

**PHASE II
ENVIRONMENTAL SITE ASSESSMENT REPORT
WATER STREET REDEVELOPMENT PROJECT
YPSILANTI, MICHIGAN**

March 13, 2003

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EXECUTIVE SUMMARY

This Phase II Environmental Site Assessment (ESA) Report, completed by The Traverse Group at the request of the City of Ypsilanti, summarizes the soil and groundwater assessment completed in preparation for the Water Street Redevelopment Project and consistent with the Amended Brownfield Plan approved by the YBRA on August 7, 2002. This Phase II ESA Report will be used to determine whether environmental response activities will be necessary prior to the transfer of the subject properties from the City of Ypsilanti to Biltmore Properties Corporation.

The field investigation was designed to further evaluate soil and groundwater conditions for various Recognized Environmental Conditions (RECs) identified at the subject property. The RECs were identified in Phase I ESAs and Phase II ESAs conducted by ECT. ECT is currently finalizing Phase II ESAs of subject parcels where (RECs) were identified.

The investigation included the completion of a total of 157 soil borings on 26 of the 39 subject parcels, eight test pits on two parcels (five on Parcel 26, three on Parcel 28) and twenty surface soil samples on three subject parcels (12 on Parcel 26, four on Parcel 28 and four on Parcel 32). Soil and groundwater samples were collected as part of the investigation. Analytical parameters for each sample varied, based on the nature of the concern being investigated, and included one or more of the following parameters: benzene, toluene, ethylbenzene and xylenes (BTEX), trimethylbenzenes (TMBs), volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PNAs), semi-volatile organic compounds (VOCs), Michigan 10 metals, aluminum, cyanide, PCBs, pesticides, and herbicides.

Soil and groundwater results were compared to Risk-Based Screening Levels (RBSLs) published by the Michigan Department of Environmental Quality (MDEQ) under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The applicable RBSLs used for evaluation of analytical sample results vary depending



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on issues such as the cause (source) of the impacts and the intent of current and future property use. For this report, Residential RBSLs were utilized for comparison to analytical results. All RBSLs published in Part 201 were retained; no RBSLs were eliminated due to potential site use or groundwater conditions.

Analytical results for soil and groundwater samples collected as part of the Phase II ESA conducted for the Water Street Development project revealed exceedances of applicable RBSLs for volatiles, semi-volatiles, metals, and PCBs. Based on the exceedances of applicable RBSLs, the site meets the definition of an environmental “facility”. The Traverse Group has identified seven “Areas of Concern” (AOCs), which are portions of the subject property that may require corrective action in order to satisfy Due Care obligations. The seven AOCs are summarized as follows:

AOC 1 – Parcels 2, 14, 15, 16, 19 - Elevated PNAs and Metals

Elevated PNAs and metals levels were detected in near-surface soil samples collected from Parcels 2, 14, 15, 16, and 19, located near the northwest corner of the subject property. This area includes Parcel 2, and the portions of Parcels 14, 15, 16, and 19 south of the buildings located on these parcels. These exceedances were detected in soil samples collected from 0 to 4 feet below grade, with the exception of an exceedance for lead in the soil sample collected from soil boring SB-16-09 at 4 to 8 feet below grade. All other soil samples collected from greater than four feet below grade were below applicable RBSLs for PNAs and lead, indicating that the elevated PNAs and lead levels are primarily associated with near-surface soil.

AOC 2 – Parcels 16-18 - Elevated BTEX and PNAs

Parcel 16 was formerly operated as a commercial gas station, and 8 USTs were removed from the site in 1992. Soil and groundwater sampling conducted at Parcels 16, 17, and 18 showed soil and groundwater BTEX concentrations in exceedance of Drinking Water Protection RBSLs and Groundwater/Surface Water Interface (GSI) RBSLs. PNAs were also detected in exceedance of GSI and Residential Direct Contact RBSLs. No free-phase petroleum product was encountered at Parcels 16, 17, or 18.

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AOC 3 – Parcel 19 - Elevated TCE

Five exceedances of Drinking Water RBSLs (3 also above GSI) were detected for TCE from 12 soil samples collected at Parcel 19. These results indicate that TCE in soil in this area does pose a potential threat to surface and subsurface water resources. Soil samples exceeded RBSLs for TCE as deep as 8 feet below grade, and TCE was detected in soil samples as deep as 10 feet below grade.

AOC 4 – Parcel 26 - Elevated PCBs and PNAs

Elevated levels of PCBs and PNAs were detected in soil samples collected from Parcel 26. In addition, lead was detected in exceedance of the Residential Direct Contact RBSL for 6 of 69 samples collected for lead. The exceedances were associated with fill material, primarily from 0 to 4 feet below grade at Parcel 26. All exceedances of Direct Contact RBSLs for PNAs, PCBs, and lead, with one exception, were located in soil samples collected from 0 to 4 feet below grade.

AOC 5 – Parcel 28 - Elevated Metals

Elevated levels of metals were detected in soil samples collected from Parcel 28. Lead was detected in exceedance of Residential Direct Contact RBSLs in 6 of 32 samples collected for analysis of Michigan 10 metals. In addition, several other metals were detected in exceedance of Drinking Water Protection and GSI RBSLs. With the exception of arsenic, these metals exceedances were primarily found in soil from 0 to 4 feet below grade.

AOC 6 – Parcel 5 and 7 - Elevated PNAs

The analytical results from Parcels 5 and 7 indicate exceedances for several PNA compounds in both soil and groundwater samples. Benzo(a)pyrene was detected in exceedance of Residential Direct Contact RBSLs in four of five soil samples from depths ranging from 0 to 8 feet below grade, and results for these four samples also showed other PNAs in exceedance of Residential Drinking Water or GSI RBSLs. Three groundwater samples were collected from Parcels 5 and 7, and several exceedances of applicable RBSLs were recorded for PNAs from the groundwater sample collected from a temporary well installed in SB-07-01.



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AOC 7 – Entire Subject Property – Elevated Arsenic

Arsenic was detected throughout the subject property in exceedance of the Residential Direct Contact RBSL of 7,600 µg/kg. In all, 201 soil samples were submitted for analysis of arsenic, and 108 exceeded the Residential Direct Contact RBSL. Arsenic was detected in all soil types, and at all depths investigated.

These seven AOCs may require corrective action in order to satisfy Due Care obligations. The recommended corrective action for each of these AOCs will be provided under a separate report.

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1.0 INTRODUCTION

This Phase II Environmental Site Assessment (ESA) Report, completed by The Traverse Group at the request of the City of Ypsilanti, summarizes the soil and groundwater assessment completed in preparation for the Water Street Redevelopment Project and consistent with the Amended Brownfield Plan approved by the YBRA on August 7, 2002. This Phase II ESA Report will be used to determine whether environmental response activities will be necessary prior to the transfer of the subject properties from the City of Ypsilanti to Biltmore Properties Corporation.

1.1 Property Information

The Eligible Property, comprising approximately 38 acres, is located south of Michigan Avenue and to the east and north of the Huron River at the eastern end of the City of Ypsilanti central business district, Washtenaw County, Michigan. A site location map is included in **Figure 1**. The eligible property is subdivided into 39 parcels, and **Figure 2** lists the parcel identification numbers within the eligible property.

The eligible property is currently owned by several individuals/entities. The City is currently in the process of purchasing each parcel making up the eligible property and currently owns 10 of the 39 parcels. It is anticipated that the City will obtain title to all of the subject parcels by July 2003. Biltmore plans to purchase the entire subject property from the City by approximately December 2003.

The Eligible Property is currently zoned General Business District (B4), Light Industrial District (M1), Medium Industrial District (M2), and Public Land District (PL). It is anticipated that the proposed development will be zoned Planned Unit Development (PUD) and will include commercial spaces mixed with upper level residential and/or office units on Michigan Avenue that complement the existing downtown commercial district to the west. It is anticipated that the interior of the redevelopment area (those properties located south of the East Michigan Avenue



buildings) will be residential, with a clear emphasis on owner-occupied multiple family residential developments. Emphasis will be placed on the pedestrian experience along with the clear delineation of public and private spaces. The redevelopment will continue the Huron River Parks Corridor system by the creation of a linear park with non-motorized pathways along the east bank of the Huron River from Michigan Avenue to Water Works Park to the south.

1.2 Historical Use of Eligible Property

The subject property has been occupied since at least 1874 by a mix of industrial, commercial and residential uses. Significant former uses include foundries, door and blind factory, lumber yard/planning mill, warehouses, “Motor Truck Company”, bulk fuel facility, machine shops, automobile sales and repair facilities, printing facility, junk yards, seat manufacturers, dry cleaner, coal storage, railroad spurs/sidings, and restaurants. A historical use map, mainly derived from Sanborn[®] Fire Insurance maps (**Figure 2**) depicts the locations of former structures/uses within the study area.

Early development in the study area focused on industry along the Huron River and Water Street. With the advent of the automobile, Congress Street (currently Michigan Ave.) uses focused on automobile sales and service, and a major auto/truck manufacturing facility was located near the center of the subject property at 101 and 103 South Water Street. Older industries along the river eventually became abandoned and vacant and large lumber yard on the southeast corner of the subject property was replaced with a shopping complex. Currently several of the subject parcels contain abandoned and vacant buildings and a number of abandoned railroad sidings are present. Parts of the southern-most portions of the subject property are occupied by a walking path, baseball field and play park. The green space is also connect by a footbridge with parkland along the south side of the Huron River.

1.3 Current Use of Eligible Property

The eligible property is currently characterized as a mix of former residential, commercial, industrial, vacant and park uses. Many of the existing uses have deteriorated, the traffic circulation pattern is unclear, and roads require improvement. The Michigan Avenue frontage

includes blighted commercial uses with little consistency in setbacks, signage, access, lighting, or landscape.

1.4 Summary of Previous Environmental Investigations

The Traverse Group reviewed the past study reports for the Water Street Redevelopment Area in order to summarize site activities and environmental conditions. In addition to reviewing these past studies, The Traverse Group conducted an Environmental Real Estate Assessment (EREA, November 12, 1997) of the subject property's history and past usage. The following is a list of significant recent investigations of the subject property.

- Environmental Real Estate Assessment (EREA) completed by The Traverse Group on November 12, 1997.
- Phase I Environmental Site Assessments (ESAs) of the subject parcels were completed by Environmental Consulting and Technology, Inc. (ECT) between 1999 and 2002.
- ECT is currently finalizing Phase II ESAs of subject parcels where Recognized Environmental Conditions (RECs) were identified.
- ECT is currently finalizing Baseline Environmental Assessments (BEAs) of subject parcels that have been defined as "facilities" (contaminant concentrations above Generic Residential Cleanup Criteria (GRCC)).

The Traverse Group reviewed the EREA and the ECT Phase I/II ESAs in order to assess the environmental conditions at the subject property. The EREA and the Phase I ESAs identified a number of RECs on the subject property, the majority of which were based on former industrial and commercial uses including the following:

- Automobile services;
- Machine shops;
- Lumber supply company;

- Bulk fuel facility;
- Newspaper press;
- Foundries;
- Auto/truck manufacturing operations;
- Dry cleaner and;
- Hazardous chemical storage.

Based on the results of the ECT Phase II ESAs (see **Table 1** for summary of Recognized Environmental Conditions), of the 39 parcels on the eligible property, 28 parcels have been defined as “facilities”, as defined by Section 20101 of Part 201 (Environmental Remediation) of the Natural Resources and Environmental Protection Act (NREPA), Act 451 of the Public Acts of 1994, as amended. Of the remaining eleven parcels, no RECs were identified on nine of the parcels (4, 10, 11, 13, 33, 34, 35, 36, and 37).

1.5 Environmental Site Assessment Objectives

The objectives of the field investigation were to:

- Review the previous studies that have been completed for the subject property.
- Investigate and characterize soil and groundwater from the RECs identified in previous environmental investigations in order to confirm the presence and/or absence of soil contamination, groundwater contamination, or free phase product.
- Identify underground infrastructure that could act as migration pathways.
- In the case where soil or groundwater contamination has been identified, evaluate the potential impact of the contamination on human health and the environment.
- In the case where dissolved phase contamination above applicable criteria and/or free phase product has been identified, evaluate the probability of migration off the subject property.

2.0 ENVIRONMENTAL SITE ASSESSMENT FIELD INVESTIGATION METHODS

This subsurface investigation was completed by The Traverse Group to further evaluate environmental impacts identified by the ECT Phase I and Phase II ESAs for the purposes of planned development. The investigation included the completion of a total of 157 soil borings on 26 of the 39 subject parcels, eight test pits on two parcels (five on Parcel 26, three on Parcel 28) and twenty surface soil samples on three subject parcels (12 on Parcel 26, four on Parcel 28 and four on Parcel 32). With the exception of test pit TP-28-01, the test pits were completed for visual observation purposes, with no soil samples collected. The surface soil samples were collected around the perimeter of previous soil sample locations where polychlorinated biphenyls (PCBs) had been detected. Soil and groundwater samples were collected as part of the investigation. Analytical parameters for each sample varied, based on the nature of the concern being investigated, and included one or more of the following parameters: benzene, toluene, ethylbenzene and xylenes (BTEX), trimethylbenzenes (TMBs), volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PNAs), semi-volatile organic compounds (VOCs), Michigan 10 metals, aluminum, cyanide, PCBs, pesticides, and herbicides. A list of the sample locations, information regarding the RECs being investigated, and whether a soil and/or groundwater sample was collected at the sample location, is presented in **Table 1**. **Figure 3** depicts the soil boring and test pit locations conducted for the subsurface investigation.

The field investigation was designed to provide soil and groundwater conditions at the site at various RECs identified within the subject property. The sample collection methods utilized during the field investigation are described in the following sections.

2.1 Geoprobe Drilling and Soil Sampling

Geoprobe[®] drilling was completed at 150 locations (seven borings were performed using hollow stem augers; see Section 2.3) to visually observe subsurface geology and to obtain discrete soil samples from the site. Sample collection methods are described in the Field Standard Operating Procedures included as **Appendix A**. Geoprobe[®] drilling was performed by Fibertec Environmental Services of Brighton, Michigan and supervised by The Traverse Group. These

Geoprobe[®] borings were completed to a maximum depth of 23 feet below grade, but most soil borings were terminated at depths of approximately 10 to 15 feet below grade, resulting from a silt/silty clay layer encountered at this depth. Due to the tightness of the silt/silty clay layer, Geoprobe[®] borings were not able to penetrate more than one to two feet into this layer. The boring locations are shown in **Figure 3**.

Soil samples were collected continuously using an Envirocore[®] sampling device that provided four-foot long samples encapsulated in a clear acetate sleeve. Upon retrieval, the soil samples were visually inspected, classified geologically, and field-screened with an organic vapor meter (OVM) equipped with a photoionization detector (PID). Based on the results of the field screening, the sample exhibiting the highest level of contamination based on visual, olfactory, and PID evidence was submitted for laboratory analysis. In the event that the boring did not exhibit evidence of contamination, a near-surface soil sample was typically submitted for laboratory analysis.

Temporary wells were installed in selected Geoprobe[®] borings for the purpose of collected a groundwater sample. Temporary monitor well installation and sampling methods are described further in Section 2.2.

Tables 1 and 2 present a summary of the soil boring locations, soil and groundwater samples and sample depths, and selected laboratory analysis. During boring installation, the physical condition of the soil was recorded and this information is included on boring logs presented in **Appendix B**.

The soil samples submitted for volatile chemical analysis were collected by placing approximately 10 grams of soil into a new methanol-preserved vial according to US EPA Method 5035. The soil samples submitted for non-volatile chemical analysis were placed in pre-cleaned 4-ounce jars according to US EPA protocol. All sample containers were obtained from Fibertec Environmental Services of Holt, Michigan. Once placed in containers, the samples were stored on ice in a cooler and sent to the laboratory for analysis. Standard chain-of-custody procedures were followed, noting the sampler's name and signature, sample identification, time

and date of collection, requested analyses, and chain-of-custody sequence denoted by the relinquish and acceptance signatures of the parties handling the samples. Completed chain-of-custody forms and their corresponding analytical results are included in **Appendix C**. Following use at each location, all sample collection and drilling equipment was decontaminated according to the procedure outlined in Section 2.5.

2.2 Temporary Monitor Well Installation and Sampling

Temporary monitor wells were installed at 50 Geoprobe[®] boring locations. All temporary wells were constructed of one-inch inner diameter polyvinyl chloride (PVC) material, with a screen length of five feet. The screens were of the machine slotted type, and the slot size was 0.010 inches. The approximate depth to saturated soil was typically 7 to 12 feet below grade during drilling activities. The screened interval depth for each temporary well is included in the boring logs in **Appendix B**.

Groundwater samples were collected from each of the temporary monitor wells immediately after installation using a peristaltic pump. The groundwater-bearing layer at each boring location was typically a sand and gravel layer saturated with perched groundwater located atop a silt or silty clay layer. Therefore, groundwater recharge was typically good in the temporary wells.

Fibertec Environmental Services provided all sample containers and preservatives for the collection of groundwater samples. Groundwater samples collected for volatile chemical analysis were collected with zero headspace in 40-mL glass containers preserved with hydrochloric acid. Care was exercised during sample collection to minimize volatilization by filling the containers sufficiently to eliminate headspace. Semi-volatile chemical samples (PNAs, SVOCs, PCBs) were collected into 1-liter amber glass containers with no preservative. Metals samples were collected into ½-liter plastic containers with nitric acid. Cyanide samples were collected into ½-liter plastic containers with sodium hydroxide preservative. Once collected, groundwater samples were stored on ice in a cooler and sent to the analytical laboratory. Standard chain-of-custody procedures were followed.

2.3 Hollow Stem Auger Drilling / Hydropunch Water Sampling

Seven soil borings were completed using hollow stem augers in order to investigate soil and groundwater conditions at deeper locations than was possible to investigate using the Geoprobe®. The borings were advanced using either 3¼-inch or 4¼-inch hollow stem augers. Sample collection techniques are described in the Field Standard Operating Procedures included as **Appendix A**. The hollow stem auger borings were completed to depths ranging from 20 to 36½ feet below grade. The boring locations are shown in **Figure 3**.

A two-foot long soil sample was collected every five feet using a split spoon sampler. Upon retrieval, the soil samples were visually inspected, classified geologically, and field-screened with an organic vapor meter (OVM) equipped with a photoionization detector (PID). **Tables 1 and 2** present a summary of the soil boring locations, soil intervals sampled, and requested laboratory analysis. During boring installation, the physical condition of the soil was recorded and this information is included on boring logs presented in **Appendix B**.

All soil samples submitted for laboratory analysis from the hollow stem auger borings were collected from the silt/silty clay layer present at the subject property. Collection techniques for soil samples submitted for volatile and non-volatile laboratory analysis are identical to the techniques described in Section 2.1. Analytical results are included in **Appendix C**. All drilling equipment was decontaminated between each boring location using a pressure washer as described in Section 2.5.

2.4 Permanent Monitor Well Sampling

Fourteen permanent monitor wells installed as part of previous investigations were sampled as part of this investigation. These permanent monitor wells are located on Parcels 16, 17, 18, and were installed to investigate groundwater conditions resulting from the historical use of Parcel 16 as a commercial fueling station.

Monitor well purging and sampling was performed using low-flow methods utilizing a peristaltic pump. New polyethylene tubing was used for each sample, and the tubing was lowered to

approximately one foot above the bottom of the monitor well screen. A Model MP-20 Flow Cell was utilized to measure water quality parameters, including pH, temperature, specific conductivity, and dissolved oxygen. Groundwater samples were collected only after water quality parameters had stabilized for three consecutive readings (pH \pm 0.1, temperature \pm 0.1°C, conductivity \pm 10%, and DO \pm 10%).

Fibertec Environmental Services provided all sample containers and preservatives for the collection of groundwater samples. Groundwater samples collected for volatile chemical analysis were collected with zero headspace in 40-mL glass containers preserved with hydrochloric acid. Care was exercised during sample collection to minimize volatilization by filling the containers sufficiently to eliminate headspace. Semi-volatile chemical samples (PNAs, SVOCs, PCBs) were collected into 1-liter amber glass containers with no preservative. Metals samples were collected into ½-liter plastic containers with nitric acid. Cyanide samples were collected into ½-liter plastic containers with sodium hydroxide preservative. Once collected, groundwater samples were stored on ice in a cooler and sent to the analytical laboratory. Standard chain-of-custody procedures were followed.

2.5 Quality Control Program/Decontamination Procedures

Sample collection quality control measures included following standard chain-of-custody procedures, noting the sampler's name and signature, sample identification, time and date of collection, requested analyses, and a chain-of-custody sequence denoted by the relinquish and acceptance signatures of the persons handling the samples.

All drilling equipment was thoroughly decontaminated between each boring location and at the completion of drilling activities with a pressure washer. Soil and groundwater sampling equipment, including latex gloves and peristaltic pump tubing, were single-use items that were not used for collection of multiple samples to prevent cross-contamination of samples.

3.0 PHYSICAL CHARACTERISTICS OF THE SITE

Physical characteristics of the subject property, including regional and local conditions, are described below. The local and regional characteristics were obtained from a review of *The Soil Survey of Washtenaw County, Michigan* (United States Department of Agriculture, the Soil Conservation Service), the *Hydrogeologic Atlas of Michigan* (Department of Geology, Western Michigan University, 1981), United States Department of the Interior Geological Survey (USGS) topographic maps, and through on-site investigation.

3.1 Regional Geology

The United States Department of Agriculture Soil Survey for Washtenaw County classified the most of the soil at the subject property as either Boyer or Oshtemo loamy sand association. These soil associations are characterized by well drained, nearly level to sloping soils formed in loamy and sandy textured deposits, generally underlain by gravelly coarse sand. These soils have a low available water capacity, but permeability is moderately rapid, and surface runoff can be slow. The soil within 200-300 feet of the Huron River is classified as Sloan silty loam. This soil association is characterized by very poorly drained, nearly level soils located on the flood plains of streams and rivers. Sloan soils have a high available water capacity, permeability is moderate, and surface runoff is typically slow.

Based on the Hydrogeologic Atlas of Michigan (Department of Geology, Western Michigan University, 1981), the bedrock formation at the subject property is classified as Antrim shale, which is located as deep as 200 feet below grade. Hydrogeologic conditions in this region are characterized as glacial drift, which generally is not an aquifer, but may include thin, interbedded aquifers at depth.

3.2 Hydrology

The USGS topographic map, 7.5 Minute Series, 1967 photorevised 1983, indicates that the subject property lies within the northwest ¼ of the Ypsilanti East Quadrangle within Section 9, T.3S, R.7E (see Figure 1). The subject property is characterized by a moderate amount of

topographic relief, as the ground surface gradually drops when traversing from the northeast to the southwest of the subject property. The slope drops about 20 feet over the course of the property, with a width of approximately 2,600 feet, and the subject property lies approximately 690 to 710 feet above mean sea level. The ground slopes toward the Huron River, which borders the subject property on the west and the south, and surface runoff from the site flows toward the Huron River. Several drains are located on the subject property, guiding storm water from the subject property into the City of Ypsilanti storm sewer system.

Surface water bodies in the region surrounding the subject property are the Huron River which borders the subject property to the west and south. The Huron River discharges into Ford Lake, which is located approximately ½ mile south of the subject property.

3.3 Local Geology and Hydrogeology

A description of the local geology and hydrogeology encountered at each individual parcel is included with the investigative and analytical findings in Section 4.0. Consult Section 4.0 for soil and groundwater information for specific areas of the site. In general terms, geology at the site is primarily composed of fill material in the top 4 to 6 feet of soil, consisting mainly of fine-grained sands, but also with occasional silty clay or clayey sand materials. Silty sand was present underneath the fill material, and extended to approximately 9 to 10 feet below grade, which was followed by sand and gravel that extends to approximately 10 to 12 feet below grade. A silt/silty clay layer is present beneath the sand and gravel, and the silt/silty clay extended to the bottom of soil borings in which the silt/silty clay was reached. Perched groundwater was generally encountered at approximately 8 to 9 feet below grade and extended to the silt/silty clay layer. Groundwater could not be recovered from the silt/silty clay layer. The stratigraphy encountered in each borehole is presented in the boring logs included in **Appendix B**.

The groundwater encountered during the investigation was perched groundwater atop the silt/silty clay layer. The saturated conditions atop the silt/silty clay layer were generally 2 to 3 feet in thickness. The local groundwater flow direction was determined for Parcels 16 through 18 near the northwest corner of the subject property. The local groundwater flow direction for

these parcels is to the west, moving toward the Huron River, and all local groundwater is likely to flow south and west toward the Huron River. Several borings were conducted into the silt/silty clay layer, and saturated conditions were encountered again at depths of 20 to 25 feet below grade in most of these borings.

No free-phase petroleum or chemical products were encountered at the subject property during collection of any soil or groundwater samples. Site-specific hydraulic conductivity tests (“slug tests”) and estimates of hydraulic conductivity and bulk groundwater flow velocity were not performed at the subject property.

4.0 INVESTIGATIVE AND ANALYTICAL FINDINGS

The site investigation included the installation of 157 soil borings, 8 test pits, the collection of 20 surface soil samples, and the collection of soil and groundwater samples from these locations and from 15 existing permanent monitor wells. This section separates the results of the site investigation into the individual parcels, and summarizes the results of the soil and groundwater investigation as well as the analytical results. Soil boring logs are included in **Appendix B**.

Soil and groundwater results were compared to Risk-Based Screening Levels (RBSLs) published by the Michigan Department of Environmental Quality under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

The applicable RBSLs in the State of Michigan for evaluation of analytical sample results vary depending on issues such as the cause (source) of the impacts and the intent of current and future property use. In situations where Part 201 is applicable, the Residential RBSLs (Operational Memorandum #8) or the Generic Commercial/Industrial RBSLs for Groundwater and Soil (Operational Memorandum #14, Revision 2, June 6, 1995) are used. For this report, Residential RBSLs were utilized for comparison to analytical results.

An evaluation of the pathways considered relevant for soil impacts resulted in comparing site data to the Residential RBSLs for Drinking Water Protection, Groundwater/Surface Water Interface (GSI) Protection, Groundwater Contact Protection, Soil Volatilization to Indoor Air Inhalation Protection, Infinite Source Volatile Soil Inhalation Criteria (VSIC), Particulate Soil Inhalation Criteria (PSIC), and Direct Contact Criteria. Our evaluation of the pathways considered relevant for groundwater impacts resulted in a comparison of site data to Residential RBSLs for Drinking Water Protection, GSI Protection, Groundwater Volatilization to Indoor Air Inhalation, and Groundwater Contact. All RBSLs published in Part 201 were retained; no RBSLs were eliminated due to potential site use or groundwater conditions. A summary of the Part 201 RBSLs, including the most stringent applicable criteria for each analyte, is included as **Table 3** through **Table 8**. These six tables include applicable Part 201 criteria for all parameters analyzed for both soil and groundwater samples during the field investigation.

4.1 Parcel 1

Parcel 1 is currently operated as a heating and cooling contractor business. Parcel 1 was previously operated as an automobile service/repair facility. Two soil borings (SB-01-05 and SB-01-06) were completed on Parcel 1 for the purpose of evaluating potential impacts from past and current site operations. Three soil samples were collected from Parcel 1 and analyzed for BTEX, TMBs, PNAs, and Michigan 10 metals. One soil sample was also collected for analysis of PCBs. No groundwater impacts were anticipated based on past or current uses; therefore, no groundwater samples were collected.

4.1.1 Geology and Hydrogeology

SB-01-05 and SB-01-06 were advanced with a Geoprobe[®] to 15 feet below grade. Geology at Parcel 1 consisted of fine to medium sand and silty sand from grade to approximately 11 feet below grade, followed by a sand and gravel layer from 11 to 13 feet below grade. The sand and gravel layer was underlain by grey silt from 13 feet below grade to the boring terminus at 15 feet below grade (bg). The sand and gravel layer was saturated with approximately six inches of perched groundwater from 12.5 to 13 feet below grade in SB-01-05, but groundwater was not encountered in SB-01-06.

4.1.2 Analytical Results

Three soil samples were collected from Parcel 1 (SB-01-05/0-4 ft bg, SB-01-06/0-4 ft bg, and SB-01-06/11-13 ft bg). A summary of the analytes detected in the soil samples is included in Table 01-1 of **Appendix D**. The following analytical results were found at Parcel 1:

Soil Samples

- BTEX & TMBs – 2 samples
 - No exceedances.
- PNAs – 2 samples
 - No exceedances.
- PCBs – 1 sample
 - No exceedances.
- Michigan 10 metals – 3 samples
 - Arsenic – 2 exceedances of Residential DC.
 - Mercury – 1 exceedance of GSI.
 - Selenium – 2 exceedances of GSI.

No exceedances were detected in the soil samples collected from Parcel 1 with the exception of arsenic, mercury, and selenium. These metals were detected in exceedance of applicable criteria on several parcels across the subject property, and these exceedances were likely not caused by operations at Parcel 1.

4.2 Parcel 2

Parcel 2 is currently vacant. Parcel 2 was formerly a flour mill and lumber storage area. Five soil borings (SB-02-03 through SB-02-07) were completed on Parcel 2 for the purpose of confirming results of the previous Phase II ESA, and to determine whether there may be a downgradient impact to the groundwater at Parcel 2 from the groundwater at Parcel 16. Four soil samples were collected from Parcel 2 and analyzed for BTEX, TMBs, PNAs, and Michigan 10 metals, and four additional soil samples were submitted for analysis of Michigan 10 metals only. One groundwater sample was collected for analysis of VOCs and SVOCs.

4.2.1 Geology and Hydrogeology

SB-02-03, SB-02-04, SB-02-06, and SB-02-07 were advanced with a Geoprobe[®] to depths ranging from 12 to 16 feet below grade. SB-02-05 was advanced using hollow stem augers to a depth of 27 feet below grade. Geology at Parcel 2 consisted of fine to medium sand and silty sand from grade to approximately 10 to 12 feet below grade, followed by a sand and gravel layer that extends from 10 to 12 feet below grade to a silt layer. The silt layer was encountered at 13 feet below grade in SB-02-05, but was not encountered in SB-02-03, SB-02-04, or SB-02-06. In SB-02-05, the silt layer was unsaturated and extended to 25 feet below grade, and a saturated silty sand layer was encountered from 25 to 27 feet below grade.

4.2.2 Analytical Results

Three soil samples were collected from SB-02-03 and SB-02-04 and analyzed for BTEX, TMBs, PNAs, and Michigan 10 metals. Five additional soil samples from SB-02-05 through SB-02-07 were submitted for analysis of Michigan 10 metals only. A summary of the analytes detected in the soil samples is included in Table 02-1 of **Appendix D**. One groundwater sample was collected from Parcel 2 (SB-02-05/27-27.5 ft bg), and a summary of analytes detected in this sample is included in Table 02-2 of **Appendix D**. The following analytical results were found at Parcel 2:

Soil Samples

- BTEX & TMBs – 3 samples
 - No exceedances.
- PNAs – 3 samples
 - Benzo(a)pyrene – 2 exceedances of Residential DC (2,000 µg/kg).
 - Fluoranthene – 2 exceedances of GSI (5,500 µg/kg).
 - Phenanthrene – 2 exceedances of GSI (2,300 µg/kg) and VSIC (9,300 µg/kg).
- Michigan 10 metals – 8 samples
 - Arsenic – 5 exceedances of Residential DC.
 - Lead – 2 exceedances of Residential DC.
 - Mercury – 3 exceedances of GSI.
 - Selenium – 4 exceedances of GSI.
 - Zinc – 1 exceedance of GSI.

Groundwater Sample

- VOCs – 1 sample
 - No exceedances.
- SVOCs – 1 sample
 - Bis(2-ethylhexyl)phthalate – 1 exceedance of Residential Drinking Water & GSI.

The exceedances for PNAs, lead, and zinc detected in the soil samples collected from Parcel 2 have been detected in exceedance of applicable criteria on several parcels across the northwest portion of the subject property. These exceedances were potentially caused by operations at Parcel 2. Based on sample results obtained from both near-surface soils and soil samples from 4 to 6 feet below grade, the PNAs and metals exceedances are confined to the near-surface soils.

4.3 Parcel 3

Parcel 3 is currently vacant. Parcel 3 was formerly operated as a business supply warehouse. No soil or groundwater investigation occurred on Parcel 3 because the investigation on Parcel 2 was considered sufficient to address Parcel 3 as well.

4.4 Parcel 4

Parcel 4 is currently a residential property. Parcel 4 was formerly operated as a wood barrel manufacturing facility. No soil or groundwater investigation occurred on Parcel 4 because the investigation on Parcel 2 was considered sufficient to address Parcel 4 as well.

4.5 Parcel 5

Parcel 5 currently includes a warehouse. Four soil borings (SB-05-05 through SB-05-08) were completed on Parcel 5 on August 13 and August 14, 2002, for the purpose of evaluating the historical use of the property as a bulk fuel storage and distribution facility. Three soil samples and one groundwater sample were collected from Parcel 5.

4.5.1 Geology and Hydrogeology

SB-05-05 through SB-05-08 were advanced with a Geoprobe[®] to depths of ranging from 11 to 15 feet below grade. Geology at Parcel 5 consisted of sand and silty sand from grade to approximately 8 feet below grade, which was followed by a sand and gravel layer that extends from approximately 8 to 12 feet below grade. A silt/silty clay layer is present beneath the sand and gravel layer, and this layer extended to the bottom of the soil borings. Perched groundwater was encountered at depths ranging from 7.5 to 10 feet below grade. The silt/silty clay layer was unsaturated.

4.5.2 Analytical Results

Three soil samples were collected from Parcel 5 (SB-05-05/6-7 ft, SB-05-06/0-2 ft, and SB-05-07/0-4 ft) and analyzed for BTEX, TMBs, PNAs, PCBs, and Michigan 10 metals. A summary of the analytes detected in the soil samples is included in Table 05-1 of **Appendix D**. One groundwater sample was collected from Parcel 5 (SB-05-05) and analyzed for BTEX, TMBs, PNAs, PCBs, and Michigan 10 metals, and a summary of analytes detected in this sample is included in Table 05-2 of **Appendix D**. The following analytical results were found at Parcel 5:

Soil Samples

- BTEX & TMBs – 3 samples
 - No exceedances.
- PNAs – 3 samples
 - Acenaphthylene – 1 exceedance of GSI (5,900 µg/kg).
 - Anthracene – 1 exceedance of Residential Drinking Water (41,000 µg/kg) and GSI (41,000 µg/kg).
 - Benzo(a)anthracene – 1 exceedance of Residential DC (20,000 µg/kg).
 - Benzo(b)fluoranthene - 1 exceedance of Residential DC (20,000 µg/kg).
 - Benzo(a)pyrene – 2 exceedances of Residential DC (2,000 µg/kg).
 - Fluoranthene – 2 exceedances of GSI (5,500 µg/kg).
 - Fluorene – 1 exceedance of GSI (5,300 µg/kg).
 - Indeno(1,2,3-cd)pyrene – 1 exceedance of Residential DC (20,000 µg/kg).
 - Naphthalene – 1 exceedance of GSI (870 µg/kg).
 - Phenanthrene
 - 2 exceedances of GSI (2,300 µg/kg).
 - 1 exceedance of VSIC (9,300 µg/kg).

- 1 exceedance of Residential Drinking Water (56,000 µg/kg).
- PCBs – 3 samples
 - No exceedances.
- Michigan 10 metals – 3 samples
 - Arsenic – 1 exceedance of Residential DC (7,600 µg/kg).
 - Mercury – 3 exceedances of GSI (130 µg/kg).
 - Selenium – 3 exceedances of GSI (410 µg/kg).

Groundwater Samples

- BTEX & TMBs, PNAs, PCBs, Michigan 10 metals – 1 sample
 - No exceedances.

The analytical results indicate exceedances for several PNA compounds, as well as three metals: arsenic, mercury, and selenium. These metals were detected in exceedance of applicable criteria from several areas across the entire subject property, and these exceedances were likely not caused by operations at Parcel 5. The PNA compounds in exceedance of criteria are potentially the result of the former operation of Parcel 5 as a bulk fuel unloading facility.

4.6 Parcel 6

Parcels 6 through 9 are currently operated as a vehicle impound lot. Parcel 6 was formerly a residential property. One soil boring (SB-06-02) was completed on Parcel 6 on August 13, 2002, for the purpose of evaluating site conditions resulting from the current property use. One soil sample was collected from Parcel 6 and analyzed for BTEX, TMBs, PNAs, PCBs, and Michigan 10 metals. No groundwater samples were collected because the investigation for this parcel was focused on near-surface soil conditions.

4.6.1 Geology and Hydrogeology

SB-06-02 was advanced with a Geoprobe[®] to a depth of 13 feet below grade. Based on SB-06-02, the geology at Parcel 6 consisted of fine to medium sand and silty sand from grade to approximately 8 feet below grade, followed by a sand and gravel layer that extends from 8 to 12 feet below grade, followed by a silt layer. The silt layer was encountered at 12 feet below grade and extended to the end of boring at 13 feet below grade. Groundwater was encountered at seven

feet below grade, and saturated conditions continued until 12 feet below grade. The silt material was not saturated.

4.6.2 Analytical Results

One soil sample was collected from Parcel 6 (SB-06-02/0-4 ft). A summary of the analytes detected in the soil samples is included in Table 06-1 of **Appendix D**. No groundwater samples were collected from Parcel 6. The following analytical results were found at Parcel 6:

Soil Samples

- BTEX & TMBs, PNAs, PCBs – 1 sample
 - No exceedances.
- Michigan 10 metals – 1 sample
 - Arsenic – 1 exceedance of Residential DC (7,600 µg/kg).
 - Mercury – 1 exceedance of GSI (130 µg/kg).
 - Selenium – 1 exceedance of GSI (410 µg/kg).

The analytical results indicate exceedances for three metals: arsenic, mercury, and selenium. These metals were detected in exceedance of applicable criteria from several areas across the entire subject property, and these exceedances were likely not caused by operations at Parcel 6.

4.7 Parcel 7

Parcels 6 through 9 are currently operated as a vehicle impound lot. Parcel 7 was formerly a residential property. Two soil borings (SB-07-01 and SB-07-02) were completed on Parcel 7 on August 13 and August 15, 2002, for the purpose of evaluating site conditions resulting from current property use, and for evaluating potential environmental impacts from the historical operation of adjacent Parcel 5 as a bulk fuel facility. Two soil samples and two groundwater samples were collected from Parcel 7 and analyzed for various parameters as summarized in Section 4.7.2.

4.7.1 Geology and Hydrogeology

SB-07-01 and SB-07-02 were advanced with a Geoprobe[®] to depths of 15 and 10 feet below grade, respectively. Geology at Parcel 7 consisted of fine to medium sand and silty sand from

grade to approximately 8 to 10 feet below grade, followed by a sand and gravel layer that extends from 8 to 10 feet below grade to a silt layer. The silt layer was encountered at 13 feet below grade in SB-07-01, but was not encountered in SB-07-02 due to refusal encountered at 10 feet below grade. Groundwater was encountered at approximately 7 feet below grade. The soil in SB-07-01 was characterized by petroleum odor and black staining, with elevated PID readings ranging from 100 to 200, from 3 to 13 feet below grade.

4.7.2 Analytical Results

Two soil samples were collected from Parcel 7 (SB-07-01/4-8 ft and SB-07-02/0-2 ft). A summary of the analytes detected in the soil samples is included in Table 07-1 of **Appendix D**. Two groundwater samples were collected from Parcel 7 (SB-07-01 and SB-07-02), and a summary of analytes detected in the groundwater samples is included in Table 07-2 of **Appendix D**. The following analytical results were found at Parcel 7:

Soil Samples

- BTEX & TMBs – 1 sample
 - No exceedances.
- VOCs – 1 sample
 - No exceedances.
- PCBs – 1 sample
 - No exceedances.
- PNAs – 2 samples
 - Acenaphthylene – 1 exceedance of GSI (5,900 µg/kg).
 - Benzo(a)pyrene – 2 exceedances of Residential DC (2,000 µg/kg).
 - Fluoranthene – 2 exceedances of GSI (5,500 µg/kg).
 - Naphthalene – 1 exceedance of GSI (870 µg/kg).
 - Phenanthrene
 - 2 exceedances of GSI (2,300 µg/kg).
 - 1 exceedance of VSIC (9,300 µg/kg).
- Michigan 10 metals – 2 samples
 - Arsenic – 1 exceedance of Residential DC (7,600 µg/kg).
 - Selenium – 1 exceedance of GSI (410 µg/kg).

Groundwater Samples

- BTEX & TMBs – 1 sample
 - No exceedances.
- VOCs – 1 sample
 - No exceedances.
- PNAs – 2 samples
 - Benzo(a)anthracene – 1 exceedance of Residential Drinking Water (2.1 µg/l) and Groundwater Contact (9.4 µg/l).
 - Benzo(b)fluoranthene – 1 exceedance of Residential Drinking Water (2.0 µg/l) and Groundwater Contact (2.0 µg/l).
 - Benzo(g,h,i)perylene – 1 exceedance of Residential Drinking Water (5.0 µg/l) and Groundwater Contact (5.0 µg/l).
 - Benzo(a)pyrene – 1 exceedance of Residential Drinking Water (5.0 µg/l) and Groundwater Contact (5.0 µg/l).
 - Chrysene – 1 exceedance of Residential Drinking Water (5.0 µg/l) and Groundwater Contact (5.0 µg/l).
 - Fluoranthene – 1 exceedance of GSI (1.6 µg/l).
 - Indeno(1,2,3-cd)pyrene – 1 exceedance of Residential Drinking Water (5.0 µg/l) and Groundwater Contact (5.0 µg/l).
 - Phenanthrene – 1 exceedance of GSI (5.0 µg/l).
- Michigan 10 metals – 1 sample
 - No exceedances.

The analytical results indicate exceedances for several PNA compounds in both soil and groundwater samples. The PNA compounds in exceedance of criteria are potentially the result of the former operation of the adjacent Parcel 5 as a bulk fuel unloading facility. Two metals (arsenic and selenium) also exceeded criteria in soil samples (but not the groundwater sample). These metals were detected in exceedance of applicable criteria from several areas across the entire subject property, and these exceedances were likely not caused by operations at Parcel 5 or Parcel 7.

4.8 Parcel 8

Parcels 6 through 9 are currently operated as a vehicle impound lot. Parcel 8 was formerly a residential property. One soil boring (SB-08-02) was completed on Parcel 8 on August 13, 2002, for the purpose of evaluating surface spills from the storage of vehicles. One soil sample was



collected from Parcel 8 and analyzed for BTEX, TMBs, PNAs, and Michigan 10 metals. No groundwater samples were collected because the investigation for this parcel was focused on near-surface soil conditions.

4.8.1 Geology and Hydrogeology

SB-08-02 were advanced with a Geoprobe[®] to a depth of 15 feet below grade. Based on information from SB-08-02, geology at Parcel 8 consisted of fine to medium sand and silty sand from grade to approximately 7.5 feet below grade, followed by a sand and gravel layer that extends to 11 feet below grade. A silt layer was encountered beneath the sand and gravel layer from 11 feet below grade to the end of boring at 15 feet below grade. Groundwater was encountered from 7 feet to 11 feet below grade. The silt material was not saturated.

4.8.2 Analytical Results

One soil sample was collected from Parcel 8 (SB-08-02/0-2 ft) for analysis of BTEX, TMBs, PNAs, and Michigan 10 metals. A summary of the analytes detected in the soil samples is included in Table 08-1 of **Appendix D**. No groundwater samples were collected from Parcel 8. The following analytical results were found at Parcel 8:

Soil Samples

- BTEX & TMBs, PNAs – 1 sample
 - No exceedances.
- Michigan 10 metals – 1 sample
 - Arsenic – 1 exceedance of Residential DC (7,600 µg/kg).
 - Mercury – 1 exceedance of GSI (130 µg/kg).
 - Selenium – 1 exceedance of GSI (410 µg/kg).

The analytical results indicate exceedances for three metals: arsenic, mercury, and selenium. These metals were detected in exceedance of applicable criteria from several areas across the entire subject property, and these exceedances were likely not caused by operations at Parcel 8.

4.9 Parcel 9

Parcels 6 through 9 are currently operated as a vehicle impound lot. Parcel 9 was formerly a residential property. Two soil borings (SB-09-01 and SB-09-02) were completed on Parcel 9 on August 13, 2002, for the purpose of evaluating surface spills from the storage of vehicles. Two soil samples were collected from Parcel 9 and analyzed for BTEX, TMBs, PNAs, PCBs, and Michigan 10 metals. No groundwater samples were collected because the investigation for this parcel was focused on near-surface soil conditions.

4.9.1 Geology and Hydrogeology

SB-09-01 and SB-09-02 were advanced with a Geoprobe[®] to depths of 13 and 12 feet below grade, respectively. Geology at Parcel 9 consisted of silty sand from grade to approximately 9 to 11 feet below grade, followed in SB-09-01 by a sand and gravel layer that extends from 9 to 12 feet below grade, and followed in SB-09-02 by pieces of slate from 11 to 11½ feet below grade. A silt layer was encountered beneath the sand and gravel layer or slate layer from approximately 11½ to 12 feet below grade to the end of borings. Groundwater was encountered from 7 feet to 12 feet below grade. The silt material was not saturated.

4.9.2 Analytical Results

Two soil samples were collected from Parcel 9 (SB-09-01/0-2 ft and SB-09-02/0-2 ft) and analyzed for BTEX, TMBs, PNAs, PCBs, and Michigan 10 metals. A summary of the analytes detected in the soil samples is included in Table 09-1 of **Appendix D**. No groundwater samples were collected from Parcel 9. The following analytical results were found at Parcel 9:

Soil Samples

- BTEX & TMBs, PNAs, PCBs – 2 samples
 - No exceedances.
- Michigan 10 metals – 2 samples
 - Arsenic
 - 2 exceedances of Residential DC (7,600 µg/kg).
 - 1 exceedance of Residential Drinking Water (23,000 µg/kg).
 - Mercury – 1 exceedance of GSI (130 µg/kg).
 - Selenium – 1 exceedance of GSI (410 µg/kg).

The analytical results indicate exceedances for three metals: arsenic, mercury, and selenium. These metals were detected in exceedance of applicable criteria from several areas across the entire subject property, and these exceedances were likely not caused by operations at Parcel 8.

4.10 Parcel 10

Parcel 10 has historically been and is currently a residential property. No soil or groundwater investigation occurred on Parcel 10 because site access was not obtained from the property owner.

4.11 Parcel 11

Parcel 11 has historically been and is currently a residential property. No soil or groundwater investigation occurred on Parcel 11 because site access was not obtained from the property owner.

4.12 Parcel 12

Parcel 12 has historically been and is currently a residential property. No soil or groundwater investigation occurred on Parcel 12 because site access was not obtained from the property owner.

4.13 Parcel 13

Parcel 13 is covered by an asphalt drive leading to a building on Parcel 19. Two soil borings (SB-13-01 and SB-13-02) were completed on Parcel 13 on August 15, 2002, for the purpose of evaluating potential junkyard use. Two soil samples were collected from Parcel 13 and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals. A third soil sample was collected for analysis of Michigan 10 metals to evaluate metals concentrations below the near-surface soils for comparison to the near-surface metals concentrations. No groundwater samples were collected because the investigation for this parcel was focused on near-surface soil conditions.

4.13.1 Geology and Hydrogeology

SB-13-01 and SB-13-02 were advanced with a Geoprobe[®] to depths of 16 and 12 feet below grade, respectively. Geology at Parcel 13 consisted of an asphalt-covered surface underlain by sand from immediately beneath the asphalt to approximately 8 feet below grade. In SB-13-01, the sand layer was underlain by sand and gravel from 8 to 16 feet below grade; a silt or silty clay layer was not encountered. In SB-13-02, the sand layer was underlain by a sand and gravel layer that extends from 8 to 9½ feet below grade and silty clay from 9½ feet below grade to the end of boring at 12 feet below grade. Groundwater was encountered at 8 feet below grade. The silty clay material encountered in SB-13-02 was not saturated.

4.13.2 Analytical Results

Two soil samples were collected from Parcel 13 (SB-13-01/0-2 ft and SB-13-02/0-4 ft) for analysis of VOCs, SVOCs, PCBs, and Michigan 10 metals. A third soil sample (SB-13-01/4-8 ft) was submitted for analysis of Michigan 10 metals. A summary of the analytes detected in the soil samples is included in Table 13-1 of **Appendix D**. No groundwater samples were collected from Parcel 13. The following analytical results were found at Parcel 13:

Soil Samples

- VOCs – 2 samples
 - Trichloroethene – 1 exceedance of Residential Drinking Water (100 µg/kg).
- SVOCs – 2 samples
 - No exceedances.
- PCBs – 2 samples
 - No exceedances.
- Michigan 10 metals – 3 samples
 - Arsenic – 2 exceedances of Residential DC (7,600 µg/kg).
 - Mercury – 2 exceedances of GSI (130 µg/kg).
 - Selenium – 1 exceedance of GSI (410 µg/kg).
 - Silver – 1 exceedance of GSI (1,000 µg/kg).

The analytical results indicate exceedances for trichloroethene as well as four metals: arsenic, mercury, selenium, and silver. The trichloroethene (TCE) exceedance is likely the result of the

historical operation of adjacent Parcel 19 as an analytical laboratory (see Section 4.19 for more detail). Arsenic, mercury, and selenium were detected in exceedance of applicable criteria on several parcels across the subject property, and these exceedances were likely not caused by operations at Parcel 13. The exceedance for silver is likely an isolated sample result and is not indicative of large-scale impact. Several soil samples were collected on Parcel 13 and neighboring Parcels 14 and 19, and silver was not detected at any of these nearby sample locations. Base on the absence of metals exceedances in the SB-13-01/4-8 ft sample, the metals exceedances identified on Parcel 13 are confined to near-surface soils.

4.14 Parcel 14

Parcel 14 is currently used as a drive to enter a car wash facility that operates on Parcel 16. Parcel 14 was formerly used for residential property and also potentially used as a junkyard. Seven soil borings (SB-14-01 through SB-14-07) were completed on Parcel 14 for the purpose of evaluating the potential junkyard use. SB-14-01 through SB-14-04 were performed on August 15, 2002, and three near-surface soil samples were collected and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals. Two additional soil samples were collected for analysis of Michigan 10 metals to evaluate metals concentrations below the near-surface soils for comparison to the near-surface metals concentrations. Based on elevated metals concentrations in the near-surface soil samples, SB-14-05 through SB-14-07 were performed on October 31, 2002. No groundwater samples were collected because the investigation for this parcel was focused on near-surface soil conditions.

4.14.1 Geology and Hydrogeology

SB-14-01 through SB-14-07 were advanced with a Geoprobe[®] to depths of ranging from 8 to 12 feet below grade. Geology at Parcel 14 consisted of a gravel surface underlain by sand and silty sand to approximately 8 feet below grade. A sand and gravel layer was encountered at approximately 8 feet below grade, and caused Geoprobe[®] refusal in two borings. A silt/silty clay layer was encountered at approximately 9 feet in the remainder of the soil borings, except in SB-14-01, where the sand and gravel layer extended to 12 feet below grade. Groundwater was

encountered at depths ranging from 7 to 9 feet below grade. The silt/silty clay material encountered in SB-14-02 and SB-14-05 through SB-14-07 was not saturated.

4.14.2 Analytical Results

Three near-surface soil samples were collected from SB-14-01, SB-14-04 and SB-14-05 for analysis of VOCs, SVOCs, and Michigan 10 metals, and two of these samples from SB-14-01 and SB-14-02 were submitted for analysis of PCBs as well. Eight additional soil samples collected from SB-14-01, SB-14-02, SB-14-05, SB-14-04 and SB-14-07 from greater depths were collected and submitted for analysis of Michigan 10 metals. A summary of the analytes detected in the soil samples is included in Table 14-1 **Appendix D**. No groundwater samples were collected from Parcel 14. The following analytical results were found at Parcel 14:

- VOCs – 3 samples
 - Benzene – 1 exceedance of Residential Drinking Water (100 µg/kg).
- PCBs – 2 samples
 - No exceedances.
- SVOCs – 3 samples
 - No exceedances.
- Michigan 10 metals – 11 samples
 - Arsenic
 - 7 exceedances of Residential DC (7,600 µg/kg).
 - 1 exceedance of Residential Drinking Water (23,000 µg/kg).
 - Chromium – 1 exceedance of GSI (18,000 µg/kg) and Residential Drinking Water (30,000 µg/kg).
 - Copper – 2 exceedances of GSI (170,000 µg/kg).
 - Lead – 2 exceedances of Residential DC (400,000 µg/kg) and Residential Drinking Water (700,000 µg/kg).
 - Mercury – 4 exceedances of GSI (130 µg/kg).
 - Selenium – 1 exceedance of GSI (410 µg/kg).
 - Zinc – 2 exceedances of GSI (380,000 µg/kg).

All exceedances were detected in soil samples collected from the 0 to 2 foot below grade area, with the exception of arsenic. The single benzene exceedance and multiple metals exceedances

appear confined to the near-surface soils, with the exception of the elevated arsenic levels detected throughout the entire subject property.

4.15 Parcel 15

Parcel 15 is not currently operated. Parcel 15 was formerly operated as a foundry. Three soil borings (SB-15-01 through SB-15-03) were completed on Parcel 15 for the purpose of evaluation foundry activities. Two soil samples were collected from SB-15-02 on August 16, 2002, and analyzed for VOCs, SVOCs, PCBs, Michigan 10 metals, and cyanide. SB-15-03 was performed on October 31, 2002, and two samples from this boring were submitted for analysis of PNAs and Michigan 10 metals. No groundwater samples were collected because the investigation for this parcel was focused on soil conditions.

4.15.1 Geology and Hydrogeology

SB-15-01 through SB-15-03 were advanced with a Geoprobe[®] to depths ranging from 6 to 10 feet below grade. Geology at Parcel 15 consisted of brown fine sand from immediately beneath surface gravel to approximately 8 to 9 feet below grade. The sand layer was underlain by sand and gravel to 10 feet below grade; Geoprobe[®] refusal was encountered in the sand and gravel layer at 10 feet below grade. Groundwater was not encountered in SB-15-01 or SB-15-02 but groundwater was encountered at 9 feet below grade in SB-15-03.

4.15.2 Analytical Results

Two soil samples were collected on August 16, 2002, from Parcel 15 (SB-15-02/2-4 ft and SB-15-02/6-8 ft) for analysis of VOCs, SVOCs, PCBs, and Michigan 10 metals, and cyanide. Based on elevated metals levels, two samples were submitted on October 31, 2002, from SB-15-03 for Michigan 10 metals analysis and PNAs as well. A summary of the analytes detected in the soil samples is included in Table 15-1 of **Appendix D**. No groundwater samples were collected from Parcel 15. The following analytical results were found at Parcel 15:

Soil Samples

- VOCs – 2 samples
 - No exceedances.
- PCBs – 2 samples
 - No exceedances.
- SVOCs/PNAs – 4 samples
 - Benzo(a)pyrene – 1 exceedance of Residential DC (2,000 µg/kg).
 - Fluoranthene – 1 exceedance of GSI (5,500 µg/kg).
 - Phenanthrene – 1 exceedance of GSI (2,300 µg/kg).
- Michigan 10 metals – 4 samples
 - Arsenic – 3 exceedances of Residential DC (7,600 µg/kg).
 - Lead – 1 exceedance of Residential DC (400,000 µg/kg).
 - Mercury – 1 exceedance of GSI (130 µg/kg).
 - Selenium – 1 exceedance of GSI (410 µg/kg).

With the exception of arsenic, all exceedances were detected in the top 4 feet of soil. The elevated and lead concentrations are likely the result of former foundry operations at Parcel 15, but appear to be isolated to the top 4 feet of soil. Arsenic was detected in exceedance of applicable criteria from several areas across the entire subject property, and these exceedances were likely not caused by operations at Parcel 15.

4.16 Parcel 16

Parcel 16 is currently operated as a car wash facility. Parcel 16 was formerly first operated as a foundry and later as a commercial gas station. USTs were removed from the site in 1992. Ten soil borings (SB-16-01 through SB-16-04 and SB-16-06 through SB-16-11) were completed on Parcel 16 for the purpose of evaluating current soil and groundwater conditions resulting from the former operation of the site as a commercial gas station. Eleven soil samples were collected from Parcel 16 for laboratory analysis of a variety of parameters, including VOCs, BTEX & TMBs, SVOCs, PNAs, Michigan 10 metals, and PCBs. Four groundwater samples were collected from Parcel 16, one from a temporary well in SB-16-03, and three from permanent monitor wells installed as part of a previous investigation.



4.16.1 Geology and Hydrogeology

All soil borings (SB-16-01 through SB-16-04, and SB-16-06 through SB-16-11) were advanced with a Geoprobe[®] to depths of ranging from 8 to 15 feet below grade. Geology at Parcel 16 consisted of asphalt covered parking area underlain by a variety of sandy materials (sand, silty sand, and clayey sand) from immediately beneath the asphalt to approximately 9 to 12 feet below grade. A silty clay layer was encountered in six of the ten soil borings at approximately 9 to 12 feet below grade. The remaining four borings did not reach the silty clay layer before Geoprobe[®] refusal prohibited deeper investigation. Perched groundwater was encountered in several, but not all, of the soil borings at approximately 8 to 9 feet below grade. The silty clay material encountered in several borings beneath the perched groundwater was not saturated.

4.16.2 Analytical Results

Eleven soil samples were collected from Parcel 16. Six soil samples from four soil borings (SB-16-01, SB-16-03, SB-16-04 and SB-16-10) were analyzed for VOCs, SVOCs, and Michigan 10 metals and four of these samples from three soil borings (SB-16-03, SB-16-04 and SB-16-10) were also analyzed for PCBs. Three soil samples (SB-16-06, SB-16-08 and SB-16-09) were analyzed for BTEX, TMBs, PNAs, and Michigan 10 metals. Two soil samples from SB-16-11 were submitted for analysis of Michigan 10 metals only. A summary of the analytes detected in the soil samples is included in Table 16-1 of **Appendix D**. One groundwater sample was collected from a temporary well (SB-16-03) and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals as summarized in Table 16-2 of Appendix D. Three groundwater samples were collected from permanent monitor wells (MW-2, MW-7, and MW-8) on Parcel 16, and a summary of the analytes detected in these samples is included in Table 16-3 of **Appendix D**. The following analytical results were found at Parcel 16:

Soil Samples

- BTEX & TMBs – 9 samples
 - Benzene – 1 exceedance of Residential Drinking Water (100 µg/kg).
 - Ethylbenzene – 2 exceedances of GSI (360 µg/kg).
 - 1,2,4-Trimethylbenzene – 2 exceedances of Residential Drinking Water (2,100 µg/kg).

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- 1,3,5-Trimethylbenzene – 1 exceedance of Residential Drinking Water (1,800 µg/kg).
- Xylenes
 - 3 exceedances of GSI (700 µg/kg).
 - 1 exceedance of Residential Drinking Water (5,600 µg/kg).
- All Other VOCs – 6 samples
 - No exceedances.
- PCBs – 4 samples
 - No exceedances.
- PNAs – 9 samples
 - Benzo(a)anthracene – 1 exceedance of Residential DC (20,000 µg/kg).
 - Benzo(b)fluoranthene – 1 exceedance of Residential DC (20,000 µg/kg).
 - Benzo(a)pyrene – 1 exceedance of Residential DC (2,000 µg/kg).
 - Fluoranthene – 1 exceedance of GSI (5,500 µg/kg).
 - Indeno(1,2,3-cd)pyrene – 1 exceedance of Residential DC (20,000 µg/kg).
 - Naphthalene – 2 exceedances of GSI (870 µg/kg).
 - Phenanthrene – 1 exceedance of GSI (2,300 µg/kg) and VSIC (9,300 µg/kg).
- All Other SVOCs – 6 samples
 - No exceedances.
- Michigan 10 metals – 11 samples
 - Arsenic – 7 exceedances of Residential DC (7,600 µg/kg).
 - Chromium – 1 exceedance of GSI (18,000 µg/kg).
 - Lead – 1 exceedance of Residential DC (400,000 µg/kg) and Residential Drinking Water (700,000 µg/kg).
 - Mercury – 4 exceedances of GSI (130 µg/kg).
 - Selenium – 8 exceedances of GSI (410 µg/kg).

Groundwater Samples

- BTEX & TMBs – 4 samples
 - Benzene – 2 exceedances of Residential Drinking Water (5 µg/l).
 - Ethylbenzene – 1 exceedance of GSI (18 µg/l) and Residential Drinking Water (74 µg/l).
 - 1,2,4-Trimethylbenzene – 1 exceedance of Residential Drinking Water (63 µg/l).
 - 1,3,5-Trimethylbenzene – 1 exceedance of Residential Drinking Water (72 µg/l).
 - Xylenes – 1 exceedance of GSI (35 µg/l), Residential Drinking Water (280 µg/l).
- All other VOCs – 2 samples



- N-Propylbenzene – 1 exceedance of Residential Drinking Water (80 µg/l).
- PCBs – 2 samples
 - No exceedances.
- PNAs – 4 samples
 - Naphthalene – 1 exceedance of GSI (13 µg/l).
- All other SVOCs – 2 samples
 - No exceedances.
- Michigan 10 metals – 4 samples
 - Arsenic – 1 exceedance of Residential Drinking Water (50 µg/l).
 - Chromium – 2 exceedances of GSI (11 µg/l).
 - Selenium – 1 exceedance of GSI (5 µg/l).
 - Zinc – 1 exceedance of Residential Drinking Water (240 µg/l) and GSI (380 µg/l).

The exceedances for soil and groundwater samples collected from the area to the north of the building located on Parcel 16 were for Residential Drinking Water and GSI. No Residential Direct Contact exceedances were found in this area with the exception of arsenic in soil, which is present throughout the entire study area on several parcels. Also, no free product was encountered during the investigation. These results indicate that while soil and groundwater in this area do pose a potential threat to surface and sub-surface water resources, the soil and groundwater does not pose an immediate threat to human health.

Elevated levels of metals and PNAs were encountered in two soil borings (SB-16-08 and SB-16-09) located south of the building located on Parcel 16. Elevated metals and PNA levels were also encountered on adjacent Parcel 14 and Parcel 15. These exceedances are likely the result of former foundry operations at Parcel 16, but likely not from the site operation as a commercial gas station.

4.17 Parcel 17

Parcel 17 is currently not operated; the car wash facility occupying Parcel 16 does use Parcel 17 as a parking area. Parcel 17 was formerly operated as a commercial auto parts store. Nine soil borings (SB-17-01 through SB-17-09) were completed on Parcel 17 for the purpose of evaluating current soil and groundwater conditions resulting from the former operation of the site as a

commercial auto parts store, and to evaluate soil and groundwater conditions resulting from the former operation of adjacent Parcel 16 as a commercial gas station. Four soil samples were collected from Parcel 17. Three soil samples were analyzed for VOCs, SVOCs, and Michigan 10 metals and one of these samples was also analyzed for PCBs. One soil sample was analyzed for BTEX, TMBs, PNAs, and Michigan 10 metals. Two groundwater samples were collected a temporary Hydropunch sampling device from Parcel 17, and submitted for analysis of VOCs and SVOCs. In addition, six groundwater samples were collected from permanent monitor wells installed on Parcel 17 as part of a previous investigation.

4.17.1 Geology and Hydrogeology

Soil borings SB-17-01 through SB-17-05, and SB-17-08 and SB-17-09, were advanced with a Geoprobe[®] to depths of ranging from 4 to 12½ feet below grade. Soil borings SB-17-06 and SB-17-07 were advanced using hollow stem augers to a depths of 21.5 and 20 feet below grade, respectively. Geology at Parcel 17 consisted of asphalt covered parking area underlain by clayey sand from immediately beneath the asphalt to approximately 9 to 11 feet below grade. A thin sand and gravel layer was present in several borings from 10 to 11 feet below grade, and this layer was underlain by a silt/silty clay layer to the end of borings at least 21.5 feet below grade. Perched groundwater was encountered in several, but not all, of the soil borings at approximately 9 to 11 feet below grade. The silt/silty clay material encountered in several borings beneath the perched groundwater was not saturated until approximately 18 feet below grade. The silt encountered in SB-17-07 from 11 to 18 feet below grade may be permeable enough to permit limited communication between the shallow and deeper groundwater units.

4.17.2 Analytical Results

Four soil samples were collected from Parcel 17. Three soil samples (SB-17-06, SB-17-08 and SB-17-09) were analyzed for VOCs, SVOCs, and Michigan 10 metals and one of these samples (SB-17-08) was also analyzed for PCBs. The fourth soil sample (SB-17-04) was analyzed for BTEX, TMBs, PNAs, and Michigan 10 metals. A summary of the analytes detected in the soil samples is included in Table 17-1 of **Appendix D**. Two groundwater samples (SB-17-06 and SB-17-07) were collected from a hydropunch sampler and analyzed for VOCs and SVOCs (and

one for Michigan 10 metals) as summarized in Table 17-2 of **Appendix D**. Six groundwater samples were collected from permanent monitor wells (MW-1, MW-14a, MW-14b, SV-16, SV-17, and SV-19) on Parcel 17, and a summary of the analytes detected in these samples is included in Table 16-3 of **Appendix D**. The following analytical results were found at Parcel 17:

Soil Samples

- BTEX & TMBs – 4 samples
 - Benzene – 1 exceedance of Residential Drinking Water (100 µg/kg).
- All Other VOCs – 3 samples
 - No exceedances.
- PCBs – 1 sample
 - No exceedances.
- PNAs – 4 samples
 - Naphthalene – 1 exceedance of GSI (870 µg/kg).
- All Other SVOCs – 3 samples
 - No exceedances.
- Michigan 10 metals – 4 samples
 - Arsenic
 - 2 exceedances of Residential DC (7,600 µg/kg).
 - 1 exceedance of Residential Drinking Water (23,000 µg/kg).
 - Cadmium – 1 exceedance of Residential Drinking Water (6,000 µg/kg) and GSI (7,400 µg/kg).
 - Chromium – 1 exceedance of Residential Drinking Water (30,000 µg/kg) and GSI (18,000 µg/kg).
 - Copper – 1 exceedance of GSI (170,000 µg/kg).
 - Lead – 1 exceedance of Residential DC (400,000 µg/kg) and Residential Drinking Water (700,000 µg/kg).
 - Mercury – 2 exceedances of GSI (130 µg/kg).
 - Selenium – 2 exceedances of GSI (410 µg/kg).

Groundwater Samples

- BTEX & TMBs – 8 samples
 - Benzene
 - 6 exceedances of Residential Drinking Water (5 µg/l).

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- 1 exceedance of GSI (200 µg/l).
- Ethylbenzene – 4 exceedances of GSI (18 µg/l) and Residential Drinking Water (74 µg/l).
- Toluene – 1 exceedance of GSI (140 µg/l).
- 1,2,4-Trimethylbenzene – 4 exceedances of Residential Drinking Water (63 µg/l).
- Xylenes
 - 5 exceedances of GSI (35 µg/l).
 - 2 exceedances of Residential Drinking Water (280 µg/l).
- All other VOCs – 5 samples
 - No exceedances.
- PCBs – 3 samples
 - No exceedances.
- PNAs – 8 samples
 - Fluoranthene – 1 exceedances of GSI (1.6 µg/l).
 - Naphthalene – 4 exceedances of GSI (13 µg/l).
 - Phenanthrene – 1 exceedance of GSI (5 µg/l).
- All other SVOCs – 5 samples
 - Bis(2-ethylhexyl)phthalate
 - 5 exceedances of Residential Drinking Water (6 µg/l)
 - 2 exceedances of GSI (32 µg/l).
 - 2,6-Dimethylphenol – 1 exceedance of Residential Drinking Water (4.4 µg/l).
- Michigan 10 metals – 7 samples
 - Chromium – 2 exceedances of GSI (11 µg/l).
 - Silver – 1 exceedance of GSI (0.2 µg/l).
 - Zinc
 - 3 exceedances of Residential Drinking Water (240 µg/l).
 - 2 exceedances of GSI (380 µg/l).

Similar to the results obtained for Parcel 16, the exceedances for soil and groundwater samples collected from the area to the north of the building located on Parcel 17 were for Residential Drinking Water and GSI. No Residential Direct Contact exceedances were found in this area with the exception of arsenic in soil, which is present throughout the entire study area on several parcels. No free product was encountered during the investigation. These results indicate that while soil and groundwater in this area do pose a potential threat to surface and sub-surface water resources, the soil and groundwater does not pose an immediate threat to human health.



Elevated levels of metals were encountered in SB-17-08 located south of the building located on Parcel 17. Elevated metals levels were also encountered on adjacent Parcels 14 through 16. These exceedances are likely not the result of the operation of Parcel 16 as a commercial gas station, but are potentially the result of some other activity such as soil backfilling in the area behind the on-site building at Parcel 17.

4.18 Parcel 18

Parcel 18 is currently not operated. Parcel 18 was formerly operated as a commercial auto service facility. Two soil borings (SB-18-01 and SB-18-02) were completed on Parcel 18 for the purpose of evaluating current soil and groundwater conditions resulting from the former operation of the site as a commercial auto service facility, and to evaluate soil and groundwater conditions resulting from the former operation of Parcel 16 as a commercial gas station. Previous investigations of the auto service operations indicated that the site was a RCRA storage facility. One soil sample was collected from Parcel 18 for analysis of BTEX, TMBs, PNAs, and Michigan 10 metals. Five groundwater samples were collected for analysis of BTEX, TMBs, PNAs, and Michigan 10 metals from permanent monitor wells installed as part of a previous investigation.

4.18.1 Geology and Hydrogeology

Soil borings SB-18-01 and SB-18-02 were advanced with a Geoprobe[®] to depths of 11 and 10 feet below grade, respectively. Geology at Parcel 18 consisted of an asphalt covered parking area underlain by a variety of sand or clayey sand from immediately beneath the asphalt to approximately 7 to 9 feet below grade. A sandy clay layer was encountered from approximately 7 to 9 feet below grade to the boring terminus. Perched groundwater was encountered at 6 to 8 feet below grade. The sandy clay layer encountered beneath the sandy materials was not saturated.

4.18.2 Analytical Results

One soil sample (SB-18-01) was collected from Parcel 18 for analysis of BTEX, TMBs, PNAs, and Michigan 10 metals. A summary of the analytes detected in the soil samples is included in

Table 18-1 of **Appendix D**. Five groundwater samples were collected from permanent monitor wells (MW-9 through MW-12 and SV-18) on Parcel 18 for analysis of BTEX, TMBs, PNAs, and Michigan 10 metals, and a summary of the analytes detected in these samples is included in Table 16-3 of **Appendix D**. The following analytical results were found at Parcel 18:

Soil Samples

- BTEX & TMBs – 1 sample
 - No exceedances.
- PNAs – 1 sample
 - No exceedances.
- Michigan 10 metals – 1 sample
 - Arsenic – 1 exceedance of Residential DC (7,600 µg/kg).
 - Selenium – 1 exceedance of GSI (410 µg/kg).

Groundwater Samples

- BTEX & TMBs – 5 samples
 - Benzene – 1 exceedance of Residential Drinking Water (5 µg/l) and GSI (200 µg/l).
 - Ethylbenzene – 1 exceedance of GSI (18 µg/l) and Residential Drinking Water (74 µg/l).
 - Toluene – 1 exceedance of GSI (140 µg/l).
 - 1,2,4-Trimethylbenzene – 2 exceedances of Residential Drinking Water (63 µg/l).
 - Xylenes – 1 exceedance of GSI (35 µg/l) and Residential Drinking Water (280 µg/l).
- PNAs – 5 samples
 - Naphthalene – 1 exceedance of GSI (13 µg/l).
- Michigan 10 metals – 5 samples
 - Barium – 1 exceedance of GSI (1,900 µg/l) and Residential Drinking Water (2,000 µg/l).
 - Selenium – 1 exceedance of GSI (5 µg/l).

The exceedances for soil and groundwater samples collected on Parcel 18 were for Residential Drinking Water and GSI. No Residential Direct Contact exceedances were found in this area with the exception of arsenic in soil, which is present throughout the entire study area on several parcels. No free product was encountered during the investigation. These results indicate that

while soil and groundwater in this area do pose a potential threat to surface and sub-surface water resources, the soil and groundwater does not pose an immediate threat to human health.

BTEX and TMB exceedances on Parcel 18 were recorded for groundwater samples collected from MW-9 and MW-11. These monitor wells are located at the west end of Parcel 18. BTEX and TMBs were not detected in groundwater samples collected from MW-10 and MW-12, located near the east end of Parcel 18. These results indicate that the plume of dissolved phase impact resulting from historical operation of Parcel 16 as a commercial gas station ends near the center of Parcel 18.

4.19 Parcel 19

Parcel 19 is not currently operated. Parcel 19 was most recently operated as an analytical laboratory and prior to that as the Ypsilanti Press. Thirteen soil borings (SB-19-03 through SB-19-15) have been completed on Parcel 19 for the purpose of evaluating potential environmental impacts resulting from the operation of Parcel 19 as an analytical laboratory and newspaper printing operation. SB-19-03 through SB-19-09 were completed on August 12, 2002, and SB-19-10 was completed on August 25, 2002. Due to elevated trichloroethene levels in some sample results from the August 12 sampling event, SB-19-10 through SB-19-15 were completed on October 28, 2002. In total, twelve soil samples and three groundwater samples were collected from Parcel 19 and analyzed for several parameters, including VOCs, SVOCs, PCBs, Michigan 10 metals, and cyanide.

4.19.1 Geology and Hydrogeology

SB-19-10 was advanced using hollow stem augers to a depth of 22 feet below grade. All other soil borings for Parcel 19 were completed with a Geoprobe[®] to depths ranging from 8 to 14 feet below grade. The geology at Parcel 19 generally consisted of an asphalt surface underlain by approximately 4 to 6 feet of fill materials consisting of mainly sand and clayey sand. The fill material was underlain by a silty sand layer to approximately 9 feet below grade, followed in several borings by a sand and gravel layer that extends from 9 feet to approximately 10 to 12 feet below grade. A silt layer was encountered beneath the silty sand and sand and gravel layers.

The silt layer was encountered as shallow as 9 feet below grade or as deep as 13 feet below grade. The silt layer extended to the end of SB-19-10 at 22 feet below grade. Groundwater was not encountered in most of the soil borings on Parcel 19. Perched groundwater was encountered atop the silt layer in three or 13 soil borings at approximately seven feet below grade. The silt material was not saturated until a depth of 20 feet below grade in SB-19-10.

4.19.2 Analytical Results

Twelve soil samples were collected from Parcel 19. Five soil samples from four soil borings (SB-19-03, SB-19-05, SB-19-06 and SB-19-07) were analyzed for VOCs, SVOCs, and Michigan 10 metals and one of these samples (SB-19-06) was also analyzed for PCBs and cyanide. Five soil samples were analyzed for VOCs and Michigan 10 metals, and two soil samples (SB-19-08 and SB-19-09) were analyzed for VOCs only. A summary of the analytes detected in the soil samples is included in Table 19-1 of **Appendix D**. Two groundwater samples were collected from temporary wells (SB-19-07 and SB-19-09) and analyzed for VOCs, SVOCs, and Michigan 10 metals. One groundwater sample (SB-19-10) was collected using a hydropunch sampler and submitted for analysis of VOCs. The analytes detected in groundwater samples are summarized in Table 19-2 of **Appendix D**. The following analytical results were found at Parcel 19:

Soil Samples

- VOCs – 12 samples
 - Trichloroethene
 - 5 exceedances of Residential Drinking Water (100 µg/kg).
 - 3 exceedances of GSI (4,000 µg/kg).
- PCBs – 1 sample
 - No exceedances.
- SVOCs – 5 samples
 - Acenaphthylene – 1 exceedance of GSI (5,900 µg/kg).
 - Benzo(a)anthracene – 1 exceedance of Residential DC (20,000 µg/kg).
 - Benzo(b)fluoranthene – 1 exceedance of Residential DC (20,000 µg/kg).
 - Benzo(a)pyrene – 1 exceedance of Residential DC (2,000 µg/kg).
 - Dibenzo(a,h)anthracene – 1 exceedance of Residential DC (2,000 µg/kg).
 - Fluoranthene – 1 exceedance of GSI (5,500 µg/kg).
 - Fluorene – 1 exceedance of GSI (5,300 µg/kg).

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- Naphthalene – 1 exceedance of GSI (870 µg/kg).
- Phenanthrene – 1 exceedance of GSI (2,300 µg/kg), VSIC (9,300 µg/kg), and Residential Drinking Water (56,000 µg/kg).
- Carbazole – 1 exceedance of GSI (1,100 µg/kg).
- Dibenzofuran – 1 exceedance of GSI (1,700 µg/kg).

- Michigan 10 metals – 10 samples
 - Arsenic – 6 exceedances of Residential DC (7,600 µg/kg).
 - Chromium – 1 exceedance of Residential Drinking Water (30,000 µg/kg) and GSI (18,000 µg/kg).
 - Copper – 2 exceedances of GSI (170,000 µg/kg).
 - Lead – 1 exceedance of Residential DC (400,000 µg/kg).
 - Mercury – 1 exceedance of GSI (130 µg/kg).
 - Selenium – 3 exceedances of GSI (410 µg/kg).

- Cyanide – 1 sample
 - No exceedances.

Groundwater Samples

- VOCs – 3 samples
 - No exceedances.

- SVOCs – 2 samples
 - Benzo(a)anthracene – 1 exceedance of Residential Drinking Water (2.1 µg/l) and Groundwater Contact (9.4 µg/l).
 - Benzo(b)fluoranthene – 2 exceedances of Residential Drinking Water (2 µg/l) and Groundwater Contact (2 µg/l).
 - Benzo(k)fluoranthene – 1 exceedance of Residential Drinking Water (5 µg/l) and Groundwater Contact (5 µg/l).
 - Benzo(g,h,i)perylene – 1 exceedance of Residential Drinking Water (5 µg/l) and Groundwater Contact (5 µg/l).
 - Benzo(a)pyrene – 1 exceedance of Residential Drinking Water (5 µg/l) and Groundwater Contact (5 µg/l).
 - Chrysene – 1 exceedance of Residential Drinking Water (5 µg/l) and Groundwater Contact (5 µg/l).
 - Fluoranthene – 2 exceedances of GSI (1.6 µg/l).
 - Indeno(1,2,3-cd)pyrene – 1 exceedance of Residential Drinking Water (5 µg/l) and Groundwater Contact (5 µg/l).
 - Phenanthrene – 1 exceedance of GSI (5 µg/l) and Residential Drinking Water (52 µg/l).
 - Pyrene – 1 exceedance of Residential Drinking Water (140 µg/l), Groundwater Volatilization to Indoor Air (140 µg/l), and Groundwater Contact (140 µg/l).



- Michigan 10 metals – 1 sample
 - No exceedances.

The five trichloroethene results in soil samples collected at Parcel 19 exceeded Residential Drinking Water and/or GSI. These results indicate that while trichloroethene in soil in this area does pose a potential threat to surface and sub-surface water resources, the trichloroethene in soil does not pose an immediate threat to human health.

The analytical results indicate exceedances for five metals: arsenic, chromium, lead, mercury, and selenium. Arsenic, mercury, and selenium have been detected in exceedance of applicable criteria from several parcels across the subject property, and these exceedances were likely not caused by operations at Parcel 19. The elevated levels of chromium and lead encountered in three soil borings (SB-19-06, SB-19-07, and SB-19-15) located on Parcel 19 are potentially the result of some other activity at Parcel 19. The source of the elevated PNA levels encountered in SB-19-07 in both soil and groundwater is not known; a potential source is soil backfilling. The groundwater sample collected from SB-19-07 was not purged due to the minimal amount of available groundwater. Therefore, the groundwater sample was characterized by high silt content, and the PNA detections from the groundwater sample from SB-19-07 are likely false detections associated with the silt in the sample, and not actual dissolved PNA concentrations.

4.20 Parcel 20

Parcel 20 is not currently operated. Parcel 20 was formerly a residential property. One soil boring (SB-20-02) was completed on Parcel 20 on July 29, 2002, for the purpose of determining if operations from surrounding parcels have impacted Parcel 20. One soil sample was collected from Parcel 20 and analyzed for VOCs, SVOCs, PCBs, Michigan 10 metals, and cyanide. No groundwater samples were collected because the investigation for this parcel was focused on near-surface soil conditions.

4.20.1 Geology and Hydrogeology

SB-20-02 was advanced with a Geoprobe[®] to a depth of 10 feet below grade. Geology at Parcel 20 consisted of an asphalt-covered surface underlain by sand and clayey sand from grade to

approximately 7½ feet below grade, followed by silty clay encountered at 7½ feet below grade extending to the end of boring at 10 feet below grade. One-half foot of groundwater was encountered from 7 to 7½ feet to 12 feet below grade. The silty clay layer was not saturated.

4.20.2 Analytical Results

One soil sample (SB-20-02) was collected from Parcel 20 and submitted for analysis of VOCs, SVOCs, PCBs, Michigan 10 metals, and cyanide. A summary of the analytes detected in the soil sample is included in Table 20-1 of **Appendix D**. No groundwater samples were collected from Parcel 20 because the investigation for this parcel was focused on near-surface soils. The following analytical results were found at Parcel 20:

Soil Samples

- VOCs – 1 sample
 - No exceedances.
- PCBs – 1 sample
 - No exceedances.
- SVOCs – 1 sample
 - Benzo(a)pyrene – 1 exceedance of Residential DC (2,000 µg/kg).
 - Fluoranthene – 1 exceedance of GSI (5,500 µg/kg).
 - Phenanthrene – 1 exceedance of GSI (2,300 µg/kg) and VSIC (9,300 µg/kg).
- Michigan 10 metals – 1 sample
 - Selenium (800 µg/kg) above GSI (410 µg/kg).
- Cyanide – 1 sample
 - No exceedances.

Selenium has been detected in exceedance of applicable criteria from several areas across the entire subject property, and this exceedance was likely not caused by operations at Parcel 20. A source is not known for the SVOC compounds in exceedance of criteria; a potential source is non-native soil backfill material.

4.21 Parcel 21

Parcel 21 is currently used for storage of snow removal chemicals. Parcel 21 was formerly operated as a aluminum foundry and junkyard. Seven soil borings (SB-21-06 through SB-21-12) were completed on Parcel 21 on July 29, 2002, for the purpose of evaluating the former site uses. Seven near-surface soil samples were collected from Parcel 21 and analyzed for VOCs, SVOCs, PCBs, Michigan 10 metals, aluminum, and cyanide. In addition, six soil samples were collected from approximately 6 to 8 feet below grade for analysis of Michigan 10 metals and aluminum for comparison to the near-surface metals concentrations. Two groundwater samples were collected and analyzed for VOCs, SVOCs, Michigan 10 metals, and aluminum. One groundwater sample was also submitted for analysis of PCBs and cyanide.

4.21.1 Geology and Hydrogeology

SB-21-06 through SB-21-12 were advanced with a Geoprobe[®] to depths ranging from 12 to 15 feet below grade, with the exception of SB-21-12 which encountered refusal at 6 feet. Geology at Parcel 21 consisted of sand and silty sand to approximately 8 to 10 feet below grade, underlain by a sand and gravel layer extending to approximately 10 to 12 feet below grade. A silty clay layer was encountered underneath the sand and gravel layer at approximately 10 to 12 feet below grade and extended to the end of the soil borings that encountered the silty clay layer. Groundwater was encountered at depths ranging from 6 to 10 feet below grade perched upon the silty clay layer.

4.21.2 Analytical Results

Thirteen soil samples were collected from Parcel 21. Seven near-surface soil samples (SB-21-06 through SB-21-12) were collected from Parcel 21 and analyzed for VOCs, SVOCs, PCBs, Michigan 10 metals, aluminum, and cyanide. In addition, six soil samples (SB-21-06, SB-21-07, SB-21-08, SB-21-09, SB-21-10 and SB-21-11) were collected from approximately 6 to 8 feet below grade for analysis of Michigan 10 metals and aluminum for comparison to the near-surface metals concentrations. A summary of the analytes detected in the soil samples is included in Table 21-1 of **Appendix D**. Two groundwater samples were collected from temporary wells (SB-21-06 and SB-21-09) and analyzed for VOCs, SVOCs, and Michigan 10

metals, and aluminum. The groundwater sample from SB-21-09 was also submitted for analysis of PCBs and cyanide. The analytes detected in groundwater samples are summarized in Table 21-2 of **Appendix D**. The following analytical results were found at Parcel 21:

Soil Samples

- VOCs – 7 samples
 - No exceedances.
- PCBs – 7 samples
 - No exceedances.
- SVOCs – 7 samples
 - Acenaphthene – 1 exceedance of GSI (4,400 µg/kg).
 - Benzo(a)anthracene – 1 exceedance of Residential DC (20,000 µg/kg).
 - Benzo(a)pyrene – 1 exceedance of Residential DC (2,000 µg/kg).
 - Fluoranthene – 1 exceedance of GSI (5,500 µg/kg).
 - Fluorene – 1 exceedance of GSI (5,300 µg/kg).
 - Naphthalene – 1 exceedance of GSI (870 µg/kg).
 - Phenanthrene – 1 exceedance of GSI (2,300 µg/kg) and VSIC (9,300 µg/kg).
 - Dibenzofuran – 1 exceedance of GSI (1,700 µg/kg).
- Michigan 10 metals and Aluminum – 13 samples
 - Aluminum – 2 exceedances of Residential Drinking Water (6,900,000 µg/kg).
 - Arsenic – 3 exceedances of Residential DC (7,600 µg/kg).
 - Copper – 4 exceedances of GSI (170,000 µg/kg).
 - Mercury – 1 exceedance of GSI (130 µg/kg).
 - Selenium – 3 exceedances of GSI (410 µg/kg).
 - Zinc – 3 exceedances of GSI (380,000 µg/kg).
- Cyanide – 7 samples
 - No exceedances.

Groundwater Samples

- VOCs, SVOCs – 2 samples
 - No exceedances.
- PCBs, Cyanide – 1 sample
 - No exceedances.
- Michigan 10 metals – 2 samples

- Chromium – 1 exceedance of GSI (11 µg/l).
- Selenium – 1 exceedance of GSI (5 µg/l).

The source of the SVOC exceedances in the SB-21-07/0-2 ft sample is unknown. Six metals exceeded applicable criteria: aluminum, arsenic, copper, mercury, selenium, and zinc. Arsenic, mercury, and selenium have been detected in exceedance of applicable criteria from several parcels across the subject property, and these exceedances were likely not caused by operations at Parcel 21. Exceedances for aluminum, copper, and zinc are potentially the result of the historical operation of Parcel 21 as an aluminum foundry and junkyard.

4.22 Parcel 22

Parcel 22 is currently operated as a commercial facility supplying carpet and carpet-related material. Parcel 22 was formerly operated as an automotive service dealer with a paint spray booth. Two soil borings (SB-22-01 and SB-22-02) were completed on August 2, 2002, for the purpose of evaluating the former site uses. Two soil samples were collected from Parcel 22 and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals. No groundwater samples were collected because the investigation for this parcel was focused on near-surface soil conditions.

4.22.1 Geology and Hydrogeology

SB-22-01 and SB-22-02 were advanced with a Geoprobe[®] to depths of 18 and 16 feet below grade, respectively. Geology at Parcel 22 consisted of medium to coarse sands from grade to approximately 16 feet below grade, which was followed by silty clay layer from 16 feet below grade to the end of boring SB-22-01 at 18 feet below grade. Groundwater was not encountered in either boring performed at Parcel 22.

4.22.2 Analytical Results

Two soil samples (SB-21-01 and SB-21-02) were collected from Parcel 22 and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals. A summary of the analytes detected in the soil samples is included in Table 22-1 of **Appendix D**. No groundwater samples were collected from Parcel 22. The following analytical results were found at Parcel 22:

Soil Samples

- VOCs, PCBs – 2 samples
 - No exceedances.
- SVOCs – 2 samples
 - Benzo(a)pyrene – 1 exceedance of Residential DC (2,000 µg/kg).
 - Fluoranthene – 1 exceedance of GSI (5,500 µg/kg).
 - Phenanthrene – 1 exceedance of GSI (2,300 µg/kg) and VSIC (9,300 µg/kg).
- Michigan 10 metals – 2 samples
 - Arsenic – 2 exceedances of Residential DC (7,600 µg/kg).
 - Mercury – 1 exceedance of GSI (130 µg/kg).
 - Selenium – 2 exceedances of GSI (410 µg/kg).

The source of the SVOC exceedances in the SB-22-02/0-4 ft sample is unknown. Three metals exceeded applicable criteria: arsenic, mercury, and selenium. These metals have been detected in exceedance of applicable criteria from other parcels across the entire subject property, and these exceedances were likely not caused by operations at Parcel 22.

4.23 Parcel 23

Parcel 23 is currently operated as a commercial facility supplying carpet and carpet-related material. Parcel 23 was formerly operated as an automobile sales/service facility. One soil boring (SB-23-01) was completed on August 2, 2002, on Parcel 23 for the purpose of evaluating past and present site activities. One soil sample was collected from Parcel 23 and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals. No groundwater samples were collected because the investigation for this parcel was focused on near-surface soil conditions.

4.23.1 Geology and Hydrogeology

SB-23-01 was advanced with a Geoprobe[®] to a depth of 19 feet below grade. Geology at Parcel 23 consisted of medium to coarse sands from grade to approximately 18½ feet below grade, which was followed by silty clay layer from 18 ½ feet below grade to the end of boring at 19 feet below grade. Groundwater was encountered at 18 feet below grade.

4.23.2 Analytical Results

One soil sample was collected from Parcel 23 (SB-23-01/0-4 ft bg) and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals. A summary of the analytes detected in the soil samples is included in Table 23-1 of **Appendix D**. No groundwater samples were collected from Parcel 23. The following analytical results were found at Parcel 23:

Soil Samples

- VOCs, SVOCs, PCBs – 1 sample
 - No exceedances.
- Michigan 10 metals – 1 sample
 - Arsenic – 2 exceedances of Residential DC (7,600 µg/kg).
 - Selenium – 2 exceedances of GSI (410 µg/kg).

Arsenic and selenium have been detected in exceedance of applicable criteria from several areas across the entire subject property, and these exceedances were likely not caused by operations at Parcel 23.

4.24 Parcel 24

Parcel 24 is currently operated as a vehicle storage facility for a commercial company supplying carpet cleaning services. Parcel 24 was formerly operated as a fuel dispensing/garage operation. One soil boring (SB-24-01) was completed on August 2, 2002, on Parcel 24 for the purpose of evaluating past and present site activities. One soil sample was collected from Parcel 24 and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals. No groundwater samples were collected because the investigation for this parcel was focused on near-surface soil conditions.

4.24.1 Geology and Hydrogeology

SB-24-01 was advanced with a Geoprobe[®] to a depth of 16 feet below grade. Geology at Parcel 24 consisted of a concrete parking surface underlain by medium to coarse sands from grade to approximately 16 feet below grade. The boring was terminated at 16 feet below grade because the loose sand was collapsing into the boring, making deeper investigation impossible. Groundwater was not encountered in SB-24-01 to 16 feet below grade.

4.24.2 Analytical Results

One soil sample was collected from Parcel 24 (SB-24-01/0-4 ft bg) and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals. A summary of the analytes detected in the soil samples is included in Table 23-1 of **Appendix D**. No groundwater samples were collected from Parcel 23. The following analytical results were found at Parcel 24:

Soil Samples

- VOCs, SVOCs, PCBs – 1 sample
 - No exceedances.
- Michigan 10 metals – 1 sample
 - Selenium – 2 exceedances of GSI (410 µg/kg).

Selenium has been detected in exceedance of applicable criteria from several areas across the entire subject property, and these exceedances were likely not caused by operations at Parcel 23.

4.25 Parcel 25

Parcel 25 is currently operated as a commercial facility. Parcel 25 was formerly operated as a dry cleaner. No soil or groundwater investigation occurred on Parcel 25 because the operations conducted on Parcel 25 do to site constraints in the building and in the parking area which overlies a basement area from a former building now demolished and removed. Further investigation may take place upon demolition of the building and filling in of the basement area.

4.26 Parcel 26

Parcel 26 is currently operated as a recycling facility Parcel 26 was formerly operated as a automotive manufacturing facility. Forty soil borings (SB-26-17 through SB-26-47 and SB-26-49 through SB-26-57) and 12 surface soil samples (SS-26-01 through SS-26-12) were completed on Parcel 26 for the purpose of evaluating soil and groundwater conditions resulting from the historical operation of the automotive manufacturing operations and the current recycling operations.

Soil borings SB-26-17 through SB-26-40, except SB-26-28, were performed using a Geoprobe[®] on July 29-31, 2002, and August 8, 2002. SB-26-28 and SB-26-41 were advanced using hollow stem augers on August 23, 2002. Laboratory analysis was performed on soil and groundwater samples collected from these borings for a variety of parameters, including VOCs, SVOCs, PCBs, Michigan 10 metals, and cyanide. The analytical results obtained from these samples indicated elevated levels of PCBs, lead, and arsenic in soil samples from some areas of Parcel 26. To obtain additional information for PCB, lead, and arsenic levels in soil, 12 surface soil samples (SS-26-01 through SS-26-12) were collected for analysis of PCBs, and SB-26-42 through SB-26-57 were performed and soil samples were collected for analysis of PCBs, lead, and arsenic.

4.26.1 Geology and Hydrogeology

All soil borings performed at Parcel 26 were advanced with a Geoprobe[®] except SB-26-28 and SB-26-41. The Geoprobe[®] borings were advanced to depths of ranging from 8 to 16 feet below grade. SB-26-28 and SB-26-41 were advanced using hollow stem augers to depths of 27 and 32 feet below grade, respectively. Geology at Parcel 26 consisted of fill material in the top 4 to 6 feet of soil, consisting mainly of fine-grained sands, but also with occasional silty clay or clayey sand materials. Slag-like fill material and brick and concrete debris was encountered in small isolated areas in the top 4 to 6 feet of material. Silty sand was present underneath the fill material, and extended to approximately 9 to 10 feet below grade, which was followed by sand and gravel that extends to approximately 10 to 12 feet below grade. A silt/silty clay layer is present beneath the sand and gravel, and extended to the bottom of those soil borings in which the silt/silty clay was encountered. Perched groundwater was generally encountered at approximately 8 to 9 feet below grade and extended to the silt/silty clay layer, which was unsaturated.

This description of the geology at Parcel 26 was obtained from soil borings located on the southern half of the parcel, where the majority of soil and groundwater investigation occurred. At the north end of Parcel 26, SB-26-41 did not encounter the silty/silty clay layer until at 20 feet below grade. Saturated conditions were not encountered in SB-26-41.

4.26.2 Analytical Results

Thirty-seven soil samples were collected from Parcel 26 as part of the initial site investigation conducted in July and August 2002. These samples (SB-26-17 through SB-26-39 and SB-26-41) were analyzed for a variety of parameters including VOCs, SVOCs, PCBs, Michigan 10 metals, and cyanide. Select locations were submitted for analysis of BTEX & TMBs and PNAs in lieu of the full VOC and SVOC scans. A summary of the analytes detected in the soil samples collected in July and August 2002 is included in Table 26-1 of **Appendix D**. Twelve groundwater samples (SB-26-17, SB-26-20, SB-26-21, SB-26-25, SB-26-26, SB-26-28, SB-26-32, SB-26-33, SB-26-34, SB-26-36, SB-26-38 and SB-26-39) were collected from Parcel 26 as part of the initial investigation and also analyzed for a variety of parameters including VOCs, SVOCs, PCBs, Michigan 10 metals, and cyanide. A summary of analytes detected in the groundwater samples is included in Table 26-2 of **Appendix D**.

The results of the analyses showed detections for PCBs in near-surface soil samples from three locations on Parcel 26, and elevated metals level and extent, including lead and arsenic, in some near-surface soil samples as well. In response to these analytical results, 12 surface soil samples were collected for analysis of PCBs on September 27, 2002. In addition, multiple soil samples were collected from soil borings SB-26-42 through SB-26-57 on October 14, 2002 for analysis of PCBs, lead, and arsenic, to determine the level of PCBs and metals at different depths at Parcel 26.

For the soil and groundwater sampling conducted at Parcel 26, the following provides a summary of the analytical results above the applicable RBSLs:

Soil Samples

- BTEX & TMBs – 33 samples
 - Ethylbenzene – 1 exceedance of GSI (360 µg/kg).
 - 1,2,4-Trimethylbenzene – 1 exceedance of Residential Drinking Water (2,100 µg/kg).
 - 1,3,5-Trimethylbenzene – 1 exceedance of Residential Drinking Water (1,800 µg/kg).
 - Xylenes – 1 exceedance of GSI (700 µg/kg).

- All other VOCs – 27 samples
 - sec-Butylbenzene – 1 exceedance of Residential Drinking Water (1,600 µg/kg).
 - n-Propylbenzene – 1 exceedance of Residential Drinking Water (1,600 µg/kg).

- PNAs – 33 samples
 - Acenaphthene – 1 exceedance of GSI (4,400 µg/kg).
 - Acenaphthylene – 5 exceedances of GSI (5,900 µg/kg).
 - Anthracene – 2 exceedances of Residential Drinking Water (41,000 µg/kg) and GSI (41,000 µg/kg).
 - Benzo(a)anthracene – 5 exceedances of Residential DC (20,000 µg/kg).
 - Benzo(b)fluoranthene – 5 exceedances of Residential DC (20,000 µg/kg).
 - Benzo(a)pyrene – 13 exceedances of Residential DC (2,000 µg/kg).
 - Dibenzo(a,h)anthracene – 1 exceedance of Residential DC (2,000 µg/kg).
 - Fluoranthene – 11 exceedances of GSI (5,500 µg/kg).
 - Fluorene – 5 exceedances of GSI (5,300 µg/kg).
 - Indeno(1,2,3-cd)pyrene – 2 exceedances of Residential DC (20,000 µg/kg).
 - Naphthalene – 8 exceedances of GSI (870 µg/kg).
 - Phenanthrene
 - 12 exceedances of GSI (2,300 µg/kg).
 - 11 exceedances of VSIC (9,300 µg/kg).
 - 4 exceedances of Residential Drinking Water (56,000 µg/kg).

- All other SVOCs – 26 samples
 - Carbazole –
 - 4 exceedances of GSI (1,100 µg/kg).
 - 2 exceedances of Residential Drinking Water (9,400 µg/kg).
 - Dibenzofuran – 3 exceedances of GSI (1,700 µg/kg).

- PCBs – 60 samples
 - Aroclor 1254 – 9 exceedances of Residential DC (1,200 µg/kg).

- Michigan 10 metals – 37 samples
 - Arsenic (69 samples total)
 - 30 exceedances of Residential DC (7,600 µg/kg).
 - 4 exceedances of Residential Drinking Water (23,000 µg/kg).
 - Barium
 - 2 exceedances of GSI (1,200,000 µg/kg).
 - 2 exceedances of Residential Drinking Water (1,300,000 µg/kg).
 - Cadmium
 - 2 exceedances of GSI (7,400 µg/kg).
 - 3 exceedances of Residential Drinking Water (6,000 µg/kg).
 - Chromium
 - 9 exceedances of GSI (18,000 µg/kg).

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- 6 exceedances of Residential Drinking Water (30,000 µg/kg).
- 2 exceedances of Particulate Soil Inhalation (260,000 µg/kg).
- 1 exceedance of Residential DC (2,500,000 µg/kg).
- Copper
 - 3 exceedances of GSI (170,000 µg/kg).
- Lead (69 samples total)
 - 5 exceedances of Residential DC (400,000 µg/kg).
 - 4 exceedances of Residential Drinking Water (700,000 µg/kg).
- Mercury
 - 13 exceedances of GSI (130 µg/kg).
- Selenium
 - 29 exceedances of GSI (410 µg/kg).
- Zinc
 - 3 exceedances of GSI (380,000 µg/kg).
 - 2 exceedances of Residential Drinking Water (2,400,000 µg/kg).
- Cyanide – 7 samples
 - Cyanide – 2 exceedance of GSI (400 µg/kg).

Groundwater Samples

- VOCs – 12 samples
 - Vinyl chloride – 1 exceedance of Residential Drinking Water (2 µg/l).
- PNAs – 12 samples
 - Fluoranthene – 1 exceedance of GSI (1.6 µg/l).
 - Naphthalene – 1 exceedance of GSI (13 µg/l).
 - Phenanthrene – 1 exceedance of GSI (5 µg/l).
- All other SVOCs – 11 samples
 - Bis(2-ethylhexyl)phthalate – 1 exceedance of Residential Drinking Water (6 µg/l) and GSI (32 µg/l).
- PCBs – 10 samples
 - Aroclor 1254 – 1 exceedance of GSI (0.2 µg/l) and Residential Drinking Water (0.5 µg/l).
- Michigan 10 metals – 11 samples
 - Chromium – 10 exceedances of GSI (11 µg/l).
 - Silver – 1 exceedance of GSI (0.2 µg/l).
- Cyanide – 9 samples
 - 3 exceedances of GSI (20 µg/l).



- 1 exceedance of Residential Drinking Water (200 µg/l).

Although isolated soil exceedances for benzene compounds, PNAs, and metals were measured in soil samples collected from greater than 5 feet below grade, the exceedances from results obtained from soil samples collected on Parcel 26 are mainly associated with the fill material present in the top 4 to 6 feet of soil. All PCBs detected in soil samples from Parcel 26 were collected from the top 4 feet of soil; no PCBs were detected in samples collected from greater than 4 feet. The source of the PCBs is unknown. The highest concentrations for metals and PNAs were also associated with the top 4 feet of soil.

4.27 Parcel 27

Parcel 27 was formerly operated as a railroad siding adjacent to a fuel unloading facility located on Parcel 5. Six soil borings (SB-27-02 through SB-27-07) were completed on Parcel 27 for the purpose of evaluating soil and groundwater conditions resulting from the historical operation of the fuel unloading facility. Four soil samples were collected and analyzed for BTEX, TMBs, PNAs, and Michigan 10 metals. One of these soil samples was also collected for a VOC and SVOC scan, and another of these soil samples was submitted for analysis of PCBs. Four groundwater samples were collected from Parcel 27 and analyzed for BTEX, TMBs, PNAs, and Michigan 10 metals. One of these groundwater samples was also submitted for analysis of PCBs.

4.27.1 Geology and Hydrogeology

Soil borings SB-27-02 through SB-27-06 were advanced with a Geoprobe[®] to depths of ranging from 11 to 12 feet below grade. SB-27-07 was advanced using hollow stem augers to a depth of 36½ feet below grade. Geology at Parcel 27 consisted of fine-grained sand and silty/clayey sands from grade to approximately 8 feet below grade, which was followed by a sand and gravel layer that extends to approximately 10 to 12 feet below grade. A silt/silty clay layer is present beneath the sand and gravel layer, and this layer extended to the bottom of soil boring SB-27-07 at 36.5 feet below grade. Perched groundwater was encountered at approximately 8 feet below grade. The silt/silty clay layer was unsaturated.

4.27.2 Analytical Results

Four soil samples were collected from Parcel 27 (SB-27-02/0-4 ft, SB-27-03/2-4 ft, SB-27-06/2-4 ft, and SB-27-07/11-12 ft) and analyzed for BTEX, TMBs, PNAs, and Michigan 10 metals. SB-27-07/11-12 ft was also collected for a VOC and SVOC scan, and SB-27-02/0-4 ft was submitted for analysis of PCBs. A summary of the analytes detected in the soil samples is included in **Appendix D** in Table 27-1. Four groundwater samples were collected from Parcel 27 (SB-27-02, SB-27-03, SB-27-05, and SB-27-06) and analyzed for BTEX, TMBs, PNAs, and Michigan 10 metals. SB-27-02 was also submitted for analysis of PCBs. A summary of analytes detected in the groundwater samples is included in Table 27-2 of **Appendix D**. The following analytical results were found at Parcel 27:

Soil Samples

- BTEX & TMBs – 4 samples
 - No exceedances.
- All other VOCs – 1 sample
 - No exceedances.
- PNAs – 4 samples
 - Benzo(a)pyrene – 2 exceedances of Residential DC (2,000 µg/kg).
 - Fluoranthene – 2 exceedance of GSI (5,500 µg/kg).
 - Fluorene – 1 exceedance of GSI (5,300 µg/kg).
 - Naphthalene – 2 exceedance of GSI (870 µg/kg).
 - Phenanthrene
 - 3 exceedances of GSI (2,300 µg/kg).
 - 1 exceedance of VSIC (9,300 µg/kg).
- All other SVOCs – 1 sample
 - No exceedances.
- PCBs – 1 sample
 - No exceedances.
- Michigan 10 metals – 4 samples
 - Arsenic – 1 exceedance of Residential DC (7,600 µg/kg).
 - Mercury – 2 exceedances of GSI (130 µg/kg).
 - Selenium – 1 exceedance of GSI (410 µg/kg).

Groundwater Samples

- BTEX & TMBs – 4 samples
 - No exceedances.
- PNAs – 4 samples
 - No exceedances.
- Michigan 10 metals – 4 samples
 - Chromium – 2 exceedances of GSI (11 µg/l).
- PCBs – 1 sample
 - No exceedances.

Five PNA compounds were detected in exceedance of applicable criteria. These exceedances may have resulted from historical operations on Parcel 5 as a bulk fuel unloading facility. Three metals were detected in exceedance of applicable criteria in soil samples collected from Parcel 27: arsenic, mercury, and selenium. These metals have been detected in exceedance of applicable criteria from several parcels within the subject property, and these exceedances were likely not caused by operations at Parcel 27. The source of the chromium exceedances of the GSI criterion is unknown; however, these chromium in groundwater do not pose a threat to human health.

4.28 Parcel 28

Parcel 28 is currently and in the past been operated as a metal painting/fabricating facility (Ypsilanti Iron & Metal). Seventeen soil borings (SB-28-01 through SB-28-17) and three test pits (TP-28-01 through TP-28-03) were completed on Parcel 28 for the purpose of evaluating soil and groundwater conditions resulting from site operations. Soil borings SB-28-01 through SB-28-09 were completed on July 31, August 2, and August 5, 2002, and laboratory analysis was performed for several parameters, including VOCs, SVOCs, Michigan 10 metals, PCBs, and cyanide. Based on the elevated metals concentrations in samples collected from SB-28-01 through SB-28-09, soil borings SB-28-10 through SB-28-17 were completed on October 28, 2002, and samples were collected from these borings for analysis of Michigan 10 metals.

4.28.1 Geology and Hydrogeology

Soil borings SB-28-01 through SB-28-09 were advanced with a Geoprobe[®] to depths of ranging from 8 to 20 feet below grade. Geology for the northern portion of Parcel 28 consisted of sand and gravel materials. The top four feet of soil was typically characterized by fill material, occasionally consisting of slag-like material or containing trace brick or concrete debris in the top four feet of soil. The silt/silty clay material was reached at varying depths on Parcel 28, as shallow as 9 feet below grade (SB-28-07) and as deep as 17 feet below grade (SB-28-09). In areas with the silt/silty clay layer, groundwater was encountered at approximately 9 feet below grade. Groundwater was encountered at approximately 14 feet below grade in areas characterized by a deeper silt/silty clay layer. The silt/silty clay layer was unsaturated.

Geology for the southern portion of Parcel 28 was characterized by fill sand material with trace gravels. Glass debris was encountered in the soil borings performed on the southern portion of Parcel 28 (SB-28-08, SB-28-16, SB-28-17). Parcel 39, located adjacent to the southern portion of Parcel 28 on the east, was historically used as a landfill, and the southern portion of Parcel 28 is characterized by similar fill material and underlying geology as Parcel 39. Groundwater in this area was encountered at 12 to 14 feet below grade, and native silty clay was encountered in SB-28-08 at 19 feet below grade.

4.28.2 Analytical Results

Soil samples were collected at Parcel 28 for analysis of VOCs, SVOCs, PCBs, Michigan 10 metals, and cyanide. A summary of the analytes detected in the soil samples is included in Table 28-1 of **Appendix D**. Groundwater samples were collected from Parcel 28 and analyzed for VOCs, SVOCs, PCBs, Michigan 10 metals, and cyanide. A summary of analytes detected in the groundwater samples is included in Table 28-2 of **Appendix D**. The following analytical results were found at Parcel 28:

Soil Samples

- VOCs – 10 samples
 - Trichloroethene – 1 exceedance of Residential Drinking Water (100 µg/kg).
 - Xylenes – 1 exceedance of GSI (700 µg/kg).

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- SVOCs – 10 samples
 - Benzo(a)pyrene – 1 exceedance of Residential DC (2,000 µg/kg).
 - Fluoranthene – 1 exceedance of GSI (5,500 µg/kg).
 - Phenanthrene – 1 exceedance of GSI (2,300 µg/kg) and VSIC (9,300 µg/kg).
- PCBs – 5 samples
 - Aroclor 1254 – 1 exceedance of Residential DC (1,200 µg/kg).
- Michigan 10 metals – 32 samples
 - Arsenic
 - 22 exceedances of Residential DC (7,600 µg/kg).
 - 1 exceedance of Residential Drinking Water (23,000 µg/kg).
 - Barium
 - 3 exceedances of GSI (1,200,000 µg/kg).
 - 2 exceedances of Residential Drinking Water (1,300,000 µg/kg).
 - Cadmium
 - 7 exceedances of GSI (7,400 µg/kg).
 - 7 exceedances of Residential Drinking Water (6,000 µg/kg).
 - Chromium
 - 11 exceedances of GSI (18,000 µg/kg).
 - 8 exceedances of Residential Drinking Water (30,000 µg/kg).
 - Copper
 - 10 exceedances of GSI (170,000 µg/kg).
 - 1 exceedance of Residential Drinking Water (5,800,000 µg/kg).
 - Lead
 - 6 exceedances of Residential DC (400,000 µg/kg).
 - 6 exceedances of Residential Drinking Water (700,000 µg/kg).
 - Mercury
 - 11 exceedances of GSI (130 µg/kg).
 - 3 exceedances of Residential Drinking Water (1,700 µg/kg).
 - Selenium
 - 20 exceedances of GSI (410 µg/kg).
 - Silver
 - 2 exceedances of GSI (1,000 µg/kg).
 - Zinc
 - 9 exceedances of GSI (380,000 µg/kg).
 - 5 exceedances of Residential Drinking Water (2,400,000 µg/kg).
- Cyanide – 2 samples
 - Cyanide – 1 exceedance of GSI (400 µg/kg) and Residential Drinking Water (4,000 µg/kg).

Groundwater Samples

- VOCs – 2 samples
 - No exceedances.
- SVOCs – 2 samples
 - No exceedances.
- PCBs – 1 sample
 - No exceedances.
- Michigan 10 metals – 4 samples
 - Chromium
 - 1 exceedance of GSI (11 µg/l).
- Cyanide – 1 sample
 - No exceedances.

The analytical results indicate that VOCs, SVOCs, PCBs, and cyanide impacts are confined to isolated sample locations at Parcel 28. Exceedances of Michigan 10 metals in soil samples collected at Parcel 28 were widespread throughout Parcel 28. The analytical results from soil samples collected at varying depths on October 28, 2002, indicate that the elevated metals concentrations are confined to the near-surface soils. The soil samples collected from depths greater than 4 feet below grade indicate much lower concentrations of the Michigan 10 metals, generally below applicable cleanup criteria. Arsenic is an exception to this general statement, as arsenic levels are frequently above Residential Direct Contact criteria regardless of the sample depth. Residential Direct Contact criteria for lead is concentrated from 0-4 feet below grade in the central portion of the site.

4.29 Parcel 29

Parcel 29 is currently operated as a commercial service business facility housing multiple businesses. Parcel 29 was formerly operated as a saw mill and lumberyard. Ten soil borings (SB-29-01 through SB-29-10) were completed on Parcel 29 on August 14 and 16, 2002, along the former rail spur and inside the on-site building for the purpose of evaluating soil and groundwater conditions resulting from past site operations. Eleven soil samples were collected

and analyzed for various parameters including VOCs, SVOCs, Michigan 10 metals, pesticides and herbicides. One groundwater sample was collected from Parcel 29 and analyzed for VOCs, SVOCs, Michigan 10 metals, pesticides, and herbicides.

4.29.1 Geology and Hydrogeology

Soil borings SB-29-01 through SB-29-10 were advanced with a Geoprobe[®] to depths ranging from 8 to 19 feet below grade. Geology at Parcel 29 mainly consisted of sand and silty sand throughout the exploration depths to a maximum of 19 feet below grade. A silt/silty clay layer was only encountered in SB-29-01 through SB-29-03, located near the northwest corner of Parcel 29. For these three borings, silty clay was encountered at approximately 6 feet below grade. In soil borings SB-29-04 through SB-29-10, no low permeability silt/silty clay layer was encountered. Perched groundwater atop the silty clay layer in SB-29-02 at approximately 5 feet below grade. The silt/silty clay layer was unsaturated. In SB-29-07, which did not encounter a silty clay layer, groundwater was encountered at 17 feet below grade.

4.29.2 Analytical Results

Ten soil samples were collected and analyzed for VOCs, SVOCs, and Michigan 10 metals. Of these soil samples, nine were also submitted for analysis of pesticides and herbicides. An eleventh soil sample was submitted for analysis of Michigan 10 metals. A summary of the analytes detected in the soil samples is included in Table 29-1 of **Appendix D**. One groundwater sample was collected from Parcel 29 and analyzed for VOCs, SVOCs, Michigan 10 metals, pesticides, and herbicides. A summary of analytes detected in the groundwater sample is included in Table 29-2 of **Appendix D**. The following analytical results were found at Parcel 29:

Soil Samples

- VOCs – 10 samples
 - Trichloroethene – 1 exceedance of Residential Drinking Water (100 µg/kg).
 - Xylenes – 2 exceedances of GSI (700 µg/kg).
- SVOCs – 10 samples
 - Acenaphthylene – 1 exceedance of GSI (4,400 µg/kg).

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- Benzo(a)anthracene – 1 exceedance of Residential DC (20,000 µg/kg).
- Benzo(b)fluoranthene – 1 exceedance of Residential DC (20,000 µg/kg).
- Benzo(a)pyrene – 4 exceedances of Residential DC (2,000 µg/kg).
- Fluoranthene – 3 exceedances of GSI (5,500 µg/kg).
- Naphthalene – 1 exceedance of GSI (870 µg/kg).
- Phenanthrene
 - 2 exceedances of GSI (2,300 µg/kg).
 - 1 exceedance of VSIC (9,300 µg/kg).

- Michigan 10 metals – 11 samples
 - Arsenic – 6 exceedances of Residential DC (7,600 µg/kg).
 - Chromium – 1 exceedance of GSI (18,000 µg/kg).
 - Mercury – 4 exceedances of GSI (130 µg/kg).
 - Selenium – 3 exceedances of GSI (410 µg/kg).

- Pesticides/Herbicides – 9 samples
 - No exceedances.

Groundwater Samples

- VOCs, SVOCs, Pesticides/Herbicides – 1 sample
 - No exceedances.

- Michigan 10 metals – 1 sample
 - Lead – 1 exceedance of Residential Drinking Water (4 µg/l).

The source of the trichloroethene, xylene, and PNA compounds detected in exceedance of applicable criteria is unknown. It is likely that these compounds were the result of historical operation of the rail spur on Parcel 29. Four metals were detected in exceedance of applicable criteria in soil samples collected from Parcel 29: arsenic, chromium, mercury, and selenium. Arsenic, mercury, and selenium have been detected above of applicable criteria on several parcels across the entire subject property, and these exceedances were likely not caused by operations at Parcel 29. The source of the chromium exceedance in one soil sample and the lead exceedance in the groundwater sample is unknown; however, these exceedances are not likely to pose a threat to human health.

4.30 Parcel 30

Parcel 30 is currently operated as a commercial building. Parcel 30 may formerly have been operated as a fuel dispensing facility or service station. No soil or groundwater investigation



occurred on Parcel 30 due to access issues. Soil and groundwater investigation may be completed upon demolition of the building.

4.31 Parcel 31

Parcel 31 is currently operated as a storage building. Parcel 31 was potentially operated as a vehicle repair facility with a potential/UST for truck fueling. One soil boring (SB-31-01) was completed on Parcel 31 on August 1, 2002, for the purpose of evaluating past building operations. One soil sample was collected from Parcel 31 and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals. No groundwater samples were collected because the investigation for this parcel was focused on near-surface soil conditions.

4.31.1 Geology and Hydrogeology

SB-31-01 was advanced with a Geoprobe[®] to a depth of 23½ feet below grade. Geology at Parcel 31 consisted of the surface covered with a concrete floor, underlain by sand and silty sand from grade to the end of boring at 23½ feet below grade, with the exception of a silty clay layer from 6 to 8 feet below grade. Groundwater was encountered at 23 feet below grade.

4.31.2 Analytical Results

One soil sample was collected from Parcel 31 (SB-31-01/0-4 ft) and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals. A summary of the analytes detected in the soil samples is included in Table 31-1 of **Appendix D**. No groundwater samples were collected from Parcel 31. The following analytical results were found at Parcel 31:

Soil Samples

- VOCs, SVOCs, PCBs – 1 sample
 - No exceedances.
- Michigan 10 metals – 1 sample
 - Arsenic – 1 exceedance of Residential DC (7,600 µg/kg).
 - Mercury – 1 exceedance of GSI (130 µg/kg).

Arsenic and mercury have been detected in exceedance of applicable criteria from several parcels within across the subject property, and these exceedances were likely not caused by operations at Parcel 31.

4.32 Parcel 32

Parcel 32 is currently a vacant parcel located between commercial buildings. Parcel 32 was formerly operated as a used car lot. Two soil borings (SB-32-01 and SB-32-02) were completed on Parcel 32 on August 1, 2002, for the purpose of evaluating a possible UST location. Two soil samples were collected from Parcel 32 and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals. Due to laboratory results obtained from SB-32-01, four surface soil samples (SS-32-01 through SS-32-04) were collected and analyzed for PCBs. One groundwater sample was collected and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals.

4.32.1 Geology and Hydrogeology

SB-32-01 and SB-32-02 was advanced with a Geoprobe[®] to depths of 23 and 22 feet below grade, respectively. Geology at Parcel 32 consisted of mainly of silty sands from grade to 20 feet below grade, with a thin silty clay layer at approximately 5 feet below grade. A gravel layer was encountered at 20 feet below grade to the end of borings at 22 and 23 feet below grade. Groundwater was encountered at 20 to 22 feet below grade.

4.32.2 Analytical Results

Two soil samples were collected from Parcel 32 (SB-32-01/0-4 ft and SB-32-02/0-2.5 ft) and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals. Four surface soil samples (SS-32-01 through SS-32-04) were collected at 10 foot intervals around SB-32-01 and analyzed for PCBs. A summary of the analytes detected in the soil samples is included in Table 32-1 of **Appendix D**. One groundwater sample (SB-32-01) was collected and analyzed for VOCs, SVOCs, PCBs, and Michigan 10 metals. A summary of the analytes detected in the groundwater sample is included in Table 32-2 of **Appendix D**. The following analytical results were found at Parcel 32:

Soil Samples

- VOCs, SVOCs – 2 samples
 - No exceedances.
- PCBs – 6 samples
 - No exceedances.
- Michigan 10 metals – 2 samples
 - Arsenic – 1 exceedance of Residential DC (7,600 µg/kg).
 - Cadmium – 1 exceedance of GSI (6,000 µg/kg).
 - Chromium – 1 exceedance of GSI (18,000 µg/kg).
 - Mercury – 1 exceedance of GSI (130 µg/kg).
 - Selenium – 2 exceedances of GSI (410 µg/kg).

Groundwater Samples

- VOCs, SVOCs, PCBs – 1 sample
 - No exceedances.
- Michigan 10 metals – 1 sample
 - Lead – 1 exceedance of Residential Drinking Water (4 µg/l).

PCBs were detected in the SB-32-01/0-4 ft soil sample, but below all applicable criteria. In order to make sure that higher concentrations of PCBs were not present in the area surrounding SB-32-01, four surface soil samples were collected from the top 12 inches of soil at 10 foot intervals at locations south, west, north, and east of SB-32-01. PCBs were not detected in any of the four surface soil samples (SS-32-01 through SS-32-04).

Five metals were detected in exceedance of applicable criteria in soil samples collected from Parcel 32: arsenic, cadmium, chromium, mercury, and selenium. Arsenic, mercury, and selenium have been detected in exceedance of applicable criteria or several parcels across the subject property, and these exceedances were likely not caused by operations at Parcel 32. The source of the cadmium and chromium exceedances in the SB-32-02/0-2.5 ft soil sample and the lead exceedance in the SB-32-01 groundwater sample is unknown; however, these exceedances are not likely to pose a threat to human health.

4.39 Parcel 39

Parcel 39 is known as Gilbert Park, and is currently used by the City of Ypsilanti for compost storage. Parcel 39 was formerly used as a baseball facility, and was used as a soil landfill prior to its use as a baseball field. Six soil borings (SB-29-11 through SB-29-16; note misnaming of the parcel number) were completed on Parcel 39 on August 16, 2002, for the purpose of determining the extent of the former landfill boundaries. No soil or groundwater samples were collected from Parcel 39, as previous soil borings were performed for visual observation of the soil conditions only.

4.39.1 Geology and Hydrogeology

SB-29-11 through SB-29-16 were advanced with a Geoprobe[®] to depths ranging from 12 to 16 feet below grade, respectively. Geology at Parcel 39 consisted of fine to medium sands from grade to the maximum depth of the borings at 16 feet below grade. The sand material was loosely packed, and traces of glass, wood, and brick debris were present throughout each of the soil borings performed on Parcel 39. SB-29-11 through SB-29-16 were located along each of the four boundaries of Parcel 39, indicating that the whole of Parcel 39 all the way to the parcel boundaries was backfilled with sand interspersed with trace debris. Groundwater was encountered at 13 feet below grade in SB-29-11 and SB-29-16, located along the west and south parcel boundaries. Groundwater was not encountered in the other four soil borings.

4.39.2 Analytical Results

No soil or groundwater samples were collected from Parcel 39, as the soil borings were performed for visual observation of the soil conditions only.

5.0 SUMMARY OF FINDINGS

Analytical results for soil and groundwater samples collected as part of the Phase II ESA conducted for the Water Street Development project revealed exceedances of applicable RBSLs for volatiles, semi-volatiles, metals, and PCBs. Based on the exceedances of applicable RBSLs, the site meets the definition of an environmental “facility”. The Traverse Group has identified

seven “Areas of Concern” (AOCs), which are portions of the subject property that may require environmental response activities in order to satisfy Due Care obligations based on the planned future uses of the property. The eight AOCs are summarized in this section.

5.1 AOC 1 – Parcels 2, 14, 15, 16, 19 - Elevated PNAs and Metals

Elevated PNAs and metals levels were detected in near-surface soil samples collected from Parcels 2, 14, 15, 16, and 19, located near the northwest corner of the subject property. This area includes Parcel 2, and the portions of Parcels 14, 15, 16, and 19 located south of the buildings located on these parcels. Four soil samples exhibited concentrations of PNAs above GSI criteria, as well as exceedances of Residential Direct Contact criteria for benzo(a)pyrene. In addition, elevated metals concentrations were obtained in several samples. In particular, lead was detected above Residential Direct Contact criteria in 6 soil samples. Each of these exceedances were detected in soil samples collected from the top four feet of soil, with the exception of one exceedance for lead which was from a 4-8 ft bg sample. All other soil samples collected from greater than four feet below grade were below applicable RBSLs for PNAs and lead, indicating that the elevated PNAs and lead levels are primarily associated with near-surface soil.

5.2 AOC 2 – Parcels 16-18 - Elevated BTEX and PNAs

Parcel 16 was formerly operated as a commercial gas station, and 8 USTs along with 200 cubic yards of contaminated soil were removed from the site in 1992. A confirmed release was reported in 1992 and a soil vapor extraction system was installed in 1994. It is unknown what year the treatment system was turned off and removed. In order to verify that the cleanup had met the required cleanup standards, additional soil and groundwater investigation was completed by The Traverse Group. Soil and groundwater sampling conducted at Parcels 16, 17, and 18 showed soil and groundwater BTEX concentrations in exceedance of Drinking Water Protection RBSLs and Groundwater/Surface Water Interface (GSI) RBSLs. PNAs were also detected in exceedance of GSI and Residential Direct Contact RBSLs. No free-phase petroleum product was encountered at Parcels 16, 17, or 18. Perched groundwater was encountered in several, but not all, of the soil borings at approximately 9 to 11 feet below grade atop a silt/silty clay

material. The silt encountered in SB-17-07 from 11 to 18 feet below grade may be permeable enough to permit limited communication between the shallow and deeper groundwater units.

5.3 AOC 3 – Parcel 19 - Elevated TCE

Five exceedances of Drinking Water RBSLs (3 also above GSI) were detected for TCE from 12 soil samples collected at Parcel 19. These results indicate that TCE in soil in this area does pose a potential threat to surface and sub-surface water resources. Soil samples exceeded RBSLs for TCE as deep as 8 feet below grade, and TCE was detected in samples as deep as 10 feet below grade.

5.4 AOC 4 – Parcel 26 - Elevated PCBs and PNAs

Elevated levels of PCBs and PNAs were detected in soil samples collected from Parcel 26. Thirty-three soil samples were collected from Parcel 26, and Residential Direct Contact RBSLs were exceeded for benzo(a)pyrene (13 samples), benzo(a)anthracene (5 samples), benzo(b)fluoranthene (5 samples), dibenzo(a,h)anthracene (1 sample), and indeno(1,2,3-cd)pyrene (2 samples). In addition PCBs were detected in exceedance of the Residential Direct Contact RBSL in nine of 60 samples collected for PCBs, and lead was detected in exceedance of the Residential Direct Contact RBSL for six of 69 samples collected for lead. The exceedances appear to be associated with fill material, primarily in the top four feet of soil at Parcel 26. All exceedances of Direct Contact RBSLs for PNAs, PCBs, and lead, with one exception, were located in samples collected from the top four feet of soil.

5.5 AOC 5 – Parcel 28 - Elevated Metals

Elevated levels of metals were detected in soil samples collected from Parcel 28. Lead was detected in exceedance of Residential Direct Contact RBSLs in 6 of 32 samples collected for analysis of Michigan 10 metals. No other metals exceeded Residential Direct Contact RBSLs. However, several other metals were detected in exceedance of Drinking Water Protection and GSI RBSLs. With the exception of arsenic, these metals exceedances were primarily found only in the top four feet of soil.

5.6 AOC 6 – Parcel 5 and 7 - Elevated PNAs

The analytical results from Parcels 5 and 7 indicate exceedances for several PNA compounds in both soil and groundwater samples. The PNA compounds in exceedance of criteria are potentially the result of the former operation of the adjacent Parcel 5 as a bulk fuel unloading facility. Benzo(a)pyrene was detected in exceedance of Residential Direct Contact RBSLs in four of five soil samples collected from Parcels 5 and 7, and results for these four samples also showed other PNAs in exceedance of Residential Drinking Water or GSI RBSLs. Additional investigation will be completed following demolition of the building on Parcel 5.

5.7 AOC 7 – Entire Subject Property – Elevated Arsenic

Arsenic was detected throughout the subject property in exceedance of the Residential Direct Contact RBSL of 7,600 µg/kg. In all, 198 soil samples were submitted for analysis of arsenic, and 111 exceeded the Residential Direct Contact RBSL. Arsenic was detected in all soil types, and at all depths investigated. It appears that the arsenic exceedances are due to background conditions. Of the 111 samples exceeding the Residential Direct Contact RBSL of 7,600 mg/kg, 42 exceed 11,000 mg/kg, 26 exceed 13,000 mg/kg and 15 exceed 17,000 mg/kg.

TABLES

FIGURES

APPENDIX A

FIELD STANDARD OPERATING PROCEDURES

APPENDIX B
BORING/WELL LOGS

APPENDIX C

LABORATORY ANALYTICAL RESULTS (CD)

APPENDIX D

SUMMARY OF DETECTED ANALYTES