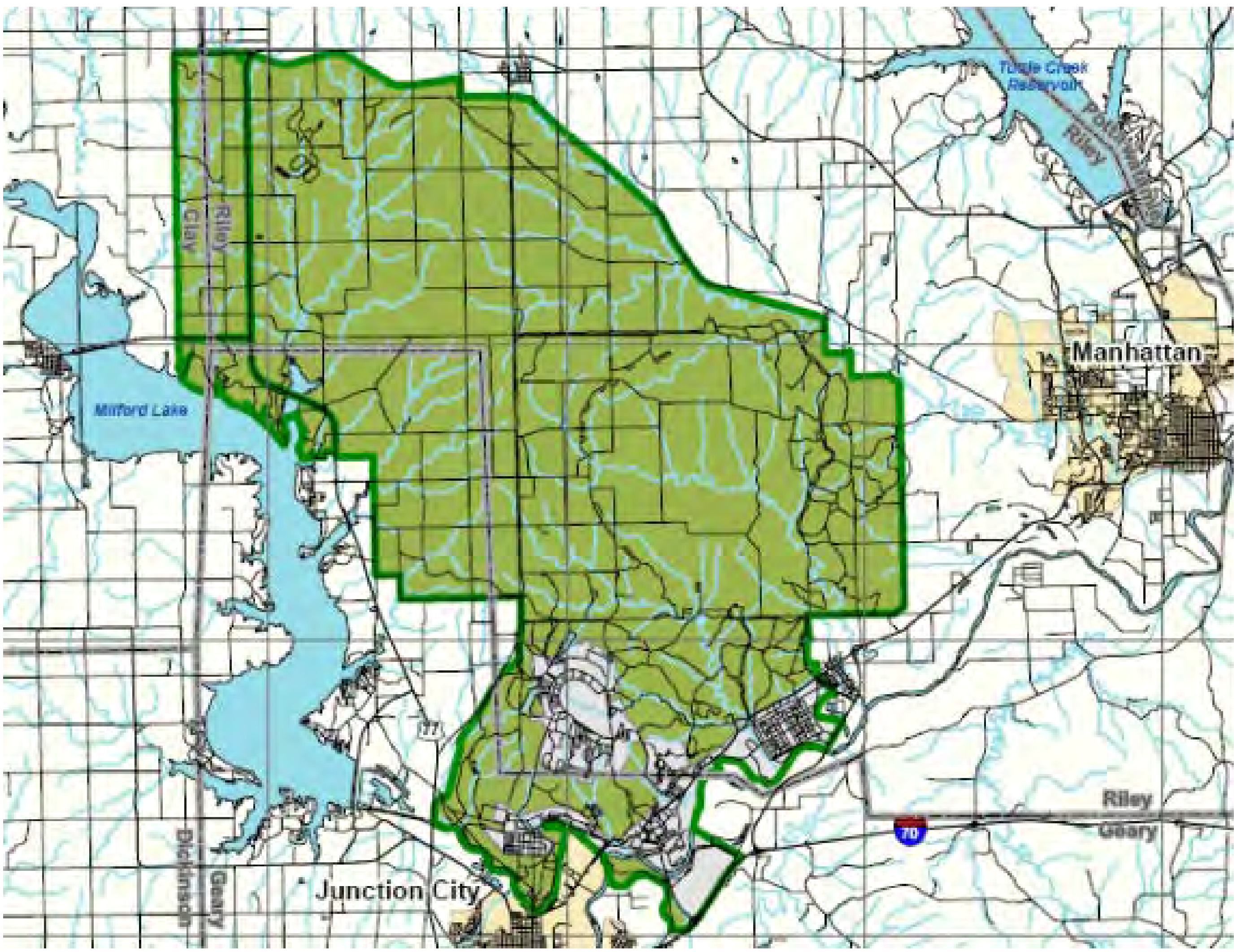
FINAL
Proposed Plan

Sherman Heights Small Arms Range
Impact Slope Munitions Response Site

Fort Riley, Junction City, Kansas
November 2014



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Acronyms and Abbreviations

µg/dL .... micrograms per deciliter
CERCLA .... Comprehensive Environmental Response, Compensation, and Liability Act
CST .... Central Standard Time
FS .... Feasibility Study
GHG .... greenhouse gas
KDHE .... Kansas Department of Health and Environment
MEC .... munitions and explosives of concern
mg/kg .... milligrams per kilogram
MRA .... Munitions Response Area
MRS .... Munitions Response Site
RAO .... Remedial Action Objective
RI .... Remedial Investigation
SAR .... Small Arms Range
SHSAR .... Sherman Heights Small Arms Range
USEPA .... U.S. Environmental Protection Agency
XRF .... X-ray florescence

Proposed Plan for

SHERMAN HEIGHTS SMALL ARMS RANGE IMPACT SLOPE MUNITIONS RESPONSE SITE FORT RILEY, JUNCTION CITY, KANSAS

Department of the Army

Army Announces Proposed Plan

The public is invited to review and comment on this Proposed Plan, which identifies the Preferred Alternative for addressing potential hazards associated with **munitions constituents** at the Sherman Heights Small Arms Range (SHSAR) Impact Slope **Munitions Response Site** (MRS) at Fort Riley, which is part of the SHSAR **Munitions Response Area** (MRA), Army Environmental Database Restoration number FTRI-001-R-02, and provides the rationale for this preference. In addition, this plan includes summaries of other remedial alternatives evaluated for use at this site. The location of Fort Riley and the project location are shown in Map 1. This document provides a glossary of the terms in bold type.

This document is issued by the Department of the Army (Army), the lead agency for site activities, and the U.S. Environmental Protection Agency (USEPA) and Kansas Department of Health and Environment (KDHE), the support agencies for site activities. The Army, in consultation with the support agencies, will select a final remedy for the site after reviewing and considering all information submitted during the 30-day public comment period. The Army, in consultation with the support agencies, may modify the Preferred Alternative or select another response action presented in this Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives in this Proposed Plan. Following public review and comment, the Army and support agencies, in consultation with the public, will finalize this proposal in a **Record of Decision**.

MARK YOUR CALENDARS

PUBLIC COMMENT PERIOD:
17 November 2014 to 16 December 2014

The Army will accept written comments on the Proposed Plan during the public comment period. Comment letters must be postmarked by 16 December 2014 and should be submitted to:

Mr. John Shimp
Environmental Division, DPW
407 Pershing Court
Fort Riley, KS 66442
john.f.shimp.civ@mail.mil
Office: (785) 239-3343
Fax: (785) 239-8535

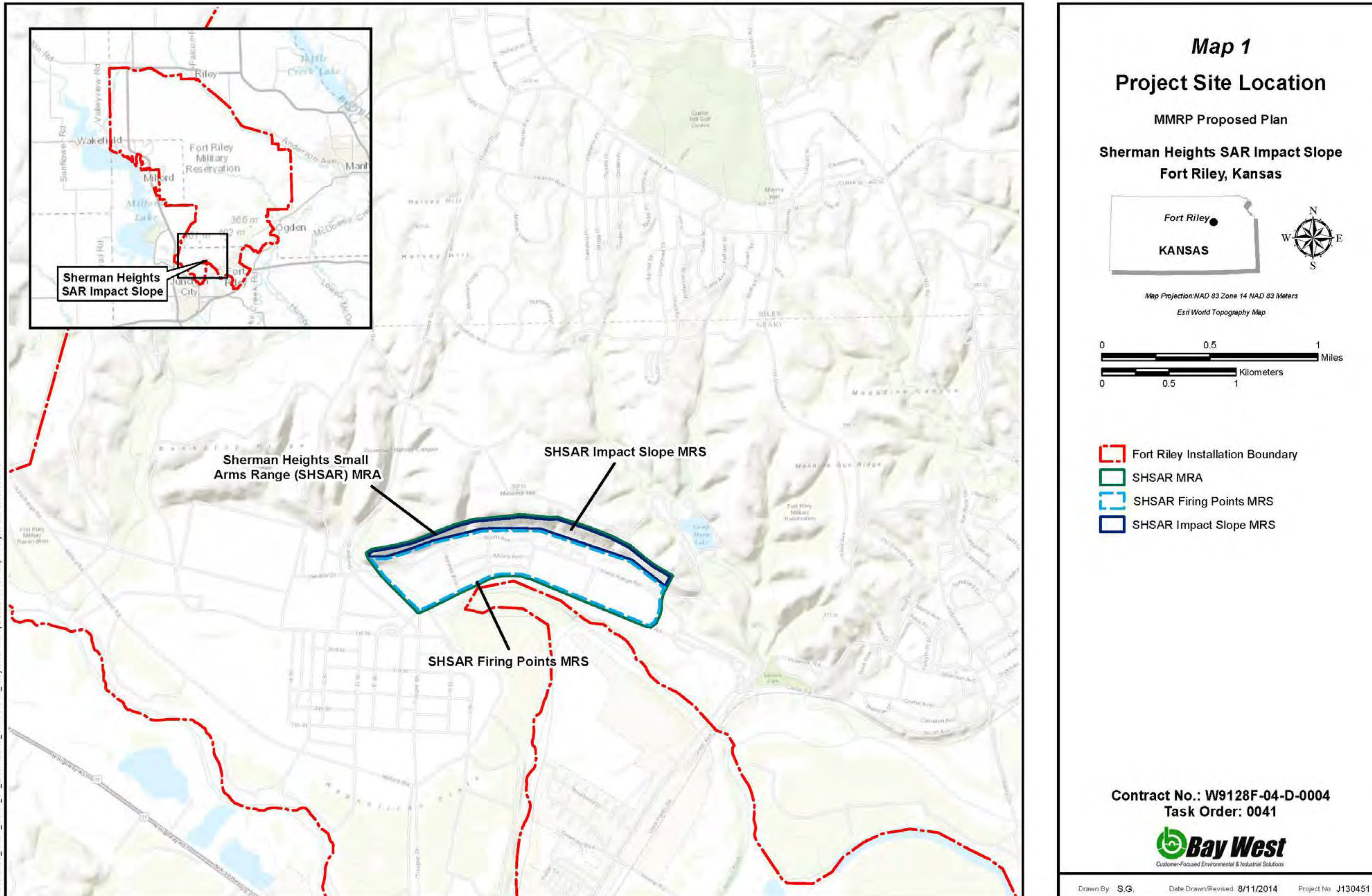
To request an extension, send a request in writing to John Shimp by 5 p.m. CST by16 December 2014.

The Army will hold a public meeting on this Proposed Plan on 1 December 2014 from 7:00 to 8:00 p.m. at Fort Riley's Conference Center, 446 Seitz Drive, Fort Riley, Kansas, to accept oral and written comments. This meeting will provide an opportunity for the public to comment on the preferred alternative. Comments made at the meeting will be transcribed. A copy of the transcript will be added to the Fort Riley **Administrative Record**.

For more information, see the Administrative Record at the following locations:

Environmental Div., DPW
Building 407 Pershing Court
Fort Riley, KS 66442-6016
(785) 239-3194
Hours: Mon. – Fri.
9 a.m. – 4 p.m.
(closed every other Friday)

Dorothy Bramlage Public Library
230 West 7th Street
Junction City, KS 66441
(785) 238-4311
Hours: Mon. – Fri.
9:30 a.m. – 6 p.m. and
Sun. 1 p.m. – 6 p.m.



Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_OMAHA\Fort_Riley\SHSAR\MapDocs\J130451 Map 1 Project Site Location.mxd

This Proposed Plan:

1. Explains ways the public can comment on this Proposed Plan;
2. Provides the basis for the Final Record of Decision;
3. Includes a brief history and principal findings of environmental investigations and risk assessments;
4. Outlines the Army's rationale for recommending Alternative 2, **Land Use Controls**;
5. Describes the other remedial options considered; and
6. Solicits public review of and comment on all alternatives described.

The Army issues this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**, 42 USC § 9617(a), and § 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan**. This Proposed Plan summarizes information that can be found in greater detail in the **Remedial Investigation (RI)/Feasibility Study (FS)** Report and other documents contained in the **Administrative Record** file for this site. The Army and the support agencies encourage the public to review these documents to gain a more comprehensive understanding of the site and remedial activities that have been conducted at the site.

Site History and Background

The SHSAR Impact Slope Munitions Response Site (MRS) is part of the SHSAR Munitions Response Area (MRA). A 2005 Historical Records Review indicated that the SHSAR Munitions Response Area (MRA) was used for a variety of munitions-related training activities (including anti-aircraft and anti-tank ranges) dating back to the 1880s (E^2M, 2005) in addition to small arms training.

As a result of discussions between the Army, USEPA, and KDHE, the SHSAR Munitions Response Area (MRA) was reconfigured to separate the contaminated portions from the uncontaminated portions. The SHSAR Munitions Response Area (MRA) was expanded and split into two Munitions Response Sites (MRSs), SHSAR Firing Points Munitions Response Site (MRS) (Fort Riley-001-R-01) and the SHSAR Impact Slope Munitions Response Site (MRS) (Fort Riley-001-R-02).

The SHSAR Firing Points (Fort Riley-001-R-01) Munitions Response Site (MRS) was investigated and no **munitions and explosives of concern (MEC)** or munitions debris was identified within the revised boundaries. Soil samples collected did not exceed the KDHE Bureau of Remediation Tier 2 Standards or USEPA Regional Screening Levels. Accordingly, the Munitions Response Site (MRS) was recommended for no further action at the conclusion of the Site Investigation (E^2M, 2006).

The SHSAR Impact Slope Munitions Response Site (MRS) was reportedly operational from the 1880s until the late 1980s. The SHSAR Impact Slope Munitions Response Site (MRS) was used primarily as a practice firing range for small arms. It is noted that while the Munitions Response Site (MRS) name includes "Impact Area" research indicated that site was not extensively used for high explosive munitions firing and was primarily used as a small arms range impact berm.

Much of the area was developed into the Colyer Manor Family residential housing complex. There are also recreational fields east of the housing complex.

Between 1994 and 2011, three studies were performed at the SHSAR Impact Slope MRS that included field investigation for munitions and explosives of concern (MEC) and/or sample collection for environmental characterization. The studies and associated reports follow:

- 1994 X-Ray Fluorescence (XRF) Survey and Confirmatory Sampling performed by OHM Corporation;
- 2005 to 2006 Site Inspection performed by E^2M; and
- 2010 to 2011 RI performed by Bay West LLC.

An X-ray fluorescence (XRF) survey and confirmatory soil sampling for lead was performed in 1994 by OHM Corporation. The soil sampling and analysis confirmed elevated lead levels in a section of the Colyer Manor housing district. In the mid-1990s, approximately 1,500 cubic yards of soil with a highest measured concentration of 1,700 milligrams per kilogram (mg/kg) were removed to remediate lead levels to below the KDHE Tier 2 Risk-Based Residential Standard of 400 mg/kg (OHM Corporation, August 1994).

The SHSAR was then investigated through a Site Investigation in 2005 to 2006 by E^2M. During a preliminary site visit in April 2005 for the Site Investigation, approximately fifteen 4-inch Stokes practice mortars (the charges were fully burned but the casings, which are made of metal with no explosive hazards, did not fully fragment) were observed. The locations of these items were not recorded other than to note that they were located within the boundary of the SHSAR Impact Slope Munitions Response Site (MRS). These potential munitions and explosives of concern (MEC) items were removed by Fort Riley personnel prior to the Site Investigation field activities that were conducted on 11 July 2005. During the follow-up survey in July 2005, **munitions debris** from an additional 4-inch Stokes practice mortar was identified. The location of this item is shown on Map 2. No munitions and explosives of concern (MEC) was found during the Site Investigation.

In addition, 32 surface soil samples were collected and analyzed for lead and 3 surface soil samples were collected and analyzed for target analyte list metals and explosives. Explosives were not detected in the samples. Lead was below background in all but one sample, which was collected adjacent to a mortar. That surface soil sample contained lead (657 mg/kg) and zinc (49,500 mg/kg) at concentrations that exceeded the residential screening levels of 400 mg/kg and 23,000 mg/kg, respectively, but below the industrial screening levels of 800 mg/kg and 310,000 mg/kg, respectively. Based on the evidence of munitions and explosives of concern (MEC) identified and lead and zinc residential screening level exceedances, the Site Investigation recommended further evaluation for both munitions and explosives of concern (MEC) and munitions constituents.

The RI was performed from 2010 to 2011 by Bay West LLC. The RI actions addressed the entire surface and subsurface (100%) of the Munitions Response Site (MRS) for munitions and explosives of concern (MEC). The investigation methods used were the same as those used for a munitions removal and included utilizing a combination of digital geophysical mapping and analog metal detectors to identified potential munitions and explosives of concern (MEC) in the subsurface. All potential items were excavated, inspected, and removed. Three munitions and explosives of concern (MEC) items (a 3-inch projectile from post WWII, a 2.36-inch rocket from WWII, and a Hodgkiss Projectile from the Civil War era) and approximately 600 pounds of munitions debris were recovered during the RI as shown on Map 2. The munitions and explosives of concern (MEC) were turned over to the 630th Explosive Ordnance Division for disposal.

The net effect of the 2010 to 2011 RI field effort was a complete surface and subsurface removal action; therefore, a no further action determination for munitions and explosives of concern (MEC) is warranted and residual explosive hazards are not anticipated. However, as no method of munitions and explosives of concern (MEC) detection and removal has proven 100% effective, there is a very small possibility of munitions and explosives of concern (MEC) remaining in the Munitions Response Site (MRS).

As part of the RI, the following environmental sampling was performed:

- 170 X-ray florescence (XRF) soil samples for lead
- 14 laboratory lead soil samples
- 14 incremental sample locations for explosives
- 1 incremental sample for explosives and Resource Conservation and Recovery Act metals plus copper, excluding mercury
- 4 groundwater samples for Resource Conservation and Recovery Act metals (excluding mercury) and explosives

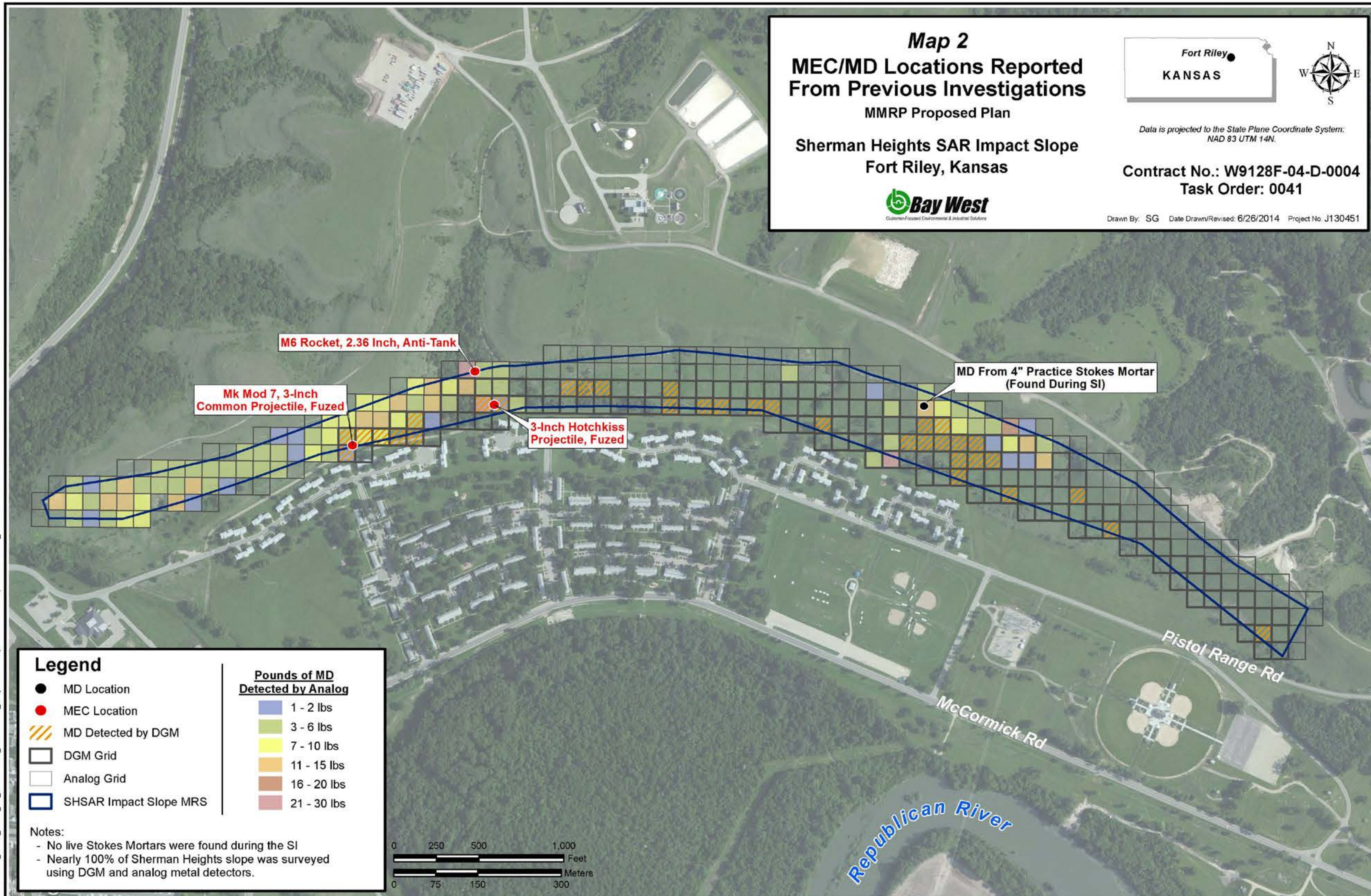
The sample locations and exceedances are shown on Map 3. The four groundwater samples were collected from the center of the SHSAR Impact Slope Munitions Response Site (MRS) and were located in areas designed to achieve spatial distribution in the central lead-impacted area. No chemical constituents detected in groundwater exceeded any **risk-based screening levels**. In addition, it is noted that while the groundwater exposure pathway is considered to be potentially complete because groundwater in the vicinity is used as a potable water supply, due to the depth to groundwater, limited snow and rainfall amounts, and the limited contaminant mobility, there is little risk for groundwater contamination from the soil.

No explosives exceeded screening levels in soil. Arsenic, chromium, and lead concentrations in soil exceeded USEPA residential Regional Screening Levels; however, arsenic did not exceed KDHE Tier 2 Risk-Based Residential Standard and chromium did not exceed background. The initial round of incremental sampling identified areas where lead exceeded the KDHE Tier 2 Risk-Based Residential Standard and USEPA residential Regional Screening Level of 400 mg/kg. Supplemental sampling for lead using X-ray fluorescence (XRF) with fixed laboratory analysis confirmed that lead in soil exceeds both the KDHE Tier 2 Risk-Based Residential Standard and USEPA Regional Screening Level of 400 mg/kg, the USEPA commercial/industrial Regional Screening Level of 800 mg/kg, the KDHE Tier 2 the Non-Resident Standard of 1,000 mg/kg, and the site-specific recreational/construction worker risk-based concentration of 2,725 mg/kg in some areas of the Munitions Response Site (MRS). The lead concentrations ranged from 61 to 38,000 mg/kg.

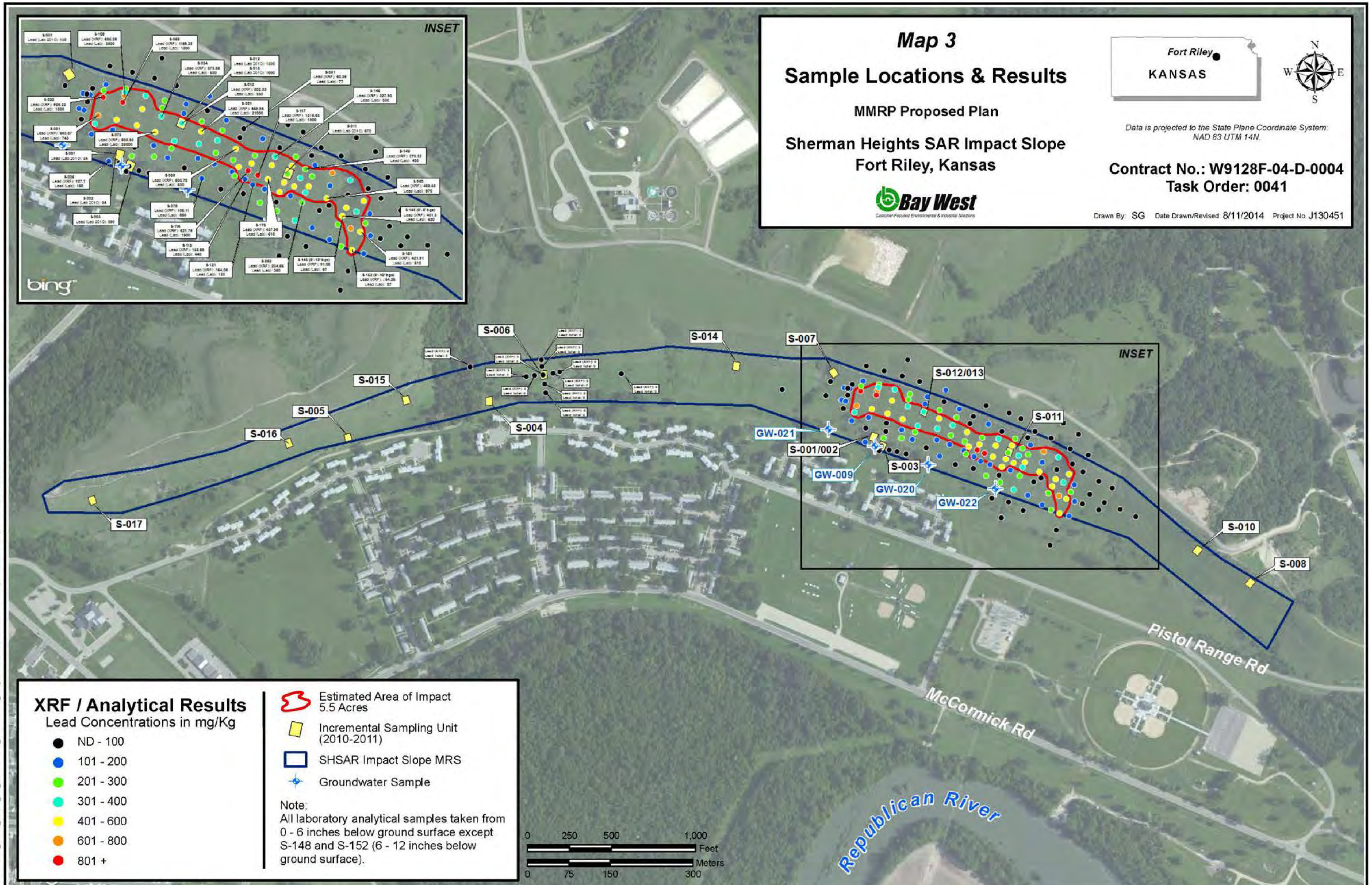
Based on the results from the RI, the area where lead was determined to be elevated above the USEPA Residential Regional Screening Level and KDHE Tier 2 Risk-Based Residential Standard is approximately 5.5 acres in size (area shown on Map 3) to a depth of approximately 6 inches.

Site Characteristics

The SHSAR Impact Slope Munitions Response Site (MRS) is located on Fort Riley near the southern Post boundary and consists of a steeply sloping ridge that rises from approximately 1,180 feet to 1,280 feet above mean sea level. The SHSAR Impact Slope Munitions Response Site (MRS) is approximately 150 feet to 400 feet wide by 8,000 feet in length (52 acres).



Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_OMAHA\Fort_Riley\SHSAR\MapDocs\J130451 Map 2 SHSAR MEC_MD Locations.mxd



Y:\Clients\US_ARMY_CORP_OF_ENGINEERS_OMAHA\Fort_Riley\SHSAR\MapDocs\J130451 Map 3 SHSAR Sample Locations and Results.mxd

The SHSAR Impact Slope Munitions Response Site (MRS) is undeveloped. Ground cover ranges from exposed bedrock to grass interspersed with small trees. One overhead utility line transects (north-south) the Munitions Response Site (MRS) near the midpoint. The Munitions Response Site (MRS) is located between the Colyer Manor military family housing complex and the Sherman Heights highlands. Access to the SHSAR Impact Slope Munitions Response Site (MRS) is currently unrestricted; however, the rugged nature of the ridge limits access by foot traffic.

A dirt road runs from a wastewater treatment plant located north of the Munitions Response Site (MRS), across the northeast portion at the top of the ridge. Access is by foot from the lower side of the SHSAR Impact Slope Munitions Response Site (MRS) from the north side of the Colyer Manor military family housing complex.

As stated previously, due to the depth to groundwater, limited snow and rainfall amounts, and the limited contaminant mobility, there is little risk for groundwater contamination from the soil.

The potential for expanded use of the Impact Slope in the future is limited by terrain and the SHSAR Impact Slope Munitions Response Site's (MRS's) proximity to the Colyer Manor military family housing area. Though future residential land use is not planned and the physical characteristics of the slope limit development, the site is in close proximity to Post housing and has unrestricted access by residents, particularly children playing within the Munitions Response Site (MRS) area.

Scope and Role of the Action

This Proposed Plan addresses the SHSAR Impact Slope Munitions Response Site (MRS) at Fort Riley. Activities for this Munitions Response Site (MRS) have been and are currently being performed in accordance with the CERCLA remedial process and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan.

The alternative selected will be the final action for the Munitions Response Site (MRS). The overall cleanup strategy is to take appropriate action to remedy environmental contamination when there is an unacceptable risk to human health or the environment.

WHAT ARE THE "CONTAMINANTS OF CONCERN"?

The Army and support agencies have identified that lead is present above the USEPA Residential Regional Screening Level and KDHE Tier 2 Risk-Based Residential Standard (both 400 mg/kg), commercial/ industrial Regional Screening Level of 800 mg/kg, and the Non-Resident Standard of 1,000 mg/kg at the Munitions Response Site (MRS). Lead is a naturally occurring metal found within soils. It occurs in small amounts in ore, along with other elements such as silver, zinc, or copper. Lead is also a component of small arms and is associated with military munitions activities involving small arms firing. In children, lead can cause delayed puberty, reduced postnatal growth, decreased IQ, and decreased hearing. In adults, lead exposure may cause increased blood pressure, increased risk of hypertension, muscle and joint pain, nerve disorders, and memory or concentration problems.

Environmental contamination at the Munitions Response Site (MRS) consists of lead only. Actions are selected after considering remedial alternatives involving land use restrictions, access restrictions, and excavation and off-site removal, and applying cost-effective solutions.

Summary of Site Risks

As part of the RI, the Army conducted a baseline risk assessment for munitions constituents to determine the current and future effects of contaminants on human health and the environment. Based on the historic information and findings presented in the RI/FS Report, the SHSAR Impact Slope Munitions Response Site (MRS) was deemed low risk for munitions and explosives of concern (MEC) exposure. As a result, a munitions and explosives of concern (MEC) Hazard Assessment score was not generated for the SHSAR Impact Slope Munitions Response Site (MRS).

It is the Army's current judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in this Proposed Plan, is necessary to protect public health and the environment from actual or threatened hazards associated with lead in surface soil at the Munitions Response Site (MRS). A summary of the results from the human health and ecological risks assessments follows.

Human Health Risk Assessment

The purpose of the **Human Health Risk Assessment** was to identify how people could be exposed to contamination in soil and groundwater at the SHSAR Impact Slope Munitions Response Site (MRS), and whether such exposure would increase the risk of cancer or other illness. People that could be exposed, called **receptors**, include trespassers/recreational users and construction workers, who are the most probable receptor; other potential, but less likely, future receptors at this Munitions Response Site (MRS) include Fort Riley residents and Post personnel/contractors. Though future residential land use is not planned and the physical characteristics of the slope limit development, the site is close to Post housing and has unrestricted access by residents, particularly children playing within the Munitions Response Site (MRS) area.

The Human Health Risk Assessment identified no contaminants of concern in groundwater and no complete groundwater exposure pathway. For groundwater, a chemical was identified as a contaminant of concern if the maximum detected concentration exceeded the USEPA tap water Regional Screening Level. To evaluate contribution from multiple contaminants, the non-cancer Regional Screening Levels were reduced by a factor of 10 to reflect a hazard quotient of 0.1, following USEPA guidance. In addition, chemical concentrations were also compared to USEPA maximum contaminant levels. The KDHE Tier 2 risk-based levels for the chemicals detected in groundwater are equal to the USEPA maximum contaminant levels. No explosives were detected in groundwater. No chemical constituents in groundwater were measured above screening levels and drinking water standards, so groundwater was not evaluated further in the Human Health Risk Assessment.

The Human Health Risk Assessment identified no unacceptable health risks associated with consumption of groundwater because no chemical constituents were measured above screening levels and drinking water standards. The groundwater exposure pathway is considered to be potentially complete because groundwater in the vicinity is used as a potable water supply. However, due to the depth to groundwater, limited snow and rainfall amounts, and the limited contaminant mobility, there is little risk for groundwater contamination from the soil.

The Human Health Risk Assessment identified potential health risk to future residents (adults and young children) and post personnel/contractors from exposure to lead in soil. Existing evidence indicates that adverse health effects occur even at very low lead exposures (e.g., subtle neurological effects in children have been observed at low doses). Soil lead concentrations ranged from 14 mg/kg to 1,300 mg/kg in incremental samples and from 67 mg/kg to 38,000 mg/kg in X-ray fluorescence (XRF) laboratory correlation samples. These concentrations exceed 400 mg/kg, which is the concentration considered by both KDHE and USEPA to be protective for residential land use. In addition, soil lead concentrations exceed 800 mg/kg, the concentration considered by USEPA to be protective for commercial/industrial land use, and 1,000 mg/kg, the concentration considered by KDHE to be protective for non-residential land use.

In addition, the USEPA Adult Lead Model was used in the Human Health Risk Assessment to evaluate risk to trespassers/ recreational users and construction workers from exposure to lead in soil and to develop a Risk-Based Concentration protective of these receptors. The USEPA assesses risks associated with adult exposure to lead in soil with its Adult Lead Model. The Adult Lead Model can be used to calculate the blood lead concentration of an adult non-resident and to estimate the probability of fetal blood lead concentration of the pregnant female worker exceeding the blood lead threshold of 10 micrograms per deciliter (µg/dL). Decision criteria for the Adult Lead Model is no more than a 5% chance that the blood lead level in a fetus will exceed a value of 10 µg/dL.

At the maximum detected lead concentration (1,300 mg/kg) in the incremental samples, the Adult Lead Model calculated an adult worker blood lead level of 2.5 µg/dL and predicted that there would be a 0.6% chance that the fetus of a pregnant adult worker would have a blood lead level above 10 µg/dL. Thus, the Human Health Risk Assessment found that lead concentrations in the incremental samples do not pose risk to recreational receptors and construction workers. For the X-ray fluorescence (XRF) laboratory correlation samples, at the 95% upper confidence limit on the mean (upper concentration limit) lead concentration (11,311 mg/kg), the Adult Lead Model calculated an adult worker blood lead level of 14.4 µg/dL and predicted that there would be a 67% chance that the fetus of a pregnant adult worker would have a blood lead level above 10 µg/dL. Thus, lead concentrations in the X-ray fluorescence (XRF) laboratory correlation samples (see Map 3, inset area) pose risk to recreational receptors and construction workers.

The Adult Lead Model can also be used to calculate a Risk-Based Concentration protective of the fetus of a female worker; the Adult Lead Model assumes that a Risk-Based Concentration protective of a fetus also affords protection for male or female adult workers. The lead Risk-Based Concentration developed for recreational/construction worker is 2,725 mg/kg. None of the incremental samples exceeded the recreational/construction worker Risk-Based Concentration; four X-ray fluorescence (XRF) laboratory correlation samples exceeded the recreational/construction worker Risk-Based Concentration.

Overall, the lead in soil at SHSAR Impact Slope Munitions Response Site (MRS) is likely a result of past site activities and is a **contaminant of concern**, which requires remedial action to address the unacceptable risk it poses to current trespassers/ recreational users, future Fort Riley personnel and contractors, and future residents.

Screening Level Ecological Risk Assessment

A **Screening Level Ecological Risk Assessment** was completed to assess potential for adverse impacts on ecological receptors exposed to munitions constituents in surface soil. The assessment endpoint for the Screening Level Ecological Risk Assessment is the protection of local populations and communities of biota. No explosives were positively detected in soil; therefore, no adverse impacts to ecological receptors exposed to explosives in soil are expected. Cadmium, copper, and lead were identified as **contaminants of potential ecological concern** in soil. No other metals were detected in soil at concentrations above risk-based ecological screening levels.

Plants and soil-dwelling organisms may be directly exposed to contaminants in soil. Wildlife receptors may be exposed to contaminants in soil by two main pathways: incidental ingestion of soil while feeding, and ingestion of food items that have become contaminated due to uptake from soil. Contaminants of potential ecological concern concentrations in soil were compared to USEPA ecological soil screening levels protective of soil invertebrates, terrestrial plants, birds, and mammals to determine the potential risk to these ecological receptors. Maximum concentrations of lead and copper in soil exceed ecological soil screening levels protective of soil invertebrates, plants, birds, and mammals; the maximum concentration of cadmium exceeds the ecological soil screening level protective of mammals.

The hazard quotient method was used to evaluate the potential risk to higher level organisms from cadmium, copper, and lead in soil, following methods presented in the Ecological Soil Screening Level guidance documents. The hazard quotient is equal to the estimated exposure dose of an ecological receptor divided by a toxicity reference value. In a Screening Level Ecological Risk Assessment, the toxicity reference value represents a receptor-class-specific estimate of a no observed adverse effect level for the respective contaminant for chronic exposure. A hazard quotient less than 1 based on a no observed adverse effect level-based toxicity reference value indicates little or no ecological risk. Calculation of an upper bound hazard quotient using lowest observed adverse effect level toxicity values is done in Ecological Risk Assessments to refine screening level risk estimates. A lowest observed adverse effect level-based toxicity reference value represents a dose that is expected to produce adverse population effects. To provide a range of ecological hazard, hazard quotients were also calculated using a lowest observed adverse effect level-based toxicity reference value. At the maximum detected copper concentration, the no observed adverse effect level-based hazard quotient exceeds 1 for the American woodcock (3.2) and the short-tailed shrew (1.8). The lowest observed adverse effect level-based hazard quotient did not exceed 1 for these wildlife receptor groups (hazard quotient of 0.37 for the American woodcock and 0.14 for the short-tailed shrew). At the maximum detected cadmium concentration, the no observed adverse effect level-based hazard quotient equals 1 for the short-tailed shrew. The lowest observed adverse effect level-based hazard quotient did not exceed 1 for any wildlife receptor group. At the maximum lead concentration, no observed adverse effect level-based hazard quotients exceed 1 for all receptor groups and the lowest observed adverse effect level-based hazard quotients exceeded unity for all wildlife receptor groups except for the meadow vole (0.84).

The hazard quotient screening estimates were refined to consider how the risk estimates would change if more realistic assumptions were used. The 95% upper confidence limit concentration was used to represent contaminant concentrations for wide-ranging wildlife and alternative low effect toxicity values (i.e., lowest observed adverse effect level-based toxicity reference values) were used to represent a dose that is expected to produce adverse population effects.

At the 95% upper confidence limit concentration of cadmium (0.448 mg/kg) and copper (41.46 mg/kg) and the low effect toxicity value, little to no population risk to wildlife is expected because lowest observed adverse effect level-based hazard quotients were less than 1 for all wildlife receptor groups. At the 95% upper confidence limit concentration of lead (527.6 mg/kg) in incremental samples (527.6 mg/kg) and the low effect toxicity value, little to no population risk to wildlife is expected because lowest observed adverse effect level-based hazard quotients were less than 1 for all wildlife receptor groups. At the 95% upper confidence limit concentration of lead in X-ray fluorescence (XRF) correlation samples (11,311 mg/kg), the lowest observed adverse effect level-based hazard quotients exceeded 1 for the American woodcock (16), mourning dove (7.1), and short-tailed shrew (2.7), indicating that there is potential for adverse impacts on populations of ground-dwelling, insectivorous small mammals and birds, and herbivorous birds.

Therefore, potential risk to terrestrial receptors is predominately driven by lead in surface soil. The human-health based residential Regional Screening Level of 400 mg/kg is proposed as the action level for the SHSAR Impact Slope MRS. At the residential Regional Screening Level for lead, the no observed adverse effect level-based hazard quotients exceed 1 for the American woodcock (22), mourning dove (8.1), and short-tailed shrew (5.2). The lowest observed adverse effect level-based hazard quotients do not exceed 1 for any wildlife receptor group (hazard quotient of 0.82 for the American woodcock; 0.30 for the mourning dove; and 0.17 for the short-tailed shrew). Thus, little to no risk to wildlife populations is expected at a residential remedial objective of 400 mg/kg lead.

Remedial Action Objectives

Remedial Action Objectives (RAOs) are developed as target goals for remediation and are used during the analysis and selection of remedial alternatives. Remedial Action Objectives (RAOs) are media-specific qualitative statements for protecting human health and the environment and/or meeting established regulatory requirements.

Based on the proximity of the housing area and currently unrestricted access to the lead-contaminated soils, the Remedial Action Objective (RAO) at this site is to prevent exposure to lead in soil having concentrations in excess of the Preliminary Remedial Goal of 400 mg/kg.

Summary of Remedial Alternatives

Remedial alternatives to address lead in surface soils at the Munitions Response Site (MRS) are presented below. The alternatives are numbered to correspond with the numbers in the RI/FS Report.

Several of the remedies require Land Use Controls, which include engineering controls (physical barriers) and institutional controls (government controls, proprietary controls, and educational controls), to limit the use of portions of the property. These use restrictions are discussed in each alternative as appropriate. The type of restriction and enforceability will need to be determined for the selected remedy in the Record of Decision. Monitoring to ensure that the effectiveness of the remedy, including deed restrictions, is a component of several of the Land Use Control alternatives.

All alternatives, except the "no action" alternatives, are expected to attain the Remedial Action Objectives (RAOs).

Alternative 1: No Action

Estimated Capital Cost: $0

Estimated Annual O&M Cost: $0

Estimated Present Worth Cost: $0

Estimated Construction Time Frame: Not Applicable

Estimated Time to Achieve Remedial Action Objectives (RAOs): Remedial Action Objectives (RAOs) will not be achieved.

As required by the National Oil and Hazardous Substances Pollution Contingency Plan 40 C.F.R. § 300.430(e)(6), the No Action alternative must be evaluated. The No Action alternative equates with a determination to do nothing further and can be selected only if it is determined that there are no unacceptable health or environmental risks at a site.

The No Action alternative is considered to establish baseline risk during an RI/FS. Actions that simply control future access to the site or limit exposures to existing contamination may not be considered when establishing risk. Therefore, enacting new Land Use Controls (e.g., deed restrictions or posting notices, warnings, and other restrictions) are not considered in the No Action alternative.

Alternative 2: Land Use Controls

Estimated Capital Cost: $108,500

Estimated Annual O&M Cost: $75,000

Estimated Present Worth Cost: $336,118

Estimated Construction Time Frame: 1 month

Estimated Time to Achieve Remedial Action Objectives (RAOs): Approximately 12 months

Control measures that are administrative in nature can, in some situations, be as effective as remedial technologies in preventing human exposure to lead. Therefore, Land Use Controls, which will include institutional controls (i.e., public health education and legal restriction on future land use) and engineering controls (i.e., physical access restrictions), are included in this alternative. In addition, long-term monitoring/maintenance would be implemented to verify that the Land Use Controls were effective and whether lead was migrating either over land during rain events, etc., or downward through the soil to groundwater. Land Use Controls are developed to reduce or prevent exposure to contamination in soil and particulate matter and to protect the remedy where contamination exceeding screening criteria is left in place. Specific Land Use Controls developed for the site would be documented as part of the remedial design in accordance with EPA-540-R-09-001 Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites (Interim Final, November 2010).

<u>Public Education</u>

Public education involves distribution of information about lead exposure to people in affected areas. Specific education activities that may prove effective at reducing exposures include holding public meetings with area stakeholders to inform the local community and adding data to the facility information repository.

<u>Legal Restrictions on Future Use</u>

Legal access restrictions include land use restrictions, which are incorporated into the Post-wide master plan. Use of this alternative requires compliance with the base's Land Use Control policy and USEPA or remedy review activities. Access restrictions would provide notification for any personnel entering the area that lead-contaminated soil exists in this area and excavation is restricted.

<u>Physical Access Restrictions</u>

Access restrictions can prevent physical contact with contaminated soil using either physical barriers. For this alternative, fencing and signage would be required around the SHSAR Impact Slope Munitions Response Site (MRS) to restrict access and contact with lead-contaminated material.

Long-Term Monitoring/Maintenance

Annual inspection of the fence and signage is required. Soil sampling should be conducted every two years and groundwater sampling should be conducted every five years, to verify that the lead is not migrating off-site.

Alternative 3: Excavation and Off-Site Disposal

Estimated Capital Cost: $3,750,022

Estimated Annual O&M Cost: $0

Estimated Present Worth Cost: $3,750,022

Estimated Construction Time Frame: 2 months

Estimated Time to Achieve Remedial Action Objectives (RAOs): Approximately 18 months

Excavation and off-site disposal of lead-contaminated soil with concentrations exceeding the Preliminary Remedial Goal removes the risk of exposure from the Munitions Response Site (MRS) site in both residential and industrial user risk settings. At the SHSAR Impact Slope Munitions Response Site (MRS), this would involve removing all soil contaminated with lead above the Remedial Action Objective (RAO) of 400 mg/kg. This soil is located on a steep slope. The volume of material requiring removal is estimated at approximately 6,650 tons. This was calculated using the assumptions that 5.5 acres (239,580 square feet) were contaminated to 0.5 feet below ground surface (i.e., 4,436.7 cubic yards) and assuming a density of 1.5 tons per cubic yard. Soil sampling following remove would be performed to confirm that the residual contamination is less than the Remedial Action Objective (RAO).

During excavation, dust monitoring and dust suppression is required to protect the workers and the public. In this alternative, all excavated soil is transported for disposal to a licensed Resource Conservation and Recovery Act Subtitle C landfill (Waste Management's Rolling Meadows facility in Topeka, Kansas). The remaining exposed bedrock slope would be covered with topsoil, native prairie grass, and reinforced rollout material for erosion prevention.

Public Education

Public education would be performed during the time when the remedial activities were being conducted. Public education involves distribution of information about lead exposure to people in affected areas. Specific education activities that may prove effective at reducing exposures include holding public meetings with area stakeholders to inform the local community and adding data to the facility information repository.

Access Restrictions

This alternative does not require the use of Land Use Controls, because all lead-contaminated soil with concentrations exceeding the Preliminary Remedial Goal will be removed from the site.

Long-Term Monitoring/Maintenance

Due to removal of the lead, maintenance for lead exposure purposes is not required. However, maintenance of the area is required until the topsoil and native prairie grass are established to prevent erosion.

Alternative 4: Soil Cover

Estimated Capital Cost: $1,813,791

Estimated Annual O&M Cost: $30,000

Estimated Present Worth Cost: $2,044,089

Estimated Construction Time Frame: 3 months

Estimated Time to Achieve Remedial Action Objectives (RAOs): 18 months

This alternative entails using a soil cover as an access restriction to prevent contact with contaminated soils. In addition, the other Land Use Controls described in Alternative 2 will be required, with the exception that a fence is not required and access restrictions and long-term monitoring/maintenance requirements will vary.

Access Restrictions

Access restrictions can prevent physical contact with contaminated soil using either physical barriers or legal restrictions. General activities associated with these restrictions include:

- Physical access restrictions – Clean backfill material (18 inches of borrow material and 6 inches of topsoil) would be placed above the lead-contaminated soil. Due to the slope, this backfill would likely require fiber-reinforcing to minimize erosion and keep the backfilled cap in place. This fiber-reinforced backfill material would provide a physical barrier to prevent contact with the lead-contaminated soil, and re-vegetation of the slope would reduce erosion and runoff of contaminated material.
- Legal access restrictions – Legal access restrictions include Land Use Controls, which are incorporated into the Post-wide Master Plan in compliance with the Post's land use control policy and the USEPA, or remedy review activities. Access restrictions for this alternative would provide notification for any personnel entering the covered area that lead-contaminated soil exists below the cover so excavation is not allowed.

Long-Term Monitoring/Maintenance

Annual inspections will be required to verify that the cover material remains in place. If the inspections show that there is potential for lead-contaminated soil to be exposed, cover maintenance will be required. In addition, soil verification sampling should be conducted every two years and groundwater verification should be conducted every five years, for additional verification of cover integrity.

Evaluation of Alternatives

Nine criteria, shown in the table on the following page, are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration.

The nine criteria fall into three groups: threshold criteria, primary balancing criteria, and modifying criteria. A description of the purposes of the three groups follows:

- Threshold criteria, which are requirements that each alternative must meet in order to be eligible for selection.
- Primary balancing criteria, which are used to weigh major trade-offs among alternatives.
- Modifying criteria, which may be considered to the extent that information is available during the RI/FS, but can be fully considered only after public comment is received on the Proposed Plan. The modifying criteria may be used in the final balancing of trade-offs between alternatives upon which the final remedy selection is based.

Each alternative is also evaluated against the following six green sustainable remediation criteria:

- Greenhouse Gas (GHG) Emissions;
- Toxic Chemical Usage and Disposal;
- Energy Consumption;
- Use of Alternative Fuels;
- Water Consumption; and
- Waste Generation.

Evaluation Criteria for Superfund Remedial Alternatives
THRESHOLD CRITERIA
Overall Protectiveness of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
Compliance with Applicable and Relevant and Appropriate Requirements evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.
PRIMARY BALANCING CRITERIA
Long-Term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.
Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternatives use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50% to -30%.
MODIFYING CRITERIA
Regulatory Acceptance considers whether the KDHE agrees with the Army's analyses and recommendations, as described in the RI/FS Report and Proposed Plan.
Community Acceptance considers whether the local community agrees with the Army's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

1. Overall Protection of Human Health and the Environment

Alternative 1: This alternative provides no effect on the site; therefore, it does not address any of the identified risks to human health and the environment.

Alternative 2: This alternative provides protection to the general public by limiting access to the site and protection for authorized personnel entering the site by requiring Land Use Controls that notify personnel of the potential site hazards and ensure that Proposed Plan E is utilized during any intrusive work at the site. Requires long-term management to maintain and enforce Land Use Controls.

Alternative 3: This alternative provides adequate protection of human health and the environment through source removal. Therefore, overall protection of human health and the environment would be provided by this alternative.

Alternative 4: This alternative provides effective protection of human health and the environment as a cover is installed over lead concentrations exceeding the Preliminary Remedial Goal; however, long-term maintenance of the cover is required and erosion control may prove to be difficult.

2. Compliance with Applicable and Relevant and Appropriate Requirements

Alternative 1: Action-specific and location-specific Applicable and Relevant and Appropriate Requirements do not apply and there are no chemical-specific Applicable and Relevant and Appropriate Requirements. However, this alternative does not meet the Remedial Action Objective (RAO), which is to prevent exposure to lead in soil having concentrations in excess of the Preliminary Remedial Goal of 400 mg/kg. No controls on contact with lead would be provided by this alternative.

Alternative 2: The action-specific Applicable and Relevant and Appropriate Requirements (i.e., the Environmental Use Controls located in K.S.A. 65-1, 224 through 65-1, 225, K.S.A. 65-1, 228 through 65-1, 230, and K.S.A. 65-1, 232 through 65-1, 235) would be met by this alternative. There are no location-specific or chemical-specific Applicable and Relevant and Appropriate Requirements for this alternative. However, this alternative does meet the Remedial Action Objective (RAO), which is to prevent exposure to lead in soil having concentrations in excess of the Preliminary Remedial Goal of 400 mg/kg by implementing Land Use Controls on the property.

Alternative 3: Action-specific and location-specific Applicable and Relevant and Appropriate Requirements do not apply and there are no chemical-specific Applicable and Relevant and Appropriate Requirements. However, this alternative does meet the Remedial Action Objective (RAO), which is to prevent exposure to lead in soil having concentrations in excess of the Preliminary Remedial Goal of 400 mg/kg by removing lead with concentrations above 400 mg/kg from the property.

Alternative 4: The action-specific Applicable and Relevant and Appropriate Requirements (i.e., the Environmental Use Controls located in K.S.A. 65-1, 224 through 65-1, 225, K.S.A. 65-1, 228 through 65-1, 230, and K.S.A. 65-1, 232 through 65-1, 235) would be met by this alternative. There are no location-specific or chemical-specific Applicable and Relevant and Appropriate Requirements for this alternative. However, this alternative does meet the Remedial Action Objective (RAO), which is to prevent exposure to lead in soil having concentrations in excess of the Preliminary Remedial Goal of 400 mg/kg by implementing access restrictions and Land Use Controls on the property.

3. Long-Term Effectiveness and Permanence

Alternative 1: This alternative does not provide long-term effectiveness or permanence for the protection of public health and the environment.

Alternative 2: The fence will provide protection for the general public, who could no longer directly access the contaminated area. However, contaminant concentrations near the surface will not be reduced by this alternative. Therefore, as long as the Land Use Controls are maintained, this alternative would be effective. However, as contaminant concentrations remain on-site, this alternative is not permanent.

Alternative 3: This alternative provides long-term effectiveness and permanence because soil with lead concentrations exceeding the Preliminary Remedial Goals will be removed and sequestered in a permitted Resource Conservation and Recovery Act Subtitle C landfill.

Alternative 4: This alternative provides reasonably effective long-term protection; however, long-term maintenance of the cover is required and erosion control may prove to be difficult. Therefore, this alternative provides effectiveness, but not permanence.

4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

Alternative 1: This alternative does not reduce toxicity, mobility, or volume of lead; lead would remain at the site.

Alternative 2: This alternative does not reduce toxicity, mobility, or volume of lead.

Alternative 3: This alternative effectively reduces mobility of lead by sequestration of soils in a permitted Resource Conservation and Recovery Act Subtitle C landfill. The toxicity and volume of the lead would remain the same for material removed from the site; however, the risk of exposure to lead-contaminated soil with concentrations exceeding the Preliminary Remedial Goal would be eliminated.

Alternative 4: This alternative does not reduce toxicity or volume of lead, since lead would remain at the site; however, the mobility of lead would be reduced by the cover.

5. Short-Term Effectiveness

Alternative 1: This alternative has no action associated with it; it provides no short-term measures to prevent impact to human or environmental receptors and would not be effective in the short term.

Alternative 2: The primary physical remedial action associated with this alternative is fencing installation. No contact with contaminants would occur during construction of the fence. Therefore, no short-term risks to site workers or the community are associated with this alternative.

Alternative 3: Lead-contaminated dust will be generated during excavation; this potential exposure would be mitigated by the use of protective equipment, dust monitoring, and suppression measures during the remedial actions. Additionally, disturbance of nearby residents (e.g., noise, truck traffic, etc.) significantly increases during the remedial actions.

Alternative 4: Some lead-contaminated dust may be generated during the cover installation; however, it would be less dust than Alternative 3. Once installed, the cover would be very effective in the short term. Disturbance of nearby residents (e.g., noise, truck traffic, etc.) significantly increases during the remedial actions.

6. Implementability

Alternative 1: This alternative is readily implementable as it involves no action.

Alternative 2: This alternative is readily implementable; Land Use Controls have been implemented at this facility and geographical information system technology exists to maintain the facility specific Land Use Control database. Personnel and materials required for fence construction are readily available.

Alternative 3: This alternative is readily implementable and uses proven, tested technologies that are technically feasible from an engineering perspective. Soil wetting and dust control would be required to protect workers and nearby residents. Noise and traffic disruption impacts on nearby residents during daylight hours will increase during the remedial action but can be mitigated with proactive planning actions. However, there would be design challenges implementing the action due to the slope present. Per Occupational Safety and Health Act 1926 Subpart P, Excavations, the sandy soil and steep sloping (greater than 1.5:1) may require shoring, or other engineering controls to provide slope stability during the implementation of the remedial action. The slope of the SHSAR Impact Slope Munitions Response Site (MRS) will cause excavation to proceed slower than excavation on less steep slopes and may require specialized equipment, particularly in areas of shallow bedrock; however, the work can still be implemented. Engineering analysis in areas, in particular those areas without shallow bedrock, is required to assess the potential for localized slope failure. Re-vegetation, erosion control, stabilization, and/or engineering controls may be required in these areas to address slope failure potential if it exists.

Alternative 4: This alternative is implementable. All services and materials required for the implementation of this alternative are available for use. As previously stated, the slope of the SHSAR Impact Slope Munitions Response Site (MRS) could represent a threat to future cover integrity; frequent cover maintenance would likely be required. Further, the slope of the SHSAR Impact Slope Munitions Response Site (MRS) will cause challenges to implementing this remedy and may require specialized equipment, particularly in areas of shallow bedrock; however, the work can still be implemented. Engineering analysis in areas, in particular those areas without shallow bedrock, is required to assess the potential for localized slope failure. Re-vegetation, erosion control, stabilization and/or engineering controls may be required in these areas to address slope failure potential if it exists. The slope will also cause an increase of the maintenance requirements for the cover beyond what would typically be expected. In addition, Land Use Controls have been implemented at this facility and geographical information system technology exists to maintain the facility specific Land Use Control database.

7. Cost

The costs associated with Alternatives 1 through 4 are summarized in the table on the following page. Costs provided are a comparison of net present value of each alternative. Capital costs are those initial costs accrued during the implementation of each alternative. Annual and periodic costs are based on the present worth with a discount rate of 7% over a 30-year duration.

8. Regulatory Acceptance

Regulatory Acceptance will be addressed in the Record of Decision once comments on the RI/FS Report and Proposed Plan have been received (USEPA, 1989). For all alternatives, this criterion cannot be evaluated at this time.

9. Community Acceptance

Community Acceptance will be addressed in the Record of Decision once comments on the RI/FS Report and Proposed Plan have been received (USEPA, 1989). For all alternatives, this criterion cannot be evaluated at this time.

10. Green House Gas Emissions

Alternative 1: This alternative includes no action and will not produce greenhouse gases.

Alternative 2: This alternative will produce only a minimal amount of greenhouse gases during the fence installation.

Alternative 3: This alternative will produce the most additional greenhouse gases due to mobilization, operation, and demobilization of heavy construction equipment, plus the transportation of the contaminated soil to an off-site location and clean backfill soil to the site.

Alternative 4: This alternative will produce significant additional greenhouse gases due to mobilization, operation, and demobilization of heavy construction equipment, plus the transportation of the cover construction soil to the site.

11. Toxic Chemical Usage and Disposal

There are no toxic chemical usage and disposal considerations for any of the four alternatives at the site.

12. Energy Consumption

Alternative 1: This alternative does not require additional energy consumption from fossil fuel sources.

Alternative 2: This alternative requires minimal energy consumption from fossil fuel sources during the fence installation.

Alternative 3: This alternative requires significant energy consumption from fossil fuel sources due to the use of diesel fuel for the delivery, operation, and demobilization of heavy construction equipment and to haul approximately 6,650 tons of contaminated soil to a landfill.

Summary of Costs Associated with Remedial Alternatives

Alternative Description	Alternative 1 No Action	Alternative 2 Land Use Controls	Alternative 3 Excavation and Off-Site Disposal	Alternative 4 Soil Cover
Capital Costs	$0	$108,050	$3,750,022	$1,813,791
Annual and Periodic Costs	$0	$75,000	$0	$30,000
Total Cost of Alternatives (Present Value)	**$0**	**$336,118**	**$3,750,022**	**$2,044,089**

Alternative 4: This alternative requires the most energy consumption from fossil fuel sources due to the use of diesel fuel for the delivery, operation, and demobilization of heavy construction equipment and to install the backfilled cover.

13. Use of Alternative Fuels

Alternative 1: This alternative consumes no fossil fuel and thus requires no consideration of alternative fuel use.

Alternative 2: This alternative could reduce GHG emissions through use of alternative fuels; however, this alternative consumes little fossil fuel.

Alternative 3: This alternative could reduce GHG emissions through use of alternative fuels.

Alternative 4: This alternative could reduce GHG emissions through use of alternative fuels.

14. Water Consumption

Alternative 1: This alternative requires no additional water consumption.

Alternative 2: This alternative requires no additional water consumption.

Alternative 3: This alternative requires water consumption; small quantities would be required for the dust suppression during excavation and decontamination of equipment.

Alternative 4: This alternative requires water consumption; small quantities would be required for the dust suppression during excavation and decontamination of equipment.

15. Waste Generation

Alternative 1: This alternative will not generate additional remedial waste.

Alternative 2: This alternative will not generate additional remedial waste.

Alternative 3: Waste generation includes approximately 6,650 tons of contaminated soil that exceeds residential Risk-Based Concentrations generated during the excavation process. This material will be transported off-site to an approved disposal facility.

Alternative 4: This alternative will not generate additional remedial waste.

Summary of Preferred Alternative

The Preferred Alternative for the Munitions Response Site (MRS) is Alternative 2, Land Use Controls. Based on information currently available, the Army believes the Preferred Alternative for the Munitions Response Site (MRS) meets the threshold criteria and provides the best balance of trade-offs among the other alternatives with respect to the balancing and modifying criteria. The Army expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA § 121(b): (1) be protective of human health and the environment; (2) comply with Applicable and Relevant and Appropriate Requirements; and (3) be cost effective. The support agencies, support the Army's selection of the Preferred Alternative.

Community Participation

The Army and support agencies provide information regarding the cleanup of the Munitions Response Site (MRS) to the public through public meetings, the Administrative Record file for the site, and announcements published in the Manhattan Mercury in Manhattan, Kansas, and the Daily Union News, Junction City, Kansas. The Army and the support agencies encourage the public to gain a more comprehensive understanding of the site and the remedial activities that have been conducted at the Munitions Response Site (MRS).

The dates for the public comment period and the locations of the Administrative Record files are provided on the front page of this Proposed Plan. Comments on the Proposed Plan may be provided using the form found on the last page of this Proposed Plan.

For Further Information on the SHSAR Impact Slope Munitions Response Site (MRS), Please Contact:

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Glossary of Terms

Specialized terms used in this Proposed Plan are defined below:

Administrative Record – This is a collection of documents that contain information and reports generated during the investigation of the site and remediation used to select the preferred alternative. It is available for public review.	***Munitions and Explosives of Concern (MEC) –*** Military munitions that are 1) unexploded ordnance, as defined in 10 U.S.C. 101(e)(5); 2) abandoned or discarded, as defined in 10 U.S.C. 2710(e)(2); 3) munitions constituents present in soil, facilities, equipment, or other materials in high enough concentrations so as to pose an explosive hazard.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) – This federal law was passed in 1980 and is commonly referred to as the Superfund Program. It provides for liability, compensation, cleanup, and emergency response in connection with the cleanup of inactive hazardous waste disposal sites that endanger public health and safety or the environment. (42 USC § 9601)	***Munitions Response Area (MRA) –*** Any area on a defense site that is known or suspected to contain UXO, DMM, or munitions constituents. Examples include former ranges and munitions burial areas. A munitions response area is composed of one or more munitions response sites.
Contaminant of Concern – Any contaminant that is shown to pose unacceptable risks or hazards at a site and determined to require evaluation of remedial alternatives.	***Munitions Response Site (MRS) –*** A discrete location that is known to require a munitions response. (Munitions Response Site (MRS)Proposed Plan, 32 CFR Part 179, October 2005)
Contaminant of Potential Ecological Concern – Any contaminant that is shown to pose possible ecological risks or hazards at a site. However, impacts are not confirmed so may or may not actually be occurring to the plants and animals at a site.	***National Oil and Hazardous Substances Pollution Contingency Plan –*** These CERCLA regulations provide the federal government the authority to respond to the problems of abandoned or uncontrolled hazardous waste disposal sites as well as to certain incidents involving hazardous wastes (e.g., spills). (40 CFR § 300).
Feasibility Study (FS) – A report that evaluates potential options for addressing soil and groundwater contamination at a site.	***Receptor –*** Individuals (human or ecological) that may be exposed to the contaminants.
Human Health Risk Assessment – An assessment of potential carcinogenic risks for chemical exposures.	***Record of Decision –*** This legal record is signed by the Army, USEPA and the KDHE. It provides the cleanup action or remedy selected for a site, the basis for selecting that remedy, public comments, responses to comments, and the cost of the action.
Land Use Controls – Administrative, legal, or physical mechanisms that prohibit unauthorized access to the site and, in this case, will be implemented as a necessary action to prevent residential exposures.	***Remedial Investigation (RI) –*** An investigation of the degree and extent of contamination at a site.
Munitions Constituent – Any material that originates from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 U.S.C. 2710(e)(4))	***Risk-Based Screening Levels –*** Calculated standards for contaminants in soil, surface water, sediment, and groundwater that are based on use scenarios (e.g., residential or industrial) or ecological impacts and are associated with either a risk of $1x10^{-6}$ (carcinogens) or a hazard quotient of 1.0 (non-carcinogens and ecological receptors).
Munitions Debris – Non-explosive remnants (e.g.,. chunks of metal) of munitions remaining after munitions use, demilitarization, or disposal.	***Screening Level Ecological Risk Assessment –*** An assessment of potential impacts for ecological-level chemical exposures.

USE THIS SPACE TO WRITE YOUR COMMENTS

Your input on the Proposed Plan for the SHSAR Impact Slope Munitions Response Site (MRS) is important to the Army. Comments provided by the public are valuable in helping the Army select a final cleanup remedy for the site.

You may use the space below to write your comments, then fold and mail. Comments must be postmarked by **16 December 2014**. If you have questions about the comment period, please contact Mr. John Shimp at (785) 239-3343. Those with access to email may submit their comments to the Army at the following address: john.f.shimp.civ@mail.mil.

Name: ______________________________

Address: ______________________________

City ______________________________

State ______________________________ Zip ______________