

**APPROVED**

## Cherryvale, Kansas Residential Soil Evaluation Phase 2 - Early Action Property Soil Removal Work Plan

Prepared for:  
Kansas Department of Health and Environment

Prepared by:  
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On behalf of United States Steel Corporation and Citigroup Global  
Market Holdings, Inc., Respondents in Consent Order Case No. 03-  
E-0222, as amended (the "Respondents")

August 2015



## Table of Contents

- 1.0 Introduction
- 2.0 Background Information
  - 2.1 Early Action Properties
  - 2.2 Remedial Objectives
- 3.0 Pre Remedial Activities
  - 3.1 Access Agreements and Notifications
  - 3.2 Permitting
  - 3.3 Utility Clearance and Survey
  - 3.4 KDHE Work Plan Approval
  - 3.5 Schedule
- 4.0 Removal Activities
  - 4.1 Soil Removal, Transport and Disposal
  - 4.2 Confirmation Sampling
  - 4.3 Procedures
  - 4.4 Sample Identification
  - 4.5 XRF Analysis
  - 4.6 Laboratory Analysis
  - 4.7 Split Samples
  - 4.8 QA/QC
- 5.0 Excavation, Backfill and Re-vegetation
- 6.0 Health and Safety
- 7.0 Reporting
- 8.0 References

## Tables

Table 1 – Property Summary

## List of Figures

Figure 1 - Site Location Map  
Figure 2 - 219 W 1<sup>st</sup>  
Figure 3 - 317 W 4<sup>th</sup>  
Figure 4 - 326 W 4<sup>th</sup>  
Figure 5 - 416 N Maple  
Figure 6 - 529 W 1<sup>st</sup>  
Figure 7 - 902 W Main  
Figure 8 - 00 E 1<sup>st</sup>  
Figure 9 - Logan Park Gazebo

## 1.0 Introduction

On behalf of United States Steel Corporation and Citigroup Global Market Holdings, Inc. (Respondents) Project Navigator Ltd. (PNL) presents the following work plan to perform an early expedited removal action on the properties identified in the *Cherryvale, Kansas Residential Soil Evaluation Phase 2 Data Evaluation of Early Action Properties* (Early Action Data Evaluation Report) dated July 2015. This work plan summarizes activities to be performed at the early action (EA) properties. The EA properties are identified in Figure 1.

The subject EA properties are described in Section 2.1 below. As part of the implementation of the Phase 2 work, at the request of the Kansas Department of Health & Environment (KDHE), schools, parks and day-care centers were evaluated early in the program. Properties identified in this report represent locations where the Respondents and KDHE concluded that subject to conditions established in the Third Amendment to Consent Order between Respondents and KDHE dated 09/16/2015, early expedited removal actions are appropriate before the completion of the city-wide smelter residue material (SRM) survey. The goal would be to complete the work by the end of summer in 2015.

This report is prepared by Project Navigator, Ltd., under the supervision of Mark Landress, Kansas Licensed Professional Geologist No. 793, coordinated by Exponent, Inc., on behalf of the Respondents.

## 2.0 Background Information

The subject EA properties are located in various locations with the city limits of Cherryvale, KS. SRM from the smelter was apparently used as construction fill material at various locations in the City over the years. A number of investigations and actions relating to the former smelter have been conducted in Cherryvale. The history and details of the former National Zinc smelter site located in the northwestern portion of the city are documented in various site reports which are on file at the Kansas Department of Health and is discussed in the aforementioned Early Action Data Evaluation Report dated July 2015.

### 2.1 Early Action Properties

The EA properties constitute locations where lead in soil composite samples is above the KDHE residential soil screening value (SSV) of 400 mg/kg in soil composites, SRM is usually observed at the surface or in the shallow subsurface, and the properties may be frequently used by children for extended play periods. These properties consist of five day-care facilities (which are housed at residences), one owner-occupied single family residence, one park property, and an isolated area of exposed brick in Logan Park. A property summary is provided in Table 1 and the proposed removal actions are shown in Figures 2 through 9.

The United Methodist Church at 301/305 W. 3<sup>rd</sup> apparently had a preschool that is understood to be inactive at this time. The lead concentrations in two of the three subareas on this property were slightly above the 400 mg/kg screening level (as shown in the Early Action Data Evaluation Report). No early action is recommended for this property for the following reasons: 1) no visible SRM at the surface (i.e., this was a SRM Class B-Fill property), 2) no indication of use by children (i.e., no play structures or outdoor toys), 3) the yards are on a corner lot,

unfenced, and face busy streets and thus are not currently suitable for play by small children; and 4) the lead screening level was only exceeded by approximately 10 percent.

SRM is usually found at the EA properties at the surface or subsurface and where encountered consists of fine to medium grained, black and dark brown colored material with a granular ashy or glassy texture, typically with fragments up to a few cm in size. Retort fragments consist of broken cylindrical-shaped fired clay-brick retorts and condensers used in the zinc smelting process. These fragments have a characteristic curved shape with a glassy black, gray or tan vesicular fusion crust. Retort fragments vary in size commonly ranging up to about 10 cm. Broken retort fragments sometimes have a distinctive purple or green color with hard white or gray silica or other mineral inclusions. SRM fill can be quite variable in texture and composition and can include ashy, granular and glassy SRM, retort fragments, all mixed with fill soil, brick and rock in varying amounts. The variability results from different times of placement, grading, and mixtures with other material placed over the years. Smelter residues, particularly the granular SRM are referred to locally as "cinders".

The EA properties are defined in the Early Action Data Evaluation Report, and are the subject of the proposed removal action.

## **2.2 Remedial Objectives**

The remedial objective is to remove the pathway for direct contact, inhalation, and ingestion to soils in excess of SSV of 400 mg/kg lead in soil composites at the EA properties. The remedial objective can be achieved through excavation and removal of affected soils to specified depths, backfilling the excavations to grade with clean soil and restoring the vegetative cover to approximately pre-excavation conditions.

## **3.0 Pre Remedial Activities**

The following sections discuss the pre remedial activities to be completed before construction activities can commence at the EA Properties.

### **3.1 Access Agreements and Notifications**

Access agreements have been obtained by the Respondents and proper notifications will be made as soon as a start date is established. Residents will be notified of upcoming actions and the Respondents will coordinate with KDHE, the City, and the residents regarding these actions including scheduling and removal of items in their yards out of the work area. PNL and the soil removal contractor, Entact Environmental Services (Entact), will work with the landowners to deal with fencing or other items that cannot be easily removed but that may obstruct the work area.

Notice will also be provided to KDHE and the City of Cherryvale prior to starting any remedial activity.

### **3.2 Permitting**

Permitting for this removal action is expected to be minimal. Any permits required will be scoped and obtained by the soil removal contractor, Entact Environmental Services (Entact).

### **3.3 Utility Clearance and Survey**

Excavation areas will be marked in the field with white pin flags, tape or paint. Utility clearance will be obtained by notifying Kansas One Call (811) at least one week before excavation activities commence. Landowners will be asked to identify any additional utilities not identified by the utility locators. All known utilities will be flagged and/or denoted with paint and stakes before excavation commences.

The proposed excavation limits for EA Properties are limited to the property boundary. Excavation may extend over the property boundary only for daycare centers where the play area extends into a right-of-way that is not fenced. Other than this circumstance, no removal work will be conducted on City or railroad rights-of-way. Where the property boundary cannot be easily located, a commercial land surveyor may be engaged to define property and excavation limits.

### **3.4 KDHE Work Plan Approval**

Removal activities will commence following the review and approval of this work plan by KDHE and coordination of the work schedule and timing with landowners and tenants.

### **3.5 Schedule**

After preparation of construction plans, Entact will provide KDHE with a schedule for work activities. The schedule will be coordinated with KDHE and the affected landowners to facilitate access and to minimize disruption to the resident to the extent possible. The goal is to complete the removal work by the end of summer, 2015, if regulatory approval of the Third Amendment to Consent Order, the Early Action Data Evaluation Report, and this work plan is received in time.

The Respondents' ability to execute this work plan is dependent upon the consent of the resident as granted by the access agreements. Work will not proceed on any EA property if a resident withdraws or revokes the authorizations and rights of access.

## **4.0 Removal Activities**

This section describes the tasks identified for performing soil removal at the EA properties.

### **4.1 Soil Removal, Transport and Disposal**

The remediation goal for all properties is to excavate and remove soil above the soil SSV of 400 mg/kg lead to a maximum depth of 12 inches below ground surface, or 6 inches if the soil below 6 inches does not target above the SSV. Garden areas, if present in accessible areas, will be excavated to a maximum depth of 24 inches. Where soils with lead concentrations greater than

400 mg/kg are present below 12 inches (24 inches for gardens) or the target depth of 12 inches cannot be achieved, appropriate marker material (e.g., orange plastic construction fencing material) will be placed at the bottom of the excavation prior to backfilling. This is in accordance with EPA's Superfund Lead-Contaminated Residential Sites Handbook.

Excavation will be performed using typical earth moving equipment, sized appropriately for the property conditions. Mini-excavators, dump trucks, skid-steer loaders and backhoes are typical equipment employed for residential remediation. In sensitive areas, shovels and hand tools may be utilized for soil removal. The selection of equipment used will be at the discretion of the excavation contractor, but mechanized equipment use will be limited within 3-feet of residence or outbuilding sidewalls.

Excavation around sensitive structures to a depth less than 1 foot may be required where a 1-foot dig depth is not feasible, practical or recommended for structural, esthetic or safety reasons. This may include certain fixed structures, concrete slabs, walkways, driveways, near utilities, large trees and other obstructions. In this case, a flat or sloped-grade (to prevent water ponding), to a maximum depth of 6-inches would be the target removal depth. Where excavation is performed to a depth less than the specified depth and soils remain above the SSV, marker material will be placed before backfilling and revegetation. The specific excavation details will be at the discretion of the remediation contractor and will be performed in accordance with common practices employed for residential soil removal.

Excavated soil from the removal action is expected to be placed at the former National Zinc Smelter site EPA Repository cell. The location and construction details for waste placement will be described in a separate document and submitted to KDHE once the volume and removal details are finalized by the contractor. Generally, the soil will be placed, leveled and lightly compacted in an area of the cell that can be managed along with the existing soil stockpile and other soils expected from future removal actions. Soil will be contained to prevent runoff and covered with clean soil or other cover to prevent direct contact, inhalation and ingestion at levels above the appropriate SSV. Alternatively, off-site commercial disposal may be considered at an appropriate permitted landfill. The various options available to the Respondents will be further considered when Entact evaluates site conditions, logistics and costs.

#### **4.2 Confirmation Sampling**

Confirmation samples will be taken of the excavation floor when the selected areas at each EA property are excavated to the target depth (i.e., either 6 inches or 12 inches). Sampling to confirm bottom excavation soil conditions will be conducted following general guidelines found in *EPA OSWER 9285.7-50 Superfund Lead-Contaminated Residential Sites Handbook as amended*. Excavation floor samples will be taken as a random five-point composite in each subarea defined from the EA property data evaluation. Samples will be collected with hand augers or other appropriate tools to a depth of 6 inches and composited. Field screening will be performed using a portable X-ray fluorescence analyzer (XRF).

#### **4.3 Procedures**

Confirmation sample composites collected from the excavation floor will be placed into a Zip-lock bag labeled with the sample number, location, depth, collection time and date. Samples will then be homogenized in a clean stainless steel mixing bowl with a clean stainless steel

spoon. The homogenized material will then be sieved to remove large particles and then transferred back into a Zip-lock bag for field XRF analysis and for laboratory sample splits and/or archiving.

Field results will determine if additional excavation is needed (i.e. if the 6-12 inch depth is greater than 400 mg/kg and needs to be excavated) or whether appropriate marker material will be placed prior to backfilling (i.e., the 12-18 inch depth composite lead concentration exceeds 400 mg/kg).

Ten percent of the confirmation samples will be sent to the Pace Analytical Services Laboratory for verification analysis of lead by EPA Method 6020. These data will be used along with previously collected laboratory samples to augment results used for XRF instrument calibration which are sufficient for excavation control. Decisions regarding the limits of excavation will therefore be based on the field XRF results. .

#### **4.4 Sample Identification**

Confirmation sample identification will be determined by address number followed by the street address, location ID, sample depth, time, and date of collection.

#### **4.5 XRF Analysis**

All samples will be screened in the field for lead using a portable XRF analyzer operating in soil mode. The instruments will be operated generally in accordance with *Method 6200, Field Portable X-ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment (February 2007)*. Other parameters and calibrations that are not user selectable will be maintained as per the manufacturer's specifications. Typically, the instrument is standardized on start-up and after 4 hours of use. The standardization process verifies the instrument is operating within factory specifications. The internal software will inhibit the instrument if the unit does not pass one or more internal checks during standardization. Replicate analysis on individual samples, laboratory cross-check and internal calibration using the manufacturer supplied standardization plates will comprise the instrument operational check for the work. NIST soil standards and replicate analyses on field samples will be used to check the reproducibility of the instrument in the field. The instrument operators will receive X-ray radiation safety training prior to the use of the instrument in Kansas, and Project Navigator Ltd., and or Entact will hold a current KDHE Radiation and Asbestos Control Section Certificate to operate XRF analyzers in the State of Kansas.

#### **4.6 Laboratory Analysis**

Laboratory analysis will be performed by Pace Analytical Services. Collected soil confirmation samples will be labeled and placed into laboratory-supplied containers for delivery to the laboratory while maintaining proper chain of custody procedures. Confirmation samples will be analyzed for arsenic, cadmium, lead and zinc by EPA method 6020. For additional quality control, a blind duplicate sample will be collected for every 20 soil samples analyzed.

#### **4.7 Split Samples**

During confirmation sampling, an adequate volume will be collected to supply KDHE with split samples, if requested. Samples will be retained for reference should additional analysis be required.

#### **4.8 QA/QC**

QAQC procedures will incorporate, as appropriate, the procedures specified in USEPA's *Generic Quality Assurance Project Plan for Region 7's Superfund Lead Contaminated Sites, 2007*.

#### **5.0 Excavation Backfill and Re-vegetation**

After confirmation sample analysis (by XRF in the field) indicates all excavation areas meet closure specifications, approved clean fill material will be imported from a nearby source to backfill and replace soil removed during the excavation.

Backfill will be tested prior use at the residential properties as per KDHE guidance. Random composite samples of backfill material will be analyzed and the results compared with KDHE RSK Tier-2 Appendix A Residential Soil pathway values. The frequency of sampling will depend on the nature of the source, however no less than 4 sample aliquots will be taken per composite sample. Previously approved soil sampling procedures for work at the former smelter site call for 1 analytical sample per 50,000 cubic yards for materials removed from in-place sources. We propose a sample frequency of 1 sample per 10,000 cubic yards for clean soil that is not in place (i.e. soil excavated for stock watering ponds for example). Topsoil will be replaced and the properties re-vegetated with sod or reseeded as discussed above. Fences, yard fixtures, play structures and other items removed during the course of work will be replaced and the properties restored to their pre-removal condition. Grass sod, if used, will be procured from commercial vendors.

Borrow soil is available from sources previously used for backfill of the former National Zinc Smelter site and for other remediation performed by the Respondents. This material has already been characterized and accepted by KDHE for backfill. For new soil sources, the material will be tested for the following parameters: PCB, pesticides, herbicides, RCRA 8 metals, TPH (DRO/ORO/GRO), volatiles and semi-volatile organic compounds.

#### **6.0 Health and Safety**

Health and safety is the number one focus and common goal for the Respondents, Entact, and other stakeholders. Before any construction activities begin, a site-specific Health and Safety Plan containing guidelines for workers as well as residents will be prepared and implemented by Entact. Entact will implement dust control/monitoring during construction activities to prevent offsite dust migration above specified limits and maintain other appropriate worker safety protocols as may be required for the project. Perimeter air monitoring is performed by the remediation contractor at up and downwind locations. Worker air monitoring is also performed by the contractor. Dust control is performed with engineering controls and water spray. Yards may be pre-wetted prior to excavation if the soil is dry. Water spray is used as needed for dust

suppression. Equipment used by the contractor typically is decontaminated dry by removing gross soil residues by hand. Water spray is used to remove dust and soil from equipment if needed. Care is taken to limit tracking soil onto roads outside of the work area and roads are periodically cleaned of soil residues. Entact will implement a traffic control plan and coordinate with the City of Cherryvale to ensure safe operations for the movement, excavation and placement of soil and waste for this work.

## 7.0 Reporting

Following completion the soil removal activities, an Early Action Removal Report will be prepared and submitted to KDHE. This report will contain a summary of the work performed, XRF and QA/QC results, maps showing the areas and depths of soil removed, soil disposal documentation and other data as needed to document the work. Work in the field will be supervised by PNL who will provide qualified staff licensed in Kansas to provide professional services under this work plan.

## 8.0 References

A&M Engineering. Removal Action Plan, Former National Zinc Site. March 2007

KDHE. Risk Based Standards for Kansas, Version 5. KDHE Bureau of Environmental Regulation, October 2010.

KDHE. Consideration and Selection of Borrow Sites. BER Policy #BER RS-048, KDHE Bureau of Environmental Regulation, June 30, 2007

KDHE. Developing a Soil Waste Management Plan. BER Policy # BER RS-55, KDHE Bureau of Environmental Regulation, September 30, 2013

Project Navigator, LTD. *Cherryvale, Kansas Residential Soil Evaluation Phase II Data Evaluation of Early Action Properties.* July 2015.

U.S. EPA. *Superfund Lead-Contaminated Residential Sites Handbook*, OSWER 9285.7.50, EPA, 2003.

U.S. EPA. Method 6200 Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment, February 2007.

# TABLES

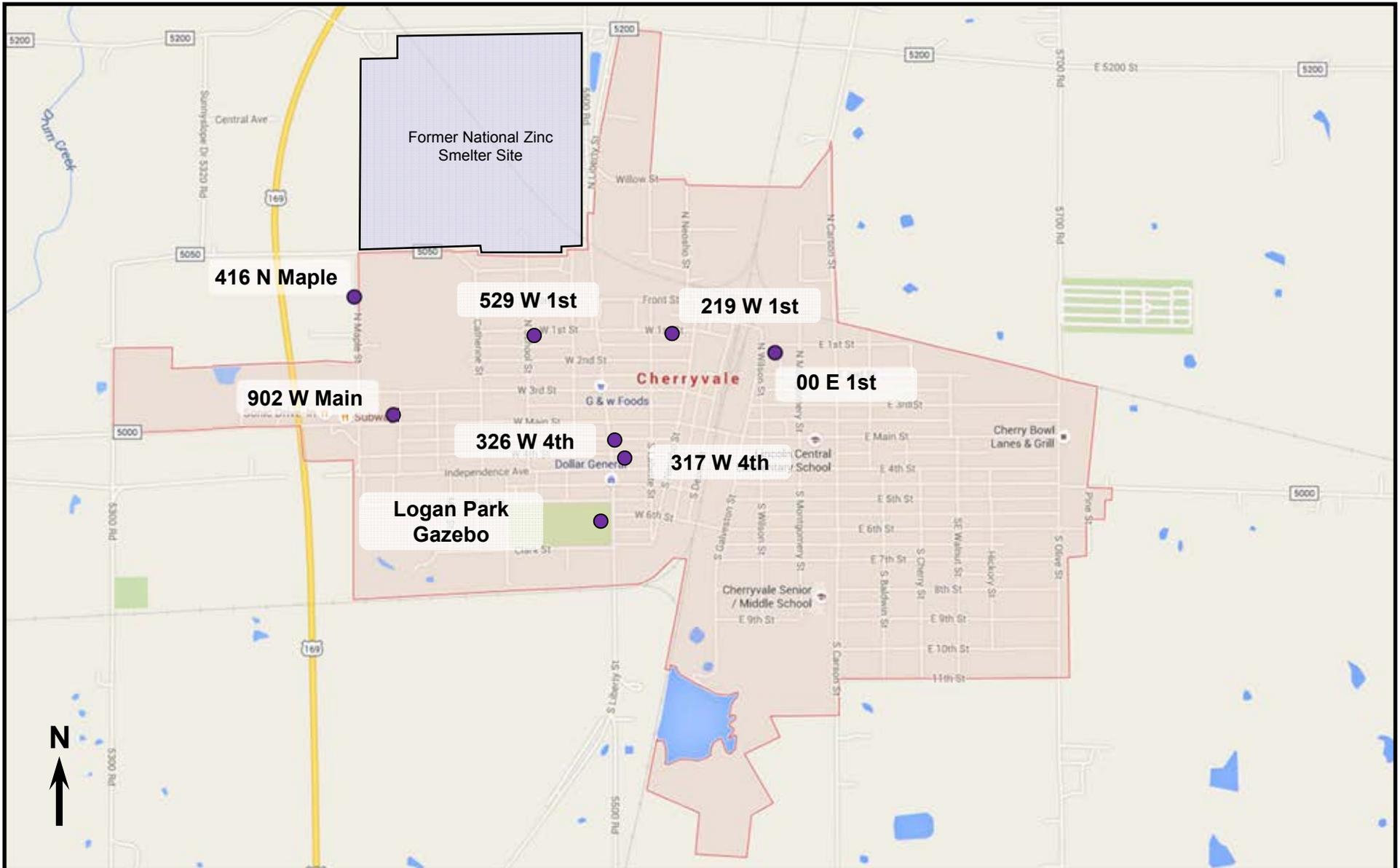
**Table 1. Property Summary. Cherryvale, Kansas Phase 2 RSE Data Evaluation of Early Action Properties**

Figure	Property	Use	Description	Proposed Action	Estimated Area > SSV (sf)
2	219 W 1st	Resident Occupied	Ashy fine SRM exposed from removed brick at front and side property. Soil > soil screening value (SSV).	Remove and replace soil from affected areas > SSV.	4,276
3	317 W 4th	Resident Occupied / Day Care Center. Listed as active DCC but not observed to be active. Permit still valid.	Placed fill in back yard to 18". Soil > SSV in former play area.	Remove and replace soil from affected areas > SSV.	4,455
4	326 W 4th	Resident Occupied / Day Care Center. Observed active. Listed as active DCC.	Placed fill. Exposed granular SRM area from old driveway on east side of property. Soil > SSV in former play area.	Remove and replace soil from affected areas > SSV.	14,329
5	416 N Maple	Resident Occupied / Day Care Center. Observed active. Listed as active DCC.	Retort fragments and granular glassy SRM observed on property. Probable placed fill and spillover from road ditch on east side by road and yard with dog pen. Active play area sampled but < SSV.	Remove and replace soil from affected areas > SSV. East side removal limited to removing SRM near house entrance from south side towards driveway.	11,062
6	529 W 1st	Resident Occupied / Day Care Center. Observed as active. Listed as active DCC.	Isolated retort fragments. Granular SRM possibly from alley fill or old construction. SRM in north side ditch ROW. Soil composite from play area and west side > SSV.	Remove and replace soil from affected areas > SSV.	6,178
7	902 W Main	Resident Occupied / Day Care Center. Observed active. Listed as active DCC.	No SRM observed at surface. Placed fill observed in subsurface. Soil > SSV in one of four composite areas (east half of play area).	Remove and replace soil from affected areas > SSV.	5,930
8	00 E 1st	Light-use local park with swings.	Ashy granular SRM, brick and soil fill exposed on surface in adjacent ROW. Soil > SSV.	Remove and replace soil from affected areas > SSV.	5,000
9	Logan Park Gazebo	Shelter area in Logan Park.	Ashy granular SRM exposed from removed brick. Soil > SSV	Remove and replace soil from affected areas > SSV.	200

51,430  
Square Feet

Note: Square footage calculated to property line.  
DCC list from KDHE. Personal contact for 326 W 4th confirmed through KDHE website.

# FIGURES



0 ft 1000 ft

● Early Action Property Location



● Site Location

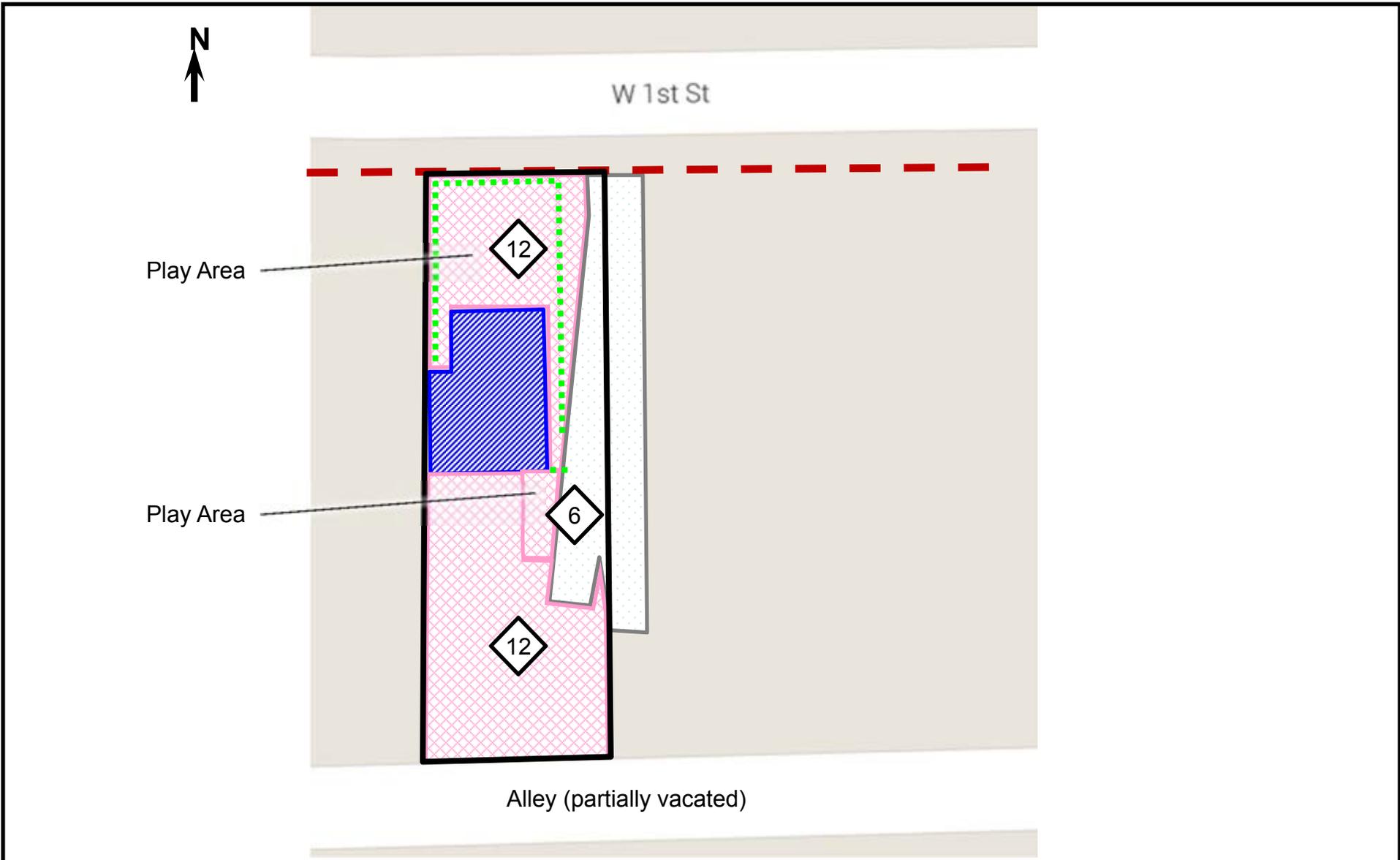
### FIGURE 1

#### SITE LOCATION MAP NATIONAL ZINC CHERRYVALE, KANSAS

DATE: August 2015

PROJECT NUMBER  
07-119-410





0 ft 20 ft



**LEGEND**

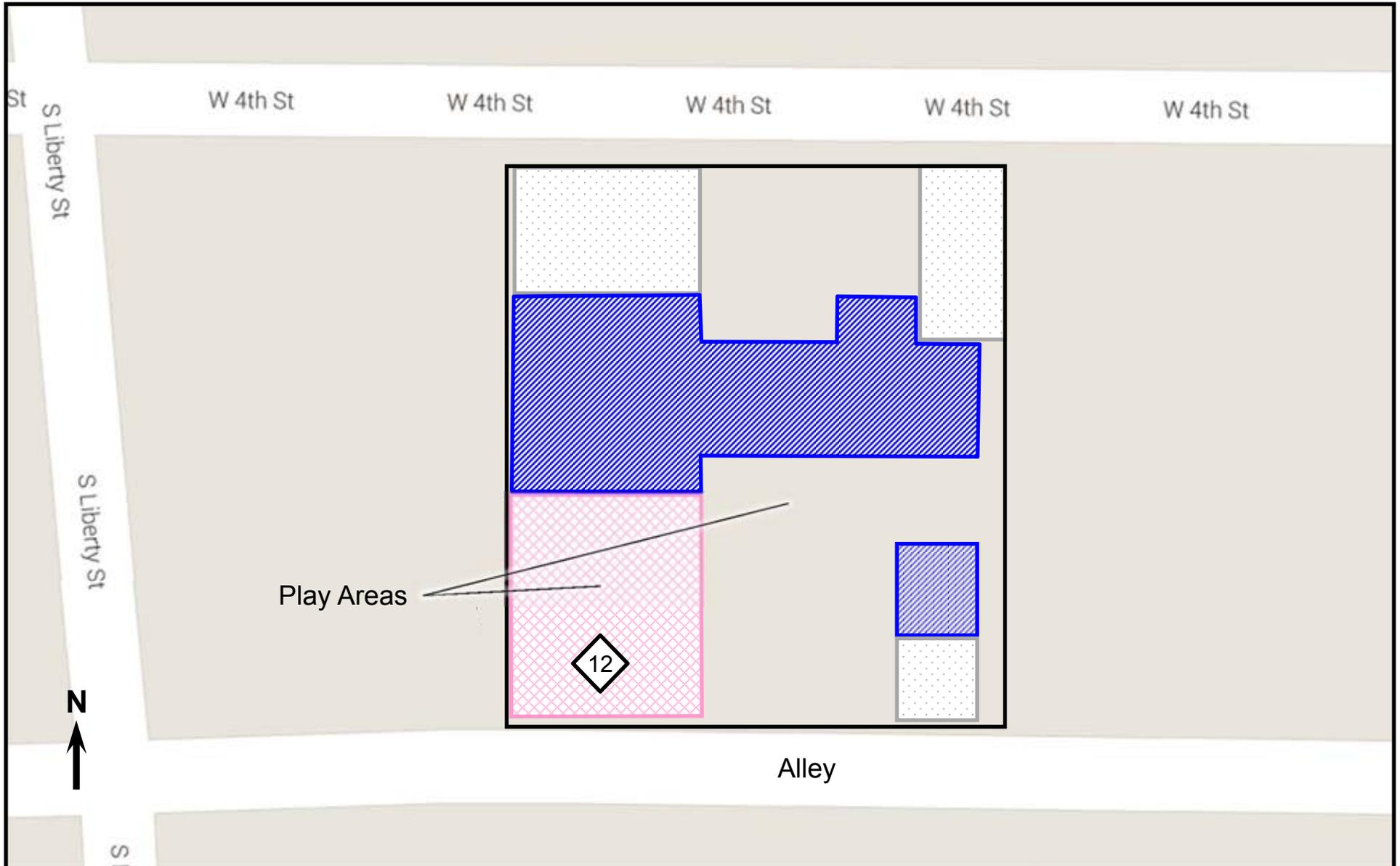
- PROPERTY BOUNDARY
- PAVED SIDEWALK
- BRICK SIDEWALK
- FENCE LINE
- STRUCTURE
- DRIVEWAY
- EXCAVATION AREA
- EXCAVATION DEPTH (IN)

**FIGURE 2**

**219 W 1ST  
EXCAVATION FIGURE  
CHERRYVALE, KANSAS**

DATE: August 2015

PROJECT NUMBER  
07-119-410



**LEGEND**

0 ft 20 ft

- PROPERTY BOUNDARY
- PAVED SIDEWALK
- BRICK SIDEWALK
- FENCE LINE
- STRUCTURE
- DRIVEWAY
- EXCAVATION AREA
- 6 EXCAVATION DEPTH (IN)

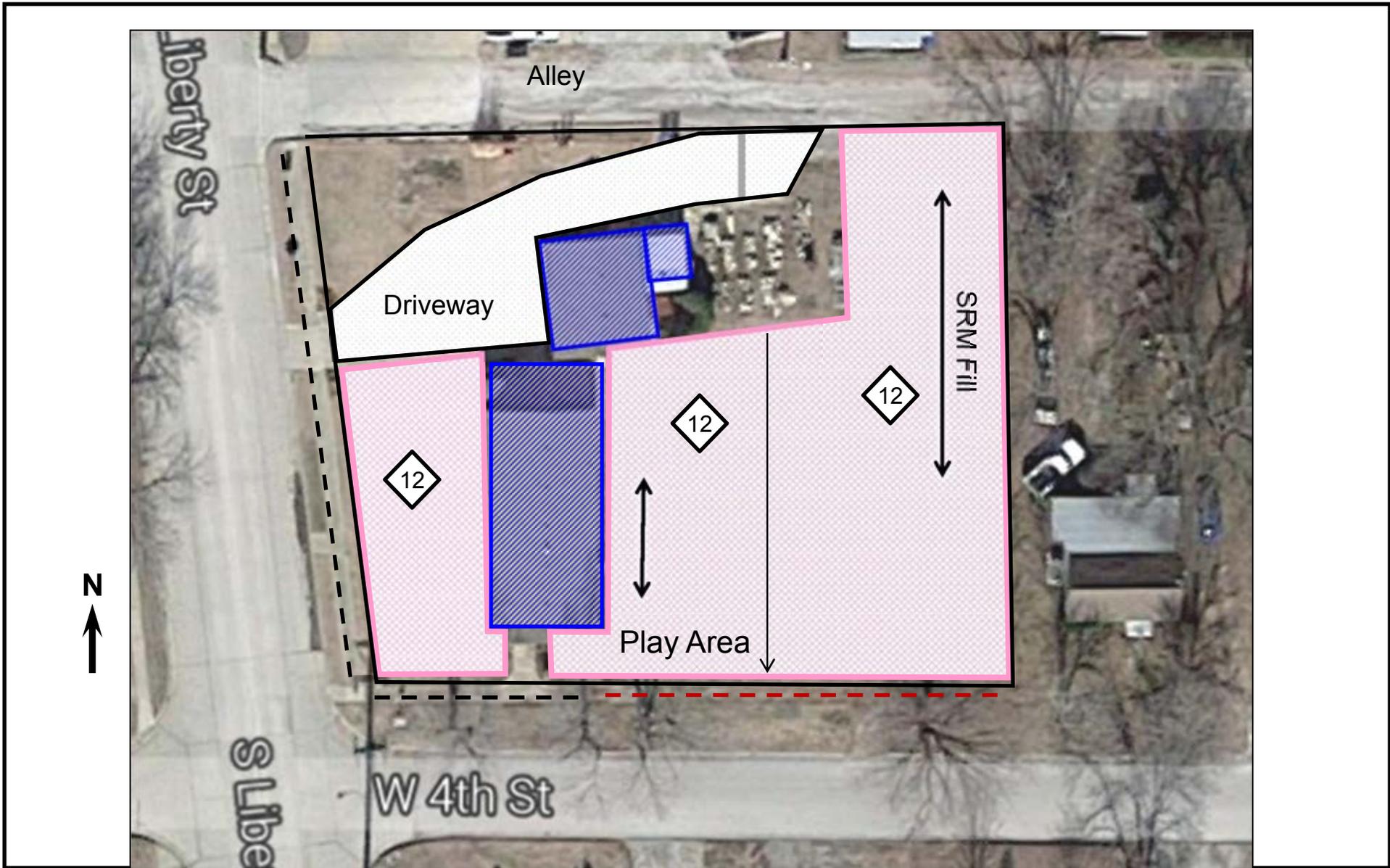


**FIGURE 3**

**317 W 4TH  
EXCAVATION FIGURE  
CHERRYVALE, KANSAS**

DATE: August 2015

PROJECT NUMBER  
07-119-410



**LEGEND**

- PROPERTY BOUNDARY
- PAVED SIDEWALK
- BRICK SIDEWALK
- FENCE LINE
- STRUCTURE
- DRIVEWAY
- EXCAVATION AREA
- EXCAVATION DEPTH (IN)

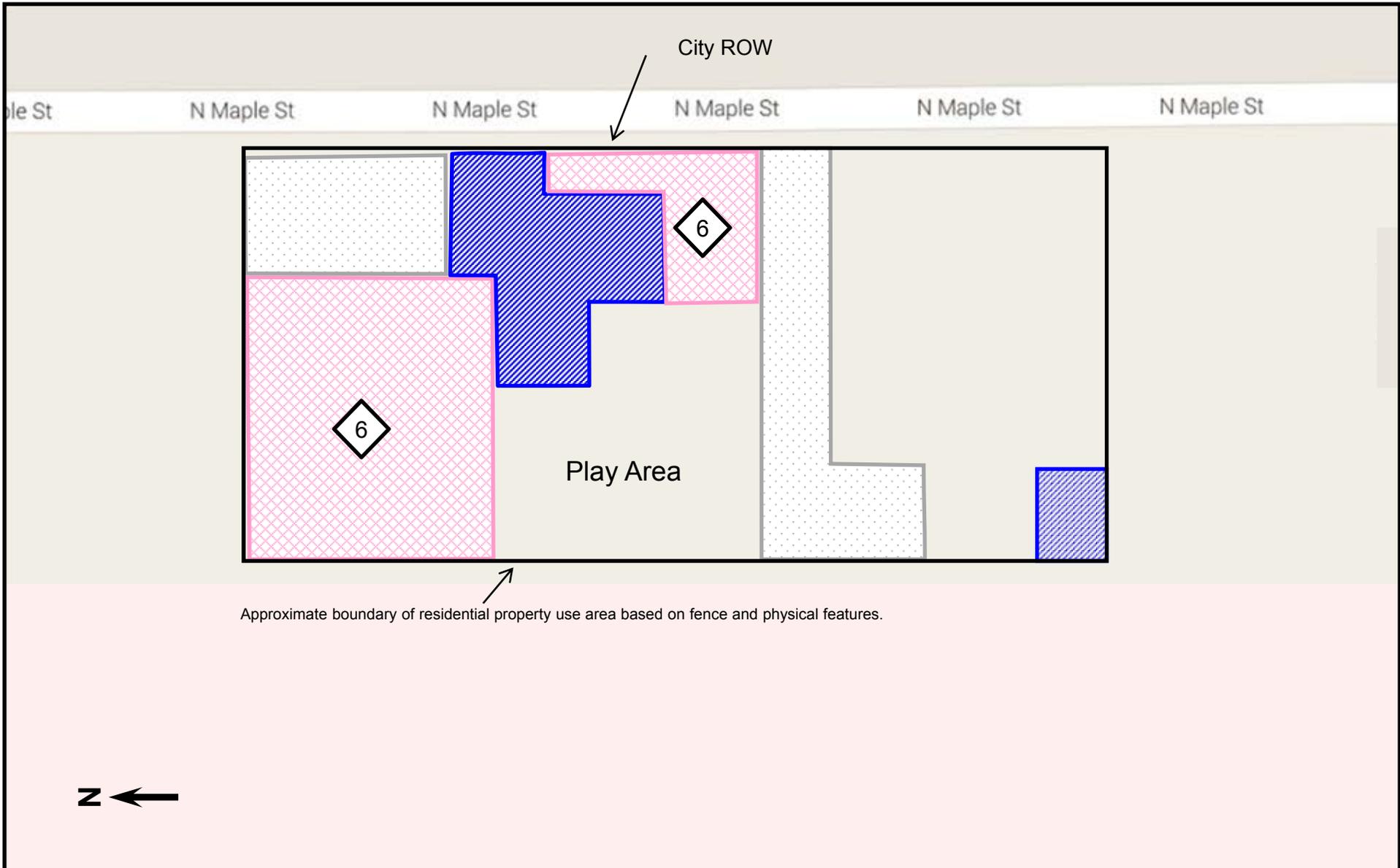
**FIGURE 4**

**326 W 4TH  
EXCAVATION FIGURE  
CHERRYVALE, KANSAS**

DATE: August 2015      PROJECT NUMBER  
07-119-410



Map Source: Google Maps. Property boundary approximately located. Actual property boundaries and excavation limits will be determined in the field with parcel maps and surveys.



**LEGEND**

- PROPERTY BOUNDARY
- PAVED SIDEWALK
- BRICK SIDEWALK
- FENCE LINE
- STRUCTURE
- DRIVEWAY
- EXCAVATION AREA
- 6 EXCAVATION DEPTH (IN)

**FIGURE 5**

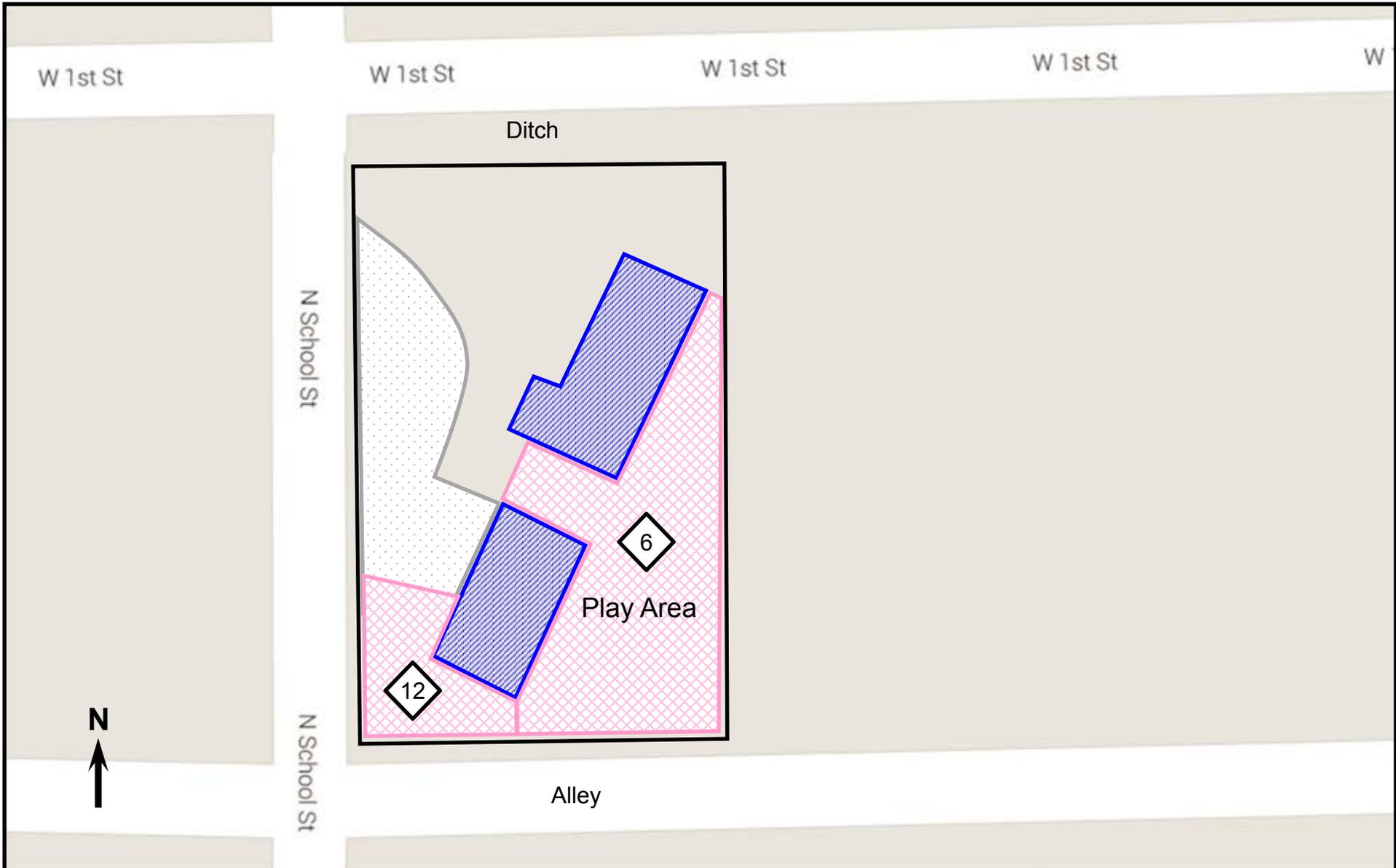
**416 N MAPLE  
EXCAVATION FIGURE  
CHERRYVALE, KANSAS**

DATE: August 2015	PROJECT NUMBER 07-119-410
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0 ft 50 ft



Map Source: Google Maps. Property boundary approximately located. Actual property boundaries and excavation limits will be determined in the field with parcel maps and surveys.



**LEGEND**

- PROPERTY BOUNDARY
- PAVED SIDEWALK
- BRICK SIDEWALK
- FENCE LINE
- STRUCTURE
- DRIVEWAY
- EXCAVATION AREA
- EXCAVATION DEPTH (IN)

**FIGURE 6**

**529 W 1ST  
EXCAVATION FIGURE  
CHERRYVALE, KANSAS**

DATE: August 2015	PROJECT NUMBER 07-119-410
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Map Source: Google Maps. Property boundary approximately located. Actual property boundaries and excavation limits will be determined in the field with parcel maps and surveys.



St W Main St

N Walnut St N Walnut St

**LEGEND**

- PROPERTY BOUNDARY
- PAVED SIDEWALK
- BRICK SIDEWALK
- FENCE LINE
- STRUCTURE
- DRIVEWAY
- EXCAVATION AREA
- 6 EXCAVATION DEPTH (IN)

**FIGURE 7**

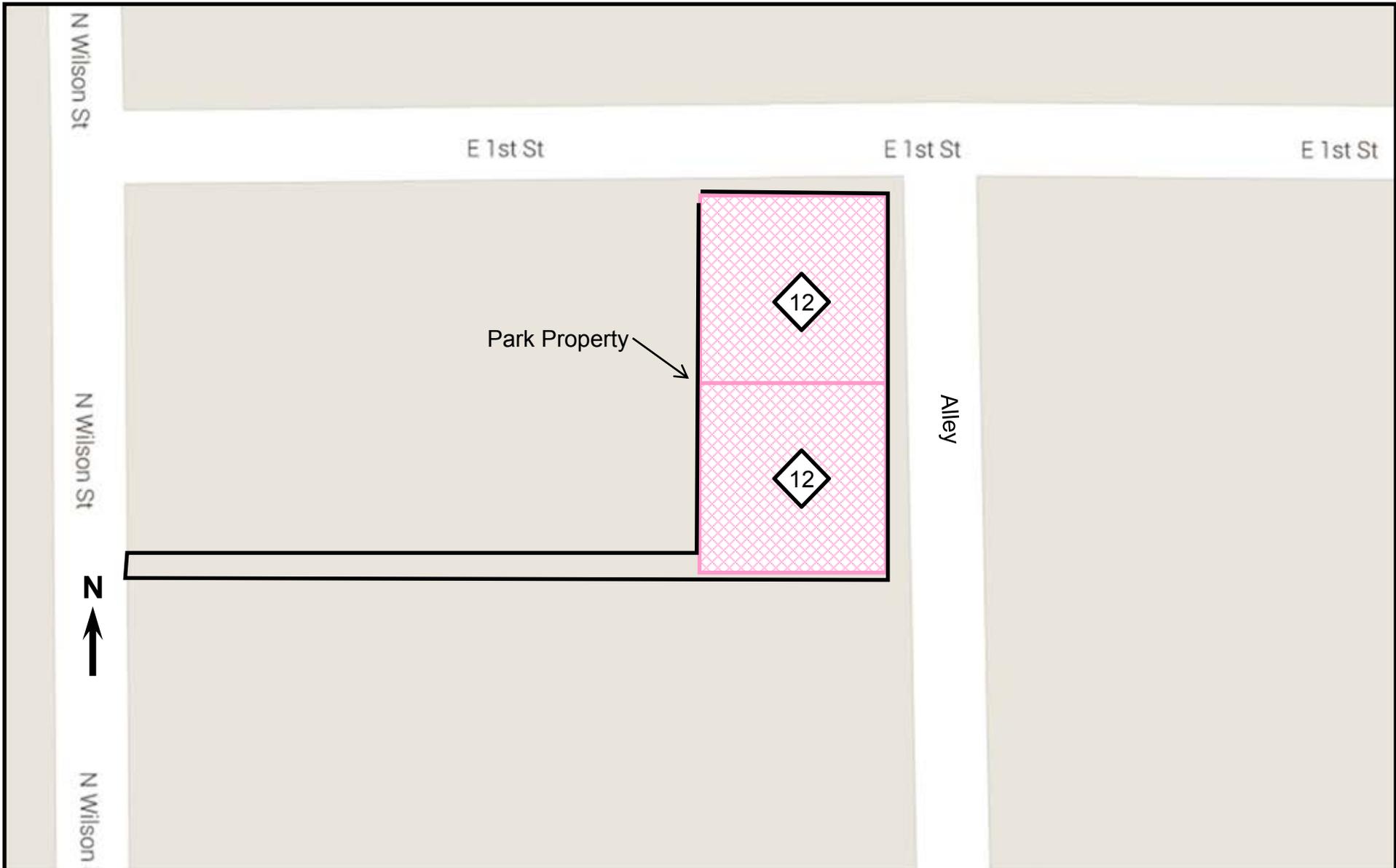
**902 W MAIN  
EXCAVATION FIGURE  
CHERRYVALE, KANSAS**

DATE: August 2015	PROJECT NUMBER 07-119-410
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0 ft 20 ft



Map Source: Google Maps. Property boundary approximately located. Actual property boundaries and excavation limits will be determined in the field with parcel maps and surveys.



**LEGEND**

- PROPERTY BOUNDARY
- PAVED SIDEWALK
- BRICK SIDEWALK
- FENCE LINE
- STRUCTURE
- DRIVEWAY
- EXCAVATION AREA
- EXCAVATION DEPTH (IN)

**FIGURE 8**

**00 E 1ST  
EXCAVATION FIGURE  
CHERRYVALE, KANSAS**

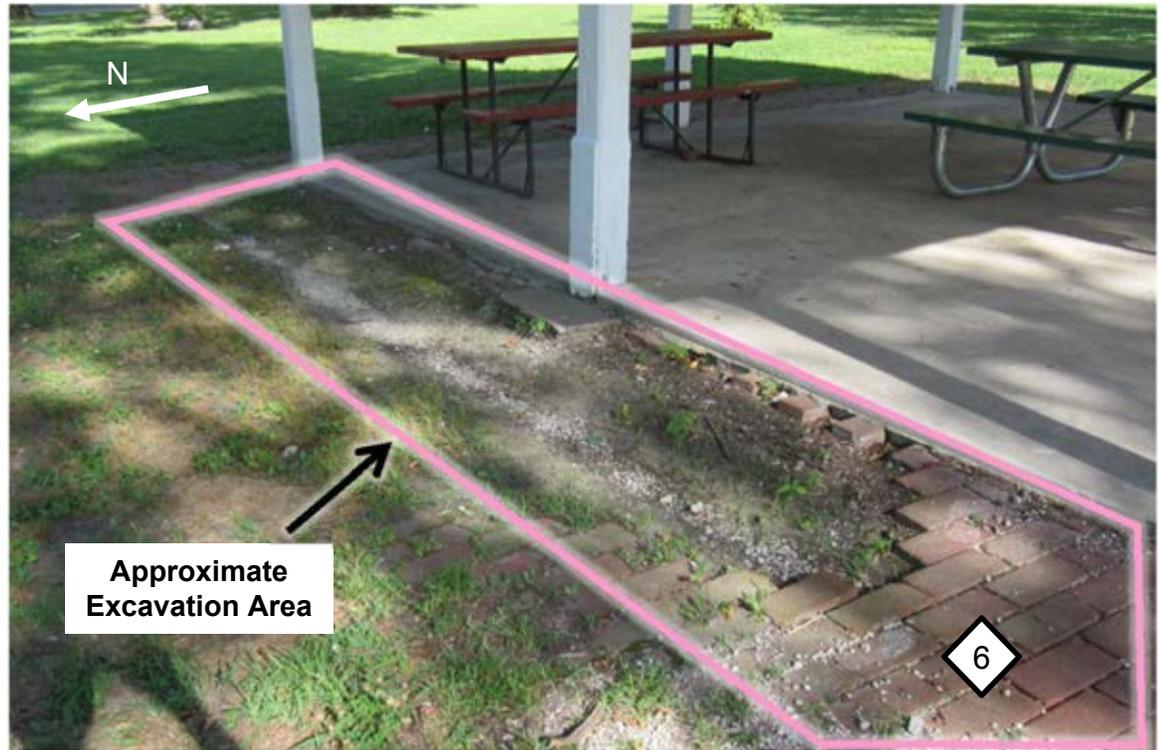
DATE: August 2015

PROJECT NUMBER  
07-119-410





Logan Park East Side



Approximate Excavation Area

**LEGEND**

- PROPERTY BOUNDARY
- PAVED SIDEWALK
- BRICK SIDEWALK
- FENCE LINE
- STRUCTURE
- DRIVEWAY
- EXCAVATION AREA
- 6 EXCAVATION DEPTH (IN)

**FIGURE 9**

**Logan Park Gazebo  
EXCAVATION FIGURE  
CHERRYVALE, KANSAS**

DATE: August 2015

PROJECT NUMBER  
07-119-410

0 ft 20 ft

