hill	Residential area in south central part of town	93	78
19	Miami	Residential area in center of town	78	78
20	Bennets Switch	Residential area in center of town	74	69
21	Peru	Residential area in southwest part of town	82	64
22	South Peru	Residential area in center of town	94	71
23	Park Vista Heights	Residential area in center of town	99	76
24	Loree	Residential area north of town	77	77
25	McGrawsville	Residential area in center of town	65	57

Note: Most common and noisiest aircraft in the Proposed Action are shown.
dB = decibel.

Surface traffic sound levels and number of residents exposed to noise levels of DNL 65 dB or greater for key roadways identified in the transportation study presented in Section 4.2.3 are presented in Table 4.4-10. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed. These noise levels represent total noise impacts due to reuses and non-reuse-related traffic. There would be an estimated 433 residents in areas exposed to noise levels of DNL 65 dB or greater due to surface traffic by 2014. This would be an increase of 142 residents over the No-Action Alternative in 2014.

Mitigation Measures. The Proposed Action aircraft operations would not cause a change in aircraft noise impacts over the realignment baseline

Table 4.4-10. Distance to DNL from Roadway Centerline - Proposed Action

Year	Roadway	Segment	Distance (ft) DNL 65	People Within DNL 65	Distance (ft) DNL 70	People Within DNL 70	Distance (ft) DNL 75	People Within DNL 75
1999	U.S. 31	SH 18 to 800 South	300	15	140	12	70	0
	U.S. 31	800 South to SH 218 (Jct. East)	290	0	140	6	70	0
	U.S. 31	SH 218 (Jct. East) to Main Gate	290	0	140	0	70	0
	U.S. 31	Main Gate to SH 218 (Jct. West)	300	9	140	0	70	0
	U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	300	102	140	38	70	0
	U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	210	12	100	3	50	0
	U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	230	0	110	0	60	0
	Old U.S. 31	U.S. 31 to 225 South	100	15	50	9	20	0
	Old U.S. 31	225 South to West River Road	110	15	50	3	30	0
	SH 218	400 West to U.S. 31	40	0	20	0	(a)	NA
	SH 218	County Line Road to 400 West	30	0	20	0	(a)	NA
	SH 218	900 East to 1000 East	30	0	20	0	(a)	NA
	SH 218	U.S. 31 to 200 West	40	52	20	0	(a)	NA
2004	U.S. 31	SH 18 to 800 South	370	20	170	12	80	0
	U.S. 31	800 South to SH 218 (Jct. East)	380	0	180	3	90	0
	U.S. 31	SH 218 (Jct. East) to Main Gate	370	0	180	0	90	0
	U.S. 31	Main Gate to SH 218 (Jct. West)	380	9	180	0	90	0
	U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	380	119	180	38	90	0
	U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	240	15	110	3	60	0
	U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	260	0	120	0	60	0
	Old U.S. 31	U.S. 31 to 225 South	140	35	70	12	30	0
	Old U.S. 31	225 South to West River Road	140	23	70	3	30	0
	SH 218	400 West to U.S. 31	70	0	30	0	20	0
	SH 218	County Line Road to 400 West	30	0	20	0	(a)	NA
	SH 218	900 East to 1000 East	50	0	20	0	(a)	NA
	SH 218	U.S. 31 to 200 West	50	52	30	0	(a)	NA
2014	U.S. 31	SH 18 to 800 South	460	20	220	12	100	3
	U.S. 31	800 South to SH 218 (Jct. East)	480	0	230	3	110	3
	U.S. 31	SH 218 (Jct. East) to Main Gate	460	0	230	0	110	0
	U.S. 31	Main Gate to SH 218 (Jct. West)	480	3	230	6	110	0
	U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	490	108	230	76	110	9
	U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	290	12	140	6	70	0
	U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	300	0	140	0	70	0
	Old U.S. 31	U.S. 31 to 225 South	190	52	90	15	40	9
	Old U.S. 31	225 South to West River Road	190	23	90	15	40	3
	SH 218	400 West to U.S. 31	90	0	40	0	20	0
	SH 218	County Line Road to 400 West	40	3	20	0	(a)	NA
	SH 218	900 East to 1000 East	60	0	30	0	20	0
	SH 218	U.S. 31 to 200 West	60	52	30	0	20	0

Note: (a) Contained within roadway.
DNL = day-night average sound level.
ft = feet.
NA = not applicable.
SH = State Highway.
U.S.# = U.S. Highway

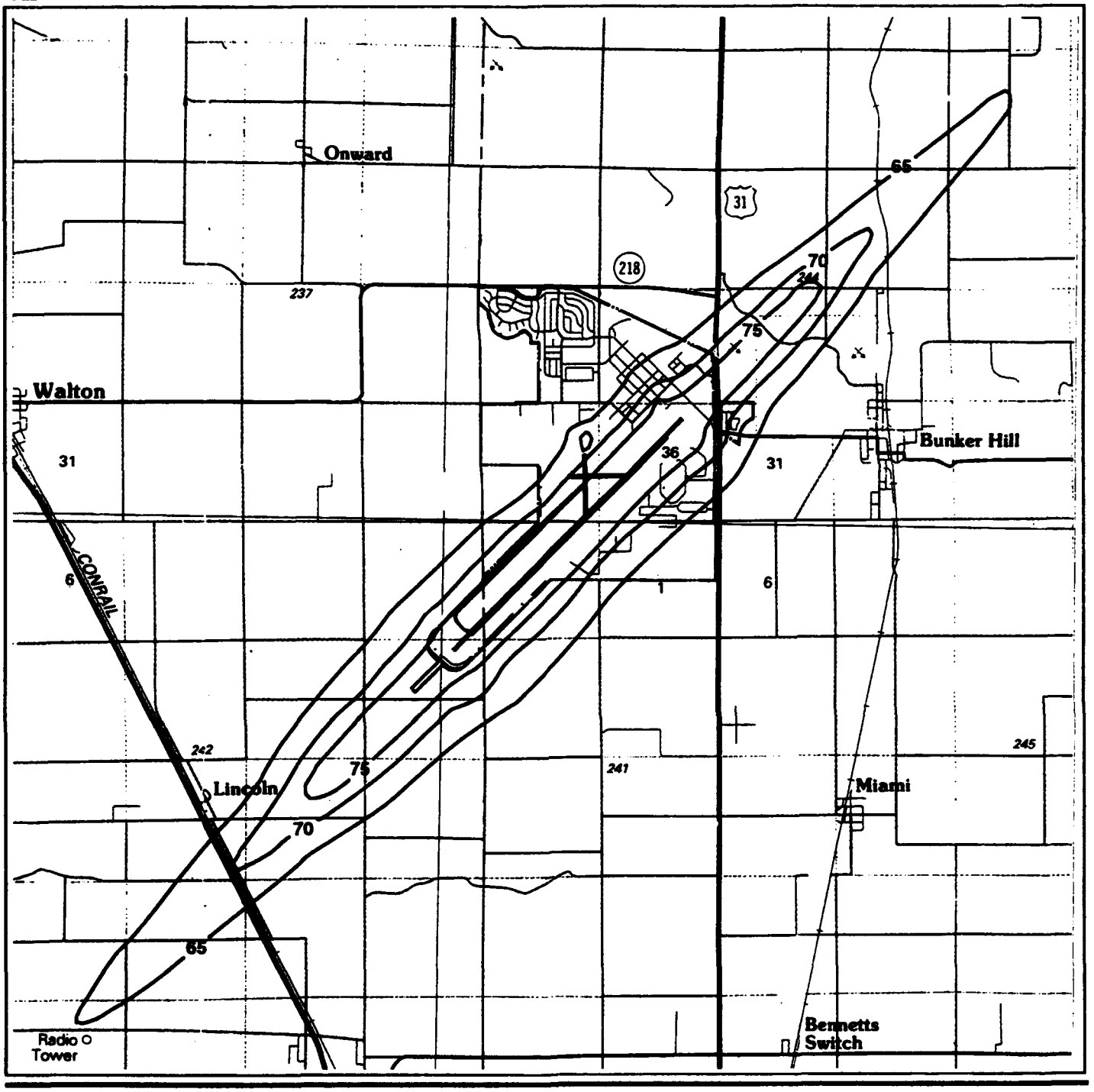
condition, and would remain below the prerealignment conditions. The AICUZ program would be continued as a means for the neighboring communities to devise land use zoning that would reduce noise impacts. Barrier walls could be used to mitigate surface traffic noise along impacted roadways. A noise barrier analysis would be necessary to determine the optimum locations, height, and/or feasibility of the barrier wall. Other mitigation measures, such as a sound insulation program, could be implemented to reduce interior noise levels for sensitive receptors exposed to DNL 65 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 DNL 65 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 Joint Use Aviation Alternative. The results of the aircraft noise modeling for the Joint Use Aviation Alternative are presented as noise contours in Figure 4.4-4. Because there is only a small difference in area exposed to the DNL 65 dB noise level or greater over the 20-year analysis period, Figure 4.4-4 is used to display noise contours for 1999 through 2014. The contribution from runup noise is evident as a protrusion on the contours directly to the north of the center of the runway.

Table 4.4-8 presents the approximate number of acres and estimated population within each DNL range for each of the study years. Compared to the realignment baseline, aircraft operations would increase the area affected by noise levels of DNL 65 dB or greater by 23 acres in 1999, 5 acres by 2004, and 11 acres by 2014. No additional residents would be exposed to DNL 65 dB or greater when compared to realignment baseline or the Proposed Action. Compared to the prerealignment reference, this represents a decrease of 1,370 acres within DNL 65 dB in 1999, 1,388 acres in 2004, and 1,382 acres in 2014.

The criteria that define Stage 2 and Stage 3 aircraft are described in Federal Aviation Regulation 36 (FAA, 1988b). Noise level limits are defined for takeoff, approach, and sideline measurements. The modeled civilian aircraft operations reflect this phaseout by replacing the 727-200 (Stage 2) with the 757-200 (Stage 3). Based on the certification test results presented in the FAA Advisory Circular 36-1F (FAA, 1992b) the 757-200 is approximately 10 dB quieter than the 727-200 for departures and approximately 3 dB quieter for approaches.

SEL was calculated at the representative residential locations presented in Figure 4.4-3 for the noisiest and most common jet aircraft; the results are presented in Table 4.4-11. The analysis suggests that, for the Joint Use



EXPLANATION

— 65 — DNL Noise Contour (in 5 dB intervals)

- - - - Base Boundary

DNL Noise Contours - Joint Use Aviation Alternative (1999-2014)

0 1625 3250 6500 Feet

Map Source: U.S. Geological Survey,1985.

Figure 4.4-4

Table 4.4-11. Sound Exposure Levels at Representative Noise Receptors for the Joint Use Aviation Alternative

No.	Community	Receptor Location	Sound Exposure Level (dB) Aircraft Type			
			747-200	Citation	F-4	KC-135R
1	Young America	Residential area in center of town	56	50	76	56
2	Walton	Residential area in center of town	83	49	76	71
3	Lewisburg	Residential area in center of town	81	47	69	62
4	Lincoln	Residential area in center of town	84	75	103	82
5	Galveston	Residential area in center of town	66	79	87	81
6	Onward	Residential area in center of town	79	47	75	74
7	On base	Northeast corner of housing	77	69	98	76
8	On base	South central of housing area	80	71	100	79
9	On base	Northwest corner of housing	70	60	90	79
10	Nead	Residential area in center of town	73	62	89	84
11	Rural Miami County	Trailer park northeast of Grissom AFB	83	74	103	81
12	Rural Miami County	Maple Lawn Trailer Court	55	74	75	71
13	Cassville	Residential area in center of town	51	60	68	66
14	Kokomo	Residential area in north central part of town	45	62	60	60
15	Wells	Residential area in center of town	88	64	84	69
16	Flora	Residential area in center of town	83	69	85	66
17	Bunker Hill	Residential area in north central part of town	80	90	100	80
18	Bunker Hill	Residential area in south central part of town	72	73	93	78
19	Miami	Residential area in center of town	57	89	78	78
20	Bennets Switch	Residential area in center of town	54	71	74	69
21	Peru	Residential area in southwest part of town	83	71	82	64
22	South Peru	Residential area in center of town	63	66	94	71
23	Park Vista Heights	Residential area in center of town	63	70	99	76
24	Loree	Residential area north of town	59	90	77	77
25	McGrawsville	Residential area in center of town	48	54	65	57

Note: Most common and noisiest aircraft in the Joint Use Aviation Alternative are shown.
dB = decibel.

Aviation Alternative, some aircraft overflights could affect the sleep of some residents in the area.

For the model years, the noisiest civilian jet aircraft would be the 747-200, and the most common civilian jet aircraft would be the Cessna Citation. The noisiest military aircraft for all years would be the F-4, with the most common military aircraft being the KC-135R. The noisiest civilian aircraft were determined from L_{max} as presented in FAA Advisory Circular AC 36-3F (FAA, 1990c).

Surface traffic sound levels for several road segments are presented in Table 4.4-12. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed. These noise levels represent total noise impacts due to reuse and non-reuse related traffic. There would be an estimated 371 residents in areas exposed to noise levels of DNL 65 dB or greater due to surface traffic by 2014. Under the Joint Use Aviation Alternative, traffic along these road segments would create increased surface traffic noise levels, exposing 80 more people to DNL 65 dB or greater, compared to the No-Action Alternative in 2014.

Mitigation Measures. The Joint Use Aviation Alternative aircraft operations would not cause a substantial change in aircraft noise impacts over the realignment baseline condition, and would remain below the prerealignment conditions. Noise mitigation measures would be the same as those described for the Proposed Action.

4.4.4.3 No-Action Alternative. For this alternative, the only aircraft operations would be those associated with the 434th ARW and military transients. Impacts due to aircraft noise would remain unchanged from realignment conditions.

Surface traffic sound levels are presented in Table 4.4-13. These levels are presented in terms of DNL as a function of the centerline of the roadways analyzed. In 2014, approximately 291 people are estimated to reside within areas exposed to DNL 65 dB and above. This increase of 60 people over realignment baseline is due to regional traffic growth of 1 percent per year over the 20-year analysis period.

4.4.4.4 Other Land Use Concepts. No noise impacts are expected to occur from implementation of the State of Indiana Public Safety Training Institute in conjunction with any alternative.

4.4.5 Biological Resources

The Proposed Action and Joint Use Aviation Alternative could potentially affect biological resources through alteration or loss of vegetation and wildlife habitat. Potential impacts are described below for each alternative.

Assumptions used in analyzing the effects of the Proposed Action and alternatives include:

- All staging and other areas disturbed temporarily by construction would be placed in already disturbed areas (e.g., paved and cleared areas), to the fullest extent possible.

- Proportions of disturbance associated with each land use category were determined based on accepted land use planning concepts.

Table 4.4-12. Distance to DNL from Roadway Centerline - Joint Use Aviation Alternative

Year	Roadway	Segment	Distance (ft) DNL 65	People Within DNL 65	Distance (ft) DNL 70	People Within DNL 70	Distance (ft) DNL 75	People Within DNL 75
1999	U.S. 31	SH 18 to 800 South	280	17	130	3	70	0
	U.S. 31	800 South to SH 218 (Jct. East)	280	3	130	6	70	0
	U.S. 31	SH 218 (Jct. East) to Main Gate	270	0	130	0	70	0
	U.S. 31	Main Gate to SH 218 (Jct. West)	280	6	130	0	70	0
	U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	280	79	130	26	70	0
	U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	200	12	100	3	50	0
	U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	220	0	110	0	60	0
	Old U.S. 31	U.S. 31 to 225 South	90	15	40	9	20	0
	Old U.S. 31	225 South to West River Road	100	15	50	3	20	0
	SH 218	400 West to U.S. 31	30	0	20	0	(a)	NA
	SH 218	County Line Road to 400 West	20	0	(a)	NA	(a)	NA
	SH 218	900 East to 1000 East	30	0	20	0	(a)	NA
	SH 218	U.S. 31 to 200 West	40	52	20	0	(a)	NA
2004	U.S. 31	SH 18 to 800 South	320	17	150	12	70	0
	U.S. 31	800 South to SH 218 (Jct. East)	320	0	160	6	80	0
	U.S. 31	SH 218 (Jct. East) to Main Gate	320	0	150	0	80	0
	U.S. 31	Main Gate to SH 218 (Jct. West)	330	9	160	0	80	0
	U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	320	102	150	38	80	0
	U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	220	15	110	3	50	0
	U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	240	0	110	0	60	0
	Old U.S. 31	U.S. 31 to 225 South	110	35	50	5	30	0
	Old U.S. 31	225 South to West River Road	120	23	60	3	30	0
	SH 218	400 West to U.S. 31	40	0	20	0	(a)	NA
	SH 218	County Line Road to 400 West	30	0	(a)	NA	(a)	NA
	SH 218	900 East to 1000 East	30	0	20	0	(a)	NA
	SH 218	U.S. 31 to 200 West	50	52	20	0	(a)	NA
2014	U.S. 31	SH 18 to 800 South	390	23	180	9	90	3
	U.S. 31	800 South to SH 218 (Jct. East)	400	0	190	3	90	3
	U.S. 31	SH 218 (Jct. East) to Main Gate	380	0	190	0	90	0
	U.S. 31	Main Gate to SH 218 (Jct. West)	400	3	190	6	90	0
	U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	400	99	190	70	90	9
	U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	250	15	120	3	60	0
	U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	270	0	130	0	60	0
	Old U.S. 31	U.S. 31 to 225 South	150	35	70	12	30	0
	Old U.S. 31	225 South to West River Road	150	23	70	3	30	0
	SH 218	400 West to U.S. 31	50	0	30	0	(a)	NA
	SH 218	County Line Road to 400 West	30	0	20	0	(a)	NA
	SH 218	900 East to 1000 East	40	0	20	0	(a)	NA
	SH 218	U.S. 31 to 200 West	50	52	30	0	(a)	NA

Note: (a) Contained within roadway.
DNL = day-night average sound level.
ft = feet.
NA = not applicable.
SH = State Highway.
U.S.# = U.S. Highway.

Table 4.4-13. Distance to DNL from Roadway Centerline - No-Action Alternative

Year	Roadway	Segment	Distance (ft) DNL 65	People Within DNL 65	Distance (ft) DNL 70	People Within DNL 70	Distance (ft) DNL 75	People Within DNL 75
1999	U.S. 31	SH 18 to 800 South	270	17	130	3	60	0
	U.S. 31	800 South to SH 218 (Jct. East)	260	0	130	6	60	0
	U.S. 31	SH 218 (Jct. East) to Main Gate	260	0	130	0	60	0
	U.S. 31	Main Gate to SH 218 (Jct. West)	270	6	130	0	60	0
	U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	260	76	130	26	60	0
	U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	190	12	90	3	50	0
	U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	220	0	100	0	50	0
	Old U.S. 31	U.S. 31 to 225 South	80	3	40	9	20	0
	Old U.S. 31	225 South to West River Road	100	15	50	3	20	0
	SH 218	400 West to U.S. 31	30	0	20	0	(a)	NA
	SH 218	County Line Road to 400 West	20	0	(a)	NA	(a)	NA
	SH 218	900 East to 1000 East	20	0	(a)	NA	(a)	NA
	SH 218	U.S. 31 to 200 West	40	52	20	0	(a)	NA
2004	U.S. 31	SH 18 to 800 South	280	17	130	3	70	0
	U.S. 31	800 South to SH 218 (Jct. East)	270	0	130	6	70	0
	U.S. 31	SH 218 (Jct. East) to Main Gate	270	0	130	0	70	0
	U.S. 31	Main Gate to SH 218 (Jct. West)	280	6	130	0	70	0
	U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	270	79	130	26	60	0
	U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	200	12	100	3	50	0
	U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	230	0	110	0	60	0
	Old U.S. 31	U.S. 31 to 225 South	90	15	40	9	20	0
	Old U.S. 31	225 South to West River Road	100	15	50	3	20	0
	SH 218	400 West to U.S. 31	30	0	20	0	(a)	NA
	SH 218	County Line Road to 400 West	20	0	(a)	NA	(a)	NA
	SH 218	900 East to 1000 East	20	0	(a)	NA	(a)	NA
	SH 218	U.S. 31 to 200 West	40	52	20	0	(a)	NA
2014	U.S. 31	SH 18 to 800 South	300	15	140	12	70	0
	U.S. 31	800 South to SH 218 (Jct. East)	290	0	140	6	70	0
	U.S. 31	SR 218 (Jct. East) to Main Gate	290	0	140	0	70	0
	U.S. 31	Main Gate to SH 218 (Jct. West)	300	9	140	0	70	0
	U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	290	102	140	38	70	0
	U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	210	12	100	3	50	0
	U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	240	0	120	0	60	0
	Old U.S. 31	U.S. 31 to 225 South	90	15	40	9	20	0
	Old U.S. 31	225 South to West River Road	110	15	50	3	20	0
	SH 218	400 West to U.S. 31	30	0	20	0	(a)	NA
	SH 218	County Line Road to 400 West	30	0	(a)	NA	(a)	NA
	SH 218	900 East to 1000 East	30	0	(a)	NA	(a)	NA
	SH 218	U.S. 31 to 200 West	40	52	20	0	(a)	NA

Note: (a) Contained within roadway.
DNL = day-night average sound level.
ft = feet.
NA = not applicable.
SH = State Highway.
U.S.# = U.S. Highway.

Development within each parcel could occur at one or more locations anywhere within that category, unless designated as vacant land on reuse maps.

4.4.5.1 Proposed Action. Development under the Proposed Action could affect biological resources primarily through loss of vegetation and wildlife habitat, including possible impacts to approximately 5 acres of wetlands. Loss of habitat by construction may be compensated by the establishment of open space planned for this action. Minimal effects to biological resources are expected from the Proposed Action.

Vegetation. The potential disturbance area (i.e., areas where construction would take place) would consist of approximately 610 acres. Of the 610 acres, 9 acres are native vegetation; 161 acres are disturbed grassland (i.e., weedy and mowed vegetation of low biological value); and 440 acres are landscaped or developed areas. Impacts to vegetation by the Proposed Action would be minimal in most cases.

Landscaping would be disturbed as a result of construction and demolition, especially for the proposed industrial development, but landscaping would be restored or replaced in most of these areas following construction activities. Some buildings would be demolished for the creation of open space, which could have a beneficial effect on native vegetation if the open space is managed to encourage native vegetation establishment and minimize human disturbance activities.

Many of the trees north of the community center and in the base housing area may be removed for industrial development. The vegetative value of this area is minimal due to the continuous removal of the understory.

Commercial development in the southern portion of the base could eliminate the 4-acre wooded area southeast of the runway, which is the only natural habitat on base. Sufficient land exists in the potential disturbance areas to possibly avoid this wooded area. Impacts to the wetland in the wooded area southeast of the runway are discussed under Sensitive Habitats.

The natural riparian area on the eastern boundary of the 33-acre parcel east of U.S. 31 could be affected by erosion from construction activities due to commercial development. However, impacts from erosion would be short-term as the area around the riparian zone would be landscaped following construction. A conservation easement for this area could reduce the potential for impacts.

Wildlife. The Proposed Action would result in the potential disturbance of 610 acres and the creation of 27 acres of open space. The impacts to wildlife include loss of habitat, displacement, increased stress, disruption of daily/seasonal behavior, and mortality for less mobile species.

Much of Grissom AFB land is presently urban, disturbed landscape, or mowed lawns with small areas of natural vegetation. The alteration of these lands for industrial, commercial, and institutional uses would have little effect on wildlife due to the small acreage of natural habitat and resultant limited wildlife utilization of the area. The trees located north of the community center and in the base housing area would likely be removed and replaced with industrial facilities. Compared to other areas on base, the trees provide habitat for a higher concentration of common animals such as gray squirrels, blue jays, and house sparrows. The alteration of this area would result in a local loss of habitat that would not likely affect regional populations of these species.

Commercial development may impact the 4-acre wooded area located on the southeast side of the base, which is a haven for wildlife, providing protection, food, and nesting materials that the surrounding habitats lack. Removal of this habitat would adversely effect the resident birds and small mammals in this area. However, due to the small size of this habitat and the small populations associated with it, effects on wildlife populations are expected to be minimal.

One area totaling 27 acres currently occupied by residential buildings would be reused as open space resulting in a positive impact to wildlife. If the area is left unmaintained, native vegetation would be expected to gradually colonize and provide additional wildlife habitat.

The riparian corridor along the east boundary of the 33-acre parcel east of U.S. 31 could be affected by erosion from construction activity due to commercial development. This area is important to wildlife because it supports breeding and foraging, and serves as a dispersal corridor for numerous wildlife species, many of which are restricted to riparian areas. However, most of this riparian zone is not owned by the Air Force and should not be directly affected by reuse. In addition, once the construction phase is complete, disturbed areas near the riparian corridor would be landscaped or paved, thus reducing the erosion potential. A conservation easement for this area would reduce the potential for impacts.

Noise and activity resulting from demolition and construction would temporarily disrupt certain types of wildlife. Birds and larger mobile mammals intolerant of these disturbances could avoid the vicinity of the project. Some mortality from earth-moving equipment may occur among the smaller mammals, which would hide in their burrows during construction disturbance. Noise impacts from aircraft would be equivalent to those experienced under realignment conditions, so no additional impacts to wildlife would be incurred.

Threatened and Endangered Species. October 1992 and June 1993 surveys did not identify any federal- or state-listed or candidate species within the

boundaries of Grissom AFB. However, several listed or candidate species are known to occur in the vicinity of the base.

The badger, state-listed as threatened, is the only sensitive animal that may occur on Grissom AFB although no evidence of this species presence was discovered during the October 1992 and June 1993 field surveys. The Proposed Action would not cause an important loss of foraging habitat for badgers because most of the foraging area is of low quality and is routinely disturbed by human activities such as mowing and aircraft operations.

Construction and operation of the Proposed Action may alter the flow, turbidity, and pollutant composition of the base runoff water that enters Pipe Creek. This creek may have provided habitat in the past for up to five species of federal candidate and endangered and state endangered freshwater mussels, although none were identified during the June 1993 survey. Potential impacts to these mussel species from Proposed Action construction erosion are not likely because of the low erosion potential of soils on base (see Section 4.4.1) and the temporary nature of the disturbance. Effluent from the new WWTP could exceed NPDES permit requirements because initial flow rates into the plant may be below minimum flow requirements. However, monitoring of effluents by the plant operator and modifications to the plant would allow NPDES permit requirements to be met (see Section 4.2.4). Therefore, no effects to the state- and federal-listed freshwater mussel species are expected to occur for the Proposed Action.

Sensitive Habitats. The 0.25 acre wetland in the wooded area southeast of the runway could potentially be impacted from proposed commercial development. However, enough land is available within the commercial land use area to allow for the avoidance of the wetland.

Approximately 4.75 acres of wetlands in the drainage ditches in the southern and eastern portions of the base could be affected from demolition and construction associated with commercial and industrial development. These drainage ditches provide important aquatic habitat for the diverse native aquatic species in the area. Removal of aquatic habitat, altering runoff patterns, and causing temporary increases in sedimentation and turbidity could have negative effects to the native aquatic species inhabiting the drainages. However, regional populations are not expected to be affected by the loss of habitat.

Filling of wetland areas totaling less than 10 acres does not require an individual Corps of Engineers (COE) permit because this activity is covered by the existing authorization of a nationwide permit. Filling of a wetland between 1 and 10 acres requires prior notification to the COE whereas filling of a wetland under 1 acre does not. However, notification of the COE is recommended where filling of less than 1 acre is anticipated.

Mitigation Measures. Development of the small wooded area in the southeastern part of the base and the wetlands in the drainage ditches should be avoided if possible. Coordination with the COE should be conducted prior to construction before impacting the wetlands. Wetlands would be protected in compliance with Section 404 of the Clean Water Act. Mitigations could include (1) avoidance of direct and indirect disturbance of wetlands through facility redesign or appropriate restrictions in the transfer documents; (2) on-base (if possible) replacement of any wetlands lost at a ratio determined through consultation with USFWS, COE, and U.S. EPA; (3) re-creation of wetland habitat elsewhere on the base or purchase and fencing of any off-base replacement habitat; and (4) monitoring (until habitat becomes well established) of any replacement wetlands as required to determine the effectiveness of replacement and any remedial measures. Avoiding disturbance to the wetlands could include controlling runoff from construction sites into the wetland through use of berms, silt curtains, straw bales, and other appropriate techniques. Equipment should be washed in areas where wastewater could be contained and treated or evaporated.

4.4.5.2 Joint Use Aviation Alternative. Development under the Joint Use Aviation Alternative could affect biological resources primarily through loss of vegetation and wildlife habitat, including possible impacts to approximately 5 acres of wetlands. Construction could increase erosion as discussed under the Proposed Action. Minimal effects to biological resources are expected from the Joint Use Aviation Alternative.

Vegetation. The potential disturbance area (i.e., areas where construction would take place) would consist of approximately 166 acres under this alternative. Of the 166 acres, 9 acres are native vegetation; 66 acres are disturbed grassland (i.e., weedy and mowed vegetation of low biological value); and 91 acres are landscaped or developed areas. Impacts to vegetation by the Joint Use Aviation Alternative would be minimal in most cases.

Most of the development and disturbances associated with the Joint Use Aviation Alternative would occur in areas that are presently landscaped or in disturbed grasslands. These losses would not be considered biologically important. Much of the trees north of the community center may be removed for commercial development. The vegetative value of this area is minimal due to the continuous removal of the understory. Activities associated with commercial development would affect the strip of riparian corridor east of U.S. 31 the same as the Proposed Action. Impacts to the wooded area southeast of the runway would also be similar to the Proposed Action.

Wildlife. The effects on wildlife are related to habitat loss, construction activities, and operations and would be similar to those described for the Proposed Action.

Impacts to wildlife residing in the trees south of the base housing would be the same as the Proposed Action. The trees that occur in the housing area would likely remain undisturbed for this alternative. Conversion of the small wooded area in the southeast part of the base and the 33-acre parcel east of U.S. 31 for commercial development would be the same as described for the Proposed Action.

Increased civilian aircraft operations under the Joint Use Aviation Alternative would result in an incremental increase in noise effects on wildlife and an increase in the potential for bird-aircraft collisions compared to realignment conditions. Because commercial aircraft are quieter than military aircraft, the increase in flights should have minimal noise impacts on wildlife.

Threatened and Endangered Species. Impacts to threatened and endangered species would be the same as for the Proposed Action.

Sensitive Habitats. Impacts to sensitive habitats would be the same as for the Proposed Action.

Mitigation Measures. Mitigation measures to offset potential adverse impacts would be the same as those described for the Proposed Action.

4.4.5.3 No-Action Alternative. Maintenance of the base by OL personnel would have minimal effects on biological resources. A reduction in human activity would reduce disturbance to sensitive wildlife on the base outside of the military cantonment. Habitat quality for wildlife as a whole could improve if mowing of non-landscaped areas was terminated, thereby allowing vegetation to grow to its natural height.

Effluent into local stream courses from the new WWTP could exceed NPDES permit requirements because flow rates into the plant may be below minimum flow requirements. Changes in stream characteristics could affect federal- and state-listed and federal candidate freshwater mussels potentially occurring in Pipe Creek, although none were discovered in the off-base drainages or in Pipe Creek during the June 1993 survey. Monitoring of effluents by the plant operator and modifications to the plant would allow NPDES permit requirements to be met (see Section 4.2.4).

4.4.5.4 Other Land Use Concepts. The effects of the State of Indiana Public Safety Training Institute would occur mainly from construction activity associated with development of the 200-foot-diameter burn facility and the 50-foot by 50-foot tower. Operational impacts to wildlife could occur from smoke caused by fire. Because of the small amount of construction required, very little erosion or vegetation loss would occur. Wildlife near the burn facility may become stressed during construction and operational activities, but it is not expected to effect wildlife populations on

Grissom AFB. No federal or state threatened or endangered species, or wetlands would be affected.

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 Indiana 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 NRHP" includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet NRHP 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 cultural resources at Grissom 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 Grissom AFB. An archaeological reconnaissance survey and subsurface investigation at Grissom AFB are complete. Evaluation of the sites identified has determined that only one site (12Mi559) could be eligible to the NRHP. Final site determination will be coordinated with the SHPO.

One World War II-era building (Building 143) and 15 Cold War facilities (see Table 3.4-14) have been evaluated and are determined to be potentially eligible for the NRHP; SHPO consultation is in progress. Until the evaluation is complete and SHPO concurrence is received, they are considered potentially eligible for the NRHP.

4.4.6.1 Proposed Action. Regulations for implementing Section 106 of the NHPA indicate that the conveyance of cultural resources 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 sites eligible for the NRHP outside of the military cantonment on base could be impacted by conveyance.

Ground disturbance by construction-associated activities that intrude upon cultural resources is considered an adverse effect. Site 12Mi559, located in commercial land use, could be affected by ground disturbance.

Under the Proposed Action, Building 143, constructed during World War II, would be in the public/recreation land use area and would continue to be used as an indoor swimming pool. Of the facilities identified as potentially eligible under the Cold War context, facilities 300 (Dormitory), 746 (Traffic Check House), 747 (Crew Readiness), 749, 757, 759, 761, 763, and 765 (WSA) and 991 (Alert Apron) would be conveyed to a nonfederal entity. These facilities would be located in industrial (Buildings 300, 757, 759, 761, 763, and 765) and commercial (Buildings 746, 747, and 749) land uses. The Alert Apron would be located in industrial and commercial land uses. Any modifications or renovations to these facilities could affect their integrity. Through application of the mitigation measures described below, effects on these structures would be reduced to a nonadverse level.

Mitigation Measures. If the land is conveyed to a nonfederal 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 sites eligible for the NRHP 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), Archaeology and Historic Preservation (48 CFR 190), and Rehabilitation of Historic Buildings (U.S. Department of the Interior, 1983). Mitigation measures could include avoidance, stabilization, preservation in place, rehabilitation, or data recovery.

The Air Force will consult with the SHPO and the Advisory Council on Historic Preservation to implement an appropriate mitigation approach, if one is required. 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 of Historic Preservation, and the Air Force. Other parties may be included as appropriate.

4.4.6.2 Joint Use Aviation Alternative. Under this alternative, the impacts to Site 12Mi559, Building 143, and Building 300 would be the same as under the Proposed Action. The Alert Apron and Buildings 746 and 747

would be located in the Aviation Support land use. The potentially eligible buildings in the WSA would be in the commercial land use.

Mitigation Measures. Appropriate mitigation measures are the same as those outlined for the Proposed Action.

4.4.6.3 No-Action Alternative. No effect on cultural resources would result from implementation of the No-Action Alternative because Grissom AFB will remain under federal jurisdiction. The OL should continue to ensure adequate security to deter illegal activities, such as looting of the archaeological sites, as specified in the Archaeological Resources Protection Act. The OL should also ensure that a minimal level of maintenance is accomplished to prevent deterioration of potential NRHP structures.

4.4.6.4 Other Land Use Concepts. Three sites potentially eligible for listing in the NRHP under the Cold War context exist within the areas identified for the State of Indiana Public Safety Training Institute. These sites consist of Building 11 (Alert Hangar), Facility 998 (Alert Taxiway), and Facility 757 (Multicubicle Magazine). Mitigation measures outlined under the Proposed Action for property conveyed to a nonfederal entity would reduce any impacts associated with this concept to a nonadverse level.

4.5 SUMMARY OF ENVIRONMENTAL CONSEQUENCES OF RELOCATING AIRCRAFT OPERATIONS FROM PERU MUNICIPAL AIRPORT TO GRISSOM AFB

The Joint Use Aviation Alternative assumes relocation of aircraft operations from Peru Municipal Airport to Grissom AFB. With Grissom AFB serving as a regional airport, the city of Peru would not need a second airport at the existing Peru Airport site.

The impacts of relocating aircraft operations from Peru Airport are not described in detail in this EIS. No definite plans for the closure and reuse of Peru Airport have been developed by the GRA or any other local agency. Therefore, it is assumed that the airport would remain in caretaker status until a final decision by the local community and the FAA is made concerning the future reuse of Peru Airport. The impacts of relocating aircraft operations based at Peru Airport are outlined below. Impacts are described for the same resource categories as discussed in this EIS for the Joint Use Aviation Alternative.

Community Setting. Employment and population changes are described for Miami County. There would be no change in employment or population because the loss of jobs at Peru Airport would be compensated by the gain in jobs at Grissom AFB, both located within Miami County.

Land Use. With the relocation of aircraft operations from Peru Airport, this land would be available for reuse.

Transportation. Traffic associated with the two full time employee's at Peru Airport along with the owners of the 22 based private aircraft would be relocated to Grissom AFB. This would reduce the traffic on 100 North Road next to Peru Airport. The diversion of traffic from Peru Airport to Grissom AFB has been factored into the estimated vehicle trips generated by the Joint Use Aviation Alternative.

Because Peru Airport is only used by private civilian aircraft, no impacts to air transportation would occur. The relocation of these civilian aircraft have been included in the Joint Use Aviation Alternative projected aircraft operations at Grissom AFB.

Utilities. Utility demands for water, wastewater, solid waste, electricity, and natural gas at the Peru Airport site would be shifted to Grissom AFB. Because the same agencies provide utilities to the two sites, there would be no net impact on the capacity of the agencies to provide needed services. The relocation of aircraft operations from the existing airport to Grissom AFB has been factored into the utility projections generated in this chapter for the Joint Use Aviation Alternative.

Hazardous Materials and Hazardous Waste Management. Hazardous materials used and wastes generated at the Peru Airport site would be eliminated with the relocation of aircraft operations to Grissom AFB. Types of hazardous materials used and wastes generated were factored into the hazardous materials and waste projections found in this chapter for the Joint Use Aviation Alternative. There are no known contaminated sites at Peru Airport (Clark, 1992).

Soils and Geology. Relocation of aircraft operations from Peru Airport to Grissom AFB would not affect the soils and geology of the site. Some soil disturbance may occur as a result of potential reuse activities.

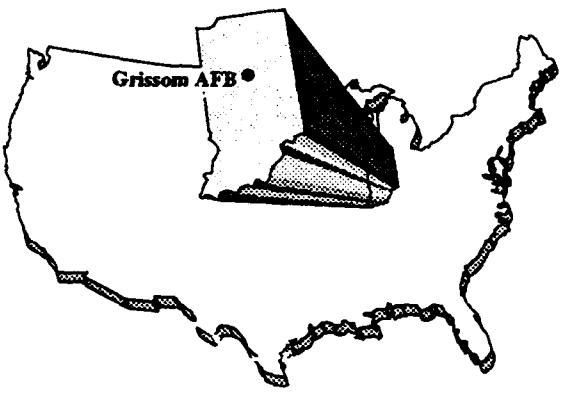
Water Resources. There would be no impact on surface or groundwater resources as a result of the relocation of aircraft operations form Peru Airport. The potential for contamination of water from airport-related activities or accidental spill at Peru Airport would be eliminated.

Air Quality. Pollutant emissions from aviation activities and traffic to and from the airport would be eliminated with the relocation of aircraft operations form Peru Airport to Grissom AFB. However, corresponding increases within the same air basin would occur as a result of the relocation of aircraft operations from Peru Airport to Grissom AFB. Air quality impacts for the Joint Use Aviation Alternative takes into account the increase aircraft operations at Grissom AFB from the relocation of the Peru Airport aircraft. All air emissions generated for the Joint Use Aviation Alternative would be below federal standards.

Noise. With the relocation of aircraft operations from Peru Airport, noise generated by airport-related activities would be eliminated. Noise reduction would also occur on roads leading to the airport, particularly 100 North Road.

Biological Resources. Relocation of aircraft operations from Peru Airport would not adversely affect biological resources on or in the vicinity of the site. Reduced noise levels may benefit some wildlife species.

Cultural Resources. Relocation of aircraft operations from Peru Airport would not adversely affect cultural and paleontological resources on or in the vicinity of the site.



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

Environmental Protection Agency (Region V)
Federal Aviation Administration
Grissom Air Force Base
United States Army Corps of Engineers
United States Department of Agriculture, Soil Conservation Service
United States Department of Justice, Federal Bureau of Prisons
United States Department of Veterans Affairs
United States Fish and Wildlife Service

STATE AGENCIES

Indiana Department of Natural Resources
Indiana Department of Transportation
Indiana Environmental Management Department, Air Management Office
Indiana Environmental Management Department, Hazardous Waste Management Office
Indiana State Office of Historic Preservation

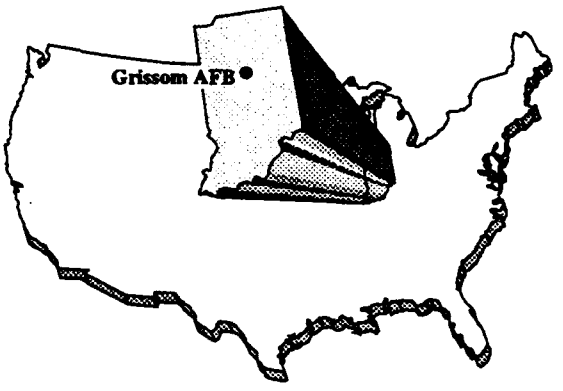
LOCAL/REGIONAL AGENCIES

Cass County
City of Kokomo
City of Peru
Grissom Redevelopment Authority
Howard County
Miami County
Town of Bunker Hill
Wabash County

PRIVATE ORGANIZATIONS

Bunker Hill Utilities
Byers Recycling and Disposal Facility
H&H Trash Removal, Inc.
Kokomo Gas and Fuel Company
Northern Indiana Public Service Company
Peru Municipal Airport
Peru Utilities
Public Service Company of Indiana
Waste Management of Central Indiana

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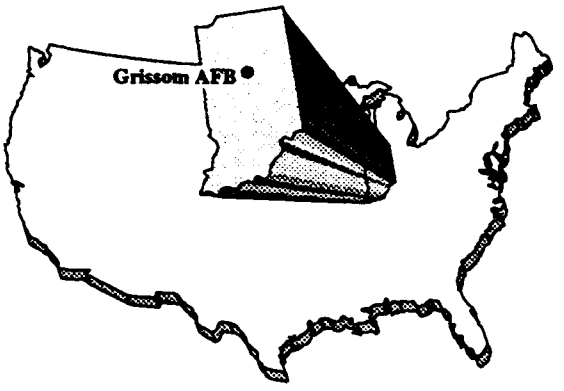
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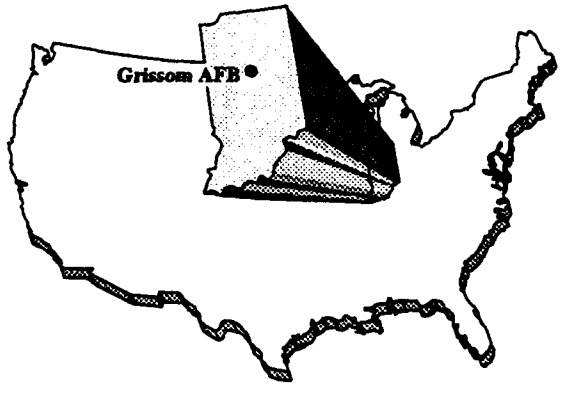
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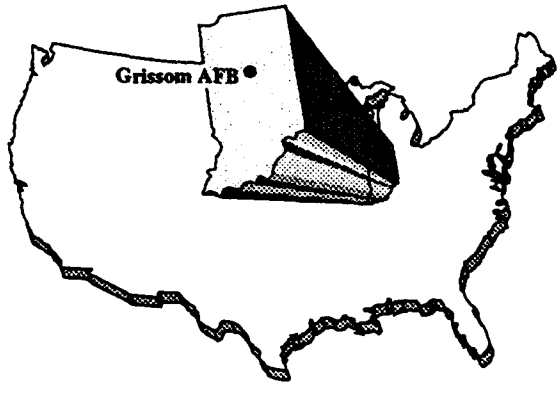
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CHAPTER 9
PUBLIC COMMENTS AND RESPONSES

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 Bunker Hill, Indiana, on August 10, 1993, at which the Air Force presented the findings of the DEIS for disposal and reuse of (portions of) Grissom AFB and invited public comments.
- The subject DEIS was made available for public review and comment in July, August, and September 1993.

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 section 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 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 Socioeconomic Impact Analysis Study

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-response 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 Socioeconomic Impact Analysis Study (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. The environmental impact analyses presented in this EIS are based on the results of the socioeconomic analyses described in detail in the SIAS. 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 section. However, those comments have been reviewed and responses have been provided to the commentors. Comments concerning socioeconomic issues addressed in the SIAS only are indicated with an S on the photocopies of 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 AIR FORCE POLICY

1.1 Comment: Comment regarding when the ROD will be made available. (6-1)

Response: The Air Force is planning to prepare the ROD after completion and consideration of this EIS. Current plans are for the EIS to be released to the public in August 1994, with the ROD being completed in fall 1994.

2.0 PURPOSE AND NEED FOR ACTION

No comments were received for this area of concern.

3.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

3.1 Comment: Budget constraints for the State of Indiana Public Safety Training Institute have terminated the request for land at Grissom AFB. (4-1)

Response: Comment noted.

3.2 Comment: The Public Safety Training Institute is the proposing agency for the state of Indiana training institute as apposed to the State Emergency Management Agency. (4-2)

Response: The text has been revised accordingly.

3.3 Comment: Support was indicated for the Joint Use Alternative, which would maintain 149 acres of land for recreation and open space. (5-1)

Response: Comment noted.

4.0 LAND TRANSFER/DISPOSAL

4.1 Comment: Comment regarding when excess property at Grissom AFB will be available for disposal or lease. (1-1)

Response: After completion and consideration of this EIS, the Air Force is planning to prepare decision documents (fall 1994) stating what property is excess and surplus, and the terms and conditions under which the dispositions will be made. In some cases, compliance with environmental laws may delay reuse of some parts of the base. Until property can be disposed of or surrendered, 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.

5.0 LOCAL COMMUNITY

No comments were received for this area of concern.

6.0 LAND USE/AESTHETICS

No comments were received for this area of concern.

7.0 TRANSPORTATION

No comments were received for this area of concern.

8.0 AIRSPACE

No comments were received for this area of concern.

9.0 UTILITIES

9.1 Comment: The DEIS states that refuse generated at Grissom AFB includes paper, garbage, glass, metal, and other components of general municipal and construction refuse. The FEIS should discuss the potential for recycling of these materials generated at Grissom AFB as an alternative to landfill disposal. (8-7)

Response: Section 4.2.4, Utilities, has been revised to include recycling of these materials as a potential mitigation to reduce impacts to landfills.

10.0 HAZARDOUS MATERIALS/WASTE MANAGEMENT

10.1 Comment: Table 3.3-2, POI/PAC Site Investigation Site Descriptions, did not list the old contaminated-jet-fuel burn area used by the fire fighters for practice fires. (2-1)

Response: Table 3.3-2 identifies potential contamination areas at Grissom AFB that were being investigated under RCRA, which has been changed to POI/PAC Sites. The fire training areas are being investigated under the IRP and are identified under Section 3.3.3, IRP Sites.

10.2 Comment: In order to characterize potential site contamination on Grissom AFB, water logs should be studied in the surrounding area, monitoring wells should be installed, and geophysical studies conducted. (2-4)

Response: Investigation and remediation of hazardous waste sites at Grissom AFB are continuing under the POI/PAC Sites and IRP. The steps suggested are applicable to the studies of the nature of contamination. Because the IRP studies would continue regardless of base realignment, disposal, and reuse, the information requested is not necessary to adequately study disposal and reuse impacts.

10.3 Comment: IRP site remediation may require lease/deed restrictions that limit redevelopment of certain locations within the base. (6-2)

Response: Disposal and reuse of some Grissom AFB properties may be delayed or limited by the extent and type of contamination at IRP sites and by current and future remediation activities. Based on the results of the IRP investigations, the Air Force may, where appropriate, place limits on land reuse through deed restrictions on conveyances and use restrictions on leases.

10.4 Comment: The recommended remediation alternative in the Draft IRP Feasibility Study entails collecting the shallow groundwater from the FPTAs and pumping the contaminated water to the base WWTP. A discussion explaining how this remediation alternative will affect operations at the WWTP should be added to the EIS. This discussion should include treatment technologies utilized and their ability to treat the constituents of concern, loading capacities, and discharge limits. (6-3)

Response: The IRP is a continuing environmental program being conducted separately from this disposal and reuse EIS. Potential remediation and impacts of these activities will continue to be addressed under the IRP. As stated in the EIS, after base realignment, the effluent from the WWTP will be monitored to ensure compliance with state and federal regulations.

10.5 Comment: The EIS should list the IDEM as a regulatory agency for IRP site remediation at Grissom AFB. (6-4)

Response: The text has been revised accordingly.

10.6 Comment: The IDEM has not received the Draft No Further Action Decision Document for the Fuel Sludge Weathering Site. (6-6)

Response: The Draft No Further Decision Document was only submitted to the U.S. EPA as part of the IRP program. The text has been revised accordingly (see Section 3.3.3).

10.7 Comment: The EIS states that a site inspection will be conducted at the Former Hazardous Waste Accumulation Point (Site 29) if requested by the state of Indiana. The EIS should either give a further explanation on why an inspection is not needed or a commitment to do the investigation. (7-1)

Response: This site was closed by the IDEM Department of Solid and Hazardous Waste in April 1994. The text has been revised accordingly (see Table 3.3-2).

10.8 Comment: The EIS should address the potential for contamination at Grissom AFB from the possible use of spent uranium shells, which are used with A-10 aircraft training operations. (7-2)

Response: No training with uranium shells is conducted at Grissom AFB. A-10 activities are conducted at Army training ranges in conjunction with maneuvers.

10.9 Comment: The EIS should consider the potential for lead or mercury soil contamination in conjunction with small arms use. (7-3)

Response: The indoor and outdoor small arms firing ranges will be cleared of all lead with soils tested at the facility for contamination prior to property disposal. Remediation of any contaminated soil could delay redevelopment. The text has been revised accordingly (see Sections 3.3.10 and 4.3.1.10).

10.10 Comment: The DEIS discusses the use and storage of hazardous materials at the base. It is recommended that the base work closely with IDEM regarding the management, storage, and disposal of hazardous materials, including the appropriate permits. In addition, the DEIS states that the responsibility for managing hazardous materials and hazardous waste may shift from a single user to multiple, independent users. As a result, this may reduce the capability of responding to hazardous materials and hazardous waste spills. Each operator that uses, stores, and disposes of hazardous waste will have to obtain a permit from IDEM. (8-1)

Response: The 434th ARW have and will continue to coordinate all necessary permits for the handling, storage, and disposal of hazardous materials and hazardous waste with IDEM and other appropriate agencies.

The text of the EIS has been revised to state that each operator that stores and disposes of hazardous waste is responsible for obtaining all appropriate permits (see Sections 4.3.1.2 and 4.3.2.2).

10.11 Comment: The Grissom AFB Oil and Hazardous Substance Spill Prevention and Response Plan should be provided to all property recipients. In addition, a single entity should be responsible for implementing this plan if an event occurs. (8-2)

Response: The Grissom AFB Oil and Hazardous Substance Spill Prevention and Response Plan was developed for Air Force use and is based on Air Force management practices, trained personnel, and equipment and may not be applicable to individual users who would have the responsibility of hazardous waste management.

Upon disposal of each parcel, hazardous waste management would fall under the control of the recipient. Once the responsibility of hazardous waste management is allocated to individual organizations, proficiency with materials and spill responses is required by OSHA regulations (29 CFR 1910). Mitigation measures have been presented in the EIS (see Section 4.3.1.12) suggesting the establishment of a cooperative planning body for hazardous materials and waste management to support new individual operators on the base. Establishment of such a body could reduce the cost of environmental compliance training, health and safety training, and waste management, and could increase recycling, minimize waste, and assist in mutual spill response.

10.12 Comment: The schedule for remediation regarding all IRP sites on base should be presented in the FEIS and the base should work closely with the appropriate agencies regarding remediation activities. (8-3)

Response: The text has been revised to include the schedule for IRP remediation (see Section 3.3.3). The Air Force is currently working with the appropriate regulatory agencies regarding all remediation activities. After base realignment, the OL will oversee the coordination of the remediation contractors and assure that the U.S. EPA, IDEM, and local regulatory agency concerns are addressed.

10.13 Comment: The FEIS should provide information regarding the 31 sites on base that are undergoing various stages of investigation for the presence/absence of past hazardous waste contamination. This information should include the materials disposed at the sites, the cleanup required, and the impacts to the environment, both human and natural. (8-4)

Response: Table 3.3-2, POI/PAC Site Descriptions, provides all the current information on the sites undergoing investigation, including the known materials disposed at the sites. Because the sites are under initial investigation, the type and extent of contamination, if any, at the sites is unknown. If it is determined that contamination exists, remediation and impacts of these activities will be addressed under separate documentation.

10.14 Comment: The FEIS should provide an analysis regarding the necessity and amounts of pesticides used on base. Measures should be taken to ensure that water quality is not impacted as a result of this usage. (8-5)

Response: The reuse scenarios presented in the EIS are conceptual. Because details about the specific type and amount of pesticides to be used as well as the necessity under the reuse proposals are unknown, it is not possible to quantify pesticide use for this analysis. The EIS states that all pesticide management practices are, and would continue to be in compliance with FIFRA. This Act regulates quantities and usage of pesticides, herbicides, and rodenticides to assure the health and safety of the public and local wildlife. The text has been revised to include a more detailed explanation of FIFRA (see Section 3.3.6).

10.15 Comment: The FEIS should address the potential for proper securement and management of ACM to avoid exposure in buildings occupied for reuse activities. (8-6)

Response: The EIS states that ACM is subject to all federal, state, and local regulations to minimize potential risks to human health and the environment. In addition, Appendix H provides detailed information on the Air Force Policy regarding management of asbestos at closure and realignment bases and a list of facilities surveyed for asbestos at Grissom AFB.

10.16 Comment: The buildings on Grissom AFB should be sampled regarding the potential for additional lead contamination and the FEIS should provide a remediation plan for lead contaminants at the base. (8-8)

Response: The Air Force will disclose in the property lease and transfer documents that lead-based paint may be present in all facilities built prior to or during 1978. Once the property is transferred it will be up to the property recipients to sample for lead-based paints. Removal, disposal, or management in place of any lead present would be the responsibility of the new owners, and would have to comply with applicable federal, state, and local

regulations to minimize potential risk to human health and the environment.

11.0 SOILS AND GEOLOGY

11.1 Comment: Although the DEIS states that the potential impacts from construction erosion are not likely due to the low erosion potential of base soils and temporary nature of the action, strict measures should be identified in the FEIS and included as part of the requirements of the land transfer. These soil measures included in the land transfer should also require future land owners to coordinate their soil erosion plans with the Soil Conservation Service. (8-12)

Response: Additional suggested mitigation measures to reduce the amounts of soil erosion have been added to Section 4.4.1.1. Since the potential environmental impacts of soil erosion would result from the reuse by others, the Air Force would not typically be responsible. Suggested mitigation, which would be made available through this EIS, would be the responsibility of future property recipients.

12.0 WATER RESOURCES

12.1 Comment: The EIS does not state whether the capacity of the base well field is cable of supporting the potential 34.6 percent increase in regional water consumption and the 45 percent increase in on-base water consumption from proposed reuses over the analysis period. Information or a study of the capability of the water wells and well field should be provided. (2-2)

Response: The 34.6 and 45 percent increases in water consumption from proposed reuses are based on a comparison with realignment conditions when most of Grissom AFB is in caretaker status. The predicted water consumption by the year 2014 in the region and on the base would decrease by 0.09 and 0.69 MGD, respectively, when compared to 1990 prerealignment levels. Because the aquifer has not experienced an overdraft condition in the past and consumption is expected to decrease over the 20-year period of analysis, there should be no effect on groundwater supplies. In addition, because historical data have established well field capabilities, pump test are not required.

12.2 Comment: The glacial till aquifer is actually discontinuous sand and gravel lenses that exist within the till comprising the aquifer. (2-3)

Response: The text has been revised accordingly (see Section 3.4.2.4).

13.0 AIR QUALITY

13.1 Comment: The IDAM should be referenced as the IDEM, Office of Air Management. (6-5)

Response: The text has been revised accordingly.

14.0 NOISE

14.1 Comment: Specific mitigative measures to reduce noise annoyance, and speech and sleep interference should be analyzed and discussed in the FEIS for implementation. (8-9)

Response: No additional population would be exposed to increased noise levels from aircraft activity from proposed reuse when compared to realignment conditions. Increases in noise levels would result primarily from increased surface traffic because of reuse. Mitigation measures to reduce surface traffic noise are suggested in the EIS (see Section 4.4.4.1) and include barrier walls, sound insulation programs to reduce interior noise, and recommendations for appropriate land use planning to restrict noise-sensitive development in high noise level areas.

15.0 BIOLOGICAL RESOURCES

15.1 Comment: It is recommended that the 0.25-acre potential jurisdictional wetland be preserved, and a 50- to 100-foot buffer be maintained to avoid degradation from construction and operation activities at the base. Measures to avoid both direct and indirect impacts to this area through facility redesign, control of construction-related erosion, and appropriate restriction in lease and transfer documents is satisfactory. (8-10)

Response: Comment noted.

15.2 Comment: It is recommended that consultation with USFWS, Bloomington Field Office, be conducted to ensure compliance with the Endangered Species Act. It is also recommended that information on threatened and endangered species that may be found in the vicinity of Grissom AFB, and impacts to these species from lease or transfer of base property, be provided to future land owners. (8-11)

Response: The Air Force has initiated informal consultation with USFWS pursuant to the Endangered Species Act and NEPA (see Appendix N). As stated in the EIS, no federal- or state-listed threatened, endangered, or candidate species have been identified on

Grissom AFB (see Sections 3.4.5.3 and 4.4.5). Information regarding impacts to these species, which may occur off base and could be affected by reuse, is addressed in the EIS, which will be available to potential land owners.

15.3 Comment: The DEIS discusses the biological significance of the riparian corridor east of U.S. 31. Because of the important breeding and foraging habitat provided by this parcel, we recommend that this undisturbed natural area be maintained and that the FEIS discuss the potential for a conservation easement. (8-13)

Response: The riparian corridor east of U.S. 31 is at the base boundary and is not completely on Air Force property. Therefore, reuse of the portion of this parcel being excessed would not directly impact the riparian zone. Text has been added to the EIS regarding the potential for a conservation easement for this area.

15.4 Comment: The vacant land resulting from all the alternatives discussed in the EIS could be enhanced for diversity of both plant and wildlife species. The avoidance and minimization of human disturbance, whenever possible (e.g., mowing), should be considered in the FEIS. (8-14)

Response: The EIS considers the use of vacant areas for land use buffering and the beneficial effect on vegetation if the open space is managed to encourage native vegetation establishment (see Section 4.4.5.1). Text in this section has been revised to include the recommendation of minimizing human disturbance in open space areas.

15.5 Comment: The FEIS should provide an analysis regarding the potential for linking ecologically important areas on the base through the use of wildlife corridors. (8-15)

Response: There are no threatened and endangered species and only 8.75 acres of sensitive habitat on Grissom AFB. Based on the limited amount of sensitive biological resources, the alternatives proposed are considered the most reasonable and economically feasible. All proposed reuse options incorporate open space and recreational areas, which would support the types of wildlife present. Planting, landscaping, and maintenance of open space and recreation areas will be the responsibility of the new owner/user(s).

16.0 CULTURAL RESOURCES

No comments were received for this area of concern.

17.0 SOCIOECONOMIC IMPACT ANALYSIS STUDY

No comments were received for this area of concern.

INDEX OF COMMENTORS

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GRISSOM AIR FORCE BASE DISPOSAL AND REUSE DRAFT EIS
PUBLIC HEARING HELD ON 10 AUGUST 1993
AT MACONAQUAH HIGH SCHOOL AUDITORIUM
PERU, MIAMI COUNTY, INDIANA

BY: COLONEL JIM HEUPEL:

I want to thank all of you for coming out tonight. This is the public hearing on the Draft Environmental Impact Statement for the disposal and reuse of Grissom Air Force Base. I'm Colonel Jim Heupel and I'll be the presiding officer for tonight's meeting.

INSERT COPY OF SLIDE #1 - PUBLIC HEARING TITLE

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Now this hearing is being held in accordance with provisions of the National Environmental Policy Act and Implementing Regulations. Now the Act requires Federal Agencies to analyze the potential environmental impacts of certain proposed actions and alternatives, and to consider the findings of those analyses in deciding how to proceed.

On November 13th, 1991, a scoping meeting was held here in this auditorium to receive your suggestions and community suggestions concerning what you felt should be covered in the Air Force's Environmental Impact Statement, or we'll refer to that as the "EIS." Since that meeting the Air Force has examined the environmental concerns that were raised, as well as others that were forwarded to Air Force authorities, and the Air Force 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, or criticisms of the Draft EIS. Those of you who have not had an opportunity to review the Draft may want to read the summary of the major findings in the handout which is available at the entrance to the auditorium. I'm holding that little summary up right now. Now these findings will also be

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addressed by panel members, and particularly by Colonel Armstrong in his presentation.

Before introducing the members of the panel let me explain my role in this hearing. I am a Military Judge for the Air Force, trying criminal cases, I also serve as the Chief Trial Judge for the Air Force.

I'm not here as an expert on the Draft EIS, I've not 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 the proposal. My purpose is to ensure that we have a fair, orderly hearing, and that all who wish to be heard have a fair chance to speak. I don't think we'll have a problem with that given to the number of people we have here so far.

Let me introduce the members of the public hearing panel. On the far left is Ms. Patricia Woolfrey, representing the Air Force Base Disposal Agency. She will describe the Air Force Base Disposal process. Now 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, San Antonio, Texas. Now he'll brief you extensively on the Environmental

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Impact Analysis Process and he'll summarize the results that are reported in the Draft EIS.

This is an informal meeting, it's intended to provide a continuing public forum for two-way communication about the Draft EIS, with a view towards improving the overall decision-making process.

And you'll notice I said "two-way communications." The first part of the hearing, these people who are the most knowledgeable people will brief you on the 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 ensures that the decision makers may benefit from your knowledge of the local area and any adverse environmental effects that you think may result from the proposed action or alternatives. Also, if you have any questions regarding the Environmental Impact Analysis Process, or the Environmental Impacts presented in the Draft EIS, please ask the panel members and they will answer to the extent that they can tonight. If your question is a technical one that requires further research and cannot be answered tonight, the Air Force will make sure your question will be answered either in the final EIS itself or in a separate comment and response

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action.
Tonight's hearing is designed to give you an opportunity to comment on the adequacy of the Air Force's EIS. Keep in mind that the EIS is simply intended to ensure that future decision makers will be fully apprized of the Environmental Impacts associated with the various reuse alternatives before they decide upon a course of action. Consequently, comments tonight on issues unrelated to the EIS are really beyond the scope of this hearing and should not be addressed.
Now when you came in tonight, you were given an attendance card and you were asked to indicate on it down on a little block on the bottom, to check that if you wish to speak tonight. After Ms. Woolfrey and Colonel Armstrong have finished their presentations, we will have a short recess, we will collect the cards, and after the recess I'll recognize any elected public officials first and then I'll call on members of the public in random order from the cards that have been handed in. Each speaker will have 5 minutes, and again I'll probably give some latitude on that period of time with the few people that we have here. So if you've not filled out a card, if you wish to speak I would ask you to fill out a card and indicate on that that you

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would like to speak, at the break, and you'll find these cards located on the tables as you came into the auditorium.
If you don't feel like standing up here at a microphone tonight and making an oral statement, you have until September 6th of this year to submit a copy of your statement for the Air Force's consideration prior to publishing the final EIS. Now you'll see the address that is on the slide in back, you'll also see that address either listed on the bottom of the back page of the little summary, or you may have picked up a written comment sheet that you can use to hand write comments if you prefer to do that, the address is listed at the bottom there.

INSERT COPY OF SLIDE #2 - ADDRESS OF AAFCEE/ESE

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Now the Air Force will continue to accept comments after September 6th, but the Air Force cannot guarantee that late comments will be included in the final EIS. So if you want to make sure that any comments that you have are received and addressed as appropriate, please make sure that they arrive by September 6th at the address listed on this green -- or on these handouts. Even if you make comments tonight, remember you still have until September 6th to submit additional written comments to the address shown on the slide and on the bottom of these comment sheets. Your comments will have the same impact and receive the same consideration whether they are made orally tonight, whether they're submitted in writing tonight, or whether they are submitted in writing later on, so that they're received by September 6th.
Just one housekeeping note since this is a school campus, I think probably everybody knows, but I'd ask you please no smoking here in the auditorium.
Now one thing I cannot stress enough, you may have information about environmental impacts that are unknown to the Air Force, so we are very interested in having and analyzing all potential environmental impacts, other proposed action and the alternatives. You have the experience from living in this area, so

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that the second part of tonight's communication, the part that flows from you to us, is particularly important and we ask you to be a part of the proceedings.
At this time it's my pleasure to introduce Ms. Patricia Woolfrey who will describe the Air Force Base Disposal Process.

INSERT COPY OF SLIDE #3 - DISPOSAL PROCESS TITLE

BY: MS. PATRICIA WOOLFREY, BDA REPRESENTATIVE:

Thank you Colonel Heupel. My name is Patricia Woolfrey, I work for the Air Force Base Disposal Agency, which is an office created to manage the cleanup and disposal of Air Force Bases that are closed under the authorities of the Base Closure and Realignment Laws. In discussing the Air Force's proposed action of disposing of Grissom Air Force Base I'm going to cover four general topics:

INSERT COPY OF SLIDE #4 - OVERVIEW

First is disposal planning, second is disposal objective used by the Air Force to guide its planning, third is disposal considerations that we will use to arrive at a decision, and lastly is the Air Force decision itself, that is what actions the Air Force will take based on the findings in the EIS and other considerations.

INSERT COPY OF SLIDE #5 - DISPOSAL PLANNING

The Secretary of the Air Force has been delegated the authority to act as the Federal Disposal Agent under the 1988 Closure and Realignment Act and the Defense Closure and Realignment Act of 1990 to utilize or dispose of the Federal property that makes up the Air Force's closing bases. Usually this responsibility rests with the General Services Administration, or GSA, who we do work directly with and there is a representative here tonight from GSA, Ms. Nancy (last name unintelligible on this tape), and despite this change we still have to follow the traditional Statutes for disposal of Federal property.

The Air Force must adhere to those laws and GSA regulations that are in place at the time of passage of the Closure Acts. The Air Force has also issued additional policy and procedures required to implement our delegated authority. Another provision of the 1988 and the 1990 Acts requires us to consult with the State Governors 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 Grissom Redevelopment Authority and have been doing so for about the past year.

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.

INSERT COPY OF SLIDE #6 - DISPOSAL OBJECTIVES

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The Air Force recognizes the significant economic impact the closure will have on the local communities, 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 communities in their efforts to replace the departing military activities with viable public and private enterprises. We are in the process of developing a comprehensive disposal plan that attempts to balance the needs of the community, the environmental consequences of our disposal action and decision, and the needs of the Air Force.

However, Congress has only provided start up capital for implementation of the realignments and closures. Revenues from property sales will be used to offset the funding shortfall.

INSERT COPY OF SLIDE #7 - DISPOSAL CONSIDERATIONS

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The disposal of property is accomplished in a three-part planning process. The first part is the Air Force's preparation of an Environmental Impact Statement, which analyzes the various reasonable disposal and reuse alternatives for the Base; the second, is the community's plan for the future use of the property; and finally, the Air Force's Disposal Plan which analyzes the various disposal options. The Disposal Plan is based on a thorough real estate analysis of the Base and region, results from the EIS, interest shown by other Federal agencies, and inputs from the Community Reuse Organization.

The EIS process culminates with the issuance of a record of decision, which documents the decisions for the disposal of the real property and specifies what environmental mitigation may be needed to protect human health and the environment as a result of the disposal and reuse decisions selected.

INSERT COPY OF SLIDE #8 - DISPOSAL DECISIONS

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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 Air Force 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 Federal Agencies generally work with the community to solicit support for their proposal to acquire property. Moreover, it has been the Air Force's experience that such uses for a portion of the property and facilities can be accommodated within the overall community's planned future use for the entire Base.

In general, the disposal options are: Federal Agency Transfers; Public Benefit conveyance to States and eligible non-profit 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 ensure that all federal property interests are disposed of in an efficient and effective manner. The Secretary

Document 1

of the Air Force will decide on the actual disposal plan. Final disposal decisions will be documented in the record of decision.

The last subject to 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 Grissom Air Force Base. Cleanup activities are continuing and additional studies are underway that will fully characterize contamination of all other sites to determine the best means to clean them up.

It should be understood that if contaminated areas are not ready for disposal at the time of cleanup -- at the time of closure, the Air Force will retain the ownership until the property is cleaned up. Other areas may require easements and rights of entry to permit long-term groundwater monitoring and treatment. Nevertheless, 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 Grissom Air Force Base. Thank you for the opportunity to meet with you this evening. Now I will turn the meeting back over to Colonel Heuel.

BY: COLONEL HEUPEL:

Thank you Ms. Woolfrey. At this time I present to you Lieutenant Colonel Terry Armstrong, who will brief us on the Environmental Impact Analysis Process.

INSERT COPY OF SLIDE #9 - ENVIRONMENTAL IMPACT ANALYSIS PROCESS

BY: LIEUTENANT COLONEL TERRY ARMSTRONG:

Thank you, Colonel Heupel. Good evening. I'm Lieutenant Colonel Terry Armstrong from the Environmental Planning Division at Brooks Air Force Base, Texas. Our organization is conducting the Environmental Impact Analysis Process for the Disposal and Reuse of Grissom Air Force Base and the other major installations mandated to close during Round II under the Base Closure and Realignment Act.

Tonight I will 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 will 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 13th, 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 comprehensive reuse plan from the Grissom Redevelopment

Authority. The Grissom Redevelopment Authority proposal includes industrial and commercial development outside the area retained by the 434th Wing. The alternative developed by the Air Force includes a small civilian aviation component along with industrial and commercial development. After scoping, we collected the necessary data and conducted the Environmental Analysis. The draft EIS was filed with the U.S. Environmental Protection Agency on July 16th, 1993. In addition to tonight's hearing, written comments on the draft EIS will continue to be accepted at this address until September 6th, 1993. 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 to us. Once the review process is complete, we will produce a final EIS, scheduled for completion in January 1994, and mail it to all those on the original distribution list for the draft EIS. If you are not on our mailing list, you can request a copy by writing to this address.

INSERT COPY OF SLIDE #10 - PUBLIC COMMENT PERIOD AND 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. Woolfrey, 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 early Spring of next 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 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 related 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 PCBs, radon, medical or biohazardous waste management, ordinance, 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 disposal and reuse of Grissom 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 has recently produced a separate socioeconomic study that is not required under NEPA. It describes in detail how disposal and reuse of Grissom Air Force Base may 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 services, police and fire protection, medical services, transportation, and utilities. Copies of this document will be provided to key Federal, State and Local officials and be available for review at libraries in the area. The document is in final review at headquarters U.S. Air Force and will be forwarded to key personnel when the document is ready.

Now I will present an overview of the proposed action and alternatives that have been analyzed. Afterwards, I will 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 numerous plans and activities that are not included in the title. Each of the alternatives analyzed assumed that

certain portions of the Base would be retained for continued use by the military, as mandated by provisions of the Defense Base Closure and Realignment Act. The areas to be retained will be used by the Air Force Reserve 434th Wing and are represented as the dark grey areas on the land use maps shown for each alternative. This figure shows the land uses for the proposed action. The proposed action includes a military-use airfield and a cantonment with the remainder of the base being developed for civilian non-aviation mixed uses. The military land area includes the airfield. Most of the civilian development involves industrial and commercial uses. The existing housing area, golf course, and parts of the aircraft parking apron would be redeveloped for industrial purposes. Commercial development would occur South of the existing Base housing and along the southern boundary of the Base with frontage on U.S. 31. Other non-aviation uses include educational, recreation, and vacant land. Industrial areas are depicted in light grey. The educational area is shown in pink, commercial in red, recreation in green, and vacant land in white. As I mentioned before, the areas to be retained by the Air Force Reserve are shown in dark grey. INSERT COPY OF SLIDES 811 and 12 - PROPOSED ACTION

This map shows land uses for the military/joint use aviation alternative.

INSERT COPY OF SLIDES 813 and 14 - MILITARY/JOINT USE AVIATION ALTERNATIVE

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The focus of this alternative is a military operated airport associated with the 434th Wing, with a civilian aviation component including general aviation, airline flight training, air cargo, and an aviation school. The airfield is shown as part of the military land area, however, a civil airport authority may have the option to operate the airport with the 434th Wing as a tenant. This alternative assumes that the Peru Municipal Airport would be closed and all operations relocated to Grissom Air Force Base. The civilian non-aviation uses of the remaining portions of the Base would include industrial, commercial, agriculture, residential, recreation, and vacant land.

Aviation-related uses are shown in blue, industrial areas are in light grey, commercial areas are in red, residential in yellow, recreation areas are in green, agriculture is shown in light green, vacant land in white, and the military cantonment areas are shown in dark grey.

As required by the National Environmental Policy Act, a no-action alternative was evaluated.

INSERT COPY OF SLIDES #15 and 16 -NO ACTION

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Under the no-action alternative, the conditions on the Base at the time of closure would remain unchanged in the long term. The military cantonment and airfield, shown in dark grey, would continue to be used to support the retained 434th Wing activities. The remainder of the Base property would remain under caretaker status with no civilian reuse. The caretaker activities would consist of resource protection, grounds maintenance, existing utilities operations, as necessary, and building care.

Along with the three alternatives I have just described, one other land use concept has been proposed, which is not part of any reuse alternative, but could be initiated on an individual basis. You may think of this concept as an overlay that can be used with any of the alternatives.

INSERT COPY OF SLIDE #17 -OTHER LAND USE CONCEPTS

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This figure shows the areas and facilities that were analyzed as potential locations for the individual land uses. The areas shown in blue represent a proposal from the Indiana State Emergency Management Agency for the use of portions of Grissom Air Force Base as a Public Safety Training Institute. This institute would provide safety and emergency training for both private and public agencies. Safety training facilities would be located in three major areas. Outdoor fire training activities would take place on the west side of the Base. The converted hangars at the Northeast end of the runway along with adjacent aircraft aprons, would be used as emergency driver training facilities. Classrooms and temporary housing would be located in the central Base area. The Base Theater would be used as a large group classroom, and 19 family housing units would be used for permanent employee housing and simulated training activities.

I will now discuss the results of our analyses, which are presented in the draft EIS. The proposed action and all alternatives were analyzed to the same level of detail. The baseline used for analysis is Grissom Air Force Base at closure in September 1994. The following slides show a comparison of impacts among the reuse alternatives, excluding the no-action alternative.

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INSERT COPY OF SLIDE #18 -RESOURCES ANALYZED

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The EIS analyzed 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 will summarize the analysis results briefly.

INSERT COPY OF SLIDE #19 -NO OR FEW IMPACTS

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Although there would be changes to land use and the visual character of the Base, these would be minor and could be controlled through use of standard land use planning techniques to guide development.

Hazardous materials and waste management as a result of reuse 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 removed if it poses a health threat, otherwise it would be managed in place, in accordance with Federal regulations and guidelines. Pesticide usage under reuse would be subject to Federal and State regulations. All polychlorinated biphenyls will be removed prior to Base closure. Small amounts of medical and biohazardous waste would be generated by the 434th Wing, and would be managed in accordance with State regulations. The remaining lead from the indoor small arms firing range and the inert practice rounds from the grenade range will be removed prior to Base closure. Lead-based paint, which may exist on facilities, will be managed in accordance with applicable Federal and State regulations.

Erosion effects on soils from construction would be minor because of the type of soils at Grissom Air Force Base and the relatively flat terrain. The abundant

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groundwater supplies within the region would not be affected by reuse and increases in air emissions would not affect the region's attaintment status. The number of residents exposed to aircraft day-night average noise levels, or DNL, of 65 decibels or greater would not increase under any reuse scenario when compared to closure conditions. The number of residents exposed to reuse-related roadway surface traffic noise levels of DNL 65 decibels or greater could increase by 142 residents. There are no threatened or endangered species on Base and only a quarter acre of wetland area which can be avoided. Overall impacts to biological resources from proposed reuse would be minimal.

Environmental analysis has indicated the potential for impacts to the remaining resources, and I will speak about each of these in more detail.

INSERT COPY OF SLIDE #20 - POTENTIAL FOR IMPACTS

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This graph shows the potential or possible increase in employment in Miami, Cass and Howard counties due solely to reuse-related activities projected through the year 2014.

INSERT COPY OF SLIDE #21 - EMPLOYMENT

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These increases include the direct jobs generated on site, and the secondary jobs created within the region. Positive economic benefits would 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 5,100 to 12,500 direct and secondary jobs in the region by 2014. This increase translates to an increased growth in the local job market of about 0.3 to 0.6 percent annually between closure and 2014. 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, 6,800 to 13,700 people would enter the region by 2014. This represents an average annual increase in the region's projected population growth of 0.2 to 0.4 percent from closure to 2014.

INSERT COPY OF SLIDE #22 - POPULATION

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The redevelopment of Grissom Air Force Base would affect local and regional transportation networks. Reuse of the Base would increase traffic on local roads near the Base, particularly Business U.S. 31 in Peru. The chart shows the average number of 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 29,800 under the military/joint use aviation alternative to 55,900 under the proposed action by 2014.

INSERT COPY OF SLIDE #23 - TRAFFIC

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Most roadways would generally maintain acceptable levels of service under each reuse alternative. However, traffic volumes on segments of Business U.S. 31 through Peru could exceed the road's capacity by 2011 under the proposed action. The redevelopment plans would incorporate appropriate transportation planning measures to accommodate the reuse activities and provide acceptable levels of service within the on-base road network and from the access points to the local network. This chart shows the number of annual air operations projected through 2014 under the proposed action and military/joint use aviation alternative.

INSERT COPY OF SLIDE #24 - AIRCRAFT OPERATIONS

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For reference, approximately 73,172 flight operations, consisting primarily of KC-135s, A-10s, and transient aircraft, occurred at Grissom Air Force Base in 1990. At closure, flight activities will be reduced to 30,410 operations associated with the continuing mission of the 434th Wing. By 2014, the number of annual flight operations would remain unchanged from closure under the proposed action and would increase to about 68,930 under the military/joint use aviation alternative. The proposed action would include aircraft operations of the 434th Wing and the military transient aircraft. The military/joint use aviation alternative would include civilian use of general-aviation aircraft. No adverse impacts to the region's airspace are anticipated under any of the reuse alternatives. Utility demand under reuse would increase from closure conditions, but would be within the capacity of the Regional Systems. At closure, the recently upgraded wastewater treatment plant at Grissom Air Force Base would be operating to support the 434th Wing. Sewage flows from these activities along with proposed reuse would be mostly from industrial operations on Base; the domestic contribution would be small because of the absence of occupied family housing. Under these conditions, the lack of domestic waste to mix with

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industrial waste may require modification of the wastewater treatment plant.

INSERT COPY OF SLIDE #25 - UTILITIES

The Air Force is conducting investigations to identify, characterize, and remediate environmental contamination at Grissom Air Force Base that has resulted from past actions. This comprehensive effort is called the Installation Restoration Program, or IRP.

INSERT COPY OF SLIDE #26 - HAZARDOUS MATERIALS/WASTE

The IRP includes procedures for identifying sites of contamination, determining appropriate remediation techniques, and remediation and monitoring as necessary to ensure that 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 process is in progress at Grissom Air Force Base. The Air Force makes information about the IRP available to the public through published information available at the Peru Public Library, as well as through sources such as the Base Public Affairs Office, the Base Disposal Agency Operating Location, and public meetings and notices.

In addition to the IRP program, the Air Force is conducting ongoing investigations to identify the presence or absence of potential hazardous waste sites at Grissom Air Force Base under the Resource Conservation and Recovery Act, or RCRA. If site contamination is found, remediation and close-out will be conducted under RCRA.

All cleanup activities will be accomplished in accordance with applicable Federal and State laws and regulations. Remedial actions and monitoring will

continue after Base closure, and long-term access to certain sites may be required to ensure 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 regarding disposal of property, the Air Force is conducting an environmental baseline survey at Grissom Air Force Base. This effort will identify all areas of the Base that are uncontaminated, as well as identify environmental conditions of the property, such as identification of contaminated sites that require remediation, and the presence of asbestos-containing materials. The environmental baseline survey results and report will be completed prior to disposal of any parcel on Grissom Air Force Base. Radon is a naturally occurring, colorless and odorless radioactive gas that is produced by the decay of naturally occurring uranium, which is present in some soils.

INSERT COPY OF SLIDE #27 - RADON

There are no Federal or State standards regulating radon exposure: however, the U.S. EPA has recommended actions that should be taken if concentrations are above various levels. Radon measurements taken in Grissom Air Force Base housing indicated that levels are above the U.S. EPA recommended level of 4 picocuries per liter. Radon levels can be reduced to acceptable levels by following recommendations provided by the U.S. EPA on how to reduce radon levels in homes. An archaeological reconnaissance survey has been performed at Grissom Air Force Base and five sites have been identified.

INSERT COPY OF SLIDE 428 - CULTURAL RESOURCES

Document 1

Evaluation to determine if these sites are eligible for the National Register of Historic Places is being performed. An initial survey of potential historic buildings has also been conducted and additional evaluation for eligibility to the National Register of Historic Places is being conducted. Consultation with the Indiana State Historic Preservation Officer 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 are soliciting your comments on the draft EIS, and this information will support informed Air Force decision-making. Now I'd like to turn the meeting back over to Colonel Heupel.

BY: COLONEL JIM HEUPEL:

Well this completes the presentation on the Base Disposal Process on the Environmental Impact Analysis Process and on the various actions and alternatives and the environmental impacts. What we're going to do now is take about a ten minute break, maybe a bit less, and then we'll come and see if you have some comments that you can provide to us. If there are some things that you can comment to us, things that we're not aware of

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Macy, IN 46951

Document 1

from an environmental standpoint or problems that you have found in the draft EIS. As I said earlier we do solicit your comments. Let's adjourn for ten minutes.

TEN MINUTE ADJOURNMENT

HEARING RESUMES

BY: COLONEL JIM HEUPEL:

Ladies and gentlemen we're going to go ahead and begin the second part of tonight's program: that will be the input from you to us. Let me point out that the two panel members that we have here with us tonight -- they are not the decision makers regarding the proposed action or the alternatives. If during the public comment period a speaker requires any clarification or information prior to providing comment, the panel members will try to answer the questions, if they can do so. As far as the comment period I have one speaker: I'm going to see if we've got anybody else that I can convince if you've got something that you think a question or clarification you need to have, or if there's something of environmental concern to you, we would like to hear what it is and would ask you to go ahead and make a statement, or to submit something in writing later on. I do want to make sure that everybody that wants to speak has a chance to be heard. We do have a reporter down front who will be taking

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Document 1

down all the questions and everything that is said tonight, it has been taped as well. This will all become a part of the final Environmental Impact Statement. As far as speaking I would ask you to help me with these items. I'll call on you and ask you to go ahead and make your statement, come to the microphone so that all can hear it and so that we can make sure that we get it. I'm going to -- while the time limit is five minutes, I'm going to be real liberal with that, so if you need a little bit more time than that, that's not going to be a problem. I would ask you to state your name and what city you're from and what capacity: private individual, public official, you're speaking in: that will help from the transcript part. Very well, at this time I have one speaker and that would be Mr. Ted Bradfield.

BY: MR. TED BRADFIELD:

I didn't know I was going to be the only one, but I only have one question. My name is Ted Bradfield and I'm a private citizen and I work and help with Grissom Redevelopment wherever I can. The question I have is 4.1 now that we've got the EIS done is there a date now when we will be able to have the Federal Government or the Department of Defense turn over the developable property at the Air Base so that we can start to advise

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clients and people that are interested in development. We know that the Base won't close until 1 October, and I don't like the word closure that you're using, I'd rather use the word realignment. We know that the Base will realign on 1 October '94, and at some point after that there has to be a date in mind that you've either geared towards or good in mind that this property, excess property, will be able to be turned over and disposed of by the local Grissom Redevelopment Authority or leased or whatever, and I'm very interested in knowing that date -- I don't think we've heard that date to this point. I got in late and Pat might have addressed that in her comments that I missed, but I'm very interested and I think all the audience is interested in knowing when will we be able to do something with that which you have available for us to use?

BY: COLONEL JIM HEUPEL:

Let me ask our panelists what guidance can we give.

BY: LIEUTENANT TERRY ARMSTRONG:

Sure I'll try to answer that for you Mr. Bradfield. We appreciate your concern and support your interest in a rapid movement and a change to the redevelopment once the military is gone. As far as giving you a specific date on when things can be transferred, those things

4.1

depend on the study that I talked about earlier, Environmental Baseline Study. We must go into the Base and do a very thorough and indepth look at what's there.

BY: MR. TED BRADFIELD:

I understand that that has to be accomplished, but you must be targeting some date that you intend to accomplish that. As I see it, it puts us in an ambiguous position when we're looking at what, 1200 acres in the grounds to develop, and it's out in the -- it's out in a picture somewhere out here painted for us and we have nothing to target against. It's awful hard, I would think, to attempt to redevelop or bring anybody into the Base for reuse unless you're able to give them some time frame, and even more beneficial under that set of circumstances would be a date: if you're going to be able to achieve this in 30 days after closure, or 60 days after closure, I think that's what, I think this whole community is interested in, in what kind of a time frame we're looking at that at, and if, if you're not able to get that do we know somebody else, is somebody else somewhere putting that date together and we would be able to contact them and get that information?

BY: LIEUTENANT COLONEL TERRY ARMSTRONG:

Sir I think I understand your question and I think you're looking for what is our goal, not, you're not asking us to give you a specific date, but you want to know what our goal is, and our goal . . . .

BY: MR. TED BRADFIELD:

I'd like to have a specific date, but if, if all I can get is the goal then I -- you know at this point in time that's more information than what we have at present.

BY: LIEUTENANT COLONEL TERRY ARMSTRONG:

Right. And, and we can't give you anything like a specific date because there are unknown factors here that we, we have to account for and have to do the cleanup before we can actually do the transfer, so

BY: MR. TED BRADFIELD:

In this Base, the environmental cleanup at this Base, from everything we've seen and heard it's a minor project in comparison to some of the other Bases.

BY: LIEUTENANT COLONEL TERRY ARMSTRONG:

It appears to be.

BY: MR. TED BRADFIELD:

It's a very clean Base from what we understand.

BY: LIEUTENANT COLONEL TERRY ARMSTRONG:

It appears to be that at this point.

BY: MR. TED BRADFIELD:

If that be it the case and that information is legitimate and accurate, I would then again ask do we have some scope of time frame? I mean we don't want to continue 5 years down the road with an environmental cleanup.

BY: LIEUTENANT COLONEL TERRY ARMSTRONG:

Sure.

BY: MR. TED BRADFIELD:

And not be able to do any development in the process. Many of the facilities that might be potentially clean at present, I would think should be in a position to either be interim leased or disposed of, etc., and I think that's what we're striving for, or that's what I'm interested in.

BY: LIEUTENANT COLONEL TERRY ARMSTRONG:

And as we are able to find a parcel that's clean, our goal is to go ahead and transfer that as quickly as we can. If it's not still in use by the Air Force on the Base, then we will go ahead and -- Ms. Woolfrey's group will go ahead and try to do an interim lease or even a transfer of that property.

BY: MR. TED BRADFIELD:

I understand what you're saying and you use the words "as quickly as we can" which becomes an ambiguous

phrase as to the time frame. I guess, I guess I'm trying to make the point that we in this community looking at the number of jobs that are going to be lost and the need to potentially develop the Base as quickly as possible so as to have the least amount of transition where you have an opportunity for it to deteriorate, etc., etc.

BY: LIEUTENANT TERRY ARMSTRONG:

Yes sir.

BY: MR. TED BRADFIELD:

These types of things, it would be beneficial to push that forward as fast as, as fast as possible, or in your comments, and that's what I'm looking for is some kind of a time frame. Have they got somewhere -- is there a higher up at some point, or place, that has set a time line on this type of problem and what's going to happen at this Base and other Bases?

BY: LIEUTENANT COLONEL TERRY ARMSTRONG:

Well our goal here is to make that transfer as the military leaves, and if we can do all the studies to determine what needs to be cleaned and perform those cleanup actions before the users actually leave there and have it clean and ready to transfer, then it will be our goal to make that transfer as they leave to make the transfers, to make immediate transfers.

BY: MR. TED BRADFIELD:

So there is potential that you will be doing the environmental cleanup between now and 1 October '94, is that what you're saying?

BY: LIEUTENANT COLONEL TERRY ARMSTRONG:

There are some possibilities that we can have some of that done.

BY: MR. TED BRADFIELD:

If -- What does it look like the extension of that 1 October '94 date frame will become? Is it a year process, a two year process? Do we have any idea about what kind of a time frame?

BY: COLONEL JIM HEUPEL:

Let me ask this -- has the study been completed at this point?

BY: LIEUTENANT COLONEL TERRY ARMSTRONG:

The EBS study is still in progress so -- and as that study goes along there will be parcels that we can determine that are clean, and then once that parcel is determined clean and there's no existing use for it, then they'll be able to go ahead and make the transfers. And there is no -- that's not out in the future, that will happen at that point.

BY: MS. PATRICIA WOOLFREY:

We also need to talk about how many different types of

screening have to be done with the Federal Agencies, with your McKinney providers, and then at the public sale, and I think you're probably more interested in the public sale aspect.

BY: MR. TED BRADFIELD:

Absolutely.

BY: MS. PATRICIA WOOLFREY:

Right.

BY: MR. TED BRADFIELD:

And the potential interim lease structures for those facilities that would need to be updated and kept up in the process.

BY: MS. PATRICIA WOOLFREY:

For the next year there's a lot to the process that has to be accomplished.

BY: MR. TED BRADFIELD:

And I understand that and I'm giving you until 1 October '94 without any hassle at all.

BY: MS. PATRICIA WOOLFREY:

Right, but as far as . . . .

BY: MR. TED BRADFIELD:

When I hassle is after that time frame on the amount of time that's necessary for this to be accomplished. And that's what I guess I'm asking for.

BY: MS. PATRICIA WOOLFREY:

Okay, I think the other thing that the Air Force is probably a little hesitant to answer on right now is trying to give any specific dates because the problems that we're finding with some of our Bases that have closed, problems that we didn't think existed we have now found exist. So although this may appear to be a Base that does not have a lot of potential cleanup, or a lot of potential hazardous waste, we still aren't sure, and we have to give our people a chance to complete those studies. And I think it's a little early for us to give you a specific date.

BY: MR. TED BRADFIELD:

If that be it the case then I would appreciate that this commission, or whatever, keeps us informed as far as the local public, about what these time lines are.

BY: MS. PATRICIA WOOLFREY:

Well I work with the GRA, I'm out here generally about every other week.

BY: MR. TED BRADFIELD:

I know you are and that's what I'm saying. I think it's necessary that the public be aware of when we're going to complete each phase.

BY: MS. PATRICIA WOOLFREY:

Absolutely.

BY: MR. TED BRADFIELD:

Document 1

And then what kind of dates -- as we get more information down the road on where we're going and what we're doing, it would then seem that we would have the ability to come to us and give -- or tell the public or whatever, a little better idea then what we're saying now which is fairly ambiguous to being some time in the future.

BY: MS. PATRICIA WOOLFREY:

No, we certainly work very closely with the GRA and the community, like I said about every other week, and with GSA as trying to get a marketing plan into affect now, so hopefully we should be able to give you something more definitive as we get closer to Base closure.

BY: MR. TED BRADFIELD:

That's exactly what I'm asking for and as soon as possible would be very beneficial.

BY: MS. PATRICIA WOOLFREY:

That's exactly what we will do.

BY: MR. TED BRADFIELD:

Thank you.

BY: COLONEL JIM HEUPEL:

Can you define what the GRA is for those that don't know?

BY: MS. PATRICIA WOOLFREY:

It's the Grissom Redevelopment Authority. GRC. I think

Document 1

is actually their official name.

BY: COLONEL JIM HEUPEL:

Now that was the only card I have. Do we have anybody else that hasn't turned in a card that has any questions that they need clarification on or another issue that raised or environmental comment that they would like to make at this time? Everybody is ready to go out and watch the meteor shower tonight? Tomorrow night? I thought it was going to be tonight. Okay, well regardless it looks like unless I can entice anybody else down -- I do want to thank you for coming out tonight. We appreciate your attendance, your participation in the process, and this meeting is adjourned.

HEARING ADJOURNED

Document 1

C E R T I F I C A T E

I, Vicky L. McGuire-Gochenour, a Notary Public in and for the County of Miami, State of Indiana, do hereby certify that the foregoing transcript was taken at a public hearing regarding the Grissom Air Force Base Disposal and Reuse Draft EIS, on the 10th day of August, 1993, commencing at the approximate hour of 7:00 o'clock p.m., in the Maconaquah High School auditorium located in Miami County, Indiana:

That said public hearing was taken down by means of two tape recorders running simultaneously, and shorthand notes, and was afterwards reduced to typewriting by me; that the foregoing typewritten transcript is a true and accurate record thereof:

IN WITNESS WHEREOF, I have hereunto set my hand and affixed by Notarial Seal this 16th day of August, 1993.

Vicky L. McGuire-Gochenour
Notary Public of Miami County, IN

My Commission Expires:

September 27th, 1995

Document 2

INDIANA UNIVERSITY

July 26, 1993

Lt. Col. Gary Beaugureal
Chief of the Environmental Planning Division
AFCEE-HSR
8106 Chennault Road
Brooks AFB, Texas 78235-5318

INDIANA GEOLOGICAL SURVEY

Dear Col. Beaugureal:

I have just completed a quick review of your Jul 93 draft environmental impact statement for the disposal and reuse of Grissom Air Force Base, IN. I found section 3.3.3 and 4.4.2 particularly interesting.

10.1 [1] I did notice that table 3.3.2 did not list the old contaminated-jet-fuel burn area used by the firefighters for practice fires. Is this area not considered a potential problem? Also you make the statement in 4.4.2 that consumption of ground water is not a concern in spite of either a 34.6 or 45 percent increase in production and appear to base that faith on the production capacity of the base well field. Is the well field capable of producing 4.9 mgd indefinitely? Was a proper pumping test done to determine this?

12.1 [2]

12.2 [3] Under 3.4.2.4 you call the glacial till an aquifer. I believe that more correctly the discontinuous sand and gravel lenses that exist within the till comprise the aquifer. Do your referenced studies indicate a higher head in the till or in the underlying carbonate bedrock? It would seem to me that you must understand the nature of the moderately thick glacial materials that underlie the area in order to practically deal with any of the potential problem sites. This would require a study of water well logs in the surrounding area plus perhaps the installation of monitoring wells and appropriate geophysical analyses of the property.

10.2 [4]

If you should require assistance re the study of the geology and ground water of the site we (IGS) are willing to work with you. If you have any questions you may call me at 812-855-7428.

Sincerely,

Edwin J. Hardin, Head
Environmental Geology Section

EJH:ss

Document 3

US Department of Transportation
Federal Highway Administration

August 16, 1993

Mr. George Gauger
AFCEE/ESEM
Brooks AFB, Texas 78235-5000

Dear Mr. Gauger:

The Federal Highway Administration has reviewed the Draft Environmental Impact Statement for the Disposal and Reuse of Grissom Air Force Base, Indiana and we have no comments to offer on the document. The discussion of the ground transportation is very good and provides sufficient information for our needs.

Sincerely yours,

Lional H. Wood, Director
Office of Planning & Program Development

By: Paul D. Quinn
Regional Environmental Specialist

Document 4

STATE OF INDIANA
EVAN BAYH, Governor
PUBLIC SAFETY TRAINING INSTITUTE
INDIANA GOVERNMENT CENTER SOUTH
302 W. WASHINGTON ST., ROOM E208
INDIANAPOLIS, IN 46204
(317) 232-8287

JEROME M. HAUER, Chairman
WM. R. SEAGRAVES, Executive Director

August 26, 1993

Mr. George Gauger
AFCEE/ESEM
Brooks, Texas 78235-5000

Dear George:

Attached is the final and most recent update of anticipated use for Grissom by the Public Safety Training Institute. Unfortunately, budget constraints have slowed our ability to continue the quest for Grissom as an institutional site. We have decided to move at a slower pace in terms of facility procurement and concentrate on accelerating the staffing and curriculum development programs, thereby terminating our need for Grissom.

3.1 [1]

The portion of the July 1993 Draft Environmental Impact Statement concerning the Public Safety Training Institute was very well written and on target with one exception. That exception is that PSTI is in fact the proposing agency for the State of Indiana as opposed to the State Emergency Management Agency.

3.2 [2]

I would like to thank you personally George for all of the support and professionalism you shared with me during our endeavors. If at any time I can be of assistance, please feel free to contact me. Again, I thank you kindly.

Sincerely,

William R. Seagraves
Executive Director
Public Safety Training Institute

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Document 5

United States Department of the Interior

OFFICE OF THE SECRETARY
OFFICE OF ENVIRONMENTAL AFFAIRS
230 S. DEARBORN, SUITE 3022
CHICAGO, ILLINOIS 60604

ER-93/616

August 27, 1993

Lt. Colonel Gary Baumgartel
Chief of Environmental Planning Division
AFCEE-ESE
8106 Chennault Road
Brooks AFB, Texas 78235-5318

Dear Colonel Baumgartel:

The Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement for Disposal and Reuse of Grissom Air Force Base, Miami and Cass Counties, Indiana. We offer the following comments for your consideration.

The subject document for the proposed project adequately addresses the concerns of the Department relative to fish and wildlife resources, mineral resources, and ground water resources. Based upon the information supplied in the document, we do not anticipate any impacts to wetlands or other aquatic resources that would require an individual permit under Section 404 of the Clean Water Act. However, the final determination of the need for a permit lies with the U.S. Army Corps of Engineers, Louisville District.

Recreational Resources

3.3 [1]

The National Park Service (Service) has reviewed the proposed alternatives in the document for possible impacts on recreational resources. In regard to the reuse of Federal surplus property, the Service advocates the maximum retention of existing public/recreation land use. Therefore, the Department endorses the Military/Joint Use Aviation Alternative, which would maintain 149 acres of land for recreation use and open space. The Service is initiating discussions with Miami County and the towns of Bunker Hill and Peru to explore their interest in acquiring all or part of this land in accordance with Section 203(k)(2) of the Federal Property and Administrative Services Act of 1949, as amended (40 U.S.C. §484(k)(2)(). The open space and recreation facilities will provide recreation opportunities to the surrounding communities without the need for significant new development or modification of the existing uses. Therefore, the Department believes that the highest and best use of the public/recreation land is to continue this use for the benefit of the neighboring population. We request that the Air Force take this finding into account when making a determination of the highest and best use for the existing public/recreation land at Grissom Air Force Base.

Document 5

2.

We appreciate the opportunity to review the subject document and provide these comments.

Sincerely,

Sheila Hiner Huff
Regional Environmental Officer

Document 6

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We make Indiana a cleaner, healthier place to live

Kevin Hoyt
Governor
Kathy Prosser
Commissioner

100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46206-6015
Telephone 317-232-8603
Environmental Helpline 1-800-451-6027

August 30, 1993

Mr. George Gauger
Department of the Air Force
AFCEE/ESEN
Brooks AFB, Texas 78235-5000

Dear Mr. Gauger:

Re: Grissom Air Force Base
Draft Environmental Impact
Statement, Peru, Indiana

Staff of the Indiana Department of Environmental Management have reviewed the above named document. Our review generated the following comments:

Section 1.2. Page 1-2

1
1.1 When is the estimated completion date for the Record of Decision?

Section 2.1. Page 2-1

2
10.3 Is Installation Restoration Program (IRP) site remediation at Grissom AFB expected to result in lease/deed restrictions that limit redevelopment at certain locations within the base?

Section 2.2.9. Page 2-12

3
10.4 The Proposed Action states that wastewater from on-site activities would continue to be treated at the base WWTP, which would be operated by the 434th Wing. The recommended alternative in the Draft Installation Restoration Program Feasibility Study entails collecting the shallow groundwater from the Fire Protection Training Areas (FPTAs) and pumping the contaminated water to the base WWTP. A discussion explaining how the recommended alternative will affect operations at the WWTP should be added. This discussion should include the treatment technologies utilized and their ability to treat the constituents of concern, loading capacities, and discharge limits.

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Document 6

Mr. Gauger
Page Two

Section 3.1.1. Page 3-52

4
10.5 IDEM is the lead regulatory agency for Installation Restoration Program (IRP) Sites at Grissom AFB and should be included in the last sentence of the first paragraph on page 3-52.

Section 3.4.1. Page 3-78

5
13.1 Indiana Department of Air Management (IDAM)? This reference should be written as IDEM, Office of Air Management.

Section 4.1.1.1. Page 4-29

6
10.6 IDEM has not received the Draft No Further Action Decision Document for the Fuel Sludge Weathering Site.

Thank you for the opportunity to review the Draft Environmental Impact Statement. We look forward to further discussion of these comments at the Public Hearing. If you have any questions please contact John Manley of my staff at (317) 233-6425.

Sincerely,

Greta J. Brummett
Assistant Commissioner
Office of Environmental Response

GJB:JJM:bl

Document 7

DEPARTMENT OF HEALTH & HUMAN SERVICES — Public Health Service

Centers for Disease Control
Atlanta GA 30333
August 31, 1993

Lt. Col. Gary Baumgartel
Chief, Environmental Planning Division
AFCEE-ESE
8106 Chennault Road
Brooks Air Force Base, Texas 78235-5318

Dear Lt. Col. Baumgartel:

We have completed our review of the Draft Environmental Impact Statement (DEIS) for the Disposal and Reuse of Grissom Air Force Base (AFB), Miami and Cass Counties, Indiana. We are responding on behalf of the U.S. Public Health Service.

We have reviewed the Draft EIS for potential adverse impacts on human health. Particular attention was given to Sections 3.3 and 4.3, Hazardous Materials and Hazardous Waste Management. The issues discussed appear generally to reflect reasonable consideration of potential problems. Several matters raised are dealt with through statements that additional site investigations will be conducted. Reviewers may feel more comfortable with completed investigations, therefore, we suggest that the final EIS summarize any further investigations.

1
10.7 In reference to site 29, the Former Hazardous Material Accumulation Point, Table 3.3.2 states ". . . Drums of industrial waste were stored here in 1991. Site inspection is to be conducted if requested by the State of Indiana." This area is within the boundaries to be retained for military use, according to Section 4.3. If any alternative is considered, there should be either further explication of the reasons why an inspection is not needed or a commitment to do the investigation.

There is a statement that the Installation Restoration Program activities will not be affected by the base closure. That should suffice for the long term. Section 4.3 indicates that releases for civilian use may be delayed for installation restoration purposes; implicitly, no hazardous areas will be released to civilians use prior to restoration.

2
10.8 Section 3.3.10 mentions 30 mm ammo ammunition for A-10 aircraft. Were spent uranium shells used, and is there any residual contamination as a result? The primary hazard if spent uranium were present would be from heavy metal toxicity, not radiation.

Document 7

Page 2 - Lt. Col. Baumgartel

3
10.9 Section 3.3.11 mentions surveys for lead in conjunction with paint; has the possibility of lead or mercury soil contamination in conjunction with small-arms use been considered and ruled out? If so, the fact might be presented more directly; if not, it should be discussed.

Thank you for the opportunity to review and comment on this document. Please ensure that we are included on your mailing list to receive a copy of the Final EIS, and future EIS's which may indicate potential public health impact and are developed under the National Environmental Policy Act (NEPA). If you have any questions regarding these comments, you may contact Dr. Sanford Leffingwell at (404) 488-7070.

Sincerely yours,

Kenneth W. Holt, M.S.E.H.
Special Programs Group (F29)
National Center for Environmental Health

cc: Sanford Leffingwell, M.D.

Document 8

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

SEP 07 1993

REPLY TO THE ATTENTION OF

Mr. George Gauger
AFCEE/ERHM
Brooks Air Force Base, Texas 78235-5000

RE: Draft Environmental Impact Statement for the Disposal and Reuse of Grissom Air Force Base, Indiana

Dear Mr. Gauger:

In accordance with our responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act, we have reviewed the Draft Environmental Impact Statement (DEIS) for the Disposal and Reuse of Grissom Air Force Base (AFB), located in Miami and Cass counties, Indiana, dated July 1993.

Three reuse alternatives were discussed in the DEIS; 1) the Proposed Action which includes the operation of a military cantonment and airfield by the 434th Wing for solely military purposes, along with the development of industrial, commercial, educational, public/recreational, and vacant land areas for civilian/non-aviation mixed use, 2) the operation of a military cantonment by the 434th Wing, including a civilian aviation component, along with the development of industrial, commercial, educational, residential, public/recreation, agricultural, and vacant land areas, and 3) a No-Action Alternative which includes the continued operation of the airfield and military cantonment by the 434th Wing and the remainder of the base property would stay under caretaker status with no civilian use in the long term.

One other land use concept was identified in the DEIS as a possible component of the three reuse alternatives. The Indiana State Emergency Management Agency is proposing to establish a Public Safety Training Institute (PSTI) to provide safety and emergency training for both private and public agencies.

The DEIS identifies environmental impacts associated with the development of the base for all of the alternatives except for the No-Action Alternative, although the Proposed Action will result in the greatest number of adverse effects. Our comments will address environmental issues of concern regarding the potential impacts associated with all construction and reuse alternatives (specifically, the Proposed Action), as discussed in the DEIS for Grissom AFB.

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Document 8

(2)

The DEIS discusses the use and storage of hazardous materials at the base. We recommend working closely with the Indiana Department of Environment Management (IDEM) regarding the management, storage, and disposal of hazardous materials at the base, including appropriate permits. In addition, the DEIS states that the responsibility for managing hazardous materials and hazardous wastes may shift from a single user, to multiple, independent users. As a result, this may reduce the capability of responding to hazardous materials and hazardous waste spills. Under the Proposed Action, this will occur because there will be more than one user of the site. Each operator that uses, stores, and disposes of hazardous wastes will have to obtain permits from IDEM. Furthermore, we recommend that the Grissom AFB Oil and Hazardous Substance Spill Prevention and Response Plan be provided to all landowners and that a single entity be responsible for implementing it if an event occurs.

1 10.10

2 10.11

The schedule for remediation regarding all Installation Restoration Program sites on base should be presented in the Final Environmental Impact Statement (FEIS) and we recommend working closely with the appropriate regulatory agencies regarding remediation activities. In addition, the FEIS should provide information regarding the 31 sites on base which are undergoing various stages of investigation for the presence/absence of past hazardous waste contamination. This information should include the materials disposed at the sites, the cleanup required, and the impacts to the environment, both human and natural.

3 10.12

4 10.13

The DEIS states that the use of pesticides will continue regardless of the reuse activities at the base. The FEIS should provide an analysis regarding the necessity and amounts of pesticides used on base. Also, we recommend that measures be taken to ensure that water quality is not impacted as a result of this usage. The use of filter strips can reduce impacts to water quality.

5 10.14

The DEIS discusses the possibility of demolition and renovation of buildings with asbestos-containing materials. The FEIS should address the potential for proper securement and management of these materials to avoid exposure in buildings occupied for reuse activities. If buildings containing asbestos must be demolished, the proper permits must be obtained from the regulatory agencies, and a landfill permitted to take special wastes should be identified prior to demolition.

6 10.15

The DEIS states that refuse generated at Grissom AFB includes paper, garbage, glass, metal, and other components of general municipal and construction refuse which are transported off-site to a solid waste landfill. The FEIS should discuss the potential for recycling of these materials as an alternative to land disposal.

7 9.1

Document 8

(3)

The DEIS states that air attainment status levels would not be exceeded under the implementation of all the alternatives presented. However, there is a potential for air quality impacts resulting from fugitive dust emissions from ground-disturbing activities during construction. We agree with the proposed mitigation measures discussed in the DEIS to avoid or minimize these emissions.

We concur in the decision to conduct radon screening at the base and providing potential purchasers of base property with the results of this screening. In addition, we agree that disclosure of lead-based paint present in buildings be provided on property leases and transfer documents. The buildings on base should be sampled regarding the potential for additional lead contamination and the FEIS should provide a remediation plan for lead contaminants at the base.

8 10.16

The DEIS discusses the potential for noise impacts regarding reuse of Grissom AFB. Day-night average sound level decibels at 65 or greater could include an additional 149 people under the proposed Action and 80 people under the Military/Joint Use Aviation Alternative than with No-Action Alternative. Specific mitigative measures to reduce noise annoyance, speech and sleep interference should be analyzed and discussed in the FEIS for implementation.

9 14.1

We recommend that the .25 acre potential jurisdictional wetland be preserved, and a 50-100 foot buffer be maintained to avoid degradation from construction and operation activities at the base. Measures to avoid both direct and indirect impacts to this area through facility redesign, control of construction-related erosion, and appropriate restrictions in lease and transfer documents is satisfactory.

10 15.1

Although no proposed or Federally listed endangered or threatened species were found during surveys conducted at the base, approximately 20 Federal endangered, threatened and candidate species may be located in the vicinity of Grissom AFB. Based on this information and the potential to affect proposed and listed species, we recommend consulting with U.S. Fish and Wildlife Service, Bloomington Field Office, to ensure compliance with the Endangered Species Act. We also recommend providing information on these species and potential impacts which may occur as a result of any lease or transfer of base property to future land managers.

11 15.2

The DEIS states that construction and operation of the Proposed Action may alter the flow, turbidity, and pollutant composition of the base runoff water that enters Pipe Creek. This creek may have provided habitat in the past for up to five species of Federal candidate and endangered freshwater mussels.

Document 8

(4)

Although the DEIS states that potential impacts from construction erosion are not likely due to low erosion potential of base soils and the temporary nature of the action, strict measures should be identified in the FEIS and included as part of the requirements of the land transfer. These soil erosion measures included in the land transfer should also require future landowners to coordinate their soil erosion plans with the Soil Conservation Service. This should be done to minimize or eliminate the potential to impact species.

12 11.1

The DEIS discusses the biological significance of the riparian corridor east of U.S. 41. Because of the important breeding and foraging habitat provided by this parcel, we recommend that this undisturbed natural area be maintained and that the FEIS discuss the potential for a conservation easement. Buffers may be necessary to protect the riparian area from both construction and reuse activities at the base. In addition, the vacant land resulting from all the alternatives discussed in the DEIS could be enhanced for diversity of both plant and wildlife species. We also agree that the development of the small wooded area in the southeastern part of the base should be avoided, due to its ecologically valuable nature. In addition, the avoidance and minimization of human disturbances, whenever possible (e.g. mowing) should be considered in the FEIS, as well. The FEIS should provide an analysis regarding the potential for linking these ecologically important areas through the use of wildlife corridors.

13 15.3

14 15.4

15 15.5

We appreciate the opportunity to review the DEIS for the disposal and reuse of Grissom Air Force Base. Based on our review, we have rated this project "EC-2". This rating indicates that we have environmental concerns (EC) relative to this project. The "2" indicates that there is a need for additional information. Our concerns will be addressed after the recommended measures are adopted. These mitigation measures include adverse impacts associated with airport noise, air, soil, wetlands, asbestos, and water quality should be implemented. Additional mitigative measures should also be discussed, where appropriate, in the FEIS. We look forward to reviewing the results of any surveys and reports relating to the environmental impacts discussed in the DEIS. Should you have any questions regarding these comments, please contact Carol Alexander at (312) 886-6244.

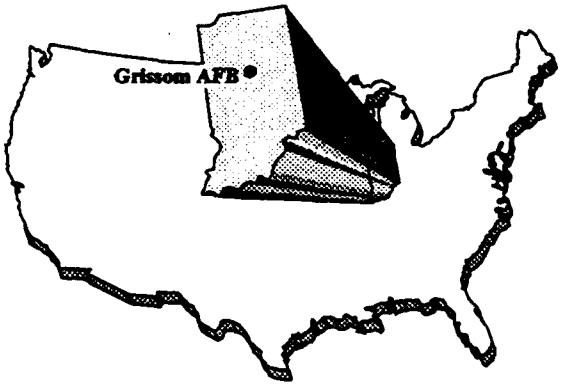
Sincerely yours,

William Franz, Acting Chief
Planning and Assessment Branch

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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

A-Weighted Sound Level. A number representing the sound level, which 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.

Accident Potential Zones (APZ). APZs include a 3,000 x 3,000 foot clear zone (CZ) at both ends of the runway and areas designated as APZ I and APZ II extending beyond the CZ. The accident potential in the CZ is so high that necessary land use restrictions prohibit reasonable economic use of the land. APZ I is less critical but still possesses a significant risk factor. APZ I is a 3,000 x 5,000 foot area with land use compatibility guidelines which are sufficiently flexible to allow reasonable economic use of the land. APZ II is less critical than APZ I; APZ II is a 3,000 x 7,000 foot area, extending to 15,000 feet from the runway threshold.

Acetone. Colorless, volatile, flammable, moderately toxic, liquid aromatic hydrocarbon, used as a solvent.

Acoustics. The science of sound, which includes the generation, transmission, and effects of sound waves, both audible and inaudible.

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.

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.

Alluvial. Composed of alluvium.

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.

Archaeology. A scientific approach to the study of human ecology, cultural history, and cultural process.

Arterial. Signalized street that serves primarily through-traffic and provides access to abutting properties as a secondary function.

Asbestos. A carcinogenic substance formerly used widely as an insulation material by the construction industry; often found in older buildings.

Association. Two or more soils occurring together in a characteristic pattern.

Attainment area. A region that meets the National Ambient Air Quality Standards for a criteria pollutant under the Clean Air Act.

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.

Biological oxygen demand. Total amount of dissolved oxygen that would be consumed by microorganisms in an aerobic environment.

Biophysical. Pertaining to the physical and biological environment, including the environmental conditions crafted by man.

Biota. The plant and animal life of a region.

British Thermal Unit. The quantity of heat required to raise the temperature of one pound of water 1 degree Fahrenheit at a specific temperature.

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.

Chlorobenzene. Flammable, volatile, toxic liquid used as a solvent.

Class I, II, and III Areas. Area classifications, defined by the Clean Air Act (CAA), 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.

Clear Zone (CZ). A 3,000 foot x 3,000 foot area at both ends of a military runway where the overall accident risk is so high that necessary land use restrictions would prohibit reasonable economic use of the land.

Commercial aviation. Aircraft activity licensed by state or federal authority to transport passengers and/or cargo for hire on a scheduled or nonscheduled basis.

Comprehensive Plan. A public document, usually consisting of maps, text, and supporting materials, adopted and approved by a local government legislative body, which describes future land uses, goals, and policies.

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, but does not include (1) the airspace less the 15,000 feet above the surface of the earth of (2) prohibited and restricted areas, other than those listed in Federal Aviation Regulation part 71.

Control zone. Controlled airspace which 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 to nonfederal entity.

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) described 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 CAA required the U.S. Environmental Protection Agency (EPA) 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, which 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 IRP activities are funded.

Disposal. Orderly placement or distribution of property.

Easement. A right or privilege (agreement) that a person may have on another's property.

Effluent. Waste material discharged into the environment.

Endangered Species. A species that is threatened with extinction throughout all or a significant portion of its range.

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.

Faults. Fracture in the 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.

Flake. A small stone fragment produced as a by-product of stone tool manufacturing; may also be used unmodified as a tool itself.

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, formerly in cycles per second.

Friable. Easily crumbled or reduced to powder.

Fungicide. Any substance that kills or inhibits the growth of fungi.

General aviation. All aircraft that are not commercial or military aircraft.

Geomorphic. Pertaining to the form of the earth or its surface features.

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.

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, power plants, transportation, communication systems).

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.

Isolate. An artifact, or a small, disarticulated group of artifacts, that cannot be associated with, or is situated outside of, a cultural resource site.

L_{eq}. The equivalent steady-state sound level, which in a specified period of time would contain the same acoustical energy as time-varying sound levels during the same period.

L_{max}. The highest A-weighted sound level observed during a single event of any duration.

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.

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, 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.

Loam, loamy. Rich, permeable soil composed of a mixture of clay, silt, sand, and organic matter.

Loudness. The qualitative judgement of intensity of a sound by a human being.

Military Cantonment. For purposes of analysis, the military cantonment comprises areas utilized by the 434th Air Refueling Wing (ARW) and U.S. Army Reserves to support military activities including billeting, industrial, storage, administrative, and airfield and flightline facilities.

Military Operations Areas (MOAs). 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 CAA requires U.S. EPA to set nationwide standards, the NAAQS, for widespread air pollutants. Currently, six pollutants are regulated by primary and secondary NAAQS: carbon monoxide (CO), lead, nitrogen dioxide (NO_2), ozone, particulate matter (PM_{10}), and sulfur dioxide (SO_2). 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. A list of sites (federal and state) where release 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 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 and formation of atmosphere 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. EPA or the appropriate state air quality 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 or realigning 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 CAA for attaining the ambient air quality standard for ozone.

PCB-contaminated equipment. Equipment that contains a concentration of polychlorinated biphenyls (PCBs) (see definition) from 50 to 499 parts per million and regulated by the U.S. EPA.

PCB equipment. Equipment that contains a concentration of PCBs of 500 parts per million or greater and regulated by the U.S. EPA.

PCB items. Equipment which contains a concentration of PCBs from 5 to 49 parts per million and regulated by the Indiana Department of Environmental Management.

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.

Physiographic Province. A region in which all parts are similar in geologic structure and climate.

Pleistocene. An earlier epoch of the Quaternary period during the "ice age" beginning approximately 3 million years ago and ending 10,000 years ago. Also refers to the rocks and sediments deposited during that time.

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 CAA, Congress mandated that areas with air cleaner than required by NAAQS must be protected from significant deterioration. The CAA'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 CAA 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 Agriculture due to their optimal physical and chemical characteristics for production of crops.

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.

Seismic Zone I. Area designated in the Uniform Building Code as having a low potential risk for large seismic events.

Sharps. Medical materials capable of cutting or piercing, such as scalpels or needles.

Shrink/swell potential. Volume change in soils possible upon wetting or drying.

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 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.

Stage 3 Noise Standard. An engine noise reduction required by the Federal Aviation Administration for new aircraft, as prescribed in Federal Aviation Regulation Part 36.

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.

Tectonic framework. Structural geologic elements of a region including the rising, stable, and subsiding areas.

Therm. A measurement of units of heat that equals 100,000 British thermal units.

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 NAAQS 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.

Understory. A layer of vegetation growing near the ground and beneath the canopy of a taller layer.

Unified Soil Classification System. A rapid method for identifying and grouping soils for military construction. Soils are grouped by grain-size, gradation, and liquid limit.

Unique Farmland. Agricultural lands protected from conversion by the U.S. Department of Agriculture due to their value for production of specific or high economic value crops.

U.S. Environmental Protection Agency (EPA). The independent federal agency, established in 1970, that regulates federal environmental matters and oversees the implementation of federal environmental laws.

Volatile organic compound (VOC). Compounds containing carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, metallic carbonates, and ammonium carbonate.

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 hydrophytic vegetation, hydric soils, and wetland hydrology criteria under normal circumstances (or meet the special circumstances as described in the 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

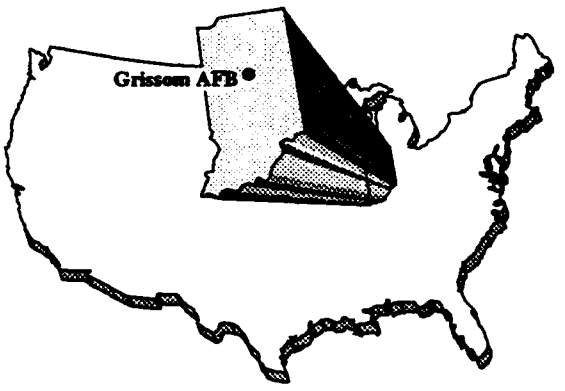
AADT	average annual daily traffic
ACM	asbestos-containing material
AFB	Air Force Base
AFBCA	Air Force Base Conversion Agency
AFR	Air Force Regulation
AFRES	Air Force Reserve
AGL	above ground level
AHERA	Asbestos Hazard Emergency Response Act
AICUZ	Air Installation Compatible Use Zone
ANSI	American National Standards Institute
APZ	Accident Potential Zone
ARFF	Airport Rescue and Fire Fighting
ARTCC	Air Route Traffic Control Center
ARW	Air Refueling Wing
ATC	air traffic control
ATCT	Air Traffic Control Tower
CAA	Clean Air Act (federal)
CE	Civil Engineering
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
COE	Corps of Engineers (U.S. Army)
CPSC	Consumer Product Safety Commission
CZ	Clear Zone
dB	decibel
DBCRA	Defense Base Closure and Realignment Act
DEIS	Draft Environmental Impact Statement
DERP	Defense Environmental Restoration Program
°F	degrees Fahrenheit
DNL	day-night average sound level
DOD	Department of Defense
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
EDMS	Emissions and Dispersion Modeling System
EIS	Environmental Impact Statement
EMO	Environmental Management Office
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration

FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FPMR	Federal Property Management Regulations
FPTA	Fire Protection Training Area
FS	feasibility study
GCRA	Grissom Community Redevelopment Authority
GRA	Grissom Redevelopment Authority
HAP	hazardous air pollutant
HHS	U.S. Department of Health and Human Services
HUD	U.S. Department of Housing and Urban Development
IAC	Indiana Administrative Code
IC	Indiana Code
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
IFR	instrument flight rules
ILS	instrument landing system
IRP	Installation Restoration Program
IWWTP	Industrial Wastewater Treatment Plant
kVA	kilovolt ampere
L_{dn}	day-night average sound level
L_{eq}	equivalent sound level
L_{max}	A-weighted maximum sound level
LOS	Level of Service
$\mu g/m^3$	micrograms per cubic meter
MGD	million gallons per day
mm	millimeter
MMS	Munitions Maintenance Squadron
MOA	Military Operations Area
MSDS	Material Safety Data Sheets
MSL	mean sea level
MTR	military training route
MWH	megawatt-hours
NAAQS	National Ambient Air Quality Standards
NAS	Naval Air Station
NCP	National Contingency Plan
NEACP	National Emergency Airborne Command Post
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NIPSCO	Northern Indiana Public Service Company
NLR	Noise Level Reduction
NM	nautical mile

N_2O	nitrous oxide
N_2O_3	nitrous anhydride
N_2O_4	nitrogen tetroxide
N_2O_5	nitric anhydride
NO	nitric oxide
NO_2	nitrogen dioxide
NO_3	nitrogen trioxide
NO_x	nitrogen oxides
NOI	Notice of Intent
NOISEMAP	Noise Exposure Model
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
PA	preliminary assessment
PAC	Potential Areas of Concern
PA/SI	preliminary assessment/site inspection
PCB	polychlorinated biphenyl
pCi/l	picocuries per liter
PHV	peak-hour volume
P.L.	Public Law
PM_{10}	particulate matter equal to or less than 10 microns in diameter
POI	Points of Interest
POL	petroleum, oils, and lubricants
ppm	parts per million
PSD	Prevention of Significant Deterioration
PSI Energy	Public Service Company of Indiana
RA	Remedial Action
RAMP	Radon Assessment and Mitigation Program
RAPCON	Radar Approach Control
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RD/RA	remedial design/remedial action
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
ROI	Region of Influence
SAC	Strategic Air Command
SARA	Superfund Amendments and Reauthorization Act
SEL	sound exposure level
SH	State Highway

SHPO	State Historic Preservation Officer
SI	site inspection
SIAS	Socioeconomic Impact Analysis Study
SO_2	sulfur dioxide
SPR	Spill Prevention and Response Plan
TD	technology development
TSCA	Toxic Substances Control Act
TSP	total suspended particulate
U.S. #	U.S. Highway
U.S.C.	U.S. Code
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VFR	visual flight rules
VOC	volatile organic compound
VOQ	visiting officers' quarters
VPH	vehicles per hour
WSA	weapons storage area
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 of disposal and reuse of (portions of) Grissom 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 environmental impact statement has been changed. The new point of contact is:

Chief of Environmental Planning Division
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.

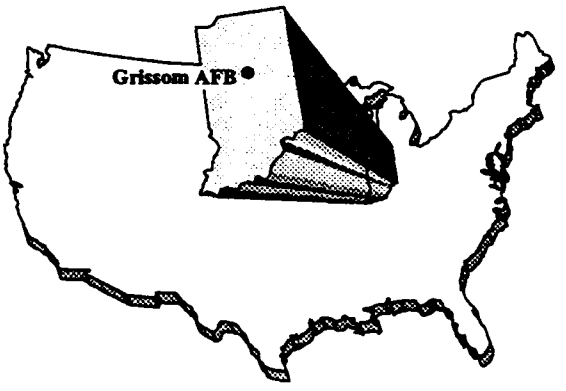
To ensure the Air Force will have sufficient time to consider public inputs on issues to be included in the EISs, and disposal alternatives to be included in the final disposal plans, comments and reuse proposals should be forwarded to the address listed below by December 1, 1991. However, the Air Force 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 Indiana, as well as United States senators and representatives and state legislators.

ELECTED OFFICIALS

Federal Officials

U.S. Senate

The Honorable Daniel Coates
The Honorable Richard Lugar

U.S. House of Representatives

The Honorable Steve Buyer

State of Indiana Officials

Governor

The Honorable Evan Bayh

State Legislature

The Honorable Richard Bech
The Honorable Tracy Boatwright
The Honorable Bill Friend
The Honorable Ray Musselman
The Honorable William Ruppel
The Honorable Thomas Weatherwax
The Honorable Harold Wheeler

Local Officials

The Honorable David Livengood
Mayor of Peru

The Honorable William Vernon
Mayor of Logansport

Local Officials (Continued)

The Honorable Steve Goldsmith
Mayor of Indianapolis

The Honorable Ron Mowery
Mayor of Marion

The Honorable James F. Riehle
Mayor of Lafayette

The Honorable Robert Sargent
Mayor of Kokomo

The Honorable Dallas Winchester
Mayor of Wabash

GOVERNMENT AGENCIES

Federal Agencies

Advisory Council on Historic Preservation

Center for Environmental Health and Injury Control
Center for Disease Control

Department of Agriculture
Environmental Coordination Office

Department of Commerce
Office of Intergovernmental Affairs

Department of Health and Human Services
Office of Environmental Affairs

Department of Housing and Urban Development
Community Management Division

Department of the Interior
Office of Environmental Affairs

General Services Administration
Office of Real Estate Policy and Sales

U.S. Department of Transportation
Federal Aviation Administration
Office of Environment and Energy

U.S. Department of Transportation
Federal Highway Administration

Federal Agencies (Continued)

U.S. Department of Veterans Affairs
Mr. Allen Maurer

U.S. Environmental Protection Agency
Office of Federal Activities

Department of Defense

Defense Technical Information Center

Department of Transportation
Federal Aviation Administration
Office of the Air Force Representative

Office of Economic Adjustment

Regional Offices of Federal Agencies

Advisory Council on Historic Preservation
Eastern Region

Army Corps of Engineers
North Central Division

Department of Agriculture
Soil Conservation Service
Peru

Department of Commerce
Economic Development Administration
Chicago Region

Department of Education
Region 5 Director

Department of Health and Human Services
Region 5 Director

Department of Housing and Urban Development
Region 5 Director

Department of the Interior
Fish and Wildlife Service
Region 3 Director

Department of the Interior
National Park Service
Midwest Region

Regional Offices of Federal Agencies (Continued)

Department of Transportation
Federal Aviation Administration
Airports Division, Great Lakes Region

Department of Transportation
Federal Highway Administration
Region 5 Director

Department of Veterans Affairs
Region 4 Director

Environmental Protection Agency
Chief, Planning & Environmental Review Branch
Region V

State of Indiana Agencies

Agriculture and Rural Development Commission
Commissioner

Department of Education
Superintendent

Department of Environmental Management
Commissioner

Department of Human Services
Commissioner

Department of Labor
Commissioner

Department of Natural Resources
Director

Department of Transportation
Commissioner

Department of Veterans Affairs
Director

Geological Survey Division
State Geologist

Historical Bureau
Director

Public Safety Training Institute
Director

State of Indiana Agencies (Continued)

Soil Conservation Division
Director

State Historic Preservation Officer
Patrick R. Ralston

State Librarian
C. Ray Ewick

State Police
Superintendent

Utility Regulatory Commission
Chairman

Water Division
Director

Local Government Agencies

Bunker Hill Town Board
President

Cass County Board of Commissioners
Chairman

Howard County Board of Commissioners
President

Indiana Department of Highways
Director

Indianapolis Chamber of Commerce

Indianapolis City Council
Chairman

Kokomo Chamber of Commerce

Kokomo City Council
President

Lafayette Chamber of Commerce

Lafayette City Council
Chairman

Logansport-Cass County Chamber of Commerce

Local Government Agencies (Continued)

Logansport City Council
President

Marion Chamber of Commerce

Marion City Council
President

Miami County Board of Commissioners
Chairman

Miami County Courthouse
Director

Miami Economic Development Corporation
Director

Peru Chamber of Commerce

Peru City Council
Chairman

Peru Police Department
Chief

Wabash Chamber of Commerce

Wabash City Council
President

OTHERS

Other Organizations/Individuals

American Operations Corporation
Kristi Field

Grissom Redevelopment Authority
Chairman

Indiana University at Kokomo
Office of the Chancellor

North Central Private Industry Council
Vicki Byrd

PSI Energy
Bill Rodgers

Other Organizations/Individuals (Continued)

Peru Daily Tribune
Beth Ann Sharpnack

WWKI
Stephanie Crayten

WARU
Joe Viery

Jeffry Price

LIBRARIES

Indiana University Library (Kokomo)

Kokomo-Howard County Public Library

Logansport Public Library

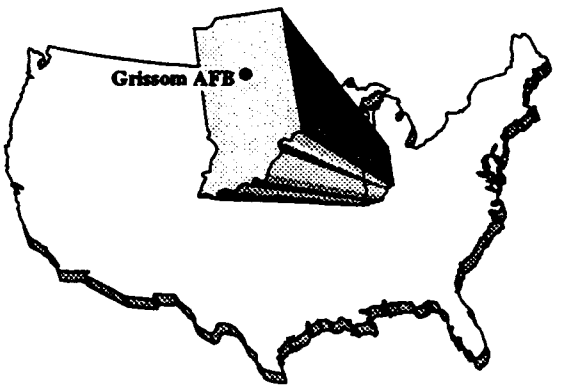
Peru Public Library

Purdue University Library

University of Indiana Library

Wabash Carnegie Public Library

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APPENDIX D

APPENDIX D

IRP BIBLIOGRAPHY

APPENDIX D

IRP BIBLIOGRAPHY

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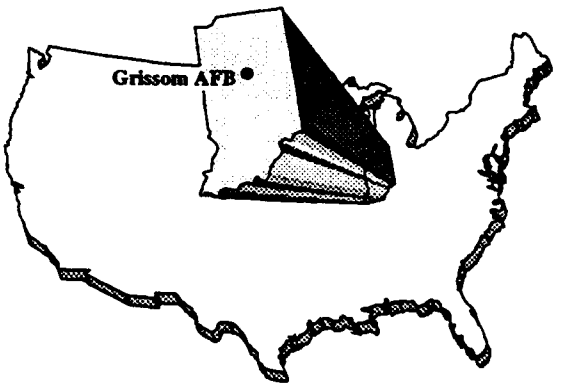
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APPENDIX E

APPENDIX E

METHODS OF ANALYSIS

APPENDIX E

METHODS OF ANALYSIS

1.0 INTRODUCTION

This appendix 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 of portions of Grissom Air Force Base (AFB) and incident reuse. Since future reuse of the site is uncertain in its scope, activities, and timing, the analysis considered several alternative reuse scenarios and evaluated their projected 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 portions 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 portions of Grissom AFB. These projections were used to quantify and evaluate changes in demand on community services, 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 portions of Grissom AFB, which is the source for baseline and projected 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; U.S. Bureau of the Census; Indiana Department of Employment and Training Services; Indiana University School of Business; the counties of Howard, Miami, Cass and Wabash; the cities of Peru, Kokomo, Logansport; and the town of Bunker Hill.

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 and regulations; 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 Grissom AFB, Cass and Miami counties, and the town of Bunker Hill. Noise-related land use impacts were determined by the extent of noise contours created by reuse alternatives and included Cass and Miami counties.

U.S. Air Force tab 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 land use plans and ordinances of Bunker Hill, as well as Cass and Miami counties. 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 General Plans.

Alternatives incorporating airfield uses were examined for consistency with the Grissom AFB Air Installation Compatible Use Zone (AICUZ) study, 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 prerealignment baseline conditions.

For the aesthetics analysis, the affected environment was described based upon the visual sensitivity of areas within and visible from the base. These areas were classified by a windshield survey in fall 1992 and review of an aerial photograph. These areas were categorized as high, medium, and 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 portions of Grissom 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 linkages to the base. The need for improvements to on-base roads, off-base access,

and regional arterials was considered. The analysis was derived using information from state and local government agencies, including the Indiana Department of Transportation, Miami County Board of Commissioners, local airport authorities, and railroad companies. Other data sources used for the roadway analysis include 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 Peru, Kokomo, and Logansport, and the local communities of Bunker Hill, Miami, and Walton, with emphasis on the area surrounding Grissom AFB.

The number of vehicle trips expected as a result of specific land uses on the base was estimated for 1994, 1999, 2004, and 2014 on the basis of direct on-base jobs and other attributes of on-base land uses (such as the number of dwelling units, and institutional, commercial, industrial, and general aviation activities). Trip Generation Data from the Institute of Transportation Engineers was 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 were estimated and resulting volume changes on key regional, local, and on-base roadway segments were then determined.

The transportation network in the ROI was then examined to identify potential impacts to level of service (LOS) arising from future baseline conditions and the direct and indirect effects of reuse alternatives. The planning application from the Highway Capacity Manual provided estimates of LOS resulting from changes in traffic. The planning procedures used in this analysis were based on forecasts of peak hour volumes and on assumed traffic, roadway, and control conditions. Intersections were considered where appropriate. The results provided an estimate of the changes in LOS ratings expected as a result of traffic volume changes on key regional, local, 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 prerealignment reference was used in characterizing these factors related to airspace use at Grissom AFB.

Historical data on military aircraft operations used to characterize airspace use at and around Grissom AFB were obtained from the base. Airport owners/operators were contacted to obtain information on civil airport use, both historical and projected. Military and civil aviation forecasts were derived from conversations with these two groups concerning their expectations of future demand under various scenarios and, where necessary, assumptions were made based on other similar airport operational environments.

The ROI selected for this analysis is an area within a 35-nautical-mile (NM) radius of Grissom AFB from the surface up to 8,000 feet mean sea level (see Figure 3.2-13). The ROI selected for Grissom AFB encompasses the airspace delegated to the Grissom AFB Radar Approach Control for providing Instrument Flight Rules and Visual Flight Rules flight-following services to aircraft. Additionally, the Grissom AFB Air Traffic Control Tower is responsible for providing air traffic control within a 3 NM radius of the base.

The types and levels of aircraft operations for the Proposed Action and alternatives were evaluated and compared to the way airspace was configured and used under the prerealignment reference. The capacity of the airfield to accommodate the projected aircraft fleet and operations was assessed by calculating the airport service volume, using the criteria in the Federal Aviation Administration (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 could likely be accommodated under the existing airspace structure, and to identify potential impacts if operational capacities were exceeded.

Future activity (i.e., based aircraft, operations, and operational fleet mix) for the Air Force Reserve, after the departure of the active duty forces in September 1994, were provided by the 434th Wing. Projections of civil aviation activity for the Joint Use Aviation Alternative were derived by (1) defining a Competitive Market Area based on geographical factors and alternative facilities; (2) developing future levels of civilian based aircraft in the defined Competitive Market Area; (3) estimating relocation of these civilian aircraft to Grissom AFB after the departure of the active duty forces based on conversations with airport owners/representatives, as well as assumptions based on similar airport operational environments; and (4) projecting future operational and air traveler visitor levels of activity based on reasonable "rule of thumb" ratios. A similar approach described in

steps 3 and 4 above was used to derive activity levels for the air cargo and aircraft maintenance scenarios at Grissom AFB.

Information regarding existing rail transportation was obtained from the Indiana Department of Transportation, Office of Intermodal Transportation and Planning.

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 extracted from various engineering reports and the Grissom AFB personnel. Information was also obtained from public and private utility purveyors 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 that serve Grissom AFB and the surrounding area. It was assumed that these local purveyors would provide services within the area of the existing base after disposal/reuse of excessed property. The communities most affected by the disposal and reuse of portions of Grissom AFB are the city of Peru, the towns of Bunker Hill and Walton, and the community of Miami.

Potential impacts were evaluated based on long-term projections of utilities demand as derived from population changes for each reuse (through 2014). These projections were then adjusted to reflect the decrease in demand associated with realignment of Grissom AFB and its subsequent operation under the military cantonment and caretaker status. These adjusted forecasts were then considered the future baseline for comparison with potential reuse alternatives.

The potential effects of reuse alternatives were evaluated by estimating and comparing the additional direct and indirect demand associated with each alternative to the existing and projected operating capabilities of each utility system. Estimates of direct utility demands on base were used to identify the effects of the reuse activities on base-related utility systems. All changes to the utility purveyors' long-term forecasts were based on estimated reuse-related population changes in the region and the future rates of per capita demand explicitly indicated by each purveyor's projections or derived from those projections. 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 excessed 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 Grissom AFB. Interviews with personnel associated with these on-base agencies provided the information necessary to fill any data gaps. State and local agencies were also contacted regarding regulations that would apply to both current and post-realignment activities for Grissom AFB.

The ROI includes the current base property and all geographical areas that have been affected by an on-base release of a hazardous material or hazardous waste. The IRP sites are located within the base boundary.

Prerealignment 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, medical/biohazardous waste, ordnance, and lead-based paint. 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 (i.e., PCBs, medical/biohazardous waste) currently used or generated 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, and subsidence), and flooding potential.

The ROI for the geologic analysis included the region surrounding Grissom AFB relative to seismic activity, mineral resources, and flooding potential. The ROI for the soils analysis was limited to the base and specific areas designated for construction or renovation.

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 for 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 determine poor soil characteristics and recommended mitigation measures.

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 and water availability. Impacts to water quality resources resulting from IRP activities were 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 quality and 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. This analysis drew from climatological data, air quality monitoring data, 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, Indiana Department of Environmental Management Office of Air Management, and the Grissom AFB Bioenvironmental 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 from the source, (i.e., the immediate area of Grissom AFB). The ROI for ozone impacts from project emissions included Miami and Cass counties.

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 were compared to air quality standards and attainment levels for complying with these standards. Appendix M contains the projected emissions inventory information and methods. Estimated background concentrations were added to the reuse-related impacts for comparison with the standards. Impacts were considered significant if reuse-related emissions would (1) increase an off-base ambient pollutant concentration from below to above a federal, state, or local standard; or (2) expose sensitive receptors (such as schools or hospitals) to substantial pollutant concentrations. All other air quality impacts were considered insignificant.

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 Grissom AFB. Most of the data were obtained from the aircraft operations and traffic data prepared for the reuse

alternatives. Day-night average sound levels (DNL) were used to determine noise impacts. A single-event noise analysis using sound exposure levels (SEL) was also performed. In addition, scientific literature on noise effects was referenced.

The ROI for noise was defined as the area within DNL 65 decibel (dB) contours based on land use compatibility guidelines developed from FAA regulations (FAA, 1989). The ROI for surface traffic noise impacts incorporated key road segments identified in the transportation analysis.

Noise levels from aircraft operations were estimated using the FAA-approved Noise Exposure Model (NOISEMAP), Version 6.1. Noise contours for DNL 65 dB and above were depicted. Noise levels due to surface traffic were estimated using the Federal Highway Administration's Highway Noise Model (Federal Highway Administration, 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 DNL above 65 dB.

SELs related to reuse alternatives were provided for representative noise sensitive receptors exposed to aircraft noise from the Grissom AFB 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 I of this EIS.

4.5 BIOLOGICAL RESOURCES

The analysis of impacts to biological resources is divided into vegetation, wildlife, threatened and endangered species, and sensitive habitats. The vegetation analysis addressed impacts from management practices, construction disturbance, herbicide use, or possible toxic contamination. Wildlife impacts addressed include habitat destruction, increased stress from noise or human presence, and individual mortality from airplane strikes. Impacts to candidate, threatened, and endangered species are especially noted where applicable. Sensitive habitats are defined as areas protected by regulations (such as wetlands and habitat for protected species), and plant communities having agency concern for being unusual, being limited in distribution, or being important seasonal use areas for wildlife. Impacts to sensitive habitats that may occur from habitat loss or degradation, noise impacts, increase in human use of an area, and other sources are addressed.

Some potential indirect impacts to biological resources considered in this analysis include erosion (habitat loss, water pollution) and increased recreational use of natural areas (animal stress, illegal collecting). Standard biological regulations, such as the Endangered Species Act and Clean Water Act were considered in this analysis. The ROI for biological resources includes the base property and off-base drainages that receive runoff from base surface water.

Data sources include general plans; aerial photographs, environmental evaluations, and inventories or descriptions of the base; U.S. Fish and Wildlife Service National Wetlands Inventory maps; rare, candidate, threatened, and endangered species lists; general information from federal and state agencies; Gray's Manual of Botany; Mammals of the Eastern United States; Birds of North America; and Atlas of North American Freshwater Fishes. Site visits were conducted to gain habitat quality information, survey for threatened and endangered species, and map vegetation, wetlands, and other sensitive habitats.

Current and future uses were compared to determine changes in conditions for biology. Acreage of vegetation/habitat loss were assessed. Other resource effects were overlaid on biology to note changes and conditions stressful to plant or animal life. Mitigations have been suggested where appropriate.

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 in 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 material on file at Grissom AFB; a basewide archaeological survey, interviews with individuals familiar with the history, archaeology, or paleontology of Central Indiana area; and records of the Information Center of the Indiana Archaeological Inventory. The ROI for cultural resources includes all areas within the boundaries of Grissom AFB.

The EIS contains the most up-to-date information on the importance of cultural resources on Grissom AFB, based on recent and ongoing evaluation of eligibility for the NRHP. Cultural resources for which eligibility information was unavailable were assumed to be eligible for the National Register, as is stipulated in the National Historic Preservation Act (NHPA).

According to National Register criteria (36 CFR 60.4), the quality of significance is present in districts, sites, buildings, structures, and objects that:

- Are associated with events that have made a significant contribution to the broad patterns of history
- Are associated with the lives of persons significant in the past
- 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
- 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 NHPA, which addresses the protection of archaeological, historic, and Native American resources. In compliance with Sections 106 and 111 of the NHPA, the Air Force is consulting with the State Historic Preservation Officer.

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 in the NRHP. Actions that can diminish the integrity, research potential, or

other important characteristics of a historic property include the following (36 CFR 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 National Register
- Introduction of visual or auditory elements that are out of character with the property or that alter its setting
- Transfer or sale 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 a eligible 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 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 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 a 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 CFR 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.

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APPENDIX F

APPENDIX F

CURRENT PERMITS

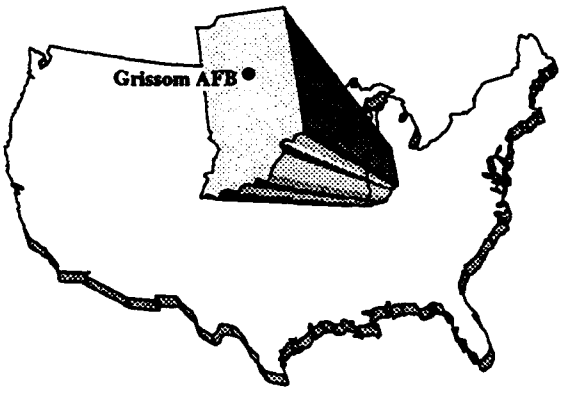
APPENDIX F

CURRENT PERMITS

Permit No.	Permitted Facility/ Equipment	Issuing Agency	Date of Issuance	Date of Expiration
52-03-94-0124	Heat Plant - Boilers No. 1 & 2	IDEM	7/13/90	3/1/94
52-03-94-0125	Heat Plant - Boiler No. 3	IDEM	7/13/90	3/1/94
52-03-94-0126	Heat Plant - Boiler No. 4	IDEM	7/13/90	3/1/94
52-03-94-0127	Heat Plant - Boiler No. 5	IDEM	7/13/90	3/1/94
52-03-94-0128	Petroleum Storage Facility	IDEM	7/13/90	3/1/94
IN 0024902	Basewide NPDES	IDEM	5/12/86	2/28/91[a]

Note: (a) Grissom AFB is currently authorized by IDEM to operate under an old permit; a new permit application is in process.
IDEM = Indiana Department of Environmental Management.
NPDES = National Pollutant Discharge Elimination System.

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APPENDIX G

APPENDIX G

STORAGE TANKS, OIL/WATER SEPARATORS, AND PESTICIDE STORAGE AT GRISSOM AFB

Table G-1. Inventory of Active Underground Storage Tanks, 1993
Page 1 of 2

Location (Facility No.)	Capacity (gallons)	Contents	Year Installed	Construction Material	Regulated
1	1,000	Diesel	1988	Fiberglass	R
14	300	Diesel	1963	Steel	R
19	500	#2 Fuel Oil	1988	Steel	NR
50[a]	325	Diesel	1961	Steel	R
103	1,000	Diesel	1957	Steel	R
121A	1,000	Gasoline	1984	Steel	R
121B	1,000	Diesel	1984	Steel	R
145	5,000	#2 Fuel Oil	1964	Steel	NR
151[a]	550	Diesel	1987	Fiberglass	R
159	325	Diesel	1957	Steel	R
162	2,000	#2 Fuel Oil	1975	Steel	NR
195	275	#2 Fuel Oil	1973	Steel	NR
216	500	Diesel	1985	Steel	R
223A	4,000	Diesel	1979	Steel	R
223B	20,000	#2 Fuel Oil	1976	Steel	NR
225	206,325	#2 Fuel Oil	1957	Steel	NR
395[a]	500	Waste Diesel	1964	Steel	R
404	2,000	Waste JP-4	1956	Steel	R
407A	550	#2 Fuel Oil	1978	Steel	NR
407B	1,000	Used Oil	1963	Steel	R
407C	550	#2 Fuel Oil	1963	Steel	NR
407D	6,000	MOGAS	1963	Steel	R
407E	6,000	MOGAS	1963	Steel	R
407F	6,000	MOGAS	1963	Steel	R
410	60	Diesel	1984	Steel	NR
419A	10,000	Gasoline	1987	Fiberglass	R
419B	10,000	Gasoline	1987	Fiberglass	R
419C	10,000	Diesel	1987	Fiberglass	R
424A	2,000	JP-4	1963	Steel	R
424B	2,000	Gasoline	1963	Steel	R
424C	2,000	Diesel	1963	Steel	R
430	60	MOGAS	1969	Steel	NR
441	10,000	Diesel	1977	Steel	R
512	2,000	Diesel	1978	Steel	R
521	1,000	#2 Fuel Oil	1979	Steel	NR
522A	275	Diesel	1984	Steel	R
522B	1,000	Gasoline	1984	Steel	R
530	325	Diesel	1958	Steel	R
570	1,000	#2 Fuel Oil	1972	Steel	NR
591A[a]	5,000	#2 Fuel Oil	1987	Steel	NR
591B[a]	100	Used Oil	1987	Steel	NR

Note: (a) Underground storage tank to be used by the 434th ARW after base realignment.
MOGAS = motor gasoline.
NR = Underground storage tank is not regulated by the state of Indiana.
R = Underground storage tank is regulated by the state of Indiana.

Table G-1. Inventory of Active Underground Storage Tanks, 1993
Page 2 of 2

Location (Facility No.)	Capacity (gallons)	Contents	Year Installed	Construction Material	Regulated
592[a]	15,000	#2 Fuel Oil	1987	Fiberglass	NR
593A[a]	2,000	JP-4	1990	Steel	R
593B[a]	2,000	Gasoline	1990	Steel	R
593C[a]	2,000	#2 Fuel Oil	1990	Steel	NR
595[a]	4,000	#2 Fuel Oil	1987	Steel	NR
597	4,000	#2 Fuel Oil	1985	Steel	NR
600	2,000	Diesel	1963	Steel	R
663[a]	1,000	Diesel	1987	Fiberglass	R
671[a]	275	Diesel	1956	Steel	R
688	1,000	#2 Fuel Oil	1964	Steel	NR
702	550	Diesel	1959	Steel	R
708[a]	2,000	Diesel	1963	Steel	R
711	1,500	#2 Fuel Oil	1960	Steel	NR
714	500	Diesel	1974	Steel	R
728	2,000	#2 Fuel Oil	1960	Steel	NR
735A[a]	50,000	JP-4	1957	Steel	NR
735B[a]	50,000	JP-4	1957	Steel	NR
735C[a]	50,000	JP-4	1957	Steel	NR
735D[a]	50,000	JP-4	1957	Steel	NR
735E[a]	50,000	JP-4	1957	Steel	NR
735F[a]	50,000	JP-4	1957	Steel	NR
735G[a]	50,000	JP-4	1957	Steel	NR
735H[a]	50,000	JP-4	1957	Steel	NR
735I[a]	2,000	Waste JP-4	1957	Steel	NR
736A[a]	50,000	JP-4	1957	Steel	NR
736B[a]	50,000	JP-4	1957	Steel	NR
736C[a]	50,000	JP-4	1957	Steel	NR
736D[a]	50,000	JP-4	1957	Steel	NR
736E[a]	50,000	JP-4	1957	Steel	NR
736F[a]	50,000	JP-4	1957	Steel	NR
736G[a]	2,000	Waste JP-4	1957	Steel	NR
747A	3,000	#2 Fuel Oil	1960	Steel	NR
747B	6,000	#2 Fuel Oil	1960	Steel	NR
749	3,000	#2 Fuel Oil	1960	Steel	NR
755	5,000	#2 Fuel Oil	1960	Steel	NR
776	55	MOGAS	1963	Steel	NR

Note: (a) Underground storage tank to be used by the 434th ARW after base realignment.
MOGAS = motor gasoline.
NR = Underground storage tank is not regulated by the state of Indiana.
R = Underground storage tank is regulated by the state of Indiana.

Table G-2. Inventory of Active Aboveground Storage Tanks, 1993
Page 1 of 2

Location (Facility No.)	Capacity (gallons)	Contents	Year Installed	Construction Material
11	275	Diesel	Unknown	Steel
33	500	Empty	Unknown	Steel
34	500	Diesel	1988	Steel
114[a]	275	Diesel	1983	Steel
121	275	MOGAS	Unknown	Steel
122	200	Waste Oil	1944	Steel
141	1,000	Diesel	1955	Steel
200	55	Diesel	Unknown	Steel
200	25,000	Demineralized Water	1962	Steel
216A	500	Carbon Dioxide	1985	Steel
216B	500	Liquid Petroleum	1942	Steel
223A	275	#2 Fuel Oil	Unknown	Steel
223B	275	Diesel	Unknown	Steel
230	55	Unknown	Unknown	Steel
235	420,000	#6 Fuel Oil	1976	Steel
239A	100	MOGAS	Unknown	Steel
239B	100	Diesel	Unknown	Steel
388	115	Diesel	Unknown	Steel
392[a]	25,000	Diesel	1978	Steel
399A	12,000	Deicing Fluid	1977	Steel
399B	10,000	Diesel	1977	Steel
399C	12,000	Deicing Fluid	1977	Steel
400	630,000	JP-4	1957	Steel
401	630,000	JP-4	1957	Steel
402[a]	630,000	JP-4	1957	Steel
403[a]	630,000	JP-4	1957	Steel
406	1,050,000	JP-4	1961	Steel
414[a]	200	JP-4	1957	Steel
416	200	JP-4	1957	Steel
419	600	Diesel	1983	Steel
420[a]	500	Waste Oil	1958	Steel
427[a]	1,000	Empty	Unknown	Steel
430[a]	500	MOGAS	1964	Steel
432A[a]	5,000	Liquid Oxygen	1964	Steel
432B[a]	400	Liquid Oxygen	1964	Steel
432C[a]	2,000	Liquid Nitrogen	1964	Steel
432D[a]	400	Liquid Nitrogen	1964	Steel
433	325	MOGAS	1970	Steel
435A[a]	18,000	AFFF	Unknown	Steel
435B[a]	18,000	AFFF	Unknown	Steel
435C[a]	18,000	AFFF	Unknown	Steel
435D[a]	18,000	AFFF	Unknown	Steel
439	250	Waste Oil	1959	Steel
440	550	#2 Fuel Oil	1973	Steel

Note: (a) Tank to be used by the 434th ARW after base realignment.
AFFF = aqueous film-forming foam.
MOGAS = motor gasoline.

Table G-2. Inventory of Active Aboveground Storage Tanks, 1993
Page 2 of 2

Location (Facility No.)	Capacity (gallons)	Contents	Year Installed	Construction Material
445	1,000	AVGAS	1983	Steel
453[a]	250	Stripping Fluid	1989	Steel
461A	5,000	Oil/Water	1989	Steel
461B	5,000	Oil/Water	1989	Steel
461C	500	Oil/Water	1991	Steel
461D	500	Oil/Water	1989	Steel
521	275	#2 Fuel Oil	Unknown	Steel
549	500	Liquid Petroleum	1975	Steel
598[a]	225	Diesel	1986	Steel
600	12,000	#2 Fuel Oil	1986	Steel
683	5,500	#2 Fuel Oil	1988	Steel
687A	275	#2 Fuel Oil	1963	Steel
687B	275	#2 Fuel Oil	Unknown	Steel
687C	275	#2 Fuel Oil	Unknown	Steel
691	500	Diesel	Unknown	Steel
704	115	Diesel	Unknown	Steel
705	115	Diesel	1982	Steel
707	500	Diesel	1961	Steel
710A	275	Diesel	1957	Steel
710B	1,000	Propane	1957	Steel
715A[a]	275	Diesel	1957	Steel
715B[a]	1,000	Propane	1957	Steel
727	275	Diesel	1965	Steel
729	550	Diesel	1991	Steel
730	250	Diesel	1983	Steel
735[a]	500	Diesel	1991	Steel
736[a]	500	Diesel	1991	Steel
741	2,500	JP-4	Unknown	Steel
747	55	Diesel	Unknown	Steel
748A	275	#2 Fuel Oil	1959	Steel
748B	500	Liquid Petroleum	1959	Steel
749	275	#2 Fuel Oil	1960	Steel
750	300	Diesel	1991	Steel
750	3,000	Diesel	1991	Steel
755	275	Diesel	1957	Steel
786	275	Diesel	1979	Steel
961	2,500	JP-4	1988	Steel

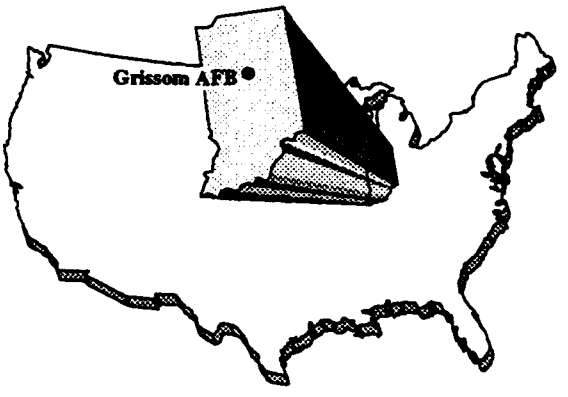
Note: (a) Tank to be used by the 434th ARW after base realignment.
AVGAS = aviation fuel.

Table G-3. Inventory of Oil/Water Separators at Grissom AFB, 1993

Location (Facility No.)	Description	Capacity (gallons)
11	Hangar Wash rack	1,600
21	Base Supply and Equipment	750
122	C.E. Snow Barn	1,100
145	Auto Hobby Shop	1,600
190	Jet Engine	1,000
	Maintenance Hangar	Unknown
223	Heat Plant	1,600
407	Base Exchange Service Station	2,000
420/421[a]	Refueling Vehicle Maintenance	1,600
425[a]	Aerospace Ground Equipment	400
434[a]	Nose Dock, North End	900
434[a]	Nose Dock, South End	900
435[a]	Nose Dock, North End	900
435[a]	Nose Dock, South End	900
436[a]	Nose Dock, North End	900
436[a]	Nose Dock, South End	900
437[a]	Nose Dock, North End	900
437[a]	Nose Dock, South End	900
438[a]	Nose Dock, North End	900
438[a]	Nose Dock, South End	900
439[a]	Nose Dock, North End	900
439[a]	Nose Dock, South End	900
461	Industrial Waste Treatment	10,000
591[a]	Jet Engine Maintenance Shop	100
592	A10 Maintenance Hangar	5,800
593[a]	Aircraft Support Equipment	300
679	West of Ramp (Row A)	36,000
788	Fire Training Area	4,200
895[a]	Southwest Corner, Tank Farm	25,000
896	East Ramp	104,500
897[a]	Northeast Corner, Tank Farm	42,000
959[a]	Power Check Pad	3,000

Note: (a) Oil/water separator to be used by the 434th ARW after base realignment.
CE = Civil Engineering.

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APPENDIX H

APPENDIX H

AIR FORCE POLICY FOR MANAGEMENT OF ASBESTOS CONTAINING MATERIAL (ACM) AT CLOSURE BASES AND BUILDINGS SURVEYED FOR ASBESTOS AT GRISSOM AFB

APPENDIX H

AIR FORCE POLICY FOR MANAGEMENT OF ASBESTOS CONTAINING MATERIAL (ACM) AT CLOSURE BASES

Grissom Air Force Base (AFB) is realigning as part of the Base Closure and Realignment Act. Part of the Defense Base Closure and Realignment Commission recommendations for Grissom AFB was the retention of the 434th Air Refueling Wing (ARW) of the Air Force Reserve within a military cantonment; the remainder of the base outside this area would be available for reuse. The Air Force Policy for Management of ACM at Grissom AFB only applies to those areas outside of the retained military cantonment that are being disposed of.

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
Acting Deputy Assistant Secretary of the Air Force
(Environment, Safety, and Occupational Health)

Date

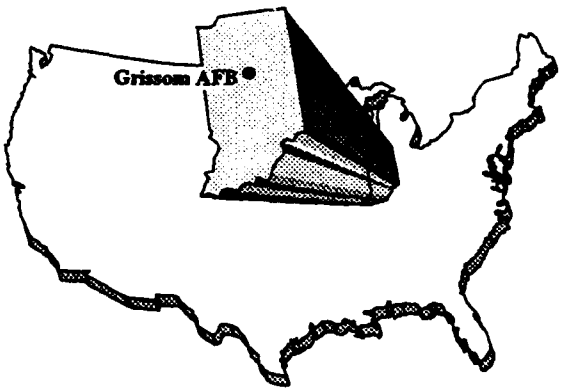
This Air Force Policy for Management of Asbestos Containing Material (ACM) at Closure Bases, March 25, 1994, supersedes previous Air Force Policy on management of asbestos dated November 6, 1990, and May 1, 1992, respectively, and has been retyped for purposes of clarity and legibility.

Table H-1. Facilities Surveyed for Asbestos, Grissom AFB, 1988
Page 1 of 2

Location (Facility No.)	Facility Description	Asbestos-Containing Material (ACM) Present
2	Old Headquarters Building	Block pipe insulation, joints associated with all pipe insulation
11	Hangar	Block and corrugated pipe insulation, joints associated with all pipe insulation, boiler insulation
18	RAPCON	Duct insulation, joints associated with all pipe insulation
37	Reserve Operations Training	No ACM identified
100	Fire Station	Block pipe insulation, joints associated with cardboard/paper pipe insulation, boiler insulation
137	Gymnasium	Block pipe insulation, joints associated with all pipe insulation, boiler insulation
143	Swimming Pool	Block pipe insulation, joints associated with all pipe insulation, boiler insulation
150	Flight Simulator	Block pipe insulation, joints associated with all pipe insulation, boiler insulation
156	Bank, Credit Union/Wing Headquarters	Block and corrugated pipe insulation, joints associated with all pipe insulation, boiler insulation, transit shingles
159	Communications Center	Block pipe insulation, joints associated with cardboard/paper pipe insulation, boiler insulation
200	Hangar	Block and corrugated pipe insulation, joints associated with all pipe insulation, boiler insulation
209	Base Supply	Corrugated pipe insulation, joints associated with all pipe insulation, boiler insulation
221	Civil Engineering Building	Block pipe insulation, joints associated with all pipe insulation, boiler insulation
223	Heat/Power Plant	Block and corrugated pipe insulation, joints associated with all pipe insulation, boiler insulation
300	Chapel Center	Corrugated pipe insulation, joints associated with all pipe insulation, boiler insulation
301	Barracks	Block and corrugated pipe insulation, joints associated with all pipe insulation, boiler insulation, transit shingles
307	Two-Story Dorm	Corrugated pipe insulation, joints associated with all pipe insulation, boiler insulation
308	Two-Story Dorm	Corrugated pipe insulation, joints associated with all pipe insulation, boiler insulation
313	Two-Story Dorm	Corrugated pipe insulation, joints associated with all pipe insulation, boiler insulation

Table H-1. Facilities Surveyed for Asbestos, Grissom AFB, 1988
Page 2 of 2

Location (Facility No.)	Facility Description	Asbestos-Containing Material (ACM) Present
327	Three-Story Dorm	No ACM identified
328	Three-Story Dorm	Joints associated with non-suspect pipe insulation
329	Three-Story Dorm	No ACM identified
331	Three-Story Dorm	Corrugated pipe insulation, joints associated with all pipe insulation, boiler insulation
337	Base Chapel	Block and corrugated pipe insulation, joints associated with block pipe insulation
415	Cold Storage Facility	Block and corrugated pipe insulation, joints associated with corrugated pipe insulation
417	Commissary	No ACM identified
427	Avionics Shop	Corrugated pipe insulation, joints associated with corrugated pipe insulation, boiler insulation, duct exterior
440	Refueling Operations	No ACM identified
530	Clinic	Block and corrugated pipe insulation, joints associated with all pipe insulation, boiler insulation, spray-on acoustical plaster, exterior duck insulation
540	Open Mess (officers)	Block pipe insulation, joints associated with all pipe insulation, boiler insulation, spray-on acoustical plaster
550	Grissom Inn - VOQ	Block pipe insulation, joints associated with block pipe insulation, boiler insulation
551	Grissom Inn - VOQ	Block and corrugated pipe insulation, joints associated with all pipe insulation, boiler insulation
563	Youth Center	No ACM identified
570	Child Care Center	Lay-in acoustical panels
572	Base Exchange	No ACM identified
575	Recreation Center	Block pipe insulation, joints associated with all pipe insulation, spray-on acoustical plaster
576	Base Theater	Block pipe insulation, joints associated with block pipe insulation, spray-on acoustical plastics
669	Squadron Operations	Block and corrugated pipe insulation, joints associated with all pipe insulation
671	Wing Command Headquarters	Block and corrugated pipe insulation, joints associated with corrugated pipe insulation, boiler insulation
748	Old Dog Kennel	Corrugated pipe insulation, joints associated with corrugated pipe insulation



APPENDIX I

APPENDIX I

NOISE

APPENDIX I

NOISE

1.0 DESCRIPTION OF PROPOSED ALTERNATIVES

1.1 PREREALIGNMENT

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 Grissom Air Force Base (AFB). Operations of based aircraft for prerealignment were developed from data provided by Air Force personnel. Transient aircraft operations were developed in the airspace study presented in Section 3.2.3, Transportation. The contours for prerealignment operations are shown in Figure 3.4-4 in the Affected Environment chapter of this Environmental Impact Statement (EIS). In airport analyses, areas exposed to a day-night average sound level (DNL) of 65 decibels (dB) are considered in land use compatibility planning and impact assessment; therefore, these areas were of particular interest.

The surface traffic noise levels in the vicinity of the base were established in terms of DNL 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/night split were developed in the traffic engineering study presented in Section 3.2.3, Transportation, and were used to estimate prerealignment noise levels. The traffic data used in the analysis are presented in Table I-1. The noise levels generated by surface traffic were predicted using the model published by the Federal Highway Administration (1978). The noise levels are estimated as a function of distance from the centerline of the nearest road.

The number of residents exposed to DNL 65 dB or greater was determined from U.S. Geological Survey (USGS) maps that had been photo-revised in 1980.

1.2 REALIGNMENT BASELINE

Military operations from the Air Force Reserve 434th Air Refueling Wing (ARW) would continue at the time of realignment. Activities associated with realignment include: Air Force Reserve, maintenance, and transient operations.

Table I-1. Surface Traffic Data (Project and Non-Project)

Roadway	Segment	AADT	Speed Assumed (mph)	Road Width Assumed (lanes)	Day/Night Split percent	Percentage Trucks Medium/Heavy
Prerealignment						
U.S. 31	SH 18 to 800 South	(a)	55	4	84.2/15.8	4.7/6.2
U.S. 31	800 South to SH 218 (Jct. East)	18,440	55	4	84.2/15.8	4.7/6.2
U.S. 31	SH 218 (Jct. East) to Main Gate	19,110	55	4	84.0/16.0	4.7/6.2
U.S. 31	Main Gate to SH 218 (Jct. West)	18,950	55	4	84.0/16.0	4.7/6.2
U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	20,130	55	4	86.7/13.3	4.7/6.2
U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	12,090	55	4	86.7/13.3	4.7/6.2
U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	14,330	55	4	86.7/13.3	4.7/6.2
Old U.S. 31	U.S. 31 to 225 South	8,360	55	2	92.0/8.0	1.9/2.5
Old U.S. 31	225 South to West River Road	9,870	55	2	92.0/8.0	1.9/2.5
SH 218 (Jct. West)	400 West to U.S. 31	2,920	45	2	92.0/8.0	1.9/2.5
SH 218 (Jct. West)	County Line Road to 400 West	1,570	45	2	92.0/8.0	1.9/2.5
SH 218 (Jct. West)	900 East to 1000 East	1,280	55	2	92.0/8.0	1.9/2.5
SH 218 (Jct. East)	U.S. 31 to 200 West	2,330	55	2	92.0/8.0	1.9/2.5
Realignment						
U.S. 31	SH 18 to 800 South	(a)	55	4	84.2/15.8	4.7/6.2
U.S. 31	800 South to SH 218 (Jct. East)	17,870	55	4	84.2/15.8	4.7/6.2
U.S. 31	SH 218 (Jct. East) to Main Gate	18,220	55	4	84.0/16.0	4.7/6.2
U.S. 31	Main Gate to SH 218 (Jct. West)	18,390	55	4	84.0/16.0	4.7/6.2
U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	19,150	55	4	86.7/13.3	4.7/6.2
U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	12,040	55	4	86.7/13.3	4.7/6.2
U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	14,470	55	4	86.7/13.3	4.7/6.2
Old U.S. 31	U.S. 31 to 225 South	7,440	55	2	92.0/8.0	1.9/2.5
Old U.S. 31	225 South to West River Road	9,160	55	2	92.0/8.0	1.9/2.5
SH 218 (Jct. West)	400 West to U.S. 31	2,040	45	2	92.0/8.0	1.9/2.5
SH 218 (Jct. West)	County Line Road to 400 West	1,460	45	2	92.0/8.0	1.9/2.5
SH 218 (Jct. West)	900 East to 1000 East	950	55	2	92.0/8.0	1.9/2.5
SH 218 (Jct. East)	U.S. 31 to 200 West	2,190	55	2	92.0/8.0	1.9/2.5

Note: (a) Not modeled for prerealignment or realignment.
AADT = average annual daily traffic.
mph = miles per hour.
SH = State Highway.
U.S. # = U.S. Highway.

Projected annual operations were developed in the airspace study presented in Section 3.2.3, Transportation. Flight track and runway utilization were determined from operating conditions provided by the Air Force. Table I-2 shows the modeled aircraft for the realignment baseline. The noise contours for realignment operations are presented in Figure 3.4-4 of this EIS.

Table I-2. Annual Aircraft Operations for the Military Cantonment (all years)

Type of Aircraft[a]	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Military - 434th ARW			9,500	59
KC-135R	9,500	100		
Military - Transient Aircraft			6,600	41
KC-135R	2,690	41		
KC-135E	120	2		
F-4C	1,230	19		
A-6A	920	14		
Cessna 182	100	2		
F-16A	693	10		
P-3A	693	10		
T-38A	77	1		
C-130E	77	1		
Total			16,100	100

Note: (a) Representative aircraft modeled for the fleet mix indicated in the Proposed Action.

Takeoff and landing profiles for the based KC-135R were provided by the Air Force. Default profiles from the Air Force-developed Noise Exposure Model (NOISEMAP), Version 6.1 (Moulton, 1990), were used for all transient aircraft.

Engine runup operations of KC-135R aircraft were assumed to result from 434th ARW activity. The 434th ARW runups were assumed to occur at two existing runup locations located to the north of the centerpoint of the runway. The assumed number of runup operations is summarized in Table I-3. It was assumed that no noise suppression facilities would be available. The aircraft were assumed to have headings of 90 and 315 degrees at the two locations, respectively.

Table I-3. Number of Daily Engine Runup Operations for the Military Cantonment

	1999	2004	2014
KC-135R	0.131	0.131	0.131

The noise levels projected for the realignment baseline for surface traffic were calculated using the traffic projections at base realignment. The AADTs used for the analysis are presented in Table I-1.

1.3 PROPOSED ACTION

The Proposed Action for the reuse of Grissom AFB would result in the continued use of the Air Force Reserve airfield. Activity associated with the 434th ARW would continue at realignment levels. Non-aviation land uses include industrial, institutional (educational), commercial, public/recreation, and vacant.

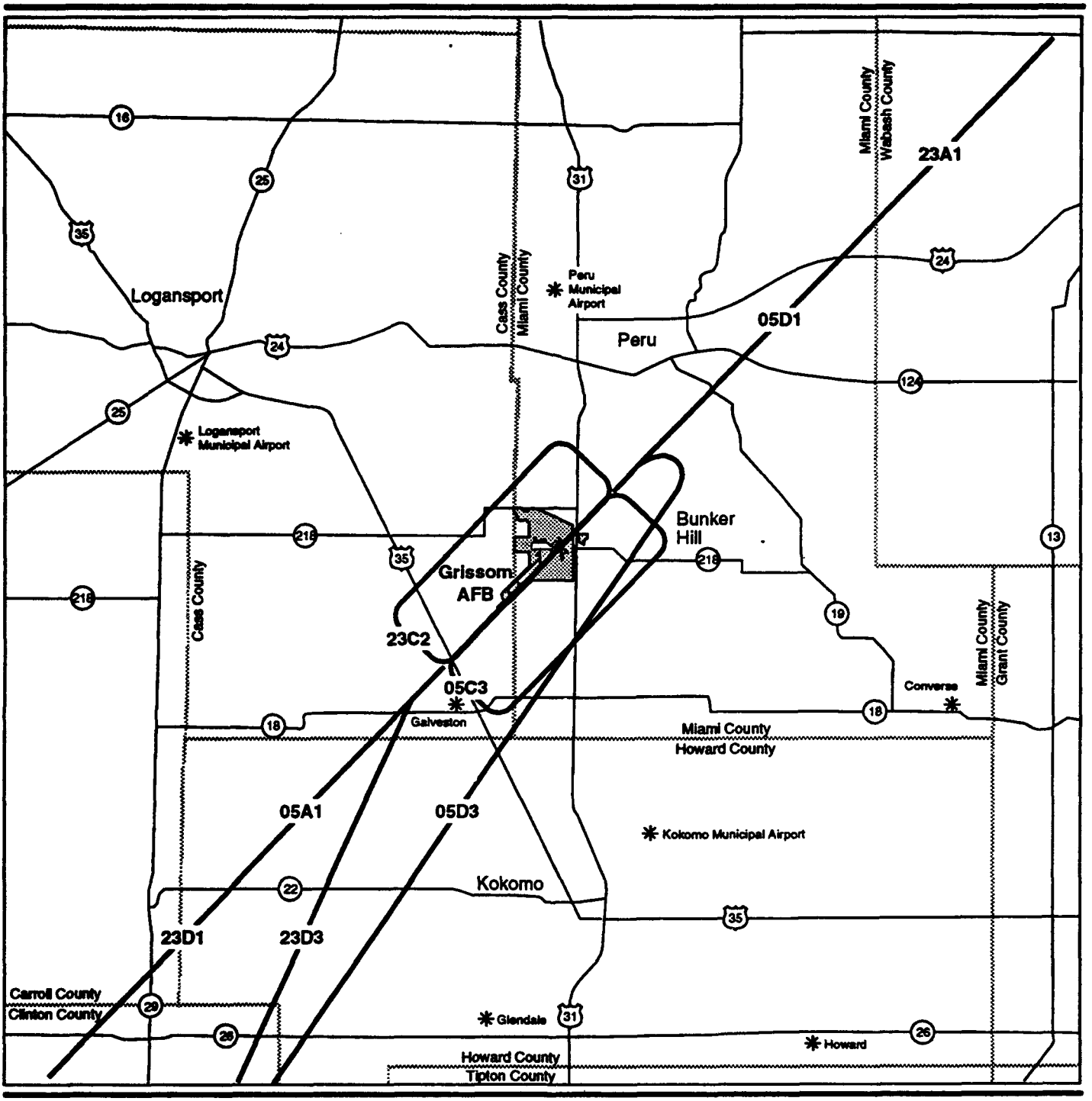
The fleet mix and annual aircraft operations for all modeled years are contained in Table I-2. The DNL contours for the flight operations are presented as realignment noise contours in Section 3.4.4, Noise. The proposed flight tracks modeled are presented in Section 4.4.4, Noise. The day-night split for all aircraft operations is shown in Table I-4.

Table I-4. Day-Night Split of Aircraft Operations for Proposed Action and Alternative

Aircraft Type	Percent Daytime	Percent Nighttime
Proposed Action		
Based Aircraft		
KC-135R	37	63
Transient Aircraft		
F-4C	80	20
KC-135R, A6	98	2
KC-135E	96	4
All Others	100	0
Joint Use Aviation Alternative		
General Aviation	75	25
Cargo	75	25
Maintenance	75	25

There would be no additional engine runup operations in the Proposed Action other than those associated with 434th ARW activity (see Table I-3). Runups were assumed to occur at the same locations as those described for the realignment baseline.

The touch-and-go patterns and the initial departure and final approach flight tracks used in the modeling are shown in Figure I-1. The departure, arrival, and touch-and-go flight tracks used are based on existing usage. Touch-and-go operations were assumed to consist of 38 percent of KC-135R



EXPLANATION

- Flight Tracks
- U.S. Highway
- State Highway
- Airport
- County Line

0 1.25 2.5 5 Miles

Military Flight Tracks

Figure I-1

operations. Daily operations assigned to each flight track and time period for the Proposed Action are provided in Table I-5 for each of the study years.

Takeoff and landing profiles for the based KC-135R were provided by the Air Force. Default profiles from the Air Force-developed NOISEMAP, Version 6.1 (Moulton, 1990), were used for all transient aircraft.

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 I-6. The traffic mix, day/night split, and speed were assumed to remain the same as for the prerealignment reference.

The number of residents exposed to DNL 65 dB or greater was determined from USGS maps that had been photo-revised in 1980.

1.4 JOINT USE AVIATION ALTERNATIVE

Under the Joint Use Aviation Alternative the base airfield would be converted to a joint military and civilian use aviation facility. Civilian aviation activities would include general aviation operations and maintenance operations. Operations associated with 434th ARW would continue as at realignment.

The fleet mix and annual operations for each of the modeled years are contained in Table I-7. The DNL contours for the proposed flight operations are presented in Section 4.4.4, Noise. The military flight tracks modeled are the same as for realignment. The civilian departure, arrival, and touch-and-go tracks used are shown in Figure I-2 and are based on those in common usage at airports of similar size and purpose. The day-night split for all civilian aircraft operations is given in Table I-8 (military operations would be the same as the realignment baseline). All civilian aircraft departure operations would be stage length 1. Stage length may affect operational parameters such as takeoff or landing profiles, engine thrust settings, and 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).

No additional runup activity would be associated with the general aviation or maintenance operations.

General aviation operations were divided into four types:

- Single-engine, piston-driven propeller - A composite single-engine propeller (COMSEP) plane was modeled.

Table I-5. Assignment of Operations for Realignment and Proposed Action - (all years)

	Arrival and Departure Flight Tracks											
	23D1		23A1		05D1		05A1		05D3		23D3	
Aircraft	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Based Aircraft												
KC-135R	-	-	1.33	7.63	-	-	0.72	4.16	0.78	-	1.44	-
Transient Aircraft												
T-38A	0.07	-	0.07	-	0.04	-	0.04	-	-	-	-	-
C-130E	0.07	-	0.07	-	0.04	-	0.04	-	-	-	-	-
F-4C	0.85	0.28	0.85	0.28	0.42	0.14	0.42	0.14	-	-	-	-
KC-135R	2.41	0.05	2.41	0.05	1.20	0.03	1.20	0.03	-	-	-	-
KC-135E	0.11	0.01	0.11	0.01	0.05	-	0.05	-	-	-	-	-
A-6A	0.82	0.02	0.82	0.02	0.41	0.01	0.41	0.01	-	-	-	-
Cessna 182	0.09	-	0.09	-	0.05	-	0.05	-	-	-	-	-
F-16A	0.63	-	0.63	-	0.32	-	0.32	-	-	-	-	-
P-3A	0.63	-	0.63	-	0.32	-	0.32	-	-	-	-	-
Total	5.68	0.36	7.01	7.99	2.85	0.18	3.57	4.34	0.78	0	1.44	0

	Touch-and-Go Flight Tracks							
					05C3		23C2	
Aircraft					Day	Night	Day	Night
KC-135R	-	-	-	-	1.82	1.66	3.42	3.05

Notes: Daytime operations are assumed to occur between the hours of 7:00 a.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 I-6. Surface Traffic Operations for Total Traffic Volumes (Project and Non-Project)
Page 1 of 2

Roadway	Segment	Annual Average Daily Traffic (AADT)				Speed Assumed (mph)	Road Width Assumed (lanes)
Proposed Action		1994	1999	2004	2014		
U.S. 31	SH 18 to 800 South	17,830	19,700	23,100	30,980	55	4
U.S. 31	800 South to SH 218 (Jct. East)	17,950	19,940	24,020	33,630	55	4
U.S. 31	SH 218 (Jct. East) to Main Gate	18,300	20,260	24,370	34,070	55	4
U.S. 31	Main Gate to SH 218 (Jct. West)	18,470	20,440	24,550	34,270	55	4
U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	19,240	21,460	25,670	35,490	55	4
U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	12,070	13,060	14,670	18,380	55	4
U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	14,490	15,530	17,070	20,560	55	4
Old U.S. 31	U.S. 31 to 225 South	7,510	8,750	11,370	17,520	55	2
Old U.S. 31	225 South to West River Road	9,210	10,380	12,670	18,030	55	2
SH 218 (Jct. West)	400 West to U.S. 31	2,090	2,760	3,520	5,270	45	2
SH 218 (Jct. West)	County Line Road to 400 West	1,470	1,680	2,000	2,710	45	2
SH 218 (Jct. West)	900 East to 1000 East	970	1,290	1,680	2,520	55	2
SH 218 (Jct. East)	U.S. 31 to 200 West	2,200	2,420	2,810	3,730	55	2
Joint Use Aviation Alternative		1994	1999	2004	2014		
U.S. 31	SH 18 to 800 South	17,920	19,910	24,470	32,570	55	4
U.S. 31	800 South to SH 218 (Jct. East)	18,050	20,180	25,950	35,920	55	4
U.S. 31	SH 218 (Jct. East) to Main Gate	18,400	20,490	25,940	35,430	55	4
U.S. 31	Main Gate to SH 218 (Jct. West)	18,570	20,660	26,120	35,640	55	4
U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	19,360	21,720	27,460	37,540	55	4
U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	12,100	13,140	15,220	19,000	55	4
U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	14,520	15,590	17,490	21,050	55	4
Old U.S. 31	U.S. 31 to 225 South	7,590	8,930	12,610	18,940	55	2
Old U.S. 31	225 South to West River Road	9,270	10,530	13,680	19,190	55	2
SH 218 (Jct. West)	400 West to U.S. 31	2,140	2,840	3,760	5,790	45	2
SH 218 (Jct. West)	County Line Road to 400 West	1,490	1,700	1,950	2,480	45	2
SH 218 (Jct. West)	900 East to 1000 East	990	1,330	1,700	2,450	55	2
SH 218 (Jct. East)	U.S. 31 to 200 West	2,210	2,440	2,970	3,900	55	2

Table I-6. Surface Traffic Operations for Total Traffic Volumes (Project and Non-Project)
Page 2 of 2

Roadway	Segment	Annual Average Daily Traffic (AADT)				Speed Assumed (mph)	Road Width Assumed (lanes)
No Action Alternative		1994	1999	2004	2014		
U.S. 31	SH 18 to 800 South	17,750	18,660	19,610	21,660	55	4
U.S. 31	800 South to SH 218 (Jct. East)	17,870	18,780	19,740	21,800	55	4
U.S. 31	SH 218 (Jct. East) to Main Gate	18,220	19,150	20,130	22,240	55	4
U.S. 31	Main Gate to SH 218 (Jct. West)	18,390	19,330	20,320	22,440	55	4
U.S. 31	SH 218 (Jct. West) to Jct. Old U.S. 31	19,150	20,120	21,150	23,360	55	4
U.S. 31	Jct. Old U.S. 31 to U.S. 24 (Jct. West)	12,040	12,650	13,300	14,690	55	4
U.S. 24	U.S. 31 (Jct. South) to U.S. 31 (Jct. North)	14,470	15,210	15,990	17,660	55	4
Old U.S. 31	U.S. 31 to 225 South	7,440	7,820	8,220	9,080	55	2
Old U.S. 31	225 South to West River Road	9,160	9,620	10,110	11,170	55	2
SH 218 (Jct. West)	400 West to U.S. 31	2,040	2,150	2,260	2,490	45	2
SH 218 (Jct. West)	County Line Road to 400 West	1,460	1,540	1,620	1,790	45	2
SH 218 (Jct. West)	900 East to 1000 East	950	1,000	1,050	1,160	55	2
SH 218 (Jct. East)	U.S. 31 to 200 West	2,190	2,300	2,420	2,670	55	2

AADT = average annual daily traffic.
mph = miles per hour.
SH = State Highway.
U.S. = U.S. Highway

Table I-7a. Annual Aircraft Operations for Joint Use Aviation Alternative (1999)

Type of Aircraft[a]	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
General Aviation			23,100	58
Single Engine Piston	15,480	67		
Beech 58P	2,540	11		
Cessna 441	2,540	11		
Business Jet	2,540	11		
Air Cargo			520	1
Cessna P-210	520	100		
Maintenance			1,000	2
B-727-200	150	15		
B-737-300/400	650	65		
B-757	100	10		
B-767	50	5		
B-747	50	5		
Military - 434th ARW			9,500	23
KC-135R	9,500	100		
Military - Transient Aircraft			6,600	16
KC-135R	2,690	41		
KC-135E	120	2		
F-4C	1,230	19		
A-6A	920	14		
Cessna 182	100	2		
F-16A	693	10		
P-3A	693	10		
T-38A	77	1		
C-130E	77	1		
Total			40,720	100

Note: (a) Representative aircraft modeled for the fleet mix indicated in the Joint Use Aviation Alternative.

Table I-7b. Annual Aircraft Operations for Joint Use Aviation Alternative (2004)

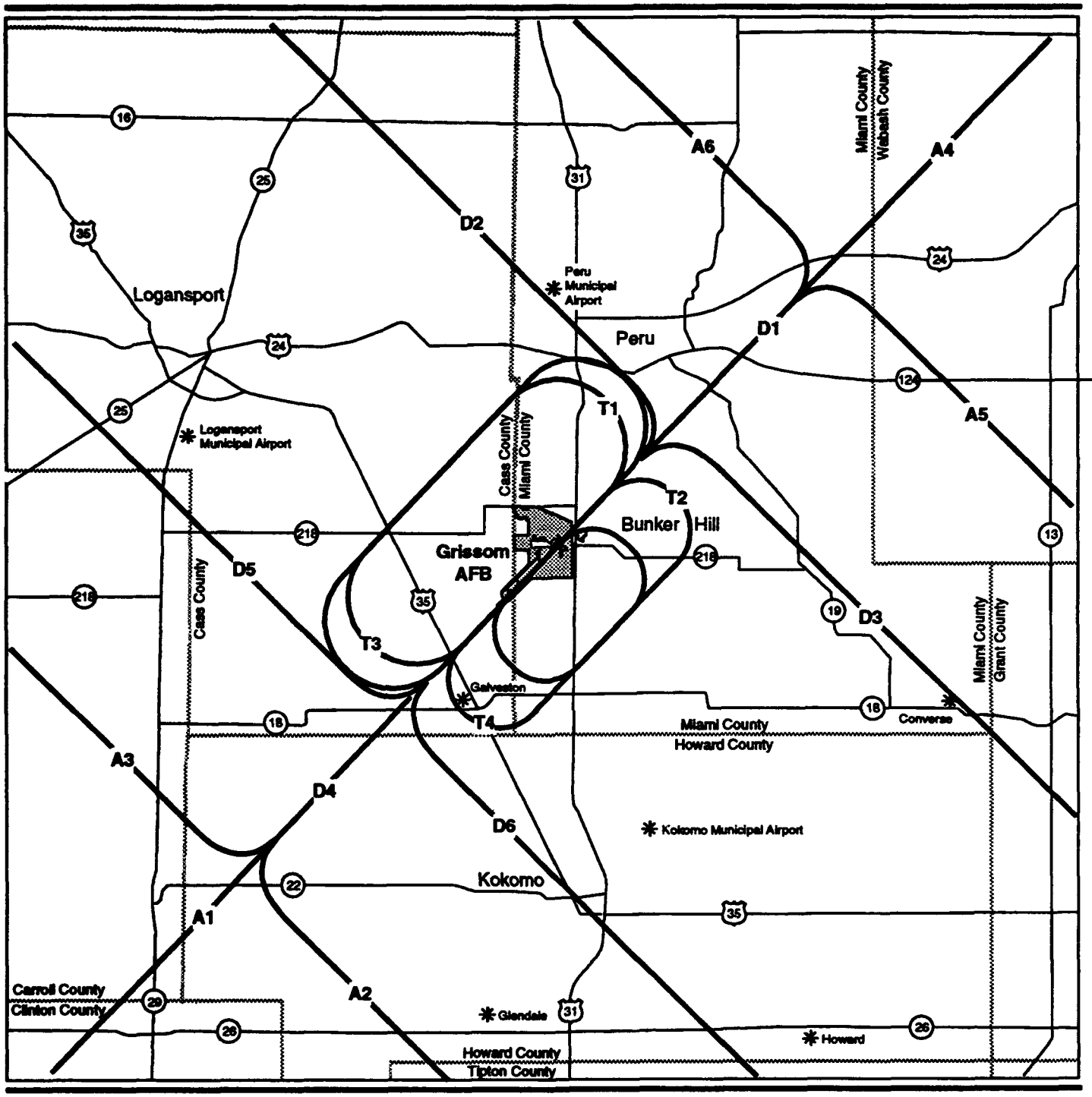
Type of Aircraft[a]	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
General Aviation			27,190	61
Single Engine Piston	17,410	64		
Beech 58P	3,260	12		
Cessna 441	3,260	12		
Business Jet	3,260	12		
Air Cargo			520	1
Cessna P-210	520	100		
Maintenance			1,000	2
B-737-300/400	700	70		
B-757	200	20		
B-767	50	5		
B-747	50	5		
Military - 434th ARW			9,500	21
KC-135R	9,500	100		
Military - Transient Aircraft			6,600	15
KC-135R	2,690	41		
KC-135E	120	2		
F-4C	1,230	19		
A-6A	920	14		
Cessna 182	100	2		
F-16A	693	10		
P-3A	693	10		
T-38A	77	1		
C-130E	77	1		
Total			44,810	100

Note: (a) Representative aircraft modeled for the fleet mix indicated in the Joint Use Aviation Alternative.

Table I-7c. Annual Aircraft Operations for Joint Use Aviation Alternative (2014)

Type of Aircraft[a]	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
General Aviation			37,000	68
Single Engine Piston	22,570	61		
Beech 58P	4,810	13		
Cessna 441	4,810	13		
Business Jet	4,810	13		
Air Cargo			520	1
Cessna P-210	520	100		
Maintenance			1,000	1
B-737-300/400	600	60		
B-757	300	30		
B-767	50	5		
B-747	50	5		
Military - 434th ARW			9,500	17
KC-135R	9,500	100		
Military - Transient Aircraft			6,600	13
KC-135R	2,690	41		
KC-135E	120	2		
F-4C	1,230	19		
A-6A	920	14		
Cessna 182	920	2		
F-16A	693	10		
P-3A	693	10		
T-38A	77	1		
C-130E	77	1		
Total			54,620	100

Note: (a) Representative aircraft modeled for the fleet mix indicated in the Joint Use Aviation Alternative.



EXPLANATION

- Flight Tracks
- U.S. Highway
- State Highway
- Airport
- County Line

0 1.25 2.5 5 Miles

Civilian Flight Tracks

Figure I-2

Table I-8a. Assignment of Operations for the Joint Use Aviation Alternative - (1999)

Aircraft	Arrival Flight Tracks											
	A1		A2		A3		A4		A5		A6	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Single Engine Piston	1.53	0.85	1.15	0.64	1.15	0.64	2.29	1.27	1.72	0.95	1.72	0.95
Cessna 500	0.25	0.14	0.19	0.10	0.19	0.10	0.38	0.21	0.28	0.16	0.28	0.16
Beech 58P	0.25	0.14	0.19	0.10	0.19	0.10	0.38	0.21	0.28	0.16	0.28	0.16
Cessna 441	0.25	0.14	0.19	0.10	0.19	0.10	0.38	0.21	0.28	0.16	0.28	0.16
Cessna 210	0.13	0.04	0.04	0.01	0.04	0.01	0.19	0.06	0.06	0.02	0.06	0.02
Total	2.41	1.31	1.76	0.95	1.76	0.95	3.62	1.96	2.62	1.45	2.62	1.45

Aircraft	Departure Flight Tracks											
	D1		D2		D3		D4		D5		D6	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Single Engine Piston	1.53	0.85	1.15	0.64	1.15	0.64	2.29	1.27	1.72	0.95	1.72	0.95
Cessna 500	0.25	0.14	0.19	0.10	0.19	0.10	0.38	0.21	0.28	0.16	0.28	0.16
Beech 58P	0.25	0.14	0.19	0.10	0.19	0.10	0.38	0.21	0.28	0.16	0.28	0.16
Cessna 441	0.25	0.14	0.19	0.10	0.19	0.10	0.38	0.21	0.28	0.16	0.28	0.16
Cessna 210	0.13	0.04	0.04	0.01	0.04	0.01	0.19	0.06	0.06	0.02	0.06	0.02
Total	2.41	1.31	1.76	0.95	1.76	0.95	3.62	1.96	2.62	1.45	2.62	1.45

Aircraft	Touch-and-Go Flight Tracks							
	T1		T2		T3		T4	
	Day	Night	Day	Night	Day	Night	Day	Night
Single Engine Piston	-	-	7.64	-	-	-	5.08	-
Cessna 500	-	-	1.26	-	-	-	0.84	-
Beech 58P	-	-	1.26	-	-	-	0.84	-
Cessna 441	-	-	1.26	-	-	-	0.84	-
Cessna 210	-	-	-	-	-	-	-	-
B-727-200	0.12	0.04	-	-	0.18	0.06	-	-
B-767-200	0.04	0.02	-	-	0.06	0.02	-	-
B-747-200	0.04	0.02	-	-	0.06	0.02	-	-
B-737-300	0.54	0.18	-	-	0.80	0.26	-	-
B-757-200	0.08	0.02	-	-	0.12	0.04	-	-
Total	0.82	0.28	11.42	0	1.22	0.40	7.60	0

Notes: Daytime operations are assumed to occur between the hours of 7:00 a.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.
Civilian operations only, military operations are the same as realignment baseline.

Table I-8b. Assignment of Operations for the Joint Use Aviation Alternative - (2004)

Aircraft	Arrival Flight Tracks											
	A1		A2		A3		A4		A5		A6	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Single Engine Piston	1.72	0.95	1.29	0.72	1.29	0.72	2.58	1.43	1.93	1.07	1.93	1.07
Cessna 500	0.32	0.18	0.24	0.13	0.24	0.13	0.48	0.27	0.36	0.20	0.36	0.20
Beech 58P	0.32	0.18	0.24	0.13	0.24	0.13	0.48	0.27	0.36	0.20	0.36	0.20
Cessna 441	0.32	0.18	0.24	0.13	0.24	0.13	0.48	0.27	0.36	0.20	0.36	0.20
Cessna 210	0.13	0.04	0.04	0.01	0.04	0.01	0.19	0.06	0.06	0.02	0.06	0.02
Total	2.81	1.53	2.05	1.12	2.05	1.12	4.21	2.30	3.07	1.69	3.07	1.69

Aircraft	Departure Flight Tracks											
	D1		D2		D3		D4		D5		D6	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Single Engine Piston	1.72	0.95	1.29	0.72	1.29	0.72	2.58	1.43	1.93	1.07	1.93	1.07
Cessna 500	0.32	0.18	0.24	0.13	0.24	0.13	0.48	0.27	0.36	0.20	0.36	0.20
Beech 58P	0.32	0.18	0.24	0.13	0.24	0.13	0.48	0.27	0.36	0.20	0.36	0.20
Cessna 441	0.32	0.18	0.24	0.13	0.24	0.13	0.48	0.27	0.36	0.20	0.36	0.20
Cessna 210	0.13	0.04	0.04	0.01	0.04	0.01	0.19	0.06	0.06	0.02	0.06	0.02
Total	2.81	1.53	2.05	1.12	2.05	1.12	4.21	2.30	3.07	1.69	3.07	1.69

Aircraft	Touch-and-Go Flight Tracks							
	T1		T2		T3		T4	
	Day	Night	Day	Night	Day	Night	Day	Night
Single Engine Piston	-	-	8.58	-	-	-	5.72	-
Cessna 500	-	-	1.60	-	-	-	1.08	-
Beech 58P	-	-	1.60	-	-	-	1.08	-
Cessna 441	-	-	1.60	-	-	-	1.08	-
Cessna 210	-	-	-	-	-	-	-	-
B-767-200	0.04	0.02	-	-	0.06	0.02	-	-
B-747-200	0.04	0.02	-	-	0.06	0.02	-	-
B-737-300	0.58	0.20	-	-	0.86	0.28	-	-
B-757-200	0.16	0.06	-	-	0.24	0.08	-	-
Total	0.82	0.30	13.38	0	1.22	0.40	8.96	0

Notes: Daytime operations are assumed to occur between the hours of 7:00 a.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.
Civilian operations only, military operational are the same as realignment baseline.

Table I-8c. Assignment of Operations for the Joint Use Aviation Alternative - (2014)

Arrival Flight Tracks

Aircraft	A1		A2		A3		A4		A5		A6	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Single Engine Piston	2.23	1.24	1.67	0.93	1.67	0.93	3.34	1.86	2.50	1.39	2.50	1.39
Cessna 500	0.47	0.26	0.36	0.20	0.36	0.20	0.71	0.40	0.53	0.30	0.53	0.30
Beech 58P	0.47	0.26	0.36	0.20	0.36	0.20	0.71	0.40	0.53	0.30	0.53	0.30
Cessna 441	0.47	0.26	0.36	0.20	0.36	0.20	0.71	0.40	0.53	0.30	0.53	0.30
Cessna 210	0.13	0.04	0.04	0.01	0.04	0.01	0.19	0.06	0.06	0.02	0.06	0.02
Total	3.77	2.06	2.79	1.54	2.79	1.54	5.66	3.12	4.15	2.31	4.15	2.31

Departure Flight Tracks

Aircraft	D1		D2		D3		D4		D5		D6	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Single Engine Piston	2.23	1.24	1.67	0.93	1.67	0.93	3.34	1.86	2.50	1.39	2.50	1.39
Cessna 500	0.47	0.26	0.36	0.20	0.36	0.20	0.71	0.40	0.53	0.30	0.53	0.30
Beech 58P	0.47	0.26	0.36	0.20	0.36	0.20	0.71	0.40	0.53	0.30	0.53	0.30
Cessna 441	0.47	0.26	0.36	0.20	0.36	0.20	0.71	0.40	0.53	0.30	0.53	0.30
Cessna 210	0.13	0.04	0.04	0.01	0.04	0.01	0.19	0.06	0.06	0.02	0.06	0.02
Total	3.77	2.06	2.79	1.54	2.79	1.54	5.66	3.12	4.15	2.31	4.15	2.31

Touch-and-Go Flight Tracks

Aircraft	T1		T2		T3		T4	
	Day	Night	Day	Night	Day	Night	Day	Night
Single Engine Piston	-	-	11.14	-	-	-	7.42	-
Cessna 500	-	-	2.38	-	-	-	1.58	-
Beech 58P	-	-	2.38	-	-	-	1.58	-
Cessna 441	-	-	2.38	-	-	-	1.58	-
Cessna 210	-	-	-	-	-	-	-	-
B-767-200	0.04	0.02	-	-	0.06	0.02	-	-
B-747-200	0.04	0.02	-	-	0.06	0.02	-	-
B-737-300	0.50	0.16	-	-	0.74	0.24	-	-
B-757-200	0.24	0.08	-	-	0.36	0.12	-	-
Total	0.82	0.28	18.28	0	1.22	0.40	12.16	0

Notes: Daytime operations are assumed to occur between the hours of 7:00 a.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.
Civilian operations only, military operations are the same as the realignment baseline.

- Multi-engine, piston-driven propeller - Beech Baron 58P assumed to be a typical multi-engine propeller plane.

- Turboprop - Cessna Conquest II assumed to be a typical turboprop.

- Turbofan - Cessna Citation I assumed to be a typical turbofan.

It was assumed that 30 percent of the general aviation operations and 100 percent of maintenance operations would be touch-and-go (or closed loop) activities.

A standard 3-degree glide slope and the takeoff profiles provided by the Federal Aviation Administration's (FAA) Integrated Noise Model (INM) Database 3.10 were assumed for all civilian aircraft.

Surface traffic data used in the modeling were developed from the project traffic study and are shown in Table I-6. The traffic mix, day/night split, and speed were assumed to remain the same as for the prerealignment reference.

The number of residents exposed to DNL 65 dB or greater was determined from USGS maps that had been photo-revised in 1980.

1.5 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the 434th ARW and military transient operations would continue at base realignment levels. Assumptions concerning aircraft flight and runup operations are described in Section 1.2 of this appendix. Surface traffic data used in the modeling were developed from the project traffic study and are presented in Table I-6. The traffic mix, day/night split, and speed were assumed to remain the same as for the prerealignment reference.

The number of residents exposed to DNL 65 dB or greater was determined from USGS maps that had been photo-revised in 1980.

2.0 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 units of dB. The dB is a dimensionless unit related to the logarithm of the ratio of the measured level to a reference level.

Because of the logarithmic nature of the dB 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

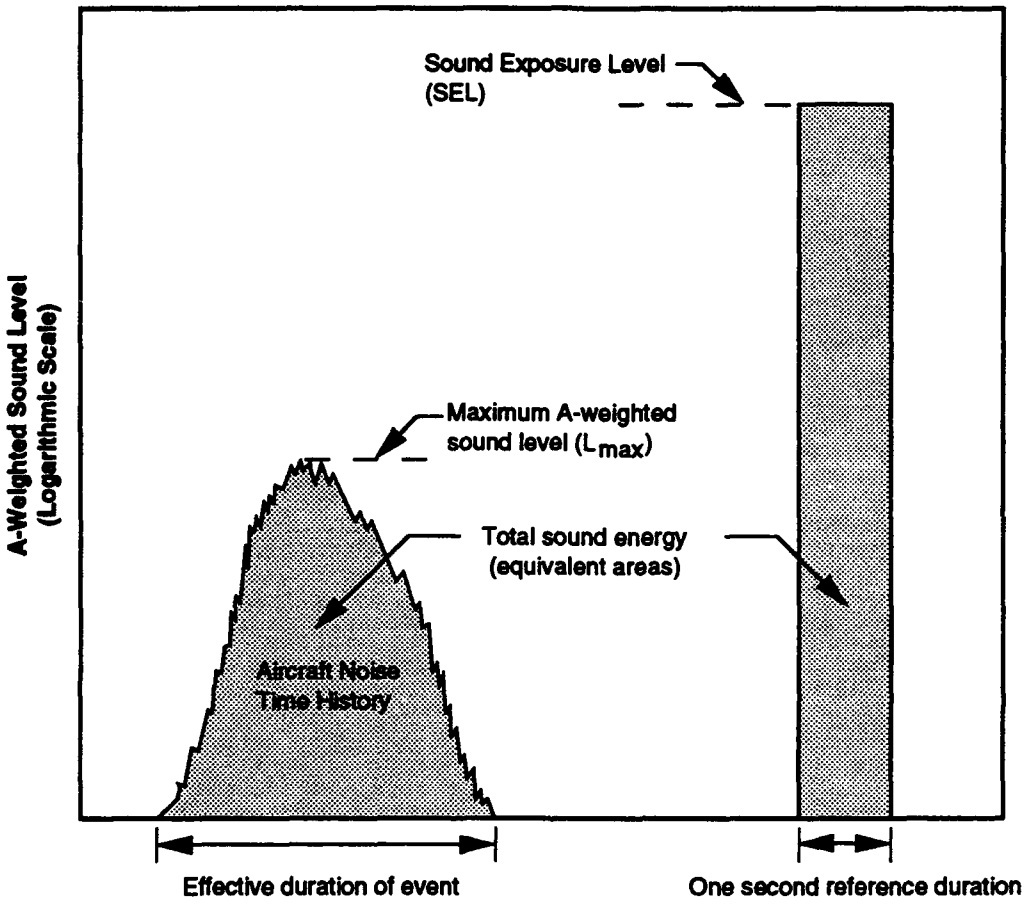
The ear is not equally sensitive at all frequencies of sound. At low frequencies, characterized as a rumble or roar, the ear is not very sensitive, while at higher frequencies, characterized as a screech or a whine, the ear is most sensitive. The A-weighted level was developed to measure and report sound levels in a way that would more closely approach how people perceive the sound. All sound levels reported herein are in terms of A-weighted sound levels (dBA).

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 afterwards 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 10:00 p.m. and 7:00 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.

Maximum Sound Level is the highest instantaneous sound level observed during a single noise event, no matter how long the sound may persist (Figure I-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 I-3 illustrates the relationship between the maximum sound level and SEL.



Sound Exposure Level and Comparison to Aircraft Noise Time History

Figure I-3

3.0 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 database. 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 DNL 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 FHWA 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.

4.0 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 Grissom 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 non-acoustic 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., there may be little or no reduction in annoyance 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.

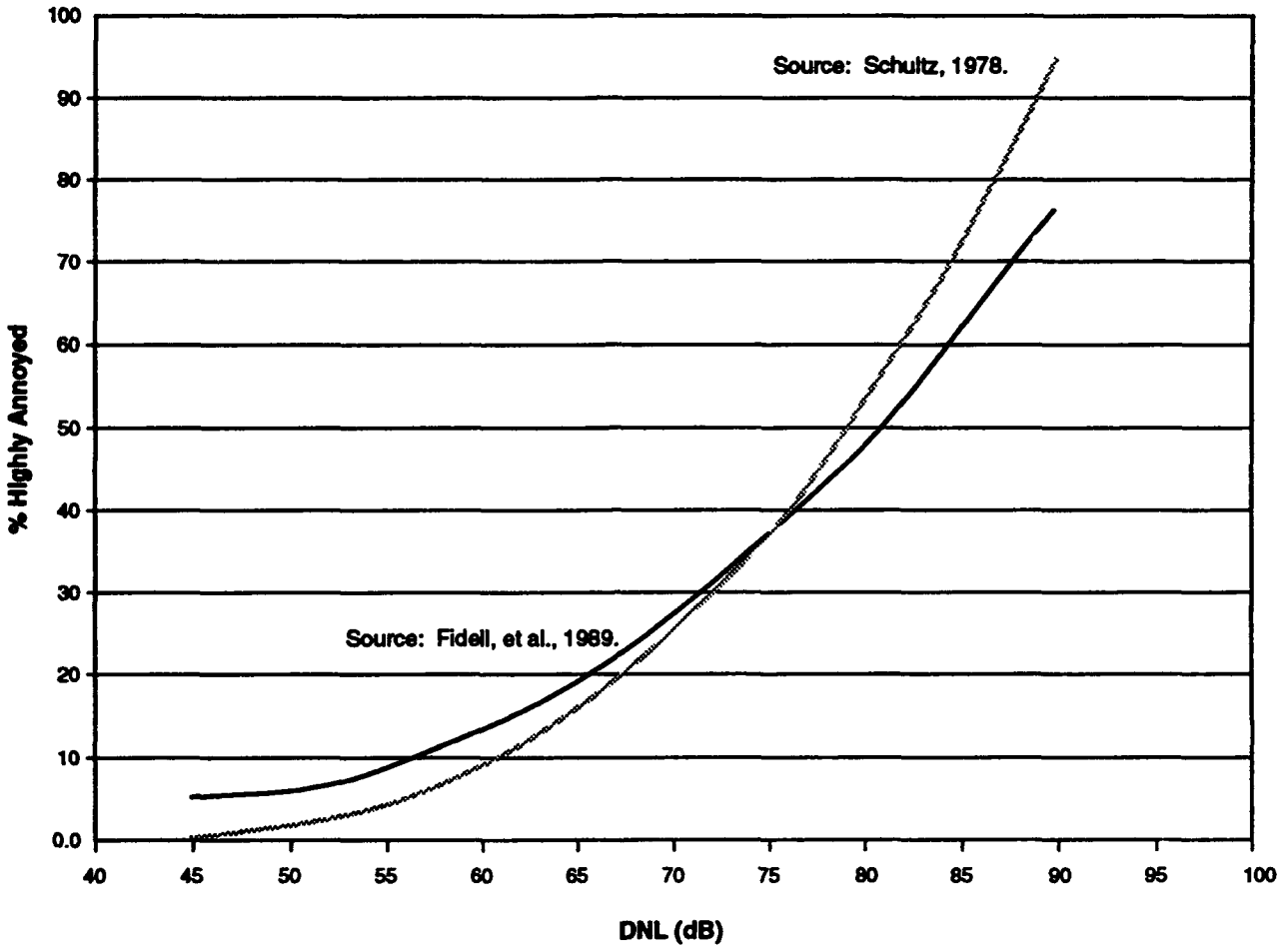
The standard method for determining the prevalence of annoyance in noise-exposed communities is by attitudinal survey. Surveys generally solicit self-reports of annoyance through one or more questions of the form "How bothered or annoyed have you been by the noise of (noise source) over the last (time 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 I-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.



Community Noise Annoyance Curves

Figure I-4

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 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 are 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 which the adult can draw on 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 Crook 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 (U.S. Environmental Protection Agency, 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 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 both 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).

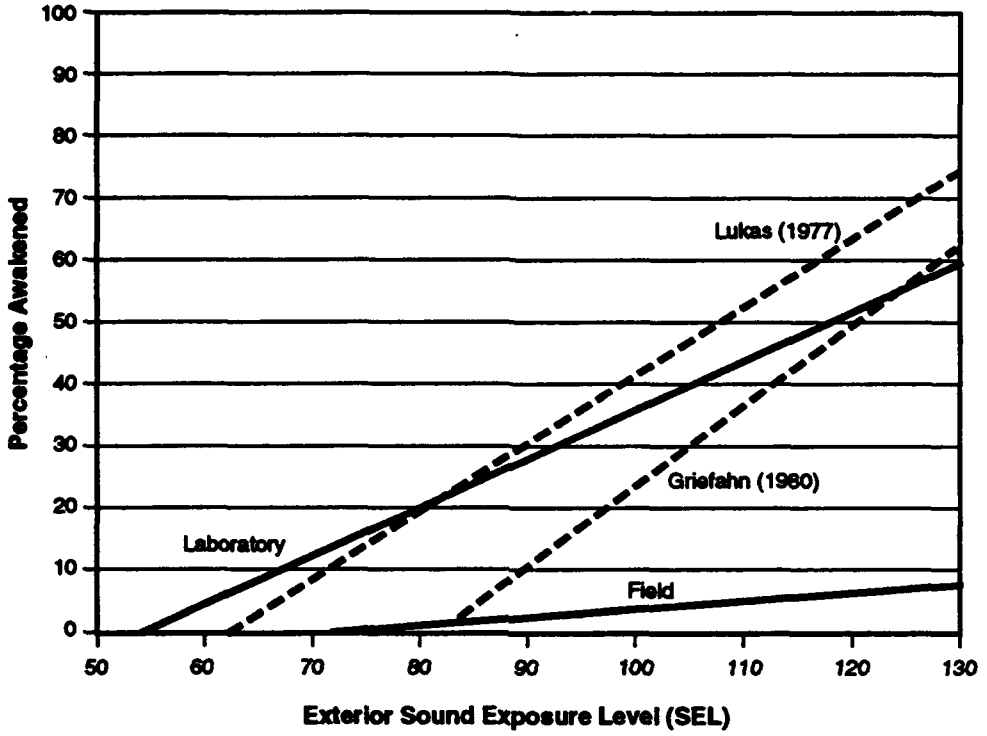
Noise must penetrate the home to disturb sleep. Interior noise levels are lower than exterior levels due to the attenuation of the sound energy by the structure. The amount of attenuation provided by the building is dependent on the type of construction and whether the windows are open or closed. The approximate national average attenuation factors are 15 dB for open windows and 25 dB for closed windows (U.S. Environmental Protection Agency, 1974).

Incorporating these attenuation factors, the percent awakened relationships previously discussed under summer conditions are presented in Figure I-5. In conclusion, the scientific literature does not provide a consensus on sleep disturbance. There is no recognized criteria or standard which provides guidance to assess sleep disturbance due to noise.

4.4 NOISE-INDUCED HEARING LOSS

Hearing loss is measured in dB 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 hearing is not as sensitive as before and the minimum sound that a person can hear must be louder. The threshold shift which 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 DNL 75 dB noise contour. 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 take-off 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 et al., 1972). A similar study was performed in the vicinity of London Heathrow Airport (Ward et al., 1972). Both studies concluded that there was no significant difference between the



Source: Pearsons, et al., 1989

Sleep Disruption (Awakening)

Figure I-5

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 mm Hg) 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 U.S. 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 literature on the effects of noise on domestic animals is not large, and most of the studies have focused on the relation 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 relation 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 literature is inadequate to document long-term or subtle effects of 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 which 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 which 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 J

APPENDIX J

FARMLAND CONVERSION IMPACT RATING
FORM AD-1006

15-1-12-1-17

United States Department of Agriculture

Soil Conservation Service

6013 Lakeside Boulevard
Indianapolis, Indiana 46278

March 26, 1993

Gary P. Baumgartel, Lt. Col, USAF
Chief, Environmental Planning Division
Environmental Services
8106 Chennault Road
Brook AFB, Texas 78235-5318

Attention: Mr. George Gauger, AFCEE/ESEM

Dear Lt. Col. Baumgartel:

Enclosed is the completed Form AD-1006. The site does not contain prime, unique, statewide or local important farm land because the base has already been developed.

If you need additional information, please contact me.

Sincerely,

ACTING FOR
Robert L Eddleman

ROBERT L. EDDLEMAN
State Conservationist

Enclosure

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)	Date Of Land Evaluation Request: January 22, 1993
Name Of Project: Grissom Air Force Base - Disposal and Reuse	Federal Agency Involved: U.S. Air Force
Proposed Land Use: Aviation/Industrial/Residential	County And State: Miami and Cass Counties, Indiana
PART II (To be completed by SCS)	Date Request Received By SCS

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	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction: Acres: %		Amount Of Farmland As Defined in FPPA: Acres: %	
Name Of Land Evaluation System Used	Name Of Local Site Assessment System		Date Land Evaluation Returned By SCS	

PART III (To be completed by Federal Agency)	Alternative Site Rating: Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	388	329	104	
B. Total Acres To Be Converted Indirectly	—	—	—	
C. Total Acres In Site	388	329	104	
PART IV (To be completed by SCS) Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				
PART V (To be completed by SCS) Land Evaluation Criterion Relative Value Of Farmland To Be Converted (Scale of 0 to 100 Points)				
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				
2. Perimeter In Nonurban Use				
3. Percent Of Site Being Farmed				
4. Protection Provided By State And Local Government				
5. Distance From Urban Builtup Area				
6. Distance To Urban Support Services				
7. Size Of Present Farm Unit Compared To Average				
8. Creation Of Nonfarmable Farmland				
9. Availability Of Farm Support Services				
10. On-Farm Investments				
11. Effects Of Conversion On Farm Support Services				
12. Compatibility With Existing Agricultural Use				
TOTAL SITE ASSESSMENT POINTS	160			
PART VII (To be completed by Federal Agency)				
Relative Value Of Farmland (From Part V)	100			
Total Site Assessment (From Part VI above or a local site assessment)	160			
TOTAL POINTS (Total of above 2 lines)	260			

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

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 K

APPENDIX K

BIOLOGICAL RESOURCES

Table K-1. Plant and Wildlife Species in the Vicinity of Grissom AFB
Page 1 of 5

Common Name	Scientific Name
PLANTS	
Trees	
Silver maple	*Acer saccharinum*
Sugar maple	*Acer saccharum*
Hickory	*Carya* sp.
Red-osier dogwood	*Cornus stolonifera*
Fleshy hawthorne	*Crataegus succulenta*
Beech	*Fagus grandifolia*
Green ash	*Fraxinus pennsylvanica*
Black walnut	*Juglans nigra*
Osage orange	*Maclura pomifera*
American sycamore	*Platanus occidentalis*
Eastern cottonwood	*Populus deltoides*
White oak	*Quercus alba*
Black locust	*Robinia pseudoacacia*
Pussy willow	*Salix discolor*
Sandbar willow	*Salix exigua*
Herbaceous Plants and Shrubs	
Great ragweed	*Ambrosia trifida*
Common burdock	*Arctium minus*
Milkweed	*Asclepias* sp.
Sedge	*Carex* sp.
Canada thistle	*Cirsium arvense*
Bull thistle	*Cirsium vulgare*
Prickly cucumber	*Echinocystis lobata*
Waterwort	*Elatine americana*
Spike rush	*Eleocharis obtusa*
Wild ryegrass	*Elymus virginicus*
Horsetail	*Equisetum* sp.
Strawberry	*Fragaria* sp.
Rush	*Juncus* sp.
Duckweed	*Lemna minor*

Table K-1. Plant and Wildlife Species in the Vicinity of Grissom AFB
Page 2 of 5

Common Name	Scientific Name
Peppermint	*Mentha piperita*
Water milfoil	*Myriophyllum alterniflorum*
Catnip	*Nepeta cataria*
Reed canary grass	*Phalaris aurundinacea*
Climbing rose	*Rosa setigera*
Hard-stemmed bulrush	*Scirpus acutus*
Bittersweet nightshade	*Solanum dulcamara*
Dandelion	*Taraxacum officinale*
Narrow-leaved cattail	*Typha angustifolia*
Stinging nettle	*Urtica* sp.
ANIMALS	
Mammals	
Coyote	*Canis latrans*
Opposum	*Didelphis virginiana*
Woodchuck	*Marmota monax*
Striped skunk	*Mephitis mephitis*
House mouse	*Mus musculus*
Long-tailed weasel	*Mustela frenata*
White-tailed deer	*Odocoileus virginianus*
Muskrat	*Ondatra zibethica*
White-footed mouse	*Peromyscus leucopus*
Deer mouse	*Peromyscus maniculatus*
Raccoon	*Procyon lotor*
Gray squirrel	*Sciurus carolinensis*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Eastern cottontail	*Sylvilagus floridanus*
Eastern chipmunk	*Tamias floridanus*
Gray fox	*Urocyon cinereoargenteus*
Waterbirds	
Wood duck	*Aix sponsa*
Northern pintail	*Anas acuta*

Table K-1. Plant and Wildlife Species in the Vicinity of Grissom AFB
Page 3 of 5

Common Name	Scientific Name
Mallard	*Anas platyrhynchos*
Great blue heron	*Ardea herodias*
Common goldeneye	*Bucephala clangula*
Green-backed heron	*Butorides striatus*
Belted kingfisher	*Ceryle alcyon*
Killdeer	*Charadrius vociferus*
American coot	*Fullica americana*
Common snipe	*Gallinago gallinago*
Common moorhen	*Gallinula chloropus*
American woodcock	*Scolopax minor*
Raptors/Carrion Feeders	
Sharp-shinned hawk	*Accipiter striatus*
Great horned owl	*Bubo virginianus*
Red-tailed hawk	*Buteo jamaicensis*
Red-shouldered hawk	*Buteo lineatus*
Turkey vulture	*Cathartes aura*
Northern harrier	*Circus cyaneus*
Eastern screech owl	*Otus asio*
Doves/Quail	
Northern bobwhite quail	*Colinus virginianus*
Rock dove	*Columba livia*
Mourning dove	*Zenaida macroura*
Hummingbirds	
Ruby-throated hummingbird	*Archilochus colubris*
Woodpeckers	
Common flicker	*Colaptes auratus*
Pileated woodpecker	*Dryocopus pileatus*
Red-bellied woodpecker	*Melanerpes carolinus*
Downy woodpecker	*Picoides pubescens*

Table K-1. Plant and Wildlife Species in the Vicinity of Grissom AFB
Page 4 of 5

Common Name	Scientific Name
Songbirds/Neotropical Migrants	
Cedar waxwing	*Bombycilla cedrorum*
Northern cardinal	*Cardinalis cardinalis*
American goldfinch	*Carduelis tristis*
Purple finch	*Carpodacus purpureus*
American crow	*Corvus brachyrhynchos*
Blue jay	*Cyanocitta cristata*
Yellow-rumped warbler	*Dendroica coronata*
Yellow warbler	*Dendroica petechia*
Horned lark	*Eremophila alpestris*
Cliff swallow	*Hirundo pyrrhonota*
Wood thrush	*Hylosichia mustelina*
Brown-headed cowbird	*Malothrus ater*
Song sparrow	*Melospiza melodia*
American redstart	*Myloborus pictus*
Black-capped chickadee	*Parus atricapillus*
Tufted titmouse	*Parus inornatus*
House sparrow	*Passer domesticus*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Bank swallow	*Riparia riparia*
Eastern bluebird	*Sialia sialis*
White-breasted nuthatch	*Sitta carolinensis*
Field sparrow	*Spizella pusilla*
Eastern meadowlark	*Sturnella magna*
European starling	*Sturnus vulgaris*
Carolina wren	*Thryothorus ludovicianus*
House wren	*Troglodytes aedon*
American robin	*Turdus migratorius*
Yellow-throated vireo	*Vireo flavifrons*
Warbling vireo	*Vireo gilvus*
White-throated sparrow	*Zonotrichia albicolis*
Reptiles	
Snapping turtle	*Chelydra serpentina*

Table K-1. Plant and Wildlife Species in the Vicinity of Grissom AFB
Page 5 of 5

Common Name	Scientific Name
Painted turtle	*Chrysemys picta*
Map turtle	*Graptemys geographica*
Mild snake	*Lampropeltis triangulus*
Common water snake	*Nerodia sipedon*
Common garter snake	*Thamnophis sirtalis*
Amphibians	
Northern cricket frog	*Acris crepitans*
American toad	*Bufo americanus*
Eastern newt	*Notophthalmus viridescens*
Bullfrog	*Rana catesbiana*
Pickerel frog	*Rana palustris*
Northern leopard frog	*Rana pipiens*
Fish	
Stoneroller	*Campostoma anomalum*
White sucker	*Catostomus commersoni*
Johnny darter	*Etheostoma nigrum*
Brassy minnow	*Hybognathus hankinsoni*
Silvery minnow	*Hybognathus nuchalis*
Golden redhorse	*Maxostoma erythrum*
Northern redhorse	*Maxostoma macrolepidotum*
Golden shiner	*Notemigonus crysoleucas*
Striped shiner	*Notropis chrysocephalus*
Bigmouth shiner	*Notropis dorsalis*
Spotfin shiner	*Notropis spilopterus*
Creek chub	*Semotilus atromaculatus*

Table K-2. Threatened, Endangered, and Candidate Species Potentially Occurring in the Vicinity of Grissom AFB
Page 1 of 4

Species	Federal[1]	State[1]	Habitat and Distribution
Plants			
Black-fruit mountain-ricegrass (*Oryzopsis racemosa*)	-	T	Usually occurs in calcareous, rocky, and rich woods in the east and middle northern United States (Fernald, 1950). Known from Cass and/or Miami counties (USFWS, 1992). Unlikely to occur on base
Canada burnet (*Sanguisorba canadensis*)	-	E	Occurs in peaty or boggy soils. Common in the Great Lakes area of the United States and in Newfoundland and Labrador. Occurs in scattered localities in the middle eastern United States (Fernald, 1950). Known from Cass and/or Miami counties (USFWS, 1992). Unlikely to occur on base
Cluster fescue (*Festuca parodoxa*)	-	E	Prairies, thickets, and open woods in the north and the eastern United States (Fernald, 1950). Known from Cass and/or Miami counties. May occur on base
Eastern featherbells (*Stenthium gramineum*)	-	E	Occurs in woods and thickets in much of middle to eastern United States. May occur on base
Forked aster (*Aster furcatus*)	C2	E	Occurs in dry woods and shaded bluffs from western Indiana and southern Wisconsin to Missouri (Fernald, 1950). Known from Cass and/or Miami counties (USFWS, 1992). Unlikely to occur on base
Glade mallow (*Napaea dioica*)	C2	T	Occurs on moist ground or road sides on alluvial terraces in much of the northeastern United States. It was found within approximately 5 miles of base in 1988 (Martin, 1992). May occur on base
Great St. John's wort (*Hypericum pyramidatum*)	-	E	Occurs in thickets, rivers, and meadows in much of the eastern half of the northern United States. It was found within 1 mile of base in 1962 (Martin, 1992). May occur on base

Table K-2. Threatened, Endangered, and Candidate Species Potentially Occurring in the Vicinity of Grissom AFB
Page 2 of 4

Species	Federal[1]	State[1]	Habitat and Distribution
Hairy-fruit sedge (*Carex sparganodes* var. *cephaloidea*)	-	T	Is found in rich upland forests. The species occurs in the more northeasterly United States and southeastern Canada (Fernald, 1950). Known from Miami and/or Cass counties (USFWS, 1992). Possible, but unlikely to occur on base
Michaux's stichwort (*Arenaria stricta*)	-	T	Occurs on dry calcareous, magnesian, or occasionally siliceous ledges and gravel, in scattered regions of the eastern United States and Canada (Fernald, 1950). Known from Miami and/or Cass counties (USFWS, 1992). Unlikely to occur on base
Purple oat (*Schizachne purpurascens*)	-	E	Occurs on steep rocky slopes and thickets and woods in southern Canada and the Great Lakes states south (Fernald, 1950). Known from Cass and/or Miami counties. Unlikely to occur on base
Tufted hairgrass (*Deschampsia cespitosa*)	-	T	Occurs in fens and moist limestone ledges at higher latitudes around the world (Fernald, 1950). Known from Miami and/or Cass counties (USFWS, 1992). Unlikely to occur on base
Whorled water-milfoil (*Myriophyllum verticillatum*)	-	T	Occurs in shallow waters and pools throughout the northern latitudes (Fernald, 1950). Known from Cass and/or Miami counties (USFWS, 1992). May occur on base. A similar species, *M. alterniflorum* was found on base in drainage ditches
Animals			
Badger (*Taxidea taxus*)	-	T	Inhabits open prairie country and flat rolling farm lands, avoiding woods and marshlands (Hamilton, 1979). Documented from the vicinity of Grissom AFB (USFWS, 1992). Unlikely to reside on-base, but may utilize it for foraging purposes

Table K-2. Threatened, Endangered, and Candidate Species Potentially Occurring in the Vicinity of Grissom AFB
Page 3 of 4

Species	Federal[1]	State[1]	Habitat and Distribution
Bobcat (*Lynx rufus*)	-	E	Occurs in swamps, woods, and mountain ranges, often near farmlands. Reported only from a rugged area of Monroe County in Indiana (Hamilton, 1979). Not expected to occur on base
Indiana bat (*Myotis sodalis*)	E	E	The winter range of this migratory bat is associated with regions of well-developed limestone caverns. Summer nursery colonies may be hundreds of miles north of their hibernacula caves in riparian woodlands under the bark of dead trees (Chandler, 1988). They summer in central and northern Indiana. Not expected at Grissom AFB due to lack of habitat
Barn owl (*Tyto alba*)	-	T	This widespread bird inhabits grasslands, marshes, savannas, and some agricultural lands. Need large cavities for roosting and nesting (Chandler, 1988). Unlikely to occur at Grissom AFB due to lack of hollow trees or abandoned buildings
Clubshell mussel (*Pleurobema clava*)	C2	E	Medium to large rivers in mixed sand and gravel. Probably extirpated from the Wabash River proper. Historically scattered in smaller streams of Indiana (Cummings et al., 1992). Not likely to occur in Pipe Creek
Eastern fanshell pearly mussel (*Cyprogenia stegaria*)	E	E	Found in gravel riffles of medium to large rivers. Historically numerous in the Wabash and White rivers. One live fanshell was found in the upper Wabash in 1988 (Cummings et al., 1992). May occur in Pipe Creek

Table K-2. Threatened, Endangered, and Candidate Species Potentially Occurring in the Vicinity of Grissom AFB
Page 4 of 4

Species	Federal[1]	State[1]	Habitat and Distribution
Rabbitsfoot mussel (*Quadrula cylindrica cylindrica*)	-	E	Found in medium to large rivers in sand and gravel. Historically common in the Wabash River. One live individual found in the Wabash River in 1992 (Cummings et al., 1992). May occur in Pipe Creek
Rayed bean mussel (*Villosa fabalis*)	C2	-	Lakes and streams of all sizes in sand and gravel. Historically common in Wabash River. Likely extirpated from Wabash River, but may still exist in some tributaries that maintain good water quality (Cummings et al., 1992). May occur in Pipe Creek
Snuffbox mussel (*Epioblasma triquetra*)	C2	E	Medium to large rivers in clear gravel riffles. Historically abundant in the Wabash River. Likely extirpated from the Wabash River, but may still exist in some tributaries that maintain good water quality (Cummings et al., 1992). May occur in Pipe Creek

Notes: 1. Federal status determined by USFWS:
E Endangered; in danger of extinction throughout all or a significant portion of its range.
C2 Information indicates that proposing to list these species is possibly appropriate, though more data on vulnerability and threat is necessary.
State status determined by Indiana Department of Natural Resources:
E Listed as endangered by the state of Indiana.
T Listed as threatened by the state of Indiana.

Table K-3. Planted Species at Grissom AFB
Page 1 of 2

Common Name	Scientific Name
Trees	
Red maple	*Acer rubrum*
Silver maple	*Acer saccharinum*
Sugar maple	*Acer saccharum*
Paper birch	*Betula papyrifera*
Redbud	*Cercis canadensis*
Russian olive	*Elaeagnus angustitfolia*
Winged spindle tree	*Euonymus alatus compactus*
Beech	*Fagus grandifolia*
Crab apple	*Malus prunifolia*
Virginal mock-orange	*Philadelphis virginalis*
Norway spruce	*Picea abies*
White pine	*Pinus strobus*
Scotch pine	*Pinus sylvestris*
Sycamore	*Platanus acerifolia*
American sycamore	*Platanus occidentalis*
Eastern cottonwood	*Populus deltoides*
Lombardi poplar	*Populus nigra italica*
White oak	*Quercus alba*
Pin oak	*Quercus palustris*
Weeping willow	*Salix babylonica*
Golden arborvita	*Thuja occidentalis*
Shrubs	
Climbing bittersweet	*Celastrus scandens*
Jackman clematic	*Clematis jackmani*
Purpleleaf wintercreeper	*Euonymus fortunei coloratus*
Common wintercreeper	*Euonymus fortunei radicans*

Table K-3. Planted Species at Grissom AFB
Page 2 of 2

Common Name	Scientific Name
Bigleaf wintercreeper	*Euonymus fortunei vegetus*
Showy border forsythia	*Forsythia spectabilis*
Honey-shuck	*Gleditsia triacanthas*
Baltic english ivy	*Hedera helix baltica*
Pfitzer juniper	*Juniperus chinesis pfitzeriana*
Common juniper	*Juniperus communis*
Upright juniper	*Juniperus virginiana canaertii*
Tulip tree	*Linodendron tulipifera*
Tatarian honeysuckle	*Lonicera tatarica*
Roses	*Rosa* spp.
Japanese globe yew	*Taxus cuspidata*
Common periwinkle	*Vinca minor*
Chinese wisteria	*Wisteria sinesis*
Grasses	
Bentgrass	*Agrostis palutris*
Brome	*Bromus* sp.
Meadow fescue	*Festuca elatior*
Kentucky bluegrass	*Poa pratensis*

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APPENDIX L

APPENDIX L

CULTURAL RESOURCES

Public dissemination of cultural resource locations is prohibited by law (APRA 16 U.S. Code §470hh, and 36 CFR 296).

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APPENDIX L

CULTURAL RESOURCES

Historic Sites:

9-1 H. This site is a scatter of historic debris, measuring approximately 35 meters (m) north-south and 34 m east-west. Artifactual constituents include more than 20 pieces of red brick and brown tile, one fragment of green glass, and one piece of white glazed ceramic.

9-2 H (12Mi559). This site is a large scatter of historic debris measuring approximately 70 m north-south and 150 m east-west. This site is due south of 9-1 H. Artifactual constituents include glass, ceramics, bricks and clay tile, a square-cut nail, and a horseshoe. Several of these artifacts, including fragments of sun-altered amethyst glass (1880-1916), a piece of ceramic manufactured in Tunstall, England (c. 1897), and the square-cut nail (c. 1800-1890) date to the late 1800s and early 1900s (Godden, 1964; Jenkins, 1991; Rock, 1980).

9-3 H. This site is an elliptically shaped diffuse scatter of approximately 20 fragments of glass and ceramics which measures about 45 m northwest by 25 m southeast.

Prehistoric Sites:

1-1. This site is a sparse scatter of lithic material consisting of flakes and shatter of local grey-white flint (or chert). There is a source of this material northeast of the base, along the Wabash River.

3-1. This site is a diffuse scatter of lithic material with artifactual constituents of small flakes, shatter, and chunks produced in stone tool manufacture. At least one flake shows signs of wear along its sides, suggesting it was used as a cutting or scraping tool. The material present is the local grey-white flint. This site measures approximately 129 m north-south by 61 m east-west and has two noticeable concentrations of material within it.

Isolated Artifacts:

Isolate 4-1 is a dark grey/brown chert flake with cortex on one face. The integrity of this find is suspect since the gravel was undoubtedly imported.

Isolate 7-1 is a fine grained red-brown chert flake and 7-2 is a light-brown and white chert flake.

Isolate 7-3 is a light grey chert core of cobble form with numerous flake scars.

Isolates 8-1 through 8-11 were all located along a dirt road and may be part of one or more archaeological sites. Ground surface visibility off of the road was poor due to heavy vegetation. **Isolate 8-1** is a grey-white flint core with scars where flakes had been removed. **Isolate 8-2** is a banded black/brown chert flake. **Isolate 8-3** is a grey flint core with flake scars. **Isolate 8-4** is a

light brown silt/mudstone core with possible flake scars. Isolate 8-5 is a small grey/dark grey chert core. Isolate 8-6 is a tan/white chert flake with a large flake scar on one side. Isolate 8-7 is a grey flint core with two flake scars. Isolate 8-8 is a large light grey flint core. Isolate 8-9 is a large light grey flint primary flake. Isolate 8-10 is a white flint flake and 8-11 is a light grey flint core.

None of the isolated artifacts, or the artifacts found at the prehistoric sites are diagnostic of a particular prehistoric tradition or time period. In most cases they relate to the manufacture of stone tools and are made of a locally available flint.

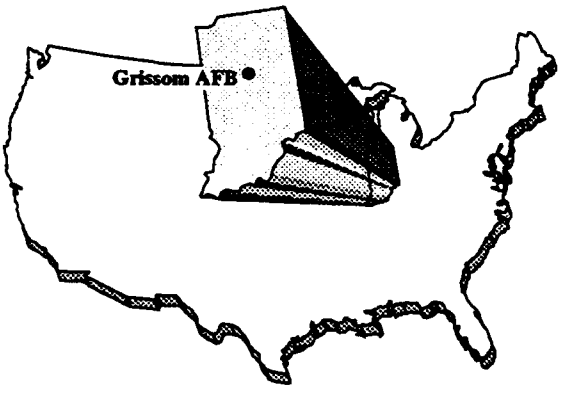
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Godden, 1964. Encyclopaedia of British Pottery and Porcelain Marks.

Jenkins, 1991. Guide to Buying and Collecting Early American Furniture.

Rock, 1980. American Bottles, A Few Basics.

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APPENDIX M

APPENDIX M

AIR EMISSIONS INVENTORY

APPENDIX M

AIR EMISSIONS INVENTORY

INTRODUCTION

The following tables contain the daily pollutant emissions associated with the Proposed Action, Joint Use Aviation Alternative, and the State of Indiana Public Safety Training Institute land use concept. Daily emissions were assumed to be constant, and were calculated based on the estimated annual emissions. Emissions are provided for the following:

- Aircraft operations
- Motor vehicle activities
- Industrial activity
- Construction
- Fire training
- Other activities.

These projected emission estimates are included in Tables M-1 through M-5, by pollutant and by alternative.

Aircraft Operations

Emissions from aircraft activities, including touch-and-go, airplane queuing, takeoff and landings, and related ground operations were calculated based on fleet mix and frequency information predicted for the alternatives for 1999 and 2004. Evaporative emissions from refueling of aircraft are based on predicted annual usage of aviation gasoline extrapolated from baseline emissions with no vapor recovery. These emissions were predicted using the Emissions and Dispersion Modeling System (EDMS) model (Segal, 1991), which contains a built-in database of U.S. Environmental Protection Agency's (EPA's) AP-42 emission factors for various types of aircraft and refueling activities.

EDMS was run in screening mode with six receptors in positions likely to show maximum impact from the runway. Meteorology was provided for 18 hours likely to produce maximum ambient concentrations. These consisted of wind speeds of 1, 3, and 10 meters per second; Pasquill-Gifford stability classes D and E; and two wind directions blowing parallel to the runway in opposite directions.

Table M-1. Emissions Inventory for Particulate Matter Equal to or Less than 10 microns in Diameter (tons/day)

	Proposed Action		Joint Use Aviation Alternative	
Source	1999	2004	1999	2004
Aircraft Operations	0.51	0.51	0.51	0.51
Motor Vehicles	0.0007	0.0007	0.0004	0.0004
Industrial Activity	0.022	0.11	-	-
Construction	0.022	0.118	0.051	0.019
Other Activities	0.0002	0.0008	0.0003	0.0005
Total	0.56	0.74	0.56	0.53

Table M-2. Emissions Inventory for Sulfur Dioxide (tons/day)

	Proposed Action		Joint Use Aviation Alternative	
Source	1999	2004	1999	2004
Aircraft Operations	0.115	0.115	0.118	0.119
Motor Vehicles	0.00009	0.0001	0.00005	0.00007
Industrial Activity	0.104	0.551	-	-
Construction	0.004	0.023	0.011	0.004
Other Activities	0.0315	0.098	0.0187	0.0174
Total	0.254	0.787	0.147	0.14

Table M-3. Emissions Inventory for Carbon Monoxide (tons/day)

	Proposed Action		Joint Use Aviation Alternative	
Source	1999	2004	1999	2004
Aircraft Operations	4.13	4.13	5.01	5.17
Motor Vehicles	0.45	0.48	0.26	0.31
Industrial Activity	0.03	0.18	-	-
Construction	0.057	0.33	0.16	0.056
Other Activities	0.003	0.011	0.003	0.006
Total	4.67	5.13	5.43	5.54

Table M-4. Emissions Inventory for Oxides of Nitrogen (tons/day)

	Proposed Action		Joint Use Aviation Alternative	
Source	1999	2004	1999	2004
Aircraft Operations	0.60	0.60	0.69	0.70
Motor Vehicles	0.064	0.070	0.037	0.045
Industrial Activity	0.060	0.317	-	-
Construction	0.166	0.954	0.47	0.161
Other Activities	0.045	0.154	0.046	0.086
Total	0.935	2.10	1.24	0.99

Table M-5. Emissions Inventory for Volatile Organic Compounds (tons/day)

	Proposed Action		Joint Use Aviation Alternative	
Source	1999	2004	1999	2004
Aircraft Operations	3.26	3.26	3.33	3.34
Motor Vehicles	0.042	0.045	0.024	0.029
Industrial Activity	0.023	0.120	-	-
Construction	0.015	0.088	0.027	0.015
Other Activities	0.01.	0.016	0.022	0.023
Total	3.35	3.53	3.40	3.41

Motor Vehicle Activities

Emissions from motor vehicle exhaust on roadways associated with the base and automobile parking were estimated from projected traffic patterns for the two phases of analysis for each alternative.

The EDMS was used to predict and model annual emissions based on the number of vehicles traveling on roadways and entering or leaving parking lots. The EDMS uses emission factors from U.S. EPA AP-42 to predict emissions from moving vehicles and cold starting of automobiles in parking areas. Detailed information about traffic patterns on residential streets was not available and was assumed to be negligible. Only major roads and large parking lots were included in the analysis.

Industrial Activity

Industrial activity under the Proposed Action would be approximately 50 percent light industrial and 50 percent heavy industrial. For purposes of this emission inventory, it was assumed that the emissions profile from these industrial sources would be similar to that of the other sources in the

Region of Influence (ROI) i.e., Miami, Howard, and Cass counties. An emission inventory for industrial sources in these counties is presented in Chapter 3.

For emission projection purposes, it was assumed that industrial emissions would be directly proportional to employment. A per employee factor was calculated for each pollutant by dividing the industrial emissions for the ROI by the total employment in the ROI. These emission factors were multiplied by the projected on-base industrial employment to determine the emissions for industrial activity for each pollutant. The emissions for sulfur dioxide (SO_2) and nitrogen oxides (NO_x) would be reduced by 70 percent and 40 percent, respectively, due to Title IV of the CAA as amended, which mandates that major combustive point sources meet emission rate standards of 1.2 pounds of SO_2 per million BTU and 0.6 pounds of NO_x per million BTU.

Construction

Fugitive dust and combustive emissions from heavy equipment would be generated during construction activities associated with aviation support, industrial, institutional (educational), commercial, residential, and public/recreation land uses. 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 110 pounds per acre per day (U.S. EPA, 1985). The particulate matter equal to or less than 10 microns in diameter (PM_{10}) fraction of the total fugitive dust emissions is assumed to be 50 percent, or 55 pounds per acre per working day.

For the Proposed Action, it is estimated that construction on base would disturb a total of approximately 244 acres over the 10-year period of analysis. Approximately 36 acres would be disturbed during the time period 1994-1999, and approximately 208 acres would be disturbed during the period from 1999-2004. The area of disturbance in any one year was calculated by dividing the number of years of each period of disturbance into the corresponding acreage disturbed. Therefore, the area of disturbance in any one year during the time period of 1994-1999 would be 7.2 acres and during 1999-2004, the annual area of disturbance would be 41.4 acres. The analysis assumes that, on average, there are 216 working days per year (excluding weekends, bad weather, and holidays), and that half of these days (108) would be used for site preparation. It further assumes 4 acre-days of disturbance per acre, which represents the area and duration of disturbing activities for each acre. Thus, for the Proposed Action years 1994-1999, the amount of PM_{10} emissions are calculated as follows:

$$7.2 \frac{\text{acres disturbed}}{\text{year}} \times \frac{\text{4 acre-days of disturbance}}{\text{acre}} \times \frac{\text{1 year}}{\text{108 days}}$$

$$\times \frac{\text{55 pounds } PM_{10}}{\text{acre-day}} = \frac{\text{14.7 pounds } PM_{10}}{\text{day}}$$

Therefore, the amount of PM_{10} that would be released is estimated to be 14.7 pounds per day (0.007 ton per day) for 1994-1999. Similarly, 84 pounds per day (0.042 ton per day) would be released in 1999-2004. The impact of these PM_{10} emissions would cause elevated short-term concentrations, would be temporary, and would fall off rapidly with distance from the source.

Similar calculations for fugitive dust emissions were performed for construction emissions for the Joint Use Aviation Alternative. These results are included in the emissions inventory tables.

In order to calculate the combustive emissions from heavy construction equipment, emission factors developed as part of a large-scale community plan impact assessment are utilized (Riverside County Planning Department, 1992). The emission factors are based on the assumption that it would take a total expenditure of 250,000 brake-horsepower hours of energy with diesel-powered internal combustion engines to completely demolish and redevelop 1 acre of land. Emission factors for this amount of energy expenditure were calculated to be 460 pounds per acre for volatile organic compounds, 1,720 pounds per acre for CO, 4,980 pounds per acre for NO_x (as NO_2), 400 pounds per acre for particulate matter (equivalent to approximately 384 pounds per acre for PM_{10} emissions from diesel combustion), and 120 pounds per acre for SO_2. Acreage and work schedule assumptions are identical to those for the fugitive dust calculations.

Fire Training

The projected frequencies and quantities of fuel for the fire safety training burns were obtained from the Indiana State Public Safety Training Institute and used in conjunction with emission factors from Manual Calculation Methods for Air Pollution Inventories (Fagin, 1988) to determine emissions from the fires. Information received from the State of Indiana Public Safety Training Institute indicated a burn frequency of approximately three times per month for 3 to 5 minutes at a fuel consumption rate of 100 gallons/minute. The fuels used in conducting a burn primarily consist of Jet-A, JP-4, or JP-5, all of which are variations of kerosene.

The U.S. EPA model, SCREEN Version 1.11, was selected to model dispersion from training fires. Fires were modeled as flare sources. The model was set to find the maximum concentration from an automated progression of meteorology and distances from the source. A source elevation of 3 meters was used to represent the height of the burn pit berm.

The average emissions per day were calculated by multiplying emissions for each burn by 36 burns per year and dividing by 365. Emissions associated with fire training activities are presented in Table M-6.

Table M-6. Emission Inventory of Fire Training Activities (tons/day)

Source	CO	PM_{10}	SO_2	NO_2	VOC
1999	0.09	0.02	0	0.001	0.05
2004	0.09	0.02	0	0.001	0.05

CO = carbon monoxide.
NO_2 = nitrogen dioxide.
PM_{10} = particulate matter equal to or less than 10 microns in diameter.
SO_2 = sulfur dioxide.
VOC = volatile organic compound.

Based on the model, the maximum concentration would be located 581 meters from the source, given a wind speed of 20 meters per second and Pasquill-Gifford stability class E. It was conservatively assumed that the concentrations predicted by the model for the 5-minute burn period would be equivalent to a 1-hour average concentration.

Other Activities

The principal source in this category is the combustion of natural gas in both the base heating plant and residential heaters. Emissions from both these sources were calculated based on estimated natural gas consumption and U.S. EPA AP-42 emission factors.

Also included in this category are solvent tank degreasing and surface coating for aircraft-related operations, both of which contribute only reactive organic gas emissions. Emissions from these operations are assumed to be proportional to aircraft operations.



APPENDIX N

APPENDIX N

AGENCY LETTERS AND CERTIFICATIONS

IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
BLOOMINGTON FIELD OFFICE (ES)
718 North Walnut Street
Bloomington, Indiana 47404
(812) 334-4261 FAX 334-4273

October 6, 1992

Mr. George H. Gauger
AFCEE Project Manager
AFCEE/ESEM
Brooks AFB, Texas 78234-5000

Dear Mr. Gauger:

This responds to your September, 1992 letter requesting a list of all state-listed species and federally endangered, threatened, proposed, and candidate species; information on sensitive habitats and sensitive areas; and a list of people who are knowledgeable about the biota found within the Grisson Air Force Base (AFB) located in Miami and Cass counties, Indiana.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et. seq.) and are consistent with the intent of the National Environmental Policy Act of 1969, the Endangered Species Act of 1973, and the U. S. Fish and Wildlife Service's Mitigation Policy.

FEDERALLY ENDANGERED and THREATENED SPECIES

The proposed project is within the range of the following federally endangered and threatened species.

Indiana bat (Myotis sodalis)- caves and riparian habitats
Eastern Fanshell pearly mussel (Cyprogenia stegaria)- rivers

STATE ENDANGERED and THREATENED SPECIES

The proposed project is within the range of the following stated-listed species.

Bobcat (Lynx rufus)
Badger (Taxidea taxus)
Barn owl (Tyto alba)
Snuffbox (Epioblasma triquetra)
Rabbitsfoot (Quadrula cylindrica cylindrica)
Michaux's stitchwort (Arenaria stricta)
Hairy-fruit sedge (Carex sparganioides var cephaloidea)
Tufted hairgrass (Deschampsia cespitosa)
Canada burnet (Sanguisorba canadensis)
Whorled water-milfoil (Myriophyllum verticulatum)

Black-fruit mountain-ricegrass (Oryzopsis racemosa)
Purple oat (Schizachne purpurascens)
Eastern featherbells (Stenanthium gramineum)
Cluster fescue (Festuca paradoxa)
Sheepnose (Plethobasus cyphyus)

PROPOSED and CANDIDATE SPECIES

The following candidate species are not afforded legal protection under the authorities of the Endangered Species Act; however, federal agencies are encouraged to consider the species because the Fish and Wildlife Service (FWS) may proceed at any time with listing actions.

Snuffbox (Epioblasma triquetra)
Clubshell (Pleurobema clava)
Forked aster (Aster furcatus)
Rayed bean (Villosa fabalis)
Glade mallow (Napaea dioica)

Regarding your request for information on sensitive areas (wildlife management areas), we suggest contacting Indiana Department of Resources (IDNR), Division of Nature Preserves. As for the request for information pertaining to sensitive habitats (wetlands), call 1-800-USA MAPS for copies of the National Wetland Inventory maps of Miami and Cass counties, IN. Per your last request, we recommend contacting IDNR, Division of Fish and Wildlife (Katie Smith) and/or Division of Nature Preserves for further information on the biota in the project area.

We appreciate the opportunity to comment at this early stage of the proposed project. If you have any questions please contact Jennifer Breidel, of my staff, at (812)334-4261.

Sincerely yours,

David C. Hudak
Supervisor

cc: IDNR, Division of Fish and Wildlife, Indianapolis, IN
IDNR, Division of Nature Preserves, Indianapolis, IN

INDIANA DEPARTMENT OF NATURAL RESOURCES

PATRICK R. RALSTON, DIRECTOR

Division of Historic Preservation
and Archaeology
402 W. Washington St., Rm. 274
Indianapolis, Indiana 46204
317-232-1646

January 14, 1993

George H. Gauger
AFCEE/ESEM
Brooks Air Force Base, Texas 78235-5000

Dear Mr. Gauger:

We are writing in response to your letter of September 16, 1992, initiating the review process for the disposal and reuse of Grissom Air Force Base in Miami and Cass Counties in Indiana, pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended. We apologize for our delay in responding.

A review of our records indicates that Grissom Air Force Base has neither been assessed, in any detail, nor subjected to field investigations by a professional archaeologist. In early 1989, our office received a report on an archaeological records and literature search for the base that was performed in 1977 by Ball State University. At that time, our office recommended that a "more comprehensive plan to locate, identify, evaluate, and protect your more significant cultural resources" be developed. Our only other record indicating that archaeological work has been performed for Grissom Air Force Base is a 1989 Ball State archaeological records review of Old Baird's Trailer Park, on the east side of US 31, across from the main part of the base.

In order to determine which portions of the base might contain significant archaeological resources, we will need a map--preferably one or more U.S. Geological Survey quadrangle sections--marked to show the degree of previous land disturbance within the base. A description of the existing environment that includes past and current land use would also be useful.

For your information, please find enclosed copies of our February 24, 1989, letter to Howard J. Holdsclaw of Grissom Air Force Base, Mr. Holdsclaw's January 13, 1989, letter to us, and the 1977 "Records Check and Literature Search for the Preliminary Assessment of the Archaeological Resources of Grissom Air Force Base" by Ball State University. Also enclosed, to complete your files, are copies of our October 20, 1992, letter to Mr. Holdsclaw

"EQUAL OPPORTUNITY EMPLOYER"

received
19 JAN 1993

regarding the Installation Restoration Program Remedial Investigation/Feasibility Study and his August 28, 1992, letter to us, with enclosures (including the 1989 records review).

We have very little information about the historical or architectural significance of buildings, structures, or objects at Grissom. As you may be aware, the World War II era B-17G "Flying Fortress" at the aircraft museum at the base's east gate has been nominated for listing in the National Register of Historic Places. A copy of the nomination form is enclosed. There could be other aircraft at the museum--most notably a B-25 bomber--that are also eligible for inclusion in the National Register, but, to our knowledge, no in-depth evaluation of the significance of the other aircraft has been conducted. Similarly, we are not aware of any surveys of historic buildings or structures at Grissom. Without such information, we can not render a meaningful opinion regarding the existence of historic buildings, structures, or objects at the base.

It is our understanding that at least a portion of Grissom Air Force Base likely will be transferred out of federal control. Accordingly, we recommend that a historic preservation plan for the entire base be prepared by a historic preservation professional. The plan would include a survey of buildings, structures, objects, sites, and districts. Depending on what we conclude regarding the base's potential for archaeological sites, the plan might also provide for an archaeological reconnaissance-level survey and data recovery. The plan should make recommendations regarding the National Register eligibility of significant properties and the long-term treatment of those properties.

Typically, as part of the Section 106 review of a proposed military base closure or disposal, a memorandum of agreement (MOA) is executed to govern the disposition of historic properties. Such an agreement is provided for in the regulations of the Advisory Council on Historic Preservation (36 CFR Part 800), promulgated to implement Section 106. Often the MOA calls for the preparation of a historic preservation plan or a cultural resources management plan.

An example of such an MOA is enclosed. The situation at the Indiana Army Ammunition Plant (INAAP) might be somewhat different from that at Grissom, in that the majority of the base's acreage is being retained by the federal government, even though the facility is being deactivated. Furthermore, rather than the federal agency bearing the responsibility for identification of significant archaeological sites within the parcel to be

transferred, the probable recipient (Indiana Department of Natural Resources or DNR) will assume that responsibility under this particular MOA. The DNR, unlike most other non-federal transferees of federal land, is well-suited to manage cultural resources. Nevertheless, we offer the INAAP MOA as a general example of the kind of agreement that the Air Force could prepare for Grissom.

If you have any questions about our comments, you are welcome call Rick Jones of my staff regarding archaeological matters or John Carr regarding buildings, structures, or objects. Either may be reached at (317) 232-1646.

Thank you for your attention.

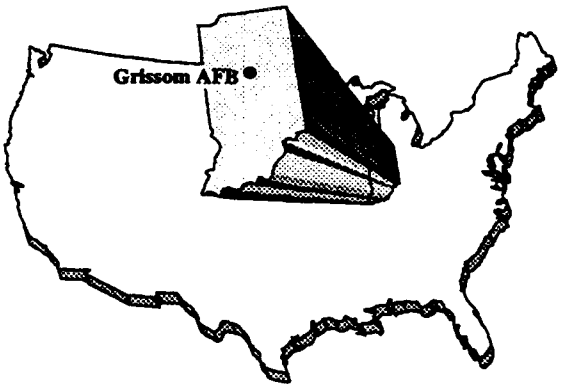
Very truly yours,

Patrick R. Ralston
State Historic Preservation Officer

PRR:JLC:DKO:jlc

Enclosures

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APPENDIX O

APPENDIX O

ENVIRONMENTAL IMPACTS OF GRISSOM AFB REUSE BY LAND USE CATEGORY

APPENDIX O

ENVIRONMENTAL IMPACTS OF GRISSOM AFB REUSE 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 Joint Use Aviation Alternative, evaluated in this Environmental Impact Statement (EIS). The data in Tables O-1 through O-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 alternative for three benchmark years, 1999, 2004, and 2014, where applicable. Land use categories for each alternative are illustrated in Figures O-1 to O-2.

Tables O-1 through O-4 present data on the influencing factors (factors that drive environmental impacts); Tables O-5 through O-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 O-11, Hazardous Materials Usage, because quantities generated will depend on the type and intensity of industrial and commercial activities developed on the site. Table O-11 presents a generalized description of the hazardous materials used under individual land use categories. Table O-12 summarizes the number of Installation Restoration Program sites identified on the base as of 1992, but does not give the likely status of these sites in 1999, 2004, and 2014.

Table O-1. Direct Employment by Land Use Category, Grissom AFB Reuse

Land Use Category	1999		2004		2014	
	P.A.	Alt. 1	P.A.	Alt. 1	P.A.	Alt. 1
Airfield	NA	NA	NA	NA	NA	NA
Aviation Support	NA	279	NA	499	NA	975
Industrial	381	181	1,945	319	4,424	778
Institutional (Educational)	8	15	14	29	14	29
Commercial	248	0	1,157	799	2,571	1,951
Residential	NA	0	NA	0	NA	0
Public/Recreation	46	29	32	26	32	26
Vacant Land	0	NA	0	NA	0	NA
Military Cantonment	928	928	928	928	928	928
Total	1,611	1,432	4,076	2,600	7,969	4,687

Note: Includes total on-base construction and operational jobs.
Alt. 1 = Joint Use Aviation Alternative.
NA = not applicable.
P.A. = Proposed Action.

Table O-2. Total Employment by Land Use Category, Grissom AFB Reuse

Land Use Category	1999		2004		2014	
	P.A.	Alt. 1	P.A.	Alt. 1	P.A.	Alt. 1
Airfield	NA	NA	NA	NA	NA	NA
Aviation Support	NA	380	NA	670	NA	1,325
Industrial	521	248	3,306	427	7,829	1,047
Institutional (Educational)	10	20	36	41	69	42
Commercial	338	0	1,947	1,074	4,547	2,652
Residential	NA	0	NA	0	NA	0
Public/Recreation	64	40	53	32	87	40
Vacant Land	0	NA	0	NA	0	NA
Military Cantonment	1,227	1,227	1,227	1,227	1,227	1,227
Total	2,160	1,915	6,569	3,471	13,759	6,333

Note: Total employment includes direct and secondary employment.
Alt. 1 = Joint Use Aviation Alternative.
NA = not applicable.
P.A. = Proposed Action.

Table O-3. Population In-migration by Land Use Category, Grissom AFB Reuse

Land Use Category	1999		2004		2014	
	P.A.	Alt. 1	P.A.	Alt. 1	P.A.	Alt. 1
Airfield	NA	NA	NA	NA	NA	NA
Aviation Support	NA	319	NA	886	NA	2,123
Industrial	454	236	3,332	622	9,057	1,888
Institutional (Educational)	99	200	273	561	274	630
Commercial	350	0	1,852	561	4,393	1,732
Residential	NA	0	NA	110	NA	439
Public/Recreation	5	5	5	5	5	5
Vacant Land	0	NA	0	NA	0	NA
Military Cantonment	0	0	0	0	0	0
Total	908	760	5,462	2,745	13,729	6,817

Alt. 1 = Joint Use Aviation Alternative.
NA = not applicable.
P.A. = Proposed Action.

Table O-4. Land Use Impacts by Land Use Category, Grissom AFB Reuse (acres of absorption)

Land Use Category	1994-1999		1994-2004		1994-2014	
	P.A.	Alt. 1	P.A.	Alt. 1	P.A.	Alt. 1
Airfield	NA	NA	NA	NA	NA	NA
Aviation Support	NA	37	NA	74	NA	149
Industrial	231	14	445	28	774	69
Institutional (Educational)	12	12	23	23	23	23
Commercial	42	0	160	25	307	63
Residential	NA	0	NA	15	NA	59
Public/Recreation	27	163	27	163	27	163
Vacant Land	27	NA	27	NA	27	NA
Military Cantonment	1,452	1,452	1,452	1,452	1,452	1,452
Total[a]	1,791	1,678	2,134	1,780	2,610	1,978

Note: Total acres based on estimated absorption rates; therefore, the total acres absorbed may not equal the entire base property acreage.
Alt. 1 = Joint Use Aviation Alternative.
NA = not applicable.
P.A. = Proposed Action.

Table O-5. Transportation Impacts by Land Use Category, Grissom AFB Reuse (Average Daily Vehicular Traffic)

Land Use Category	1999		2004		2014	
	P.A.	Alt. 1	P.A.	Alt. 1	P.A.	Alt. 1
Airfield	NA	NA	NA	NA	NA	NA
Aviation Support	NA	893	NA	1,492	NA	2,928
Industrial	1,170	571	5,879	950	11,607	2,332
Institutional (Educational)	134	239	185	769	1,886	755
Commercial	4,677	0	21,279	8,624	41,119	21,161
Residential	NA	0	NA	433	NA	1,711
Public/Recreation	2,466	1,294	1,704	1,079	1,435	1,060
Vacant Land	0	NA	0	NA	0	NA
Military Cantonment	2,803	2,803	2,803	2,803	2,803	2,803
Total	11,250	5,800	31,850	16,150	58,850	32,750

Alt. 1 = Joint Use Aviation Alternative.
NA = not applicable.
P.A. = Proposed Action.

Table O-6. Water Consumption by Land Use Category, Grissom AFB Reuse (gallons per day)

Land Use Category	1999		2004		2014	
	P.A.	Alt. 1	P.A.	Alt. 1	P.A.	Alt. 1
Airfield	NA	NA	NA	NA	NA	NA
Aviation Support	NA	3,800	NA	15,280	NA	43,430
Industrial	17,360	2,130	134,910	8,500	353,130	27,670
Institutional (Educational)	10,640	1,040	22,720	4,180	25,350	5,440
Commercial	19,940	0	140,170	37,380	359,070	121,650
Residential	NA	0	NA	18,380	NA	95,520
Public/Recreation	2,060	33,030	2,200	66,280	2,450	86,290
Vacant Land	0	NA	0	NA	0	NA
Military Cantonment	139,200	139,200	139,200	139,200	139,200	139,200
Total	203,770	179,200	439,200	289,200	879,200	519,200

Note: Numbers represent reuse-related demand in ROI.
Alt. 1 = Joint Use Aviation Alternative.
NA = not applicable.
P.A. = Proposed Action.

Table O-7. Wastewater Generation by Land Use Category, Grissom AFB Reuse (gallons per day)

Land Use Category	1999		2004		2014	
	P.A.	Alt. 1	P.A.	Alt. 1	P.A.	Alt. 1
Airfield	NA	NA	NA	NA	NA	NA
Aviation Support	NA	19,020	NA	33,830	NA	66,650
Industrial	15,350	6,640	121,440	11,750	307,520	26,540
Institutional (Educational)	9,400	3,260	20,450	5,780	22,080	5,220
Commercial	13,430	0	96,130	39,420	238,260	88,910
Residential	NA	0	NA	28,260	NA	101,810
Public/Recreation	1,820	1,080	1,980	960	2,140	870
Vacant Land	0	NA	0	NA	0	NA
Military Cantonment	269,120	269,120	269,120	269,120	269,120	269,120
Total	309,120	299,120	509,120	389,120	839,120	559,120

Note: *Numbers represent reuse-related wastewater, generation.*
Alt. 1 = Joint Use Aviation Alternative.
NA = not applicable.
P.A. = Proposed Action.

Table O-8. Solid Waste Disposal by Land Use Category, Grissom AFB Reuse (pounds per day)

Land Use Category	1999		2004		2014	
	P.A.	Alt. 1	P.A.	Alt. 1	P.A.	Alt. 1
Airfield	NA	NA	NA	NA	NA	NA
Aviation Support	NA	1,200	NA	1,535	NA	3,177
Industrial	509	280	3,658	356	11,157	843
Institutional (Educational)	312	137	617	175	801	166
Commercial	1,337	0	8,687	3,576	25,932	8,477
Residential	NA	0	NA	641	NA	2,426
Public/Recreation	242	182	238	117	310	111
Vacant Land	0	NA	0	NA	0	NA
Military Cantonment	4,176	4,176	4,176	4,176	4,176	4,176
Total	6,576	5,975	17,376	10,576	42,376	19,376

Note: Numbers represent reuse-related waste generation (including demolition debris).
Alt. 1 = Joint Use Aviation Alternative.
NA = not applicable.
P.A. = Proposed Action.

Table O-9. Electricity Consumption by Land Use Category, Grissom AFB Reuse (MWH per day)

Land Use Category	1999		2004		2014	
	P.A.	Alt. 1	P.A.	Alt. 1	P.A.	Alt. 1
Airfield	NA	NA	NA	NA	NA	NA
Aviation Support	NA	2.9	NA	8.2	NA	16.2
Industrial	7.7	3.2	51.0	9.3	151.6	27.4
Institutional (Educational)	0.9	1.2	3.1	3.1	8.5	3.6
Commercial	3.3	0	22.3	9.9	66.2	28.8
Residential	NA	0	NA	2.4	NA	10.4
Public/Recreation	1.0	3.2	1.8	4.7	4.8	5.5
Vacant Land	0	NA	0	NA	0	NA
Military Cantonment	28.6	24.5	28.6	24.5	28.6	24.5
Total	41.5	35.0	106.8	62.1	259.7	116.4

Note: Numbers represent reuse-related demand.
Alt. 1 = Joint Use Aviation Alternative.
NA = not applicable.
P.A. = Proposed Action.

Table O-10. Natural Gas Consumption by Land Use Category, Grissom AFB Reuse (therms per day)

Land Use Category	1999		2004		2014	
	P.A.	Alt. 1	P.A.	Alt. 1	P.A.	Alt. 1
Airfield	NA	NA	NA	NA	NA	NA
Aviation Support	NA	202	NA	612	NA	1,158
Industrial	529	194	5,019	586	13,230	1,664
Institutional (Educational)	53	55	270	165	659	187
Commercial	231	0	2,188	614	5,766	1,742
Residential	NA	0	NA	247	NA	1,122
Public/Recreation	87	249	223	376	545	427
Vacant Land	0	NA	0	NA	0	NA
Military Cantonment	1,455	1,296	1,455	1,296	1,455	1,296
Total	2,355	1,996	9,155	3,896	21,655	7,596

Note: Numbers represent reuse-related demand.
Alt. 1 = Joint Use Aviation Alternative.
NA = not applicable.
P.A. = Proposed Action.

Table O-11. Hazardous Materials Usage by Land Use Category, Grissom AFB Reuse

Land Use Category	Proposed Action	Joint Use Aviation Alternative
Airfield	NA	NA
Aviation Support	NA	Aviation fuels, solvents; POL; hydraulic fluids; degreasers; corrosives; heavy metals; reactives; thinners; paints; glycols; ignitibles; heating oils; pesticides
Industrial	Solvents, heavy metals, POL, corrosives, aerosols, fuels, heating oils, ignitibles, pesticides, paints, thinners, degreasers	Same as Proposed Action
Institutional (Educational)	Corrosives, solvents, heating oils, POL, cleaners, pesticides, paints, thinners	Same as Proposed Action with inclusion of ignitibles, degreasers, fuels, and hydraulic fluids
Commercial	Heating oils, pesticides, cleaners, paints, thinners, aerosols, ordnance	Same as Proposed Action with exception of ordnance
Residential	NA	Pesticides, fertilizers, fuels, POL, heating oils, household products
Public/Recreation	Pesticides, chlorine, heating oils, paints, thinners, cleaners, solvents, aerosols, POL	Same as Proposed Action
Agricultural	NA	NA
Vacant Land	Pesticides	NA
Military Cantonment	Aviation fuels, motor fuels, glycols, POL, heating oils, heavy metals, thinners, paints, solvents, degreasers, hydraulic fluids, ignitibles, corrosives, pesticides, ordnance	Same as Proposed Action

Note: Quantities of hazardous materials used will depend on the specific industrial development and are not reported here.
NA = not applicable.
POL = petroleum, oil, and lubricants.

Table O-12. Number of Installation Restoration Program (IRP) Sites by Land Use Category, Grissom AFB Reuse

Land Use Category	Proposed Action	Joint Use Aviation Alternative
Airfield	NA	NA
Aviation Support	NA	0
Industrial	3	1
Institutional (Educational)	0	0
Commercial	2	4
Residential	NA	0
Public/Recreation	0	1
Vacant Land	0	NA
Military Cantonment	6	6

Note: Summarized above are identified IRP sites as of 1992. The number of sites over the 1992-2013 period would change as remediation measures are implemented for individual sites. IRP sites may overlap Land Use categories and, therefore, may be counted more than one time.
NA = not applicable.

Table O-13. Soils and Geology Impacts by Land Use Category, Grissom AFB Reuse, 1999-2014
(acres of ground disturbance)

Land Use Category	Proposed Action	Joint Use Aviation Alternative
Airfield	NA	NA
Aviation Support	NA	17
Industrial	410	50
Institutional (Educational)	2	2
Commercial	173	47
Residential	NA	23
Public/Recreation	1	7
Vacant Land	24	NA
Military Cantonment	0	20
Total	610	166

NA = not applicable.

Table O-14. Expected Noise Levels by Land Use Category, Grissom AFB Reuse (Typical Day-Night Average Sound Level in Decibels), 2014

Land Use Category	Proposed Action	Joint Use Aviation Alternative
Airfield	NA	NA
Aviation Support	NA	65-75
Industrial	65-75	70-75
Institutional (Educational)	70-75	70-75
Commercial	65-75	65-75
Residential	NA	<65
Public/Recreation	65-75	65-75
Vacant Land	<65	NA
Military Cantonment	65-75	65-75

dB = decibel.
DNL = day-night average sound level.
NA = not applicable.

Table O-15. Biological Resource Impacts by Land Use Category, Grissom AFB Reuse 1999-2014
(acres of wetland habitat potentially disturbed)

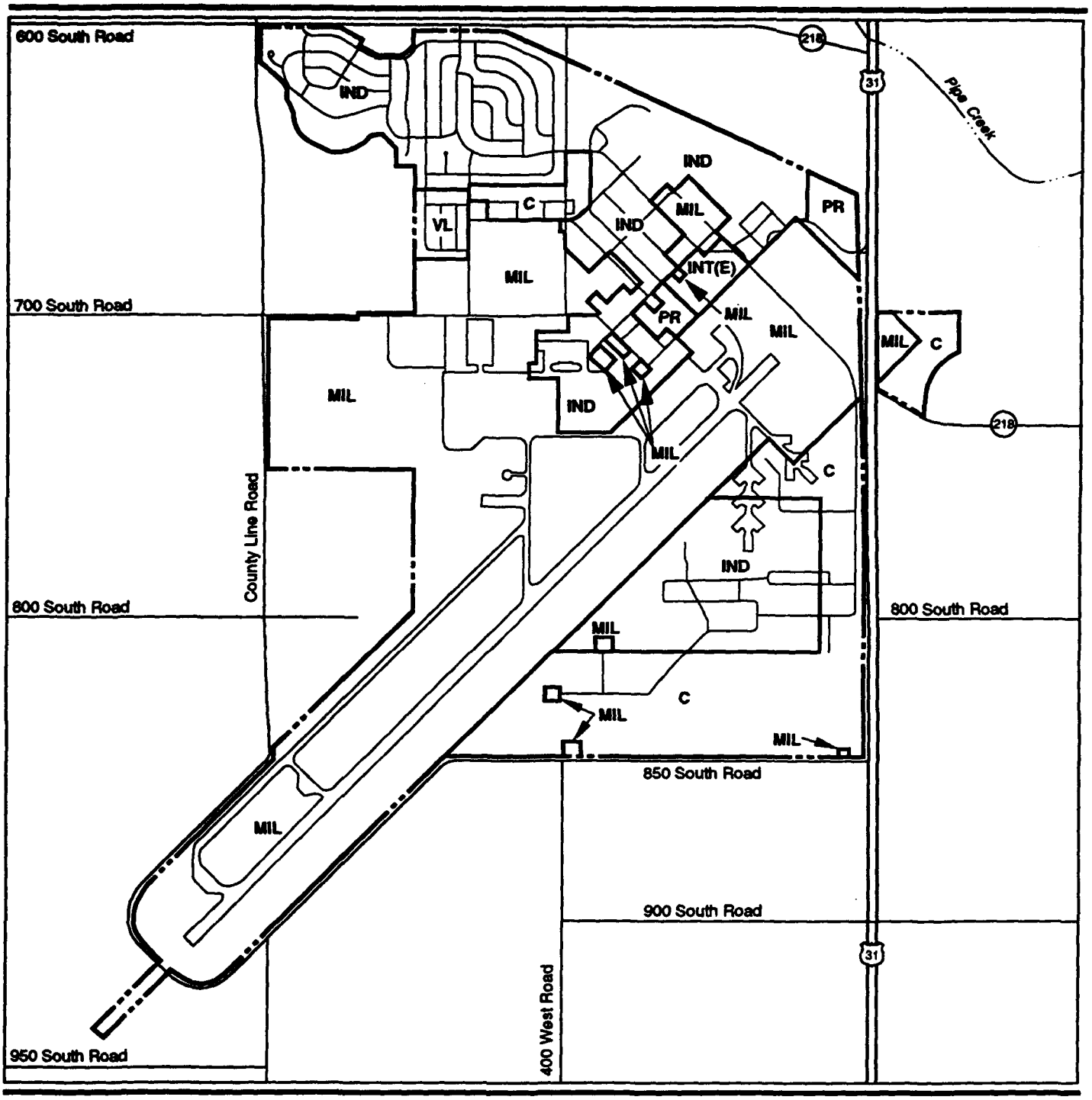
Land Use Category	Proposed Action	Joint Use Aviation Alternative
Airfield	NA	NA
Aviation Support	NA	3.36
Industrial	3.15	0
Institutional (Educational)	0	NA
Commercial	1.85	0.76
Residential	NA	0.88
Public/Recreation	0	0
Vacant land	0	NA
Military Cantonment	3.75	3.75
Total	8.75	8.75

Note: Wetland effects.
NA = not applicable.

Table O-16. Cultural Resource by Land Use Category, Grissom AFB Reuse (number of potential historic properties)

Land Use Category	Proposed Action	Joint Use Aviation Alternative
Airfield	NA	NA
Aviation Support	NA	0/3
Industrial	0/7	0/1
Institutional (Educational)	0/0	0/0
Commercial	1/3	1/6
Residential	NA	0/0
Public/Recreation	0/1	0/1
Vacant Land	0/0	NA
Military Cantonment	0/6	0/6

NA = not applicable.
#/# Archaeological Sites/Historic Facility location.



EXPLANATION

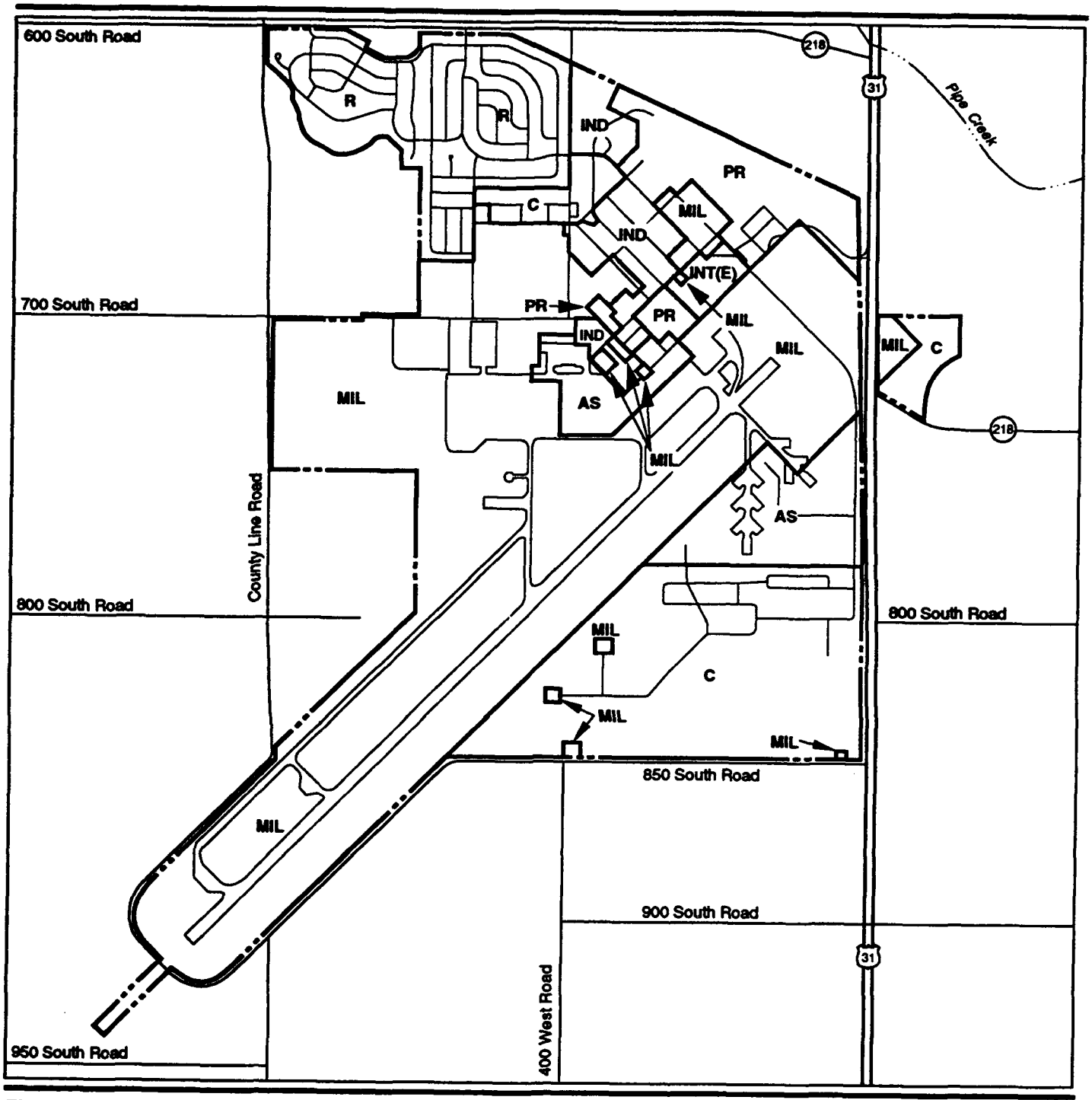
A	Airfield *	INT (E)	Institutional (Educational) - 23 ac.	AG	Agriculture *
AS	Aviation Support *	C	Commercial - 419 ac.	VL	Vacant Land - 27 ac.
IND	Industrial - 774 ac.	R	Residential *	MIL	Military Cantonment - 1,452 ac.
INT (M)	Institutional (Medical) *	PR	Public/Recreation - 27 ac.	----	Base Boundary

0 650 1300 2600 Feet

* Standard land use designation not applicable to this figure.

Land Use Parcels - Proposed Action

Figure O-1



EXPLANATION

A	Airfield *	INT (E)	Institutional (Educational) - 23 ac.	AG	Agriculture *
AS	Aviation Support - 192 ac.	C	Commercial - 491 ac.	VL	Vacant Land *
IND	Industrial - 106 ac.	R	Residential - 293 ac.	MIL	Military Cantonment - 1,452 ac.
INT (M)	Institutional (Medical) *	PR	Public/Recreation - 163 ac.	----	Base Boundary

0 650 1300 2600 Feet

* Standard land use designation not applicable to this figure.

Land Use Parcels - Joint Use Aviation Alternative

Figure O-2

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