

# WORK PLAN AND SAMPLING AND ANALYSIS PLAN ADDENDUM

SALADO CREEK AREA ANOMALIES  
AOC-42, AOC-52, AOC-58, AND AOC-62



*Prepared for:*

**Camp Stanley Storage Activity  
Boerne, Texas**

*PREPARED BY:*

**PARSONS**

Austin, TX

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## **ADDENDUM TO WORK PLAN AND SAMPLING AND ANALYSIS PLAN SITE CLOSURE INVESTIGATION FOR THE SALADO CREEK AREA ANOMALIES AT AOC-42, 52, 58, AND 62**

Parsons is currently under contract to provide a Site Closure Investigation for a combined set of Areas of Concern (AOCs) located in the northeastern portion of the Inner Cantonment section within the vicinity of Salado Creek at Camp Stanley Storage Activity (CSSA), Boerne, Texas. The AOCs include AOC-42, AOC-52, AOC-58, and AOC-62. This document serves as both an addendum to the existing CSSA *Work Plan*, February, 1996 (see CSSA Environmental Encyclopedia (www.stanley.army.mil), Volume 1-1) and Work Plan Addenda contained therein, and an addendum to the existing CSSA *Field Sampling Plan*, February, 1996 (see CSSA Environmental Encyclopedia, Volume 1-4) and Sampling and Analysis Plan Addenda contained therein.

An investigation will be performed to remove impacted media and waste located at AOC-42, 52, 58, and 62 (Figure 1). The investigation will remove potential sources of contamination including metal and assorted debris, and all soils with contamination levels that exceed the identified Texas Risk Reduction Program (TRRP) protective concentration limits (PCLs) (see Section 2.3). It is expected that upon completion of this investigation, one Release Investigation Report (RIR) will be completed for all four sites. Both the identified PCLs and the type of closure report may be modified based on the results of the investigation.

This Addendum describes additional activities to be conducted as part of this investigation, and addresses specific Sampling and Analysis Plan (SAP) items related to those activities. Work will be performed in accordance with the requirements of the Resource Conservation and Recovery Act (RCRA) 3008(h) Order in effect for CSSA, and in accordance with 30 Texas Administrative Code (TAC) §350, the Texas Risk Reduction Program (TRRP) administered by the Texas Commission on Environmental Quality (TCEQ).

Additional specific activities associated with this investigation are described in the *RCRA Facility Investigation Interim Measures Waste Management Plan (RFI/IM WMP) Addendum for AOC-42, 52, 58 and 62*, March, 2011.

### **1.0 SITE DESCRIPTION AND BACKGROUND**

#### **1.1 Description**

AOC-42 was discovered during a geophysical investigation conducted in May 1995 of the “open” areas within a 2,000-foot radius of Well CS-16. The area surveyed was designated “Salado Creek” and portions of the survey include the area now defined as AOC-42. Due to the variety and geography of the geophysical anomalies detected during the Salado Creek geophysical survey, the area was subdivided into AOC-42, AOC-52, and AOC-62. AOC-58 is a suspected trench based on a 1973 aerial photograph. No

waste disposal activities are currently practiced at the four sites. The anomalies identified from the geophysical survey at the four sites are shown in Figure 2, and the area of each site and associated anomaly or anomalies is presented in Table 1. The anomaly areas are estimations and will be verified and adjusted accordingly during the field effort.

The average elevation in feet relative to Mean Sea Level (MSL) at the anomaly or anomalies within each site are also presented in Table 1. The gradients for the four sites range from 3% to 7% and slope generally towards the southwest. The general area is thickly vegetated by native grasses

**Table 1 – Areas of Anomalies at AOC-42, 52, 58, and 62**

Site	Area of Site as Depicted on Figure 2 (acres)	Area of Identified Anomalies (acres)	Average Elevation at the Anomaly (ft MSL)	Gradient and Direction of Surface Drainage Flow at the Anomaly
AOC-42	2.47	0.11	1,225	4.8% west
AOC-52	0.46	0.10	1,230	6.4% west-southwest
AOC-58	0.39	0.01	1,227	6.9% south-southwest
AOC-62	0.42	0.10	1,224	3.2% west-southwest
<b>Total</b>	<b>3.74</b>	<b>0.32</b>		

Additional background information on AOC-42, AOC-52, AOC-58 and AOC-62 can be found in CSSA Environmental Encyclopedia, Volume 3-2.

## 1.2 Previous Investigations

Previous investigations at the four sites have included geophysical surveys, surface and subsurface soil sampling, and soil gas surveys. Geophysical and soil gas surveys were conducted at all four sites, and soil sampling was conducted at AOC-42 and AOC-58. A summary of the findings associated with each site are presented below.

### 1.2.1 AOC-42

In March 2001, nine soil borings were drilled at AOC-42. Surface soil samples (AOC42-SB01 through AOC42-SB09) were collected and analyzed for metals, volatile organic compounds (VOCs), and explosives. Of the metals detected in surface soils, mercury was detected at concentrations exceeding the CSSA background concentrations in four of the nine samples and copper was detected in one sample above the background level. No explosives or VOCs were detected in surface soil samples collected at the site. The sample locations are shown on Figure 2. The results were all below the identified Tier 1 PCLs (as described in Section 2.3).

Eighteen subsurface soil samples were also collected from the borings performed at AOC-42 in March 2001. These samples were analyzed for VOCs, explosives, and metals. No VOCs or explosives were detected above the laboratory reporting limits. Although barium, nickel, cadmium, and zinc were detected at concentrations slightly exceeding CSSA background levels, all results were below the identified Tier 1 PCLs (as described in Section 2.3).

A soil gas survey was conducted on the area designated “Salado Creek” in June and July 1995. Five soil gas samples were collected within the boundaries of AOC-42. The samples were analyzed for chlorinated and aromatic volatile organics. Tetrachloroethylene (PCE) was the only target analyte detected in soil gas at the site. PCE concentrations detected within the boundaries of AOC-42 ranged from 0.03 micrograms per liter ( $\mu\text{g/L}$ ) to 0.15  $\mu\text{g/L}$  (from sample point located approximately 75 feet west of AOC42-SB02.) Note that soil gas concentrations less than 1.0  $\mu\text{g/L}$  for an 1800-foot (east-west) by 2500-foot (north-south) area extending south from the Well CS-16 area and including AOC-42 is typical to expect for former disposal sites O-1 and B-3 where soil gas values for PCE were greater than 100  $\mu\text{g/L}$ . Additional background information on O-1 and SWMU B-3 can be found in CSSA Environmental Encyclopedia, Volume 1-2.

Exploratory excavations were performed at AOC-42 in 2000. During that effort, radios and machine guns were uncovered in one of the former disposal trenches at the site.

### **1.2.2 AOC-52**

The anomaly area shown on Figure 2 for AOC-52 is based on geophysical surveys conducted in 1995. The original geophysical survey data are currently unavailable. Notes documenting prior activities at the site indicate that there are three anomalies; however maps referencing the geophysical survey at the site indicate only one area as shown on Figure 2. The notes also indicate that two of the three anomalies are trenches. No soil samples have been collected from the site.

Exploratory excavations were performed at AOC-52 in 2000. The effort encountered spring filled gun clips in one of the anomaly areas.

### **1.2.3 AOC-58**

The location of AOC-58 is based on a suspected trench that was identified in a 1973 aerial photograph. Three small anomalies were identified at the site based on a 1995 geophysical survey and are shown in Figure 2.

In 2000, surface soil samples (AOC58-SS01 through AOC58-SS03) were collected from the site based on the locations of the geophysical anomalies and the samples were analyzed for VOCs, semivolatile organic compounds (SVOCs) and metals. VOCs and SVOCs were not detected. Mercury was the only metal detected at concentrations

exceeding the CSSA background concentration in surface soils and the TRRP PCL at location AOC58-SS01 (3.20 mg/kg). No subsurface soil samples have been collected from the site.

Exploratory excavations were performed at AOC-58 in 2000. The effort encountered bayonets with corrosive material.

#### **1.2.4 AOC-62**

One anomaly area, shown on Figure 2, was identified as AOC-62 based on the 1995 geophysical surveys. The original geophysical survey data are unavailable. No soil samples have been collected from the site.

Exploratory excavations were performed at AOC-62 in 2000. The effort uncovered 20mm guns in the anomaly area.

## **2.0 INVESTIGATION PROCEDURES**

This investigation involves the excavation of the anomalous areas as shown on Figure 3, appropriate management of all associated debris and soils, and confirmation soil sampling to ensure the success of the excavation.

All removal work will be performed in Level D personal protective equipment and under the health and safety protocol included in the *Health and Safety Plan*, December, 2010. Due to the potential for encountering UXO during the excavation activities, the effort will be supervised by UXO technicians. The technicians will provide MEC identification, avoidance, clearance certification of the excavated media, and will be on site to address any MEC safety issues associated with the excavation process.

### **2.1 Excavation Effort**

As necessary, the identified anomaly areas shown on Figure 3 will be delineated in the field through the use of exploratory excavations. The anomalous areas will be excavated to a depth where confirmation samples indicate the concentrations of contaminants of concern are below the criteria described in Section 2.3. Note that previous soil borings at AOC-42 were drilled to refusal at depths ranging from 11 feet at AOC42-SB03 to 16 feet at AOC42-SB08.

The excavated soil material may either be stockpiled along and adjacent to the excavation to allow for inspection, or moved directly to the respective staging area (Figure 4) and placed into 500-cubic-yard (CY) piles. During the sifting operations, all foreign material that is not native soil/rock will be sorted and managed as appropriate in coordination with CSSA. The remaining excavated soil media will be managed as described below.

A UXO technician will be present during the excavation effort to provide UXO support, as necessary. Passenger vehicles and equipment trailers will not enter the excavated area. Excavating equipment will be parked on a trailer prior to leaving CSSA.

## 2.2 Waste Management

It is anticipated that as much as 6,000 CY of excavated material will require some form of management at AOC-42. The volume of soil and debris anticipated for the other three sites cannot be confirmed until exploratory excavations are conducted to assess the sources of the geophysical anomalies. All contaminated soils will be managed in accordance with CSSA's *RFI Interim Measures Waste Management Plan*, Parsons, 2006 and the *RFI/IM Addendum for AOCs-42, 52, 58 and 62*, March, 2011.

For presumed impacted soil media, waste characterization sampling will occur at a frequency rate of 1 sample per 500 CY. Waste characterization samples will be analyzed by the toxicity characteristic leaching procedure (TCLP) for RCRA 8 metals, in addition to other analyses, as appropriate. All non-impacted soil, as per the results of the analysis for CSSA 9 metals and other analyses conducted, will be reused on site. All impacted soil media that meets non-hazardous criteria, and CSSA standards for berm reuse (e.g. no pieces of metal greater than six inches, no materials identified as MEC items, etc.), will be transported to the East Pasture berm for reuse.

Any soil media identified above characteristic hazardous criteria (40 Code of Federal Regulations [CFR] 261.24) may be treated in accordance with the *RFI/Interim Measures Waste Management Plan* to non-hazardous levels (i.e. with use of PIMS, etc.) and managed at the East Pasture berm or off-post as appropriate.

Parsons will coordinate the transportation of the soils to the East Pasture berm with CSSA personnel.

## 2.3 Soil Sampling

The TRRP Tier 1 PCL identified for AOC-42 for this investigation is defined as the lowest value among following: 1) the TRRP Tier 1 Residential 0.5-acre PCL for total soil combined ( $^{Tot}Soil_{Comb}$ ); 2) the TRRP Tier 1 Residential 0.5-acre PCL for groundwater protection ( $^{GW}Soil_{Ing}$ ); and 3) the TCEQ Ecological Benchmark for Soil. If the lowest of these three values is less than the CSSA soil background value, the soil background value becomes the Tier 1 PCL. Table 1 outlines these values and then identifies PCLs for the CSSA 9 metal analytes. The TRRP Human Health PCLs for VOCs and SVOCs can be found at <http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html>. The identified PCLs may be modified based on investigation findings, if necessary.

Due to the size of the remaining sites (each individually less than 1 acre in size), they are excluded from comparison against the TCEQ Ecological Benchmarks. The TRRP Tier 1 PCL identified for AOC-52, 58, and 62 for this investigation are defined as the

lowest value between 1) the TRRP Tier 1 Residential 0.5-acre PCL for total soil combined ( $^{Tot}Soil_{Comb}$ ) and 2) the TRRP Tier 1 Residential 0.5-acre PCL for groundwater protection ( $^{GW}Soil_{Ing}$ ). If the lowest value is less than the CSSA soil background value, the soil background value becomes the Tier 1 PCL. Table 2 outlines these values and identifies PCLs for the CSSA 9 metal analytes. The identified PCLs may be modified based on investigation findings, if necessary.

Soil samples for laboratory analysis will be collected during and post-excavation, as necessary, to confirm the successful removal of contaminated soils. Based on previous findings and results from the investigation, confirmation samples may be analyzed for CSSA 9 metals, VOCs, SVOCs, and/or explosives. Since PCE was reported at AOC-42 during a prior soil gas survey (at the soil/rock interface), at least one confirmation sample from the soil/rock interface for each of the four sites will be tested for VOCs. Soil samples with results lower than the identified PCLs will be used to confirm contamination removal at a rate of approximately 1 sample per 50 feet along the horizontal excavation boundary, and 1 sample per 10,000 square feet to confirm the vertical excavation boundary. If any results indicate contamination above the identified PCLs, the excavation of soils will be expanded in that direction until confirmation samples show no indication of metal contamination above PCLs. The number and location of confirmation samples will be dependent on the extent of excavation.

Soil samples will be discrete grab samples and will be collected as described in the CSSA *SAP*, February, 1996. The collection and analysis of quality assurance/quality control (QA/QC) samples is described in the *CSSA Base-wide Quality Assurance Project Plan, Version 1.0*, January, 2003 (see CSSA Environmental Encyclopedia, Volume 1-4). The QA/QC samples and their collection frequency are as follows:

- One Field Duplicate (FD) per 10 samples
- One Matrix Spike (MS) and one Matrix Spike Duplicate (MSD) per 20 samples
- One Equipment Blank (EB) per site.

Full QA/QC will be performed on these samples and 100% of the results will be validated/verified by a chemist.

The necessary turnaround time (TAT) for the samples will be based on the current timeframe of the excavation and may range from expedited (3-day) to the standard TAT (21-day).

#### **2.4 Erosion Control Measures and Site Rehabilitation**

As shown in Table 1, the total area of four anomalies is 0.32 acres. The staging areas (Figure 4) total 0.28 acres: 0.08 acres for AOC-42, 0.05 acres for AOC-52, 0.09 acres for AOC-58 and 0.06 acres for AOC-62 for a total of 0.28 acres. Since the area to be disturbed at each of the sites during the excavation effort is less than 1 acre, coverage under the TPDES General Permit No. TXR150000 is not required. However, due to the location of these areas near Salado Creek, a Storm Water Pollution Prevention Plan will

be developed specifying the appropriate best management practices in compliance with the TPDES General Permit No TXR150000. Additionally, a Notice of Intent is not required for construction sites less than 5 acres.

There will be no permanent storm water controls. Once the excavation is complete, the site will be restored or graded in coordination with CSSA's future plans for the area. If the area is to remain free of construction, native grasses will be planted to help control erosion.

### **3.0 SCHEDULE**

The investigation is proposed to begin approximately March 14, 2011 and is projected to take approximately 12 weeks. Confirmation and waste characterization sampling will be conducted, as appropriate, throughout the excavation procedure.

Upon completion of the field effort, it is expected that one Release Investigation Report (RIR) will be completed for AOC-42, 52, 58, and 62. As discussed previously, if the investigation results warrant, another type of closure report may be completed instead.



Table 1. Assessment Levels for Chemicals of Potential Concern  
 CSSA 9 Metals  
 AOC-42

Chemical of Potential Concern	Residential Tier 1 <sup>Tot</sup> Soil <sub>Comb</sub> (mg/kg) <sup>1</sup>	Residential Tier 1 <sup>GW</sup> Soil <sub>Ing</sub> (mg/kg) <sup>2</sup>	CSSA Soil Background (mg/kg) <sup>3</sup>	EcoBenchmark (mg/kg) <sup>4</sup>
Arsenic	24.2	5.0	<b>19.6</b>	18
Barium	7962.3	443.8	186	<b>330</b>
Cadmium	52.4	1.5	<b>3.0</b>	32
Chromium	32,607.2	2,400.2	<b>40.2</b>	0.4
Copper	547.6	1042.5	23.2	<b>61</b>
Lead	500	3.03	<b>84.5</b>	120
Mercury	3.6	0.0078	<b>0.77</b>	0.1
Nickel	839.7	157.4	<b>35.5</b>	30
Zinc	9,921.5	2360.5	73.2	<b>120</b>

1) Texas Risk Reduction Program Rule Tier 1 Protective Concentration Levels (PCLs) <sup>Tot</sup>Soil<sub>Comb</sub>, March 31, 2010 (<http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html>).

2) Texas Risk Reduction Program Rule Tier 1 Protective Concentration Levels (PCLs) <sup>GW</sup>Soil<sub>Ing</sub>, March 31, 2010 (<http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html>).

3) Second Revision to Evaluation of Background Metals Concentrations in Soils and Bedrock, February 2002.

4) TCEQ Ecological Benchmark for Soil as stated in Update to Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas, Regulatory Guidance (RG)-263, Revised (January 2006) (<http://www.tceq.state.tx.us/assets/public/remediation/eco/0106eragupdate.pdf>).

Identified PCLs are shown in **bold**.

Table 2. Assessment Levels for Chemicals of Potential Concern  
 CSSA 9 Metals  
 AOC-52, 58 and 62

Chemical of Potential Concern	Residential Tier 1 <sup>Tot</sup> Soil <sub>Comb</sub> (mg/kg) <sup>1</sup>	Residential Tier 1 <sup>GW</sup> Soil <sub>Ing</sub> (mg/kg) <sup>2</sup>	CSSA Soil Background (mg/kg) <sup>3</sup>
Arsenic	24.2	5.0	<b>19.6</b>
Barium	7962.3	<b>443.8</b>	186
Cadmium	52.4	1.5	<b>3.0</b>
Chromium	32,607.2	<b>2,400.2</b>	40.2
Copper	<b>547.6</b>	1042.5	23.2
Lead	500	3.03	<b>84.5</b>
Mercury	3.6	0.0078	<b>0.77</b>
Nickel	839.7	<b>157.4</b>	35.5
Zinc	9,921.5	<b>2360.5</b>	73.2
1) Texas Risk Reduction Program Rule Tier 1 Protective Concentration Levels (PCLs) <sup>Tot</sup> Soil <sub>Comb</sub> , March 31, 2010 ( <a href="http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html">http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html</a> ). 2) Texas Risk Reduction Program Rule Tier 1 Protective Concentration Levels (PCLs) <sup>GW</sup> Soil <sub>Ing</sub> , March 31, 2010 ( <a href="http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html">http://www.tceq.state.tx.us/remediation/trrp/trrppcls.html</a> ). 3) Second Revision to Evaluation of Background Metals Concentrations in Soils and Bedrock, February 2002. Identified PCLs are shown in <b>bold</b> .			



Aerial Photo Date: 2008



- CSSA Boundary
- AOC Boundary

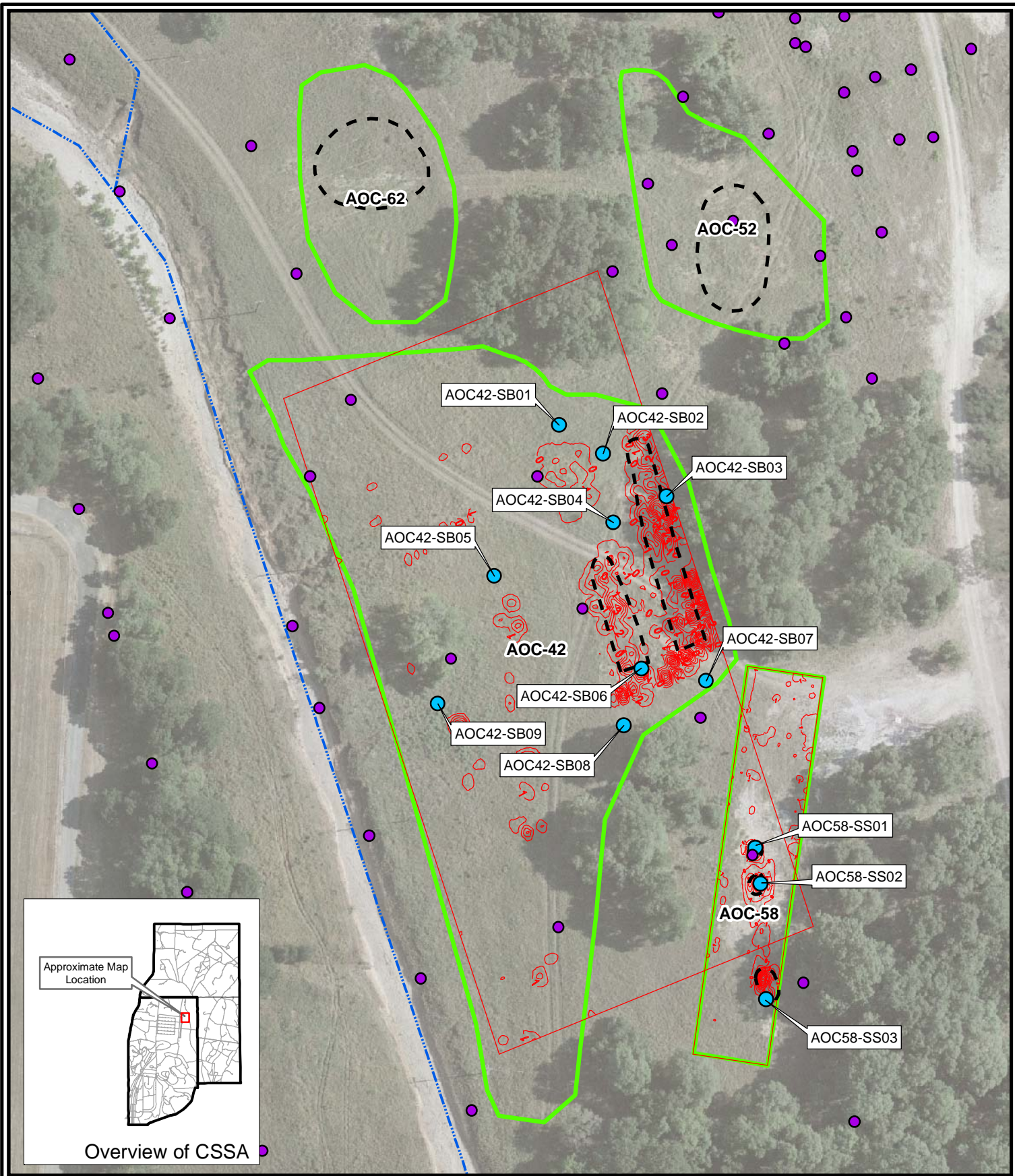
2,500    1,250    0    2,500 Feet



Figure 1

Site Location Map  
 AOCs 42, 52, 58, and 62  
 Camp Stanley Storage Activity

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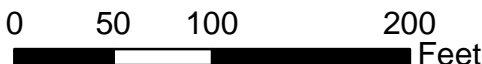
Overview of CSSA



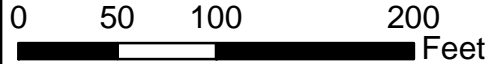
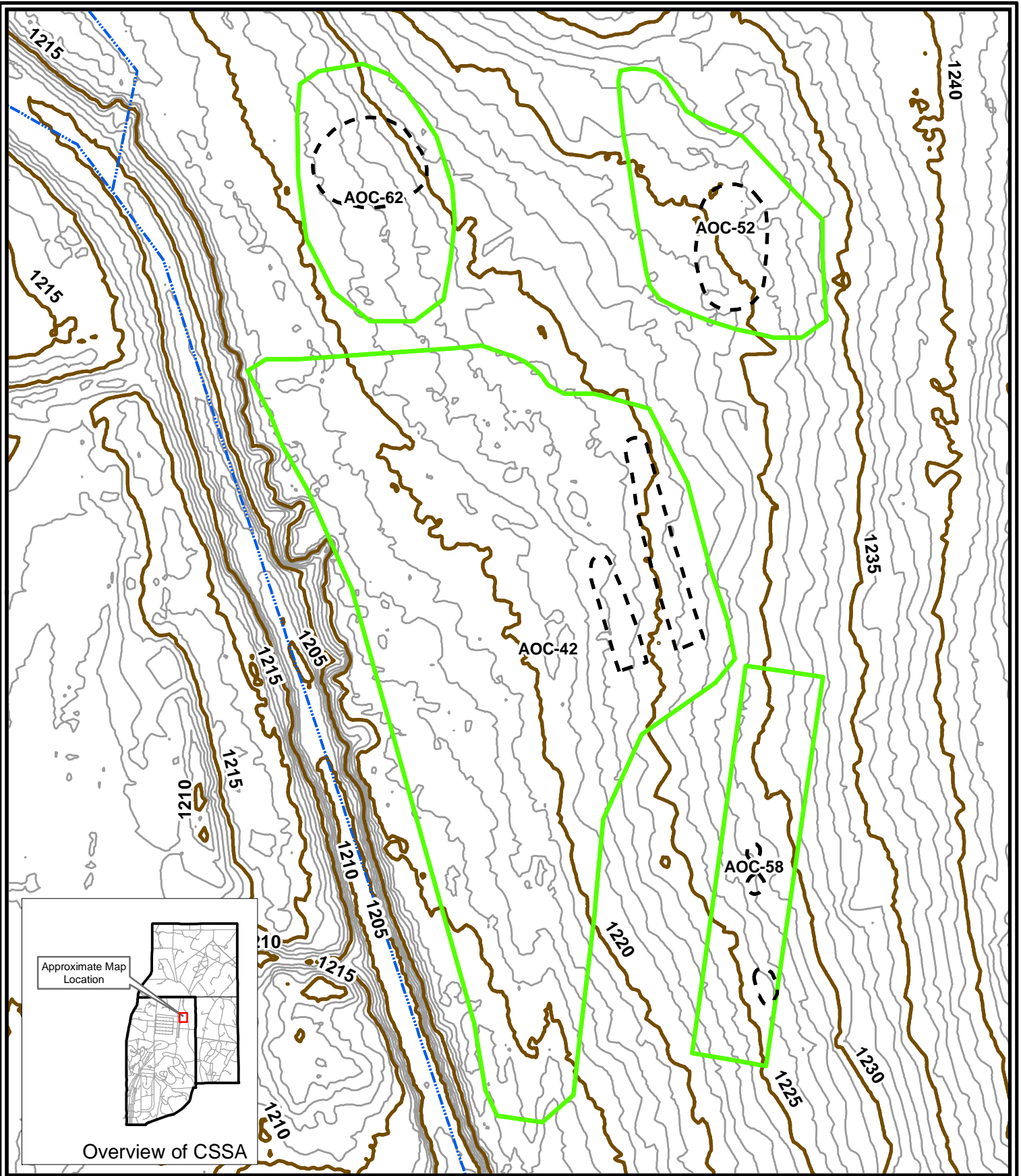
- Soil gas samples, 2001
- Soil sample locations
- Intermittent Stream

- Geophysical Anomaly Area
- Conductivity in milli-Siemens per meter (mS/m) contour lines; EM-31 survey, 1996
- Site Boundaries

Note: Anomaly Areas for AOC-52 and AOC-62 are approximate



**Figure 2**  
**AOCs 42, 52, 58, and 62**  
**Site Map**  
**Camp Stanley Storage Activity**  
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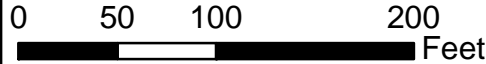
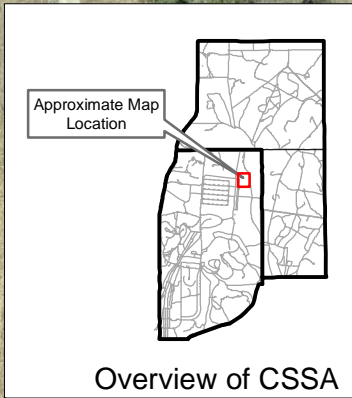
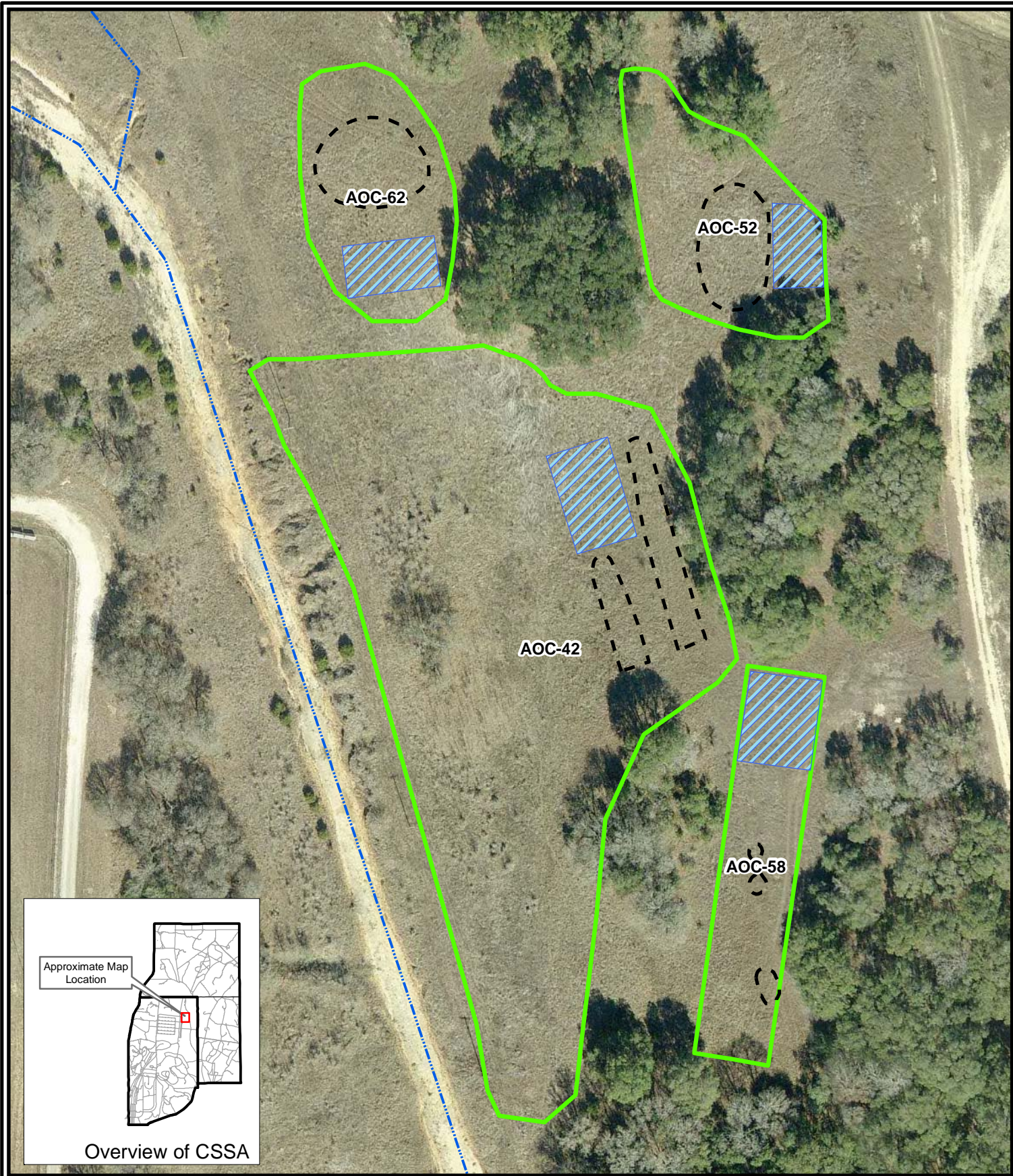
- - - - Intermittent Stream
- Geophysical Anomaly Area
- Site Boundaries
- 5 Foot Contours
- 1 Foot Contours





Note: Anomaly Areas for AOC-52 and AOC-62 are approximate

Figure 3

AOCs 42, 52, 58, and 62  
Proposed Excavation Effort  
Camp Stanley Storage Activity

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-  Staging Areas
-  Intermittent Stream
-  Geophysical Anomaly Area
-  Site Boundaries

Note: Anomaly Areas for AOC-52 and AOC-62 are approximate

**Figure 4**

AOCs 42, 52, 58, and 62  
Location of Staging Areas  
Camp Stanley Storage Activity

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