

Final

Remedial Action Work Plan

for the

Former U.S. Border Protection Firing Range

Nogales, AZ

Prepared for:

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ACRONYMS AND ABBREVIATIONS

ADEQ	Arizona Department of Environmental Quality
APP	Accident Prevention Plan
BMP	Best Management Practice
bgs	below grade surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
CRZ	Contaminant Reduction Zone
EZ	Exclusion Zone
°F	Fahrenheit
FS	Feasibility Study
GIS	Geographic Information System
GPL	Groundwater Protection Level
IDW	Investigation Derived Waste
mg/L	milligram per Liter
mg/kg	milligram per kilogram
mg/m ³	milligram per cubic meter
NTP	Notice To Proceed
PAH	Polynuclear Aromatic Hydrocarbon
PAL	Project Action Levels
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RSL	Regional Screening Level
SCO	Stabilized Construction Entrance
Sol-JCP	Sol Solutions, LLC and J.C. Palomar, Inc. Joint Venture
SRLs	[AZ] Soil Remediation Levels
SSHP	Site Safety and Health Plan
SWPPP	Storm Water Pollution Prevention Plan
SZ	Support Zone
TCLP	Toxicity Characteristic Leaching Procedure
UFP-QAPP	Uniform Federal Policy Quality Assurance Project Plan
USACE	United States Army Corps of Engineers
USCBP	United States Customs Border Protection
USEPA	United States Environmental Protection Agency
XRF	X-Ray Fluorescence

1 INTRODUCTION

The Joint Venture formed by Sol Solutions, LLC and J.C. Palomar (Sol-JCP) has been retained by the United States Army Corps of Engineers (USACE) to provide a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Remedial Action for the removal of contaminated soil at the former U.S. Customs and Border Protection (USCBP) Firing Range (the Site). The former USCBP Firing Range is located in Santa Cruz County in southern Arizona. The Remedial Action activities for the Site are being conducted pursuant to Contract No. W9126G-17-C-0009.

This Remedial Action Work Plan (RAWP) has been prepared to outline the scope of work for the remedial activities that will be conducted at the Site. As presented in the Decision Document (Terranear PMC, 2015) Alternative 4, Off-Site Disposal was selected as the remedial action for the Site. In support of this RAWP, a Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP) (Sol-JCP, 2018a) and an Accident Prevention Plan (APP) and Site Safety and Health Plan (SSHP) (Sol-JCP, 2018b) were developed. The UFP-QAPP outlines the procedures this project will use to ensure the data it collects and analyzes meets project quality assurance and quality control (QA/QC) requirements while the AAP /SSHP addresses all occupational safety and health hazards associated with cleanup operations.

The USCBP is the lead agency for site activities. As the lead agency, USCBP is responsible for executing environmental restoration of properties that were formerly owned by, leased by, or otherwise possessed by the U.S. government and under the jurisdiction of the USCBP. From 2011 through the present, USCBP conducted assessments, investigations, and studies in accordance with CERCLA to determine the potential presence of contamination in environmental media at the Site that may pose a risk to human health and the environment. The State of Arizona, through the Arizona Department of Environmental Quality (ADEQ) and U.S. Environmental Protection Agency (USEPA) are the regulatory agencies for this remediation.

2 SITE BACKGROUND

This section discusses the site description and operational history, current and future land uses, previous investigations, and environmental setting of the former USCBP Firing Range.

2.1 Site Location and Operational History

The former USCBP Firing Range is located at 1651 W. Target Range Road in Nogales, Arizona (Figure 1). The area is defined as the leased portion of the Arbo property (parcel no. 112-29-010B) (Figure 2). The site on the Arbo property (113-49-010B) is surrounded on two sides located in a portion of Section 13, Township 24 south, Range 13 east Santa Cruz County, Arizona with its center located at latitude of 31.347139 North and longitude of 110.969525 West.

The former USCBP Firing Range encompasses approximately one-half acre of shooting range property and empty range land used for small arms training in the form of target practice beginning in 1992. The USCBP discontinued use of the firing range in mid-2010. USCBP continues to lease the property from the current property owner, Mr. Arbo (Allwyn Environmental, 2009b). The property is currently idle.

2.2 Current and Future Land Use

The area within the former USCBP Firing Range currently consists of the firing range and firing range structures. An aerial photograph review conducted as part of Phase I ESAs (Allwyn Environmental, 2009a and b) of a property adjacent to the Site revealed that the structures present were constructed in 1992, and no previous development had occurred at the Site. The areas immediately surrounding the Site have never been developed. Operations ceased at the property in 2010 and it is no longer used as an active firing range.

The Site is located within a mostly open and moderately restricted area that is undeveloped property. It is unknown whether or not water, electric, and communications utilities traverse this property. However, due to the undeveloped nature of this area, it is unlikely. The Site is unfenced, although there is a locked gate on the main road to the Site. There is no signage at the Site to indicate property boundaries or to ward off trespassers. It is possible for cattle and other livestock from surrounding properties to enter the Site. At the completion of the Remedial Action, the USCBP will terminate the lease of this property and it will return to the property owner for use as agricultural land.

2.3 Environmental Setting

2.3.1 Topography

The majority of the former USCBP Firing Range has been graded by heavy machinery and is essentially flat. The topography of the remainder of the Site and of the surrounding property is typical of dry desert lowlands present throughout the Basin and Range province of the western United States. The land surface is generally rugged and hilly. Several dry creek beds (arroyos) separate steep hills and ridges present throughout this area. The elevation ranges from approximately 3,960 to 4,130 feet above sea level.

2.3.2 Climate

Nogales' climate is typically sunny and dry, with low relative humidity. Average monthly high temperatures recorded at the Nogales 6 N climate station from 1952 to 2010 range from a low of 64.3 degrees Fahrenheit (°F) in January to a high of 95.3°F in June. Average monthly low temperatures range from 27.3°F in January to 63.9°F in June during the same time period (Western Regional Climate Center, 2011).

Nogales' climate is classified as arid, which is defined by average annual precipitation less than half of evaporation and mean temperature of the coldest month above freezing (32 °F). The former USCBP Firing Range receives little rain or snow, averaging about 17.21 inches of precipitation per year. Most precipitation occurs during the summer monsoon season, typically from July through mid-September. The monthly average precipitation recorded at the Nogales 6 N climate station from 1952 to 2010 ranges from a low average of 0.22 inches for May to a high average of 4.38 inches for August. The summer monsoon season for regional precipitation is characterized by incidences of sudden, dramatic downpours of heavy rain within a short period of time

2.3.3 Soils and Vegetation

The soils in the Site are primarily shallow and rocky with un-weathered clasts of andesite and rhyolite tuffs, granites, and small areas of clay shales. The steeper slopes have numerous rock outcroppings and shallow loamy soils. Five soil associations dominate the area: Comoro-Pima, Continental-Sonoita, Caralampi-White House - Hathaway, Lampshire-Chiracahua-Graham, and Faraway-Rock Outcrop-Barkerville. The first three are typically deep soils and sandy loams with varying amounts of gravel and clay, generally appearing in or along floodplains and streambeds. The latter two are typically shallow cobbled clay or sandy loams occurring in the upper elevations on foothills and mountains (Allwyn Environmental, 2009c). Soil pH ranges from slightly acidic (pH 6) to slightly alkaline (pH 8) (USDA, 1979).

Most of the ground surface is bare, with portions partially covered with vegetation. The vegetation that grows in these soils is representative of desert shrub land. Common vegetation includes several varieties of cacti, mesquite, creosote bush, ocotillo, acacia trees, desert willow, and yucca (National Park Service, 2011). Vegetation at the former USCBP Firing Range did not significantly hinder the Remedial Investigation (RI) field activities (Terranear PMC, 2014).

2.3.4 Hydrogeology

The Site lies within the boundaries of the Santa Cruz Active Management Area. The Santa Cruz Active Management Area was designed to address groundwater overdraft in the area, as a result, water management in this area is intensive. Within the Santa Cruz Active Management Area, groundwater can be withdrawn legally only through a groundwater right or permit, unless groundwater is withdrawn from an exempt well (maximum capacity of 35 gallons per minute or less). Based on the information provided in a well driller report from a well located within proximity to the site (Arizona Department of Water Resources Well No.55-636229), the local groundwater is located approximately 135 feet below land surface in this well which is cased to 420 feet below land surface. No perched water appears to exist in the area as no intermittent clay layers were noted. Based on site topography, the groundwater flow near the subject property is likely to the north to northeast.

2.3.5 Prehistoric and Historic Cultural Resources

There are no identified prehistoric or historic cultural resources within the immediate vicinity of the former USCBP Firing Range property.

2.4 Summary of Previous Investigations

2.4.1 2014 Remedial Investigation

The RI was completed at the Site in 2014 (Terranear PMC, 2014). A total of 60 soil samples were collected at the Site and analyzed for antimony, arsenic and lead (Figure 3) as follows:

- 38 soil samples (16 composite samples and 22 discrete samples) were collected from the surface (0-12 inches below ground surface [bgs]), and
- 22 soil samples (16 composite samples and 6 discrete samples) were collected between 12 and 42 inches bgs.

In addition, 10 of the surface soil samples were analyzed for polynuclear aromatic hydrocarbons (PAHs) and 5 samples were selected for Toxicity Characteristic Leaching Procedure (TCLP) analysis for antimony, arsenic, lead and PAHs.

Arsenic, antimony and lead were detected in all 60 samples. The highest concentration of metals and PAHs were found in the southwest corner of the firing range. This area comprises the major portion of the backstop berm and firing range area between the berm and last target area.

Antimony: Antimony concentrations ranged from not detected to 454 milligrams per kilogram (mg/kg). It was detected at concentrations greater than the USEPA Regional Screening Level (RSL) for residential soil (31 mg/kg) in 27 of the 60 soil samples. The highest concentrations of antimony were detected in the soil samples BPN-13S (composite, west part of the firing range on the east slope of backstop berm) and BPG-3S (discrete 'grab', southwest part of the firing range on the east slope of backstop berm) both at 454 mg/kg. Therefore, antimony was retained as a contaminant of concern (COC).

Arsenic: Arsenic concentrations ranged from 4.4 mg/kg (composite sample BPN-14D14, central firing range) to 22.8 mg/kg (composite sample BPN-13S, west central firing range, east side of backstop berm) which were greater than the 2014 USEPA RSL for residential soil (0.39 mg/kg). However, these concentrations are consistent with both local and regional background levels of arsenic, ranging from 10 to 40 mg/kg (Shacklette and Boerngen, 1984). Therefore, arsenic was determined to not be a COC.

Lead: Lead concentrations ranged from 198 mg/kg to 49,300 mg/kg in the shallow samples and from 20 mg/kg to 27,000 mg/kg in the deep samples. Of the 60 soil samples collected, 50 contained concentrations of lead above the USEPA RSL for residential soil (400 mg/kg). The highest concentration of lead (49,300 mg/kg) was detected in the discrete sample BPG-3S (southwest firing range, on eastern slope of backstop berm). Therefore, lead was identified as the primary COC.

PAHs: PAHs were detected in six of the nine shallow composite soil samples and in the one discrete shallow 'grab' soil sample (BPG-20S). Five composite soil samples and the discrete 'grab' soil sample contained concentrations exceeding their respective USEPA RSLs for residential soil for at least one of the following PAH compounds: benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene. Therefore, PAHs were identified as a COC.

TCLP: Four of the five TCLP samples exceeded the USEPA Regulatory Level for lead (5 milligrams per liter [mg/L]). Arsenic was detected in only one of the samples at a concentration that is less than the USEPA Regulatory Level for arsenic (5 mg/L). There are no USEPA Regulatory Levels for PAHs and antimony. The results of TCLP analyses of soil samples indicate that lead may be present at characteristically hazardous levels as defined by 40 CFR 261, Appendix II, 1993 ed., as amended by 58 FR 46040, August 31, 1993.

2.4.2 2018 Background Arsenic Investigation Report

In September 2018, a background arsenic study was completed at the Site (HDR, 2018). A total of 10 soil samples were collected from a depth interval of 1-1.5 ft bgs and analyzed for arsenic. Arsenic was detected at concentrations ranging from 5.7 mg/kg to 11 mg/kg. The report concluded that the 95% UCL for arsenic was 7.55 mg/kg or 6.63 mg/kg (with or without the potential 11 mg/kg outlier). The arsenic concentrations are within the naturally occurring range in the state of Arizona, with a 95% UCL less than the SRL of 10 mg/kg.

3 REMEDIAL OBJECTIVES

3.1 Remedial Action Objectives

The goal of the remedial action at the former USCBP Firing Range to effectively mitigate impacts to soil in a manner that provides short-term and long-term protection of human health and the environment. The Remedial Action Objectives (RAOs) are intended to be specific to the affected media i.e., soil, but sufficiently broad so as not to overly restrict the potential remedial technology available.

The Decision Document (Terranear PMC, 2015) identified the following as the RAO for the Site: Remove the potential for receptors to come in direct contact with small arms remains and COCs at the former USCBP Firing Range.

The aim is to achieve the USEPA’s threshold criteria of “Overall Protection of Human Health and the Environment” and “Compliance with Applicable or Relevant and Appropriate Requirements”. Specifically, the USEPA RSLs for residential soil (USEPA, 2017a), the Arizona SRLs (AZ, 2007), the ADEQ’s Groundwater Protection Levels (GPLs) (ADEQ, 1996), and the arsenic background levels (HDR, 2018) have been identified as Project Action Levels (PALs). Note, due to the recent publication of the Final Toxicological Review of Benzo[a]pyrene (USEPA, 2017b), the RSLs for PAHs are different from those used in the RI/FS. The specific values are included in Worksheet #15 of the *UFP-QAPP* (Sol-JCP, 2018a) and the table below:

Constituent	USEPA RSLs (mg/kg)	ADEQ SRLs (mg/kg)	ADEQ Groundwater Protection Levels (mg/kg)	Background Levels (HDR, 2018) (mg/kg)
	Residential	Residential		
Inorganics				
Lead	400	400	290	
Antimony	31	31	35	
Arsenic	0.68	10	290	5.7-11
Polynuclear Aromatic Hydrocarbons				
Acenaphthene	3,600	3,700		
Anthracene	18,000	22,000		
Benzo(a)anthracene	1.1	0.69		
Benzo(a)pyrene	0.11	0.069		
Benzo(b)fluoranthene	1.1	0.69		
Benzo(g,h,i)perylene	none	none		
Benzo(k)fluoranthene	11	6.9		
Chrysene	110	68		
Dibenz(a,h)anthracene	0.11	0.069		
Fluoranthene	2,400	2,300		
Fluorene	2,400	2,700		
Indeno(1,2,3-cd)pyrene	1.1	0.69		

Naphthalene	3.8	56.0		
Pyrene	1,800	2,300		

3.2 Description of the Remedial Action

In accordance with the Decision Document (Terranear PMC, 2015), Alternative 4 has been approved for implementation. This alternative includes the excavation of soils containing COCs at concentrations greater than their Project Action Levels, and off-site disposal of excavated soils.

4 REMEDIAL ACTION

This section provides a description of the components for the remedial action. A phased approach was developed in the Decision Document consisting of pre-construction/site preparation activities; soil excavation; and disposal and Site restoration. Each of these components is described below.

4.1 Pre-Construction Activities

The following activities will be completed prior to any intrusive work.

4.1.1 Site Security

Security of former USCBP Firing Range will be maintained through-out the duration of the remediation. Remediation personnel shall coordinate with the USCBP to ensure compliance with all security measures. The only persons with permitted access to the former USCBP Firing Range are the USCBP staff and the property owners. A potential does exist for trespassers to enter the area. Additionally, fire-fighting personnel and equipment may be required to enter the site to suppress brush fires.

Because there is no fencing or other restrictions to the area, the following zones will be established at the Site. The Exclusion Zone (EZ), Contamination Reduction Zone (CRZ), and Support Zone (SZ) as illustrated in Figure 4 will be established as described below:

Exclusion Zone (EZ): includes areas where potentially contaminated materials will be excavated or handled and all areas where contaminated equipment or personnel may travel. The EZ also includes an equipment laydown area when not in use. Orange fencing will be installed around the perimeter of the EZ as well as a Project Sign and warning placards. This will provide a physical separation that serves as the transition between the EZ and SZ for the transfer of construction materials and equipment from off-site to the EZ, decontamination of vehicles prior to reentering the SZ, decontamination of personnel and clothing (including containerization of disposable outerwear), and personnel decontamination facilities.

Contamination Reduction Zone (CRZ): A personal hygiene and decontamination station will be set up in the CRZ for personnel to remove contaminated personal protective equipment (PPE) and to wash when exiting the EZ. An equipment decontamination station will be set up in the CRZ for equipment to be decontaminated when exiting the EZ.

Support Zone (SZ): provides a location for temporary site facilities and an entry and exit area for personnel, material, and equipment from the project site.

4.1.2 Mobilization and Site Preparation

Prior to mobilizing equipment, the work area will be inspected by Sol-JCP and the USACE representative to identify existing conditions. Areas of concern, such as trees, shrubs or structures that need to be protected, will be identified and marked. A series of digital color photographs will be taken to establish the pre-field activity site conditions. Sol-JCP will include the results of this survey in the subsequent monthly progress report / invoice. Sol-JCP will avoid those environmental features included in the survey

report and any indicated on the drawings. A series of digital color photographs will be taken to establish the pre-field activity site conditions. Additional photographs will be taken during the project and submitted to the USACE as part of the monthly progress report / invoice.

A project staging area will be established with portable toilets and hand wash stations. Areas for personnel and truck access and egress will also be established with signage for authorized personnel only. Areas specified for decontamination of equipment, the loading and unloading of materials, clean soil storage, and soil stockpiling will be defined prior to commencement of work. The area of excavation will be accessed via W. Target Range Road; therefore, the creation of a temporary access road is not anticipated.

As part of community involvement activities required by A.R.S. § 49-176, signage will be displayed on-site during remedial activities. The sign will describe the type of work being done and include contact information for USACE, USCBP, ADEQ, and Sol-JCP. Refer to Attachment 1 for an example of the site signage.

4.1.3 Truck and Equipment Ingress/Egress Routes

Paved and dirt surface roads provide access to the Site. Where possible, all vehicle traffic will remain on these roads. A Stabilized Construction Entrance (SCE) may be required during execution of construction activities. The necessity of the SCE will be determined in the field by the Field Team Leader. If required, the SCE will be constructed in accordance with the details provided on Drawing 1. Depending on the condition of access roads prior to and during construction, improvements and/or reconstruction to adequately accommodate the anticipated construction equipment and traffic during construction activities may be required. In the event that the roads used for site ingress/egress require improvement to accommodate construction or other equipment utilized during the removal action, temporary gravel roads may be installed. If required, the temporary roads will be constructed in accordance with the details provided on Drawing 1.

4.1.4 Topographic Survey

A pre-topographic and post-topographic survey will be performed by a registered land surveyor licensed in the state of Arizona. The survey will consist of establishing three permanent control points, and a sufficient number of temporary control points and off-sets to perform for locating and marking the limits of the specified excavation areas and confirmatory sampling grids. The horizontal extent of the excavation will be determined relative to the Arizona Coordinate System of 1983, Central Zone 0202 (which covers Santa Cruz County, Arizona) to the nearest 1.0 foot. Based on the established control points, the excavation area and a 50-foot grid will be marked with paint and/or flags by SOL-JCP personnel.

4.1.5 Utility Location

Upon delineation of the excavation area, Sol-JCP will contact the following parties to locate and mark-out the utilities in the area:

- Arizona811: 800.STAKE.IT (800-782-5348) will be contacted at least two full working days, but not more than 15 calendar days before intrusive activities. Arizona Blue Stake was established as a

one-call notification system by underground facility owners such as water, cable, gas, telephone, and electric to assist excavators in notifying underground facility owners prior to digging.

- Any utilities identified will be contacted and a request for identification at the property boundary will be made.
- A private utility locating service will be used to mark any utilities located within the excavation area. At this time, no utilities are expected within the excavation area. However, if one is identified, it will be avoided, and a contingency plan will be developed for addressing soils within 3 feet on either side of the utility.

4.1.6 Clearing of Work Area

Sol-JCP will remove debris, trash, slash, logs, snags, branches, and brush from the work and excavation area. This woody material will be disposed of on site, as much as possible out of sight of the roadway. Other debris and trash will be separated from woody material and will be properly disposed of with other construction debris. The stockpile area will also be cleared of any debris or large rocks that may interfere with the geomembrane liner.

4.1.7 Removal of Structures

Range structures and concrete pads shown in Figure 3 will be removed and disposed of at a Class III landfill. As the buildings were erected in 1992 and are not insulated, neither lead-based paint nor asbestos is expected to be present. Since the structure is a single-story that would pose no hazards to neighboring structures or personnel, a common demolition plan will be determined in field and will be submitted to the USACE COR for approval. Prior to disposal, any loose soil will be brushed off the building materials. Demolition debris from firing position structures will be disposed of at Rio Rico Landfill, located in Rio Rico, Arizona.

4.1.8 Erosion and Sediment Control

Soil erosion and sediment controls as well as storm water management controls may be required during execution of construction activities. Field conditions and on-site Sol-JCP personnel will dictate and identify the control techniques and specific locations for installation of such applications. The controls may include, but are not limited to, silt fence, straw bales, and plastic sheeting. The erosion and sediment control practices and stormwater management controls will remain in place during construction activities until deemed no longer necessary by the field engineer. If required, controls will be inspected periodically and maintained throughout the duration of the remedial action. Any liquids captured during the remedial activities will be containerized and disposed of appropriately upon receipt of the waste characterization sample.

4.2 Soil Excavation and Temporary Stockpiling

Upon the completion of the pre-construction activities described above, the soil will be excavated and stockpiled. During the RI, soil samples collected from four out of five samples exhibited TCLP lead concentrations greater than 5 mg/L. Based on these results, and the results of the total lead levels observed in the soil, it is anticipated that a majority of the material within the Western portion of the

excavation area will be characteristically hazardous and that there is the potential for excavated soil from the Eastern portion of the Site to be non-hazardous. Therefore, as soil is excavated, it will be segregated and stockpiled to await transportation to the appropriate off-site disposal facility identified in Section 4.3.2. Stockpiled soils will be shipped to the appropriate disposal facility within 90 days of excavation.

4.2.1 Soil Excavation

The areas of lead impacted surface soil exceeding the EPA RSL for lead (400 mg/kg) are depicted in the RI figures. Elevated levels of antimony, arsenic, and PAHs are collocated with lead-impacted soil within the excavation area. The excavation area is approximately 0.5 acres and is rectangular in shape, approximately 250 feet by 200 feet. The excavation will begin in the southwest corner and proceed to the northeast corner. During the RI, the Site was characterized in 50 by 50-foot grids as shown on Figure 3. Within each grid, soil will be excavated as follows:

- The Berm area will be excavated in its entirety. Dimensions are assumed to be approximately 120-foot x 25-foot x and average height of 7-foot tall (approximately 1,166 tons).
- Western Portion: 42-inch maximum depth in grids N-7, N-8, N-9, N-12, N-13, N-14, 78, N-16 and N-17 (approximately 5,000 tons).
- Eastern Portion: 3-foot maximum depth in grids N-10, N-61, N-15, N-60, N-18 and N-59 (approximately 2,916 tons).

The excavation will be performed using a backhoe/front-end loader. Excavation depths will be measured using marked rods. Based on the proposed excavation depths, excavations will not require benching or shoring. The field crew will prepare daily reports that will include load counts and approximate volumes.

The presence of nuisance dust will be monitored throughout construction activities using a dust meter (mini-ram). Per the AAP/SSHP (Sol-JCP, 2018b), if dust readings exceed 1 milligram per cubic meter (mg/m^3), engineering controls will be implemented to mitigate dust generation. Soil will be hand dug around any utilities and any other objects that will not be removed from the excavation area. An X-ray fluorescence (XRF) spectrometer will be employed to field screen excavated areas for metals in real-time. The XRF output is in a concentration (mg/kg) which will be compared directly against the Project Action Level for lead to segregate soil for stockpiling as described in Section 4.2.2. Confirmation samples will be collected from the excavation boundary sidewalls and from the excavation base as described in Section 4.2.3.

4.2.2 Temporary Stockpiles

Prior to each bucket of soil being placed in the stockpile area, a grab sample will be collected with a portion analyzed using XRF and a portion being compiled into the stockpile sample bucket. Using the results of the real-time XRF output, excavated soil will be segregated and temporarily stockpiled prior to load-out. Refer to SOP-22 for field screening procedures using an XRF spectrometer. Based on nature of the Site and the results of soil characterization samples collected and analytical for the RI, the soil is anticipated to be characteristically hazardous. Therefore, the XRF output will be compared to the Project Action Level of 400 mg/kg for segregation into potentially hazardous ($>400 \text{ mg}/\text{kg}$) and potentially non-hazardous

stockpiles (<400 mg/kg). Final determination for waste characterization will rely on laboratory analysis as described in Section 4.2.5.

Stockpiled soil will be placed over polyethylene sheeting with a minimum thickness of 20 millimeters (mils) or other impervious material. Stockpiles will be constructed to prevent incursion of rain or stormwater through the use of wattles. At the end of each workday or when wind speeds exceed 15 miles per hour, stockpiles will be covered. Covers will be weighted down and/or secured with ropes or other devices as necessary to prevent wind or storm damage.

Stockpile maintenance will be performed as necessary throughout the project duration. Use of additional grading, berming, or curbing to prevent runoff of contaminated flows and divert run-on away from these areas will be utilized as a contingency measure if a rain event occurs that demonstrates the need for additional diversion to provide a non-erosive flow velocity. Any liquids that come into contact with stockpiled soil will be captured, containerized and disposed of appropriately upon receipt of the waste characterization sample.

4.2.3 Confirmatory Soil Sampling

After excavation of the individual designated excavation areas is complete or nearly complete, a 50-foot grid pattern will be established over the entire remediation site and tailored to excavation area. The grid will be constructed using stakes and string lines based on surveyor offsets. The grids will be numerically identified consistent with the RI. The grid will be maintained during confirmation sampling and potential additional remediation or sampling.

Confirmation soil samples will be collected from the outside boundary side walls and excavation floor when the planned extent of excavation has been reached to determine whether or not the horizontal and vertical extent of each excavation is sufficient to meet the Project Action Levels. The confirmatory sampling program will include collecting one discrete (grab) sample per 25 feet of outside boundary side wall beginning at the southwest corner of the excavation and one composite sample per 50-foot grid, resulting in the collection of 47 confirmatory samples (32 grab sidewall samples and 15 composite base samples) over the 0.5-acre excavation area for XRF screening. The applicable SOP for discrete (grab) soil sampling is provided in SOP-07. The applicable SOP for composite soil sampling is provided in SOP-08. The applicable SOP for field screening procedures using an XRF spectrometer is provided in SOP-22. In addition, 50 percent of the sidewall and 100 percent of the excavation base samples will be submitted to the laboratory and analyzed for antimony, arsenic, lead and PAHs. Method 6200 states that the method of confirmatory analysis must meet the project and XRF measurement data quality objectives. The method also suggests that the regression coefficient of determination for the results should be 0.7 or greater for the XRF data to be considered screening level data. Finally, the method states that if the regression coefficient is 0.9 or greater and inferential statistics indicate the XRF data and the confirmatory data are statistically equivalent at a 99 percent confidence level, the data could potentially meet definitive level data criteria.

Results of the XRF and laboratory analysis of confirmation samples for lead, antimony, arsenic, and PAHs will be compared to Project Action Levels as identified in Section 3.1. Based on the results, the following decision rules applied:

- If COC concentrations area are at or below the PALs, then backfill and demobilization may occur.
- If COC concentrations are greater than the PALs, then consultation with the USACE Contracting Officer is required to authorize Notice to Proceed (NTP) for one of the following options within 14 days of receipt of the final confirmation sample to avoid additional equipment rental and other similar costs:
 - (a) Additional excavation until Project Action Levels are achieved;
 - (b) Backfilling or leaving site as is and demobilizing until such time additional funding can be obtained to complete the action; or
 - (c) Other to be defined by USACE Contracting Officer.

4.3 Disposal and Site Restoration Activities

Temporarily stockpiled soil will be characterized and scheduled for the load-out and transportation of the soil to the approved facility utilizing licensed haulers as described in this section. Ingress and egress routes will be established so that the trucks can approach the stockpiles without traveling on the impacted soils. Haul trucks will be backed to the Temporary Stockpile area and loaded so that they do not come into contact with contaminated soil while driving. Temporarily stockpiled soil will be loaded onto tri-axle trucks using a track-mounted excavator. Construction entrances and proper traffic control will be maintained. Trucks will be inspected to ensure that no soils are transported on the truck tires onto public roadways.

4.3.1 Waste Characterization

Prior to loading, temporarily stockpiled soils will be characterized for disposal at the rate of approximately one sample per 500 cubic yards. This equates to approximately two waste characterization samples from the berm and one waste characterization sample from each grid. During the excavation and stockpiling, one scoop from each excavator bucket will be collected and placed into a 5-gallon bucket and homogenized. A composite sample will be drawn from the representative bucket and analyzed for TCLP lead for pre-disposal waste characterization. Note, waste characterization samples will be submitted with a turn-around-time of 3 days. In addition, prior to disposal, any decontamination water, leachate, or storm water collected will be characterized and disposed of accordingly.

4.3.2 Disposal

All off-site disposal of materials will be performed in accordance with applicable Federal, state, and local regulations pursuant to 40 CFR Part 262, Standards Applicable to Generators of Hazardous Waste ([45 FR 33142, May 19, 1980, as amended at 70 FR 10818, Mar. 4, 2005; 81 FR 85724, Nov. 28, 2016]) and 40 CFR Part 266, Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (50 FR 666, Jan. 4, 1985).

All soil will be shipped using the current USEPA revised Hazardous Waste Manifest Forms with a copy of each manifest submitted to ADEQ:

- Each shipment will be documented utilizing the Uniform Hazardous Waste Manifest (USEPA Form 8700-22).
- Manifests will be prepared for approval by USACE/USCBP prior to transportation.
- Approved Waste Manifests will require signature by USACE or USCBP authorized personnel prior or the day of transport. Copies of manifests, bills of lading, and weight tickets will be provided to the USACE with the project close-out documents.
- Placards will be affixed to each side and each end of the transport trucks as required by the Department of Transportation.
- Soil that contains TCLP lead at concentrations greater than 5.0 mg/L will require management as a RCRA hazardous waste carrying waste code D008 and shipped to US Ecology located in Beatty, Nevada, which is a RCRA permitted disposal facility. US Ecology treats the waste using a pozzolonic stabilization process that decharacterizes the waste so that it meets the Land Disposal Restrictions (LDR) and can be disposed of in a non-hazardous subtitle D landfill.
- If the TCLP lead concentration in the soil is less than 5.0 mg/L, the soil will be managed as non-hazardous and shipped to the Marana Regional Landfill located in Marana, Arizona.

All waste classification forms, waste manifests, and Bills of Lading will be properly completed, signed and maintained. Investigation derived waste (IDW) including PPE, plastic sheeting, decontamination water, and miscellaneous debris will be properly disposed of as solid waste at an approved landfill.

4.3.3 Decontamination Procedure

A pre-fabricated decontamination pad (Spilltech, Model: PAC1225, or equivalent as depicted on Drawing 1) will be installed and utilized as necessary for decontamination of trucks and equipment to remove any excess materials prior to Site departure from the EZ. Based on the size of the excavation, it is anticipated that earth moving equipment will have to enter the area of excavation; thus; tracks, wheels and undercarriage of equipment will require decontamination. All trucks and heavy equipment leaving the sites will be decontaminated prior to departure to prevent release of lead-contaminated materials to the environment. Decontamination will be accomplished by first manual wiping or brushing of surfaces followed by water rinse with tap water stored on site for decontamination purposes. Decontamination water will be containerized and characterized for off-site disposal. At the conclusion of all operations, all equipment will be decontaminated, and the decontamination pad will be dismantled by removing the plastic liner and placing it along with fluids and collected soil in the next load of waste to be hauled for disposal.

4.3.4 Site Restoration

Site restoration will follow remediation activities and is limited to backfilling excavated areas with clean soil to restore areas to the prior grade less the berm. In order to avoid the potential for cross-

contamination, clean fill will be brought in after excavated soils are removed from the Site and the Temporary Stockpile area is dismantled. Prior to loading borrow material for transportation, three discrete soil samples will be collected and analyzed for TAL Metals and PAHs. Results of the soil analysis will be compared to residential RSLs to confirm that materials are clean.

Clean fill will be stored near the excavation area for placement. Due to the arid climate, revegetation will not be performed as part of site restoration. Imported clean fill will be placed and compacted in lifts no greater than 8-inches (refer to Attachment 2 for information on the backfill material from CalPortland Plant 101). Water will be used for dust control and compaction to meet 90 percent of laboratory maximum density per ASTM D1557. The excavation limits will be backfilled less the volume of the firing berm resulting in equal or less than in volume and pollutant load from disturbed areas. Upon completion of Site Restoration, a post-topographic survey will be conducted by a licensed surveyor consistent with the requirements identified in Section 4.1.4.

4.3.5 Demobilization

At the completion of on-site activities Sol-JCP will conduct demobilization. All equipment and excess materials will be transported off-site. Any remaining trash or debris will be removed. Fencing and signage will be removed. All work area will be inspected, and any signs of construction will be removed.

5 SCHEDULE AND REPORTING

The Project Schedule is outlined in the *Project Management Plan* (Sol-JCP, 2017) and the major milestones are presented below. After approval of the Final UFP-QAPP, Sol-JCP will prepare a public notice and attend a public meeting. At least 30 calendar days must pass between the public meeting and the start of field work. It is anticipated that field work will take three months. The draft documents will be submitted to the government for review within 60 days of the completion of field work.

5.1 PROJECT REPORTING

5.1.1 Daily Field Reports

Sol-JCP, led by the Onsite QA/QC Manager, maintains the Daily Field Reports that cover a summary of activities including the QC operations, activities, and tests performed, including the work of subcontractors and suppliers. The records will include the following information:

- Contractor/Subcontractor(s) and areas of responsibility
- Equipment used with hours working, idle, and down
- Description and location of activities performed, including task identifier and names of workers
- Test and control data, including results and corresponding contract requirements
- Efficiency and cost control measures, including phase identification, and deficiency and corrective actions
- Material received with statement of acceptability and storage
- Submittals reviewed, with contract reference, name of reviewer, and appropriate actions
- Instructions given/received and conflicts with plans or specifications
- Verification of submittal accuracy

Daily Field Reports will also identify the trades working on the project, the number of workers, weather conditions, and delays encountered. The records will include both conforming and deficient features and include a statement of contract compliance.

The Daily Field Reports will be submitted daily to the USACE PM in electronic format. A report will be prepared and submitted for every seven (7) days in which no work is done, and on the last day of a no-work period.

5.1.2 Field Logbook

Throughout the field activities, we will maintain field notes in a field logbook. The field logbook will be bound with serially numbered pages and assigned to a specific person who is responsible for entry of information into the logbook. All entries must be inscribed by indelible ink, legible, and dated. Entries made by individuals other than the person to whom the logbook was assigned will be dated and signed by the individual making the entry. Drawing a line through the entry and entering the correct information will make Corrections to erroneous data. The correction will be initialed and dated by the person making the entry. We will document all field activities, including excavation, screening, fixation, field sampling/analysis, and recycling/disposal of waste disposal. If requested, we will submit a copy of the field notes to the USACE PM immediately after the fieldwork has been completed.

The field notes will contain a daily log of all contractor personnel on site by name as well as a description of the field activities performed that day. Procedures for field documentation are presented in SOP-2.

5.1.3 Photographic Documentation

Sol-JCP will maintain photographic documentation adequate to describe the work effort. Progress photographs will be taken on the first and 15th of each month of the main features of work and of special conditions. Construction completion photographs will be taken upon completion of construction work. Photographs will be in a Word format, with a caption under each photo showing date taken, project location, contract title and number, and a brief description of what the photo depicts. The photos will be submitted on a CD-ROM. Progress photographs will be submitted as part of the monthly progress report / invoice, and a complete photographic record will be included with the Remedial Action Completion Report as described in Section 5.1.4.

5.1.4 Remedial Action Completion Report

After the completion of the remediation activities, SOL-JCP will prepare a draft and final Remedial Action Completion Report. This report will include a summary of project activities, maps showing excavation and sampling areas, sample results, survey date, a discussion of the final disposition of materials, and copies of manifests, bills of lading, weight tickets, photographs, and as-built drawings. The draft report will be submitted to the COR within 60 calendar days of completion of field activities. Within 30 calendar days after receipt of all comments on the draft final report, the Contractor shall revise the report and submit the Final Remedial Action Completion Report.

6 REFERENCES

- Code of Federal Regulations. Title 40 Protection of Environment Part 261, Identification and Listing of Hazardous Waste. 40 CFR 261, Appendix II, 1993 ed., as amended by 58 FR 46040, August 31, 1993.
- Code of Federal Regulations. Title 40 Protection of Environment Part 262, Standards Applicable to Generators of Hazardous Waste. 45 FR 33142, May 19, 1980, as amended at 70 FR 10818, Mar. 4, 2005; 81 FR 85724, Nov. 28, 2016.
- Code of Federal Regulations. Title 40 Protection of Environment Part 266, Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (50 FR 666, Jan. 4, 1985).
- Allwyn Environmental, 2009a. Phase I Environmental Site Assessment Hazardous Substances, La Loma Grande, LLC Property Nogales, Arizona (Parcel No. 113-49-006), March 2009.
- Allwyn Environmental, 2009b. Phase I Environmental Site Assessment Hazardous Substances, Barr Property Nogales, Arizona (Parcel No. 113-49-027), May 2009.
- Allwyn Environmental, 2009c. Phase II Environmental Site Assessment, Two Properties Impacted by Small Arms Shooting Range Nogales, Arizona (Parcel Nos. 113-49-006 and 11349-027. December.
- Arizona Department of Environmental Quality, 1996. *A Screening Method to Determine Soil Concentrations Protective of Groundwater Quality*. September.
- Arizona Administrative Code, Title 18. Environmental Quality, Chapter 7, Department of Environmental Quality Remedial Action, Article 2, Soil Remediation Standards, Appendix A. Soil Remediation Levels (SRLs); adopted December 4, 1997; updated May 5, 2007.
- HDR Environmental, Operations and Construction, Inc. 2018. *Background Arsenic Investigation Report, Former U.S. Customs and Border Protection Nogales Firing Range*. December.
- National Park Service, U.S. Department of the Interior, Tonto National Monument, Common Plants of the Sonoran Desert, website accessed 12 December 2011. <http://www.nps.gov/tont/forteachers/upload/Sonoran%20Desert%20Plants.pdf>
- Shacklette, H. T., Boerngen, J. G., 1984. Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Professional Paper 1270. United States Government Printing Office Washington.
- Sol-JCP, 2018a. Final Uniform Federal Policy-Quality Assurance Project Plan. January.
- Sol-JCP, 2018b. Final Accident Prevention Plan and Site Safety and Health Plan. January.
- Terranear PMC, 2014. Remedial Investigation/Feasibility Study for the U.S. Customs and Border Protection Firing Range Nogales, Arizona. Final. June.

Terranear PMC, 2015. Decision Document for the U.S. Customs and Border Protection Firing Range Nogales, Arizona. Final. June.

U.S. Customs and Border Protection, 2014. Proposed Plan for Remedial Action at the Former U.S. Border Protection Firing Range Nogales, Arizona.

U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Santa Cruz and Parts of Cochise and Pima Counties, Arizona, 1979.

U.S. Environmental Protection Agency, 2017a. Regional Screening Levels for Chemical Contaminants at Superfund Sites. (Accessed 27 July 2017).

U.S. Environmental Protection Agency, 2017b. IRIS Toxicological Review of Benzo[a]pyrene (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/635/R-17/003F.

FIGURES

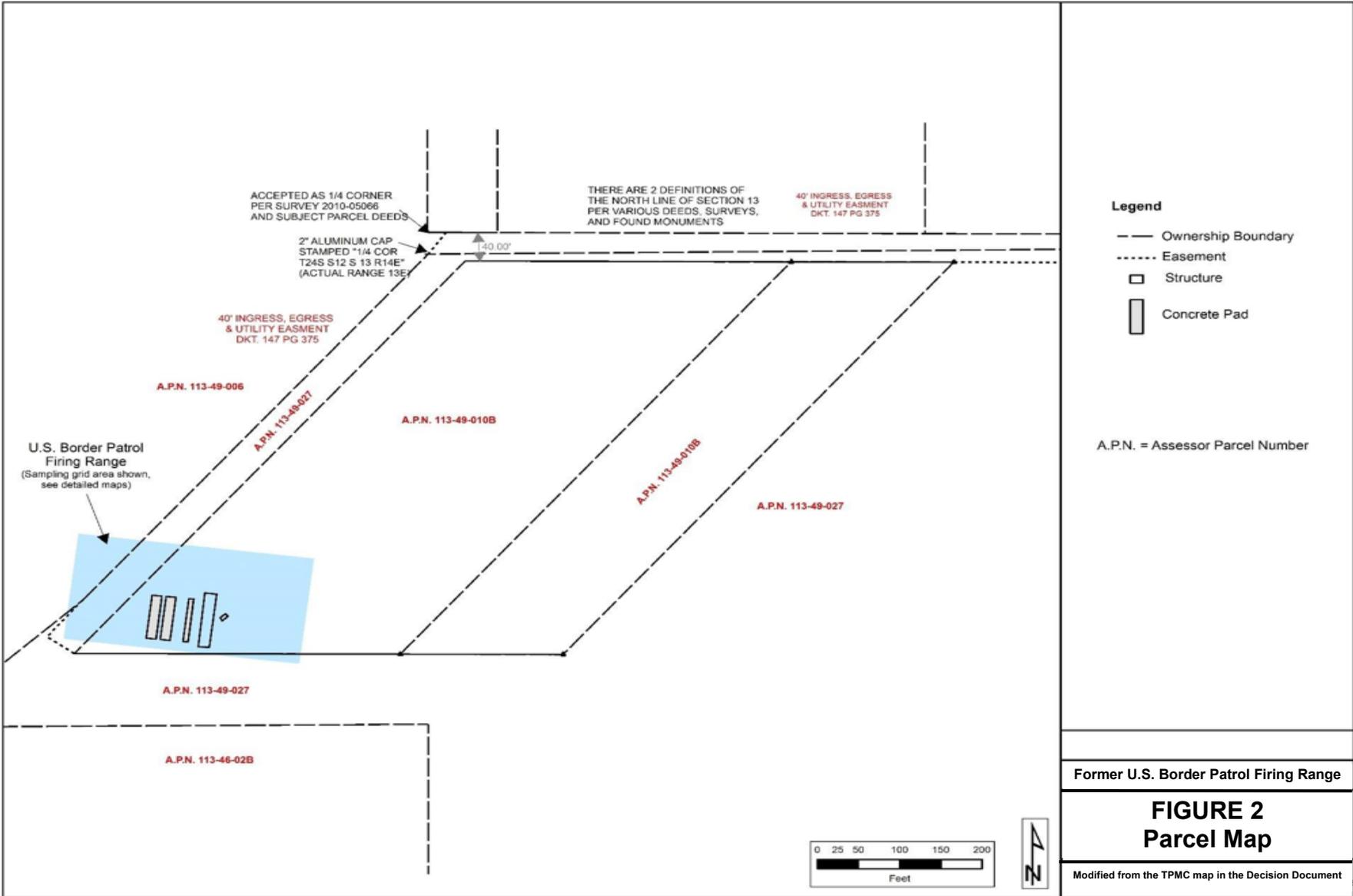


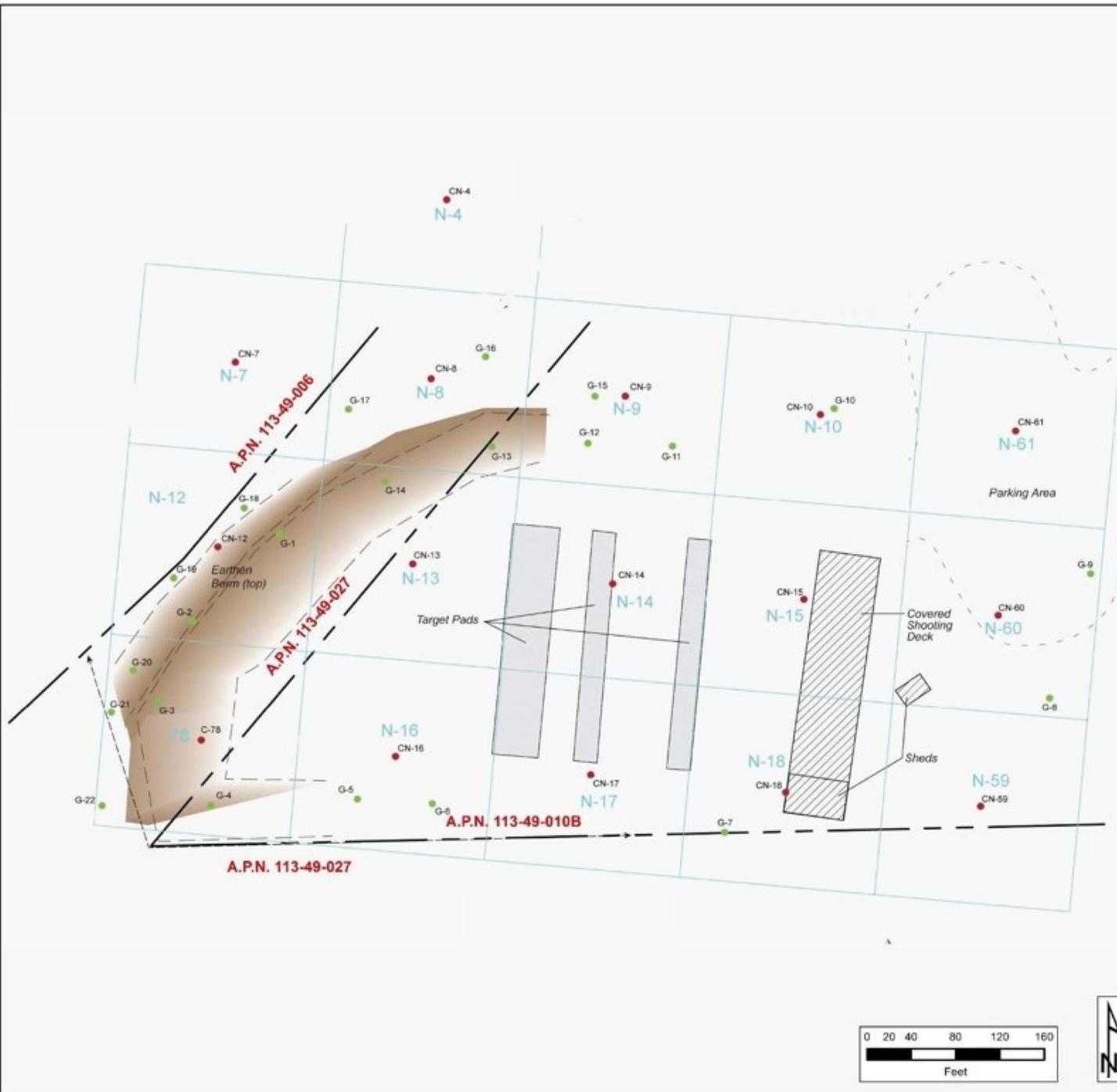
Index Map

Former U.S. Border Patrol Firing Range

FIGURE 1 Site Location

Date: May 5, 2017
Modified from TPMC map in the Decision Document





Legend

- Grab Sample Location (G-*nn*)
- Composite Sample Location (CX-*NN*)
- Sampling Grid
- - - Ownership Boundary
- Structure (shooting deck, shed)
- Earthen Berm
- Concrete Pad
- - - Fence Line
- - - Parking Lot

G-10
G = Grab Sample

CN-10
N = Grid ID
C = Composite Sample

Former U.S. Border Patrol Firing Range

FIGURE 3
2014 RI Sampling
Locations and Grid

Modified from the TPMC map in the Decision Document





Transportation
Ingress/Egress
Route

Support
Zone

Toilets

Equip

Stockpile
Area

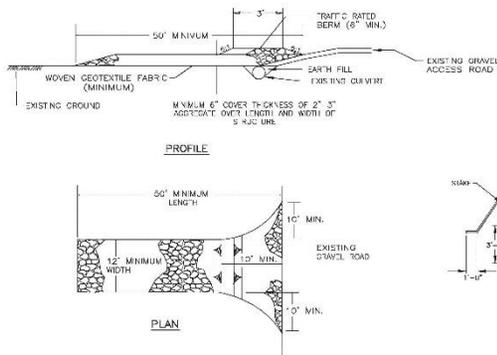
Contaminant
Reduction
Zone

Air
Monitoring
Station

Former U.S. Border Patrol Firing Range

FIGURE 4
Site Layout

DRAWINGS



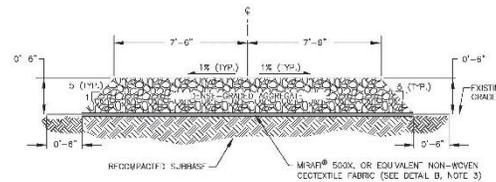
CONSTRUCTION SPECIFICATIONS:

1. LENGTH - MINIMUM OF 50'.
2. WIDTH - 12' MINIMUM, FLARED AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
3. GEOTEXTILE SHALL BE PLACED OVER THE EXISTING GROUND PRIOR TO LACING STONE.
4. SIDING AGGREGATE (2-INCH MINIMUM, 3-INCH MAXIMUM) LACING SHALL BE PLACED AT 1-TO-8\"/>

MAINTENANCE REQUIREMENTS:

1. INSPECT ENTRANCE PAD WEEKLY AND AFTER STORM EVENTS OR HEAVY USE.
2. RESURFACE PAD AS NEEDED FOR DRAINAGE AND RUNOFF CONTROL.
3. TOP DRESS PAD WITH CLEAN STONE AS NEEDED.
4. IMMEDIATELY REMOVE MUD AND SEDIMENT TRACKED BY BRUSHING OR SWEEPING. FLUSHING SHALL ONLY BE USED IF THE WATER IS CONVEYED INTO A SEDIMENT TRAP OR BASIN.

TYPICAL STABILIZED CONSTRUCTION ENTRANCE DETAIL

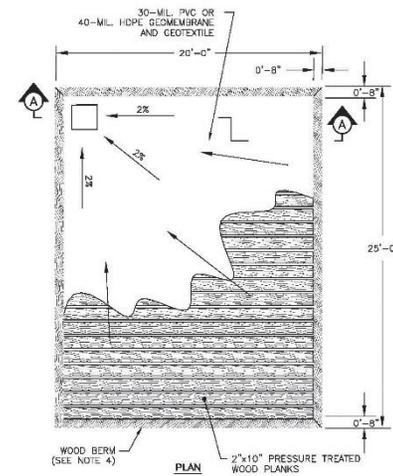
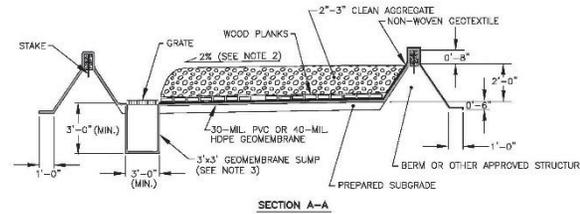


NOTE:

1. DENSE-GRADED AGGREGATE SHALL CONSIST OF HARD, STRONG, DURABLE PARTICLES THAT ARE FREE OF ANY MATERIALS, ROOTS, TREES, STUMPS, CONCRETE CONSTRUCTION DEBRIS, OTHER ORGANIC MATTER AND TOXIC/HAZARDOUS MATERIALS. DENSE-GRADED AGGREGATE SHALL HAVE A MINIMUM LIQUID LIMIT OF 35, A MAXIMUM PLASTICITY INDEX OF 3, AND SHALL MEET THE GRADATION REQUIREMENTS SET FORTH BY THESE SPECIFICATIONS AS GIVEN BELOW AND AS DETERMINED BY ASTM C 136.

SEIVE SIZE	PERCENT PASSING
1-INCH	100
3/4-INCH	70-100
1/2-INCH	---
3/8-INCH	50-80
No. 4	30-65
No. 20	10-40
No. 200	4-13

ACCESS ROAD DETAIL

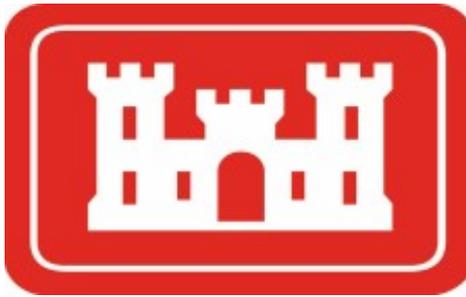


TYPICAL DECONTAMINATION PAD DETAIL

Former U.S. Border Patrol Firing Range

DRAWING 1
Construction Details

ATTACHMENTS



Remedial Action for the Former U.S. Border Protection Firing Range (Nogales, AZ)

Site Name and Location: Former U.S. Border Protection Firing Range,
1651 W. Target Range Road, Nogales, Arizona

Summary of Planned Work:

The United States Army Corps of Engineers (USACE) has retained the Joint Venture formed by Sol Solutions, LLC and J.C. Palomar (Sol-JCP) to provide a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Remedial Action for the removal of contaminated soil at the former U.S. Customs and Border Protection (USCBP) Firing Range.

Contact Information:

USACE: David Clark (817-886-1876)

USCBP: Joseph Zidron (949-643-6392)

Arizona Department of Environmental Quality: Nicole Osuch (602-771-4847)

Sol-JCP: Robert Noyes (480-544-7045)



April 23, 2018

JC Palmar

Project: Nogales BP Firing Range
Nogales, Arizona

RE: Bedding Sand Commodity Code - 90000345

Ladies and Gentlemen:

Please find attached the referenced material submittal as requested.

This material will be produced at CalPortland Plant 101 located at 409 Camino Ramanote Rio Rico Arizona 85648. The material mined from this location is virgin material. This is a commercial aggregate source CM 0426 that has been in operation for the past 50 years.

Should you have any questions regarding this submittal, please call.

Sincerely,

CalPortland

A handwritten signature in blue ink that reads 'Tom Romero'.

Tom Romero
Quality Control Director



Western Technologies Inc.
The Quality People
Since 1955

3480 South Dodge Boulevard
Tucson, AZ 85713
(520) 748-2262

**PHYSICAL PROPERTIES
OF SOILS & AGGREGATES**

Client **CALPORTLAND**
6601 N. CASA GRANDE HWY
TUCSON, AZ 85743

Date of Report **09-14-17**
Job No. **2947JG029**
Event / Invoice No. **C029-020**
Authorized by **TOM ROMERO**
Sampled by **S. PRIES**
Submitted by **S. PRIES**
Source / Location Designated by **S. PRIES**

Lab No. **4843**
Date **09-09-17**
Date **09-09-17**
Date **09-09-17**
Date **09-09-17**

Project **ANNUAL QUALITY CONTROL**
Location **TUCSON, AZ**
Type / Use of Material **BEDDING SAND/VARIOUS**
Supplier / Source **CALPORTLAND/RIO RICO (101R)**
Sample Source / Location **STOCKPILE/PLANT**
Special Instructions

TEST RESULTS

SIEVE ANALYSIS : AZ 201 FINER THAN NO. 200 :			LABORATORY COMPACTION CHARACTERISTICS :		METHOD			
SIEVE	ACCUMULATIVE % PASSING	SPECIFICATION	DRY UNIT WEIGHT, LBF/FT ³	[Grid Area]	SAMPLE PREPARATION: <input type="checkbox"/> WET <input type="checkbox"/> DRY			
6"							RAMMER USED:	
4"							<input type="checkbox"/> 2 IN. CIRCULAR FACE <input type="checkbox"/> OTHER	
3"							<input type="checkbox"/> MECHANICAL <input type="checkbox"/> MANUAL	
2"							MAXIMUM DRY UNIT WEIGHT, LBF/FT ³ →	
1 1/2"							OPTIMUM WATER CONTENT, % →	
1 1/4"							OVERSIZE AGGREGATE :	
1"							BULK SPECIFIC GRAVITY :	
3/4"							ABSORPTION, % :	
1/2"							% OVERSIZE IN LAB SAMPLE :	
3/8"							SPECIFIC GRAVITY IN	
1/4"							ZERO AIR VOID CURVE :	
No.4	100							
8	16							
10	9							
16	4							
30	3							
40	2							
50	2							
100	2							
200	1.5							
TEST PROCEDURE			RESULT	SPECS	TEST PROCEDURE	RESULT	SPECS	
LIQUID & PLASTIC PROPERTIES AASHTO T89, 90					RESISTANCE TO DEGRADATION OF SMALL-SIZE COARSE AGGREGATES BY ABRASION :			
METHOD B					GRADING 100 REV, % LOSS →			
ESTIMATED % RETAINED ON NO. 40 0			NP		GRADING 500 REV, % LOSS →			
SAMPLE AIR DRIED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO								
LIQUID LIMIT →					SPECIFIC GRAVITY :			
PLASTIC LIMIT →					MAX. PARTICLE SIZE, IN. SPECIFIC GRAVITY @ 20°C →			
PLASTICITY INDEX →					pH DETERMINATION : AZ 236	pH → 9.2		
MOISTURE CONTENT :					SOLUBLE SALTS :	PPM →		
PORTION TESTED					MINIMUM RESISTIVITY : AZ 236	OHM-CM → 11033		
% DRY WEIGHT →					SOIL CLASSIFICATION :	GROUP SYMBOL:		
EXPANSION / COMPRESSION PROPERTIES OF COHESIVE SOIL :					NAME:			
<input type="checkbox"/> EXPANSION <input type="checkbox"/> COMPRESSION, % →								
SURCHARGE, PSF								
MAXIMUM SWELL PRESSURE, KSF →								
INITIAL WATER CONTENT, %								
DRY UNIT WEIGHT LBF/FT ³								
EXPANSION INDEX OF SOIL :			EI →					
INITIAL WATER CONTENT, % :								
INITIAL DRY UNIT WEIGHT LBF/FT ³ :								
INITIAL DEGREE OF SATURATION :								
FINAL WATER CONTENT, % :								

Comments :

Copies to : **CLIENT**

THE SERVICES REFERRED TO HEREIN WERE PERFORMED IN ACCORDANCE WITH THE STANDARD OF CARE PRACTICED LOCALLY FOR THE REFERENCED METHOD(S) AND RELATE ONLY TO THE CONDITION(S) OR SAMPLE(S) TESTED AS STATED HEREIN. WESTERN TECHNOLOGIES INC. MAKES NO OTHER WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, AND HAS NOT CONFIRMED INFORMATION INCLUDING SOURCE OF MATERIALS SUBMITTED BY OTHERS.

REVIEWED BY _____

(SIGNED COPY ON FILE)