FINAL WORKPLAN
SAMPLING AND ANALYSIS OF PROPERTIES IN THE VICINITY OF THE EXIDE FACILITY (VERNON, CALIFORNIA)

Prepared for

California Department of
Toxic Substances Control

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ACRONYMS AND ABBREVIATIONS

AL	Action Level
Cal-EPA	California Environmental Protection Agency
CCR	California Code of Regulations
CFR	Code of Federal Regulations
COC	chain-of-custody
CDPH	State of California Health and Human Services Agency, Department of Public Health
DQOs	Data Quality Objectives
DL	detection limit
DTSC	Department of Toxic Substances Control
ELAP	Environmental Laboratory Accreditation Program
EPA	Environmental Protection Agency
ft	feet
ft^2	square feet
HUD	Department of Housing and Urban Development
IMWP	Interim Measures Workplan
LAC	Los Angeles County
LBP	lead-based paint
mg/kg	milligrams per kilogram
mg/cm^2	milligrams per square centimeter
MS/MSD	matrix spike/matrix spike duplicates
NIST	National Institute of Standards and Technology
OEHHA	Office of Environmental Health Hazard Assessment
OSHA	Occupational Safety and Health Administration
POC	point of contact
PPE	personal protective equipment
PSHEP	Project Safety Health and Environmental Plan
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
SI	Site Investigation
SOW	scope of work
SCAQMD	South Coast Air Quality Management District
USA	Underground Services Alert
Workplan	Site Characterization Workplan
XRF	X-ray fluorescence

1 INTRODUCTION AND BACKGROUND

1.1 Introduction

On October 29, 2015, Parsons was tasked by the Department of Toxic Substances Control (DTSC) with the preparation and implementation of a Workplan addressing sampling and analysis at up to 10,000 residential and sensitive-use properties located near the former Exide Technologies (Exide) battery recycling facility in Vernon, California. Lead emissions from the former Exide facility are suspected of impacting surface and near-surface soils in surrounding areas as a result of aerial deposition. A number of previous investigations have been performed to characterize soil impacts at various properties near the Exide site. DTSC's preliminary evaluation of the soil sampling results collected to date at the Exide facility suggests that the geographic distribution of Exide's lead emissions may extend 1.7 miles from the Exide facility into portions of Maywood, Boyle Heights, Los Angeles, East Los Angeles, City of Commerce, Bell, and Huntington Park Preliminary Investigation Area (collectively referred to as the PIA), as shown in Figure 1. As a result, DTSC has contracted with Arcadis, EFI Global, and Parsons to determine if aerially deposited lead may have affected off-site residential soils within the PIA at concentrations of potential concern to human health. DTSC is developing criteria for cleanup of the off-site residential soils as part of the Remedial Action Plan (RAP).

The goal of this investigation is to determine the concentrations of lead in soil at residential properties, schools, daycares, and parks with in the PIA.

The Workplan is organized as follows: Section 1 presents an introduction, background and scope of work (SOW). Section 2 presents the pre-investigation activities. Section 3 presents the field sampling and data collection activities. Section 4 presents the reporting structure. Section 5 presents data management information. Section 6 presents the references cited in this Workplan.

1.2 Background

The former Exide Facility is located at 2700 South Indiana Street in the City of Vernon, California (Figure 1). This industrial property occupies approximately 15 acres, bounded by South Indian Street to the west, 26th Street to the north, Bandini Boulevard (Bandini) to the south, and industrial properties to the east. The facility was formerly used for lead battery recycling. The immediate surrounding area is industrial, but the within 1.7 miles of the facility there are approximately 10,000 residential properties.

To determine whether off-site residential soils had concentrations of selected constituents that were greater than background or residential screening levels, Exide's contractors, Advanced GeoServices Corp. and ENVIRON International Corporation, conducted soil sampling at residential properties and two schools near the Site in November 2013. Additional soil samples were collected from a background area approximately 14 miles to the south of the facility.

Air dispersion modeling based on the South Coast Air Quality Management District (SCAQMD) requirements identified a preliminary indication of the area in which Exide emissions may have resulted in lead-impacted soil near the Site. Based on this air modeling, soil sampling took place in two residential areas that were identified as having the greatest potential for elevated lead impacts. The Northern Assessment Area for soil sampling is located in Boyle Heights and East Los Angeles; the Southern Assessment Area is located in Maywood.

Nineteen properties were sampled in the Northern Assessment Area, and twenty properties were sampled in the Southern Assessment Area. The soil sampling results were compared to the background results and to California Environmental Protection Agency (Cal-EPA) Office of Environmental Health Hazard Assessment (OEHHA) health screening levels.

Soil lead concentrations exceeding the OEHHA residential soil screening value of 80 milligrams per kilogram (mg/kg) were identified in both the Northern and Southern Assessment Areas. No attempt was made to attribute observed lead concentrations to specific sources, although it is recognized that, due to the heavily industrialized and densely populated nature of the area, multiple sources exist, including Exide's historic emissions. Other potential lead sources that have affected the soils in the PIA include deposition from leaded fuel combustion emissions (e.g., from gasoline combustion prior to lead phase-out) and from lead-based paint that is present on most structures in these areas.

Based on the review of the initial soil sampling results and the results of more detailed subsequent sampling, as many as 10,000 properties in the PIA have been identified by the DTSC as properties that may have been impacted by the Exide facility's past emissions.

1.3 Scope of Work

The following SOW is addressed in this Workplan and will be implemented at up to 10,000 residential properties, where access is obtained, as part of this investigation:

1. Conduct soil sample screening on each property at up to 17 locations on lawn areas, bare soils, garden areas, play areas, and roof drip-zones using an X-ray fluorescence (XRF) analyzer; at least two of the XRF samples representing the two highest concentrations (one from the front yard and one from the back yard) will be submitted to an off-site DTSC certified laboratory for confirmatory analysis.

   Conduct lead-based paint (LBP) screening on each property using an XRF analyzer at up to six exterior structure locations. Paint chip samples will only be collected if loose and flakey paint is observed on the main dwelling and from any additional dwellings and structures. No destructive sampling (i.e., collection of paint samples from intact paint on exterior structures) will be conducted.

2 PRE-INVESTIGATION ACTIVITIES

2.1 Health and Safety

Contractors and their subcontractors are responsible for operating in accordance with the most current requirements of Title 8, California Code of Regulations (CCR) Section 5192 (8 CCR 5192); and Title 29, Code of Federal Regulations (CFR) Section 1910.120 (29 CFR 1910.120), Standards for Hazardous Waste Operations and Emergency Response. On-site personnel are responsible for operating in accordance with all applicable regulations of the Occupational Safety and Health Administration (OSHA) outlined in 8 CCR General Industry and Construction Safety Orders; 29 CFR 1910; and 29 CFR 1926, Construction Industry Standards; and with other applicable federal, state, and local laws and regulations. All personnel must operate in compliance with all California OSHA requirements.

A project-specific health and safety plans have been prepared in compliance with above regulations and DTSC health and safety requirements. As minimum safety requirements for the work, all subcontractors must evaluate job hazards analyses, prepare a site-specific subcontractor health and safety plan, and review and accept the Parsons Project Safety Health and Environmental Plan (PSHEP). The field superintendent and the project managers are authorized to issue a stop work order at any time if deemed necessary due to safety concerns. Each site worker will attend a detailed project orientation on the first day work and all workers will attend daily tailgate meetings. Activity hazards analysis will be reviewed daily at the tailgate meetings in order to inform each employee of potential hazards associated to each job step (e.g. exposure to site contaminants, biological hazards, traffic, etc.). Due to the low-risk nature of the scope of work, job tasks are anticipated to be conducted in Level D personal protective equipment (PPE).

Particular attention will be given to minimizing impacts to the residents and their surrounding neighbors. This will include establishing clear work zones and areas where the public may not enter.

Chemical exposure to lead in soil for site workers is anticipated to be of low risk for this project. There is no dust generation as part of the sampling activities as soil disturbance is very low. As such exposure due to inhalation is not of concern. Exposure due to ingestion may pose a risk, which can be easily mitigated by proper use of Level D PPE. Hands and shoes may come in direct contact with potentially contaminated soil. Therefore, workers will be required to wear appropriate work boots, chemical-resistant gloves, high visibility vests, and hard hats (as necessary) as part of their Level D PPE. Handling of soil, soil samples, and sampling equipment is only allowed while wearing chemical-resistant gloves, or work gloves over chemical-resistant gloves. After sampling activity is completed, the chemical-resistant gloves will be discarded and hand washing will be required. Additionally, to prevent track-out off-site, work boots will be decontaminated by brushing off any loose soil on site, and washing the boots with water, or chemically-resistant boot covers will be worn and disposed of at the conclusion of sampling at each property.

2.2 Regulatory Clearances

The sampling activities will be conducted on private residences; therefore, no permit requirements are necessary with the local jurisdictions. If necessary, encroachment permits will be obtained from the local municipality if equipment will be present within public rights-of-way and “No Parking” areas must be established.

2.3 Project Team

Due to the number of stakeholders on this public project, compliance with the chain of command and lines of communication is an absolute necessity for proper implementation of the Workplan. The following subsections list the authority points of contact (POCs) to be considered during the course of work.

The site investigation (SI) will be collectively managed by the DTSC. The nature of each party’s responsibilities is discussed below.

2.3.1 DTSC Contract Management Representative

Ms. Tamara Zielinski, PE, of the DTSC is responsible for overall coordination and organization of the Exide Residential Cleanup project, including this investigation work. She can be reached at (916) 255-6419. Ms. Zielinski may delegate authority to DTSC field representative for field-related decisions.

2.3.2 DTSC Project Manger

Mr. Rafat Abbasi, PE will represent the DTSC. He will review and approve the Workplan and will coordinate all environmental activities with the contractors. . He can be reached at (714) 484-5449.

2.3.3 Contractors

Ms. Nichole Pagano (Arcadis) and Shayan Simantob (EFI Global) are the contractor Project Managers for providing environmental services to the Design Team. In this capacity, they will be the primary liaison between the DTSC and Arcadis/EFI Global. They can be reached at the following numbers:

Nichole Pagano (503) 952-6525

Shayan Simantob (310) 854-6300

3 FIELD INVESTIGATION ACTIVITIES

Field investigation activities are based on U.S. EPA Superfund Lead-Contaminated Residential Sites Handbook. The field investigation methods are designed to meet the overall objectives of the SOW as described in Section 1.3. The sampling strategy, field and laboratory methodologies, and quality assurance/quality control (QA/QC) measures to provide data of sufficient quantity and quality are described in this section. A Quality Assurance Project Plan (QAPP) and Data Quality Objectives (DQOs) have also been developed by DTSC. The purpose of the QAPP is to present the organization, objectives, functional activities, and specific QA/QC activities in support the proposed sampling. The QAPP and DQOs are provided in Appendix A.

3.1 Property Access

All property access agreements will be handled by the DTSC for this project. The contractors will only mobilize to a property after an access agreement has been negotiated and signed by each property owner tenant and a date and time has been scheduled for sampling by the DTSC or their contractors. The contractors Field Teams will maintain a copy of each access agreement in the field. A contractor representative, in conjunction with a DTSC representative, will notify each residential occupant prior to the scheduled start of field activities to ensure that each is aware of the project schedule and anticipated activities. If any questions or concerns are raised by the occupant, the DTSC Project Manager will be contacted. At some properties, the owner may not be on-site and renters may be present.

3.2 Utility Clearance

Prior to the start of intrusive work, a number of steps will be taken to prepare for the field activities. The initial reconnaissance will include a field check for any utilities or landscape irrigation lines. These can be identified by locating water valves, irrigation sprinklers, and gas and electric meters. Because no intrusive work other than hand auguring is expected, a subsurface utility survey will not be conducted. At least 48 hours before intrusive field tasks begin, Underground Services Alert (USA) will be notified of the intent to conduct subsurface investigations.

3.3 Sampling

Sampling to assess properties for soil lead concentration will be conducted following two different methodologies depending on the weather and soil conditions at the time of sampling. During dry weather conditions, soil samples will be screened on-site using an XRF analyzer. Based on the XRF results, two soil samples will be collected in the 0 to 3 inch depth range at the locations with the highest XRF lead results (one from front yard and one from back yard) and submitted to an off-site DTSC approved certified laboratory for confirmation analysis. The borings at these two locations will be advanced to depths of 18 inches bgs. XRF samples will be collected and analyzed at the 6, 12, and 18 depth intervolves. All XRF samples will be collected in specialized, labeled sampling cups and retained by the contractor for the duration of their contract or until requested by DTSC.

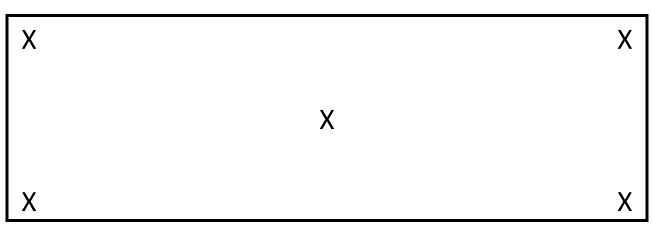
In the event of wet weather conditions (i.e., rain) at the time of sampling, no XRF soil screening will occur due to the difficultly of achieving soil moisture levels below 20 percent as required by the XRF device. When wet weather conditions are present, all soil samples will be sent to the off-site laboratory for lead analysis by EPA Method 6010B. Two soil samples will be analyzed for: lead, arsenic, copper, zinc, antinomy, and cadmium by the same method. These field procedures may be modified based on the soil conditions encountered and approval by DTSC. These procedures are discussed in further detail in the following subsections.

3.3.1 Dry Weather Conditions: Soil Screening with XRF

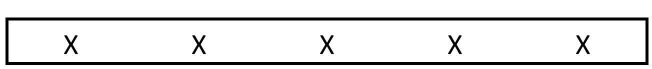
Soil Sample Location Selection and Sample Collection

During dry weather and soil conditions, the following steps will be taken to select the soil sampling areas:

1. Sampling locations will target bare exposed soils that have not been recently disturbed and open grassy areas away from structures or thick trees. Sampling locations will target areas, including play and garden areas, in which maximum deposition and exposure potential are likely.
2. To ensure that the sampling locations represent locations of maximally and primarily affected by aerial deposition, soil will not be collected in the following areas: within areas that were recently disturbed; within 2 ft of a roadway; within 5 ft of potential property-specific contamination sources (e.g., trash, burning areas, waste storage areas, etc.); beneath crushed stone, dirt or gravel driveways, or parking areas; and from public areas.
3. The area for sampling will be selected using the following criteria listed in order of importance: bare, exposed soils; open grassy areas; child play areas; and garden areas.
4. From 8 to 17 sample locations will be selected at each property; each location will be marked with pin flags. The locations will be as evenly spaced as possible to achieve coverage of the area with preference for bare soils. If a designated play area is on the property, two additional soil samples will be collected from the play area for a total of 17 sample locations. For example, a square or rectangular yard area would be sampled as follows:



A thin, rectangle-like lawn would be sampled as follows:



In most cases, the 15 soil sampling locations will be distributed as follows: five locations in the front yard; five locations in the back yard; five locations distributed in drip zones, near downspouts, side yards, and other open bare soils areas; and two additional contingency sample locations if a play area is present.

Two sample location, the location with the highest lead detection in the front yard and in the back yard, will be selected for laboratory analysis and deeper sample collection up to 18-inches bgs.

5. Soil samples will be collected at all 8 to 17 locations for the 0- to 3-inch depth interval. In the two highest detected lead concentration locations, samples will be collected from three additional discrete depth intervals at 3- to 6-inch, 6- to 12-inch, and 12- to 18-inch depth. All depth intervals will be screened with the XRF analyzer for a total of up to 23 XRF soil sample analyses per property.
6. Various field conditions may arise in which either: a) a front yard or a back yard is not present; or b) both front and back yards are not present and only planter areas exist on the property. In these type of situations the following alternative sampling will be conducted:
    a) If only a front yard or a back yard is present only eight sample locations will be selected for surface soil sampling at 0- to 3-inches and two locations will be selected within the yard that is present for deeper soil sampling.
    b) If both front yard and back yard are not present and only planter locations exist, 8 sample locations will be selected and two deep borings will be selected within the planter areas at the two highest surface lead concentration locations.
7. If grass is present at the sample location, the grass and root mat will be carefully cut away and removed. Loose dirt will be shaken into a plastic Ziploc bag for the 0- to 3-inch depth interval sample. The grass will be set aside to be replaced after sampling is complete.
8. Prior to sample collection, an ex-situ soil moisture reading will be taken near surface. Moist soil samples will be allowed to either air dry, be dried with a portable gas camping stove until a moisture content of less than 20 percent is achieved or the wet weather sampling method (see Section 3.3.2 below) can be used.
9. Soil from each depth interval will be placed into separate new plastic Ziploc bags. Lumps, rocks, or grass that could interfere with the XRF readings will be removed. The sample will be homogenized in the Ziploc bag for 1 to 2 minutes.
10. After sample homogenization, and in accordance with EPA Method 6200 (EPA, 2007), the sample will be sieved through a Number 60 mesh sieve (250 microns), unless a correlation study that shows the relationship between sieved and unsieved soil is approved by DTSC.
11. After sample sieving, the sieved soil will be placed in labeled sampling cups for XRF data collection and retained by the contractor unit requested by DTSC or for the duration of the contract.
12. At the two locations where deeper soil samples are collected, a measuring tape will be used to confirm that at least 18 inches of sample was retrieved. Any material extending beyond 18 inches, or slough collected in the hand auger bucket will be returned to the site where it was originally collected.

All reusable equipment, such as hand trowels, sieves and bucket augers, will be decontaminated between sample locations by removing particulate matter and surface films with cloths, clean water or both in accordance with ASTM standard E 1727 – 16. Chemical-resistant gloves will be changed between sampling intervals. Between properties reusable sampling equipment will be first washed in a water/Alconox solution and then rinsed with clean water. Decontaminated equipment will be properly covered and stored prior to use at the next sampling location to prevent cross-contamination.

The location of each sample will be measured from a reference point at the property and marked on a field sketch and on an aerial photograph of the site. In addition, coordinates of each soil sampling location will be recorded using a global positioning system (GPS) unit or a map. The coordinates of each sampling location will also be recorded in the field notes and an aerial photograph of the site. The coordinates will be submitted electronically to DTSC in a U.S. EPA Scribe compatible format.

If loose and flakey paint chips are visually observed on exposed soil nearby the exterior of structures, they will be collected in plastic bags, described accordingly with photographs, and submitted for laboratory analysis. Sampling locations near potential presence of non-aerial depositional sources such as stains, debris, burn pits, or peeling paint will also be carefully documented in notes and by photograph.

XRF Analysis of Soil Samples

All soil samples will be analyzed in the field using XRF methods as described in EPA Method 6200 (EPA, 2007). A copy of EPA Method 6200 is provided in Appendix B.

The use of a field-portable XRF analyzer will be the primary method of estimating lead in impacted soils for screening and verification purposes. However, the field portable XRF method has a distinct operating range and is subject to interferences caused by site-specific physical and chemical characteristics of the sample, which must be understood in order to optimize the use of the instrument. These interferences include the following:

- Sample moisture content greater than about 20 percent
- Physical matrix effects, such as variations in particle size and sample homogeneity
- Inconsistent positioning of samples in front of the probe window
- Chemical matrix effects resulting from differences in the concentrations of interfering elements
- Changes in ambient air temperature producing instrument drift

EPA Method 6200 (EPA, 2007) is a standard analytical method that guides the use of field-portable XRF instruments. The method discusses the two modes in which field-portable XRF instruments can be operated: in situ and intrusive. The in situ mode involves analysis of an undisturbed soil. Intrusive analysis involves collection and preparation of a soil sample before analysis. In situ analysis is an attractive method in that no sample is collected and prepared, only limited preparation of the surface to be sampled is needed, and results can be obtained rapidly. In practice, however, in situ results can be highly variable (an order of magnitude) and subject to most, if not all, of the interferences noted above. In addition, in situ measurements could damage an expensive instrument and expose the unit to dirt and possible contamination. Therefore, in situ measurements will not be used on this project.

The preparation methods for intrusive XRF analysis using a sample cup have certain disadvantages, including a significant amount of time required for soil sieving. Sample results are also more difficult to reproduce. However, using the intrusive, sample cup method, analysis can be performed quickly, which may be useful for sample screening (e.g., identifying samples with extremely high concentrations where no further analysis would be required).

The XRF device will be calibrated daily and operated by a trained individual who is certified in California to conduct lead-related testing (i.e., California Department of Public Health-Certified Lead Inspector/Assessor [CLIA] or Certified Lead Sampling Technician [CLST] working under the supervision of CLIA) and the use a field-portable XRF. To confirm that the XRF is within allowable tolerances, the XRF readings will be checked for conformance to the National Institute of Standards and Technology (NIST) and/or manufacturer-supplied referenced soil samples prior to its use in the sampling or at least once a day or every 4 hours of use. The concentrations of the metals and analysis of standards will be determined daily and will be recorded on the daily worksheet.

Prior to soil sample collection, a soil moisture reading will be collected at ground surface (0-3”). The hand-auger or trowel sample will be placed directly into a new, unused plastic Ziploc bag that will be discarded after one use. Soil samples will be prepared for XRF analysis by homogenizing within the plastic bag. Large soil particles will be broken up by hand in order to create a homogenous material suitable for XRF analysis through the bag. Moist soil samples will be allowed to either air dry, or will be dried using a gas camping stove if moisture content is above 20 percent. After proper moisture content is achieved, the sample will be sieved through a No. 60 screen. After proper homogenization and preparation, the sample identification will be entered onto a XRF worksheet along with the XRF reading results, the testing date and times, the run time (30 seconds minimum), and the metals result(s). Standard check results will also be entered on the worksheet. The worksheet will also note if a sample was sent to the off-site analytical laboratory for analysis. A sample worksheet is provided in Appendix C. Copies of the completed worksheets will be provided in the subsequent Soil Sampling Report to the resident.

The result for lead will be entered onto the XRF worksheet. If a specific analyte is below the detection limit (DL), the DL will be entered onto the worksheet.

Research on reproducibility of XRF data indicates that longer XRF reading times resulted in better correlation and reproducibility. The contractor will follow the above sampling procedure for the first 10 residences. The reproducibility of the data will allow DTSC to determine if this lengthy procedure is warranted. If not warranted, DTSC will modify this protocol in consultation with the contractor.

The XRF correction factors and summary tables of corrected XRF data will be provided in the subsequent Soil Sampling Report to the resident. This information will be used in conjunction with laboratory results to create profiles that will be used to guide the Remediation Contractor through soil removal activities. Laboratory samples will be analyzed for lead, arsenic, copper, zinc, antinomy, and cadmium by EPA Method 6010B. A Certificate of Registration for the

XRF device to be used for the soil sampling will be obtained from the State of California Health and Human Services Agency, Department of Public Health (CDPH), prior to its use in the field. A copy of the Certificate of Registration, all completed registration forms, and CDPH approval letter will be included in the subsequent Soil Sampling Report to the resident. The CDPH will also be notified of the mobilization/demobilization of the XRF within the appropriate time periods set forth by the CDPH, with copies of all notices to be provided in the Report.

Alternate Soil Screening with XRF at a Remote Location

An alternate sampling procedure to the one outlined above may be implemented for processing of soil samples at a DTSC-approved satellite sample processing location. For this alternative, soil samples will be collected following procedures mentioned above, but the following alternative procedures will be implemented:

- All Ziploc bags will be temporarily stored in a property specific box and delivered to the remote sample processing location.
- Upon arrival at the remote sample processing location, soil samples from each property will be analyzed by XRF in the same manner as specified above.

As a result of using this alternative, backfill material such as a Monterey sand or a clean certified import soil will be used to backfill each sample location. The sampled material accumulated at the satellite sample processing location will be disposed of in accordance with all relevant regulatory compliance.

This sample processing alternative may be conducted during either dry or wet weather conditions.

3.3.2 Soil XRF Screening at Individual Properties during Wet Weather Conditions

Due to the logistical complications associated with performing soil screening using an XRF unit during wet weather and soil conditions the following alternative has been developed. In wet weather conditions, the XRF unit will not be used and all soil samples will be analyzed by a fixed laboratory. Sample locations will be selected using the same criteria described in steps 1-5 for dry weather conditions in Section 3.3.1. After the sample locations have been identified the following steps will be followed:

- Soil samples will be collected with a hand auger or trowel at all locations for the 0- to 3-inch depth interval. The immediate sample results will be unavailable due to the XRF analyzer not being used as a result of wet weather conditions; therefore, one boring location from the front yard and one boring location from the back yard, if available, will be selected for advancement from the initial depth of 3 inches bgs to 18 inches bgs. In general, these locations will be selected in the middle of the front and back yards in areas expected to be uniformly impacted by aerially deposited lead (i.e., not beneath a tree or near a drip zone). If a front and back yard are not present, the two deep borings will be selected in planter areas or dripline. In the 18-inch borings, soil samples will be collected from three additional discrete depth intervals: 3- to 6-inches, 6- to 12-inches, and 12- to 18-inches bgs. All depth intervals in all locations, samples will be prepared for submittal to the offsite laboratory for lead analysis for a total of up to 23 laboratory soil samples per property.

- At the two locations where deeper soil samples are collected, a measuring tape will be used to confirm that at least 18 inches of sample was retrieved. Any material extending beyond 18 inches, or slough collected in the hand auger bucket will be returned to the site where it was originally collected.
- Soil from each depth interval will be placed into new, separate plastic Ziploc bags. Lumps, rocks, or grass present in the sample will be removed.
- Each sample will be homogenized for 1 to 2 minutes and an aliquot of the sample will be collected for submittal to the fixed laboratory. The remaining sampled material will be returned to its original sampling location.

Steps 14 through 1515, as described in Section 3.1.1 for dry weather conditions, are also followed during sampling conducted under wet weather conditions.

3.3.3 Soil Sample Collection for Laboratory Analysis

For sampling conducted during dry weather conditions, up to two of the soil samples found through the XRF analysis to have the highest lead concentrations from the front yard and/or back yard of each property will be submitted for fixed laboratory analysis (approximately two samples per property). If only a dripline or planter decision unit exists then one confirmation lab sample will be collected from these areas and sent for laboratory analysis. It is anticipated that the soil samples with the highest concentrations selected for laboratory analyses will not be from the same decision unit, boring location; one should be from the front yard and one from the back yard, if possible. For sampling conducted during wet weather conditions, all soil samples will be submitted for fixed laboratory analysis. Each sample will be labeled with the corresponding sample ID, time, date, project name, and client name. All soil samples will be properly secured, placed in Ziploc bags, and stored in a cooler. The soil samples will be submitted to a designated analytical laboratory under a chain-of-custody (COC) record. The laboratory will be certified in the state of California by the Environmental Laboratory Accreditation Program (ELAP). All soil samples will be analyzed for lead, arsenic, copper, zinc, antinomy, and cadmium using EPA Method 6010B. During wet weather sampling protocol, all samples will initially be submitted for laboratory analysis of lead only and the remaining five metals (arsenic, copper, zinc, antinomy, and cadmium) will be analyzed based on dry weather sampling protocol. Soil samples will be analyzed with no more than a 2-week turnaround time. Standard Level 1 electronic data packages will be provided by the laboratory. After data validation the contractor will submit the data to DTSC in a U.S. EPA Scribe compatible format. The laboratory will retain all samples until the data evaluation is complete.

Quality Assurance / Quality Control

A quality assurance project plan developed by the contractor will be used, which has set forth all required guidelines for all activities, products, and services and is designed to ensure that all activities are accomplished in an approved, prescribed manner by technically trained and competent staff. Approximately 10% of the XRF soil samples (two per property) will be sent to the laboratory for six metal analysis. Duplicate soil samples, 10% of the daily total samples sent to the laboratory, will be collected and analyzed. Laboratory duplicate samples will be prepared in the same manner as other samples and will be given the sample designation “D” to indicate that it is a duplicate sample. Field duplicate samples will be analyzed for lead, arsenic, copper, zinc, antinomy, and cadmium by EPA 6010B. Whenever laboratory samples are collected they will be compared to the XRF analyzed soil samples of the same location and closest depth interval to determine the precision of the XRF and the analytical laboratory.

Equipment Blanks

Equipment blanks will be prepared when a particular piece of sampling equipment, such as a sieve, was employed for sample collection and subsequently decontaminated in the field for use in additional sampling. The equipment blank will be taken in the field by collecting a blank water rinse from the equipment (e.g. hand auger bucket) in the appropriate pre-preserved container after execution of the last step of the field decontamination protocol. One equipment blank will be collected per team for each day of testing. Each equipment blank will be analyzed for lead, copper, zinc, antinomy, and cadmium by EPA Method 6010B.

A review of equipment blank sample results will be conducted after the first month of sampling. If the results for equipment blanks are non-detect for lead on all equipment blank samples, the equipment blank sampling interval will be minimized to one sample collected every week per team.

Matrix Spike/Matrix Spike Duplicate Samples

The laboratory will split matrix spike/matrix spike duplicates (MS/MSD) from one sample collected from each sampling day and will analyze the sample for the same parameters as the parent sample. Each sample will be labeled with the sample identification as the original sample and will be designated as MS or MSD samples. MS/MSD samples determine accuracy by the recovery rates of the compounds added by the laboratory (the MS compounds are defined in the analytical methods). The MS/MSD samples also monitor any possible matrix effects specific to samples collected from the Site and the extraction/digestion efficiency. In addition, the analyses of MS and MSD samples check precision by comparing the two spike recoveries.

Data Analysis

Following receipt of the electronic data packages, a Level 1 review will be conducted by the contractor. This review includes checks on holding times, blank contamination, MS/MSD results and duplicate analysis, and completion of the associated checklist. The results will be compiled into Excel spreadsheets in a US EPA Scribe compatible format for data presentation and analysis.

3.3.4 LBP Testing

The LBP testing for this sampling effort is proposed as a preliminary screening approach. No published strategies currently exist for field XRF testing at commercial, industrial, school, public buildings, or soil testing. The procedures for the LBP testing of the exterior of the structures in remedial areas will not follow the Department of Housing and Urban Development (HUD) guidelines for LBP testing. The intent is to provide a screening of potential LBP on the exterior of buildings and, if paint is in a deteriorating state, to determine the extent to which it might affect the nearby soil.

The surveyor will use available information, experience, and judgment, along with the following criteria to perform the LBP testing:

- ***Color.*** Lead is added to paints for pigmentation and corrosion resistance. Paints of similar color are assumed to contain similar amounts of lead and, therefore, will test each color observed.
- ***Substrate.*** Lead is used as a primer for various substrates. However, similar to topcoats, the undercoat primer and other paint layers could be different. It is assumed that, on each substrate type in the building (e.g., metal, wood, wallboard, and stucco), primer and undercoat paint are consistently applied and contain similar quantities of lead, if any. Thus, each substrate observed will be tested.
- ***Building Components.*** Building components (e.g., walls, floor, and ceiling) could have been painted with different colors of paint throughout the history of the building. It is assumed that the different components had different primers and undercoats applied even though the topcoat colors appeared similar. It is also assumed that similar primer and paint had been applied underneath the top layer on similar building components. Thus, each building component observed will be tested.
- ***Functional Areas***. A functional area consists of a group of areas put to similar use where similar topcoats of paint are observed (e.g., exterior walls). Because the primer and paint in the same functional area probably contain similar amounts of lead, each functional area will be tested rather than every individual area within.

The surveyor will perform up to six XRF readings for exterior structures on each property regardless of the state of deterioration of the paint. XRF data from each residence will be recorded on the field data sheet presented in Appendix C. If peeling and deteriorating paint is observed in sufficient quantity for analysis and the access agreement allows for collection, up to two loose and flakey paint chips from exposed surface soil nearby exterior structures on each property will be collected and submitted to the laboratory for lead analysis by EPA Method 6010B. No destructive sampling (i.e., collection of paint samples from intact paint on exterior structures) will be conducted.

XRF Data Evaluation Criteria

When an XRF analyzer is used to test painted surfaces, the HUD guidelines and Los Angeles County (LAC) Health and Safety Codes specify action levels (ALs) of 1.0 and 0.7 milligrams per square centimeter (mg/cm^2), respectively. Because the properties are located in LAC, 0.7 mg/cm^2 will be used to evaluate the presence/absence of LBP on various building components.

The performance characteristic sheet (PCS), as specified by HUD (Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, 2012 Edition), provides an inconclusive range for each type of XRF analyzer and is only relevant at the AL of 1.0 mg/cm^2. The same inconclusive range is not available or applicable for the more stringent LAC AL of 0.7 mg/cm^2. Because of the limitations of field-portable XRF analyzers, an “inconclusive” range of 0.6 to 0.8 mg/cm^2 is arbitrarily established and used for this screening.

Because the number of locations tested is limited by practical considerations, certain painted surfaces judged to pose a minimal potential hazard during remediation or impact to the nearby soil will be excluded from the survey. These surfaces include miscellaneous artwork, graffiti, trash, debris, some areas smaller than 10 square feet (ft^2), movable fixtures (e.g., chairs, tables, lights, and cabinets), and building components that can be removed with little or no disturbance to the LBP.

Terminology

The 1997 HUD guidelines originally defined terms "intact," "fair," and "poor" referring to the conditions of LBP observed at the time of the survey (HUD, 1997). In the 2012 revised version of the HUD guidelines, additional terms describing LBP conditions were used including "good condition," "*de minimis* (minimal) amount," and "deteriorated condition" (HUD, 2012). Because the CDPH has not adopted HUD 2012 definitions and for clarification purposes in this report, the following definitions are qualitatively applied within the framework of contractor judgment and the modified version of definitions in the 1997 and 2012 HUD guidelines:

- Intact: Paint generally in good condition
- Fair: Paint generally intact with minor, normal wear and tear; or *de minimis* amount of damage at:
    - Less than 20 ft^2 on exterior surfaces,
    - Less than 10 percent of the total surface area on the exterior component type of a small surface area (i.e., window sills, baseboards, trims, etc.).
- Poor: Paint not intact, severely worn, damaged, chalking, or deteriorated; or damaged beyond the *de minimis* amount.

For discussion purposes, the term "LBP" will be used for or defined as any paint reported to contain lead concentrations greater than or equal to 0.7 mg/cm^2 as determined by the field XRF analyzer.

Typically, three classifications are used for results: positive, inconclusive, and negative. A positive classification is defined as LBP at or above 0.7 mg/cm^2. Negative and inconclusive classifications, which are based on the PCS as published by each manufacturer, are substrate-dependent. When no inconclusive reading was recorded, a negative classification is defined as any paint reported to contain less than 0.7 mg/cm^2.

3.3.5 Sample ID Designation

Samples will be identified first by a unique property number and a unique sample identification number. Soil samples will also include the bottom depth of the sampling interval. The following is an example of the sampling nomenclature:

<u>*XRF and Laboratory Soil Samples*</u>

(Property ID (Generated by the contractor in a U.S. EPA SCRIB compatible format and related to the Assessor's parcel number) – Sample Number - Bottom Depth of Sample Interval)

PIA00001-1-3 (for 0 to 3 inches)

PIA00001-1-6 (for 3 to 6 inches)

PIA00001-1-12 (for 6 to 12 inches)
PIA00001-1-18 (for 12 to 18 inches)

Depth sampling intervals will also be recorded in a SCRIB compatible format.

XRF and Laboratory Paint Samples
(Property Number – Sample Number)
PIA00001-L11

Duplicate samples will be collected for soil samples submitted to the laboratory. All duplicate samples will be identified with a "D", for example, PIA00001-1-3D.

Other quality assurance samples will have the following IDs:
Equipment Blanks – (*EB- -Date-Team Name*) EB- -######-A0

3.3.6 Sampling Equipment

The following or similar appropriate equipment will be used for soil sampling:

- A Niton XU 700 Series XRF analyzer or similar
- XRF sample cups
- A 2-inch-diameter bucket auger
- Stainless steel trowel
- Small and large plastic Ziploc Bags
- Paper towels
- Disposal chemical-resistant gloves
- Sample glass jars and labels
- Coolers

3.3.7 Documentation

Field Logbooks

Field logbooks will document where, when, how, and from whom vital project information was obtained. Logbook entries will be complete and accurate enough to permit reconstruction of field activities. Logbooks will be bound with consecutively numbered pages. Each page will be dated and the time of entry noted in military time. All entries will be legible, written in black ink, and signed by the individual making the entries. Language will be factual, objective, and free of personal opinions or other terminology that might be inappropriate. If an error is made, corrections will be made by crossing a line through the error and entering the correct information. Corrections will be dated and initialed. No entries will be erased or rendered unreadable.

At a minimum, entries in the field logbook will include the following information for each sample date:

- Project name and address
- Recorder's name
- Weather
- Team members and their responsibilities
- Time of arrival/entry on-site and time of departure
- Other personnel on-site
- Summary of any on-site meetings
- Deviations from sampling plans and site safety plans
- Changes in personnel and responsibilities as well as reasons for the changes
- Levels of safety protection
- Calibration readings, equipment model, and serial number for any equipment used

At a minimum, the following information will be recorded during the collection of each sample:

- Sample identification number
- Sample location and description
- Aerial map showing sample locations and results
- Sampler's name(s)
- Date and time of sample collection
- Designation of sample as composite or grab
- Type of sample (i.e., matrix)
- Type of preservation
- Type of sampling equipment used
- Field observations and details important to analysis or integrity of samples (e.g., heavy rains, odors, and colors)
- COC form numbers and seal numbers
- Transport arrangements (e.g., courier delivery or lab pickup)
- Recipient laboratory

Field XRF Sheets

All XRF data will be recorded on the field data sheets presented in Appendix C.

Chain-of-Custody Records

COC records are used to document sample collection and shipment to the laboratory for analysis. All sample shipments for analysis will be accompanied by a COC record. Form(s) will be completed and sent with the samples for each laboratory and each shipment. If multiple coolers are sent to a single laboratory on a single day, separate COC form(s) will be completed and sent with the samples for each cooler. The COC record will identify the contents of each shipment and will maintain the custodial integrity of the samples. Generally, a sample is considered to be in someone's custody if it is either in someone's physical possession, in someone's view, locked up, or kept in a secured area that is restricted to authorized personnel. Until the samples are received by the laboratory, they will be the responsibility of the sample collector.

Photographs

Photographs will be taken at selected sample locations and at other areas of interest on-site. They will serve to verify information entered in the field logbook. When a photograph is taken, the following information will be written in the logbook or will be recorded in a separate field photography log:

- Time, date, location, and (if appropriate) weather conditions
- Description of the subject photographed, including direction of view
- Name of person taking the photograph

Mapping of Sampling Locations

Aerial maps will be produced for each property detailing the exact layout of each property. These aerial maps will be used in the field to plot the exact location of each soil and LBP sampling location. A map will be produced for each property and it will contain at a minimum the following information:

- An approximate layout of the property with dimensions, and the relation to the street
- A unique property number, address, date, and initials of the employee that created the sketch.
- The XRF lead data results, the time of sample collection and, moisture reading and spectra number for each sample collected.

4 REPORTING AND DELIVERABLES

Sampling reports will be provided for each property in accordance with the CDPH form 8552 and HUD guidance. Sampling reports will include, but are not limited to:

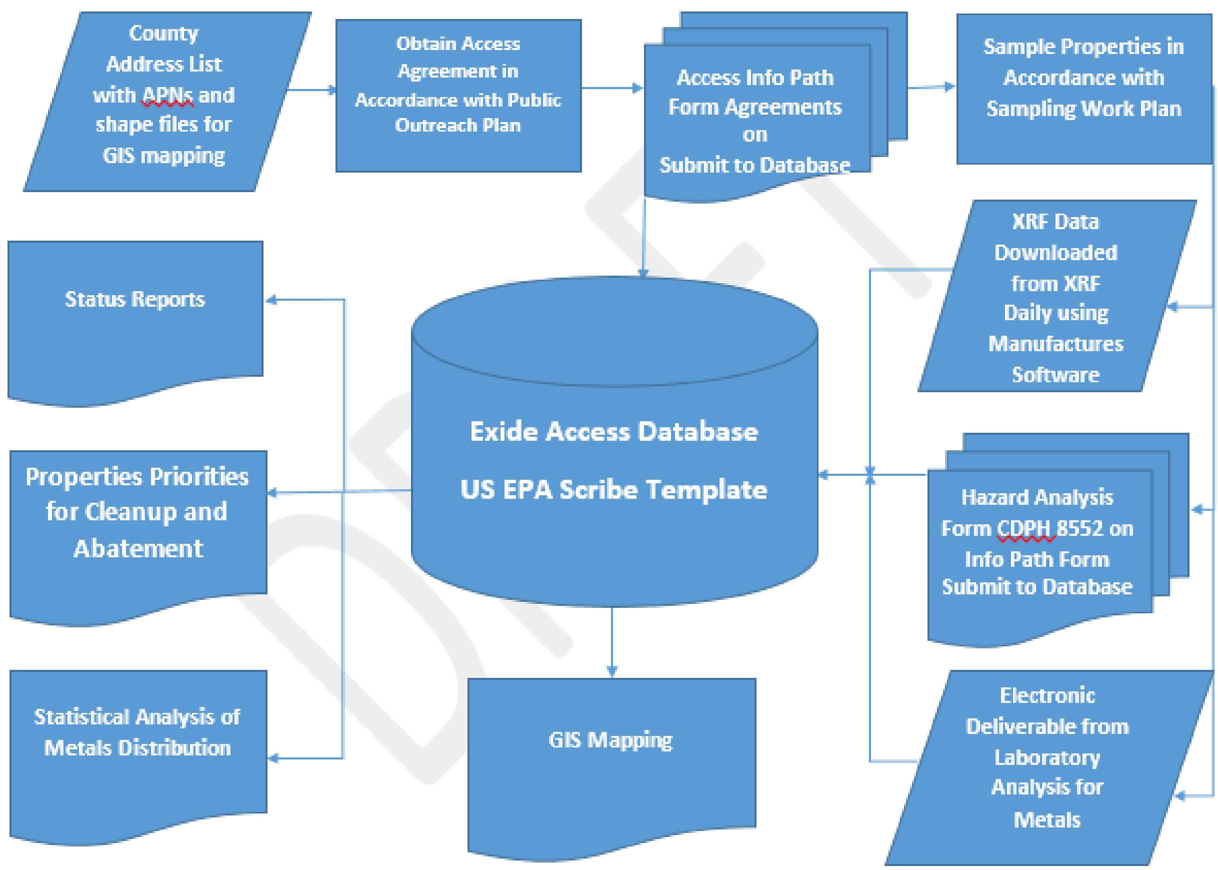
- A summary of sampling activities
- Maps showing the sampling locations and results
- Sampling results in tabular form format (Scribe compatible MS Excel)
- Screening of the results against criteria established in the Workplan
- Recommended Actions
- Laboratory analysis reports

Sampling reports will be submitted within 35 days from the sampling event and will be signed and stamped by a professional engineer or geologist and the CDPH certified Lead Assessor. Sampling of up to 10,000 properties will be completed no later than June 30, 2017, so that all activities listed in this workplan are completed no later than December 30, 2017.

5 DATA MANAGEMENT

All data for property information, sample locations, analysis, samplers, instrument list, soil sample results, XRF monitoring data, and other relevant information shall be submitted to DTSC on a monthly basis in a U.S. EPA Scribe compatible MS Excel spreadsheet. All CDPH and access agreement form information shall be submitted in a Scribe compatible MS Excel spreadsheet.

DTSC will manage the data generated for the PIA with the U.S. EPA Scribe database. The system flowchart for the data management system is shown below.



6 REFERENCES

EPA, 2007. *Method 6200, Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment*, Department of Toxic Substances Control. February 2007.

U.S. Department of Housing and Urban Development (HUD), 1997. *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing.* Revised 1997.

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U.S. Department of Housing and Urban Development (HUD), 2012. *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, Second Edition.* July 2012. http://portal.hud.gov/hudportal/HUD?src=/program_offices/healthy_homes/lbp/hud guidelines

Figures

FIGURE 1
Northern and Southern Assessment Areas Location Plan
Off-Site Soil Sampling Work Plan Addendum

DTSC Exide Site
PARSONS
Pasadena, CA

APPENDIX A

QAPP and DQOs

APPENDIX B

EPA METHOD 6200

APPENDIX C
SAMPLE SOIL AND LBP XRF DATA SHEET