DRAFT
SHAW AIR FORCE BASE INFRASTRUCTURE PROJECT

ENVIRONMENTAL ASSESSMENT

UNITED STATES AIR FORCE
20TH FIGHTER WING
SHAW AFB, SOUTH CAROLINA

July 2008

FINDING OF NO SIGNIFICANT IMPACT

NAME OF THE PROPOSED ACTION

Infrastructure Project at Shaw Air Force Base (AFB), South Carolina (S.C.).

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The United States Air Force (Air Force) proposes to execute a Base Infrastructure Project and evaluate an additional site for Headquarters of United States Army Central (USARCENT) on the west side of the base. Components of the Base Infrastructure Project would include acquisition of approximately 46 acres of land immediately north of the base, construction of approximately 10,600 linear feet of roads, demolition of approximately 1,800 linear feet of existing roads, construction of additional fencing and an entry control facility, and relocation of three golf course holes. No additional personnel would be located at Shaw AFB as a result of the Base Infrastructure Project, and total construction expenditures would be roughly $8.3 million. Siting of the USARCENT command HQ building on the west side of the base would result in no additional personnel being located at Shaw AFB beyond the 1,518 analyzed under the environmental analysis (EA) for the implementation of Defense Base Closure and Realignment Commission (BRAC) recommendations at Shaw AFB, S.C., which is hereby incorporated by reference. Construction expenses would be higher than those analyzed under the BRAC EA due to the relocation of four structures currently located at the proposed action USARCENT command HQ building. This EA analyzes the impacts associated with implementation of the proposed action, one alternative, and the no action alternative. The alternative action would construct the USARCENT command HQ building just west of the proposed action site, on the opposite side of Shaw Drive, which would require relocation of five structures. Under the No Action alternative, the Base Infrastructure Project would not go forward, but the actions described in the BRAC EA would go forward, with the USARCENT command HQ building being constructed on the east side of the base.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The public and agency scoping process focused the analysis on the following environmental resources: land use, infrastructure, socioeconomics and environmental justice, cultural resources, biological resources, water resources, air quality, hazardous materials, and hazardous waste safety, and noise. As indicated in Chapter 4.0, neither the proposed action nor the action alternative would result in significant impacts to any resource area.

Land Use Resources: Changes to on-base land use under both the proposed action and Alternative 1 would be consistent with the *Shaw AFB General Plan*. Land use in the 46-acre area proposed to be acquired would change from light residential/commercial to various military uses. Recreation on-base would be temporarily adversely affected while golf course holes are relocated. Under the proposed action, two bank branches (Buildings 1405 and 1406), the base theater (Building 1413), and the Base Exchange (Building 1422) would be demolished. Under Alternative 1, the enlisted club (Building 1402), bowling center (Building 1401), and community activity center (Building 1411) would be demolished. Replacement of these facilities would occur but has not been scheduled at this time. Implementation of

the proposed action or Alternative 1 would result in additional traffic entering and exiting at the Main and Northwest Gates. Improvements are planned at these gates that would alleviate potential resulting congestion. No significant adverse effects are expected.

Infrastructure: With the exception of the sewage system, all infrastructure systems at Shaw AFB have capacity to handle increased demands imposed by implementation of the proposed action or Alternative 1. Improvements to the sewer system have been scheduled. No significant adverse effects are expected.

Socioeconomics and Environmental Justice: Effects of the increase in manning associated with beddown of HQ USARCENT on the local economy were analyzed as part of the EA for implementation of BRAC at Shaw AFB and found to be not significant. Additional expenditure of $8.3 million for the Base Infrastructure Project would be expected to have no significant impacts. Neither the proposed action nor Alternative 1 would result in disproportionate adverse effects on minority persons, low-income populations, or children. No significant adverse effects are expected.

Cultural Resources: No impacts to cultural resources are expected, as none of the proposed projects are sited in areas known to contain cultural resources and all project areas have been previously disturbed. If cultural resources were to be found during construction on-base or in the land proposed for acquisition, the Air Force would comply with Section 106 of the National Historic Preservation Act, including consultation with the State Historic Preservation Officer. No effects are expected.

Biological Resources: The Base Exchange (BX), which would be demolished as part of the proposed action, is a nesting site for a state threatened species, the least tern (*Sterna antillarum*). As long as the BX is not demolished during the least tern nesting season (mid-April – late July), no adverse impacts to the species would be expected. No significant adverse effects are expected.

Water Resources: No changes to water usage patterns would be expected under the proposed action or Alternative 1. No effects are expected.

Air Quality: Sumter County is in attainment for all criteria air pollutants; therefore, no conformity determination is required. Furthermore, impacts to air quality under the proposed action or Alternative 1 would be less than two percent of the total emissions for the county. No significant adverse effects are expected.

Hazardous Materials and Hazardous Waste: Handling procedures would be the same under the proposed action, Alternative 1, and the No Action Alternative. No effects are expected.

Safety: Acquisition of approximately 46 acres of land north of the base would result in a positive impact to safety, in that minimum anti-terrorism/force protection (AT/FP) facility standoff distances would be met and clear zone land use controls would be imposed. The proposed construction of a stormwater retention pond of approximately 0.9 acres could slightly increase bird-aircraft strike hazard (BASH) at Shaw AFB, but application of standard BASH control techniques would minimize the associated risk. Effects would be positive overall and not significant.

Noise: Noise associated with the proposed action would be temporary and would be expected to occur only during business hours. The USARCENT command HQ building and replacement North Gate Entry Control Facility would require special noise attenuation construction methods in order to meet interior noise level goals.

CONCLUSION

Based on information and analysis presented in the Environmental Assessment conducted in accordance with the requirements of the National Environmental Policy Act, the Council on Environmental Quality regulations, and implementing regulations set forth in 32 CFR Part 989 (Environmental Impact Analysis Process), as amended, and review of the public and agency comments submitted during the 30-day public comment period, I conclude that implementation of the proposed action would not result in significant impacts to the quality of the human or natural environment. For these reasons, a finding of no significant impact (FONSI) is made and preparation of an environmental impact statement (EIS) is not warranted.

_____ _____

JAMES N.POST III
Colonel, USAF
Commander, 20 Fighter Wing

DATE

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Draft

Shaw Air Force Base Infrastructure Project

Environmental Assessment

U.S. Air Force
Air Combat Command
20th Fighter Wing
Shaw AFB, S.C.

July 2008

PRINTED ON RECYCLED PAPER

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ACRONYMS, ABBREVIATIONS, AND SYMBOLS

µg/m³	Micrograms per Cubic Meter
AAFES	Army & Air Force Exchange Service
ACC	Air Combat Command
ACHP	Advisory Council on Historic Preservation
ADP	Area Development Plans
AFB	Air Force Base
AFH	Air Force Handbook
AFI	Air Force Instruction
AFOSH	Air Force Occupational Safety and Health
AICUZ	Air Installation Compatible Use Zone
APZ	Accident Potential Zone
AST	Aboveground Storage Tank
AT/FP	Anti-Terrorism/Force Protection
BOS	Base Operating Support
BRAC	Base Realignment and Closure
BREC	Black River Electric Cooperative
C&D	Construction & Demolition
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIRF	Centralized Intermediate Repair Facility
CME	Contract Manpower Equivalent
CO	Carbon Monoxide
CRM	Cultural Resources Management
CWA	Clean Water Act
CZ	Clear Zone
dB	Decibels
dBA	A-weighted Decibels
DD	Decision Document
DNL	Day-Night Average Sound Level
DoD	Department Of Defense
DRMO	Defense Reutilization and Marketing Office
EA	Environmental Assessment
EBS	Environmental Baseline Study
ECR	Electronic Combat Ranges
ECU	Environmental Control Units
EECP	Early Entry Command Post
EIAP	Environmental Impact Analysis Program
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ETSC	Endangered, Threatened, and Special Concern
FE	Federal Endangered
FONSI	Finding of No Significant Impact
FT	Federal Threatened

ACRONYMS, ABBREVIATIONS, AND SYMBOLS CONT'D

ft	Foot/feet
FW	Fighter Wing
FY	Fiscal Year
GOV	Government Owned Vehicles
gpm	Gallons per Minute
HAP	Hazardous Air Pollutant
HMMP	Hazardous Material Management Process
HQ	Headquarters
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
JCLUS	Joint Compatible Land Use Study
L_{dn}	Day-Night Average Sound Level
MCP	Main Command Post
MFH	Military Family Housing
mgd	Million Gallons per Day
MILCON	Military Construction
MILVAN	Military Van
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_x	Nitrogen Oxide
NPDES	National Pollution Discharge Elimination System
NPS	Nonpoint Source
NRHP	National Register of Historic Places
ORW	Outstanding Resources Waters
OSHA	Occupational Safety and Health Administration
OWS	Oil-Water Separator
PCE	Perchloroeythlene
PDU	Power Distribution Unit
PL	Public Law
PM_{10}	Particulate Matter With Diameter Less Than or Equal To 10 Microns
$PM_{2.5}$	Particulate Matter With Diameter Less Than or Equal To 2.5 Microns
POL	Petroleum, Oil, and Lubricant
POV	Privately Owned Vehicles
ppm	Parts Per Million
Q-D	Quantity-Distance
RC	Regional Concern
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
SC	Special Concern
SCDHEC	South Carolina Department of Health and Environmental Control
SCIAA	South Carolina Institute of Archaeology & Anthropology
SE	State Endangered
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SR	State Route

ACRONYMS, ABBREVIATIONS, AND SYMBOLS CONT'D

ST	State Threatened
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan
TCE	Trichloroethylene
TCR	Traditional Cultural Resource
UFC	Unified Facilities Criteria
USACE	U.S. Army Corps of Engineers
USAFCENT	U.S. Air Force Central Command
USARCENT	United States Army Central
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WINDO	Wing Infrastructure Development Outlook
WMA	Wildlife Management Area
WWTP	Wastewater Treatment Plant

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1.0 PURPOSE AND NEED

This environmental assessment (EA) has been prepared to analyze the potential environmental consequences associated with the proposed action, one action alternative, and the No Action alternative at Shaw Air Force Base (AFB) in accordance with the requirements of the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321 et seq.) and its implementing regulations.

Section 1.1 provides background information on Shaw AFB. The purpose and need for the proposed action are described in Section 1.2. A detailed description of the proposed action and alternatives is provided in Chapter 2.0. Chapter 3.0 describes the existing conditions of various environmental resources that could be affected by the proposed action and the alternatives. Effects of the proposed action and alternatives on resources are addressed in Chapter 4.0. Chapter 5.0 addresses potential cumulative effects of the proposed action and the alternatives, in conjunction with other recent-past, current, and future actions that may be implemented in the region of influence (ROI).

Shaw AFB Infrastructure EA

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1.1 BACKGROUND

Shaw AFB is located in the east central part of South Carolina, approximately 30 miles east of the capital city of Columbia. The base is located within the city limits of Sumter and is 10 miles west of the city's center (Figure 1-1).

The city of Sumter is located in Sumter County, which is naturally bounded by the Wateree River to the west and the Lynches River to the east. The county includes a mixture of farmland, forested areas, and wetlands, with the main population in and around the city of Sumter.

The 20th Fighter Wing (FW), the base host wing, operates the 55th, 77th and 79th Fighter Squadrons. Its primary mission is to provide, project, and sustain combat-ready air forces. Headquarters (HQ) 9th Air Force is the major tenant at Shaw AFB. General goals of the base are to sustain the resources and relationships deemed appropriate to pursue national interests and provide for the command, control, and communications necessary to execute the missions of the Air Force, Air Combat Command (ACC), 9th Air Force, the 20th FW, and HQ United States Army Central (USARCENT).

Figure 1-1. Shaw AFB Vicinity Map

The HQ USARCENT mission is to serve as the Army component in a unified command—the United States Central Command—which has responsibility over a vast overseas area covering parts of Africa, Asia, and the Persian Gulf. HQ USARCENT draws upon a reservoir of Army units and is responsible for planning, exercising, and rapidly deploying these units in crisis situations.

1.2 PURPOSE AND NEED

The purpose of this action is to improve base security and traffic flow, as well as create additional space for future development. This action would also include evaluating additional on-base locations for facilities necessary to implement the BRAC Commission recommendations that became law on November 9, 2005, in accordance with Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended.

This action is needed to provide force protection measures for existing facilities by allowing proper standoff distances from the facilities to Frierson Road and Sweeney Street. Relocation of the three golf course holes, along with the rerouting of Shaw Drive, is required to provide areas for construction of primary mission facilities.

In order to implement the BRAC actions and improve military capabilities, Shaw AFB will require facilities and infrastructure to house and support HQ USARCENT.

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2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This section describes the components of the Base Infrastructure Project and potential locations for the relocation of the HQ USARCENT in response to the BRAC Commission recommendations for Shaw AFB. This chapter presents the proposed action, Alternative 1, and the No Action alternative. Figure 2-1 identifies those areas affected by the proposed action and alternatives.

2.1 PROPOSED ACTION

The proposed action is twofold: 1) implement the Base Infrastructure Project (VLSB083007) at Shaw AFB and 2) evaluate an additional site for the construction of the USARCENT command HQ building. These actions include the following elements as shown in Figure 2-2.

2.1.1 Base Infrastructure Project

The Base Infrastructure Project would consist of:

- Acquisition of approximately 46 acres of privately owned land adjacent to Frierson Road on the northeast side of the base. These lands include all or a portion of 17 parcels adjacent to Frierson Road. A portion of the land acquired between the existing North Gate and the bridge over Long Branch would be redeveloped to accommodate a new entry control facility (Figure 2-3) that provides adequate standoff distances to existing critical mission facilities in accordance with antiterrorism/force protection standards (Unified Facility Criteria 4-010-01). Lands east of the Long Branch Bridge would be acquired to maintain an adequate clear zone associated with Runway 04L-22R, in accordance with AFI 32- 7063, *The Air Installation Compatible Use Zone Program*.

- Removal of paved roads (Palmetto Avenue, Magnolia and Cypress Streets) and subsurface utility infrastructure within former housing area, grading and construction of three new replacement golf course holes and realignment of one existing golf course hole. This project component would temporarily disturb approximately 23 acres of Shaw AFB that was previously cleared of housing under the housing privatization program.

- Closure of existing golf course holes 3, 4, and 5 and the grading and construction of approximately 4,400 feet of realigned Shaw Drive to Frierson Road. Shaw Drive would be constructed with four lanes divided by a grassed median. The road would consist of two 24-foot-wide travel lanes (Figure 2-4).

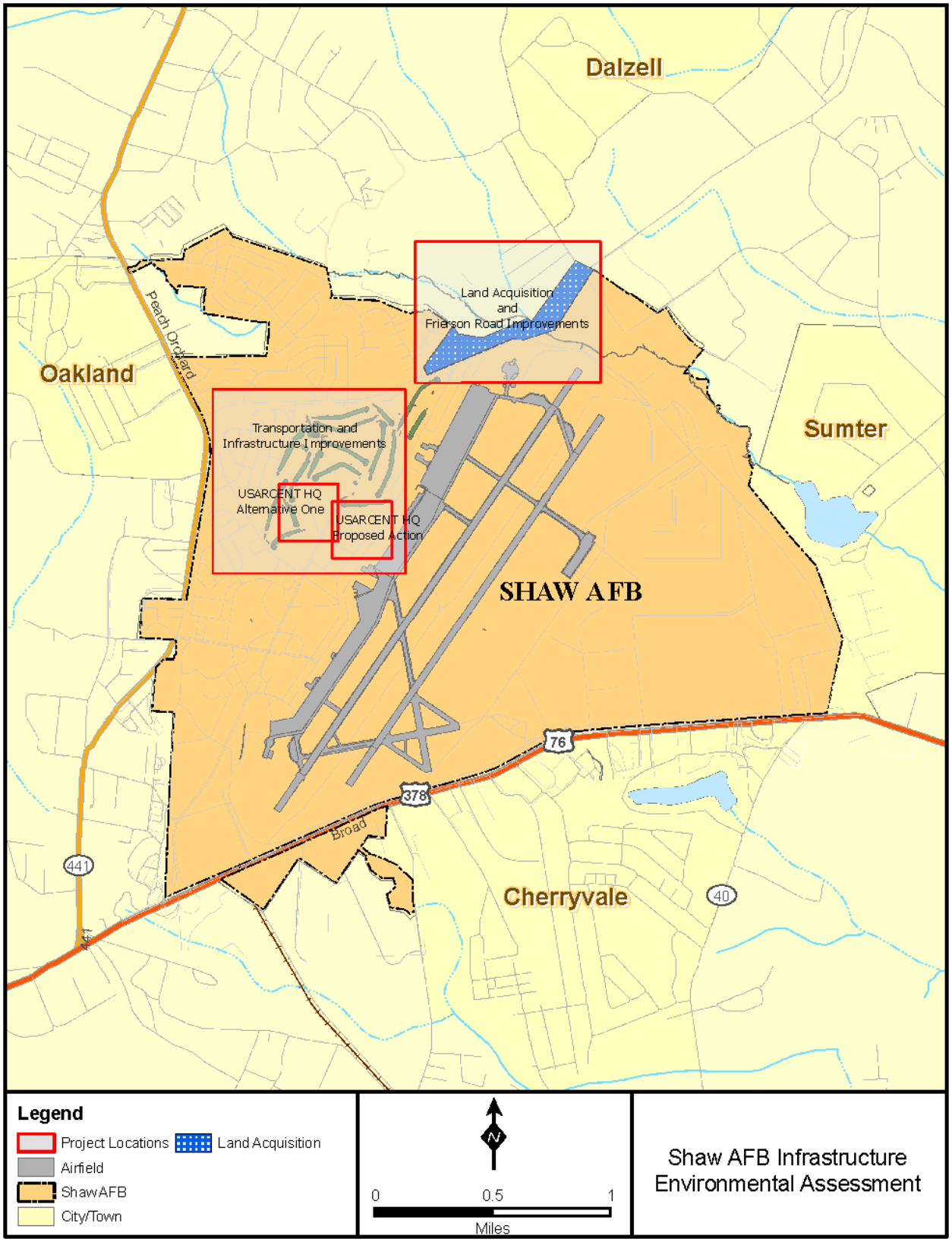

Figure 2-1. Proposed Project Areas

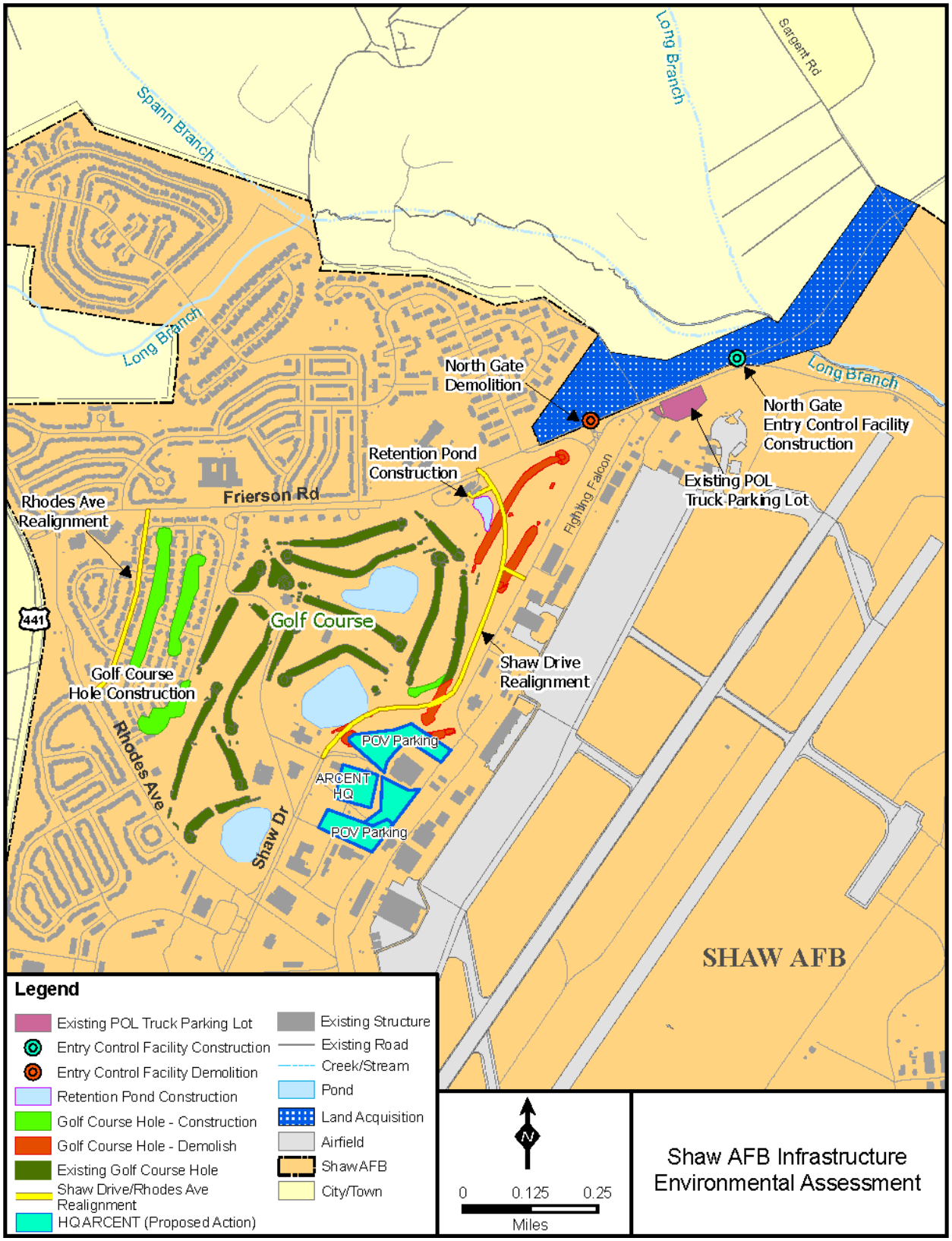

Figure 2-2. Project Locations Under Proposed Action

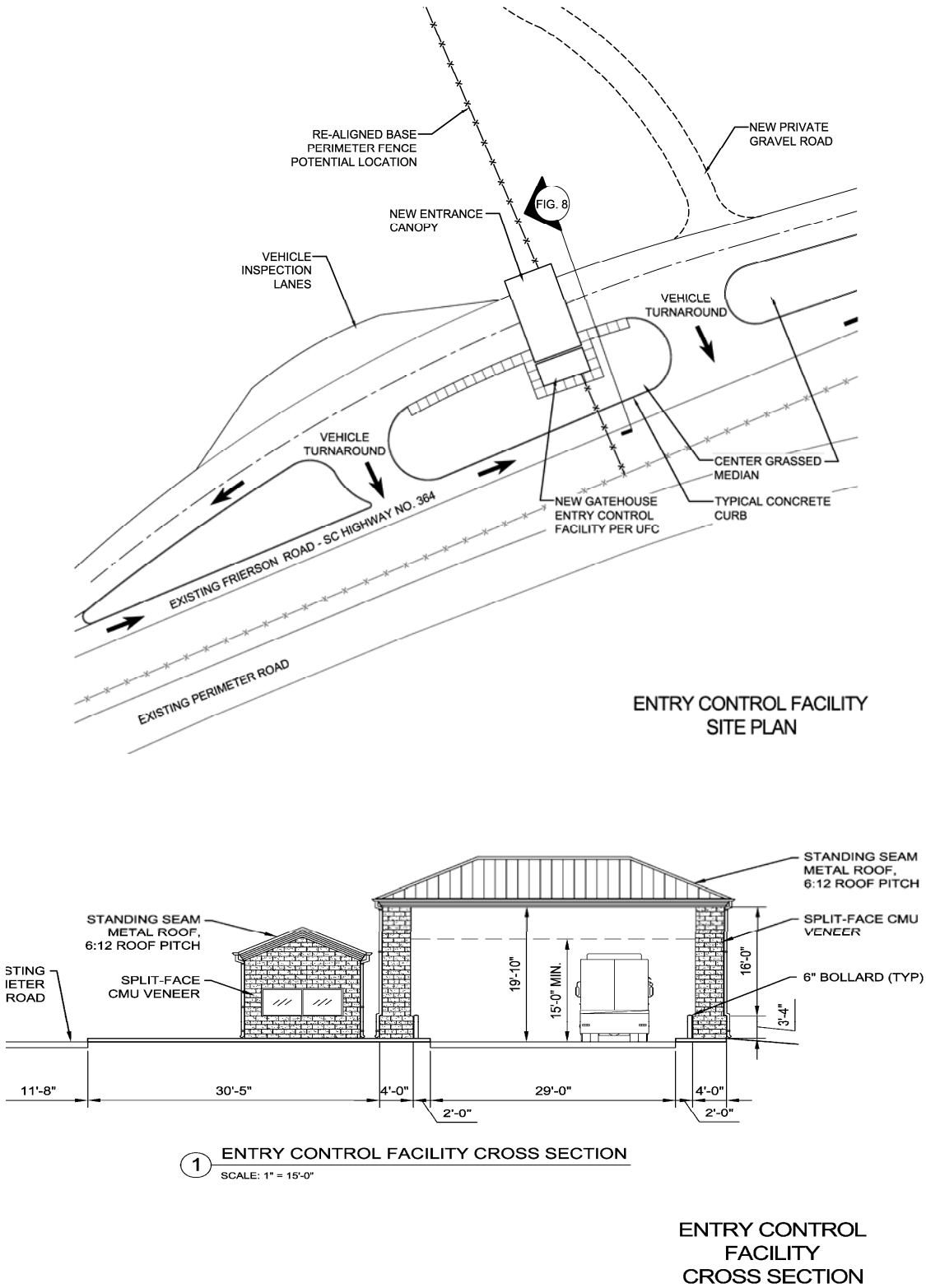

Figure 2-3. Entry Control Facility

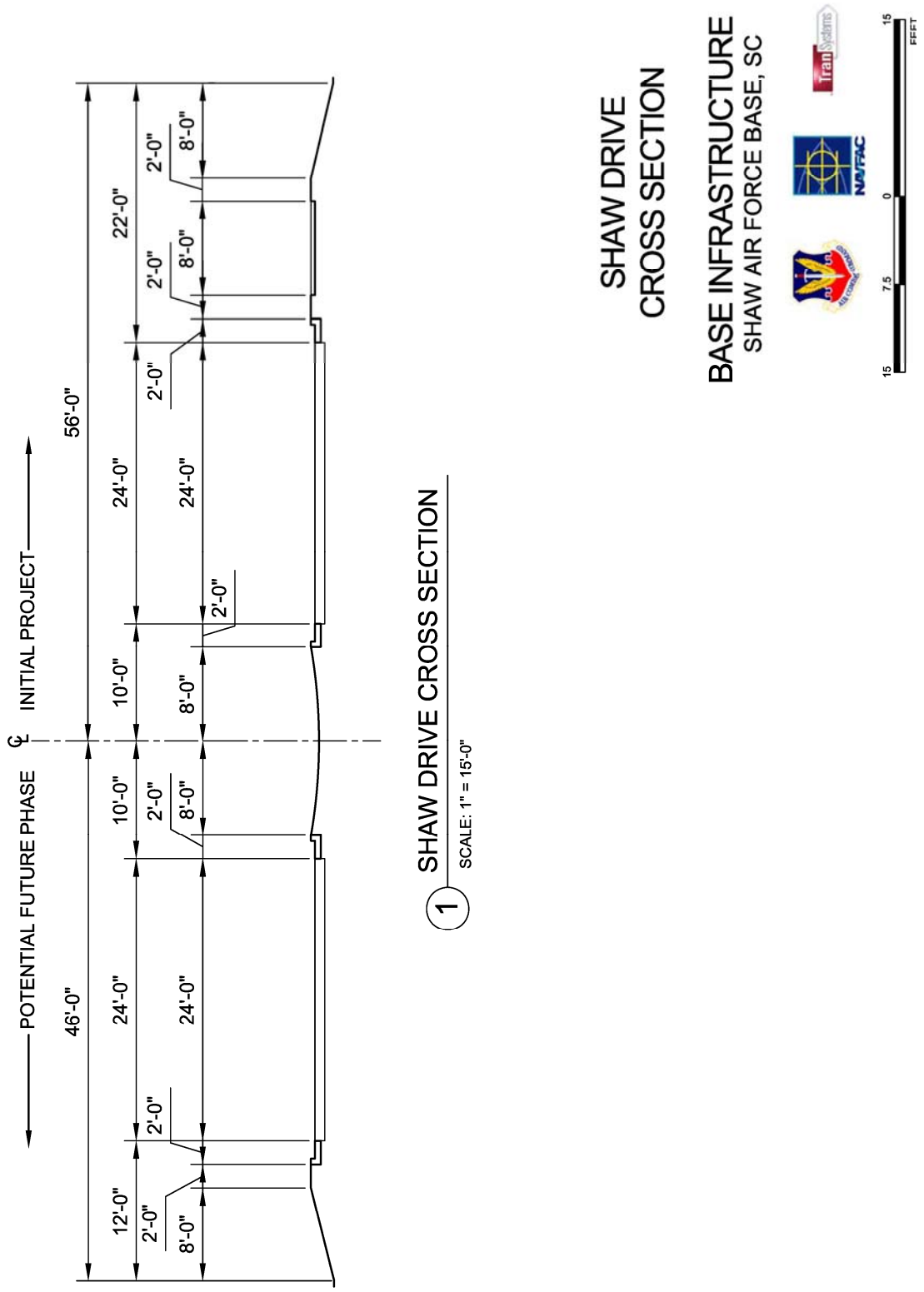

Figure 2-4. Shaw Drive Cross Section

- Construction of various interior road connections (approximately 1,400 feet), to link flightline facilities to the new Shaw Drive and realign approximately 3,700 feet of Rhodes Avenue to intersect with Frierson Road.

- Construction of a new entry control facility (300 square feet) and shelter (1,560 square feet) and the new alignment of 2,400 feet of Frierson Road.

- Demolition of existing Frierson Road entry control facility (Building 1625, 204 square feet) and removal of existing pavement.

- Regrading of the existing golf course holes 3, 4, and 5 and construction of new retention pond of approximately 0.9 acres and an access road to golf maintenance facilities (Buildings 1416/1419).

Road construction would include approximately 9,200 feet of 24-foot-wide arterial roadways and 1,400 feet of access roadways. Approximately 1,800 linear feet of existing roadway (43,100 square feet of pavement) would be removed at various locations.

2.1.2 Construction of the USARCENT Command HQ Building on West Side of Base

The proposed action also includes consideration of an additional site for the construction of the USARCENT command HQ building (approximately 300,000 square feet).

The site evaluated in this EA is shown in Figure 2-2; it would be available for redevelopment once a new AAFES Base Exchange is constructed and operational. The site is located between the existing Shaw Drive and Lance Avenue and is currently occupied by Buildings 1413 (Base Theater), 1422 (Base Exchange), 1405 (bank), 1406 (bank). The site also includes parking lots supporting these facilities.

A previous EA evaluated sites for the HQ facilities on the east side of the base, base operating support projects, and housing projects. The sites for the six base operating support projects totaled 83,110 square feet, and the five housing projects included approximately 77,204 square feet and 24 single family housing units (57, 600 square feet). The EA for these projects was accompanied by a signed FONSI (Air Force, 2007a). Beddown of HQ USARCENT would result in a net increase of approximately 1,518 personnel at Shaw AFB with an estimated total construction expenditure of $132 million.

Construction. Prior to the start of building construction, each building site would be graded, and sediment and erosion would be controlled by the use of standard construction practices. These practices would include the installation of a silt fence, storm drain inlet protection, temporary sediment traps, and diversion dikes within project limits prior to commencement of any on-site work.

Gravel would be placed at the entrance to construction sites to reduce the amount of soil tracked onto the paved roads. Similarly, fugitive dust would be controlled through standard construction practices. All construction operations would comply with the requirements of the South Carolina Stormwater Management and Sediment Reduction Act. Before beginning construction, the construction contractor would apply for and receive a permit from the South Carolina Department of Health and Environmental Control (SCDHEC) Bureau of Water. All areas disturbed by construction activities would be graded, seeded, fertilized, and mulched upon completion of proposed construction activities.

Connections to the existing water supply system would provide adequate domestic and fire protection water systems for the proposed North Gate Entry Control Facility and the USARCENT command HQ building. Wastewater generated by these facilities would be discharged to the existing sewer system and directed to the base wastewater treatment plant. Stormwater would be directed through vegetated swales and storm sewers to the existing drainage system. Electric connections to the existing system are available in the immediate vicinity of each project area.

Manpower. In addition to over 5,600 military assigned to Shaw AFB, more than 600 civilians and 438 Contract Manpower Equivalents (CMEs) are currently employed on-base. The authorized manpower figures associated with HQ USARCENT and other BRAC actions are listed in Table 2-1; these staffing levels would occur by FY12. BRAC actions other than the beddown of HQ USARCENT include establishment of an ALQ-184 Composite Intermediate Repair Facility (adding 24 maintenance personnel) and relocation of the TF-34 engine Propulsion Flight (losing approximately 62 authorizations with 37 military assigned).

Table 2-1. Existing and Projected Base Personnel Authorizations

	Military	Civilian	Contract Manpower Equivalents (CMEs)	Total
Existing Base Population	5,600	600	438	6,638
Proposed Personnel	1,097	199	222	1,518
Projected Base Population	**6,697**	**799**	**660**	**8,156**

2.2 ALTERNATIVE 1

Under this alternative, all actions associated with the Base Infrastructure Project contained in the proposed action would occur. This alternative would include a potential location for the USARCENT command HQ complex as shown in Figure 2-5. This location west of Shaw Drive, would require the demolition of buildings 1401 (Bowling Center), 1402 (Enlisted Club), 1408 (swimming pool facilities), 1409 (swimmer's bath house), and 1411 (Community Activities Center). The costs for demolition of these structures and the need for replacement of these facilities have not been identified.

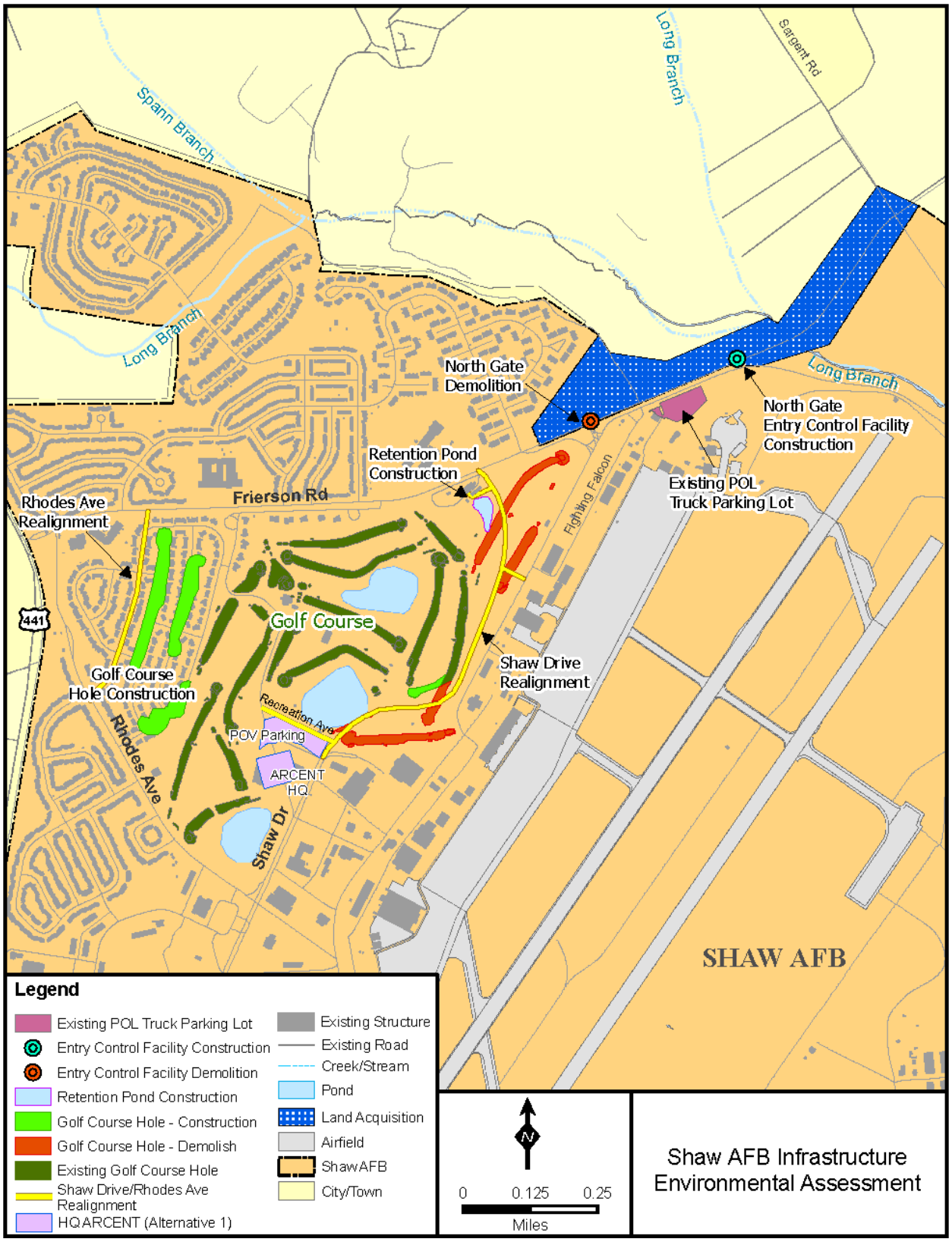

Figure 2-5. Project Locations Under Alternative 1

2.3 NO ACTION ALTERNATIVE

Section 1502.14(d) of NEPA requires an EA to include a no action alternative. Under the No Action alternative for this EA, the Base Infrastructure Project would not be implemented. Critical base facilities would continue to have inadequate standoff distances as directed by anti-terrorism/force protection standards. Also under the adoption of the No Action alternative, neither of the sites analyzed for the HQ USARCENT would be chosen. Other locations on the east side of the base that have been previously analyzed in an EA would be chosen. Manpower authorizations under the No Action alternative would include the existing and proposed authorization described in Table 2-1. Analysis of the No Action alternative provides a benchmark against which decision-makers can compare the magnitude of the environmental effects from the proposed action.

2.4 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

This EA for the Base Infrastructure Project and implementation of BRAC recommendation at Shaw AFB has been prepared in accordance with NEPA (42 USC 4321-4347), Council on Environmental Quality (CEQ) Regulations (40 Code of Federal Regulations [CFR] § 1500–1508), and 32 CFR Part 989, et seq., *Environmental Impact Analysis Process* (Air Force Instruction [AFI] 32-7061). NEPA is the basic national requirement for identifying environmental consequences of federal decisions. NEPA ensures that environmental information is available to the public, agencies, and the decision-maker before decisions are made and before actions are taken.

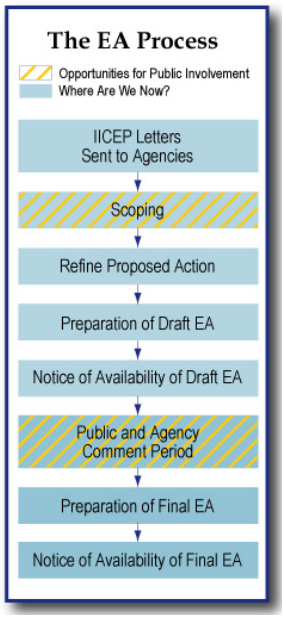

Figure 2-6. EA Process

2.4.1 Environmental Assessment Process

Compliance with NEPA guidance for preparation of an EA involves several steps, depicted in Figure 2-6. The environmental analysis process includes public and agency review of information pertinent to the proposed action and alternatives and provides a full and fair discussion of potential consequences to the natural and human environment. Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) letters were sent; see Appendix A for responses received through July 14, 2008.

The Environmental Impact Analysis Process includes the review of all information pertinent to the proposed action and no action alternative and provides a full and fair discussion of potential consequences to the natural and human environment. The process includes involvement with the public and agencies to identify possible consequences of an action, as well as the focusing of analysis on environmental resources potentially affected by the proposed action or no action alternative.

2.4.2 Scope of Resource Analysis

The proposed action and the No Action alternative have the potential to affect certain environmental resources. These potentially affected resources have been identified through scoping, communications with state and federal agencies, and review of past environmental documentation. Specific environmental resources with the potential for environmental consequences include noise, safety, air quality, physical resources, biological resources, cultural resources, land use, socioeconomics, and environmental justice.

2.4.3 Public and Agency Involvement

In June 2008, the Air Force contacted local, state, tribal, and federal agencies to inform them of the Air Force's intent to prepare an EA for the proposed action at Shaw AFB (refer to Appendix A). Through this scoping process, the Air Force obtained information regarding pertinent environmental issues the agencies indicated should be addressed in the environmental impact analysis. Community leaders and legislative representatives from potentially affected communities in South Carolina were contacted. Agencies associated with the management of cultural and biological resources, primarily for compliance with the Endangered Species Act (ESA) and National Historic Preservation Act (NHPA), were notified of the intent to prepare an EA. Their responses are included in Appendix A.

To facilitate public involvement in this project, the Air Force prepared and published newspaper advertisements announcing the availability of the Draft EA for public and agency review. Further, the Draft EA was posted on the Shaw AFB website at www.shaw.af.mil.

Regulatory Compliance and Permit Requirements

This EA has been prepared to satisfy the requirements of NEPA (Public Law [PL] 91-190, 42 USC 4321, et seq.) as amended in 1975 by PL 94-52 and PL 94-83. The intent of NEPA is to protect, restore, and enhance the environment through well-informed federal decisions. In addition, this document was prepared in accordance with the requirements of the NEPA (42 USC 4321-4347), Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR § 1500–1508), and 32 CFR Part 989, et seq., *Environmental Impact Analysis Process* (formerly promulgated as AFI 32-7061).

Implementation of the proposed action would require concurrence from several regulatory agencies. Compliance with the ESA involves communication with the Department of the Interior (delegated to the USFWS) in cases where a federal action could affect the listed, threatened, or endangered species, species proposed for listing, or species that could be candidates for listing. A letter was sent to the appropriate USFWS agencies as well as their state counterparts, informing them of the proposed action and alternatives and requesting data regarding applicable protected species.

The preservation of cultural resources falls under the purview of the State Historic Preservation Office (SHPO), as mandated by the NHPA and its implementing regulations. A letter was sent to the South Carolina SHPO and the Catawba Tribe informing them of the proposed action and

No Action alternative. Other regulatory or permit requirements include a stormwater National Pollutant Discharge Elimination System Permit issued by the SCDHEC. Appendix A includes copies of relevant coordination letters sent by the Air Force.

2.5 COMPARISON OF ALTERNATIVES

Table 2-2 summarizes the potential environmental impacts of the proposed action and alternatives, based on the detailed impact analyses presented in Chapter 4.0.

Table 2-2. Summary of Potential Environmental Consequences

Resources	Proposed Action	Alternative 1	No Action Alternative
Land Use			
Land Use	+	+	–
Recreation	-	-	0
Visual Resources	+	+	0
Transportation	-	-	-
Infrastructure	-	-	0
Socioeconomics/Environmental Justice	+	+	0
Cultural Resources	0	0	0
Biological Resources	-	-	0
Water Resources	0	0	0
Air Quality	-	-	0
Hazardous Materials and Waste Management	0	0	0
Safety	+	+	-
Noise	-	-	0

Notes: " – " indicates an adverse but not significant impact; " + " indicates a positive/beneficial impact; and " 0 " indicates no change.

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3.0 AFFECTED ENVIRONMENT

3.1 LAND USE RESOURCES

3.1.1 Definition of the Resource

The attributes of land use addressed in this analysis include land use, visual resources, transportation, and recreation. Analysis of land use resources focuses on general land use patterns (including recreational areas), ownership, management plans, policies, ordinances, and regulations. These provisions determine the types of uses that are compatible and identify appropriate design and development standards to address designated or environmentally sensitive areas. Visual resources include the natural and manufactured features that constitute the aesthetic qualities of an area. Transportation includes the road and rail networks providing access between the local community and the base as well as within the base. Recreation considers recreational opportunities on and near Shaw AFB. The ROI for land use, visual resources, transportation, and recreation includes Shaw AFB, the off-base road network providing direct access to Shaw AFB, and the 46-acre area proposed to be purchased as part of the action.

3.1.2 Existing Conditions

Land Use

Shaw AFB's main cantonment area encompasses 3,466 acres and is located within the city limits of Sumter, approximately 10 miles west of the city center, as depicted on Figure 1-1. Shaw AFB groups land uses by function in geographic areas. Most of the developed land uses occur north and west of the airfield. Support services and the runway are centrally located, and the residential areas on-base are located in the northwest portions of the base. Open space and light development, including a munitions storage area and outdoor recreational facilities, are located in the eastern portion of the base.

Several adopted plans and programs guide land use planning for Shaw AFB. Base plans and studies present factors affecting both on- and off-base land use and include recommendations to assist on-base officials and local community leaders in ensuring compatible development.

The *Shaw AFB General Plan* (Air Force, 2006) provides an overall perspective on development opportunities and constraints as well as a framework for making effective programming, design, construction, and resource management decisions. Two area development plans (ADPs) that guide and identify development opportunities and constraints are being prepared for the F-35 beddown and the north and south flightline. The base's *Integrated Natural Resources Management Plan FY 2007-2011* (Air Force, 2007b) is used to coordinate natural resources management on the base.

The *Air Installation Compatible Use Zone (AICUZ) Study* (Air Force, 1994) for Shaw AFB recommends compatible land development patterns in the off-base areas subject to aircraft noise and accident potential. Sumter County, in conjunction with Shaw AFB, has prepared a *Joint Compatible Land Use Study (JCLUS)* that incorporates AICUZ recommendations. The JCLUS also describes existing land uses; identifies encroachment areas around the base; recommends modifications to the county zoning ordinance; addresses long-range infrastructure improvements; and describes 20-year growth trends for the area (Robert and Company, 1994). This 24-year-old study is being updated to include review of land development patterns surrounding the base.

Zoning around the base includes heavy industrial and limited commercial. Varying degrees of residential densities are permitted around the base, and general commercial businesses are permitted along the major roads. On the major roads, including U.S. Highways 76/378 and 521 and State Route (S.R.) 441, commercial development occurs.

Land uses within Sumter County include agriculture and forestry, with approximately 58 percent of the county classified as prime farmland or farmlands of statewide importance (Air Force, 2007b). Special-use areas in the vicinity of the base include Poinsett State Park, a portion of Woods Bay State Park, the Manchester State Forest (including a Wildlife Management Area [WMA]), Lee State Park, and a portion of Lake Marion impoundment, comprising over 110,000 acres.

The Air Force is considering the acquisition of 46 acres of land along Frierson Road as part of the actions evaluated. The 46 acres would be composed of all or portions of 15 privately owned parcels. These parcels range in size from less than 1 acre to nearly 53 acres. The parcels are zoned for residential or light commercial; however, only four parcels currently have structures and the remaining parcels are undeveloped.

Visual Resources

Shaw AFB is located on the edge of the city of Sumter and approximately 30 miles east of the capital city of Columbia. The areas on the northwest portion of the base are primarily base housing. The flight line area bisects the base from a northeast to southwest direction through the middle of the installation. Land situated on the southeast side of the installation is predominantly planted pine forest, along with the munitions storage facilities (and recreational facilities). Approximately nine percent of the land within the base boundary is open space (Air Force, 2006). These areas include pine plantations adjacent to the airfield, a creek along the north edge of the base, and four ponds, including the man-made ponds on the golf course.

Sumter County is characterized by a mixture of large tracts of agricultural land interspersed with low-density residential development and homesteads. Commercial strip development occurs along U.S. Highway 76/378. With a long history of pine plantations, the landscape is broken up with tracts of pine trees of varying age and height. The area is generally flat to

gently sloping, with steeper slopes located near streams and drainage areas. Surface elevation ranges from 200 to 330 feet above sea level (Air Force, 2006).

Transportation

Shaw AFB allows vehicle access to the base via four active security checkpoints: the Southwest (Main) Gate on Shaw Drive, the Northwest Gate on Frierson Road, the Southeast (Commercial) Gate on US 76/378 and the Northeast Gate on Frierson Road (Air Force, 2007c). The on-base streets are classified as arterials, collectors, or local streets. The arterials, those streets that carry the majority of traffic, are Polifka Drive, Rhodes Avenue, and Shaw Drive. Six collectors (Condor Country Road, Killian Avenue, Lance Avenue, Patrol Road, Stuart Street, and Sweeney Street) distribute traffic from the arterials to the local streets or directly to intended destinations. The major arterial highway in the area is US 76/378, which borders Shaw AFB on the south and provides access to the Interstate Highway system (Air Force, 2004b).

Shaw AFB conducted a traffic study (Air Force, 2007c) in 2006 to determine the existing and future traffic conditions. The study focused on peak-hour intersection counts at the four gates (Southwest–Main, Northwest, Northeast, and Southeast-Commercial) and two intersections on Shaw Drive (Polifka Drive and Rhodes Avenue). The study also looked at the level of service (LOS), which is a quantitative measure of the level of congestion or delay at an intersection. LOS is indicated on a scale from "A" to "F." LOS A indicates very little congestion or delay. LOS F indicates a high level of congestion or delay. The study identified several traffic movements that had existing unsatisfactory LOS of E or F. These locations included Shaw Drive/Aiken Street, Shaw Drive and Polifka Drive, Frierson Road, and State Highway 441 and US 76/378 at the Southeast Gate. The study also noted that for vehicles entering the base during the morning, long queues were experienced at the Southwest (Main) Gate and the Northwest Gate off State Highway 441.

The study also projected traffic at various gates and intersections based on proposed land use changes at Shaw AFB outlined in Area Development Plans. These changes would lead to an estimated increase in morning peak hour volumes of 23 percent and afternoon peak hour increases of 18 percent. Given these increases, recommendations for immediate improvements were identified for the Southwest (Main) Gate and the Northwest Gate and for the intersections of Shaw Drive with Polifka Drive and Aiken Street. The study also identified future improvements for the Northwest and Southeast (Commercial) Gates.

A five-mile rail spur is used to move petroleum, oil, and lubricant (POL) tank cars from the CSX railroad siding to the POL off-load area (Air Force, 2004b). This rail line crosses US 76/378 and enters the base's southern edge just east of the Main Gate.

Recreation

The Carolina Lakes Golf Course is an 18-hole golf course located on the west side of Shaw AFB. This championship golf course includes several par 3 holes. The terrain of the course is mostly

flat with several water hazards and sand bunkers. Other recreational opportunities on Shaw AFB include two pools, a skeet range, bowling alley, and theater.

3.2 INFRASTRUCTURE

3.2.1 Definition of the Resource

The infrastructure of Shaw AFB includes utility systems (electrical, potable water, sewage/ wastewater, solid waste, storm drainage, heating and cooling, and liquid fuels) and the communications system. The ROI for infrastructure is Shaw AFB and the capacity of the infrastructure systems outside the base to provide necessary services.

3.2.2 Existing Conditions

Electrical Distribution and Natural Gas Systems

Shaw AFB purchases power from the Progress Energy and the Black River Electric Cooperative (BREC). Progress Energy provides electricity to the main cantonment area and the majority of the housing area, whereas BREC supports the remaining housing and southeastern portion of the base. The total capacity of the electrical system is 27.6 megawatts, and FY07 usage was approximately 61 percent at peak periods.

Natural gas for Shaw AFB is provided by South Carolina Pipeline via a four-inch pipeline entering the base at the junction of Frierson Road and Sweeney Street. A metering station divides the supply between MFH areas and industrial facilities. The capacity of the system is 150,000 cubic feet/day, and it is 21.5 percent utilized.

Potable Water

Shaw AFB produces all of its own water from six on-base wells, which withdraw from the Black Creek Aquifer. Wells completed in this aquifer are capable of yielding up to 750 gallons per minute (gpm). The main base is served by Wells 3 and 5 and the Wherry system (housing) is served by Wells 4, 6, and 7. Well 1 is inoperable and must be redrilled in a new location or at a high cost in the current location, while Well 2 has been abandoned (personal communication, S. Johnson, 2008). The functional wells have a capacity to provide 2.4 million gallons per day (mgd), based on a 16-hour pumping day. Average daily production is 0.75 mgd with a daily maximum reported at 1.1 mgd. Water is treated with chlorine, fluoride, and calcium at each well site prior to storage in one of three aboveground storage tanks (ASTs). The total storage capacity for potable water is 900,000 gallons. Additionally, there are two ground-level storage tanks that provide 1,000,000 gallons of potable water to support the fire protection system (personal communication, J. Tucker, 2007). The peak usage in FY07 was 10 percent of the total water production of over 262 million gallons (personal communication, G. Skaggs, 2008).

The installation water supply also has two interconnections with the High Hills Rural Water Company and one interconnection with the City of Sumter Water System. These interconnections are rarely used and are intended for emergencies (HQ ACC, 2006; Air Force, 2004a and 2004b).

Groundwater wells and other existing water-related infrastructure located on the 46 acres that are proposed for acquisition would not be expected to be incorporated into the Shaw AFB potable water system. This infrastructure would be closed in place and disposed of in accordance with state regulations.

Sewage

Shaw AFB discharges domestic and industrial wastewater to an on-base wastewater treatment plant (WWTP) that was constructed in the 1940s and is currently operated by a contractor. Five lift stations move the wastewater from the main cantonment and housing areas to the WWTP where preliminary, secondary, and tertiary treatment processes are conducted. Effluent from the filters is disinfected and discharged from the facility after metering and sampling at outfall 001; from there it is directed off-base by a new six-mile-long pipeline into the Wateree River under National Pollution Discharge Elimination System (NPDES) Permit # SC0024970 (currently in the process of being renewed). The permit capacity of the WWTP is 1.2 mgd, and the capacity is generally exceeded twice a year when inflow/infiltration into the wastewater conveyance system occurs as a result of periods of heavy rainfall (HQ ACC, 2006; Air Force, 2004b and 2004d).

Solid Waste

Shaw AFB has developed a Solid Waste Management Plan to guide and direct the management of solid wastes. Solid wastes on the installation are either landfilled or recycled (there are no active landfills on the base). In 2003, Shaw AFB generated 8,230 tons of solid waste, of which 2,457 tons were recycled and the remaining 5,773 tons were transported to a landfill. In the same year, Shaw AFB generated 1,459 tons of construction and demolition (C&D) waste and recycled 1,371 tons (Air Force, 2005). Solid waste is taken to the Sumter County landfill transfer point and then transported to the Lee County municipal solid waste Landfill in Bishopville or the Richland County landfill. C&D materials that are not recycled are disposed in the Sumter County C&D landfill. The Sumter County landfill is currently projected to reach capacity within 20 years. The Lee County landfill is projected to reach capacity in 15 years and the Richland County landfill is projected to reach capacity in 6 years (South Carolina Department of Health and Environmental Control, 2007). From July 2005 through June 2006, approximately 3,088 tons of solid waste was disposed of into an off-base landfill (personal communication, S. Johnson, 2006).

The base recycling and reuse program significantly reduces the amount of solid waste that is transported to the landfill. Shaw AFB has a two-year recycling contract with Atlantic Coast

Containers. The on-base recycling service is basically composed of two parts: MFH and the Industrial sector. The MFH uses eight-gallon totes to collect all of the commodities. This "mixed collection" container is then left at the curb on the prescribed pick-up day. The Industrial sector collects only mixed paper and cardboard in six- to eight-cubic-yard containers placed around the base. Base personnel take the remaining commodities to the on-base Recycling Center by privately owned vehicles (POV) or government-owned vehicles (GOV). Recyclables are stored in the six- to eight-cubic-yard containers at the Recycling Center before going off-base. Items such as waste tires and lead acid batteries are turned into the Defense Reutilization and Marketing Office (DRMO) for resale/recycling, while household tires are collected for recycling at the Recycling Center. Shaw AFB does not compost yard waste or similar materials, as composting is not permitted within two miles of the flightline due to the risk of attracting birds (Air Force, 2004b and 2005a; HQ ACC, 2006).

Storm Drainage System

Surface water features on Shaw AFB consist primarily of ditches, swales, and canals associated with runways and taxiways, as these were created to remove stormwater runoff from the airfield and vicinity. Naturally occurring surface waters on the base include Long Branch along the northeast boundary and one of its tributaries, Spann Branch, along the northern boundary, as well as Mush Branch, originating at the southwest corner of the base just south of US 76/378 (Figure 3-1). Long Branch flows to the southeast and off-base into Booth's Pond, Sawmill Pond, and then into Mush Swamp. Waters from Long Branch and Mush Branch eventually flow into the Pocotaligo River, east of the base. Other surface waters on the installation include four artificial, recreational impoundments: No. 1 Golf Course Pond, No. 8 Golf Course Pond, Memorial Lake, and Chapel Pond (Air Force, 2006).

The storm drainage system also includes drainage pipes ranging from 12 to 72 inches in diameter. Drainage from the housing areas is channeled into three of the above-mentioned lakes located on the golf course (Figure 3-1). As mentioned in Section 3.2.3, stormwater runoff from the base is regulated by SCDHEC NPDES permit program, which includes a Stormwater Pollution Prevention Plan (SWPPP). Under this permit, stormwater is discharged through four permitted stormwater outfalls: two into Mush Branch Creek and two into Long Branch Creek. The majority of the area east of the runway discharges through outfall 004 to Long Branch Creek. Additionally, there are two other stormwater outfalls that do not require monitoring under the NPDES permit. As part of the NPDES permit and the SWPPP, oil-water separators (OWS) are required throughout the installation. Of the total 36 OWSs, 19 are currently in use. The remaining OWSs are checked monthly and skimmed as required. The OWSs are pumped and cleaned annually (personal communication, S. Johnson, 2008). The base includes approximately 780 acres of impervious surface, including the runways, flightline, ramps, roads, parking lots, and buildings (Air Force 2006).

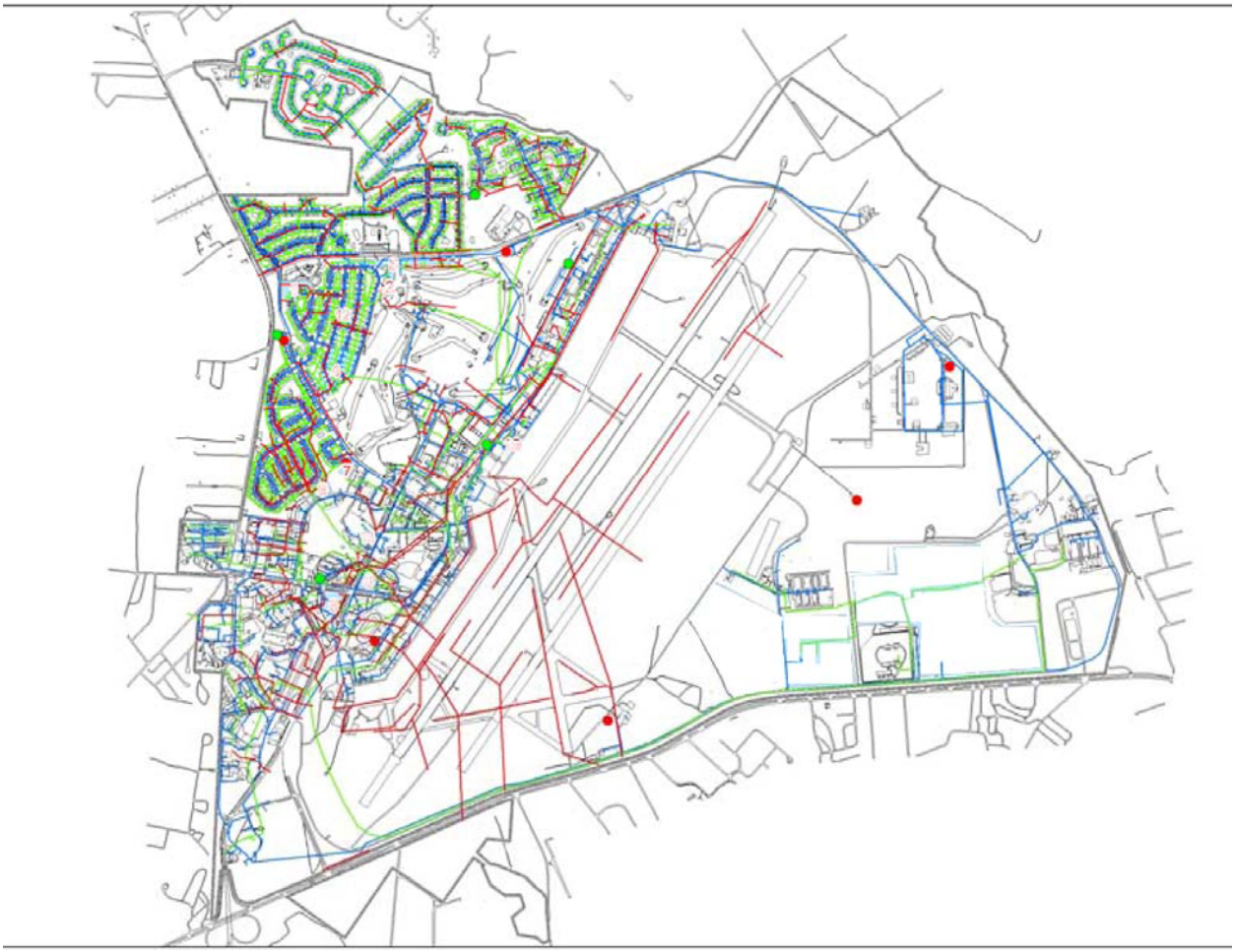

Figure 3-1. Shaw AFB Infrastructure

Heating and Cooling

Shaw AFB has a single gas-fired, central heating plant that provides heat to 22 buildings, including most of the buildings in the 900 area and all of the dormitories in the 400 area. The system can be switched to a 10,000-gallon No. 2 diesel fuel backup if necessary. Individual dedicated units provide heating and cooling for all other base buildings, while heat exchangers provide heating and cooling for family housing units (Air Force, 2004b).

Liquid Fuels

Aircraft operations rely on JP-8 jet fuel that is transported to the base by rail. A tank car siding capable of handling 10 tank cars simultaneously is located adjacent to the three jet fuel storage tanks. These tanks have a combined storage capacity of 2.4 million gallons and are connected to a decommissioned flightline hydrant refueling system. Consequently, all aircraft are fueled using tanker trucks. Three other tanks, capable of holding 12,000 gallons each, are available for unleaded gas and diesel fuel. These products are delivered to the base storage area and then on to the military service station by tank trucks (Air Force, 2004b and 2006). Lastly, No. 2 heating

oil is delivered to the base by truck and stops at all 54 locations that have oil burner heating units and fills the tanks. A heating oil fuel underground storage tank (UST) is located just north of Building 1602 (HQ ACC, 2006 and Air Force, 2005b).

Communications System

The Command, Control, Communications, Computers, and Intelligence blueprint for Shaw AFB identifies existing communications and information systems, shortfalls, planned improvements, and transitional and implementation plans. Communications systems at the base include data communications, long-haul communications, information transfer, telephone switching, and radio and security systems. The installation maintains a high-capacity digital data network using mode and multimode fiber optics that provides secure networking, electronic messaging (email), and other services. The current telephone switching system fully supports switching needs for mission changes, dial-up local area networks, and additional programs and has ample trunking expansion capacity (Air Force, 2004b).

The Shaw AFB data system network includes classified and unclassified data systems essential to operations of the 20th FW, HQ 9th AF/U.S. Air Forces Central Command (USAFCENT), and tenant units. Long-haul communications systems interconnect the voice and data systems with the wide area voice and data networks. These systems are periodically evaluated and improved as new technology becomes available. The base radio system consists of a land mobile radio network and very-high-frequency and ultra-high-frequency radios. These systems, which are vital for tactical control of aircraft, are all in excellent condition. The base also has a flightline video surveillance system and a video teleconferencing system (Air Force, 2004b).

3.3 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.3.1 Definition of the Resource

The specific socioeconomic resource areas addressed include employment, income and earnings, and property values of the land to be acquired. The ROI comprises Shaw AFB and the surrounding area, which encompasses Sumter County, S.C. Socioeconomic information is presented for the ROI and, where appropriate, comparisons are presented with conditions for the state of South Carolina. Environmental justice, which concerns the disproportionately high or adverse effects of an action on minority and low-income populations, must be considered for federal actions under the NEPA review process.

3.3.2 Existing Conditions

Employment and Unemployment

In the ROI, total full- and part-time employment increased from 54,375 jobs in 2001 to 54,505 in 2006, at an average rate of 0.1 percent annually (Table 3-1). The largest contributions to employment in 2006 were made by manufacturing (16.0 percent), and government enterprises

(23.1 percent), which combines employment related to federal, state, and local government. The sectors of the economy exhibiting the greatest relative increase in jobs over the period 2001 to 2006 were wholesale trade, real estate, and administrative and waste services. For the years 2001 and 2006, the contribution of the military to total employment decreased from 10.2 percent to 9.8 percent, respectively (U.S. Bureau of Economic Analysis, 2008b). Employment in the government sector, including federal, state, and local governments, decreased slightly between 2001 and 2006 from 12,920 jobs to 12,567 jobs in spite of the large military presence due to Shaw AFB, the largest employer in Sumter County. The manufacturing sector also decreased the number of jobs from 11,586 to 8,748 during the same time period. About half of the top 16 employers in Sumter County are manufacturers (Table 3-2).

Table 3-1. Total Employment by Industry, Sumter County, 2006

Industry	Number of Employees	
	2001	2006
Total employment	54,345	54,505
Farm employment	686	691
Nonfarm employment	53,659	53,814
Forestry, fishing, related activities, and other	(D)	(D)
Mining	(D)	(D)
Utilities	107	109
Construction	3,732	4,204
Manufacturing	11,586	8,748
Wholesale trade	797	1,063
Retail trade	5,808	5,840
Transportation and warehousing	974	1,372
Information	532	500
Finance and insurance	1,271	1,292
Real estate and rental and leasing	947	1,330
Professional and technical services	999	1,244
Management of companies and enterprises	205	246
Administrative and waste services	1,867	2,486
Educational services	740	832
Health care and social assistance	4,283	4,676
Arts, entertainment, and recreation	539	554
Accommodation and food services	2,927	3,140
Other services, except public administration	3,001	3,307
Government and government enterprises	12,920	12,567
Federal, civilian	1,128	1,180
Military	5,545	5,359
State and local	6,247	6,028

Source: U.S. Bureau of Economic Analysis, 2008b

Table 3-2. Major Employers, Sumter County, 2006

Employer	Industry	Number of Employees
Shaw Air Force Base	Military	6,866
Pilgrim's Pride	Poultry Processing*	2,150
Tuomey Healthcare System	Hospital	1,600
Sumter School District 17	Public Education	1,389
Sumter School District 2	Public Education	1,200
State of South Carolina	Government	1,060
Eaton Electrical (Cutler Hammer)	Electrical Services Manufacturer*	810
BD Pre analytical Solutions	Medical Supplies Manufacturer*	720
Santee Print Works	Textiles Manufacturer*	500
Sumter County Government	Government	520
City of Sumter	Government	500
Cooper Tools, Sumter Operation	Tools Manufacturer*	385
Wal-Mart	Retail	475
Color-Fi, Inc.	Plastics Manufacturer*	247
Caterpillar, Inc.-Precision Pins	Equipment Parts Manufacturer*	201
Interlake Material Handling	Steel Shelving Manufacturer*	211

Source: Sumter Economic Development, 2008
* indicates manufacturers

For the state of South Carolina, full- and part-time employment increased at an average rate of 1.5 percent annually between 2001 and 2006, at which time employment in the state was just over 2.4 million jobs. The sectors of the economy contributing the greatest number of jobs in the state over this period were retail trade, and manufacturing.

The unemployment rate in Sumter County fluctuated greatly between 2000 and 2007 (Figure 3-2). In 2000, Sumter County experienced its lowest unemployment rate in this seven-year period, dropping to 4.2 percent. However, over the past three years, the unemployment rate has been increasing toward a high of 8.5 percent in 2005 (Figure 3-3). Since then, the unemployment rate has decreased until reaching 7.3 percent in 2007.

Unemployment in South Carolina has been lower than that of Sumter County during the same time period. In 2000, the unemployment rate for South Carolina was 3.6 percent and increased over time to reach a high in 2004 of 6.8 percent. Following 2004, the unemployment rate for the state decreased to 5.9 percent (Figure 3-3).

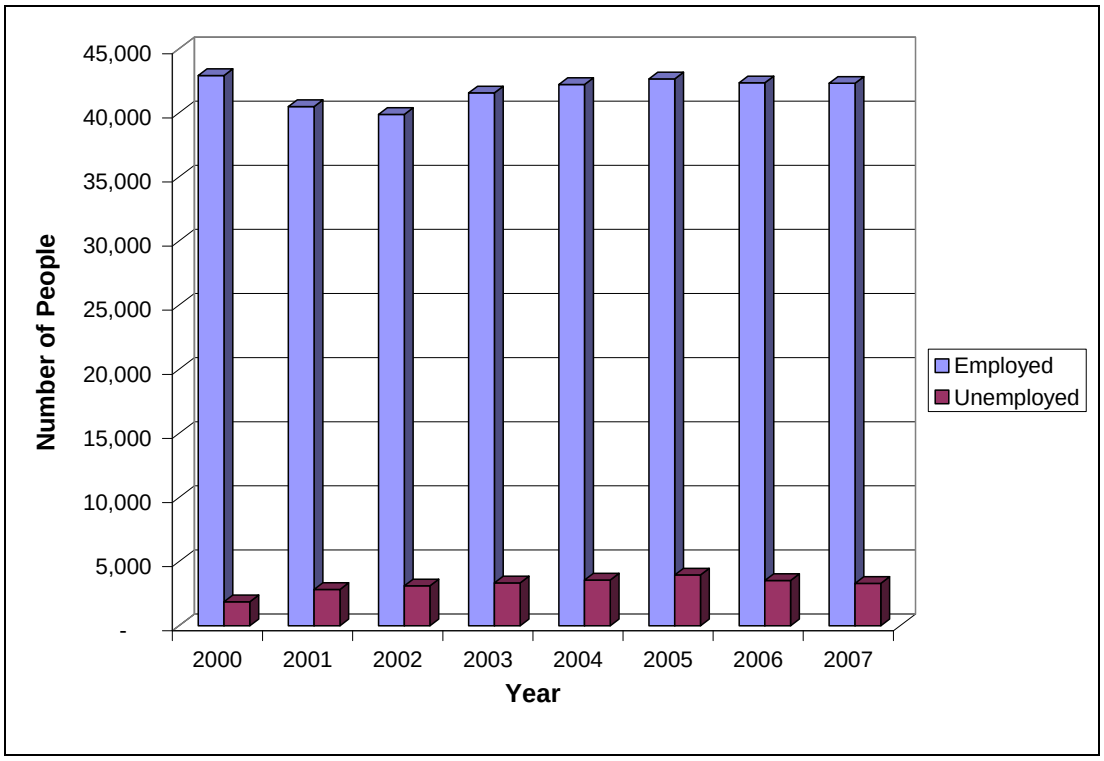

Figure 3-2. Employment and Unemployment, Sumter County, 2000-2007
Source: U.S. Bureau of Labor Statistics, 2008

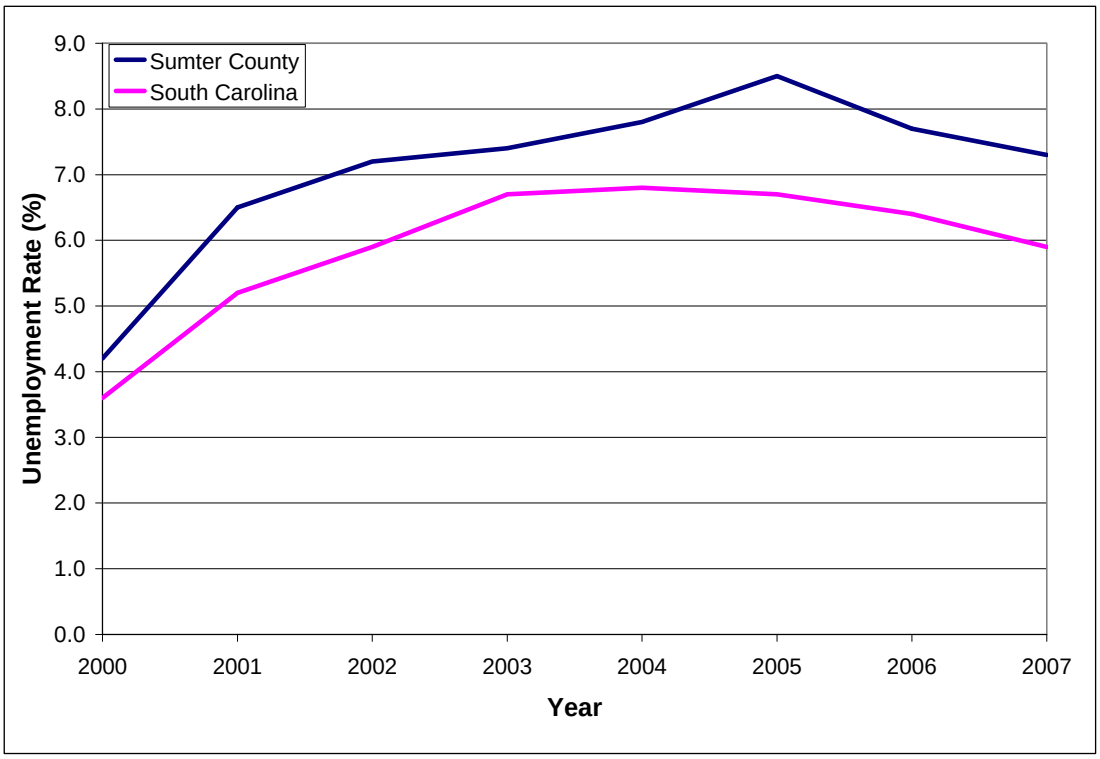

Figure 3-3. Unemployment Rate, Sumter County and South Carolina, 2000-2007
Source: U.S. Bureau of Labor Statistics, 2008

Earnings and Income

In 2001, total earnings in the ROI totaled over $1.6 billion and by 2006, total earnings in Sumter County were over $2 billion, an average annual increase of 4.7 percent (Table 3-3). Average earning per job in the ROI in 2006 amounted to $37,999 while per capita income was $26,242 (U.S. Bureau of Economic Analysis, 2008a). The government remains as the largest generator of earnings for Sumter County followed by manufacturing and health care and social assistance. Nearly 60 percent of those earnings from the government sector are attributed to the military. Industries that contributed the most toward job earnings included military, state and local government, manufacturing, and health care and social assistance.

Table 3-3. Earnings by Industry (in thousands), Sumter County, South Carolina, 2001-2006

Industry	2001	2006
Farm earnings	$13,315	$13,051
Nonfarm earnings	$1,629,570	$2,058,084
Forestry, fishing, related activities, and other	(D)	(D)
Mining	(D)	(D)
Utilities	$7,640	$10,887
Construction	$116,951	$147,961
Manufacturing	$378,892	$397,542
Wholesale trade	$30,239	$52,862
Retail trade	$112,793	$123,427
Transportation and warehousing	$26,970	$56,030
Information	$16,684	$18,287
Finance and insurance	$44,533	$55,119
Real estate and rental and leasing	$11,125	$16,405
Professional and technical services	$32,902	$51,974
Management of companies and enterprises	$10,557	$15,097
Administrative and waste services	$28,801	$43,243
Educational services	$15,110	$19,110
Health care and social assistance	$140,139	$182,865
Arts, entertainment, and recreation	$6,417	$6,333
Accommodation and food services	$33,044	$40,562
Other services, except public administration	$50,605	$65,477
Government and government enterprises	$554,601	$741,162
Federal, civilian	$52,847	$72,435
Military	$288,310	$429,860
State and local	$213,444	$238,867

Source: U.S. Bureau of Economic Analysis, 2008
(D)- not shown to avoid disclosure of confidential information, but included in totals

Shaw AFB has been a strong component of the economy since it was established in 1941. The annual economic impact of Shaw AFB for FY06 to the local economy exceeds $379.6 million annually (Air Force, 2006). The total annual payroll associated with Shaw AFB is $283 million including military and civilian personnel. An additional $32.8 million in expenditures is used for local contracts and procurement. The total annual expenditures for construction, services, and supplies equal $64 million (Air Force, 2006).

Per capita personal income in Sumter County increased by nearly 4.7 percent per year between 2001 and 2006, while the state of South Carolina experienced slower growth with approximately 3.6 percent average annual growth over the same period (Table 3-4). Although, Sumter County has experienced greater growth it continues to lag behind the states average.

Table 3-4. Per Capita Personal Income, Sumter, S.C.

State/County	Per capita personal income	
	2001	2006
Sumter County	$20,863	$26,242
South Carolina	$24,974	$29,767

Source: U.S. Bureau of Economic Analysis, 2008

Property Value

The Air Force is considering the acquisition of 46 privately-owned acres along Frierson Road in order to complete proposed infrastructure improvements. The property to be acquired would consist of all or portions of 15 parcels on the north and south of Frierson Road adjacent to Shaw AFB property. The parcels range in size from less than an acre to over 52 acres. Two of the parcels currently have structures available for commercial use, Parcel H and Parcel J. Parcel H includes a commercial skating rink that is no longer in operation. Parcel J includes a furniture outlet store that is currently open.

The fair market value of the parcels under consideration as evaluated by the Sumter County Assessor's Office is included in Table 3-5. The fair market value is a measure of the value that a property is worth in the present market including a wide range of factors such as the current improvements or structures on the property, estimated replacement value, rent that the property could potentially earn, and current interest rates. The assessed value of a property and subsequent property taxes are determined by the fair market value.

Table 3-5. Fair Market Value of Parcels, 2007

Parcel	Parcel ID Number	Size (Acres)	Fair Market Value, 2007
A	1340002027	0.89	$10,000
B	1340002028	1.00	$10,000
C	1340002029	1.28	$20,480
D	1340002030	1.55	$24,800
E	1340002031	1.83	$14,640
F	1340002032	0.94	$15,040
G	1340002033	0.96	$9,600
H	1340002015	2.81	$238,667
I	1340002037	20.00	$54,000
J	1530001001	1.78	$4,895
K	1530001002	9.78	$26,894
L	1530001014	8.20	$277,132
M/N	1530001003	52.79	$43,580
O	1530001015	17.99	$199,032
Total		121.80	$948,760

Source: Sumter County Assessor's Office, 2008

Environmental Justice

Disadvantaged groups within the ROI, including low-income and minority communities, are specifically considered in order to assess the potential for disproportionate occurrence of impacts. Based on 2000 Census data, the incidence of persons and families in the ROI with incomes below the poverty level was comparable to state levels (U.S. Bureau of the Census, 2000). In the ROI during 2000, 19.7 percent of persons and 26.9 percent of children were living below the poverty level, compared to 14.9 percent of persons and 23.0 percent of children in the state of South Carolina as a whole.

Minority persons represent just over half the ROI population (50.6 percent). Black or African-American persons account for almost all of the minority population in the ROI, representing 46.7 percent of the county population of 104,646 persons (or 92 percent of the minority population). By comparison, 33.9 percent of the state population is represented by minority persons (U.S. Bureau of the Census, 2000).

The youth population, those individuals age 18 and younger, accounts for 28.1 percent of the ROI population, compared to 25.2 percent at the state level. The senior population, those individuals age 65 and older, accounts for 11.2 percent of the ROI and 12.1 percent of the state population (U.S. Bureau of the Census, 2000).

3.4 CULTURAL RESOURCES

3.4.1 Definition of the Resource

The existing cultural resources at Shaw AFB include historic and prehistoric sites, structures, districts, artifacts, or any other physical evidence of human activities considered important to a culture or community for traditional, religious, scientific, or other reasons. The ROI for cultural resources includes Shaw AFB but does not include Poinsett Electronic Combat Range (ECR). The area of focus within the ROI is the project locations. Section 106 of the NHPA of 1966, as amended, requires federal agencies to take into account the effects of their actions on historic properties, and requires archaeological surveys prior to surface disturbing activities in areas not previously surveyed. The agencies must allow the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on any Federal undertakings affecting cultural resources. The Section 106 process is part of the Air Force's EIAP, a program that implements NEPA (Air Force, 2004b and 2006b). Shaw AFB does not have a Memorandum of Agreement with the State Historic Preservation Officer (SHPO); it is done on a case-by-case basis. In the event that a project results in an adverse impact to cultural resources, during the Section 106 process a Memorandum of Agreement is drafted to resolve the adverse effects and the agreement document contains a mitigation plan. The plan addresses how the adverse effects caused by the undertaking will be lessened (Air Force, 2006b).

Section 110 of the NHPA requires that federal agencies assume responsibility for identifying, evaluating, nominating, and protecting historic properties under their control. Historic properties are cultural resources that are listed in, or eligible for listing in, the National Register of Historic Places (NRHP). Impacts to cultural resources may be considered adverse if the resources have been determined eligible for listing in the NRHP or have significance for Native American groups.

3.4.2 Existing Conditions

Architectural Resources

Two studies have been completed on Shaw's Cold War era resources (1946–1989). One study performed a reconnaissance survey of 127 resource types built between 1945 and 1989. One resource, a documentary collection, was selected for documentation and evaluation. A second study, part of the Department of Defense's (DoD's) Legacy Demonstration Project, sought to establish historic contexts for Cold War era resources on DoD facilities throughout South Carolina. Neither study fulfills Section 106 requirements, but they do lay the groundwork for future evaluations of Cold War era resources at Shaw (Air Force, 2006b). The last evaluation of architectural resources was conducted in 1996. Resources that have attained 50-year-old status since that time require evaluation in order for Shaw AFB to satisfy its Section 110 of the NHPA requirement. ACC is presently assisting Shaw AFB with completing a Cold War architecture

inventory to comply with Section 110 of the NHPA. The Air Force considers buildings constructed between 1946–1989 as Cold War era structures (Air Force, 2006b).

There is one architectural site (Hangar B611) that is eligible for listing on the NRHP. This structure is located along the southwestern edge of the flightline. Hangar B611 was built in 1942 and is historically significant as an important example of a form of industrial construction that occurred during World War II (Air Force, 2004b, 2005a, and 2005c). Additionally, as of the end of FY07 there were approximately 45 buildings and structures that were at least 50 years old (Air Force, 2006b).

Archaeological Resources

The first large-scale archaeological investigation within the project area occurred in the early 1980s and intensified in the 1990s. To date, 147 sites have been identified on Shaw AFB and Poinsett ECR. A total of 18 cultural resource management studies and reports have been produced as a result of the work that has been done at Shaw AFB. The reports are stored in the office of the CRM at Shaw AFB in the Asset Management Flight, Natural Resources Management. Additional copies are on file with the South Carolina Institute of Archaeology and Anthropology (SCIAA) (Air Force, 2006b). Currently, there is one site on Shaw AFB, 38SU299 (FS-1), which is potentially eligible for listing on the NRHP.

No archeological surveys are known to have been conducted on the 46 acres of land that are proposed for acquisition as part of the Proposed Action. The majority of the 46 acres has been disturbed in the past and is, therefore, not likely to contain intact archeological resources. Historical aerial photographs reveal that the vast majority of upland areas to the east and west of the Long Branch Corridor were being used for crop agriculture prior to 1937 and up to the late 1960's. During the 1950-1980 timeframe, Frierson Road was constructed, fill material was added, and several commercial buildings were built in this area.

Traditional Resources

Traditional resources are identified by Native American tribes or other groups and include properties of religious or cultural importance to an Indian tribe or native Hawaiian organization (Air Force, 2004b). No formal surveys for Traditional Cultural Resources (TCR) or sacred sites have been conducted, nor have any tribes come forward and notified Shaw AFB of the presence of such sites (Air Force, 2006b). No sacred sites are expected to exist on the 46 acres proposed to be purchased as part of the Proposed Action. The federally recognized tribe nearest to Shaw AFB is the Catawba Indian Nation, near Rock Hill, S.C. (Air Force, 2005a).

3.5 BIOLOGICAL RESOURCES

3.5.1 Definition of the Resource

The existing biological resources at Shaw AFB include terrestrial and aquatic communities, including wetlands, as well as individual flora and fauna species, of which some are locally, regionally, and/or nationally rare. The ROI includes Shaw AFB and the parcel of land that is proposed to be acquired by the Air Force as part of this action. The following sections describe these biological resources as a baseline to understanding the potential impacts to each by the proposed action. Detailed information on the installation's biological resources is available in the Integrated Natural Resources Management Plan (INRMP) (Air Force, 2007b).

3.5.2 Existing Conditions

Terrestrial Communities

Shaw AFB is located within the Southeastern Mixed Forest Province, also known as the Middle Atlantic Coastal Forest. The original forested areas were cleared in the 1940s when the base was commissioned. Because of subsequent extensive disturbance, few natural communities remain on the installation. Consequently, the base is now dominated by a disturbed/urbanized community (84 percent) and pine plantation (13 percent). Oak/hickory forest, Pond/Pond Margin/Stream-head Pocosin, and Hardwoods/Small Stream Forest account for the remaining one percent of terrestrial communities (Air Force, 2007b). The 46 acres of land proposed to be purchased by the Air Force are also dominated by disturbed/urbanized community with the remaining area made up of pine, Oak/Hickory Forest, Pond/Pond Margin/Stream-head Pocosin, and Hardwoods/Small Stream Forest.

Disturbed/Urbanized. The majority of the grounds on Shaw AFB are semi-improved to improved and are intensively landscaped and maintained (Air Force, 2007b). Aside from structures and pavement, improved and semi-improved landscaped areas include mowed lawn and field areas, as well as horticultural trees and shrubs (Air Force, 2004b).

Pine Plantation. The pine plantations in the southeastern portion of the base consist primarily of 25- to 35-year-old loblolly pine trees. The trees are between 40 and 70 feet tall and spaced on 8-ft by 10-ft or 8-ft by 8-ft spacing. The pine plantation is not considered to be ideal for red-cockaded woodpecker (RCW) because the trees are generally too small, young, close and isolated to provide appropriate habitat (Air Force, 2007b).

Oak/Hickory Forest. The oak/hickory forest community is locally restricted to the northern portion of Shaw AFB adjacent to housing. In addition to a dominance of white oak, pignut hickory, and mockernut hickory, other associated woody species include flowering dogwood, sparkleberry, loblolly pine, and winged elm (Air Force, 2007b). Species of wildlife that may inhabit this forest community include gray squirrel, southern flying squirrel, pileated woodpecker, and blue jay (Air Force, 2004b and 2005a).

Wetlands, Floodplains, and Freshwater Aquatic Communities

Wetlands are subject to regulatory authority under several laws and regulations including Section 404 of the Clean Water Act (CWA) and Executive Order (EO) 11990, *Protection of Wetlands*. In order for a wetland area to fall under the jurisdiction of Section 404 of the CWA, the three wetland delineation criteria, defined in the 1987 U.S. Army Corps of Engineers' (USACE's) *Wetlands Delineation Manual,* must be met and the area must have a "significant nexus with navigable waters of the United States" (USEPA, 2007). Wetlands occupy approximately 95 acres on Shaw AFB, but only approximately 44 of these acres fall under the jurisdiction of the Section 404 of the CWA (personal communication, R. June, 2008) (Figure 3-4). All jurisdictional wetlands on Shaw AFB are located along Long Branch in the northern portion of the base. The approximately 46-acre area proposed to be purchased contains approximately 4.1 acres of wetlands. A jurisdictional delineation has not yet been carried out on these wetland areas. Hydrologically isolated, "nonjurisdictional" wetlands are not regulated by Section 404 of the CWA but are provided protection under EO 11990.

Floodplains are regulated under EO 11988, *Floodplain Management*. Floodplains on Shaw AFB are located along Long Branch in the northern portion of the base. Approximately 0.39 acres of floodplain lie within the area proposed to be purchased. Freshwater aquatic communities on Shaw AFB include approximately 95 acres of wetlands, 19 acres of ponds, and several miles of freshwater streams (Air Force, 2007b). The biological habitats that occur in these communities are "small stream forest" and "ponds," which are described in greater detail below.

<u>Small Stream Forest</u>. Small stream forest wetland occurs along Long Branch, where it crosses the northeast corner of the base within the runway approach, and in Mush Swamp in the southwest corner of the base south of U.S. 76/378. At the former location, hydrophytic (water-loving) species of trees within the wetland includes river birch, sweetgum, water oak, and red maple. At the latter location, dominant canopy trees include laurel-leaf oak, hackberry, red maple, and ash. Understory species in both areas include native species such as wax myrtle, common elderberry, willows, and greenbriar, and nonnative invasive species such as Japanese privet and Chinese privet. Wildlife typical of these wetlands include species such as two-toed amphiuma, muskrat, beaver, raccoon, white-tailed deer, wood duck, and various frogs, toads, snakes, and turtles (Air Force, 2004b and 2005a).

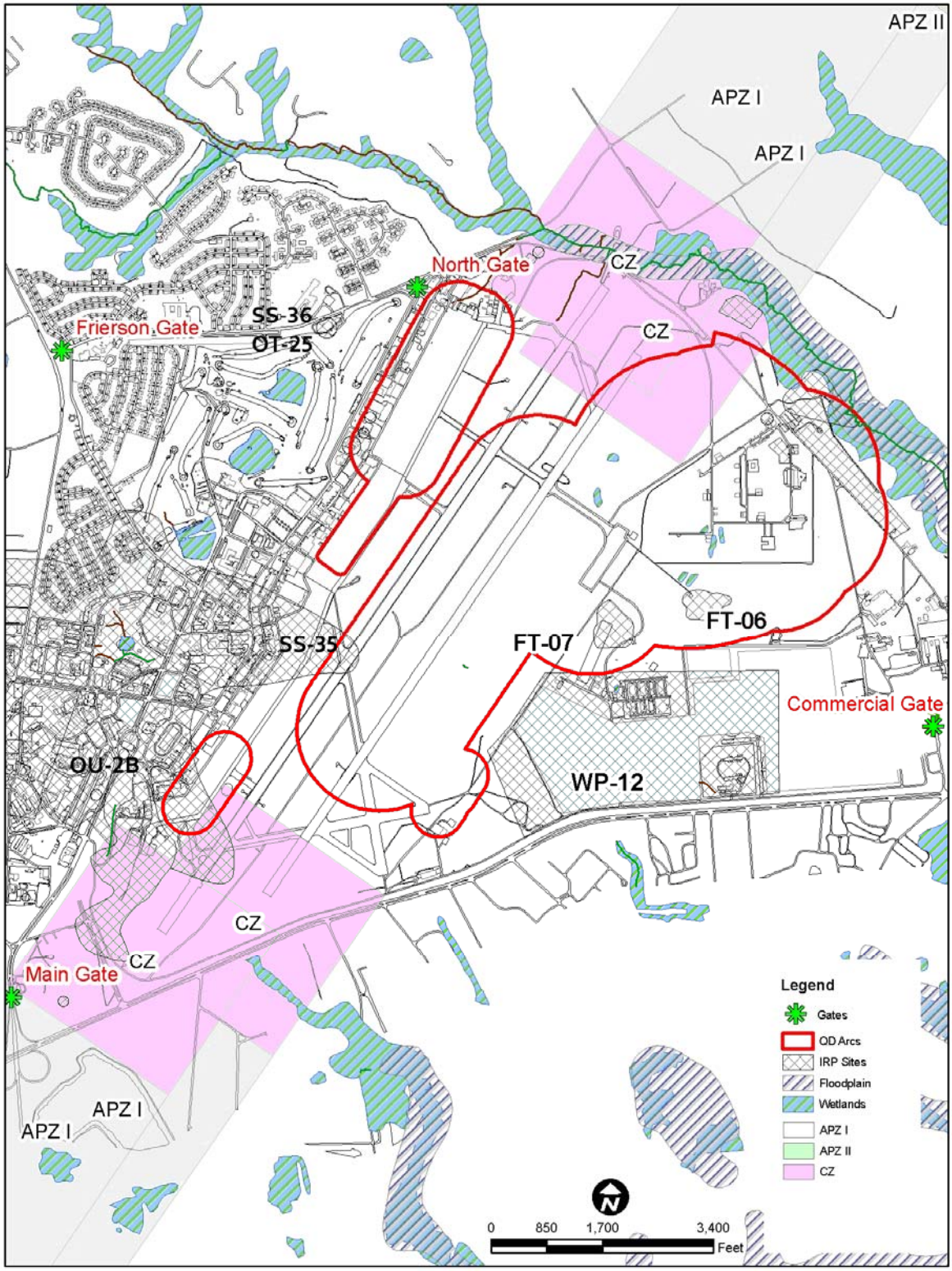

Figure 3-4. Environmental and Safety Constraints at Shaw AFB

Ponds. Pond wetlands occur only as artificially constructed features within the installation. Each of the four constructed ponds is located within the developed western portion of the base. Two of the ponds occur on the golf course, one is adjacent to the golf course, and the other is behind the chapel. These ponds are managed for recreation (fishing and picnicking) and aesthetics, and their margins are regularly mowed and trimmed of tall vegetation. Shallow areas fringing the ponds often support emergent wetland vegetation that includes species such as meadow beauty, smartweeds, seedbox, bugleweed, nama, and water-spider orchid. Wildlife expected in these open water habitats includes stocked fish such as various sunfish, bullhead catfish, and largemouth bass and birds such as resident Canada geese, mallards, and kingfishers (Air Force, 2004b).

Endangered, Threatened, and Special Concern (ETSC) Species

Section 7 of the federal Endangered Species Act, as amended, requires each federal agency to ensure that "any action authorized, funded, or carried out by such agency… is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species… unless such agency has been granted an exemption for such action…" Additionally, animals designated by South Carolina as endangered or threatened are granted legal protection by the state. The South Carolina Department of Natural Resources Rare Threatened and Endangered Species List was accessed to produce a list of rare flora and fauna known to occur within Sumter County and that have the potential to occur on Shaw AFB. Table 3-6 provides information on 28 endangered, threatened, and special concern (ETSC) species, including their legal status (if any) and habitat typical for each species (Air Force, 2004b).

Federally listed candidate species are not known to occur on Shaw AFB. The only known ETSC species on the installation is the least tern, which nests on the flat roof of the Base Exchange building (Air Force, 2007b). The least tern is listed as threatened in the state, and this breeding colony is the farthest inland breeding colony recorded for South Carolina. This bird preys exclusively on live fish captured by plunge-diving into water bodies. The species prefers to nest along coastal beaches but has adapted to nesting on flat, graveled rooftops where ideal habitat is overly disturbed (Air Force, 2004b). Least terns typically nest at the BX from mid-April to late July (Air Force, 2007b). Observations made on 6 June 2008 led to an estimate of 12 breeding pairs on the BX roof in the 2008 breeding season (personal communication, J. Hovis, 2008).

Table 3-6. Endangered, Threatened, and Special Concern Species Known in Sumter County, S.C.

Scientific Name	Common Name	Legal Status	Special Concern Status*	Habitat
Plants				
Aristida condensata	Piedmont three-awned grass	—	SC	Sandridges
Carex decomposita	Cypress-knee sedge	—	SC	Swamps and lake margins on floating logs
Carya myristiciformis	Nutmeg hickory	—	RC	Wet floodplain forests
Chamaedaphne calyculata	Leatherleaf	—	SC	Wetlands and bogs
Cyperus lecontei	Leconte's flatsedge	—	SC	Sand dune swales; pond margins
Echinodorus parvulus	Dwarf burhead	—	SC	Shallow pools and ponds
Echinodorus tenellus	Dwarf burhead	—	SC	Shallow pools and ponds
Eleocharis robbinsii	Robbin's spikerush	—	SC	Pine savanna ponds
Eupatorium recurvans	Coastal-plain thorough-wort	—	SC	Depressions
Lobelia boykinii	Boykin's lobelia	—	SC	Cypress ponds; swamp margins
Nestronia umbellata	Nestronia	—	SC	Oak-hickory-pine woods; often in transition areas between flatwoods and uplands
Oxypolis canbyi	Canby's dropwort	FE/SE	SC	Cypress ponds and sloughs; wet savannas
Plantago sparsiflora	Pineland plantain	—	SC	Open, wet pine savannas; shallow ditches and seeps
Rhexia aristosa	Awned meadow-beauty	—	SC	Pond margins and wet savannas
Rhexia cubensis	West Indian meadow-beauty	—	SC	Wet savannas including cutthroat seeps, flatwoods, and bogs
Rhynchospora scirpoides	Long-beaked baldrush	—	SC	Floating mats in ponds; pond margins
Ruellia caroliniensis	Wild petunia	—	SC	Woods and wood margins
Sagittaria isoetiformis	Slender arrow-head	—	SC	Sandy ponds and bogs
Schwalbea americana	Chaffseed	FE/SE	—	Pond margins and wet savannas; land ridge forest
Scleria baldwinii	Baldwin's nutrush	—	SC	Wetlands
Amphibians				
Acris crepitans crepitans	Northern cricket frog	—	SC	Margins of shallow ponds or marshy areas

Table 3-6. Endangered, Threatened, and Special Concern Species Known in Sumter County, S.C. cont'd

Scientific Name	Common Name	Legal Status	Special Concern Status*	Habitat
Reptiles				
Micrurus fulvius	Eastern coral snake	—	SC	Hardwood forest; pine flatwoods; marshes
Mammals				
Corynorhinus rafinesquii	Rafinesque's big-eared bat	SE	—	Pine and hardwood forest; caves; abandoned buildings
Ursus americanus	Black bear	—	SC	Large undeveloped wooded tracts
Birds				
Haliaeetus leucocephalus	Bald eagle	FT/SE	—	Edges of lakes and large rivers; seacoasts
Ictinia mississippiensis	Mississippi kite	—	SC	Woodlands and brushy areas; near water
Picoides borealis	Red-cockaded woodpecker	FE/SE	—	Open pine woods; pine savannas
Sterna antillarum	Least tern	ST	—	Sandy beaches; sandbars

FE= Federal Endangered; FT= Federal Threatened; SE= State Endangered; ST= State Threatened (animals only); SC= Of Special Concern; RC= Of Regional Concern (plants only).

* The status designations in this column do not confer legal protection; these species of are special concern in the state because their populations may be declining.

— No status designation

Source: South Carolina Heritage Trust website accessed June 5, 2008; data last updated 1/17/2006; [https://www.dnr.sc.gov/pls/heritage/county_species.list?pcounty=sumter]; species habitat descriptions adapted from Air Force, 2004b]

3.6 WATER RESOURCES

3.6.1 Definition of the Resource

Water resources include surface waters and groundwater features, stormwater runoff, and floodplains. Surface waters on Shaw AFB include ponds, streams, and other wetlands. Groundwater underlying the base is utilized as a source of potable water and was addressed in Section 3.2.2.2 as a water supply. The ROI for this resource is Shaw AFB and the 46 acres of land that are proposed to be purchased as part of this action.

3.6.2 Existing Conditions

Surface Water

Shaw AFB is located within the Southern Coastal Plain physiographic region of South Carolina. Spann Branch and Long Branch Creeks are the major naturally occurring surface water features on Shaw AFB. Spann Branch flows along the northern boundary of the base into Long Branch. Long Branch runs along the northeast edge of the base, into Booth's Pond, Sawmill Pond, and then into Mush Swamp. From there, the creeks become part of the headwaters of the Pocotaligo Swamp, which flows into the Black River, which makes its way to the Atlantic Ocean near Georgetown, S.C. (Air Force, 2004a).

Surface water features within the base consist primarily of canals and ditches associated with runways and taxiways. These ditches were created for the purpose of removing stormwater runoff from airfield areas. The base also maintains four artificial impoundments: Chapel Pond, Memorial Lake, No. 1 Hole Golf Course Pond and No. 8 Hole Golf Course Pond. These ponds are maintained for fishing, picnicking, and aesthetic value.

Stormwater runoff from the base is regulated by the SCDHEC NPDES permit program. Under the base NPDES permit, stormwater is discharged through four permitted stormwater outfalls and two outfalls that are not regulated by a permit. The areas drained by outfalls on Shaw AFB are described in Table 3-7.

Surface Water Quality

Water quality of surface water resources may be impacted by point and nonpoint sources of pollutants. Water bodies are classified by the state based on their water quality, and discharges that can affect water quality are regulated through permits.

The Pocotaligo River and its tributaries, including Long Branch, have been designated by South Carolina as "freshwaters," indicating that they are suitable for secondary contact recreation, drinking water supply after conventional treatment, fishing, and the survival and propagation of a balanced indigenous aquatic community of flora and fauna (Air Force, 2004b). No waters are classified as Outstanding Resources Waters (ORW) within one mile of Shaw AFB. Also,

Shaw AFB does not have water bodies on or in the immediate vicinity listed on South Carolina's Section 303(d) List of impaired water bodies (SCDHEC, 2006).

Table 3-7. Outfalls and Areas Drained on Shaw AFB

Outfall #	Area Drained	Receiving Water	Residential	Non-Residential Impervious (roads, buildings, etc.)	Golf Course	Undeveloped/ Unpaved	Total (acres)
002	West of runway	Long Branch Creek	110	228	200	45	583
003	Southeast portion of base	Mush Branch Creek	39	230	0	318	587
004	East of runway	Long Branch Creek	0	200	0	1,027	1,227
005	Northern portion of base	Long Branch Creek	0	13	0	84	97
006	Northern portion of base	Booth's Pond	0	17	0	163	180
007	JP-8 bulk storage	Mush Branch Creek	0	1	0	0	1
		Total	149	689	200	1,637	2,675

Source: Air Force, 2006

Unlike pollution from industrial and sewage treatment sources, nonpoint source (NPS) pollution comes from many nondiscrete sources. As rainfall runs off the land and manmade structures, natural and man-made pollutants are picked up, transported, and ultimately deposited into lakes, rivers, wetlands, coastal waters, and groundwater. These pollutants may have harmful effects on water quality, adversely affecting drinking water supplies, recreation, wildlife, and fisheries. Potential NPS pollution at Shaw AFB originates from fertilizers, herbicides, and insecticides used in landscaped and developed areas; hydrocarbon and chemical runoff from parking lots, roadways, and the flight line; and sediment runoff from construction sites and land clearing.

Groundwater

Three aquifer systems are located under Shaw AFB. They consist of the Middendorf Aquifer, Black Creek Aquifer, and the shallow aquifer system, which includes the Lang Syne Formation and the Duplin Formation.

The Middendorf (Tuscaloosa) Aquifer is the most productive of the aquifer systems in the western portion of Sumter County. The aquifer is approximately 250 feet thick and is encountered at about –50 feet mean sea level (MSL) in the Shaw AFB area. The Middendorf Aquifer is confined by a 15- to 75-foot-thick clay layer located at the base of the Black Creek Formation (Air Force, 2004a).

The six water supply wells currently located on Shaw AFB are screened in the Black Creek Aquifer. The Black Creek Aquifer is separated into upper and lower portions by a confining layer. The upper aquifer is approximately 50 to 70 feet thick, while the lower aquifer ranges from 75 to 105 feet thick. Wells completed in the Black Creek Aquifer are capable of yielding up to 750 gpm (Air Force, 2004a).

The Lang Syne Formation of the Black Mingo Group and the Duplin Formation make up the shallow aquifer system in the Shaw AFB area. The Lang Syne Aquifer is located in the northwestern portion of Shaw AFB, northwest of the Orangeburg Scarp, while the Duplin Aquifer is present southeast of the scarp. The two aquifers are not hydraulically connected due to the presence of the fine-grained Sawdust Landing Formation, considered an aquitard, underneath the Lang Syne Aquifer (Air Force, 2004a).

3.7 AIR QUALITY

3.7.1 Definition of the Resource

This section discusses the potential impacts to air quality resulting from the proposed action, Alternative 1, and No Action alternative. For the analysis, thresholds were established on an individual pollutant-by-pollutant basis. Sumter County, S.C., will be considered the ROI.

The emissions sources analyzed for the proposed action include heavy construction machinery, semi-tractor trailer rigs, dust (particulate matter) from unpaved roads, and vehicle exhaust emissions from employees' personal vehicles.

In order to evaluate the air emissions and their impact to the overall ROI, the emissions associated with the project activities were compared to the total emissions on a pollutant-by-pollutant basis for the ROI's 2002 NEI data. Potential impacts to air quality are identified as the total emissions of any pollutant that equals 10 percent or more of the ROI's emissions for that specific pollutant. The 10 percent criteria approach is used in the General Conformity Rule as an indicator for impact analysis for nonattainment and maintenance areas. Although Sumter County is in attainment, the General Conformity Rule's impact analysis methodology was utilized to provide a consistent approach to evaluating the impact of construction emissions. To provide a more conservative evaluation, the impacts screening in this analysis, used a more restrictive criteria than required in the General Conformity Rule. Rather than comparing emissions from construction activities to regional inventories (as required in the General Conformity Rule), emissions were compared to the individual county (Sumter) potentially impacted, which is a smaller area.

A Department of Defense developed model, the Air Conformity Applicability Model (ACAM), used by the U.S. Air Force for conformity evaluations was utilized to provide a level of consistency with respect to emissions factors and calculations. Air emissions estimated using ACAM were compared to the established 10 percent criteria for Sumter County as represented in the USEPA 2002 NEI (USEPA, 2002). Emissions associated with construction activities are the main issues generated by the proposed action and were the focus of the air analysis. Air quality issues associated with operational activities at Shaw AFB after the completion of construction are not included in this evaluation.

Fugitive dust (PM10), nitrogen oxide (NOx), and CO constitute the majority of the emissions from construction activities and the project overall. A construction operation incorporates grading operations, construction worker trips, stationary equipment (e.g., generators and saws), mobile equipment, nonresidential architectural coatings, and acres paved. CO and PM10 are the primary pollutants of concern, constituting 91 percent of total tons of pollutant emissions. A majority of the CO emissions are associated with stationary equipment (e.g., saws and generators), while the PM10 emissions are primarily associated with grading operations.

3.7.2 Existing Conditions

Baseline Air Quality

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 levels of pollutants are generally expressed on a concentration basis in units of part per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). For this air quality analysis, the ROI centers on Sumter County for both the proposed action and alternative sites located on Shaw AFB.

The baseline standards for pollutant concentrations are the National Ambient Air Quality Standards (NAAQS) and state air quality standards. These standards represent the maximum allowable atmospheric concentration that may occur and still protect public health and welfare. Further discussion of the NAAQS and state air quality standards are included in Appendix B.

For analysis purposes, the emissions from the proposed action will be compared to the Sumter County emissions obtained from the USEPA's 2002 National Emissions Inventory (NEI), which are presented in Table 3-8, Baseline Emissions Inventory for Sumter County, S.C. The county data includes emissions data from point sources, area sources, and mobile sources. P*oint sources* are stationary sources that can be identified by name and location. *Area sources* are point sources whose emissions are too small to track individually, such as a home or small office building or a diffuse stationary source, such as wildfires or agricultural tilling. M*obile sources* are any kind of vehicle or equipment with gasoline or diesel engine, an airplane, or a ship. Two types of mobile sources are considered: on-road and nonroad. *On-road* sources consist of vehicles such as cars, light trucks, heavy trucks, buses, engines, and motorcycles. *Nonroad* sources are aircraft, locomotives, diesel and gasoline boats and ships, personal watercraft, lawn

and garden equipment, agricultural and construction equipment, and recreational vehicles (USEPA, 2005).

Table 3-8. Baseline Emissions Inventory for Sumter County, S.C.

	Emissions (tons/year)				
Source Type	**CO**	**NO_x**	**PM_{10}**	**SO_2**	**VOC**
Area Source	4,301	553	14,974	726	4,875
Nonroad Mobile	6,015	665	7,433	53	504
On-Road Mobile	23,443	2,786	7,508	104	1,840
Point Source	127	271	114	0	0
Total	*33,886*	*4,275*	*30,030*	*884*	*7,219*

CO = Carbon Monoxide NO_x = Nitrogen Oxide; PM_{10} = Particulate Matter with Diameter Less Than or Equal To 10 Microns; SO_2 = Sulfur Dioxide; VOC = Volatile Organic Compound
Source: USEPA, 2002

Shaw AFB 2005 Annual Air Emissions Report summarizes the emissions generated from all point sources located on the installation. The CY05 emissions are summarized in Table 3-9.

Table 3-9. CY05 Air Emissions Inventory, Shaw AFB

	Emissions (tons/year)					
Source Type	**CO**	**NO_x**	**PM_{10}**	**SO_2**	**VOC**	**HAPs**
Stationary Sources	20.58	24.99	3.69	1.73	40.62	3.63
Mobile Sources	23.13	7.00	3.47	0.23	2.87	0.12
Total	43.71	31.99	7.16	1.96	43.49	3.75

HAPs = Hazardous Air Pollutants
Source: Air Force, 2008a

Regulatory Setting

The Federal Clean Air Act of 1963 and its subsequent amendments establish air quality regulations and the NAAQS and delegate the enforcement of these standards to the states. The SCDHEC enforces air pollution regulations and sets guidelines to attain and maintain the national and state ambient air quality standards within the state of South Carolina. For nonattainment regions, states are required to establish a State Implementation Plan (SIP) that is designed to reduce emissions to a level that will bring the regions into compliance with the NAAQS by specific deadlines. Control measures proposed in the SIP and adopted by the SCDHEC are incorporated into the SCDHEC *Regulation 61-62 – Air Pollution Control Regulations and Standards* (SCDHEC, 2003).

The USEPA recently implemented the new eight-hour O_3 and 24-hour and annual $PM_{2.5}$ national standards (see Air Quality, Appendix B). An area will attain this standard if its three-year running average of the annual fourth-highest daily maximum eight-hour O_3 concentration remains below 0.085 ppm. The USEPA will not revoke implementation of the one-hour O_3 standard in a given area until that area achieves this standard. Otherwise, as is the

case for South Carolina, implementation of the eight-hour standard will replace the existing one-hour standard. In South Carolina, 18 of 23 O_3 monitors, particularly those in the more populated urban areas, regularly exceed the 8-hour O_3 standard (SCDHEC, 2004). Upon final designation of these nonattainment areas, the SCDHEC will have to submit a plan to the USEPA that demonstrates how they will bring the areas into attainment of the 8-hour O_3 standard. Sumter County and Shaw AFB are located in an air quality attainment district (Environmental Quality Control Region 4).

3.8 HAZARDOUS MATERIALS AND HAZARDOUS WASTE

3.8.1 Definition of the Resource

Hazardous materials are identified and regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the Occupational Safety and Health Administration (OSHA); and the Emergency Planning and Community Right-to-Know Act (EPCRA). Hazardous materials have been defined in AFI 32-7086, *Hazardous Materials Management*, to include any substance with special characteristics that could harm people, plants, or animals.

Hazardous waste is defined in the Resource Conservation and Recovery Act (RCRA) as any solid, liquid, contained gaseous or semisolid waste, or any combination of wastes that could or do pose a substantial hazard to human health or the environment. Waste may be classified as hazardous because of its toxicity, reactivity, ignitibility, or corrosivity. In addition, certain types of waste are "listed" or identified as hazardous in 40 CFR Part 263. The ROI for hazardous materials and waste management is Shaw AFB.

3.8.2 Existing Conditions

Hazardous Materials

The majority of hazardous materials used by Air Force and contractor personnel at Shaw AFB are controlled through an Air Force pollution prevention process called Hazardous Material Management Process (HMMP). This process provides centralized management of the procurement, handling, storage, and issuing of hazardous materials and turn-in, recovery, reuse, or recycling of hazardous materials. The HMMP includes review and approval by Air Force personnel to ensure users are aware of exposure and safety risks.

Hazardous Waste

The Shaw AFB *Hazardous Waste Management Plan,* dated 28 February 2007, governs the Shaw AFB Hazardous Waste Management Program. The plan sets forth specific procedures for handling hazardous wastes. Shaw AFB is a large-quantity hazardous waste generator. Hazardous wastes generated during operations and maintenance activities include solvents, metal-contaminated spent acids, and sludge from wash racks. Shaw AFB recycles all

lubricating fluids, batteries, oil filters, and shop rags. During 2006, approximately 34,320 pounds of hazardous wastes were generated and removed from the base in accordance with state and federal regulations (personal communication, S. Johnson, 2007).

Environmental Restoration Program (ERP)

The DoD developed the ERP to identify, investigate, and remediate potentially hazardous material disposal sites that existed on DoD property prior to 1984. The *Shaw Air Force Base Environmental Restoration Program Site Status Summaries dated December 2007* (Air Force, 2007d) summarizes the current status of the base environmental programs and presents a comprehensive strategy for implementing actions necessary to protect human health and the environment. This strategy integrates activities under the ERP and the associated environmental compliance programs that support full restoration of the base.

ACC policy requires that any proposed project on or near a Shaw AFB ERP site be coordinated through the Shaw ERP Manager. The alignment of the proposed action would have the potential to be on or near ERP sites WP-12, FT-07, FT-06, SS-35, OU-2B, OT-25, and SS-36.

ERP Site WP-12 is the Land Spreading Sludge Area located along the southern edge of the Base (see Figure 3-4). Between 1976 and May 1992, approximately 280 tons of dried and liquid sludge were disposed of at this site annually. Use of this site was discontinued in May 1992. Soil and composite sludge samples indicated concentrations of contaminants within the typical background concentrations. Soils underlying the sludge throughout the area contained no detectable amounts of contaminants, therefore, no groundwater contamination was evident and no monitoring wells were installed during this investigation. A Decision Document (DD) recommending no further investigation/no further action at the site was submitted in March 1993 and was approved by the EPA on March 24, 1993, and by SCDHEC in July 1995. The site was closed and included in the July 9, 1999 RCRA permit update.

ERP Site FT-07 is the former Fire Training Area No. 2 located approximately 1,600 feet east of the main runway near the southeast corner of the current munitions unload pad (see Figure 3-4). Fire training operations were conducted at this site from 1970 to 1981. The only flammable material used at this site is thought to be JP-04. Low concentrations of ethyl benzene, xylenes, 2-methylnaphthalene, trichloroethylene (TCE), and/or styrene were detected during the remedial investigation in the soil samples collected from the center of the former fire training pit. No contaminant plume was delineated at this site. The RCRA permit modification for the site was completed July 8, 1999. This site is closed with no further action required.

ERP Site FT-06 is the former Fire Training Area No. 3 located in a clearing 3,000 feet east of the runway and 1,200 feet south of the ammunition storage area (see Figure 3-4). Fire training operations were conducted at this site from 1981 to 1989. Prior to training exercises, the surface of the earthen pit was sprayed with water to retard seepage of oil into the ground. Screening and remedial investigation was conducted and no significant volatile organic compound

contamination was detected. The site monitoring well was purged and sampled on two separate occasions. None of the samples detected concentrations of contaminants. The RCRA permit modification for the site was completed on July 9, 1999. This site is closed with no further action required.

ERP Site SS-35 is located near Buildings 1205 and 1200 along the flight line. The site was separated from SD-29 by the ERP site designation SS-35, SWMU No. AOC-H, OU-2D, since it is associated with TCE contamination in the OU-2B site. The Remedial Investigation/RCRA Facility Investigation delineated chlorinated solvents in both the upper and lower portions of the Duplin Aquifer, as well as the Upper Black Creek Aquifer. The Air Force has proposed injection of potassium permanganate into shallow aquifer hot spot/source area; continue hydraulic containment in Upper Black Creek Aquifer with groundwater treatment at the OT-16B facility; and develop an optimized long-term monitoring program (install more wells), which will be included in a Corrective Measures Study, Statement of Basis Corrective Measures, and Implementation Work Plan.

ERP Site OU-2B TCE and PCE Contamination Site Black Creek Aquifer is divided into two plumes, Plume 1 and Plume 2. Plume 1 is located on the southwest extending from the runways to beyond the western base boundary and contains both TCE and PCE. Plume 2 is located to the northeast extending from the runways near Building 1200 to the Carolina Skies Club and has not migrated to off-base property. Plume 2 also contains only TCE contamination. The entire plume encompasses approximately 640 acres in the Upper Black Creek Aquifer. A pump and treat system with hydraulic containment has been installed with three new extraction wells along the western side of the base.

Former ERP site OT-25 is located southeast of the golf course maintenance area (Buildings 595, 604, 614). The site consists of a septic tank and drain field that accept water used to wash golf course maintenance equipment and human waste. The tank has been found to contain volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, and pesticides at concentrations below action levels. A decision document signifying closure of the site was approved in 1995.

SS-36 is base drinking well BW-5, located along the northern boundary of Shaw AFB, near Frierson Road and close to former ERP site OT-25. In December 2000, the well was found to contain TCE at concentrations below the maximum contaminant level. The potential source area is unknown. However, a surface aquifer source area has been delineated, which underlies the north end of the runways as well as portions of the golf course and the housing area and extends downward into the Black Creek Aquifer. The site is currently being investigated, and remediation of the site will be required.

There are approximately 46 acres of land that the Air Force is considering to acquire. The 46 acres are comprised of all or portions of 15 parcels along Frierson Road outside of the Northeast Gate. All of the parcels are currently privately owned with four parcels with

structures. The parcel sizes vary from three-quarters of an acre up to 25 acres. Records of the parcels and titles have not revealed any evidence of activities or uses of environmental concern. However, visual site inspections did reveal the presence of construction debris and unknown solid waste fill on four of the considered parcels.

3.9 SAFETY

3.9.1 Definition of the Resource

Ground and flight safety involving aviation operations conducted by the 20th FW are addressed in this section. Because of the proposal to construct within portions of the airfield environment, the focus of this section is on safety-of-flight issues associated with airfield operations. Within the *ground safety* section, issues involving operations and maintenance activities that support operation of the airfield are addressed. Also considered in this section is the safety of personnel and facilities on the ground that may be placed at risk from flight operations. Within the *flight safety* section, aircraft flight risks and safety issues associated with the conduct of aviation activities at the installation are addressed.

Although ground and flight safety are addressed independently, it should be noted that, in the immediate vicinity of the runway, risks associated with safety-of-flight issues are interrelated with ground safety concerns. Any aircraft accident at the airfield would have direct impacts on the ground in the immediate vicinity of the mishap as a result of explosion, fire, and debris spread. The ROI for safety in this EA includes Shaw AFB.

3.9.2 Existing Conditions

Ground Safety

Ground safety includes safety as it pertains to construction and demolition, airfield operations and potential accident zones as well as force protection. Air Force day-to-day operations and maintenance activities completed by the 20th FW and their tenants in the use and operation of the airfield are performed in accordance with applicable Air Force and ACC safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health (AFOSH) requirements.

Clear zones (CZs) and accident potential zones (APZs) are surface areas, described geographically on the ground. Specific dimensions, geophysical and topographic standards, and approved land uses are discussed in detail in Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*; AFI 32-7063, *The AICUZ Program*; and Air Force Handbook (AFH) *32-7084*, *AICUZ Program Manager's Handbook*. The Air Force has conducted several studies over many years assessing aircraft accidents occurring in the vicinity of airfields to support the definition of CZs and APZs. The studies show that approximately 27 percent of the accidents occurred on, or within an area 1,000 feet on either side of the runway; approximately 29 percent occurred within 3,000 feet from the end of the runway and 1,500 feet

on either side of the extended runway centerline. Extending the 3,000-foot-wide region another 5,000 feet accounted for an additional 18 percent of the accidents, and further extending it 7,000 feet accounted for an additional 5 percent.

The CZ is basically a square that is 3,000 feet long and 3,000 feet wide at both ends of the runway (extends 3,000 feet out from the end of the runway and 1,500 feet on either side of the runway centerline (Shaw AFB has two parallel runways). It is 206 acres in size at each end of the runway and includes the 46 acres of the graded area. UFC 3-260-01 dictates that within the CZ (and outside of the graded area), there can be no permanent facilities. Brush and trees are allowed in this area; however, they may not penetrate the approach/departure slope, or the transitional surface slope.

The graded area is an area within the CZ that is 1,000 feet in length and 2,000 feet wide; it extends 1,000 feet from the end of the runway and 1,000 feet on either side of the runway centerline. The graded area is 46 acres at each end of the runway. UFC 3-260-01 dictates that the graded area must be clear of all aboveground obstacles (including roadbeds) and vegetation (except grass [herbaceous]). It must also have no abrupt surface irregularities, such as ditches or ponds. The maximum allowable slope of the graded area is +/- 2 percent. Air Force Instruction 32-7063, *The Air Installation Compatible Use Zone Program,* states that the Air Force shall acquire a real property interest over all land within the clear zones whenever practicable. Currently, the Air Force does not have real estate interest in a strip of land approximately 500 feet wide that runs along the western edge of the northern clear zone. This land was not purchased as a part of initial clear zone land use control initiatives because the original clear zone was smaller than the present clear zone. Acquisition of the 500-foot-wide strip of land is necessary to ensure Air Force control of land use within the current, expanded clear zone.

Force protection is a security program designed to protect Air Force personnel, civilian employees, family members, facilities, and equipment, in all locations and situations. The program is accomplished through the planned and integrated application of antiterrorism measures, physical security, operations security, and personal protective services. It is supported by intelligence, counterintelligence, and other security programs. In response to terrorist attacks, several regulations have been promulgated to ensure that force protection standards are incorporated into the planning, programming, and budgeting for the design and construction of Military Construction (MILCON)-funded facilities. Unified Facilities Criteria 04-010-01, *DoD Minimum Antiterrorism Standards for Buildings* (published in 2003 and updated in 2007) establishes minimum standoff distances that must be maintained between several categories of structures and areas that are relatively accessible to terrorists.

Force protection at Shaw AFB is also maintained through the use of the entry gates to control access to the base. Personal vehicles enter and exit the base through four active security checkpoints: the Main Gate on Shaw Drive, the Frierson Street Gate, and the North Gate on Frierson Road. A commercial gate is located off of US 76/378 for use by commercial vehicles entering Shaw AFB. Personal vehicles can use this gate, however, it is largely used for

commercial vehicle access. Existing gate facilities are inadequate in several respects. The Main Gate on Shaw Drive is located adjacent to an off-base wooded area to the west and does not provide adequate space for search and inspection of suspected vehicles. The current location of the Main Gate also causes traffic to back up onto US 76/378, increasing the potential for vehicle accidents. Relocation of the Main Gate to address the problems listed above was analyzed for environmental impacts under the 2004 Wing Infrastructure Development Outlook (WINDO) Environmental Analysis (EA) and found to have no significant impacts (Air Force, 2004).

Several facilities in the northern portion of Shaw AFB are currently not in compliance with AT/FP standards in that they are too close to publicly-accessible, off-base areas. In order to provide the required level of protection, the Air Force must control access to these areas through fences, gates, and/or other measures.

Flight Safety

As with ground safety, day-to-day flying operations are conducted by highly trained and qualified flight crews in accordance with detailed operational procedures. Since takeoff and landing operations constitute the most critical phases of flight, there are numerous requirements applicable to the airspace through which an aircraft flies during these operations.

These requirements focus on the configuration of the airspace which extends from the end of the runway and is best described as a plane which rises on given gradients forming a floor, or an imaginary surface for the airspace used during these operations.

UFC 3-260-01 defines and describes these imaginary surfaces. The imaginary surfaces of concern in this assessment are referred to as the approach/departure slope and the transitional surface slope. The approach/departure slope rises at a rate of 40:1, starting 200 feet from the end of the runway. The transitional surface is an imaginary surface that extends outward and upward at right angles to the runway centerline and extended runway centerline at a slope ratio of 7:1 (for every seven feet horizontally there can be a one-foot increase vertically). The transitional surface connects the primary and the approach/departure clearance surfaces to the inner horizontal, the conical and the outer horizontal surfaces. UFC 3-260-01 dictates that the vertical height of vegetation and other fixed or mobile obstacles (such as construction equipment) will not penetrate the transitional surface to be compatible. At Shaw AFB, there are 88 obstacles waived, 27 deviations, and 32 exempt items (Air Force, 2005a).

Explosives Safety

The 20th FW controls, maintains, and stores all ordnance and munitions required for mission performance. Ordnance is handled and stored in accordance with Air Force explosive safety directives (AFI 91-201), and all munitions maintenance is carried out by trained, qualified personnel using Air Force approved technical data. Ample storage facilities exist and all facilities are fully licensed for the ordnance they store. No storage facility waivers are currently in effect.

Safety clearance zones protect areas where munitions are stored, maintained, and handled. These zones are geographically defined as Q-D arcs, and are based on the types and amounts of explosive material involved. Shaw AFB has constructed nine facilities where a variety of munitions are stored or handled. The Safety Office has established Q-D arcs based on the types and amounts of explosives to be stored at each location (Table 3-10). The arcs shown in Figure 3-4 are a result of munitions storage and handling at the locations identified in Table 3-10. Construction of inhabited buildings within Shaw AFB Q-D arcs has been limited to those facilities essential to effective mission accomplishment. Due to proximity to the installation boundary, one safety arc in the munitions storage area extends off the east side of the installation. However, no waiver is required because the Air Force has established easements with the property owner to ensure protection of the area (Air Force, 2002a).

Table 3-10. Quantity-Distance Arcs

Location	Radius (feet)
Building 1803	1,250
Building 1815	1,250
Building 1816	1,250
Building 1824	2,115
Building 1870	1,250
Hot Cargo Pad	1,400
EOD Range	500
All Aircraft	
Parking Ramps	400
Runway 04R/22L	1,400

Source: Air Force, 2004a

3.10 NOISE

3.10.1 Definition of the Resource

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Human response to noise varies according to the type and characteristics of the noise source, distance between source and receptor, receptor sensitivity, and time of day. The ROI for noise includes the area surrounding each project location that may be affected by construction noise and noise from on-going operations.

Sound is measured with instruments that record instantaneous sound levels in decibels (dB). A-weighted sound level measurements (often denoted dBA) are used to characterize sound levels that are heard especially well by the human ear. All sound levels analyzed in this EA are A-weighted; thus, the term dB implies dBA unless otherwise noted. Because noise levels at a given location typically change constantly over the course of a day, time-averaged noise metrics are often used to describe the general noise environment. Because the same level of noise is more intrusive at night than it would be during the day, the Air Force uses the Day-Night

Average Sound Level (L_{dn} or DNL) to describe noise. The L_{dn} averages the sound energy from aircraft operations over a 24-hour period and assigns an additional 10-dB penalty to noises that occur between 10:00PM and 7:00AM.

3.10.2 Existing Conditions

At Shaw AFB, noise contributions from aircraft flying operations and ground engine run-ups have been calculated using the NOISEMAP model, which is the standard noise estimation methodology used for military airfields. NOISEMAP uses the following data to develop noise contours: aircraft types, runway utilization patterns, engine power settings, airspeeds, altitude profiles, flight track locations, number of operations per flight track, engine run-ups, and time of day. The most recent update of noise data at Shaw AFB took place in February 2004 (Air Force, 2007a) and noise contours generated during this data collection are displayed in Figure 3-5.

The Air Installation Compatible Use Zone (AICUZ) Program has been developed in an effort to protect local citizens from the noise exposure and accident potential associated with flying activities and to prevent degradation of the Air Force's capability to achieve its mission by promoting compatible land use planning. Facilities on Air Force installations are sited compatibly with AICUZ recommendations whenever it is practicable to do so. According to AFH 32-7084, both "professional services" and "governmental services" land uses are compatible with noise levels up to 69 dB DNL. Both land uses are considered compatible between 70 and 79 dB DNL only with the addition of special noise attenuation measure. Both are unconditionally incompatible at noise levels greater than 80 dB DNL. About 85 percent of the area within the installation boundary is within noise level zones exceeding 65 dB DNL.

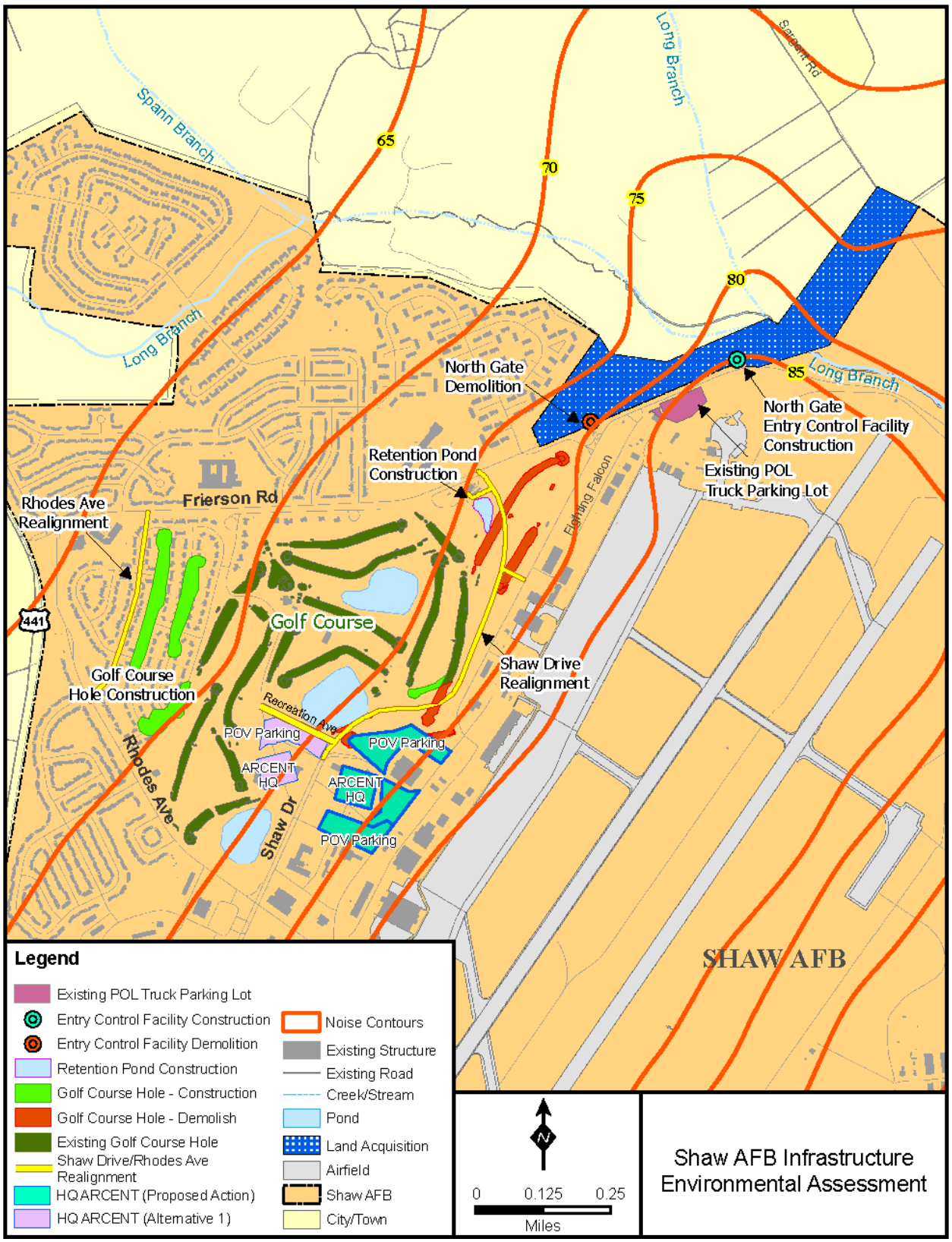

Figure 3-5. Shaw AFB Noise Contour Map

4.0 SHAW AFB ENVIRONMENTAL CONSEQUENCES

Chapter 4.0 presents the environmental consequences of the Base Infrastructure Project and constructing the USARCENT command headquarters building on the west side of Shaw AFB. To define potential direct and indirect impacts, this chapter evaluates the project elements described in Chapter 2.0 against each of the resource areas discussed in Chapter 3.0. Cumulative effects of the proposed action with other foreseeable future actions are presented in Chapter 5.0.

Environmental impacts are discussed for all components of the Base Infrastructure Project and the Proposed Action site for the USARCENT command HQ building. Each resource area also contains discussion of Alternative 1. Under Alternative 1, all components of the Base Infrastructure Project would occur, and the USARCENT command headquarters would be constructed at a location just west of the proposed action site.

4.1 LAND USE RESOURCES

4.1.1 Proposed Action

Land Use

The 46 acres of privately-owned land to be acquired as part of the proposed action is currently used for agricultural, residential, and commercial purposes. After acquisition by the Air Force, a portion of the land would be enclosed in a fence and a new entry control facility would be constructed on Frierson Road to control access to the land. The fenced area would be available for development by the Air Force subject to AT/FP and other constraints. Portions of the land to be acquired that would not be within the new fence would not be expected to be developed by the Air Force and the Air Force may see fit to lease this land back to its previous owners with appropriate land use restrictions. A gravel access road would be constructed to provide access to a residential lot whose access to Frierson Road would be blocked by the proposed new fence. The land acquisition would satisfy AT/FP minimum standoff distance requirements and ensure that no incompatible development will occur within the northern runway 04/22 clear zone.

Construction and demolition of roads and infrastructure as part of the Base Infrastructure Project would conform to the land use goals and objectives stated in the 2006 Shaw AFB Electronic General Plan (Air Force, 2006) and the 2020 Base Vision (Air Force, 2008b). These projects would improve the safety and efficiency of transportation on Shaw AFB. Realignment of Rhodes Avenue would provide high-capacity road access to the proposed new community center, which may be located near the western edge of the base. The new portions of Shaw Drive would be aligned to allow for additional mission development.

Siting of the USARCENT command HQ near HQ 9th Air Force would further define that area as the administrative center of the base. Selection of the proposed action site for the USARCENT command HQ building would require relocation of the Base Exchange (Building 1422), theater (Building 1413), and two bank branches (Buildings 1405 and 1406). The current location of these facilities is in close proximity to the runway, which is not ideal from a land use planning standpoint. The relocation of these facilities to a new community center area is in keeping with general land use planning objectives (Air Force, 2006). Overall, impacts of the proposed action on land use would be positive.

Recreation

As part of the proposed action, Shaw AFB's Carolina Lakes Golf Course holes 3, 4, and 5 would be demolished and hole 6 would be reconfigured to make way for the realigned Shaw Drive. Disruption of golfing would be temporary, lasting only until construction of replacement holes was complete. In the meantime, golfers could play the first nine holes twice as to experience a Championship level course. Alternatively, all of the remaining holes could be played through once as an executive level course.

In addition, the base theater would be demolished to make room for the USARCENT command HQ. While it is assumed that a replacement theater would be constructed at some point, that project is not analyzed as part of this action. Several privately-run theaters are available off-base in the town of Sumter. It is assumed that base personnel would make use of these off-base theaters after the demolition of the base theater. Overall, impacts to recreation would be negative but not significant.

Visual Resources

Implementation of the proposed action would relocate several roads and golf courses holes on the base and construct a large headquarters facility. All constructed roads and golf course holes would be landscaped and would be expected to improve visual resources on the base once they are complete. The USARCENT command HQ building would be visually consistent with the surrounding administrative functions and the area surrounding the HQ facility would also be landscaped. The gatehouse and fence proposed to be constructed on the 46 acres of land proposed to be acquired would be visually consistent with the industrial/commercial land uses currently in place in that area. Some of the trees growing in areas through which the fence would run would need to be removed to allow for line of sight along the fence. These trees are not visually exceptional and their loss would not be a significant impact to visual resources. Impacts to visual resources overall would be positive and not significant

Transportation

Implementation of the proposed action would involve the construction of approximately 9,200 liner feet of arterial roadways and 1,400 liner feet of smaller access roads. This would include the realignment of Shaw Drive between the existing BX building and Frierson Road, a

new Northeast gate on Frierson Road and various internal improvements in the vicinity of Rhodes Avenue and the Northwest gate and access from the flightline to Shaw Drive. Shaw Drive would be improved to a four lane divided roadway along a new corridor to assist in the flow of traffic to the Northeast gate.

The beddown of HQ USARCENT at Shaw AFB would add up to approximately 1,518 additional personnel to Shaw AFB (Air Force, 2007a). The number of personnel added to the base can be used to estimate the increase in traffic to be expected. Transportation engineering generally determines the expected function of the roadway in the design peak hour. Methods contained in the *Trip Generation Handbook* and *Trip Generation 7th Edition* by the Institute of Transportation Engineers (Trip Generation) were used to estimate the expected design peak hour traffic**.** The expected traffic can vary depending on the time of the day and week. The weekday peak morning hours would have the largest expected impact since entering traffic would be slowed by security procedures.

The 2007 traffic study noted that traffic entering the base during this time would be expected to increase from baseline levels by about 23 percent (391 additional trips) and traffic exiting the base during the afternoon peak is expected to increase by about 18 percent (293 additional trips) (Air Force, 2007c). These trips could potentially be split among the four existing access points to the base. Currently the Northwest and Southwest (Main) Gates are operating at a rate that is resulting in congestion and delay at the gates during peak traffic (Air Force, 2007c). Siting of the USARCENT command HQ on the west side of Shaw AFB would be expected to result in increased traffic at these two gates. However, a project to relocate and improve capacity at the Main Gate has been proposed. With the implementation of the project, congestion at the Main Gate would be reduced. Under this Base Infrastructure Project, Rhodes Avenue would be redirected to a new intersection on Frierson Road, reducing congestion at the Northwest Gate. Existing roads off Shaw AFB are capable of supporting the anticipated increase in traffic. Under the proposed action traffic on base roads would increase but the effects would not be significant.

4.1.2 Alternative 1

Land Use

Siting of USARCENT command HQ west of Shaw Drive would displace the Bowling Center (building 1401), Community Activity Center (1411), the Lakeside Pool (1408/1409) and the Enlisted Club (1402). These facilities would be expected to be relocated to the new community center area, which may be located near the western edge of Shaw AFB. Construction of replacement facilities for the buildings to be demolished has not yet been planned in detail and is not analyzed in this environmental analysis. Implementation of Alternative 1 would change the land use of the approximately 23-acre USARCENT command HQ site from community center to administrative. Impacts to land use under this alternative would be positive overall and not significant.

Visual Resources

The USARCENT command HQ building would be constructed on previously developed land. The new facility would be larger and taller than the recreationally-oriented buildings that it would displace. The area surrounding the building would be landscaped. Impacts would be positive and not significant.

Transportation

Impacts to transportation under Alternative 1 would be approximately the same as under the proposed action. The proposed action and Alternative 1 sites for the USARCENT command HQ building are across the road from one another and both are expected to have similar effects on traffic.

Recreation

Under Alternative 1, the Bowling Center, Enlisted Club, Community Center, and Lakeside Pool would be demolished to make room for the USARCENT command HQ building. It is assumed that these facilities would eventually be replaced. However, construction of replacement facilities has not yet been scheduled and is not included as part of the Alternative 1 set of actions. A privately-operated bowling alley is available in the town of Sumter to accommodate bowlers on Shaw AFB. Loss of the Enlisted Club, Community Center, and Lakeside Pool would be an adverse impact to recreation at Shaw AFB. However, other recreational activities are available in the area, and the impact to recreation is considered to be not significant. Shaw AFB's Woodland Pool would not be impacted by this action and is open 7 days per week. The base theater would not be demolished under Alternative 1.

4.1.3 No Action Alternative

Under the No Action alternative, HQ USARCENT and its supporting facilities would still beddown at Shaw AFB. Under this alternative, the USARCENT command HQ building would be located on the east side of the base. Impacts resulting from this beddown are discussed in the EA to implement BRAC recommendations for Shaw AFB, which is hereby incorporated by reference. The Base Infrastructure Project would not be implemented and land uses in the 46 acres of land that would be bought under the proposed action and Alternative 1 would not be bought. Land use in these areas would not be controlled in such a way that clear zone-compatible land use could be guaranteed and AT/FP requirements would not be met for facilities in the North Ramp area of the base. Recreation and visual resources would not be affected under the No Action alternative. Transportation would not be improved through realignment of roads on the base. Under the No Action alternative, impacts to land use and transportation would be adverse and no impacts would occur to recreation or visual resources. All impacts would not significant.

4.2 INFRASTRUCTURE

4.2.1 Proposed Action

Implementation of the Base Infrastructure Project would involve construction of new roads, golf course holes, and a gatehouse, all of which would require connections to Shaw AFB's existing utilities infrastructure network. The USARCENT command headquarters, at its proposed location on the west side of the base, would also require connections to existing utilities infrastructure.

Electrical Distribution

The proposed action would not result in significant impacts to electrical distribution system. New roads, gatehouse and golf course holes would require relatively small quantities of electricity and would, for the most part, replace existing facilities. The Shaw AFB electrical distribution system operated at 61 percent capacity in FY07 during peak usage (personal communication, G. Skaggs, 2008) and is expected to have plenty of capacity to support additional development. The primary difference between the east side and west side sites for the USARCENT command HQ building would be that existing utilities infrastructure would be located in closer proximity to the construction site on the west side of the base. Demolition of the Base Exchange, Theater, and two bank branch facilities would reduce electrical demand until those functions are replaced.

Potable Water

The proposed action would not result in significant impacts to potable water resources. The potable water system is currently operating at approximately 54 percent of its capacity and is, therefore, capable of supporting substantial growth on the base. Average water production is .75 mgd with a 5 well pumping capacity of 2.4 mgd. Therefore, excess pumping capacity is approximately 1.28 mgd (J. Tucker, Pers. Comm., 2007 and McKay Pers. Comm., 2007a). The proposed replacement golf course holes, roads, and entry control facility would require potable water. However, because these facilities would replace existing facilities, the net change in demand for water would be expected to be minimal. Impacts to potable water demand stemming from the beddown of HQ USARCENT at Shaw AFB were analyzed and found to be not significant (Air Force, 2007a). The primary difference between the east side and west side sites for the USARCENT command HQ building would be that existing utilities infrastructure would be located in closer proximity to the construction site on the west side of the base. The increase in demand for potable water should be adequately met using existing infrastructure.

Sewage

The Base Infrastructure Project would not increase the number of people on the base. No increase would be expected to overall demands on the sanitary sewer system as a result of this set of projects.

Siting of the USARCENT command HQ building on the west side of the base is expected to impose the same demands on the sanitary sewer as would be imposed if the same HQ facilities were located on the east side of the base. It is not known at this time whether or not the beddown of HQ USARCENT at Shaw AFB could result in an increase in wastewater output that exceeds the permitted capacity of the WWTP, 1.2 mgd. Over last 5 years of discharge monitoring data, the averaged monthly maximum reported value of discharge from the WWTP has been 0.77 mgd (700,000 gpd). During periods of heavy rain fall, inflow and infiltration into the conveyance system increase the amount of discharge from the plant. The most recent inflow/infiltration estimate is that storm water accounts for 20-40% of the WWTP influent during heavy rainfall. Because the permit deals with single events, not just averages, it can not be assumed that there is 0.43 mdg of available capacity (personal communication, D. McKay, 2007b). It is suggested that a rate of 1.1 mgd be used for the base's maximum flow with current population (personal communication, D. McKay, 2007b) . Therefore, excess capacity would be 0.1 mgd (100,000 gpd). Using an average flow rate of 78.7 gpd (700,000 gpd/8,900) for base population, this would allow for an additional 1,270 (100,000 gpd/78.7 gpd) people to be added to the base population. (Note: if there was 0.43 mgd of capacity, the base could support an additional population of over 5,000 people.). The beddown of HQ USARCENT at Shaw AFB would result in a net increase of approximately 1,500 permanent party personnel plus about 2,500 dependents (some of which would not reside on base), or a total increase of approximately 4,000 people. Several projects have been proposed that would reduce inflow and infiltration to the sanitary sewer system, thereby decreasing the peak flows that result from rainfall events. These projects are currently unfunded but are expected to be funded in the near future. Impacts to the sanitary sewer system resulting from this increase in personnel have been analyzed in the context of ongoing and planned system upgrades and were found to be not significant (Air Force, 2007a).

Solid Waste

The proposed action would not result in significant impacts to solid waste handling capacity. There is expected to be a short-term increase in solid waste during the construction phase of the proposed action. Under the proposed action, Buildings 1405, 1406, 1413, 1422 and 1625, which have a total combined size of 76,913 SF, would be demolished and the 267,300 square foot USARCENT command HQ building would be constructed. In addition, 43,100 square feet of roadway would be demolished and 254,400 square feet of roadway would be constructed. Total waste generated by construction and demolition of structures was calculated using the methodologies described in the USEPA's 1998 document titled Characterization of Building-Related Construction and Demolition Debris in the United States. Waste was estimated to be generated at a rate of 155 pounds per square foot of structure demolished and 3.89 pounds per square foot of structure constructed. Roadway to be demolished was assumed to be 8 inches deep and weigh 145.4 pounds per cubic foot (Brown, 1990). Waste generated during roadway construction is expected to be minimal and was not quantified. Using these factors, it is estimated that 8,573 tons of solid waste would be generated with execution of the proposed action. Demolition contractors would be directed to recycle materials to the maximum extent

possible, thereby reducing the amount of demolition debris disposed of in landfills. Materials not suitable for recycling would be taken to a landfill permitted to handle construction debris wastes.

The same long-term rate of solid waste generation would be expected regardless of whether the USARCENT command HQ building were to be located on the east or west side of the base. Quantities generated would be expected to be the same as described in the Environmental Assessment to Implement the BRAC Recommendations for Shaw AFB (Air Force, 2007a). It is expected that the beddown of HQ USARCENT at Shaw AFB would generate between approximately 1,250 tons/year of additional solid waste (based on 4.6 pounds/person/day × 1,500 additional people) and 3,350 tons/year of additional solid waste (based on 4.6 pounds/person/day x 4,000 additional people; see Section 4.2.1.2, above). Based on personal communication (January 2007) with Chuck Nesbitt of the Sumter County Landfill, the proposed action is not expected to shorten the useful lifespan of the Sumter County landfill, which is reported to have adequate capacity for approximately 20 more years for construction and demolition waste. Domestic waste received at the Sumter County landfill is transferred to two other landfills. The Lee County landfill has 15 more years of capacity and the Richland County landfill has 6 years of capacity remaining (South Carolina Department of Health and Environmental Control, 2007).

Storm Drainage System

The proposed action would not result in significant impacts to the storm drainage system. Implementation of the proposed action would add an additional retention pond of approximately 0.9 acres and increase the impervious surface area at the base of 7.3 acres. This represents an approximate 1.8 percent increase over the current 400 acres of impervious surface area. The storm water collection system in the proposed area of construction has the capacity, and can be modified, to accommodate the anticipated increase in run-off and sediment load. The proposed action would require an updated NPDES permit and revised SWPPP.

Heating and Cooling

The proposed action would not result in significant impacts to heating and cooling systems. Construction as part of the base Infrastructure would consist of a replacement for the North Gate entry control facility. No changes are expected to overall heating and cooling demand as a result of this action. Heating and cooling demands imposed by proposed new USARCENT command headquarters building have been analyzed for environmental impacts in the EA to implement BRAC recommendations for Shaw AFB (Air Force, 2007a). The current proposed action differs from the action analyzed in that EA only in the location of the USARCENT command HQ building. No difference in overall demand for heating and cooling is expected between and east side location and a west side location for the HQ building. New structures on the west side of the base may be served by existing heating and cooling systems and therefore not require heating and cooling systems individual to each new building. The increase in

demand for heating and cooling by the proposed action is expected to be met by using existing capacity, and all necessary permits would be acquired.

Liquid Fuels

The proposed action would not result in significant impacts to liquid fuel resources at Shaw AFB. The proposed action would provide appropriate AT/FP standoff distance from the petroleum, oils, and lubricants (POL) truck parking area located near the north ramp. There would be no change in jet fuel demand as a result of the proposed action. All components of the proposed action involving the storage and distribution of liquid fuels would be conducted in accordance with AFI 23-204.

Communications Systems

The proposed action would not result in significant impacts to communication systems at Shaw AFB. New wiring and some reconfigurations of various communication systems would be conducted in accordance with the needs of the individual projects. It is expected that all communication capacity needs will be met through planning and system improvements.

4.2.2 Alternative 1

Infrastructure impacts under Alternative 1 would be similar to those incurred under the proposed action. Location of USARCENT command HQ building on the west side of Shaw Drive as opposed to the east side is not expected to have any effect on utilities demand or accessibility. Solid waste generated by demolition and construction activities under Alternative 1 would be expected to total to 6,929 tons. Total impervious surface on Shaw AFB would be increased by approximately 5.9 acres (1.5 percent increase from baseline conditions). This increase would not be expected to result in exceedance of stormwater drainage system capacity.

4.2.3 No Action Alternative

Under the No Action alternative, HQ USARCENT would still beddown at Shaw AFB and impacts to infrastructure would occur as described in the EA to implement BRAC recommendations for Shaw AFB (Air Force, 2007a), which is hereby incorporated by reference. Alternative 1 would result in the same likelihood of exceeding sanitary sewer capacity as the proposed action.

4.3 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

In order to assess the potential socioeconomic impacts of the proposed action and the alternatives, demographic and economic characteristics at Shaw AFB and Sumter County were analyzed, as presented in Section 3.3. Potential socioeconomic consequences were assessed in terms of effects of the proposed action on the local economy, typically driven by changes in expenditure levels.

For this environmental assessment, potential socioeconomic impacts are evaluated for factors associated with the construction expenditures for the Base Infrastructure Project and the construction of the USARCENT command HQ building. Potential socioeconomic impacts associated with construction of all proposed USARCENT facilities other than the HQ building and the additional personnel that would be associated with the USARCENT beddown at Shaw AFB have been evaluated in the EA to implement BRAC recommendations for Shaw AFB. Construction activity associated with facility modification, construction, demolition, and road improvements on base generates temporary economic benefits to the region in terms of employment and income, lasting, however, only for the duration of the construction period.

In order to assess potential environmental justice issues associated with the proposed action, minority and low-income populations in the vicinity of Shaw AFB were identified, as presented in Section 3.3. Environmental justice analysis applies to adverse environmental impacts. Potential disproportionate impacts to minority or low-income populations are assessed only when adverse environmental consequences to the human population are anticipated, otherwise no analysis is required. The infrastructure improvements and facility modifications associated with the actions are not expected to create significant adverse environmental or health effects to the human population; consequently no environmental justice concerns are anticipated.

4.3.1 Proposed Action

Implementation of the infrastructure improvements and facility modifications would require the construction of several facilities and road improvements and expansions. The Base Infrastructure Project proposed action includes a total of four project elements to be implemented over the period from FY07 to FY12 with an estimated cost of $8.3 million. These project elements include the relocation of three golf course holes, extending Shaw Drive to Frierson Road, acquisition of approximately 46 acres of land located north of the base, and the relocation of the Frierson Road gate onto the land to be acquired. Execution of these projects would generate a number of jobs during the construction period and contribute to local earnings and induced spending. A second portion of the project includes the construction of the USARCENT command HQ building on the west side of the flightline in the area currently occupied by the Base Exchange, base theater and two bank branches. Construction costs related to beddown of HQ USARCENT at Shaw AFB were evaluated in the EA to implement BRAC recommendations for Shaw AFB. Total costs to construct all operational and support components of HQ USARCENT were estimated to be $132 million. Potential adjustments in the design of the USARCENT command HQ may change the estimated construction costs. However, these changes are not estimated to be large changes and would likely be small adjustments. In addition, location of the USARCENT command HQ building at the proposed action site would require relocation of the Base Exchange, base theater and two bank branches. Additional construction costs would be associated with relocating these facilities, however, these costs have not yet been determined.

Construction-related economic effects from the infrastructure projects and the HQ USARCENT projects would be beneficial to the region, but of minimal consequence given the likelihood that construction workers would come from the existing labor pool in the region. Furthermore, the employment and earnings effects would be temporary, only occurring for the duration of the construction period. No permanent or long-lasting socioeconomic impacts are associated with construction under the proposed action.

In addition to the on-base construction and infrastructure projects, the Air Force is proposing an acquisition of 46 acres of land along the northeast boundary of the base. The acquisition would allow relocation of the installation fenceline such that AT/FP minimum standoff distance could be met for facilities in the north ramp area of the base. The proposed property acquisition would be comprised of all or portions of 15 parcels that are currently privately-owned. The Air Force has not initiated negotiations with the property owners at this time and does not yet have an estimated purchase price. However, based on the total fair market value of the parcels in 2007, the purchase cost of all of the parcels in their entirety could be $950,000. The sale of these parcels would benefit the property owners and those property owners would be likely to spend a portion of the funds received from the sale in the local economy. However, the one-time purchase of the parcels would not be likely to have a lasting socioeconomic impact to the county as a whole.

4.3.2 Alternative 1

The construction expenditures associated with the facility construction and the road improvements would provide an economic benefit to the local community in terms of additional jobs and income. Given the location of the USARCENT command HQ building under Alternative 1, additional construction expenditures may be needed for structure modifications. In addition, locating the USARCENT command HQ building on the west side of the base would require relocation of the Bowling Center, Enlisted Club, Community Center, and Lakeside Pool. Additional construction costs would be associated with relocating these facilities, however, these costs have not yet been determined. The benefit to the local economy caused by proposed construction expenditures would be temporary, lasting only for the term of the construction, and would be of similar magnitude and intensity as the economic benefits generated under the proposed action.

4.3.3 No Action Alternative

With the No Action alternative, infrastructure and road improvements would not occur and the USARCENT command HQ building would be located on the east side of the base, as analyzed in the EA to implement BRAC recommendations for Shaw AFB. No increase in construction spending would take place and no additional economic effects would occur in Sumter County with adoption of the No Action alternative.

4.4 CULTURAL RESOURCES

A number of federal regulations and guidelines have been established for the management of cultural resources. Section 106 of the NHPA, as amended, requires federal agencies to take into account the effects of their undertakings on historic properties. Historic properties are cultural resources that are listed in or eligible for listing in, the NRHP. Eligibility evaluation is the process by which resources are assessed relative to NRHP significance criteria for scientific or historic research, for the general public, and for traditional cultural groups. Under federal law, impacts to cultural resources may be considered adverse if the resources have been determined eligible for listing in the NRHP or have significance for Native American groups.

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may occur by physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; or neglecting the resource to the extent that it deteriorates or is destroyed. Direct impacts are assessed by identifying the types and locations of proposed activity and determining the exact location of cultural resources that could be affected. Indirect impacts result primarily from the effects of project-induced population increases.

Direct impacts related to the proposed action could occur as the result of disturbance to an archeological site through subsurface excavation. A letter was sent to the South Carolina SHPO informing them of the proposed action and No Action alternative on 13 Jun 2008. The Draft EA will be distributed to the SHPO.

4.4.1 Proposed Action

Adverse impacts to historic architectural resources are not expected under the proposed action because no component of the proposed action would disturb the existing architectural features of the single resource on Shaw AFB declared eligible for inclusion in the NRHP, Hangar B611. The entire extent of Shaw AFB has undergone survey for cultural resources. Proposed project locations do not include any areas known to contain cultural resources. The proposed action includes purchase of and construction on approximately 46 acres of land north of the base which has not yet been surveyed for cultural resources. The portion of the land to be acquired that would be built on under the Proposed Action has been disturbed in the past and is unlikely to contain intact cultural resources. Nevertheless, once the property has been acquired, and prior to construction, a cultural resources survey would be conducted to determine conclusively whether or not cultural resources are present. If archaeological resources were to be encountered during any construction, the Air Force would comply with Section 106 of NHPA and the Shaw Air Force Base Cultural Resources Management Plan (2001), including consulting with the SHPO.

No impacts to traditional resources are likely under the proposed action. No traditional resources have been identified at Shaw AFB or in the 46 acres to be purchased under the Proposed Action. There are no federally recognized Indian lands or resources at Shaw AFB, and no issues have been identified by the Catawba Indian Nation, a federally recognized Indian tribe, in South Carolina.

4.4.2 Alternative 1

The proposed location of USARCENT command HQ building under Alternative 1 is not known to contain any cultural resources. If archaeological resources were to be encountered during construction of the USARCENT command HQ building or any other component of Alternative 1, the Air Force would comply with Section 106 of NHPA and the *Shaw Air Force Base Cultural Resources Management Plan (2001)*, including consulting with the SHPO. Therefore, cultural resources would not be affected as defined under Section 106 of the NHPA. All such resources would continue to receive protection as described under Section 3.4.

4.4.3 No Action Alternative

With the No Action alternative, all actions described in the EA to implement BRAC recommendations for Shaw AFB (Air Force, 2007a) would occur. No affects on cultural resources as defined under Section 106 of the NHPA are expected to result from that action. All such resources would continue to receive protection as described under Section 3.4.

4.5 BIOLOGICAL RESOURCES

4.5.1 Proposed Action

The proposed action would not result in significant impacts to biological resources at Shaw AFB. Some trees and other vegetation would be cleared in the approximately 46 acres area to be purchased as part of the proposed action. The area would be cleared to provide clear line-of-sight along new fenceline and a site for the new entry control facility. Trees in this area are mostly oak, hickory, or pine. The area has been previously disturbed during its use as a commercial property and the value to wildlife is expected to be minimal. All other components of the Base Infrastructure Project and the construction of the USARCENT command HQ building projects occur on the west side of the base occur within the highly developed cantonment area, which is highly disturbed and has limited value as habitat. Biological impacts would be limited to removal of some landscape trees and conversion of mowed lawn areas to building sites, golf courses, or roads. New landscaping with trees and shrubs would be incorporated into all proposed action projects.

Individuals of the state threatened species *Sterna antillarum* (least tern) are known to nest on the Shaw AFB Base Exchange (BX), which would be demolished under the proposed action. The least tern nests during mid-April through late July and is not present in the nesting area at other times. If demolition of the BX were to be carried out when least terns were not present, no

direct impacts to the birds would be expected to occur and no take permit would be required from the South Carolina Department of Natural Resources. The least tern is a migratory bird, and is therefore protected by the Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712, as amended), which is enforced by the USFWS. Because least tern nests are typically used during only one nesting season and then abandoned, the destruction of nests while no birds are present would not be expected to constitute violation of the Act (personal communication, Ms. Julie Hovis, 2008). Nearby buildings, such as the commissary, have flat roofs covered with pea gravel that provide suitable nesting sites for least terns. If the BX were to be demolished during nesting season, additional consultation with the USFWS would be required prior to demolition.

Because the proposed action projects would not be located in wetlands, streams, or ponds (see Figure 3-4), no impact to these water bodies would be expected. Overall, impacts would be adverse but not significant.

4.5.2 Alternative 1

Implementation of Alternative 1 would result in no short- and long-term impacts to biological resources including ETSC species, wildlife habitat, and wetlands. Under this alternative, demolition of the Base Exchange would not be required and no impacts to the least tern would be expected. In the short-term, some biological resources may be minimally impacted by effects from on-going demolition and construction, but long-term impacts would be negligible. Overall, impacts would be adverse but not significant.

4.5.3 No Action Alternative

Under the No Action alternative, HQ USARCENT would beddown at Shaw AFB and the USARCENT command HQ building would be sited on the east side of the base. Beddown of the HQ USARCENT, in this manner was found to have no significant impacts to biological resources including ETSC species, wildlife habitat, and wetlands (Air Force, 2007a). In the short-term, some biological resources may be minimally impacted by effects from on-going construction activities, while long-term impacts would be negligible. Overall, impacts would be adverse but not significant.

4.6 WATER RESOURCES

4.6.1 Proposed Action

Execution of the Base Infrastructure Project and construction of the USARCENT command HQ building would occur outside the limits of the 100-year floodplain of the Long Branch or Spann Branch. Prior to the start of construction, silt fences, storm drain inlet and outlet protection, and other appropriate standard construction practices would be instituted in accordance with the Shaw *SWPPP* (Air Force, 2006).

Since more than one acre would be disturbed during execution of the proposed action, a South Carolina Pollutant Discharge Elimination System (SCPDES) Stormwater General Permit would

be required. Under the permit, the construction contractor(s) would obtain the permit and provide a SWPPP that describes standard construction practices to be implemented to eliminate or reduce sediment and nonstorm water discharges. With the implementation of the SWPPP and the standard practices, environmental consequences from erosion and sedimentation would be negligible. There would be no impacts to water resources from point or nonpoint sources with implementation of the proposed action.

There would be an increase in the use of groundwater from the existing Base wells. With the system operating at 54 percent of capacity, there would be available capacity to meet the increased demands associated with all components of the proposed action. No impacts to water resources would be expected as a result of implementation of the proposed action.

4.6.2 Alternative 1

Implementation of Alternative 1 would have the same short- and long-term impacts to water resources as the proposed action. Water usage, stormwater management, and erosion control would be carried out under Alternative 1 in the same manner they would be under the proposed action. As the projects would not occur in floodplains or wetlands, and appropriate sediment containment measures would be taken at project sites, no impacts to floodplains or wetlands would be expected. No impacts to water resources would be expected under Alternative 1.

4.6.3 No Action Alternative

With the No Action alternative, the Base Infrastructure Project would not occur. The HQ USARCENT would still beddown at Shaw, but the USARCENT command HQ building would be located on the east side of the base as described in the 2007 EA for implementation of BRAC Recommendations at Shaw AFB (Air Force, 2007a). No increases in base population would occur beyond what was described in the EA for implementation of BRAC Recommendations at Shaw AFB, for which a FONSI was signed on 24 July 2007. No impacts to water resources would be expected.

4.7 AIR QUALITY

This section discusses the potential impacts to air quality resulting from the proposed action, alternative action and No Action alternative. For the analysis, thresholds were established on an individual pollutant-by-pollutant basis. Sumter County, S.C., will be considered the ROI.

In order to evaluate the air emissions and their impact to the overall ROI, the emissions associated with the project activities were compared to the total emissions on a pollutant-by-pollutant basis for the ROI's 2002 NEI data. Potential impacts to air quality are identified as the total emissions of any pollutant that equals 10 percent or more of the ROI's emissions for that specific pollutant. The 10 percent criteria approach is used in the General Conformity Rule as an indicator for impact analysis for nonattainment and maintenance areas. Although Sumter County is in attainment, the General Conformity Rule's impact analysis

methodology was utilized to provide a consistent approach to evaluating the impact of construction emissions. To provide a more conservative evaluation, the impacts screening in this analysis, used a more restrictive criteria than required in the General Conformity Rule. Rather than comparing emissions from construction activities to regional inventories (as required in the General Conformity Rule), emissions were compared to the individual county (Sumter) potentially impacted, which is a smaller area.

A Department of Defense developed model, the Air Conformity Applicability Model (ACAM), used by the U.S. Air Force for conformity evaluations was utilized to provide a level of consistency with respect to emissions factors and calculations. Air emissions estimated using ACAM were compared to the established 10 percent criteria for Sumter County as represented in the USEPA 2002 NEI (USEPA, 2002). Emissions associated with construction activities are the main issues generated by the proposed action and were the focus of the air analysis. Air quality issues associated with operational activities at Shaw AFB after the completion of construction are not included in this evaluation.

Fugitive dust (PM10), nitrogen oxide (NOx), and carbon monoxide (CO) constitute the majority of the emissions from construction activities and the project overall. A construction operation incorporates grading operations, construction worker trips, stationary equipment (e.g., generators and saws), mobile equipment, nonresidential architectural coatings, and acres paved. CO and PM10 are the primary pollutants of concern, constituting 91 percent of total tons of pollutant emissions. A majority of the CO emissions are associated with stationary equipment (e.g., saws and generators), while the PM10 emissions are primarily associated with grading operations.

4.7.1 Proposed Action

The proposed action consists of the execution of the Base Infrastructure Project and the construction of the USARCENT command HQ building at a location on the west side of the installation. Emissions generated during construction of HQ USARCENT operational and support facilities at Shaw AFB were analyzed as part of the EA for implementation of BRAC recommendations at Shaw AFB (Table 4-1). A FONSI was signed on this EA on 24 July 2007. Under the current proposed action, the location of the USARCENT command HQ building would require demolition of buildings 1405, 1406, 1413, and 1422, which have a combined total size of 76,709 square feet. Additional emissions associated with the demolition of these structures are included as a separate line-item in Table 4-1.

Air emissions associated with the addition of HQ USARCENT personnel at Shaw AFB are shown in Table 4-1 in the column labeled "Beddown of HQ USARCENT." These numbers were taken from the 2007 EA for the implementation of BRAC recommendations at Shaw AFB. Increase in population affects the number of personnel commuting to and from work therefore increasing vehicular emissions. The Base Infrastructure Project would not involve any additional personnel at Shaw AFB and, therefore, would not result in an increase in the number of daily commuters.

Table 4-1. Proposed Action Estimated Construction Air Emissions by Activity

Source Categories		Emissions (tons/year)				
		CO	NO_x	PM_{10}	SO_2	VOC
Beddown of HQ USARCENT - Maximum Annual Emissions FY2009-FY2012 [1]	Acres Paved	0	0	0	0	0.00036
	Grading Operations	0	0	47.338	0	0
	Mobile Equipment	14.235	33.945	2.7375	4.198	3.103
	Nonresidential Arch. Coatings	0	0	0	0	0.11
	Residential Arch. Coatings	0	0	0	0	1.038
	Stationary Equipment	96.543	2.5	0.073	0.128	3.6135
	Workers Trips	11.161	0.639	0.094	0	0.68157
	Total	**121.938**	**37.084**	**50.242**	**4.325**	**8.546**
Demolition of Buildings 1405, 1406, 1413, and 1422 – FY 2009	Mobile Equipment	0.000	0.000	0.883	0.000	0.000
	Total	**0.000**	**0.000**	**0.883**	**0.000**	**0.000**
Execution of the Base Infrastructure Project – FY 2009	Acres Paved	0.000	0.000	0.000	0.000	0.011
	Grading Operations	0.363	1.368	359.292	0.139	0.145
	Mobile Equipment	0.131	0.311	0.025	0.039	0.028
	Nonresidential Arch. Coatings	0.000	0.000	0.000	0.000	0.035
	Residential Arch. Coatings	0.000	0.000	0.000	0.000	0.000
	Stationary Equipment	0.886	0.023	0.001	0.001	0.033
	Workers Trips	0.014	0.001	0.000	0.000	0.001
	Demolition	0.000	0.000	0.009	0.000	0.000
	Total	**1.394**	**1.703**	**359.327**	**0.178**	**0.254**
All Components Combined at Year of Highest Emissions – FY 2009	**Combined Total**	**123.332**	**38.787**	**410.452**	**4.503**	**8.800**

Notes 1. Calculated emissions data taken from the 2007 Environmental Analysis for Implementation of BRAC Recommendations at Shaw AFB.

As indicated in Table 4-2, the individual pollutant emissions from the project will not exceed 10 percent of the total Sumter County emissions for any of the criteria pollutants. The highest pollutant percentage is for PM10 which is approximately 1.37 percent of Sumter County total emissions based on the USEPA 2002 NEI. The increase in PM10 is primarily due to grading activities. This slight decrease in local air quality will be temporary. In calculating emissions, certain assumptions were made regarding various variables associated with construction activities. Details regarding the assumptions and calculations associated with the emissions estimates are located in Appendix B. Impacts to air quality under the proposed action would be adverse, but not significant.

Table 4-2. Percentage of Proposed Action Emissions Compared to Sumter County

Emission Activities	CO	NO_x	PM_{10}	SO_2	VOC
Construction Emissions	123.332	38.787	410.452	4.503	8.800
Point Source[1]	0.007	0.008	0.001	0.000	0.000
Mobile Source[2]	0.014	0.001	0.000	0.000	0.001
Total	**123.352**	**38.796**	**410.453**	**4.503**	**8.801**
Sumter County Emissions	33,885.88	4,275.45	30,029.74	883.64	7,219.21
Percentage of County Emissions	***0.36%***	***0.91%***	***1.37%***	***0.51%***	***0.12%***

[1] Point Source – includes facility heating, miscellaneous point sources, and residential space heating.

[2] Mobile Source - includes base employee commute, on-road government owned vehicles, and off-road base support vehicles.

4.7.2 Alternative 1

Alternative 1 would differ from the proposed action only in the location of the USARCENT command HQ building. The Alternative 1 location of the building would require demolition of Buildings 1401, 1402, 1408, 1411, 1409, with a combined total size of 55,474 square feet. Impacts to Air Quality under Alternative 1 would be exactly the same as those reported for the proposed action except that PM10 emissions generated during demolition of structures to prepare the HQ command HQ building site would be slightly lower. Under the proposed action PM10 emissions would total 410.201 tons while under Alternative 1, PM10 emissions would total 410.452 tons. Impacts to air quality under Alternative 1 would be adverse, but not significant.

4.7.3 No Action Alternative

With the No Action alternative, HQ USARCENT would beddown at Shaw AFB, as described in the 2007 EA for the implementation of BRAC recommendations, but the Base Infrastructure Project would not occur. Impacts to Air Quality under the No Action alternative would be as stated in Table 4-1 in the rows designated "Beddown of HQ USARCENT." Impacts to air quality under the No Action alternative would be adverse, but not significant.

4.8 HAZARDOUS MATERIALS AND HAZARDOUS WASTE

4.8.1 Proposed Action

Construction and demolition accomplished as part of the proposed action may require the use of hazardous materials by contractor personnel. In accordance with the base's HMMP, copies of Material Safety Data Sheets must be provided to the base and maintained on the construction site. The base would maintain any hazardous materials used by base personnel in the operation of the complex and no adverse environmental consequences are anticipated. Project contractors would comply with federal, state, and local environmental laws and would employ affirmative procurement practices when economically and technically feasible.

Contractor personnel may generate hazardous waste, such as paints, adhesives, and batteries, during construction of the USARCENT command HQ building or execution of the Base Infrastructure Project. Storage and disposal of these wastes would be the responsibility of the site contractor and the base's hazardous waste program. Any hazardous waste generated by facilities covered by this EA during everyday or special event operations will be handled by Shaw AFB Hazardous Waste Managers in accordance with the Shaw AFB Hazardous Waste Management Plan. No adverse environmental consequences are expected.

None of the components of the proposed action directly overlie ERP sites and no impacts related to ERP sites are expected. Coordination with the 20 CES Asset Management Flight would be carried out prior to any site preparation or construction to ensure that any necessary waivers, manifests, approvals and/or permits are in place.

Visual site inspections of the 46 acres of privately-owned land to be acquired under the proposed action revealed the presence of construction debris and unknown solid waste fill on one of the parcels to be acquired. Road construction would avoid disturbing this pile of debris and solid waste.

4.8.2 Alternative 1

Impacts to hazardous waste safety under Alternative 1 would be the same as under the proposed action. The Alternative 1 location for the USARCENT does not overlie any ERP sites. No significant impacts involving hazardous materials and hazardous waste would be expected to occur under Alternative 1 .

4.8.3 No Action Alternative

Under the No Action alternative, the Base Infrastructure Project would not be carried out. HQ USARCENT would be beddown at Shaw in the manner described in the EA to implement BRAC recommendations for Shaw AFB (Air Force, 2007a). A FONSI was signed on that EA on 24 July 2007.

4.9 SAFETY

4.9.1 Proposed Action

Short-term safety risks are associated with any demolition and construction activity, including those activities proposed as part of this action. However, adherence to standard safety practices would minimize any potential risks. None of the proposed structures penetrate the airfield imaginary surfaces and none are located within designated CZ/APZ's or explosive quantity-distance arcs. The proposed action would improve ground safety in that acquisition of the property within the CZ would guarantee compatible land use in that area. Acquisition of remainder of the CZ land would be in accordance with safety-related recommendations found in AFI 32-7063. The land acquisition would also improve force protection by providing

increased standoff distance between the installation fenceline and facilities that could potentially be targets for terrorists. Notably, the POL truck parking area located north of the hush houses is approximately 50 feet from the installation fenceline. After acquisition, the distance between the POL truck parking area and the installation fenceline would exceed 300 feet and would be in accordance with the minimum AT/FP standoff distance, as stated in UFC 4-010-01.

Bird aircraft strike hazard (BASH) at Shaw AFB would increase slightly with the construction of a 0.9 acre retention pond immediately west of the re-aligned Shaw Drive. Use of pyrotechnics, depredation, catch-and-release, and other standard bird-exclusion techniques have been successful at reducing BASH at Shaw AFB in the past. The base currently contains approximately 20 acres of pond, in total. It is expected that application of these same procedures at the proposed new retention pond would negate any associated increase in bird-strike hazard. Overall, impacts to safety under the proposed action would be positive and not significant.

4.9.2 Alternative 1

Safety impacts under Alternative 1 would be the same as under the proposed action. With the exception of minimal short-term risks associated with construction and demolition, and minimal increase in BASH associated with construction of a stormwater retention pond, impacts would be positive. All impacts would be not significant.

4.9.3 No Action Alternative

Under the No Action alternative, the Base Infrastructure Project would not be carried out. HQ USARCENT would be beddown as described in the EA to Implement BRAC Recommendations for Shaw AFB (Air Force, 2007a) for which a FONSI was signed for on 24 July 2007. Compatible land use in the CZ would not be guaranteed and AT/FP concerns related to facilities in the north ramp area would not be addressed. No impacts to safety would be expected as the level of safety at Shaw AFB would not change from baseline conditions.

4.10 NOISE

4.10.1 Proposed Action

Implementation of the proposed action would result in minor, temporary increases in localized noise levels in the vicinity of the project areas during development. The base is an active military facility that typically experiences high noise levels from daily flight operations. Use of construction and demolition equipment for site preparation and development (i.e., demolition, grading, fill, and construction) would generate noise. The noise would be typical of construction and demolition noise, which is not uncommon at Shaw AFB, and would be expected to be limited to normal working hours (i.e., between 7:00 AM and 5:00 PM). Construction and demolition noise could be reduced by the use of equipment sound mufflers.

Table 4-3 shows sound levels associated with typical heavy construction equipment under varying modes of operation.

Table 4-3. Typical Equipment Sound Levels

Equipment	Sound Level (in dB) Under Indicated Operational Mode [1]		
	Idle Power	Full Power	Moving Under Load
Forklift	63	69	91
Backhoe	62	71	77
Dozer	63	74	81
Front-End Loader	60	62	68
Dump Truck	70	71	74

Note: 1. Measured at 125 feet
Source Air Force, 2007a

Compared with aircraft noise, noise produced by construction and demolition would be relatively low in magnitude. The noise disruptions would be temporary and limited to daytime hours; therefore, impacts are considered not significant.

All of the facilities proposed to be constructed would be located in areas subject to noise from aircraft operations. Using the NOISEMAP modeling program, DoD produces contours showing noise levels generated by current aircraft operations. Current Shaw AFB noise contours are shown in Figure 3-5. Table 4-4 lists noise levels, land use category, and recommendation for noise attenuation for each proposed facility. Land use categories and noise attenuation recommendations are as per Air Force Handbook 32-7084, *The AICUZ Program Manager's Guide*. Noise impacts resulting from siting the proposed facilities in high noise areas would be adverse, but not significant.

4.10.2 Alternative 1

Under Alternative 1, the same construction projects that would occur under the proposed action would still occur. However, the USARCENT command HQ building would be constructed on the west side of Shaw Drive instead of on the east side. Construction noise impacts would be minimal in nature and of temporary duration. The noise level at the Alternative 1 site is between 70 and 80 dB DNL. Special noise attenuation measures are recommended for administrative facilities in these noise zones (Air Force, 1999). Noise impacts would be adverse, but not significant.

Table 4-4. Noise Levels, Land Use Category, and Noise Attenuation Recommendation for Proposed Facilities

Proposed Facility	*Noise Zone (dB DNL)*	*Land Use Category*	*Noise Attenuation Recommended*
USARCENT command HQ building	75-85	Professional Services	Yes
Replacement North Gate Entry Control Facility	> 85	Governmental Services	Yes
Replacement Golf Course Holes	65-75	Recreational Activities	No*
Realigned Shaw Drive	75-80	Highway and Street Right-of-way	No
Realigned Rhodes Ave	65-70	Highway and Street Right-of-way	No

* Attenuation of outdoor activities is not possible when noise source is overhead
Source: Air Force, 1999

4.10.3 No Action Alternative

Under the No Action alternative, the Base Infrastructure Project would not occur. The USARCENT command HQ building would be located on the east side of Shaw AFB. Noise impacts of this action were analyzed as part of the EA to implement BRAC recommendations for Shaw AFB and found to not be significant. The area in which the USARCENT command HQ building would be constructed under this alternative is exposed to noise levels between <65 and 80 dB DNL. Depending on the exact location of the USARCENT command HQ building, special noise attenuation may be required. Noise impacts would be adverse, but not significant.

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5.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.1 CUMULATIVE EFFECTS

This section provides (1) a definition of cumulative effects, (2) a description of past, present, and reasonably foreseeable actions relevant to cumulative effects, (3) an assessment of the nature of interaction of the proposed action, one alternative, and the No Action alternative with other actions, and (4) an evaluation of cumulative effects potentially resulting from these interactions.

5.1.1 Definition of Cumulative Effects

CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR Part 1508.7). Recent CEQ guidance in *Considering Cumulative Effects* affirms this requirement, stating that the first steps in assessing cumulative effects involve defining the scope of the other actions and their interrelationship with the proposed action and alternatives. The scope must consider geographic and temporal overlaps and must also evaluate the nature of interactions among these actions.

Cumulative effects are most likely to arise when a relationship or synergism exists between a proposed action and alternatives and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in close proximity to the proposed action would be expected to have more potential for a relationship than actions that may be geographically separated. Similarly, actions that coincide, even partially, in time would tend to offer a higher potential for cumulative effects.

To identify cumulative effects, this EA analysis addresses three questions:

1. Does a relationship exist such that elements of the proposed action might interact with elements of past, present, or reasonably foreseeable actions?

2. If one or more of the elements of the proposed action and another action could be expected to interact, would the proposed action affect or be affected by impacts of the other action?

3. If such a relationship exists, does an assessment reveal any potentially significant impacts not identified when the proposed action is considered alone?

In this EA, an effort has been made to identify all actions that are being considered and that are in the planning phase at this time. To the extent that details regarding such actions exist and

the actions have a potential to interact with the proposed action in this EA, these actions are included in this cumulative analysis. This approach enables decision makers to have the most current information available so that they can evaluate the environmental consequences of the proposed action.

5.1.2 Past, Present, and Reasonably Foreseeable Actions

This EA applies a stepped approach to provide decision makers with not only the cumulative effects of the proposed action and alternatives but also the incremental contribution of past, present, and reasonably foreseeable actions.

Past Actions Relevant to the Proposed Action and Alternatives

Shaw AFB is an active military installation that undergoes continuous change in mission and in training requirements. This process of change is consistent with the United States defense requirement to be constantly ready to respond to changing threats to American interests throughout the world.

In 2002, Shaw AFB was home to four squadrons of F-16 Block 50 aircraft—three 18 Primary Mission Aircraft Inventory (PMAI) squadrons and one 24 PMAI squadron. In FY03 the Air Force deactivated one of the 18 aircraft squadrons and added 12 newer F-16 Block 50 aircraft to the 20th FW. Each of the three squadrons now has 24 PMAI Block 50 F-16 aircraft. Base personnel numbered 5,663 after this force structure change.

The base has completed construction of a new building to house the 28th Operational Weather Squadron and a new Dining Facility. EAs for the force structure change and this construction were completed and FONSIs were issued. Shaw AFB constructed an extension to their wastewater discharge pipe to the Wateree River. This action required a pumping station and approximately five miles of additional pipeline.

In FY03, a temporary training mission was established at Shaw AFB. To support the mission, approximately 8,400 square feet of trailer space and 5,000 square feet of maintenance area, along with 22 personnel were added to the base. This construction activity was environmentally assessed in 2002. Three Aircraft Maintenance Units (AMUs) were completed by 2005 to provide space for administration, supervision, and training of personnel and storage of tools and supplies to support day-to-day flightline maintenance of fighter aircraft. The new AMUs totaled 36,000 square feet and expenditures were estimated at $6.8 million. This project included the demolition of five facilities totaling 41,000 square feet. This construction activity was environmentally assessed in 2002.

In 2007, Shaw AFB completed construction of a new library and deployment center. Improvements to the installation fenceline have also been recently completed. The improvements to the fenceline were analyzed and found to have no significant environmental impacts in 2005.

Present Actions Relevant to the Proposed Action and Alternatives

The base, like any other major institution, also requires occasional new construction, facility improvements, and infrastructure upgrades.

Shaw AFB is in the process of privatizing on-base MFH. This process involves conveying 1,702 housing units to a private contractor. The contractor is conducting renovation, demolition, and construction, over a seven-year period, resulting in a total of 1,447 military housing units. The demolition/construction is being conducted in phases in order to keep as many units as possible filled during the project. An Environmental Baseline Survey (EBS) and an EA were completed in 2005 and a FONSI signed in June 2005.

Several projects were analyzed for impacts as part of the Wing Infrastructure Development Outlook environmental analysis. The seventeen projects analyzed as part of this EA were related to providing new or improved operational facilities, enhancing force protection, or improving the quality of life of base personnel. A FONSI was signed in July 2005 and the projects have been being completed, according to priority and the availability of funds, since that time.

Reasonably Foreseeable Actions that Interact with the Proposed Action and Alternatives

This category of actions includes Air Force actions that have a potential to coincide, either partially in time or geographic extent, with the proposed action. Information on these actions is included to determine whether these actions would, if implemented, incrementally affect environmental resources. These recently proposed actions include:

- Several beddown and realignment actions will take place at Shaw AFB in accordance with the BRAC commission recommendations that became law on November 9, 2005. Actions include establishment of an ALQ-184 Pod Centralized Intermediate Repair Facility, relocation of TF-34 engine intermediate repair facilities to another base, and beddown of HQ USARCENT at Shaw AFB. The environmental analysis for this action considered locating the command HQ building on the east side of Shaw AFB. A FONSI was signed for this EA on 24 July, 2007.
- Shaw AFB was chosen as the site for the establishment of a permanent air sovereignty alert mission. The alert mission is made up of 20th FW aircraft, which are temporarily parked in the North Ramp area while carrying out the alert mission. The mission and aircraft will be moving to a permanent location on the South Ramp Area. No additional buildings will be constructed. Q-D arcs will change from their present alignment as a result of this action. However, the new Q-D arcs would still not affect any of the components of either the proposed action or alternatives. The action was categorically excluded.

- Shaw AFB is also being considered as a potential location for the beddown of the F-35 Lightning II Joint Strike Fighter. Environmental analysis for that action has not yet begun.

5.1.3 Analysis of Cumulative Effects

The following analysis examines how the impacts of the actions presented above might be affected by those resulting from the proposed action, Alternative 1, and No Action alternative at Shaw AFB, and whether such a relationship would result in potentially significant impacts not identified when the proposed action or alternatives are considered individually.

With the No Action alternative, the Base Infrastructure Project would not take place. Actions described in the 2007 BRAC EA would take place, including construction of the USARCENT HQ building on the east side of the base. The BRAC EA analyzed an increase of 1,518 personnel and 15 construction projects at Shaw AFB. The current EA analyzes construction of the same USARCENT command HQ building as was analyzed under the BRAC EA. The current proposed action and alternative differ from the actions analyzed in the BRAC EA in that the USARCENT HQ building would be built on the west side of the base rather than the east side.

No specific projects have been identified that would produce incremental impacts when added to other past, present, or reasonably feasible future actions. Shaw AFB is an active military installation that undergoes changes in mission and in training requirements in response to defense policies, current threats, and tactical and technological advances. The base population experiences periods of decline and growth with changing missions and the current base population is somewhat larger now than in the past. The base, like any other major institution (e.g., university, industrial complex), requires new construction, facility improvements, infrastructure upgrades, and maintenance and repairs. All of these factors (i.e., mission changes, facility improvements, and tenant use) will continue to occur before, during, and after the proposed action if it is selected.

The base actions described in section 5.1.2 affect specific areas on base and, for the most part, the scope of the actions is focused within those specific areas. None of these on-base actions would be expected to result in more than negligible impacts individually or cumulatively.

The cumulative effects of the proposed execution of the Base Infrastructure Project and the construction of the USARCENT command HQ building on the west side of the base would remain below the threshold of significance for all resource areas.

5.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA requires that environmental analysis include identification of "...any irreversible and irretrievable commitments of resources, which would be involved in the proposed action should it be implemented." Irreversible and irretrievable resource commitments are related to

the use of nonrenewable resource and the effects that the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

For the proposed action and action alternative, most resource commitments are neither irreversible nor irretrievable. Those limited resources that may involve a possible irreversible or irretrievable commitment under the proposed action and action alternative are discussed below.

Training operations at Shaw AFB associated with Shaw's mission and the proposed facilities construction would continue and involve consumption of nonrenewable resources, such as gasoline and diesel used in vehicles. None of these activities would be expected to significantly decrease the availability of minerals or petroleum resources.

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APPENDIX A:
COORDINATION

INTERGOVERNMENTAL AND INTERAGENCY COORDINATION FOR ENVIRONMENTAL PLANNING (IICEP)

DEPARTMENT OF THE AIR FORCE
20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

13 JUN 2008

Commander
20th Civil Engineer Squadron
428 Chapin Street
Shaw AFB, SC 29152

Chief Donald Wayne Rodgers
Catawba Indian Tribe
996 Avenue of the Nations
Rock Hill, SC 29730

Subject: Shaw Air Force Base Infrastructure Project Environmental Assessment

Dear Chief Rodgers

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Shaw AFB, SC to assess the potential environmental consequences associated with the implementation of the Base Infrastructure Project. The EA will also evaluate alternate sites for U.S. Army Central Command (ARCENT) facilities which may become available for re-use as a result of the changes in the base's infrastructure configuration.

The Base Infrastructure Project consists of several elements to include relocation of three golf course holes, construction of 10,500 feet of new roads, a signalized intersection, relocation of primary electric utilities, storm drainage systems, street lighting and fencing. The project also includes the construction of a new entry control gate on Frierson Road. In order to accommodate the new Frierson Road gate and to establish a secure zone around critical base facilities, approximately 46 acres of new property will be acquired along the northeast side of the base. This EA also addresses the relocation of the Main Gate house approximately 1,000 feet further into the base from State Highway 76/378 and the construction of an additional roadway lane within the base to improve traffic flows. These projects would have a potential value of $8.9 million in addition to the approximately $100 million for the U.S. ARCENT facilities.

We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by July 14, 2008. Please contact the EA Project Manager, Mr. Sam Johnson, at (803) 895-9999 or via e-mail at samuel.johnson@shaw.af.mil with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

Sincerely

JACQUELINE CRUM, Lt Col, USAF

Global Power For America

DEPARTMENT OF THE AIR FORCE
20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

1 3 JUN 20

Commander
20th Civil Engineer Squadron
428 Chapin Street
Shaw AFB, SC 29152

Ms. Vivian Fleming-McGhaney
Sumter City Council
13 East Canal Street
Sumter, SC 29150

Subject: Shaw Air Force Base Infrastructure Project Environmental Assessment

Dear Ms. Fleming-McGhaney

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Shaw AFB, SC to assess the potential environmental consequences associated with the implementation of the Base Infrastructure Project. The EA will also evaluate alternate sites for U.S. Army Central Command (ARCENT) facilities which may become available for re-use as a result of the changes in the base's infrastructure configuration.

The Base Infrastructure Project consists of several elements to include relocation of three golf course holes, construction of 10,500 feet of new roads, a signalized intersection, relocation of primary electric utilities, storm drainage systems, street lighting and fencing. The project also includes the construction of a new entry control gate on Frierson Road. In order to accommodate the new Frierson Road gate and to establish a secure zone around critical base facilities, approximately 46 acres of new property will be acquired along the northeast side of the base. This EA also addresses the relocation of the Main Gate house approximately 1,000 feet further into the base from State Highway 76/378 and the construction of an additional roadway lane within the base to improve traffic flows. These projects would have a potential value of S8.9 million in addition to the approximately S100 million for the U.S. ARCENT facilities.

We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by July 14, 2008. Please contact the EA Project Manager, Mr. Sam Johnson, at (803) 895-9999 or via e-mail at samuel.johnson@shaw.af.mil with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

Sincerely

JACQUELINE CRUM, Lt Col, USAF

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DEPARTMENT OF THE AIR FORCE
20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

1 3 JUN 200

Commander
20th Civil Engineer Squadron
428 Chapin Street
Shaw AFB, SC 29152

Honorable Joseph T. McElveen, Mayor
City of Sumter
P.O. Box 1449
Sumter, SC 29251

Subject: Shaw Air Force Base Infrastructure Project Environmental Assessment

Dear Mayor McElveen

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Shaw AFB, SC to assess the potential environmental consequences associated with the implementation of the Base Infrastructure Project. The EA will also evaluate alternate sites for U.S. Army Central Command (ARCENT) facilities which may become available for re-use as a result of the changes in the base's infrastructure configuration.

The Base Infrastructure Project consists of several elements to include relocation of three golf course holes, construction of 10,500 feet of new roads, a signalized intersection, relocation of primary electric utilities, storm drainage systems, street lighting and fencing. The project also includes the construction of a new entry control gate on Frierson Road. In order to accommodate the new Frierson Road gate and to establish a secure zone around critical base facilities, approximately 46 acres of new property will be acquired along the northeast side of the base. This EA also addresses the relocation of the Main Gate house approximately 1,000 feet further into the base from State Highway 76/378 and the construction of an additional roadway lane within the base to improve traffic flows. These projects would have a potential value of $8.9 million in addition to the approximately $100 million for the U.S. ARCENT facilities.

We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by July 14, 2008. Please contact the EA Project Manager, Mr. Sam Johnson, at (803) 895-9999 or via e-mail at samuel.johnson@shaw.af.mil with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

Sincerely

JACQUELINE CRUM, Lt Col, USAF

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20th FIGHTER WING (ACC)
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Commander
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428 Chapin Street
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Mr. Phil Degarmo
U.S. Fish and Wildlife Service Ecological Field Office
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558

Subject: Shaw Air Force Base Infrastructure Project Environmental Assessment

Dear Mr. Degarmo

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Shaw AFB, SC to assess the potential environmental consequences associated with the implementation of the Base Infrastructure Project. The EA will also evaluate alternate sites for U.S. Army Central Command (ARCENT) facilities which may become available for re-use as a result of the changes in the base's infrastructure configuration.

The Base Infrastructure Project consists of several elements to include relocation of three golf course holes, construction of 10,500 feet of new roads, a signalized intersection, relocation of primary electric utilities, storm drainage systems, street lighting and fencing. The project also includes the construction of a new entry control gate on Frierson Road. In order to accommodate the new Frierson Road gate and to establish a secure zone around critical base facilities, approximately 46 acres of new property will be acquired along the northeast side of the base. This EA also addresses the relocation of the Main Gate house approximately 1,000 feet further into the base from State Highway 76/378 and the construction of an additional roadway lane within the base to improve traffic flows. These projects would have a potential value of $8.9 million in addition to the approximately $100 million for the U.S. ARCENT facilities.

In association with the analysis and in compliance with the Endangered Species Act, we are requesting information regarding federally listed threatened, endangered, candidate, and proposed to be listed species that occur on Shaw AFB. Please provide your response or any specific concerns by July 14, 2008 to the EA Project Manager, Mr. Sam Johnson, at (803) 895-9999 or via e-mail at samuel.johnson@shaw.af.mil. Thank you for your assistance in this matter.

Sincerely

JACQUELINE CRUM, Lt Col, USAF

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Commander
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428 Chapin Street
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Jean Manhiemer, South Carolina State Clearinghouse
Office of State Budget
1201 Main Street, Suite 950
Columbia, SC 29201

Subject: Shaw Air Force Base Infrastructure Project Environmental Assessment

Dear Ms. Manhiemer

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Shaw AFB, SC to assess the potential environmental consequences associated with the implementation of the Base Infrastructure Project. The EA will also evaluate alternate sites for U.S. Army Central Command (ARCENT) facilities which may become available for re-use as a result of the changes in the base's infrastructure configuration.

The Base Infrastructure Project consists of several elements to include relocation of three golf course holes, construction of 10,500 feet of new roads, a signalized intersection, relocation of primary electric utilities, storm drainage systems, street lighting and fencing. The project also includes the construction of a new entry control gate on Frierson Road. In order to accommodate the new Frierson Road gate and to establish a secure zone around critical base facilities, approximately 46 acres of new property will be acquired along the northeast side of the base. This EA also addresses the relocation of the Main Gate house approximately 1,000 feet further into the base from State Highway 76/378 and the construction of an additional roadway lane within the base to improve traffic flows. These projects would have a potential value of $8.9 million in addition to the approximately $100 million for the U.S. ARCENT facilities.

We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by July 14, 2008. Please contact the EA Project Manager, Mr. Sam Johnson, at (803) 895-9999 or via e-mail at samuel.johnson@shaw.af.mil with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

Sincerely

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Valerie Marcil, Staff Archaeologist
South Carolina State Historic Preservation Office
8301 Parklane Road
Columbia, SC 29223-4905

Subject: Shaw Air Force Base Infrastructure Project Environmental Assessment

Dear Ms. Marcil

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Shaw AFB, SC to assess the potential environmental consequences associated with the implementation of the Base Infrastructure Project. The EA will also evaluate alternate sites for U.S. Army Central Command (ARCENT) facilities which may become available for reuse as a result of the changes in the base's infrastructure configuration.

The Base Infrastructure Project consists of several elements to include relocation of three golf course holes, construction of 10,500 feet of new roads, a signalized intersection, relocation of primary electric utilities, storm drainage systems, street lighting and fencing. The project also includes the construction of a new entry control gate on Frierson Road. In order to accommodate the new Frierson Road gate and to establish a secure zone around critical base facilities, approximately 46 acres of new property will be acquired along the northeast side of the base. This EA also addresses the relocation of the Main Gate house approximately 1,000 feet further into the base from State Highway 76/378 and the construction of an additional roadway lane within the base to improve traffic flows. These projects would have a potential value of $8.9 million in addition to the approximately $100 million for the U.S. ARCENT facilities.

We are beginning the process of identifying applicable cultural resource information for areas within Shaw AFB. We would appreciate and assistance you could provide in identifying and retrieving this important information, as well as concerns you may have about the potential effects of the proposal on significant cultural resources. If you have any specific items of interest about the proposal, we would like to hear from you by July 14, 2008. Please contact the EA Project Manager, Mr. Sam Johnson, at (803) 895-9999 or via e-mail at samuel.johnson@shaw.af.mil with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

Sincerely

JACQUELINE CRUM, Lt Col, USAF

Global Power For America

DEPARTMENT OF THE AIR FORCE
20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

13 JUN 2008

Commander
20th Civil Engineer Squadron
428 Chapin Street
Shaw AFB, SC 29152

Ms. Julie Holling
South Carolina Department of Natural Resources
P.O. Box 167, Rembert C. Dennis Building
Columbia, SC 29201

Subject: Shaw Air Force Base Infrastructure Project Environmental Assessment

Dear Ms. Holling

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Shaw AFB, SC to assess the potential environmental consequences associated with the implementation of the Base Infrastructure Project. The EA will also evaluate alternate sites for U.S. Army Central Command (ARCENT) facilities which may become available for re-use as a result of the changes in the base's infrastructure configuration.

The Base Infrastructure Project consists of several elements to include relocation of three golf course holes, construction of 10,500 feet of new roads, a signalized intersection, relocation of primary electric utilities, storm drainage systems, street lighting and fencing. The project also includes the construction of a new entry control gate on Frierson Road. In order to accommodate the new Frierson Road gate and to establish a secure zone around critical base facilities, approximately 46 acres of new property will be acquired along the northeast side of the base. This EA also addresses the relocation of the Main Gate house approximately 1,000 feet further into the base from State Highway 76/378 and the construction of an additional roadway lane within the base to improve traffic flows. These projects would have a potential value of $8.9 million in addition to the approximately $100 million for the U.S. ARCENT facilities.

In association with the analysis and in compliance with the Endangered Species Act, we are requesting information regarding federally listed threatened, endangered, candidate, and proposed to be listed species that occur on Shaw AFB. Please provide your response or any specific concerns by July 14, 2008 to the EA Project Manager, Mr. Sam Johnson, at (803) 895-9999, or via email at samuel.johnson@shaw.af.mil. Thank you for your assistance in this matter.

Sincerely

JACQUELINE CRUM, Lt Col, USAF

Global Power For America

DEPARTMENT OF THE AIR FORCE
20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE, SOUTH CAROLINA

13 JUN 2008

Commander
20th Civil Engineer Squadron
428 Chapin Street
Shaw AFB, SC 29152

South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Subject: Shaw Air Force Base Infrastructure Project Environmental Assessment

The United States Air Force is in the process of preparing an Environmental Assessment (EA) at Shaw AFB, SC to assess the potential environmental consequences associated with the implementation of the Base Infrastructure Project. The EA will also evaluate alternate sites for U.S. Army Central Command (ARCENT) facilities which may become available for re-use as a result of the changes in the base's infrastructure configuration.

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We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by July 14, 2008. Please contact the EA Project Manager, Mr. Sam Johnson, at (803) 895-9999 or via e-mail at samuel.johnson@shaw.af.mil with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

Sincerely

JACQUELINE CRUM, Lt Col, USAF

Global Power For America

RESPONSES TO IICEP LETTERS

6/26 CEA
— CEP
In order.

STATE OF SOUTH CAROLINA

State Budget and Control Board

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LES BOLES
DIRECTOR

June 18, 2008

Jacqueline Crum, Lt. Col
Department of the Air Force
Commander
20th Civil Engineer Squadron
428 Chapin Street
Shaw AFB, SC 29152

Project Name: **Shaw Air Force Base Infrastructure Project Environmental Assessment**

CFDA #: **66.606**

State Application Identifier: **SC080602-636**

Dear Lt. Col:

The South Carolina State Clearinghouse does not require an intergovernmental review on all CFDA numbers. The CFDA number submitted does not require intergovernmental review from this office. A listing of the State Clearinghouse CFDA numbers requiring review are available on our website **www.budget.sc.gov**. You may proceed with the submission of this project to the authorized federal funding agency.

South Carolina state agencies are reminded that if additional budget authorization is needed for this project, one copy of the completed GCR-1 form and one copy of the award documentation must be submitted to this office. This action should be initiated immediately, if required. Please include the State Application Identifier in any correspondence with our office regarding this project. If you have any questions please contact Bonny Anderson at 734-0435.

Sincerely,

Jean Ricard

Jean Ricard
Fiscal Manager, Grant Services

RARE, THREATENED, AND ENDANGERED SPECIES OF SUMTER COUNTY

STATUS	GRANK	SRANK	SCIENTIFIC NAME	COMMON NAME
ANIMALS:				
SC	G5T5	S5	ACRIS CREPITANS CREPITANS	NORTHERN CRICKET FROG
SE	G3G4	S2?	CORYNORHINUS RAFINESQUII	RAFINESQUE'S BIG-EARED BAT
FT/SE	G4	S2	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE
SC	G5	S4	ICTINIA MISSISSIPPIENSIS	MISSISSIPPI KITE
SC	G5	S2	MICRURUS FULVIUS	EASTERN CORAL SNAKE
FE/SE	G3	S2	PICOIDES BOREALIS	RED-COCKADED WOODPECKER
ST	G4	S3	STERNA ANTILLARUM	LEAST TERN
SC	G5	S3?	URSUS AMERICANUS	BLACK BEAR
PLANTS:				
SC	G4?	S?	ARISTIDA CONDENSATA	PIEDMONT THREE-AWNED GRASS
SC	G3	S?	CAREX DECOMPOSITA	CYPRESS-KNEE SEDGE
RC	G4	S1	CARYA MYRISTICIFORMIS	NUTMEG HICKORY
SC	G5	S?	CHAMAEDAPHNE CALYCULATA	LEATHERLEAF
SC	G4?	S?	CYPERUS LECONTEI	LECONTE FLATSEDGE
SC	G3Q	S2	ECHINODORUS PARVULUS	DWARF BURHEAD
SC	G5?	S?	ECHINODORUS TENELLUS	DWARF BURHEAD
SC	G4G5	S?	ELEOCHARIS ROBBINSII	ROBBINS SPIKERUSH
SC	G3G4Q	SR	EUPATORIUM RECURVANS	COASTAL-PLAIN THOROUGH-WORT
SC	G2G3	S?	LOBELIA BOYKINII	BOYKIN'S LOBELIA
SC	G4	S2	NESTRONIA UMBELLULA	NESTRONIA
FE	G2	S1	OXYPOLIS CANBYI	CANBY'S DROPWORT
SC	G3	S?	PLANTAGO SPARSIFLORA	PINELAND PLANTAIN
SC	G3	S2	RHEXIA ARISTOSA	AWNED MEADOWBEAUTY
SC	G4G5	SR	RHEXIA CUBENSIS	WEST INDIAN MEADOW-BEAUTY
SC	G4	SR	RHYNCHOSPORA SCIRPOIDES	LONG-BEAKED BALDRUSH
SC	G5T3T4	S?	RUELLIA CAROLINIENSIS SSP CILIOSA	A PETUNIA
SC	G4?	S2	SAGITTARIA ISOETIFORMIS	SLENDER ARROW-HEAD
FE	G2	S2	SCHWALBEA AMERICANA	CHAFFSEED
SC	G4	S1S2	SCLERIA BALDWINII	BALDWIN NUTRUSH

APPENDIX B:
AIR QUALITY

This appendix presents an overview of the Clean Air Act (CAA) and the State of South Carolina air quality program. The appendix also discusses emission factor development and calculations including assumptions employed in the air quality analyses.

- **Air Quality Program Overview**

- *National Ambient Air Quality Standards:*

- In order to protect public health and welfare, the USEPA has developed numerical concentration-based standards or National Ambient Air Quality Standards (NAAQS) for six "criteria" pollutants (based on health-related criteria) under the provisions of the CAA Amendments of 1970. There are two kinds of NAAQSs: Primary and Secondary standards. Primary standards prescribe the maximum permissible concentration in the ambient air to protect public health including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards prescribe the maximum concentration or level of air quality required to protect public welfare including protection against decreased visibility, damage to animals, crops, vegetation, and buildings *(40 CFR Part 51).*

- The CAA gives states the authority to establish air quality rules and regulations. These rules and regulations must be equivalent to, or more stringent than, the Federal program. The Bureau of Air Quality (BAQ) within the South Carolina Department of Health and Environmental Control (SCDHEC) administers the state's air pollution control program under authority of the Air Pollution Control Regulations and Standards and the Environmental Protection Act (EPA).

- South Carolina has adopted the NAAQS except changes have not been made to reflect the recent standards promulgated for particulate matter. The USEPA has revoked the annual PM_{10} standard, changed the $PM_{2.5}$ standard from 65 grams per cubic meter (g/m^3) to 35 g/m^3. South Carolina standards reflect the old standards and the most stringent standards would be enforced both by federal and state agencies. Federal and State of South Carolina ambient air quality standards are presented in Table B-1 (SCDHEC, 2004).

- Based on measured ambient air pollutant concentrations, the USEPA designates areas of the U.S. as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. In addition, those areas that cannot be classified on the basis of available information as meeting or not meeting the NAAQS for a particular pollutant are called "unclassifiable" and are treated as attainment until proven otherwise. Attainment areas can be further classified as "maintenance" areas. Maintenance areas are those areas previously classified as nonattainment and has successfully reduced air pollutant concentrations below the standard. Maintenance areas are under special maintenance plans and must operate under some of the nonattainment area plans to ensure compliance with the NAAQS. Sumter County is in attainment with the NAAQS, five counties are listed under the SC Early Action Compact (EAC) for eight-hour ozone level, and one county is considered a maintenance area for the eight-hour ozone level (USEPA, 2006).

- Each state is required to develop a state implementation plan (SIP) that sets forth how CAA provisions will be imposed within the state. The SIP is the primary means for the implementation, maintenance, and enforcement of the measures needed to attain and maintain the NAAQS within each state and includes control measures, emissions limitations, and other provisions required to attain and maintain the ambient air quality standards. The purpose of the SIP is twofold. First, it must provide a control strategy that will result in the attainment and maintenance of the NAAQS. Second, it must demonstrate that progress is being made in attaining the standards in each nonattainment area.

  In attainment areas, major new or modified stationary sources of air emissions on and in the area are subject to Prevention of Significant Deterioration (PSD) review to ensure that these sources are constructed without causing significant adverse deterioration of the clean air in the area. A major new source is defined as one that has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specific major source thresholds — 100 or 250 tons/year based on the source's industrial category. A major modification is a physical change or change in the method of operation at an existing major source that causes a significant "net emissions increase" at that source of any regulated pollutant. Table B-2 provides a tabular listing of the PSD significant emissions rate (SER) thresholds for selected criteria pollutants *(*USEPA, 1990*)*. (PSD SER and increment thresholds have been established for PM_{10}, but not for $PM_{2.5}$.). It should be noted that mobile source emissions as well as those associated with construction activities are excluded from the PSD applicability process.

  The goal of the PSD program is to: 1) ensure economic growth while preserving existing air quality, 2) protect public health and welfare from adverse effects which might occur even at pollutant levels better than the NAAQS, and 3) preserve, protect, and enhance the air quality in areas of special natural recreational, scenic, or historic value, such as national parks and wilderness areas. Sources subject to PSD review are required by the CAA to obtain a permit before commencing construction. The permit process requires an extensive review of all other major sources within a 50-mile radius and all Class I areas within a 62-mile radius of the facility. Emissions from any new or modified source must be controlled using Best Available Control Technology. The air quality, in combination with other PSD sources in the area, must not exceed the maximum allowable incremental increase identified in Table B-3. 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.

Table B-1. National and State Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Federal Primary NAAQS(8)	Federal Secondary NAAQS (8)	South Carolina Standards
Carbon Monoxide (CO)	8-hour(1)	9 ppm	No standard	9 ppm
		(10 mg/m^3)		(10 mg/m^3)
	1-hour(1)	35 ppm	No standard	35 ppm
		(40 mg/m^3)		(40 mg/m^3)
Lead (Pb)	Quarterly	1.5 µg/m^3	1.5 µg/m^3	1.5 mg/m^3
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm	0.053 ppm	0.053 ppm
		(100 µg/m^3)	(100 µg/m^3)	(100 µg/m^3)
Particulate Matter ≤10 Micrometers (PM_{10})	Annual(2)	Revoked	Revoked	50 µg/m^3
	24-hour(3)	150 µg/m^3	150 µg/m^3	150 µg/m^3
Particulate Matter <2.5 Micrometers ($PM_{2.5}$)	Annual(4)	15 µg/m^3	15 µg/m^3	15 µg/m^3
	24-hour(5)	35 µg/m^3	35 µg/m^3	65 µg/m^3
Ozone (O_3)	1-hour(7)	0.12 ppm	0.12 ppm	0.12 ppm
		(235 µg/m^3)	(235 µg/m^3)	(235 µg/m^3)
	8-hour(6)	0.08 ppm	0.08 ppm	0.08 ppm
		(157 µg/m^3)	(157 µg/m^3)	(157 µg/m^3)
Sulfur Dioxide (SO_2)	Annual	0.03 ppm	No standard	0.03 ppm
		(80 µg/m^3)		(80 µg/m^3)
	24-hour(1)	0.14 ppm	No standard	0.14 ppm
		(365 µg/m^3)		(365 µg/m^3)
	3-hour(1)	No standard	0.50 ppm	0.50 ppm
			(1300 µg/m^3)	(1300 µg/m^3)

Source: USEPA, 2006 (federal standards), SCDHEC, 2004 (South Carolina state standards)

(1) Not to be exceeded more than once per year.

(2) Due to lack of evidence linking health problems to long-term exposure to coarse particle pollution, the agency revoked the annual PM10 standard in 2006 (effective December 17, 2006).

(3) Not to be exceeded more than once per year on average over 3 years.

(4) To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3

(5) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 mg/m^3 (effective December 17, 2006)

(6) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

(7) (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is < 1. (b) As of June 15, 2005 EPA revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone nonattainment Early Action Compact (EAC) Areas.

(8) Concentration expressed first in the units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25° C and a reference pressure of 760 mm of mercury; ppm refers to parts per million by volume.

Table B-2. Criteria Pollutant Significant Emissions Rate Increases Under PSD Regulations

Pollutant	Significant Emissions Rate (tons/year)
PM_{10}	15
Total Suspended Particulate (TSP)	25
SO2	40
NOx	40
Ozone (VOC)	40
CO	100

Source: Title 40 CFR Part 51

Table B-3. Federal Allowable Pollutant Concentration Increases Under PSD Regulations

Pollutant	Averaging Time	Maximum Allowable Concentration (μg/m³)		
		Class I	Class II	Class III
PM_{10}	Annual	4	17	34
	24-hour	8	30	60
SO_2	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
NO_2	Annual	2.5	25	50

Source: Title 40 CFR Part 51
μg/m³ = Micrograms per cubic meter

- South Carolina has a statewide air quality-monitoring network that is operated by both state and local environmental programs. The air quality is monitored for carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, sulfur dioxide, total suspended particulate, and fluoride. The monitors tend to be concentrated in areas with the largest population densities and not all pollutants are monitored in those areas. The air quality monitoring network is used to identify areas where the ambient air quality standards are being violated and plans are needed to reduce pollutant concentration levels to be in attainment with the standards, also included are areas where the ambient standards are being met but plans are necessary to ensure maintenance of acceptable levels of air quality in the face of anticipated population or industrial growth (SCDHEC, 2006).

- The end result of this attainment/maintenance analysis is the development of local and statewide strategies for controlling emissions of criteria air pollutants from stationary and mobile sources. The first step in this process is the annual compilation of the ambient air monitoring results, and the second step is the analysis of the monitoring data for general air quality exceedances of the NAAQS as well as pollutant trends. Currently, South Carolina is in attainment for all criteria pollutants except for a few counties which are subject to Subpart 1 EAC or are in moderate nonattainment for eight-hour ozone.

- **Regulatory Comparisons**

- In order to evaluate the air emissions and their impact to the overall region of influence (ROI), the emissions associated with the construction activities were compared to the total emissions on a pollutant-by-pollutant basis for the ROI's 2002 National Emissions Inventory (NEI) data. Potential impacts to air quality are then identified as the total emissions of any pollutant that equals 10 percent or more of the ROI's emissions for that specific pollutant. The 10 percent criteria approach is used in the General Conformity Rule as an indicator for impact analysis for nonattainment and maintenance areas and although much of the state of South Carolina is in attainment for all pollutants (vice a few counties subject to the EAC for eight-hour ozone), the General Conformity Rule's impact analysis was utilized to provide a consistent approach to evaluating the impact of construction emissions.

- To provide a conservative evaluation, the impacts screening in this analysis used a more restrictive criterion than that required in the General Conformity Rule. Rather than comparing emissions from construction activities to regional inventories (as required in the General Conformity Rule), emissions were compared to the individual counties potentially impacted, which constitute a smaller area.

- **Project Calculations:**

- ***Construction Emissions:***

- Construction emissions calculations were completed using the calculation methodologies described in the U.S. Air Force Air Conformity Applicability Model (ACAM). As previously indicated, a conformity determination is not required since Sumter County is designated "attainment," the ACAM was used to provide a level of consistency with respect to emissions factors and calculations.

- The ACAM evaluates the individual emissions from different sources associated with the construction phases. These sources include grading activities, asphalt paving, construction worker trips, stationary equipment (e.g., saws and generators), nonresidential architectural coatings, and mobile equipment emissions *(*Air Force, 2003*).*

- As a result of early project information, certain assumptions were made to develop the air quality analysis. It was assumed that one structure the Entry Control Facility on Frierson Road, would be constructed on 0.25 acres of land in Sumter County. Ninety percent or 0.225 acres of the 0.25 acres would be paved. The facilities to be constructed would total 1,860 square feet. Approximately 9,200 liner feet of arterial road and 1,400 feet of access roads would be constructed. Clearing and grading for these roads would disturb 14.82 acres and require 8.04 acres of pavement. Grading and construction of the golf course would require disturbance of 36 acres of land. Based on these assumptions, the construction emissions were calculated using the methodology below.

- *Grading Activities:*
- Grading activities are divided into grading equipment emissions and grading operation emissions. Grading equipment calculations are combustive emissions from equipment engines and are ascertained in the following manner:
- VOC = .22 (lbs/acre/day) * Acres * DPY_1 / 2000
- NOx = 2.07 (lbs/acre/day) * Acres * DPY_1 / 2000
- PM_{10} = .17 (lbs/acre/day) * Acres * DPY_1 / 2000
- CO = .55 (lbs/acre/day) * Acres * DPY_1 / 2000
- SO2 = .21 (lbs/acre/day) * Acres * DPY_1 / 2000
- Where:
- Acres = number of gross acres to be graded during construction.
- DPY_1 = number of days per year during construction which are used for grading
- 2000 = conversion factor from pounds to tons
- All emissions are represented as tons per year.
- Grading operations are calculated using a similar equation from the Sacramento Air Quality Management District and the South Coast Air Quality Management Districts *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*. These calculations include grading and truck-hauling emissions.
- PM_{10} (tons/yr) =60.7 (lbs/acre/day) * Acres * DPY_1 / 2000
- Where:
- Acres = number of gross acres to be graded during construction.
- DPY_1 = number of days per year during construction which are used for grading
- 2000 = conversion factor from pounds to tons
- Calculations used in the EA assumed that there were no controls used to reduce fugitive emissions. Also, it was assumed that construction activities would occur over the FY09-10 timeframe and include 360 days and grading activities would represent 83 percent of that total. Therefore, a 300-day period was the duration established for grading operations. Emissions factors were derived from the Sacramento Air Quality Management District and

the South Coast Air Quality Management District *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*.

- *Architectural Coatings:*
- Nonresidential architectural coating emissions are released through the evaporation of solvents that are contained in paints, varnishes, primers and other surface coatings.
- VOC_{SF} (lbs/yr) = (SQR_GRSQF * 1.63)/2000
- Where:
- SQR_GRSQF = square root of gross square feet of nonresidential building space to be constructed in the given year of construction.
- 1.63 = Emissions factor
- 2000 = conversion factor from pounds to tons
- It was assumed that construction activities would occur within 360 days. After subtracting the grading activities from the estimated overall construction time, the actual construction period was reduced to 60 days. Additionally, it was assumed that the one building was constructed over the period of one year at the specified square footage. Emissions factors were derived from the Sacramento Air Quality Management District and the South Coast Air Quality Management District *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*.
- *Asphalt Paving:*
- VOC emissions are released during asphalt paving and are calculated using the following methodology:
- VOC_{PT} (tons/yr) = (2.62 lbs/acre) * Acres Paved / 2000
- Acres Paved = total number of acres to be paved at the site
- 2000 = conversion factor from pounds to tons
- It was assumed that 8.04 acres to be developed for the Base Infrastructure Project would be paved with asphalt. The specific emissions factors used in the calculations were available through Sacramento Air Quality Management and the South Coast Air Quality Management Districts *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*.

- *Construction Worker Trips:*
- Construction worker trips during the construction phases of the project are calculated and represent a function of the square feet of construction.
- Trips (trips/day) = .42 (trip/unit/day) * Area of training facilities
- Total daily trips are the applied to the following factors depending on the corresponding years.
- Year 2009:
- VOC_E = .016 * Trips
- NO_{xE} = .015 * Trips
- PM_{10E} = .0022 * Trips
- CO_E = .262 * Trips
- Year 2010 and beyond:
- VOC_E = .012 * Trips
- NO_{xE} = .013 * Trips
- PM_{10E} = .0022 * Trips
- CO_E = .262 * Trips

- To convert from pounds per day to tons per year:
- VOC (tons/yr) = VOC_E * DPY_{II}/2000
- No_x (tons/yr) = NO_{xE} * DPY_{II}/2000
- PM10(tons/yr) = PM_{10E} * DPY_{II}/2000
- CO (tons/yr) = CO_E * DPY_{II}/2000
- Where:
- Commercial construction = total square footage of to be constructed in the given year of construction.

- 2000 = conversion factor from pounds to tons
- DPY_{II} = number of days per year during construction activities
- It was assumed that the total area of construction (roads, golf course, entry control facilities) is 2.2 million square feet (51 acres). Emissions factors were derived from the Sacramento Air Quality Management District and the South Coast Air Quality Management District *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*.
- <u>*Stationary Equipment:*</u>
- Emissions from stationary equipment occur when gasoline-powered equipment (e.g., saws, generators, etc.) is used at the construction site.
- VOC = .198 * (GRSQFT) * DPY_{II}/ 2000
- NO_x = .137 * (GRSQFT) * DPY_{II}/ 2000
- PM_{10} = .004 * (GRSQFT) * DPY_{II}/ 2000
- CO = 5.29 * (GRSQFT) * DPY_{II}/ 2000
- SO_2 = .007 * (GRSQFT) * DPY_{II}/ 2000
- Where:
- GRSQF = Gross square feet of buildings to be constructed
- DPY_{II} = number of days per year during construction
- 2000 = conversion factor from pounds to tons
- It was assumed that the total area of construction was 1,860 square feet. Emissions factors were derived from the Sacramento Air Quality Management District and the South Coast Air Quality Management District *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*.
- <u>*Mobile Equipment:*</u>
- Mobile equipment emissions include pollutant releases associated with forklifts, dump trucks, etc. used during construction.
- VOC = .17 * (GRSQFT) * DPY_{II}/ 2000
- NO_x = 1.86 * (GRSQFT) * DPY_{II}/ 2000

- PM_{10} = .15 * (GRSQFT) * DPY_{II}/ 2000
- CO = .78 * (GRSQFT) * DPY_{II}/ 2000
- SO_2 = .23 * (GRSQFT) * DPY_{II}/ 2000
- Where: GRSQF = Gross square feet of area to be constructed
- DPY_{II} = number of days per year during construction
- 2000 = conversion factor from pounds to tons
- It was assumed that the total area of construction was 2.2 million square feet. Emissions factors were derived from the Sacramento Air Quality Management District and the South Coast Air Quality Management District *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*.
- ***Demolition Emissions:***

  Based on the Description of Proposed Action and Alternatives (DOPAA), approximately 76,700 square feet of existing buildings are expected to be demolished for the completion of the proposed action and 55,500 square feet under Alternative 1.

- **National Emissions Inventory**
- The National Emissions Inventory (NEI) is operated under EPA's Emission Factor and Inventory Group, which prepares the national database of air emissions information with input from numerous state and local air agencies, from tribes, as well as from industry. The database contains information on stationary and mobile sources that emit criteria air pollutants and hazardous air pollutants (HAPs). The database includes estimates of annual emissions, by source, of air pollutants in each area of the country. The NEI includes emission estimates for all 50 States, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. Emission estimates for individual point or major sources (facilities), as well as county-level estimates for area, mobile and other sources, are available currently for 2002 for criteria pollutants and HAPs.
- Criteria air pollutants are those for which EPA has set health-based standards. Four of the six criteria pollutants are included in the NEI database:
- Carbon Monoxide (CO)
- Nitrogen Oxides (NO_x)
- Sulfur Dioxide (SO_2)

- Particulate Matter (PM_{10} and $PM_{2.5}$)

- The NEI also includes emissions of Volatile Organic Compounds (VOCs), which are ozone precursors, emitted from motor vehicle fuel distribution and chemical manufacturing, as well as other solvent uses. VOCs react with nitrogen oxides in the atmosphere to form ozone. The NEI database defines three classes of criteria air pollutant sources:

    - Point sources - stationary sources of emissions, such as an electric power plant, that can be identified by name and location. A "major" source emits a threshold amount (or more) of at least one criteria pollutant, and must be inventoried and reported. Many states also inventory and report stationary sources that emit amounts below the thresholds for each pollutant.

    - Area sources - small point sources such as a home or office building, or a diffuse stationary source, such as wildfires or agricultural tilling. These sources do not individually produce sufficient emissions to qualify as point sources. Dry cleaners are one example, i.e., a single dry cleaner within an inventory area typically will not qualify as a point source, but collectively the emissions from all of the dry cleaning facilities in the inventory area may be significant and therefore must be included in the inventory.

    - Mobile sources - any kind of vehicle or equipment with a gasoline or diesel engine; airplane; or ship.

- The main sources of criteria pollutant emissions data for the NEI are:

    - For electric generating units - EPA's Emission Tracking System / Continuous Emissions Monitoring Data (ETS/CEM) and Department of Energy fuel use data.

    - For other large stationary sources - state data and older inventories where state data was not submitted.

    - For on-road mobile sources - the Federal Highway Administration's (FHWA's) estimate of vehicle miles traveled and emission factors from EPA's MOBILE Model.

    - For nonroad mobile sources - EPA's NONROAD Model.

    - For stationary area sources - state data, EPA-developed estimates for some sources, and older inventories where state or EPA data was not submitted.

    - State and local environmental agencies supply most of the point source data. EPA's Clean Air Market Program supplies emissions data for electric power plants.

References:

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