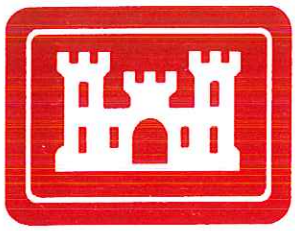

US Army Corps
of Engineers

Toxic and Hazardous
Materials Agency

PRELIMARY SITE INSPECTION REPORT FOR FORT STEWART MILITARY RESERVATION

Site Inspection Report No. 91034

FINAL

September 1992

Prepared For:
U.S. Army Corps of Engineers
Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, MD

Contract No. DAAA15-90-D-0001, Task 9

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Belcamp, MD 21017

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LIST OF ACRONYMS

24th ID(M)	24th Infantry Division (Mechanized)
AEHA	U.S. Army Environmental Hygiene Agency
ASI	Advanced Sciences, Incorporated
BOD	Biochemical Oxygen Demand
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COE	U.S. Army Corps of Engineers
DEH	Directorate of Engineering and Housing
DPDO	Defense Property Disposal Office
DRMO	Defense Reutilization and Marketing Office
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
EPD	Georgia Environmental Protection Division
ESE	Environmental Science and Engineering , Incorporated
FORSCOM	U.S. Army Forces Command
ft	feet/foot
ft^2	square feet
FWS	U.S. Fish and Wildlife Service
gal	gallon
GADNR	Georgia Department of Natural Resources
HRS2	Hazard Ranking System 2nd Revision
HRSTF	Hinesville Regional Sewage Treatment Facility
HSWA	Hazardous and Solid Waste Amendments
IIA	Initial Installation Assessment
IWTP	Industrial Wastewater Treatment Plant
MGD	million gallons per day
MSL	mean sea level
NOAA	National Oceanographic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
POW	Prisoner of War
POL	Petroleum, Oils, and Lubricants
PSI	Preliminary Site Inspection
RCRA	Resource Conservation and Recovery Act
SWMU	Solid Waste Management Unit
TASCO	Training Aids Service Office
TMDE	Test, Measurement and Diagnostic Equipment
ug/g	Micorgrams per gram
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USGS	U.S. Geological Survey
UST(s)	underground storage tank(s)
UXO	unexploded ordnance
WWII	World War II

EXECUTIVE SUMMARY

SITE DESCRIPTION

The U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) has contracted Advanced Sciences, Inc. (ASI) to prepare a Preliminary Site Inspection Report (PSI) for Fort Stewart Army Base, Georgia. The U.S. Environmental Protection Agency (EPA) Region IV deemed it necessary to rescore selected U.S. Army installations not currently on the National Priority List (NPL) using EPA's revised Hazard Ranking System (HRS2). This report provides data and information necessary for rescoring this site. The scope of this report is based solely on the review of available reports.

The Facility Commanding Officer for Fort Stewart is Major General Barry R. McCaffrey. The Facility Environmental Coordinator is Mr. Thomas Houston. The Facility address is:

AFZP-DEV
24th Infantry Division (M)
Fort Stewart, Georgia 31314-5000
Phone (912) 767-2010

Fort Stewart is situated in southeast Georgia at 31° 51' North and 81° 36' West. It occupies an area of 279,000 acres of heavily wooded land. The cantonment area, located in the southern portion of the installation, is adjacent to the city of Hinesville, Georgia. Savannah, Georgia is located approximately 34 miles northeast of the cantonment area and approximately 10 miles from the eastern reservation boundary. The installation is bisected by Georgia Highway 119, which runs north to south from Pembroke to Hinesville, and Georgia Highway 144, which runs east to west from Richmond Hill to Glenville.

HISTORY

Fort Stewart (named in honor of the Revolutionary War Brigadier General Daniel Stewart) was established in June 1940 as an Antiaircraft Artillery Center to prepare artillery troops for overseas deployment. Training activities associated with World War II (WWII) decreased by the end of 1944. Between January and September 1945, the installation operated as a Prisoner of War (POW) camp, housed two Italian units, and served as a separation center. The Post was deactivated in September 1945 (ESE 1983).

In August 1950, Fort Stewart was reactivated to train antiaircraft artillery units for the Korean Conflict. The training mission was expanded to include armor training concurrent with antiaircraft artillery training in 1953. In 1956, Fort Stewart was then designated a permanent Army Installation and an element of the U.S. Army Aviation School from Fort Rucker, Alabama was stationed there from 1966 to 1973 (ESE 1983).

The 1st Battalion, 75th Infantry (Ranger) was activated at Fort Stewart on January 31, 1974. As a result, Fort Stewart became a training and maneuver area, providing tank, field artillery, helicopter gunnery, and small arms training for regular Army, U.S. Army Reserve, and National Guard units. The 24th Infantry Division (Mechanized) [24th ID(M)] was permanently stationed at Fort Stewart in 1975 (ESE 1983).

SITE CHARACTERISTICS

The 39 waste areas assessed in this report include landfills, incinerators, heating plants, industrial and sewage treatment facilities, a PCB-containing transformer storage area, vehicle and aircraft maintenance areas, underground storage tanks (USTs), above ground storage tanks, oil/water separators, hazardous waste storage areas, pesticide/herbicide storage areas, industrial operations and a fire training area. Most of the waste areas are found in the cantonment area or the nearby Wright Army Airfield.

GEOLOGIC SETTING

Fort Stewart lies within the Southern Atlantic Lower Coastal Plain with most surface elevations on the flat, forested lands of the reservation ranging from 6 to 182 ft above mean sea level (msl). It is underlain by a moderately thick wedge of unconsolidated and semi-consolidated sediments which thicken and dip eastward toward the coast.

POTENTIAL RECEPTORS

Targets potentially affected by hazardous materials include human, animal, and plant populations on or near the Facility. Possible pathways for contamination are groundwater, surface water, soil and air. A number of potential sources exist on Fort Stewart. Of those discussed in the report, the landfills, burn pits, fire training pits and several industrial operations are of concern.

The potential for Army activities to contaminate the groundwater at Fort Stewart is high, particularly for the shallow sand aquifer. A potential route of further contamination are abandoned wells that have not been properly closed in accordance with Georgia requirements. Approximately 20 percent of the land area is wetlands, therefore, surface water and associated ecological habitats are also a concern at Fort Stewart.

The 24th ID(M) did not have an effective hazardous waste management program. Various deficiencies included the absence of a hazardous waste management plan, a non-existent hazardous waste management board, and insufficient hazardous waste management training. Although much of this is being addressed as a result of the Waste Management Plan prepared in 1991, these deficiencies have led to numerous potential violations of the state and federal regulations.

Solid waste collection, storage, and disposal practices were adequate except for problems associated with the disposal of inadequately dewatered sewage sludge at the Fort Stewart sanitary landfill.

1.0 INTRODUCTION

This PSI report of Headquarters 24th ID(M) and Fort Stewart Military Reservation has been prepared by ASI under Contract Number DAAA-15-90-D-0001, Task 9 for the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA). The purpose of this report is to provide a compilation of recent data to update a previous Initial Installation Assessment (IIA) Report completed by Environmental Science and Engineering, Incorporated (ESE) in October 1983. The purpose of the IIA was to determine the existence of toxic and hazardous materials and related contamination and identify those substances posing a potential for migration off the installation.

In the past, Fort Stewart, which is located 34 miles southwest of Savannah, Georgia, has engaged in a variety of activities that may have resulted in the release of hazardous materials. These activities include landfill operations, open burning of debris, explosive ordnance disposal (EOD), fire training exercises, hazardous waste storage, industrial wastewater treatment plant (IWTP) operations and associated sludge disposal, various types of incineration, petroleum, oils and lubricants (POL), waste storage and disposal, sanitary sewage treatment plant (STP) operation and associated sludge drying beds, and various shop operations.

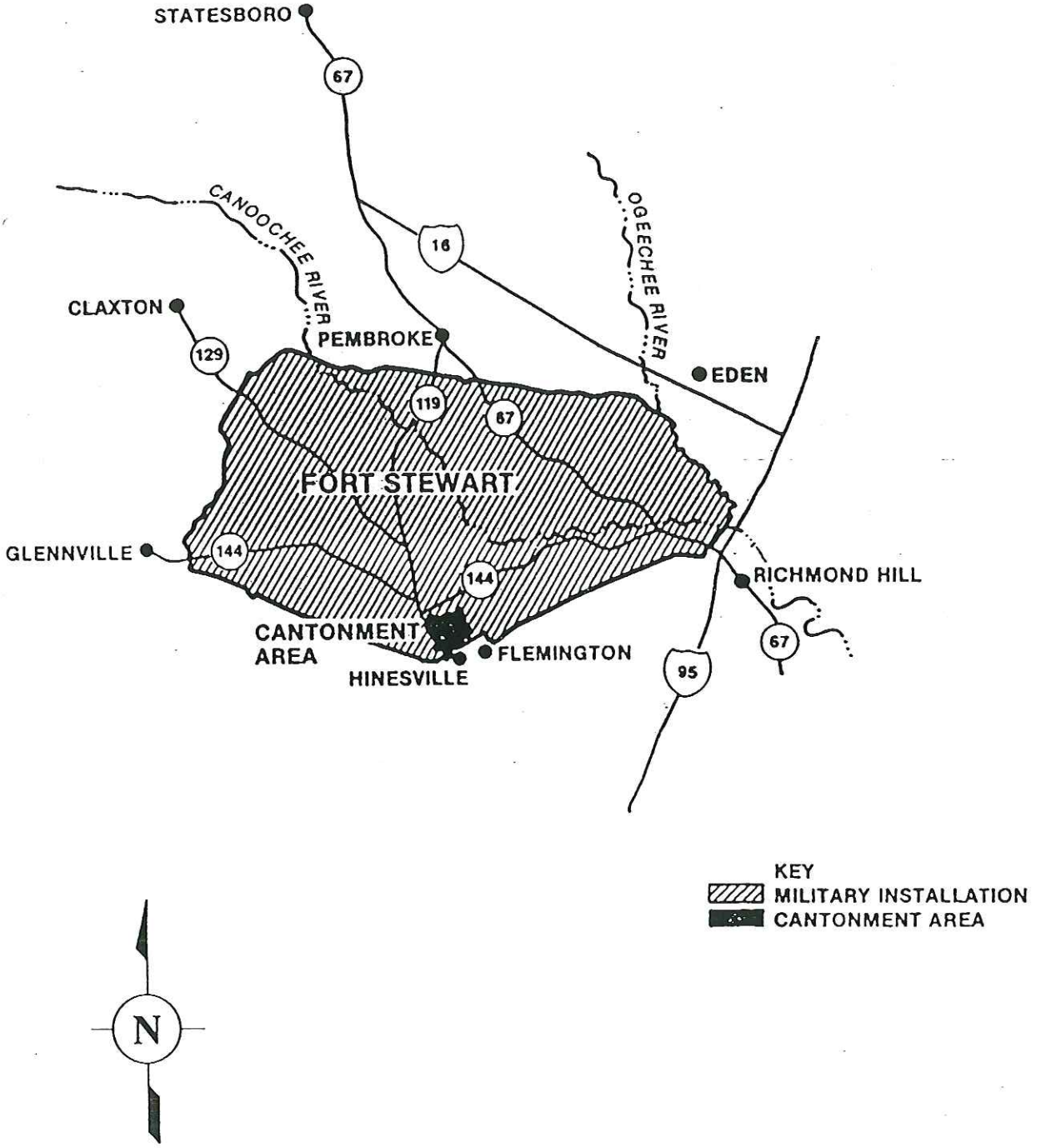
This report is based entirely on the review of existing documents and records and was constructed entirely from data gathered during the on-site phase of the PSI conducted July 8 through 11, 1991. Data gathered from other sources pertinent to the records search effort include input from the following government agencies:

- U.S. Geological Survey (USGS)
- U.S. Army Environmental Hygiene Agency (AEHA)
- Georgia Department of Natural Resources (DNR)
- U.S. Environmental Protection Agency (EPA)
- U.S. Fish and Wildlife Service (FWS)
- U.S. Army Corps of Engineers (COE)
- U.S. Soil Conservation Service
- National Oceanographic and Atmospheric Administration (NOAA)

1.1 LOCATION

Fort Stewart is located on heavily wooded land in southeast Georgia within portions of Bryan, Liberty, Evans, Tattnall, and Long counties (see Figure 1.1). The city of Hinesville lies adjacent to its southern border with Savannah approximately 34 miles to the northeast. Georgia highway 119 bisects Fort Stewart and runs north to south while highway 144 bisects it from east to west (see Figure 1.2).

FIGURE 1.1. FORT STEWART MILITARY RESERVATION LOCATION MAP



SOURCE: Hunter/ESE, 1990

FIGURE 1.2. REGIONAL LOCATION MAP - FORT STEWART MILITARY RESERVATION

2.0 SITE CHARACTERIZATION

2.1 SITE BACKGROUND AND HISTORY

2.1.1 Ownership History

Fort Stewart was established in June 1940 as an Antiaircraft Artillery Center to prepare artillery troops for overseas deployment. Training activities associated with WWII decreased by the end of 1944. Between January and September 1945, the installation operated as a POW camp, housing two Italian units and served as a separation center. The installation was deactivated in September 1945 (ESE 1983).

In August 1950, Fort Stewart was reactivated to train artillery units for the Korean Conflict. The training mission was expanded (1953) to include armor training concurrent with antiaircraft artillery training. In 1953, Fort Stewart was designated a permanent Army installation and from 1966 to 1973 an element of the U.S. Army Aviation School from Fort Rucker, Alabama was established there (ESE 1983).

The 1st Battalion, 75th Infantry (Ranger) was activated at Fort Stewart on January 31, 1974. As a result, it became a training and maneuver area, providing tank, field artillery, helicopter gunnery, and small arms training for regular Army, U.S. Army Reserve, and National Guard units. The 24th ID(M) was permanently stationed at Fort Stewart in 1975 (ESE 1983). Fort Stewart is of strategic value to the Division and the Army because of its size, terrain, climate, proximity to the East Coast, and the ports of Savannah and Brunswick, Georgia; Jacksonville, Florida; and Charleston, South Carolina. Fort Stewart is readily accessible by rail and Interstate Highways 95 and 16. Tank, field artillery, helicopter gunnery, and small arms ranges can operate simultaneously on the installation throughout the year with little loss of time due to bad weather. The nearby Hunter Army Airfield can handle large transport aircraft, enabling the Division to deploy anywhere in the world. The Division recently returned from participation in the Desert Storm operation in the Middle East. The current troop strength at Fort Stewart is 16,000 with 3700 civilian workers and an average of 3600 non-resident military personnel in training.

Fort Stewart currently operates under the U.S. Army Forces Command (FORSCOM). The mission of Fort Stewart is to:

- Command and support assigned and attached FORSCOM activities, units and sub-installations;
- Train and maintain an infantry division;
- Provide for the operation, safety, security, administration, education, training procurement;
- Provide support, service, maintenance, supply, and transportation of all individuals, units, and activities assigned, attached, or under the command of the installation; and
- Provide ranges and training facilities for non-resident active Army, U.S. Army Reserve, and National Guard units.

Fort Stewart also provides administrative and logistical support to the following tenant units and activities:

- U.S. Army Medical Activity
- U.S. Army Dental Activity
- U.S. Communications Command Agency
- Defense Property Disposal Office
- U.S. Army Commissary
- U.S. Army Trial Defense Service
- U.S. Army Logistic Assistance Office
- Defense Investigative Service
- U.S. Army Criminal Investigation Command, 3rd Region
- Red Cross
- 902nd Military Intelligence Group
- Naval Space Surveillance Field Station
- U.S. Coast Guard Air Station
- U.S. Air Force Tactical Air Command, 507th Tactical Air Control Wing
- 95th Service Company, Test, Measurement, and Diagnostic Equipment (TMDE) Support Team
- 2nd Platoon, 192nd Air Traffic Control Company
- 1160th Transportation Company
- 117th Tactical Control Squadron
- U.S. Army Corps of Engineers (COE), Fort Stewart Timber Harvesting Project
- COE - Savannah District, Fort Stewart Area Office
- Mobilization and Training Equipment Site, Georgia Army National Guard
- 224th Military Intelligence Battalion, and
- Detachment 21, 5th Weather Squadron

2.1.2 Regulatory History

2.1.2.1 Wastewater

A National Pollutant Discharge Elimination System (NPDES), Permit No. GA0004308 was issued to Fort Stewart by the EPA in August 1975 to allow the installations main STP to discharge normal secondary biological treatment effluent. The permit was effective until June 1977. The STP was generally in compliance until July 1977 when more stringent limitations became effective. During the permit period, effective July 1977 through August 1980, the STP was generally not in compliance because biochemical oxygen demand (BOD) and ammonia-nitrogen limitations were exceeded.

In addition to submitting a NPDES permit number renewal application to EPA in 1980, Fort Stewart submitted a NPDES permit application to the State of Georgia in 1982 because the state obtained NPDES permitting authority at that time. Fort Stewart operated the Main Post Area STP until 1985 when it was abandoned and sewage was routed to the Hinesville Regional Sewage Treatment Facility.

In addition to the former STP in the Main Post Area, there are three other wastewater treatment facilities permitted under GA0004308 in the outlying areas of Fort Stewart. These facilities consist of the TAC-X training area package STP, the Evans Heliport package STP, and the IWTP. The current NPDES permit authorizes the three treatment facilities to discharge until the end of February 1996.

The Camp Oliver and Wright Army Airfield oxidation lagoons spray irrigation systems are no-discharge wastewater systems regulated under Land Application System Permit Nos. GA03-834 and GA03-624, respectively. These permits were issued in March 1985 by the Georgia Environmental Protection Division (EPD) and expire August, 1995. Permits issued to Fort Stewart are included in Appendix B.

2.1.2.2 Air

Although the principle of federal sovereignty traditionally excluded federal installations from state and local procedural requirements, the 1977 Clean Air Act Amendments removed this exemption. Federal facilities must now comply with state and local procedural standards relating to ambient air quality, air emissions, equipment design and operation, fuel use, and composition.

In September 1978, Fort Stewart was issued a Permit to Operate No. 9711-089-6355-0 governing the original boilers firing of natural gas, No. 2 fuel oil, and No. 5 fuel oil, the Heston Model CA-200 incinerator, and the fuel storage tanks at the installation. The permit was amended in July 1985 to include an additional No. 5 fuel, oil-fired boiler and the waste, wood-fired unit until the Fort Stewart Environmental Office had documented that the boilers in the Central Energy Plant (Bldg. 1412) met EPA's regulatory definition of "boilers" and notified the EPA Region IV office in March of 1986 of Fort Stewart's intent to burn "off-specification" used oil. A trial burn was conducted in May 1988 to determine the feasibility of burning this type of fuel and a waste oil analysis program was instituted to determine that waste oils to be burned in the boilers met the specifications of 40 CFR 266. Waste oils have been used as an alternative fuel source at Fort Stewart since 1988.

2.1.2.3 Hazardous Waste

Fort Stewart filed a RCRA notification form with EPA in July 1980. A RCRA Part A permit application for interim status as a generator and storage facility was filed for Fort Stewart in November 1980, (EPA ID No. GA214020872). Subsequent to the Part A submittal, the State of Georgia was given final authorization for their entire hazardous waste program, including the Hazardous and Solid Waste Amendments (HSWA) in July 1985. The 24th ID(M) is currently operating an active EOD area and the hazardous waste storage area (DRMO) under interim status until approval of final status (Part B) is received.

2.1.3 Process and Waste Disposal History

One active (Post) and two closed (Camp Oliver and TAC-X) landfills, a closed unofficial dump, and seven dump and/or burn pits are located on Fort Stewart. In 1982, approximately 36,961 cubic yards of solid waste were disposed of per month at the 89-acre South-Central landfill. During past years, solid waste

generation increased because of construction and increased population. In 1987, 517,928 cubic yards of refuse and garbage were taken to the sanitary landfill. The Post landfill has an almost unlimited waste disposal capacity using the area-fill method. The life expectancy for this landfill is 8.5 years. All solid waste, which had been disposed of in the TAC-X landfill, is being taken to the Post landfill. In April 1987, a trench-like depression still existed at the TAC-X landfill. (AEHA 1987)

Landfill operations appear to be adequate with the exception of the disposal of semi-liquid to liquid sewage sludge. This sludge, from the Hinesville Regional Sewage Facility (HRSF) is not being dried sufficiently due to inadequate drying time. The GADNR considers liquid sewage sludge as a hazardous waste. Any liquid waste dumped on a landfill increases the amount of leachate and may impact the local surface and groundwater quality (AEHA 1988). It has also been reported that the used air filters from the vehicle spray booth were disposed of in the dumpster and ultimately in the Post-South Central Landfill. Since lead-based paints were applied in the spray booth, the filters are likely to be contaminated with lead.

The seven dump and/or burn pits are located near the cantonment area. These sites are used for open burning of scrap lumber and timber cuttings, and are also used for dumping construction and demolition waste. The State of Georgia, in the past, approved the operation of these burn pits.

In general, industrial wastewaters are discharged to the industrial sewer system which leads to the IWTP. The IWTP began operation during the summer of 1982. (ESE 1983)

Waste POL is currently sold to a reclamation contractor, and scrap materials that have a salvage value are sold to salvaging contractors. Nonhazardous scrap materials, having no salvage value, are disposed of in the Post landfill.

Pesticide storage facilities and practices throughout the 24th ID(M) were inadequate and did not comply with federal and Army regulations.

The overall operation and maintenance of the 24th ID(M) wastewater treatment systems was inadequate. Particular deficiencies existed in the wastewater monitoring and preventative maintenance programs.

Prior to the mid-1960s, segregation of waste oil, hydraulic fluid, and degreasing solvent was reportedly not practiced. These wastes were collected in 55-gal drums, forming a waste POL mixture. There are currently eighty-five waste oil tanks located at various areas within the cantonment area.

2.1.4 Remedial/Removal Action

There have been no qualified remedial or removal actions completed at Fort Stewart to date.

2.1.5 Previous Environmental Reports

There have been nine previous investigations with accompanying completed documentation for Fort Stewart. These reports are as follows:

- AEHA, Environmental Program Review No. 32-24-7038-89, 1988
- AEHA, Hazardous Waste Consultation No. 37-26-1382-88, 1987
- AEHA, Water Quality Consultation No. 31-62-0140-90, 1989
- AEHA, Hazardous Waste Study No. 37-26-0127-88, 1987
- Installation Assessment of Headquarters, 24th Infantry Division and Fort Stewart, GA, ESE 1983
- USATHAMA, Property Report, Fort Stewart, 1991
- Contamination Evaluation/Closure Plan, Fort Stewart Fire Training Areas, ESE, 1990
- Waste Analysis Plan, Fort Stewart, ASI, 1991
- RCRA Facility Investigation Work Plan, Fort Stewart, G&M, 1991

2.2 SITE DESCRIPTION

Fort Stewart covers an area of approximately 279,270 acres in five counties of southeastern Georgia. These counties include, Bryan, Evans, Liberty, Long and Tattnall (see Figure 2-1). The Facility has been in operation since 1940. Waste sites identified from previous investigations are located on Figure 2-2.

The U.S. Army Environmental Hygiene Agency (AEHA) conducted Hazardous Waste Study No. 37-26-0127. The analytical results of this survey are contained in Appendix C.

2.2.1 Post Landfill

Description

Located northwest of the cantonment area, this currently active, 89-acre landfill is surrounded on three sides by surface water, including Mill Creek to the north, a tributary to Taylors creek to the south, and Taylors Creek to the west. Since the landfill operation began in 1940, sections have been used for burning of wastes and unburned wastes were deposited using the trench method. The area fill method is currently in practice as required by the State of Georgia.

Waste Characteristics

Wastes received and deposited in the landfill include: sludge from the wastewater treatment plant, potentially contaminated waste air filters, construction debris, dewatered sludge from the STP, autoclave infectious wastes (bagged in special containers) and incinerator ash.

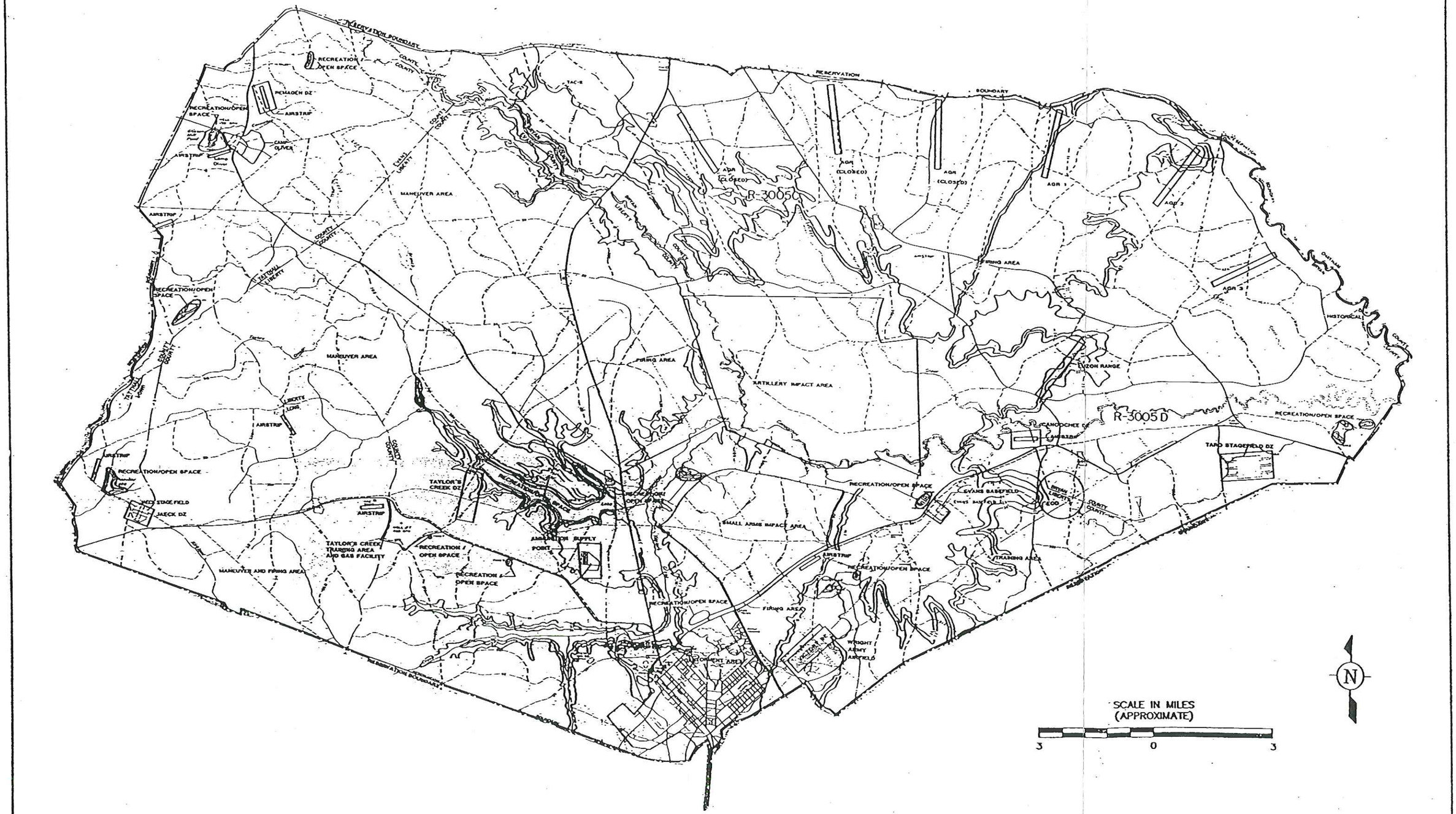


FIGURE 2.1 FORT STEWART MILITARY RESERVATION FACILITY MAP

1 - Post Landfill
2 - Camp Oliver Landfill
3 - Tac-X Landfill
4 - Burn Pit
5 - Hospital Incinerator
6 - Document Incinerator
7 - Veterinary Incinerator
8 - EOD Area
9 - EOD Area
10 - EOD Area
11 - EOD Area
12 - EOD Area
13 - Fire Training Pit
14 - Old Fire Training Pit
15 - Silver Recovery Unit
16 - Transformer Storage Shed
17 - DRMO Storage Area
18 - Industrial Wastewater Plant
19 - Former Sanitary Treatment Plant
20 - Sewage Disposal Beds
21 - Heating Plant
22 - DEH Above Ground Tanks
23 - Helicopter Maintenance Area
24 - Radiator Repair Shop
25 - Hazardous Waste Storage
26 - Impact Area/Firing Range
27 - Gas Chamber
28 - Package Treatment Plant
29 - Oxidation Lagoon
30 - Vehicle Maintenance Area
31 - Medical Laboratories
32 - Dental Clinic
33 - Veterinary Clinic
34 - Wastewater Treatment Plant
35 - Wright Field Dump
36 - Pesticide Storage
37 - Former Pesticide Storage
38 - Vehicle Wash Rack
39 - Transformers (Located Throughout Facility So Not Shown)
40 - Above Ground Storage Tanks
41 - Underground Storage Tanks (Located Throughout Facility So Not Shown)
42 - Underground Storage Tanks
43 - Underground Storage Tank
44 - Underground Storage Tanks (Located Throughout Facility So Not Shown)

USATHAMA
U.S. Army Toxic and Hazardous Materials Agency
18-December-1990

FIGURE 2.2 WASTE SITE LOCATIONS, FORT STEWART MILITARY RESERVATION

Environmental Considerations

Leachate exits the landfill via a drainage ditch located on the western boundary and empties into Mill Creek. Drainage from the northern and eastern boundaries drains into swampy areas that are adjacent to Taylors Creek. Potential to release is either by surface or subsurface water movement. (AEHA 1988)

The water table is within 10 ft of the base of the landfill, therefore, potential to release to this medium is high but potential to release directly to the Floridian aquifer, an important regional groundwater source, is low.

Monitoring History

Regular analysis of samples collected from six monitoring wells, installed in 1980, surrounding the landfill, has shown no contamination by any CERCLA-listed hazardous constituents. Only iron (1.2 parts per million (ppm) to 10.9 ppm) was detected above the National Interim Primary Drinking Water Regulations (0.3 ppm). This high iron concentration can be attributed to the indigenous soils and the probable iron waste products buried within the landfill (G&M 1991). Monitoring data has not indicated release of iron into the uppermost aquifer, however, potential to release to groundwater is high. Iron concentrations of 1.09 ppm to 17.3 ppm in surface water near the intersection of Mill Creek and a drainage canal that extends from the landfill were documented but values decreased and stabilized at 2.1 ppm a short distance from the landfill. (G&M 1991)

Monitoring data, to date, has not indicated any known releases that would impact the environment. An RFI is planned and this site is proposed for further study.

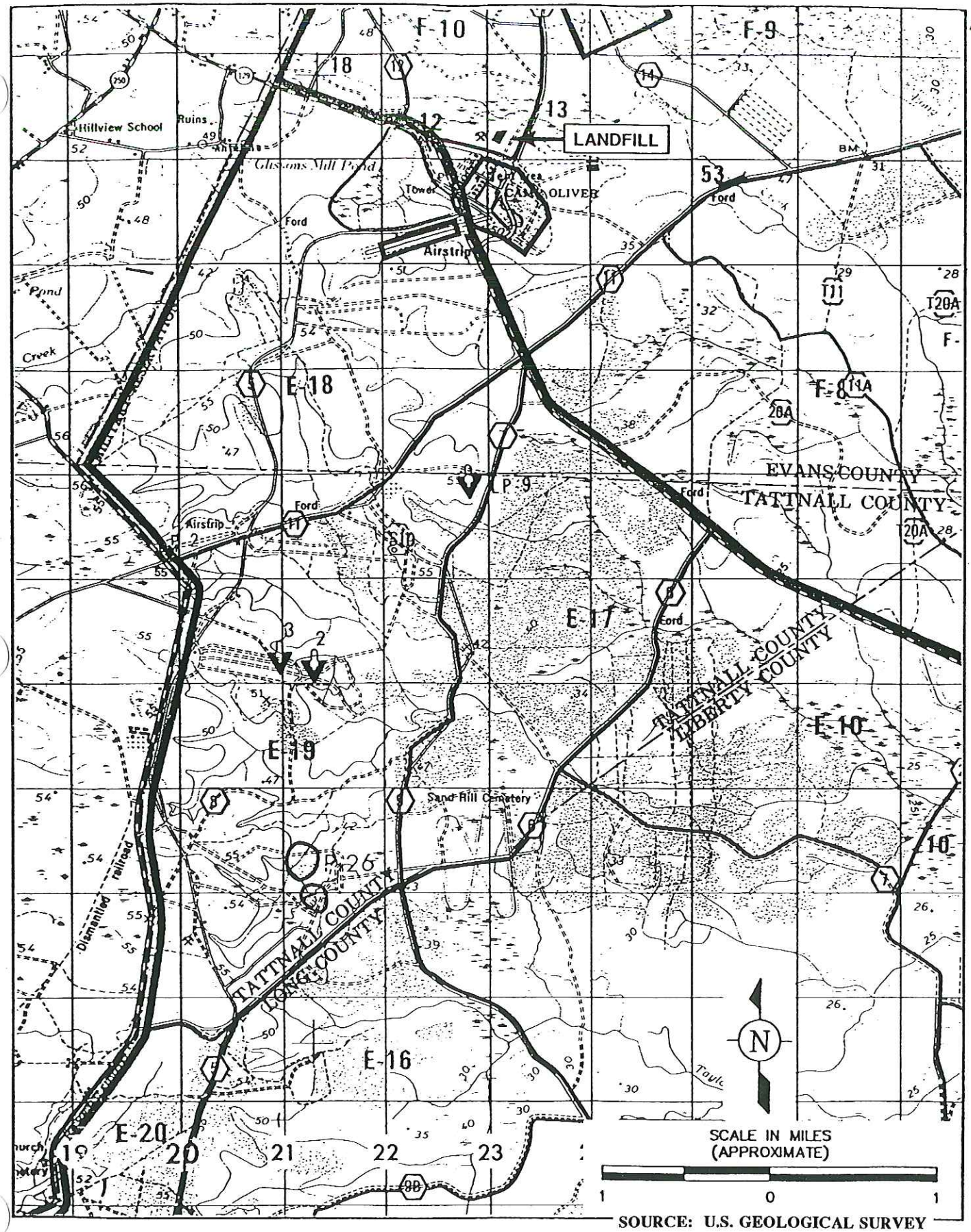
2.2.2 Camp Oliver Landfill

Description

Located approximately 16 miles northwest of the cantonment area on state highway 129 near Glissons Pond (Figure 2.3), this two-acre, closed, unlined landfill was in operation from the 1960s to 1979. It was situated on a hillside with a 25 ft downward slope from south to north (AEHA 1988). From 1979 to 1984, there was disposal of asphalt, concrete, tree stumps, general refuse and grass clippings in this area even though it had been officially closed in 1979. This area was revegetated and is covered by grass, trees and bushes.

Waste Characteristics

Wastes deposited in the landfill included general refuse generated during troop training exercises and refuse from nearby residents. Open pit burning was employed during the 1960s to 1979 operational period. From 1979 to 1984, about 100 cubic yards of refuse and debris was covered by the trench method.



SOURCE: U.S. GEOLOGICAL SURVEY

FIGURE 2.3. CAMP OLIVER LANDFILL LOCATION MAP
FORT STEWART MILITARY RESERVATION

Environmental Considerations

The northern portion of the landfill is within the floodplain of the Canoochee Creek. The soil in this area is loamy sand over a sandy subsoil and is poorly drained, which allows depressions and small drainageways to form. Due to soil conditions in this area, potential leachate release to the soil directly under the landfill is high (G&M 1991).

Monitoring History

Regular analysis from two monitoring wells installed in 1980 has shown no contamination by any CERCLA-listed hazardous constituents. Iron (0.684 ppm to 8.750 ppm) was detected above the National Interim Primary Drinking Water Regulations (0.03 ppm). This high level of iron was attributed to high levels in the indigenous soils (G&M, 1991). Monitoring data does not indicate known releases that would impact the environment. Additional sampling is proposed under the planned RFI.

2.2.3 TAC-X Landfill

Description

This five-acre, closed landfill, approximately 1.25 miles from the northern Fort Stewart boundary and 3.5 miles south-southwest of Pembroke, operated from the 1960s to 1979 (Figure 2-4). It is located in the floodplain of the Canoochee River and the main channel of the river is approximately two miles south of the landfill. The site is primarily flat with less than seven ft of natural relief and has a gradual slope extending from north to south.

Waste Characteristics

Wastes deposited in the landfill include: residential refuse, cardboard boxes and lawn/shrubbery waste.

Environmental Considerations

Soils in this area are primarily sands and sand/silt mixtures. Sands in the upper 20 ft are fine-grained and become medium- to coarse-grained from 20 to 100 ft. In the southeast corner of the landfill, boring indicated small gravel pockets. Although one high-permeable area was encountered that produced groundwater at a rate of 25 gallons per minute (gpm) for approximately 15 minutes, the yield decreased to a few gpm. For the most part, the potential to release by groundwater is limited because the overall permeability of the sandy, silt soils generally restricts movement of groundwater. There is little runoff due to the flat terrain and the surface soils absorb most of the rainfall. In 1980, due to the wet season, there were active groundwater seeps that drained via trenches from the landfill toward the swampy areas located to the south of the site. There may be a potential for leachate to develop from the waste materials within the landfill and migration could occur to the local aquifer and to the wetlands located to the south of the landfill. (AEHA 1988) In 1980, leachate was observed emanating from an earthen bank at this landfill (AEHA 1987).

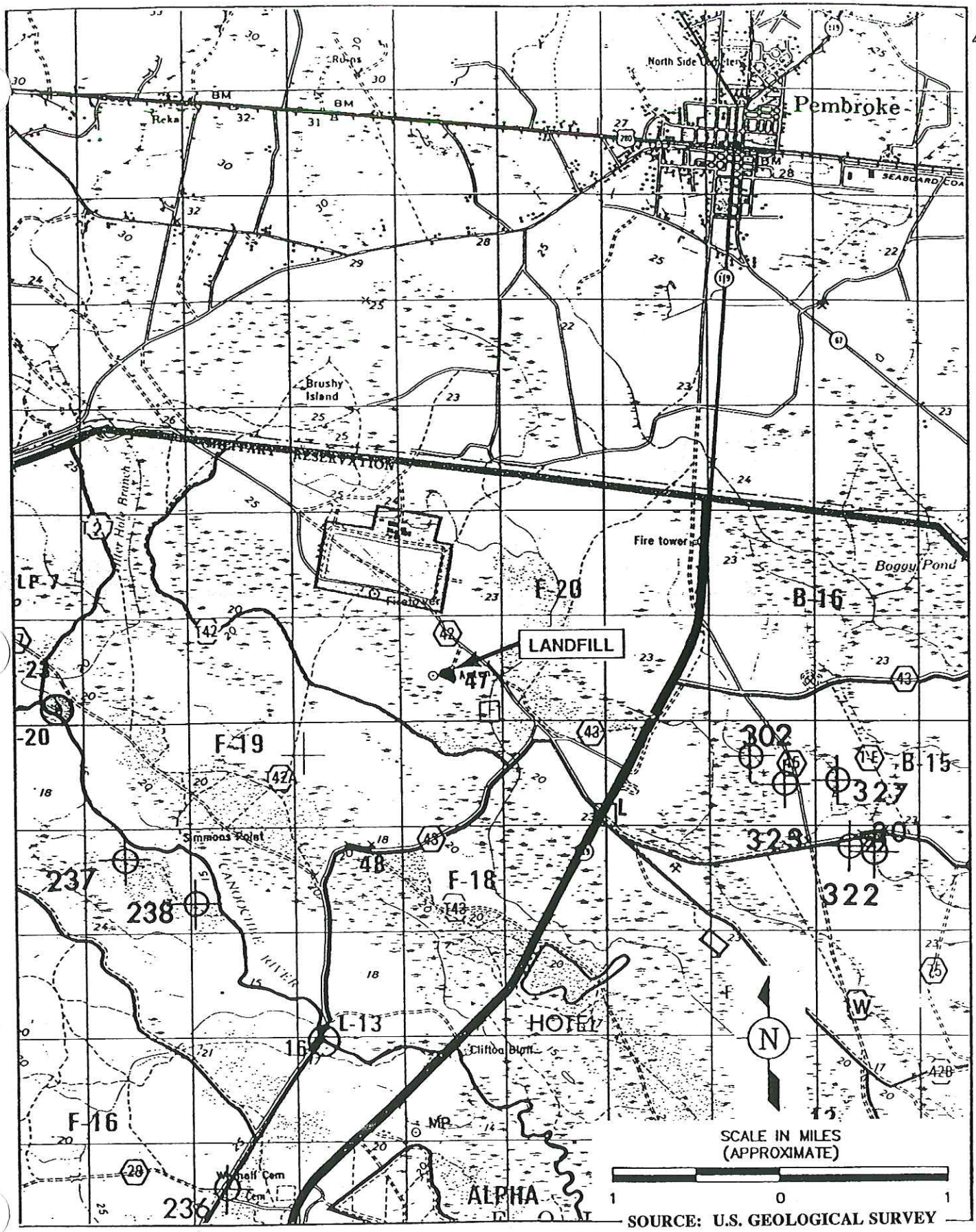


FIGURE 2.4. TAC - X LANDFILL - FORT STEWART MILITARY RESERVATION

Monitoring History

Regular analysis of samples collected from two monitoring wells installed in 1980 indicate no contamination of CERCLA-listed hazardous constituents to the groundwater. Iron was detected above the National Interim Primary Drinking Water Regulations, again this has been attributed primarily to the indigenous soils. (G&M 1991)

Two surface water samples were analyzed in the 1982 ESE survey. Chemical data from the site indicate that the surface water in the area is not being significantly degraded by the past operation of the TAC-X Landfill (G&M 1991). An RFI is planned and additional sampling is proposed for this area.

2.2.4 The Burn Pits

Description

Seven burn pits are located at Fort Stewart: four north to northwest of the cantonment area and three northeast of the cantonment area. One pit was unused, five are inactive, and one remains active. These open burning pits were used to dispose combustible solid waste (i.e. construction debris, trees, etc.) and were also used for dumping demolition waste.

Waste Characteristics

Wastes attributed to the burn pits include scrap lumber, timber cuttings, construction and demolition waste, ashes, and excavation soil.

Environmental Considerations

Medium of concern for the burn pit areas is groundwater and soil.

Monitoring History

No known data exists to characterize the burn pits or any releases to the environment. An RFI is planned and sampling is proposed. No evidence exists that would indicate release of CERCLA-listed hazardous wastes to the environment. No investigations have been conducted to characterize the burn pits or any releases that may have occurred, however, monitoring wells are to be installed around the five closed areas and the one active area under the planned RFI (G&M 1991).

2.2.5 Explosive Ordnance Detonation (EOD) Area 2

Description

Located 11 miles north of the cantonment area and 1 mile east of Georgia Highway 119, this EOD Area operated from 1979 until 1983. Excess military explosive materials were detonated in this area, creating an area of approximately 2 acres where the ground surface is covered with small craters.

Waste Characteristics

Wastes in this area include excess artillery powder bags, small arms rounds, artillery and mortar rounds, illuminating projectiles, pyrotechnics, bulk explosives, rockets, propellant and regular and smoke grenades.

Environmental Considerations

Media of concern would be soil, surface water, and groundwater. Munitions are basically consumed by detonation, therefore, migration or movement of any hazardous waste residue is not likely.

Monitoring History

In the 1987 AEHA soil analysis survey, selenium (0.259 ug/g in 1 of 10 samples), total chromium (3.92 to 4.78 ug/g in 3 of 10 samples) and cadmium (1.98 to 25.4 ug/g in 5 of 10 samples) were detected in samples taken within one inch of the surface. However, these samples were not detected in the Toxicity Extraction Procedure (EP Tox) analysis, therefore, these metals are defined as not leachable (G&M 1991).

2.2.6 Explosive Ordnance Detonation (EOD) Area 3

Description

EOD Area 3 operated from 1975 until 1980. Located four miles north of the cantonment area and one mile east of Georgia Highway 119, the area consists of one trench with a total area of approximately two acres.

Waste Characteristics

Excess military explosive materials (small arms rounds, artillery and mortar rounds, illuminating projectiles, pyrotechnics, bulk explosives, rockets, propellent and smoke grenades) were deposited in the trench.

Environmental Considerations

Media of concern would be soil, surface water, and groundwater. However, the detonation process eliminates most of the potential hazardous waste and migration of detonation products is considered unlikely.

Monitoring History

The 1987 AEHA Soil Survey detected lead (see Appendix C) in levels significantly above background in all samples. Selenium, cadmium and total chromium were also detected, but deemed not leachable by EP Tox testing. The report indicated that the compounds were not mobile in the soil (G&M 1991). This area will be investigated under the proposed RFI.

2.2.7 Explosive Ordnance Detonation (EOD) Area 4

Description

Open detonation of unexploded ordnance (UXO) took place at EOD Area 4 from 1953 to 1975. Located three miles northeast of the cantonment area, about two miles south of Georgia Highway 144, and one mile northeast of Wright Army Airfield, blast craters spread out over 10 acres which is now overgrown with trees and brush.

Waste Characteristics

Wastes characteristic of the EOD area include excess powder bags, small arms rounds, artillery and mortar rounds, illuminating projectiles, pyrotechnics, bulk explosives, rockets, propellant, and regular and smoke grenades.

Environmental Considerations

Media of concern include soil, surface water and groundwater, but migration of potential waste from this area is not considered likely since basically all the munitions products are eliminated by detonation.

Monitoring History

The 1987 AEHA Survey indicated that two soil samples taken within 1 inch of the surface contained levels of total lead above background samples (432 ug/g and 191 ug/g). Selenium to 0.787 ug/g (1 out of 9 samples), total chromium (3.69 to 4.35 ug/g in 3 of 9 samples) and cadmium (1.98 to 518.0 ug/g in 8 of 9 samples) were also detected in soil samples, however, these metals are not leachable as defined by EP Tox testing. Therefore, the report indicated that these compounds were not mobile in the in the soil. This area will be further covered in the proposed RFI.

2.2.8 The Current EOD Area

Description

The current EOD area covers approximately three acres, and is located approximately six miles north of the cantonment area, between the Artillery Impact Area and the Small Arms Impact Area south of the Canoochee River. It began operation in 1987 and is presently active. Disposal of UXO is completed by thermal treatment methods (G&M 1991).

Waste Characteristics

Wastes characteristic of the current EOD area include excess powder bags, small arms rounds, artillery and mortar rounds, illuminating projectiles, pyrotechnics, bulk explosives, rockets, propellant, regular and smoke grenades, unserviceable light antitank weapons (LAWs), dragons, and 2.75 inch rocket mortars (G&M 1991).

Environmental Considerations

Soil, surface water, and groundwater would be the media of concern, however, the potential for possible waste migration is unlikely since virtually all of the waste byproduct is eliminated during the detonation process.

Monitoring History

No known information is available to characterize the waste material at this unit. Sampling is planned for this area in the proposed RFI.

2.2.9 Old Fire Training Pit

Description

The old fire training pit is located on the southwest boundary of the cantonment area across from Zouck's Cemetery. During the 1940s and 1950s, crash response crews used this area for fire fighting training exercises, burning waste oil and petroleum contaminated with water (G&M 1991).

Waste Characteristics

Waste oil, solvents and waste fuels contaminated with water are the characteristic wastes at this site.

Environmental Considerations

Media of concern are soil, groundwater and surface water. The soils in this area consist of fine sands and sandy soils that are well drained and exhibit low pH. It is probable that groundwater flow and migration pathways would follow the general topography and flow from south to north. Therefore, a potential release of fuels or waste oil to the shallow aquifer is high (G&M 1991).

Monitoring History

The results of the 1987 AEHA survey indicated no significant soil contamination at the Old Fire Training Pit. Groundwater analysis has not been conducted but is expected to be included in the planned RFI (G&M 1991).

2.2.10 DRMO Hazardous Waste Storage Area

Description

From 1985 until 1988 hazardous waste was stored outside in a 25 ft wide by 50 ft long area, located in the cantonment area on the west side of building 1152. The area was neat, with most containers of waste in over-pack containers and no evidence of any leaks or spills on the asphalt surface (AEHA 1988).

Waste Characteristics

Wastes which were stored at this area include lead-acid batteries which were pallatized and covered, leaking drums of hazardous materials in over-pack containers, spill clean-up residue in over-pack containers, and drums of excess hazardous materials.

Environmental Considerations

Surface water and soil are the media of concern. There are no known records documenting spills or leaks occurring at this location; however, any spill would have washed to a nearby ditch and carried into the nearest surface water, or contaminated the soil in the nearby ditch. (AEHA 1987)

Monitoring History

No investigations have been made at this area although the proposed RFI will include soil boring and monitoring wells at this location. Sampling to be conducted in the proposed RFI.

2.2.11 Old Sludge Drying Beds

Description

The old sludge drying beds were located in the north central portion of the cantonment area next to the Old Sewage Treatment Plant. Sludge from the domestic wastewater treatment plant was dewatered at this site from the 1960s to 1985. The beds were closed, removed, and in 1989 they were backfilled and currently have a grass cover.

Waste Characteristics

The waste characterization of the old sludge drying beds includes sludge from the domestic wastewater treatment plant incorporated in a sand media. There is a potential for some contaminants to concentrate in the media, but no analysis is available that characterizes the waste. (G&M 1991)

Environmental Considerations

Concentration of some contaminants could occur in the sand media and possibly surface water migration.

Monitoring History

No known investigations have been conducted at this site but the site is to be included in the proposed RFI to be conducted by Geraghty & Miller. It is recommended that soil samples be taken from this area if they are not included as part of the RFI.

2.2.12 Radiator Shop

Description

The radiator shop is located inside Building 1070 in the southern portion of the cantonment area. The work area is approximately 20 ft by 20 ft, and has been in operation since 1980. Radiators are repaired at this shop by descaling the radiator and soaking it in an aqueous solution of sodium hydroxide. The next step is to encapsulate this caustic waste solution by mixing it with concrete and sodium silicate and disposing of it in the landfill (encapsulating is no longer performed at this shop). The radiator is then leak tested using a fluorescein dye and painted in a wet curtain spray paint booth located in building 1056 (G&M 1991). Waste solution is collected in drums and sent to the Hazardous Waste Storage Facility.

Waste Characteristics

Wastes generated at the radiator shop include caustic waste cleaning solution, sodium hydroxide, water-based fluorescein dye solution, and spent recirculation water from the wet curtain spray booth.

Environmental Considerations

Media of concern are soil and surface water. Wastes were discharged to a drain field that is adjacent to Building 1070. Since late 1981, the caustic waste cleaning solution has been handled as a hazardous waste. A ditch in this area is a possible containment area for any potential hazardous waste.

Monitoring History

From 1980 to late 1981, wastes were discharged to a drain field located adjacent to the radiator shop. The drain field became inoperable as a result of damage to the drain field pipes caused by heavy equipment traffic. AEHA estimated that only about one pound of lead was discharged into the drain field during this two-year period; consequently, it is unlikely that this past waste disposal operation has caused a significant contamination migration problem (ESE 1983). Addition sampling is proposed under the planned RFI.

2.2.13 Waste Oil Tanks

Description

Eighty-five waste oil tanks are located within the cantonment area, and are listed in Table 2-1. Many of the tanks are USTs and are constructed of concrete, steel, or fiberglass. Eleven of the tanks are above ground within earthen-bermed areas. The tanks which vary in capacity of from 150 gallons to 11,000 gallons, are frequently associated with Motor Pools. The tanks vary from 4 to 41 years in age.

Waste Characteristics

The waste oil tanks have been included in several inventory and tank and pipeline tightness tests conducted by Fort Stewart in the past. The tightness testing was performed for the Directorate of Engineering and Housing (DEH) by the Tracer Research Corporation in 1988. Investigations conducted by AEHA include the 1987 Evaluation of Solid Waste Management Units and the 1988 Environment Program Review. In the latter document, the waste oil was determined to be non-hazardous based on previous analytical results provided by the Fort Stewart Environmental Office. (G&M 991)

Some of the tanks included in this section contained certain mixtures of waste oil, standard type II solvent, used antifreeze, and used hydraulic fluid. (G&M 1991)

Environmental Considerations

Environmental media subject to contamination include soil and groundwater. Soil gas surveys conducted adjacent to two of the waste oil USTs revealed concentrations of VOCs up to 1,000 ppm. (USATHAMA 1991)

TABLE 2-1
WASTE OIL TANKS

Tank No.	Building No.	Capacity (gallons)	Construction Material	Installation Date	Ground Cover
1	1841	1000	Fiberglass	1982	Concrete
4	1840	2500	Fiberglass	1982	Concrete
7	1820	11000	Steel	1980	Concrete
8	1828	4000	Concrete	1982	Concrete
9	1828	4000	Concrete	1982	Concrete
10	1820	500	Steel	1980	Concrete
13	1810	2500	Steel	1982	Concrete
14	1811	500	Steel	1982	Concrete
17	1720	2000	Fiberglass	1981	Concrete
18	1720	2000	Fiberglass	1981	Concrete
19	1720	2000	Fiberglass	1981	Concrete
20	1720	2000	Fiberglass	1981	Concrete
21	1720	2000	Fiberglass	1981	Concrete
22	1720	2000	Fiberglass	1981	Concrete
23	1720	2000	Fiberglass	1981	Concrete
24	1720	2000	Fiberglass	1981	Concrete
25	1720	4000	Concrete	1981	Concrete
26	1720	4000	Concrete	1981	Concrete
27	1720	4000	Concrete	1981	Concrete
28	1720	4000	Concrete	1981	Concrete
28A	1720/22	1000	Fiberglass	1981	Concrete
28B	1720	2000	Fiberglass	1987	Concrete
29	1633	1000	Steel	1982	Concrete
38	1510/13	1000	Steel	1983	Concrete
39	1510	4000	Concrete	1983	Concrete
40	1510	4000	Concrete	1983	Concrete
42	1542	1000	Fiberglass	1983	Concrete
45	1172	500	Steel	1983	Concrete
46	1170	4000	Concrete	1981	Concrete
47	1170	4000	Concrete	1981	Concrete
56*	1056	2000	Steel	1960	Concrete
59	1160	4000	Concrete	1983	Concrete
60	1160	4000	Concrete	1983	Concrete
61	1164	500	Fiberglass	1983	Concrete
64*	1128	1000	Steel	1950	Concrete
64A*	1130	500	Steel	1970	Soil with Concrete
67*	967	1000	Steel	1969	Soil with Cement Pad
70*	955	1000	Concrete	1969	Soil with Cement Pad
71	1203	1000	Fiberglass	1980	Concrete
71A	1260	1000	Concrete	1984	Concrete
74	1280	2500	Fiberglass	1983	
75	1809	1000	Fiberglass	1985	Concrete
76	1223	1000	Fiberglass	1981	Concrete
79	1224	1000	Fiberglass	1981	Concrete
82	1266	1000	Steel	1981	Concrete

*Possible Soil Boring

WASTE OIL TANKS

Tank No.	Building No.	Capacity (gallons)	Construction Material	Installation Date	Ground Cover
83	1286	4000	Concrete	1981	Concrete
84	1285	4000	Concrete	1981	Concrete
85	1284	4000	Concrete	1981	Concrete
86	1283	4000	Concrete	1981	Concrete
89	1247	1000	Fiberglass	1981	Concrete
92	1331	1000	Fiberglass	1981	Concrete
93	1330	2500	Fiberglass	1981	Concrete
94	1320/234	1000	Fiberglass	1988	Concrete
94A	1320 (2)(4)	1000	Fiberglass	1988	Soil
94B	1339B	1000	Fiberglass	1988	Concrete
94C	1339A	1000	Fiberglass	1988	Concrete
100	1340/43F	1000	Steel	1983	Concrete
100A	1349	1000	Fiberglass	1988	Soil/no pad
100B	1350	1000	Fiberglass	1988	Soil/no pad
201A	260	1000	Fiberglass	1985	
201B	260	1000	Fiberglass	1985	
207	232	500	Steel	1985	Concrete
207A	230	2500	Fiberglass	1985	Concrete
210	272	1000	Steel	1985	
214	1503	550	Fiberglass	1988	Soil
215	1503	500	Fiberglass	1988	Soil
216	4502	1000	Fiberglass	1985	
217	4502	1000	Fiberglass	1985	
218	4502	1000	Fiberglass	1985	
219	4502	1000	Fiberglass	1985	
220	4502	5000	Fiberglass	1985	
224	4528	1000	Fiberglass	1985	
225	4529	1000	Fiberglass	1985	
228	4577	1000	Fiberglass	1985	
229	4577	1000	Fiberglass	1985	
230	4577	1000	Fiberglass	1985	
231	4577	1000	Fiberglass	1986	
232	4577	5000	Fiberglass	1986	
236	4578	2500	Fiberglass	1987	
237	4578	2500	Fiberglass	1987	
238	4586	1000	Steel	1987	
241	241	2000	Fiberglass	1985	
242	241	1000	Fiberglass	1985	
243	241	1000	Fiberglass	1985	
244	241	1000	Fiberglass	1985	

*Possible Soil Boring

Monitoring History

As of February 1991, soil borings with soil sample collection was planned for 10 of the Waste Oil USTs. Of the ten locations proposed for sampling, five are tanks 56, 64, 64A, 67, and 70. The remaining five tanks had not yet been selected. This area of concern will be addressed in the proposed RFI.

2.2.14 724th Tanker Purging Station

Description

Located on the western portion of the cantonment area near the fuel truck parking lot is the Purging Station, an area where tanker trailers carrying JP-4 Jet Fuel (JP-4), #2 Fuel Oil and Mogas are routinely cleaned. This area consists of an underground waste oil tank and an above ground storage tank that receive water after phase separation of waste oil (G&M 1991).

Waste Characteristics

Waste liquids from the purging of the tanker trailers contain assorted petroleum hydrocarbons to include JP-4, #2 Fuel Oil and Mogas.

Environmental Considerations

Potential spills could result in soil contamination around the tanks, and further soil contamination could occur if the underground tank should fail.

Monitoring History

No previous investigations have been conducted in this area. Sampling is planned at this location under the proposed RFI.

2.2.15 Motor Pools; Includes Wash Racks, Grease Racks and Steam Racks

Description

The motor pools and their associations are located throughout the cantonment area, and are listed on Table 2-2. Wash racks, steam racks, grease racks, oil/water separators, and many of the USTs are found at most motor pools.

TABLE 2-2
MOTOR POOLS (FST-027)

		Block No. Location
1st	Battalion 2nd AAA	700
1st	Battalion 5th AAA	700
1st	Battalion 41st field artillery	600
1st	Battalion 64th amour	500
1st	Battalion 14th field artillery	600 & 1200
2nd	Battalion provisional desert shield	200
2nd	Battalion 7th infantry	600 & 1200
2nd	Brigade 24th infantry mechanized	500 & 1500
2nd	Battalion 24th infantry mechanized	1500
2-4	Squadron cavalry	700 & 1100
3rd	Battalion 7th infantry	600 & 1500
3rd	Battalion 19th infantry	1200
3rd	Battalion 41st field artillery	1500
3rd	Battalion 69th amour	1600
4th	Battalion 64th amour	1500
81st	ARCOM	900
92nd	Engineers	400 & 500
124th	Military Intelligence	200
224th	Support	400 & 500
224th	Military Intelligence	1300
724th	Battalion support	200
724th	Support Battalion, Alpha & Bravo Companies	200
724th	Support, Maintenance	800
HHB	Division Artillery	800
HQ	Command	400 & 500

Source: Geraghty & Miller, Inc.

Waste Characteristics

Waste oil, antifreeze, petroleum products, and possibly solvents, are included in the waste products associated with the motor pools. Very little information is present on the motor pools, however, the potential for release to soils at all motor pools is high.

Wash rack, oil/water separators were installed in the mid-1970s, the separator effluent lines were directed to the storm drainage system. Prior to the installation of the separators, the wash rack wastewater was discharged untreated to the storm drainage system. As of 1982, all but three of the wash rack separators were connected to the new IWTP. These three wash racks are closely monitored. In 1983, an effluent pipe from the oil/water separator for the wash rack near Building 1060 was broken. Consequently, wastewater exited through a hole in the side of the pipe and entered an open drainage ditch, rather than flowing through the pipe to the IWTP. Subsequently, the pipe was repaired.

Environmental Considerations

Motor pools are potential contributors to soil surface water contamination, and to a lesser extent groundwater. The majority of the effluent in now handled by the IWTP.

Monitoring History

Past records were not complete and additional information is to be provided on these units under the proposed RFI.

2.2.16 Battery Shop

Description

Located on the western portion of the cantonment area behind building 1720, this facility is an open air cage where batteries are filled, charged and neutralized. The storage area for spent lead-acid batteries is on concrete. Recently the building has been enlarged and the concrete foundation repaired.

Waste Characteristics

Waste products associated with the servicing and charging of batteries includes sulfuric acid, and "neutralized" battery solutions.

In 1989, the GADNR noted evidence of spillage by deterioration of the concrete in the parking lot downgradient of the site, and a dissolved portion of the concrete with a leachate trail across the parking lot to bare soil. It is estimated that about two pounds of lead was discharged per year when the hazardous neutralized battery acid was discharged to the storm drainage system prior to 1981.

Environmental Considerations

The potential for release to the soil and possibly the groundwater is high (G&M 1991).

Monitoring History

Records did not indicate results of any sampling for this area, however, this unit is to be included in the proposed RFI.

2.2.17 Recirculating Wash Impoundment "Birdbath"

Description

Located on the western edge of the cantonment area off State Route 144; the Recirculating Wash Impoundment or "Birdbath" receives wastewater from the vehicle washing facility in a concrete-lined impoundment.

Waste Characteristics

Wastes characteristic of the "Birdbath" include grease and oils generated in the wash waters during the cleaning of equipment, sludge (grease and sand), nonhazardous used standard type II solvent, and used hydraulic fluid. Sludge is removed and disposed of in the on-site landfill approximately every six months.

Environmental Considerations

The "Birdbath" is reported to be a closed system so that the potential for a release to the surrounding soil or groundwater is low. This unit is included in the proposed RFI.

Monitoring History

No investigations of this site have been performed, and no available information documents a release of waste to the environment.

2.2.18 Above Ground Petroleum Product Storage Tanks

Description

There are 19 above ground petroleum product storage tanks at Fort Stewart. All of the tanks, except for five, located in the vicinity of the DEH buildings, contain petroleum products and are located at various sites on the Post. Of the five DEH tanks, two totalling 20,000 gallons in capacity, were used to contain waste oil. These two tanks are reported to be empty and are no longer in use. The remaining three tanks totalling 60,000 gallons in capacity contain asphalt that is used on the installation. All 19 of the tanks are reported to have secondary containment composed of earthen, concrete, or asphalt berms.

Waste Characteristics

All of the above ground tanks presently contain petroleum products or are empty.

Environmental Considerations

Environmental media subject to potential contamination include soil and groundwater.

Monitoring History

No environmental investigations have been conducted at these sites except for visual inspections. There are no documented releases from the storage tanks.

2.2.19 Pesticide Storage Facilities

Pesticides (insecticides, rodenticide, herbicides, and fungicides) are stored in Building 1123 at Fort Stewart. It is a corrugated metal pole barn and reported to lack fire resistance (no fire/smoke alarms) and did not have proper ventilation for cooling (ventilation fan not adequate). Consequently, inside temperature could exceed 100° F (AEHA 1988). Pesticides were stacked on wooden pallets and also directly on the floor, however, the floor is reported to be concrete with a continuous curb with no floor drains. Pesticides are mixed inside of Building 1125 and also outside the building on a concrete-curbed pad.

Waste Characteristics

Various pesticides (i.e. Diazion, Dursban, Malathion, Chlordane, Ficam W, 2,4-D, and Roundup) are stored at this area.

Environmental Considerations

Although unlikely, due to the bermed concrete floor, surface water; groundwater; and soil are the media of concern at this site.

Monitoring History

No known releases have been recorded for this area and monitoring data regarding sampling for this area was not located.

2.2.20 Former Pesticide Storage

Description

Storage activity occurred as follows: 1960 - 1973, inside Building 924; 1968 to 1973, outside Building 924 in a tent; 1973 to 1976, inside Building 1245. In the 1988 AEHA report, pesticides were noted as being stored in substandard facilities at the golf course and at the pest control shop, and pesticides were stored above food storage bags and wrap cases in the Troop Support Activity area.

Waste Characteristics

Various insecticides (i.e. Diazion, Dursban, Malathion, Chlordane, Ficam W, 2,4-D, and Roundup) were stored in these areas.

Environmental Considerations

Groundwater and surface water are media of concern particularly in the areas (i.e. golf course) where outside storage of containers and improper storage was noted. Under these conditions, the potential for contamination is high for soil and groundwater.

Monitoring History

There are no documented releases and no known environmental monitoring data is available for these sites.

2.2.21 Range and Impact Areas

Description

Ranges are areas of the installation that are authorized for the use of weapons firing and grenade and explosives detonation. Some of the ranges are used for aerial gunnery practice. The artillery impact areas are also used for aerial bomb drops. The configuration of ranges currently in place at Fort Stewart has been changed many times in the past. Thus, Unexploded Ordinance (UXO) may occur nearly everywhere on the installation exclusive of the cantonment area. (ESE 1983).

Waste Characteristics

Ordnance used on these ranges and impact areas include target practice with tracer (TPT) rounds, high explosives (HE), white phosphorous (WP), and C4 explosive. No chemical or biological agents are known to have been used at Fort Stewart. (ESE 1983)

Environmental Considerations

Environmental media subject to contamination include soil, surface water and groundwater. The deteriorations of UXOs, to a larger extent and the detonation byproducts may contribute contaminants to the environment.

Monitoring History

No environmental sampling has been conducted.

2.2.22 Underground Petroleum Product Storage Tanks

Description

There are approximately 334 USTs located at Fort Stewart. The tanks, which ranked in capacity from 100 to 50,000 gallons, are used to store various products including gasoline, diesel fuel, fuel oil, and solvents. (USATHAMA 1991)

Waste Characteristics

All of these tanks are used for storage of the above mentioned petroleum products. Two tanks (Nos. 211, 212) have been emptied of their contents and filled with sand. (AEHA 1988)

Environment Considerations

Environmental media subject to contamination are soil and groundwater.

Monitoring History

Thirty-four of the 334 USTs have been leak tested. Three 10,000 gal capacity gasoline tanks were found to have vapor leaks and one 10,000 gal capacity gasoline tank had a small product leak. A total of 210 of the USTs are registered with the state. (USATHAMA 1991).

2.2.23 Document Incinerator

Description

This unit is located in Building 338 and is a gas-fired, dual chamber burner located on a concrete pad. Pathological wastes were burned from 1976 to 1983. Since 1983, paper documents are burned once a week. Ashes are taken to the Post landfill.

Waste Characteristics

Since 1983, paper products are incinerated at this location, however, pathological wastes and animal carcasses from the veterinary activities were handled from 1976 to 1983.

Environmental Considerations

Air would be the medium of concern, however, no known releases above ambient air standards is known to have occurred. Since ash byproduct is removed to the Post landfill, potential soil, groundwater or surface water contamination is unlikely.

Monitoring History

No sampling data has been recorded for this site. No known releases above ambient air standards have been recorded.

2.2.24 Veterinary Incinerator

Description

This incinerator is located outside Building 1109 on a concrete pad and has been in operations since the 1970s. Waste is stored inside Building 1109 until the burner is fired. Cracking of the refractory and deterioration of the gasket around the door was apparent and attributed to the unit operating at excessive temperature because of overcharging or burning of classified wastes for which the unit was not designed (AEHA 1988).

Waste Characteristics

Animal carcasses and infectious waste from veterinary activities are burned. Ash is taken to the Post landfill for disposal.

Environmental Considerations

The medium of concern is air as ash is disposed at the landfill. However, no known release is known to have occurred that would exceed air quality standards. Potential contamination to soil, groundwater or surface water is unlikely because the ash is disposed of in the Post landfill.

Monitoring History

No monitoring is known to have taken place at this location. Potential contamination to soil, groundwater, or surface water is removed since the ash is disposed of at the Post landfill.

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2.2.25 Silver Recovery Unit

Description

Since 1983, the Silver Recover Unit, located in Building 302, collects film and photochemical fixer solution from the dental and medical units on Fort Stewart. A 200-gal, above-ground storage tank feeds two silver recovery cartridges in series. The recovered silver is turned over to DRMO, and the wastewater is discharged to the sanitary sewer.

Waste Characteristics

The fixer solution used in photo developing units that contain silver is the waste product at this site.

Environmental Considerations

Should a spill occur, it flows down a floor drain through the sewer line to the sewage treatment facility. The waste solution is extensively diluted and then passed through a wastewater treatment facility. It is not likely that any potential contamination would occur at this site since all potential waste products are removed from the area.

Monitoring History

Sampling is not known to have occurred at this site.

2.2.26 Transformer Storage Shed

Description

This metal shed (approximately 8 ft x 12 ft) is for temporary storage of transformers containing polychlorinated biphenyl (PCB) that are to be disposed. It is located 500 ft west of Building 1123 in the southwest corner of the DEH yard and has been in operation since 1983. The floor is concrete and has a continuous six-inch concrete berm around it. A private contractor obtains the transformers through DRMO for disposition of the units. (USATHAMA 1987)

Waste Characteristics

PCB-contaminated dielectric fluid from the transformers is a potential contaminant.

Environmental Considerations

The enclosed building with its bermed, concrete floor make environmental contamination unlikely. This results in a low potential for soil contamination.

Monitoring History

The out-of-service transformers that are stored in the shed are tested by a certified laboratory for PCBs. No known monitoring has taken place at the shed itself or the area surrounding it.

2.2.27 Heating Plants

Description

The Central Energy Plant is located in Building 1412 and burns waste oil for energy recovery. Estimated starting date for this boiler was September 1988. In 1988, a waste, wood-fired boiler was being operated and burned approximately 200 tons per day of wood chips. At the time of the site visit, visible emissions from this unit met the Georgia limitations. The Laundry Boiler Plant houses a single 150 horsepower unit and is used to provide steam and hot water only for the Post laundry. The boilers located in Building 336 at the Old Hospital Complex are only used in a standby status. A Satellite Energy Plant is used to heat the remote portions of the cantonment area and is not truly a boiler plant. The facility contains two cascade heaters which are used to reheat the live steam that is pumped to the facility.

Waste Characteristics

Wastes at this location are a mixture of waste oil, nonhazardous stoddard type II solvent, used antifreeze and used hydraulic fluid.

Environmental Considerations

If waste oil did not meet specifications, air contamination could potentially be a problem. Soil, surface water or groundwater could be potential receptors if a spill occurred at the tanks. No known releases have been reported.

Monitoring History

There are no known records indicating that monitoring has been conducted at the heating plants, however, no known releases above air quality control standards have been reported. If an oil spill should occur, this would be monitored under the oil storage tanks.

2.2.28 Wright Field Dump

Description

This area was an unofficial borrow pit located east of the Fort Stewart cantonment area, and covered between 5 to 10 acres. It was associated with construction activity at Wright Field; the usage dates are

not known. It is reported that debris (paper, crates, boxes, oil cans, steel melting, and asphalt) was disposed of in this area (AEHA 1988). The pit is no longer used and has been covered with soil.

Waste Characteristics

Debris consisting of paper, crates, boxes, oil cans, steel meltings, and asphalt were disposed of in the borrow pit.

Environmental Considerations

Media of concern include groundwater, surface water, and soil. However, due to the nature of the wastes deposited in this area, groundwater or other media is not expected to be contaminated (AEHA 1988).

Monitoring History

Records did not indicate that monitoring had taken place at this location.

2.2.29 Medical, Dental, and Veterinary Laboratories

Description

MEDDAC and DENTAC operate several clinical laboratories at Fort Stewart, including a water and sewage test laboratory at the STP, photographic processing laboratories. Table 2-3 provides a summary of the laboratories and their activities.

MEDDAC provides first stages of patient care through surgery and has been operating since the 1940s. It is located in the 300 block complex. Building 306, Clinical Laboratory, discharges dilute quantities of waste solvents and reagents to the sanitary sewer. For instance, xylene is discharged at a rate of 0.5 liter (one) per week, the infectious wastes (needles and cultures) are autoclaved, bagged in special containers and disposed of at the Post landfill. Contaminated tissue wastes are collected separately in specially marked bags and incinerated at the hospital incinerator. (ESE 1983)

The Medical Maintenance Branch located in Building 326 recovers silver from X-ray and photographic fixative solutions that are generated by the X-ray Clinic and are sent to the DRMO (formerly Defense Property Disposal Officer [DPDO]) on a quarterly basis. Once the silver is recovered, the fixative solution is discharged to the sanitary sewer.

MEDDAC also operates a veterinary clinic in Building P108. Diluted quantities of waste chemicals are discharged to the sanitary sewer while infections wastes are autoclaved and disposed of in the Post landfill. Animal carcasses and contaminated tissue are incinerated in the veterinary incinerator.

TABLE 2-3
LABORATORY OPERATIONS AT FORT STEWART

Laboratory*	Activity*	Bldg. No.
Clinical Laboratory (e.g., Histology, Hematology)	MEDDAC	306
X-Ray Clinic	MEDDAC	315
Veterinary Clinic	MEDDAC	P108
Dental Clinic No. 1	DENTAC	440
Dental Clinic No. 1 X-Ray	DENTAC	440
Dental Clinic No. 4	DENTAC	2115
Dental Clinic No. 4 X-Ray	DENTAC	2115
STP Laboratory	DEH	5016
TASO Photography Laboratory	TASO	937
Craft Photography Shop	DPCA	443
92nd Engineer Battalion Photography Laboratory	92nd Eng.	816

* TASO = Training Aids Service Office.
DPCA = Directorate of Personnel and Community Activities.

Source: ESE, 1983.

Since 1980, DENTAC has maintained clinics in Building 440 and Building 2115. The Medical Maintenance Branch recovers the silver from X-ray fixative solutions generated by the clinic and processes the silver and sends it to the DRMO quarterly. Scrap film and amalgam are processed by the Medical Maintenance Branch.

The STP laboratory, operational since the 1940s, performs routine analysis of potable water (operational control only) and wastewater. It is located in Building 5016. Waste reagents in dilute quantities are discharged to the sanitary sewer.

The Directorate of Personnel and Community Activities operates a photography laboratories in Building 443 and the 92nd Engineer Detachment operates a photography laboratory in Building 816 but they do not recover silver from the photographic fixative solutions. The fixative solutions are discharged directly to the sanitary sewer. The Training Aids Service Office (TASCO) operates a photography laboratory and does recover silver which is also turned over to DRMO for resale. (ESE 1983)

Waste Characteristics

The waste characteristics associated with the various laboratories are infectious waste, pathological wastes, animal carcasses, solvents, X-ray fixer solution, and amalgam.

Environmental Considerations

Groundwater and surface water are the media that would act as potential receptors. However, due to the disposal practices of incineration or disposal at the Post landfill, contamination is not likely since potential wastes are removed from the particular locations.

Monitoring History

Monitoring is not known to have occurred at the medical, dental and veterinary laboratories.

2.2.30 Fire Training Pit

Description

This actively used fire training pit is located on the northwest boundary of Wright Army Airfield. It is a square-shaped, concrete-lined area that is 90 ft by 150 ft. It is reported to have a soil berm existing around the perimeter of the concrete pad and a ditch for water drainage, which extend from the southwest corner of the pad. Crash response crews from the airfield have used this area for fire fighting training exercises. Waste oil and contaminated petroleum was used as fuel.

Waste Characteristics

Waste oil, solvents, and waste fuels contaminated with water were burned at this site.

Environmental Considerations

Soil and surface water are media of concern. Blackened soil in the bottom of the drainage ditch was observed and may be a possible release of waste fuel to the environment (AEHA 1987).

Monitoring History

Soil samples have been analyzed and showed evidence of total metals. In addition, background samples contained lead. Two samples contained levels of total chromium ranging from 4.13 to 17.5 ppm. However, analyses for EP Tox metals failed to demonstrate that any of these were above the detection limits (AEHA 1988).

2.2.31 Hazardous Waste Storage Area

Description

The 90-day Hazardous Waste Storage Area is located in Building 1159. The storage area consists of drums stored in the building which has a concrete floor. The floor has no drain and is curbed in order to contain a spill. The maximum container size is 55 gallons. (USATHAMA 1991)

Waste Characteristics

The types of hazardous waste stored at this site include waste solvents, waste acids, and bases, and ash. The estimated quantity of waste is approximately 4,400 gallons and it is removed by a private contractor. (USATHAMA 1991)

Environmental Considerations

As long as run-on/run-off controls are in place and maintained and other 90-Day Storage Facility requirements are met, there is little risk of environmental contamination.

Monitoring History

There has been no documented releases from this site and no environmental sampling data is available.

2.2.32 Motor Vehicle Maintenance Areas

Description

Motor vehicle maintenance occurs at various motor pool locations within the cantonment area at Fort Stewart (Buildings 1056, 1069, 1051, and 10501). Maintenance, which occurs at these sites, consists of engine oil changes, engine repair, degreasing, battery changes, and other general vehicle maintenance.

Major metal working is the only operation not performed at these sites. All of the locations have concrete floors but there is no data regarding the absence or presence of concrete berms or floor drains. (AEHA 1988, USATHAMA 1991, ESE 1983)

Waste Characteristics

The types of wastes generated during vehicle maintenance operations include waste oil, grease, used antifreeze, waste type II solvent, and asbestos. The combined estimated quantity of waste material is 2,513 gallons per month. (USATHAMA 1991)

Environmental Considerations

The environmental media subject to potential contamination include soil, surface water, groundwater and air.

Monitoring History

The waste materials generated during routine operation are disposed via several methods. The waste solvents are removed by a contractor, the waste oil is used as fuel in the heating plant, and asbestos is disposed of in the active landfill. There is no data concerning the disposal of antifreeze or any other material generated at these sites. There is no sampling data available for these sites. (AEHA 1988, USATHAMA 1991)

2.2.33 Evans Army Heliport Maintenance and POL Storage Facility

Description

The Evans Army Heliport is located approximately five miles northeast of the cantonment area at the junctions of State Road 144 and Fort Stewart 54. Light maintenance of helicopters is performed at this location, including parts cleaning and oil changing. Diesel fuel is stored at the facility in two 250,000-gal, above ground tanks that are surrounded by an asphalt-covered, 5-foot high earthen dike. (G&M 1991)

Waste Characteristics

Diesel fuel stored at the POL facility and waste fluids, primarily waste oil, and waste jet fuel occur at this site. The waste fluids are stored in 55-gal drums, then moved and burned at the heating plant for disposal. (USATHAMA 1991)

Environmental Considerations

The enclosed, bermed area surrounding the tanks at the POL facility accumulate water during rainstorms. The water is inspected and released through drain lines to the storm sewer or drainage ditch if no contamination (floating Diesel fuel) is visible. Consequently, the likelihood of release to surface water,

groundwater and soil is low. Maintenance and waste fluid storage at the maintenance facility is performed on concrete surfaces, therefore, the likelihood of environmental release is also low. (G&M 1991)

Monitoring History

No history of monitoring at this facility was revealed during the literature review, however, an RFI is planned for the POL storage area.

2.2.34 Camp Oliver and Wright Airfield Sewage Disposal Facilities

Description

Camp Oliver is located in the northeast portion of Fort Stewart along Road 125. Wright Airfield is located approximately one-half mile east of the cantonment area. Both systems are similarly configured, consisting of lined biological, oxidation lagoons, with effluent from the lagoons disposed by spray irrigation onto the land surface. Both are no-discharge systems, with all effluent evaporating, or infiltrating the soil; however, the Camp Oliver System is considerably smaller than the Wright Air Field system (G&M 1991). A more detailed description of the Wright system follows:

The Wright Airfield sewage disposal facility is located approximately one-half mile south of the airfield. Approximately 3000 gallons per day (gpd) of wastewater is discharged to 2 lined biological, oxidation lagoons, with the effluent going to a spray irrigation field. The primary lagoon is equipped with a floating aerator. The estimated capacity of the plant is 24,500 gpd operating under an NPDES permit, with seven monitoring wells providing routine data. (G&M 1991)

Waste Characteristics

Wastes at both Camp Oliver and Wright Airfield are characterized as domestic wastewater.

Environmental Considerations

Due to effective handling and treatment of solid wastes, no evidence of release of hazardous constituents to the environment has been documented, however, the potential for release to surface water, groundwater and soil exists.

Monitoring History

At Wright Airfield, monitoring is conducted monthly for BOD, suspended solids, fecal coliforms, pH, Chlorine residual, ammonia-nitrogen, and dissolved oxygen. Samples are taken from seven monitoring wells to comply with permit requirements. At Camp Oliver, BOD and suspended solids are monitored quarterly. Monitoring data pertinent to both systems is included in Appendix B.

2.2.35 Industrial Wastewater Treatment Plant (IWTP)

Description

The IWTP, operating since 1981, is located in the western portion of the Cantonment area west of Building 4420, along 15th Street. The plant receives wastewater dewatering from all wash racks, grease racks and maintenance areas within Fort Stewart except for three vehicle wash racks located in the Directorate of Industrial Operations and DEH maintenance areas. The plant consists of a pump station, bar screens, an 18-inch Parshall flume, three 25-ft x 100-ft sedimentation and oil separation basins, a 5-million gal flow equalization basin and a final 12-inch Parshall flume. Oil skimmed from the water is collected in a 4000-gal UST and transferred weekly or biweekly to a 10,000-gal storage tank. Sludge that collects in the basins and holding tanks is periodically removed to the STP and pumped to an aerobic digester for treatment and dewatering. (G&M 1991)

Waste Characteristics

Wastewater from the wash racks, grease rack and maintenance areas is transported via sewer lines to the IWTP. Wastes include crankcase oil, oily sludge and methylene chloride degreaser. (AEHA 1988)

Environmental Considerations

Effluent discharge to surface water results in a high likelihood to release hazardous constituents such as TCA, into Mill Creek. The likelihood for release to soil or groundwater is considerably lower. The Bayonet Assault/Confidence Course is located across 15th Street from the equalization basin and filtration basin. Although unlikely, a low potential exists for air transport of volatile components of wastewater such as TCA to personnel using the Bayonet Assault Facility. No other facilities are located within 500-ft of the plant. (USATHAMA 1991)

Monitoring History

Three investigations have been conducted at this location, one by ESE in 1983, and two by AEHA in 1985 and 1988. Analyses of the sludge indicate that the flash point exceed 140°. PCB concentrations were below detection limits of 7.0 PPM, and only cadmium was found above detection limits by EP TOX analysis (AEHA 1985). Analysis for total metals during this study indicated that barium, chromium, cadmium and lead were found above detection limits in the sludge, and chromium and cadmium in the wastewater. Consequently, these metals are entering the treatment system. Analytical results for volatile organic compounds indicated concentrations of TCA (160-340 ug/l) in the sludge (G&M 1991). Monitoring is also conducted to support the NPDES permit (AEHA 1988). Results are shown in Appendix B. A work plan prepared by G&M (1991) indicated that an RFI is planned for this facility.

2.2.36 Former Sanitary Treatment Plant

Description

The Former Sanitary Treatment Plant, located in the cantonment area on Hero Road, south of the current Hinesville Regional Sewage Treatment Facility (HRSTF) operated from the mid-1960s to 1985. The plant was replaced because effluent discharge could not meet the more stringent specifications imposed after July 1, 1977. During its operation, the average flow rate was 4.5 million gallons per day (mgd), with effluent discharge into Taylors Creek, a tributary of Canoochee River. All equipment has been subsequently removed, but consisted of primary sedimentation followed with secondary biological treatment via trickling filters and secondary clarification. Prior to discharge, the effluent was chlorinated in a chlorine contact tank. Sludge from the primary and secondary clarifiers is treated in aerobic digesters, then dewatered on sand drying beds. The dewatered sludge was disposed in the Post landfill. The sand drying beds, located remotely from the plant, are treated as a separate waste area.

Waste Characteristics

Because the waste stream contained only small quantities of industrial wastewater, it is unlikely that it is hazardous. For the most part, industrial wastes were treated at the IWTP, addressed as a separate wastewater area.

Environmental Considerations

The facility has been decommissioned, and since there is no past evidence of hazardous waste handling at this facility, the potential for contamination of any environmental media is low. In addition, sludge from the clarifiers, the most likely component of the waste stream to be hazardous, was transported off the site and ultimately disposed in the Post landfill.

Monitoring History

During its history of operation, effluent was routinely monitored for BOD, suspended solids, fecal coliform bacteria, chlorine, ammonia-nitrogen, and pH. No other monitoring activities are known.

2.2.37 Hinesville Regional Sewage Treatment Facility

Description

Prior to 1985, Fort Stewart operated its own sewage treatment plant. This plant, described separately, was abandoned after connection to the HRSTF. Connection is via a metered 36-inch diameter force main, then combined with other Hinesville influent. HRSTF, located on Hero Road, within the Fort Stewart Cantonment Area, has a design capacity of 7.15 mgd and currently operates at 5 mgd, with Fort Stewart contributing 2.71 mgd. The system consists of preliminary treatment including grit removal, flow metering and pre-aeration; primary settling; two-stage biological treatment; intermediate settling; biological

nitrification, chlorine disinfection; and post-aeration. Sludge is anaerobically digested, dewatered on vacuum-assisted drying beds and disposed at the Post landfill. (AEHA,1988)

Waste Characteristics

The Fort Stewart wastestream does not contain a significant amount of industrial wastewater due to separate routing of this component to the IWTP. In addition, the City of Hinesville has developed a pretreatment program to regulate the discharge of nondomestic wastewater to the HRSTF. The wastestream is likely to be compliant with federal regulations.

Environmental Considerations

Sludge, the wastestream component most likely to contain hazardous components, is disposed in the Post landfill. Effluent is discharged into Taylors Creek.

2.2.38 Package Treatment Plant

Description

Package Treatment Plant systems are located at Evans Army Airfield and TAC-X training areas. Both are Davco extended aeration package systems and consist of an aeration tank, a settling basin, a chlorine contact chamber and a sludge holding tank. The system at Evans Army Heliport has a design capacity of 125,000 liters per day and the effluent is discharged to an unnamed drainage ditch leading to Jerico River (ESE 1983). The TAC-X system has an extended aeration package system and the design capacity is 132,000 liters per day. Effluent from TAC-X is discharged to an unnamed drainage ditch leading to the Canoochee River (ESE 1983).

Waste Characteristics

Wastewater is generated at both the Evans and TAC-X package plants and both discharge this waste to above-ground, extended aeration areas. Sludge is accumulated in the sludge holding tanks of the two package STPs and is removed periodically and taken to the main Post STP and pumped into the aerobic digesters for treatment. It is ultimately dewatered on the sand drying beds before being disposed of in the Post landfill.

Environmental Considerations

Media of concern are soil, groundwater and surface water.

Monitoring History

These units were reportedly in poor condition when reviewed by AEHA in 1987. However, they are operated within the requirements of NPDES Permit No. GA0004308 which expires at the end of February 1996.

2.2.39 Gas Chamber

Description

The Gas Chamber is located in Building T-4999 within the cantonment area. This is used for mask confidence training using CS (riot control agent) and Camphor.

Waste Characteristics

CS and Camphor.

Environmental Considerations

No known releases have occurred that would impact the environment. No known monitoring has been implemented for this location.

2.3 ENVIRONMENTAL AND REGIONAL SETTING

2.3.1 Demography

A demographic profile of the area, according to the 1990 Decennial census (Figure 2-5), shows that the six county area with the four-mile radius encompassing Fort Stewart has a population of 70,920 (Table 2-4). All of the land on the Fort Stewart Reservation is used for military operations. Fort Stewart has an on-post population of 16,599 residents and 24,027 workers (Table 2-5).

2.3.2 Land Use

Approximately 7.8 square miles of the 437 square miles at Fort Stewart comprise the cantonment area. The cantonment area is largely characterized by open, maintained grass lawns with shrubs and shade trees (native and ornamental) maintained or planted around buildings or along roads and walkways. The remaining area is used for ranges and training areas or held as non-use areas.

Approximately 367 square miles is forested (approximately 87 percent of the land area). Sixty-six percent of this is pine forest with major species including the slash pine, loblolly pine and the long-leaf pine.

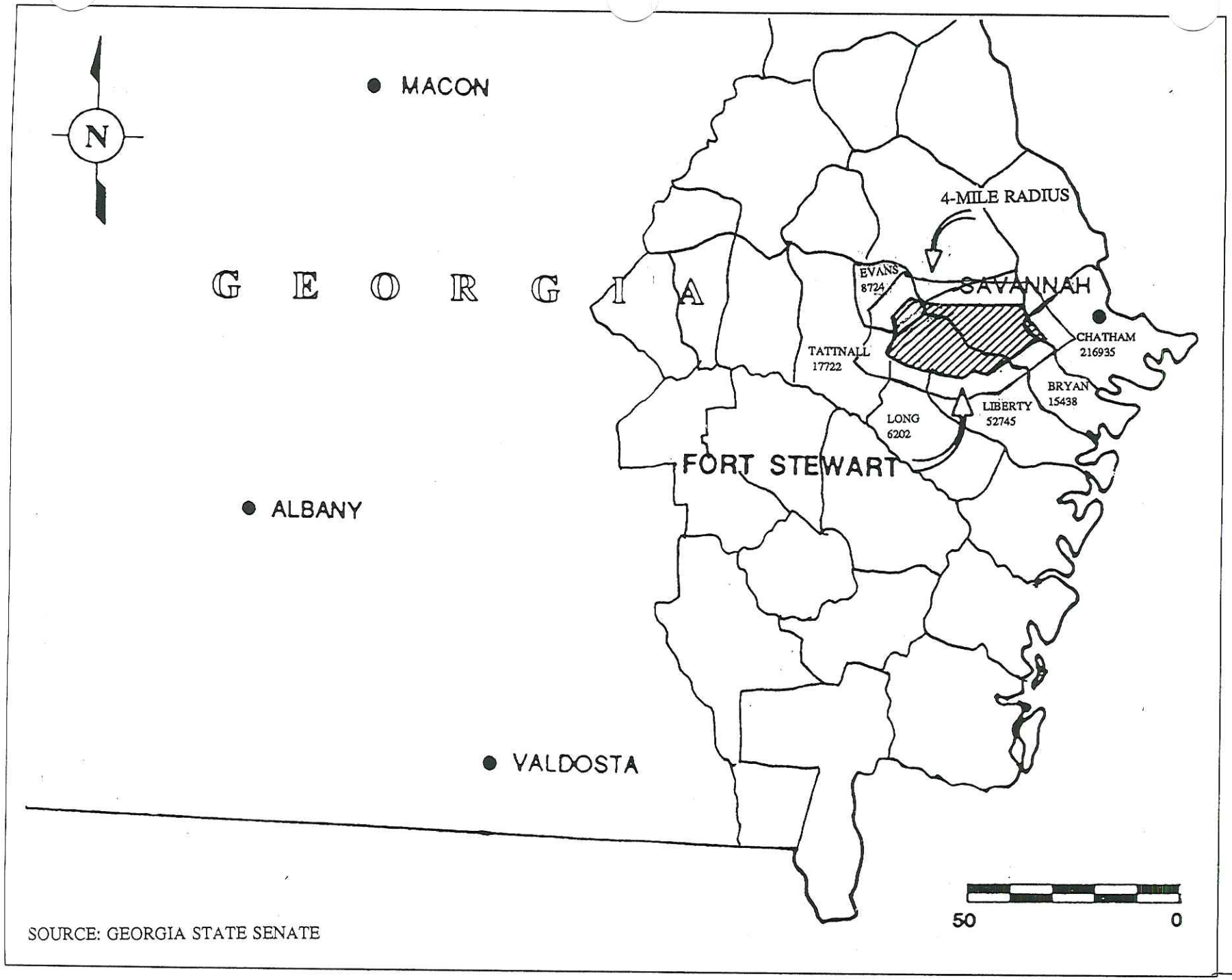


FIGURE 2.5 POPULATION OF SOUTHEASTERN GEORGIA

TABLE 2-4
POPULATION OF SOUTHEAST GEORGIA

Approximate Population within 4 miles of Fort Stewart boundary for all surrounding counties is 70,920 people.

Liberty County	(Total pop. - 42,300)
Hinesville	21,600
Flemington	500
Fleming	75
Gum Branch	280
McIntosh	500
Rural Areas	11,020
Population within 4 miles:	33,975

Bryan County	(Total pop. - 15,438)
Pembroke	1,500
Groveland	400
Lanier	200
Ellabell	350
Richmond Hills	2,930
Rural Areas	3,800
Population within 4 miles:	9,180

Evans County	(Total pop. - 8,730)
Daisy	140
Rural Areas	1,370
Population within 4 miles:	1,150

Long County	(Total pop. - 6,000)
Rural areas	620
Population within 4 miles:	620

Chatham County	Total pop. - 216,400)
William Hill	500
Burroughs	500
Rural Areas	15,460
Population within 4 miles:	15,960

Tattnall County	(Total pop. - 18,200)
Midway	500
Glennville	3,680
Rural Areas	3,540
Population within 4 miles:	7,720

TABLE 2-5
ON-POST POPULATION OF FORT STEWART

Number of Residents on Facility	16,599
Number of Military Personnel	16,699
Number of Civilian Personnel	3,746
Number of Personnel in Training	3,583
Total Number of Personnel	24,028

Thirty-four percent of the forest is comprised of river bottom lands and swamps whose major species include tupelo, gum, water oak, and bald cypress trees. Approximately 70,000 acres or 20 percent of the total areas are designated wetlands.

2.3.3 Soil

The natural soil types present at Fort Stewart range from excessively drained to poorly drained. The excessively drained soils are composed of nearly pure sands often located at higher elevation on the Post. The poorly drained soil tends to occur at lower elevations in associations with swamps. Poorly drained soil on the Post tends to be higher in organic matter than other soils. Due to the very low topographic relief of the site, most of the soils have a seasonally high water table. The soil at Fort Stewart is especially vulnerable to erosion once vegetation has been removed. (AEHA 1988) Soil data resulting from sub-surface investigations at Fort Stewart may be found in Appendix D.

2.3.4 Biota

Fort Stewart has a strong program of fish and wildlife management, as well as habitat management. Management activities include controlled harvest of game animals; stocking, fertilizing, and control of pond fish populations; controlled opening of forest areas to increase edge habitat and early successional growth; and the maintenance of areas in annual and perennial wildlife food plants (McMaster et al, 1983).

Aquatic habitats on Fort Stewart include a number of natural or man-made ponds and lakes, the Canoochee River, Canoochee Creek and tributaries, and a number of bottom land swamps and pools. The Ogeechee River borders the installation along its northeast boundary. Organic detritus content is high and dark coloring of the water is not unusual. Dense growths of aquatic vegetation are also typical, especially during summer months (G&M 1991).

Both terrestrial and aquatic fauna are abundant in the unimproved areas of Fort Stewart. Major game species found on the installation include white-tailed deer, feral hog, wild turkey, rabbit, squirrel, and bobwhite in addition to numerous mammal, bird, reptile and amphibian species (ESE, 1983). Three federally listed threatened or endangered species reside at Fort Stewart; the American alligator (*Alligator mississippiensis*), Eastern indigo snake (*Drymarchon coralis couperi*), and the red-cockaded woodpecker (*Picoides borealis*).

Dominant fish include bluegill, largemouth bass, crappie, sunfish, channel catfish, minnows, and shiners. The top three species of fish harvested from the Ogeechee River are white catfish, channel catfish, and redbreast sunfish. Fish harvested from the Ogeechee River are generally smaller than those harvested from the Savannah River. The Savannah and Ogeechee River estuarine creel surveys were conducted between the months of October 1989 and March 1990. Summarized data can be found in Appendix D.

2.4 HYDROLOGY

2.4.1 Climatology

The climate of Fort Stewart is humid subtropical. Temperatures range from an average of 50° Celsius in July to 80° Celsius in December. The annual precipitation averages 48 inches, with slightly over half falling from June through September. Under normal conditions, wind speeds rarely exceed five knots; however, thunderstorms are prevalent from May to September and may produce gusty winds over 25 knots from the northwest (McMaster et al. 1983). The 2-year/24-hour rainfall for Fort Stewart is approximately 4.5 inches. (USDA 1986)

2.4.2 Overland Drainage

The majority of Fort Stewart is located within the Canoochee River watershed. The principal water courses on Fort Stewart are the Canoochee River and tributaries of the Ogeechee River. Most of the surface waters on Fort Stewart drain into the Canoochee River, which passes through the northwestern, central and southeastern areas of the installation and joins the southward-flowing Ogeechee River (Figure 2.6). The Ogeechee River forms part of the northeastern boundary of Fort Stewart. The remaining surface waters represent a relatively small percentage of the total volume of water leaving the area. Some streams along the eastern margin of the installation move to the Ogeechee River through undefined drainageways. Others along the southeastern margin flow southward to the Jerico and North Newport Rivers. In the eastern half of the installation, 60 percent of the surface area is comprised of marshes and swamps (McMaster et al, 1983). Daily mean discharge values for area surface water are located in Appendix F.

Four major lakes and ponds are located on the installation, Pineview Lake, Glissons Pond, Holbrook Pond, and Cantonment Pond. Daily mean discharges for Canoochee Creek and Ogeechee River are listed in Appendix F.

2.4.3 Potentially Affected Water Bodies

The water bodies most likely to be impacted by contaminants include Glissons Pond, Taylors Creek, Canoochee Creek, and the Canoochee and Ogeechee Rivers. The Canoochee River receives stormwater runoff from the cantonment area and effluent from sewage and industrial wastewater treatment plants at Fort Stewart.

2.4.4 Surface Water Usage

The major water bodies at Fort Stewart water are classified by the State of Georgia, as follows:

- Taylors Creek — Fishing
- Canoochee Creek — Fishing
- Canoochee River — Fishing (if NPDES permit requirements are met)
- Ogeechee River — Recreation

There are no surface water intakes within a 15-mile radius of Fort Stewart.

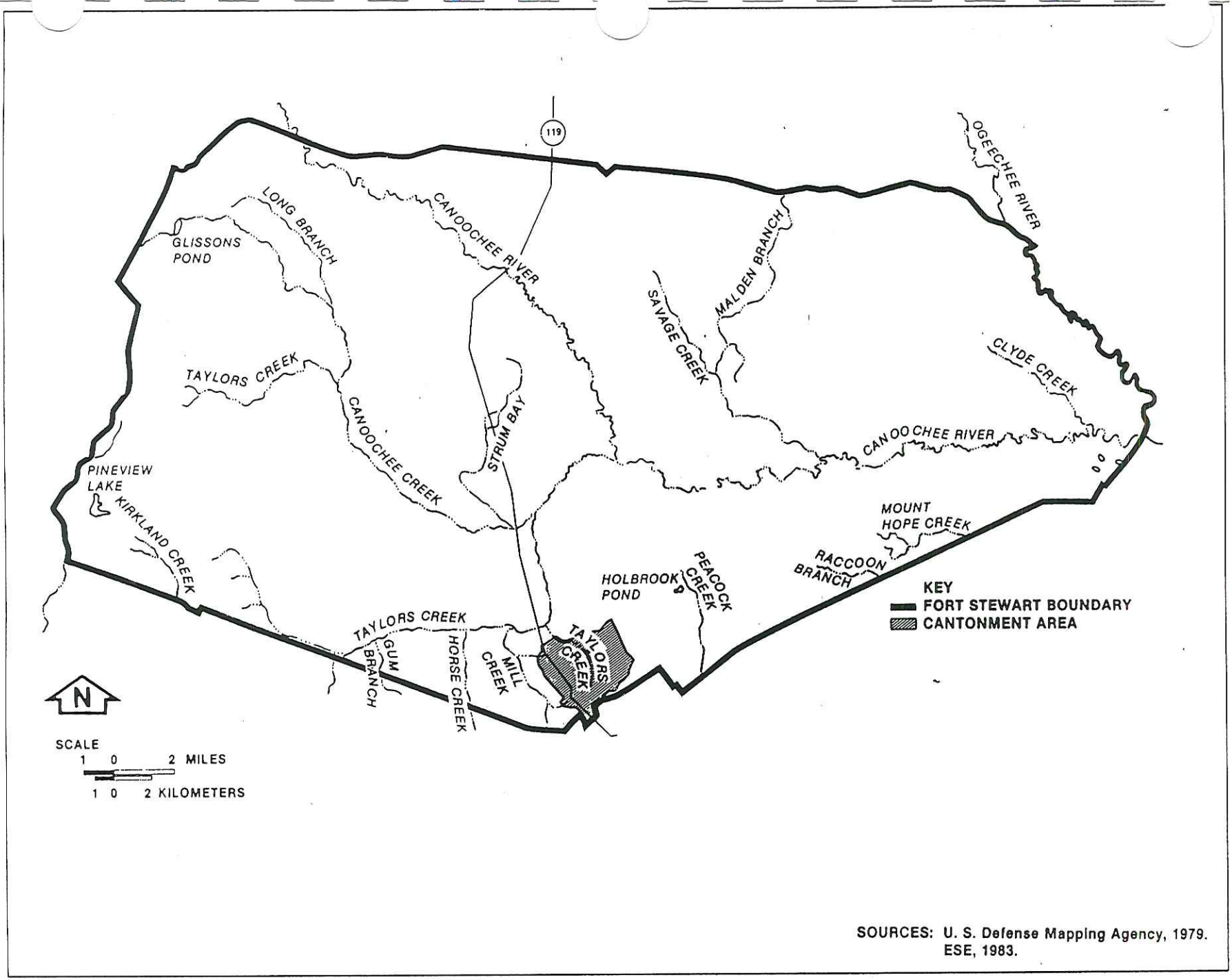


FIGURE 2.6 OVERLAND DRAINAGE

2.5 REGIONAL AQUIFER CHARACTERISTICS

2.5.1 Geological Setting

The site is located within the Southern Atlantic Coastal Plain Physiographic Province. The Province is characterized by a wedge of gentle, southeast-dipping, clastic sediments that overlie the crystalline basement rock. The unconsolidated clastic sediments thicken in an easterly direction. The topography of the Coastal Plain within the study area is flat-lying becoming gently rolling in the northwestern portion of the installation. The maximum relief in the study area is approximately 176 ft. Surface water drainage patterns are primarily dendritic. Meanders develop in stream channels in the eastern portion of the installation where swamps and marshes are common. (G&M 1991, Warren 1944)

The site is underlain by non-indurated sediments which are recent to Pliocene in age (See Figure 2.7). Various older geologic units occur stratigraphically underlying the Quaternary deposits, but they do not crop out within the study area. The geologic column is detailed in Figure 2.8. (G&M 1991)

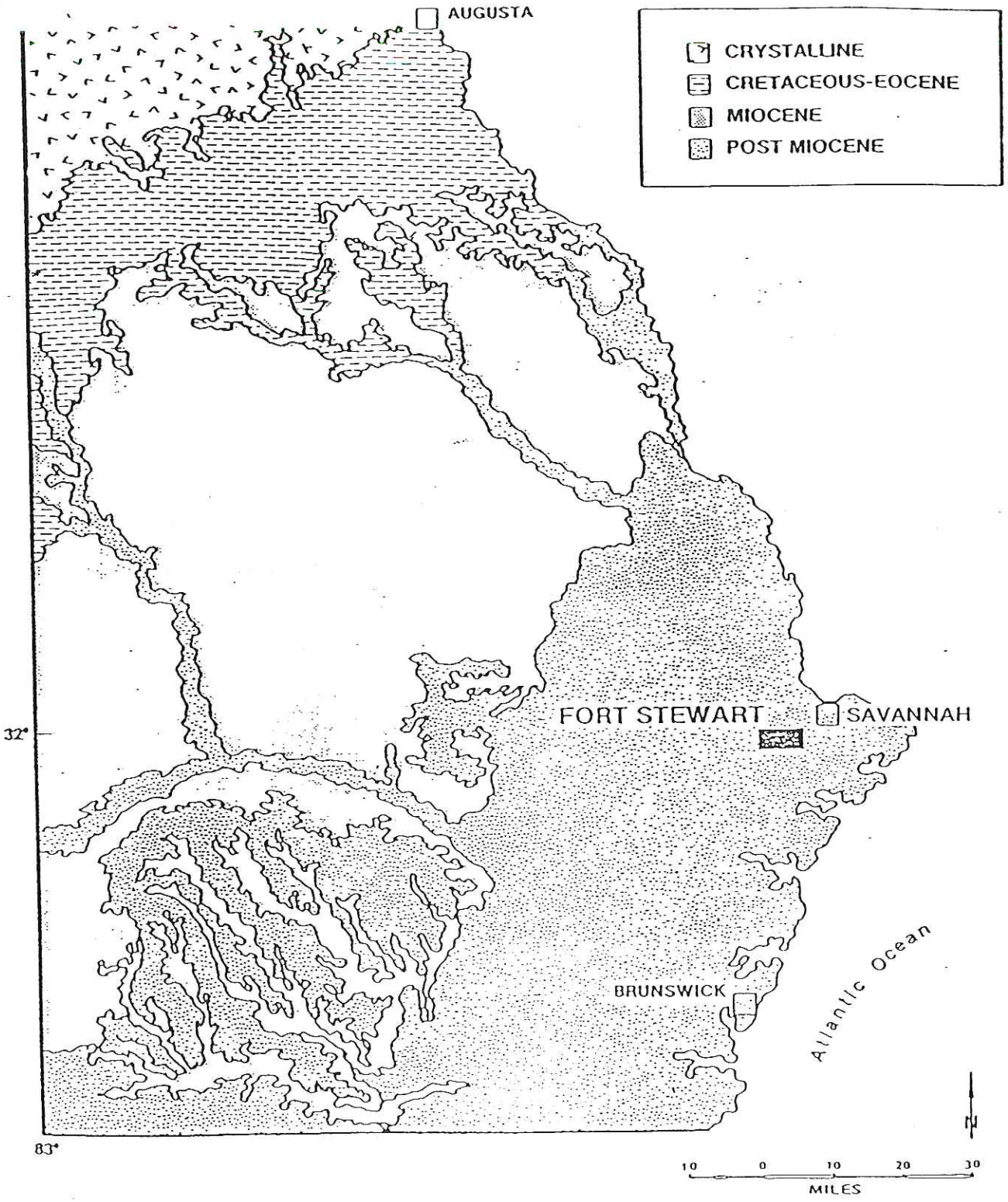
The surficial Holocene age sedimentary unit beneath the site is generally loose, structureless and massive. The color ranges from pale gray to buff and white. The texture is fine- to medium-grained, and well sorted. The average thickness of this unit is 25 ft. (G&M 1991)

Stratigraphically underlying the Holocene sediments are lacustrine and palustrine derived fine-grained sediments. The upper Miocene age units tend to function as a confining layer between the upper or lower aquifer. (G&M 1991)

2.5.2 Groundwater

All of the lithologic units within the study area are water bearing. Groundwater movement and storage occur in the primary intergranular porosity of the unconsolidated sediments. The recharge of groundwater is by the infiltration of precipitation through the soil. Water that is not absorbed in this manner is returned to the atmosphere by means of transpiration, evaporation, or flows as runoff to topographic lows. The discharge of groundwater is to pumping wells and to the maintenance of baseflow in streams and wetlands. (G&M 1991, Fetter 1988)

The geologic units beneath the site function as two aquifers (see Figure 2.8) that may be in hydrologic communication under certain conditions (ESE 1982). The upper aquifer or water table aquifer is present in the Recent to Pliocene age sediments. It is separated from the lower confined aquifer by the upper members of the Miocene age Hawthorn Group. The confined aquifer is the artisian Floridan aquifer. The recharge area for the Floridan aquifer is located northwest and outside of the study area. (G&M 1991)



SOURCE: GERAGHTY & MILLER, INC. 1991

FIGURE 2.7 SEDIMENTS OF SOUTHEASTERN GEORGIA

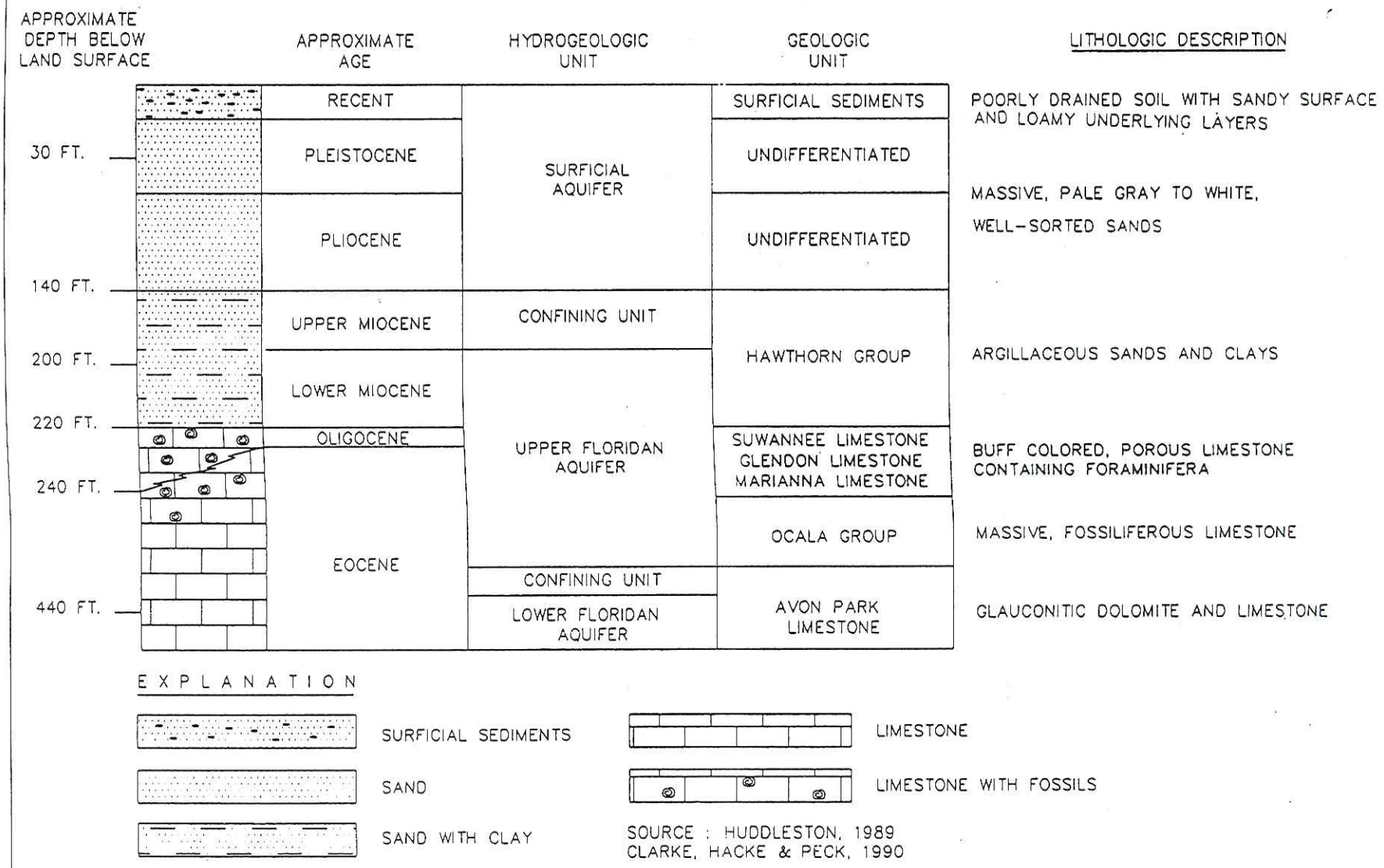


FIGURE 2.8 GEOLOGIC COLUMN

The depth below land surface to groundwater of the surficial aquifer ranges from 2 to 140 ft. The hydraulic conductivity of the surface soils ranges from $8x10^{-5}$ to $8x10^{-3}$ ft per second and is often in the lower portion of the range. The transmissivity of the surficial aquifer material ranges from 14 to 6,700 ft^2/day. Wells producing from this unit yield from 2 to 180 gallons per minute. Tidal influences in this aquifer may occur in the extreme eastern portion of the installation, east of the 20 ft topographic contour line. (G&M 1991)

Underlying the surficial water table aquifer, is the Floridan aquifer, which is an important regional aquifer. The Floridan aquifer is divided into an upper and lower unit. The upper Floridan is coincident with the Lower Miocene age non-indurated, sedimentary units and the oligocene and Upper Eocene age limestone units. The lower Floridan aquifer yields brackish water. The depth below land surface to the top of the upper Floridan aquifer is approximately 185 ft. The transmissivity of the upper aquifer ranges from 28,000 to 30,200 ft^2/day in the Savannah area east of the installations. (G&M 1991)

2.5.3 Aquifer Use

Residents living within a four-mile radius of the installation boundary and residents and employees of Fort Stewart receive potable water from groundwater sources, distributed from seven public water supply systems. Data concerning the six municipal systems operating within the study area may be found in Table 2-6. The well locations are depicted in Figure 2.9. Residents not served by public water supplies are assumed to rely on private individual groundwater sources.

Fort Stewart maintains its own potable water distribution system. There are 31 groundwater wells located on the installation (Figure 2.10). Five of these wells are used to supply water to the distribution system that serves the cantonment area (Figure 2.11). These wells produce from the upper Floridan aquifer. There are four other active groundwater supply wells located elsewhere on the installation that serve as individual water supplies. Data concerning these four wells may be found in Table 2-7. The remaining 22 wells are distributed across the Post. Of these, two are on standby and the remaining twenty are no longer in use. Additional data concerning groundwater wells at Fort Stewart may be found in Appendix G.

Monitoring wells and observation wells have been installed at several locations at Fort Stewart. The boring logs, completion diagrams and test data from these wells may be found in Appendix D. The locations of these wells may be found in Appendix H.

TABLE 2-6
PUBLIC WATER SUPPLIES IN SOUTHEAST GEORGIA

BRYAN COUNTY

Population: 15,440
Population served by public supply: 4,440
Acres irrigated: 0
Hydroelectric use (Mgal/d): 0

WITHDRAWALS IN MILLION GALLONS PER DAY							
	Public Supply	Domestic & Commercial	Industry & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Groundwater	0.95	0.73	0.01	0.00	0.36	0.00	2.05
Surface Water	0.00	0.00	0.00	0.00	0.01	0.00	0.01
TOTALS	0.95	0.73	0.01	0.00	0.37	0.00	2.06

Withdrawals by Major Public Suppliers (Mgal/d):

	GW	SW	No. of Supply Wells
*City of Pembroke (1503)	0.35	0.00	2
*City of Richmond Hill (2934)	0.50	0.00	3

Withdrawals by Major Industrial Groups (Mgal/d):

SIC	GW	SW
24 Lumber	0.01	0.00

CHATHAM COUNTY

Population: 218,100
Population served by public supply: 215,890
Acres irrigated: 930
Hydroelectric use (Mgal/d): 0

WITHDRAWALS IN MILLION GALLONS PER DAY							
	Public Supply	Domestic & Commercial	Industry & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Groundwater	31.31	2.69	36.06	1.30	0.01	2.31	73.68
Surface Water	34.50	0.00	37.16	0.28	0.02	350.00	421.96
TOTALS	65.81	2.69	73.22	1.58	0.03	352.31	495.64

Withdrawals by Major Public Suppliers (Mgal/d):

	GW	SW	No. of Supply Wells
City of Bloomingdale	0.10	0.00	2
Chatham County	0.89	0.00	12
City of Garden City	1.5	0.00	5
Hunter Army Airfield	1.03	0.00	7
Town of Pooler	0.41	0.00	2
City of Port Wentworth	0.43	0.00	4
City of Savannah	23.88	0.00	38
Savannah Ind. & Dom. Water Syst.	0.00	34.50	0
Skidaway Island Utilities	0.37	0.00	3
Town of Thunderbolt	0.43	0.00	2
City of Tybee Island	0.51	0.00	2
*William Hill (650)	0.04	0.00	2

Withdrawals by Major Industrial Groups (Mgal/d):

SIC	GW	SW
14 Mining	0.01	0.00
16 Construction	0.15	0.00
20 Food	3.41	0.00
24 Lumber	0.06	0.00
26 Paper	23.89	25.00
28 Chemicals	7.07	12.16
29 Petroleum	0.72	0.00
32 Stone, Clay	0.17	0.00

TABLE 2-6 (Continued)
PUBLIC WATER SUPPLIES IN SOUTHEAST GEORGIA

EVANS COUNTY

Population: 8,730
Population served by public supply: 4,420
Acres irrigated: 2,770
Hydroelectric use (Mgal/d): 0

WITHDRAWALS IN MILLION GALLONS PER DAY							
	Public Supply	Domestic & Commercial	Industry & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Groundwater	0.49	0.31	0.71	0.83	0.05	0.00	2.39
Surface Water	0.00	0.00	0.00	0.90	0.03	0.00	0.93
TOTALS	0.49	0.31	0.71	1.73	0.08	0.00	3.32

Withdrawals by Major Public Suppliers (Mgal/d):

	GW	SW	No. of Supply Wells
City of Bellville	0.04	0.00	1
City of Claxton	0.34	0.00	4
*City of Daisy (138)	0.02	0.00	1
City of Hagan	0.09	0.00	2

Withdrawals by Major Industrial Groups (Mgal/d):

SIC	GW	SW
20 Food	0.71	0.00

LIBERTY COUNTY

Population: 42,300
Population served by public supply: 39,020
Acres irrigated: 110
Hydroelectric use (Mgal/d): 0

WITHDRAWALS IN MILLION GALLONS PER DAY							
	Public Supply	Domestic & Commercial	Industry & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Groundwater	3.37	2.18	10.11	0.14	0.01	0.00	15.81
Surface Water	0.00	0.00	0.00	0.00	0.01	0.00	0.01
TOTALS	3.37	2.18	10.11	0.14	0.02	0.00	15.82

Withdrawals by Major Public Suppliers (Mgal/d):

	GW	SW	No. of Supply Wells
*City of Hinesville	2.96	0.00	4
City of Midway	0.02	0.00	1
City of Walthourville	0.13	0.00	2
City of Riceboro	0.02	0.00	2

Withdrawals by Major Industrial Groups (Mgal/d):

SIC	GW	SW
26 Paper	10.11	0.00

TABLE 2-6 (Continued)
PUBLIC WATER SUPPLIES IN SOUTHEAST GEORGIA

ONG COUNTY

Population: 6,000
Population served by public supply: 2,880
Acres irrigated: 80
Hydroelectric use (Mgal/d): 0

WITHDRAWALS IN MILLION GALLONS PER DAY							
	Public Supply	Domestic & Commercial	Industry & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Groundwater	0.21	0.20	0.00	0.00	0.02	0.00	0.43
Surface Water	0.00	0.00	0.00	0.00	0.01	0.00	0.01
TOTALS	0.21	0.20	0.00	0.00	0.03	0.00	0.44

Withdrawals by Major Public Suppliers (Mgal/d):

	GW	SW	No. of Supply Wells
City of Ludowici	0.14	0.00	2

Withdrawals by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		

ATTNALL COUNTY

Population: 18,200
Population served by public supply: 9,220
Acres irrigated: 8,060
Hydroelectric use (Mgal/d): 0

WITHDRAWALS IN MILLION GALLONS PER DAY							
	Public Supply	Domestic & Commercial	Industry & Mining	Irrigation	Livestock	Thermo-electric	TOTALS
Groundwater	1.06	1.56	0.00	1.12	0.19	0.00	3.93
Surface Water	0.00	0.00	0.00	1.04	0.10	0.00	1.14
TOTALS	1.06	1.56	0.00	2.16	0.29	0.00	5.07

Withdrawals by Major Public Suppliers (Mgal/d):

	GW	SW	No. of Supply Wells
City of Cobbtown	0.07	0.00	2
City of Collins	0.06	0.00	2
*City of Glennville (3700)	0.50	0.00	4
City of Manassas	0.02	0.00	1
City of Reidsville	0.40	0.00	2

Withdrawals by Major Industrial Groups (Mgal/d):

SIC	GW	SW
None		

TABLE 2-7
WELL DATA

Summary of number of wells by type of water use, by county, 1980.

Use of Water	Bryan County	Chatham County	Liberty County	Long County
Industrial	0	38	2	0
Irrigation	0	4	0	0
Public supply	13	67	9	0
Commercial	2	11	6	0
Domestic	9	23	19	0
Recreation	0	3	0	0
Air Conditioning	0	5	0	0
Stock	0	2	4	0
Institution	3	13	0	0
Unused*	11	44	24	1
Fire	0	1	0	0
Other	0	0	0	0
Unknown	0	0	0	0
Total	38	211	64	1

* This category includes wells for the purpose of ongoing testing and monitoring, and abandoned wells for which important data exist.

Summary of ground-water use for irrigation by county, 1980.

Type of Irrigation System		Bryan County	Chatham County	Liberty County	Long County
Portable Pipe	Number of Systems	0	0	1	16
	Acres Irrigated	0	0	25	515
Cable Tow	Number of Systems	0	0	0	0
	Acres Irrigated	0	0	0	0
Hose Reel	Number of Systems	0	0	0	0
	Acres Irrigated	0	0	0	0
Solid-set Sprinkler	Number of System	2	11	4	0
	Acres Irrigated	2	684	156	0
Center Pivot	Number of Systems	0	0	0	0
	Acres Irrigated	0	0	0	0
Drip Trickler	Number of Systems	0	0	0	0
	Acres Irrigated	0	0	0	0
Total	Number of Systems	2	11	5	16
	Acres Irrigated	2	684	181	155

Summary of total ground-water use, by county 1980

Use of water	Water use, in million gallons per day			
	County			
	Bryan	Chathman	Liberty	Long
Public supply	0.55	29.11	5.50	0.22
Rural (total)	.14	.87	3.05	.25
Domestic	.12	.86	3.04	.22
Livestock	.02	.01	.01	.03
Irrigation	.01	.29	.17	.00
Industrial (total)	.20	41.16	8.51	.00
Mining	.00	.00	.00	.00
Food	.00	4.28	.00	.00
Textiles	.00	.00	.00	.00
Lumber	.00	.21	.00	.00
Paper	.00	26.33	8.51	.00
Chemicals	.00	8.81	.00	.00
Stone, clay	.00	.19	.00	.00
Miscellaneous	.20	1.79	.00	.00
Power generation (thermoelectric)	.00	4.20	.00	.00
Totals	.90	71.88	17.23	.47

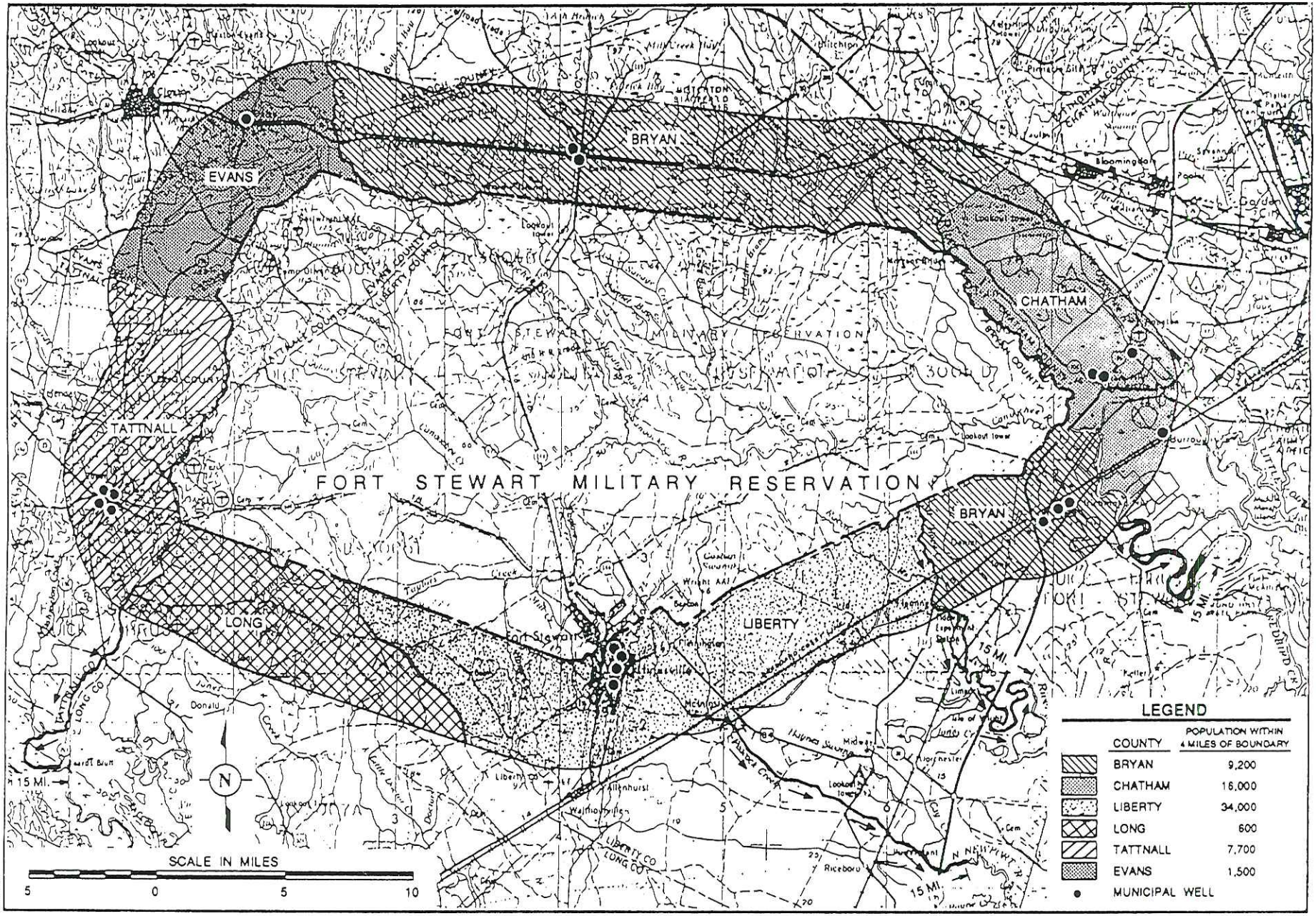
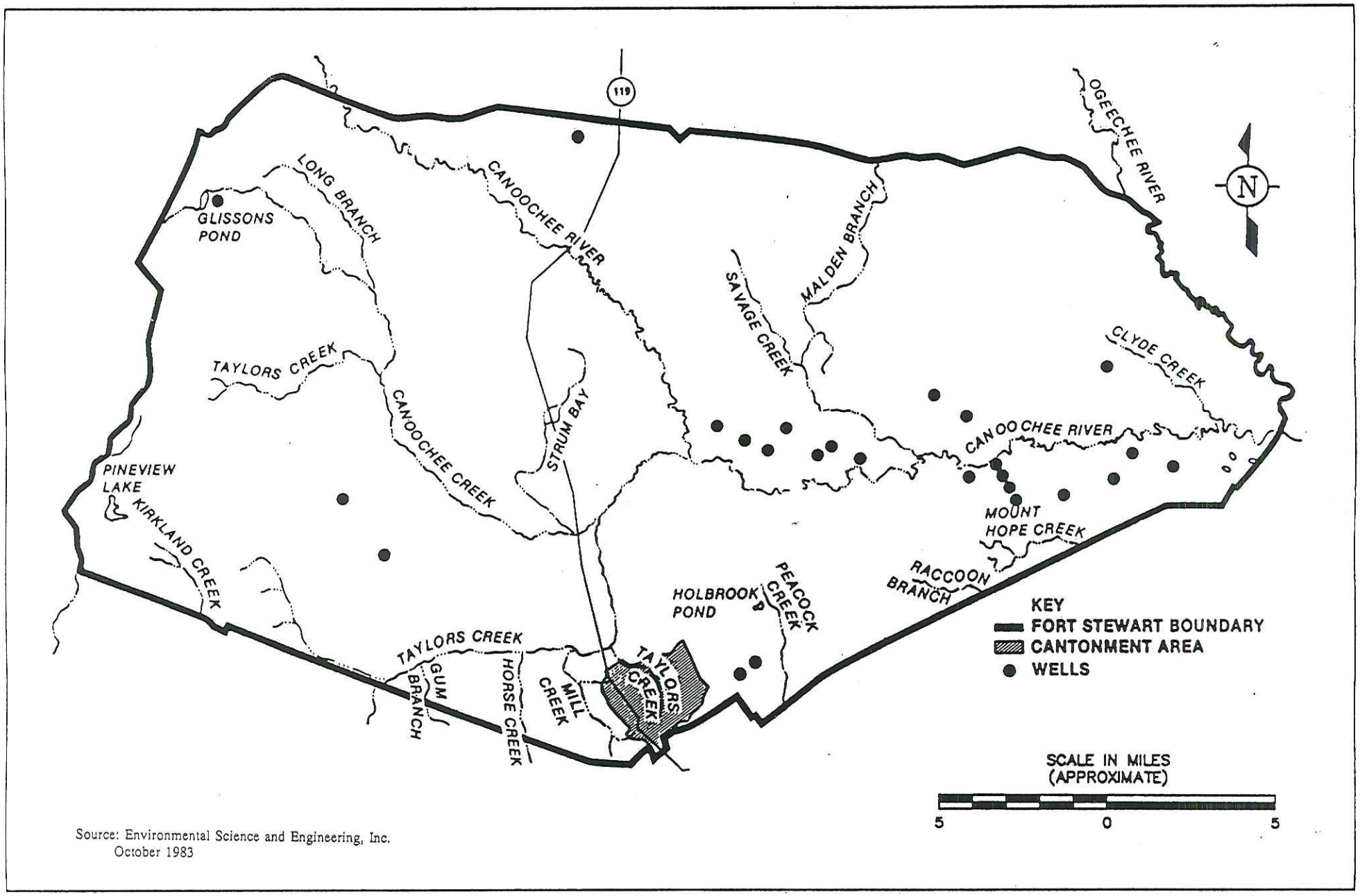
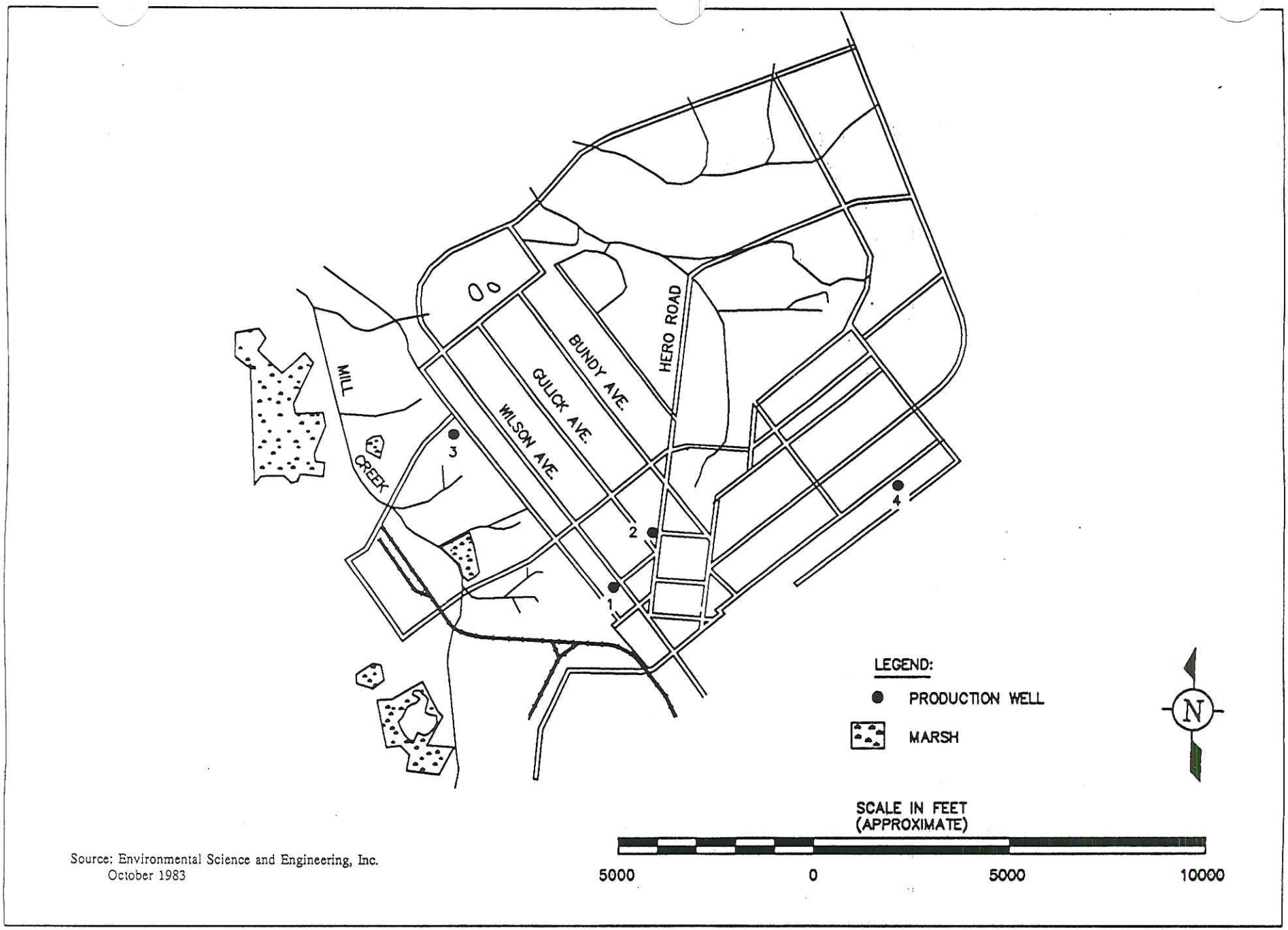


FIGURE 2-9. FOUR MILE RADIUS WITH MUNICIPAL WELL LOCATIONS



Source: Environmental Science and Engineering, Inc.
October 1983

FIGURE 2-10. DRINKING WATER WELL LOCATIONS AT FORT STEWART



Source: Environmental Science and Engineering, Inc.
October 1983

FIGURE 2-11. DRINKING WATER WELL LOCATIONS IN CANTONMENT AREA

3.0 TARGET ANALYSIS

Thirty-nine waste areas were assessed within Fort Stewart. Contamination could potentially emanate from many of them and impact on-site and off-site human receptors and the environment. The following sections discuss receptor locations, transport mechanisms and other parameters that may impact each of the environmental media.

3.1 SOIL

No evidence to support significant amounts soil contamination at Fort Stewart was encountered, and leachate was reportedly observed emanating from the Post Landfill and small areas of blackened, or stained ground was also reported. None of the stained areas, however, represent a large spill. Human impacts as a result of soil contamination include direct ingestion, skin contact and indirect uptake via the food pathway. As hunting is a popular activity at Fort Stewart, the latter pathway is the most probable, considering reported site conditions. Areas such as EOD demolition sites, where metals are present, range areas, burn pits and landfills represent the greatest potential for uptake by plants and animals.

3.2 SURFACE WATER

Fort Stewart, and the counties and municipalities that immediately surround it obtain potable water from groundwater sources, therefore, no water intake structures are known to occur within 15-miles of the installation. Streams deemed suitable for fishing and/or recreation by (the State of Georgia) are located within or adjacent to Fort Stewart. In addition, wetlands in the form of marshes, swamps and riparian woodlands comprise more than 20 percent of the land area. Wetlands may comprise as much as 60 percent of the eastern half of the installation. Consequently, potential impacts to humans via direct contact with contaminated recreational water or ingestion of contaminated aquatic species may occur. Potential degradation of habitat may occur as a result of transport of contaminants to wetland soil and surface water. Although no substantial evidence exists to support environmental degradation, effluent from the wastewater treatment facilities and leachate from the landfills could impart a future impact on surface water and associated wetlands.

3.3 GROUNDWATER

Groundwater is the major source of potable water within Fort Stewart, and the four-mile radius of the Post. The most important aquifer, and consequently, the aquifer of concern, is the Floridan aquifer. Water is obtained from this aquifer throughout the region, including Fort Stewart, Hinesville, and Savannah. Private homes and farms within a four-mile radius of the Post may obtain water from the shallow, unconfined aquifer that overlies the Floridan aquifer. No evidence exists to support off-site contamination of potable water supplies, however, groundwater is especially susceptible to contamination from leachate emanating from landfills, untreated industrial wastes and spills, and unregulated land disposal of effluent.

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3.4 AIR

Fort Stewart is situated in the Savannah-Beaufort Interstate (Georgia-South Carolina) Air Quality Control Region. Those portions of the Air Quality Control Region which contain Fort Stewart have been classified by EPA as "better than National Ambient Air Quality Standards" for total suspended particles and sulfur dioxide (SO_2); and "cannot be classified as better than National Ambient Air Quality Standards" for carbon monoxide (CO), ozone (O_3), and nitrous oxide (NO). (AEHA 1988)

Small-scale industrial operations at Fort Stewart that may adversely affect air quality include cold-bath solvent cleaning, woodworking operations, painting, and construction/renovation projects. No permits have been required for these operations. The GADNR maintains and operates numerous ambient air quality monitoring stations throughout the state (AEHA 1988). There have been no documented releases of hazardous materials at Fort Stewart. The potentially affected population within a four-mile radius of Fort Stewart is 92,633 persons.

4.0 FIELD INVESTIGATIONS

Field investigations were not conducted as part of the PSI. Data from previous investigations when available, were used, in the assessment process.

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5.0 SUMMARY

Fort Stewart occupies approximately 279,270 acres in eastern Georgia and is approximately 34 miles southwest of Savannah, Georgia. The facility lies within the Southern Coastal Plain Physiographic Province and is underlain by a thick wedge of sediments that dip southeastward toward the Atlantic coast. Near-surface sediments range in permeability from low to moderate, consisting mostly of sandy materials with various percentages of silt and clay. Potentially affected targets include plant, animal and human populations near the facility. Possible pathways for the transport of contamination include surface water, groundwater, soil and air.

This PSI assessed 39 waste areas at Fort Stewart and indicates that there is a low overall potential for environmental degradation if proper waste management procedures are followed and if monitoring is conducted at selected areas to ensure compliance with environmental regulations. For instance, the occurrence of TCA and metals in the IWTP effluent and sludge should be confirmed, EOD areas should undergo additional evaluation, as well as the landfills throughout the Post, as leachate was indicated emanating from the Post landfill. Much of these additional studies will be supported by the RFI planned by G&M. Future analysis of data gathered from this study can be used to fill data gaps or confirm the need for additional regulatory activities at the Post.

Groundwater from the Floridan aquifer is the most important supply of potable water for the entire region, including the population residing within a four-mile radius of the Post. Proper waste management practices at Fort Stewart will help protect this valuable resource. Surface water is an important environmental medium as 20% of the site is considered wetlands, and fishing and recreational activities are practiced in waters within and near Fort Stewart.

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