

**FINAL
RELEASE INVESTIGATION REPORT**

**RANGE MANAGEMENT UNIT 5
CAMP STANLEY STORAGE ACTIVITY**



Prepared for:

**Camp Stanley Storage Activity
Boerne, Texas**

Prepared by:

PARSONS

Austin, Texas

May 2012

EXECUTIVE SUMMARY

Range Management Unit (RMU) 5 is an approximately 19.3-acre site located in Camp Stanley Storage Activity's (CSSA) North Pasture. RMU-5 was identified as a rocket range on a 1953 map of CSSA; however, historic aerial photographs do not show any evidence of the range and there are no physical features at the site suggesting that it was ever used as a range. RMU-5 is located in the safety fan of CSSA's active East Pasture range, approximately 4,000 yards from the firing point and approximately 200 feet from CSSA's former open burn / open detonation area, solid waste management unit (SWMU) B-20/21.

Work performed at RMU-5 included x-ray fluorescence (XRF) analysis of soil samples, an unexploded ordnance (UXO) investigation, environmental sampling, and proper documentation of all activities, including preparation of this Release Investigation Report (RIR). This RIR requests No Further Action (NFA) at RMU-5.

From the information presented in this report, the results of the investigations at RMU-5 meet the three criteria as described in Texas Commission on Environmental Quality (TCEQ) (2003) guidance *Determining Which Releases are Subject to the Texas Risk Reduction Program (TRRP)*. Thus, the following criteria were met:

- Concentrations of chemicals in soil samples do not exceed Tier 1 residential protective concentration levels (PCLs) or were used to calculate a 95% upper confidence limit (UCL) per Texas Administrative Code (TAC) §350.79(2)(A) which does not exceed the Tier 1 PCL.
- There is no evidence of other affected or threatened environmental media (groundwater, surface water, or sediment) at RMU-5. Since soils were not found to have concentrations of explosives or metals above Tier 1 PCLs or the calculated 95% UCL, there will be no impact to groundwater, surface water, or sediment from RMU-5.
- RMU-5 passes the Tier 1 Ecological Exclusion Criteria Checklist (**Appendix B**).

Because these three criteria are met, RMU-5 is not subject to TRRP. Therefore, this RIR has been prepared to document the results and an NFA decision is requested from the TCEQ for RMU-5. Impacts to the RMU-5 area from either the nearby SWMU B-20/21 or the active East Pasture Range will be addressed separately if and when the East Pasture Range is closed in the future.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	I
1.0 INTRODUCTION	1
2.0 HISTORICAL BACKGROUND	1
2.1 Camp Stanley Storage Activity	1
2.2 Range Management Unit 5	2
2.2.1 Overview	2
2.2.2 Setting, Size, and Description	2
2.2.3 Potential Contaminant Sources, Chemicals of Concern, and Previous Investigations	2
3.0 OBJECTIVES OF RIR FOR RMU-5.....	3
3.1 Field Activities and Investigations	3
3.1.1 XRF Survey	3
3.1.2 Assessment for Potential Munitions Presence	4
3.1.3 Soil Sampling	4
3.2 Site Geology/Hydrogeology	5
3.2.1 CSSA Geology/Hydrogeology	5
3.2.2 RMU-5 Groundwater and Surface Water	6
4.0 TIER 1 ECOLOGICAL EXCLUSION CRITERIA CHECKLIST	6
5.0 SUMMARY AND RECOMMENDATIONS	6

LIST OF TABLES

Table 1	Summary of Chemical Constituents Remaining in Soils at RMU-5	9
---------	--	---

LIST OF FIGURES

Figure 1	CSSA Location Map	10
Figure 2	RMU-5 Location Map	11
Figure 3	RMU-5 1953 Historical Map	12
Figure 4	RMU-5 Aerial Photographs	13
Figure 5	Perimeter Investigation	14
Figure 6	RMU-5 XRF Sampling Results	15
Figure 7	RMU-5 Munitions Assessment Results	16
Figure 8	RMU-5 Sample Locations	17
Figure 9	RMU-5 Topography, Surface Water, and Floodplains	18

APPENDICES

Appendix A	Site Photographs
Appendix B	Tier 1 Ecological Exclusion Criteria Checklist
Appendix C	Confirmation Sample Results for All Analytes at RMU-5
Appendix D	Data Verification Summary Report
Appendix E	ProUCL Statistical Calculation Summary for Chromium in RMU-5 Soils

ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
APPL	Agriculture & Priority Pollutants Laboratory, Inc.
BTOC	below top of casing
BS	Bexar Shale
CC	Cow Creek
COC	contaminant of concern
CSSA	Camp Stanley Storage Activity
DQO	Data Quality Objective
EE	Environmental Encyclopedia
FSP	Field Sampling Plan
ft	feet
^{GW} Soil _{Ing}	soil to groundwater ingestion pathway (PCL)
LGR	Lower Glen Rose
MCL	maximum contaminant level
MD	munitions debris
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NFA	No Further Action
PCL	protective concentration level
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RIR	Release Investigation Report
RL	reporting limit
RMU	Range Management Unit
SAP	Sampling and Analysis Plan
SWMU	Solid Waste Management Unit
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
^{Tot} Soil _{Comb}	total soil combined pathway (PCL)
TRRP	Texas Risk Reduction Program
UCL	upper confidence limit
UGR	Upper Glen Rose
USEPA	United States Environmental Protection Agency
UXO	unexploded ordnance
VOC	volatile organic compound
XRF	x-ray fluorescence

1.0 INTRODUCTION

Parsons is under contract to provide investigations and environmental services for waste sites located at Camp Stanley Storage Activity (CSSA) in Boerne, Texas (**Figure 1**). This contract includes characterization of selected waste disposal sites and preparation of appropriate documentation, including a Release Investigation Report (RIR) for Range Management Unit (RMU) 5 (**Figure 2**). RMU-5, which covers approximately 19.3 acres, is located in the North Pasture, approximately 1,200 yards west of the eastern CSSA boundary. All work was performed in accordance with 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) of the Texas Commission on Environmental Quality (TCEQ). This RIR was prepared following TCEQ reporting and documentation requirements for releases that do not trigger applicability to the TRRP rule.

This report describes environmental investigation activities at RMU-5. Work included field screening of soils using an x-ray fluorescence (XRF) analyzer, an unexploded ordnance (UXO) investigation, environmental sampling, and proper documentation of all activities, including preparation of this closure report. All work was performed according to applicable federal, state, and local rules and regulations.

For this report, Section 1 provides the introduction and the documentation to support this RIR. Section 2 provides historical background information for CSSA and for RMU-5. Section 3 describes the objectives and rationale for preparing an RIR for RMU-5 and the findings from environmental investigations for the site. The groundwater and surface water for CSSA and the area near RMU-5 are also described in Section 3. Section 4 summarizes the findings from completing the Tier 1 Ecological Exclusion Criteria Checklist, which is included as an appendix to this RIR. Section 5 summarizes the overall findings and recommendations for the site. All figures and tables are provided at the end of this RIR (pages 9 through 18). References cited in this report can be found in the CSSA Environmental Encyclopedia (EE) ([Volume 1-1, Bibliography](#)) at www.stanley.army.mil.

2.0 HISTORICAL BACKGROUND

2.1 CAMP STANLEY STORAGE ACTIVITY

Camp Stanley Storage Activity is located in northwestern Bexar County, about 19 miles northwest of downtown San Antonio. The installation consists of approximately 4,004 acres immediately east of Ralph Fair Road, and approximately 0.5 mile east of Interstate Highway 10 (Figure 1). Camp Bullis borders CSSA on the north, east, and south.

The land where CSSA is located was used for ranching and agriculture until the 1900s. During 1906 and 1907, six tracts of land were purchased by the U.S. Government and designated the Leon Springs Military Reservation. The land included campgrounds and cavalry shelters.

In October 1917, the installation was re-designated Camp Stanley. Extensive construction was started during World War I to provide housing for temporary cantonments and support facilities. In 1931, the installation was selected as an ammunition depot, and construction of standard magazines and igloo magazines began in 1938. Land was also used to test, fire and overhaul ammunition components. As a result of these historic activities, CSSA has several

historical waste sites, including Areas of Concern (AOCs), Solid Waste Management Units (SWMUs), and RMUs.

The present mission of CSSA is the receipt, storage, issue, and maintenance of ordnance as well as quality assurance testing and maintenance of military weapons and ammunition. Because of its mission, CSSA has been designated a restricted access facility. No changes to the CSSA mission and/or military activities are expected in the future.

2.2 RANGE MANAGEMENT UNIT 5

2.2.1 Overview

RMU-5 was identified as a rocket range on a 1953 map of CSSA. As shown in **Figure 3**, which is a scan of the 1953 map, the area was shown simply with a line labeled “Rocket Range” and an arrow. No other documentation regarding this potential range has been found, and historic aerial photographs (**Figure 4**) do not show any evidence of the range. The 1953 map also showed an area to the north-northwest labeled as “burning contamination.” Munitions debris (MD) had reportedly been found previously in the vicinity but the nature was undocumented and source unknown.

A series of historical aerial photos of the site are shown on Figure 4 and photographs showing the site are provided in **Appendix A**. The history of the site and previous investigations at the site are discussed below.

2.2.2 Setting, Size, and Description

RMU-5 is located in the North Pasture, approximately 1,200 yards west of the eastern CSSA boundary. This site boundary, which was based on the historically marked rocket range on the 1953 map, includes approximately 19.3 acres. Situated on the side of a hill, the historical placement is not suitable topography for a rocket range. As shown in Figure 2, the RMU-5 boundary is approximately 200 feet from solid waste management unit (SWMU) B-20/21, CSSA’s former open burn/open detonation (OB/OD) area. The “Rocket Range” line on the 1953 map is approximately 1,100 feet from SWMU B-20/21. Additional background information on RMU-5 can be found in the CSSA EE ([Volume 1-3, RMU-5](#)).

2.2.3 Potential Contaminant Sources, Chemicals of Concern, and Previous Investigations

The potential contaminant source at a rocket range would be munitions and explosives of concern (MEC) resulting from munitions which did not detonate as intended and munitions constituents (MC) such as explosives and metals associated with firing, detonation, and degradation in the environment of MEC and munitions debris (MD).

In July 2010, a perimeter assessment was conducted around SWMU B-20/21 (Figure 2) to evaluate the lateral extent of munitions and explosives of concern (MEC) contamination resulting from previous activities at the former OB/OD area beyond the site boundary. This assessment involved estimating the number of MEC or MD items identified on the ground surface within a 20 foot (ft) by 20 ft grid at random locations by using a Schonstedt hand-held magnetometer or visual inspection (**Figure 5**). Three locations were investigated within the RMU-5 boundary. The volume of MD encountered in the investigation ranged from 3 to 28 pieces of MD. No MEC was encountered in these areas. Based on the diminishing concentration

of surficial MD moving away from SWMU B-20 and the types of fragmentation of items, it is highly likely that the MD items identified originated from activities at SWMU B-20.

3.0 OBJECTIVES OF RIR FOR RMU-5

In accordance with TCEQ (2003) guidance, *Determining Which Releases are Subject to TRRP* (www.tceq.state.tx.us/assets/public/remediation/trrp/releasesTRRPprev.pdf), an RIR can be performed for a site when results of an investigation lead to the following conclusions:

- Concentrations of chemicals detected at the site do not exceed Tier 1 residential soil action levels or the calculated site-specific 95% upper confidence limit (UCL) value;
- There is no evidence of other affected or threatened environmental media (groundwater, surface water, or sediment) at the site; and
- The site passes the Tier 1 Ecological Exclusion Criteria Checklist (the completed checklist is provided in **Appendix B**).

When these three criteria are met for a site, the release is not subject to TRRP. For such sites, an RIR can be submitted to document the results and a No Further Action (NFA) decision can be requested from the TCEQ.

As referred to in the criteria listed above, the Tier 1 residential soil action levels are provided by TCEQ (2010) and were selected following TCEQ guidance (TCEQ, 2007). These action levels are referred to as PCLs and are selected for each chemical detected at the site (*i.e.*, contaminants of concern [COCs]). The PCLs are based on the general size of the site, which is also referred to as the “source area” size. The source area is either 0.5 acre or less in size, or assumed to be 30 acres if the site is larger than 0.5 acre in size. Thus, the soil action levels for RMU-5 are based on a 30-acre source area, since the size of the site is approximately 19.3 acres. The PCL is then selected based on the lower of the two PCLs listed for either (1) the total soil combined pathway ($^{Tot}Soil_{Comb}$) (*i.e.*, exposure to a COC from incidental ingestion, dermal contact, inhalation of volatiles and particulates, and vegetable consumption); or (2) the soil to groundwater pathway ($^{GW}Soil_{Ing}$) (*i.e.*, soil-to-groundwater leaching of a COC to groundwater, where the PCL is the highest concentration of COC allowed in soil to be protective of Class 1 or Class 2 groundwater).

3.1 FIELD ACTIVITIES AND INVESTIGATIONS

Because there was no obvious evidence that the site was used as a rocket range, the field investigations began with an XRF survey to identify areas of concern. It was followed by a systematic visual inspection for evidence of munitions debris and MEC. Finally, soil samples were collected to provide proof that soil concentrations met requirements for closure with an RIR.

3.1.1 XRF Survey

An XRF survey was conducted within the boundary of RMU-5 in December 2010 to gather field screening data regarding the presence of metals above Tier 1 protective concentration levels (PCLs) in surface soils. Many munitions contain lead, and our experience at CSSA has shown that lead is an excellent indicator of impacted areas. In addition, lead and zinc XRF results have shown a strong statistical correlation with laboratory-verified samples. Therefore, an XRF

analyzer was used to identify potentially contaminated areas, particularly because there was no visual evidence or evidence on historical aerial photographs that there was an area of concern. Sample locations and results of the XRF survey are shown on **Figure 6**. Samples for XRF analysis were collected from a total of 64 locations across the site. XRF results showed that neither lead nor zinc was detected above Tier 1 PCLs at RMU-5.

3.1.2 Assessment for Potential Munitions Presence

Most recently, in October 2011, an assessment took place in the North Pasture, including in and around RMU-5, to evaluate if there was any evidence indicating that there was a rocket range in the area of RMU-5. A Schonstedt hand-held magnetometer was used by the UXO team to estimate the subsurface anomaly density (**Figure 7**). A medium density (between 151 and 300 detections) was estimated at the north end of the site and a low density (between 0 and 150 detections) was estimated for the rest of RMU-5 (**Figure 7**). The presence and nature of the MD identified during this investigation within the RMU-5 boundary was not indicative of a rocket range, but of kick-out from historical ordnance activities at SWMU B-20/21.

Given that the denoted location of the rocket range on the historic map (**Figure 3**) was not optimum for a rocket range, the hillside situated to the lower east of the site boundary was investigated as the possible location of the range in February 2012. No evidence of the rocket range was found in that location.

3.1.3 Soil Sampling

Soil sampling at RMU-5 was conducted in February 2012 to assess whether historical activities affected the site. A total of 13 surface soil samples were collected at RMU-5 and analyzed for metals and explosives. A summary of the soil sampling results at the site are shown in **Table 1** (detected compounds only) and **Appendix C** (all analytes), and the soil sampling locations are shown on **Figure 8**. The data verification summary report for the sampling and analytical results is provided in **Appendix D**.

As shown in Table 1, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, and zinc were not detected at concentrations exceeding Tier 1 PCLs. One soil sample (RMU5-SS05) slightly exceeded the Tier 1 PCL for chromium of 40.2 milligrams per kilogram (mg/kg). Per TAC §350.79(2)(A), a 95% UCL may be calculated to determine if there is a statistical basis for no further action on a particular COC. A 95% UCL of 25.92 mg/kg was calculated for the chromium concentrations remaining in site soils, which does not exceed the Tier 1 PCL of 40.2 mg/kg (**Appendix E**).

For all sampling and analytical activities at CSSA, Parsons follows TCEQ-approved Quality Assurance (QA) and Quality Control (QC) procedures as described in the post-wide CSSA Quality Assurance Project Plan (QAPP) which can be found in the CSSA EE ([Volume 1-4, QAPP](#)). The detailed CSSA QAPP presents specific policies, organization, functions, and QA/QC requirements for environmental programs at CSSA, including TCEQ-approved analytical methods, reporting limits (RL), and QA/QC procedures.

The CSSA QAPP: (1) was prepared for use by contractors that perform environmental services at CSSA to ensure that the data are scientifically valid and defensible; (2) establishes the analytical protocols and documentation requirements to ensure that the samples are collected and

analyzed, and that the data are reviewed and validated in a specified manner; and (3) provides detailed guidance for using the Data Quality Objective (DQO) process for specific investigations. The CSSA QAPP and delivery/task order specific Field Sampling Plans (FSP) constitute the CSSA Sampling and Analysis Plan (SAP). The SAP defines data quality for a specific project. Information regarding post-wide and site-specific plans and TCEQ correspondence can be found in the CSSA EE ([Volume 1-1, Correspondence](#)).

Following the CSSA-specific plans, the investigative soil analyses for RMU-5 were performed using U.S. Environmental Protection Agency (USEPA) *Test Methods for Evaluating Solid Waste* (SW-846): Method 8330B (explosives); and Method 6010 (arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, and zinc). All samples were sent to Agriculture & Priority Pollutants Laboratory, Inc. (APPL) for analyses.

3.2 SITE GEOLOGY/HYDROGEOLOGY

Based on the sampling results and the geological and hydrogeological characteristics of the site, surface water and groundwater have not been affected by historical activities at RMU-5. A description of the geology and hydrogeology of the area is provided below. Additional information on geology, hydrology and physiography at CSSA are also available in the CSSA EE ([Volume 1-1, Background Information Report](#)).

3.2.1 CSSA Geology/Hydrogeology

The Lower Glen Rose (LGR) is the uppermost geologic stratum in the CSSA area. The LGR is a massive, fossiliferous, vuggy limestone that grades upward into thin beds of limestone, marl, and shale. The LGR is approximately 300-330 ft thick in the CSSA area and is underlain by the Bexar Shale (BS) facies of the Hensell Sand, which is estimated to be from 60 to 150 ft thick under the CSSA area. The BS consists of silty dolomite, marl, calcareous shale, and shaley limestone. The geologic strata dip approximately 1 to 2 degrees to the south-southeast at CSSA.

The uppermost hydrogeologic layer at CSSA is the unconfined Upper Trinity aquifer, which consists of the Upper Glen Rose (UGR) Limestone. Locally at CSSA, very low-yielding perched zones of groundwater can exist in the UGR; however, it is very sporadic and seasonal. Transmissivity values are not available for the UGR. Regionally, groundwater flow is thought to be enhanced along the bedding contacts between marl and limestone; however, the hydraulic conductivity between beds is thought to be poor. This interpretation is based on the observation of discordant static water levels in adjacent wells completed in different beds. Principal development of solution channels is limited to evaporite layers in the UGR Limestone.

The Middle Trinity aquifer functions as the primary source of groundwater at CSSA. It consists of the LGR Limestone, the BS, and the Cow Creek (CC) Limestone. The LGR Limestone outcrops north of CSSA, along Cibolo Creek, and within the central and southwestern portions of CSSA. As such, principal recharge into the Middle Trinity aquifer is via precipitation infiltration at outcrops and along creek beds during flood events. At CSSA, the BS is interpreted as a confining layer, except where it is fractured and faulted, allowing vertical flow from the up-dip CC Limestone into the overlying, down-dip LGR. Fractures and faults within the BS may allow hydraulic communication between the LGR and CC Limestones. Regional groundwater flow within the Middle Trinity aquifer is toward the south and southeast and the average transmissivity coefficient is 1,700 gallons per day per ft (CSSA EE, [Volume 5, Hydrogeologic](#)

[Report](#)). In general, groundwater at CSSA flows in a northeast to southwest direction. However, local flow gradient may vary depending on rainfall, recharge, and possibly well pumping.

3.2.2 RMU-5 Groundwater and Surface Water

No site-specific information regarding groundwater is available for RMU-5. However, between September 1994 and December 2011, measured water levels at Well CS-MWG-LGR, which is located approximately 1,700 ft west of the site, have ranged from 170.8 ft below top of casing (BTOC) (June 2005) to 316.7 ft BTOC (January 1997). Copper has been detected slightly above its maximum contaminant level (MCL) of 1.3 milligrams per liter (mg/L) on one occasion (February 1996) and lead has been detected slightly above its MCL of 0.015 mg/L on three occasions (January 1996, February 1996, and September 2001). No pattern in the metal detections has been identified, and given that neither copper nor lead was a COC at RMU-5 it is very unlikely that this site is the source of the metal contamination. No other analytes have exceeded MCLs. Sporadic low concentrations of volatile organic compounds (VOCs) detected in CS-MWG-LGR (below their respective MCLs) are attributed to contaminated groundwater from the SWMU B-3 bioreactor plume.

The closest surface water body to RMU-5 is an unnamed intermittent tributary that runs southwest (downgradient) through the site (**Figure 9**). The tributary, which only contains water immediately after significant rain events, drains to Salado Creek, located approximately 1,700 yards southwest of RMU-5. The north-south trending creek exits the CSSA boundary approximately 3,900 yards south-southeast of the site. No significant degradation of high quality receiving waters is anticipated from RMU-5.

4.0 TIER 1 ECOLOGICAL EXCLUSION CRITERIA CHECKLIST

In accordance with TCEQ (2003) guidance, an RIR is submitted when the results of an investigation lead to a conclusion that COCs do not exceed Tier 1 residential soil action levels and there is no evidence of other affected media. The site must also pass the Tier 1 Ecological Exclusion Criteria Checklist. The checklist must be completed as part of the RIR for a site. The completed checklist is provided in Appendix B. Results show that the site passes the checklist and that there are no ecological exposure pathways of concern at RMU-5. Thus, based on the absence of any complete or significant ecological exposure pathways, RMU-5 may be excluded from further ecological assessment.

5.0 SUMMARY AND RECOMMENDATIONS

RMU-5 is located in the North Pasture, approximately 1,200 yards west of the eastern CSSA boundary. This site covers approximately 19.3 acres. RMU-5 was identified as a rocket range on a 1953 map of CSSA; however, historic aerial photos, visual site surface inspections, UXO assessments, field screening, and analytical sample results do not show any evidence of the range.

From the information summarized above and presented in this report, the results of the investigations at RMU-5 meet the three criteria as described in the TCEQ (2003) guidance *Determining Which Releases are Subject to the TRRP*. Thus, the following criteria were met:

- Concentrations of chemicals in soil samples do not exceed Tier 1 PCLs or were used to calculate a 95% UCL per TAC §350.79(2)(A) that does not exceed the Tier 1 PCL;
- There is no evidence of other affected or threatened environmental media (groundwater, surface water, or sediment) at RMU-5; and
- RMU-5 passes the Tier 1 Ecological Exclusion Criteria Checklist (Appendix B).

Because these three criteria are met, RMU-5 is not subject to TRRP. Therefore, this RIR requests an NFA decision from the TCEQ for RMU-5. Impacts to the RMU-5 area from either the nearby SWMU B-20/21 or the active East Pasture Range will be addressed separately if and when the East Pasture Range is closed in the future.

TABLES AND FIGURES

Table 1. Summary of Chemical Constituents Remaining in Soils at RMU-5

	Metals																												
	Arsenic CAS: 7440-38-2	Qualifier	Dilution	Barium CAS: 7440-39-3	Qualifier	Dilution	Cadmium CAS: 7440-43-9	Qualifier	Dilution	Chromium CAS: 7440-47-3	Qualifier	Dilution	Copper CAS: 7440-50-8	Qualifier	Dilution	Lead CAS: 7439-92-1	Qualifier	Dilution	Mercury CAS: 7439-97-6	Qualifier	Dilution	Nickel CAS: 7440-02-0	Qualifier	Dilution	Zinc CAS: 7440-66-6	Qualifier	Dilution		
Tier 1 Soil PCLs - 30 acre[†]																													
Residential Combined Exposure ^[1]	2.40E+01	n		8.10E+03	n		5.20E+01	n		2.70E+04	n		5.50E+02	n		5.00E+02	n		2.10E+00	n		8.30E+02	n		9.90E+03	n			
Residential Groundwater Exposure ^[2]	2.50E+00	m	>S	2.20E+02	m	>S	7.50E-01	m	>S	1.20E+03	m	>S	5.20E+02	a	>S	1.50E+00	a	>S	3.90E-03	m		7.90E+01	n	>S	1.20E+03	n	>S		
Ecological Benchmark ^[3]	1.80E+01			3.30E+02			3.20E+01			4.00E-01			6.10E+01			1.20E+02			1.00E-01			3.00E+01			1.20E+02				
TCEQ-Approved Background Values																													
CSSA 9 Metals Background Concentration ^[4]	19.6 ^{††}			300 ^{†††}			3 ^{††}			40.2 ^{††}			23.2 ^{††}			84.5 ^{††}			0.77 ^{††}			35.5 ^{††}			73.2 ^{††}				
Sample Locations (Date Collected)																													
RMU5-SS01 (08-Feb-2012)	8.7	F	1	80		1	0.030	U	1	24		1	14		1	18		1	0.080	F	1	13		1	42		1		
RMU5-SS02 (07-Feb-2012)	7.3	F	1	47		1	0.030	U	1	13	F	1	11		1	18		1	0.070	F	1	7.1		1	39		1		
RMU5-SS03 (07-Feb-2012)	4.4	F	1	32		1	0.030	U	1	7.9	F	1	10		1	17		1	0.090	F	1	4.2		1	18		1		
RMU5-SS04 (07-Feb-2012)	5.2	F	1	38		1	0.030	U	1	9.6	F	1	13		1	16		1	0.060	F	1	3.8		1	24		1		
RMU5-SS05 (07-Feb-2012)	14	F	1	170		1	0.22	F	1	47		1	20		1	32		1	0.080	F	1	26		1	72		1		
RMU5-SS06 (07-Feb-2012)	5.0	F	1	39		1	0.030	U	1	12	F	1	9.3		1	9.8	F	1	0.050	F	1	6.8		1	16		1		
RMU5-SS07 (08-Feb-2012)	9.0	F	1	83		1	0.030	U	1	26		1	11		1	18		1	0.060	F	1	14		1	37		1		
RMU5-SS08 (08-Feb-2012)	9.2	F	1	98		1	0.030	U	1	30		1	12		1	17		1	0.050	F	1	16		1	39		1		
RMU5-SS08-DUP (08-Feb-2012)	9.2	F	1	91		1	0.030	U	1	28		1	12		1	16		1	0.040	F	1	14		1	35		1		
RMU5-SS09 (08-Feb-2012)	10	F	1	110		1	0.030	U	1	39		1	14		1	27		1	0.090	F	1	23		1	80		1		
RMU5-SS10 (08-Feb-2012)	5.2	F	1	41		1	0.030	U	1	11	F	1	14		1	19		1	0.080	F	1	5.2		1	50		1		
RMU5-SS11 (07-Feb-2012)	6.0	F	1	46		1	0.030	U	1	14	F	1	16		1	12		1	0.040	F	1	7.2		1	22		1		
RMU5-SS12 (08-Feb-2012)	4.6	F	1	26		1	0.030	U	1	7.0	F	1	9.5		1	13		1	0.040	F	1	3.2		1	38		1		
RMU5-SS13 (08-Feb-2012)	4.9	F	1	20		1	0.030	U	1	6.2	F	1	9.3		1	7.7	F	1	0.040	F	1	3.2	J	1	37		1		
RMU5-SS13-DUP (08-Feb-2012)	5.8	F	1	23		1	0.030	U	1	7.7	F	1	9.9		1	9.0	F	1	0.040	F	1	4.0	J	1	39		1		

NOTES:

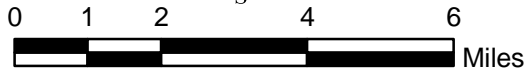
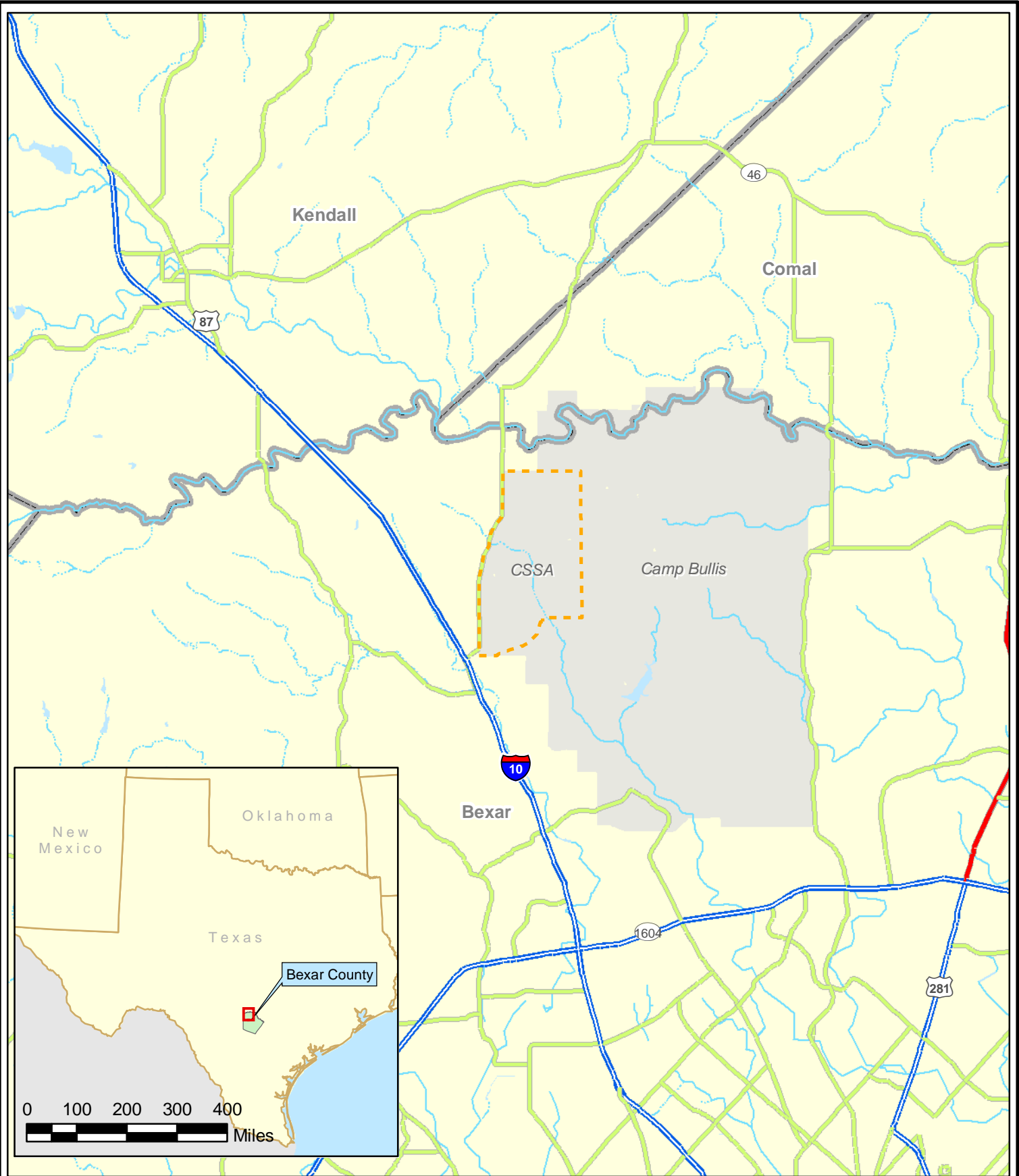
- † TCEQ, TRRP Tier 1 Soil PCLs (Last Revised: May 24, 2011).
- †† CSSA Soil Background Concentrations. Second Revision, Evaluation of Background Metals Concentrations in Soils and Bedrock at CSSA. February 2002. Values from Table 3.3.
- ††† Texas-Specific median background concentration.
- PCLs and CSSA background values coded in this table as [1, 2, 3].
- [1] ^{Tot}Soil_{Comb} = PCL for COPC in soil for a 30 acre source area and a potential future resident (combined exposure for ingestion, dermal contact, inhalation of volatiles and particulates, and ingestion of above-ground and below-ground vegetables).
- [2] ^{GW}Soil_{Ing} = PCL for COPC in soil for a 30 acre source area and a potential future resident (soil-to-groundwater leaching of COPC to Class 1 and 2 groundwater).
- [3] TCEQ Ecological Benchmark for Soil (Last Revised: January 2006).
- [4] CSSA Soil Background Concentrations.

PCLs are shown in **blue** font.

All values are measured in milligrams per kilogram (mg/Kg) unless otherwise noted.

QA NOTES AND DATA QUALIFIERS:

- (NO CODE) - Confirmed identification.
- U - Analyte was not detected above the indicated Method Detection Limit (MDL).
- F - Analyte was positively identified, but the quantitation is an estimation above the MDL and below the Reporting Limit (RL).
- J - Analyte was positively identified, but the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
- M = Concentration is estimated due to a matrix effect.
- Values shown in **BOLD** indicate detections above the MDL.
- Values **HIGHLIGHTED** indicate detections above the PCL.









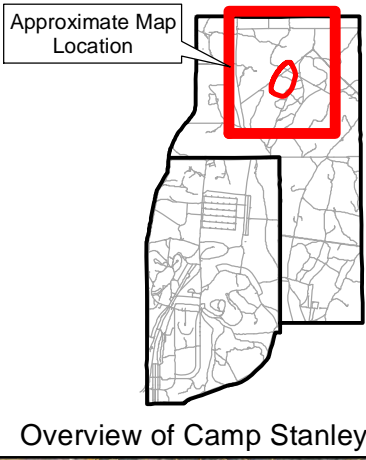
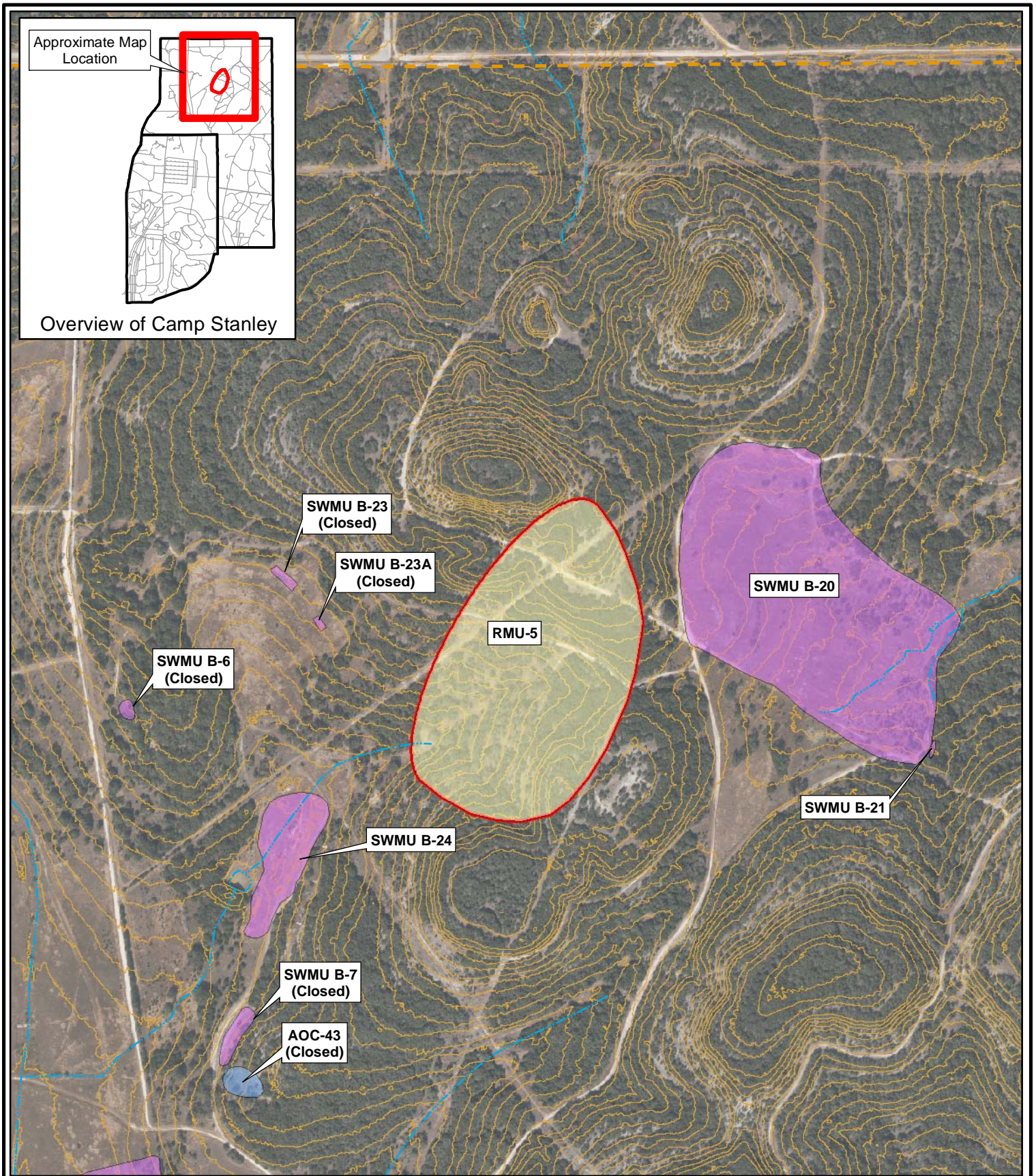
-  CSSA
-  Freeway
-  Highway
-  Major Road
-  County Boundary
-  Military Installation

Figure 1

CSSA Location Map
Camp Stanley Storage Activity

PARSONS



SWMU B-23
(Closed)

SWMU B-23A
(Closed)

RMU-5

SWMU B-20

SWMU B-6
(Closed)

SWMU B-21

SWMU B-24

SWMU B-7
(Closed)

AOC-43
(Closed)



- RMU-5 Boundary
- AOC Boundary
- RMU Boundary
- SWMU Boundary
- CSSA Outer Fence Line
- Intermittent Stream
- 5' Topographic Contours

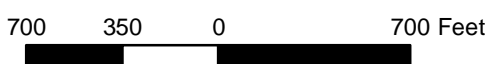
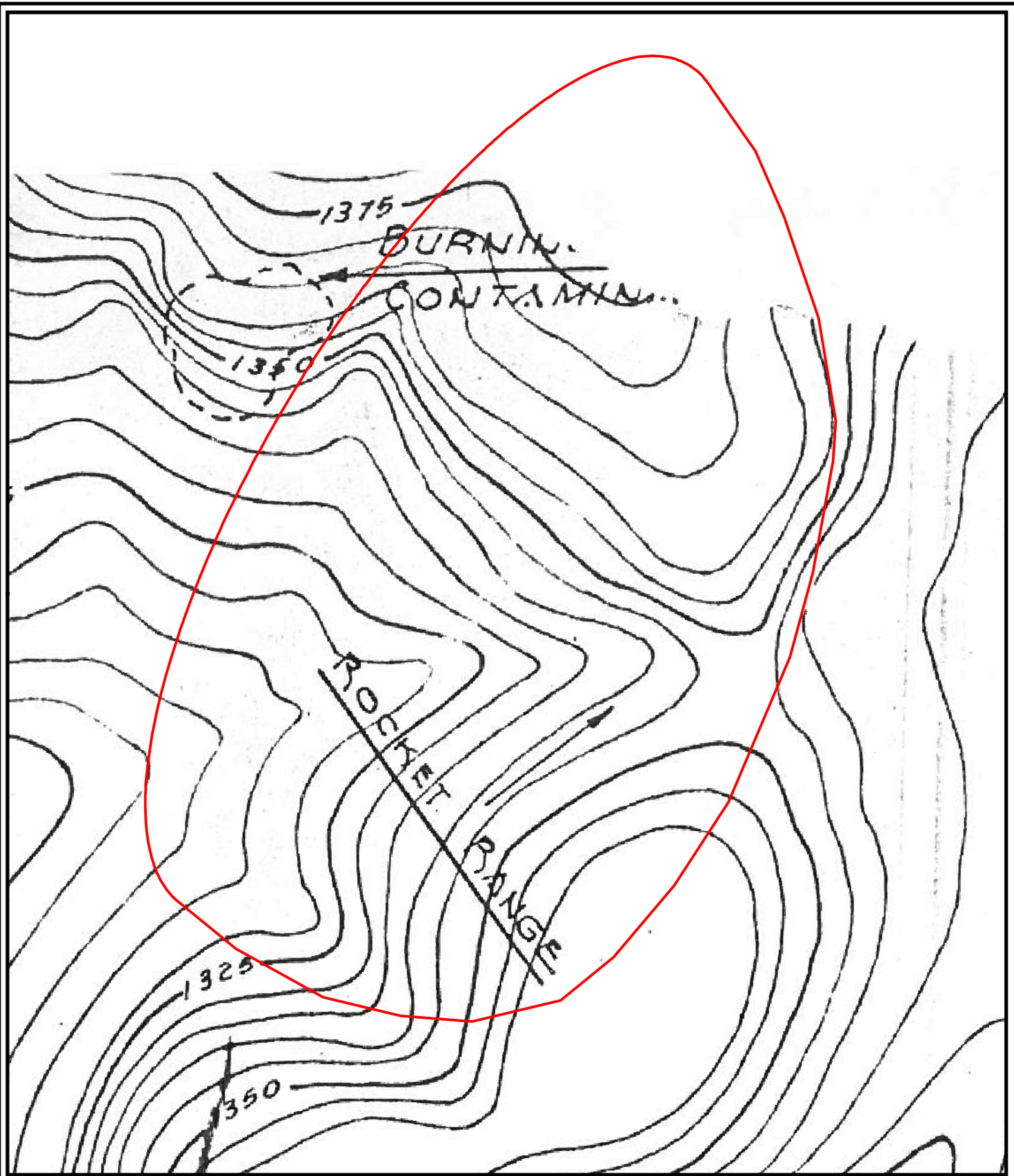


Figure 2

RMU-5
Site Location Map
Camp Stanley Storage Activity

PARSONS




 RMU-5 Boundary



Figure 3

RMU-5 1953 Historical Map
Camp Stanley Storage Activity

PARSONS

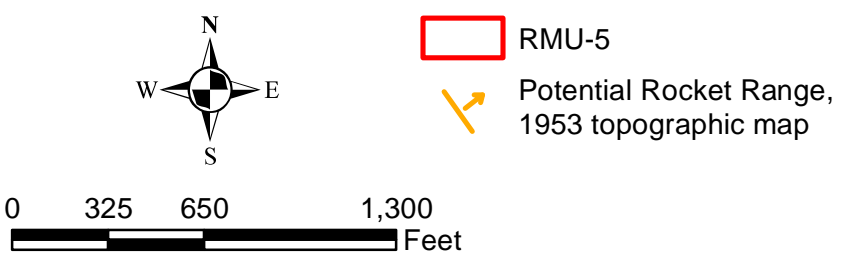
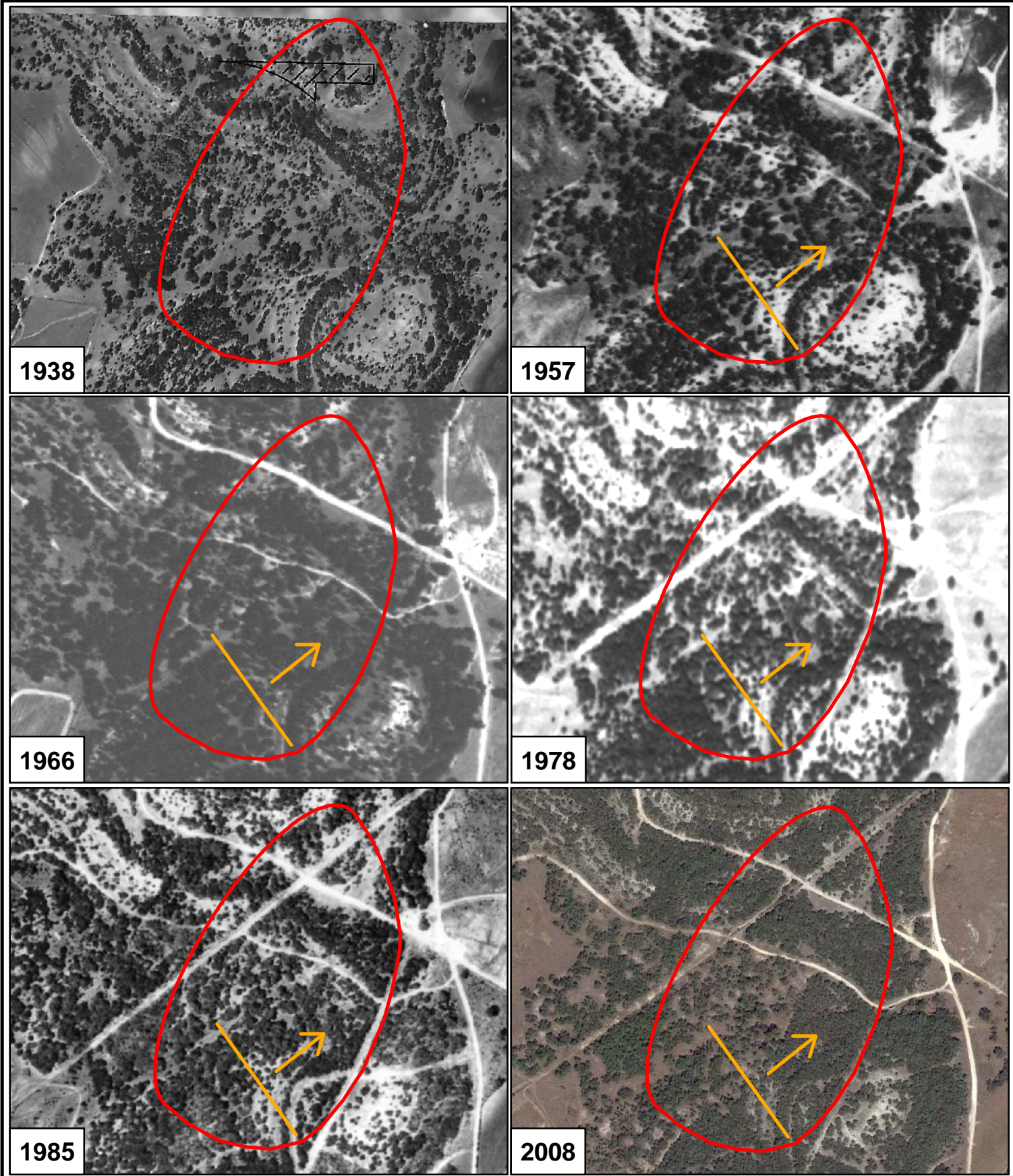


Figure I
 RMU-5
 Aerial Photographs
 Camp Stanley Storage Activity
PARSONS

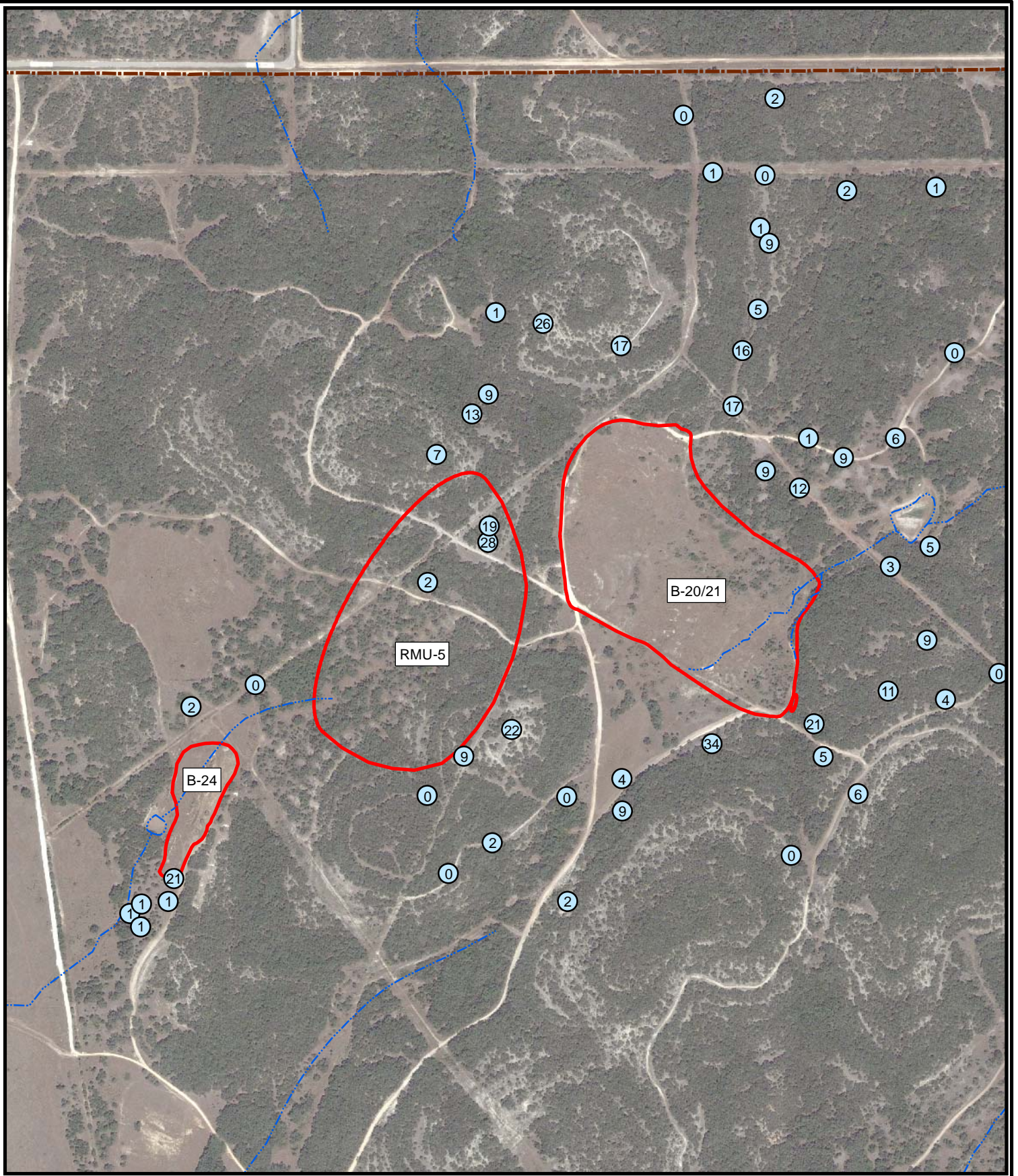
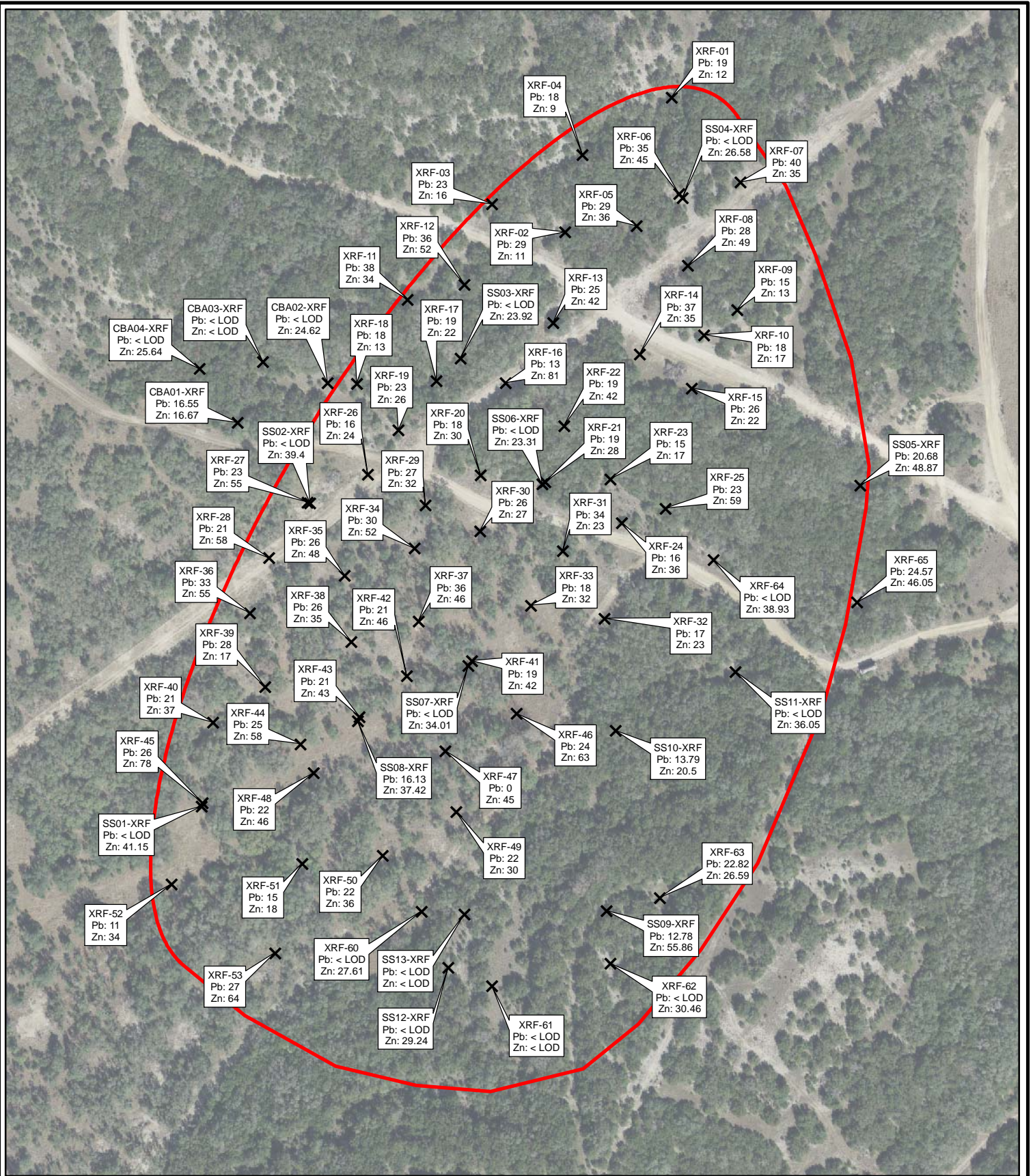


Figure 5

Perimeter Investigation
Camp Stanley Storage Activity

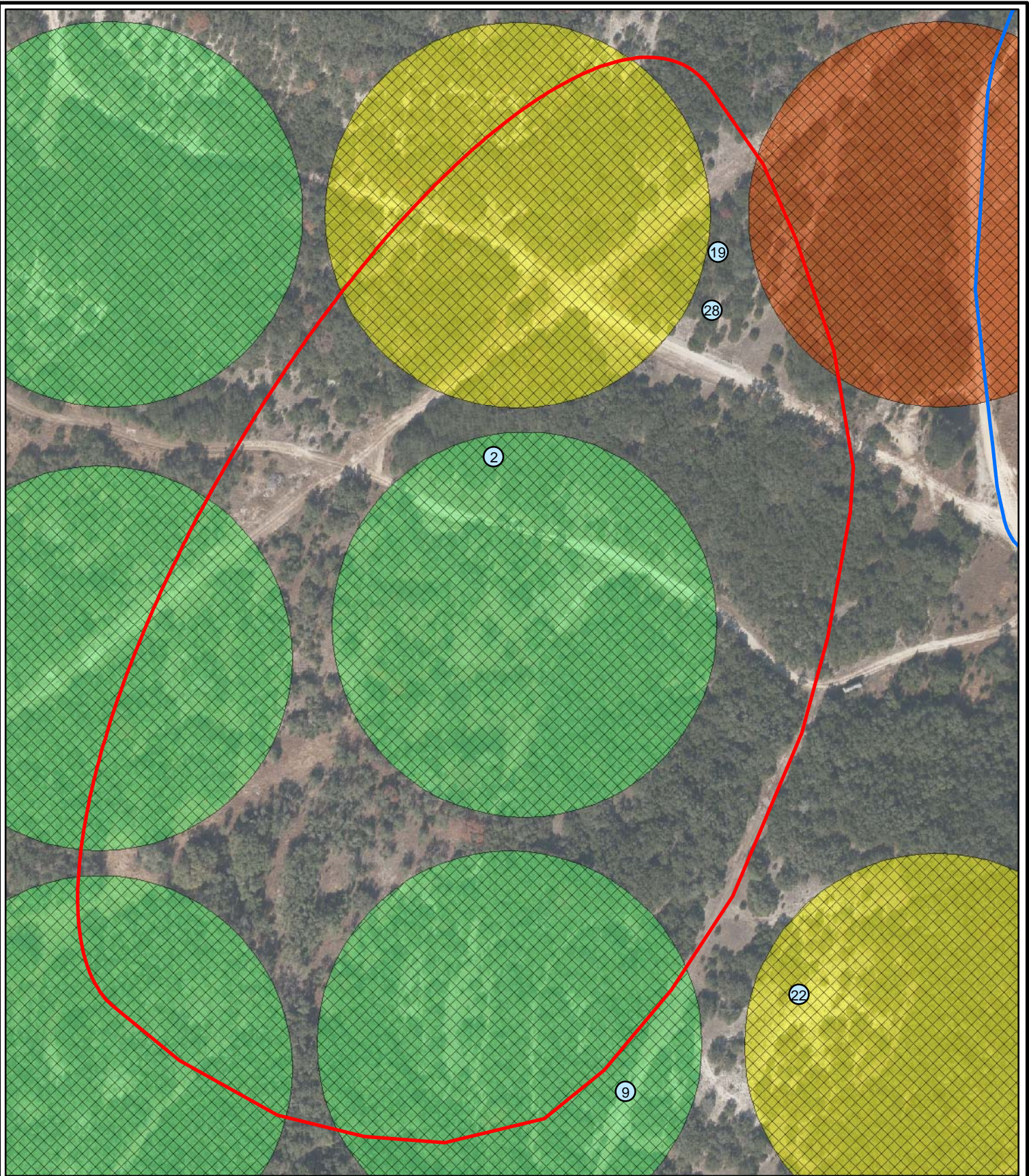
PARSONS



RMU-5 Boundary
X XRF Sample Location

225 112.5 0 225 Feet

Figure 6
RMU-5
XRF Sampling Results
Camp Stanley Storage Activity
PARSONS



- ▭ RMU-5 Boundary
- ▭ SWMU B-20 Boundary

B20/21 Perimeter Assessment, 2010

- Estimated density of surficial munitions debris, 20' x 20' area

North Pasture UXO Assessment, 2011

- Surface Density Estimations
 - High (26 or greater detections)
- Subsurface Anomaly Density Estimations
 - Low (0 - 150 detections)
 - Medium (151 - 300 detections)
 - High (301 or greater detections)

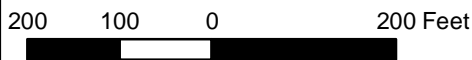
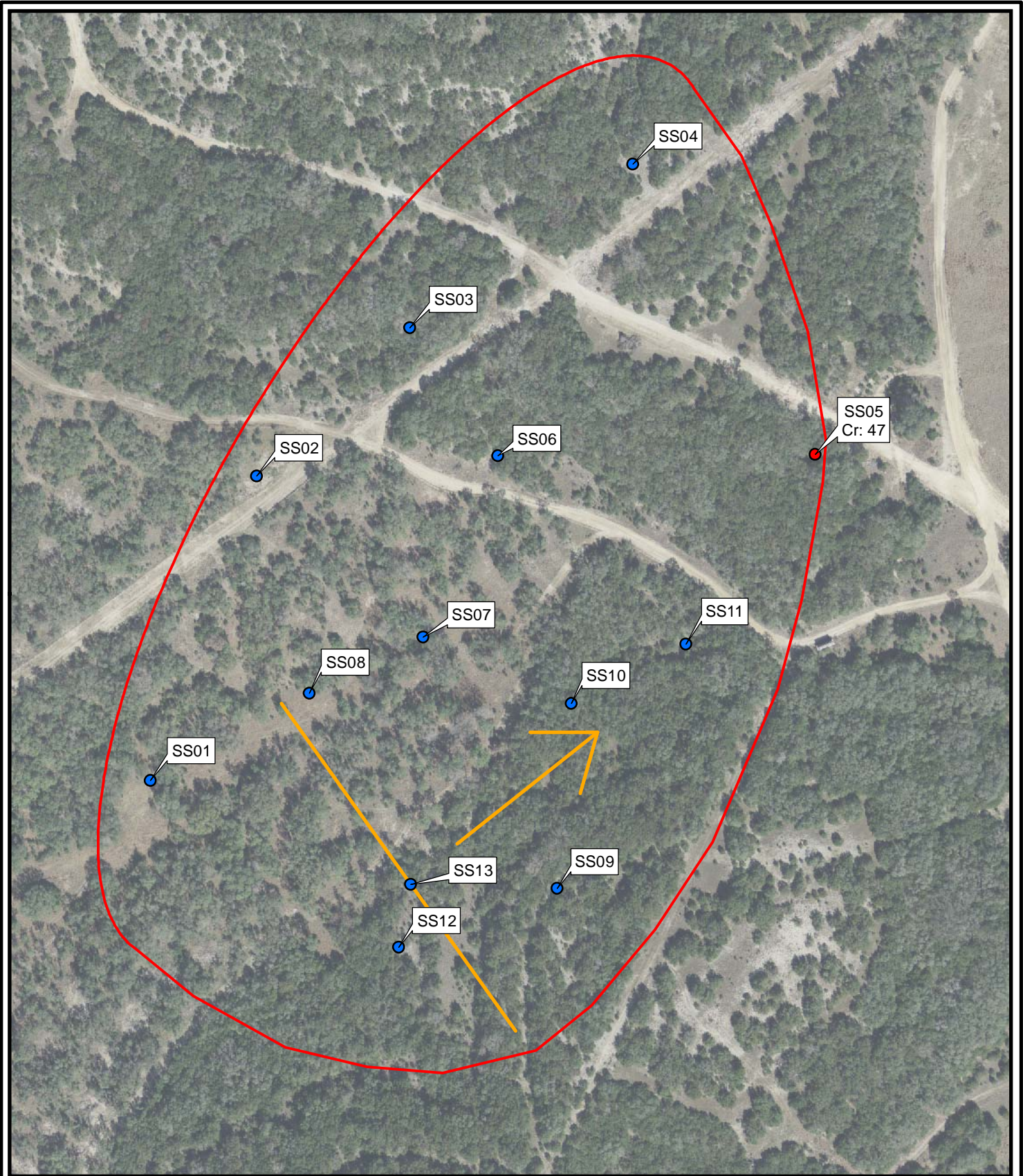


Figure 7

**RMU-5
Munitions Assessment Results
Camp Stanley Storage Activity**

PARSONS



- Soil Sample
- Soil Sample Location with result above Tier 1 PCL in mg/kg
- Rocket Range
- RMU-5 Boundary



Figure 8
 RMU-5
 Sample Locations
 Camp Stanley Storage Activity

PARSONS

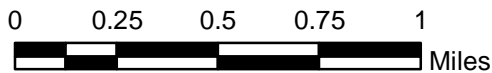
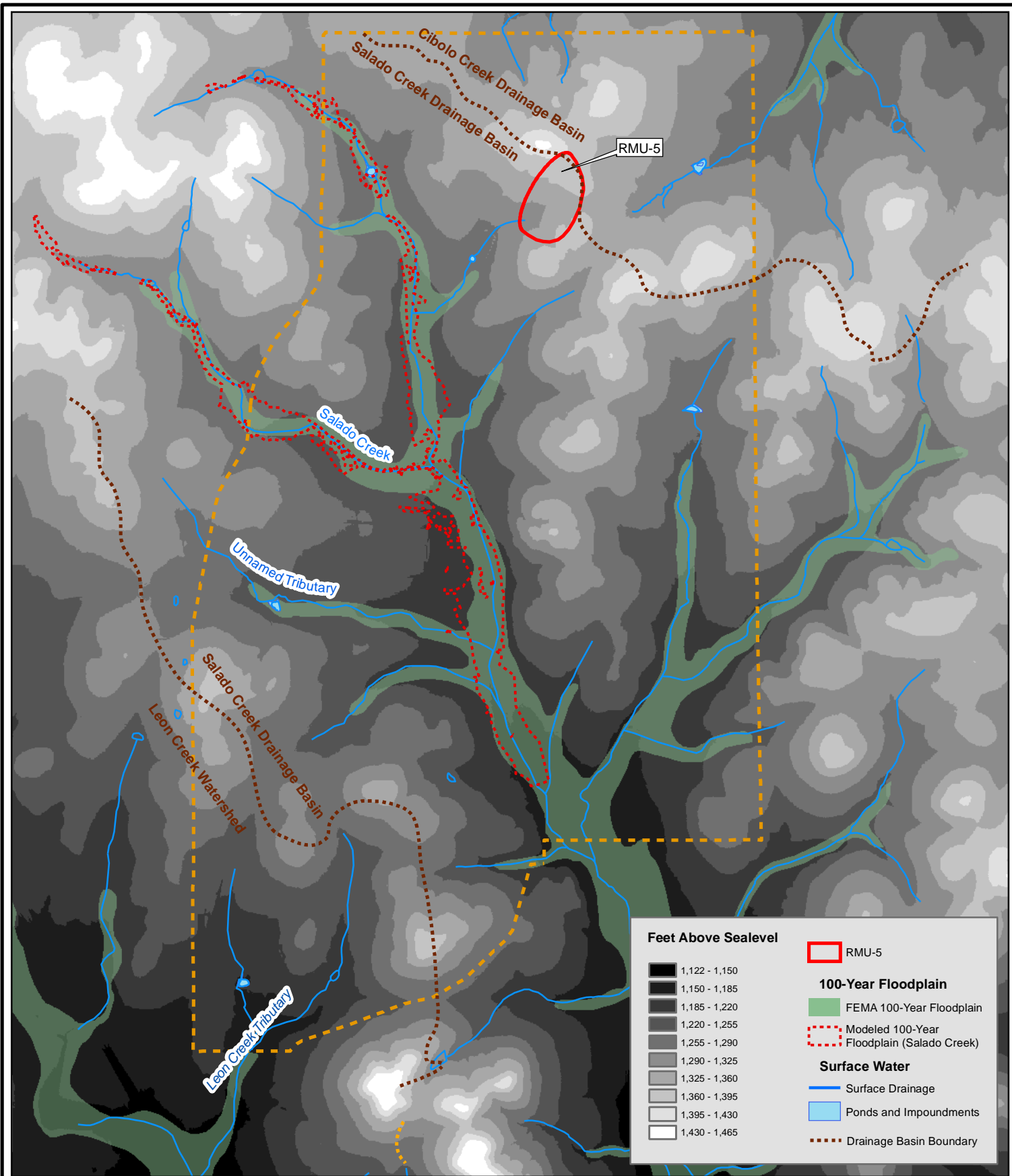


Figure 9

RMU-5 Topography, Surface Water, and Floodplains Camp Stanley Storage Activity

PARSONS

APPENDIX A
Site Photographs



Photo 1. View of RMU-5, looking northeast (December 2001).



Photo 2. View of RMU-5, looking southeast (December 2011).



Photo 3. View of RMU-5, looking north (December 2011).



Photo 4. View of RMU-5, looking west (December 2011).

APPENDIX B
Tier 1 Ecological Exclusion Criteria Checklist

Figure: 30 TAC §350.77(b)

TIER 1: Exclusion Criteria Checklist

This exclusion criteria checklist is intended to aid the person and the TNRCC in determining whether or not further ecological evaluation is necessary at an affected property where a response action is being pursued under the Texas Risk Reduction Program (TRRP). Exclusion criteria refer to those conditions at an affected property which preclude the need for a formal ecological risk assessment (ERA) because there are **incomplete or insignificant ecological exposure pathways** due to the nature of the affected property setting and/or the condition of the affected property media. This checklist (and/or a Tier 2 or 3 ERA or the equivalent) must be completed by the person for all affected property subject to the TRRP. The person should be familiar with the affected property but need not be a professional scientist in order to respond, although some questions will likely require contacting a wildlife management agency (i.e., Texas Parks and Wildlife Department or U.S. Fish and Wildlife Service). The checklist is designed for general applicability to all affected property; however, there may be unusual circumstances which require professional judgement in order to determine the need for further ecological evaluation (e.g., cave-dwelling receptors). In these cases, the person is strongly encouraged to contact TNRCC before proceeding.

Besides some preliminary information, the checklist consists of three major parts, **each of which must be completed unless otherwise instructed**. PART I requests affected property identification and background information. PART II contains the actual exclusion criteria and supportive information. PART III is a qualitative summary statement and a certification of the information provided by the person. **Answers should reflect existing conditions and should not consider future remedial actions at the affected property**. Completion of the checklist should lead to a logical conclusion as to whether further evaluation is warranted. Definitions of terms used in the checklist have been provided and users are strongly encouraged to familiarize themselves with these definitions before beginning the checklist.

Name of Facility:

Camp Stanley Storage Activity (CSSA), Boerne, Texas.

Affected Property Location:

RMU-5 is located in the North Pasture, approximately 1,200 yards west of the eastern CSSA boundary. This site covers approximately 19.3 acres. RMU-5 was identified as a rocket range on a 1953 map of CSSA (Figure 3 of this RIR), but historic aerial photos, visual site surface inspections, UXO investigations, field screening, and analytical sample results do not show any evidence of the range.

Mailing Address:

**Camp Stanley Storage Activity
25800 Ralph Fair Road
Boerne, TX 78015**

TNRCC Case Tracking #s:

**Water Customer No.: CN602728206.
Air Customer No.: CN600126262.**

Solid Waste Registration #s:

Texas Solid Waste Registration No.: 69026.

Voluntary Cleanup Program #: **Not applicable.**

EPA I.D. #s:

USEPA Identification No.: TX2210020739.

Figure: 30 TAC §350.77(b)

Definitions¹

Affected property - The entire area (i.e., on-site and off-site; including all environmental media) which contains releases of chemicals of concern at concentrations equal to or greater than the assessment level applicable for residential land use and groundwater classification.

Assessment level - A critical protective concentration level for a chemical of concern used for affected property assessments where the human health protective concentration level is established under a Tier 1 evaluation as described in §350.75(b) of this title (relating to Tiered Human Health Protective Concentration Level Evaluation), except for the protective concentration level for the soil-to-groundwater exposure pathway which may be established under Tier 1, 2, or 3 as described in §350.75(i)(7) of this title, and ecological protective concentration levels which are developed, when necessary, under Tier 2 and/or 3 in accordance with §350.77(c) and/or (d), respectively, of this title (relating to Ecological Risk Assessment and Development of Ecological Protective Concentration Levels).

Bedrock - The solid rock (i.e., consolidated, coherent, and relatively hard naturally formed material that cannot normally be excavated by manual methods alone) that underlies gravel, soil or other surficial material.

Chemical of concern - Any chemical that has the potential to adversely affect ecological or human receptors due to its concentration, distribution, and mode of toxicity. Depending on the program area, chemicals of concern may include the following: solid waste, industrial solid waste, municipal solid waste, and hazardous waste as defined in Texas Health and Safety Code, §361.003, as amended; hazardous constituents as listed in 40 Code of Federal Regulations Part 261, Appendix VIII, as amended; constituents on the groundwater monitoring list in 40 Code of Federal Regulations Part 264, Appendix IX, as amended; constituents as listed in 40 CFR Part 258 Appendices I and II, as amended; pollutant as defined in Texas Water Code, §26.001, as amended; hazardous substance as defined in Texas Health and Safety Code, §361.003, as amended, and the Texas Water Code §26.263, as amended; regulated substance as defined in Texas Water Code §26.342, as amended and §334.2 of this title (relating to Definitions), as amended; petroleum product as defined in Texas Water Code §26.342, as amended and §334.122(b)(12) of this title (relating to Definitions for ASTs), as amended; other substances as defined in Texas Water Code §26.039(a), as amended; and daughter products of the aforementioned constituents.

Community - An assemblage of plant and animal populations occupying the same habitat in which the various species interact via spatial and trophic relationships (e.g., a desert community or a pond community).

Complete exposure pathway - An exposure pathway where a human or ecological receptor is exposed to a chemical of concern via an exposure route (e.g., incidental soil ingestion, inhalation of volatiles and particulates, consumption of prey, etc).

De minimus - The description of an area of affected property comprised of one acre or less where the ecological risk is considered to be insignificant because of the small extent of contamination, the absence of protected species, the availability of similar unimpacted habitat nearby, and the lack of adjacent sensitive environmental areas.

Ecological protective concentration level - The concentration of a chemical of concern at the point of exposure within an exposure medium (e.g., soil, sediment, groundwater, or surface water) which is determined in accordance with §350.77(c) or (d) of this title (relating to Ecological Risk Assessment and Development of Ecological Protective Concentration Levels) to be protective for ecological receptors. These concentration levels are primarily intended to be protective for more mobile or wide-ranging ecological receptors and, where appropriate, benthic invertebrate communities within the waters in the state. These concentration levels are not intended to be directly protective of receptors with limited mobility or range (e.g., plants, soil invertebrates, and small rodents), particularly those residing within active areas of a facility, unless these receptors are threatened/endangered species or unless impacts to these receptors result in disruption of the ecosystem or other unacceptable consequences for the more

¹These definitions were taken from 30 TAC §350.4 and may have both ecological and human health applications. For the purposes of this checklist, it is understood that only the ecological applications are of concern.

mobile or wide-ranging receptors (e.g., impacts to an off-site grassland habitat eliminate rodents which causes a desirable owl population to leave the area).

Ecological risk assessment - The process that evaluates the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more stressors; however, as used in this context, only chemical stressors (i.e., COCs) are evaluated.

Environmental medium - A material found in the natural environment such as soil (including non-waste fill materials), groundwater, air, surface water, and sediments, or a mixture of such materials with liquids, sludges, gases, or solids, including hazardous waste which is inseparable by simple mechanical removal processes, and is made up primarily of natural environmental material.

Exclusion criteria - Those conditions at an affected property which preclude the need to establish a protective concentration level for an ecological exposure pathway because the exposure pathway between the chemical of concern and the ecological receptors is not complete or is insignificant.

Exposure medium - The environmental medium or biologic tissue in which or by which exposure to chemicals of concern by ecological or human receptors occurs.

Facility - The installation associated with the affected property where the release of chemicals of concern occurred.

Functioning cap - A low permeability layer or other approved cover meeting its design specifications to minimize water infiltration and chemical of concern migration, and prevent ecological or human receptor exposure to chemicals of concern, and whose design requirements are routinely maintained.

Landscaped area - An area of ornamental, or introduced, or commercially installed, or manicured vegetation which is routinely maintained.

Off-site property (off-site) - All environmental media which is outside of the legal boundaries of the on-site property.

On-site property (on-site) - All environmental media within the legal boundaries of a property owned or leased by a person who has filed a self-implementation notice or a response action plan for that property or who has become subject to such action through one of the agency's program areas for that property.

Physical barrier - Any structure or system, natural or manmade, that prevents exposure or prevents migration of chemicals of concern to the points of exposure.

Point of exposure - The location within an environmental medium where a receptor will be assumed to have a reasonable potential to come into contact with chemicals of concern. The point of exposure may be a discrete point, plane, or an area within or beyond some location.

Protective concentration level - The concentration of a chemical of concern which can remain within the source medium and not result in levels which exceed the applicable human health risk-based exposure limit or ecological protective concentration level at the point of exposure for that exposure pathway.

Release - Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, with the exception of:

(A) A release that results in an exposure to a person solely within a workplace, concerning a claim that the person may assert against the person's employer;

(B) An emission from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine;

(C) A release of source, by-product, or special nuclear material from a nuclear incident, as those terms are defined by the Atomic Energy Act of 1954, as amended (42 U.S.C. §2011 et seq.), if the release is subject to requirements concerning financial protection established by the Nuclear Regulatory Commission under §170 of that Act;

(D) For the purposes of the environmental response law §104, as amended, or other response action, a release of source, by-product, or special nuclear material from a processing site designated under

§102(a)(1) or §302(a) of the Uranium Mill Tailings Radiation Control Act of 1978 (42 U.S.C. §7912 and §7942), as amended; and

(E) The normal application of fertilizer.

Sediment - Non-suspended particulate material lying below surface waters such as bays, the ocean, rivers, streams, lakes, ponds, or other similar surface water body (including intermittent streams). Dredged sediments which have been removed from below surface water bodies and placed on land shall be considered soils.

Sensitive environmental areas - Areas that provide unique and often protected habitat for wildlife species. These areas are typically used during critical life stages such as breeding, hatching, rearing of young, and overwintering. Examples include critical habitat for threatened and endangered species, wilderness areas, parks, and wildlife refuges.

Source medium - An environmental medium containing chemicals of concern which must be removed, decontaminated and/or controlled in order to protect human health and the environment. The source medium may be the exposure medium for some exposure pathways.

Stressor - Any physical, chemical, or biological entity that can induce an adverse response; however, as used in this context, only chemical entities apply.

Subsurface soil - For human health exposure pathways, the portion of the soil zone between the base of surface soil and the top of the groundwater-bearing unit(s). For ecological exposure pathways, the portion of the soil zone between 0.5 feet and 5 feet in depth.

Surface cover - A layer of artificially placed utility material (e.g., shell, gravel).

Surface soil - For human health exposure pathways, the soil zone extending from ground surface to 15 feet in depth for residential land use and from ground surface to 5 feet in depth for commercial/industrial land use; or to the top of the uppermost groundwater-bearing unit or bedrock, whichever is less in depth. For ecological exposure pathways, the soil zone extending from ground surface to 0.5 feet in depth.

Surface water - Any water meeting the definition of surface water in the state as defined in §307.3 of this title (relating to Abbreviations and Definitions), as amended.

PART I. Affected Property Identification and Background Information

1) Provide a description of the specific area of the response action and the nature of the release. Include estimated acreage of the affected property and the facility property, and a description of the type of facility and/or operation associated with the affected property. Also describe the location of the affected property with respect to the facility property boundaries and public roadways.

Camp Stanley Storage Activity: CSSA is located in northwestern Bexar County, about 19 miles northwest of downtown San Antonio. The installation consists of approximately 4,004 acres immediately east of Ralph Fair Road, and approximately 0.5 mile east of Interstate Highway 10 (see Figure 1 of the RIR). CSSA has several historical waste sites, including SWMUs, AOCs, and RMUs. The present mission of CSSA is the receipt, storage, issue, and maintenance of ordnance as well as quality assurance testing and maintenance of military weapons and ammunition. Because of its mission, CSSA has been designated a restricted access facility. No changes to the CSSA mission and/or military activities are expected in the future.

RMU-5 is located in the North Pasture, approximately 1,200 yards west of the eastern CSSA boundary. This site covers approximately 19.3 acres. RMU-5 was identified as a rocket range on a 1953 map of CSSA (Figure 3 of this RIR), but historic aerial photos, visual site surface inspections, UXO investigations, field screening, and analytical sample results do not show any evidence of the range.

Attach available USGS topographic maps and/or aerial or other affected property photographs to this form to depict the affected property and surrounding area. Indicate attachments:

- Topo map Aerial photo Other

Aerial photos of the site and land adjacent to the site are shown on Figure 4 of the RIR. Figures 1 and 2 of the RIR show the general location of RMU-5.

2) Identify environmental media known or suspected to contain chemicals of concern (COCs) at the present time. Check all that apply:

<u>Known/Suspected COC Location</u>	<u>Based on sampling data?</u>	
<input type="checkbox"/> NO – Soil ≤ 5 ft below ground surface	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<input type="checkbox"/> NO – Soil >5 ft below ground surface	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<input type="checkbox"/> NO – Groundwater	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
<input type="checkbox"/> NO – Surface Water/Sediments	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Explain (previously submitted information may be referenced):

The closest surface water body to RMU-5 is an unnamed intermittent tributary that runs southwest through the site. The tributary, which only contains water immediately after significant rain events, drains to Salado Creek, located approximately 1,700 yards southwest of RMU-5. The north-south trending creek exits the CSSA boundary approximately 3,900 yards south-southeast of the site. No significant degradation of high quality receiving waters is anticipated from RMU-5.

Based on soil samples collected at RMU-5, no explosives were detected at the site (see Appendix C of this RIR). Concentrations of metals in soil samples do not exceed Tier 1 PCLs or were used to calculate a 95% UCL per TAC §350.79(2)(A) that does not exceed the Tier 1 PCL.

There is no evidence of other affected or threatened environmental media (groundwater, surface water, or sediment) at RMU-5. Over the past 17 years, there have been samples collected from the closest well to RMU-5 (CS-MWG-LGR, located 1,700 ft west of the site) and analyzed for metals and VOCs. Copper was detected slightly above the MCL of 1.3 mg/L on one occasion (February 1996) and lead was detected slightly above the MCL of 0.015 mg/L on three occasions (January 1996, February 1996, and September

2001). No pattern in the metal detections has been identified, and given that neither copper nor lead was a COC at RMU-5, it is very unlikely that this site is the source of the metal contamination. No other analytes have exceeded MCLs. Sporadic low concentrations of VOCs detected in CS-MWG-LGR (below their respective MCLs) are attributed to contaminated groundwater from the SWMU B-3 bioreactor plume.

3) Provide the information below for the nearest surface water body which has become or has the potential to become impacted from migrating COCs via surface water runoff, air deposition, groundwater seepage, etc. Exclude wastewater treatment facilities and stormwater conveyances/impoundments authorized by permit. Also exclude conveyances, decorative ponds, and those portions of process facilities which are:

- a. Not in contact with surface waters in the State or other surface waters which are ultimately in contact with surface waters in the State; and
- b. Not consistently or routinely utilized as valuable habitat for natural communities including birds, mammals, reptiles, etc.

The nearest surface water body, **an unnamed tributary to Salado Creek, runs southwest through** the affected property **RMU-5**. The water body is best described as a:

- freshwater stream: _____ perennial (has water all year)
 _____ intermittent (dries up completely for at least 1 week a year) **[only has water during and immediately after rain events]**
_____ intermittent with perennial pools
- freshwater swamp/marsh/wetland
- saltwater or brackish marsh/swamp/wetland
- reservoir, lake, or pond; approximate surface acres:
- drainage ditch
- tidal stream bay estuary
- other; specify

Is the water body listed as a State classified segment in Appendix C of the current Texas Surface Water Quality Standards; §§307.1 - 307.10?

- Yes Segment # _____ Use Classification:
- No**

If the water body is not a State classified segment, identify the first downstream classified segment.

Name:

Salado Creek Drainage Basin

Segment #:

Segment 1910 – From the confluence with the San Antonio River in Bexar County to Rocking Horse Lane west of Camp Bullis in Bexar County.

Use Classification:

Salado Creek is classified as an intermittent creek upstream (south) of CSSA to Loop 410 in San Antonio. The creek is classified as perennial downstream of Loop 410. Although water uses are not distinguished between the upstream intermittent and the downstream perennial sections, the designated uses of Segment 1910 as a whole are high aquatic life, contact recreation, public water supply, and

aquifer protection. No significant degradation of high quality receiving waters is anticipated from RMU-5.

As necessary, provide further description of surface waters in the vicinity of the affected property:

The nearest surface water body is an unnamed tributary to Salado Creek that runs southwest (downgradient) through the site. This unnamed tributary is intermittent. Salado Creek is intermittent and only contains water during and immediately following rain events due to limited-duration flowing springs during the winter and spring.

PART II. Exclusion Criteria and Supportive Information

Subpart A. Surface Water/Sediment Exposure

1) Regarding the affected property where a response action is being pursued under the TRRP, have COCs migrated and resulted in a release or imminent threat of release to either surface waters or to their associated sediments via surface water runoff, air deposition, groundwater seepage, etc.? Exclude wastewater treatment facilities and stormwater conveyances/impoundments authorized by permit. Also exclude conveyances, decorative ponds, and those portions of process facilities which are:

- a. Not in contact with surface waters in the State or other surface waters which are ultimately in contact with surface waters in the State; and
- b. Not consistently or routinely utilized as valuable habitat for natural communities including birds, mammals, reptiles, etc.

Yes No

Explain:

There is no evidence of affected or threatened environmental media (groundwater, surface water, or sediment) at RMU-5. Since concentrations of chemicals in soil samples do not exceed Tier 1 PCLs or were used to calculate a 95% UCL per TAC §350.79(2)(A) that does not exceed the Tier 1 PCL, there will be no impact to groundwater, surface water, or sediment from RMU-5.

If the answer is Yes to Subpart A above, the affected property does not meet the exclusion criteria. However, complete the remainder of Part II to determine if there is a complete and/or significant soil exposure pathway, then complete PART III - Qualitative Summary and Certification. If the answer is No, go to Subpart B.

Subpart B. Affected Property Setting

In answering "Yes" to the following question, it is understood that the affected property is not attractive to wildlife or livestock, including threatened or endangered species (i.e., the affected property does not serve as valuable habitat, foraging area, or refuge for ecological communities). (May require consultation with wildlife management agencies.)

1) Is the affected property wholly contained within contiguous land characterized by: pavement, buildings, landscaped area, functioning cap, roadways, equipment storage area, manufacturing or process area, other surface cover or structure, or otherwise disturbed ground?

Yes No

Explain:

RMU-5 is undeveloped rangeland that is covered with cedar and oak trees and brush. Several surveys have been conducted at CSSA for threatened and endangered (T&E) species. The only T&E species that have been documented at CSSA are the black-capped vireo (*Vireo atricapillus*) [BCVI] and golden-cheeked warbler (*Dendroica chrysoparia*) [GCWA]. RMU-5 is located within GCWA habitat. Additional information can be found in the following references:

- **Parsons, 2007. *Final Integrated Natural Resource Management Plan*. Prepared for Camp Stanley Storage Activity, Boerne, Texas. October 2007. Available online: [CSSA EE \(Volume 1.6, Other Plans and Approaches\)](#)**
- **Parsons, 2009. *Final Species and Habitat Distributions of Black-Capped Vireos and Golden-Cheeked Warblers, 2009 Breeding/Nesting Season*. Prepared for Camp Stanley Storage Activity, Boerne, Texas. September 2009. Available online: [CSSA EE \(Volume 1.6, Other Plans and Approaches\)](#)**

If the answer to Subpart B above is Yes, the affected property meets the exclusion criteria, assuming the answer to Subpart A was No. Skip Subparts C and D and complete PART III - Qualitative Summary and Certification. If the answer to Subpart B above is No, go to Subpart C.

S Subpart C. Soil Exposure

1) Are COCs which are in the soil of the affected property solely below the first 5 feet beneath ground surface **or** does the affected property have a physical barrier present to prevent exposure of receptors to COCs in surface soil?

Yes **See explanation** No

Explain:

Based on Table 1 of this RIR there are no COCs at the site.

If the answer to Subpart C above is Yes, the affected property meets the exclusion criteria, assuming the answer to Subpart A was No. Skip Subpart D and complete PART III - Qualitative Summary and Certification. If the answer to Subpart C above is No, proceed to Subpart D.

Subpart D. *De Minimis* Land Area Subparts C and D skipped based on answers to Subparts A and B.

In answering “Yes” to the question below, it is understood that all of the following conditions apply:

- The affected property is not known to serve as habitat, foraging area, or refuge to threatened/endangered or otherwise protected species. (Will likely require consultation with wildlife management agencies.)
- Similar but unimpacted habitat exists within a half-mile radius.
- The affected property is not known to be located within one-quarter mile of sensitive environmental areas (e.g., rookeries, wildlife management areas, preserves). (Will likely require consultation with wildlife management agencies.)
- There is no reason to suspect that the COCs associated with the affected property will migrate such that the affected property will become larger than one acre.

1) Using human health protective concentration levels as a basis to determine the extent of the COCs, does the affected property consist of one acre or less **and** does it meet all of the conditions above?

Yes No

Explain how conditions are met/not met:

If the answer to Subpart D above is Yes, then no further ecological evaluation is needed at this affected property, assuming the answer to Subpart A was No. Complete PART III - Qualitative Summary and Certification. If the answer to Subpart D above is No, proceed to Tier 2 or 3 or comparable ERA.

PART III. Qualitative Summary and Certification (Complete in all cases).

Attach a brief statement (not to exceed 1 page) summarizing the information you have provided in this form. This summary should include sufficient information to verify that the affected property meets or does not meet the exclusion criteria. The person should make the initial decision regarding the need for further ecological evaluation (i.e., Tier 2 or 3) based upon the results of this checklist. After review, TNRCC will make a final determination on the need for further assessment. **Note that the person has the continuing obligation to re-enter the ERA process if changing circumstances result in the affected property not meeting the Tier 1 exclusion criteria.**

Completed by: Laura Marbury, P.G. (Typed/Printed Name)


Principal Geologist (Title)

May 30, 2012 (Date)

I believe that the information submitted is true, accurate, and complete, to the best of my knowledge.

Julie Burdey, P.G. (Typed/Printed Name of Person)

Project Manager (Title of Person)



(Signature of Person)

May 30, 2012 (Date Signed)

APPENDIX C
Confirmation Sample Results for All Analytes at RMU-5

Appendix C. Confirmation Sample Results for All Analytes at RMU-5

	Explosives																											
	1,3,5-Trinitrobenzene CAS: 99-35-4		1,3-Dinitrobenzene CAS: 99-65-0		2,4,6-Trinitrotoluene (TNT) CAS: 118-96-7		2,4-Dinitrotoluene CAS: 121-14-2		2,6-Dinitrotoluene CAS: 606-20-2		2-Nitrotoluene CAS: 88-72-2		3-Nitrotoluene CAS: 99-08-1		4-Nitrotoluene CAS: 99-99-0		HMX CAS: 2691-41-0		Nitrobenzene CAS: 98-95-3		RDX CAS: 121-82-4							
	Qualifier	Dilution	Qualifier	Dilution	Qualifier	Dilution	Qualifier	Dilution	Qualifier	Dilution	Qualifier	Dilution	Qualifier	Dilution	Qualifier	Dilution	Qualifier	Dilution	Qualifier	Dilution	Qualifier	Dilution	Qualifier	Dilution				
Tier 1 Soil PCLs - 30 acre[†]																												
Residential Combined Exposure ^[1]	2.00E+03	n	6.70E+00	n	3.30E+01	n	6.90E+00	c	6.90E+00	c	2.10E+01	c	6.70E+02	n	2.70E+02	n	1.60E+03	n	3.40E+01	c	4.30E+01	c						
Residential Groundwater Exposure ^[2]	9.10E-01	n	3.80E-03	n	8.60E-02	n	2.70E-03	c	2.40E-03	c	1.60E-02	c	9.20E-01	n	2.20E-01	c	1.20E+00	n	1.80E-01	n	1.80E-02	c						
Ecological Benchmark ^[3]	na		na		na		na		na		na		na		na		na		na		na							
TCEQ-Approved Background Values																												
CSSA 9 Metals Background Concentration ^[4]	na		na		na		na		na		na		na		na		na		na		na							
Sample Locations (Date Collected)																												
RMU5-SS01 (08-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS02 (07-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS03 (07-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS04 (07-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS05 (07-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS06 (07-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS07 (08-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS08 (08-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS08-DUP (08-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS09 (08-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS10 (08-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS11 (07-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS12 (08-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS13 (08-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						
RMU5-SS13-DUP (08-Feb-2012)	0.075	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.075	U 1	0.075	U 1	0.080	U 1	0.080	U 1	0.080	U 1	0.075	U 1	0.080	U 1						

Appendix C. Confirmation Sample Results for All Analytes at RMU-5

	Explosives						Metals																								
	Tetryl CAS: 479-45-8	Qualifier	Dilution	Arsenic CAS: 7440-38-2	Qualifier	Dilution	Barium CAS: 7440-39-3	Qualifier	Dilution	Cadmium CAS: 7440-43-9	Qualifier	Dilution	Chromium CAS: 7440-47-3	Qualifier	Dilution	Copper CAS: 7440-50-8	Qualifier	Dilution	Lead CAS: 7439-92-1	Qualifier	Dilution	Mercury CAS: 7439-97-6	Qualifier	Dilution	Nickel CAS: 7440-02-0	Qualifier	Dilution	Zinc CAS: 7440-66-6	Qualifier	Dilution	
Tier 1 Soil PCLs - 30 acre[†]																															
Residential Combined Exposure ^[1]	2.70E+02	n		2.40E+01	n		8.10E+03	n		5.20E+01	n		2.70E+04	n		5.50E+02	n		5.00E+02	n		2.10E+00	n		8.30E+02	n		9.90E+03	n		
Residential Groundwater Exposure ^[2]	5.50E-01	n		2.50E+00	m	>S	2.20E+02	m	>S	7.50E-01	m	>S	1.20E+03	m	>S	5.20E+02	a	>S	1.50E+00	a	>S	3.90E-03	m		7.90E+01	n	>S	1.20E+03	n	>S	
Ecological Benchmark ^[3]	na			1.80E+01			3.30E+02			3.20E+01			4.00E-01			6.10E+01			1.20E+02			1.00E-01			3.00E+01			1.20E+02			
TCEQ-Approved Background Values																															
CSSA 9 Metals Background Concentration ^[4]	na			19.6 ^{††}			300 ^{†††}			3 ^{††}			40.2 ^{††}			23.2 ^{††}			84.5 ^{††}			0.77 ^{††}			35.5 ^{††}			73.2 ^{††}			
Sample Locations (Date Collected)																															
RMU5-SS01 (08-Feb-2012)	0.075	U	1	8.7	F	1	80		1	0.030	U	1	24		1	14		1	18		1	0.080	F	1	13		1	42		1	
RMU5-SS02 (07-Feb-2012)	0.075	U	1	7.3	F	1	47		1	0.030	U	1	13	F	1	11		1	18		1	0.070	F	1	7.1		1	39		1	
RMU5-SS03 (07-Feb-2012)	0.075	U	1	4.4	F	1	32		1	0.030	U	1	7.9	F	1	10		1	17		1	0.090	F	1	4.2		1	18		1	
RMU5-SS04 (07-Feb-2012)	0.075	U	1	5.2	F	1	38		1	0.030	U	1	9.6	F	1	13		1	16		1	0.060	F	1	3.8		1	24		1	
RMU5-SS05 (07-Feb-2012)	0.075	U	1	14	F	1	170		1	0.22	F	1	47		1	20		1	32		1	0.080	F	1	26		1	72		1	
RMU5-SS06 (07-Feb-2012)	0.075	U	1	5.0	F	1	39		1	0.030	U	1	12	F	1	9.3		1	9.8	F	1	0.050	F	1	6.8		1	16		1	
RMU5-SS07 (08-Feb-2012)	0.075	U	1	9.0	F	1	83		1	0.030	U	1	26		1	11		1	18		1	0.060	F	1	14		1	37		1	
RMU5-SS08 (08-Feb-2012)	0.075	U	1	9.2	F	1	98		1	0.030	U	1	30		1	12		1	17		1	0.050	F	1	16		1	39		1	
RMU5-SS08-DUP (08-Feb-2012)	0.075	U	1	9.2	F	1	91		1	0.030	U	1	28		1	12		1	16		1	0.040	F	1	14		1	35		1	
RMU5-SS09 (08-Feb-2012)	0.075	U	1	10	F	1	110		1	0.030	U	1	39		1	14		1	27		1	0.090	F	1	23		1	80		1	
RMU5-SS10 (08-Feb-2012)	0.075	U	1	5.2	F	1	41		1	0.030	U	1	11	F	1	14		1	19		1	0.080	F	1	5.2		1	50		1	
RMU5-SS11 (07-Feb-2012)	0.075	U	1	6.0	F	1	46		1	0.030	U	1	14	F	1	16		1	12		1	0.040	F	1	7.2		1	22		1	
RMU5-SS12 (08-Feb-2012)	0.075	U	1	4.6	F	1	26		1	0.030	U	1	7.0	F	1	9.5		1	13		1	0.040	F	1	3.2		1	38		1	
RMU5-SS13 (08-Feb-2012)	0.075	U	1	4.9	F	1	20		1	0.030	U	1	6.2	F	1	9.3		1	7.7	F	1	0.040	F	1	3.2	J	1	37		1	
RMU5-SS13-DUP (08-Feb-2012)	0.075	U	1	5.8	F	1	23		1	0.030	U	1	7.7	F	1	9.9		1	9.0	F	1	0.040	F	1	4.0	J	1	39		1	

NOTES:

- † TCEQ, TRRP Tier 1 Soil PCLs (Last Revised: May 24, 2011).
 - †† CSSA Soil Background Concentrations. Second Revision, Evaluation of Background Metals Concentrations in Soils and Bedrock at CSSA. February 2002. Values from Table 3.3.
 - ††† Texas-Specific median background concentration.
 - PCLs and CSSA background values coded in this table as [1, 2, 3].
 - [1] ^{Tot}Soil_{Comb} = PCL for COPC in soil for a 30 acre source area and a potential future resident (combined exposure for ingestion, dermal contact, inhalation of volatiles and particulates, and ingestion of above-ground and below-ground vegetables).
 - [2] ^{GW}Soil_{Ing} = PCL for COPC in soil for a 30 acre source area and a potential future resident (soil-to-groundwater leaching of COPC to Class 1 and 2 groundwater).
 - [3] TCEQ Ecological Benchmark for Soil (Last Revised: January 2006).
 - [4] CSSA Soil Background Concentrations.
- PCLs are shown in **blue** font.
All values are measured in milligrams per kilogram (mg/Kg) unless otherwise noted.

QA NOTES AND DATA QUALIFIERS:

- (NO CODE) - Confirmed identification.
- U - Analyte was not detected above the indicated Method Detection Limit (MDL).
- F - Analyte was positively identified, but the quantitation is an estimation above the MDL and below the Reporting Limit (RL).
- J - Analyte was positively identified, but the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
- M = Concentration is estimated due to a matrix effect.
- Values shown in **BOLD** indicate detections above the MDL.
- Values **HIGHLIGHTED** indicate detections above the PCL.

APPENDIX D
Data Verification Summary Report

DATA VERIFICATION SUMMARY REPORT
for samples collected from RMU-5
CAMP STANLEY STORAGE ACTIVITY
BOERNE, TEXAS

Data Verification by: Tammy Chang
Parsons - Austin

INTRODUCTION

The following data verification summary report covers soil samples and the associated field quality control (QC) sample collected from Camp Stanley Storage Activity (CSSA) on February 7 and 8, 2012. The samples in the following Sample Delivery Group (SDG) included samples collected from RMU5:

66923

Samples were tested for explosives and selected metals. There were one equipment blank (EB), two pairs of parent/field duplicate (FD) samples and one set of matrix spike/matrix spike duplicate (MS/MSD) samples.

All samples were collected by Parsons and analyzed by Agriculture & Priority Pollutants Laboratories, Inc. (APPL) in Clovis, California, following the procedures outlined in the Statement of Work and CSSA QAPP, Version 1.0.

The samples in this SDG were shipped to the laboratory in one cooler. The cooler was received by the laboratory at a temperature of 1.5°C which was slightly below the recommended range of 2-6° C. According to lab, the only aqueous sample, EB, was not frozen upon receiving. There should not be any negative effect to the data quality.

EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the CSSA QAPP, Version 1.0. Information reviewed in the data packages included sample results; field and laboratory quality control results; calibrations; case narratives; raw data; COC forms and the cooler receipt checklist. The analyses and findings presented in this report are based on the reviewed information, and whether guidelines in the CSSA QAPP, Version 1.0, were met.

ICP METALS

General

The ICP metals portion of this SDG consisted of seventeen (17) soil samples including two FDs and one pair of MS/MSD. Also included was one EB. All samples were collected on February 7 and 8, 2012. All samples were analyzed for arsenic, barium, cadmium, chromium, copper, nickel, lead, and zinc.

The ICP metals analyses were performed using USEPA SW846 Method 6010B. All samples in this SDG were analyzed following the procedures outlined in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method.

The ICP metals samples were digested in two analytical batches, one for soil samples and one for the EB. All samples were analyzed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the two laboratory control samples (LCS) and MS/MSD results. Sample RMU5-SS08 was designated as the parent sample for MS and MSD analyses.

All LCS recoveries were within acceptance criteria.

The non-compliant %Rs of MS/MSD are listed below:

RMU5-SS08

Metals	MS, %R	MSD, %R	Criteria, %R
Cadmium	72	72	75 - 125

The “M” flag applied to the cadmium result by the lab was removed by Parsons data validator due to minor exceedances.

Precision

Precision was evaluated based on the %RPDs of the MS/MSD results and the parent/FD sample results. Samples RMU5-SS08 and RMU-SS13 were collected in duplicate.

%RPDs of the MS/MSD were compliant.

%RPD calculation of the parent and FD results is only applicable when both concentrations are greater than reporting limits.

RMU5-SS08

Metals	Parent, mg/kg	FD, mg/kg	%RPD	Criteria, %RPD
Barium	97.8	90.6	7.6	≤20
Chromium	30.3	28.0	7.9	
Copper	12.11	12.09	0.17	
Lead	16.97	15.90	6.5	
Nickel	15.66	14.18	9.9	
Zinc	39.2	35.3	10	

RMU5-SS13

Metals	Parent, mg/kg	FD, mg/kg	%RPD	Criteria, %RPD
Barium	19.9	22.6	13	
Copper	9.27	9.87	6.3	

Lead	7.73	8.99	15	≤20
Nickel	3.17	4.00	23	
Zinc	36.9	39.0	5.5	

“J” flags were applied to the nickel result of parent and FD samples.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during sample analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the CSSA QAPP. All samples were prepared and analyzed within the holding times required by the method.

- All instrument tune criteria were met.
- All initial calibration criteria were met.
- All calibration verification criteria were met.
- All three ICVs were prepared using a secondary source.
- All second source verification criteria were met.
- All interference check criteria were met.
- All internal standard criteria were met.
- Dilution test (DT) was analyzed on sample RMU5-SS08.

Metal	%D	Criteria
Arsenic	15.8	%D ≤ 10
Barium	5.31	
Chromium	6.44	
Copper	9.13	
Lead	0.315	
Nickel	1.53	

- Post digestion spike (PDS) was analyzed on the same sample as the DT. It is applicable to all metals, except Copper:

RMU5-SS08

Metal	%R	Criteria, %R
Arsenic	94	75 - 125
Cadmium	74	
Zinc	78	

Lab applied “J” to all the cadmium results in this SDG. Parsons data validator removed all the “J” for cadmium data due to minor exceedance.

There were two method blanks (MB), one EB, and several calibration blanks associated with the ICP analyses in this SDG. All blanks were free of any target metals at or above the RL.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All ICP results for the samples in this SDG were considered usable. The completeness for the ICP portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

MERURY

General

The mercury portion of this SDG consisted of seventeen (17) soil samples including one FD and one pair of MS/MSD. All samples were collected on February 7 and 8, 2012. All samples were analyzed for total mercury by SW7471B.

All samples were analyzed following the procedures outlined in the CSSA QAPP, prepared and analyzed within the holding time required by the method.

All samples were prepared in batch #164008. The analyses were performed undiluted. None of the results were higher than reporting limit.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS, MS, and MSD.

The LCS, MS, and MSD recoveries for mercury were within acceptance criteria.

Precision

Precision was evaluated based on the %RPD of the MS and MSD results which was compliant.

%RPD calculation was not applicable to the parent/FD results since both results were less than the reporting limit.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;

- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method.

- All initial calibration criteria were met.
- All second source verification criteria were met. The ICV was prepared using a secondary source.
- All calibration verification criteria were met.

There was one method blank and several calibration blanks associated with the mercury analyses in this SDG. All blanks were free of mercury at or above the RL.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

The mercury result for the samples in this SDG was considered usable. The completeness for the mercury portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

EXPLOSIVES

General

This data package consisted of seventeen (17) soil samples including two FDs and one pair of MS/MSD. Also included was an EB. All samples were collected on February 7 and 8, 2012. All samples were analyzed for a full list of explosives by SW8330B.

The explosive analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8330B. The samples were analyzed in two analytical batches under one set of initial calibration (ICAL) curves. All samples were analyzed following the procedures outlined in the CSSA QAPP. All samples were prepared and analyzed within the holding time required by the method. All samples were analyzed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the two LCSs, MS, MSD, and the surrogate spikes. Sample RMU5-SS08 was designated as the parent sample for the MS/MSD analyses by Parsons.

All LCSs, MS, MSD, and surrogate spike recoveries were within acceptance criteria.

Precision

Precision was evaluated based on the %RPD of MS/MSD and parent/FD. Samples RMU5-SS08 and RMU5-SS13 were collected in duplicate.

Neither parent or FD had explosives detected at or above reporting limits in both pairs, therefore, the %RPD calculation is not applicable. All %RPDs of MS/MSD were compliant.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during sample preparation and analysis.

All samples in this data package were analyzed following the COC and the analytical procedures described in the CSSA QAPP, Version 1.0. All samples were prepared and analyzed within the holding time required by the method.

- All instrument performance check criteria were met.
- All initial calibration criteria were met.
- The LCS was prepared with a secondary source. All second source verification criteria were met.
- All initial calibration verification (ICV) criteria were met.
- All continuing calibration verification (CCV) criteria were met.

There were two MBs, one EB, and several calibration blanks associated with the explosive analyses in this SDG. All blanks were non-detect for all target explosives.

Completeness

Completeness has been evaluated in accordance with the CSSA QAPP. The number of usable results has been divided by the number of possible individual analyte results and expressed as a percentage to determine the completeness of the data set.

All explosive results for the samples in this SDG were considered usable. The completeness for this SDG is 100%, which meets the minimum acceptance criteria of 95%.

APPENDIX E

ProUCL Statistical Calculation Summary for Chromium in RMU-5 Soils

General UCL Statistics for Full Data Sets

User Selected Options

From File Worksheet.wst
Full Precision OFF
Confidence Coefficient 95%
Number of Bootstrap Operations 2000

Chromium

General Statistics

Number of Valid Observations 15

Number of Distinct Observations 15

Raw Statistics

Minimum 6.2
Maximum 46.7
Mean 18.82
Median 13.1
SD 12.7
Std. Error of Mean 3.279
Coefficient of Variation 0.675
Skewness 0.975

Log-transformed Statistics

Minimum of Log Data 1.825
Maximum of Log Data 3.844
Mean of log Data 2.728
SD of log Data 0.664

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic 0.865
Shapiro Wilk Critical Value 0.881

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic 0.929
Shapiro Wilk Critical Value 0.881

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL 24.6

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995) 25.1
95% Modified-t UCL (Johnson-1978) 24.73

Assuming Lognormal Distribution

95% H-UCL 28.48

95% Chebyshev (MVUE) UCL 33.45
97.5% Chebyshev (MVUE) UCL 39.81
99% Chebyshev (MVUE) UCL 52.3

Gamma Distribution Test

k star (bias corrected) 2.103
Theta Star 8.95
MLE of Mean 18.82
MLE of Standard Deviation 12.98
nu star 63.08
Approximate Chi Square Value (.05) 45.81
Adjusted Level of Significance 0.0324
Adjusted Chi Square Value 44

Anderson-Darling Test Statistic 0.561
Anderson-Darling 5% Critical Value 0.746
Kolmogorov-Smirnov Test Statistic 0.206
Kolmogorov-Smirnov 5% Critical Value 0.224

Data appear Gamma Distributed at 5% Significance Level

Data Distribution

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL 25.92
95% Adjusted Gamma UCL 26.98

Nonparametric Statistics

95% CLT UCL 24.21
95% Jackknife UCL 24.6
95% Standard Bootstrap UCL 24
95% Bootstrap-t UCL 26.39
95% Hall's Bootstrap UCL 25.36
95% Percentile Bootstrap UCL 24.13
95% BCA Bootstrap UCL 25.06
95% Chebyshev(Mean, Sd) UCL 33.11
97.5% Chebyshev(Mean, Sd) UCL 39.3
99% Chebyshev(Mean, Sd) UCL 51.45

Potential UCL to Use

Use 95% Approximate Gamma UCL 25.92

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and IacI (2002)

and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.