SOURCES OF LEAD TO RESIDENTIAL SOILS OF ST. FRANCOIS COUNTY

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May 15, 2014

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ACRONYMS AND ABBREVIATIONS

CHUA	Child High Use Area
DeNovo	DeNovo Group
EPA	U.S. Environmental Protection Agency
ICP	inductively coupled plasma
Integral	Integral Consulting Inc.
NewFields	NewFields Inc.
OU1	Operable Unit 1
SFCMA	St. Francois County Mining Area
XRF	x-ray fluorescence

EXECUTIVE SUMMARY

There are multiple sources of lead to residential soils in St. Francois County. Based on an evaluation of the available data, the primary sources of lead to residential soils in St. Francois County are, in the order of importance: background (both naturally mineralized soils and contributions from historical surface mining), lead paint, repurposed chat and tailings, and automobile emissions. Background is the most important contributor to lead in soil, particularly in historical surficial mining, processing, and smelting areas, resulting in lead concentrations that are consistently in the 400 to 1,200 mg/kg range. These surficial mining areas underlie many of the locations where homes have been constructed in what the U.S. Environmental Protection Agency has labeled as the "Response Area" or "Operable Unit 1." Leaded paint is the second most important source of lead to residential soils and appears to contribute, on average, 700 mg/kg lead to drip zone soils and 350 mg/kg lead to yard soils of the pre-1970 homes. Repurposed chat and tailings have contributed lead to specific residential locations, particularly in the case of driveways constructed of chat. However, only 4 percent of the homes sampled during the Interim Action and Halo Removal Action (2,057 homes sampled) appear to have contained chat as a driveway surface. The use of tailings as a liming agent could not have contributed sufficient lead to residential soils to require remediation because even if the tailings were surface applied at the standard rate of 2 tons/acre, the maximum soil lead concentration would only have been 44 mg/kg. The use of chat as road construction or road sanding material could have contributed lead to soils proximate to roadways, however, this could not have resulted in the need for yard remediation. Finally, the use of leaded gasoline appears to have made only minor contributions of lead to residential soils in St. Francois County.

The distribution of residential soil lead concentrations bear almost no relationship to proximity to the chat piles or tailings ponds, indicating that contributions of lead to residential soils from windborne chat and tailings are minimal in both magnitude and extent.

1 INTRODUCTION

Residential soils are a major focus of the remedial activities at the St. Francois County Mining Area (SFCMA) Superfund site. To-date, approximately 2,100 yards have been sampled, primarily within an area referred to by the U.S. Environmental Protection Agency (EPA) as the "Response Area" or Operable Unit 1 (OU1). Of these homes, 87 percent have at least one yard quadrant or area that exceeded EPA's remedial action level of 400 mg/kg lead (NewFields 2011a) and thus require some degree of remediation. To date, remediation has been completed at nearly 600 residences. It is estimated that an additional 4,500 yards remain to be sampled within St. Francois County (NewFields 2011a).

EPA has assumed that the lead in residential soils is the result of windborne and waterborne transport of lead-bearing material from chat piles and tailings ponds and manual relocation of chat and tailings (USEPA 2011). This assumption ignores the presence of background lead and contributions from other anthropogenic lead sources.

Based on an evaluation of the available data, the primary sources of lead to residential soils in St. Francois County are, in the order of importance:

1. Background
    a. Naturally occurring mineralized soils
    b. Early surficial lead mining, processing, and smelting
2. Paint
3. Repurposed chat and tailings
4. Windborne material from chat piles and tailings ponds, prior to the cleanup actions that have been completed on them
5. Automobile emissions.

This report discusses each of these sources of lead to residential soils, including their relative magnitude and spatial distribution, and provides a conceptual understanding of how these multiple sources of lead to residential soils have combined to produce the observed conditions.

2 DATA SOURCES

The following sections describe the sources of lead concentration data that were obtained by Integral Consulting Inc. (Integral).

2.1 NEWFIELDS INC.

The Interim Action (NewFields 2004) included soil sampling at 1,955 residences. The purpose of this sampling was to characterize the extent and magnitude of lead concentrations in residential soils. This sampling was conducted by NewFields Inc. (NewFields) in accordance with the Interim Action work plan (NewFields 2000), which is generally consistent with EPA's lead-contaminated residential sites handbook (USEPA 2003). At each residence, composite samples of surface soil (0 to 1 in.) were collected in each of the four yard quadrants; additional composite soil samples were collected from the drip zone and potential "hot spots" (e.g., chat driveways, play areas, gardens). Prior to analysis, samples were air-dried, disaggregated, and sieved to less than 2 mm. Samples were analyzed by x-ray fluorescence (XRF) spectroscopy. Confirmation samples, at a rate of 1 per 20 samples, were sent to an analytical laboratory for metals analysis by inductively coupled plasma (ICP) spectroscopy. The Interim Action concluded in March 2004.

The Halo Removal Action replaced the Interim Action, and focused sampling in the "Halo" around the major mine sites of St. Francois County. An additional 102 residences and 12 child high use areas (CHUAs)[1] were sampled between March 2004 and January 2011 (NewFields 2011a). Sampling and analytical methods for residential soils were consistent with the Interim Action and the results are presented in NewFields (2011a). The CHUA samples were composite samples from the 0- to 2-in. depth interval. Results of the CHUA sampling are reported in NewFields (2006).

The Subsurface Soil Investigation (NewFields 2011b) collected samples at a total of 58 residential locations in the Response Area. Surface soil samples were collected at locations not previously sampled as part of the Interim Action or Halo Removal Action. Surface soil samples were collected using methods consistent with the Interim Action. At each of the 58 residential locations, one subsurface sample was collected using a direct-push geoprobe rig to a depth of 4 ft (or refusal). Resulting cores were vertically composited from 0 to 30 in. in 6-in. intervals. Analysis of the subsurface samples was by XRF, following the methods of the Interim Action work plan.

[1] CHUAs are defined as areas where children under of the age of seven congregate for significant periods of time. These are composed primarily of day care facilities and public playgrounds.

Near-pile soil transects were collected as part of the Remedial Investigation (NewFields 2006). The purpose of this sampling was to investigate the importance of wind-borne tailings deposition in proximity to the piles. A total of 64 samples were collected at varying distances from 5 of the tailings areas.[2] Transects extended from the outer edge of the pile in either an upwind or downwind direction, and were collected at either 50- or 100-m intervals. Surface soil samples were collected from either the 0- to 0.5-in. or 0- to 2-in. interval. Samples were analyzed by ICP spectroscopy.

Data from the Interim Action, Halo Removal Action, Subsurface Soil Investigation, and near-pile soil transect sampling events were provided to Integral by NewFields.

2.2 DENOVO GROUP

In early 2013, a round of focused residential sampling was completed by DeNovo Group (DeNovo). This sampling effort focused on nine discrete sampling areas (Figure 2-1) that were selected because they were located upwind and/or distant from known lead sources. The sampling areas were also selected to investigate the effect on soil lead concentrations of two variables: housing age and proximity to historical surficial mining. Sampling and analysis was conducted in accordance with the Surface Soil Sampling work plan (NewFields 2012). A total of 670 residences were identified for this focused residential sampling effort. EPA handled sampling access requests and obtained access at a total of 166 homes. Samples were collected by DeNovo from February 13 to 20, 2013, and analyzed for lead concentrations by XRF spectroscopy.

Data from the focused residential sampling were provided to Integral by DeNovo and are presented in Appendix A.

[2] Bonneterre, Desloge, Elvins/Rivermines, Federal, and Leadwood.

3 LEAD SOURCES TO RESIDENTIAL SOILS

The sources of lead to residential soils include background, lead paint, chat and tailings, and automobile emissions. Analysis of the soil lead data informs a discussion of each source, its magnitude, and its extent.

3.1 BACKGROUND LEAD

In the context of residential soils in St. Francois County, "background" specifically refers to lead from naturally mineralized soils and lead redistributed in soils due to early surficial lead mining, processing, and smelting. This is consistent with EPA guidance, which states that background consists of "substances or locations that are not influenced by the releases from a site, and are described as naturally occurring or anthropogenic" (USEPA 2002). The occurrence, distribution, and magnitude of background lead concentrations in St. Francois County residential soils is described in detail in the report titled *Background Soil Lead Concentrations in the Big River Watershed* (Integral 2014). Background soil lead concentrations in the Big River watershed are characterized by values that are generally less than 200 mg/kg, with a significant population that contain more than 400 mg/kg (46 out of 165 samples, or 28 percent, of background locations sampled; Integral 2014). The data exhibit high variability, with individual samples having concentrations greater than 10,000 mg/kg. This pattern is consistent with observations of soil overlaying lead ore veins, where soils in close proximity to the lead ore have high concentrations, and concentrations decrease with distance from the lead source. Surficial mining disrupts this pattern, and the associated mixing of soil and residuum results in relatively consistent lead concentrations in the range of 400 to 1,200 mg/kg across the surface mined areas (Integral 2014). The large variability of background lead concentrations results in elevated background reference values, and as a consequence, most of the St. Francois County residential soils are indistinguishable from background.

The Potosi area of the Washington County Lead District provides a useful comparison site for St. Francois County. The Potosi area was the location of extensive surface mining (and naturally mineralized soils), but no underground hard rock mining of any significance and, therefore, contains no chat piles. Despite this, 45 percent of the residential properties sampled (716 out of 1,601) had yards that exceeded 400 mg/kg lead (USEPA 2010).

3.2 LEAD PAINT

Lead-based paint, which was banned for residential use in 1978, is common in the residential environment of homes constructed prior to the late-1970s. In 1991, the U.S. Department of Housing and Urban Development estimated that "74% of all housing units built before 1980 contain lead-based paint" (HUD 1991). In addition, the contamination of residential soil with lead from lead-based exterior house paint is a well-established fact (Weitzman et al. 1993). EPA is aware that exterior lead-based paint has contaminated residential soils at other Superfund sites (USEPA 2009). Because approximately 77 percent of the residences in OU1 were constructed prior to 1970[3], and because lead-based paint is frequently detected on the exterior of houses in OU1 using XRF analysis, it is clear that lead-based paint is contributing to lead in residential soil.

The focused residential sampling performed in 2013 was designed to investigate three factors identified as having an effect on soil lead concentrations. The first of these is housing age, which is a proxy for the presence of lead-based paint. The second is areas of historical surface mining, which contain elevated background lead concentrations (see Integral 2014). The third factor is distance to the line demarcating the geological contact between the Bonneterre dolomite and the overlaying Davis Shale, referred to as the Bonneterre-Davis contact. The Bonneterre-Davis contact appears to exert a geological control on lead concentrations in soil and was also the location of much of the historical surficial lead mining in St. Francois County (see Integral 2014 for a detailed description of how the bedrock geology underlying OU1 controls soil lead concentration). Evaluation of residential soil lead concentrations (all data) as a function of proximity to the Bonneterre-Davis contact suggests that lead concentrations are elevated for about 2,000 ft on either side of the contact (Figure 3-1). In addition, the blocks of homes selected for sampling were distant from, and upwind of, chat piles, tailings ponds, and historical smelters, and outside of the 100-year floodplains of the Big River and Flat River Creek. This was done to ensure that windblown chat and tailings would not be a source of lead in this set of residential samples.

The distribution of housing ages in the different sampling areas are indicated in Figure 3-2, with the distinction of having a construction date that is either older or newer than 1970. The importance of housing age can be seen by comparing Figure 3-2 with Figure 3-3, which shows the lead concentrations in backyard soils. For example, the newer housing located within the Highley Heights area has soil lead concentrations that are primarily less than 400 mg/kg, whereas the older housing of Leadington and Desloge has lead concentrations mostly between 400 and 1,200 mg/kg. This pattern is consistent for all of the nine areas sampled. Drip zone and backyard soil samples from newer housing (built post-1970) have median lead concentrations of approximately 300 and 250 mg/kg, respectively (Figure 3-4). The fact that drip zone and backyard lead concentrations are nearly equal for newer homes indicates a limited impact from leaded paint on newer homes. For older housing (built pre-1970), median backyard lead concentrations are approximately 600 mg/kg. Thus, for older homes median backyard lead concentrations are approximately 350 mg/kg higher than for new homes (600 mg/kg minus

[3] Estimate based on total residential parcels located within urban and suburban residential areas of OU1 with known construction dates (6,722) versus number constructed prior to 1970 (5,151), from St. Francois County Assessor's office parcel database (database obtained August 2, 2012).

250 mg/kg). Finally, drip zone lead concentrations of older housing are about 1,000 mg/kg (median), compared to the 300 mg/kg (median) found at newer homes, indicating that lead-based exterior house paint is contributing about 700 mg/kg to drip zone soils of older homes.

3.3 PROXIMITY TO THE BONNETERRE-DAVIS CONTACT

Higher concentrations of lead also appear to be associated with locations closer to the Bonneterre-Davis contact. For drip zone soils (Figure 3-5; size of circles is proportional to lead concentration), soils further from the Bonneterre-Davis contact generally have lower lead concentrations than soils close to the contact, likely due to proximity to veins and outcrops containing galena. The effect of house age and proximity to the contact on drip zone lead concentrations is evident in Figure 3-5. For backyard quadrant samples (Figure 3-6), the pattern is less distinct than for drip zone soils, but there is still an obvious relationship between proximity to the contact and higher soil lead concentrations.

3.4 REPURPOSED CHAT AND TAILINGS

Chat and tailings have reportedly been used for a number of purposes, including railroad ballast (NewFields 2007), agricultural lime (Wixson et al. 1983), roadway traction sand (MoDOT 1997), aggregate (Barr 2003), driveway cover material (MoDOH 1998), and even for sandbag fill during flood events (Forsythe 1993). The contribution of lead from repurposed chat and tailings to soils is dependent on the lead concentration of the material and the amount of the material that is deposited in soil. Relevant data on lead concentrations in chat and tailings were compiled from Wixson et al. (1983) and remediation design documents from Barr (2003, 2005), Black & Veatch (2005), and TetraTech (2003). Spatial analysis was used to classify each sample as either chat or tailings. For chat, median lead concentrations varied between 2,180 and 6,000 mg/kg depending on the chat pile, while for tailings median lead concentrations varied between 720 and 3,250 mg/kg (Figure 3-7, Table 3-1).

For residential areas, the primary uses of chat and tailings are likely to have been in driveways or as lime to improve soil quality. During the Interim Action and Halo Removal Action (2,057 homes sampled), only 435 driveways were sampled (only driveways with gravel or dirt surfaces were sampled). Of those 435 driveways, only 84 had lead concentrations that exceeded 2,180 mg/kg (the lowest median chat lead concentration; Desloge pile). Thus, only 4 percent (84/2,057) of the homes sampled during the Interim Action and Halo Removal Action appear to have been composed of chat, indicating that the use of chat as a driveway surface material was relatively rare in St. Francois County.

Agricultural soil liming in Missouri typically occurs at a rate of 2 tons per acre, and this liming rate has been documented for agricultural soils using tailings from the SFCMA (Wixson et al. 1983); excessive liming is avoided as it raises soil pH beyond optimal levels for plant growth.

Chat would not have been used for liming because its large particle size renders it much less effective for liming than tailings. At a liming rate of 2 tons per acre, the added tailings would account for 1.4 weight percent if surface applied (assumes a 0- to 1-in. mixing depth) or 0.2 weight percent when tilled to a 6-in. depth. At this rate of dilution, lead contributions per soil liming event would have been modest: from 7 mg/kg (tilled to 6 in.) to 44 mg/kg for a surface application; this assumes tailings from the National site were used, which had the highest lead concentrations (Figure 3-7). Thus, even at the limited number of residences where this may have occurred, the use of tailings as a liming material for residential soils would not have resulted in soil lead concentrations that would trigger remediation.

There are anecdotal reports that chat may have been used as a soil conditioner to improve the texture of the clayey soils in St. Francois County. If this did occur, its impact would have been limited to certain houses. Residential soils could also have been impacted by chat used for road sanding, which could have resulted in increased soil lead concentrations adjacent to roadways.

3.5 WINDBORNE CHAT AND TAILINGS

Windborne releases of chat and tailings have been postulated by EPA as a mechanism for residential soil contamination with lead. Both aerial deposition modeling and soil transect sampling have been conducted to evaluate the plausibility of this transport mechanism (NewFields 2006).

As discussed previously, the DeNovo focused residential sampling effort consisted of locations distant and upwind from known hard rock mining sources (chat, tailings, and smelters). This is in contrast to the NewFields Interim Action and Halo Removal Action sampling efforts that focused on residences proximate to chat piles, tailings impoundments, and historical smelters. However, comparison of the soil lead concentrations of the NewFields and DeNovo sampling efforts (Figure 3-8) shows little overall difference (median lead concentrations of 531 and 518 mg/kg, respectively). Further, 87 percent of homes from the Interim Action and Halo Removal Action sampling events had one, or more, yard quadrants with greater than 400 mg/kg lead, while for the focused residential sampling this value was 84 percent. Thus, proximity to chat piles or tailings ponds, even in a prevailing downwind direction, does not appear to produce an effect on soil lead concentrations.

3.5.1 Air Modeling and Transect Data

The SFCMA Remedial Investigation (NewFields 2006) included the results of air dispersion and deposition modeling performed by the Idaho National Engineering and Environmental Laboratory (Abbott 1999) to assess the ground deposition rates of airborne lead. In addition, eight transects of soil samples extending from the chat piles and tailings ponds were collected to evaluate the model's performance.

Despite the conservative nature of the air deposition model, predicted maximum soil lead concentrations were only about 250 mg/kg adjacent to the chat piles and tailings ponds in the downwind direction (the maximum modeled soil lead contours for most of the chat piles and tailings ponds were 300 mg/kg, which includes 65 mg/kg lead attributed to background). The highest concentrations occurred at the edges of the chat piles and tailings ponds, with concentrations decreasing rapidly with distance.

Soil transects were collected at the Bonne Terre (two transects), Desloge, Elvins/Rivermines (two transects), Federal, and Leadwood chat piles and tailings ponds (NewFields 2006). Most of the soil lead data from these transects showed no correlation with proximity to chat piles or tailings ponds. For example, at the Bonne Terre site, the north transect showed no correlation with proximity to the tailings pond and the east transect showed only a slight correlation (Figure 3-9). Evaluation of all of the residential soil lead data (average of backyard quadrants) demonstrates that soil lead concentrations have no relationship with proximity to the Bonne Terre chat pile or the tailings pond (Figure 3-10). The same results were observed at the Leadwood location (Figures 3-11 and 3-12). The orange and red dots close to the east side of the Leadwood tailings pond in Figure 3-12 cannot be due to tailings because these lead concentrations are as high, or higher, than the concentrations of lead in the Leadwood tailings (i.e., even pure tailings could not account for these lead concentrations). Although no soil transect data were collected at the National chat piles, the distribution of soil lead data (Figure 3-13) provides a clear demonstration that soil lead concentrations bear no relationship to proximity to the chat piles. Thus, any impact from windborne or waterborne transport was limited in amount and confined to areas immediately downwind or downgradient of the chat piles or tailings impoundments.

3.6 AUTOMOBILE EMISSIONS

In the United States, tetraethyl lead was added to gasoline starting in 1923 and was phased out between 1976 and 1986 (CONCAWE 1993). Between 1923 and 1976, the concentration of lead in top grade gasoline was 0.84 g/L (0.11 percent by weight). Combustion of tetraethyl lead in car engines resulted in lead in automobile emissions and subsequent deposition in soils along roadways. Numerous studies have documented the extent and magnitude of soil lead concentrations along roadways due to the use of leaded gasoline (Byrd et al. 1983; Daines et al. 1970; Lagerwerff and Specht 1970; Motto et al. 1970; Piron-Frenet et al. 1994). These studies concur that soil lead concentrations decrease with distance from highways and streets and increase with traffic density. In these studies, maximum soil lead concentrations around 200 mg/kg were observed within 25–30 ft of highways (high traffic density) and dropped to background concentrations within 75–100 ft. Increases in soil lead concentrations along surface streets (low traffic density) were negligible. Based on these observations, contributions of lead from gasoline to residential soils in St. Francois County are likely negligible, except in isolated situations where homes are located adjacent to major thoroughfares.

4 CONCLUSIONS

There are multiple sources of lead to residential soils in St. Francois County (Figure 4-1). It is clear that background is the most important contributor to lead in soil, particularly in historical surficial mining, processing, and smelting areas where lead concentrations are consistently in the 400 to 1,200 mg/kg range. These surficial mining areas underlie much of what are now residential zones in the St. Francois County Mining Area (see Integral 2014). Leaded paint is the second most important source of lead to residential soils and appears to contribute, on average, 700 mg/kg lead to drip zone soils and 350 mg/kg lead to yard soils of homes constructed prior to 1970. Repurposed chat and tailings have contributed lead to specific residential locations, particularly in the case of driveways constructed of chat. However, only 4 percent of the homes sampled during the Interim Action and Halo Removal Action (2,057 homes sampled) appear to have contained chat as a driveway surface. The use of tailings as a liming agent could not have contributed sufficient lead to residential soils to require remediation because even if the tailings were surface applied (0- to 1-in. mixing depth) maximum soil lead concentration would only have been 44 mg/kg. The use of chat as road construction or road sanding material would only have contributed lead to soils adjacent to roadways, which could not have resulted in the need for yard remediation. Finally, the use of leaded gasoline appears to have made only minor contributions of lead to residential soils in St. Francois County.

The distribution of residential soil lead concentrations bear almost no relationship to proximity to the chat piles or tailings impoundments, indicating that contributions of lead to residential soils from windborne chat and tailings are minimal in both magnitude and extent.

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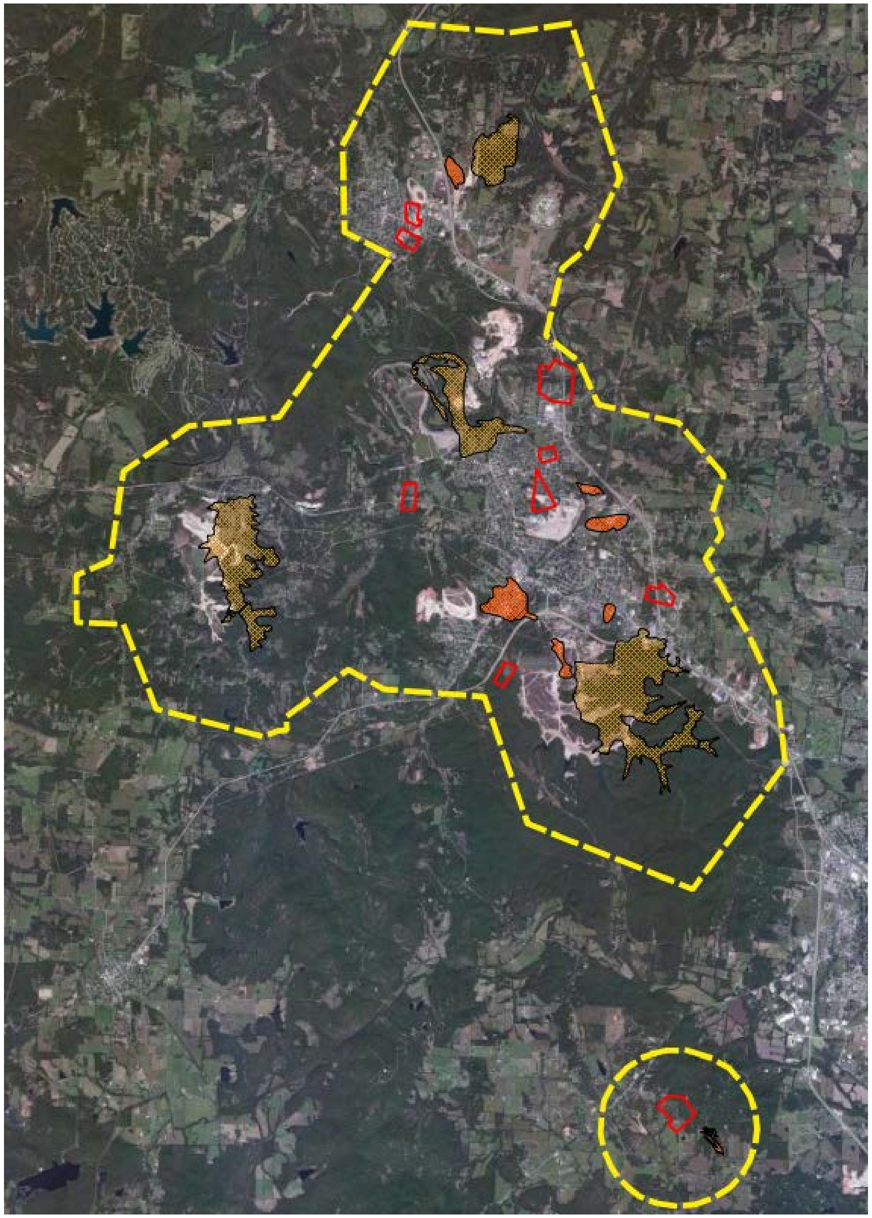
FIGURES



Legend

OU1 of the SFCMA

Sampling Block

Tailings Pond

Chat Pile

integral consulting inc.

Figure 2-1.
Location of Residential Sampling Blocks for the Focused Residential Sampling

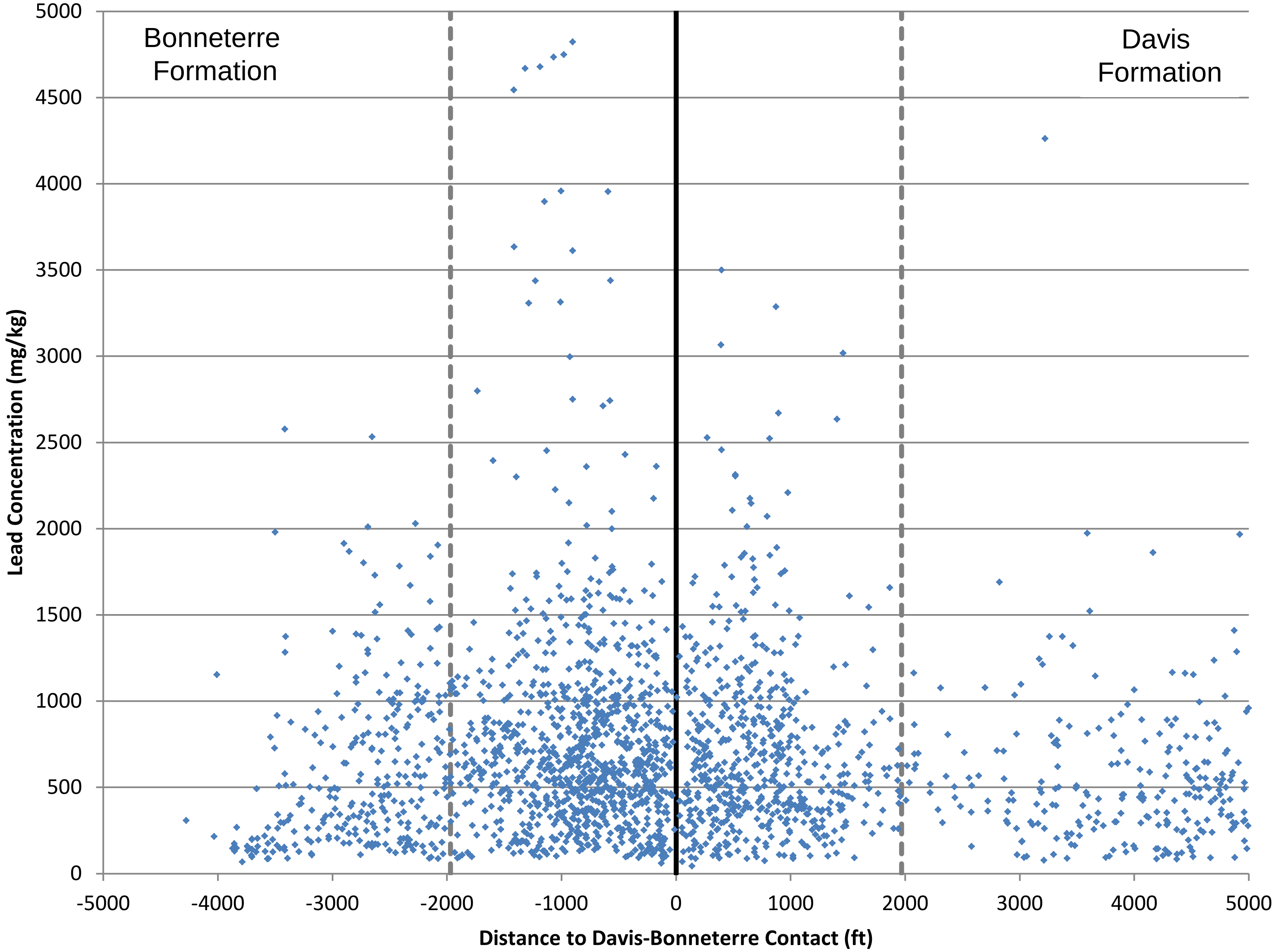


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Figure 3-1.
Residential Soil Lead Concentrations and the Width of the Davis-Bonneterre Contact Zone

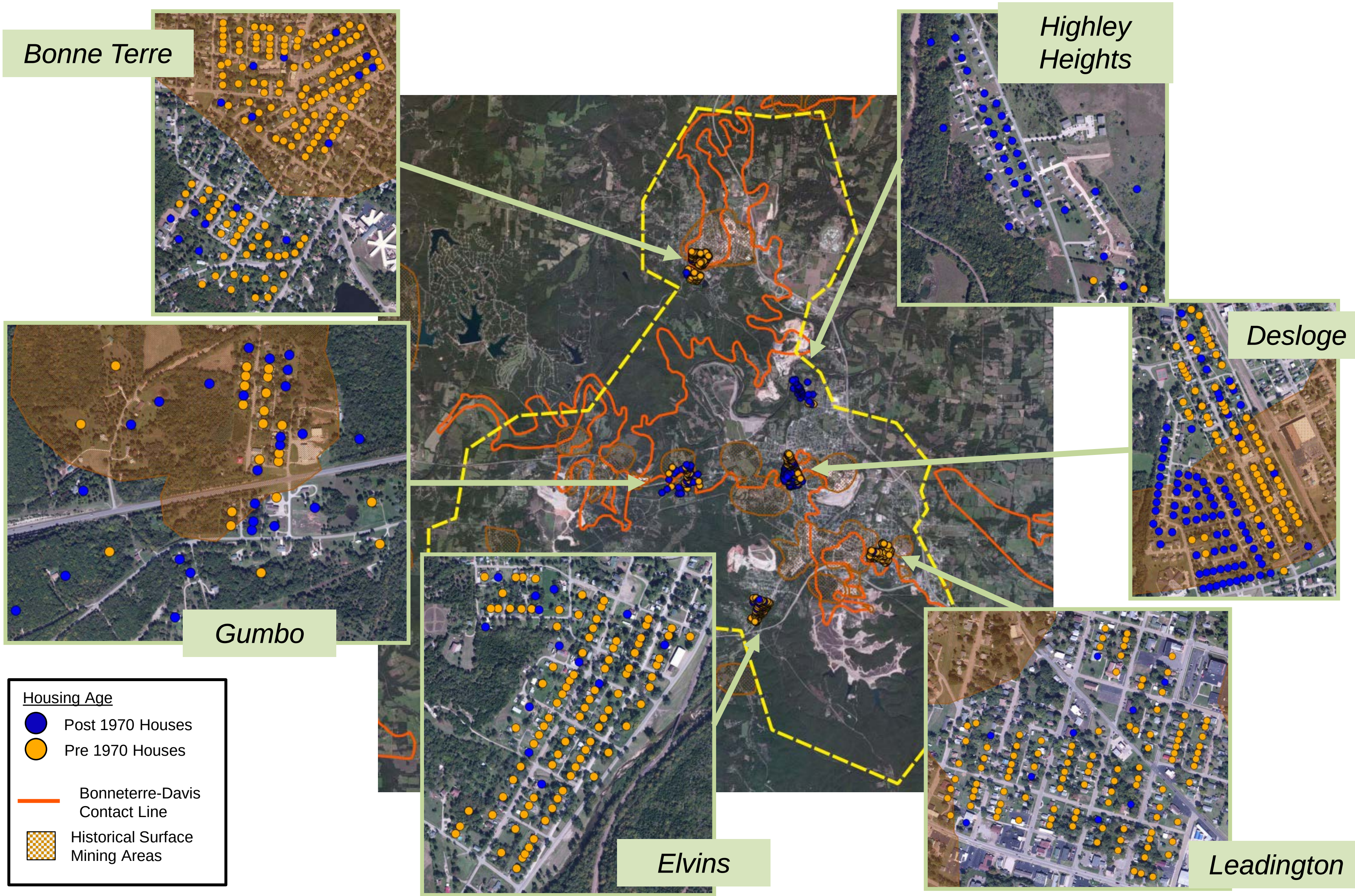

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Figure 3-2.
Properties Identified for Sampling during the 2013 Focused Residential Sampling

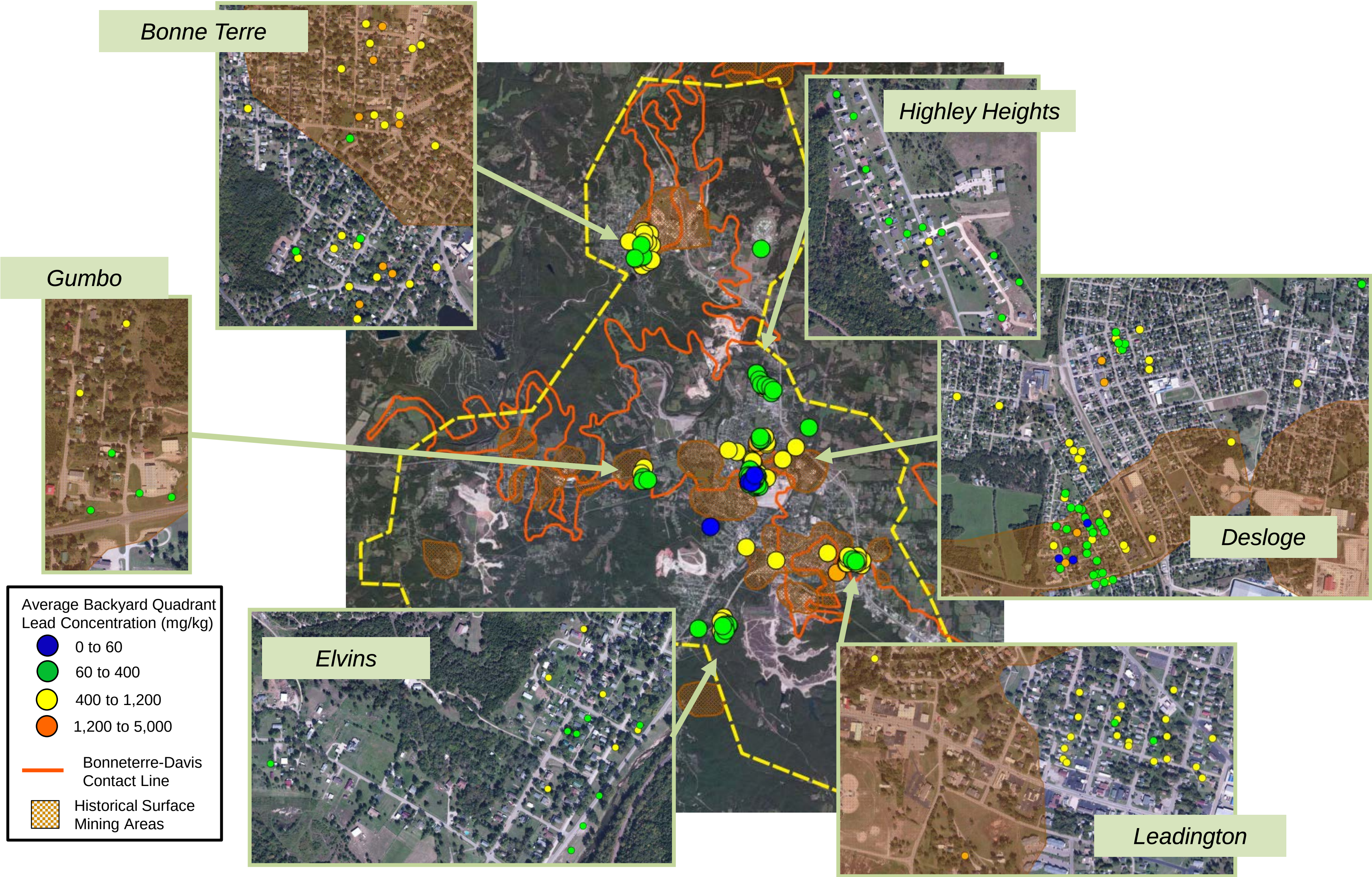

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Figure 3-3.
Soil Lead Concentrations from the 2013 Focused Residential Sampling

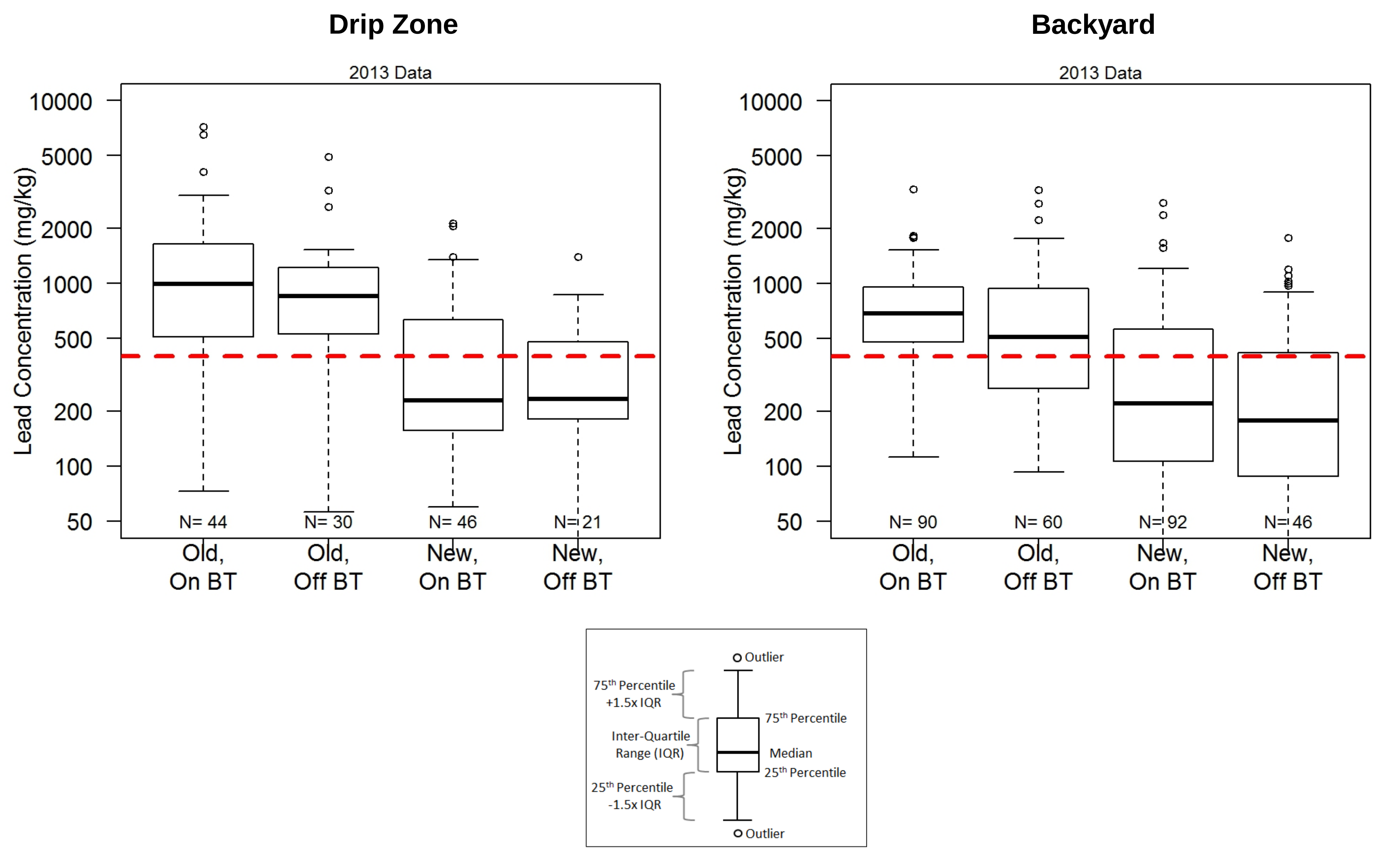

Figure 3-4.
Boxplots of Soil Lead Concentrations, Focused Residential Sampling

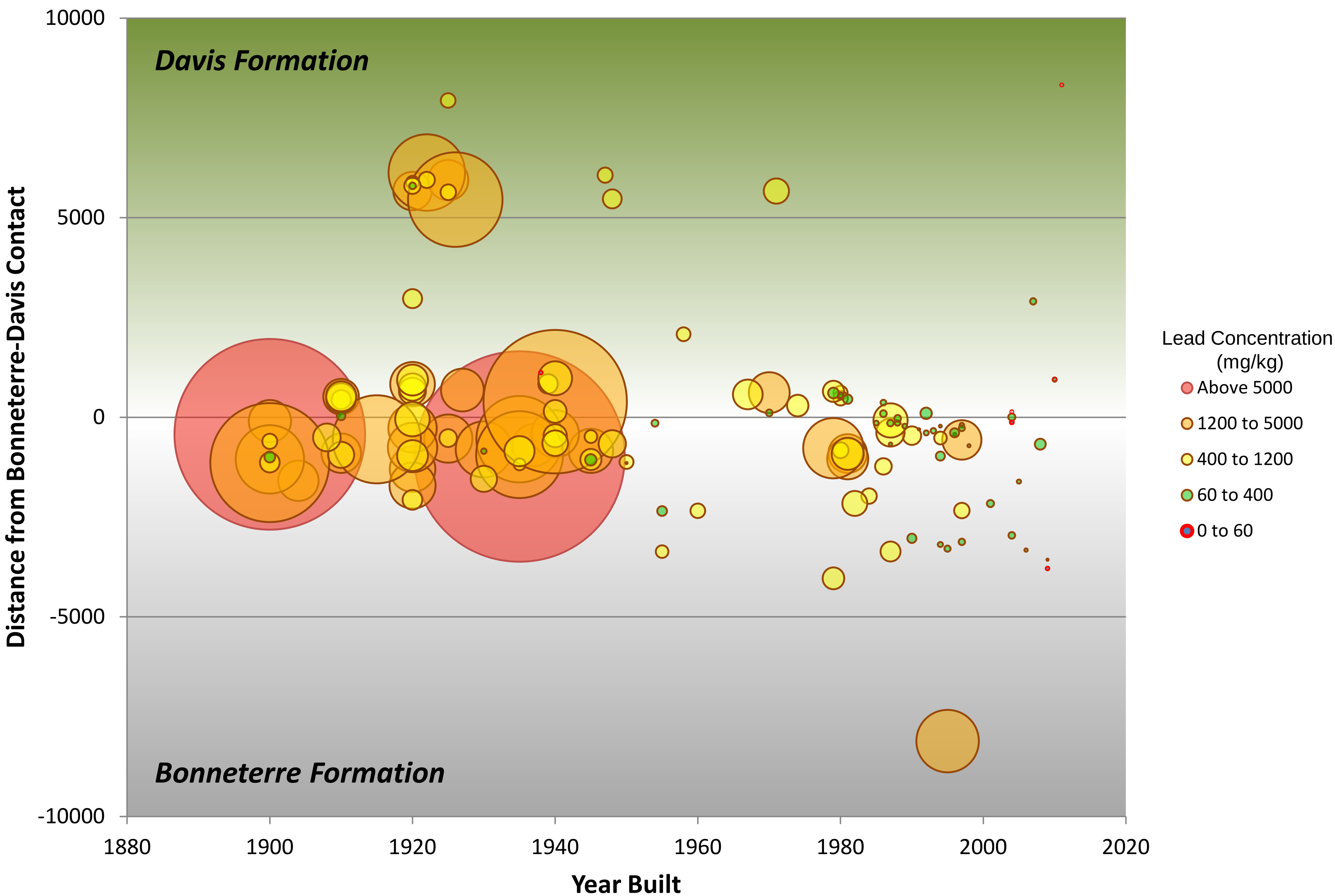

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Figure 3-5.
Residential Soil Lead Concentrations as a Function of Housing Age and Distance from Davis-Bonneterre Contact, Drip Zone Samples

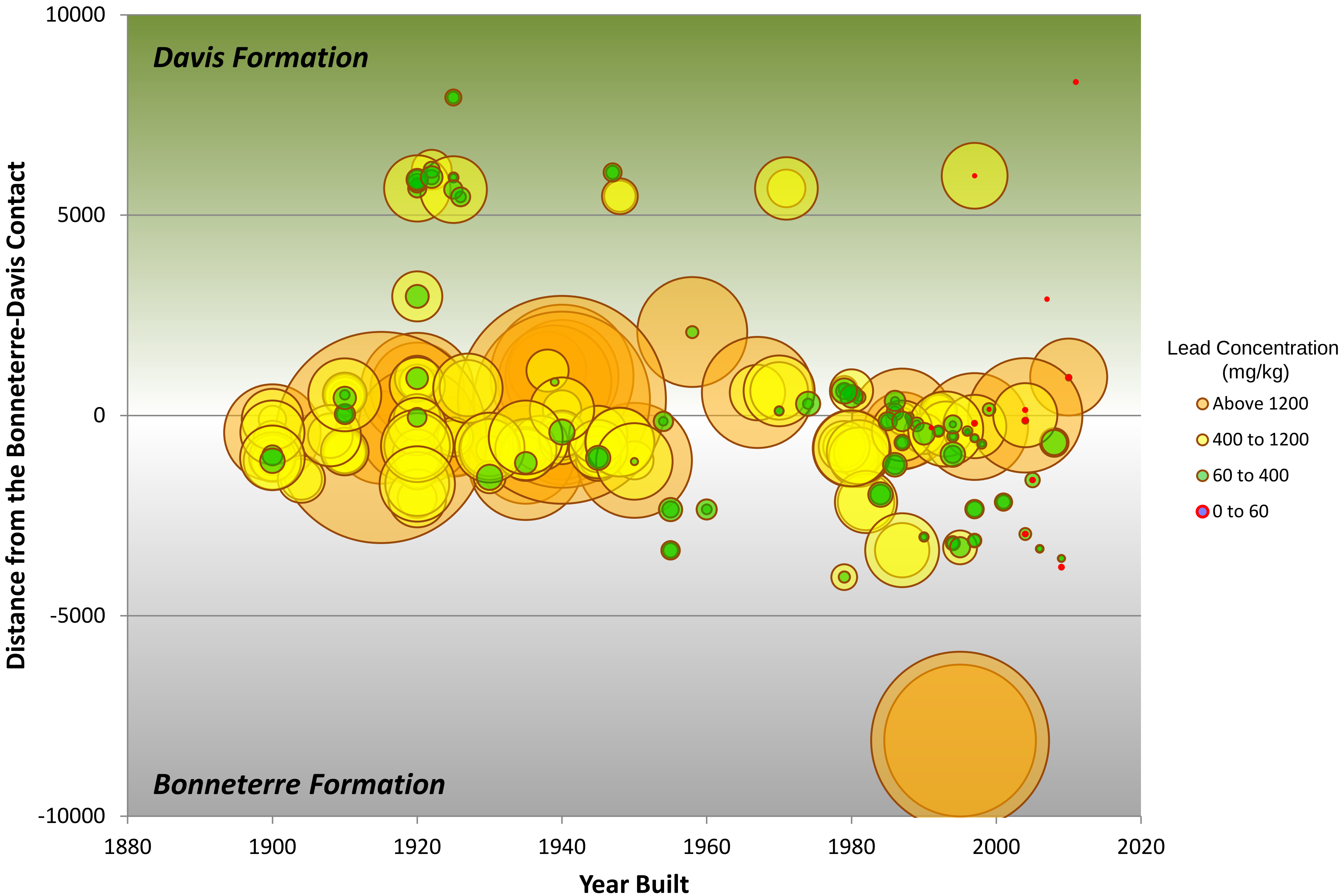

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Figure 3-6.
Residential Soil Lead Concentrations as a Function of Housing Age and Distance from Davis-Bonneterre Contact, Backyard Samples

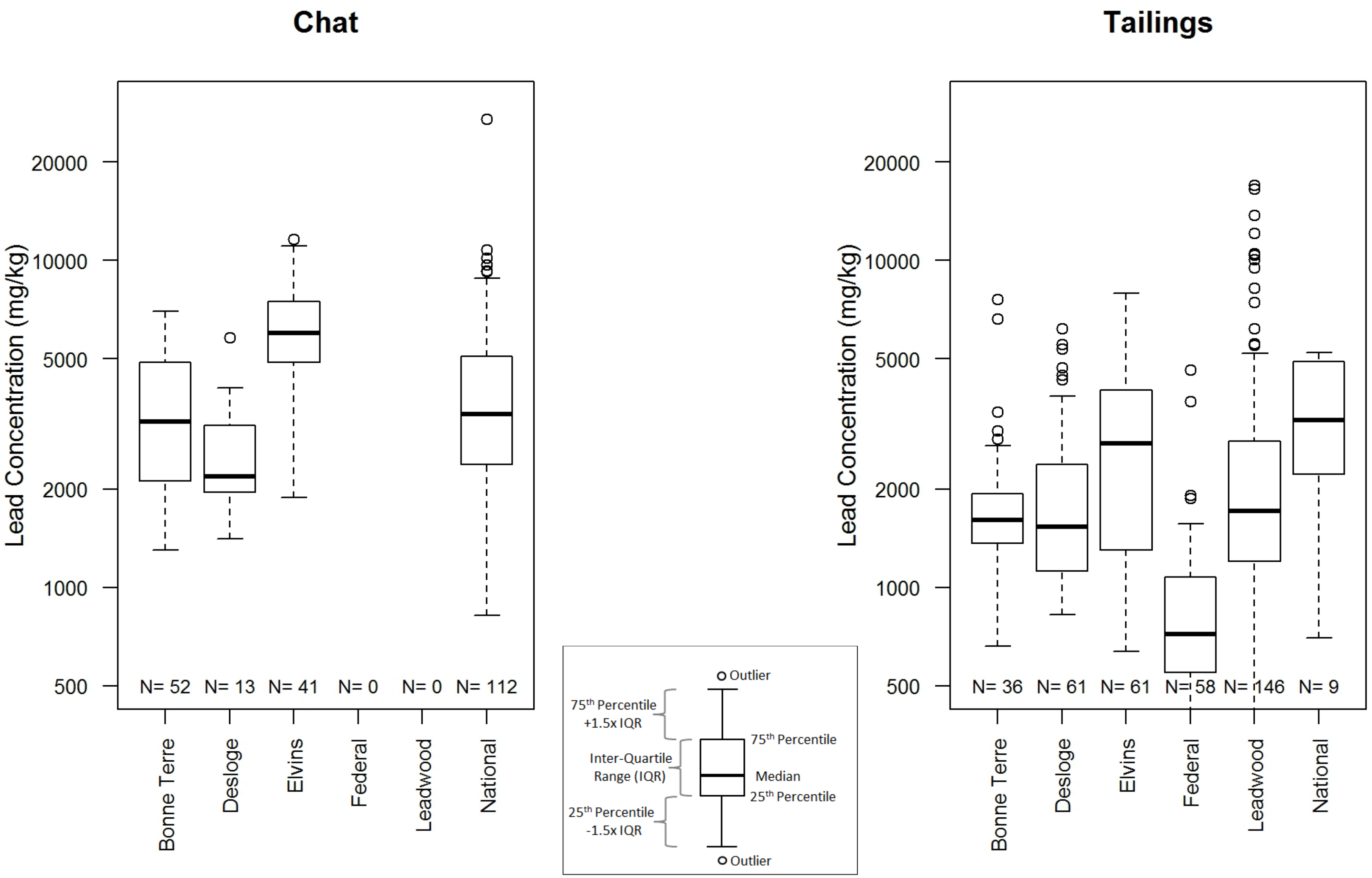

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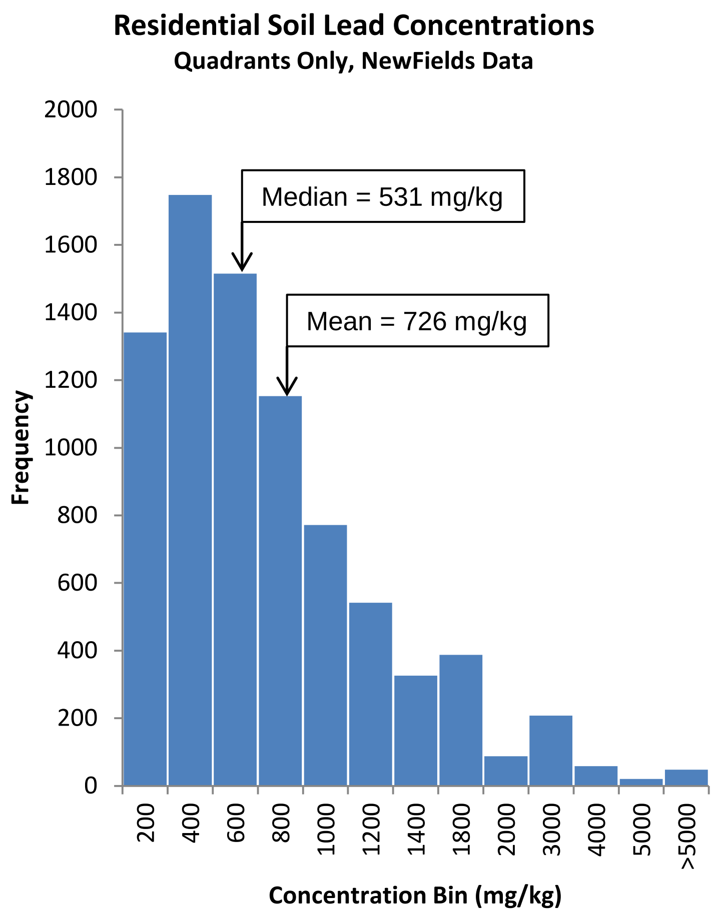
Figure 3-7.
Boxplots of Lead Concentrations in Chat and Tailings



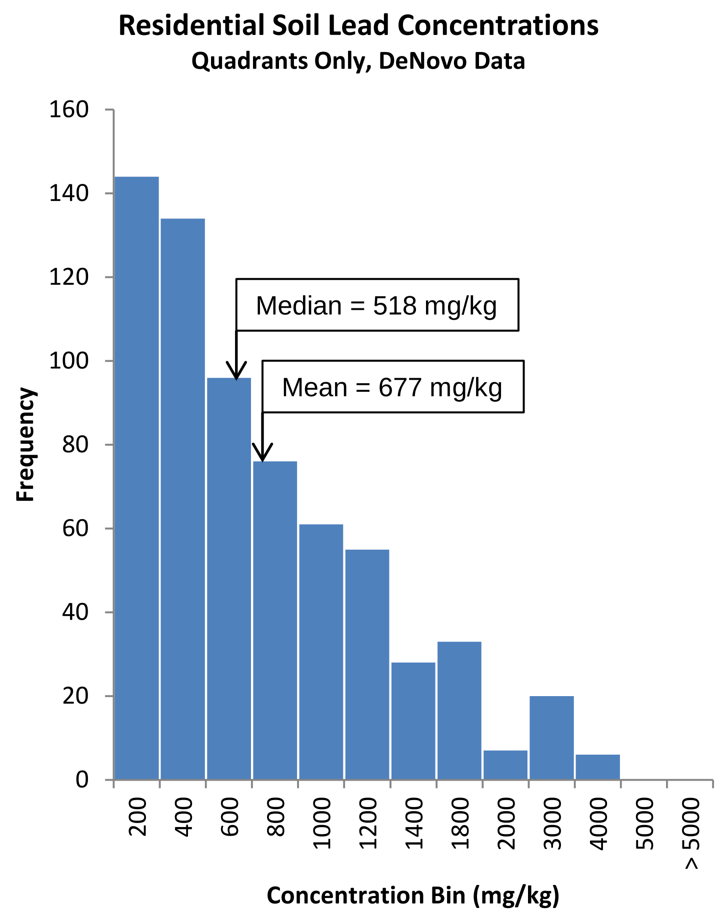
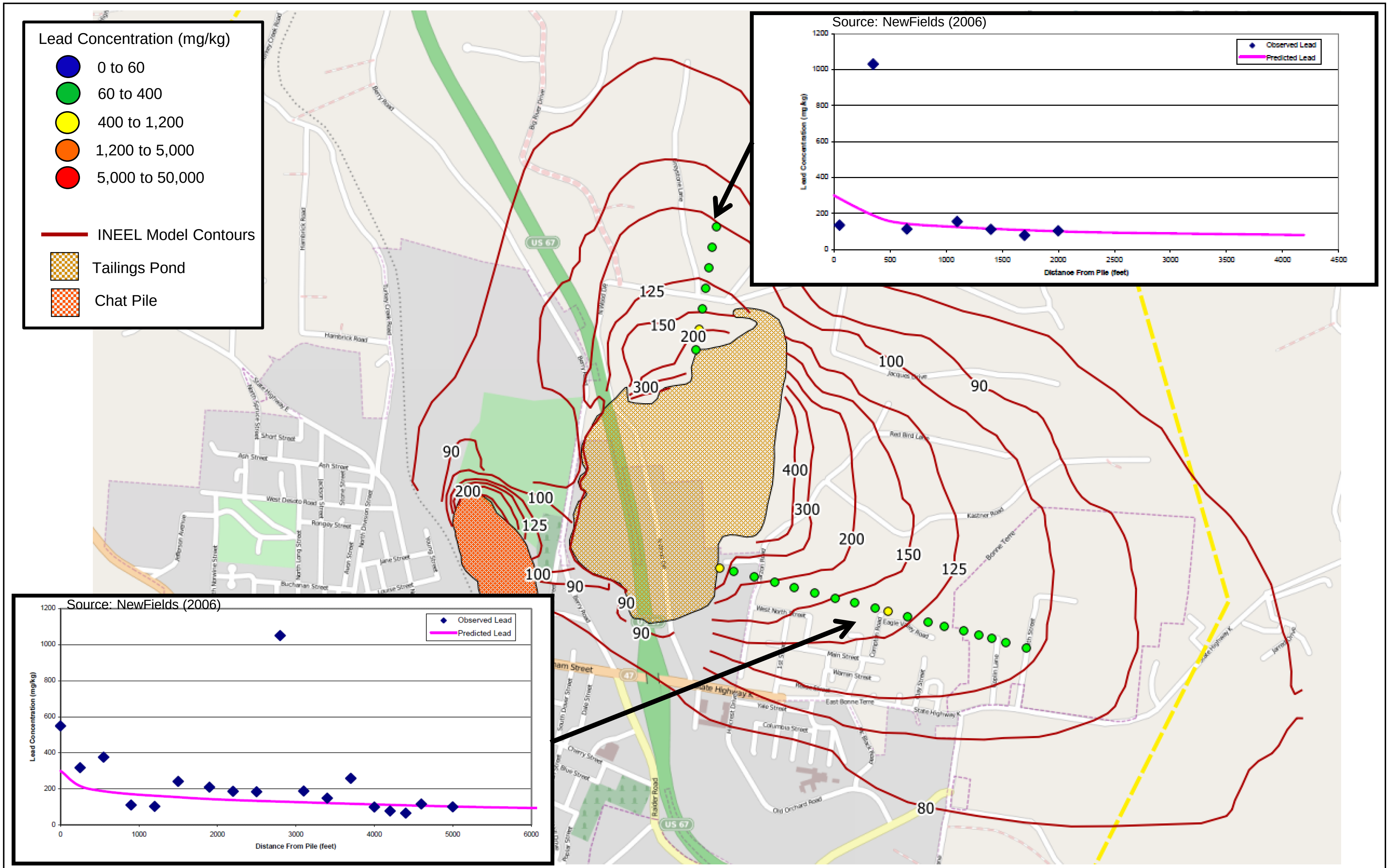
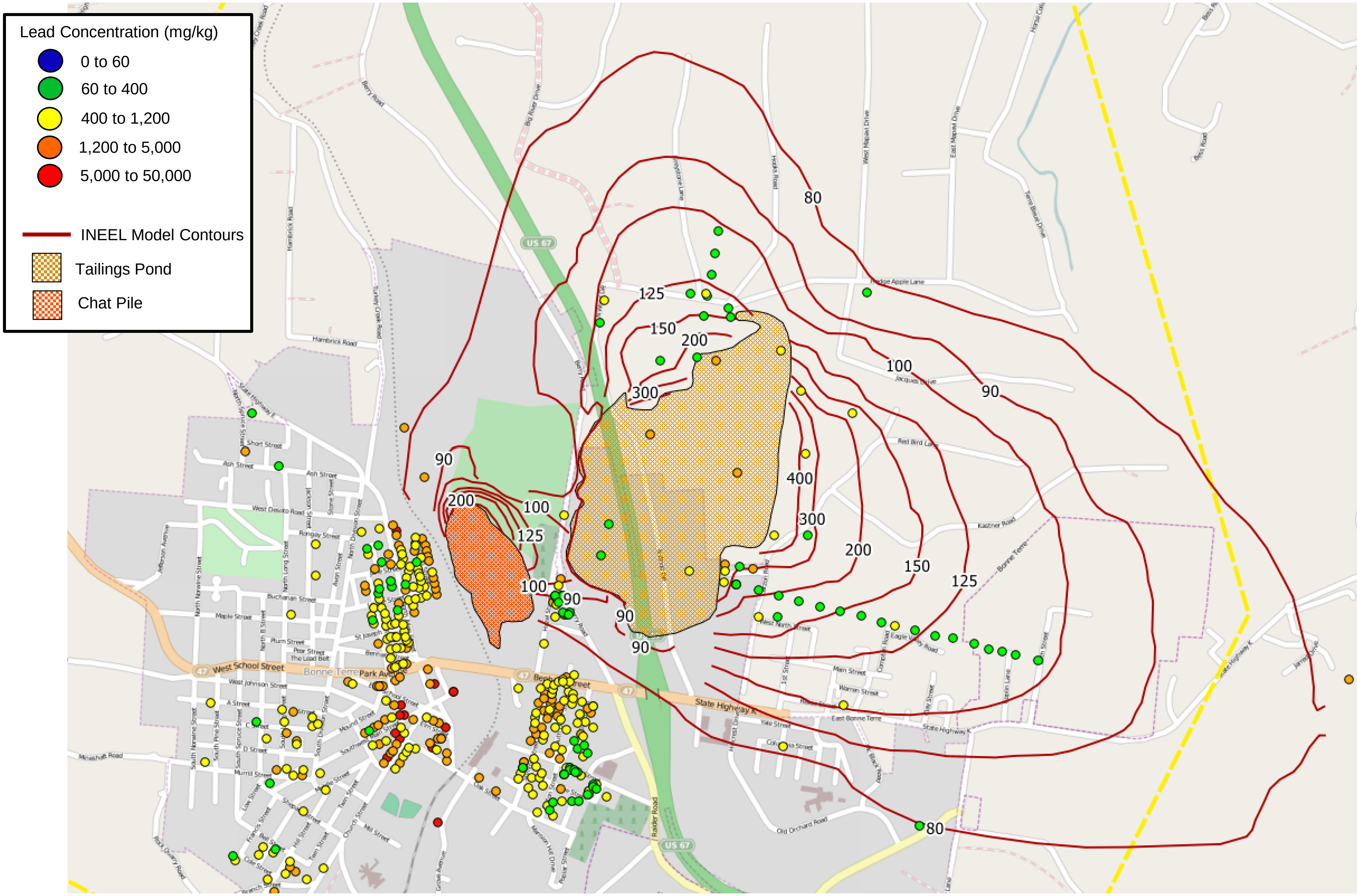


Figure 3-8.
Histograms of Residential Soil Lead Concentration for the NewFields (2004 to 2011) and DeNovo (2013) Sampling Efforts



Note: INEEL = Idaho National Engineering and Environmental Laboratory

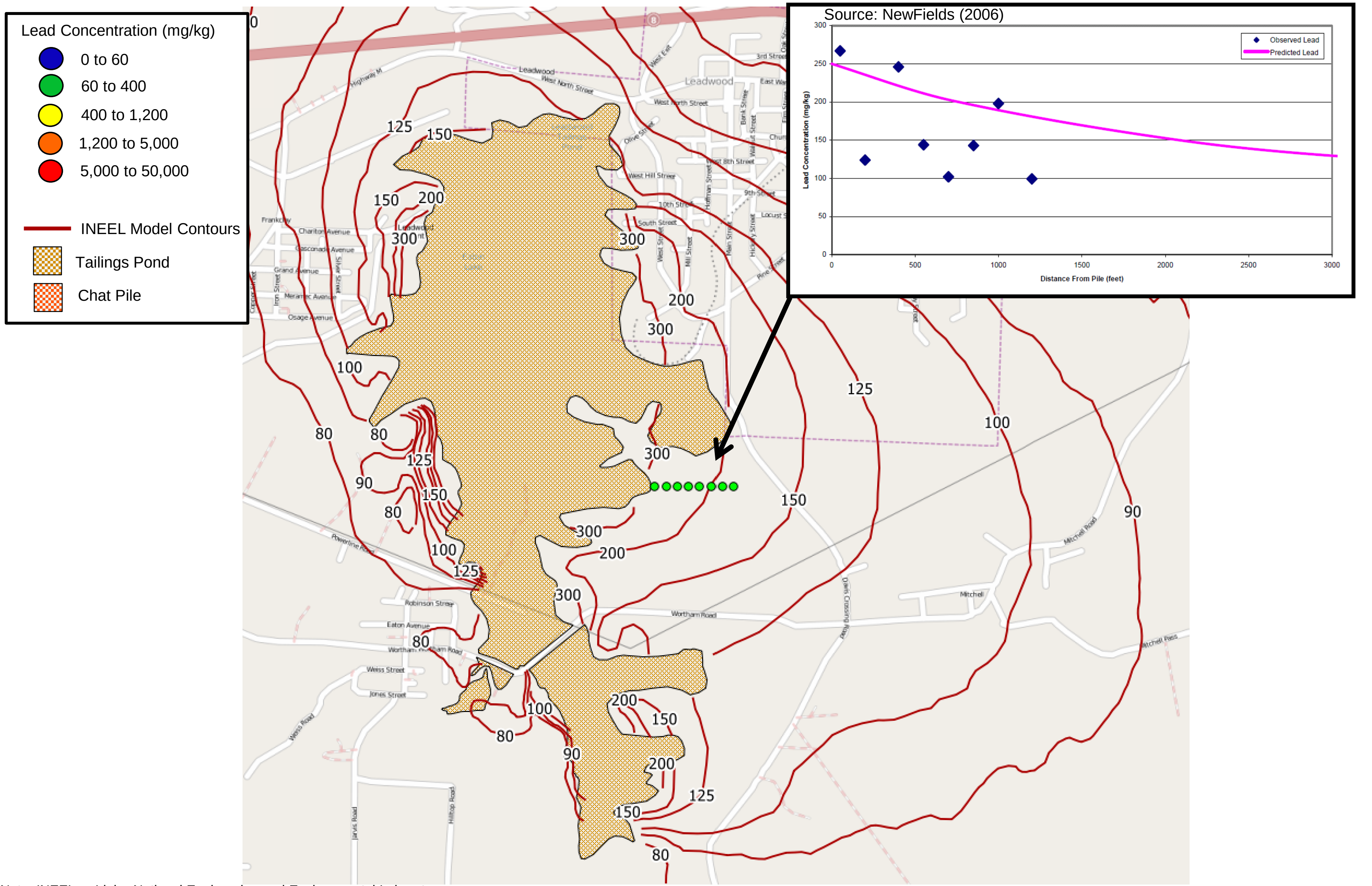
Figure 3-9.
Soil Transect Sampling and INEEL Air Dispersion Modeling Results, Bonne Terre



Note: INEEL = Idaho National Engineering and Environmental Laboratory

integral consulting inc.

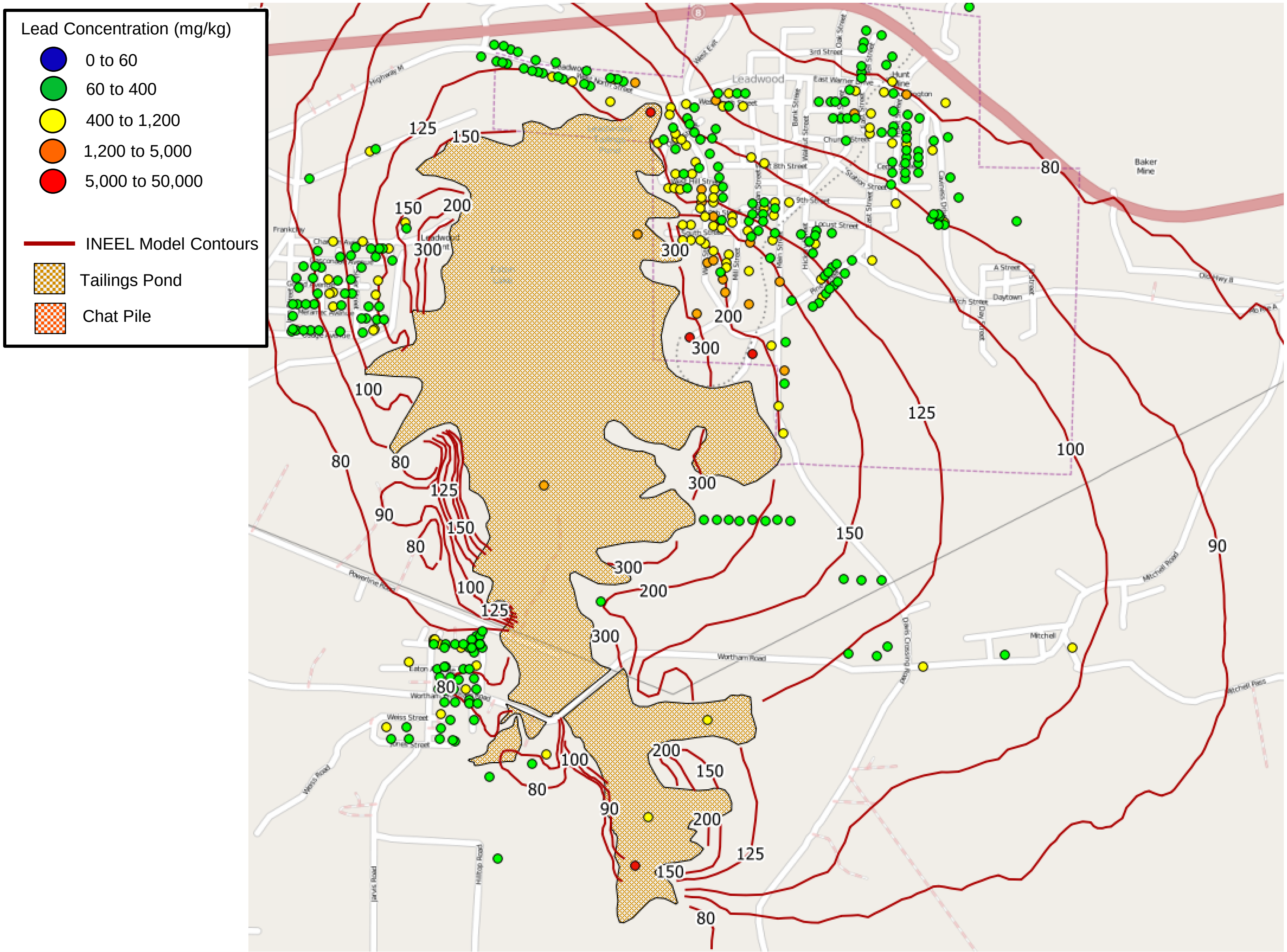
Figure 3-10.
Soil Sampling and INEEL Air Dispersion Modeling Results, Bonne Terre



Note: INEEL = Idaho National Engineering and Environmental Laboratory

integral consulting inc.

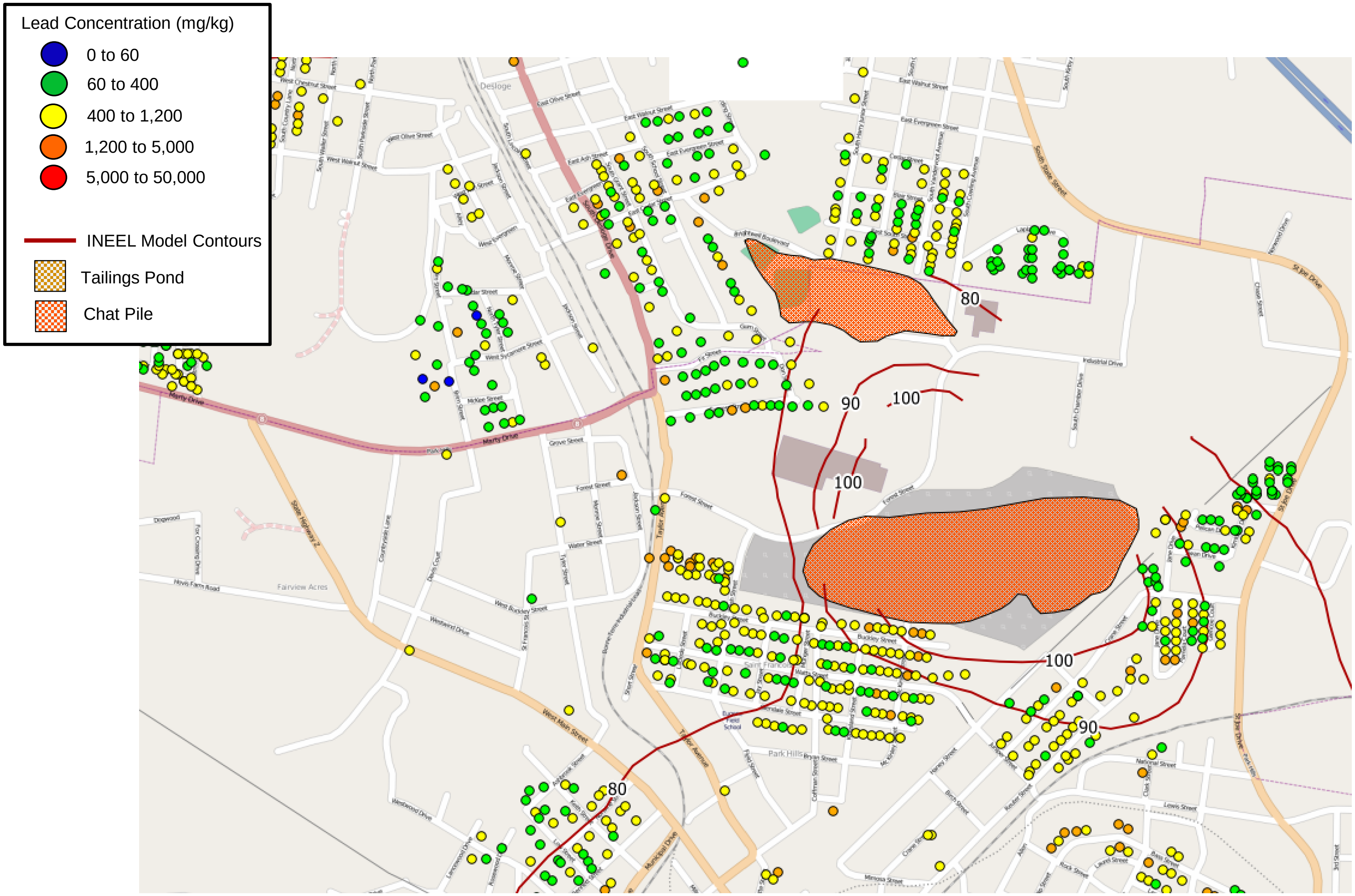
Figure 3-11.
Soil Transect Sampling and INEEL Air Dispersion Modeling Results, Leadwood



Note: INEEL = Idaho National Engineering and Environmental Laboratory

integral consulting inc.

Figure 3-12.
Soil Sampling and INEEL Air Dispersion Modeling Results, Leadwood



Note: INEEL = Idaho National Engineering and Environmental Laboratory

integral consulting inc.

Figure 3-13.
Soil Sampling and INEEL Air Dispersion Modeling Results, National

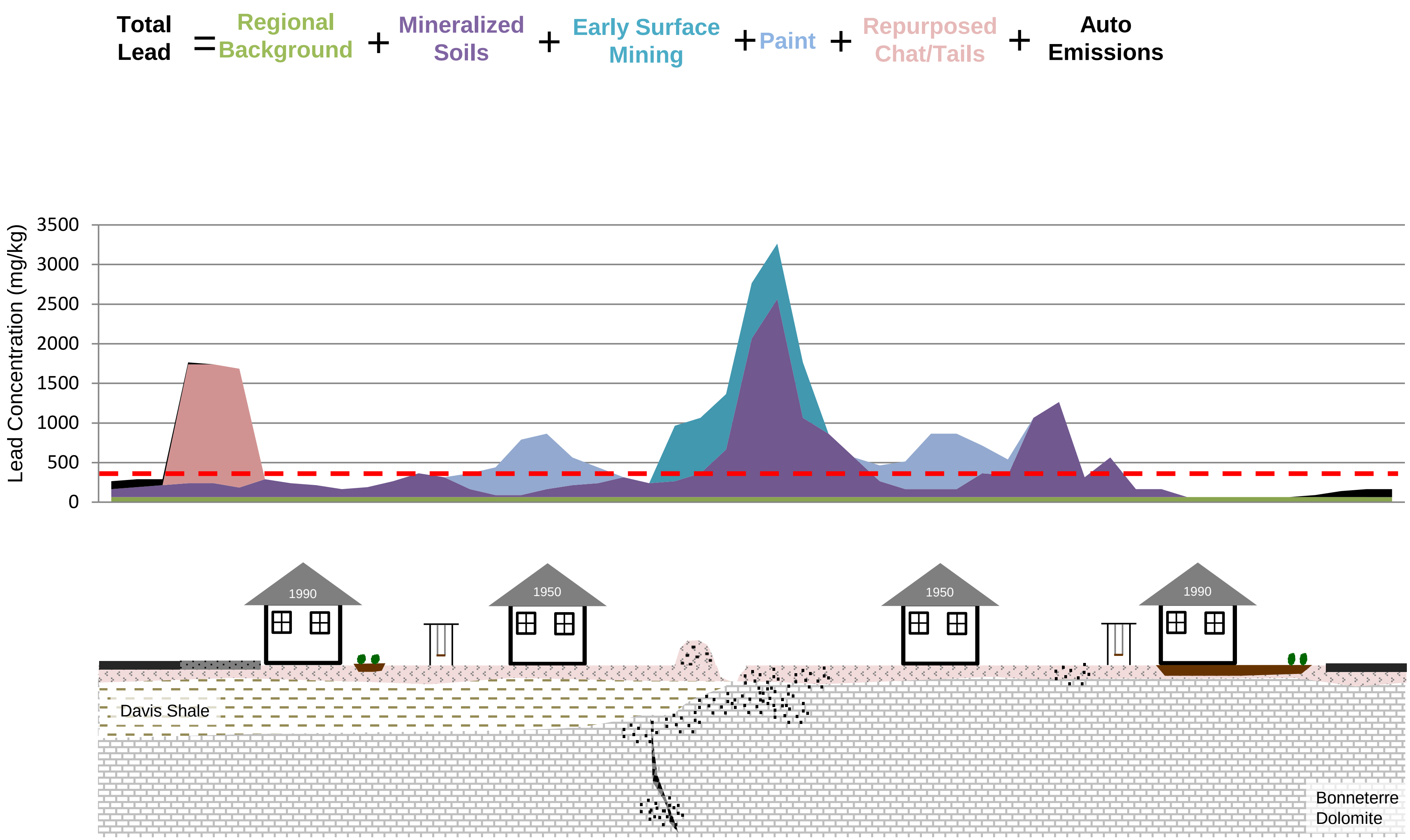


Figure 4-1.
Effect of Multiple Lead Sources on St. Francois County Residential Soils

TABLES

Table 3-1. Lead Concentrations in Chat and Tailings in the St. Francois County Mining Area (SFCMA), Summary Statistics

			Lead Concentrations (mg/kg)					
Matrix	Location	N	Minimum	25th Percentile	Median	Mean	75th Percentile	Maximum
Chat								
	Bonne Terre	52	1,300	2,155	3,215	3,583	4,795	7,010
	Desloge	13	1,410	1,950	2,180	2,696	3,130	5,822
	Elvins	41	1,880	4,890	6,000	6,405	7,500	11,600
	Federal	0	--	--	--	--	--	--
	Leadwood	0	--	--	--	--	--	--
	National	112	820	2,375	3,384	4,239	5,080	27,100
Tailings								
	Bonne Terre	36	660	1,380	1,605	2,024	1,928	7,610
	Desloge	61	826	1,120	1,530	1,979	2,380	6,200
	Elvins	61	638	1,300	2,750	2,824	4,020	7,950
	Federal	58	349	550	720	943	1,070	4,638
	Leadwood	146	208	1,200	1,715	2,677	2,750	17,000
	National	10	699	2,220	3,250	3,250	4,900	5,230

Note:
-- = no data

APPENDIX A

LEAD, COPPER AND ZINC CONCENTRATIONS IN RESIDENTIAL SOILS, 2013 FOCUSED RESIDENTIAL SAMPLING

Table A-1. Lead, Copper and Zinc Concentrations in Residential Soils, 2013 Focused Residential Sampling

					Concentration (mg/kg)																			
					Lead										Copper									
PROPERTY ID	ADDRESS	Sample Date	Latitude	Longitude	FL	FR	BR	BL	DRIP	DW	PA	GAR	DW 2	PA 2	FL	FR	BR	BL	DRIP	DW	PA	GAR	DW 2	PA 2
BTM0319	33 "A", Bonne Terre	2/19/2013	37° 55.287'	90° 33.446'	1345	956	3300	1443	3022	1117	--	--	--	--	54	52	82	103	93	33	--	--	--	--
BTM0320	310 "B", Bonne Terre	2/19/2013	37° 55.222'	90° 33.533'	309	734	663	603	578	1003	777	--	--	--	19	37	56	75	59	66	54	--	--	--
BTM0321	203 Bell, Bonne Terre	2/19/2013	37° 54.950'	90° 33.496'	357	234	319	125	196	--	--	--	--	--	39	31	32	6	35	--	--	--	--	--
BTM0322	11 Branch, Bonne Terre	2/19/2013	37° 54.859'	90° 33.395'	399	1722	864	527	938	202	--	--	--	--	7	7	32	67	59	25	--	--	--	--
BTM0323	103 Branch, Bonne Terre	2/19/2013	37° 54.858'	90° 33.457'	2738	2625	1763	1460	922	292	--	--	--	--	79	82	57	41	53	-2	--	--	--	--
BTM0324	108 Branch, Bonne Terre	2/19/2013	37° 54.838'	90° 33.522'	2465	2365	1765	2238	1163	--	936	--	--	--	61	60	89	120	59	--	44	--	--	--
BTM0325	203 Branch, Bonne Terre	2/19/2013	37° 54.856'	90° 33.528'	1364	1007	122	1769	666	553	80	--	--	--	52	50	13	61	51	17	116	--	--	--
BTM0326	12 "C", Bonne Terre	2/19/2013	37° 55.250'	90° 33.387'	646	1211	1187	1208	545	--	--	--	--	--	46	68	62	38	20	--	--	--	--	--
BTM0327	233 Church, Bonne Terre	2/19/2013	37° 54.893'	90° 33.349'	565	3060	149	1140	1220	663	--	--	--	--	25	105	-17	69	64	27	--	--	--	--
BTM0328	215 Division, Bonne Terre	2/19/2013	37° 55.261'	90° 33.373'	528	572	953	422	188	--	--	--	--	--	33	21	31	43	29	--	--	--	--	--
BTM0329	319 Francis, Bonne Terre	2/19/2013	37° 54.919'	90° 33.634'	211	60	55	88	140	--	--	--	--	--	6	<21	27	<20	<20	--	--	--	--	--
BTM0330	323 Francis, Bonne Terre	2/19/2013	37° 54.914'	90° 33.632'	119	76	45	1204	31	--	--	--	--	--	30	42	21	98	22	--	--	--	--	--
BTM0331	1104 Hawthorne, Bonne Terre	2/19/2013	37° 53.029'	90° 31.340'	123	161	174	403	746	1189	153	--	--	--	42	35	3	31	72	32	25	--	--	--
BTM0332	1125 Hawthorne, Bonne Terre	2/19/2013	37° 53.122'	90° 31.438'	516	239	315	529	210	--	--	--	--	--	38	<22	<22	<6	34	--	--	--	--	--
BTM0333	1131 Hawthorne, Bonne Terre	2/19/2013	37° 53.149'	90° 31.454'	190	143	218	179	176	--	--	--	--	--	<19	10	3	<20	<19	--	--	--	--	--
BTM0334	306 Middle, Bonne Terre	2/19/2013	37° 54.938'	90° 33.518'	800	201	479	352	661	--	317	--	--	--	43	25	88	43	58	--	58	--	--	--
BTM0335	305 Middle, Bonne Terre	2/19/2013	37° 54.943'	90° 33.527'	701	1831	474	609	1031	--	--	394	--	--	56	28	39	14	59	--	--	31	--	--
BTM0336	410 Murril, Bonne Terre	2/19/2013	37° 55.151'	90° 33.729'	958	1258	557	549	1527	--	--	--	--	--	26	73	36	46	45	--	--	--	--	--
BTM0337	306 Long, Bonne Terre	2/19/2013	37° 55.237'	90° 33.473'	892	891	1509	1000	6538	4	1728	531	--	--	89	19	28	77	57	5	201	8	--	--
BTM0338	214 Long, Bonne Terre	2/19/2013	37° 55.260'	90° 33.473'	192	406	708	482	314	136	--	--	--	--	46	52	52	19	19	16	--	--	--	--
BTM0339	201 Long, Bonne Terre	2/19/2013	37° 55.292'	90° 33.480'	1751	2331	1116	609	1166	209	--	--	--	--	73	104	38	54	72	24	--	--	--	--
BTM0340	7527 Jarred, Bonne Terre	2/19/2013	37° 55.366'	90° 30.095'	2798	298	2777	2371	2138	15	109	--	--	--	112	17	99	50	60	21	46	--	--	--
BTM0341	324 Hill, Bonne Terre	2/19/2013	37° 54.824'	90° 33.533'	654	55	1210	660	56	1167	--	--	--	--	16	1	-12	43	15	42	--	--	--	--
BTM0342	316 Hill, Bonne Terre	2/19/2013	37° 54.883'	90° 33.485'	680	919	879	1083	1467	469	--	--	--	--	76	52	59	26	36	25	--	--	--	--
BTM0343	306 Hill, Bonne Terre	2/19/2013	37° 54.906'	90° 33.467'	1044	890	867	1734	1016	--	--	--	--	--	64	13	44	42	72	--	--	--	--	--
BTM0344	141 Hill, Bonne Terre	2/19/2013	37° 55.097'	90° 33.331'	443	628	861	479	1449	--	--	--	--	--	24	21	32	15	57	--	--	--	--	--
BTM0345	313 Middle, Bonne Terre	2/19/2013	37° 54.924'	90° 33.547'	1195	1575	1108	899	1398	--	--	--	--	--	45	56	33	27	28	--	--	--	--	--
BTM0346	28 Murril, Bonne Terre	2/19/2013	37° 55.127'	90° 33.470'	1722	972	393	527	1624	446	--	--	--	--	50	63	9	40	41	10	--	--	--	--
BTM0347	102 Murril, Bonne Terre	2/19/2013	37° 55.127'	90° 33.504'	1340	2487	1828	902	1657	--	926	--	--	--	34	78	76	50	78	--	55	--	--	--
BTM0349	416 Murril, Bonne Terre	2/19/2013	37° 55.138'	90° 33.425'	663	537	583	709	877	857	--	--	--	--	33	35	39	42	76	24	--	--	--	--
BTM0350	419 Murril, Bonne Terre	2/19/2013	37° 55.125'	90° 33.445'	357	548	908	472	436	--	--	--	--	--	26	41	58	11	<14	--	--	--	--	--
BTM0351	420 Murril, Bonne Terre	NA	37° 55.124'	90° 33.416'	1074	1656	1246	1217	1377	--	--	--	--	--	52	49	44	64	40	--	--	--	--	--
BTM0352	1137 Riverwoods, Bonne Terre	2/19/2013	37° 53.150'	90° 31.511'	251	323	61	185	226	--	--	133	--	--	35	49	<18	<20	28	--	--	<22	--	--
BTM0353	1161 Riverwoods, Bonne Terre	2/19/2013	37° 53.215'	90° 31.544'	275	143	163	90	261	--	--	--	--	--	37	6	73	35	<22	--	--	--	--	--
BTM0354	1178 Riverwoods, Bonne Terre	2/19/2013	37° 53.276'	90° 31.572'	375	313	244	288	534	--	--	100	--	--	2	0.6	31	46	23	--	--	47	--	--
BTM0355	412 Shepard, Bonne Terre	2/19/2013	37° 55.102'	90° 33.533'	109	351	302	136	238	22	--	--	--	--	<21	<6	26	69	26	<22	--	--	--	--
DLM0462	1118 Bluffview, Desloge	2/14/2013	37° 27.271'	91° 12.605'	91	203	71	96	85	--	--	--	--	--	<20	<20	20	15	11	--	--	--	--	--
DLM0463	1120 Bluffview, Desloge	2/14/2013	37° 55.000'	90° 31.459'	159	98	225	59	144	--	--	--	--	--	54	29	<22	<18	11	--	--	--	--	--
DLM0464	508 Brim, Desloge	2/13/2013	37° 51.991'	90° 31.750'	193	133	81	144	107	--	--	--	--	--	<20	<20	<20	<19	<20	--	--	--	--	--
DLM0465	509 Brim, Desloge	2/13/2013	37° 51.980'	90° 31.754'	1134	1054	659	385	645	--	--	--	--	--	16	42	8	39	34	--	--	--	--	--
DLM0466	607 Brim, Desloge	2/13/2013	37° 51.902'	90° 31.766'	310	445	69	150	309	--	--	--	--	--	<5	30	8	<4	<21	--	--	--	--	--
DLM0467	613 Brim, Desloge	2/13/2013	37° 51.859'	90° 31.768'	268	313	1175	862	187	--	92	--	--	--	10	9	34	13	<21	--	<21	--	--	--
DLM0468	617 Brim, Desloge	2/13/2013	37° 51.849'	90° 31.745'	188	153	78	57	159	--	--	--	--	--	34	62	<19	<19	9	--	--	--	--	--
DLM0469	300 W. Cedar, Desloge	2/13/2013	37° 51.947'	90° 31.696'	148	98	174	112	435	--	--	--	--	--	13	40	7	<20	<5	--	--	--	--	--
DLM0470	301 W. Cedar, Desloge	2/13/2013	37° 51.949'	90° 31.706'	363	1052	129	112	1347	--	--	102	--	--	32	<20	<20	<9	<16	--	--	<19	--	--
DLM0471	304 W. Cedar, Desloge	2/13/2013	37° 51.953'	90° 31.732'	289	397	241	182	112	78	79	89	--	--	6	100	35	34	11	27	<20	36	--	--
DLM0472	406 E. Cedar, Desloge	2/14/2013	37° 52.120'	90° 31.177'	1301	1827	948	1208	967	--	--	--	--	--	40	59	37	47	44	--	--	--	--	--
DLM0473	400 Chace, Desloge	2/14/2013	37° 51.810'	90° 31.730'	44	39	51	36	33	--	--	--	--	--	5	<17	34	<16	<20	--	--	--	--	--
DLM0474	401 Chace, Desloge	2/14/2013	37° 51.788'	90° 31.725'	44	51	91	52	60	--	--	--	--	--	<19	<20	25	<17	<17	--	--	--	--	--
DLM0475	402 Chace, Desloge	2/14/2013	37° 51.803'	90° 31.757'	453	841	1003	1788	244	--	--	--	--	--	59	66	85	75	54	--	--	--	--	--
DLM0476	404 Chace, Desloge	2/14/2013	37° 51.806'	90° 31.773'	1019	793	53	50	134	--	69	--	--	--	54	46	14	<43	6	--	<19	--	--	--

Table A-1. Lead, Copper and Zinc Concentrations in Residential Soils, 2013 Focused Residential Sampling

					Concentration (mg/kg)																			
					Lead										Copper									
PROPERTY ID	ADDRESS	Sample Date	Latitude	Longitude	FL	FR	BR	BL	DRIP	DW	PA	GAR	DW 2	PA 2	FL	FR	BR	BL	DRIP	DW	PA	GAR	DW 2	PA 2
DLM0477	105 N. Desloge Dr., Desloge	2/14/2013	37° 52.291'	90° 31.607'	2256	1467	1832	3882	4031	--	--	--	--	--	71	54	70	67	244	--	--	--	--	--
DLM0478	208 N. Grant, Desloge	2/14/2013	37° 52.379'	90° 31.541'	799	1068	328	464	434	--	374	--	--	--	3	29	<34	<5	42	--	<21	--	--	--
DLM0479	209 N. Grant, Desloge	2/14/2013	37° 52.378'	90° 31.549'	1274	803	628	658	894	--	--	--	--	--	11	24	41	28	13	--	--	--	--	--
DLM0480	300 N. Grant, Desloge	2/14/2013	37° 52.394'	90° 31.532'	499	382	401	315	373	546	288	--	--	--	<18	<20	22	8	55	25	33	--	--	--
DLM0481	204 N. Desloge Dr., Desloge	2/14/2013	37° 52.349'	90° 31.613'	1855	2107	1592	1643	2161	1997	765	--	--	--	59	86	62	45	1113	81	67	--	--	--
DLM0482	305 N. Grant. Desloge	2/14/2013	37° 52.408'	90° 31.563'	1260	3099	898	655	4077	--	--	--	--	--	26	13	26	52	34	--	--	--	--	--
DLM0483	308 N. Grant. Desloge	NA	37° 52.426'	90° 31.562'	891	539	370	293	568	--	--	--	--	--	35	6	13	<5	<9	--	--	--	--	--
DLM0484	1119 Hawthorne, Desloge	2/14/2013	37° 53.098'	90° 31.456'	358	1146	850	1156	689	--	--	120	--	--	<20	<22	11	<24	<6	--	--	16	--	--
DLM0485	1136 Hawthorne, Desloge	2/14/2013	37° 53.135'	90° 31.430'	320	128	99	117	109	--	--	--	--	--	42	<21	38	<21	21	--	--	--	--	--
DLM0486	211 S. Harry, Desloge	2/19/2013	37° 52.274'	90° 30.945'	1295	825	737	642	1385	549	--	--	42	--	63	65	59	54	52	-15	--	--	17	--
DLM0487	707 S. Jackson, Desloge	NA	37° 51.862'	90° 31.457'	558	876	726	295	1180	101	--	--	--	--	47	61	30	4	92	19	--	--	--	--
DLM0488	2 Lacy Ct., Desloge	2/14/2013	37° 51.894'	90° 31.750'	154	84	88	76	101	--	--	--	--	--	49	45	<18	<4	60	--	--	--	--	--
DLM0489	4 Lacy Ct., Desloge	2/14/2013	37° 51.884'	90° 31.713'	112	1129	989	1670	198	--	--	--	--	--	<20	44	48	84	<5	--	--	--	--	--
DLM0490	309 Marty, Desloge	2/14/2013	37° 51.751'	90° 31.601'	334	197	183	246	183	434	127	--	--	93	<4	9	<4	37	<4	31	<6	--	--	23
DLM0491	311 Marty, Desloge	2/14/2013	37° 51.737'	90° 31.603'	1058	457	135	675	477	--	--	--	--	--	62	<18	<19	29	23	--	--	--	--	--
DLM0492	313 Marty, Desloge	2/14/2013	37° 51.734'	90° 31.606'	1172	457	417	172	724	--	153	34	--	149	82	<31	6	34	13	--	15	22	--	26
DLM0493	317 Marty, Desloge	2/14/2013	37° 51.733'	90° 31.660'	321	677	395	254	364	546	--	--	--	--	4	25	<22	<20	12	31	--	--	--	--
DLM0494	304 McKee, Desloge	2/14/2013	37° 51.708'	90° 31.635'	1282	645	199	113	181	--	--	--	--	--	13	10	17	7	55	--	--	--	--	--
DLM0495	305 McKee, Desloge	NA	37° 51.806'	90° 31.648'	699	476	379	159	738	--	--	--	--	--	<19	<3	33	<13	29	--	--	--	--	--
DLM0496	306 McKee, Desloge	2/14/2013	37° 51.780'	90° 31.653'	521	994	354	122	491	727	--	--	--	--	8	32	<6	41	70	42	--	--	--	--
DLM0497	308 McKee, Desloge	2/14/2013	37° 51.778'	90° 31.654'	213	137	209	121	319	59	--	--	--	--	12	<19	30	16	4	6	--	--	--	--
DLM0498	301 Monroe, Desloge	2/13/2013	37° 52.135'	90° 31.712'	519	1042	403	596	1794	475	--	--	254	--	5	37	24	23	45	34	--	--	20	--
DLM0499	307 Monroe, Desloge	2/13/2013	37° 52.115'	90° 31.700'	737	435	928	628	1403	--	--	--	--	--	<6	8	31	<20	42	--	--	--	--	--
DLM0500	309 Monroe, Desloge	2/13/2013	37° 52.104'	90° 31.691'	629	1106	600	480	1324	81	--	--	--	--	21	61	35	28	68	46	--	--	--	--
DLM0501	401 Monroe, Desloge	2/13/2013	37° 52.087'	90° 31.682'	946	460	769	543	1061	677	--	--	--	--	57	-7	1.3	19	40	<21	--	--	--	--
DLM0502	409 Monroe, Desloge	2/13/2013	37° 52.063'	90° 31.666'	681	766	676	746	1358	127	880	803	--	755	29	28	<45	36	47	159	13	83	--	<5
DLM0503	601 Monroe, Desloge	2/13/2013	37° 51.938'	90° 31.592'	776	597	955	428	1449	--	468	--	--	--	19	13	59	48	33	--	54	--	--	--
DLM0504	703 Monroe, Desloge	2/13/2013	37° 51.854'	90° 31.536'	299	431	584	522	391	46	--	--	--	--	10	<3	13	<19	8	<22	--	--	--	--
DLM0505	705 Monroe, Desloge	2/13/2013	37° 51.842'	90° 31.529'	457	344	599	1005	785	99	--	--	--	--	10	<20	34	<4	11	<21	--	--	--	--
DLM0506	1202 Orchard, Desloge	2/19/2013	37° 52.564'	90° 30.695'	249	584	288	227	432	--	280	--	--	--	11	54	10	10	36	--	6	--	--	--
DLM0507	101 S. Ravencrest, Desloge	2/19/2013	37° 52.262'	90° 32.113'	1032	1417	904	607	676	--	3093	--	--	--	33	11	<7	9	20	--	57	--	--	--
DLM0509	1130 Riverwoods, Desloge	2/14/2013	37° 53.133'	90° 31.496'	156	216	190	213	220	--	--	--	--	--	19	<20	<21	11	33	--	--	--	--	--
DLM0510	1190 Riverwoods, Desloge	NA	37° 53.307'	90° 31.586'	275	328	267	212	241	--	--	--	--	--	-4	<20	5	39	17	--	--	--	--	--
DLM0511	103 N. School, Desloge	NA	37° 52.323'	90° 31.451'	1098	508	671	730	794	--	--	--	--	--	48	<6	20	78	29	--	--	--	--	--
DLM0512	109 N. School, Desloge	2/13/2013	37° 52.347'	90° 31.451'	338	359	590	481	517	--	--	--	--	--	<14	<5	33	20	40	--	--	--	--	--
DLM0513	305 N. School, Desloge	2/13/2013	37° 52.431'	90° 31.480'	458	410	384	455	682	--	303	1299	--	549	13	<4	<4	<7	52	--	<9	71	--	47
DLM0514	1130 Stonecrest, Desloge	2/14/2013	37° 53.072'	90° 31.312'	72	66	70	59	60	--	--	--	--	--	14	<31	45	<23	<23	--	--	--	--	--
DLM0515	1135 Stonecrest, Desloge	2/14/2013	37° 53.105'	90° 31.350'	70	60	110	101	73	--	--	--	--	--	<3	<2	<6	<20	<22	--	--	--	--	--
DLM0516	303 Sycamore, Desloge	2/14/2013	37° 57.850'	90° 31.661'	1368	822	1566	499	1176	--	--	--	--	--	49	58	44	51	44	--	--	--	--	--
DLM0517	304 Sycamore, Desloge	2/14/2013	37° 51.841'	90° 37.673'	177	95	134	145	228	--	--	--	--	--	<6	28	<17	20	<5	--	--	--	--	--
DLM0518	305 Sycamore, Desloge	2/14/2013	37° 51.850'	90° 31.680'	1644	1208	133	65	231	--	--	--	--	--	54	15	<17	<18	27	--	--	--	--	--
DLM0519	601 Tyler, Desloge	2/13/2013	37° 51.925'	90° 31.667'	698	401	146	177	170	--	--	--	--	--	11	<18	<19	<17	<4	--	--	--	--	--
DLM0520	602 Tyler, Desloge	NA	37° 51.902'	90° 31.652'	132	116	215	123	157	--	--	--	--	--	10	<20	9	11	49	--	--	--	--	--
DLM0521	603 Tyler, Desloge	2/13/2013	37° 51.915'	90° 31.661'	325	57	32	37	77	--	--	--	--	--	<5	11	<4	<18	<19	--	--	--	--	--
DLM0522	604 Tyler, Desloge	2/13/2013	37° 51.891'	90° 31.640'	131	120	312	427	221	--	--	--	--	--	14	11	28	<21	78	--	--	--	--	--
DLM0523	605 Tyler, Desloge	2/13/2013	37° 51.902'	90° 31.649'	88	113	281	99	99	--	--	101	--	--	<18	21	53	22	<20	--	--	30	--	--
DLM0524	606 Tyler, Desloge	2/13/2013	37° 51.878'	90° 31.633'	150	292	259	172	233	--	245	--	--	--	<34	<6	40	<20	<13	--	11	--	--	--
DLM0525	607 Tyler, Desloge	2/13/2013	37° 51.891'	90° 31.644'	271	226	80	89	188	--	--	--	--	--	32	<5	16	27	24	--	--	--	--	--
DLM0526	107 S. Waller, Desloge	2/19/2013	90° 52.201'	90° 31.968'	943	1021	1000	1178	1576	--	--	--	--	--	44	52	51	60	48	--	--	--	--	--
DLM0527	300 6th, Desloge	2/19/2013	37° 50.765'	90° 29.924'	521	1037	622	680	1561	1705	516	--	--	--	12	45	32	40	52	57	12	--	--	--
DRM0061	3115 Hwy 221, Doe Run (left)	2/20/2013	37° 54.937'	90° 33.300'	1228	866	840	767	--	--	--	--	--	--	37	15	44	16	--	--	--	--	--	--

Table A-1. Lead, Copper and Zinc Concentrations in Residential Soils, 2013 Focused Residential Sampling

					Concentration (mg/kg)																			
					Lead										Copper									
PROPERTY ID	ADDRESS	Sample Date	Latitude	Longitude	FL	FR	BR	BL	DRIP	DW	PA	GAR	DW 2	PA 2	FL	FR	BR	BL	DRIP	DW	PA	GAR	DW 2	PA 2
DRM0061	3115 Hwy 221, Doe Run (right)	2/20/2013	37° 44.617'	90° 29.816'	1918	1277	1417	786	717	--	--	--	--	--	33	16	36	37	11	--	--	--	--	--
DRM0062	3360 Hwy 221, Doe Run	2/20/2013	37° 45.174'	90° 29.152'	561	308	189	1717	467	1682	--	--	--	--	33	22	26	74	79	24	--	--	--	--
DRM0063	2674 Birch, Doe Run	2/20/2013	37° 44.744'	90° 30.028'	110	129	154	313	503	198	--	--	--	--	33	41	27	<7	42	20	--	--	--	--
DRM0064	2706 Birch, Doe Run	2/20/2013	37° 44.768'	90° 30.068'	151	139	135	259	110	159	--	--	--	--	29	24	30	61	7	23	--	--	--	--
DRM0065	2651 Cedar, Doe Run	2/20/2013	37° 44.791'	90° 29.797'	366	422	972	882	855	167	--	--	--	--	34	1	43	81	81	29	--	--	--	--
DRM0066	2624 Elm, Doe Run	2/20/2013	37° 44.524'	90° 30.016'	131	1191	1196	110	112	73	--	--	--	--	13	98	102	23	56	5	--	--	--	--
DRM0067	2631 Maple, Doe Run	2/20/2013	37° 44.683'	90° 29.812'	580	1673	291	283	--	114	--	--	--	--	24	34	60	42	--	5	--	--	--	--
DRM0068	2659 Maple, Doe Run	2/20/2013	37° 44.744'	90° 29.869'	1546	2173	384	310	531	2146	--	--	--	--	87	50	42	59	75	32	--	--	--	--
DRM0069	1533 Hwy 221, Doe Run	2/20/2013	37° 42.194'	90° 32.662'	46	331	41	49	36	74	--	--	--	--	61	35	9	47	42	37	--	--	--	--
DRM0070	2678 Maple, Doe Run	2/20/2013	37° 44.784'	90° 29.896'	674	1293	256	361	334	1542	--	--	382	--	20	72	19	26	38	22	--	--	-10	--
DRM0071	2816 Maple, Doe Run	2/20/2013	37° 44.675'	90° 29.773'	1182	1326	532	266	996	616	1440	--	--	--	61	55	36	40	57	39	26	--	--	--
DRM0072	2616 Oak, Doe Run	2/20/2013	37° 44.564'	90° 29.957'	714	167	711	494	674	902	--	--	--	--	20	47	17	3	20	65	--	--	--	--
DRM0073	2624 Willow, Doe Run	2/20/2013	37° 44.659'	90° 29.857'	849	528	397	503	901	475	634	--	--	--	32	34	84	29	71	49	72	--	--	--
DRM0074	2741 Willow, Doe Run	2/20/2013	37° 44.858'	90° 30.091'	329	290	103	144	313	30	--	--	--	--	16	23	39	36	30	4	--	--	--	--
DRM0075	2733 Willow, Doe Run	2/20/2013	37° 44.843'	90° 30.077'	540	102	76	80	143	118	--	--	--	--	36	54	43	30	23	6	--	--	--	--
DRM0076	2623 Maple, Doe Run	2/20/2013	37° 44.683'	90° 29.810'	247	325	356	266	218	820	249	--	--	467	43	35	27	29	46	85	51	--	--	10
GUM0002	1823 Hwy 8, Parkhills	2/19/2013	37° 51.876'	90° 33.520'	136	197	36	198	--	74	--	--	--	--	27	55	395	<5	--	108	--	--	--	--
GUM0003	5902 Spruce, Parkhills	2/19/2013	37° 51.866'	90° 33.618'	254	534	264	167	284	1887	--	--	--	--	<5	31	35	30	13	<6	--	--	--	--
GUM0004	5957 Spruce, Parkhills	2/19/2013	37° 51.978'	90° 33.627'	2690	2907	338	629	634	1111	325	--	--	321	106	647	8	54	71	85	38	--	--	28
PHM0904	505 Adams, Parkhills	2/18/2013	37° 50.820'	90° 30.447'	687	1150	339	698	1059	611	--	--	--	--	<21	50	7	44	49	31	--	--	--	--
PHM0905	700 Camilla, Parkhills	2/18/2013	37° 49.861'	90° 32.189'	525	996	167	297	3241	--	--	--	--	--	24	24	2	36	90	--	--	--	--	--
PHM0906	701 Camilla, Parkhills	2/18/2013	37° 49.855'	90° 32.192'	257	333	490	558	650	--	--	--	--	--	55	52	10	35	43	--	--	--	--	--
PHM0907	704 Camilla, Parkhills	2/18/2013	37° 49.837'	90° 32.224'	526	748	1044	287	530	--	--	--	--	--	5	16	11	<21	30	--	--	--	--	--
PHM0908	705 Camilla, Parkhills	2/18/2013	37° 49.829'	90° 32.706'	419	299	249	183	499	--	--	--	--	--	56	45	37	39	39	--	--	--	--	--
PHM0909	802 Camilla, Parkhills	2/18/2013	37° 49.784'	90° 32.248'	278	397	172	93	232	--	--	--	--	--	<23	<20	<9	<17	26	--	--	--	--	--
PHM0910	808 Camilla, Parkhills	2/18/2013	37° 49.751'	90° 32.272'	245	533	225	338	549	--	302	--	--	--	<21	8	4	-6	10	--	4	--	--	--
PHM0911	902 Camilla, Parkhills	2/18/2013	37° 49.724'	90° 32.290'	194	483	207	280	515	1742	--	--	--	--	<21	28	15	11	45	40	--	--	--	--
PHM0912	803 Central, Parkhills	2/18/2013	37° 52.397'	90° 31.555'	488	704	378	307	728	2066	--	--	--	--	33	44	45	31	17	64	--	--	--	--
PHM0913	706 Ethel, Parkhills	2/18/2013	37° 49.856'	90° 32.280'	329	447	156	109	1385	--	--	--	--	--	7	33	6	27	10	--	--	--	--	--
PHM0914	703 Ethel, Parkhills	2/18/2013	37° 49.870'	90° 32.262'	337	520	168	291	559	172	--	--	--	--	-4	<21	4	24	<20	28	--	--	--	--
PHM0915	627 Ethel, Parkhills	2/18/2013	37° 49.896'	90° 32.240'	309	359	1035	284	1320	953	450	--	--	--	37	44	31	23	64	27	44	--	--	--
PHM0916	707 Ethel, Parkhills	2/18/2013	37° 49.853'	90° 32.278'	546	782	295	337	440	90	--	--	--	--	22	57	36	5	21	19	--	--	--	--
PHM0917	809 Ethel, Parkhills	2/18/2013	37° 49.793'	90° 32.320'	1028	1035	251	622	2617	--	--	--	--	--	49	34	47	36	40	--	--	--	--	--
PHM0918	10 Federal Park, Parkhills	2/18/2013	37° 50.542'	90° 30.298'	3713	2549	3247	2752	4919	1794	1979	--	--	--	75	68	107	69	107	15	66	--	--	--
PHM0919	305 Gettinger, Parkhills	2/18/2013	37° 49.916'	90° 32.315'	46	52	1027	36	--	--	--	--	--	--	<24	<22	44	<22	--	--	--	--	--	--
PHM0920	402 Hovis Farm Ln, Parkhills	2/18/2013	37° 51.223'	90° 32.458'	795	826	44	42	215	--	46	225	--	--	15	35	14	20	22	--	31	<21	--	--
PHM0921	820 E. Main, Parkhills	2/18/2013	37° 50.645'	90° 30.055'	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHM0922	5905 Maple, Parkhills	2/18/2013	37° 51.881'	90° 33.559'	656	452	253	316	295	265	--	--	--	--	45	<6	<6	13	23	49	--	--	--	--
PHM0923	5923 Maple, Parkhills	2/18/2013	37° 51.920'	90° 33.591'	308	405	285	215	161	271	--	--	--	--	40	47	10	27	36	<23	--	--	--	--
PHM0924	5977 Maple, Parkhills	2/18/2013	37° 52.043'	90° 33.569'	754	800	660	796	2066	771	--	30	--	--	41	13	3	25	50	35	--	30	--	--
PHM0925	6 Pine, Parkhills	2/18/2013	37° 50.923'	90° 31.843'	1112	986	780	356	647	--	305	--	--	--	44	55	65	32	27	--	8	--	--	--
PHM0926	103 Rebel, Parkhills	NA	37° 50.738'	90° 31.344'	734	757	633	685	1036	2137	--	--	--	--	30	42	15	44	63	<7	--	--	--	--
PHM0927	600 Sutton, Parkhills	2/18/2013	37° 49.969'	90° 32.264'	1734	421	978	590	865	1397	--	--	558	--	52	12	47	<22	54	<5	--	--	16	--
PHM0928	100 4th, Parkhills	2/18/2013	37° 50.673'	90° 30.121'	976	1071	611	1241	1653	--	--	--	--	--	30	65	29	35	78	--	--	--	--	--
PHM0929	101 4th, Parkhills	2/18/2013	37° 50.668'	90° 30.115'	1101	1380	695	955	949	303	--	--	--	--	60	53	36	43	33	27	--	--	--	--
PHM0930	108 4th, Parkhills	2/18/2013	37° 50.688'	90° 30.118'	1268	1012	506	1227	607	86	--	--	--	--	40	43	25	30	<22	<23	--	--	--	--
PHM0931	116 4th, Parkhills	2/18/2013	37° 50.704'	90° 30.107'	1516	1440	1156	539	2960	58	--	--	--	--	49	47	45	22	162	<21	--	--	--	--
PHM0932	205 4th, Parkhills	2/18/2013	37° 50.731'	90° 30.093'	1171	980	703	699	2298	164	--	--	--	--	37	20	42	40	51	<22	--	--	--	--
PHM0933	216 4th, Parkhills	2/18/2013	37° 50.765'	90° 30.090'	431	373	396	447	376	--	--	--	--	--	37	43	80	16	56	--	--	--	--	--
PHM0934	115 5th, Parkhills	2/18/2013	37° 50.689'	90° 30.006'	924	996	327	584	1468	--	--	--	--	--	42	43	27	27	88	--	--	--	--	--
PHM0935	200 5th, Parkhills	2/18/2013	37° 50.704'	90° 30.026'	1440	1758	721	916	1520	--	--	--	--	--	44	68	14	<9	51	--	--	--	--	--

Table A-1. Lead, Copper and Zinc Concentrations in Residential Soils, 2013 Focused Residential Sampling

					Concentration (mg/kg)																			
					Lead										Copper									
PROPERTY ID	**ADDRESS**	**Sample Date**	**Latitude**	**Longitude**	**FL**	**FR**	**BR**	**BL**	**DRIP**	**DW**	**PA**	**GAR**	**DW 2**	**PA 2**	**FL**	**FR**	**BR**	**BL**	**DRIP**	**DW**	**PA**	**GAR**	**DW 2**	**PA 2**
PHM0936	201 5th, Parkhills	2/18/2013	37° 50.694'	90° 30.005'	905	870	957	708	1034	--	--	--	--	--	62	63	42	39	35	--	--	--	--	--
PHM0937	202 5th, Parkhills	2/18/2013	37° 50.721'	90° 30.029'	609	508	376	402	475	56	413	--	--	--	38	42	30	47	30	46	46	--	--	--
PHM0938	210 5th, Parkhills	2/18/2013	37° 50.726'	90° 30.024'	1144	1079	543	509	2981	--	--	--	--	--	41	44	25	18	86	--	--	--	--	--
PHM0939	220 5th, Parkhills	NA	37° 50.745'	90° 30.016'	876	995	1523	809	7212	--	811	--	--	--	27	36	41	24	62	--	31	--	--	--
PHM0940	110 6th, Parkhills	2/18/2013	37° 50.666'	90° 29.962'	917	941	569	447	1052	538	1057	--	--	--	49	52	76	44	37	37	74	--	--	--
PHM0941	111 6th, Parkhills	2/18/2013	37° 50.669'	90° 29.939'	2767	1826	775	1000	1098	--	--	--	--	--	17	119	60	14	190	--	--	--	--	--
PHM0942	205 6th, Parkhills	2/18/2013	37° 50.701'	90° 29.938'	592	273	705	593	392	17	--	--	--	--	32	36	55	7	37	2	--	--	--	--
PHM0943	206 6th, Parkhills	2/18/2013	37° 50.695'	90° 29.962'	445	339	383	270	311	49	--	--	--	--	<4	48	36	18	29	<20	--	--	--	--
PHM0944	214 6th, Parkhills	2/18/2013	37° 50.724'	90° 29.939'	1205	399	1787	339	404	--	--	--	--	--	38	78	52	14	10	--	--	--	--	--
PHM0945	104 7th, Parkhills	2/18/2013	37° 52.397'	90° 31.555'	1344	947	728	1008	2345	--	--	--	--	--	67	64	45	63	71	--	--	--	--	--
PHM0946	111 7th, Parkhills	2/18/2013	37° 50.641'	90° 29.878'	1050	1071	1079	1067	939	734	--	--	--	--	34	62	44	51	43	35	--	--	--	--
PHM0947	112 7th, Parkhills	2/18/2013	37° 50.657'	90° 29.888'	1493	2024	1133	1025	1694	18	--	--	--	--	51	58	45	38	43	<21	--	--	--	--
PHM0948	212 7th, Parkhills	NA	37° 50.696'	90° 29.858'	1049	2970	894	1089	1922	764	--	--	--	--	57	149	66	22	83	437	--	--	--	--

Table A-1. Lead, Copper and Zinc Concentrations in Residential Soils, 2013 Focused Residential Sampling

					Concentration (mg/kg)									
					Zinc									
PROPERTY ID	**ADDRESS**	**Sample Date**	**Latitude**	**Longitude**	**FL**	**FR**	**BR**	**BL**	**DRIP**	**DW**	**PA**	**GAR**	**DW 2**	**PA 2**
BTM0319	33 "A", Bonne Terre	2/19/2013	37° 55.287'	90° 33.446'	350	188	594	304	606	551	--	--	--	--
BTM0320	310 "B", Bonne Terre	2/19/2013	37° 55.222'	90° 33.533'	152	280	226	298	295	522	294	--	--	--
BTM0321	203 Bell, Bonne Terre	2/19/2013	37° 54.950'	90° 33.496'	173	110	162	119	143	--	--	--	--	--
BTM0322	11 Branch, Bonne Terre	2/19/2013	37° 54.859'	90° 33.395'	128	874	308	204	487	193	--	--	--	--
BTM0323	103 Branch, Bonne Terre	2/19/2013	37° 54.858'	90° 33.457'	646	620	393	610	503	147	--	--	--	--
BTM0324	108 Branch, Bonne Terre	2/19/2013	37° 54.838'	90° 33.522'	60	670	483	644	673	--	381	--	--	--
BTM0325	203 Branch, Bonne Terre	2/19/2013	37° 54.856'	90° 33.528'	351	326	75	566	437	330	65	--	--	--
BTM0326	12 "C", Bonne Terre	2/19/2013	37° 55.250'	90° 33.387'	358	576	469	470	383	--	--	--	--	--
BTM0327	233 Church, Bonne Terre	2/19/2013	37° 54.893'	90° 33.349'	142	577	53	246	228	238	--	--	--	--
BTM0328	215 Division, Bonne Terre	2/19/2013	37° 55.261'	90° 33.373'	189	165	610	98	681	--	--	--	--	--
BTM0329	319 Francis, Bonne Terre	2/19/2013	37° 54.919'	90° 33.634'	106	76	59	85	104	--	--	--	--	--
BTM0330	323 Francis, Bonne Terre	2/19/2013	37° 54.914'	90° 33.632'	85	58	57	460	47	--	--	--	--	--
BTM0331	1104 Hawthorne, Bonne Terre	2/19/2013	37° 53.029'	90° 31.340'	96	68	70	218	145	147	85	--	--	--
BTM0332	1125 Hawthorne, Bonne Terre	2/19/2013	37° 53.122'	90° 31.438'	237	139	201	253	148	--	--	--	--	--
BTM0333	1131 Hawthorne, Bonne Terre	2/19/2013	37° 53.149'	90° 31.454'	166	187	235	194	175	--	--	--	--	--
BTM0334	306 Middle, Bonne Terre	2/19/2013	37° 54.938'	90° 33.518'	371	231	245	318	838	--	216	--	--	--
BTM0335	305 Middle, Bonne Terre	2/19/2013	37° 54.943'	90° 33.527'	317	473	432	426	516	--	--	221	--	--
BTM0336	410 Murril, Bonne Terre	2/19/2013	37° 55.151'	90° 33.729'	300	437	395	327	488	--	--	--	--	--
BTM0337	306 Long, Bonne Terre	2/19/2013	37° 55.237'	90° 33.473'	380	321	452	793	3807	44	728	186	--	--
BTM0338	214 Long, Bonne Terre	2/19/2013	37° 55.260'	90° 33.473'	115	142	224	168	112	149	--	--	--	--
BTM0339	201 Long, Bonne Terre	2/19/2013	37° 55.292'	90° 33.480'	479	526	371	369	919	90	--	--	--	--
BTM0340	7527 Jarred, Bonne Terre	2/19/2013	37° 55.366'	90° 30.095'	852	135	672	494	678	25	65	--	--	--
BTM0341	324 Hill, Bonne Terre	2/19/2013	37° 54.824'	90° 33.533'	288	51	155	226	67	825	--	--	--	--
BTM0342	316 Hill, Bonne Terre	2/19/2013	37° 54.883'	90° 33.485'	505	308	302	416	876	252	--	--	--	--
BTM0343	306 Hill, Bonne Terre	2/19/2013	37° 54.906'	90° 33.467'	246	190	172	556	561	--	--	--	--	--
BTM0344	141 Hill, Bonne Terre	2/19/2013	37° 55.097'	90° 33.331'	109	138	257	117	579	--	--	--	--	--
BTM0345	313 Middle, Bonne Terre	2/19/2013	37° 54.924'	90° 33.547'	996	1051	864	665	1120	--	--	--	--	--
BTM0346	28 Murril, Bonne Terre	2/19/2013	37° 55.127'	90° 33.470'	445	271	183	266	379	327	--	--	--	--
BTM0347	102 Murril, Bonne Terre	2/19/2013	37° 55.127'	90° 33.504'	525	594	509	321	610	--	335	--	--	--
BTM0349	416 Murril, Bonne Terre	2/19/2013	37° 55.138'	90° 33.425'	338	132	263	265	429	451	--	--	--	--
BTM0350	419 Murril, Bonne Terre	2/19/2013	37° 55.125'	90° 33.445'	189	302	533	225	331	--	--	--	--	--
BTM0351	420 Murril, Bonne Terre	NA	37° 55.124'	90° 33.416'	317	310	459	486	703	--	--	--	--	--
BTM0352	1137 Riverwoods, Bonne Terre	2/19/2013	37° 53.150'	90° 31.511'	144	193	82	137	167	--	--	133	--	--
BTM0353	1161 Riverwoods, Bonne Terre	2/19/2013	37° 53.215'	90° 31.544'	270	165	158	117	222	--	--	--	--	--
BTM0354	1178 Riverwoods, Bonne Terre	2/19/2013	37° 53.276'	90° 31.572'	727	602	536	674	836	--	--	131	--	--
BTM0355	412 Shepard, Bonne Terre	2/19/2013	37° 55.102'	90° 33.533'	107	118	173	104	239	75	--	--	--	--
DLM0462	1118 Bluffview, Desloge	2/14/2013	37° 27.271'	91° 12.605'	125	137	98	107	128	--	--	--	--	--
DLM0463	1120 Bluffview, Desloge	2/14/2013	37° 55.000'	90° 31.459'	154	109	144	86	123	--	--	--	--	--
DLM0464	508 Brim, Desloge	2/13/2013	37° 51.991'	90° 31.750'	293	278	137	170	160	--	--	--	--	--
DLM0465	509 Brim, Desloge	2/13/2013	37° 51.980'	90° 31.754'	1008	908	420	189	464	--	--	--	--	--
DLM0466	607 Brim, Desloge	2/13/2013	37° 51.902'	90° 31.766'	229	275	87	135	205	--	--	--	--	--
DLM0467	613 Brim, Desloge	2/13/2013	37° 51.859'	90° 31.768'	128	248	372	308	153	--	91	--	--	--
DLM0468	617 Brim, Desloge	2/13/2013	37° 51.849'	90° 31.745'	178	173	88	74	174	--	--	--	--	--
DLM0469	300 W. Cedar, Desloge	2/13/2013	37° 51.947'	90° 31.696'	129	103	98	180	267	--	--	--	--	--
DLM0470	301 W. Cedar, Desloge	2/13/2013	37° 51.949'	90° 31.706'	384	817	155	133	772	--	--	97	--	--
DLM0471	304 W. Cedar, Desloge	2/13/2013	37° 51.953'	90° 31.732'	225	195	220	166	137	169	137	149	--	--
DLM0472	406 E. Cedar, Desloge	2/14/2013	37° 52.120'	90° 31.177'	530	727	412	474	387	--	--	--	--	--
DLM0473	400 Chace, Desloge	2/14/2013	37° 51.810'	90° 31.730'	63	60	62	51	79	--	--	--	--	--
DLM0474	401 Chace, Desloge	2/14/2013	37° 51.788'	90° 31.725'	67	69	88	57	61	--	--	--	--	--
DLM0475	402 Chace, Desloge	2/14/2013	37° 51.803'	90° 31.757'	104	99	97	241	138	--	--	--	--	--
DLM0476	404 Chace, Desloge	2/14/2013	37° 51.806'	90° 31.773'	358	291	68	83	108	--	79	--	--	--

Table A-1. Lead, Copper and Zinc Concentrations in Residential Soils, 2013 Focused Residential Sampling

					Concentration (mg/kg)									
					Zinc									
PROPERTY ID	**ADDRESS**	**Sample Date**	**Latitude**	**Longitude**	**FL**	**FR**	**BR**	**BL**	**DRIP**	**DW**	**PA**	**GAR**	**DW 2**	**PA 2**
DLM0477	105 N. Desloge Dr., Desloge	2/14/2013	37° 52.291'	90° 31.607'	766	425	881	1396	1358	--	--	--	--	--
DLM0478	208 N. Grant, Desloge	2/14/2013	37° 52.379'	90° 31.541'	646	728	328	345	729	--	407	--	--	--
DLM0479	209 N. Grant, Desloge	2/14/2013	37° 52.378'	90° 31.549'	865	433	762	389	656	--	--	--	--	--
DLM0480	300 N. Grant, Desloge	2/14/2013	37° 52.394'	90° 31.532'	234	286	220	229	289	305	202	--	--	--
DLM0481	204 N. Desloge Dr., Desloge	2/14/2013	37° 52.349'	90° 31.613'	691	830	772	620	1421	665	480	--	--	--
DLM0482	305 N. Grant. Desloge	2/14/2013	37° 52.408'	90° 31.563'	427	852	436	403	1443	--	--	--	--	--
DLM0483	308 N. Grant. Desloge	NA	37° 52.426'	90° 31.562'	637	494	303	258	595	--	--	--	--	--
DLM0484	1119 Hawthorne, Desloge	2/14/2013	37° 53.098'	90° 31.456'	251	864	626	1098	608	--	--	122	--	--
DLM0485	1136 Hawthorne, Desloge	2/14/2013	37° 53.135'	90° 31.430'	172	101	102	93	113	--	--	--	--	--
DLM0486	211 S. Harry, Desloge	2/19/2013	37° 52.274'	90° 30.945'	381	283	354	331	816	824	--	--	15	--
DLM0487	707 S. Jackson, Desloge	NA	37° 51.862'	90° 31.457'	240	448	332	143	508	130	--	--	--	--
DLM0488	2 Lacy Ct., Desloge	2/14/2013	37° 51.894'	90° 31.750'	144	115	117	108	138	--	--	--	--	--
DLM0489	4 Lacy Ct., Desloge	2/14/2013	37° 51.884'	90° 31.713'	135	326	313	317	183	--	--	--	--	--
DLM0490	309 Marty, Desloge	2/14/2013	37° 51.751'	90° 31.601'	255	178	80	110	155	175	83	--	--	61
DLM0491	311 Marty, Desloge	2/14/2013	37° 51.737'	90° 31.603'	719	230	97	334	346	--	--	--	--	--
DLM0492	313 Marty, Desloge	2/14/2013	37° 51.734'	90° 31.606'	908	159	206	114	286	--	159	88	--	88
DLM0493	317 Marty, Desloge	2/14/2013	37° 51.733'	90° 31.660'	186	300	106	107	207	548	--	--	--	--
DLM0494	304 McKee, Desloge	2/14/2013	37° 51.708'	90° 31.635'	716	418	199	90	237	--	--	--	--	--
DLM0495	305 McKee, Desloge	NA	37° 51.806'	90° 31.648'	319	294	212	127	311	--	--	--	--	--
DLM0496	306 McKee, Desloge	2/14/2013	37° 51.780'	90° 31.653'	263	508	171	116	490	603	--	--	--	--
DLM0497	308 McKee, Desloge	2/14/2013	37° 51.778'	90° 31.654'	153	108	101	211	160	82	--	--	--	--
DLM0498	301 Monroe, Desloge	2/13/2013	37° 52.135'	90° 31.712'	228	389	235	340	872	318	--	--	195	--
DLM0499	307 Monroe, Desloge	2/13/2013	37° 52.115'	90° 31.700'	448	294	537	464	810	--	--	--	--	--
DLM0500	309 Monroe, Desloge	2/13/2013	37° 52.104'	90° 31.691'	374	548	349	389	587	130	--	--	--	--
DLM0501	401 Monroe, Desloge	2/13/2013	37° 52.087'	90° 31.682'	481	266	569	370	835	186	--	--	--	--
DLM0502	409 Monroe, Desloge	2/13/2013	37° 52.063'	90° 31.666'	292	343	328	389	699	295	487	303	--	764
DLM0503	601 Monroe, Desloge	2/13/2013	37° 51.938'	90° 31.592'	317	321	656	323	781	--	573	--	--	--
DLM0504	703 Monroe, Desloge	2/13/2013	37° 51.854'	90° 31.536'	204	293	432	383	333	72	--	--	--	--
DLM0505	705 Monroe, Desloge	2/13/2013	37° 51.842'	90° 31.529'	151	163	435	1357	917	109	--	--	--	--
DLM0506	1202 Orchard, Desloge	2/19/2013	37° 52.564'	90° 30.695'	168	231	182	185	262	--	162	--	--	--
DLM0507	101 S. Ravencrest, Desloge	2/19/2013	37° 52.262'	90° 32.113'	281	439	237	303	264	--	817	--	--	--
DLM0509	1130 Riverwoods, Desloge	2/14/2013	37° 53.133'	90° 31.496'	157	185	144	153	195	--	--	--	--	--
DLM0510	1190 Riverwoods, Desloge	NA	37° 53.307'	90° 31.586'	256	179	158	364	207	--	--	--	--	--
DLM0511	103 N. School, Desloge	NA	37° 52.323'	90° 31.451'	377	286	308	321	380	--	--	--	--	--
DLM0512	109 N. School, Desloge	2/13/2013	37° 52.347'	90° 31.451'	212	206	332	187	537	--	--	--	--	--
DLM0513	305 N. School, Desloge	2/13/2013	37° 52.431'	90° 31.480'	195	180	176	244	546	--	146	668	--	343
DLM0514	1130 Stonecrest, Desloge	2/14/2013	37° 53.072'	90° 31.312'	96	128	105	136	103	--	--	--	--	--
DLM0515	1135 Stonecrest, Desloge	2/14/2013	37° 53.105'	90° 31.350'	84	96	91	86	116	--	--	--	--	--
DLM0516	303 Sycamore, Desloge	2/14/2013	37° 57.850'	90° 31.661'	596	436	737	318	578	--	--	--	--	--
DLM0517	304 Sycamore, Desloge	2/14/2013	37° 51.841'	90° 37.673'	147	108	88	98	176	--	--	--	--	--
DLM0518	305 Sycamore, Desloge	2/14/2013	37° 51.850'	90° 31.680'	830	650	119	100	185	--	--	--	--	--
DLM0519	601 Tyler, Desloge	2/13/2013	37° 51.925'	90° 31.667'	374	266	171	113	297	--	--	--	--	--
DLM0520	602 Tyler, Desloge	NA	37° 51.902'	90° 31.652'	102	111	135	154	230	--	--	--	--	--
DLM0521	603 Tyler, Desloge	2/13/2013	37° 51.915'	90° 31.661'	206	90	66	76	94	--	--	--	--	--
DLM0522	604 Tyler, Desloge	2/13/2013	37° 51.891'	90° 31.640'	119	109	230	341	213	--	--	--	--	--
DLM0523	605 Tyler, Desloge	2/13/2013	37° 51.902'	90° 31.649'	101	137	297	111	132	--	--	197	--	--
DLM0524	606 Tyler, Desloge	2/13/2013	37° 51.878'	90° 31.633'	126	245	243	153	174	--	182	--	--	--
DLM0525	607 Tyler, Desloge	2/13/2013	37° 51.891'	90° 31.644'	203	219	89	159	187	--	--	--	--	--
DLM0526	107 S. Waller, Desloge	2/19/2013	90° 52.201'	90° 31.968'	298	465	529	541	493	--	--	--	--	--
DLM0527	300 6th, Desloge	2/19/2013	37° 50.765'	90° 29.924'	136	234	159	355	852	623	137	--	--	--
DRM0061	3115 Hwy 221, Doe Run (left)	2/20/2013	37° 54.937'	90° 33.300'	194	190	230	267	--	--	--	--	--	--

Table A-1. Lead, Copper and Zinc Concentrations in Residential Soils, 2013 Focused Residential Sampling

					Concentration (mg/kg)									
					Zinc									
PROPERTY ID	ADDRESS	Sample Date	Latitude	Longitude	FL	FR	BR	BL	DRIP	DW	PA	GAR	DW 2	PA 2
DRM0061	3115 Hwy 221, Doe Run (right)	2/20/2013	37° 44.617'	90° 29.816'	343	345	456	170	364	--	--	--	--	--
DRM0062	3360 Hwy 221, Doe Run	2/20/2013	37° 45.174'	90° 29.152'	130	110	52	519	367	517	--	--	--	--
DRM0063	2674 Birch, Doe Run	2/20/2013	37° 44.744'	90° 30.028'	81	45	77	81	259	95	--	--	--	--
DRM0064	2706 Birch, Doe Run	2/20/2013	37° 44.768'	90° 30.068'	66	181	56	129	191	79	--	--	--	--
DRM0065	2651 Cedar, Doe Run	2/20/2013	37° 44.791'	90° 29.797'	134	104	335	234	326	86	--	--	--	--
DRM0066	2624 Elm, Doe Run	2/20/2013	37° 44.524'	90° 30.016'	264	479	506	70	612	132	--	--	--	--
DRM0067	2631 Maple, Doe Run	2/20/2013	37° 44.683'	90° 29.812'	237	1146	269	130	--	161	--	--	--	--
DRM0068	2659 Maple, Doe Run	2/20/2013	37° 44.744'	90° 29.869'	796	901	177	146	238	1157	--	--	--	--
DRM0069	1533 Hwy 221, Doe Run	2/20/2013	37° 42.194'	90° 32.662'	56	113	60	42	137	145	--	--	--	--
DRM0070	2678 Maple, Doe Run	2/20/2013	37° 44.784'	90° 29.896'	162	403	91	141	154	729	--	--	217	--
DRM0071	2816 Maple, Doe Run	2/20/2013	37° 44.675'	90° 29.773'	442	237	149	79	414	175	354	--	--	--
DRM0072	2616 Oak, Doe Run	2/20/2013	37° 44.564'	90° 29.957'	234	786	163	153	381	425	--	--	--	--
DRM0073	2624 Willow, Doe Run	2/20/2013	37° 44.659'	90° 29.857'	410	255	281	177	486	547	550	--	--	--
DRM0074	2741 Willow, Doe Run	2/20/2013	37° 44.858'	90° 30.091'	230	255	128	156	359	51	--	--	--	--
DRM0075	2733 Willow, Doe Run	2/20/2013	37° 44.843'	90° 30.077'	301	585	81	80	141	49	--	--	--	--
DRM0076	2623 Maple, Doe Run	2/20/2013	37° 44.683'	90° 29.810'	121	239	211	83	138	540	98	--	--	368
GUM0002	1823 Hwy 8, Parkhills	2/19/2013	37° 51.876'	90° 33.520'	89	102	246	297	--	96	--	--	--	--
GUM0003	5902 Spruce, Parkhills	2/19/2013	37° 51.866'	90° 33.618'	194	325	169	150	223	1318	--	--	--	--
GUM0004	5957 Spruce, Parkhills	2/19/2013	37° 51.978'	90° 33.627'	788	554	257	526	731	487	310	--	--	246
PHM0904	505 Adams, Parkhills	2/18/2013	37° 50.820'	90° 30.447'	266	253	38	243	418	223	--	--	--	--
PHM0905	700 Camilla, Parkhills	2/18/2013	37° 49.861'	90° 32.189'	270	451	142	341	1770	--	--	--	--	--
PHM0906	701 Camilla, Parkhills	2/18/2013	37° 49.855'	90° 32.192'	159	172	189	537	497	--	--	--	--	--
PHM0907	704 Camilla, Parkhills	2/18/2013	37° 49.837'	90° 32.224'	243	330	438	167	717	--	--	--	--	--
PHM0908	705 Camilla, Parkhills	2/18/2013	37° 49.829'	90° 32.706'	254	234	214	157	534	--	--	--	--	--
PHM0909	802 Camilla, Parkhills	2/18/2013	37° 49.784'	90° 32.248'	256	304	118	91	203	--	--	--	--	--
PHM0910	808 Camilla, Parkhills	2/18/2013	37° 49.751'	90° 32.272'	161	280	144	202	493	--	181	--	--	--
PHM0911	902 Camilla, Parkhills	2/18/2013	37° 49.724'	90° 32.290'	116	251	221	233	353	598	--	--	--	--
PHM0912	803 Central, Parkhills	2/18/2013	37° 52.397'	90° 31.555'	188	155	105	161	566	933	--	--	--	--
PHM0913	706 Ethel, Parkhills	2/18/2013	37° 49.856'	90° 32.280'	229	292	101	146	3053	--	--	--	--	--
PHM0914	703 Ethel, Parkhills	2/18/2013	37° 49.870'	90° 32.262'	196	276	137	223	379	473	--	--	--	--
PHM0915	627 Ethel, Parkhills	2/18/2013	37° 49.896'	90° 32.240'	144	152	537	260	957	525	387	--	--	--
PHM0916	707 Ethel, Parkhills	2/18/2013	37° 49.853'	90° 32.278'	373	590	256	170	377	95	--	--	--	--
PHM0917	809 Ethel, Parkhills	2/18/2013	37° 49.793'	90° 32.320'	464	525	184	452	1192	--	--	--	--	--
PHM0918	10 Federal Park, Parkhills	2/18/2013	37° 50.542'	90° 30.298'	458	529	381	385	761	469	305	--	--	--
PHM0919	305 Gettinger, Parkhills	2/18/2013	37° 49.916'	90° 32.315'	70	95	375	64	--	--	--	--	--	--
PHM0920	402 Hovis Farm Ln, Parkhills	2/18/2013	37° 51.223'	90° 32.458'	340	383	69	63	141	--	66	135	--	--
PHM0921	820 E. Main, Parkhills	2/18/2013	37° 50.645'	90° 30.055'	--	--	--	--	--	--	--	--	--	--
PHM0922	5905 Maple, Parkhills	2/18/2013	37° 51.881'	90° 33.559'	407	237	324	339	384	237	--	--	--	--
PHM0923	5923 Maple, Parkhills	2/18/2013	37° 51.920'	90° 33.591'	264	445	237	269	218	68	--	--	--	--
PHM0924	5977 Maple, Parkhills	2/18/2013	37° 52.043'	90° 33.569'	185	131	168	188	389	367	--	55	--	--
PHM0925	6 Pine, Parkhills	2/18/2013	37° 50.923'	90° 31.843'	747	589	670	270	282	--	313	--	--	--
PHM0926	103 Rebel, Parkhills	NA	37° 50.738'	90° 31.344'	280	286	306	406	735	307	--	--	--	--
PHM0927	600 Sutton, Parkhills	2/18/2013	37° 49.969'	90° 32.264'	406	164	323	328	448	781	--	--	217	--
PHM0928	100 4th, Parkhills	2/18/2013	37° 50.673'	90° 30.121'	287	260	221	220	788	--	--	--	--	--
PHM0929	101 4th, Parkhills	2/18/2013	37° 50.668'	90° 30.115'	341	406	259	416	452	91	--	--	--	--
PHM0930	108 4th, Parkhills	2/18/2013	37° 50.688'	90° 30.118'	413	332	191	569	350	145	--	--	--	--
PHM0931	116 4th, Parkhills	2/18/2013	37° 50.704'	90° 30.107'	420	428	278	183	1097	83	--	--	--	--
PHM0932	205 4th, Parkhills	2/18/2013	37° 50.731'	90° 30.093'	308	201	197	315	1227	163	--	--	--	--
PHM0933	216 4th, Parkhills	2/18/2013	37° 50.765'	90° 30.090'	172	155	150	163	146	--	--	--	--	--
PHM0934	115 5th, Parkhills	2/18/2013	37° 50.689'	90° 30.006'	246	208	140	324	538	--	--	--	--	--
PHM0935	200 5th, Parkhills	2/18/2013	37° 50.704'	90° 30.026'	374	378	362	306	527	--	--	--	--	--

Table A-1. Lead, Copper and Zinc Concentrations in Residential Soils, 2013 Focused Residential Sampling

					Concentration (mg/kg)									
					Zinc									
PROPERTY ID	ADDRESS	Sample Date	Latitude	Longitude	FL	FR	BR	BL	DRIP	DW	PA	GAR	DW 2	PA 2
PHM0936	201 5th, Parkhills	2/18/2013	37° 50.694'	90° 30.005'	233	233	385	307	669	--	--	--	--	--
PHM0937	202 5th, Parkhills	2/18/2013	37° 50.721'	90° 30.029'	146	133	108	191	136	45	115	--	--	--
PHM0938	210 5th, Parkhills	2/18/2013	37° 50.726'	90° 30.024'	553	405	151	208	1336	--	--	--	--	--
PHM0939	220 5th, Parkhills	NA	37° 50.745'	90° 30.016'	254	232	390	26	2164	--	214	--	--	--
PHM0940	110 6th, Parkhills	2/18/2013	37° 50.666'	90° 29.962'	305	320	667	365	514	286	478	--	--	--
PHM0941	111 6th, Parkhills	2/18/2013	37° 50.669'	90° 29.939'	1612	811	308	481	626	--	--	--	--	--
PHM0942	205 6th, Parkhills	2/18/2013	37° 50.701'	90° 29.938'	177	125	393	198	300	60	--	--	--	--
PHM0943	206 6th, Parkhills	2/18/2013	37° 50.695'	90° 29.962'	225	110	200	153	156	123	--	--	--	--
PHM0944	214 6th, Parkhills	2/18/2013	37° 50.724'	90° 29.939'	264	172	472	189	184	--	--	--	--	--
PHM0945	104 7th, Parkhills	2/18/2013	37° 52.397'	90° 31.555'	311	299	337	576	741	--	--	--	--	--
PHM0946	111 7th, Parkhills	2/18/2013	37° 50.641'	90° 29.878'	238	617	209	338	371	306	--	--	--	--
PHM0947	112 7th, Parkhills	2/18/2013	37° 50.657'	90° 29.888'	413	669	376	982	1008	60	--	--	--	--
PHM0948	212 7th, Parkhills	NA	37° 50.696'	90° 29.858'	173	550	205	365	834	368	--	--	--	--

Notes:
Yard Sampling Locations
FL Front Left Quadrant
FR Front Right Quadrant
BR Back Right Quadrant
BL Back Left Quadrant
DRIP Dripzone sample
DW Driveway
PA Play Area
GAR Garden
DW 2 Driveway 2
PA 2 Play Area 2

< = Less Than
-- = No Data Available
NA = Not Available