

**Monitoring Well Abandonment Report  
Multiple Sites at Fort McClellan**

**Calhoun County, Alabama**

**Prepared for:**

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## **List of Acronyms**

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ADEM	Alabama Department of Environmental Management
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
EPA	U.S. Environmental Protection Agency
FTMC	Fort McClellan
Shaw	Shaw Environmental, Inc.
SI	site investigation
USACE	U.S. Army Corps of Engineers
UST	underground storage tank
WAC	Women's Army Corps

## 1.0 Introduction

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Shaw Environmental, Inc. (Shaw) completed well abandonment activities at multiple sites within Fort McClellan (FTMC) in Anniston, Alabama. These activities were in support of environmental investigations conducted by Shaw under contract with the U.S. Army Corps of Engineers, Mobile District.

A total of 28 monitoring wells were abandoned at the following 14 sites:

- Telephone Exchange Building 251, Parcel 3(3)
- Recreation Building 503, Parcel 9(3)
- Ammunition Supply Point, Building 4400, Parcel 31(3)
- Bivouac Area Building B-44, Parcel 38(3)
- Community Club Building 3212, Parcel 56(3)
- Recreation Center Building 3213, Parcel 57(3)
- Chapel Building 3293, Parcel 58(3)
- Women's Army Corps (WAC) Museum Building 1077, Parcel 167(3)
- Building 3691, Parcel 506(3)
- Former Motor Pool 800, Parcels 164(3), 68(3), 12(3) and 11(3)
- Former Motor Pool 1800/1900, Parcels 145(3) and 52(3)
- Ground Scar South of Building 3134, Parcel 153(3)
- Ground Scar Near the Ammunition Supply Point, Parcel 156(3)
- Ground Scar South of the Autocraft Shop, Parcel 157(3).

The site locations at FTMC are shown on Figure 1. The well designations of the abandoned wells are listed in Table 1. All known monitoring wells at these sites were abandoned. The well abandonments were completed in accordance with Alabama Department of Environmental Management (ADEM) Groundwater Branch guidelines (IT Corporation, 2000).

## **2.0 Site Descriptions**

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This section provides brief descriptions of Fort McClellan and the 14 sites where well abandonments were performed.

### **2.1 Facility Description**

Fort McClellan is located in Calhoun County in the foothills of the Appalachian Mountains in northeast Alabama and is comprised of two tracts of land: Main Post and Pelham Range. The installation previously included the Choccolocco Corridor, a 4,488-acre tract of land that was leased from the State of Alabama from the 1940s until 1998. The city of Anniston is located to the south and west and the city of Weaver to the northwest of the Main Post installation. Pelham Range is located approximately five miles due west of the Main Post and adjoins the Anniston Army Depot to the south.

### **2.2 Site Descriptions and Background**

The well abandonments were performed at the 14 sites discussed below.

#### **2.2.1 Underground Storage Tank (UST) Sites**

Under contract with the U.S. Army Corps of Engineers (USACE)–Mobile District, Shaw completed UST closure assessment investigations at 25 UST sites including the following sites described below from 1999 to 2000. The purpose of the assessments was to evaluate environmental conditions at each site so that the Army could transfer the parcels to the public in accordance with the Base Realignment and Closure Environmental Restoration Program. Shaw submitted the *Final Underground Storage Tank Closure Assessment Report* in February 2001. The report documents the findings at each site.

Based on the results of the UST closure assessments and previously reported removal and/or UST abandonment in-place activities conducted, the U.S. Army implemented no further action with regard to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-related hazardous substances at each UST site in May 2001.

**UST, Telephone Exchange Building 251, Parcel 3(3).** Building 251, known as the Telephone Exchange, is located in the northwestern portion of the former FTMC Main Post. This location had a 600-gallon diesel UST that was removed and not replaced in 1994.

Braun Intertec Corporation (Braun) installed four permanent groundwater-monitoring wells (UST-3-MW01, UST-3-MW02, UST-3-MW03 and UST-3-MW04) during the UST closure in October 1994. Subsequently, Parcel 3(3) was investigated as part of the UST closure assessments from 1999 to 2000.

**UST, Recreation Building 503, Parcel 9(3).** Building 503, known as the Recreation Building, is located in the northwestern portion of the Main Post. Shaw installed one permanent groundwater-monitoring well (UST-9-MW01) downgradient of a former UST on the southeastern corner of Building 503 in January 2000.

**UST, Ammunition Supply Point, Building 4400, Parcel 31(3).** Building 4400 is located adjacent to the Ammunition Supply Point in the northwestern portion of the Main Post. Shaw installed one permanent groundwater-monitoring well (UST-31-MW01), adjacent to a former 1,000-gallon heating oil UST in December 1999.

**UST, Bivouac Area Building B-44, Parcel 38(3).** The Bivouac Area Building B-44 is located within the western portion of Choccolocco Corridor. Shaw installed one permanent groundwater-monitoring well (UST-38-MW01) downgradient of a former 1,000-gallon UST in November 1999.

**UST, Community Club Building 3212, Parcel 56(3).** The Community Club Building 3212 is located in the western-central portion of the Main Post. Shaw installed one permanent groundwater-monitoring well (UST-56-MW01) downgradient of a UST on the southeastern side of Building 3212 in November 1999.

**UST, Recreation Center Building 3213, Parcel 57(3).** The Recreation Center Building 3213 is located in the western-central portion of the Main Post. Shaw installed one permanent groundwater-monitoring well (UST-57-MW01) downgradient (south) of a former UST on the southwestern side of Building 3213 in November 1999.

**UST, Chapel Building 3293, Parcel 58(3).** The Chapel Building 3293 is located in the western-central portion of the Main Post. Shaw installed one permanent groundwater-monitoring well (UST-58-MW01) downgradient (south-southeast) of a former UST, near the northwestern corner of Building 3293 in December 1999.

**UST, WAC Museum Building 1077, Parcel 167(3).** The WAC Museum Building 1077 is located in the northwestern portion of the Main Post. The parcel previously had two 1,000-

gallon heating oil USTs. Four permanent monitoring wells were installed in the vicinity of the USTs by the USACE in 1990. Shaw installed one permanent groundwater-monitoring well (UST-167-MW01) downgradient (west/northwest) of the two removed USTs in December 1999. It should be noted that only three of the four wells installed by the USACE were observed at the site in March 2006. However, Shaw personnel were able to locate the fourth well (UST-167-MW05) during well abandonment activities. The Shaw well (UST-167-MW01) and the four USACE wells (UST-167-MW02, UST-167-MW03, UST-167-MW04 and UST-167-MW05) are presented in Table 1.

**UST, Building 3691, Parcel 506(3).** Building 3691 is located in the western portion of the Main Post. Shaw installed one permanent groundwater-monitoring well (UST-506-MW01) downgradient (west) of an existing 150-gallon UST, near the southeastern corner of Building 3691 in December 1999.

### **2.2.2 Fuel Training Area Sites**

**Former Motor Pool 800, Parcel 164(3).** Former Motor Pool Area 800 (Parcel 164[3]) is located in the north-central portion of the Main Post. Parcel 11(3) is a former UST associated with Building T-888 within Parcel 164(3). This UST location is adjacent to (south of) a former grease pit. Braun installed four permanent monitoring wells (FTA-164-MW01, FTA-164-MW02, FTA-164-MW03 and FTA-164-MW04) during UST closure activities in June 1994.

As part of the site investigation (SI) for Parcel 164(3), Shaw installed nine temporary wells in December 1998. These nine wells were subsequently abandoned in February 2002.

Based on the results of the SI and UST closure activities, the U.S. Army implemented no further action at the site with regard to CERCLA-related hazardous substances in July 2001.

**Former Motor Pool Area 1800/1900, Parcels 145(3) and 52(3).** Former Motor Pool Area 1800/1900 is located in the western-central portion of the Main Post. Shaw installed ten temporary monitoring wells during an SI; however, these 10 wells were abandoned in November 2000. One permanent monitoring well (FTA-145-GP13) was installed in December 1999.

Based on the results of the SI, the U.S. Army implemented no further action at the site with regard to CERCLA-related hazardous substances in March 2001.

### **2.2.3 Ground Scar Sites**

**Ground Scar South of Building 3134, Parcel 153(3).** The Ground Scar South of Building 3134 is located in the western-central portion of the Main Post. The ground scar is located in a wooded area approximately 150 feet south of Building 3134. Shaw installed one permanent groundwater monitoring well (GSBP-153-MW01) at the site in October 1999.

Based on the results of the SI, the U.S. Army implemented no further action at the site with regard to CERCLA-related hazardous substances in November 2001.

**Ground Scar Near the Ammunition Supply Point, Parcel 156(3).** The Ground Scar near the Ammunition Supply Point is located in the northern-central portion of the Main Post. Shaw installed four permanent groundwater monitoring wells (GSBP-156-MW01, GSBP-156-MW02, GSBP-156-MW03 and GSBP-156-MW04) as part of an SI in October 1999.

Based on the results of the SI, the U.S. Army implemented no further action at the site with regard to CERCLA-related hazardous substances in November 2001.

**Ground Scar South of the Autocraft Shop, Parcel 157(3).** The Ground Scar South of the Autocraft Shop is located in the western-central portion of the Main Post. The area is bounded on the north by Derby Street and bounded on the south by Training Area T-6 and the Former Sandel Flamethrower Range. Shaw installed two groundwater monitoring wells (GSBP-157-MW01 and GSBP-157-MW02) at the site as part of an SI in September 1999.

Based on the results of the SI, the U.S. Army implemented no further action at the site with regard to CERCLA-related hazardous substances in March 2002.

## **3.0 Field Activities**

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This section describes the well abandonment field activities conducted by Shaw from July 17 through July 21, 2006.

### **3.1 Well Abandonment Activities**

The 28 monitoring wells were abandoned in place according to ADEM guidelines. These wells are listed in Table 1. It should be noted that monitoring well UST-49-MW01, located at the Dental Clinic Building 1929, Parcel 49(3) could not be located and is presumed to have been destroyed during recent UST closure activities. Additionally, monitoring well UST-167-MW05,

located at the WAC Museum Building 1077, Parcel 167(3), was previously thought to have been destroyed but was located using a metal detector and abandoned during this effort.

Well abandonments consisted of filling and isolating the screened interval and cementing the casing with a bentonite-cement grout. The grout was pumped through a tremie pipe inside the well. The goals of monitoring well abandonment were to:

- Prevent vertical migration of fluids within the monitoring well being abandoned
- Prevent intermixing of waters from different water-bearing zones
- Eliminate physical hazards (e.g., open boreholes)
- Preserve aquifer properties.

ADEM guidance states that in-place abandonment is complete when cross contamination cannot occur between various zones and contamination cannot enter from the surface.

Shaw contracted Boart Longyear to perform the well abandonment activities. A Shaw geologist supervised Boart Longyear personnel to ensure that all wells were the correct recorded depth (i.e., no foreign objects or obstructions present). Grout was mixed to appropriate ADEM standards, and sufficient decontaminated tremie pipe was placed to the bottom of the well. The field geologist completed a well abandonment form for each of the wells. The well abandonment forms are included as Attachment 1.

***In-Place Abandonment Procedures.*** In-place abandonment leaves the well intact and is used when the construction details are known. The ADEM procedures for in-place abandonments are as follows:

1. Upon initiation of abandonment activities, the well was checked for obstruction (e.g., dedicated purge pumps, sample pumps, monitoring equipment), and any obstructions were removed from the well.
2. Using a weighted tape, the total depth of the well was measured (Table 1).
3. The wells were determined to be void of granular material (e.g., sand pack, formation sediment).
4. A neat grout mixture was prepared consisting of American Society for Testing and Materials Type I portland cement, water, and bentonite. The organic-free bentonite was added at a ratio of 5 pounds of bentonite per 94-pound bag of cement to produce a grout of 5-percent bentonite by weight. The grout was mixed with 6.5 to 7 gallons of water to create a pumpable slurry. The amount of neat

grout needed to abandon each well was determined by calculating the volume of each well and is shown in Table 1. The well volume was calculated using the following formula:

$$V = \frac{\pi D^2 h}{4}$$

Where:                      V = Well volume in cubic feet  
                                  D = Diameter of well in feet  
                                  h = Depth of well, from top of casing, in feet  
                                   $\pi = 3.14$

5. Decontaminated tremie pipe with a side-discharge tip was assembled and extended to the bottom of the well.
6. Once thoroughly mixed, the grout was pumped through the tremie pipe to the bottom of the well. The grout was forced through the well screen, into the filter pack (sand pack), and up the inside of the well casing to seal holes and cracks that were present. The tremie pipe was slowly raised as the well filled with grout.
7. The grout was allowed to settle for 2 to 4 hours. A second visit ensured that the well was grouted to ground surface.
8. After the second visit, the grout was allowed to cure for a minimum of 24 hours to ensure that it did not settle below ground surface.
9. Once the grout hardened, all surface completion materials (i.e., well stickup, protective steel casing, well pad, and protective posts) were removed to approximately 2 feet below ground surface. The 2-foot annulus was then filled with concrete to ground surface and a 2-foot by 2-foot by 1-foot-thick concrete surface pad was placed over the abandoned well. The concrete pad was completed flush with the ground surface.

### **3.2 Equipment Cleaning**

All equipment used in the abandonment process (i.e., tremie pipe, weighted tape, and tools) was thoroughly cleaned using steam and high-pressured hot water from a steam cleaner supplied by Boart Longyear. Potable water was obtained at the Shaw compound on Main Post and transported to each site in clean poly tanks.

### **3.3 Disposal of Spent Well Materials**

Spent well materials (i.e., steel bumper posts, polyvinyl chloride well casings, concrete, steel manhole covers, well locks, etc) and any other solid waste generated during well abandonment activities were placed in a construction debris roll-off container provided by Boart Longyear.

The roll-off container was then transported to the Tri-Corners Landfill for disposal as nonhazardous waste.

## **4.0 Summary**

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Shaw abandoned 28 wells at 14 sites at FTMC in accordance with ADEM guidelines. Well abandonment activities began on July 17, 2006, and were completed on July 21, 2006. Monitoring well UST-49-MW01, previously located at the Dental Clinic Building 1929, Parcel 49(3), could not be located and is presumed to have been destroyed during recent UST closure activities. The 14 sites where abandonment activities occurred were:

- Telephone Exchange Building 251, Parcel 3(3)
- Recreation Building 503, Parcel 9(3)
- Ammunition Supply Point, Parcel 31(3)
- Bivouac Area Building B-44, Parcel 38(3)
- Community Club Building 3212, Parcel 56(3)
- Recreation Center Building 3213, Parcel 57(3)
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- Ground Scar Near the Ammunition Supply Point, Parcel 156(3)
- Ground Scar South of the Autocraft Shop, Parcel 157(3).

All known groundwater monitoring wells at the 14 sites were abandoned in place. A concrete surface pad was constructed on top of each abandoned well. All spent well materials were removed and properly disposed.

## **5.0 References**

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IT Corporation, 2000, *Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama.*

Table 1

**Monitoring Well Abandonment Summary  
Multiple Sites  
Fort McClellan, Calhoun County, Alabama**

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Well Designation	Well Type	Northing	Easting	Ground Elevation (ft.amsl)	Total Depth Measured (ft btoc)	Screen Length (ft)	Well Material	Date Grouted	Volume of Grout Used (ft3)	Surface Completion Date
GSBP-153-MW01	Residuum	1166833.01	668863.59	805.01	31.3	15	2" ID Sch. 40 PVC	7-18-06	0.68	7-20-06
GSBP-156-MW01	Residuum	1172885.75	673368.79	811.43	36.4	20	2" ID Sch. 40 PVC	7-18-06	0.79	7-20-06
GSBP-156-MW02	Residuum	1172774.72	673381.67	811.91	31.1	15	2" ID Sch. 40 PVC	7-18-06	0.68	7-20-06
GSBP-156-MW03	Residuum	1172660.58	673432.03	812.70	25.8	15	2" ID Sch. 40 PVC	7-18-06	0.56	7-20-06
GSBP-156-MW04	Residuum	1172716.98	673585.31	819.73	31.6	15	2" ID Sch. 40 PVC	7-17-06	0.69	7-20-06
GSBP-157-MW01	Residuum	1167260.05	669745.23	789.11	25	15	2" ID Sch. 40 PVC	7-17-06	0.55	7-20-06
GSBP-157-MW02	Residuum	1167111.04	669900.52	790.47	25.7	15	2" ID Sch. 40 PVC	7-18-06	0.56	7-20-06
FTA-145-GP13	Residuum	1168394.65	669807.56	758.27	16.5	5	2" ID Sch. 40 PVC	7-18-06	0.36	7-20-06
FTA-164-MW01	Residuum	1170407.68	673900.48	813.74	14.3	10*	4" ID Sch. 40 PVC*	7-18-06	1.25	7-20-06
FTA-164-MW02	Residuum	1170427.64	673934.97	814.03	12	10*	4" ID Sch. 40 PVC*	7-18-06	1.05	7-20-06
FTA-164-MW03	Residuum	1170456.53	673955.63	814.62	13.4	10*	4" ID Sch. 40 PVC*	7-18-06	1.2	7-20-06
FTA-164-MW04	Residuum	1170452.39	673911.39	813.69	12.6	10*	4" ID Sch. 40 PVC*	7-18-06	1.1	7-20-06
UST-3-MW01	Residuum	1170530.89	668571.81	739.08	11.9	10*	4" ID Sch. 40 PVC*	7-17-06	1.04	7-19-06
UST-3-MW02	Residuum	1170512.54	668532.46	737.38	9.3	5*	4" ID Sch. 40 PVC*	7-17-06	0.8	7-19-06
UST-3-MW03	Residuum	1170490.49	668522.09	737.71	11.9	10*	4" ID Sch. 40 PVC*	7-17-06	1.04	7-19-06
UST-3-MW04	Residuum	1170506.89	668507.79	737.40	12.5	10*	4" ID Sch. 40 PVC*	7-17-06	1.10	7-19-06
UST-9-MW01	Residuum	1173326.84	670668.80	763.70	28.7	15	2" ID Sch. 40 PVC	7-17-06	0.63	7-19-06
UST-31-MW01	Residuum	1173559.23	673110.30	798.40	28.9	15	2" ID Sch. 40 PVC	7-17-06	0.63	7-19-06
UST-38-MW01	Residuum	1171509.50	696203.70	722.03	32.3	10	2" ID Sch. 40 PVC	7-18-06	0.7	7-21-06
UST-49-MW01* *	Residuum	1168728.14	670794.81	783.82	NA	5	2" ID Sch. 40 PVC	NA	NA	NA
UST-56-MW01	Residuum	1168019.38	666540.98	762.93	8	5	2" ID Sch. 40 PVC	7-18-06	0.17	7-19-06
UST-57-MW01	Residuum	1167797.98	665894.65	803.32	33.6	15	2" ID Sch. 40 PVC	7-18-06	0.73	7-19-06
UST-58-MW01	Residuum	1167784.15	665438.73	806.34	39.4	15	2" ID Sch. 40 PVC	7-18-06	0.86	7-19-06
UST-167-MW01	Residuum	1177000.86	668220.93	777.63	38.3	20	2" ID Sch. 40 PVC	7-20-06	0.83	7-21-06
UST-167-MW02	Residuum	1176995.70	668251.26	778.91	17.5	10*	4" ID Sch. 40 PVC*	7-20-06	1.53	7-21-06
UST-167-MW03	Residuum	1176970.27	668232.47	778.76	14.7	10*	4" ID Sch. 40 PVC*	7-20-06	1.3	7-21-06
UST-167-MW04	Residuum	1176929.98	668245.98	778.35	14.7	10*	4" ID Sch. 40 PVC*	7-20-06	1.3	7-21-06
UST-167-MW05	Residuum	NS	NS	NS	19	10*	4" ID Sch. 40 PVC*	7-20-06	1.66	7-21-06
UST-506-MW01	Residuum	1168260.51	660335.99	734.76	46.8	25	2" ID Sch. 40 PVC	7-18-06	1.02	7-19-06

**Table 1**

**Monitoring Well Abandonment Summary  
at Multiple Sites  
Fort McClellan, Calhoun County, Alabama**

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2" ID Sch. 40 PVC - 2-inch inside diameter, Schedule 40 polyvinyl chloride.

4" ID Sch. 40 PVC - 4-inch inside diameter, Schedule 40 polyvinyl chloride.

amsl - Above mean sea level.

bgs - Below ground surface.

btoc - Below top of casing.

ft - Feet.

ft<sup>3</sup> - Cubic feet.

NA - Not available.

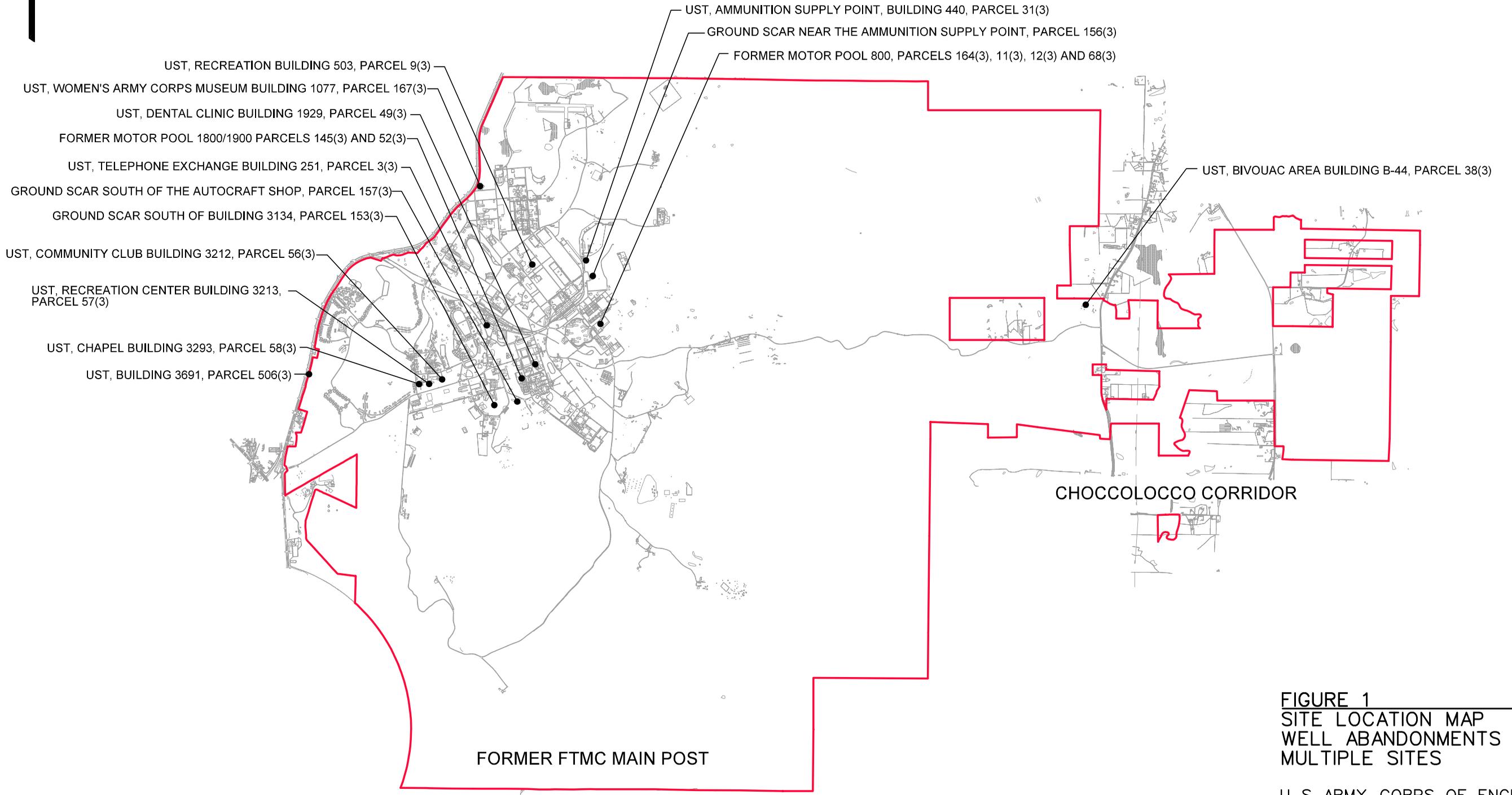
NS - Not surveyed.

\* Based on field observations, drill log, and/or report.

\*\* Monitoring well could not be located and was presumably destroyed during recent tank closure activities.

7/12/2006 10:09:07 AM dbomor 796887ES.925

STARTING DATE: 07/12/06	DRAWN BY: D. BOMAR
DATE LAST REV.:	DRAWN BY:
DRAFT. CHK. BY:	ENGR. CHK. BY:
INITIATOR: J. TARR	PROJ. MGR.: S. MORAN
DWG. NO.: 796887ES.925	PROJ. NO.: 796887



**FIGURE 1**  
**SITE LOCATION MAP**  
**WELL ABANDONMENTS AT**  
**MULTIPLE SITES**

U. S. ARMY CORPS OF ENGINEERS  
MOBILE DISTRICT  
FORT McCLELLAN  
CALHOUN COUNTY, ALABAMA  
Contract No. DACA21-96-D-0018

