

**SITE ASSESSMENT REPORT
FOR THE
EASTERN SANDUSKY COUNTY DUMPS SITE
CLYDE, SANDUSKY COUNTY, OHIO**

NPL STATUS: NON-NPL

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Emergency Response Branch
Region V
25089 Center Ridge Road
Westlake, OH 44145

Prepared by:

WESTON SOLUTIONS, INC.
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Suite I
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- N. **York Township Dump Site**

ABBREVIATIONS AND ACRONYMS

ALS	ALS Laboratory Group
ASTM	American Society for Testing and Materials International
bgs	Below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
CFR	Code of Federal Regulations
EDR	Environmental Data Resources, Inc.
EM	Electromagnetic
ERB	Emergency Response Branch
FSP	Field Sampling Plan
GPR	Ground-Penetrating Radar
HDPE	High-Density Polyethylene
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OSC	On-scene Coordinator
OSWER	Office of Solid Waste and Emergency Response
PCB	Polychlorinated Biphenyl
PVC	Polyvinyl Chloride
RSL	Residential Screening Level
START	Superfund Technical Assessment and Response Team
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leaching Procedure
TDD	Technical Direction Document
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

1. INTRODUCTION

Under Technical Direction Document (TDD) S05-0001-1111-033, the United States Environmental Protection Agency (U.S. EPA) Region 5 Emergency Response Branch (ERB) tasked the Weston Solutions, Inc. (WESTON®) Superfund Technical Assessment and Response Team (START) to assist with sampling activities at 14 Sites located throughout eastern Sandusky County, Ohio. Historical disposal records from the U.S. EPA and Ohio EPA along with anecdotal information indicate that each of these 14 Sites formerly received municipal or industrial wastes prior to enactment of stricter land disposal restrictions in the latter 20th century. As a result, these former landfills, dumps, and/or wastewater lagoons may be unlined and also may lack modern engineering controls for collection, management, and monitoring of leachate and landfill gas.

The U.S. EPA On-Scene Coordinator (OSC) tasked START with the following objectives:

- Gather and review available environmental and historical records for each of the 14 Sites;
- Participate in walkthroughs of each of the 14 Sites;
- Prepare a sampling and analysis strategy to evaluate each of the 14 Sites;
- Procure a geophysical subcontractor to conduct geophysical surveys of each of the 14 Sites to further refine sampling locations;
- Collect subsurface soil, groundwater, soil vapor, and leachate samples, if applicable, at each of the 14 Sites, as defined in the Field Sampling Plan (FSP);
- Procure a drilling subcontractor to advance soil borings, install soil vapor probes, and install temporary groundwater monitoring wells;
- Procure a laboratory for analysis of soil, groundwater, soil vapor, and leachate samples;

START and subcontractor personnel mobilized to the Site and conducted site assessment tasks under the direction of OSCs Stephen Wolfe and Andrew McGuire.

This site assessment report is organized into the following sections:

- **Introduction** – Provides a brief description of the objectives of the site assessment.

- **Site Background** – Provides a description of the overall site area and lists the 15 selected sites.
- **Site Assessment Activities** – Discusses methods used during the site assessment.
- **Sampling Summary** – Discusses the number of soil borings, temporary monitoring wells, soil vapor probes, and samples collected during the site assessment.
- **Results** – Discusses the information obtained from the site assessment
- **Summary** – Discusses the results as it pertains to a removal action under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The sampling designs, sampling activities, analytical results, and other information specific to each of the 14 sites are presented in the respective attachments to this report (Appendices A through N).

2. SITE BACKGROUND

This section discusses the Site description and history.

2.1 SITE LOCATION AND DESCRIPTION

Sandusky County is located in northwestern Ohio and borders Lake Erie, which is to the northeast (**Figure 1**). Approximately 95% of Sandusky County is rural, and agricultural land use is prevalent throughout the county. The three largest urban areas in Sandusky County are the cities of Fremont, Clyde, and Bellevue, with many smaller villages and rural communities. According to the U.S. Census Bureau, the population of Sandusky County was 60,944 in 2010.

Overland and groundwater flow trends north-northeast throughout the county toward Lake Erie. The largest drainage basin in the county is the Sandusky River, which flows northeast through the City of Fremont and ultimately discharges to Lake Erie through Sandusky Bay. Additional smaller drainage basins on the eastern half of the county include Green Creek, Raccoon Creek, Pickerel Creek, Fuller Creek, Strong Creek, and South Creek. Surface water resources are used to supply public water utilities in larger urban areas such as Fremont and Clyde. Public water in Fremont is supplied by the Sandusky River and in Clyde by the Raccoon and Beaver reservoirs. The City of Bellevue purchases public water from Erie County and also receives water supply from surface water resources.

Unconsolidated soils in eastern Sandusky County are generally well-graded glacial till and lacustrine clay sediments that are underlain by consolidated carbonate bedrock units. Dissolution of carbonate bedrock units has resulted in some karst topography and subsurface drainage networks in the southeastern portion of the county near the cities of Bellevue and Castalia. Groundwater resources in the eastern half of the county are primarily derived from fractured limestone aquifers typically 70 to 100 feet below ground surface (bgs). Groundwater yields from these aquifers tend to be greater toward the eastern side of the county. Less than half of the households in Sandusky County are supplied by groundwater wells.

2.2 PROPERTIES SELECTED FOR INVESTIGATION

The 14 Sites selected for this investigation are located in an area of Sandusky County between the cities of Clyde and Bellevue, Ohio (**Figure 2**). These Sites, listed in the table that follows,

were identified in a previous study entitled “Childhood Cancer among Residents of Eastern Sandusky County (October 30, 2009) conducted by the Ohio EPA and the Ohio Department of Health as candidate Sites for further investigation. Each Site is described in greater detail in **Appendices A through N**. Access to one of the Sites, McGrath Dump, was not granted to the U.S. EPA by the property owners. At the time the site assessments were performed, the location of the Meggitt Landfill could not be verified. As a result, no investigative sampling activities were planned for these two Sites.

Former Dump Sites Summary Table

Site Name	Address	Parcel No(s).	Geographic Coordinates	Estimated Waste Footprint
Amert Lagoon	County Road 213, Clyde, Ohio 43410	061500002700	41.3013° N / -83.0001° W	7
Bellevue City Dump - SW	610 County Road 328, Bellevue, Ohio 44811	013600001500	41.2572° N / -82.8532° W	4.8
Clyde City Dump	McPherson Highway, Clyde, Ohio 43410	326000009900	41.3021° N / -82.9853° W	25
Formulated Products	110 East Street, Clyde, Ohio 43410	325000008200, 325000073500, 326000003908	41.3049° N / -82.9693° W	1.9
Golembiowski Dump	County Road 179, Clyde, Ohio 43410	062200002801	41.2982° N / -83.0006° W	8.4
Green Creek Township Dump	Clyde, Ohio 43410	063600003800	41.2615° N / -82.9745° W	4
Leach Dump	1672 County Road 236, Clyde, Ohio 43410	062200003500, 062200003400	41.2978° N / -83.0112° W	4.1
McGrath Dump	3966 County Road 231, Vickery, Ohio 43464	093500000600	41.3522° N / -82.9800° W	6
Meggitt Landfill	Unknown	Unknown	Unknown	Unknown
Riley Township Dump	1155 County Road 232, Riley, Ohio 43420	082200000500, 082200001100, 082200001200	41.3725° N / -83.0115° W	1.2
Townsend Township Dump	County Road 322, Vickery, Ohio 43464	041900002500	41.3804° N / -82.9401° W	3.9

Site Name	Address	Parcel No(s).	Geographic Coordinates	Estimated Waste Footprint
Whirlpool Manufacturing	119 Birdseye Street, Clyde, Ohio 43410	325000138300, 325000140600, 326000002607, 326000006000	41.3091° N / -82.9865° W	2.3
Wickerham Drum Site	853 Main Street, Clyde, Ohio 43410	325000176000	41.3118° N / -82.9755° W	0.1
York Township Dump	County Road 205, Bellevue, Ohio 44811	012300002300	41.2989° N / -82.8741° W	0.7

3. SITE ASSESSMENT ACTIVITIES

The U.S. EPA Region 5 ERB directed START to prepare a FSP for investigative sampling, laboratory analysis, and geophysical surveying techniques to be used at the Site. Because the project encompasses 14 former dumps located throughout eastern Sandusky County, a specific sampling strategy was developed for each location. The description and investigative sampling strategy proposed for each former dump site are provided in **Appendices A** through **N**.

The objectives of site assessment tasks at the 14 Sites are shown below:

- Determine whether there was a history of hazardous-waste disposal at the sites;
- Determine whether any subsurface anomalies are present that may be a potential source of subsurface contamination;
- Determine whether any contamination is present in the soil and groundwater;
- Determine whether any leachate is present, which may have an impact on surface soils, surface water, or groundwater;
- Document threats to human health and the environment based on guidance in the NCP, Code of Federal Regulations (CFR) Title 40 Part 300.415(b) (2).

Specific site assessment activities and results pertaining to each of the 14 Sites are presented in the respective appendices of this report (**Appendices A** through **N**). A general description of the assessment activities pertaining to all of the properties is provided below.

3.1 RECORDS REVIEWS

This subsection discusses the multi-agency records review conducted by START.

3.1.1 OHIO EPA RECORDS REVIEW

In December 2011, WESTON reviewed the Ohio EPA files relating to the 14 Sites under investigation. The Ohio EPA maintained files relating to 10 Sites including Amert Lagoon, Bellevue City Dump SW, Clyde City Dump, Formulated Products, Golembiowski Dump, Green Creek Township Dump, Leach Dump, McGrath Dump, Whirlpool Manufacturing, and Wickerham Drum. The details relating to this file review are provided in **Appendices A, B, C, D, E, F, G, H, L, and M**.

3.1.2 U.S. EPA RECORDS REVIEW

In December 2011, START reviewed records provided by U.S. EPA from its files relating to the 14 Sites under investigation. The U.S. EPA retained a file relating to a removal action that took place at the Formulated Products site from June 1994 to August 1994. The details relating to this file review are provided in **Appendix D**. The U.S. EPA did not have files relating to the remaining 13 Sites.

3.1.3 ENVIRONMENTAL DATABASE SEARCH

On December 15, 2011, START signed an agreement with Environmental Data Resources, Inc. (EDR) to provide reports detailing environmental database and historical document search results for 10 Sites located in Sandusky County, Ohio. These 10 Sites include Amert Lagoon, Bellevue City Dump SW, Clyde Dump, Formulated Products, Golembiowski Dump, Green Creek Township Dump, Leach Dump, McGrath Dump, Whirlpool Manufacturing, and Wickerham Drum. The historical documents requested as part of the database search included Sanborn maps, topographic maps, aerial photos, city directories, environmental liens, property tax maps, and building permits. Copies of the environmental database search results for each of the Sites listed above are provided in **Appendices A, B, C, D, E, F, G, H, L, and M**.

3.1.4 HISTORICAL AERIAL PHOTOGRAPHS REVIEW

Historical aerial photographs were obtained from two sources. EDR provided an aerial photograph database package for 10 Sites located in Sandusky County, Ohio. These 10 Sites are listed in Subsection 3.1.3. The historical aerial photographs provided by EDR cover a time span from 1951 to 2006. Copies of these historical photographs, along with a review summary for each of the Sites listed above are provided in **Appendices A, B, C, D, E, F, G, H, L, and M**.

As part of the records search by U.S. EPA, START received historical aerial photos of five Sites including Bellevue City Dump SW, Green Creek Township Dump, McGrath Dump, Riley Township Dump, and Townsend Township Dump. The historical aerial photographs for these five Sites date to 1950, 1964, and 1977. Copies of these historical photographs, along with a review summary for each of the Sites listed above are provided in **Appendices B, F, H, J, and K**.

3.2 GEOPHYSICAL SURVEYS

Geophysical survey techniques were used to assist with delineation of former dumping areas at each of the 11 selected Sites where access was obtained. These geophysical techniques would also assist in identifying buried metal indicative of drums or tanks. Electromagnetic (EM) and ground penetrating radar (GPR) equipment were used to search for subsurface anomalies that may indicate the location of buried waste, drums, or tanks. Geophysical surveying services and equipment were provided by THG Geophysics, Ltd. (THG) of Murrysville, Pennsylvania, during the week of February 13, 2012. An EM survey was conducted over the entirety of the estimated waste footprint at each property to identify potential subsurface anomalies. A GPR survey was conducted over the areas where potential anomalies were identified by the EM survey to better delineate the extent of the anomalies. The EM and GPR surveys were conducted in accordance with ASTM International methods and the equipment user manuals. Preliminary findings of the geophysical surveys were used by field personnel to refine the proposed locations or target depths of subsurface sampling activities. THG's detailed report summarizing the findings of the geophysical surveys for each of the Sites is described in greater detail in **Appendices A through N**.

3.3 SUBSURFACE SOIL CHARACTERIZATION

Field activities, consisting of the geophysical surveys and sample collection activities, began on February 13, 2012, and were completed on February 24, 2012. A track-mounted hydraulic push-probe drill rig, provided by Buckeye Probe, was used to retrieve continuous soil cores from the subsurface at each Site where soil sampling was conducted. In general, the soil borings were advanced until native, non-fill material was encountered. Sampling depth intervals were selected based on preliminary findings of the geophysical survey, field observations, and field screening results. Soil from each subsurface sampling interval was removed from acetate liners and homogenized using either Ziploc[®] plastic bags or decontaminated stainless steel trowels and bowls. The homogenized soil was then transferred directly into laboratory-provided sample containers. Sample containers were labeled using the nomenclature outlined in Subsection 5.1 of the FSP and placed in a cooler on ice for delivery to the designated laboratory under chain-of-custody control. A total of 79 subsurface soil samples were collected from 11 of the 14 sites.

Excess soil cuttings were collected in the field and subsequently containerized into 55-gallon metal drums for later off-site disposal by Chemtron Corporation, located in Avon Lake, Ohio.

Based on field observations and conditions in the field, some modifications to the FSP were approved by the OSC. The rationale for the modifications with regard to each of the Sites is described in greater detail in **Appendices A, B, C, D, E, F, G, J, K, L, and N**.

All soil samples were placed in ice-filled coolers and delivered via courier to the ALS Laboratory Group (ALS) in Holland, Michigan. Each of the soil samples were analyzed for the following analytical parameters:

- Toxicity Characteristic Leaching Procedure (TCLP) Volatile Organic Compounds (VOCs) and Total VOCs
- TCLP Semivolatile Organic Compounds (SVOCs) and Total SVOCs
- TCLP Metals and Target Analyte List (TAL) Metals (including mercury and boron)
- TCLP Pesticides and Total Pesticides
- TCLP Herbicides and Total Herbicides
- Polychlorinated Biphenyls (PCBs)

Detailed descriptions of the soil sampling activities at each of the 11 Sites, and the resultant laboratory analytical results are presented in **Appendices A, B, C, D, E, F, G, I, K, L and N**.

3.4 GROUNDWATER MONITORING WELL INSTALLATION AND SAMPLING

As specified in the FSP, temporary groundwater monitoring wells were installed after direct-push sampling was completed at a soil boring location, if a suitable water-bearing horizon was found. Temporary monitoring wells were constructed using 1-inch-diameter polyvinyl chloride (PVC) screen and risers. A 5- or 10-foot length of 0.010-inch slotted screen was installed in a water-bearing zone documented during continuous soil sampling, with riser extending above the ground surface.

Prior to groundwater sample collection, the depth to groundwater from the top of the monitoring well casing was measured using an electronic water level indicator and recorded in a field

logbook. Temporary monitoring wells were surveyed to determine top of casing and ground-surface elevations referenced to a temporary Site benchmark.

A low-flow peristaltic pump with Teflon-lined high-density polyethylene (HDPE) tubing was used to collect a groundwater sample from the temporary monitoring wells. The presence/absence and recharge rate of groundwater at the Sites was highly variable and likely subject to fluctuations based on seasonal and recent precipitation events. Groundwater samples were collected utilizing low-flow groundwater sampling techniques to ensure samples representative of groundwater conditions in the geological formation were collected as indicated by stable field parameters for dissolved oxygen, oxidation/reduction potential, conductivity, temperature, and turbidity as measured with a YSI Inc. model 556 water-quality monitoring instrument equipped with a flow-through cell. Purged groundwater was collected in the field and subsequently containerized into 55-gallon metal drums for later off-site disposal by Chemtron Corporation, located in Avon Lake, Ohio. During sample collection, the groundwater was pumped directly into laboratory-provided sample containers. Sample containers were labeled using the nomenclature outlined in Subsection 5.1 of the FSP and placed in a cooler on ice for delivery to the designated laboratory under chain of custody.

Once groundwater sampling activities were completed, the direct-push operator or START sample personnel removed the temporary monitoring well PVC casing and abandoned the borehole with bentonite chips.

A total of 12 temporary groundwater monitoring wells were installed at five of the 14 Sites. These properties included the Clyde City Dump, Golembiowski Dump, Green Creek Township Dump, Leach Dump, and the Townsend Township Dump sites. Nine of the 12 temporary monitoring wells produced enough recharge to allow for the collection of groundwater samples. In addition, START field personnel collected groundwater samples from four existing monitoring wells located at the Amert Lagoon site.

All groundwater samples were placed in ice-filled coolers and delivered via courier under chain-of-custody control to ALS in Holland, Michigan. Each of the groundwater samples were analyzed for the following analytical parameters:

- TCLP VOCs and Total VOCs
- TCLP SVOCs and Total SVOCs
- TCLP Metals and TAL Metals (including mercury and boron)
- TCLP Pesticides and Total Pesticides
- TCLP Herbicides and Total Herbicides
- PCBs
- pH
- Flashpoint

A further detailed description of the groundwater sampling activities at each of the six Sites and the resultant laboratory analytical results are presented in **Appendices A, C, E, F, G, and K**.

3.5 SOIL VAPOR PROBE INSTALLATION AND SAMPLING

A total of nine soil vapor samples were collected from soil boring locations at six of the 14 Sites. These properties included the Amert Lagoon, Bellevue City Dump SW, Clyde City Dump, Green Creek Township Dump, Golembiowski Dump, and the York Township Dump. Soil vapor sample locations were selected based on field screening readings and field observations of the availability of sufficient vadose zone to collect vapor samples. Each vapor probe was connected to dedicated Teflon tubing that extended to the ground surface for connection to a dedicated 1-liter SUMMA canister. Vapor probes were surrounded by a 2-foot thickness of high-porosity filter sand pack. Low-permeability bentonite grout was filled between the filter sand-pack layers and the ground surface. Before the SUMMA canister sample was initialized, a low-flow sample pump was used to purge ambient air from the Teflon tubing. The initial pressure and sample identification of the SUMMA canister were recorded on dedicated sample logs and in the logbook. The SUMMA canister valve was then opened to collect the grab sample, the final pressure was recorded, and the SUMMA canister was packaged for shipment to Air Toxics Ltd., in Folsom, California, under chain of custody. Each of the soil vapor samples was analyzed for VOCs by Method TO-15. The analytical results of the soil vapor probe samples collected from the six Sites listed above are described in greater detail in **Appendices A, B, C, E, F, and N**.

4. SAMPLING SUMMARY

From February 13 through 24, 2012, two U.S. EPA OSCs, four START members, and the direct-push subcontractor, Buckeye Probe, collected the following samples from the Sites targeted for investigation:

- 79 subsurface soil samples collected from 11 of the 14 Sites,
- Nine soil vapor samples collected from six of the 14 Sites,
- Nine groundwater samples collected from six of the 14 Sites.

This section summarizes the number of samples collected at each of the 11 Sites. Detailed descriptions of the laboratory analytical results for the various multimedia samples collected from the 11 Sites are provided in **Appendices A, B, C, D, E, F, G, J, K, L, and N.**

4.1 AMERT LAGOON

Site assessment activities were conducted at Amert Lagoon on February 20, 2012. A total of six soil samples, four groundwater samples, and two soil vapor samples were collected from this Site.

One soil sample was collected from each of the four soil borings (B01 through B04) advanced on the property. An additional soil sample was collected from soil borings B01 and B02.

Four groundwater samples were collected from existing monitoring wells MW-2, MW-4, MW-7, and MW-12 using low-flow sampling techniques.

A soil vapor probe sample was collected from soil borings B01 and B02.

4.2 BELLEVUE CITY DUMP - SW

Site assessment activities were conducted at the Bellevue City Dump - SW site on February 22, 2012. A total of four soil samples and one soil vapor sample were collected from this Site.

One soil sample was collected from each of the three soil borings (B01 through B03) advanced on the Site. An additional soil sample was collected from soil boring B03.

A soil vapor probe sample was collected from soil boring B02.

4.3 CLYDE CITY DUMP

Site assessment activities were conducted at the Clyde City Dump on February 22 and 23, 2012. A total of 12 soil samples, two groundwater samples, two soil vapor samples, and two surface soil samples were collected from this Site.

One soil sample was collected from each of the seven soil borings (B01 through B07). An additional soil sample was collected from soil borings B02, B04, and B05. Two surface soil samples were collected along the east bank of Raccoon Creek (S01 and S02) at leachate outbreak locations.

Two groundwater samples were collected from temporary monitoring wells installed in soil borings B04 and B05, using low-flow sampling techniques. Temporary monitoring wells were also installed in borings B03 and B06 but did not produce enough groundwater to allow sample collection.

Soil vapor probe samples were collected from soil borings B01 and B03.

4.4 FORMULATED PRODUCTS

Site assessment activities were conducted at the Formulated Products Site on February 13, 2012. A total of nine soil samples were collected from this Site. One soil sample was collected from each of the five soil borings (B01 through B05) advanced on the Site. An additional soil sample was collected from soil borings B01 through B04.

4.5 GOLEMBIOWSKI DUMP

Site assessment activities were conducted at the Golembiowski Dump on February 20 and 21, 2012. A total of six soil samples, one groundwater sample, and one soil vapor sample were collected from this Site.

One soil sample was collected from soil borings B01, B03, B04, B06, B09, and B10 advanced on the Site.

One groundwater sample was collected from a temporary monitoring well installed in soil boring B06 using low-flow sampling techniques.

A soil vapor probe sample was collected from soil boring B09.

4.6 GREEN CREEK TOWNSHIP DUMP

Site assessment activities were conducted at the Green Creek Township Dump on February 21 and 26, 2012. A total of four soil samples, two groundwater samples, and two soil vapor samples were collected from this Site.

One soil sample was collected from each of the four soil borings (B01 through B04) advanced on the Site.

Two groundwater samples were collected from temporary monitoring wells installed in soil borings B01 and B02 using low-flow sampling techniques.

Soil vapor probe samples were collected from soil borings B02 and B03.

4.7 LEACH DUMP

Site assessment activities were conducted at the Leach Dump on February 17, 2012. A total of 17 soil samples and one groundwater sample were collected from this Site.

Two soil samples were collected from each of the eight soil borings (B01 through B07 and B09) advanced on the Site. Only one soil sample was collected from soil boring B08.

One groundwater sample was collected from a temporary monitoring well installed in soil boring B02 using low-flow sampling techniques. A temporary monitoring well was also installed in boring B02 but did not produce enough groundwater to allow representative sample collection.

4.8 RILEY TOWNSHIP DUMP

Site assessment activities were conducted at the Riley Township Dump on February 15, 2012. A total of four soil samples were collected from this Site. Two soil samples were collected from each of the two soil borings (B01 and B02) advanced on the Site.

4.9 TOWNSEND TOWNSHIP DUMP

Site assessment activities were conducted at the Townsend Township Dump on February 14, 2012. A total of eight soil samples and one groundwater sample were collected from this Site.

One soil sample was collected from soil borings B01, B03, B04, B05, and B06. An additional soil sample was collected from soil borings B01, B03, and B06.

Groundwater samples were collected from temporary monitoring wells installed in soil borings B01, B03, and B06 using low-flow sampling techniques.

4.10 WHIRLPOOL MANUFACTURING

Site assessment activities were conducted at the Whirlpool Manufacturing Site on February 16, 2012. A total of six soil samples were collected from this Site. Two soil samples were collected from soil borings B01 through B03.

4.11 YORK TOWNSHIP DUMP

Site assessment activities were conducted at the York Township Dump on February 15, 2012. A total of three soil samples and one soil vapor sample were collected from this site. One soil sample was collected from each of the three soil borings (B01 through B03). A soil vapor probe sample was collected from soil boring B01.

5. RESULTS

The following site-specific results are based upon START's review of available historical documents and geophysical survey results, as well as field observations and laboratory analytical results obtained from the recent subsurface investigation. Laboratory analytical results were received by START, beginning in mid-March 2012, and were validated by a START chemist when the full laboratory reports became available. Validated analytical results and other findings are provided in this report. The soil sample results were compared to the U.S. EPA Regional Screening Levels (RSL) and the U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24). The groundwater sample results were compared to the the National Primary Drinking Water Regulations Maximum Contaminant Levels (MCL), The soil vapor results were compared to Table 2b of the U.S. EPA 2002 Subsurface Vapor Intrusion Guidance (Office of Solid Waste and Emergency Response [OSWER] document EPA530-D-02-004).

5.1 AMERT LAGOON SITE

The groundwater elevations measured indicated that the groundwater flow potential direction was west to slightly northwest. Refer to **Figure A5** in **Appendix A**.

Soil sample results indicated that total arsenic was detected above the U.S. EPA Regional Screening Level (RSL) of 0.39 milligrams per kilogram (mg/kg) for all of the soil samples collected, at concentrations ranging from 2 to 61 mg/kg. Arsenic was also the only metal that exceeded the RSL at the surface (0 to 2 ft). Total cobalt, iron, lead, and nickel were detected above their respective RSLs at soil borings AL-B01 (3 to 5 ft) and AL-B02 (3 to 4 ft) in the porcelain fill material and at AL-B02 (6 to 8 ft) in the sand layer immediately below the fill. No other analytes were detected above their respective RSLs. None of the detected contaminants exceeded the U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24).

Lead was detected at a concentration of 0.019 milligrams per liter (mg/L) in the groundwater sample collected from monitoring well MW4, which exceeds the National Primary Drinking Water Regulations Maximum Contaminant Level (MCL) of 0.015 mg/L. No other analytes were detected in any groundwater samples above their respective MCLs. Compounds were not

detected in the groundwater samples at concentrations exceeding the U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24).

The soil vapor sample results indicated that no compounds were detected above the levels listed in Table 2b of the U.S. EPA 2002 Subsurface Vapor Intrusion Guidance (Office of Solid Waste and Emergency Response [OSWER] document EPA530-D-02-004).

5.2 BELLEVUE CITY DUMP SITE - SOUTHWEST

Total arsenic was detected above the U.S. EPA Residential Regional Screening Level (RSL) of 0.39 milligrams per kilogram (mg/kg) for all of the soil samples collected, at concentrations ranging from 7.6 to 11 mg/kg. Benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene were detected above their respective RSLs in soil boring BS-B01 (0 to 2 ft) at concentrations of 0.6, 0.57, and 1.0 mg/kg, respectively. No other analytes were detected above their respective RSLs. Contaminants were not detected in any of the soil samples at concentrations exceeding U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24).

The soil vapor sample was analyzed for VOCs by U.S. EPA Method TO-15. Compounds were not detected above the levels listed in Table 2b of the U.S. EPA 2002 Subsurface Vapor Intrusion Guidance (OSWER document EPA530-D-02-004). A method blank was analyzed with the VOC analysis and was free of target compound contamination above the reporting limit.

5.3 CLYDE CITY DUMP SITE

Groundwater and/or leachate flow at the Site is complicated by the presence of trenches in the waste disposal area, as well as nonhomogeneous placement of waste material. A trench capturing leachate is located along the north and east sides of the Site, and leachate was observed discharging from the bank several feet above Raccoon Creek along the west side of the Site. The Site itself is higher in elevation than the surrounding land because of the placement of waste materials and cover material on the Site. The presence and quantity of leachate and/or groundwater is highly variable, as evidenced by historical reports as well as by the lack of groundwater in CD-B06 and the limited groundwater found in CD-B03. Therefore, an accurate representation of the actual groundwater or leachate flow potential direction at the Site could not

be produced from the limited data collected as part of this assessment. **Figure C5 in Appendix C** illustrates the groundwater elevations at the Site.

The soil sample analytical results reveal that total arsenic was detected above the U.S. EPA Residential Regional Screening Level (RSL) of 0.39 mg/kg for all of the samples collected, at concentrations ranging from 3.5 to 52 mg/kg. Antimony, cadmium, cobalt, iron, lead, and manganese were detected above their respective RSLs primarily at CD-B04 (10 to 12 ft). In addition, PCB Aroclor 1254 was detected above the RSL of 0.22 mg/kg at soil borings CD-B01 (8 to 12 ft), CD-B03 (14 to 18 ft), CD-B05 (0 to 2 ft), and CD-B07 (0 to 2 ft) at concentrations ranging from 0.26 to 40 mg/kg. Ethylbenzene was detected above the RSL of 5.4 mg/kg at CD-B04 (10 to 12 ft) at a concentration of 17 mg/kg. Several SVOCs were detected above their respective RSLs at multiple sampling locations, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, and naphthalene. In particular, benzo(a)pyrene and benzo(b)fluoranthene were detected above their respective RSLs at soil borings CD-B01 (8 to 12 ft.) and CD-B04 (10 to 12 ft.). Benzo(a)anthracene and benzo(k)fluoranthene were detected above their respective RSLs in CD-B04 (10 to 12 ft.) No other analytes were detected above their respective RSLs. Contaminants were not detected in the TCLP samples above the U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24).

The two surface soil samples CD-S01 (0 to 0.5 ft) and CD-S02 (0 to 0.5 ft) collected from the areas of leachate seepage along the Raccoon Creek bank contained total arsenic above the RSL of 0.39 mg/kg for both samples collected, at concentrations of 10 and 6.5 mg/kg, respectively. PCB Aroclor 1254 was detected above the RSL of 0.22 mg/kg at surface soil sample CD-S01 (0 to 0.5 ft) at a concentration of 0.39 mg/kg. Cobalt was detected above the RSL of 23 mg/kg at surface soil sample CD-S02 (0 to 0.5 ft) at a concentration of 45 mg/kg. Several SVOCs were detected above their respective RSLs at both sampling locations, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene. No other analytes were detected above their respective RSLs. Contaminants were not detected in the surface soil samples at concentrations above the U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24).

Neither VOCs nor SVOCs were detected in the groundwater samples above their respective

National Primary Drinking Water Regulations MCLs in the groundwater samples. However, benzene, toluene, ethylbenzene, and total xylenes (BTEX), 2,4-dimethylphenol, naphthalene, o-cresol, p-cresol, and phenol were detected at low levels. Antimony, arsenic, barium, and lead were detected above their respective MCLs in one or both groundwater samples. No other analytes measured were detected above their respective RSLs. Contaminants were not detected in any of the samples at concentrations above the U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24).

5.4 FORMULATED PRODUCTS SITE

The soil sample analytical results indicate that total arsenic was detected above the U.S. EPA Residential Regional Screening Level (RSL) of 0.39 mg/kg for all of the soil samples collected, at concentrations ranging from 4 to 15 mg/kg. Benzo(a)anthracene was detected above the RSL of 0.15 mg/kg at borings FP-B02 (0 to 2 ft) and FP-B05 (0 to 2 ft), at concentrations of 1 and 1.5 mg/kg, respectively. Benzo(a)pyrene was detected above the RSL of 0.015 mg/kg at borings FP-B01 (0 to 2 ft), FP-B02 (0 to 2 ft), FP-B03 (0 to 2 ft), and FP-B05 (0 to 2 ft), at concentrations ranging from 0.034 to 2.3 mg/kg. Benzo(b)fluoranthene was detected above the RSL of 0.15 mg/kg at borings FP-B02 (0 to 2 ft), FP-B03 (0 to 2 ft), and FP-B05 (0 to 2 ft), at concentrations ranging from 0.19 to 3.3 mg/kg. Dibenzo(a,h)anthracene was detected above the RSL of 0.015 mg/kg in boring FP-B05 (0 to 2 ft) at a concentration of 0.42 mg/kg. Indeno(1,2,3-cd)pyrene was detected above the RSL of 0.15 mg/kg at borings FP-B02 (0 to 2 ft) and FP-B05 (0 to 2 ft), at concentrations of 0.6 and 1.5 mg/kg, respectively. No other analytes were detected above their respective RSLs. None of the TCLP samples contained contaminants at concentrations above U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24).

5.5 GOLEMBIOWSKI DUMP SITE

Total arsenic was detected above the U.S. EPA Residential Regional Screening Level (RSL) of 0.39 mg/kg for all of the soil samples collected, at concentrations ranging from 1.4 to 5.9 mg/kg. No other analytes were detected above their respective RSLs. Contaminants were not detected in the TCLP samples above U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24).

The groundwater analytical results indicate that no analytes were detected above their respective

National Primary Drinking Water Regulations MCLs. Boron was detected in groundwater collected from the temporary monitoring well in GD-B06 at a concentration of 2.6 mg/L. An MCL has not been established for boron.

The soil vapor analytical results indicate that compounds were not detected above the levels listed in Table 2b of the U.S. EPA 2002 Subsurface Vapor Intrusion Guidance (OSWER document EPA530-D-02-004). A method blank was analyzed with the VOC analysis and was free of target compound contamination above the reporting limit.

5.6 GREEN CREEK TOWNSHIP DUMP SITE

The groundwater elevations measured indicated that the groundwater flow potential direction was to the northwest. Refer to **Figure F5** in **Appendix F**.

Total arsenic was detected above the U.S. EPA Residential Regional Screening Level (RSL) of 0.39 mg/kg for all of the soil samples collected, at concentrations ranging from 5.6 to 7.7 mg/kg. PCB Aroclor 1254 was detected above the RSL of 0.22 at soil boring GC-B01 (0 to 2 ft) at a concentration of 0.96 mg/kg. Benzo(a)anthracene was detected above the RSL of 0.15 mg/kg in GC-B01 (0 to 2 ft) at a concentration of 0.19 mg/kg. Benzo(a)pyrene was detected above the RSL of 0.015 mg/kg in GC-B02 (4 to 6 ft) at a concentration of 0.069 mg/kg. No other analytes were detected above their respective RSLs. None of the TCLP samples contained contaminant detections above U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24).

The groundwater analytical results indicate that lead was detected above the National Primary Drinking Water Regulations MCL of 0.015 mg/L for both samples: GC-B01, at a concentration of 0.018 mg/L, and GC-B02 at a concentration of 0.03 mg/L. No other analytes were detected above their respective MCL.

The soil vapor analytical results indicate that no compounds were detected above the levels listed in Table 2b of the U.S. EPA 2002 Subsurface Vapor Intrusion Guidance (OSWER document EPA530-D-02-004). A method blank was analyzed with the VOC analysis and was free of target compound contamination above the reporting limit.

5.7 LEACH DUMP SITE

The soil sample analytical results reveal that total arsenic was detected above the U.S. EPA Residential Regional Screening Level (RSL) of 0.39 mg/kg for all of the samples collected except LD-B02 at 2 to 4 ft, at concentrations ranging from 1.5 to 14 mg/kg. Thallium was detected above the RSL of 0.78 mg/kg at soil boring LD-B03 (2 to 4 ft) at a concentration of 1.4 mg/kg. Benzo(a)pyrene was detected above the RSL of 0.015 mg/kg at LD-B02 (2 to 4 ft) at a concentration of 0.037 mg/kg. PCB Aroclor 1254 was detected above the RSL of 0.22 mg/kg at LD-B04 (2 to 4 ft) at a concentration of 0.4 mg/kg. No other analytes were detected above their respective RSLs. None of the TCLP samples contained detected contaminants above the U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24).

5.8 MCGRATH DUMP SITE

The results of the historical document review did not provide definitive information regarding whether hazardous materials have been used, stored, or disposed of on the Site. At the time the site assessments were conducted, the property owner(s) did not grant the U.S. EPA access to the Site. U.S. EPA will continue to investigate the past use of the property as well as continuing to seek access to the site for assessment.

5.9 MEGGITT LANDFILL SITE

At the time the site assessments were performed, U.S. EPA and START personnel were unable to locate the Meggitt Landfill Site. Further investigation after the site assessments were performed led to the exact location of the Meggitt Landfill. Interviews of residents provided enough information that U.S. EPA will not conduct any further investigation on the property.

5.10 RILEY TOWNSHIP DUMP SITE

A total of two soil borings were installed at the Site, and samples were collected for analysis at an off-site laboratory.

Soil sample results indicated that total arsenic was detected above the U.S. EPA Regional Screening Level (RSL) for residential use of 0.39 mg/kg for all of the samples collected, at concentrations ranging from 4.3 to 13 mg/kg. Total iron was detected above its RSL at soil boring RD-B01 (0 to 2 ft). Several SVOCs were detected in concentrations above their

respective RSLs in soil borings RD-B01 (0 to 2 ft) and RD-B06 (0 to 2 ft). These SVOCs include benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene. In addition, dibenzo(a,b)anthracene and indeno(1,2,3-cd)pyrene were detected above their respective RSLs in soil boring RD-B02 (6 to 8 ft). No other analytes were detected above their respective RSLs. None of the TCLP samples contained contaminant detections above the U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24).

5.11 TOWNSEND TOWNSHIP DUMP SITE

A total of six soil borings and three temporary groundwater monitoring wells were installed at the Site, and samples were collected for analysis at an off-site laboratory. The groundwater elevations measured indicated that groundwater was flowing to the east-southeast. Refer to **Figure K5** in **Appendix K**.

Soil sample results indicated that two metals, arsenic and manganese, are present at the site in concentrations above their respective RSLs. In particular, arsenic was present above the RSL in all of the soil samples, at shallow depths. This may represent a background level of arsenic in the area above the RSL. Several SVOCs, including benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene, were detected in soil samples collected at shallow depths in soil borings located in west-central and northern portions of the Site. Contaminants were not detected in the groundwater samples. None of the TCLP analyses resulted in contaminant detections above the U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24), indicating that the sampled media was not characteristically hazardous waste.

The groundwater elevations measured indicated that the groundwater flow potential direction was to the east-southeast.

5.12 WHIRLPOOL MANUFACTURING SITE

Soil sample results indicated that arsenic was present above the RSL in all of the soil samples, at all depths sampled. This may represent a background level of arsenic in the area above the RSL. Soil sample results also indicated the presence of PCB Aroclor 1254 and 1,1-dichloroethane above their RSLs. The presence of 1,1-dichloroethane corresponds to field observations of black staining and a petroleum odor in soil collected from this sample interval. None of the TCLP

analyses resulted in detections above the U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24).

5.13 WICKERHAM DRUM SITE

The geophysical survey task completed as part of this site assessment confirmed that there were no other buried containers on the Site. Based upon these results, the U.S. EPA determined that further assessment of the Site was not necessary.

5.14 YORK TOWNSHIP DUMP SITE

Soil sample results indicated that arsenic, iron, and lead were present at the Site in concentrations above their respective RSLs. In particular, arsenic was present above the RSL in all of the soil samples, at shallow depths. This may represent a background level of arsenic in the area above the RSL. Several SVOCs were detected in soil samples collected at shallow depths in soil borings located in northern and southern portions of the site. This may indicate that waste material was either incinerated on the Site or that incinerated waste was subsequently disposed of on the Site. None of the TCLP analyses resulted in detections above the U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24).

Compounds were not detected in the soil vapor sample above the levels listed in Table 2b of the U.S. EPA 2002 Subsurface Vapor Intrusion Guidance (OSWER document EPA530-D-02-004). A method blank was analyzed with the VOC analysis and was free of target compound contamination above the reporting limit.

6.0 Summary

The following paragraphs summarize the results of the site assessments. Detailed information for each site investigated is provided in Appendixes A-N. The soil/leachate laboratory analytical results for total VOCs, total SVOCs, TAL metals and total pesticides and herbicides were compared to the Regional Screening Levels (RSLs) for residential properties. It should be noted that these are conservative values since many of the investigated sites are not zoned for residential use. In addition, these conservative values are being compared to subsurface soil results where direct contact is not likely to occur. The TCLP laboratory analytical results were compared to the U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24). The groundwater laboratory analytical results were compared to the National Primary Drinking Water Regulations Maximum Contaminant Level (MCL). Residential property values and drinking water criteria were used to be conservative.

Based on the results of the site assessments performed, U.S. EPA does not expect to take any removal action pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. 9601 et seq. at any of the sites investigated.

6.1 ARSENIC IN SOIL

Arsenic was detected above the RSLs in almost all soil samples collected. Ohio has a high natural background level for Arsenic and the U.S. Geological Survey has published the background levels for Sandusky County with a mean of 13.2 ppm with a standard deviation of 6.8. All surface samples (0-2 feet) were within the published range.

6.2 SEMIVOLATILE ORGANIC COMPOUNDS IN SOIL

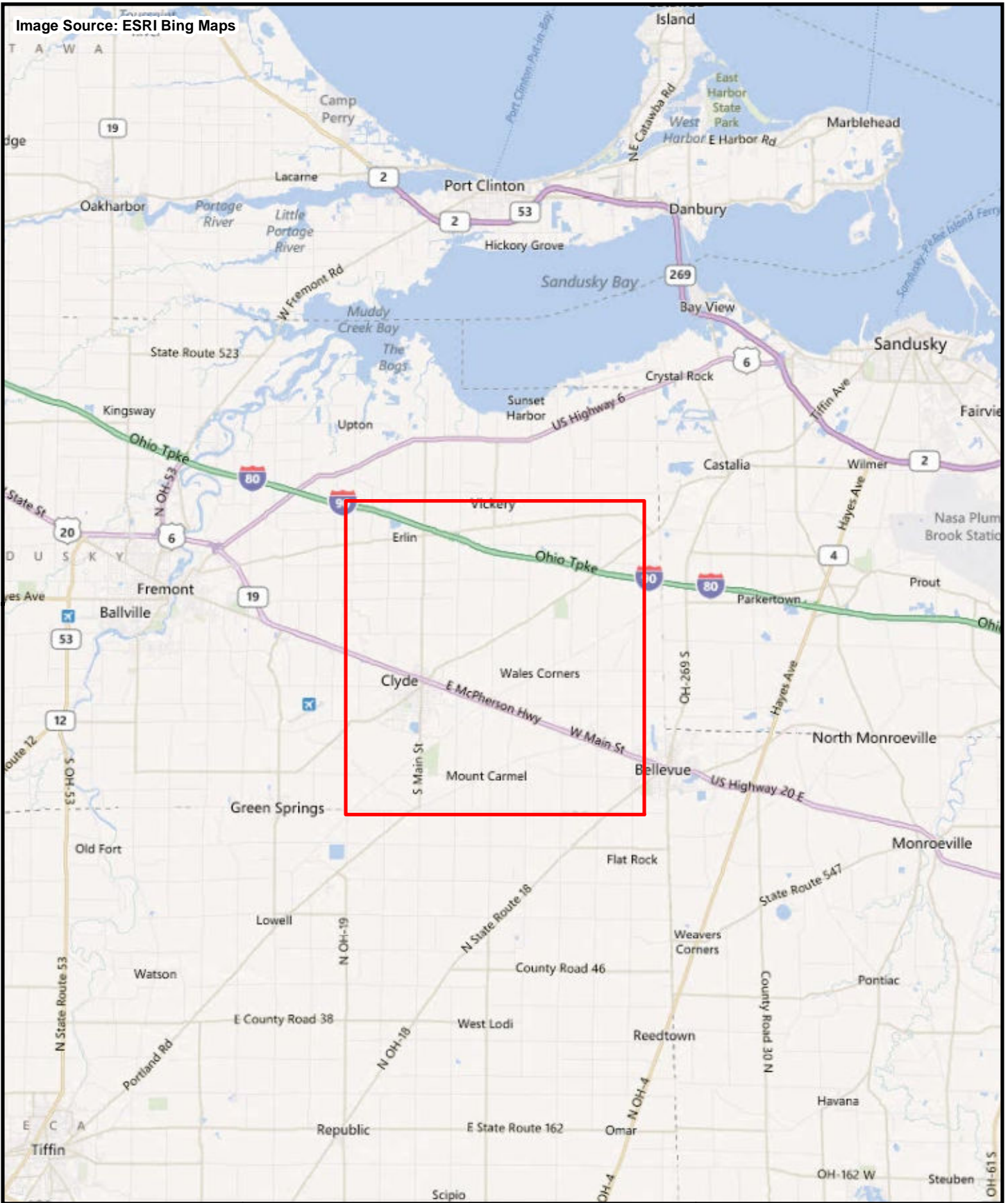
Several SVOCs were detected above the RSLs, in particular at Townsend Township Dump. A U.S. EPA toxicologist reviewed the data and concluded that the SVOCs present do not pose a risk to the public. A copy of the Toxicologist's report is provided in **Appendix K**.

6.3 LEAD IN GROUNDWATER

LEAD IN GROUNDWATER – Lead was detected in 3 samples above the MCL criteria. Two of the samples were collected from the Green Creek Township Dump. The Green Creek Township Dump was created inside of an old limestone quarry. The shallow groundwater, which was sampled at these two wells, is the result of direct rainfall which has been contained within the walls of the old quarry, creating a perched water table, in which little or no groundwater is able to migrate from beyond the quarry walls. Ohio Department of Natural Resources water well logs indicate the regional groundwater aquifer is at a much greater depth. The nearest residential well is less than .25 miles away and is set in this regional aquifer. The third sample that contained lead above the MCL was collected at the Amert Lagoon site. Groundwater flow was to the northwest and a sample from the well downgradient from the high result did not exceed the MCL for lead indicating that the contaminant is not migrating off site.

FIGURES

Image Source: ESRI Bing Maps



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Legend

 Project Area

0 20,000 Feet



Prepared for:
U.S. EPA REGION V

Contract No: EP-S5-06-04
TDD: S05-0001-1111-033
DCN: 1691-2A-AVDK

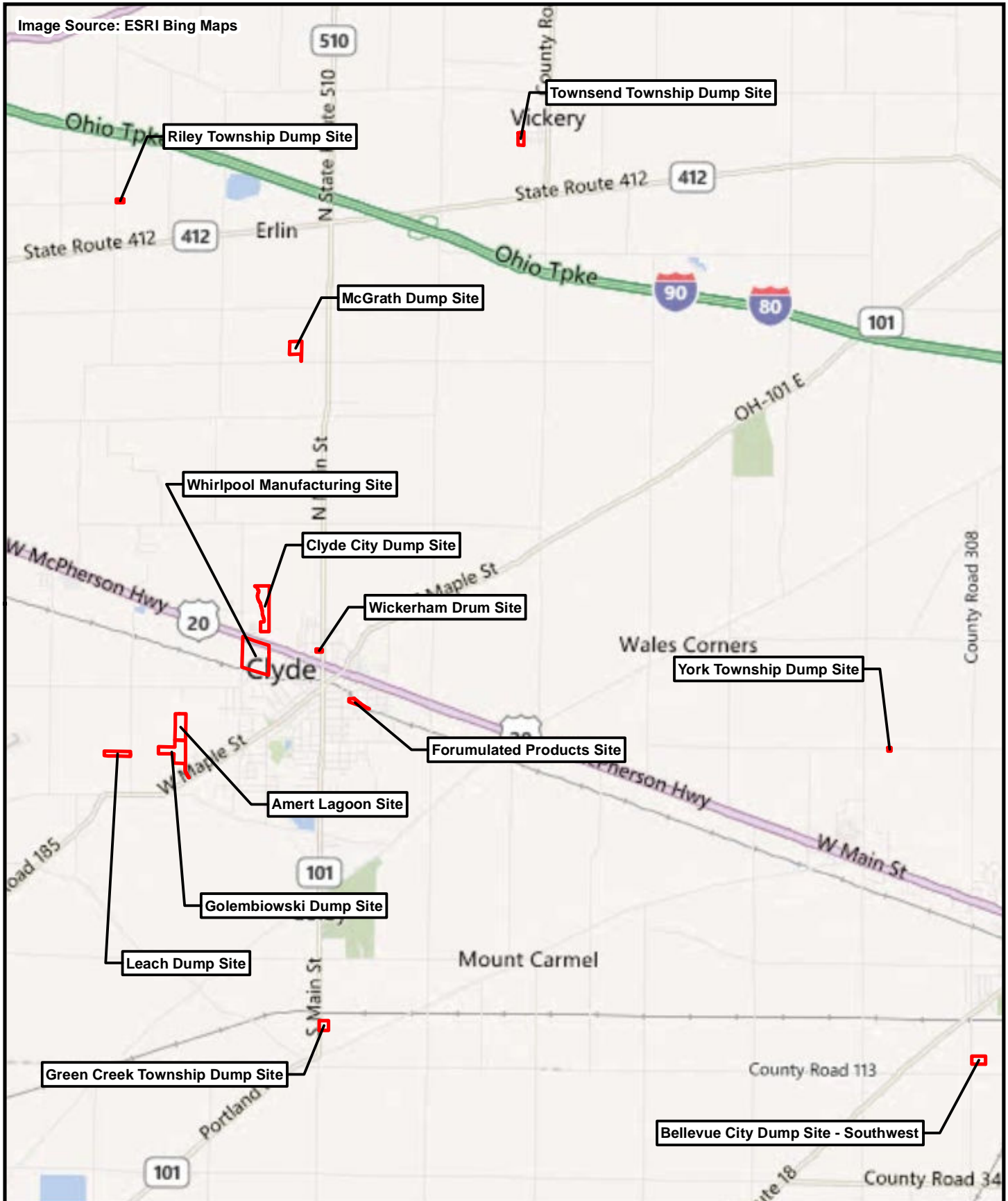


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WESTON SOLUTIONS, INC

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Figure 1
Project Location Map
Eastern Sandusky County Dumps SA
Sandusky County, Ohio

Image Source: ESRI Bing Maps



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Legend

 Sites

0 6,500 Feet



Prepared for:
U.S. EPA REGION V

Contract No: EP-S5-06-04
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Figure 2
Sites Location Map
Eastern Sandusky County Dumps SA
Sandusky County, Ohio

REFERENCES

Cox, Craig A. and Colvin, George H., 1996, Evaluation of Background Metals Concentrations in Ohio Soils.

Ohio Department of Health, Sandusky County Health Department and Ohio EPA Progress Report, 2009, Childhood Cancer Among Residents of Eastern Sandusky County.

U.S. Department of Interior, U.S. Geological Survey Open-File Report 2004-1001, Mineral Resources On-Line Spatial Data.

Field Sampling Plan for the Eastern Sandusky County Dumps Site Assessment, Sandusky, County, Ohio. February 2, 2012, Weston Solutions, Inc.

APPENDIX A

AMERT LAGOON SITE

APPENDIX B

BELLEVUE CITY DUMP SITE – SOUTHWEST

APPENDIX C

CLYDE CITY DUMP SITE

APPENDIX D

FORMULATED PRODUCTS SITE

APPENDIX E

GOLEMBIOWSKI DUMP SITE

APPENDIX F

GREEN CREEK TOWNSHIP DUMP SITE

APPENDIX G

LEACH DUMP SITE

APPENDIX H

MCGRATH DUMP SITE

APPENDIX I

MEGGITT LANDFILL SITE

APPENDIX J

RILEY TOWNSHIP DUMP SITE

APPENDIX K

TOWNSEND TOWNSHIP DUMP SITE

APPENDIX L

WHIRLPOOL MANUFACTURING SITE

APPENDIX M

WICKERHAM DRUM SITE

APPENDIX N

YORK TOWNSHIP DUMP SITE
